

Title: Northcentral Montana Off-Station Spring Wheat Variety Performance Evaluations

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Terry 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 2015-2019 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 northcentral 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 2020 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 | S28-T27N-R10E |
| 4. Kammerzell Farm, Liberty County | S10-T31N-R5E |

With the addition of private entries to be tested at specific locations, the four spring wheat trials consisted of either 25 or 26 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 seed 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 just over 50 bu/ac (Table 1). 'Vida' was the top yielding entry producing nearly 57 bu/ac. 'Dagmar', 'Lanning' and 'Reeder' along with the breeding line MT 1866 all produced yields statistically equal to that of Vida. Test weights of all spring wheat entries for this site averaged just under 59 lb/bu. Following a severe hailstorm in 2014, there were consecutive years with no wheat stem sawfly cutting or infestation in the spring wheat trial at Turner, with only minimal cutting from 2017 through 2020. Plant height, yield, protein, falling number and sawfly cutting data for the 2020 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 (2011-2020) for spring wheat seed yield and test weight at Turner are summarized in Table 2, while nine-year comparable averages for protein content and wheat stem sawfly cutting are summarized in Table 3.

Loring spring wheat yields averaged nearly 43 bu/ac with Vida producing the highest seed yield at over 53 bu/ac (Table 4). 'Allegiant 811', Lanning and breeding line MT 1866 produced seed yields statistically equal to that of Vida. For the sixth consecutive year, sawfly cutting was virtually nonexistent in the trial at the Loring site. Plant height, yield, test weight, moisture, protein, falling number and wheat stem sawfly cutting data for the 2020 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 protein content and wheat stem sawfly cutting are summarized in Table 6.

In 2013, off-station spring wheat trials were re-established near Loma. Seed yields for 2020 averaged nearly 47 bu/ac (Table 7). 'Egan', a 2014 release from Montana State University to help combat the orange wheat blossom midge, was the highest yielding entry at over 53 bu/ac. 'Alum', 'Brennan', 'Corbin', 'Dagmar', 'Duclair', 'NS Presser CLP', 'Vida', 'WB Gunnison', 'WB9879CLP' and one Montana breeding line produced yields statistically equal to that of Egan. Sawfly damage in the spring wheat small plot scenario averaged just over 10 percent cutting. Plant height, yield, test weight, protein, falling number and sawfly cutting data for the 2020 Loma dryland spring wheat trial are summarized in Table 7. Eight-year comparable averages for spring wheat seed yield and test weight at Loma are summarized in Table 8, while eight-year comparable averages for protein content and wheat stem sawfly cutting are summarized in Table 9.

Spring wheat seed yields at Chester averaged 49 bu/ac, while test weights averaged just under 56 lb/bu (Table 10). Experimental line X-4 was the highest yielding entry at just under 56 bu/ac. Seed yields of Allegiant 811, Brennan, Dagmar, Duclair, Lanning, WB Gunnison and two other experimental lines were statistically equal to that of X-4. Sawfly cutting in the small plot scenario averaged just under five percent in 2020. Plant height, yield, test weight, protein, falling number and sawfly cutting data for the 2020 Chester dryland spring wheat trial are summarized in Table 10. Seven-year comparable averages for spring wheat seed yield and test weight at Chester are summarized in Table 11, while seven-year comparable averages for protein content and wheat stem sawfly cutting are summarized in Table 12.

Summary:

Cropping environments for 2020 started out with very good soil moisture recharge. The spring growing season was cooler and drier than average with many crops showing drought stress during early June. Timely rainfall was spotty during the mid- to latter part of June and into early July having significant impact on localized yields. Both Turner and Loring received near average rainfall for June, resulting in average spring crop yields. The Turner site was seeded into a chemical fallow field. The Loma and Loring locations were seeded into chemical fallow ground that had been minimally tilled to eliminate potential weed issues. The Chester site was also seeded into chemical fallow. This area started out with excellent soil moisture, and timely spring precipitation resulted in a very good stand, however July was

fairly dry and spring wheat seed production was limited.

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-sixth 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 2020 marking 37 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: Peyton Brown, Jonathan Erickson, Daisen Fox, Faith Gasvoda, Isabella Lawless, Tracey Reed, Erin Taylor and Ivy Thomas.

TABLE 1. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Max Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2020. (Exp# 20-9951-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/	TEST WT Lbs/Bu	2/	3/	4/
			YIELD Bu/Ac		PROTEIN %	FN Seconds	SAWFLY %
ALLEGIANT 811	CHS 1	26.2	52.1	59.5	15.4	470	0.7
ALUM	WSCIA	25.7	45.8	58.2	15.8	324	0.7
BRENNAN	AGRIPR 10	24.3	46.4	60.8	16.0	393	1.0
CHOTEAU	PI 633974	25.6	46.4	58.5	16.0	364	0.0
CORBIN	BZ 996434	26.9	48.3	59.1	15.7	368	0.0
DAGMAR	PI 690450	27.4	53.6	59.3	16.0	373	0.0
DUCLAIR	PI 660981	27.3	49.7	58.0	15.7	346	0.3
EGAN	PI 671855	28.6	48.3	56.5	17.1	406	0.7
FORTUNA	CI 13596	32.2	43.5	58.6	15.4	362	0.7
LANNING	PI 676978	25.2	54.8	58.7	15.9	357	0.3
LCS PRO	LIMAGR143	29.3	51.4	59.3	15.8	365	0.7
NS PRESSER CLP	PI 679964	29.3	46.1	56.6	16.7	405	1.0
REEDER	ND 695	29.0	54.4	58.3	15.8	360	1.0
SY INGMAR	AGRIPR141	26.3	51.6	59.8	16.0	405	0.3
SY SOREN	AGRIPR 14	27.2	53.3	59.2	16.1	397	0.7
VIDA	PI 642366	28.9	56.8	58.7	14.6	351	0.3
WB GUNNISON	BZ 92413R	27.1	50.7	59.2	15.0	402	0.0
WB9879CLP	WB9879CLP	27.2	50.1	58.8	16.0	383	0.0
MT 1716	MT1274/RB07	27.5	51.7	59.8	15.5	370	0.0
MT 1855	MT1053/MO8/3-4	29.3	52.6	58.5	15.6	389	0.7
MT 1866	Vida*4/Conan	29.2	54.4	58.6	15.2	357	0.3
E-2	DL 2	27.8	45.1	57.9	15.7	344	0.0
N-1	DL 1	30.1	45.8	57.9	16.0	395	3.7
W-2	DL 3	26.7	50.3	58.3	15.8	366	0.0
X-4	DL 4	29.4	50.8	58.4	15.3	358	0.3
EXPERIMENTAL MEANS		27.7	50.2	58.7	15.8	376.4	0.5
LSD (0.05)		2.1	3.7	0.6	0.4	17.1	1.0
C.V.%		4.7	4.5	0.7	1.6	2.8	110.8
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 (20-9951-SW)

