

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

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Lyle 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, and durum production together in the five counties (Blaine, Chouteau, Hill, Liberty, and Phillips), represents nearly 29 percent of the 2017-2021 statewide cereal production totals (43 percent for winter wheat, 28 percent for spring wheat, 22 percent for barley and 5 percent for durum). 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 2022 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 | S20-T27N-R10E |
| 4. Kammerzell Farm, Liberty County | S11-T31N-R5E |

All four spring wheat trials consisted of 25 entries, and were seeded in replicated, 3-row, 22-foot plots on a 12-inch row spacing, utilizing a self-propelled cone seeder with Atom Jet paired row openers. All rows of each plot were trimmed to a harvest length of 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' small 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 37 bu/ac (Table 1), double the average seed yield of 2021. Montana State University breeding line 'MT 1939' was the top yielding entry producing just under 46 bu/ac. No other entry produced yields statistically equal to that of MT 1939. Test weights of all spring wheat entries for this site averaged just under 60 lb/bu. After years of minimal wheat stem sawfly infestation, cutting in the spring wheat trial at Turner increased to about six percent, overall. Plant height, yield, test weight, protein, falling number and sawfly cutting data for the 2022 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 (2013-2022) 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. Based on the comparable average calculations, 'Vida', 'Lanning' and 'Dagmar' are the highest yielding varieties at Turner.

Loring spring wheat yields averaged just under 24 bu/ac with breeding line MT 1939 producing the highest seed yield at over 27 bu/ac (Table 4). Dagmar, 'Reeder' and six additional breeding lines produced seed yields statistically equal to that of MT 1939. After seven consecutive years of virtually nonexistent wheat stem sawfly cutting, Loring also had a rise in sawfly damage similar to that at Turner. Plant height, yield, test weight, moisture, protein, falling number and wheat stem sawfly cutting data for the 2022 Loring dryland spring wheat trial are summarized in Table 4. Nine-year comparable averages (2013-2022) 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. Based on the comparable average calculations, Vida and Lanning are the highest yielding varieties at Loring.

Loma spring wheat seed yields for 2022 averaged nearly 28 bu/ac (Table 7), double the yield of 2021. Dagmar was the highest yielding entry at just under 34 bu/ac and MSU breeding line MT 1939 was the only entry to produce a yield statistically equal to that of Dagmar. Wheat stem sawfly damage in the spring wheat small plot scenario was high, averaging just under 40 percent cut and ranging from 3.7 to 78.3 percent cut. Plant height, yield, test weight, protein, falling number and sawfly cutting data for the 2022 Loma dryland spring wheat trial are summarized in Table 7. Ten-year comparable averages for spring wheat seed yield and test weight at Loma are summarized in Table 8, while ten-year comparable averages for protein content and wheat stem sawfly cutting are summarized in Table 9. Based on the comparable average calculations, Dagmar and Vida are the highest yielding varieties at Loma, while WB Gunnison, WB9879CLP and Dagmar have lowest percent sawfly cutting.

Spring wheat seed yields at Chester averaged just under 27 bu/ac, while test weights averaged just under 56 lb/bu (Table 10). 'NS Presser CLP' was the highest yielding entry at just under 32 bu/ac. Seed yields of Dagmar and 'Duclair', along with four MSU breeding lines produced yields statistically equal to that of NS Presser CLP. Sawfly cutting in the small plot scenario averaged just under 7 percent in 2022. Plant height, yield, test weight, protein, falling number and sawfly cutting data for the 2022 Chester dryland spring wheat trial are summarized in Table 10. Nine-year comparable averages for spring wheat seed yield and test weight at Chester are summarized in Table 11, while nine-year comparable averages for protein content and wheat stem sawfly cutting are summarized in Table 12. Based on the comparable average calculations, Dagmar is the highest yielding variety at Chester, and has the second lowest percent sawfly cutting.

Summary:

Cropping environments for 2022 started out cooler and drier than average with very few meaningful rain events from March through May. During the first week of June, over an inch of precipitation was received in many areas across northcentral Montana, resulting in better than anticipated spring crop yields. The month of June through mid-July was cooler than average, giving crops time to head, flower and mature prior to being hit with high temperatures typical of the season. Overall lack of precipitation kept the majority of northcentral Montana in a severe to extreme drought throughout 2022, which resulted in reduced seed yields and low test weights. In comparison to other trial sites, Turner

received significantly more rainfall events throughout the season, which is reflected in the spring wheat and durum seed yields. The Chester area was not as fortunate, starting out the season with low soil moisture, and continuing that trend throughout the summer. The Turner, Loma and Chester sites were all seeded into chemical fallow and the Loring location was seeded into chemical fallow ground that had been minimally tilled to eliminate potential weed issues.

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-eighth 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 2022 marking 39 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: Tracy Gorecki, Cleta Lamb, Kyla McNamara, Teresa Miller, and Emily Tripp.

TABLE 1. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Max Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2022. (Exp# 22-9951-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/	TEST WT Lbs/Bu	2/	3/	4/
			YIELD Bu/Ac		PROTEIN %	FN Seconds	SAWFLY %
BRENNAN	AGRIPR 10	20.8	32.2	60.6	16.4	432	3.7
CHOTEAU	PI 633974	22.9	35.0	59.1	15.4	376	2.3
CORBIN	BZ 996434	22.4	32.2	60.2	14.9	381	3.7
DAGMAR	PI 690450	23.2	38.3	59.4	15.6	378	5.3
DUCLAIR	PI 660981	22.5	34.2	58.7	15.6	369	3.7
LANNING	PI 676978	21.9	40.1	59.1	16.1	370	10.0
MT SIDNEY	MT 1716	23.9	37.1	60.4	15.9	399	8.3
NS PRESSER CLP	PI 679964	24.1	36.1	59.5	15.3	392	5.3
REEDER	ND 695	24.1	37.6	59.4	15.5	378	11.7
SY INGMAR	AGRIPR141	21.9	33.6	60.5	16.1	436	11.7
SY SOREN	AGRIPR 14	21.7	33.3	60.5	16.2	414	5.0
VIDA	PI 642366	24.0	39.8	59.2	15.2	374	8.3
WB GUNNISON	BZ 92413R	22.9	37.0	60.4	14.6	396	3.7
WB9879CLP	WB9879CLP	22.9	33.6	59.2	15.4	405	1.0
MT 1809	VIDA/MO 09/3-4	21.9	39.3	58.7	15.5	391	5.0
MT 1939	LANNING//MT1018//CHOTEAU/YELLOW	23.6	45.9	59.3	15.0	384	3.7
MT 2007	LANNING/ND819	22.6	38.5	59.5	14.9	387	8.3
MT 2013	MT 1542/ND819	23.6	35.9	60.4	15.3	424	3.7
MT 2022	MT 1401/ND 819	21.4	37.9	60.1	14.8	391	5.3
MT 2030	LANNING/MT 1338	21.5	40.0	59.8	14.6	401	6.7
MT 2038	LANNING/MT1133//MT0744/MT0614	23.2	37.6	59.1	15.7	411	10.0
MT 2049	LANNING/MT 1415	21.9	42.5	58.3	15.6	384	8.3
MT 2050	MT 1542/MT 1415	22.7	32.7	59.1	14.4	391	5.3
MT 2054	LANNING/MT 1528	25.4	38.0	59.3	15.6	397	2.3
MT 2063	MT 1572/MT1133//CHOTEAU/YELLOWS	22.6	38.1	60.2	14.5	363	5.3
EXPERIMENTAL MEANS		22.8	37.1	59.6	15.4	363.0	5.9
LSD (0.05)		1.2	3.2	0.5	0.7	18.1	4.9
C.V.%		3.2	5.3	0.5	2.6	2.8	50.5
P-VALUE (Varieties)		<.0001	<.0001	<.0001	<.0001	<.0001	0.0008

