

**Title:** Winter Wheat, Spring Wheat, Spring Durum and Spring Barley Variety Performance Evaluations Under Dryland Chemical Fallow Conditions On-Station at Northern Agricultural Research Center, Havre, Montana. 2012-2021.

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### **Content:**

This report is intended to serve as a popularized 2021 summary of “primary” on-going cereal variety investigations traditionally conducted on-station by the Variety Testing Program at Northern Agricultural Research Center. These data represent approximately 15 percent of NARC Variety Testing Programs total research project effort on-station at Havre. The remaining 85 percent of the research not reported here includes cultivar and product evaluations associated with larger nurseries featuring early generation or other unnamed experimental materials not of general interest to the public; and/or experimental seed treatment, specialty crop, forage, fertility, fungicide and insecticide evaluations. Long-term data summaries reported here are limited to the most recent ten years. This is largely due to need for report brevity and the fact that most varieties have approximately a 10-year life span before they are replaced in common use with newer materials having superior production characteristics. Variety performance data has been continuously collected and maintained at the Havre station for 106 years beginning in 1916. Collection of wheat stem sawfly cutting data was added beginning in 2003.

Detailed data pertaining to multiple performance characters, along with associated climatic and management inputs are presented for 2021. Abridged, multi-year summaries for each wheat cereal trial are limited to four crop characters (yield, test weight, protein and sawfly rating). Individuals desiring additional detailed data may contact the research center or refer to current and previous editions of this and other reports at <https://agresearch.montana.edu/narc/>.

### **2021 Data:**

It should be noted that 2021 data tables in this report represent varietal performance for a single crop year at a single location only, and thus cannot be considered representative of performance expected when differing conditions due to location, year and management are imposed. Therefore, by itself, 2021 data shall not constitute in any form a recommendation for or against any entry or practice included.

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 wheat stem sawfly. Pickup guards coupled with an extremely slow ground speed and an exceptionally low cutting height help researchers collect all heads in order to assess seed yield potential. If you are a producer in a wheat stem sawfly environment, although hollow stemmed varieties may be high yielding in research trials in your area, we strongly recommend against growing those hollow stemmed varieties. Please be aware that if you seed hollow stemmed varieties with wheat stem sawfly present, you are only creating a breeding ground for future generations of sawfly in your area and not helping combat the pest population.

During the fall of 2020, northcentral Montana received above average precipitation, but the spring of 2021 did not follow suit. Although, the growing season started out cooler than average, it quickly turned warmer and drier than average, with many fall seeded crops showing drought stress by early to mid-May. Meaningful rain events were minimal from late April through August, as northcentral Montana progressed from moderate, to severe, to extreme

drought in 2021, as classified by the National Oceanic and Atmospheric Administration U. S. Drought Monitor. Spring and summer months during the growing season had below average precipitation, coupled with above average temperatures, resulting in stressed crops with reduced seed yields and low test weights. At Havre, annual growing season precipitation (9/1/20 through 8/31/21) was 10.00 inches, 2.02 inches lower than the average for all years since 1916. April 1 through July 31 precipitation was 4.08 inches, just 66 percent of the 106-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July totaled 1391, or 108 percent of the average for the last 71 years (1951-2021). The last spring frost was on May 14 and the first fall frost of 2021 was on September 17, resulting in 117 frost-free days. The minimum winter temperature was -34 degrees F on February 14, 2021. Overall, the 2020-2021 average crop year temperatures were 1.4 degrees F warmer than the long-term average. The April through July growing season saw an average daily temperature of 58.5 degrees F, 1.4 degrees F higher than historical temperatures, with June, July and August average temperatures 3.6 degrees F higher than normal. The high temperature for 2021 was recorded on June 16 at 102 degrees F. There were 33 days with temperatures 90 degrees F or above, with three days over 100 degrees F.

### **Multi-Year Summary Data:**

Use of a "Comparable Average" provides a mechanism for "estimating" the performance of varieties over a period of time longer than that for which actual data is available for them. This is accomplished by comparing the performance of a "variety of interest" for the years it was actually tested with that of a designated "check" or reference variety grown in the same trial in the same years. The performance of the variety of interest is then expressed as a percentage of the check variety's performance. This actual percentage or index is then applied to the actual long-term performance of the check to estimate the performance of the variety of interest had it been grown over the same long term. The reliability of comparable average figures improves with increasing years of actual evaluation, so no entries with less than three years of actual data have been included in long-term summaries.

### **Other References:**

It is intended that this report be used as a supplement to variety performance summaries prepared by MSU's Plant Science and Plant Pathology Department on statewide evaluations by the Montana Agricultural Experiment Station:

Winter Wheat Varieties, Extension Service 2B 1098 (Revised January-February annually)  
Spring Wheat Varieties, Extension Service 2B 1093 (Revised January-February annually)  
Barley Varieties, Extension Service 2B 1094 (Revised January-February annually)

These summaries include performance data, descriptions, quality assessments, disease and insect considerations, cropping district recommendations, cultural practices, and general crop production management information. These publications are available from MSU-Extension Service offices and can further be accessed via the Internet at <https://plantsciences.montana.edu/crops/index.html>.

### **Recognition:**

This research would not have been possible without the assistance of the following seasonal employees: Peyton Brown, Savannah Dawson, Teresa Miller, Kristin Obresley, Treygan Olson, Rhoda Peterson and Ivy Thomas.

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Summary of climatic data by months for the 2020-2021 crop year (September to August) and averages for the period 1916-2021 at the Northern Agricultural Research Center. Havre, Montana.

Month Year	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Crop Year
<b><u>Precipitation (inches)</u></b>													<b><u>Total</u></b>
Current Year	1.72	0.99	1.11	0.07	0.02	0.59	0.20	0.51	3.02	0.23	0.32	1.22	10.00
Average (1916-2021)	1.18	0.69	0.45	0.45	0.43	0.35	0.53	0.99	1.85	2.53	1.41	1.17	12.02
Difference	0.54	0.30	0.66	-0.38	-0.41	0.24	-0.33	-0.48	1.17	-2.30	-1.09	0.05	-2.02
<b><u>Mean Temperature (°F)</u></b>													<b><u>Average</u></b>
Current Year	58.8	39.1	32.1	29.8	28.2	10.0	37.6	42.6	49.8	66.9	74.7	67.7	44.8
Average (1916-2021)	56.4	45.5	30.2	19.7	15.9	19.7	30.1	43.5	53.9	61.9	69.3	67.4	42.8
Difference	2.4	-6.4	1.9	10.1	12.3	-9.7	7.5	-0.9	-4.1	5.0	5.4	0.3	2.0

Last killing frost in spring\*

2021 \_\_\_\_\_ May 23rd (32.0°)  
Ave. 1916-2021 \_\_\_\_\_ May 14th

First killing frost in fall\*

2021 \_\_\_\_\_ September 17th (29.9°)  
Ave. 1916-2021 \_\_\_\_\_ September 20th

Frost free period

2021 \_\_\_\_\_ 117 days  
Ave. 1916-2021 \_\_\_\_\_ 130 days

Growing degree days (base 50)

May 23-Sept. 17, 2021 \_\_\_\_\_ 2005.6  
May 1-Sept. 30, 2021 \_\_\_\_\_ 2327.9  
Ave. 1951-2021 (May 1-Sept. 30) \_\_\_\_\_ 2179.2

Maximum summer temperature \_\_\_\_\_ 101.8° F on June 16, 2021  
Minimum winter temperature \_\_\_\_\_ -34.3° F on February 14, 2021

\*In this summary 32° is considered a killing frost.

**2021**  
**INDIVIDUAL CROP EXPERIMENT IDENTIFICATION & DESCRIPTION RECORD**  
**Variety Testing Program**  
**Northern Agricultural Research Center**  
**Havre, Montana**

Experiment No. *	Description	Crop	Ents	Reps	Plots	Loc-Field	Legal Desc	Leader	Sponsor	Cooperator
<b>WINTER WHEAT (WW) INVESTIGATIONS</b>										
<b>ON-STATION</b>										
21-3502-WW	Intrastate Cultivar Nursery	WW	49	3	147	A-6-2	33 32N 15E	Bruckner	MAES-MWBC	Lamb
21-1402-WW	Advanced Cultivar Nursery	WW	36	3	108	A-6-2	33 32N 15E	Bruckner	MAES-MWBC	Lamb
21-5802-WW	Sawfly Line Evaluation Nursery	WW	49	2	98	A-6-2	33 32N 15E	Bruckner	MAES-MWBC	Lamb
21-WQDS-WW	Winter Wheat Quality Drill Strips	WW	7	1	7	A-6-2	33 32N 15E	Bruckner	MAES-MWBC	Lamb
Sub-Totals:			4	141	360	5.98%	of Total Plot Inventory			
<b>OFF-STATION</b>										
21-3851-WW	Off-Station Cultivar Eval Nursery	WW	25	3	75	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
21-3853-WW	Off-Station Cultivar Eval Nursery	WW	25	3	75	Loma	28 27N 10E	Lamb	MWBC-MAES	McKeever Farm
21-5852-WW	Sawfly Line Evaluation Nursery	WW	49	2	98	Kremlin	21 31N 13E	Bruckner	MAES-MWBC	McCormick Farm
21-SR02-WW	v Single-Row Line Eval Nursery	WW	1000	1	1000	Kremlin	21 31N 13E	Bruckner	MAES-MWBC	McCormick Farm
21-3952-WW	Prelim C Sawfly Line Evaluation	WW	49	2	98	Kremlin	21 31N 13E	Bruckner	MAES-MWBC	McCormick Farm
Sub-Totals:			5	1148	1346	22.37%	of Total Plot Inventory			
<b>SPRING WHEAT &amp; DURUM (SW &amp; DUR) INVESTIGATIONS</b>										
<b>ON-STATION</b>										
21-3102-SW	Advanced Yield Nursery	SW	64	3	192	A-6-4	33 32N 15E	Cook	MAES-MWBC	Lamb
21-9802-DUR	Montana Durum Cultivar Nursery	DUR	24	3	72	A-6-4	33 32N 15E	Giroux	MAES-MWBC	Lamb
21-3302-SW	Preliminary Yield Nursery	SW	121	2	242	A-6-4	33 32N 15E	Cook	MAES-MWBC	Lamb
21-SR05-DUR	Durum Tillering and Yield	DUR	400	1	400	A-6-1	33 32N 15E	Giroux	MAES-COA	Lamb
21-SWQAC-SW	Spring Wheat Quality Assessm't	SW	4	1	4	A-2-4	33 32N 15E	MWBC	Wht Qual Cncl	Lamb
Sub-Totals:			5	213	910	15.13%	of Total Plot Inventory			

**SPRING WHEAT & DURUM (SW & DUR) INVESTIGATIONS continued . . .**

**OFF-STATION**

21-9951-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
21-9953-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Chester	12 31N 5E	Lamb	MWBC-MAES	Kammerzell Farm
21-9955-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
21-9957-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Loma	28 27N 10E	Lamb	MWBC-MAES	McKeever Farm
21-9851-DUR	Off-Station Cultivar Eval Nursery	DUR	15	3	45	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
21-9853-DUR	Off-Station Cultivar Eval Nursery	DUR	15	3	45	Chester	12 31N 5E	Lamb	MWBC-MAES	Kammerzell Farm
21-9855-DUR	Off-Station Cultivar Eval Nursery	DUR	15	3	45	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
21-3152-SW	Off-Station Advanced Yield SW	SW	64	3	192	Rudyard	23 36N 8E	Cook	MWBC-MAES	Bangs Farm
21-3352-SW	Off-Station Prelim Yield SW	SW	121	2	242	Rudyard	23 36N 8E	Cook	MWBC-MAES	Bangs Farm
Sub-Totals:			9	330		869	14.44%	of Total Plot Inventory		

**SPRING BARLEY (SB) INVESTIGATIONS**

**ON-STATION**

21-2102-SB	Intrastate Cultivar Eval Nursery	SB	49	3	147	A-6-3	33 32N 15E	Sherman	MAES-MWBC	Lamb
21-3102-SB	Early Yield Evaluation Nursery	SB	64	3	192	A-6-3	33 32N 15E	Sherman	MAES-MWBC	Lamb
21-2502-SB	Hulless Intrastate Eval Nursery	SB	16	3	48	A-6-4	33 32N 15E	Sherman	MAES-MWBC	Lamb
Sub-Totals:			3	129		387	6.43%	of Total Plot Inventory		

**BRASSICA (B\_) INVESTIGATIONS**

**ON-STATION**

21-CN02-CN	Statewide Canola Trial	CN	22	4	88	An-2-5	33 32N 15E	Fordyce	Var. Industry	Lamb
21-BJ02-BJ	BASF Brassica juncea Trial	BJ	16	4	64	An-2-5	33 32N 15E	Potts	BASF	Lamb
Sub-Totals:			2	38		152	2.53%	of Total Plot Inventory		