Seeding Date:	May 5, 2020
Harvest Date:	August 21, 2020
Fertility:	100-20-10-10 side banded
System:	no till
Herbicide:	Bromac (16oz/ac), Affinity (0.4oz/ac), Discover (12.8oz/ac)
Insecticide:	none
Previous Crop:	Chemical Fallow - Durum
Precipitation:	5.45" 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. 2011-2020. (Exp# 9951-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)					TEST WEIGHT (Pounds Per Bushel)					9-YR COMP. AVE YIELD 5/	9-YR COMP. TEST WT 5/				
		2016	2017	2018	2019	2020	AVE. YEARS TESTED 3/	% of CHECK YIELD 4/	2016	2017	2018			2019	2020	AVE. YEARS TESTED 3/	% of CHECK TEST WT 4/
LIMAGR143 LCS PRO (P+)	4		19.0	39.3	58.0	51.4	42.0	116.7	50.1		60.5	60.4	56.5	59.3	59.2	100.5	60.0
AGRIPR141 SY INGMAR (P+)	4		15.8	39.0	48.2	51.6	38.6	107.5	46.1		61.3	61.9	58.9	59.8	60.5	102.8	61.3
PI642366 VIDA (+)	9	38.3	25.1	39.3	58.5	56.8	42.9	100.0	42.9	55.8	59.3	60.4	57.0	58.7	59.7	100.0	59.7
PI676978 LANNING (++)	6	43.5	19.6	39.5	55.8	54.8	42.8	98.3	42.2	56.9	59.8	59.3	56.0	58.7	58.7	99.7	59.5
MT 1621 DAGMAR	3			35.4	56.1	53.6	48.3	93.8	40.3			60.5	58.1	59.3	59.3	101.1	60.3
PI671855 EGAN (+)	6	49.7	18.9	35.0	49.8	48.3	40.1	91.9	39.5	57.6	58.6	58.1	56.1	56.5	57.9	98.3	58.7
ND 695 REEDER (+)	9	40.4	21.2	36.8	50.8	54.4	39.1	91.0	39.1	57.4	59.3	60.0	57.0	58.3	60.0	100.5	60.0
PI679964 NS PRESSER CLP (P+)	5	27.9	25.4	40.4	57.1	46.1	39.4	90.3	38.8	52.8	59.2	59.4	54.9	56.6	56.6	97.1	58.0
WA 8166 ALUM (+)	5	41.4	18.8	37.8	52.8	45.8	39.3	90.2	38.7	58.7	60.6	60.8	58.2	58.2	59.3	101.8	60.8
PI660981 DUCLAIR (+)(saw fly tol)	9	39.9	22.1	28.7	53.7	49.7	38.3	89.2	38.3	55.8	58.8	59.3	56.1	58.0	58.7	98.3	58.7
IMICHT-79 WB9879CLP (P+)	9	35.4	19.5	32.6	53.8	50.1	38.1	88.7	38.1	57.6	59.6	60.5	57.1	58.8	59.8	100.3	59.8
BZ996434 CORBIN (P+)	9	43.0	16.1	30.2	52.2	48.3	37.5	87.2	37.5	57.9	60.8	60.9	57.2	59.1	60.3	101.0	60.3
BZ902413 WB GUNNISON (P+)(saw fly tol)	9	35.2	20.3	37.7	47.6	50.7	37.1	86.3	37.1	58.3	59.9	60.8	58.8	59.2	60.6	101.6	60.6
01S0263-28 SY SOREN (P+)	6	30.4	18.5	32.1	52.1	53.3	37.1	85.1	36.5	55.2	60.8	61.5	58.1	59.2	59.5	101.0	60.3
PI633974 CHOTEAU (+)(saw fly tol)	9	31.7	17.3	37.0	53.1	46.4	36.3	84.5	36.3	56.1	59.7	60.2	56.2	58.5	59.3	99.3	59.3
0150042-10 BRENNAN (P+)	6	40.3	11.5	37.2	51.6	46.4	36.1	82.8	35.5	60.2	61.0	61.5	59.7	60.8	61.0	103.6	61.8
CI13596 FORTUNA (saw fly tol)	9	33.2	15.7	28.8	46.9	43.5	33.2	77.2	33.2	58.3	59.6	60.8	58.0	58.6	60.1	100.8	60.1
MEANS (For Entries Listed)		37.9	19.1	35.7	52.8	50.1			39.4	57.0	59.9	60.4	57.3	58.7			60.0
6/ Grow ing Season Precipitation (in.)		8.6	2.3	4.0	3.0	5.9	7.0										
Soil PAW (in.) to SD @ Planting		6.1	n/a	n/a	6.3	n/a	7.4										
Total Plant Available Water (in.)		14.7	n/a	n/a	9.3	n/a	16.4										
Soil NO3 (lbs.) to SD at Planting		85	n/a	n/a	n/a	n/a	46										
SD (Sampling Depth in Inches)		48	n/a	n/a	19	n/a	44										
Fertilizer Applied																	
	(# N)	125	100	100	100	100	97										
	(# P2O5)	20	20	20	20	20	24										
	(# K2O)	10	10	10	10	10	13										
	(# S)	10	0	10	10	10	4										

Check variety is Vida.

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 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. No harvest in 2014 due to hail.

4/ Percent of Vida 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 Vida for the same years, and z = 9-Yr average yield or test weight for the check variety Vida.

6/ Seeding to 14 days prior to harvest maturity.

