Title: North Central Montana Off-Station Spring Wheat Variety Performance Evaluations

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Kendrick McKeever, Landowner, 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 just over 28 percent of the 2014-2018 statewide cereal production totals (42 percent for winter wheat and 27 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 or minimal tillage during 2019 in four northern Montana counties.

Dryland Spring Wheat Trials:

1. Cederberg Farm, Blaine County S13-T36N-R25E
2. Flansaas/Lumsden Farm, Phillips County S24-T35N-R29E
3. McKeever Farms, Chouteau County S29-T27N-R10E
4. Kammerzell Farm, Liberty County S34-T32N-R05E

All four spring wheat trials consisted of 20 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 approximately 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.

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.

Results:

Spring wheat seed yields at Turner averaged nearly 53 bu/ac (Table 1). 'Vida' was the top yielding entry producing 58.5 bu/ac. 'Dagmar', 'Lanning', 'LCS Pro', and 'NS Presser CLP', 'along the breeding line 'MT 1673' all produced yields statistically equal to that of Vida. Test weight of all spring wheat entries for this site averaged just over 57 lb/bu. Following a severe hailstorm in 2014, there were consecutive years with no sawfly cutting or infestation in the spring wheat trial at Turner, and only minimal cutting in 2017, 2018 and 2019. Plant height, yield, protein, falling number and sawfly cutting data for the 2019 Turner dryland spring wheat trial are summarized in Table 1.

Comparable averages are calculated using a standard 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 the comparable average calculation. Nine-year comparable averages (2010-2019) 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 nearly 54 bu/ac with Vida producing the highest yield at over 65 bu/ac (Table 4). NS Presser CLP, at just over 63 bu/ac, was the only other entry to produce a seed yield statistically equal to that of Vida. For the fifth consecutive year, sawfly cutting was virtually nonexistent in the trial at the Loring site. Plant height, yield, test weight, moisture, protein, falling number and sawfly cutting data for the 2019 Loring dryland spring wheat trial are summarized in Table 4. Nine-year comparable averages for spring wheat seed yield and test weight at Loring are summarized in Table 5, while nine-year comparable averages for sawfly cutting are summarized in Table 6.

In 2013, off-station spring wheat trials were re-established near Loma. Seed yields averaged over 42 bu/ac (Table 7). Dagmar, a 2019 release from Montana State University, was the highest yielding entry at nearly 52 bu/ac. 'Choteau', 'Corbin', 'Duclair', NS Presser CLP, Vida, 'WB Gunnison' and two Montana breeding lines produced yields statistically equal to that of Dagmar. Sawfly damage in the spring wheat small plot scenario was low again this year, averaging less than six percent cutting. Plant height, yield, test weight, protein, falling number and sawfly cutting data for the 2019 Loma dryland spring wheat trial are summarized in Table 7. Seven-year comparable averages for spring wheat seed yield and test weight at Loma are summarized in Table 8, while seven-year comparable averages for sawfly cutting are summarized in Table 9.

Spring wheat seed yields at Chester averaged over 61 bu/ac, while test weights averaged just under 59 lb/bu (Table 10). Vida was the highest yielding entry at just under 70 bu/ac. Seed yields of Dagmar, Duclair and 'Reeder' were statistically equal to that of Vida. Sawfly cutting in the small plot scenario averaged just over 12 percent in 2019, however, there were six lines that were cut and lodged between 22 and 32 percent. Plant height, yield, test weight, protein, falling number and sawfly cutting data for the 2019 Chester dryland spring wheat trial are summarized in Table 10. Six-year comparable averages for spring wheat seed yield and test weight at Chester are summarized in Table 11, while six-year comparable averages for sawfly cutting are summarized in Table 12.

Summary:

Cropping environments for 2019 started out with an abundance of fall rain and very good soil moisture recharge. The spring growing season was cooler and dryer than average with many crops showing drought stress during early June. Heavy rainfall was spotty during the latter part of June and into early July. Precipitation coupled with prolonged cooler temperatures in July allowed for a longer period of grain fill, resulting in better than anticipated crop yields in several areas. Both Turner and Loring received above average rainfall for June and July, resulting in above average spring crop yields. The Turner site was seeded into a mechanical fallow field, as the producer is still dealing with soil drifts from a windstorm in 2017. The Loma and Loring locations were seeded into chemical fallow ground that had been minimally tilled to eliminate potential weed issues. The Chester area started out with excellent recharge soil moisture, and timely spring precipitation resulted in a very good stand, producing a high number of tillers and above average seed yield. The Chester site was seeded into chemical fallow.

This work has been strongly supported by producers near each of the off-station 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-fifth year, and the cooperator 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 has been outstanding through the years with 2019 marking 36 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.

Recognition:

This research would not have been possible without the assistance of the following seasonal employees: Tawnya Brown, Wylee Brown, Eleri Haney, Abbey Morse and Tracey Reed.

TABLE 1. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Max Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2019. (Exp# 19-9951-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/ YIELD Bu/Ac	TEST WT Lbs/Bu	2/ PROTEIN %	3/ FN Seconds	4/ SAWFLY %
ALUM	WSCIA	28.0	52.8	58.2	15.4	361	0.3
BRENNAN	AGRIPR10	25.4	51.6	**59.7**	15.4	441	1.0
CHOTEAU	PI633974	26.5	53.1	56.2	15.5	424	0.3
CORBIN	BZ996434	27.3	52.2	57.2	15.5	446	1.0
DAGMAR	MT 1621	28.8	**56.1**	58.1	15.5	463	0.7
DUCLAIR	PI660981	28.9	53.7	56.1	15.3	405	0.3
EGAN	PI 671855	26.5	49.8	56.1	**16.7**	**467**	0.7
FORTUNA	CI 13596	33.8	46.9	58.0	15.1	447	0.0
LANNING	PI 676978	26.6	**55.8**	56.0	15.6	415	0.7
LCS PRO	LIMAGR143	31.5	**58.0**	56.5	15.3	399	1.0
NS PRESSER CLP	PI 679964	30.3	**57.1**	54.9	15.2	407	0.3
REEDER	ND 695	28.7	50.8	57.0	15.9	417	0.7
SY INGMAR	AGRIPR141	25.2	48.2	**58.9**	15.7	**501**	0.3
SY SOREN	AGRIPR14	27.3	52.1	58.1	15.7	**500**	1.0
VIDA	PI642366	28.6	**58.5**	57.0	14.9	374	0.7
WB GUNNISON	BZ92413R	24.2	47.6	**58.8**	14.3	436	0.3
WB9879CLP	WB9879CLP	27.1	53.8	57.1	15.8	444	0.3
MT 1673	DuclairxMcNeal/Glupro,+,fam 72-17	27.1	**55.2**	54.5	15.8	401	0.7
MT 1716	MT1274/RB07	28.0	51.6	58.0	15.6	393	0.7
MT 1767	12SR225/12F5 827	27.3	49.8	55.4	15.5	402	0.0
EXPERIMENTAL MEANS		27.8	52.7	57.1	15.5	427.2	0.6
LSD (0.05)		2.2	4.3	1.0	0.4	35.9	0.8
C.V.%		4.8	5.0	1.0	1.6	5.1	89.6
P-VALUE (Varieties)		<.0001	<.0001	<.0001	<.0001	<.0001	0.3111

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 adjusted to 14 percent flour moisture.