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 (22-9951-SW)

Seeding Date: May 3, 2022
 Harvest Date: August 18, 2022
 Fertility: 46-9-5-5 side banded
 System: No Till
 Herbicide: Vendetta (20 oz/ac), Discover (12.8 oz/ac)
 Insecticide: none
 Previous Crop: Chemical Fallow - Winter Wheat
 Precipitation: 5.22" seeding to harvest maturity*

* Precip from NOAA website

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. 2013-2022. (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/						
		2018	2019	2020	2021	2022	AVE for YEARS TESTED 3/	% of CHECK YIELD 4/	AVE for YEARS TESTED 3/			% of TEST WT 4/					
PI642366 VIDA (+)	9	39.3	58.5	56.8	20.4	39.8	43.2	100.0	43.2	60.4	57.0	58.7	57.7	59.2	59.1	100.0	59.1
PI676978 LANNING (+)	8	39.5	55.8	54.8	18.8	40.1	39.5	98.2	42.4	59.3	56.0	58.7	56.6	59.1	58.5	99.5	58.8
PI 690450 DAGMAR (+)	5	35.4	56.1	53.6	21.1	38.3	40.9	95.2	41.1	60.5	58.1	59.3	58.5	59.4	59.2	101.0	59.6
PI679964 NS PRESSER CLP (P+)	7	40.4	57.1	46.1	23.8	36.1	36.7	92.3	39.8	59.4	54.9	56.6	58.2	59.5	57.2	98.1	58.0
ND 695 REEDER (+)	9	36.8	50.8	54.4	17.9	37.6	39.7	91.9	39.7	60.0	57.0	58.3	57.0	59.4	59.4	100.5	59.4
MT 1716 MT SIDNEY (++)	4		51.6	51.7	17.8	37.1	39.6	90.2	38.9		58.0	59.8	58.3	60.4	59.1	101.7	60.1
PI660981 DUCLAIR (+)(saw fly tol)	9	28.7	53.7	49.7	15.8	34.2	37.7	87.3	37.7	59.3	56.1	58.0	53.7	58.7	58.0	98.1	58.0
IMICHT-79 WB9879CLP (P+)	9	32.6	53.8	50.1	18.8	33.6	37.5	86.8	37.5	60.5	57.1	58.8	57.1	59.2	59.3	100.4	59.3
AGRIPR141 SY INGMAR (P+)	6	39.0	48.2	51.6	17.7	33.6	34.3	85.8	37.0	61.9	58.9	59.8	58.5	60.5	60.2	102.4	60.5
BZ996434 CORBIN (P+)	9	30.2	52.2	48.3	17.1	32.2	36.8	85.3	36.8	60.9	57.2	59.1	57.6	60.2	59.8	101.2	59.8
BZ902413 WB GUNNISON (P+)(sawfly tol)	9	37.7	47.6	50.7	15.3	37.0	36.8	85.2	36.8	60.8	58.8	59.2	56.7	60.4	59.9	101.4	59.9
01S0263-28 SY SOREN (P+)	8	32.1	52.1	53.3	15.8	33.3	33.9	84.4	36.4	61.5	58.1	59.2	56.6	60.5	59.3	100.8	59.6
PI633974 CHOTEAU (+)(saw fly tol)	9	37.0	53.1	46.4	17.5	35.0	36.2	83.8	36.2	60.2	56.2	58.5	55.9	59.1	58.7	99.3	58.7
0150042-10 BRENNAN (P+)	8	37.2	51.6	46.4	13.8	32.2	32.8	81.5	35.2	61.5	59.7	60.8	56.3	60.6	60.4	102.7	60.7
MEANS (For Entries Listed)		35.8	53.0	51.0	18.0	35.7			38.5	60.5	57.4	58.9	57.1	59.7			59.4
6/ Growing Season Precipitation (in.)		4.0	3.0	5.9	3.5	5.2	6.1										
Soil PAW (in.) to SD @ Planting		n/a	6.3	n/a	n/a	n/a	7.1										
Total Plant Available Water (in.)		n/a	9.3	n/a	n/a	n/a	16.4										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	n/a	n/a	n/a	52										
SD (Sampling Depth in Inches)		n/a	19	n/a	n/a	n/a	42										
Fertilizer Applied	(# N)	100	100	100	100	46	97										
	(# P2O5)	20	20	20	20	9	19										
	(# K2O)	10	10	10	10	5	10										
	(# S)	10	10	10	10	5	6										

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.