TABLE 3. Nine-Year Protein and 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. 2011-2020. (Exp# 9951-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ PROTEIN % (Adjusted to 13% grain moisture)					SAWFLY RATING (% of cut and lodged stems)										
		2016	2017	2018	2019	2020	AVE. for YEARS TESTED 3/	% of CHECK PROTEIN 4/	9-YR COMP. AVE. PROTEIN 5/	2016	2017	2018	2019	2020	AVE. for YEARS TESTED 3/	% of CHECK SAWFLY 4/	9-YR COMP. AVE. SAWFLY 5/
BZ902413 WB GUNNISON (P+)(sawfly tol)	9	14.2	15.8	15.2	14.3	15.0	14.3	99.2	14.3	0.0	0.3	0.7	0.3	0.0	1.2	16.5	1.2
AGRIPR141 SY INGMAR (P+)	4		17.6	16.5	15.7	16.0	16.4	108.6	15.6		0.0	0.0	0.3	0.3	0.2	50.1	3.6
BZ996434 CORBIN (P+)	9	14.4	16.9	16.5	15.5	15.7	14.9	103.8	14.9	0.0	0.3	1.0	1.0	0.0	4.9	68.6	4.9
CI 13596 FORTUNA (saw fly tol)	9	14.6	16.0	15.7	15.1	15.4	14.9	103.5	14.9	0.0	0.0	0.7	0.0	0.7	5.9	82.5	5.9
IMICHT-79 WB9879CLP (P+)	9	15.2	17.2	17.1	15.8	16.0	15.4	106.7	15.4	0.0	0.0	0.0	0.3	0.0	6.6	91.2	6.6
PI642366 VIDA (+)	9	15.1	15.4	15.3	15.3	14.6	14.4	100.0	14.4	0.0	0.3	0.0	0.7	0.3	7.2	100.0	7.2
PI660981 DUCLAIR (+)(saw fly tol)	9	14.9	15.6	16.2	15.3	15.7	14.8	102.8	14.8	0.0	0.3	0.3	0.3	0.3	7.6	106.2	7.6
PI633974 CHOTEAU (+)(saw fly tol)	9	15.1	17.1	16.8	15.5	16.0	15.3	106.2	15.3	0.0	0.0	0.0	0.3	0.0	8.0	111.3	8.0
MT 1621 DAGMAR	3			16.3	15.5	16.0	15.9	105.8	15.2				0.7	0.7	0.4	133.5	9.6
ND 695 REEDER (+)	9	14.6	16.5	16.5	15.9	15.8	15.1	104.9	15.1	0.0	2.3	0.7	0.7	1.0	10.7	149.5	10.7
WA 8166 ALUM (+)	5	14.6	16.8	16.0	15.4	15.8	15.7	103.9	15.0	0.0	0.3	0.7	0.3	0.7	0.4	149.8	10.8
O150042-10 BRENNAN (P+)	6	14.7	17.7	17.4	15.4	16.0	16.1	107.6	15.5	0.0	0.0	0.7	1.0	1.0	0.4	200.2	14.4
PI676978 LANNING (++)	6	15.0	17.1	16.9	15.6	15.9	15.9	105.9	15.3	0.0	0.7	1.0	0.7	0.3	0.4	200.2	14.4
PI671855 EGAN (+)	6	16.2	18.8	18.1	16.7	17.1	17.1	114.3	16.5	0.0	0.7	1.0	0.7	0.7	0.5	225.2	16.2
O1S0263-28 SY SOREN (P+)	6	15.6	17.5	17.0	15.7	16.1	16.2	108.1	15.6	0.0	1.0	0.7	1.0	0.7	0.6	250.3	18.0
LIMAGR143 LCS PRO (P+)	4		17.3	16.1	15.3	15.8	16.1	106.5	15.3		2.3	0.7	1.0	0.7	1.2	350.4	25.2
PI679964 NS PRESSER CLP (P+)	5	15.1	16.2	15.9	15.2	16.7	15.8	104.5	15.0	0.0	3.7	0.3	0.3	1.0	1.1	399.5	28.7
MEANS (For Entries Listed)		15.0	16.8	16.4	15.5	15.9			15.2	0.0	0.8	0.5	0.6	0.5			11.3
6/ Growing Season Precipitation (in.)		8.6	2.3	4.0	3.0	5.9	7.0										
Soil PAW (in.) to SD @ Planting		6.1	n/a	n/a	6.3	n/a	7.4										
Total Plant Available Water (in.)		14.7	n/a	n/a	9.3	n/a	16.4										
Soil NO3 (lbs.) to SD at Planting		85	n/a	n/a	n/a	n/a	46										
SD (Sampling Depth in Inches)		48	n/a	n/a	19	n/a	44										
Fertilizer Applied	(# N)	125	100	100	100	100	97										
	(# P2O5)	20	20	20	20	20	24										
	(# K2O)	10	10	10	10	10	13										
	(# S)	10	0	10	10	10	4										

Check variety is Vida.

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 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. No harvest in 2014 due to hail.

4/ Percent of Vida protein or 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 protein or saw fly rating of a given entry for years tested, y = average protein or saw fly rating for Vida for the same years, and z = 9-Yr average protein or saw fly rating for the check variety Vida.

6/ Seeding to 14 days prior to harvest maturity.

TABLE 4. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Flansaa-Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 2020. (Exp# 20-9955-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/	TEST WT	2/	3/	4/
			YIELD Bu/Ac	Lbs/Bu	PROTEIN %	FN Seconds	SAWFLY %
ALLEGIAN 811	CHS 1	25.0	48.9	61.9	14.4	433	0.7
ALUM	WSCIA	24.8	45.1	61.5	14.4	377	0.7
BRENNAN	AGRIPR 10	23.0	33.0	61.2	17.0	396	1.0
CHOTEAU	PI 633974	24.4	41.3	60.5	15.4	354	1.0
CORBIN	BZ 996434	25.1	39.7	61.6	15.7	371	0.0
DAGMAR	PI 690450	25.4	45.2	61.4	15.7	387	0.7
DUCLAIR	PI 660981	25.7	35.2	59.3	15.6	343	0.3
EGAN	PI 671855	24.7	40.2	58.8	16.7	452	1.0
FORTUNA	CI 13596	31.9	35.7	60.6	15.2	355	1.0
LANNING	PI 676978	26.1	49.0	61.1	15.1	383	1.0
LCS PRO	LIMAGR143	29.3	40.1	60.8	15.3	382	2.3
NS PRESSER CLP	PI 679964	27.5	43.7	59.1	16.0	450	1.0
REEDER	ND 695	25.2	44.7	61.1	14.9	345	1.0
SY INGMAR	AGRIPR141	25.1	43.1	62.3	16.0	431	0.7
SY SOREN	AGRIPR 14	25.9	38.5	61.9	16.2	439	1.0
VIDA	PI 642366	24.8	53.4	61.0	14.0	350	1.0
WB GUNNISON	BZ 92413R	24.4	39.0	61.6	14.8	386	0.3
WB9879CLP	WB9879CLP	22.9	43.4	60.4	16.2	380	0.7
MT 1716	MT1274/RB07	24.5	42.6	61.7	15.9	400	1.0
MT 1855	MT1053/MO8/3-4	28.1	47.6	60.3	14.3	410	0.3
MT 1866	Vida*4/Conan	25.0	48.1	60.7	14.5	385	0.3
E-2	DL 2	28.1	46.6	60.4	14.7	379	0.0
N-1	DL 1	27.6	46.8	60.4	14.8	496	5.0
W-2	DL 3	27.1	36.0	59.5	15.9	373	0.3
X-4	DL 4	27.2	38.9	59.9	14.4	343	0.3
EXPERIMENTAL MEANS		26.0	42.6	60.8	15.3	392.0	0.9
LSD (0.05)		2.1	5.4	0.5	0.6	18.6	1.0
C.V.%		5.0	7.8	0.5	2.3	2.9	66.0
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 (20-9955-SW)

Seeding Date: May 5, 2020
Harvest Date: August 24, 2020
Fertility: 100-20-10-10 side banded
System: no till
Herbicide: Wild Card Extra (21oz/acre)
Insecticide: none
Previous Crop: Chemical Fallow - Spring Wheat
Precipitation: n/a