**PULSE CROP (PC) INVESTIGATIONS**

**ON-STATION**

21-PC01-PC	Statewide Pea Trial	PC	51	4	204	A-2-2	33 32N 15E	Chen	USADPLC-MAES	Lamb
21-PC02-PC	Statewide Lentil Trial	PC	9	4	36	B-5-3	32 32N 15E	Chen	USADPLC-MAES	Lamb
21-LCSP-Pea	LCS Pea Trial	PC	20	2	40	B-5-3	33 32N 15E	Oberg	LCS	Lamb
21-2104A-PEA	MSU Spring Pea Breeding Lines	PC	49	2	98	B-5-2	32 32N 15E	McPhee	MAES-MSU	Lamb
21-2164-LN	MSU Spring Lentil Breeding Lines	PC	30	1	30	B-5-3	32 32N 15E	McPhee	MAES-MSU	Lamb
21-2177-PEA	MSU RMA Spring Pea	PC	10	4	40	A-5-3	33 32N 15E	McPhee	MAES-MSU	Lamb
21-2178-LN	MSU RMA Spring Lentil	PC	6	4	24	B-5-3	32 32N 15E	McPhee	MAES-MSU	Lamb
21-2179-CP	MSU RMA Chickpea	PC	6	4	24	A-2-1	33 32N 15E	McPhee	MAES-MSU	Lamb
21-2182-CP	MSU Advanced Chickpea Yield Trl	PC	49	2	98	A-2-1	33 32N 15E	McPhee	MAES-MSU	Lamb
21-2134-WPEA f	MSU Winter Pea Breeding Line Trl	PC	50	1	50	B-5-4	32 32N 15E	McPhee	MAES-MSU	Lamb
21-2141-WLEN	MSU Winter Lentil Adaptability Trl	PC	18	1	18	B-5-4	32 32N 15E	McPhee	MAES-MSU	Lamb
21-2121-WPEA	MSU Winter Pea Breeding Line Trl	PC	66	1	66	B-5-4	32 32N 15E	McPhee	MAES-MSU	Lamb
21-PC10-WPEA f	Meridian Winter Pea Observations	PC	3	1	3	B-5-4	32 32N 15E	Hochhalter	Meridian	Lamb
21-2123-WPEA	MSU Winter Pea Breeding Line Trl	PC	50	2	100	B-5-4	32 32N 15E	McPhee	MAES-MSU	Lamb
21-PC0C-CP	Progene Chickpea Eval	PC	25	2	50	A-2-1	33 32N 15E	Powel	Progene	Lamb
21-CS04-LnR	Lentil Rolling/Seeding Rate Trial	PC	50	5	250	B-2-2	32 32N 15E	Miller	USDA-MAES	Lamb
21-CS05-LnVT	Lentil Variety Trial	PC	10	4	40	H	27 32N 15E	Burrows	USDA-MAES	Lamb
21-CS06-LnTrt	Lentil Seed Trt Fusarium Fung. Trl	PC	10	4	40	H	27 32N 15E	Burrows	USDA-MAES	Lamb
21-CS03-LnF	Lentil Fertility-inoculants & fertility	PC	10	4	40	A-3-1	33 32N 15E	Miller	USDA-MAES	Lamb
21-CS01-PeaN	Peas - Increasing N Fixation	PC	10	4	40	A-3-1	33 32N 15E	Jones	USDA-MAES	Lamb
21-CS02-LenN	Lentils - Increasing N Fixation	PC	10	4	40	A-3-1	33 32N 15E	Jones	USDA-MAES	Lamb
21-PC05-CP	Statewide Chickpea Trial	PC	13	4	52	A-2-1	33 32N 15E	Chen	USADPLC-MAES	Lamb
Sub-Totals:			22	555	1383	22.99%	of Total Plot Inventory			

**OTHER CROP (OC) INVESTIGATIONS**

**ON-STATION**

21-OC10-HP	Hemp Demo Trial	HP	4	4	16	An-2-5	33 32N 15E	IndHemp	MAES-NARC	Lamb
Sub-Totals:			1	4	16	0.27%	of Total Plot Inventory			

**FORAGE RESEARCH (FR) INVESTIGATIONS**

**ON-STATION**

21-FR02-FR	Winter Cereal Forage Trial	FR	9	4	36	A-6-1	33 32N 15E	Carr	MAES-CARC	Lamb
21-FR03-FR	Spring Cereal Forage Trial	FR	13	4	52	A-6-1	33 32N 15E	Carr	MAES-CARC	Lamb
21-FR05-FR	Intrastate Spring Barley Forage	FR	25	3	75	A-6-1	33 32N 15E	Sherman	MAES-MSU	Lamb
Sub-Totals:			3	47	163	2.71%	of Total Plot Inventory			

**NUTRIENT RESEARCH (NR) INVESTIGATIONS**

**ON-STATION**

21-NM09-SW	BioConsortia SW N Fixation w/ N	SW	6	6	36	An-4-5	33 32N 15E	Mann	Mosaic	Lamb
21-NM10-SW	BioConsortia SW N Fixation w/out N	SW	6	6	36	An-4-5	33 32N 15E	Mann	Mosaic	Lamb
21-NM05-Alf	Alfalfa Fertility	SW	30	3	90	H	27 32N 15E	Torrion	MFAC-MAES	Lamb
21-NM06-SWDP	SW following Pea Deep P on WW	SW	9	4	36	B-9-3 & 4	32 32N 15E	Bourgault	MFAC-MAES	Lamb
21-NM07-WWDP	WW following WW Deep P on WW	WW	9	4	36	B-8-3 & 4	32 32N 15E	Bourgault	MFAC-MAES	Lamb
Sub-Totals:			5	60	234	3.89%	of Total Plot Inventory			

**PEST MANAGEMENT (PM) INVESTIGATIONS**

**ON-STATION**

21-PM36-WW	Wheat Curl Mite Tolerant WW	WW	49	4	196	An-4-5	33 32N 15E	Burrows	MWBC-MAES	Bruckner/Lamb
21-PM60-PM	Hill Plots	SW				A-6-1	33 32N 15E	Cook/Weaver	MAES-MSU	Lamb
Sub-Totals:			2	49	196	3.26%	of Total Plot Inventory			



2019-2021  
CROP EXPERIMENT INFORMATION RECORD  
Agronomy  
Northern Agricultural Research Center  
Havre, Montana

Location	Description	Number of Trials			Number of Entries			Number of Plots			% of Total Plot Inventory		
		2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
On-Station	Winter Wheat*	4	4	4	138	138	141	357	357	360	10.5%	7.9%	7.8%
Off-Station	Winter Wheat*	8	7	5	257	148	148	455	346	346	13.3%	7.6%	7.5%
On-Station	Spring Wheat and Durum	4	4	5	174	173	213	512	511	510	15.0%	11.3%	11.0%
Off-Station	Spring Wheat and Durum*	7	7	9	168	147	330	504	441	869	14.8%	9.7%	18.8%
On-Station	Spring Barley	3	5	3	129	189	129	384	627	387	11.3%	13.8%	8.4%
On-Station	Safflower	1	1	0	16	16	0	48	48	0	1.4%	1.1%	0.0%
On-Station	Brassica sp.	1	2	2	14	38	38	56	152	152	1.6%	3.4%	3.3%
On-Station	Pulse Crops	7	16	22	156	333	555	422	1002	1383	12.4%	22.1%	30.0%
On-Station	Other Crops	3	4	1	50	152	4	228	426	16	6.7%	9.4%	0.3%
On-Station	Forage	3	3	3	36	50	47	128	175	163	3.8%	3.9%	3.5%
On-Station	Nutrient Research	3	5	5	41	76	60	147	250	234	4.3%	5.5%	5.1%
On-Station	Pest Management	2	1	2	12	49	49	36	196	196	1.1%	4.3%	4.2%
Off-Station	Pest Management*	3	2	0	64	0	0	136	0	0	4.0%	0.0%	0.0%
Grand Total		49	61	61	1255	1509	1714	3413	4531	4616	100.0%	100.0%	100.0%
Harvested								2895	4531	4563	84.8%	100.0%	98.9%
Total On-Station Plots								2318	3744	3401	67.9%	82.6%	73.7%
Total Off-Station Plots								1095	787	1215	32.1%	17.4%	26.3%

\* Winter Wheat, Spring Wheat & Pest Management:

2019: 1398 single row plots along with individual hill plots are no longer included in count

2020: 1703 single row plots along with individual hill plots are no longer included in count

2021: 1400 single row plots along with individual hill plots are no longer included in count

**TABLE 1. Intrastate Winter Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2021. (Exp# 21-3502-WW)**

ID	Cultivar Source or Selection	1/ Head Date	1/ Maturity Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ FN Sec	5/ Sawfly %
AAC Wildfire	Alberta/SECAN, 2015	164.5	189.7	27.1	17.6	54.1	17.6	466	17.3
AP Solid	Syngenta, NP13005004#49	161.3	188.3	28.2	28.9	<u>56.9</u>	16.1	449	24.6
AP18 AX	Syngenta 2020	156.3	186.0	30.3	28.6	52.1	15.8	401	33.7
Balance	Nutrien, 2020	159.2	190.0	28.7	23.8	52.4	<b>18.9</b>	420	44.0
Battle AX	Colorado Wheat Fdn/Montech, 2019	157.0	187.7	30.7	29.1	51.1	17.3	421	22.2
Bobcat	Montana, 2019	163.1	188.0	26.6	25.5	54.8	17.8	434	<b>8.8</b>
Brawl CL Plus	Plainsgold/Colorado Wheat Res Fdn, 2011	156.0	185.3	30.1	29.5	52.1	17.6	418	23.7
Byrd CL Plus	Plainsgold/Col. Wheat Res Fdn, 2018	158.3	186.7	31.9	26.7	51.9	17.5	479	24.6
CP7017AX	Winfield United (Croplan), 2020	156.1	183.3	28.7	31.1	51.1	16.0	457	26.4
CP7050AX	Winfield United (Croplan), 2020	154.4	185.0	30.1	<b>33.9</b>	55.3	16.4	504	33.8
CP7869	Winfield United (Croplan), 2018	155.4	184.7	27.6	<b>32.5</b>	50.3	17.1	417	26.8
CP7909	Winfield United (Croplan), 2018	153.9	184.3	29.6	<b>34.5</b>	52.3	16.5	429	37.8
Flathead	Montana, 2019	156.3	185.7	30.4	<u>35.2</u>	51.8	17.1	519	34.9
Fortify SF	Plainsgold/Colorado Wheat Res Fdn, 2019	157.9	187.0	30.9	22.8	54.4	15.9	470	49.4
FourOsix	Montana, 2018	161.5	188.3	29.3	23.7	53.3	17.4	456	27.1
Judee	Montana, 2011	162.1	190.3	29.5	18.7	55.0	18.4	351	40.7
Keldin	WestBred, 2011	162.7	189.3	31.5	28.5	52.7	<b>18.7</b>	489	37.2
LCS Helix AX	Limagrain Cereal Seeds, 2020	156.0	185.0	29.0	29.8	54.5	15.8	480	45.1
LCS Julep	Limagrain Cereal Seeds, 2020	156.7	186.0	29.6	29.1	53.4	17.8	454	14.7
LCS Steel AX	Limagrain Cereal Seeds, LCH18-7071	162.7	189.3	29.7	25.8	54.6	16.8	465	41.1
Loma	Montana, 2016	163.8	190.0	28.1	24.2	53.2	18.3	442	<b>10.3</b>
Milestone	Nutrien, 2020	162.6	189.7	26.0	25.8	51.8	16.8	503	41.3
Northern	Montana, 2015	164.1	187.0	27.5	22.8	51.6	18.2	<b>541</b>	33.3
Ramsay	Nutrien, NAS-7653	162.9	189.3	29.1	27.2	51.9	<b>18.7</b>	472	32.0
StandClear CLP	Nutrien, 2020	162.7	186.7	29.8	23.7	54.4	17.9	506	55.1
SY 517 CL2	Syngenta, 2018	155.9	185.0	27.7	<b>33.8</b>	53.6	16.6	425	20.2
SY Clearstone 2CL	Montana/Syngenta, 2012	162.8	188.7	31.5	18.8	54.6	17.6	522	25.5
SY Wolverine	Syngenta 2019	156.6	186.3	29.8	28.3	54.5	16.9	435	19.8
Warhorse	Montana, 2013	162.8	189.0	26.6	20.6	51.5	18.3	406	<b>13.3</b>
WB4401	WestBred, 2020	157.5	185.7	26.7	23.3	51.9	16.1	430	24.2
WB4418	WestBred, 2018	156.4	186.3	28.1	31.8	52.5	16.5	403	<b>7.3</b>
WB4505	WestBred, 2019	157.6	186.3	30.0	29.2	52.7	16.9	<b>531</b>	50.7
WB4792	WestBred, 2019	160.5	190.0	29.1	30.0	54.8	17.1	493	29.3
Whistler	Plainsgold/Colorado Wheat Res Fdn, 2018	160.7	188.0	30.5	21.4	54.4	16.9	504	41.2
Yellowstone	Montana 2005	162.6	189.7	30.9	27.9	53.5	17.5	<b>543</b>	27.5
MT1745	Decade*2/NI06732	163.4	188.0	28.4	21.4	54.4	17.0	489	25.9
MT1872	MT0859//MT0840/MT0873	162.1	187.0	28.3	21.3	53.9	17.2	267	<b>11.6</b>
MT19175	SD08198/Northern	164.0	189.0	27.9	19.8	53.2	17.6	426	24.9
MTCL1737	YLL-2CL/3/YLL*2/Pelsart//PROM/3*YLL	163.7	190.3	27.7	18.8	<b>55.8</b>	17.2	480	4.9
MTCL19149	MTCL1125/MT1091	162.7	188.7	31.2	20.7	51.9	17.5	456	37.2
MTCL19151	MT0871/(06X445B1-2, SY Clearstone sib)	159.5	186.7	29.9	31.1	50.2	17.5	<u>562</u>	35.4

**TABLE 1. Intrastate Winter Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2021. (Exp# 21-3502-WW)**

Cultivar/Line	Cultivar Source or Selection	1/ Head Date	1/ Maturity Date	2/ Plant HT Inches	2/ Yield Bu/Ac	3/ Test Wt Lbs/Bu	3/ Protein %	4/ FN Sec	5/ Sawfly %
MTCL19151	MT0871/(06X445B1-2, SY Clearstone sib)	159.5	186.7	29.9	31.1	50.2	17.5	<b>562</b>	35.4
MTFH19132	MT1078//Colter/Emerson	159.8	187.0	31.7	23.1	52.2	17.6	<b>530</b>	55.3
MTS18116	Loma*2/Warhorse	163.4	190.0	25.1	17.6	55.5	17.9	433	<b>4.0</b>
MTS18149	Loma*2/AAC Gateway	163.7	188.3	26.9	25.9	54.5	18.2	485	19.5
MTS1831	MTS0907/MTS0827	164.7	191.0	24.2	17.7	<b>56.2</b>	17.8	409	<b>0.1</b>
MTS1855	05X438-aC71(MT0097*2//Jagalene/Choteau)/Rou	163.7	189.7	27.6	19.4	52.9	<b>18.9</b>	526	<b>13.4</b>
MTS1903	(Judee sib, MTS0819)//08X350-A6/Warhorse	164.7	190.3	28.2	19.4	54.0	18.0	486	<b>3.0</b>
MTS1908	(Judee sib, MTS0819)//08X350-A6/Warhorse	165.0	188.3	26.6	21.0	54.3	18.0	440	<b>0.3</b>
MTS1915	MTS1596//Emerson/Spur	164.1	189.3	23.8	16.5	54.6	17.3	478	<b>0.0</b>
EXPERIMENTAL MEANS		160.5	187.8	28.7	25.3	53.4	17.4	461.4	26.1
LSD (0.05)		1.7	1.8	2.1	3.3	1.4	0.4	34.5	14.4
C.V.%		0.6	0.6	5.1	7.6	1.5	1.4	4.6	31.9
P-VALUE (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

**Bold** Indicates the best entry within a column based on Fisher's Protected LSD at the 0.05 probability level.

**Bold** Indicates cultivars equal to the best entry within a column based on Fisher's Protected LSD at the 0.05 probability level.