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. 2013-2022. (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)										
		2018	2019	2020	2021	2022	AVE for YEARS TESTED 3/	% of CHECK PROTEIN 4/	9-YR COMP. AVE PROTEIN 5/	2018	2019	2020	2021	2022	AVE for YEARS TESTED 3/	% of CHECK SAWFLY 4/	9-YR COMP. AVE SAWFLY 5/
IMICHT-79 WB9879CLP (P+)	9	17.1	15.8	16.0	16.2	15.4	15.8	106.0	15.8	0.0	0.3	0.0	1.0	1.0	0.5	31.7	0.5
BZ902413 WB GUNNISON (P+)(sawfly tol)	9	15.2	14.3	15.0	15.5	14.6	14.7	98.6	14.7	0.7	0.3	0.0	0.7	3.7	0.7	43.9	0.7
PI660981 DUCLAIR (+)(saw fly tol)	9	16.2	15.3	15.7	16.4	15.6	15.3	102.8	15.3	0.3	0.3	0.3	1.0	3.7	1.1	73.1	1.1
PI633974 CHOTEAU (+)(saw fly tol)	9	16.8	15.5	16.0	16.3	15.4	15.7	105.2	15.7	0.0	0.3	0.0	0.7	2.3	1.1	73.1	1.1
BZ996434 CORBIN (P+)	9	16.5	15.5	15.7	16.4	14.9	15.4	103.2	15.4	1.0	1.0	0.0	2.3	3.7	1.1	75.6	1.1
PI 690450 DAGMAR (+)	5	16.3	15.5	16.0	16.2	15.6	15.9	105.4	15.7	0.7	0.7	0.0	1.7	5.3	1.7	83.3	1.3
PI642366 VIDA (+)	9	15.3	15.3	14.6	15.3	15.2	14.9	100.0	14.9	0.0	0.7	0.3	0.7	8.3	1.5	100.0	1.5
MT 1716 MT SIDNEY (++)	4		15.6	15.5	16.5	15.9	15.9	105.2	15.7		0.7	0.0	2.0	8.3	2.8	110.0	1.7
PI679964 NS PRESSER CLP (P+)	7	15.9	15.2	16.7	14.9	15.3	15.6	103.0	15.4	0.3	0.3	1.0	5.0	5.3	2.2	151.6	2.3
01S0263-28 SY SOREN (P+)	8	17.0	15.7	16.1	17.3	16.2	16.3	108.5	16.2	0.7	1.0	0.7	6.7	5.0	1.9	163.3	2.5
AGRIPR141 SY INGMAR (P+)	6	16.5	15.7	16.0	16.3	16.1	16.4	107.8	16.1	0.0	0.3	0.3	5.0	11.7	2.9	167.8	2.5
ND 695 REEDER (+)	9	16.5	15.9	15.8	16.1	15.5	15.6	104.5	15.6	0.7	0.7	1.0	3.7	11.7	2.8	185.3	2.8
0150042-10 BRENNAN (P+)	8	17.4	15.4	16.0	16.8	16.4	16.2	107.8	16.1	0.7	1.0	1.0	11.7	3.7	2.3	196.0	3.0
PI676978 LANNING (+)	8	16.9	15.6	15.9	15.9	16.1	15.9	105.6	15.7	1.0	0.7	0.3	10.0	10.0	2.8	246.8	3.7
MEANS (For Entries Listed)		16.4	15.5	15.8	16.1	15.6			15.6	0.5	0.6	0.4	3.7	6.0			1.8
6/ Growing Season Precipitation (in.)		4.0	3.0	5.9	3.5	5.2	6.1										
Soil PAW (in.) to SD @ Planting		n/a	6.3	n/a	n/a	n/a	7.1										
Total Plant Available Water (in.)		n/a	9.3	n/a	n/a	n/a	16.4										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	n/a	n/a	n/a	52										
SD (Sampling Depth in Inches)		n/a	19	n/a	n/a	n/a	42										
Fertilizer Applied																	
	(# N)	100	100	100	100	46	97										
	(# P2O5)	20	20	20	20	9	19										
	(# K2O)	10	10	10	10	5	10										
	(# S)	10	10	10	10	5	6										

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.

TABLE 4. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Flansaa-Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 2022. (Exp# 22-9955-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/	TEST WT Lbs/Bu	2/	3/	4/
			YIELD Bu/Ac		PROTEIN %	FN Seconds	SAWFLY %
BRENNAN	AGRIPR 10	20.2	22.8	59.6	14.9	445.2	8.3
CHOTEAU	PI 633974	21.8	21.7	58.2	14.4	398.3	2.3
CORBIN	BZ 996434	21.7	23.1	58.9	14.5	409.8	1.0
DAGMAR	PI 690450	21.2	25.0	59.0	15.0	424.5	1.0
DUCLAIR	PI 660981	20.2	20.3	57.8	15.0	368.7	<u>0.7</u>
LANNING	PI 676978	20.6	20.3	57.9	14.9	397.1	11.7
MT SIDNEY	MT 1716	20.7	24.3	58.8	14.3	408.7	8.7
NS PRESSER CLP	PI 679964	22.2	23.3	57.3	14.4	355.6	11.7
REEDER	ND 695	21.6	25.2	58.9	14.5	406.5	10.0
SY INGMAR	AGRIPR141	21.1	23.2	59.1	15.0	450.4	13.3
SY SOREN	AGRIPR 14	20.1	21.9	58.2	15.0	450.7	8.3
VIDA	PI 642366	21.7	23.4	58.1	13.7	383.0	5.3
WB GUNNISON	BZ 92413R	20.8	22.0	60.0	13.8	444.4	1.0
WB9879CLP	WB9879CLP	21.0	21.4	58.6	14.6	441.2	<u>0.7</u>
MT 1809	VIDA/M0 09/3-4	21.5	21.0	57.1	14.7	432.7	6.7
MT 1939	LANNING///MT1018//CHOTEAU/YELLOW	20.8	27.5	58.9	14.2	421.7	1.0
MT 2007	LANNING/ND819	21.2	21.8	58.9	14.2	412.2	13.3
MT 2013	MT 1542/ND819	22.6	25.6	59.2	15.1	464.3	3.7
MT 2022	MT 1401/ND 819	21.2	25.6	59.1	14.4	420.5	2.3
MT 2030	LANNING/MT 1338	21.0	24.5	57.9	14.0	411.5	5.0
MT 2038	LANNING/MT1133//MT0744/MT0614	21.3	22.9	59.1	14.3	418.7	1.0
MT 2049	LANNING/MT 1415	21.9	26.3	57.4	14.0	386.7	11.7
MT 2050	MT 1542/MT 1415	22.4	26.3	57.8	13.8	399.4	2.3
MT 2054	LANNING/MT 1528	23.6	25.5	59.5	14.1	418.0	2.3
MT 2063	MT 1572/MT1133//CHOTEAU/YELLOWS*	21.5	25.2	59.4	14.4	398.0	5.0
EXPERIMENTAL MEANS		21.4	23.6	58.6	14.4	414.7	5.5
LSD (0.05)		1.2	2.9	0.6	0.3	21.3	5.0
C.V.%		3.5	7.4	0.6	1.5	3.1	54.7
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 (22-9955-SW)

