

**TITLE:** Winter Wheat, Spring Wheat, Spring Durum, Spring Barley and Safflower Variety Performance Evaluations Under Dryland Chemical Fallow Conditions On-Station at Northern Agricultural Research Center, Havre, Montana. 2008-2019.

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**Content:**

This report is intended to serve as a popularized 2019 summary of “primary” on-going cereal and oilseed crop variety investigations traditionally conducted on-station by the Variety Testing Program at Northern Agricultural Research Center. These data represent approximately 26 percent of NARC Variety Testing Programs total research project effort on-station at Havre. The remaining 74 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 104 years beginning in 1916. Collection of sawfly stem cutting data was added beginning in 2003.

Detailed data pertaining to multiple performance characters, along with associated climatic and management inputs are presented for 2019. Abridged, multi-year summaries for each cereal trial are limited to three crop characters (yield, test weight and sawfly rating) while the safflower summary is limited to two crop characters (yield and oil content). Individuals desiring detailed data for other than the current year may contact the research center or refer to previous editions of this report for the year(s) of interest.

**2019 Data:**

It should be noted that 2019 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, 2019 data shall not constitute in any form a recommendation for or against any entry or practice included.

Please note that research trial yield results recorded under wheat stem sawfly pressure are likely much higher than a producer should expect. Small plot variety trials are managed to assess maximum yield potential and are harvested in such a way that all stems and heads are picked up by the combine, regardless of lodging or cutting due to sawfly. Pickup guards coupled with an extremely slow ground speed and an exceptionally low cutting height help researchers collect all heads in order to assess seed yield potential. If you are a producer in a wheat stem sawfly environment, although hollow stemmed varieties may be high yielding in research trials in your area, we strongly recommend against growing those hollow stemmed varieties. Please be aware that if you seed hollow stemmed varieties with 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.

Crop year 2019 was cooler than normal with only December, January and April having above average temperatures. Spring and summer months during the growing season had below average precipitation, however late June rainfall coupled with below average temperatures in July resulted in better than anticipated spring crop yields in north central Montana. At Havre, annual growing season precipitation (9/1/18 through 8/31/19) was 11.29 inches, 0.78 inches lower than the average for all years since 1916. April 1 through July 31 precipitation was 6.33 inches, or 92 percent of the 104-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May

through July totaled 1106, or 86 percent of the average for the last 69 years (1951-2019). The last spring frost was on May 20 and the first fall frost of 2019 was on September 28, resulting in 131 frost-free days. The minimum winter temperature was -38 degrees F on February 7, 2019. Overall, the 2018-2019 average crop year temperatures were 2.6 degrees F lower than the long-term average. The April through July growing season saw an average daily temperature of 56 degrees F, 1.45 degrees F lower than historical temperatures. July and August temperatures were also lower than the long-term averages, with the high for 2019 recorded on August 3 at 98 degrees F. There were 13 days with temperatures 90 degrees F or above, with no 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 February-March annually)  
Spring Wheat Varieties, Extension Service 2B 1093 (Revised February-March annually)  
Barley Varieties, Extension Service 2B 1094 (Revised February-March 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 <http://plantsciences.montana.edu/crops/index.html>.

### **Recognition:**

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

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Summary of climatic data by months for the 2018-2019 crop year (September to August) and averages for the period 1916-2019 at the Northern Agricultural Research Center. Havre, Montana.

Month	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Crop Year
Year	2018	2018	2018	2018	2019	2019	2019	2019	2019	2019	2019	2019	
<b><u>Precipitation (inches)</u></b>													<b><u>Total</u></b>
Current Year	2.08	0.29	0.35	0.02	0.40	0.86	0.23	0.92	1.53	3.24	0.64	0.73	11.29
Average (1916-2019)	1.17	0.69	0.44	0.45	0.43	0.35	0.54	1.00	1.84	2.55	1.43	1.18	12.07
Difference	0.91	-0.40	-0.09	-0.43	-0.03	0.51	-0.31	-0.08	-0.31	0.69	-0.79	-0.45	-0.78
<b><u>Mean Temperature (°F)</u></b>													<b><u>Average</u></b>
Current Year	54.1	42.8	31.9	27.0	24.1	-6.1	21.0	44.6	49.4	61.4	67.4	67.3	40.4
Average (1916-2019)	56.3	45.6	30.2	19.6	15.7	19.7	30.0	43.6	53.9	61.8	69.3	67.3	42.8
Difference	-2.2	-2.8	1.7	7.4	8.4	-25.8	-9.0	1.0	-4.5	-0.4	-1.9	0.0	-2.4

Last killing frost in spring\*

2019 \_\_\_\_\_ May 20th (29.3°)  
Ave. 1916-2019 \_\_\_\_\_ May 14th

First killing frost in fall\*

2019 \_\_\_\_\_ September 28th (29.0°)  
Ave. 1916-2019 \_\_\_\_\_ September 20th

Frost free period

2019 \_\_\_\_\_ 131 days  
Ave. 1916-2019 \_\_\_\_\_ 129 days

Growing degree days (base 50)

May 20-Sept. 28, 2019 \_\_\_\_\_ 1851.6  
May 1-Sept. 30, 2019 \_\_\_\_\_ 1955.9  
Ave. 1951-2019 (May 1-Sept. 30) \_\_\_\_\_ 2177.1

Maximum summer temperature \_\_\_\_\_ 98.1° F on August 3, 2019  
Minimum winter temperature \_\_\_\_\_ -38.4° F on February 7, 2019