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 (19-9951-SW)

Seeding Date:	May 3, 2019
Harvest Date:	August 30, 2019
Fertility:	100-20-10-10 side banded
System:	Till
Herbicide:	Bromac-16oz/ac, Affinity-1oz/ac
Insecticide:	none
Previous Crop:	Chemical Fallow - Durum
Precipitation:	2.98" 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 Max Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (Exp# 9951-SW)

			1/ YIELD (Bushels Per Acre)								TEST WEIGHT (Pounds Per Bushel)							
2/ VARIETY or SELECTION		No. of YEARS TESTED 3/	2015	2016	2017	2018	2019	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	**9-YR COMP. AVE. YIELD 5/**	2015	2016	2017	2018	2019	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/	**9-YR COMP. AVE. TEST WT 5/**
PI676978	LANNING (++)	5	43.8	43.5	19.6	39.5	55.8	40.5	152.8	**47.4**	61.7	56.9	59.8	59.3	56.0	58.7	98.3	**58.9**
PI671855	EGAN (+)	5	38.5	49.7	18.9	35.0	49.8	38.4	145.0	**45.0**	60.6	57.6	58.6	58.1	56.1	58.2	97.4	**58.3**
0150042-10	BRENNAN (P+)	5	29.3	40.3	11.5	37.2	51.6	34.0	128.4	**39.9**	63.0	60.2	61.0	61.5	59.7	61.1	102.2	**61.2**
01S0263-28	SY SOREN (P+)	5	36.2	30.4	18.5	32.1	52.1	33.8	127.8	**39.7**	62.3	55.2	60.8	61.5	58.1	59.6	99.7	**59.7**
LIMAGR143	LCS PRO (P+)	3			19.0	39.3	58.0	38.8	127.3	**39.5**			60.5	60.4	56.5	59.1	99.3	**59.5**
PI642366	VIDA (+)	9	43.5	38.3	25.1	39.3	58.5	39.5	127.1	**39.5**	62.2	55.8	59.3	60.4	57.0	59.3	99.1	**59.3**
Win 3504	HRS 3504 (P+)	3		39.7	20.8	35.6		32.0	123.6	**38.4**		55.3	60.6	60.8		58.9	98.8	**59.2**
PI679964	NS PRESSER CLP (P+)	4		27.9	25.4	40.4	57.1	37.7	121.0	**37.6**		52.8	59.2	59.4	54.9	56.6	95.6	**57.2**
WA 8166	ALUM (+)	4		41.4	18.8	37.8	52.8	37.7	120.9	**37.5**		58.7	60.6	60.8	58.2	59.6	100.7	**60.3**
BZ999592	ONEAL (P+)	8	41.1	31.6	19.9	35.7		35.1	120.7	**37.5**	62.7	54.5	60.3	60.3		60.2	100.1	**60.0**
PI660981	DUCLAIR (+)(saw fly tol)	9	39.4	39.9	22.1	28.7	53.7	36.8	118.7	**36.8**	60.6	55.8	58.8	59.3	56.1	58.3	97.4	**58.3**
ND 695	REEDER (+)	9	39.0	40.4	21.2	36.8	50.8	36.5	117.4	**36.5**	62.9	57.4	59.3	60.0	57.0	59.8	99.8	**59.8**
BZ996434	CORBIN (P+)	9	38.3	43.0	16.1	30.2	52.2	35.7	115.1	**35.7**	62.3	57.9	60.8	60.9	57.2	59.9	100.0	**59.9**
IMICHT-79	WB9879CLP (P+)	8	38.7	35.4	19.5	32.6	53.8	36.6	114.8	**35.6**	61.8	57.6	59.6	60.5	57.1	60.0	99.4	**59.5**
AGRIPR141	SY INGMAR (P+)	3			15.8	39.0	48.2	34.3	112.6	**35.0**			61.3	61.9	58.9	60.7	102.0	**61.1**
PI633974	CHOTEAU (+)(saw fly tol)	9	35.3	31.7	17.3	37.0	53.1	34.7	111.9	**34.7**	61.2	56.1	59.7	60.2	56.2	58.7	98.0	**58.7**
BZ902413	WB GUNNISON (P+)(sawfly tol)	8	37.2	35.2	20.3	37.7	47.6	35.3	110.9	**34.4**	62.3	58.3	59.9	60.8	58.8	60.8	100.7	**60.3**
Win 3616	HRS 3616 (P+)	3		33.1	15.4	36.2		28.2	108.9	**33.8**		56.9	58.8	60.8		58.8	98.7	**59.1**
CI13596	FORTUNA (saw fly tol)	9	34.2	33.2	15.7	28.8	46.9	31.1	100.0	**31.1**	62.0	58.3	59.6	60.8	58.0	59.9	100.0	**59.9**
MEANS (For Entries Listed)			38.0	37.3	19.0	35.7	52.6			**37.7**	62.0	56.8	59.9	60.4	57.2			**59.5**
6/ Growing Season Precipitation (in.)			n/a	8.6	2.3	4.0	3.0	7.5										
Soil PAW (in.) to SD @ Planting			6.3	6.1	n/a	n/a	6.3	7.6										
Total Plant Available Water (in.)			n/a	14.7	n/a	n/a	9.3	16.8										
Soil NO3 (lbs.) to SD at Planting			49	85	n/a	n/a	n/a	63										
SD (Sampling Depth in Inches)			48	48	n/a	n/a	19	44										
Fertilizer Applied	(# N)		100	125	100	100	100	94										
	(# P2O5)		20	20	20	20	20	26										
	(# K2O)		10	10	10	10	10	15										
	(# S)		0	10	0	10	10	3										

Check variety is Fortuna.

1/ See MCES Bulletin 1093 or the Plant Sciences & Plant Pathology website at http://plantsciences.montana.edu/crops/index.html 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 Pending.

3/ Only the most recent 5 years are shown, but summary calculations include all years noted. No harvest in 2014 due to hail.

4/ Percent of Fortuna yield or test weight 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 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.