Seeding Date:	April, 29, 2022
Harvest Date:	August 18, 2022
Fertility:	46-9-5-5 side banded
System:	Minimum Till
Herbicide:	OpenSky (16 oz/ac)
Insecticide:	Roundhouse (4 oz/ac)
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	2.62" 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. 2013-2022. (Exp# 9955-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/				
		2018	2019	2020	2021	2022	AVE for YEARS TESTED 3/	% of CHECK YIELD 4/	2018	2019	2020			2021	2022	AVE for YEARS TESTED 3/	% of CHECK TEST WT 4/
PI642366 VIDA (+)	9	38.7	65.8	53.4	35.1	23.4	49.3	100.0	49.3	61.5	59.3	61.0	58.9	58.1	59.6	100.0	59.6
PI676978 LANNING (+)	7	36.7	56.6	49.0	36.3	20.3	43.5	95.8	47.2	60.9	58.7	61.1	56.6	57.9	59.4	99.2	59.1
PI679964 NS PRESSER CLP (+)	6	40.2	63.4	43.7	32.1	23.3	40.7	91.8	45.2	61.1	58.4	59.1	58.0	57.3	58.7	98.0	58.4
ND 695 REEDER (+)	9	36.7	53.1	44.7	30.1	25.2	44.6	90.6	44.6	61.3	59.3	61.1	58.5	58.9	60.0	100.7	60.0
PI 690450 DAGMAR (+)	5	36.0	55.4	45.2	32.9	25.0	38.9	89.9	44.3	61.8	59.3	61.4	59.2	59.0	60.1	100.6	60.0
MT 1716 MT SIDNEY (++)	4		57.7	42.6	33.8	24.3	39.6	89.1	43.9		59.7	61.7	59.5	58.8	59.9	101.0	60.2
AGRIPR141 SY INGMAR (P+)	5	32.7	55.1	43.1	28.5	23.2	36.5	84.4	41.6	62.3	60.5	62.3	58.4	59.1	60.5	101.3	60.4
IMICHT-79 WB9879CLP (P+)	9	31.5	50.8	43.4	33.7	21.4	41.3	83.8	41.3	61.0	58.7	60.4	57.9	58.6	59.0	99.1	59.0
01S0263-28 SY SOREN (P+)	7	28.9	56.0	38.5	31.4	21.9	37.9	83.6	41.2	62.2	59.8	61.9	58.4	58.2	60.2	100.6	59.9
BZ996434 CORBIN (P+)	9	34.6	52.7	39.7	31.3	23.1	41.1	83.5	41.1	62.0	59.2	61.6	59.3	58.9	60.0	100.7	60.0
PI660981 DUCLAIR (+)(saw fly tol)	9	31.4	53.6	35.2	30.0	20.3	40.3	81.8	40.3	60.0	58.2	59.3	57.0	57.8	58.3	97.8	58.3
BZ902413 WB GUNNISON (P+)(sawfly tol)	9	31.7	49.0	39.0	28.9	22.0	40.2	81.7	40.2	62.0	60.6	61.6	59.2	60.0	60.6	101.7	60.6
PI633974 CHOTEAU (+)(saw fly tol)	9	31.9	49.2	41.3	32.4	21.7	40.2	81.7	40.2	60.6	58.8	60.5	58.1	58.2	58.9	98.8	58.9
0150042-10 BRENNAN (P+)	8	21.8	44.2	33.0	28.9	22.8	34.6	74.4	36.6	62.0	60.1	61.2	59.4	59.6	60.3	101.5	60.5
MEANS (For Entries Listed)		33.3	54.5	42.3	31.8	22.7			42.6	61.4	59.3	61.0	58.5	58.6			59.6
6/ Growing Season Precipitation (in.)		n/a	8.8	n/a	5.8	2.6	6.9										
Soil PAW (in.) to SD @ Planting		n/a	6.2	8.9	8.6	7.4	7.6										
Total Plant Available Water (in.)		n/a	15.0	n/a	14.4	10.0	14.3										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	23	36	62	41										
SD (Sampling Depth in Inches)		n/a	33	48	48	44	43										
Fertilizer Applied	(# N)	100	100	100	100	46	97										
	(# P ₂ O ₅)	20	20	20	20	9	19										
	(# K ₂ O)	10	10	10	10	5	10										
	(# S)	10	10	10	10	5	6										

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. No harvest in 2017 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.

TABLE 6. Nine-Year Protein and 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. 2013-2022. (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)										
		2018	2019	2020	2021	2022	AVE for YEARS TESTED 3/	% of CHECK PROTEIN 4/	9-YR COMP. AVE PROTEIN 5/	2018	2019	2020	2021	2022	AVE for YEARS TESTED 3/	% of CHECK SAWFLY 4/	9-YR COMP. AVE SAWFLY 5/
PI660981 DUCLAIR (+)(saw fly tol)	9	15.8	13.7	15.6	16.2	15.0	14.9	106.9	14.9	0.0	0.0	0.3	0.3	0.7	0.2	20.9	0.2
IMICHT-79 WB9879CLP (P+)	9	16.6	14.8	16.2	16.3	14.6	15.4	110.1	15.4	0.3	0.0	0.7	0.0	0.7	0.2	25.1	0.2
PI 690450 DAGMAR (+)	5	16.3	13.8	15.7	16.1	15.0	15.4	110.0	15.3	0.0	0.0	0.7	0.3	1.0	0.4	27.3	0.2
BZ996434 CORBIN (P+)	9	16.1	13.8	15.7	16.2	14.5	14.9	106.7	14.9	0.3	0.0	0.0	0.0	1.0	0.3	29.7	0.3
BZ902413 WB GUNNISON (P+)(sawfly tol)	9	14.9	14.2	14.8	15.4	13.8	14.3	102.7	14.3	0.3	0.0	0.3	0.3	1.0	0.3	37.7	0.3
PI633974 CHOTEAU (+)(saw fly tol)	9	16.2	14.5	15.4	16.0	14.4	15.0	107.8	15.0	0.0	0.0	1.0	0.7	2.3	0.6	71.6	0.6
PI642366 VIDA (+)	9	14.6	12.6	14.0	15.0	13.7	13.9	100.0	13.9	0.3	0.0	1.0	0.7	5.3	0.9	100.0	0.9
MT 1716 MT SIDNEY (++)	4		13.8	15.9	15.9	14.3	15.0	107.9	15.1		0.0	1.0	0.3	8.7	2.5	142.9	1.3
01S0263-28 SY SOREN (P+)	7	17.6	14.8	16.2	16.6	15.0	15.8	113.4	15.8	0.7	0.0	1.0	1.0	8.3	1.6	149.9	1.3
0150042-10 BRENNAN (P+)	8	17.5	15.2	17.0	16.4	14.9	15.8	112.6	15.7	1.7	0.0	1.0	0.7	8.3	1.5	152.2	1.3
PI679964 NS PRESSER CLP (P+)	6	14.9	12.6	16.0	15.1	14.4	14.6	103.7	14.5	0.7	0.0	1.0	0.7	11.7	2.3	190.9	1.7
AGRIPR141 SY INGMAR (P+)	5	16.7	14.0	16.0	16.6	15.0	15.6	111.8	15.6	0.3	0.0	0.7	0.0	13.3	2.9	195.4	1.7
ND 695 REEDER (+)	9	15.6	14.0	14.9	16.3	14.5	14.9	106.7	14.9	2.0	0.0	1.0	0.7	10.0	1.9	209.7	1.9
PI676978 LANNING (+) (++)	7	15.7	13.9	15.1	16.1	14.9	15.0	107.3	15.0	2.3	0.0	1.0	2.0	11.7	2.4	231.7	2.1
MEANS (For Entries Listed)		16.0	14.0	15.6	16.0	14.6			15.0	0.7	0.0	0.8	0.5	6.0			1.0
6/ Growing Season Precipitation (in.)		n/a	8.8	n/a	5.8	2.6	6.9										
Soil PAW (in.) to SD @ Planting		n/a	6.2	8.9	8.6	7.4	7.6										
Total Plant Available Water (in.)		n/a	15.0	n/a	14.4	10.0	14.3										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	23	36	62	41										
SD (Sampling Depth in Inches)		n/a	33	48	48	44	43										
Fertilizer Applied	(# N)	100	100	100	100	46	97										
	(# P ₂ O ₅)	20	20	20	20	9	19										
	(# K ₂ O)	10	10	10	10	5	10										
	(# S)	10	10	10	10	5	6										

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. No harvest in 2017 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.