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. 2011-2020. (Exp# 9955-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)							TEST WEIGHT (Pounds Per Bushel)							
		2016	2017 4/	2018	2019	2020	AVE. for YEARS TESTED 3/	% of YIELD CHECK 5/	9-YR COMP. AVE. YIELD 6/	2016	2017 4/	2018	2019	2020	AVE. for YEARS TESTED 3/	% of TEST WT CHECK 5/
PI642366 VIDA (+)	9	49.3		38.7	65.8	53.4	50.3	100.0	50.3	60.3	61.5	59.3	61.0	60.1	100.0	60.1
PI676978 LANNING	5	50.1		36.7	56.6	49.0	49.5	95.5	48.0	60.7	60.9	58.7	61.1	60.2	99.7	60.0
WA 8166 ALUM (+)	4	51.2		35.9	56.6	45.1	47.2	91.2	45.8	62.4	62.9	60.4	61.5	61.8	102.1	61.4
PI679964 NS PRESSER CLP (+)	4	41.3		40.2	63.4	43.7	47.1	91.0	45.8	58.0	61.1	58.4	59.1	59.2	97.8	58.8
ND 695 REEDER (+)	9	45.4		36.7	53.1	44.7	45.3	90.1	45.3	61.5	61.3	59.3	61.1	60.5	100.6	60.5
MT 1621 DAGMAR	3			36.0	55.4	45.2	45.5	86.5	43.5		61.8	59.3	61.4	60.8	100.4	60.4
IMICHT-79 WB9879CLP (P+)	9	43.0		31.5	50.8	43.4	42.5	84.5	42.5	59.8	61.0	58.7	60.4	59.6	99.0	59.6
BZ996434 CORBIN (P+)	9	43.3		34.6	52.7	39.7	42.4	84.4	42.4	61.5	62.0	59.2	61.6	60.5	100.5	60.5
LIMAGR143 LCS PRO (P+)	3			34.9	56.2	40.1	43.7	83.1	41.8		61.4	58.9	60.8	60.4	99.7	60.0
AGRIPR141 SY INGMAR (P+)	3			32.7	55.1	43.1	43.7	82.9	41.7		62.3	60.5	62.3	61.7	101.9	61.3
PI660981 DUCLAIR (+)(saw fly tol)	9	41.5		31.4	53.6	35.2	41.3	82.2	41.3	60.1	60.0	58.2	59.3	58.8	97.7	58.8
01S0263-28 SY SOREN (P+)	5	42.2		28.9	56.0	38.5	42.4	81.9	41.2	61.1	62.2	59.8	61.9	60.9	100.9	60.7
BZ902413 WB GUNNISON (P+)(saw fly tol)	9	43.2		31.7	49.0	39.0	41.0	81.6	41.0	61.5	62.0	60.6	61.6	60.8	101.1	60.8
PI633974 CHOTEAU (+)(saw fly tol)	9	44.9		31.9	49.2	41.3	40.8	81.2	40.8	59.9	60.6	58.8	60.5	59.3	98.6	59.3
PI671855 EGAN (+)	6	44.3		28.0	44.1	40.2	41.6	79.6	40.0	59.6	59.2	58.1	58.8	58.5	97.8	58.8
CI13596 FORTUNA (saw fly tol)	9	40.3		28.9	47.2	35.7	38.3	76.2	38.3	61.0	61.1	58.9	60.6	60.0	99.8	60.0
0150042-10 BRENNAN (P+)	6	39.4		21.8	44.2	33.0	37.5	71.8	36.1	61.7	62.0	60.1	61.2	60.6	101.4	61.0
MEANS (For Entries Listed)		44.2			53.5	41.8			42.7	60.6		59.3	60.8			60.1
7/ Growing Season Precipitation (in.)		7.2	n/a	n/a	8.8	n/a	8.0									
Soil PAW (in.) to SD @ Planting		3.7	n/a	n/a	6.2	8.9	7.6									
Total Plant Available Water (in.)		10.9	n/a	n/a	15.0	n/a	15.2									
Soil NO3 (lbs.) to SD at Planting		25	n/a	n/a	n/a	23	39									
SD (Sampling Depth in Inches)		24	n/a	n/a	33	48	43									
Fertilizer Applied	(# N)	125	100	100	100	100	97									
	(# P ₂ O ₅)	20	20	20	20	20	24									
	(# K ₂ O)	10	10	10	10	10	13									
	(# S)	10	0	10	10	10	4									

Check variety is Vida.

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/ No harvest in 2017 due to hail.

5/ Percent of Vida 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 Vida for the same years, and z = 9-Yr average yield or test weight for the check variety Vida.

7/ Seeding to 14 days prior to harvest maturity.

TABLE 6. Nine-Year Protein and Sawfly Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at the Flanssas/Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (Exp# 9955-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ PROTEIN % (Adjusted to 13% grain moisture)							SAWFLY RATING (% of cut and lodged stems)						
		2016	2017	2018	2019	2020	AVE. for YEARS TESTED 3/	% of CHECK PROTEIN 5/	9-YR COMP. AVE. PROTEIN 6/	2016	2017	2018	2019	2020	AVE. for YEARS TESTED 3/
BZ902413 WB GUNNISON (P+)(sawfly tol)	9	14.3	14.9	14.2	14.8	14.1	102.9	14.1	0.0	0.3	0.0	0.3	0.9	25.3	0.9
BZ996434 CORBIN (P+)	9	14.7	16.1	13.8	15.7	14.5	105.8	14.5	0.0	0.3	0.0	0.0	1.7	49.7	1.7
MT 1621 DAGMAR	3		16.3	13.8	15.7	15.3	111.2	15.3		0.0	0.0	0.7	0.2	50.1	1.7
IMICHT-79 WB9879CLP (P+)	9	15.4	16.6	14.8	16.2	15.1	109.5	15.1	0.0	0.3	0.0	0.7	1.9	56.1	1.9
CI13596 FORTUNA (saw fly tol)	9	14.8	15.8	13.9	15.2	14.6	105.9	14.6	0.0	0.3	1.0	1.0	1.9	57.3	1.9
PI660981 DUCLAIR (+)(saw fly tol)	9	14.9	15.8	13.7	15.6	14.6	106.0	14.6	0.0	0.0	0.0	0.3	2.5	73.7	2.5
WA 8166 ALUM (+)	4	14.5	15.3	13.7	14.4	14.5	104.4	14.3	0.0	0.3	0.0	0.7	0.3	75.1	2.5
AGRIPR141 SY INGMAR (P+)	3		16.7	14.0	16.0	15.6	113.3	15.6		0.3	0.0	0.7	0.3	75.1	2.5
PI633974 CHOTEAU (+)(saw fly tol)	9	14.8	16.2	14.5	15.4	14.9	108.2	14.9	0.0	0.0	0.0	1.0	2.9	85.9	2.9
PI642366 VIDA (+)	9	14.3	14.6	12.6	14.0	13.7	100.0	13.7	0.0	0.3	0.0	1.0	3.4	100.0	3.4
01S0263-28 SY SOREN (P+)	5	15.8	17.6	14.8	16.2	15.8	114.8	15.8	0.0	0.7	0.0	1.0	0.3	124.8	4.2
PI679964 NS PRESSER CLP (P+)	4	14.3	14.9	12.6	16.0	14.5	104.2	14.3	0.0	0.7	0.0	1.0	0.4	125.1	4.2
ND 695 REEDER (+)	9	15.0	15.6	14.0	14.9	14.6	106.6	14.6	0.0	2.0	0.0	1.0	4.4	129.9	4.4
0150042-10 BRENNAN (P+)	6	15.9	17.5	15.2	17.0	15.9	113.9	15.7	0.0	1.7	0.0	1.0	0.4	159.9	5.4
PI671855 EGAN (+)	6	17.3	17.7	16.1	16.7	16.7	119.7	16.4	0.0	2.3	0.0	1.0	0.6	219.8	7.4
LIMAGR143 LCS PRO (P+)	3		16.5	13.5	15.3	15.1	110.0	15.1		0.7	0.0	2.3	1.0	225.2	7.6
PI676978 LANNING (++)	5	15.1	15.7	13.9	15.1	14.8	107.1	14.7	0.0	2.3	0.0	1.0	0.7	249.7	8.4
MEANS (For Entries Listed)		15.1	16.1	14.1	15.5			14.9	0.0	0.7	0.1	0.9			3.7
7/ Growing Season Precipitation (in.)		7.2	n/a	n/a	8.8	n/a	8.0								
Soil PAW (in.) to SD @ Planting		3.7	n/a	n/a	6.2	8.9	7.6								
Total Plant Available Water (in.)		10.9	n/a	n/a	15.0	n/a	15.2								
Soil NO3 (lbs.) to SD at Planting		25	n/a	n/a	n/a	23	39								
SD (Sampling Depth in Inches)		24	n/a	n/a	33	48	43								
Fertilizer Applied	(# N)	125	100	100	100	100	97								
	(# P ₂ O ₅)	20	20	20	20	20	24								
	(# K ₂ O)	10	10	10	10	10	13								
	(# S)	10	0	10	10	10	4								