6/ 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 Max Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (Exp# 9951-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ SAWFLY RATING (% of cut and lodged stems) 2010	2011	2012	2013	2014 3/	2015	2016	2017	2018	2019	AVE. for YEARS TESTED	% of CHECK SAWFLY 4/	**9-YR COMP. AVE. SAWFLY 5/**
BZ902413	WB GUNNISON (P+)(sf tol)	8		6.7	2.3	0.3		0.0	0.0	0.3	0.7	0.3	1.3	20.3	**1.4**
AGRIPR141	SY INGMAR (P+)	3								0.0	0.0	0.3	0.1	50.1	**3.4**
BZ996434	CORBIN (P+)	9	10.3	21.7	18.3	2.0		0.0	0.0	0.3	1.0	1.0	6.1	89.6	**6.1**
CI 13596	FORTUNA (saw fly tol)	9	8.3	28.3	20.0	3.7		0.0	0.0	0.0	0.7	0.0	6.8	100.0	**6.8**
Win 3504	HRS 3504 (P+)	3							0.0	0.3	0.3		0.2	100.1	**6.8**
Win 3616	HRS 3616 (P+)	3							0.0	0.0	0.7		0.2	100.1	**6.8**
IMICHT-79	WB9879CLP (P+)	8		40.0	16.7	2.0		0.0	0.0	0.0	0.0	0.3	7.4	112.0	**7.6**
PI660981	DUCLAIR (+)(saw fly tol)	9	13.7	33.3	30.0	4.0		0.0	0.0	0.3	0.3	0.3	9.1	134.4	**9.1**
BZ999592	ONEAL (P+)	8	2.3	40.0	35.0	5.0		0.0	0.0	0.0	0.3		10.3	135.5	**9.2**
PI642366	VIDA (+)	9	18.3	26.7	33.3	3.3		0.0	0.0	0.3	0.0	0.7	9.2	135.5	**9.2**
PI633974	CHOTEAU (+)(saw fly tol)	9	13.3	36.7	28.3	6.7		0.0	0.0	0.0	0.0	0.3	9.5	139.9	**9.5**
ND 695	REEDER (+)	9	16.7	53.3	33.3	5.3		0.0	0.0	2.3	0.7	0.7	12.5	184.2	**12.5**
WA 8166	ALUM (+)	4							0.0	0.3	0.7	0.3	0.3	199.6	**13.5**
0150042-10	BRENNAN (P+)	5						0.0	0.0	0.0	0.7	1.0	0.3	250.6	**17.0**
PI671855	EGAN (+)	5						0.0	0.0	0.7	1.0	0.7	0.5	350.9	**23.8**
PI676978	LANNING (++)	5						0.0	0.0	0.7	1.0	0.7	0.5	350.9	**23.8**
01S0263-28	SY SOREN (P+)	5						0.0	0.0	1.0	0.7	1.0	0.5	401.0	**27.2**
LIMAGR143	LCS PRO (P+)	3								2.3	0.7	1.0	1.3	600.6	**40.7**
PI679964	NS PRESSER CLP (P+)	4							0.0	3.7	0.3	0.3	1.1	648.7	**44.0**
MEANS (For Entries Listed)			11.9	31.9	24.1	3.6		0.0	0.0	0.7	0.5	0.6			**14.6**
6/ Growing Season Precipitation (in.)			10.3	8.3	7.5	n/a	16.4	n/a	8.6	2.3	4.0	3.0	7.5		
Soil PAW (in.) to SD @ Planting			9.0	7.9	8.9	7.8	8.9	6.3	6.1	n/a	n/a	6.3	7.6		
Total Plant Available Water (in.)			19.2	16.2	16.4	n/a	25.2	n/a	14.7	n/a	n/a	9.3	16.8		
Soil NO3 (lbs.) to SD at Planting			162	51	15	11	65	49	85	n/a	n/a	n/a	63		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	48	n/a	n/a	19	44		
Fertilizer Applied	(# N)		70	70	70	100	100	100	125	100	100	100	94		
	(# P_2O_5)		40	40	40	20	20	20	20	20	20	20	26		
	(# K_2O)		25	25	25	10	10	10	10	10	10	10	15		
	(# S)		0	0	0	0	0	0	10	0	10	10	3		

Check variety is Fortuna.

1/ See MCES Bulletin 1093 or the Plant Sciences & Plant Pathology website at http://plantsciences.montana.edu/crops/index.html 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 Pending.

3/ No harvest in 2014 due to hail.

4/ Percent of Fortuna yield or test weight 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 sawfly of a given entry for years tested, y = average sawfly for Fortuna for the same years, and z = 9-Yr average sawfly 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. 2019. (Exp# 19-9955-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/ YIELD Bu/Ac	TEST WT Lbs/Bu	2/ PROTEIN %	3/ FN Seconds	4/ SAWFLY %
ALUM	WSCIA	27.7	56.6	**60.4**	13.7	365	0.0
BRENNAN	AGRIPR10	23.1	44.2	**60.1**	15.2	383	0.0
CHOTEAU	PI633974	25.4	49.2	58.8	14.5	404	0.0
CORBIN	BZ996434	27.2	52.7	59.2	13.8	383	0.0
DAGMAR	MT 1621	28.3	55.4	59.3	13.8	404	0.0
DUCLAIR	PI660981	26.7	53.6	58.2	13.7	380	0.0
EGAN	PI 671855	27.5	44.1	58.1	**16.1**	**427**	0.0
FORTUNA	CI 13596	29.1	47.2	58.9	13.9	402	1.0
LANNING	PI 676978	27.0	56.6	58.7	13.9	374	0.0
LCS PRO	LIMAGR143	28.7	56.2	58.9	13.5	355	0.0
NS PRESSER CLP	PI 679964	26.7	**63.4**	58.4	12.6	372	0.0
REEDER	ND 695	28.7	53.1	59.3	14.0	394	0.0
SY INGMAR	AGRIPR141	28.1	55.1	**60.5**	14.0	393	0.0
SY SOREN	AGRIPR14	26.0	56.0	59.8	14.8	407	0.0
VIDA	PI642366	28.0	**65.8**	59.3	12.6	376	0.0
WB GUNNISON	BZ92413R	26.9	49.0	**60.6**	14.2	**418**	0.0
WB9879CLP	WB9879CLP	24.5	50.8	58.7	14.8	403	0.0
MT 1673	DuclairxMcNeal/Glupro,+,fam 72-17	24.5	50.9	57.3	14.5	385	0.0
MT 1716	MT1274/RB07	26.9	57.7	59.7	13.8	360	0.0
MT 1767	12SR225/12F5 827	27.8	54.1	57.4	14.3	358	0.0
EXPERIMENTAL MEANS		26.9	53.6	59.1	14.1	387.1	0.1
LSD (0.05)		2.2	6.2	0.5	0.5	14.0	-
C.V.%		5.0	7.0	0.6	2.1	2.2	-
P-VALUE (Varieties)		0.0001	<.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 adjusted to 14 percent flour moisture.