1/ No. of Days from January 1 (160 = June 9, 188= July 7).

2/ 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.

3/ Protein values are adjusted to 13 percent grain moisture.

4/ FN is the falling number reported in seconds adjusted to 14 percent flour moisture.

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

Management Information (21-3502-WW)

Seeding Date:	September 17, 2020
Harvest Date:	July 16, 2021
Fertility:	125-20-10-10 side banded
System:	no till
Herbicide:	Vendetta-16oz/ac
Insecticide:	none
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	7.73" (seeding to harvest)

**TABLE 2. Ten-Year Yield Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 3502-WW)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)										AVE. for YEARS TESTED	% of CHECK YIELD 3/	10-YR COMP. AVE. YIELD 4/
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
MTS1588	BOBCAT (++) (saw fly res)	5						56.4	62.7	62.6	59.5	25.5	53.3	112.0	<b>65.8</b>
ACS55017	KELDIN (P+)	8			61.5	54.8	107.8	56.2	68.6	52.4	58.1	28.5	61.0	106.2	<b>62.4</b>
Alberta, 2015	AAC WILDFIRE (+)	4							72.5	54.0	52.0	17.6	49.0	105.2	<b>61.7</b>
MTCS1601	STANDCLEAR CLP (P+,CL)	4							55.5	61.6	53.5	23.7	48.6	104.2	<b>61.2</b>
MT1564	FLATHEAD (++)	5						51.2	61.2	49.1	50.4	35.2	49.4	103.8	<b>61.0</b>
CO13003C	BYRD CL PLUS (+,CL)	5						51.0	58.8	51.0	57.7	26.7	49.0	103.0	<b>60.5</b>
MT00159	YELLOWSTONE (+)	9	52.1	68.2	64.1	62.4	103.6		61.9	54.8	53.5	27.9	60.9	102.4	<b>60.1</b>
WestBred, 2018	WB4418 (P+)	3								53.5	46.3	31.8	43.9	101.3	<b>59.5</b>
MT1465	FOUROSIX (++)	6					98.7	50.4	60.3	57.5	53.1	23.7	57.3	100.5	<b>59.0</b>
MT0978	NORTHERN (+)	10	54.8	73.1	60.5	56.9	103.8	51.6	56.5	57.7	49.4	22.8	58.7	100.0	<b>58.7</b>
MTCL1077	SY CLEARSTONE 2CL (P+,CL)	10	59.6	75.4	57.3	53.5	98.4	48.5	61.8	56.8	52.4	18.8	58.3	99.2	<b>58.3</b>
Syngenta 2019	SY WOLVERINE (P+)	3								48.9	49.0	28.3	42.1	97.1	<b>57.0</b>
Syngenta, 2017	SY 517 CL2 (P+,CL)	4							51.3	46.4	44.7	33.8	44.0	94.5	<b>55.5</b>
MTS0713	JUDEE (+) (saw fly tol)	10	48.9	70.6	61.5	56.9	85.2	48.9	55.7	52.6	50.8	18.7	55.0	93.6	<b>55.0</b>
CO06052	BRAWL CL PLUS (+,CL)	7				47.2	89.7	43.8	57.6	52.2	47.1	29.5	52.4	92.1	<b>54.1</b>
MTS1224	LOMA (+)	8			50.5	52.9	80.8	48.0	60.5	51.1	53.0	24.2	52.6	91.7	<b>53.8</b>
MTS0808	WARHORSE (+) (saw fly res)	10	51.7	65.1	47.9	57.7	89.8	43.8	57.0	46.5	51.4	20.6	53.1	90.5	<b>53.1</b>
MEANS (For Entries Listed)			53.4	70.5	57.6	55.3	95.3	50.0	60.1	53.5	51.9	25.7			<b>58.6</b>
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			n/a	9.1	n/a	9.4	10.0	9.3	8.6	7.7	9.4	6.4	8.7		
Total Plant Available Water (in.)			7.3	22.4	4.9	17.0	22.2	11.7	12.6	14.0	15.0	10.5	13.7		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			60	59	48	37	113	65	272	117	419	77	127		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	48	46	47	47	48		
Fertilizer Applied															
(# N)			100	100	100	100	100	100	125	125	125	125	110		
(# P <sub>2</sub> O <sub>5</sub> )			20	20	20	20	20	20	20	20	20	20	20		
(# K <sub>2</sub> O)			10	10	10	10	10	10	10	10	10	10	10		
(# S)			0	0	0	0	0	10	10	10	10	10	5		

Check variety is Northern.

1/ See MCES Bulletin 1098 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include protein, quality, disease resistance, etc. before making cultivar selection decisions.

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

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

4/ 10-Yr Comparable Average = (x/y) \* z where x = average yield of a given entry for years tested, y = average yield for Northern for the same years, and z = 10-Yr average yield for the check variety Northern.

**TABLE 3. Ten-Year Test Weight Summary on Selected Entries from Dryland Intra-state Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 3502-WW)**

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ TEST WEIGHT (Pounds Per Bushel)										AVE. for YEARS TESTED	% of CHECK TEST WT 3/	10-YR COMP. AVE. TEST WT 4/
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
MTCS1601 STANDCLEAR CLP (P+,CL)	4							62.9	60.7	62.4	54.4	61.8	104.7	<b>62.7</b>
Syngenta, 2017 SY 517 CL2 (P+,CL)	4							64.1	61.3	63.7	53.6	60.7	102.8	<b>61.6</b>
Syngenta 2019 SY WOLVERINE (P+)	3									60.3	63.1	54.5	102.4	<b>61.3</b>
CO06052 BRAWL CL PLUS (+,CL)	7				62.1	61.0	62.6	64.3	62.0	63.4	52.1	61.1	101.9	<b>61.0</b>
MTS0713 JUDEE (+)(saw fly tol)	10	56.9	60.2	61.8	61.8	61.3	62.9	63.6	61.3	63.6	55.0	60.9	101.6	<b>60.9</b>
MTS1588 BOBCAT (++) (saw fly res)	5						62.2	62.7	60.6	62.6	54.8	60.6	101.6	<b>60.8</b>
MT1564 FLA THEAD (++)	5						62.4	63.6	60.4	63.1	51.8	60.3	101.0	<b>60.5</b>
MT1465 FOUROSIX (++)	6					59.9	62.5	62.6	60.0	62.2	53.3	60.1	100.8	<b>60.4</b>
ACS55017 KELDIN (P+)	8			61.1	61.7	61.2	62.2	63.1	59.9	62.0	52.7	60.5	100.7	<b>60.3</b>
CO13003C BYRD CL PLUS (+,CL)	5						61.3	63.4	60.6	63.0	51.9	60.0	100.6	<b>60.2</b>
Alberta, 2015 AAC WILDFIRE (+)	4							62.2	58.8	61.5	54.1	59.1	100.2	<b>60.0</b>
WestBred, 2018 WB4418 (P+)	3								59.9	61.4	52.5	58.0	100.0	<b>59.9</b>
MT0978 NORTHERN (+)	10	58.5	59.6	61.0	62.1	59.2	62.2	62.3	60.3	62.0	51.6	59.9	100.0	<b>59.9</b>
MTS1224 LOMA (+)	8			60.5	61.0	58.6	62.1	62.6	59.7	62.1	53.2	60.0	99.8	<b>59.8</b>
MTS0808 WARHORSE (+)(saw fly res)	10	57.6	59.0	61.1	60.6	60.4	62.2	62.5	60.2	62.1	51.5	59.7	99.8	<b>59.7</b>
MT00159 YELLOWSTONE (+)	9	58.1	59.3	60.7	60.9	59.4		61.7	59.5	61.5	53.5	59.4	99.7	<b>59.7</b>
MTCL1077 SY CLEARSTONE 2CL (P+,CL)	10	57.1	58.2	60.8	60.9	59.5	62.0	61.4	59.5	61.6	54.6	59.6	99.5	<b>59.6</b>
<b>MEANS (For Entries Listed)</b>		<b>57.6</b>	<b>59.3</b>	<b>61.0</b>	<b>61.4</b>	<b>60.1</b>	<b>62.2</b>	<b>62.9</b>	<b>60.3</b>	<b>62.4</b>	<b>53.3</b>			<b>60.5</b>
April-July Precip. (in.)		7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)		9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting		n/a	9.1	n/a	9.4	10.0	9.3	8.6	7.7	9.4	6.4	8.7		
Total Plant Available Water (in.)		7.3	22.4	4.9	17.0	22.2	11.7	12.6	14.0	15.0	10.5	13.7		
Soil NO <sub>3</sub> (lbs.) to SD at Planting		60	59	48	37	113	65	272	117	419	77	127		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	46	47	47	48		
Fertilizer Applied	(# N)	100	100	100	100	100	100	125	125	125	125	110		
	(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	20	20	20	20	20	20		
	(# K <sub>2</sub> O)	10	10	10	10	10	10	10	10	10	10	10		
	(# S)	0	0	0	0	0	10	10	10	10	10	5		

Check variety is Northern.

1/ See MCES Bulletin 1098 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include protein, quality, disease resistance, etc. before making cultivar selection decisions.

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

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

4/ 10-Yr Comparable Average = (x/y) \* z where x = average test weight of a given entry for years tested, y = average test weight for Northern for the same years, and z = 10-Yr average test weight for the check variety Northern.

**TABLE 4. Ten-Year Protein Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 3502-WW)**

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ PROTEIN % (Values Adjusted to 13% Grain Moisture)											AVE. for YEARS TESTED	% of CHECK PROTEIN 3/	10-YR COMP. AVE. PROTEIN 4/
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021				
MTS0808	WARHORSE (+)(saw fly res)	10	13.1	12.3	13.5	12.8	10.7	14.8	14.9	16.2	14.8	18.3	14.1	101.9	14.1
MTS0713	JUDEE (+)(saw fly tol)	10	14.6	12.1	12.8	12.6	9.8	14.4	15.5	15.8	15.2	18.4	14.1	101.7	14.1
MTS1224	LOMA (+)	8			13.5	13.5	10.2	14.0	14.4	15.2	14.7	18.3	14.2	100.5	14.0
MT0978	NORTHERN (+)	10	13.3	12.3	13.1	12.7	10.8	14.6	14.2	14.8	14.8	18.2	13.9	100.0	13.9
CO06052	BRAWL CL PLUS (+,CL)	7				13.9	11.1	14.1	14.0	15.3	14.0	17.6	14.3	99.9	13.9
MT1465	FOUROSIX (++)	6					11.2	14.4	14.9	14.9	14.2	17.4	14.5	99.5	13.8
MTCL1077	SY CLEARSTONE 2CL (P+,CL)	10	13.3	12.1	12.4	12.8	10.4	14.8	14.3	15.3	14.7	17.6	13.8	99.2	13.8
MT00159	YELLOWSTONE (+)	9	13.5	11.9	12.6	12.6	10.6		14.2	15.1	14.4	17.5	13.6	98.5	13.7
Syngenta 2019	SY WOLVERINE (P+)	3								15.7	14.5	16.9	15.7	98.5	13.7
Syngenta, 2017	SY 517 CL2 (P+,CL)	4							14.1	16.0	14.3	16.6	15.3	98.4	13.7
MTS1588	BOBCAT (++) (saw fly res)	5						14.0	14.3	14.9	14.4	17.8	15.1	98.4	13.7
ACS55017	KELDIN (P+)	8			12.4	12.6	10.6	12.5	13.7	15.1	14.3	18.7	13.7	97.1	13.5
Alberta, 2015	AAC WILDFIRE (+)	4							13.8	14.6	13.8	17.6	14.9	96.4	13.4
MT1564	FLATHEAD (++)	5						13.8	13.8	15.1	13.9	17.1	14.7	96.2	13.4
CO13003C	BYRD CL PLUS (+,CL)	5						13.8	12.6	15.3	13.1	17.5	14.5	94.5	13.1
MTCS1601	STANDCLEAR CLP (P+,CL)	4							14.7	11.6	14.1	17.9	14.6	94.1	13.1
WestBred, 2018	WB4418 (P+)	3								14.4	13.5	16.5	14.8	93.0	12.9
MEANS (For Entries Listed)			13.6	12.1	12.9	12.9	10.6	14.1	14.2	15.0	14.3	17.6			13.6
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			n/a	9.1	n/a	9.4	10.0	9.3	8.6	7.7	9.4	6.4	8.7		
Total Plant Available Water (in.)			7.3	22.4	4.9	17.0	22.2	11.7	12.6	14.0	15.0	10.5	13.7		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			60	59	48	37	113	65	272	117	419	77	127		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	48	46	47	47	48		
Fertilizer Applied															
	(# N)		100	100	100	100	100	100	125	125	125	125	110		
	(# P <sub>2</sub> O <sub>5</sub> )		20	20	20	20	20	20	20	20	20	20	20		
	(# K <sub>2</sub> O)		10	10	10	10	10	10	10	10	10	10	10		
	(# S)		0	0	0	0	0	10	10	10	10	10	5		

Check variety is Northern.