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

**2019**  
**INDIVIDUAL CROP EXPERIMENT IDENTIFICATION & DESCRIPTION RECORD**  
**Variety Testing Program**  
**Northern Agricultural Research Center**  
**Have, 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>										
19-3502-WW	Intrastate Cultivar Nursery	WW	49	3	147	A-4-2	33 32N 15E	Bruckner	MAES-MWBC	Lamb
19-1402-WW	Advanced Cultivar Nursery	WW	36	3	108	A-4-2	33 32N 15E	Bruckner	MAES-MWBC	Lamb
19-5802-WW	Sawfly Line Evaluation Nursery	WW	49	2	98	A-4-2	33 32N 15E	Bruckner	MAES-MWBC	Lamb
19-WQDS-WW	Winter Wheat Quality Drill Strips	WW	4	1	4	A-4-2	33 32N 15E	Bruckner	MAES-MWBC	Lamb
Sub-Totals:			4	138	357	7.42%	of Total Plot Inventory			
<b>OFF-STATION</b>										
19-3851-WW	Off-Station Cultivar Eval Nursery	WW	25	3	75	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
19-3853-WW	Off-Station Cultivar Eval Nursery	WW	25	3	75	Loma	29 27N 10E	Lamb	MWBC-MAES	McKeever Farm
19-5852-WW	Sawfly Line Evaluation Nursery	WW	49	2	98	Big Sandy	18 28N 10E	Bruckner	MAES-MWBC	Works Farm
19-SR01-WW	v Single-Row Yield Eval Nursery	WW	198	1	198	Big Sandy	18 28N 10E	Bruckner	MAES-MWBC	Works Farm
19-SR02-WW	v Single-Row Line Eval Nursery	WW	1000	1	1000	Big Sandy	18 28N 10E	Bruckner	MAES-MWBC	Works Farm
19-SR03-WW	v Limagrain Single-Row Evaluation	WW	200	1	200	Big Sandy	18 28N 10E	Bruckner	MAES-MWBC	Works Farm
19-3RSP-WW	v 3-Row Segregating Populations	WW	109	1	109	Big Sandy	18 28N 10E	Bruckner	MAES-MWBC	Works Farm
19-3952-WW	Prelim C Sawfly Line Evaluation	WW	49	2	98	Big Sandy	18 28N 10E	Bruckner	MAES-MWBC	Works Farm
Sub-Totals:			8	1655	1853	38.49%	of Total Plot Inventory			
<b>SPRING WHEAT &amp; DURUM (SW &amp; DUR) INVESTIGATIONS</b>										
<b>ON-STATION</b>										
19-3102-SW	Advanced Yield Nursery	SW	64	3	192	A-4-4	33 32N 15E	Talbert	MAES-MWBC	Lamb
19-9802-DUR	Montana Durum Cultivar Nursery	DUR	24	3	72	A-4-4	33 32N 15E	Giroux	MAES-MWBC	Lamb
19-3302-SW	Preliminary Yield Nursery	SW	81	3	243	A-4-4	33 32N 15E	Talbert	MAES-MWBC	Lamb
19-SWQAC-SW	Spring Wheat Quality Assessm't	SW	5	1	5	A-6-1	33 32N 15E	MWBC	Wht Qual Cncl	Lamb
Sub-Totals:			4	174	512	10.64%	of Total Plot Inventory			

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

**OFF-STATION**

19-9951-SW	Off-Station Cultivar Eval Nursery	SW	24	3	72	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
19-9953-SW	Off-Station Cultivar Eval Nursery	SW	24	3	72	Chester	34 32N 05E	Lamb	MWBC-MAES	Kammerzell Farm
19-9955-SW	Off-Station Cultivar Eval Nursery	SW	24	3	72	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
19-9957-SW	Off-Station Cultivar Eval Nursery	SW	24	3	72	Loma	29 27N 10E	Lamb	MWBC-MAES	McKeever Farm
19-9851-DUR	Off-Station Cultivar Eval Nursery	DUR	24	3	72	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
19-9853-DUR	Off-Station Cultivar Eval Nursery	DUR	24	3	72	Chester	34 32N 05E	Lamb	MWBC-MAES	Kammerzell Farm
19-9855-DUR	Off-Station Cultivar Eval Nursery	DUR	24	3	72	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
Sub-Totals:			7	168	504	10.47%	of Total Plot Inventory			

**SPRING BARLEY (SB) INVESTIGATIONS**

**ON-STATION**

19-2102-SB	Intrastate Cultivar Eval Nursery	SB	49	3	147	A-4-3	33 32N 15E	Sherman	MAES-MWBC	Lamb
19-3102-SB	Early Yield Evaluation Nursery	SB	64	3	192	A-4-3	33 32N 15E	Sherman	MAES-MWBC	Lamb
19-2502-SB	e Hulless Intrastate Eval Nursery	SB	16	3	48	A-4-3	33 32N 15E	Sherman	MAES-MWBC	Lamb
Sub-Totals:			3	129	387	8.04%	of Total Plot Inventory			

**SAFFLOWER INVESTIGATIONS**

**ON-STATION**

19-7702-SAF	Safflower Cultivar Eval. Nursery	SA	16	3	48	A-4-1	33 32N 15E	Bergman	NDSU-WREC	Lamb
Sub-Totals:			1	16	48	1.00%	of Total Plot Inventory			

**BRASSICA INVESTIGATIONS**

**ON-STATION**

19-CN02-CN	Statewide Canola Trial	CN	14	4	56	A-4-1	33 32N 15E	Fordyce	Var. Industry	Lamb
Sub-Totals:			1	14	56	1.16%	of Total Plot Inventory			

**PULSE CROP (PC) INVESTIGATIONS**

**ON-STATION**

19-PC01-PC	Statewide Pea Trial	PC	42	4	168	A-2-4	33 32N 15E	Chen	MAES-EARC	Lamb
19-PC02-PC	Statewide Lentil Trial	PC	10	4	40	A-2-3	33 32N 15E	Chen	MAES-EARC	Lamb
19-PC09-PC	Yellow Pea Protein Trial WSU	PC	28	2	56	A-2-4	33 32N 15E	McGee	WA Crop Imp.	Lamb
19-PC03-PC	Western Regional Pea Trial	PC	12	3	36	A-2-4	33 32N 15E	Vandemark	USDA	Lamb
19-PC04-PC	Western Regional Lentil Trial	PC	14	3	42	A-2-3	33 32N 15E	Vandemark	USDA	Lamb
19-1914-PC	MSU Pea Breeding Lines	PC	40	1	40	A-2-3	33 32N 15E	McPhee	MAES-MSU	Lamb
19-PC05-PC	Statewide Chickpea Trial	PC	10	4	40	A-2-3	33 32N 15E	Chen	MAES-EARC	Lamb
Sub-Totals:			7	156	422	8.77%	of Total Plot Inventory			