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 (19-9955-SW)	
Seeding Date:	May 3, 2019
Harvest Date:	September 4, 2019
Fertility:	100-20-10-10 side banded
System:	Minimum Till
Herbicide:	Wild Card- 20oz/ac, Axial- 16.4 oz/ac
Insecticide:	none
Previous Crop:	Chemical Fallow- Spring Wheat
Precipitation:	8.78" seeding to harvest maturity

TABLE 5. Nine-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. 2010-2019. (Exp# 9955-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre) 2015	2016	2017 4/	2018	2019	AVE. for YEARS TESTED 3/	% of CHECK YIELD 5/	**9-YR COMP. AVE. YIELD 6/**	TEST WEIGHT (Pounds Per Bushel) 2015	2016	2017 4/	2018	2019	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 5/	**9-YR COMP. AVE. TEST WT 6/**
PI642366	VIDA (+)	9	52.0	49.3		38.7	65.8	48.5	130.0	**48.5**	59.8	60.3		61.5	59.3	59.7	100.2	**59.7**
PI676978	LANNING	4	55.1	50.1		36.7	56.6	49.6	124.5	**46.4**	59.5	60.7		60.9	58.7	60.0	99.3	**59.2**
PI679964	NS PRESSER CLP (+)	3		41.3		40.2	63.4	48.3	124.4	**46.4**		58.0		61.1	58.4	59.2	98.1	**58.4**
WA 8166	ALUM (+)	3		51.2		35.9	56.6	47.9	123.5	**46.0**		62.4		62.9	60.4	61.9	102.6	**61.1**
ND 695	REEDER (+)	9	48.4	45.4		36.7	53.1	44.0	118.0	**44.0**	60.5	61.5		61.3	59.3	60.0	100.8	**60.0**
BZ999592	ONEAL (P+)	8	52.3	39.5		35.6		42.4	117.8	**43.9**	61.0	59.4		62.5		60.3	101.2	**60.3**
04S0515-2-2	SY TYRA (+)	7	46.3	42.4				41.7	112.6	**42.0**	62.1	60.2				59.7	100.4	**59.8**
BZ996434	CORBIN (P+)	9	45.4	43.3		34.6	52.7	41.4	111.0	**41.4**	60.3	61.5		62.0	59.2	59.8	100.5	**59.8**
PI660981	DUCLAIR (+)(saw fly tol)	9	47.0	41.5		31.4	53.6	41.3	110.7	**41.3**	57.2	60.1		60.0	58.2	58.3	98.0	**58.3**
IMICHT-79	WB9879CLP (P+)	8	44.7	43.0		31.5	50.8	42.4	109.7	**40.9**	59.6	59.8		61.0	58.7	59.4	99.2	**59.1**
01S0263-28	SY SOREN (P+)	4	46.7	42.2		28.9	56.0	43.4	109.0	**40.6**	59.7	61.1		62.2	59.8	60.7	100.6	**59.9**
BZ902413	WB GUNNISON (P+)(sawfly tol)	8	47.2	43.2		31.7	49.0	41.3	106.9	**39.8**	61.1	61.5		62.0	60.6	60.7	101.3	**60.3**
PI633974	CHOTEAU (+)(saw fly tol)	9	42.5	44.9		31.9	49.2	39.5	106.0	**39.5**	58.7	59.9		60.6	58.8	58.7	98.5	**58.7**
PI671855	EGAN (+)	5	51.4	44.3		28.0	44.1	41.9	105.8	**39.4**	60.6	59.6		59.2	58.1	58.4	98.2	**58.4**
NDSW0449	MOTT (+)(saw fly tol)	7	41.9	35.3				38.5	104.0	**38.8**	60.1	59.6				59.0	99.4	**59.2**
PI574642	McNEAL	7	44.5	36.4				37.4	101.0	**37.7**	59.4	59.7				58.9	99.2	**59.1**
CI13596	FORTUNA (saw fly tol)	9	43.0	40.3		28.9	47.2	37.3	100.0	**37.3**	60.4	61.0		61.1	58.9	59.5	100.0	**59.5**
0150042-10	BRENNAN (P+)	5	39.3	39.4		21.8	44.2	38.4	97.1	**36.2**	61.3	61.7		62.0	60.1	60.5	101.6	**60.5**
MEANS (For Entries Listed)			46.7	42.9		32.8	53.0			**41.7**	60.1	60.4		61.3	59.2			**59.5**
7/ Growing Season Precipitation (in.)			8.9	7.2	n/a	n/a	8.8	8.6										
Soil PAW (in.) to SD @ Planting			8.2	3.7	n/a	n/a	6.2	7.4										
Total Plant Available Water (in.)			17.2	10.9	n/a	n/a	15.0	15.9										
Soil NO3 (lbs.) to SD at Planting			41	25	n/a	n/a	n/a	49										
SD (Sampling Depth in Inches)			48	24	n/a	n/a	33	43										
Fertilizer Applied	(# N)		100	125	100	100	100	94										
	(# P_2O_5)		20	20	20	20	20	26										
	(# K_2O)		10	10	10	10	10	15										
	(# S)		0	10	0	10	10	3										

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 selecton 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/ No harvest in 2017 due to hail.