TABLE 7. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2022. (Exp# 22-9957-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/	TEST WT Lbs/Bu	2/	3/	4/
			YIELD Bu/Ac		PROTEIN %	FN Seconds	SAWFLY %
BRENNAN	AGRIPR 10	24.0	28.1	57.0	16.2	470.3	71.7
CHOTEAU	PI 633974	23.6	25.5	54.5	16.6	397.7	13.3
CORBIN	BZ 996434	24.4	25.3	55.3	16.9	388.5	10.0
DAGMAR	PI 690450	25.0	33.7	55.8	16.5	403.4	7.0
DUCLAIR	PI 660981	25.2	27.1	54.0	16.7	370.3	8.7
LANNING	PI 676978	22.6	25.8	53.0	16.9	431.3	78.3
MT SIDNEY	MT 1716	22.9	26.4	55.9	16.4	406.2	78.3
NS PRESSER CLP	PI 679964	25.5	25.1	52.0	16.1	338.6	53.3
REEDER	ND 695	24.7	24.5	54.5	16.2	397.5	70.0
SY INGMAR	AGRIPR141	24.4	24.0	53.7	16.8	497.1	73.3
SY SOREN	AGRIPR 14	23.3	25.7	53.8	17.0	500.2	63.3
VIDA	PI 642366	25.1	29.9	54.6	15.9	368.0	31.7
WB GUNNISON	BZ 92413R	22.4	28.4	54.9	15.8	429.1	3.7
WB9879CLP	WB9879CLP	22.1	25.6	54.9	16.7	412.9	5.3
MT 1809	VIDA/MO 09/3-4	24.1	28.9	53.2	16.7	406.1	48.3
MT 1939	LANNING//MT1018//CHOTEAU/YELLOW	24.1	32.7	54.1	16.0	407.2	30.0
MT 2007	LANNING/ND819	23.6	27.2	54.0	15.8	421.5	71.7
MT 2013	MT 1542/ND819	24.5	28.2	55.4	16.1	470.8	28.3
MT 2022	MT 1401/ND 819	22.8	28.6	56.4	15.9	449.4	30.0
MT 2030	LANNING/MT 1338	24.3	30.0	53.7	16.5	447.4	58.3
MT 2038	LANNING/MT1133//MT0744/MT0614	25.5	29.5	54.9	16.6	466.3	38.3
MT 2049	LANNING/MT 1415	23.3	29.5	54.0	15.8	427.4	78.3
MT 2050	MT 1542/MT 1415	23.5	27.2	54.0	16.0	398.1	8.3
MT 2054	LANNING/MT 1528	23.8	29.1	54.3	15.9	398.8	8.7
MT 2063	MT 1572/MT1133//CHOTEAU/YELLOWS*	23.4	26.5	54.5	15.9	375.3	25.0
EXPERIMENTAL MEANS		23.9	27.7	54.5	16.3	419.2	39.7
LSD (0.05)		1.9	3.1	0.9	0.3	27.0	15.9
C.V.%		4.8	6.8	1.0	1.1	3.9	24.4
P-VALUE (Varieties)		0.0102	<.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 (22-9957-SW)

Seeding Date: April 27, 2022
 Harvest Date: August 16, 2022
 Fertility: 46-9-5-5 side banded
 System: No Till
 Herbicide: none
 Insecticide: none
 Previous Crop: Chemical Fallow - Spring Wheat
 Precipitation: 0.99" seeding to harvest maturity

TABLE 8. Ten-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. 2013-2022. (Exp# 9957-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)					TEST WEIGHT (Pounds Per Bushel)					10-YR COMP. AVE YIELD 5/	10-YR COMP. TEST WT 5/				
		2018	2019	2020	2021	2022	AVE for YEARS TESTED 3/	% of CHECK YIELD 4/	2018	2019	2020			2021	2022	AVE for YEARS TESTED 3/	% of CHECK TEST WT 4/
PI690450 DAGMAR (+)	5	37.8	51.9	52.1	17.0	33.7	38.5	107.1	39.9	55.3	56.3	60.4	56.0	55.8	56.7	102.4	56.7
PI642366 VIDA (+)	10	33.5	48.8	52.2	15.4	29.9	37.2	100.0	37.2	52.8	55.8	59.6	54.4	54.6	55.4	100.0	55.4
BZ92413R WB GUNNISON (P+)(sawfly tol)	10	31.3	48.5	50.5	18.0	28.4	34.9	93.7	34.9	54.3	56.3	59.3	56.5	54.9	56.4	101.8	56.4
PI679964 NS PRESSER CLP (P+)	7	31.9	49.2	49.7	12.5	25.1	30.3	93.7	34.9	49.9	54.4	56.5	52.5	52.0	52.8	96.0	53.2
BZ996434 CORBIN (P+)	10	32.7	46.8	50.2	19.6	25.3	34.6	93.0	34.6	55.4	55.9	59.8	56.3	55.3	56.0	101.1	56.0
0150042-10 BRENNAN (P+)	9	35.2	42.8	52.6	15.3	28.1	31.1	92.9	34.6	57.1	57.2	61.4	57.5	57.0	57.4	104.6	57.9
PI676978 LANNING (+) (++)	8	33.2	45.3	42.6	10.5	25.8	29.7	91.8	34.1	50.2	52.6	58.4	53.5	53.0	52.8	96.3	53.4
PI660981 DUCLAIR (+)(saw fly tol)	10	31.2	47.8	48.0	15.8	27.1	34.1	91.7	34.1	53.3	55.4	58.2	53.1	54.0	54.7	98.8	54.7
PI671855 EGAN (+)	8	31.4	43.3	53.3	11.8		30.9	91.0	33.9	51.6	53.2	56.7	52.1		53.0	96.5	53.4
IMICHT-79 WB9879CLP (P+)	10	29.9	45.9	50.3	15.3	25.6	33.0	88.7	33.0	54.6	56.2	59.3	54.2	54.9	55.5	100.2	55.5
WA 8166 ALUM (+)	6	31.4	37.9	46.7	15.1		28.9	88.2	32.8	53.3	53.5	57.8	55.9		54.8	99.5	55.1
AGRIPR141 SY INGMAR (P+)	6	37.9	42.3	41.1	9.1	24.0	30.6	86.7	32.3	54.2	56.0	57.9	56.4	53.7	55.3	100.3	55.6
PI633974 CHOTEAU (+)(saw fly tol)	10	29.6	48.5	45.3	13.9	25.5	31.8	85.4	31.8	53.7	54.7	59.0	54.5	54.5	55.0	99.4	55.0
MT 1716 MT SIDNEY (++)	4		32.6	50.9	12.7	26.4	30.7	83.8	31.2		54.7	60.8	55.2	55.9	56.7	101.0	56.0
01S0263-28 SY SOREIN (P+)	8	35.5	28.3	45.0	15.8	25.7	27.1	83.8	31.2	53.3	53.2	58.6	55.1	53.8	54.4	99.2	54.9
ND 695 REEDER (+)	10	32.1	25.7	36.0	10.9	24.5	29.6	79.5	29.6	53.4	51.5	58.4	53.8	54.5	55.0	99.3	55.0
MEANS (For Entries Listed)		33.0	42.8	47.9	14.3	26.8			33.7	53.5	54.8	58.9	54.8	54.6			55.3
6/ Growing Season Precipitation (in.)		n/a	n/a	n/a	n/a	0.99	5.3										
Soil PAW (in.) to SD @ Planting		n/a	n/a	9.81	7.94	5.31	8.6										
Total Plant Available Water (in.)		n/a	n/a	9.81	n/a	6.3	12.9										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	197	193	120	138										
SD (Sampling Depth in Inches)		n/a	n/a	48	45	42	47										
Fertilizer Applied	(# N)	100	100	100	100	46	97										
	(# P ₂ O ₅)	20	20	20	20	9	19										
	(# K ₂ O)	10	10	10	10	5	10										
	(# S)	10	10	10	10	5	6										