**OTHER CROP (OC) INVESTIGATIONS**

**ON-STATION**

19-OC20-SO	o Sorghum Seeding Date/Rate Trial	SR	24	6	144	A-4-1	33 32N 15E	Lamb	MAES-NARC	
19-SP04-QU	Quinoa Adaptability Trial	QU	6	4	24	A-4-1	33 32N 15E	McNamara	MAES-NARC	Lamb
19-CM05-CM	o GCEH/SusOils Camelina	CM	20	3	60	A-4-1	33 32N 15E	SusOils	MAES-NARC	Lamb
Sub-Totals:			3	50	228	4.74%	of Total Plot Inventory			

**FORAGE RESEARCH (FR) INVESTIGATIONS**

**ON-STATION**

19-FR02-FR	Winter Cereal Forage Trial	FR	10	4	40	A-4-2	33 32N 15E	Carr	MAES-CARC	Lamb/Boss
19-FR03-FR	Spring Cereal Forage Trial	FR	10	4	40	A-4-3	32 32N 15E	Carr	MAES-CARC	Lamb/Boss
19-FR05-FR	Prelim Spring Barley Forage	FR	16	3	48	A-4-3	33 32N 15E	Sherman	MAES-MSU	Lamb/Boss
Sub-Totals:			3	36	128	2.66%	of Total Plot Inventory			

**NUTRIENT RESEARCH (NR) INVESTIGATIONS**

**ON-STATION**

19-NM03-SW	Mosaic SW MicroNutrients	SW	10	4	40	An-2-5	33 32N 15E	Mann	Mosaic	Lamb
19-NM04-SW	Verdesian SW Nutrient Use Eff.	SW	7	5	35	C-BR-N	29 32N 15E	Frost	Mosaic	Lamb
19-CG19-WW	Foliar Zinc on Winter Wheat	WW	24	3	72	A-4-2	33 32N 15E	Bruckner	MAES-MWBC	Lamb
Sub-Totals:			3	41	147	3.05%	of Total Plot Inventory			

**PEST MANAGEMENT (PM) INVESTIGATIONS**

**ON-STATION**

19-PM34-WW	WW Seeding Date/Rate/Variety	WW	6	3	18	An-4-5	33 32N 15E	Burrows	Industry-MAES	Lamb
19-PM35-SW	SW Seeding Date/Rate/Variety	SW	6	3	18	An-4-5	33 32N 15E	Burrows	Industry-MAES	Lamb
Sub-Totals:			2	12	36	0.75%	of Total Plot Inventory			

**PEST MANAGEMENT (PM) INVESTIGATIONS**

**OFF-STATION**

19-PM43-SW	SW Tiller and Spike	SW	4	4	16	Big Sandy	14 29N 10E	Talbert/Weaver	MAES-MSU	Edwards Farm
19-PM11-SW	Bayer Sawfly Cutting SW	SW	60	2	120	Big Sandy	14 29N 10E	Gautam	BASF	Edwards Farm
19-PM60-PM	Hill Plots	SW				Big Sandy	14 29N 10E	Talbert/Weaver	MAES-MSU	Edwards Farm
Sub-Totals:			3	64	136	2.83%	of Total Plot Inventory			

2017-2019  
CROP EXPERIMENT INFORMATION RECORD  
Variety Testing Program  
Northern Agricultural Research Center  
Have, Montana

Location	Description	Number of Trials			Number of Entries			Number of Plots			% of Total Plot Inventory		
		2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
On-Station	Winter Wheat*	4	4	4	140	140	138	359	359	357	9.7%	8.6%	10.5%
Off-Station	Winter Wheat*	6	7	8	196	148	257	345	346	455	9.3%	8.3%	13.3%
On-Station	Spring Wheat and Durum	5	9	4	186	235	174	554	613	512	14.9%	14.7%	15.0%
Off-Station	Spring Wheat and Durum*	7	7	7	128	160	168	384	480	504	10.3%	11.5%	14.8%
On-Station	Spring Barley	3	3	3	129	129	129	387	387	384	10.4%	9.3%	11.3%
On-Station	Safflower	1	1	1	14	12	16	42	36	48	1.1%	0.9%	1.4%
On-Station	Brassica sp.	3	1	1	54	15	14	216	60	56	5.8%	1.4%	1.6%
On-Station	Pulse Crops	6	7	7	133	151	156	456	570	422	12.3%	13.7%	12.4%
On-Station	Other Crops	2	1	3	31	24	50	165	144	228	4.4%	3.5%	6.7%
On-Station	Forage	2	3	3	38	45	36	114	145	128	3.1%	3.5%	3.8%
On-Station	Nutrient Research	2	6	3	34	137	41	112	434	147	3.0%	10.4%	4.3%
On-Station	Pest Management	6	4	2	118	55	12	451	226	36	12.1%	5.4%	1.1%
Off-Station	Pest Management*	6	7	3	34	99	64	132	368	136	3.6%	8.8%	4.0%
Grand Total		53	60	49	1235	1350	1255	3717	4168	3413	100.0%	100.0%	100.0%
Harvested								3266	3880	2895	87.9%	93.1%	84.8%
Total On-Station Plots								2856	2974	2318	76.8%	71.4%	67.9%
Total Off-Station Plots								861	1194	1095	23.2%	28.6%	32.1%

\* Winter Wheat, Spring Wheat & Pest Management:

2017: 1198 single row plots along with individual hill plots are no longer included in count

2018: 1198 single row plots along with individual hill plots are no longer included in count

2019: 1398 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. 2019. (Exp# 19-3502-WW)**