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

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

4/ 10-Yr Comparable Average = (x/y) \* z where x = average protein percent of a given entry for years tested, y = average protein percent for Northern for the same years, and z = 10-year average protein percent for the check variety Northern.

**TABLE 5. Ten-Year Sawfly Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 3502-WW)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ SAWFLY RATING (% Cut and Lodged)										AVE. for YEARS TESTED	% of CHECK SAWFLY 3/	10-YR COMP. AVE SAWFLY 4/	
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021				
MTS1588	BOBCAT (++) (saw fly res)	5						0.3	1.9	0.6	19.0	8.8	6.1	59.8	<b>3.5</b>	
MTS0808	WARHORSE (+) (saw fly res)	10	2.3	2.3	1.0	2.0	0.0	0.3	0.2	2.8	34.6	13.3	5.9	100.0	<b>5.9</b>	
WestBred, 2018	WB4418 (P+)	3									15.5	31.6	7.3	18.1	107.2	<b>6.3</b>
MTS1224	LOMA (+)	8			2.3	2.3	0.0	0.3	4.1	15.4	37.8	10.3	9.1	133.7	<b>7.9</b>	
Syngenta, 2017	SY 517 CL2 (P+,CL)	4							1.6	16.0	33.9	20.2	17.9	140.9	<b>8.3</b>	
CO06052	BRAWL CL PLUS (+,CL)	7				1.0	0.0	1.0	6.6	13.9	30.7	23.7	11.0	144.3	<b>8.5</b>	
MTS0713	JUDEE (+) (saw fly tol)	10	2.1	5.3	1.0	0.7	0.0	0.0	5.0	11.4	31.3	40.7	9.7	165.6	<b>9.7</b>	
CO13003C	BYRD CL PLUS (+,CL)	5						0.3	3.6	21.0	43.6	24.6	18.6	181.7	<b>10.7</b>	
Syngenta 2019	SY WOLVERINE (P+)	3								28.9	48.3	19.8	32.3	191.1	<b>11.2</b>	
MT1564	FLATHEAD (++)	5						0.7	2.3	27.4	33.7	34.9	19.8	192.9	<b>11.4</b>	
MT0978	NORTHERN (+)	10	9.3	6.7	2.3	2.3	0.0	0.0	3.9	37.6	24.6	33.3	12.0	203.7	<b>12.0</b>	
Alberta, 2015	AAC WILDFIRE (+)	4							5.5	32.4	52.4	17.3	26.9	211.5	<b>12.4</b>	
MT00159	YELLOWSTONE (+)	9	8.9	10.0	2.3	2.3	0.0		7.7	30.2	38.4	27.5	14.1	217.5	<b>12.8</b>	
MT1465	FOUROSIX (++)	6						0.0	0.3	3.6	38.6	62.4	27.1	22.0	257.4	<b>15.2</b>
MTCS1601	STANDCLEAR CLP (P+,CL)	4							4.2	11.6	61.0	55.1	33.0	259.0	<b>15.2</b>	
MTCL1077	SY CLEARSTONE 2CL (P+,CL)	10	11.0	13.3	2.3	11.7	0.0	0.0	10.6	44.0	55.1	25.5	17.3	294.7	<b>17.3</b>	
ACS55017	KELDIN (P+)	8			2.3	15.0	0.0	0.7	7.2	45.9	61.1	37.2	21.2	312.2	<b>18.4</b>	
MEANS (For Entries Listed)			6.7	7.5	2.0	4.7	0.0	0.4	4.5	23.1	41.1	25.1			<b>11.0</b>	
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8			
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7			
Soil PAW (in.) to SD @ Planting			n/a	9.1	n/a	9.4	10.0	9.3	8.6	7.7	9.4	6.4	8.7			
Total Plant Available Water (in.)			7.3	22.4	4.9	17.0	22.2	11.7	12.6	14.0	15.0	10.5	13.7			
Soil NO <sub>3</sub> (lbs.) to SD at Planting			60	59	48	37	113	65	272	117	419	77	127			
SD (Sampling Depth in Inches)			48	48	48	48	48	48	48	46	47	47	48			
Fertilizer Applied																
	(# N)		100	100	100	100	100	100	125	125	125	125	110			
	(# P <sub>2</sub> O <sub>5</sub> )		20	20	20	20	20	20	20	20	20	20	20			
	(# K <sub>2</sub> O)		10	10	10	10	10	10	10	10	10	10	10			
	(# S)		0	0	0	0	0	10	10	10	10	10	5			

Check variety is Warhorse.

1/ See MCES Bulletin 1098 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include protein, quality, disease resistance, etc. before making cultivar selection decisions.

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

3/ Percent of Warhorse saw fly rating for the same data years as those in which a given entry was tested.

4/ 10-Yr Comparable Average = (x/y) \* z where x = average saw fly rating of a given entry for years tested, y = average saw fly rating for Warhorse for the same years, and z = 10-Yr average saw fly rating for the check variety Warhorse.

**TABLE 6. Advanced Yield Spring Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2021. (Exp# 21-3102-SW)**

ID	Cultivar or Selection	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
AAC CONCORD	MS 211	173.0	25.5	26.6	57.0	16.3	<u>1.0</u>
AP GUNSMOKE CL2	SYN 212	172.0	20.5	23.6	57.1	16.5	60.0
AP SMITH	SYN 211	173.3	19.6	21.9	58.4	16.4	60.0
CHOTEAU	PI 633974	173.3	22.9	24.6	57.6	16.3	<b>6.7</b>
CORBIN	BZ 996434	170.3	22.9	<b>28.8</b>	59.6	16.2	<b>8.3</b>
DAGMAR	PI 690450	170.7	22.3	25.3	59.7	16.5	<b>3.7</b>
DUCLAIR	PI 660981	171.7	22.9	21.2	56.6	16.9	<b>5.0</b>
EGAN	PI 671855	173.7	23.8	20.5	56.3	17.1	58.3
LANNING	PI 676978	169.3	18.7	21.5	58.2	16.4	56.7
LCS ASCENT	LIMAGR 211	170.3	23.8	22.0	<b>60.8</b>	15.6	55.0
LCS BUSTER	LIMAGR 201	176.3	20.9	<b>26.8</b>	56.4	14.5	<u>1.0</u>
MCNEAL	PI 574642	173.3	23.9	21.5	57.5	15.8	48.3
MS COBRA	MS 212	170.7	21.8	19.0	59.1	16.6	46.7
MS RANCHERO	MS 201	170.3	20.9	24.2	58.5	15.6	50.0
MT SIDNEY	MT 1716	173.7	23.3	22.5	57.9	16.5	25.0
NS PRESSER CLP	PI 679964	175.0	24.0	26.5	58.4	15.2	23.3
REEDER	ND 695	173.0	24.1	21.1	58.3	16.0	46.7
SY 611 CL2	SYN 183	172.7	20.2	18.3	59.1	16.2	68.3
SY INGMAR	AGRIPR 141	173.7	21.9	23.7	59.2	16.7	45.0
SY LONGMIRE	SYN 182	172.3	21.9	22.4	59.0	16.5	11.7
SY MCCLOUD	SYN 181	171.0	22.8	22.7	<b>59.8</b>	16.2	71.7
SY ROCKFORD	AGRIPR 161	173.3	23.4	24.3	56.9	16.2	65.0
THATCHER	CI 10003	175.7	28.0	16.3	55.3	16.7	25.0
VIDA	PI 642366	173.3	24.9	24.7	58.3	15.6	<b>15.0</b>
WB 9516	WB 211	172.7	23.9	24.5	<b>59.8</b>	15.5	35.0
WB 9590	WB 171	171.0	19.0	21.4	<b>60.6</b>	16.4	53.3
WB 9719	WB 173	173.7	22.8	20.8	59.2	15.9	63.3
WB 9879 CLP	CHOTEAU*3/CHOTEAU/IMI8134	174.0	22.2	25.0	57.7	16.7	<b>3.7</b>
WB GUNNISON	BZ 92413R	173.7	22.2	<u>29.3</u>	58.5	15.5	<b>1.0</b>
509-2	SYN 213	170.7	19.8	24.2	58.2	16.1	71.7
BZ917-252	Vida/WestBred 906R//Egan	173.7	21.4	26.1	54.4	16.2	41.7
BZ917-277	Choteau/TCG-Cornerstone//McNeal	173.0	24.6	<b>28.8</b>	59.3	15.6	<b>15.0</b>
LNR 1713	LIMAGR 212	172.7	22.2	19.6	59.1	16.1	35.0
MT 1809	VIDA/MO 09/3-4	172.7	22.6	<b>28.0</b>	59.0	15.9	25.0
MT 1855	MT1053/MO8/3-4	174.3	25.6	21.6	58.1	<b>17.3</b>	<b>13.3</b>
MT 1904	VIDA//MT1018//CHOTEAU/YELLOWSTONE	173.7	22.8	26.7	59.4	16.4	<b>2.3</b>
MT 1927	MT1203/MT1234	174.7	23.9	25.0	56.2	16.8	<b>6.7</b>
MT 1931	MT1316/MT1319	169.7	18.5	20.4	58.9	16.1	73.3
MT 1934	VIDA/MT1319	169.3	22.0	24.8	58.3	15.7	<b>15.0</b>
MT 1938	MT1316//MT1018//CHOTEAU/YELLOWSTO	172.3	23.5	26.6	58.6	16.1	21.7
MT 1939	MT1316//MT1018//CHOTEAU/YELLOWSTO	172.7	22.0	23.4	57.4	16.2	31.7
MT 1951	MT1316/EGAN	172.0	24.2	20.9	53.8	17.3	55.0
MT 2005	MT 1453/MT 1338	170.7	20.7	24.1	59.2	16.4	23.3

**TABLE 6. Advanced Yield Spring Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2021. (Exp# 21-3102-SW)**

ID	Cultivar or Selection	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
MT 2007	MT 1316/ND819	170.0	21.7	22.2	59.5	15.8	66.7
MT 2011	MT 1542/MT 1338	173.7	23.2	21.7	59.4	16.3	18.3
MT 2013	MT 1542/ND819	170.0	22.3	20.4	<b>59.9</b>	16.2	20.0
MT 2018	MT 1524/ND819	169.7	22.3	22.4	<b>60.4</b>	16.2	<b>13.3</b>
MT 2019	MT 1316/MT 1451	170.7	23.0	<b>27.0</b>	57.2	15.9	43.3
MT 2020	MT 1316/MT 1451	170.0	21.9	24.8	57.9	16.0	30.0
MT 2021	MT 1316/VIDA	170.7	23.7	25.1	57.0	16.6	45.0
MT 2022	MT 1401/ND 819	170.0	21.8	24.7	59.5	15.9	46.7
MT 2030	MT 1316/MT 1338	170.7	19.6	22.5	59.1	15.4	53.3
MT 2034	MT1133//CHOTEAU/YELLOWSTONE (44)(1)	172.7	23.9	25.4	56.3	15.7	36.7
MT 2038	MT 1316/MT1133//MT0744/MT0614	169.7	23.1	21.3	58.8	<u>17.7</u>	33.3
MT 2043	MT 1542/MT 1451	173.0	22.9	20.7	58.8	<b>17.3</b>	<b>10.0</b>
MT 2045	MT 1572/(Bar Nir X Zahir)Xm (14)	170.7	22.5	20.2	58.7	16.7	35.0
MT 2047	MT 1572/MT 1401	173.3	21.4	24.1	<b>60.3</b>	16.2	30.0
MT 2049	MT 1316/MT 1415	171.3	21.1	26.1	57.2	16.1	43.3
MT 2050	MT 1542/MT 1415	171.3	23.0	25.1	57.2	16.1	<b>13.3</b>
MT 2054	MT 1316/MT 1528	170.7	26.0	<b>29.0</b>	58.7	16.0	<b>5.0</b>
MT 2063	MT 1572/MT1133//CHOTEAU/YELLOWSTONE	173.3	23.8	24.5	59.0	15.8	23.3
MT 2065	MT1317//UC1110/ABG282-290	168.7	21.6	22.6	59.2	16.5	30.0
MT 2072	DuClair_H2.1*2//Patwin515/MN-11394-6	175.0	23.2	23.8	58.0	<b>17.6</b>	<b>3.7</b>
MT 2075	DuClair_H2.1*2//Patwin515/MN-11394-6	172.0	23.0	19.8	57.0	15.8	18.3
EXPERIMENTAL MEANS		172.1	22.6	23.5	58.3	16.2	32.2
LSD (0.05)		1.4	1.5	2.5	1.1	0.5	14.7
C.V.: ( S / MEAN)*100		0.5	4.1	6.6	1.2	1.9	28.2
P-VALUE (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

**Bold** Indicates the best entry within a column based on Fisher's Protected LSD at the 0.05 probability level.

**Bold** Indicates cultivars equal to the best entry within a column based on Fisher's Protected LSD at the 0.05 probability level.

1/ No. of Days from January 1 (172 = June 21).

2/ 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.