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/ 10-Yr Comparable Average = (x/y) * z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Vida for the same years, and z = 10-Yr average yield or test weight for the check variety Vida.

6/ Seeding to 14 days prior to harvest.

TABLE 9. Ten-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. 2013-2022. (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)										
		2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK PROTEIN 4/	10-YR COMP. AVE PROTEIN 5/	2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK SAWFLY 4/	10-YR COMP. AVE SAWFLY 5/
BZ92413R WB GUNNISON (P+)(sawfly tol)	10	17.1	16.0	14.1	15.3	15.8	15.7	97.8	15.7	0.7	0.3	1.0	0.0	3.7	0.8	9.6	0.8
IMICHT-79 WB9879CLP (P+)	10	17.7	15.8	14.9	16.2	16.7	16.5	102.4	16.5	0.7	1.0	1.0	2.3	5.3	1.6	20.0	1.6
PI 690450 DAGMAR (+)	5	17.9	15.6	15.0	15.8	16.5	16.2	103.0	16.6	0.7	1.0	2.3	11.7	7.0	4.5	36.2	2.9
BZ996434 CORBIN (P+)	10	18.2	16.6	15.2	15.9	16.9	16.7	103.8	16.7	0.0	1.0	5.0	12.0	10.0	3.4	42.9	3.4
PI633974 CHOTEAU (+)(saw fly tol)	10	18.0	15.7	15.1	15.6	16.6	16.5	102.6	16.5	0.7	1.0	6.7	5.3	13.3	3.6	45.0	3.6
PI660981 DUCLAIR (+)(saw fly tol)	10	17.8	15.7	15.2	16.5	16.7	16.6	103.0	16.6	0.7	2.3	5.0	12.0	8.7	4.4	54.6	4.4
PI642366 VIDA (+)	10	17.5	15.7	14.2	15.1	15.9	16.1	100.0	16.1	0.3	4.0	5.0	21.7	31.7	8.0	100.0	8.0
WA 8166 ALUM (+)	6	18.6	16.6	14.7	15.8		16.9	102.6	16.5	2.3	4.0	10.0	23.3		7.8	129.3	10.3
PI679964 NS PRESSER CLP (P+)	7	17.7	15.2	15.6	15.6	16.1	16.7	101.9	16.4	1.0	5.0	21.7	25.0	53.3	15.8	162.7	13.0
MT 1716 MT SIDNEY (++)	4		16.1	14.5	15.3	16.4	15.6	102.3	16.5		10.0	18.3	23.3	78.3	32.5	208.6	16.7
AGRIPR141 SY INGMAR (P+)	6	18.0	15.8	15.0	15.7	16.8	16.6	103.1	16.6	6.7	5.3	16.7	40.0	73.3	24.8	236.0	18.9
0150042-10 BRENNAN (P+)	9	17.5	15.7	14.6	15.6	16.2	16.5	101.2	16.3	8.3	16.7	13.3	46.7	71.7	19.7	242.3	19.4
ND 695 REEDER (+)	10	18.1	16.5	14.8	15.7	16.2	16.5	102.6	16.5	5.3	16.7	13.3	51.7	70.0	21.1	263.7	21.1
PI671855 EGAN (+)	8	19.9	17.0	15.6	16.6		18.2	110.9	17.8	3.7	11.7	25.0	45.0		13.9	267.2	21.4
01S0263-28 SY SOREN (P+)	8	18.4	16.5	15.3	16.1	17.0	17.4	106.0	17.1	6.7	11.7	16.7	43.3	63.3	21.9	656.3	52.5
PI676978 LANNING (+)	8	18.8	15.6	14.8	15.5	16.9	17.0	103.8	16.7	2.3	6.7	6.7	66.7	78.3	27.4	821.3	65.7
MEANS (For Entries Listed)		18.1	16.0	14.9	15.8	16.5			16.6	2.7	6.1	10.5	26.9	40.6			16.5
6/ Growing Season Precipitation (in.)		n/a	n/a	n/a	n/a	0.99	5.3										
Soil PAW (in.) to SD @ Planting		n/a	n/a	9.81	7.94	5.31	8.6										
Total Plant Available Water (in.)		n/a	n/a	9.81	n/a	6.3	12.9										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	197	193	120	138										
SD (Sampling Depth in Inches)		n/a	n/a	48	45	42	47										
Fertilizer Applied																	
	(# N)	100	100	100	100	46	97										
	(# P ₂ O ₅)	20	20	20	20	9	19										
	(# K ₂ O)	10	10	10	10	5	10										
	(# S)	10	10	10	10	5	6										

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/ 10-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 = 10-Yr average protein or saw fly rating for the check variety Vida.