Cultivar/Line	Release/Pedigree	1/	2/	3/	4/	5/		
		Head Date	Plant HT Inches	Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	FN Sec	Sawfly %
AAC Wildfire	Alberta/SECAN, 2015	174.3	25.4	54.0	58.8	14.6	485	32.4
Bobcat (MTS1588)	Montana, 2019	168.1	25.6	<b>62.6</b>	60.6	14.9	460	<u>0.6</u>
Brawl CL Plus	Plainsgold/Colorado Wheat Res Fdn, 2011	160.5	25.3	52.2	<b>62.0</b>	15.3	455	<b>13.9</b>
Byrd CL Plus	Plainsgold/Col. Wheat Res Fdn, 2018 (CO13003C)	163.7	24.3	51.0	60.6	13.9	438	21.0
Canvas	Plainsgold/Colorado Wheat Res Fdn, 2018	165.8	21.5	55.5	<b>62.4</b>	14.2	467	24.4
Decade	Montana/North Dakota, 2010	167.2	29.2	55.5	60.1	15.5	495	22.4
Flathead (MT1564)	Montana, 2019	163.8	24.6	49.1	60.4	15.1	513	27.4
FourOsix	Montana, 2018	166.8	25.4	<b>57.5</b>	60.0	14.9	451	38.6
Incline AX	Plainsgold/Colorado Wheat Res Fdn, 2017	166.7	27.3	<b>63.1</b>	59.8	13.7	432	14.8
Judee	Montana, 2011	168.9	27.0	52.6	61.3	15.8	458	<b>11.4</b>
Keldin	WestBred, 2011	169.2	25.4	52.4	59.9	15.1	469	45.9
LCS Chrome	Limagrain Cereal Seeds, 2016	166.8	26.2	48.2	59.6	15.1	458	51.3
LCS Jet	Limagrain Cereal Seeds, 2015	167.6	20.7	<b>58.9</b>	57.5	14.6	441	34.7
LCS Zoom	Limagrain Cereal Seeds, 2018 (LWW14-73915)	167.3	24.5	48.7	57.6	14.2	385	48.1
Loma	Montana, 2016	172.2	23.7	51.1	59.7	15.2	417	15.4
Long Branch	Limagrain; Dyna-Gro Wheat, 2016	160.8	23.4	<b>61.5</b>	60.9	13.9	427	<b>12.4</b>
Northern	Montana, 2015	170.0	24.4	<b>57.7</b>	60.3	14.8	<b>544</b>	37.6
Oahe	South Dakota, 2016	165.0	28.6	46.7	60.2	15.1	<b>544</b>	36.4
Ray	Montana, 2018	173.8	31.4	<b>58.9</b>	58.7	14.5	502	39.5
StandClear CLP	Nutrien Ag Solutions (Loveland Products, Inc), 2019	168.0	25.8	<b>61.6</b>	60.7	15.1	468	<b>11.6</b>
SY 517 CL2	Syngenta (AgriPro), 2017	162.9	22.4	46.4	61.3	<b>16.0</b>	472	16.0
SY Clearstone 2CL	Montana/Syngenta, 2012	168.8	28.1	<b>56.8</b>	59.5	15.3	<b>548</b>	44.0
SY Legend CL2	Syngenta, 2018 (07CL046-2)	165.9	26.0	53.6	60.6	14.8	496	26.9
SY Monument	Syngenta (AgriPro), 2014	165.7	25.3	<b>57.4</b>	59.5	14.0	459	32.4
SY Wolverine	Syngenta 2019 (08BC379-40-1)	163.6	23.0	48.9	60.3	15.7	437	28.9
Warhorse	Montana, 2013	170.4	26.2	46.5	60.2	<b>16.2</b>	<b>544</b>	<b>2.8</b>
WB4269	WestBred, 2017	162.7	25.3	53.5	60.8	13.7	454	<b>12.4</b>
WB4311	WestBred, 2017	164.4	22.6	51.1	60.4	15.0	454	29.6
WB4418	WestBred, 2018	163.1	22.6	53.5	59.9	14.4	433	15.5
Yellowstone	Montana 2005	169.7	30.0	54.8	59.5	15.1	514	30.2
ASC107	Europe/All Star Seeds experimental line	166.1	23.0	38.0	59.7	15.6	427	22.8
ASC116	Europe/All Star Seeds experimental line	161.8	22.7	41.3	60.1	15.9	<b>534</b>	18.1
ASC122	Europe/All Star Seeds experimental line	166.1	24.3	39.5	59.9	<b>16.0</b>	395	<b>12.9</b>
MT1642	Yellowstone/Madsen//Yellowstone	173.2	28.0	51.3	58.8	15.7	519	34.4
MT1683	Yellowstone(L)*2/CDC Buteo	170.2	27.4	51.6	59.8	15.1	<b>545</b>	46.4
MT1745	Decade*2/NI06732	169.7	26.2	<b>57.5</b>	60.9	14.4	507	18.0
MT1746	MT06103//MTW0881//SD06W166	169.4	22.6	54.8	61.5	14.7	475	<b>13.3</b>
MT1747	MT06103//MTW0881//SD06W166	168.3	23.9	52.6	61.6	14.8	481	23.9
MT1750	MT08185//YLL(L)/NX05M4391	171.7	22.4	49.8	61.4	15.3	473	<b>10.2</b>
MT1764	YLL*3//NE01533//PROM/3*YLL/3/YLL*2//Pelsart//PI	163.9	24.9	51.6	59.9	15.5	479	21.2

**TABLE 1. Intrastate Winter Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2019. (Exp# 19-3502-WW)**

Cultivar/Line	Release/Pedigree	1/	2/	3/	4/	5/		
		Head Date	Plant HT Inches	Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	FN Sec	Sawfly %
MT1773	MTS04114*2/PI640431	169.3	26.3	49.1	60.2	14.9	<b>556</b>	20.9
MT1782	MT0859//MT0860/MT0885	165.4	25.9	53.5	60.9	15.5	456	20.0
MT1787	MT08185//YLL*2/PI640431/3/PROM/3*YLL//YLL*2	169.1	25.5	52.3	60.3	15.0	517	30.2
MT1793	Decade-Fhb1	164.4	26.2	<b>58.5</b>	59.7	<b>16.1</b>	485	22.3
MT1796	Decade-Fhb1	164.9	23.7	47.8	60.0	<b>16.5</b>	475	17.9
MTCL1732	AP035-8-1/5/MT08134/4/YLL*4/3/MTCL01158/CI	168.7	27.4	53.0	59.6	14.4	458	<b>13.9</b>
MTCL1737	YLL-2CL/3/YLL*2/Pelsart//PROM/3*YLL	173.5	29.0	<b>56.4</b>	58.6	14.8	503	22.7
MTS1731(w)	MTS0531*2//PI640431/MTS04114	166.0	27.6	54.0	59.8	15.6	480	<b>7.7</b>
MTW1491	MT08189//MT08187/(MTW08166, WB3768 sib)	169.6	27.5	<b>57.5</b>	59.6	14.7	<b>537</b>	30.1
EXPERIMENTAL MEANS		167.3	25.4	52.9	60.1	15.0	478.0	24.2
LSD (0.05)		1.7	2.0	7.4	0.6	0.5	30.2	14.1
C.V.%		0.6	4.8	8.0	0.6	1.8	3.9	34.6
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 (167 = June 16).