3/ Protein values are adjusted to 13 percent grain moisture.

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

Management Information (21-3102-SW)

Seeding Date:	April 10, 2021
Harvest Date:	July 28-29, 2021
Fertility:	100-20-10-10 side banded
System:	no till
Herbicide:	Vendetta-16oz/ac
Insecticide:	none
Previous Crop:	Chemical Fallow-Spring Wheat
Precipitation:	3.63" (seeding to harvest)

**TABLE 7. Ten-Year Yield Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 3102-SW)**

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)											AVE. for YEARS TESTED	% of CHECK YIELD 3/	10-YR COMP. AVE. YIELD 4/
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021				
PI642366 VIDA (+)	10	35.1	67.2	47.9	45.9	40.5	35.6	44.4	53.1	64.4	24.7	45.9	100.0	<b>45.9</b>	
MT 1621 DAGMAR (+)	5						29.4	45.1	49.8	71.9	25.3	44.3	99.7	<b>45.7</b>	
MT 1716 MT SIDNEY (++)	4							44.0	51.6	63.5	22.5	45.4	97.3	<b>44.7</b>	
SYN 182 SY LONGMIRE (P+)	4							41.4	50.4	66.8	22.4	45.2	96.9	<b>44.5</b>	
WB 173 WB 9719 (P+)	5						31.9	48.2	50.6	61.7	20.8	42.7	96.0	<b>44.0</b>	
PI679964 NS PRESSER CLP (P+,CL)	8	32.1	69.4			35.3	34.7	45.7	46.0	59.9	26.5	43.7	95.7	<b>43.9</b>	
PI676978 LANNING (++)	8			44.2	44.3	45.6	27.7	44.6	43.0	66.4	21.5	42.2	94.6	<b>43.4</b>	
AGRIPR161 SY ROCKFORD (P+)	6					41.4	30.9	44.5	44.2	61.8	24.3	41.2	94.0	<b>43.1</b>	
ND695 REEDER (+)	10	31.4	62.7	45.7	42.3	44.7	29.0	44.6	42.8	61.1	21.1	42.5	92.7	<b>42.5</b>	
04S0258-12 SY INGMAR (P+)	8			44.9	43.7	41.2	30.8	44.2	45.5	56.4	23.7	41.3	92.6	<b>42.5</b>	
IMICHT-79 WB9879CLP (P+,CL)	10	29.8	58.9	40.5	38.0	43.6	29.1	43.5	51.3	64.6	25.0	42.4	92.4	<b>42.4</b>	
PI660981 DUCLAIR (+)	10	34.9	61.7	46.9	43.2	38.6	26.2	33.9	47.7	64.8	21.2	41.9	91.3	<b>41.9</b>	
SYN 183 SY 611 CL2 (P+,CL)	4							43.9	46.3	60.6	18.3	42.2	90.5	<b>41.5</b>	
BZ 996-434 CORBIN (P+)(saw fly tol)	10	31.3	59.3	38.8	42.3	45.7	25.3	40.8	44.8	56.8	28.8	41.4	90.2	<b>41.4</b>	
BZ902-413R WB-GUNNISON (P+)	10	32.3	56.5	43.4	39.7	34.0	26.7	36.3	52.0	61.0	29.3	41.1	89.6	<b>41.1</b>	
PI574642 MCNEAL	10	34.1	53.0	41.5	43.4	39.2	32.2	41.1	46.8	55.8	21.5	40.9	89.0	<b>40.9</b>	
PI 671855 EGAN (+)	10	31.6	55.5	37.8	38.9	46.5	30.5	38.6	44.0	63.6	20.5	40.8	88.8	<b>40.8</b>	
SYN 181 SY MCCLOUD (P+)	4							40.1	40.4	59.0	22.7	40.5	86.9	<b>39.9</b>	
PI633974 CHOTEAU (+)(saw fly tol)	10	31.1	53.9	40.2	39.5	36.8	26.4	36.6	43.5	64.9	24.6	39.7	86.6	<b>39.7</b>	
WB 171 WB 9590 (P+)	5						23.4	39.1	46.5	57.8	21.4	37.6	84.7	<b>38.9</b>	
CI10003 THATCHER	9	25.9	44.9	33.0	29.2	32.3	28.1	34.5	37.1		16.3	31.3	71.3	<b>32.7</b>	
MEANS (For Entries Listed)		31.8	58.5	42.1	40.9	40.4	29.3	41.7	46.5	62.1	23.0			<b>42.0</b>	
April-July Precip. (in.)		7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8			
Total Annual Precip. (in.)		9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7			
Soil PAW (in.) to SD @ Planting		n/a	9.2	8.3	9.8	8.8	8.7	7.4	n/a	8.7	8.3	8.6			
Total Plant Available Water (in.)		7.3	22.5	13.1	17.3	21.0	11.1	11.4	n/a	14.2	12.2	14.5			
Soil NO <sub>3</sub> (lbs.) to SD at Planting		35	56	86	75	55	85	77	300	171	120	106			
SD (Sampling Depth in Inches)		48	48	48	48	48	45	42	47	45	45	46			
Fertilizer Applied	(# N)	100	100	100	100	125	125	100	100	100	100	105			
	(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	20	20	20	20	20	20			
	(# K <sub>2</sub> O)	10	10	10	10	10	10	10	10	10	10	10			
	(# S)	0	0	0	0	10	10	10	10	10	10	6			

Long-term 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/ Percent of Vida yield for the same data years as those in which a given entry was tested.

4/ 10-Yr Comparable Average = (x/y) \* z where x = average yield of a given entry for years tested, y = average yield for Vida for the same years, and z = 10-Yr average yield for the check variety Vida.

**TABLE 8. Ten-Year Test Weight Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 3102-SW)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ TEST WEIGHT (Pounds Per Bushel)										AVE. for YEARS TESTED	% of CHECK TEST WT 3/	10-YR COMP. AVE. TEST WT 4/	
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021				
SYN 181	SY MCCLLOUD (P+)	4							62.5	60.5	62.6	59.8	61.3	103.2	<b>59.7</b>	
WB 173	WB 9719 (P+)	5							60.5	61.9	61.5	61.8	59.2	61.0	102.9	<b>59.5</b>
WB 171	WB 9590 (P+)	5							61.0	61.0	60.3	61.9	60.6	61.0	102.9	<b>59.5</b>
SYN 183	SY 611 CL2 (P+,CL)	4							61.0	61.1	61.5	59.1	60.7	102.1	<b>59.1</b>	
04S0258-12	SY INGMAR (P+)	8			60.6	54.0	58.1	59.6	61.7	60.5	61.2	59.2	59.4	102.1	<b>59.0</b>	
SYN 182	SY LONGMIRE (P+)	4							60.7	60.9	60.9	59.0	60.4	101.6	<b>58.8</b>	
MT 1621	DAGMAR(+)	5							59.2	61.0	59.4	61.4	59.7	60.1	101.5	<b>58.7</b>
BZ902-413R	WB-GUNNISON (P+)	10	52.9	62.6	58.2	56.1	56.8	58.6	60.4	60.0	61.3	58.5	58.5	101.2	<b>58.5</b>	
BZ 996-434	CORBIN (P+)(saw fly tol)	10	51.3	62.7	59.5	53.3	58.6	59.0	60.7	59.8	60.4	59.6	58.5	101.1	<b>58.5</b>	
MT 1716	MT SIDNEY (++)	4							61.2	59.9	61.0	57.9	60.0	101.0	<b>58.4</b>	
ND695	REEDER (+)	10	52.9	62.8	58.5	54.4	58.2	58.4	59.7	59.8	61.1	58.3	58.4	101.0	<b>58.4</b>	
IMICHT-79	WB9879CLP (P+,CL)	10	51.9	61.7	58.6	53.8	57.7	58.2	59.7	58.8	61.0	57.7	57.9	100.1	<b>57.9</b>	
PI642366	VIDA (+)	10	50.8	62.4	58.6	53.8	56.5	58.7	59.9	59.4	60.1	58.3	57.8	100.0	<b>57.8</b>	
PI676978	LANNING (++)	8			59.1	53.0	58.1	58.3	58.4	59.7	60.5	58.2	58.2	100.0	<b>57.8</b>	
PI633974	CHOTEAU (+)(saw fly tol)	10	52.0	61.5	58.3	52.8	58.1	57.8	59.8	58.7	61.0	57.6	57.8	99.9	<b>57.8</b>	
PI660981	DUCLAIR (+)	10	51.6	61.2	58.1	52.5	57.5	57.2	59.8	58.4	59.4	56.6	57.2	98.9	<b>57.2</b>	
AGRIPR161	SY ROCKFORD (P+)	6						56.1	57.8	59.9	57.9	60.0	56.9	58.1	98.8	<b>57.1</b>
PI574642	MCNEAL	10	52.3	61.8	56.8	54.5	55.7	57.1	57.5	58.5	58.4	57.5	57.0	98.5	<b>57.0</b>	
PI679964	NS PRESSER CLP (P+,CL)	8	49.2	61.7				53.8	58.6	58.8	58.1	58.4	58.4	57.1	98.1	<b>56.7</b>
PI671855	EGAN (+)	10	54.1	60.8	56.9	53.5	57.0	56.1	57.2	57.1	58.3	56.3	56.7	98.0	<b>56.7</b>	
CI10003	THATCHER	9	50.2	61.5	54.7	50.1	55.6	55.8	55.5	54.0		55.3	54.7	95.0	<b>55.0</b>	
MEANS (For Entries Listed)			51.7	61.9	58.2	53.5	57.0	58.3	59.9	59.3	60.6	58.3			<b>58.1</b>	
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8			
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7			
Soil PAW (in.) to SD @ Planting			n/a	9.2	8.3	9.8	8.8	8.7	7.4	n/a	8.7	8.3	8.6			
Total Plant Available Water (in.)			7.3	22.5	13.1	17.3	21.0	11.1	11.4	n/a	14.2	12.2	14.5			
Soil NO <sub>3</sub> (lbs.) to SD at Planting			35	56	86	75	55	85	77	300	171	120	106			
SD (Sampling Depth in Inches)			48	48	48	48	48	45	42	47	45	45	46			
Fertilizer Applied																
	(# N)		100	100	100	100	125	125	100	100	100	100	105			
	(# P <sub>2</sub> O <sub>5</sub> )		20	20	20	20	20	20	20	20	20	20	20			
	(# K <sub>2</sub> O)		10	10	10	10	10	10	10	10	10	10	10			
	(# S)		0	0	0	0	10	10	10	10	10	10	6			

Long-term 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/ Percent of Vida test weight for the same data years as those in which a given entry was tested.

4/ 10-Yr Comparable Average = (x/y) \* z where x = average test weight of a given entry for years tested, y = average test weight for Vida for the same years, and z = 10-Yr average test weight for the check variety Vida.

**TABLE 9. Ten-Year Protein Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 3102-SW)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ PROTEIN % (Values Adjusted to 13% Grain Moisture)										AVE. for YEARS TESTED	% of CHECK PROTEIN 3/	10-YR COMP. AVE. PROTEIN 4/
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
PI671855	EGAN (+)	10	18.3	15.7	17.3	18.2	17.4	16.9	17.4	17.1	15.1	17.1	17.1	111.1	<b>17.1</b>
SYN 181	SY MCCLOUD (P+)	4							16.5	17.2	14.6	16.2	16.1	108.1	<b>16.6</b>
CI 10003	THATCHER	9	17.7	14.7	16.5	18.2	16.0	15.8	16.9	16.5		16.7	16.6	106.6	<b>16.4</b>
WB 171	WB 9590 (P+)	5						16.3	16.4	16.5	14.4	16.4	16.0	106.3	<b>16.3</b>
SYN 182	SY LONGMIRE (P+)	4							16.6	16.5	13.6	16.5	15.8	106.1	<b>16.3</b>
PI 676978	LANNING (++)	8			16.3	16.6	16.0	16.8	16.0	16.9	14.1	16.4	16.1	105.5	<b>16.2</b>
BZ 996-434	CORBIN (P+)(saw fly tol)	10	18.5	13.8	16.4	17.3	15.0	16.2	16.7	16.6	14.7	16.2	16.1	105.2	<b>16.1</b>
MT 1621	DAGMAR (+)	5						16.2	15.9	16.3	14.2	16.5	15.8	105.1	<b>16.1</b>
PI633974	CHOTEAU (+)(saw fly tol)	10	17.5	15.1	16.3	16.7	15.7	16.4	16.1	16.5	14.2	16.3	16.1	104.8	<b>16.1</b>
MT 1716	MT SIDNEY (++)	4							15.6	15.8	14.3	16.5	15.6	104.4	<b>16.0</b>
SYN 183	SY 611 CL2 (P+,CL)	4							15.8	16.1	14.2	16.2	15.6	104.4	<b>16.0</b>
04S0258-12	SY INGMAR (P+)	8			15.7	17.0	15.9	16.3	15.7	16.2	14.3	16.7	16.0	104.4	<b>16.0</b>
IMICHT-79	WB9879CLP (P+,CL)	10	17.4	14.8	16.4	16.7	15.8	16.3	15.3	16.6	14.1	16.7	16.0	104.2	<b>16.0</b>
PI660981	DUCLAIR (+)	10	18.0	14.1	15.7	17.0	15.4	16.3	15.9	16.1	14.3	16.9	16.0	104.0	<b>16.0</b>
ND 695	REEDER (+)	10	17.5	15.3	15.9	17.2	15.1	16.0	15.8	15.8	13.9	16.0	15.8	103.1	<b>15.8</b>
PI574642	MCNEAL	10	16.9	14.8	15.8	17.0	15.4	16.0	15.8	15.6	14.3	15.8	15.7	102.5	<b>15.7</b>
AGRIPR161	SY ROCKFORD (P+)	6					15.4	16.0	15.5	15.8	13.7	16.2	15.5	102.1	<b>15.7</b>
PI 679964	NS PRESSER CLP (P+,CL)	8	17.6	14.4			15.5	15.4	15.2	15.6	14.8	15.2	15.5	101.5	<b>15.6</b>
WB 173	WB 9719 (P+)	5						15.3	15.4	15.4	13.6	15.9	15.1	100.5	<b>15.4</b>
PI642366	VIDA (+)	10	17.1	14.0	15.1	16.6	15.6	15.6	15.0	15.4	13.7	15.6	15.4	100.0	<b>15.4</b>
BZ902-413R	WB-GUNNISON (P+)	10	17.0	14.0	15.1	16.6	15.0	15.1	15.3	15.1	13.7	15.5	15.2	99.3	<b>15.2</b>
MEANS (For Entries Listed)			17.6	14.6	16.1	17.1	15.7	16.0	15.9	16.2	14.2	16.3			<b>16.0</b>
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			n/a	9.2	8.3	9.8	8.8	8.7	7.4	n/a	8.7	8.3	8.6		
Total Plant Available Water (in.)			7.3	22.5	13.1	17.3	21.0	11.1	11.4	n/a	14.2	12.2	14.5		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			35	56	86	75	55	85	77	300	171	120	106		
SD (Sampling Depth in Inches)			48	48	48	48	48	45	42	47	45	45	46		
Fertilizer Applied															
			(# N)	100	100	100	100	125	125	100	100	100	105		
			(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	20	20	20	20	20		
			(# K <sub>2</sub> O)	10	10	10	10	10	10	10	10	10	10		
			(# S)	0	0	0	0	10	10	10	10	10	6		

Long-term 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/ Percent of Vida protein for the same data years as those in which a given entry was tested.