6/ Seeding to 14 days prior to harvest.

TABLE 10. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Kammerzell Farm, Chester. Northern Agricultural Research Center. Havre, Montana. 2022. (Exp# 22-9953-SW)

ID	CULTIVAR or SELECTION	PLNT HT Inches	1/	TEST WT Lbs/Bu	2/	3/	4/
			YIELD Bu/Ac		PROTEIN %	FN Seconds	SAWFLY %
BRENNAN	AGRIPR 10	21.8	26.9	58.2	16.2	446.4	12.0
CHOTEAU	PI 633974	22.1	24.7	55.4	16.5	405.1	1.7
CORBIN	BZ 996434	22.8	26.3	56.2	16.6	389.3	2.3
DAGMAR	PI 690450	22.5	31.4	57.1	16.3	428.4	0.0
DUCLAIR	PI 660981	23.0	30.6	54.7	16.5	387.3	3.7
LANNING	PI 676978	21.5	27.2	54.9	16.8	406.6	13.3
MT SIDNEY	MT 1716	22.3	20.3	56.8	16.8	380.1	5.0
NS PRESSER CLP	PI 679964	24.8	31.7	54.2	15.9	383.1	10.0
REEDER	ND 695	22.8	23.1	55.0	16.5	392.9	11.7
SY INGMAR	AGRIPR141	22.3	21.3	55.0	17.0	439.2	8.3
SY SOREN	AGRIPR 14	20.5	25.1	55.9	16.9	423.3	6.7
VIDA	PI 642366	23.1	27.6	55.1	16.5	376.2	8.3
WB GUNNISON	BZ 92413R	21.2	26.4	56.4	15.2	440.0	1.7
WB9879CLP	WB9879CLP	21.7	27.5	55.5	16.6	412.3	0.7
MT 1809	VIDA/MO 09/3-4	23.0	26.7	54.7	17.3	425.0	3.7
MT 1939	LANNING//MT1018//CHOTEAU/YELLOW	22.9	29.4	55.8	15.8	414.4	3.7
MT 2007	LANNING/ND819	22.6	27.1	54.3	16.4	416.7	15.0
MT 2013	MT 1542/ND819	23.0	27.0	57.3	16.0	458.4	5.7
MT 2022	MT 1401/ND 819	21.9	30.2	57.4	16.0	436.6	7.0
MT 2030	LANNING/MT 1338	20.9	28.1	56.8	15.6	462.0	15.0
MT 2038	LANNING/MT1133//MT0744//MT0614	23.1	23.9	55.9	16.4	468.0	8.3
MT 2049	LANNING/MT 1415	21.7	27.3	54.8	16.3	400.1	13.3
MT 2050	MT 1542/MT 1415	21.3	27.7	55.5	15.8	400.7	3.7
MT 2054	LANNING/MT 1528	24.6	28.4	56.4	15.9	422.6	1.7
MT 2063	MT 1572/MT1133//CHOTEAU/YELLOWS*	21.8	26.7	57.5	15.9	373.0	2.3
EXPERIMENTAL MEANS		22.4	26.9	55.9	16.3	415.5	6.6
LSD (0.05)		1.4	3.7	1.2	0.6	26.6	6.9
C.V.%		3.9	8.4	1.3	2.3	3.9	63.6
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 (22-9953-SW)

Seeding Date: April 27, 2022
 Harvest Date: August 16, 2022
 Fertility: 46-9-5-5 side banded
 System: No Till
 Herbicide: LV-6 (16 oz/ac), Harmony SG (0.5 oz/ac)
 Insecticide: Lambda (4 oz/ac), twice
 Previous Crop: Chemical Fallow - Spring Wheat
 Precipitation: 4.96" seeding to 14 days prior to harvest

* Precip from NOAA website

TABLE 11. Nine-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. 2014-2022. (Exp# 9953-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)								TEST WEIGHT (Pounds Per Bushel)							
		2018	2019	2020	2021	2022	AVE	%	9-YR COMP. AVE YIELD 5/	2018	2019	2020	2021	2022	AVE	%	9-YR COMP. AVE TEST WT 5/
							for YEARS TESTED 3/	of CHECK YIELD 4/							for YEARS TESTED 3/	of CHECK TEST WT 4/	
MT 1621 DAGMAR (+)	5	44.6	69.6	52.9	25.7	31.4	44.8	104.6	38.4	57.5	60.5	57.5	55.2	57.1	57.6	102.8	56.4
PI660981 DUCLAIR (+)(saw fly tol)	9	37.0	65.8	54.4	21.7	30.6	37.1	101.1	37.1	54.6	58.8	55.3	52.9	54.7	54.1	98.5	54.1
0150042-10 BRENNAN (P+)	9	41.4	56.0	54.3	23.4	26.9	36.8	100.2	36.8	58.5	61.5	59.9	55.9	58.2	57.7	105.2	57.7
PI642366 VIDA (+)	9	41.8	69.9	51.3	23.9	27.6	36.7	100.0	36.7	55.7	59.2	55.3	54.7	55.1	54.9	100.0	54.9
PI671855 EGAN (+)	8	41.8	63.6	48.3	22.2		36.5	96.5	35.4	55.3	56.8	54.0	52.8		54.0	98.5	54.0
PI676978 LANNING (+)	8	40.8	61.3	52.3	21.9	27.2	35.3	96.4	35.4	54.6	58.5	55.8	52.8	54.9	54.0	98.0	53.8
BZ92413R WB GUNNISON (P+)(sawfly tol)	9	37.3	58.6	52.7	25.4	26.4	35.0	95.4	35.0	55.6	58.9	56.9	55.2	56.4	55.8	101.7	55.8
BZ996434 CORBIN (P+)	9	37.5	59.4	48.1	24.2	26.3	35.0	95.4	35.0	55.6	59.5	55.5	55.1	56.2	55.3	100.9	55.3
ND 695 REEDER (+)	9	40.1	64.5	46.6	19.5	23.1	33.9	92.3	33.9	55.7	59.0	56.1	54.1	55.0	55.1	100.5	55.1
PI679964 NS PRESSER CLP (P+)	7	39.8	62.3	48.0	23.7	31.7	35.2	91.2	33.5	54.8	57.4	54.2	54.4	54.2	53.6	97.7	53.6
01S0263-28 SY SOREN (P+)	8	36.4	61.8	51.0	20.4	25.1	33.3	90.8	33.3	54.7	59.6	56.2	54.1	55.9	54.9	99.6	54.6
IMICHT-79 WB9879CLP (P+)	9	36.3	60.3	48.0	25.5	27.5	33.2	90.4	33.2	56.6	58.2	56.1	54.1	55.5	55.1	100.4	55.1
MT 1716 MT SIDNEY (++)	4		64.3	48.5	20.5	20.3	38.4	89.0	32.6		60.3	57.1	54.2	56.8	57.1	101.8	55.9
PI633974 CHOTEAU (+)(saw fly tol)	9	36.2	55.9	48.3	22.4	24.7	31.9	86.9	31.9	56.3	57.8	55.8	53.8	55.4	54.8	99.9	54.8
WA 8166 ALUM (+)	6	37.2	53.3	49.0	23.9		35.0	86.5	31.7	55.5	54.7	53.7	57.7		55.2	100.7	55.3
AGRIPR141 SY INGMAR (P+)	6	32.7	62.6	48.9	18.5	21.3	35.2	85.3	31.3	53.1	59.9	55.8	54.6	55.0	55.6	99.3	54.5
CI13596 FORTUNA (saw fly tol)	7	38.3	53.6	28.2			31.8	79.8	29.3	57.3	58.5	57.0			56.5	103.0	56.5
LIMAGR143 LCS PRO (P+)	4	34.1	56.4	39.5			39.0	79.7	29.2	53.6	56.5	54.9			54.7	96.9	53.2
MEANS (For Entries Listed)		38.4	61.1	48.4	22.7	26.4			33.9	55.6	58.7	56.0	54.5	55.7			55.0
6/ Growing Season Precipitation (in.)		n/a	n/a	n/a	n/a	5.0	5.3										
Soil PAW (in.) to SD @ Planting		n/a	n/a	n/a	12.7	9.1	11.3										
Total Plant Available Water (in.)		n/a	n/a	n/a	n/a	15.2	15.0										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	n/a	197	276	245										
SD (Sampling Depth in Inches)		n/a	n/a	n/a	48	48	48										
Fertilizer Applied	(# N)	100	100	100	100	46	97										
	(# P2O5)	20	20	20	20	9	19										
	(# K2O)	10	10	10	10	5	9										
	(# S)	10	10	10	10	5	7										