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 6. Nine-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. 2009-2019. (Exp# 9955-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ SAWFLY RATING (% Cut and Lodged) 2010	2011	2012	2013	2014	2015	2016	2017 3/	2018	2019	AVE. for YEARS TESTED	% of CHECK SAWFLY 4/	**9-YR COMP. AVE. SAWFLY 5/**
WA 8166	ALUM (+)	3							0.0		0.3	0.0	0.1	25.0	**0.8**
NDSW0449	MOTT (+)(saw fly tol)	7	1.0	5.0	1.0	0.0	0.7	0.0	0.0				1.1	28.7	**0.9**
BZ902413	WB GUNNISON (P+)(saw fly tol)	8		5.0	1.0	1.0	0.0	0.0	0.0		0.3	0.0	0.9	44.8	**1.4**
01S0263-28	SY SOREN (P+)	4						0.0	0.0		0.7	0.0	0.2	50.1	**1.6**
PI679964	NS PRESSER CLP (P+)	3							0.0		0.7	0.0	0.2	50.1	**1.6**
0150042-10	BRENNAN (P+)	5					0.0	0.0	0.0		1.7	0.0	0.3	71.4	**2.2**
BZ996434	CORBIN (P+)	9	5.3	10.0	3.7	0.7	0.3	0.0	0.0		0.3	0.0	2.3	72.8	**2.3**
IMICHT-79	WB9879CLP (P+)	8		13.3	2.3	0.3	0.0	0.0	0.0		0.3	0.0	2.0	99.8	**3.1**
CI13596	FORTUNA (saw fly tol)	9	11.7	6.7	6.7	0.7	1.0	0.0	0.0		0.3	1.0	3.1	100.0	**3.1**
BZ999592	ONEAL (P+)	8	2.3	16.7	8.3	0.0	0.0	0.0	0.0		1.0		3.5	104.6	**3.3**
PI660981	DUCLAIR (+)(saw fly tol)	9	10.0	15.0	6.7	0.0	0.3	0.0	0.0		0.0	0.0	3.6	114.1	**3.6**
PI671855	EGAN (+)	5					0.3	0.0	0.0		2.3	0.0	0.5	114.2	**3.6**
PI633974	CHOTEAU (+)(saw fly tol)	9	8.3	16.7	6.7	0.7	1.0	0.0	0.0		0.0	0.0	3.7	119.0	**3.7**
04S0512-2-2	SY TYRA (P+)	7	5.0	15.0	11.7	0.0	0.7	0.0	0.0				4.6	121.1	**3.8**
PI642366	VIDA (+)	9	10.0	18.3	10.0	0.3	0.3	0.0	0.0		0.3	0.0	4.4	140.2	**4.4**
ND 695	REEDER (+)	9	10.3	18.3	15.0	0.7	2.3	0.0	0.0		2.0	0.0	5.4	173.7	**5.4**
PI676978	LANNING (++)	4						0.0	0.0		2.3	0.0	0.6	175.2	**5.5**
PI574642	McNEAL	7	20.0	20.0	25.0	1.0	7.0	0.0	0.0				10.4	273.4	**8.5**
MEANS (For Entries Listed)			8.4	13.3	8.2	0.5	1.0	0.0	0.0		0.8	0.1			**3.3**
6/ Growing Season Precipitation (in.)			11.6	n/a	n/a	9.5	5.6	8.9	7.2	n/a	n/a	8.8	8.6		
Soil PAW (in.) to SD @ Planting			7.7	7.1	8.8	8.8	8.9	8.2	3.7	n/a	n/a	6.2	7.4		
Total Plant Available Water (in.)			19.3	n/a	n/a	18.3	14.5	17.2	10.9	n/a	n/a	15.0	15.9		
Soil NO3 (lbs.) to SD at Planting			94	50	34	34	64	41	25	n/a	n/a	n/a	49		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	24	n/a	n/a	33	43		
Fertilizer Applied	(# N)		70	70	70	100	100	100	125	100	100	100	94		
	(# P_2O_5)		40	40	40	20	20	20	20	20	20	20	26		
	(# K_2O)		25	25	25	10	10	10	10	10	10	10	15		
	(# S)		0	0	0	0	0	0	10	0	10	10	3		

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 selecton decisions.

2/ P = Private Variety, + = Protected Variety, ++ = PVP Title 5 Pending.

3/ No harvest in 2017 due to hail.

4/ Percent of Fortuna saw fly rating 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 for the check variety Fortuna.

6/ 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. 2019. (Exp# 19-9957-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/ YIELD Bu/Ac	TEST WT Lbs/Bu	2/ PROTEIN %	3/ FN Seconds	4/ SAWFLY %
ALUM	WSCIA	32.1	37.9	53.5	**16.6**	357	4.0
BRENNAN	AGRIPR10	26.9	42.8	**57.2**	15.7	427	16.7
CHOTEAU	PI633974	29.6	**48.5**	54.7	15.7	428	1.0
CORBIN	BZ996434	32.6	**46.8**	**55.9**	**16.6**	402	1.0
DAGMAR	MT 1621	33.2	**51.9**	**56.3**	15.6	459	1.0
DUCLAIR	PI660981	31.6	**47.8**	55.4	15.7	385	2.3
EGAN	PI 671855	31.5	43.3	53.2	**17.0**	452	11.7
FORTUNA	CI 13596	39.7	31.8	53.7	**16.3**	427	6.7
LANNING	PI 676978	30.4	45.3	52.6	15.6	395	6.7
LCS PRO	LIMAGR143	34.8	40.8	54.5	14.9	401	7.0
NS PRESSER CLP	PI 679964	32.5	**49.2**	54.4	15.2	405	5.0
REEDER	ND 695	32.7	25.7	51.5	**16.5**	392	16.7
SY INGMAR	AGRIPR141	30.7	42.3	**56.0**	15.8	463	5.3
SY SOREN	AGRIPR14	27.7	28.3	53.2	**16.5**	462	11.7
VIDA	PI642366	33.0	**48.8**	**55.8**	15.7	405	4.0
WB GUNNISON	BZ92413R	30.1	**48.5**	**56.3**	16.0	454	0.3
WB9879CLP	WB9879CLP	30.5	45.9	**56.2**	15.8	439	1.0
MT 1673	DuclairxMcNeal/Glupro,+,fam 72-17	31.5	**48.0**	54.0	**16.7**	372	4.0
MT 1716	MT1274/RB07	25.4	32.6	54.7	16.1	434	10.0
MT 1767	12SR225/12F5 827	31.4	**47.1**	54.0	15.6	399	2.3
EXPERIMENTAL MEANS		31.4	42.7	54.7	16.0	417.9	5.9
LSD (0.05)		3.4	6.0	1.7	0.9	25.4	7.2
C.V.%		6.6	8.4	1.9	3.5	3.7	73.7
P-VALUE (Varieties)		<.0001	<.0001	<.0001	0.0	<.0001	0.0001

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 adjusted to 14 percent flour moisture.

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 (19-9957-SW)	
Seeding Date:	April 26, 2019
Harvest Date:	September 4, 2019
Fertility:	100-20-10-10 side banded
System:	Minimum Till
Herbicide:	Bromac-16oz
Insecticide:	none
Previous Crop:	Spring Wheat
Precipitation:	n/a