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 (19-3502-WW)

Seeding Date: October 10, 2018  
 Harvest Date: August 8, 2019  
 Fertility: 125-20-10-10 side banded  
 System: No-till  
 Herbicide: Bromac-16oz/ac  
 Insecticide: none  
 Previous Crop: Chemical Fallow - Spring Wheat  
 Precipitation: 8.31" (seeding to harvest)

**TABLE 2. Nine-Year Yield Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (Exp# 3502-WW)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)									AVE for YEARS TESTED	% of CHECK YIELD 4/	9-YR COMP. AVE YIELD 5/	
			2010	2011 3/	2012	2013	2014	2015	2016	2017	2018				2019
MTS1588	BOBCAT (++)	3							56.4	62.7	62.6	60.6	116.2	<b>69.6</b>	
ACS55017	KELDIN (P+)	6				61.5	54.8	107.8	56.2	68.6	52.4	66.9	115.7	<b>69.3</b>	
04BC74-2	SY MONUMENT (P+)	5					61.0	103.3	53.0	59.3	57.4	66.8	115.0	<b>68.9</b>	
MT1465	FOUROSIX (++)	4						98.7	50.4	60.3	57.5	66.7	112.6	<b>67.4</b>	
LCH12-012	LONG BRANCH (P+)	3							49.3	64.6	61.5	58.5	112.2	<b>67.2</b>	
BC01007-7	SY WOLF (P+)	7			56.2	70.4	69.4	56.5	97.8	53.2	59.7	66.2	111.8	<b>67.0</b>	
BZ9W07-2034	WB4614 (P+)	4						55.9	97.5	50.0	56.9	65.1	110.8	<b>66.4</b>	
06BC796#68	SY SUNRISE (P+)	4						55.5	92.8	50.8	61.0	65.0	110.7	<b>66.3</b>	
MT0978	NORTHERN (+)	8			54.8	73.1	60.5	56.9	103.8	51.6	56.5	57.7	64.4	109.6	<b>65.7</b>
MTF1432	RAY (++)	3								51.5	60.6	58.9	109.4	<b>65.5</b>	
MT00159	YELLOWSTONE (+)	8	70.7		52.1	68.2	64.1	62.4	103.6		61.9	54.8	67.2	109.4	<b>65.5</b>
BZ9W09-2212	WB4483 (P+)	3							87.6	49.1	61.2	66.0	109.0	<b>65.3</b>	
MTCL1077	SY CLEARSTONE 2CL (P+)	8			59.6	75.4	57.3	53.5	98.4	48.5	61.8	56.8	63.9	108.9	<b>65.2</b>
NSA10-7208	LCS Jet (P+)	3								48.8	59.5	58.9	55.7	106.9	<b>64.0</b>
BZ9W09-2075	WB4575 (P+)	3							75.8	52.8	61.7	63.4	104.8	<b>62.8</b>	
MT1564	FLATHEAD (++)	3								51.2	61.2	49.1	53.8	103.3	<b>61.9</b>
CO13003C	BYRD CL PLUS	3								51.0	58.8	51.0	53.6	102.8	<b>61.6</b>
MTS0713	JUDEE (+)(saw fly tol)	9	72.2		48.9	70.6	61.5	56.9	85.2	48.9	55.7	52.6	61.4	102.5	<b>61.4</b>
CO06052	BRAWL CL PLUS (+)	5						47.2	89.7	43.8	57.6	52.2	58.1	100.1	<b>59.9</b>
MT0552	DECADE (+)	9	69.3		55.8	66.9	56.7	53.3	80.7	47.3	53.6	55.5	59.9	100.0	<b>59.9</b>
BZ9WM09-1663	WB4623CLP (P+)	4						52.9	84.9	42.4	52.7	58.2	99.1	<b>59.4</b>	
MTS1224	LOMA (++)	6					50.5	52.9	80.8	48.0	60.5	51.1	57.3	99.0	<b>59.3</b>
BZ9W05-2043	WB-QUAKE (P+)	6			48.4	70.0	51.2	55.8	87.4	43.3			59.3	98.7	<b>59.1</b>
MTS0808	WARHORSE (+)(saw fly res)	8			51.7	65.1	47.9	57.7	89.8	43.8	57.0	46.5	57.4	97.8	<b>58.6</b>
LCH13DFH-20-87	LCS CHROME (P+)	3								47.3	54.5	48.2	50.0	96.0	<b>57.5</b>
MTS0721	BEARPAW (+)(saw fly tol)	8	67.1		55.4	64.0	51.8	60.4	64.1	42.9	57.9	57.9	94.3	<b>56.5</b>	
MEANS (For Entries Listed)			69.8		53.6	69.3	57.5	55.8	91.0	49.3	59.4	54.7		<b>63.5</b>	
April-July Precip. (in.)			9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64		
Total Annual Precip. (in.)			14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62		
Soil PAW (in.) to SD @ Planting			9.43	9.66	n/a	9.12	n/a	9.43	9.95	9.26	8.61	7.66	9.14		
Total Plant Available Water (in.)			19.12	18.41	7.33	22.40	4.87	16.95	22.19	11.67	12.63	13.99	14.96		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			204	32	60	59	48	37	113	65	272	117	101		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	48	48	48	46	48		
Fertilizer Applied															
(# N)			70	70	100	100	100	100	100	100	100	125	125	99	
(# P <sub>2</sub> O <sub>5</sub> )			40	40	20	20	20	20	20	20	20	20	20	24	
(# K <sub>2</sub> O)			25	25	10	10	10	10	10	10	10	10	13		
(# S)			0	0	0	0	0	0	0	10	10	10	3		

Check variety is Decade.

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/ No harvest due to spotty, poor stands unrelated to variety differences.

4/ Percent of Decade yield 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 of a given entry for years tested, y = average yield for Decade for the same years, and z = 9-Yr average yield for the check variety Decade.