Check variety is Vida.

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/ No harvest in 2017 due to hail.

5/ Percent of Vida protein or saw fly rating 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 protein or saw fly rating of a given entry for years tested, y = average protein or saw fly rating for Vida for the same years, and z = 9-Yr average protein or saw fly rating for the check variety Vida.

7/ 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. 2020. (Exp# 20-9957-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/	TEST WT Lbs/Bu	2/	3/	4/
			YIELD Bu/Ac		PROTEIN %	FN Seconds	SAWFLY %
AAC CONCORD	MeridianSeeds-sawfly	31.1	44.8	58.6	15.1	430	2.3
ALUM	WSCIA	29.2	46.7	57.8	14.7	343	10.0
BRENNAN	AGRIPR 10	26.7	52.6	61.4	14.6	384	13.3
CHOTEAU	PI 633974	26.5	45.3	59.0	15.1	424	6.7
CORBIN	BZ 996434	28.7	50.2	59.8	15.2	409	5.0
DAGMAR	PI 690450	28.4	52.1	60.4	15.0	400	2.3
DUCLAIR	PI 660981	27.6	48.0	58.2	15.2	396	5.0
EGAN	PI 671855	27.0	53.3	56.7	15.6	412	25.0
FORTUNA	CI 13596	31.5	40.4	58.3	15.2	429	6.7
LANNING	PI 676978	27.8	42.6	58.4	14.8	359	6.7
LCS PRO	LIMAGR143	30.0	40.3	58.3	14.7	368	20.0
MS CAMARO	MeridianSeeds-high protein	25.9	41.3	61.0	15.2	462	20.0
NS PRESSER CLP	PI 679964	29.2	49.7	56.5	15.6	399	21.7
REEDER	ND 695	29.0	36.0	58.4	14.8	394	13.3
SY INGMAR	AGRIPR141	28.5	41.1	57.9	15.0	413	16.7
SY SOREN	AGRIPR 14	25.2	45.0	58.6	15.3	445	16.7
VIDA	PI 642366	26.8	52.2	59.6	14.2	399	5.0
WB GUNNISON	BZ 92413R	26.9	50.5	59.3	14.1	420	1.0
WB9879CLP	WB9879CLP	25.7	50.3	59.3	14.9	427	1.0
MT 1716	MT1274/RB07	29.3	50.9	60.8	14.5	390	18.3
MT 1855	MT1053/MO8/3-4	28.5	45.9	58.7	15.0	415	5.0
MT 1866	Vida*4/Conan	26.7	45.8	59.3	15.0	421	3.7
N-1	DL 1	28.1	44.0	57.0	15.1	466	28.3
E-2	DL 2	27.8	43.0	57.9	15.2	378	2.3
W-2	DL 3	27.2	53.0	59.4	15.0	386	5.0
X-4	DL 4	29.7	46.5	57.4	14.5	352	3.7
EXPERIMENTAL MEANS		28.0	46.9	58.8	14.9	402.3	10.2
LSD (0.05)		2.0	6.6	0.9	0.7	21.9	7.9
C.V.%		4.3	8.5	1.0	2.7	3.3	47.4
P-VALUE (Varieties)		<.0001	<.0001	<.0001	0.0	<.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 (20-9957-SW)

Seeding Date: May 6, 2020
 Harvest Date: August 14, 2020
 Fertility: 100-20-10-10 side banded
 System: minimum till
 Herbicide: Vendetta (16 oz/ac)
 Insecticide: none
 Previous Crop: Chemical Fallow - Spring Wheat
 Precipitation: n/a