TABLE 8. Seven-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. 2013-2019. (Exp# 9957-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre) 2015	2016	2017	2018	2019	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	**7-YR COMP. AVE. YIELD 5/**	TEST WEIGHT (Pounds Per Bushel) 2015	2016	2017	2018	2019	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/	**7-YR COMP. AVE. TEST WT 5/**
PI642366	VIDA (+)	7	32.0	14.8	32.0	33.5	48.8	39.2	131.7	**39.2**	53.7	54.1	53.5	52.8	55.8	55.0	98.7	**55.0**
PI676978	LANNING (++)	5	36.8	12.2	30.9	33.2	45.3	31.7	122.2	**36.4**	53.0	51.4	50.4	50.2	52.6	51.5	94.7	**52.8**
BZ92413R	WB GUNNISON (P+)(saw fly to	7	30.4	13.5	33.7	31.3	48.5	36.0	120.8	**36.0**	54.7	54.1	54.7	54.3	56.3	56.2	100.8	**56.2**
BZ996434	CORBIN (P+)	7	31.8	12.9	30.0	32.7	46.8	35.9	120.4	**35.9**	53.5	53.3	53.5	55.4	55.9	55.5	99.5	**55.5**
AGRIPR141	SY INGMAR (P+)	3			29.1	37.9	42.3	36.4	120.1	**35.8**			53.6	54.2	56.0	54.6	100.5	**56.0**
PI660981	DUCLAIR (+)(saw fly tol)	7	29.7	16.9	33.2	31.2	47.8	35.8	120.1	**35.8**	52.1	54.8	52.3	53.3	55.4	54.6	97.9	**54.6**
PI679964	NS PRESSER CLP (P+)	4		11.0	32.8	31.9	49.2	31.2	119.1	**35.5**		51.4	52.6	49.9	54.4	52.1	96.1	**53.6**
LIMAGR143	LCS PRO (P+)	3			33.2	33.3	40.8	35.8	117.9	**35.1**			53.3	51.7	54.5	53.2	96.1	**53.6**
IMICHT-79	WB9879CLP (P+)	7	27.8	12.4	26.7	29.9	45.9	34.1	114.6	**34.1**	53.5	51.8	53.6	54.6	56.2	55.2	99.0	**55.2**
BZ999592	ONEAL (P+)	6	32.8	9.9	28.8	32.9		33.4	113.4	**33.8**	56.1	51.9	54.8	54.4		55.6	99.2	**55.3**
0150042-10	BRENNAN (P+)	6	32.6	6.9	31.1	35.2	42.8	30.7	112.2	**33.4**	56.1	54.9	56.1	57.1	57.2	56.8	103.3	**57.6**
PI633974	CHOTEAU (+)(saw fly tol)	7	29.0	10.9	25.5	29.6	48.5	33.3	111.7	**33.3**	53.4	52.7	52.8	53.7	54.7	54.6	98.0	**54.6**
PI671855	EGAN (+)	6	32.4	11.7	25.6	31.4	43.3	30.3	110.9	**33.1**	52.9	51.4	51.0	51.6	53.2	52.5	95.5	**53.2**
ND 695	REEDER (+)	7	30.3	10.5	29.3	32.1	25.7	32.0	107.5	**32.0**	54.7	54.5	52.8	53.4	51.5	54.8	98.2	**54.8**
WA 8166	ALUM (+)	4		11.3	31.0	31.4	37.9	27.9	106.4	**31.7**		52.9	55.3	53.3	53.5	53.7	99.2	**55.3**
01S0263-28	SY SOREN (P+)	5	29.3	8.5	28.6	35.5	28.3	26.0	100.4	**29.9**	53.8	53.1	54.0	53.3	53.2	53.5	98.4	**54.8**
CI13596	FORTUNA (saw fly tol)	7	24.7	13.9	27.6	31.5	31.8	29.8	100.0	**29.8**	55.2	53.8	54.8	54.5	53.7	55.7	100.0	**55.7**
Win 3504	HRS 3504(P+)	3		10.4	25.1	29.9		21.8	89.5	**26.7**		51.8	52.8	51.8		52.1	95.8	**53.4**
Win 3616	HRS 3616 (P+)	3		5.4	24.5	31.7		20.5	84.3	**25.1**		50.3	53.1	55.4		52.9	97.3	**54.2**
MEANS (For Entries Listed)			30.7	11.3	29.4	32.4	42.1			33.3	54.1	52.8	53.4	53.4	54.6			54.8
6/ Growing Season Precipitation (in.)			n/a	6.0	n/a	n/a	n/a	6.7										
Soil PAW (in.) to SD @ Planting			8.8	8.7	n/a	n/a	n/a	9.3										
Total Plant Available Water (in.)			n/a	14.8	n/a	n/a	n/a	16.1										
Soil NO3 (lbs.) to SD at Planting			126	194	n/a	n/a	n/a	114										
SD (Sampling Depth in Inches)			48	48	n/a	n/a	n/a	48										
Fertilizer Applied	(# N)		100	125	100	100	100	104										
	(# P_2O_5)		20	20	20	20	20	20										
	(# K_2O)		10	10	10	10	10	10										
	(# S)		0	10	0	10	10	4										

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 selecton 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/ 7-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 = 7-Yr average yield or test weight for the check variety Fortuna.

6/ Seeding to 14 days prior to harvest maturity.

TABLE 9. Seven-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. 2013-2019. (Exp# 9957-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ SAWFLY RATING (% of cut and lodged stems) 2013	2014	2015	2016	2017	2018	2019	AVE. for YEARS TESTED	% of CHECK SAWFLY 3/	**7-YR COMP. AVE. SAWFLY 4/**
BZ92413R	WB GUNNISON (P+)(sawfly	7	1.0	0.0	1.0	0.0	0.0	0.7	0.3	0.4	15.0	**0.4**
IMICHT-79	WB9879CLP (P+)	7	3.7	0.3	1.0	0.3	0.3	0.7	1.0	1.0	36.6	**1.0**
BZ996434	CORBIN (P+)	7	3.7	0.0	2.3	0.3	0.0	0.0	1.0	1.0	36.6	**1.0**
PI633974	CHOTEAU (+)(sawfly tol)	7	5.7	0.0	2.3	1.0	0.0	0.7	1.0	1.5	53.3	**1.5**
PI660981	DUCLAIR (+)(sawfly tol)	7	7.0	0.0	3.7	3.7	0.7	0.7	2.3	2.6	90.0	**2.6**
PI679964	NS PRESSER CLP (P+)	4				2.3	2.3	1.0	5.0	2.7	91.4	**2.6**
CI13596	FORTUNA (sawfly tol)	7	5.0	1.0	2.3	3.7	0.3	1.0	6.7	2.9	100.0	**2.9**
PI642366	VIDA (+)	7	6.7	0.3	5.0	5.0	0.3	0.3	4.0	3.1	108.3	**3.1**
WA 8166	ALUM (+)	4				5.0	2.3	2.3	4.0	3.4	117.1	**3.3**
BZ999592	ONEAL (P+)	6	6.7	0.7	6.7	3.7	0.3	2.3		3.4	152.5	**4.4**
AGRIPR141	SY INGMAR (P+)	3					6.7	6.7	5.3	6.2	233.3	**6.7**
LIMAGR143	LCS PRO (P+)	3					8.3	3.7	7.0	6.3	237.5	**6.8**
PI671855	EGAN (+)	6		0.7	3.7	15.0	6.7	3.7	11.7	6.9	275.4	**7.9**
0150042-10	BRENNAN (P+)	6		0.3	2.3	8.3	10.0	8.3	16.7	7.7	306.5	**8.8**
01S0263-28	SY SOREN (P+)	5			6.7	20.0	6.7	6.7	11.7	10.3	368.9	**10.5**
ND 695	REEDER (+)	7	15.0	0.7	10.0	18.3	10.0	5.3	16.7	10.9	379.9	**10.9**
PI676978	LANNING (++)	5			28.3	21.7	8.3	2.3	6.7	13.5	480.8	**13.7**
Win 3504	HRS 3504 (P+)	3				13.3	8.3	5.0		8.9	532.8	**15.2**
Win 3616	HRS 3616 (P+)	3				20.0	11.7	5.0		12.2	732.7	**20.9**
MEANS (For Entries Listed)			6.0	0.4	5.8	8.3	4.4	3.0	6.3			6.5
5/ Growing Season Precipitation (in.)			9.0	5.1	n/a	6.0	n/a	n/a	n/a	6.7		
Soil PAW (in.) to SD @ Planting			9.1	10.4	8.8	8.7	n/a	n/a	n/a	9.3		
Total Plant Available Water (in.)			18.1	15.5	n/a	14.8	n/a	n/a	n/a	16.1		
Soil NO3 (lbs.) to SD at Planting			51	85	126	194	n/a	n/a	n/a	114		
SD (Sampling Depth in Inches)			48	48	48	48	n/a	n/a	n/a	48		
Fertilizer Applied	(# N)		100	100	100	125	100	100	100	104		
	(# P_2O_5)		20	20	20	20	20	20	20	20		
	(# K_2O)		10	10	10	10	10	10	10	10		
	(#S)		0	0	0	10	0	10	10	4		