**TABLE 3. Nine-Year Test Weight Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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 4/	9-YR COMP. AVE TEST WT 5/
		2010	2011 3/	2012	2013	2014	2015	2016	2017	2018	2019			
CO06052 BRAWL CL PLUS (+)	5						62.1	61.0	62.6	64.3	62.0	62.4	102.7	<b>62.2</b>
MT1465 FOUROSIX (++)	4							59.9	62.5	62.6	60.0	61.2	102.5	<b>62.1</b>
BZ9W09-2075 WB4575 (P+)	3							59.3	62.9	64.3		62.2	102.5	<b>62.1</b>
06BC796#68 SY SUNRISE (P+)	4						62.2	61.0	62.1	63.8		62.3	102.2	<b>61.9</b>
BC01007-7 SY WOLF (P+)	7			60.7	58.4	62.2	62.2	61.4	63.1	63.4		61.6	102.0	<b>61.8</b>
BZ9W07-2034 WB4614 (P+)	4						61.4	61.1	62.1	62.9		61.9	101.6	<b>61.5</b>
BZ9W09-2212 WB4483 (P+)	3							59.1	62.3	63.0		61.4	101.2	<b>61.3</b>
ACS55017 KELDIN (P+)	6					61.1	61.7	61.2	62.2	63.1	59.9	61.5	101.2	<b>61.3</b>
BZWM07-1663 WB4623CLP (P+)	4						60.9	61.7	62.0	62.1		61.7	101.2	<b>61.3</b>
MT1564 FLA THEAD (++)	3								62.4	63.6	60.4	62.2	101.2	<b>61.3</b>
MTS0713 JUDEE (+)(saw fly tol)	9	61.0		56.9	60.2	61.8	61.8	61.3	62.9	63.6	61.3	61.2	101.0	<b>61.2</b>
MTS1588 BOBCAT (++)	3								62.2	62.7	60.6	61.9	100.7	<b>61.0</b>
CO13003C BYRD CL PLUS	3								61.3	63.4	60.6	61.8	100.5	<b>60.9</b>
MT0978 NORTHERN (+)	8			58.5	59.6	61.0	62.1	59.2	62.2	62.3	60.3	60.6	100.5	<b>60.9</b>
BZ9W05-2043 WB-QUAKE (P+)	6			58.8	58.0	60.7	60.7	60.0	62.7			60.1	100.2	<b>60.7</b>
MTS0808 WARHORSE (+)(saw fly res)	8			57.6	59.0	61.1	60.6	60.4	62.2	62.5	60.2	60.4	100.1	<b>60.7</b>
04BC74-2 SY MONUMENT (P+)	5						60.9	59.6	61.5	62.4	59.5	60.8	100.1	<b>60.6</b>
MT0552 DECADE (+)	9	62.3		59.7	58.6	61.0	61.6	57.8	61.7	62.6	60.1	60.6	100.0	<b>60.6</b>
MTS1224 LOMA (++)	6					60.5	61.0	58.6	62.1	62.6	59.7	60.8	100.0	<b>60.6</b>
LCH12-012 LONG BRANCH (P+)	3								60.1	63.2	60.9	61.4	100.0	<b>60.6</b>
LCH13DH-20-87 LCS CHROME (P+)	3								61.6	63.0	59.6	61.4	99.9	<b>60.5</b>
MT00159 YELLOWSTONE (+)	8	61.2		58.1	59.3	60.7	60.9	59.4		61.7	59.5	60.1	99.5	<b>60.2</b>
MTS0721 BEARPAW (+)(saw fly tol)	8	61.4		58.8	57.6	60.6	60.6	57.3	61.5	62.8		60.1	99.1	<b>60.0</b>
MTCL1077 SY CLEARSTONE 2CL (P+)	8			57.1	58.2	60.8	60.9	59.5	62.0	61.4	59.5	59.9	98.9	<b>59.9</b>
MTF1432 RAY (++)	3								61.5	59.8	58.7	60.0	97.6	<b>59.1</b>
NSA10-7208 LCS Jet (P+)	3								60.2	60.7	57.5	59.5	96.8	<b>58.6</b>
MEANS (For Entries Listed)		61.5		58.5	58.8	61.0	61.4	59.9	62.0	62.7	60.0			<b>60.9</b>
April-July Precip. (in.)		9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64		
Total Annual Precip. (in.)		14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62		
Soil PAW (in.) to SD @ Planting		9.43	9.66	n/a	9.12	n/a	9.43	9.95	9.26	8.61	7.66	9.14		
Total Plant Available Water (in.)		19.12	18.41	7.33	22.40	4.87	16.95	22.19	11.67	12.63	13.99	14.96		
Soil NO <sub>3</sub> (lbs.) to SD at Planting		204	32	60	59	48	37	113	65	272	117	101		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	48	48	46	48		
Fertilizer Applied														
	(# N)	70	70	100	100	100	100	100	100	100	125	125	99	
	(# P <sub>2</sub> O <sub>5</sub> )	40	40	20	20	20	20	20	20	20	20	20	24	
	(# K <sub>2</sub> O)	25	25	10	10	10	10	10	10	10	10	13		
	(# S)	0	0	0	0	0	0	0	10	10	10	3		

Check variety is Decade.

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/ No harvest due to spotty, poor stands unrelated to variety differences.

4/ Percent of Decade 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 test weight of a given entry for years tested, y = average test weight for Decade for the same years, and z = 9-Yr average test weight for the check variety Decade.