TABLE 8. Eight-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. 2013-2020. (Exp# 9957-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)							TEST WEIGHT (Pounds Per Bushel)								
		2016	2017	2018	2019	2020	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	8-YR COMP. AVE. YIELD 5/	2016	2017	2018	2019	2020	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/	8-YR COMP. AVE. TEST WT 5/
MT 1621 DAGMAR	3			37.8	51.9	52.1	47.3	105.5	43.1			55.3	56.3	60.4	57.3	102.3	56.9
PI642366 VIDA (+)	8	14.8	32.0	33.5	48.8	52.2	40.9	100.0	40.9	54.1	53.5	52.8	55.8	59.6	55.6	100.0	55.6
PI679964 NS PRESSER CLP (P+)	5	11.0	32.8	31.9	49.2	49.7	34.9	96.3	39.4	51.4	52.6	49.9	54.4	56.5	53.0	96.0	53.4
PI676978 LANNING (++)	6	12.2	30.9	33.2	45.3	42.6	33.5	94.2	38.5	51.4	50.4	50.2	52.6	58.4	52.7	95.9	53.3
BZ92413R WB GUNNISON (P+)(sawfly tol)	8	13.5	33.7	31.3	48.5	50.5	37.8	92.5	37.8	54.1	54.7	54.3	56.3	59.3	56.6	101.8	56.6
0150042-10 BRENNAN (P+)	7	6.9	31.1	35.2	42.8	52.6	33.8	92.4	37.7	54.9	56.1	57.1	57.2	61.4	57.4	104.5	58.1
BZ996434 CORBIN (P+)	8	12.9	30.0	32.7	46.8	50.2	37.7	92.2	37.7	53.3	53.5	55.4	55.9	59.8	56.0	100.7	56.0
PI671855 EGAN (+)	7	11.7	25.6	31.4	43.3	53.3	33.6	91.8	37.5	51.4	51.0	51.6	53.2	56.7	53.1	96.6	53.7
PI660981 DUCLAIR (+)(saw fly tol)	8	16.9	33.2	31.2	47.8	48.0	37.3	91.3	37.3	54.8	52.3	53.3	55.4	58.2	55.0	98.9	55.0
AGRIPR141 SY INGMAR (P+)	4		29.1	37.9	42.3	41.1	37.6	90.4	36.9		53.6	54.2	56.0	57.9	55.4	100.0	55.6
LIMAGR143 LCS PRO (P+)	4		33.2	33.3	40.8	40.3	36.9	88.6	36.2		53.3	51.7	54.5	58.3	54.5	98.2	54.6
IMCHT-79 WB9879CLP (P+)	8	12.4	26.7	29.9	45.9	50.3	36.2	88.5	36.2	51.8	53.6	54.6	56.2	59.3	55.7	100.2	55.7
WA 8166 ALUM (+)	5	11.3	31.0	31.4	37.9	46.7	31.7	87.3	35.7	52.9	55.3	53.3	53.5	57.8	54.6	98.9	55.0
PI633974 CHOTEAU (+)(saw fly tol)	8	10.9	25.5	29.6	48.5	45.3	34.8	85.2	34.8	52.7	52.8	53.7	54.7	59.0	55.2	99.2	55.2
01S0263-28 SY SOREN (P+)	6	8.5	28.6	35.5	28.3	45.0	29.2	82.1	33.5	53.1	54.0	53.3	53.2	58.6	54.4	99.0	55.0
ND 695 REEDER (+)	8	10.5	29.3	32.1	25.7	36.0	32.5	79.6	32.5	54.5	52.8	53.4	51.5	58.4	55.2	99.3	55.2
CI13596 FORTUNA (saw fly tol)	8	13.9	27.6	31.5	31.8	40.4	31.1	76.2	31.1	53.8	54.8	54.5	53.7	58.3	56.1	100.8	56.1
MEANS (For Entries Listed)		11.9	30.0	32.9	42.7	46.8			36.9	53.2	53.4	53.4	54.7				55.3
6/ Growing Season Precipitation (in.)		6.0	n/a	n/a	n/a	n/a	6.7										
Soil PAW (in.) to SD @ Planting		8.7	n/a	n/a	n/a	9.81	9.4										
Total Plant Available Water (in.)		14.8	n/a	n/a	n/a	9.81	14.5										
Soil NO3 (lbs.) to SD at Planting		194	n/a	n/a	n/a	197	131										
SD (Sampling Depth in Inches)		48	n/a	n/a	n/a	48	48										
Fertilizer Applied																	
	(# N)	125	100	100	100	100	103										
	(# P ₂ O ₅)	20	20	20	20	20	20										
	(# K ₂ O)	10	10	10	10	10	10										
	(# S)	10	0	10	10	10	5										

Check variety is Vida.

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 Vida yield or test weight for the same data years as those in which a given entry was tested.

5/ 8-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 Vida for the same years, and z = 8-Yr average yield or test weight for the check variety Vida.

6/ Seeding to 14 days prior to harvest maturity.

TABLE 9. Eight-Year Protein and 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. 2013-2020. (Exp# 9957-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ PROTEIN % (Adjusted to 13% grain moisture)					SAWFLY RATING (% of cut and lodged stems)										
		2016	2017	2018	2019	2020	AVE. for YEARS TESTED 3/	% of CHECK PROTEIN 4/	8-YR COMP. AVE PROTEIN 5/	2016	2017	2018	2019	2020	AVE. for YEARS TESTED 3/	% of CHECK SAWFLY 4/	8-YR COMP. AVE SAWFLY 5/
BZ92413R WB GUNNISON (P+)(sawfly tol)	8	16.6	17.7	17.1	16.0	14.1	15.8	97.3	15.8	0.0	0.0	0.7	0.3	1.0	0.5	15.0	0.5
IMICHT-79 WB9879CLP (P+)	8	17.7	18.4	17.7	15.8	14.9	16.5	101.5	16.5	0.3	0.3	0.7	1.0	1.0	1.0	31.2	1.0
MT 1621 DAGMAR	3			17.9	15.6	15.0	16.2	103.6	16.8			0.7	1.0	2.3	1.3	42.9	1.4
BZ996434 CORBIN (P+)	8	17.8	19.1	18.2	16.6	15.2	16.8	103.4	16.8	0.3	0.0	0.0	1.0	5.0	1.5	46.2	1.5
PI633974 CHOTEAU (+)(saw fly tol)	8	17.7	18.7	18.0	15.7	15.1	16.6	102.3	16.6	1.0	0.0	0.7	1.0	6.7	2.2	65.0	2.2
PI660981 DUCLAIR (+)(saw fly tol)	8	17.6	18.5	17.8	15.7	15.2	16.6	102.1	16.6	3.7	0.7	0.7	2.3	5.0	2.9	86.3	2.9
PI642366 VIDA (+)	8	17.8	18.3	17.5	15.7	14.2	16.2	100.0	16.2	5.0	0.3	0.3	4.0	5.0	3.3	100.0	3.3
CI13596 FORTUNA (saw fly tol)	8	17.8	17.7	17.2	16.3	15.2	16.4	101.1	16.4	3.7	0.3	1.0	6.7	6.7	3.3	100.0	3.3
WA 8166 ALUM (+)	5	17.1	18.4	18.6	16.6	14.7	17.1	102.3	16.6	5.0	2.3	2.3	4.0	10.0	4.7	161.4	5.4
PI679964 NS PRESSER CLP (P+)	5	18.0	18.4	17.7	15.2	15.6	17.0	101.7	16.5	2.3	2.3	1.0	5.0	21.7	6.5	220.5	7.3
0150042-10 BRENNAN (P+)	7	18.8	17.8	17.5	15.7	14.6	16.7	100.8	16.4	8.3	10.0	8.3	16.7	13.3	8.5	296.7	9.9
PI671855 EGAN (+)	7	19.9	20.7	19.9	17.0	15.6	18.4	111.0	18.0	15.0	6.7	3.7	11.7	25.0	9.5	331.7	11.1
ND 695 REEDER (+)	8	17.2	18.6	18.1	16.5	14.8	16.6	102.5	16.6	18.3	10.0	5.3	16.7	13.3	11.2	335.0	11.2
01S0263-28 SY SOREN (P+)	6	19.5	18.5	18.4	16.5	15.3	17.7	105.8	17.2	20.0	6.7	6.7	11.7	16.7	11.4	347.4	11.6
AGRIPR141 SY INGMAR (P+)	4		18.5	18.0	15.8	15.0	16.8	102.4	16.6		6.7	6.7	5.3	16.7	8.8	365.5	12.2
PI676978 LANNING (++)	6	18.5	19.0	18.8	15.6	14.8	17.3	103.5	16.8	21.7	8.3	2.3	6.7	6.7	12.3	376.3	12.5
LIMAGR143 LCS PRO (P+)	4		17.7	17.5	14.9	14.7	16.2	98.6	16.0		8.3	3.7	7.0	20.0	9.8	403.4	13.4
MEANS (For Entries Listed)		18.0	18.5	18.0	16.0	14.9			16.6	7.5	3.9	2.6	6.0	10.4			6.5
6/ Growing Season Precipitation (in.)		6.0	n/a	n/a	n/a	n/a	6.7										
Soil PAW (in.) to SD @ Planting		8.7	n/a	n/a	n/a	9.81	9.4										
Total Plant Available Water (in.)		14.8	n/a	n/a	n/a	9.81	14.5										
Soil NO3 (lbs.) to SD at Planting		194	n/a	n/a	n/a	197	131										
SD (Sampling Depth in Inches)		48	n/a	n/a	n/a	48	48										
Fertilizer Applied	(# N)	125	100	100	100	100	103										
	(# P ₂ O ₅)	20	20	20	20	20	20										
	(# K ₂ O)	10	10	10	10	10	10										
	(# S)	10	0	10	10	10	5										

Check variety is Vida.