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/ 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.

TABLE 12. Nine-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. 2014-2022. (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)										
		2018	2019	2020	2021	2022	AVE for YEARS TESTED 3/	% of CHECK PROTEIN 4/	9-YR COMP. AVE 4/	2018	2019	2020	2021	2022	AVE for YEARS TESTED 3/	% of CHECK SAWFLY 4/	9-YR COMP. AVE 5/
BZ92413R WB GUNNISON (P+)(sawfly tol)	9	16.8	14.5	15.9	15.6	15.2	16.0	97.5	16.0	0.5	0.7	0.7	0.0	1.7	1.3	18.0	1.3
MT 1621 DAGMAR (+)	5	16.0	15.3	16.4	16.4	16.3	16.1	101.6	16.7	1.0	5.0	2.3	4.0	0.0	2.5	32.5	2.3
IMICHT-79 WB9879CLP (P+)	9	15.7	15.6	16.2	16.6	16.6	16.6	101.3	16.6	1.3	1.0	1.0	5.3	0.7	2.7	38.0	2.7
PI633974 CHOTEAU (+)(saw fly tol)	9	15.8	15.5	16.3	16.7	16.5	16.7	102.0	16.7	0.8	1.0	3.7	10.3	1.7	3.4	47.7	3.4
PI660981 DUCLAIR (+)(saw fly tol)	9	16.6	15.0	16.5	16.2	16.5	16.8	102.2	16.8	1.5	5.0	3.7	3.7	3.7	3.6	51.3	3.6
BZ996434 CORBIN (P+)	9	17.2	15.3	17.4	16.2	16.6	17.0	103.7	17.0	2.3	3.7	2.3	10.3	2.3	4.0	56.2	4.0
PI642366 VIDA (+)	9	16.0	14.8	16.2	15.7	16.5	16.4	100.0	16.4	2.3	3.7	3.7	20.0	8.3	7.1	100.0	7.1
WA 8166 ALUM (+)	6	16.7	16.4	17.1	16.1		16.8	103.6	17.0	3.8	6.7	3.7	11.7		6.9	110.3	7.8
CI13596 FORTUNA (saw fly tol)	7	15.6	15.1	16.5			16.5	100.3	16.5	10.8	5.3	5.3			6.0	118.2	8.4
PI 679964 NS PRESSER CL (P+)	7	15.8	15.1	18.1	15.4	15.9	16.5	101.4	16.6	0.3	6.7	5.0	11.7	10.0	8.4	128.5	9.1
0150042-10 BRENNAN (P+)	9	15.7	15.4	15.9	16.3	16.2	16.3	99.6	16.3	14.2	25.0	5.3	18.3	12.0	10.0	140.9	10.0
MT 1716 MT SIDNEY (++)	4		15.1	16.2	16.1	16.8	16.0	101.5	16.7		16.7	11.7	25.0	5.0	14.6	163.5	11.6
01S0263-28 SY SOREN (P+)	8	16.7	15.4	16.6	16.6	16.9	17.2	105.0	17.2	6.7	15.0	8.7	20.0	6.7	9.8	172.3	12.3
ND 695 REEDER (+)	9	16.1	15.4	16.5	16.2	16.5	16.8	102.1	16.8	8.3	23.3	10.0	25.0	11.7	12.8	179.7	12.8
PI 671855 EGAN (+)	8	17.0	16.4	18.2	17.0		18.0	109.7	18.0	10.8	21.7	3.7	41.7		12.9	184.8	13.1
AGRIPR141 SY INGMAR (P+)	6	17.5	15.4	16.8	16.9	17.0	16.9	105.3	17.3	5.2	23.3	8.7	25.0	8.3	12.9	191.3	13.6
PI 676978 LANNING (+)	8	15.8	15.6	16.4	15.9	16.8	16.8	102.5	16.8	1.7	31.7	11.7	25.0	13.3	14.4	251.8	17.9
LIMAGR143 LCS PRO (P+)	4	16.4	15.3	16.1			16.3	102.0	16.7	14.2	31.7	6.7			16.0	534.7	38.0
MEANS (For Entries Listed)		16.3	15.4	16.6	16.2	16.4			16.8	5.0	12.6	5.4	16.1	6.1			9.2
6/ Growing Season Precipitation (in.)		n/a	n/a	n/a	n/a	5.0	5.3										
Soil PAW (in.) to SD @ Planting		n/a	n/a	n/a	12.7	9.1	11.3										
Total Plant Available Water (in.)		n/a	n/a	n/a	n/a	14.1	14.4										
Soil NO3 (lbs.) to SD at Planting		n/a	n/a	n/a	197	276	245										
SD (Sampling Depth in Inches)		n/a	n/a	n/a	48	48	48										
Fertilizer Applied	(# N)	100	100	100	100	46	97										
	(# P2O5)	20	20	20	20	9	19										
	(# K2O)	10	10	10	10	5	9										
	(# S)	10	10	10	10	5	7										

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/ 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.