**TABLE 4. Ten-Year Sawfly Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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/
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019			
MTS1588 BOBCAT (++)	3								0.3	1.9	0.6	0.9	17.4	<b>0.6</b>
MTS0808 WARHORSE (+)(saw fly res)	9		1.0	2.3	2.3	1.0	2.0	0.0	0.3	0.2	2.8	1.3	35.6	<b>1.2</b>
BZ9W09-2075 WB4575 (P+)	3							0.0	0.0	2.2		0.7	42.9	<b>1.4</b>
BZ9W09-2212 WB4483 (P+)	3							0.0	0.0	3.3		1.1	66.2	<b>2.2</b>
MTS0721 BEARPAW (+)(saw fly tol)	9	2.3	1.0	2.5	5.3	1.0	2.3	0.0	0.7	2.4		1.9	78.9	<b>2.6</b>
MTS0713 JUDEE (+)(saw fly tol)	10	4.0	4.0	2.1	5.3	1.0	0.7	0.0	0.0	5.0	11.4	3.4	100.0	<b>3.4</b>
LCH12-012 LONG BRANCH (P+)	3								1.0	3.7	12.4	5.7	103.9	<b>3.5</b>
06BC796#68 SY SUNRISE (P+)	4						3.7	0.0	0.7	2.6		1.7	121.7	<b>4.1</b>
BZ9W05-2043 WB-QUAKE (P+)	7		2.3	4.3	3.7	5.0	0.7	0.0	0.3			2.3	123.8	<b>4.1</b>
CO06052 BRAWL CL PLUS (+)	5						1.0	0.0	1.0	6.6	13.9	4.5	131.8	<b>4.4</b>
MTS1224 LOMA (++)	6					2.3	2.3	0.0	0.3	4.1	15.4	4.1	135.4	<b>4.5</b>
CO13003C BYRD CL PLUS	3								0.3	3.6	21.0	8.3	152.0	<b>5.1</b>
MT1564 FLATHEAD (++)	3								0.7	2.3	27.4	10.1	184.9	<b>6.2</b>
BC01007-7 SY WOLF (P+)	8		6.7	4.7	8.3	2.3	8.3	0.0	0.0	3.8		4.3	188.5	<b>6.3</b>
MT0978 NORTHERN (+)	9		2.3	9.3	6.7	2.3	2.3	0.0	0.0	3.9	37.6	7.2	192.1	<b>6.4</b>
BZ9W07-2034 WB4614 (P+)	4						3.7	0.0	0.7	7.0		2.8	199.0	<b>6.7</b>
MT0552 DECADE (+)	10	3.7	6.7	9.5	8.3	1.0	13.3	0.0	1.0	4.1	22.4	7.0	209.2	<b>7.0</b>
04BC74-2 SY MONUMENT (P+)	5						3.7	0.0	0.3	3.4	32.4	7.9	232.8	<b>7.8</b>
NSA10-7208 LCS Jet (P+)	3								0.3	5.1	34.7	13.4	244.8	<b>8.2</b>
MT1465 FOUROSIX (++)	4							0.0	0.3	3.6	38.6	10.6	259.1	<b>8.7</b>
MT00159 YELLOWSTONE (+)	9	11.7	5.3	8.9	10.0	2.3	2.3	0.0	0.0	7.7	30.2	8.7	265.6	<b>8.9</b>
BZWM07-1663 WB4623CLP (P+)	4						10.0	0.0	0.0	7.5		4.4	306.9	<b>10.3</b>
MTF1432 RAY (++)	3								0.3	15.2	39.5	18.3	335.2	<b>11.2</b>
LCH13DH-20-87 LCS CHROME (P+)	3								0.3	7.6	51.3	19.8	361.4	<b>12.1</b>
MTCL1077 SY CLEARSTONE 2CL (P+)	8			11.0	13.3	2.3	11.7	0.0	0.0	10.6	44.0	11.6	364.2	<b>12.2</b>
ACS55017 KELDIN (+)	6					2.3	15.0	0.0	0.7	7.2	45.9	11.9	393.7	<b>13.2</b>
MEANS (For Entries Listed)		5.4	3.7	6.0	7.0	2.1	5.2	0.0	0.4	5.0	26.7			<b>6.2</b>
April-July Precip. (in.)		9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64		
Total Annual Precip. (in.)		14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62		
Soil PAW (in.) to SD @ Planting		9.43	9.66	n/a	9.12	n/a	9.43	9.95	9.26	8.61	7.66	9.14		
Total Plant Available Water (in.)		19.12	18.41	7.33	22.40	4.87	16.95	22.19	11.67	12.63	13.99	14.96		
Soil NO <sub>3</sub> (lbs.) to SD at Planting		204	32	60	59	48	37	113	65	272	117	101		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	48	48	46	48		
Fertilizer Applied	(# N)	70	70	100	100	100	100	100	100	125	125	99		
	(# P <sub>2</sub> O <sub>5</sub> )	40	40	20	20	20	20	20	20	20	20	24		
	(# K <sub>2</sub> O)	25	25	10	10	10	10	10	10	10	10	13		
	(# S)	0	0	0	0	0	0	0	10	10	10	3		

Check variety is Judee.

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 Decade 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 saw fly rating of a given entry for years tested, y = average saw fly rating for Judee for the same years, and z = 10-Yr average saw fly rating for the check variety Judee.