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 selecton 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/ 7-Yr Comparable Average = (x/y) * z where x = average sawfly rating of a given entry for years tested, y = average sawfly rating for Fortuna for the same years, and z = 7-Yr average sawfly 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. 2019. (Exp# 19-9953-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/ YIELD Bu/Ac	TEST WT Lbs/Bu	2/ PROTEIN %	3/ FN Seconds	4/ SAWFLY %
ALUM	WSCIA	33.3	53.3	54.7	**16.4**	340	6.7
BRENNAN	AGRIPR10	30.6	56.0	61.5	15.4	372	25.0
CHOTEAU	PI633974	31.0	55.9	57.8	15.5	408	1.0
CORBIN	BZ996434	31.9	59.4	59.5	15.3	413	3.7
DAGMAR	MT 1621	33.1	**69.6**	**60.5**	15.3	438	5.0
DUCLAIR	PI660981	32.6	**65.8**	58.8	15.0	404	5.0
EGAN	PI 671855	32.0	63.6	56.8	**16.4**	442	21.7
FORTUNA	CI 13596	40.7	53.6	58.5	15.1	407	5.3
LANNING	PI 676978	31.2	61.3	58.5	15.6	390	31.7
LCS PRO	LIMAGR143	35.2	56.4	56.5	15.3	407	31.7
NS PRESSER CLP	PI 679964	33.9	62.3	57.4	15.1	388	6.7
REEDER	ND 695	32.8	**64.5**	59.0	15.4	412	23.3
SY INGMAR	AGRIPR141	31.5	62.6	59.9	15.4	442	23.3
SY SOREN	AGRIPR14	29.2	61.8	59.6	15.4	450	15.0
VIDA	PI642366	32.8	**69.9**	59.2	14.8	405	3.7
WB GUNNISON	BZ92413R	30.3	58.6	58.9	14.5	450	0.7
WB9879CLP	WB9879CLP	32.3	60.3	58.2	15.6	412	1.0
MT 1673	DuclairxMcNeal/Glupro,+,fam 72-17	32.9	62.9	58.0	15.7	385	3.7
MT 1716	MT1274/RB07	31.0	64.3	**60.3**	15.1	436	16.7
MT 1767	12SR225/12F5 827	32.1	62.5	57.7	15.6	410	13.7
EXPERIMENTAL MEANS		32.5	61.2	58.6	15.4	410.6	12.2
LSD (0.05)		2.2	5.5	1.3	0.4	16.4	9.5
C.V.%		4.2	5.5	1.3	1.5	2.4	46.8
P-VALUE (Varieties)		<.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 adjusted to 14 percent flour moisture.

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 (19-9953-SW)	
Seeding Date:	April 26, 2019
Harvest Date:	August 28, 2019
Fertility:	100-20-10 side banded
System:	no till
Herbicide:	none
Insecticide:	none
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	n/a

TABLE 11. Six-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. 2014-2019. (Exp# 9953-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre) 2015	2016	2017	2018	2019	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	**6-YR COMP. AVE. YIELD 5/**	TEST WEIGHT (Pounds Per Bushel) 2015	2016	2017	2018	2019	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/	**6-YR COMP. AVE. TEST WT 5/**
PI642366	VIDA (+)	6	22.8	23.0	33.0	41.8	69.9	37.9	117.0	**37.9**	56.7	48.5	55.7	55.7	59.2	54.8	97.1	**54.8**
PI660981	DUCLAIR (+)(saw fly tol)	6	16.1	34.2	33.7	37.0	65.8	37.9	116.9	**37.9**	53.6	50.5	53.6	54.6	58.8	53.9	95.6	**53.9**
0150042-10	BRENNAN (P+)	6	24.3	31.3	30.4	41.4	56.0	37.7	116.5	**37.7**	58.2	53.1	57.5	58.5	61.5	57.6	102.0	**57.6**
PI671855	EGAN (+)	6	22.6	32.4	27.2	41.8	63.6	36.9	113.9	**36.9**	55.5	49.8	54.4	55.3	56.8	54.2	96.1	**54.2**
PI676978	LANNING (++)	5	24.5	23.8	30.8	40.8	61.3	36.3	112.6	**36.5**	54.4	47.4	53.9	54.6	58.5	53.8	94.9	**53.5**
BZ996434	CORBIN (P+)	6	21.3	26.8	35.2	37.5	59.4	36.1	111.4	**36.1**	55.5	50.6	55.7	55.6	59.5	55.2	97.8	**55.2**
ND 695	REEDER (+)	6	22.0	23.1	31.6	40.1	64.5	35.9	111.0	**35.9**	56.6	50.2	55.4	55.7	59.0	55.2	97.8	**55.2**
BZ92413R	WB GUNNISON (P+)(sawfly tol)	6	23.1	18.3	35.1	37.3	58.6	35.1	108.4	**35.1**	56.8	51.8	56.0	55.6	58.9	55.6	98.6	**55.6**
01S0263-28	SY SOREN (P+)	5	16.9	25.9	28.8	36.4	61.8	34.0	105.5	**34.2**	54.9	49.0	54.6	54.7	59.6	54.6	96.3	**54.3**
AGRIPR141	SY INGMAR (P+)	3			27.0	32.7	62.6	40.8	103.6	**33.6**			55.1	53.1	59.9	56.0	97.5	**55.0**
IMICHT-79	WB9879CLP (P+)	6	18.1	21.4	28.3	36.3	60.3	32.9	101.6	**32.9**	56.6	48.9	55.7	56.6	58.2	55.0	97.6	**55.0**
PI679964	NS PRESSER CLP (P+)	4		12.0	29.1	39.8	62.3	35.8	100.4	**32.5**		46.1	54.4	54.8	57.4	53.2	94.3	**53.2**
CI13596	FORTUNA (saw fly tol)	6	18.3	24.6	26.1	38.3	53.6	32.4	100.0	**32.4**	57.7	53.2	56.6	57.3	58.5	56.4	100.0	**56.4**
BZ999592	ONEAL (P+)	5	19.8	15.3	27.6	44.1		28.1	99.7	**32.3**	58.4	50.1	57.4	57.9		55.9	99.9	**56.3**
LIMAGR143	LCS PRO (P+)	3			26.1	34.1	56.4	38.9	98.8	**32.0**			54.0	53.6	56.5	54.7	95.2	**53.7**
PI633974	CHOTEAU (+)(saw fly tol)	6	18.3	24.8	26.4	36.2	55.9	31.9	98.5	**31.9**	55.7	49.6	55.3	56.3	57.8	54.7	96.9	**54.7**
WA 8166	ALUM (+)	4		22.4	24.1	37.2	53.3	34.3	96.0	**31.1**		51.4	58.4	55.5	54.7	55.0	97.5	**55.0**
Win 3616	HRS 3616 (P+)	3		24.7	27.6	29.8		27.4	92.2	**29.9**		48.3	54.7	54.6		52.5	94.3	**53.2**
Win 3504	HRS 3504 (P+)	3		19.6	25.9	36.4		27.3	91.9	**29.8**		45.7	55.0	53.4		51.4	92.3	**52.1**
MEANS (For Entries Listed)			20.6	23.7	29.2	37.8	60.3			**34.0**	56.2	49.7	55.5	55.4	58.4			**54.7**
6/ Growing Season Precipitation (in.)			5.0	8.3	2.8	n/a	n/a	5.3										
Soil PAW (in.) to SD @ Planting			9.8	n/a	n/a	n/a	n/a	11.7										
Total Plant Available Water (in.)			14.8	n/a	n/a	n/a	n/a	14.8										
Soil NO3 (lbs.) to SD at Planting			251	n/a	n/a	n/a	n/a	254										
SD (Sampling Depth in Inches)			48	48	n/a	n/a	n/a	48										
Fertilizer Applied	(# N)		100	125	100	100	100	104										
	(# P2O5)		20	20	20	20	20	20										
	(# K2O)		10	10	10	10	10	10										
	(# S)		0	10	0	0	0	2										