4/ 10-Yr Comparable Average = (x/y) \* z where x = average protein percent of a given entry for years tested, y = average protein percent for Vida for the same years, and z = 10-Yr average protein percent for the check variety Vida.

**TABLE 10. Ten-Year Sawfly Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 3102-SW)**

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ SAWFLY RATING (% Cut and Lodged)											AVE. for YEARS TESTED	% of CHECK SAWFLY 3/	10-YR COMP. AVE. SAWFLY 4/
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021				
BZ902-413R WB-GUNNISON (P+)	10	1.0	0.7	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.4	9.8	<b>0.4</b>	
MT 1621 DAGMAR (+)	5						0.0	0.0	2.3	0.3	3.7	1.3	23.2	<b>0.9</b>	
IMICHT-79 WB9879CLP (P+,CLP)	10	10.0	0.7	0.3	1.0	0.0	0.0	0.0	1.0	0.7	3.7	1.7	46.5	<b>1.7</b>	
P660981 DUCLAIR (+)	10	7.5	1.0	0.3	1.0	0.0	0.0	0.3	2.3	2.3	5.0	2.0	53.2	<b>2.0</b>	
BZ 996-434 CORBIN (P+)(saw fly tol)	10	7.5	0.7	0.3	0.7	0.0	0.0	0.0	1.0	2.0	8.3	2.1	55.0	<b>2.1</b>	
P633974 CHOTEAU (+)(saw fly tol)	10	8.0	1.0	0.7	0.7	0.0	0.0	0.3	3.7	2.0	6.7	2.3	61.7	<b>2.3</b>	
P642366 VIDA (+)	10	5.0	1.0	0.3	3.7	0.0	0.0	0.3	10.0	2.0	15.0	3.7	100.0	<b>3.7</b>	
SYN 182 SY LONGMIRE (P+)	4							0.3	13.3	3.7	11.7	7.3	106.1	<b>4.0</b>	
PI 679964 NS PRESSER CLP (P+,CL)	8	15.0	1.0			0.0	0.0	0.3	8.3	10.0	23.3	7.3	174.0	<b>6.5</b>	
MT 1716 MT SIDNEY (++)	4							0.7	18.3	8.7	25.0	13.2	192.7	<b>7.2</b>	
CI 10003 THATCHER	9	17.5	2.3	3.7	2.3	0.0	0.0	3.7	16.7		25.0	7.9	201.6	<b>7.5</b>	
WB 171 WB 9590 (P+)	5						0.0	1.0	8.3	5.0	53.3	13.5	247.5	<b>9.2</b>	
04S0258-12 SY INGMAR (P+)	8			1.0	1.0	0.0	0.0	2.3	20.0	8.3	45.0	9.7	248.1	<b>9.3</b>	
ND 695 REEDER (+)	10	20.0	2.3	2.3	2.3	0.0	0.0	2.3	16.7	5.3	46.7	9.8	262.7	<b>9.8</b>	
PI 676978 LANNING (++)	8			1.0	2.3	0.0	0.0	0.3	21.7	6.7	56.7	11.1	283.2	<b>10.6</b>	
P671855 EGAN (+)	10	15.0	2.3	2.3	1.0	0.0	0.0	2.0	26.7	6.7	58.3	11.4	306.5	<b>11.4</b>	
WB 173 WB 9719 (P+)	5						0.0	0.3	15.0	5.7	63.3	16.9	308.5	<b>11.5</b>	
AGRIPR161 SY ROCKFORD (P+)	6					0.0	0.0	1.0	16.7	2.3	65.0	14.2	310.9	<b>11.6</b>	
SYN 183 SY 611 CL2 (P+,CL)	4							3.7	15.0	2.0	68.3	22.3	325.6	<b>12.1</b>	
P574642 MCNEAL	10	30.0	7.0	5.0	5.0	0.0	0.3	0.3	18.3	13.3	48.3	12.8	342.3	<b>12.8</b>	
SYN 181 SY MCCLOUD (P+)	4							3.3	18.3	7.0	71.7	25.1	367.1	<b>13.7</b>	
MEANS (For Entries Listed)		12.4	1.8	1.4	1.8	0.0	0.0	1.1	12.1	4.7	33.6			<b>7.2</b>	
April-July Precip. (in.)		7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	3.9	6.7			
Total Annual Precip. (in.)		9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7			
Soil PAW (in.) to SD @ Planting		n/a	9.2	8.3	9.8	8.8	8.7	7.4	n/a	8.7	8.3	8.6			
Total Plant Available Water (in.)		7.3	22.5	13.1	17.3	21.0	11.1	11.4	n/a	14.2	12.2	14.5			
Soil NO <sub>3</sub> (lbs.) to SD at Planting		35	56	86	75	55	85	77	300	171	120	106			
SD (Sampling Depth in Inches)		48	48	48	48	48	45	42	47	45	45	46			
Fertilizer Applied	(# N)	100	100	100	100	125	125	100	100	100	100	105			
	(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	20	20	20	20	20	20			
	(# K <sub>2</sub> O)	10	10	10	10	10	10	10	10	10	10	10			
	(# S)	0	0	0	0	10	10	10	10	10	10	6			

Long-term 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/ Percent of Vida saw fly rating for the same data years as those in which a given entry was tested.

4/ 10-Yr Comparable Average = (x/y) \* z where x = average saw fly rating of a given entry for years tested, y = average saw fly rating for Vida for the same years, and z = 10-Yr average saw fly rating for the check variety Vida.

**Table 11. Montana Spring Durum Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, Montana. 2021. (Exp# 21-9802-DUR)**

ID	Cultivar Source	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	3/ FN seconds	4/ Sawfly %
CARPIO	NDSU	177.3	25.3	24.8	55.3	17.7	491	11.7
CDC-VIVID	CDC	175.3	25.5	22.3	56.8	18.5	<b>511</b>	<b>3.7</b>
DIVIDE	NDSU	175.0	28.2	24.4	57.6	17.4	453	15.0
GRENORA	NDSU	174.3	24.8	21.4	57.1	17.3	461	21.7
JOPPA	NDSU	175.0	26.1	24.4	57.8	17.0	454	21.7
LUSTRE	MSU	175.7	25.6	23.9	55.5	17.9	483	18.3
MOUNTRAIL	NDSU	175.7	25.5	23.5	57.3	17.3	443	23.3
ND-GRANO	NDSU	176.7	23.6	24.5	57.0	16.9	434	25.0
ND-RIVELAND	NDSU	174.7	26.7	26.0	57.3	16.6	500	21.7
TIOGA	NDSU	174.3	28.0	21.4	57.3	18.0	<b>520</b>	20.0
MTD16001	MSU	175.7	25.5	22.0	56.9	17.4	481	13.3
MTD16002	MSU	176.7	28.3	<b>31.1</b>	57.4	16.1	487	<b>5.0</b>
MTD18067	MSU	175.7	26.2	23.3	56.7	17.1	421	18.3
MTD18091	MSU	176.3	27.5	23.8	56.0	17.9	468	11.7
MTD18148	MSU	174.7	21.0	20.0	<b>59.5</b>	17.2	<b>530</b>	8.3
MTD18155	MSU	175.3	22.6	22.6	56.5	<b>18.1</b>	428	<b>2.3</b>
MTD18172	MSU	175.3	24.5	<b>30.4</b>	57.5	17.7	406	8.3
MTD18179	MSU	175.7	26.0	21.3	54.9	<b>19.1</b>	487	<b>2.3</b>
MTD18181	MSU	177.7	25.3	21.7	57.1	<b>18.5</b>	485	<b>5.3</b>
MTD18213	MSU	177.7	25.8	21.1	54.4	<b>18.6</b>	<b>531</b>	20.0
MTD18217	MSU	178.0	24.6	22.0	57.6	17.7	496	<b>5.3</b>
MTD18256	MSU	176.3	26.0	23.4	57.9	18.1	496	10.0
MTD18266	MSU	177.3	26.7	24.6	58.5	17.9	495	<b>3.7</b>
MTD18313	MSU	172.3	21.5	24.6	<b>60.4</b>	17.4	469	<b>1.0</b>
MTD18348	MSU	176.3	26.2	23.9	57.0	17.5	<b>521</b>	<b>6.7</b>
MTD18381	MSU	173.7	24.2	19.3	56.6	18.1	431	25.0
MTD18413	MSU	174.3	25.0	21.7	56.5	17.9	422	23.3
MTD18430	MSU	177.0	27.6	25.6	54.3	17.6	<b>518</b>	<b>3.7</b>
MTD18486	MSU	178.7	25.5	22.1	<b>59.5</b>	17.1	484	<b>1.0</b>
EXPERIMENTAL MEANS		175.8	25.4	23.4	57.1	17.6	476.1	12.7
LSD (0.05)		1.2	2.3	3.3	1.0	0.7	28.3	5.5
C.V.: ( S / MEAN)*100		0.4	5.6	8.7	1.1	2.3	3.6	26.5
P-VALUE (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

**Bold** Indicates the best entry within a column based on Fisher's Protected LSD at the 0.05 probability level.

**Bold** Indicates cultivars equal to the best entry within a column based on Fisher's Protected LSD at the 0.05 probability level.

1/ No. of Days from January 1 (176 = June 25).

2/ Volumetric yields are based on plot weights adjusted to uniform 13 percent grain moisture and 60 lbs/bu as the standard test weight for durum.

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.

Management Information (21-9802-DUR)

Seeding Date:	April 10, 2021
Harvest Date:	August 5, 2021
Fertility:	100-20-10-10
System:	no till
Herbicide:	Vendetta, 16 oz/ac
Insecticide:	none
Previous Crop:	Chemical Fallow-Spring Wheat
Precipitation:	4.02" (seeding to harvest)

**TABLE 12. Ten-Year Yield Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 9802-DUR)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)										AVE. for YEARS TESTED	% of CHECK YIELD 3/	10-Yr COMP. AVE. YIELD 4/
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
YU894-75	ALZADA (P+)	8	34.4	58.7	40.6		36.4	24.1	37.9	49.9	57.3		42.4	107.6	<b>40.6</b>
D9715-11	DIVIDE (+)	10	28.0	55.7	38.6	34.9	39.7	27.4	41.1	44.5	55.2	24.4	39.0	103.2	<b>39.0</b>
MTD16005	LUSTRE (+)	5						27.2	41.1	51.0	54.4	23.9	39.5	103.2	<b>39.0</b>
D03028	CARPIO (+)	9		59.8	39.7	34.6	41.3	26.7	35.8	47.4	48.7	24.8	39.9	102.6	<b>38.7</b>
CDC Vivid	CDC VIVID (P+)	5						24.5	40.5	54.1	54.6	22.3	39.2	102.3	<b>38.6</b>
D97780	GRENORA (+)	10	26.0	62.3	37.0	31.3	36.2	30.8	40.2	49.2	51.1	21.4	38.5	102.1	<b>38.5</b>
D04581	JOPPA (+)	8			41.3	34.8	31.5	28.0	41.1	43.0	54.2	24.4	37.3	101.9	<b>38.5</b>
D00095	TIOGA (+)	10	30.1	54.1	36.3	34.4	35.9	30.8	40.3	47.0	52.9	21.4	38.3	101.5	<b>38.3</b>
D901313	MOUNTRAIL (+)	10	27.9	57.0	32.4	38.8	30.1	28.2	38.2	45.2	56.4	23.5	37.8	100.0	<b>37.8</b>
NDSU	ND-RIVELAND (P+)	3								44.2	53.4	26.0	41.2	98.9	<b>37.3</b>
NDSU	ND-GRANO (P+)	3								47.2	50.9	24.5	40.9	98.1	<b>37.0</b>
MEANS (For Entries Listed)			29.3	57.9	38.0	34.8	35.9	27.5	39.6	47.5	53.5	23.7			<b>38.5</b>
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			n/a	9.1	8.3	9.8	8.2	8.7	9.2	n/a	7.7	7.6	8.6		
Total Plant Available Water (in.)			7.3	22.4	13.1	17.3	20.5	11.1	13.2	6.3	13.2	11.5	13.6		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			60	22	86	75	28	85	112	268	72	56	86		
SD (Sampling Depth in Inches)			n/a	48	48	48	48	45	48	48	40	39	46		
Fertilizer Applied															
			(# N)	100	100	100	100	125	125	100	100	100	105		
			(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	20	20	20	20	20		
			(# K <sub>2</sub> O)	10	10	10	10	10	10	10	10	10	10		
			(# S)	0	0	0	0	10	10	10	10	10	6		

Long-term check variety is Mountrail.