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 Vida protein or saw fly rating for the same data years as those in which a given entry was tested.

5/ 8-Yr Comparable Average = (x/y) * z where x = average protein or saw fly rating of a given entry for years tested, y = average protein or saw fly rating for Vida for the same year and z = 8-Yr average protein or saw fly rating for the check variety Vida.

6/ 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. 2020. (Exp# 20-9953-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/	TEST WT Lbs/Bu	2/	3/	4/
			YIELD Bu/Ac		PROTEIN %	FN Seconds	SAWFLY %
ALLEGIANT 811	CHS 1	29.6	52.7	56.1	16.3	412	3.7
ALUM	WSCIA	33.9	49.0	53.7	17.1	324	3.7
BRENNAN	AGRIPR 10	28.2	54.3	59.9	15.9	397	5.3
CHOTEAU	PI 633974	31.9	48.3	55.8	16.3	404	3.7
CORBIN	BZ 996434	32.2	48.1	55.5	17.4	390	2.3
DAGMAR	PI 690450	33.8	52.9	57.5	16.4	436	2.3
DUCLAIR	PI 660981	32.8	54.4	55.3	16.5	369	3.7
EGAN	PI 671855	33.0	48.3	54.0	18.2	387	3.7
FORTUNA	CI 13596	39.2	28.2	57.0	16.5	413	5.3
LANNING	PI 676978	32.0	52.3	55.8	16.4	355	11.7
LCS PRO	LIMAGR143	37.6	39.5	54.9	16.1	373	6.7
NS PRESSER CLP	PI 679964	33.8	48.0	54.2	18.1	378	5.0
REEDER	ND 695	33.0	46.6	56.1	16.5	386	10.0
SY INGMAR	AGRIPR141	30.7	48.9	55.8	16.8	453	8.7
SY SOREN	AGRIPR 14	28.4	51.0	56.2	16.6	383	8.7
VIDA	PI 642366	33.7	51.3	55.3	16.2	414	3.7
WB GUNNISON	BZ 92413R	29.6	52.7	56.9	15.9	377	0.7
WB9879CLP	WB9879CLP	32.3	48.0	56.1	16.2	398	1.0
MT 1716	MT1274/RB07	31.1	48.5	57.1	16.2	378	11.7
MT 1855	MT1053/MO8/3-4	34.8	39.5	52.6	16.8	386	5.3
MT 1866	Vida*4/Conan	33.7	54.1	56.1	16.4	380	2.3
E-2	DL 2	35.2	46.8	54.9	16.8	325	1.0
N-1	DL 1	33.0	49.2	54.0	17.3	365	5.3
W-2	DL 3	31.6	55.8	55.4	16.4	344	2.3
X-4	DL 4	35.0	56.0	55.8	16.2	318	2.3
EXPERIMENTAL MEANS		32.8	49.0	55.7	16.6	381.7	4.8
LSD (0.05)		2.0	4.3	1.1	0.4	17.6	5.2
C.V.%		3.8	5.3	1.2	1.6	2.8	65.7
P-VALUE (Varieties)		<.0001	<.0001	<.0001	<.0001	<.0001	0.0

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 (20-9953-SW)

Seeding Date:	May 4, 2020
Harvest Date:	August 27, 2020
Fertility:	100-20-10 side banded
System:	no till
Herbicide:	none
Insecticide:	none
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	n/a

TABLE 11. Seven-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. 2014-2020. (Exp# 9953-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)					TEST WEIGHT (Pounds Per Bushel)					7-YR COMP. AVE. YIELD 5/	7-YR COMP. AVE. TEST WT 5/				
		2016	2017	2018	2019	2020	AVE. YEARS TESTED 3/	% of CHECK YIELD 4/	2016	2017	2018			2019	2020	AVE. YEARS TESTED 3/	% of CHECK TEST WT 4/
MT 1621 DAGMAR	3			44.6	69.6	52.9	55.7	102.6	40.8			57.5	60.5	57.5	58.5	103.1	56.6
PI660981 DUCLAIR (+)(saw fly tol)	7	34.2	33.7	37.0	65.8	54.4	40.2	101.0	40.2	50.5	53.6	54.6	58.8	55.3	54.1	98.7	54.1
0150042-10 BRENNAN (P+)	7	31.3	30.4	41.4	56.0	54.3	40.1	100.7	40.1	53.1	57.5	58.5	61.5	59.9	57.9	105.6	57.9
PI642366 VIDA (+)	7	23.0	33.0	41.8	69.9	51.3	39.8	100.0	39.8	48.5	55.7	55.7	59.2	55.3	54.9	100.0	54.9
PI671855 EGAN (+)	7	32.4	27.2	41.8	63.6	48.3	38.5	96.8	38.5	49.8	54.4	55.3	56.8	54.0	54.2	98.8	54.2
PI676978 LANNING (++)	6	23.8	30.8	40.8	61.3	52.3	38.9	96.7	38.5	47.4	53.9	54.6	58.5	55.8	54.1	98.0	53.8
BZ996434 CORBIN (P+)	7	26.8	35.2	37.5	59.4	48.1	37.8	95.0	37.8	50.6	55.7	55.6	59.5	55.5	55.2	100.7	55.2
BZ92413R WB GUNNISON (P+)(sawflytol)	7	18.3	35.1	37.3	58.6	52.7	37.6	94.5	37.6	51.8	56.0	55.6	58.9	56.9	55.8	101.7	55.8
ND 695 REEDER (+)	7	23.1	31.6	40.1	64.5	46.6	37.5	94.1	37.5	50.2	55.4	55.7	59.0	56.1	55.3	100.8	55.3
0150263-28 SY SOREN (P+)	6	25.9	28.8	36.4	61.8	51.0	36.8	91.4	36.4	49.0	54.6	54.7	59.6	56.2	54.8	99.4	54.5
IMICHT-79 WB9879CLP (P+)	7	21.4	28.3	36.3	60.3	48.0	35.1	88.1	35.1	48.9	55.7	56.6	58.2	56.1	55.2	100.6	55.2
AGRIPR141 SY INGMAR (P+)	4		27.0	32.7	62.6	48.9	42.8	87.4	34.8		55.1	53.1	59.9	55.8	56.0	99.1	54.4
PI679964 NS PRESSER CLP (P+)	5	12.0	29.1	39.8	62.3	48.0	38.2	87.3	34.8	46.1	54.4	54.8	57.4	54.2	53.4	97.3	53.4
PI633974 CHOTEAU (+)(saw fly tol)	7	24.8	26.4	36.2	55.9	48.3	34.3	86.1	34.3	49.6	55.3	56.3	57.8	55.8	54.8	100.0	54.8
WA 8166 ALUM (+)	5	22.4	24.1	37.2	53.3	49.0	37.2	85.0	33.8	51.4	58.4	55.5	54.7	53.7	54.8	99.8	54.7
CH13596 FORTUNA (saw fly tol)	7	24.6	26.1	38.3	53.6	28.2	31.8	79.8	31.8	53.2	56.6	57.3	58.5	57.0	56.5	103.0	56.5
LIMAGR143 LCS PRO (P+)	4		26.1	34.1	56.4	39.5	39.0	79.7	31.7		54.0	53.6	56.5	54.9	54.7	96.9	53.2
MEANS (For Entries Listed)		24.6	29.6	38.4	60.9	48.3			36.7	50.0	55.4	55.6	58.6				55.0
6/ Growing Season Precipitation (in.)		8.3	2.8	n/a	n/a	n/a	5.3										
Soil PAW (in.) to SD @ Planting		n/a	n/a	n/a	n/a	n/a	11.7										
Total Plant Available Water (in.)		n/a	n/a	n/a	n/a	n/a	14.8										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	n/a	n/a	n/a	254										
SD (Sampling Depth in Inches)		48	n/a	n/a	n/a	n/a	48										
Fertilizer Applied	(# N)	125	100	100	100	100	104										
	(# P2O5)	20	20	20	20	20	20										
	(# K2O)	10	10	10	10	10	10										
	(# S)	10	0	0	0	0	1										