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 selecton 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/ 6-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 = 6-Yr average yield or test weight for the check variety Fortuna.

6/ Seeding to 14 days prior to harvest maturity.

TABLE 12. Six-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. 2014-2019. (Exp# 9953-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ SAWFLY RATING (% of cut and lodged stems) 2014	2015	2016	2017	2018	2019	AVE. for YEARS TESTED	% of CHECK SAWFLY 3/	**6-YR COMP. AVE. SAWFLY 4/**
CI13596	FORTUNA (saw fly tol)	6	6.7	0.0	11.7	2.3	10.8	5.3	6.1	100.0	**6.1**
0150042-10	BRENNAN (P+)	6	5.0	0.0	3.7	6.7	14.2	25.0	9.1	148.0	**9.1**
ND 695	REEDER (+)	6	6.7	0.0	16.7	13.3	8.3	23.3	11.4	185.5	**11.4**
PI 671855	EGAN (+)	6	6.7	0.0	5.0	13.3	10.8	21.7	9.6	156.2	**9.6**
PI660981	DUCLAIR (+)(saw fly tol)	6	5.0	0.0	6.7	3.7	1.5	5.0	3.6	59.3	**3.6**
PI642366	VIDA (+)	6	18.3	0.0	5.3	2.3	2.3	3.7	5.3	86.9	**5.3**
BZ996434	CORBIN (P+)	6	1.0	0.0	13.3	0.7	2.3	3.7	3.5	57.0	**3.5**
PI633974	CHOTEAU (+)(saw fly tol)	6	5.7	0.0	5.3	2.0	0.8	1.0	2.5	40.3	**2.5**
IMICHT-79	WB9879CLP (P+)	6	3.7	0.0	10.3	1.0	1.3	1.0	2.9	47.0	**2.9**
BZ92413R	WB GUNNISON (P+)(saw fly tc	6	3.7	0.0	4.0	0.3	0.5	0.7	1.5	24.9	**1.5**
PI 676978	LANNING (++)	5		0.0	18.3	13.3	1.7	31.7	13.0	215.4	**13.2**
01S0263-28	SY SOREN (P+)	5		0.0	6.7	15.0	6.7	15.0	8.7	143.6	**8.8**
BZ999592	ONEAL (P+)	5	3.7	0.0	15.0	3.7	3.0		5.1	98.0	**6.0**
PI 679964	NS PRESSER CL+	4			18.3	6.7	0.3	6.7	8.0	106.0	**6.5**
WA 8166	ALUM (+)	4			11.7	3.7	3.8	6.7	6.5	85.6	**5.3**
LIMAGR143	LCS PRO (P+)	3				11.7	14.2	31.7	19.2	310.8	**19.1**
AGRIPR141	SY INGMAR (P+)	3				6.7	5.2	23.3	11.7	190.1	**11.7**
Win 3616	HRS 3616 (P+)	3			10.0	11.7	17.5		13.1	157.7	**9.7**
Win 3504	HRS 3504 (P+)	3			4.0	8.3	3.0		5.1	61.7	**3.8**
MEANS (For Entries Listed)			6.0	0.0	9.8	6.6	5.7	12.8			**7.3**
5/ Growing Season Precipitation (in.)			n/a	5.0	8.3	2.8	n/a	n/a	5.3		
Soil PAW (in.) to SD @ Planting			13.7	9.8	n/a	n/a	n/a	n/a	11.7		
Total Plant Available Water (in.)			n/a	14.8	n/a	n/a	n/a	n/a	14.8		
Soil NO3 (lbs.) to SD at Planting			257	251	n/a	n/a	n/a	n/a	254		
SD (Sampling Depth in Inches)			48	48	48	n/a	n/a	n/a	48		
Fertilizer Applied	(# N)		100	100	125	100	100	100	104		
	(# P2O5)		20	20	20	20	20	20	20		
	(# K2O)		10	10	10	10	10	10	10		
	(# S)		0	0	10	0	0	0	2		

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 selecton 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/ 6-Yr Comparable Average = (x/y) * z where x = average sawfly rating of a given entry for years tested, y = average sawfly rating for Fortuna for the same years, and z = 6-Yr average sawfly rating for the check variety Fortuna.

5/ Seeding to 14 days prior to harvest maturity.