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 or Title 5 Pending.

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

4/ 10-Yr Comparable Average = (x/y) \* z where x = average yield of a given entry for years tested, y = average yield for Mountrail for the same years, and z = 10-Yr average yield for the check variety Mountrail.

**TABLE 13. Ten-Year Test Weight Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 9802-DUR)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ TEST WEIGHT (Pounds Per Bushel)										AVE. for YEARS TESTED	% of CHECK TEST WT 3/	10-Yr COMP. AVE. TEST WT 4/
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
D9715-11	DIVIDE (+)	10	56.6	63.6	57.6	55.4	56.5	58.7	59.7	58.2	60.1	57.6	58.4	101.3	<b>58.4</b>
YU894-75	ALZADA (P+)	8	55.8	62.8	58.1		54.5	59.4	59.3	58.8	59.5		58.5	101.0	<b>58.3</b>
D04581	JOPPA (+)	8			58.1	55.8	53.7	58.6	59.7	58.3	60.0	57.8	57.8	100.7	<b>58.0</b>
NDSU	ND-GRANO (P+)	3								59.4	59.8	57.0	58.7	100.5	<b>58.0</b>
D00095	TIOGA (+)	10	55.7	64.0	56.9	55.7	54.9	58.3	58.3	59.0	59.4	57.3	58.0	100.5	<b>58.0</b>
D97780	GRENORA (+)	10	55.2	63.3	56.9	55.8	54.5	58.4	58.2	58.4	59.1	57.1	57.7	100.0	<b>57.7</b>
D901313	MOUNTRAIL (+)	10	54.2	63.4	56.3	55.9	54.3	58.6	58.8	58.3	59.6	57.3	57.7	100.0	<b>57.7</b>
CDC Vivid	CDC VIVID (P+)	5						58.6	58.1	59.3	59.4	56.8	58.4	99.9	<b>57.6</b>
NDSU	ND-RIVELAND (P+)	3								57.6	59.2	57.3	58.0	99.3	<b>57.3</b>
D03028	CARPIO (+)	9		63.4	56.7	56.2	56.3	56.2	57.4	58.4	58.2	55.3	57.6	99.2	<b>57.2</b>
MTD16005	LUSTRE (+)	5						57.9	58.0	58.6	58.9	55.5	57.8	98.7	<b>56.9</b>
MEANS (For Entries Listed)			55.5	63.4	57.2	55.8	55.0	58.3	58.6	58.6	59.4	56.9			<b>57.7</b>
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			n/a	9.1	8.3	9.8	8.2	8.7	9.2	n/a	7.7	7.6	8.6		
Total Plant Available Water (in.)			7.3	22.4	13.1	17.3	20.5	11.1	13.2	6.3	13.2	11.5	13.6		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			60	22	86	75	28	85	112	268	72	56	86		
SD (Sampling Depth in Inches)			n/a	48	48	48	48	45	48	48	40	39	46		
Fertilizer Applied															
		(# N)	100	100	100	100	125	125	100	100	100	100	105		
		(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	20	20	20	20	20	20		
		(# K <sub>2</sub> O)	10	10	10	10	10	10	10	10	10	10	10		
		(# S)	0	0	0	0	10	10	10	10	10	10	6		

Long-term check variety is Mountrail.

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 or Title 5 Pending.

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

4/ 10-Yr Comparable Average = (x/y) \* z where x = average test weight of a given entry for years tested, y = average test weight for Mountrail for the same years, and z = 10-Yr test weight for the check variety Mountrail.

**TABLE 14. Ten-Year Protein Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 9802-DUR)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ PROTEIN % (Values Adjusted to 13% Grain Moisture)										AVE. for YEARS TESTED	% of CHECK PROTEIN 3/	10-Yr COMP. AVE. PROTEIN 4/
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
CDC Vivid	CDC VIVID (P+)	5						17.3	18.8	14.5	16.2	18.5	17.1	105.0	<b>17.4</b>
MTD16005	LUSTRE (+)	5						16.7	18.8	13.7	15.1	17.9	16.4	101.2	<b>16.7</b>
D00095	TIOGA (+)	10	16.3	16.0	17.6	17.3	17.4	16.4	18.7	14.1	15.3	18.0	16.7	101.1	<b>16.7</b>
D03028	CARPIO (+)	9		15.5	16.7	17.0	17.4	16.3	18.6	13.8	15.5	17.7	16.5	100.4	<b>16.6</b>
D901313	MOUNTRAIL (+)	10	17.4	16.0	16.5	16.5	17.7	16.6	18.4	14.0	14.9	17.3	16.5	100.0	<b>16.5</b>
D04581	JOPPA (+)	8			16.7	16.6	17.8	16.6	17.5	14.2	14.3	17.0	16.3	99.1	<b>16.4</b>
D9715-11	DIVIDE (+)	10	15.8	16.2	17.0	17.2	17.6	16.3	17.8	13.6	15.0	17.4	16.4	99.1	<b>16.4</b>
D97780	GRENORA (+)	10	15.4	15.3	16.5	16.2	17.3	16.3	17.7	14.1	15.3	17.3	16.1	97.6	<b>16.1</b>
YU894-75	ALZADA (P+)	8	14.4	16.0	15.9		17.5	16.3	17.3	14.1	15.0		15.8	96.2	<b>15.9</b>
NDSU	ND-GRANO (P+)	3								5.0	15.2	16.9	12.4	80.4	<b>13.3</b>
NDSU	ND-RIVELAND (P+)	3								2.3	15.0	16.6	11.3	73.4	<b>12.1</b>
<b>MEANS (For Entries Listed)</b>			<b>15.9</b>	<b>15.8</b>	<b>16.7</b>	<b>16.8</b>	<b>17.5</b>	<b>16.5</b>	<b>18.2</b>	<b>12.1</b>	<b>15.2</b>	<b>17.5</b>			<b>15.8</b>
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			n/a	9.1	8.3	9.8	8.2	8.7	9.2	n/a	7.7	7.6	8.6		
Total Plant Available Water (in.)			7.3	22.4	13.1	17.3	20.5	11.1	13.2	6.3	13.2	11.5	13.6		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			60	22	86	75	28	85	112	268	72	56	86		
SD (Sampling Depth in Inches)			n/a	48	48	48	48	45	48	48	40	39	46		
Fertilizer Applied															
			(# N)	100	100	100	100	125	125	100	100	100	105		
			(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	20	20	20	20	20		
			(# K <sub>2</sub> O)	10	10	10	10	10	10	10	10	10	10		
			(# S)	0	0	0	0	10	10	10	10	10	6		

Long-term check variety is Mountrail.

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 or Title 5 Pending.

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

4/ 10-Yr Comparable Average = (x/y) \* z where x = average protein percent of a given entry for years tested, y = average protein percent for Mountrail for the same years, and z = 10-Yr protein percent for the check variety Mountrail.

**TABLE 15. Ten-Year Sawfly Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (Exp# 9802-DUR)**

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ SAWFLY RATING (% Cut and Lodged)											AVE. for YEARS TESTED	% of CHECK SAWFLY 3/	10-Yr COMP. AVE. SAWFLY 4/
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021				
CDC Vivid	CDC VIVID (P+)	5						0.0	0.3	2.3	2.3	3.7	1.7	26.8	<b>1.3</b>
D9715-11	DIVIDE (+)	10	6.7	1.0	1.0	0.3	0.0	0.0	0.0	1.0	0.7	15.0	2.6	53.1	<b>2.6</b>
YU894-75	ALZADA (P+)	8	2.3	2.3	0.3		0.0	0.0	0.3	1.0	7.0	1.7	53.3	<b>2.6</b>	
D03028	CARPIO (+)	9		3.7	1.0	1.0	0.0	0.0	0.0	1.0	0.7	11.7	2.1	54.3	<b>2.6</b>
MTD16005	LUSTRE (+)	5						0.0	0.0	1.0	2.0	18.3	4.3	66.0	<b>3.2</b>
D00095	TIOGA (+)	10	6.7	2.3	1.0	2.3	0.0	0.3	0.0	3.7	0.7	20.0	3.7	76.5	<b>3.7</b>
D97780	GRENORA (+)	10	8.3	2.3	0.7	0.3	0.0	0.0	0.7	5.0	3.7	21.7	4.3	88.2	<b>4.3</b>
NDSU	ND-RIVELAND (P+)	3								2.3	5.0	21.7	9.7	89.7	<b>4.3</b>
D901313	MOUNTRAIL (+)	10	13.3	2.3	0.3	0.0	0.0	0.0	0.0	2.3	6.7	23.3	4.8	100.0	<b>4.8</b>
D04581	JOPPA (+)	8			2.3	2.0	0.0	0.0	0.0	3.7	3.7	21.7	4.2	102.0	<b>4.9</b>
NDSU	ND-GRANO (P+)	3								5.0	8.7	25.0	12.9	119.6	<b>5.8</b>
MEANS (For Entries Listed)			7.5	2.3	1.0	1.0	0.0	0.0	0.1	2.6	3.7	18.2			<b>3.6</b>
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			n/a	9.1	8.3	9.8	8.2	8.7	9.2	n/a	7.7	7.6	8.6		
Total Plant Available Water (in.)			7.3	22.4	13.1	17.3	20.5	11.1	13.2	6.3	13.2	11.5	13.6		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			60	22	86	75	28	85	112	268	72	56	86		
SD (Sampling Depth in Inches)			n/a	48	48	48	48	45	48	48	40	39	46		
Fertilizer Applied															
	(# N)		100	100	100	100	125	125	100	100	100	100	105		
	(# P <sub>2</sub> O <sub>5</sub> )		20	20	20	20	20	20	20	20	20	20	20		
	(# K <sub>2</sub> O)		10	10	10	10	10	10	10	10	10	10	10		
	(# S)		0	0	0	0	10	10	10	10	10	10	6		

Long-term check variety is Mountrail.

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 or Title 5 Pending.

3/ Percent of Mountrail saw fly rating for the same data years as those in which a given entry was tested.

4/ 10-Yr Comparable Average = (x/y) \* z where x = average saw fly rating of a given entry for years tested, y = average saw fly rating for Mountrail for the same years, and z = 10-Yr saw fly rating for the check variety Mountrail.

**TABLE 16. Intrastate Spring Barley Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions at Northern Agricultural Research Center. Havre, MT. 2021. (Exp# 21-2102-SB)**

ID	Cultivar Source	1/	Plant Ht Inches	1/	2/	Test Wt Lbs/Bu	Plump %	3/
		Head Date		Maturity Date	Yield Bu/Ac			Protein %
ABI MERIT 57	BuschAgri, 2009	174.0	22.1	195.7	32.1	42.7	42.9	<b>17.8</b>
HOCKETT	MSU, 2008	179.0	22.4	194.3	33.4	47.1	71.6	17.1
LCS ODYSSEY	Limagrain, 2015	177.3	22.0	193.0	43.7	44.1	59.0	16.1
MT16M00707	MSU	176.0	24.5	195.0	<b>47.4</b>	47.1	67.7	14.9
MT16M00709	MSU	173.3	25.2	195.7	40.9	47.3	<b>76.1</b>	14.8
MT16M01801	MSU	177.3	24.5	190.7	44.9	44.9	59.7	14.6
MT16M01902	MSU	168.3	23.4	191.7	42.9	45.2	71.7	15.2
MT16M02201	MSU	176.3	21.7	194.3	34.4	44.0	74.6	14.8
MT16M05403	MSU	177.3	21.9	197.3	33.5	47.4	44.8	15.6
MT16M05610	MSU	178.0	21.5	196.0	36.7	44.2	<b>74.8</b>	16.4
MT16M09602	MSU	167.0	20.9	196.7	35.5	<b>48.6</b>	<b>82.7</b>	14.3
MT17M00302	MSU	175.7	22.7	197.0	34.0	47.1	50.5	15.1
MT17M01711	MSU	173.7	21.6	191.3	<b>50.0</b>	44.0	63.9	14.6
MT17M01906	MSU	171.0	22.2	192.0	<b>46.2</b>	44.3	61.8	14.8
MT17M01908	MSU	172.7	23.9	191.0	<b>47.6</b>	46.3	<b>78.7</b>	14.5
MT17M02507	MSU	170.7	22.6	192.0	<b>47.5</b>	43.9	55.6	14.3
MT17M04801	MSU	173.7	22.5	195.7	35.3	<b>49.2</b>	<b>76.6</b>	15.7
MT17M05416	MSU	175.7	21.8	195.7	38.4	45.2	59.9	16.0
MT17M05502	MSU	174.3	24.5	195.3	36.1	46.7	68.4	16.7
MT17M05508	MSU	179.0	22.2	193.0	37.0	46.0	54.1	16.3
MT17M05808	MSU	178.7	21.6	194.7	28.1	44.5	64.4	<b>17.9</b>
MT17M06305	MSU	176.7	23.5	197.7	25.4	46.2	74.2	16.0
MT18M06008	MSU	167.0	23.6	189.3	42.7	47.3	68.1	13.9
MT18M06009	MSU	166.7	22.0	191.0	42.2	46.3	<b>77.5</b>	14.0
MT18M06011	MSU	166.0	24.4	189.0	<b>49.0</b>	47.0	65.1	13.9
MT18M06012	MSU	168.0	21.0	193.7	30.4	46.1	72.5	13.4
MT18M09205	MSU	178.3	24.0	193.0	40.5	44.5	67.2	15.9
MT18M09301	MSU	176.7	23.1	193.7	42.0	44.5	73.4	16.8
MT18M09403	MSU	174.0	22.6	196.0	32.7	46.8	<b>85.1</b>	16.0
MT18M09602	MSU	174.3	22.6	196.3	38.3	46.3	67.5	14.6
MT18M09802	MSU	179.3	22.3	193.7	35.5	45.5	48.0	16.7
MT18M09804	MSU	175.0	21.7	193.0	39.0	45.1	42.5	16.2
MT18M09901	MSU	179.0	21.9	193.3	39.2	42.8	62.8	<b>18.0</b>
MT18M09902	MSU	179.7	21.3	194.3	32.7	44.3	51.2	16.5
MT18M09904	MSU	179.3	22.1	192.3	39.0	43.7	46.0	<b>17.3</b>
MT18M10106	MSU	178.0	22.7	195.7	44.5	46.9	63.7	15.9
MT18M10107	MSU	176.0	23.3	194.3	35.9	47.5	64.8	16.8
MT18M10204	MSU	167.0	21.8	189.3	41.4	46.3	54.6	14.8
MT18M10205	MSU	168.0	24.5	194.0	36.0	47.8	<b>83.7</b>	14.8
MT18M10207	MSU	168.0	22.5	194.0	41.7	46.9	<b>79.7</b>	15.8
MT18M10208	MSU	168.3	22.2	192.7	40.0	48.0	<b>77.9</b>	15.5
MT18M10401	MSU	177.3	21.5	193.7	40.4	45.9	64.6	16.1
MT18M11002	MSU	176.7	23.6	194.3	<b>45.7</b>	48.0	64.5	16.8