Check variety is Vida.

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 Vida 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 Vida for the same years, and z = 7-Yr average yield or test weight for the check variety Vida.

6/ Seeding to 14 days prior to harvest maturity.

TABLE 12. Seven-Year Protein and Sawfly 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. 2014-2020. (Exp# 9953-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ PROTEIN % (Adjusted to 13% grain moisture)					SAWFLY RATING (% of cut and lodged stems)					AVE. for YEARS TESTED 3/	% of CHECK SAWFLY 4/	7-YR COMP. AVE. PROTEIN 4/	7-YR COMP. AVE. SAWFLY 5/		
		2016	2017	2018	2019	2020	2016	2017	2018	2019	2020						
		AVE. for YEARS TESTED 3/	% of CHECK PROTEIN 4/	7-YR COMP. AVE. PROTEIN 4/	2016	2017	2018	2019	2020	AVE. for YEARS TESTED 3/	% of CHECK SAWFLY 4/					7-YR COMP. AVE. SAWFLY 5/	
BZ92413R WB GUNNISON (P+)(sawfly tol)	7	16.4	16.6	16.8	14.5	15.9	16.2	98.0	16.2	4.0	0.3	0.5	0.7	0.7	1.4	27.6	1.4
IMICHT-79 WB9879CLP (P+)	7	16.9	17.5	15.7	15.6	16.2	16.6	100.8	16.6	10.3	1.0	1.3	1.0	1.0	2.6	51.4	2.6
PI633974 CHOTEAU (+)(saw fly tol)	7	17.1	17.7	15.8	15.5	16.3	16.8	101.8	16.8	5.3	2.0	0.8	1.0	3.7	2.6	51.9	2.6
BZ996434 CORBIN (P+)	7	17.1	17.8	17.2	15.3	17.4	17.2	104.2	17.2	13.3	0.7	2.3	3.7	2.3	3.3	65.4	3.3
PI660981 DUCLAIR (+)(saw fly tol)	7	17.0	17.8	16.6	15.0	16.5	16.9	102.4	16.9	6.7	3.7	1.5	5.0	3.7	3.6	71.5	3.6
MT 1621 DAGMAR	3			16.0	15.3	16.4	15.9	101.7	16.8			1.0	5.0	2.3	2.8	86.2	4.4
PI642366 VIDA (+)	7	17.6	17.1	16.0	14.8	16.2	16.5	100.0	16.5	5.3	2.3	2.3	3.7	3.7	5.1	100.0	5.1
CI13596 FORTUNA (saw fly tol)	7	17.3	17.5	15.6	15.1	16.5	16.5	100.3	16.5	11.7	2.3	10.8	5.3	5.3	6.0	118.2	6.0
050042-10 BRENNAN (P+)	7	16.9	17.1	15.7	15.4	15.9	16.4	99.2	16.4	3.7	6.7	14.2	25.0	5.3	8.5	167.8	8.5
WA 8166 ALUM (+)	5	17.4	17.3	16.7	16.4	17.1	17.0	103.9	17.1	11.7	3.7	3.8	6.7	3.7	5.9	170.2	8.7
PI 671855 EGAN (+)	7	18.8	19.2	17.0	16.4	18.2	18.1	109.9	18.1	5.0	13.3	10.8	21.7	3.7	8.7	171.6	8.7
PI 679964 NS PRESSER CL+	4		17.5	15.8	15.1	18.1	16.6	103.8	17.1	18.3	6.7	0.3	6.7	5.0	7.4	213.5	10.9
ND 695 REEDER (+)	7	17.6	17.6	16.1	15.4	16.5	16.9	102.3	16.9	16.7	13.3	8.3	23.3	10.0	11.2	219.6	11.2
050263-28 SY SOREN (P+)	6	18.2	18.1	16.7	15.4	16.6	17.3	105.4	17.4	6.7	15.0	6.7	15.0	8.7	8.7	300.1	15.3
AGRIPR 141 SY INGMAR (P+)	4		17.8	17.5	15.4	16.8	16.9	105.3	17.4		6.7	5.2	23.3	8.7	11.0	365.3	18.6
PI 676978 LANNING (++)	6	17.7	18.0	15.8	15.6	16.4	16.9	102.8	17.0	18.3	13.3	1.7	31.7	11.7	12.8	442.4	22.5
LIMAGR143 LCS PRO (P+)	4		17.6	16.4	15.3	16.1	16.3	102.0	16.8		11.7	14.2	31.7	6.7	16.0	534.7	27.2
MEANS (For Entries Listed)		17.4	17.6	16.3	15.4	16.6			16.9	9.4	6.8	5.6	12.4				9.2
6/ Growing Season Precipitation (in.)		8.3	2.8	n/a	n/a	n/a	5.3										
Soil PAW (in.) to SD @ Planting		n/a	n/a	n/a	n/a	n/a	11.7										
Total Plant Available Water (in.)		n/a	n/a	n/a	n/a	n/a	14.8										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	n/a	n/a	n/a	254										
SD (Sampling Depth in Inches)		48	n/a	n/a	n/a	n/a	48										
Fertilizer Applied	(# N)	125	100	100	100	100	104										
	(# P2O5)	20	20	20	20	20	20										
	(# K2O)	10	10	10	10	10	10										
	(# S)	10	0	0	0	0	1										

Check variety is Vida.

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 Vida protein or saw fly 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 protein or saw fly rating of a given entry for years tested, y = average protein or saw fly rating for Vida for the same years, and z = 7-Yr average protein or saw fly rating for the check variety Vida.

6/ Seeding to 14 days prior to harvest maturity.