**TABLE 16. Intrastate Spring Barley Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions at Northern Agricultural Research Center. Havre, MT. 2021. (Exp# 21-2102-SB)**

ID	Cultivar Source	1/	1/	1/	2/	Test Wt Lbs/Bu	Plump %	3/ Protein %
		Head Date	Plant Ht Inches	Maturity Date	Yield Bu/Ac			
MT18M11004	MSU	177.0	20.2	194.0	40.0	47.7	41.0	16.8
MT18M11006	MSU	174.0	24.3	192.7	<b>47.4</b>	47.3	63.1	15.8
MT18M11101	MSU	175.0	21.3	192.3	39.0	46.7	46.0	15.3
MT18M11103	MSU	178.0	22.8	197.3	36.1	44.6	62.8	16.4
MT18M11105	MSU	179.0	21.0	195.7	33.7	45.7	54.0	16.8
MT18M11106	MSU	176.0	21.3	194.7	38.5	47.4	69.9	15.7
EXPERIMENTAL MEANS		174.4	22.5	193.9	39.1	46.0	64.3	15.7
LSD (0.05)		2.0	1.3	1.7	4.8	1.2	10.3	0.8
C.V.		0.7	3.5	0.5	7.5	1.7	9.9	3.1
P-Value (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

**Bold** Indicates the best entry within a column based on Fisher's Protected LSD at the 0.05 probability level.

**Bold** Indicates cultivars equal to the best entry within a column based on Fisher's Protected LSD at the 0.05 probability level.

1/ No. of Days from January 1 (174 = June 23).

2/ Volumetric yields are based on plot weights adjusted to uniform 13 percent grain moisture and 48 lbs/bu as the standard test weight for barley.

3/ Protein values are reported on a 100% dry matter basis.

Management Information (21-2102-SB)

Seeding Date:	April 10, 2021
Harvest Date:	July 27, 2021
Fertility:	36-6-3-3 side banded
System:	no till
Herbicide:	Vendetta-16oz/ac
Insecticide:	none
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	4.03" (seeding to harvest)

**TABLE 17. Ten-Year Yield Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (EXP# 2102-SB)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)										AVE. for YEARS TESTED	% of CHECK YIELD 3/	10-YR COMP. AVE. YIELD 4/
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
Limagrain	LCS ODYSSEY (P+)	6		65.6			90.4	41.7	57.0	62.2		43.7	60.1	104.8	<b>67.1</b>
Limagrain	LCS GENIE (P+)	5		67.2			87.0	46.3	57.4	54.8			62.6	100.7	<b>64.5</b>
PI 657121	HOCKETT (+)	10	54.4	70.7	88.6	76.1	97.1	37.4	52.7	52.7	77.1	33.4	64.0	100.0	<b>64.0</b>
TR09208	AAC SYNERGY (P+)	3					87.0	39.6	59.4				62.0	99.4	<b>63.6</b>
YU501385	CHAMPION (P+)	5	47.0	69.7	86.3	78.5	95.0						75.3	97.3	<b>62.3</b>
TR150	CDC COPELAND	2					82.1	45.4					63.7	94.8	<b>57.8</b>
BuschAgri	ABI MERIT 57	5				63.1			49.9	55.7	74.5	32.1	55.1	94.3	<b>60.4</b>
MT124112	BUZZ	5				73.2	86.2	41.2		54.0	65.0		63.9	93.9	<b>60.1</b>
SK76333	CDC HARRINGTON	6	37.7	71.3	82.5	61.0	85.6	41.4					63.3	89.5	<b>57.3</b>
TR232	AC METCALFE	7	39.5		76.3	59.1	76.1	40.1	61.7	57.0			58.5	89.3	<b>57.2</b>
MT950186	HAXBY	5	25.1	67.3	78.1	79.4	80.9						66.1	85.5	<b>54.7</b>
MT970116	CRAFT	5	31.4	60.2	74.9	70.2		33.7					54.1	82.6	<b>52.9</b>
<b>MEANS (For Entries Listed)</b>			<b>39.2</b>	<b>67.4</b>	<b>81.1</b>	<b>70.1</b>	<b>86.7</b>	<b>40.7</b>	<b>56.3</b>	<b>56.1</b>	<b>72.2</b>	<b>36.4</b>			<b>60.2</b>
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			7.5	8.5	7.8	8.9	8.7	9.1	10.0	8.7	9.7	26.7	10.5		
Total Plant Available Water (in.)			14.8	21.8	12.7	16.4	20.9	11.5	14.0	15.0	15.2	13.9	15.6		
Soil NO3 (lbs.) to SD at Planting			60	415	57	123	28	103	94	48	114	56	110		
SD (Sampling Depth in Inches)			48	48	48	48	48	41	44.5	46	48	48	47		
Fertilizer Applied															
			(# N)	100	100	100	100	125	90	20	20	20	36	71	
			(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	30	4	4	4	6	15	
			(# K <sub>2</sub> O)	10	10	10	10	10	10	2	2	2	3	7	
			(# S)	0	0	0	0	10	0	2	2	2	3	2	

Check variety is Hockett.

1/ See MCES Bulletin 1094 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include malting potential, disease resistance, etc. before making cultivar selection decisions.

2/ P = Private Variety, + = Protected Variety.

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

4/ 10-Yr Comparable Average = (x/y) \* z where x = average yield of a given entry for years tested, y = average yield for Hockett for the same years, and z = 10-Yr average yield for the check variety Hockett.

**TABLE 18. Ten-Year Test Weight Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (EXP# 2102-SB)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ TEST WEIGHT (Pounds Per Bushel)										AVE. for YEARS TESTED	% of CHECK TEST WT 3/	10-YR COMP. AVE. TEST WT 4/
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
YU501385	CHAMPION (P+)	5	47.5	53.1	53.3	51.4	54.7						52.0	100.4	51.7
TR09208	AAC SYNERGY (P+)	3					52.3	53.4	52.6				52.8	100.1	51.5
PI 657121	HOCKETT (+)	10	46.2	53.2	54.2	50.7	54.7	54.0	49.6	51.1	54.4	47.1	51.5	100.0	51.5
MT970116	CRAFT	5	43.9	53.2	53.1	51.4		54.3					51.2	99.1	51.1
MT950186	HAXBY	5	43.2	53.9	53.8	51.9	53.3						51.2	98.9	51.0
MT124112	BUZZ	5				51.3	53.8	53.5		48.9	53.6		52.2	98.6	50.8
Limagrain	LCS GENIE (P+)	5		52.1			53.8	52.8	50.6	47.9			51.5	98.0	50.5
Limagrain	LCS ODYSSEY (P+)	6		52.5			53.0	53.5	49.5	49.3		44.1	50.3	97.5	50.2
TR232	AC METCALFE	7	43.8		51.1	48.4	52.4	54.0	50.1	49.5			49.9	96.9	49.9
SK76333	CDC HARRINGTON	6	42.1	52.3	51.0	49.4	53.5	53.2					50.2	96.4	49.6
BuschAgri	ABI MERIT 57	5				47.8			50.3	49.9	52.1	42.7	48.6	96.0	49.5
TR150	CDC COPELAND	2					51.8	52.3					52.1	95.8	49.4
MEANS (For Entries Listed)			44.4	52.9	52.7	50.3	53.3	53.4	50.5	49.4	53.3	44.7			50.5
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			7.5	8.5	7.8	8.9	8.7	9.1	10.0	8.7	9.7	26.7	10.5		
Total Plant Available Water (in.)			14.8	21.8	12.7	16.4	20.9	11.5	14.0	15.0	15.2	13.9	15.6		
Soil NO3 (lbs.) to SD at Planting			60	415	57	123	28	103	94	48	114	56	110		
SD (Sampling Depth in Inches)			48	48	48	48	48	41	44.5	46	48	48	47		
Fertilizer Applied															
			(# N)	100	100	100	100	125	90	20	20	20	36	71	
			(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	30	4	4	4	6	15	
			(# K <sub>2</sub> O)	10	10	10	10	10	10	2	2	2	3	7	
			(# S)	0	0	0	0	10	0	2	2	2	3	2	

Check variety is Hockett.

1/ See MCES Bulletin 1094 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include malting potential, disease resistance, etc. before making cultivar selection decisions.

2/ P = Private Variety, + = Protected Variety.

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

4/ 10-Yr Comparable Average = (x/y) \* z where x = average test weight of a given entry for years tested, y = average test weight for Hockett for the same years, and z = 10 average test weight for the check variety Hockett.

**TABLE 19. Ten-Year Protein Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2012-2021. (EXP# 2102-SB)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ Proten % (Values Adjusted to 13% Grain moisture)										AVE. for YEARS TESTED	% of CHECK PROTEIN 3/	10-YR COMP. AVE. PROTEIN 4/
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
MT124112	BUZZ	5				14.6	11.8	12.1		10.0	9.7	11.6	92.0	<b>12.3</b>	
Limagrain	LCS ODYSSEY (P+)	6		14.2			13.6	14.3	9.5	9.3		12.8	97.1	<b>12.9</b>	
Limagrain	LCS GENIE (P+)	5		14.2			13.8	13.8	9.1	9.6		12.1	97.3	<b>13.0</b>	
TR09208	AAC SYNERGY (P+)	3					13.6	13.5	9.1			12.1	98.1	<b>13.1</b>	
PI 657121	HOCKETT (+)	10	14.7	14.8	13.3	15.6	12.5	14.2	10.2	10.5	10.4	13.3	100.0	<b>13.3</b>	
YU501385	CHAMPION (P+)	5	15.1	14.0	13.9	15.6	13.5					14.4	101.8	<b>13.6</b>	
BuschAgri	ABI MERIT 57	5				18.5			10.4	9.6	9.8	13.2	103.5	<b>13.8</b>	
MT970116	CRAFT	5	16.0	15.1	14.6	16.3		14.0				15.2	104.8	<b>14.0</b>	
MT950186	HAXBY	5	15.6	15.1	14.2	16.0	14.4					15.1	106.2	<b>14.2</b>	
SK76333	CDC HARRINGTON	6	16.2	14.8	14.1	16.9	14.3	14.5				15.1	106.7	<b>14.2</b>	
TR232	AC METCALFE	7	17.1		15.5	18.1	14.6	14.6	8.8	9.5		14.0	107.8	<b>14.4</b>	
TR150	CDC COPELAND	2					15.6	14.0				14.8	111.0	<b>14.7</b>	
<b>MEANS (For Entries Listed)</b>			<b>15.8</b>	<b>14.6</b>	<b>14.3</b>	<b>16.5</b>	<b>13.8</b>	<b>13.9</b>	<b>9.5</b>	<b>9.7</b>	<b>10.0</b>	<b>17.0</b>		<b>13.6</b>	
April-July Precip. (in.)			7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	4.1	6.8		
Total Annual Precip. (in.)			9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	10.0	12.7		
Soil PAW (in.) to SD @ Planting			7.5	8.5	7.8	8.9	8.7	9.1	10.0	8.7	9.7	26.7	10.5		
Total Plant Available Water (in.)			14.8	21.8	12.7	16.4	20.9	11.5	14.0	15.0	15.2	13.9	15.6		
Soil NO3 (lbs.) to SD at Planting			60	415	57	123	28	103	94	48	114	56	110		
SD (Sampling Depth in Inches)			48	48	48	48	48	41	44.5	46	48	48	47		
Fertilizer Applied															
			(# N)	100	100	100	100	125	90	20	20	20	36	71	
			(# P <sub>2</sub> O <sub>5</sub> )	20	20	20	20	20	30	4	4	4	6	15	
			(# K <sub>2</sub> O)	10	10	10	10	10	10	2	2	2	3	7	
			(# S)	0	0	0	0	10	0	2	2	2	3	2	

Check variety is Hockett.

1/ See MCES Bulletin 1094 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include malting potential, disease resistance, etc. before making cultivar selection decisions.

2/ P = Private Variety, + = Protected Variety.

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

4/ 10-Yr Comparable Average = (x/y) \* z where x = average protein of a given entry for years tested, y = average protein for Hockett for the same years, and z = 10 average protein for the check variety Hockett.