**TABLE 5. Advanced Yield Spring Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2019. (Exp# 19-3102-SW)**

ID	Cultivar or Selection	1/	2/	3/	4/	5/		
		Head Date	Plant HT Inches	Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	FN seconds	Sawfly %
ALUM	WSCIA	176.7	29.2	<b>49.6</b>	59.4	15.5	460	13.3
CHOTEAU	PI 633974	176.7	29.2	43.5	58.7	16.5	455	<b>3.7</b>
CORBIN	BZ 996434	175.3	27.9	44.8	59.8	16.6	464	<u>1.0</u>
DAGMAR	MT1621	174.3	30.2	<b>49.8</b>	59.4	16.3	487	<b>2.3</b>
DUCLAIR	PI 660981	175.0	28.5	47.7	58.4	16.1	439	<b>2.3</b>
EGAN	PI 671855	176.3	27.9	44.0	57.1	17.1	504	26.7
FORTUNA	CI 13596	178.7	36.1	41.7	58.2	15.7	485	<b>3.7</b>
LANNING	PI 676978	173.7	27.1	43.0	59.7	16.9	430	21.7
LCS REBEL	LIMAGR 171 (LNR 13-0594)	173.7	31.0	43.7	59.8	16.6	457	16.7
LIMAGR 191	LNR 1156	177.0	28.2	<b>50.1</b>	59.8	16.1	461	15.0
LIMAGR 192	LNR 1751	174.0	28.5	43.9	59.2	15.8	445	16.7
MCNEAL	PI 574642	176.0	30.6	46.8	58.5	15.6	519	18.3
NS PRESSER CLP	PI 679964	178.7	29.4	46.0	58.1	15.6	467	8.3
REEDER	ND 695	175.0	31.8	42.8	59.8	15.8	437	16.7
SY 611 CL2	10S0176-18 CL (SYN 183)	174.3	26.7	46.3	<b>61.1</b>	16.1	529	15.0
SY INGMAR	AGRIPR 141	176.7	30.1	45.5	60.5	16.2	502	20.0
SY LONGMIRE	09S0306-24 SS (SYN 182)	175.0	28.4	<b>50.4</b>	<b>60.9</b>	16.5	505	13.3
SY MCCLOUD	10S0059-28 (SYN 181)	172.7	30.0	40.4	60.5	17.2	458	18.3
SY ROCKFORD	AGRIPR 161	177.7	30.0	44.2	57.9	15.8	480	16.7
SY VALDA	AGRIPR 151	176.3	29.1	47.4	59.9	16.0	461	16.7
THATCHER	CI 10003	179.3	39.7	37.1	54.0	16.5	437	16.7
VIDA	PI 642366	177.0	28.9	<b>53.1</b>	59.4	15.4	452	10.0
WB 143	WB 9668	173.3	25.1	41.1	60.1	<b>18.1</b>	491	<b>3.7</b>
WB 171	WB 9590	174.3	24.2	46.5	60.3	16.5	479	8.3
WB 173	WB 9719	178.7	29.3	<b>50.6</b>	<b>61.5</b>	15.4	459	15.0
WB 9879 CLP	CHOTEAU*3/CHOTEAU/IMI8134	176.7	28.5	<b>51.3</b>	58.8	16.6	462	<u>1.0</u>
WB GUNNISON	BZ 92413R	177.3	28.6	<b>52.0</b>	60.0	15.1	522	<u>1.0</u>
MT 1673	Duclair x McNeal/Glupro, +, fam 72-17	172.3	30.1	47.3	58.4	16.6	408	<b>3.7</b>
MT 1716	MT1274/RB07	173.7	29.3	<b>51.6</b>	59.9	15.8	467	18.3
MT 1736	12F5 2124/12SR 37	178.3	31.8	<b>49.0</b>	57.6	16.1	445	<b>2.3</b>
MT 1742	MT1274/12F5 827	174.0	30.0	<b>49.8</b>	59.6	15.9	449	<b>3.7</b>
MT 1743	MT1274/12F5 827	178.7	27.3	<b>49.2</b>	57.1	15.9	461	<u>1.0</u>
MT 1748	12F5 2124/IDO868	179.7	34.1	<b>49.6</b>	57.5	16.3	419	13.3
MT 1750	12SR93/12F5 1215	174.0	29.1	<b>51.3</b>	60.1	15.5	469	<b>6.7</b>
MT 1756	MT1253/12F5 1215	175.7	31.8	<b>53.7</b>	58.1	16.0	493	8.3
MT 1767	12SR225/12F5 827	172.7	30.7	<b>51.8</b>	58.0	16.5	450	<u>1.0</u>
MT 1775	12F5 827/12F5 2124	178.3	32.0	45.0	57.9	16.2	510	<b>5.0</b>
MT 1807	VIDA/MO8/3-4	175.3	29.4	<b>51.3</b>	59.3	15.9	488	<b>7.0</b>
MT 1809	VIDA/MO 09/3-4	177.3	28.8	<b>52.9</b>	58.5	16.0	443	<b>5.3</b>
MT 1811	MT1142/MTHW1150	176.7	32.4	<b>52.8</b>	60.2	15.5	479	18.3
MT 1815	MT1206/MT1203	177.0	32.6	<b>51.6</b>	59.3	16.2	449	<u>1.0</u>
MT 1818	VIDA/ULEN	177.3	30.0	48.7	58.6	16.4	425	21.7
MT 1819	VIDA/ULEN	176.0	30.0	41.7	58.7	16.8	508	28.3

**TABLE 5. Advanced Yield Spring Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2019. (Exp# 19-3102-SW)**

ID	Cultivar or Selection	1/	2/	3/	4/	5/		
		Head Date	Plant HT Inches	Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	FN seconds	Sawfly %
MT 1821	VIDA/H0800103L	177.3	31.4	<b>50.3</b>	<b>60.9</b>	16.0	460	<b>5.3</b>
MT 1824	MT 1206/MT 1273	175.7	29.3	<b>54.4</b>	58.7	16.3	456	<b>3.7</b>
MT 1826	MT1142/MT1203	176.0	27.3	<b>49.8</b>	56.3	16.5	461	<b>5.3</b>
MT 1837	VIDA/MT1219	176.7	27.9	45.0	58.6	16.7	462	<b>5.0</b>
MT 1838	MT1206/MT172	173.3	29.4	<b>52.6</b>	58.4	15.8	450	10.0
MT 1840	VIDA/LIMAGR1	176.3	27.1	<b>49.8</b>	<b>60.9</b>	15.5	444	<b>3.7</b>
MT 1846	MT 1053/SD4265	175.3	31.0	46.3	59.5	16.9	555	8.3
MT 1853	MT1053/MT1273	177.3	29.3	<b>53.8</b>	60.7	15.7	461	<b>6.7</b>
MT 1855	MT1053/MO8/3-4	179.3	32.0	<b>49.4</b>	58.7	15.9	483	<b>5.0</b>
MT 1856	MT1007/MT1203	175.3	29.6	47.6	58.2	16.7	455	<b>2.3</b>
MT 1857	MT1142/MT1273	175.3	31.2	<b>51.5</b>	59.4	16.2	474	10.0
MT 1861	MT1142/MT1264	175.0	30.0	<b>52.6</b>	<b>61.4</b>	16.5	489	<b>5.3</b>
MT 1862	MT1142/MT1264	174.7	28.0	<b>51.0</b>	58.9	16.2	469	<b>5.3</b>
MT 1863	MT1007/MT1273	175.3	28.9	48.4	59.0	16.4	446	<b>3.7</b>
MT 1865	VidaXConan(BC3F2)a2.1.3.6	177.3	30.9	<b>52.0</b>	58.2	15.3	447	<b>2.3</b>
MT 1866	VidaXConan(BC3F2)a4.6.8.3	177.3	29.6	<b>49.8</b>	59.8	15.8	443	<b>2.3</b>
MT 1867	DuClairXConan(BC3F2)e3.10.1.3	175.3	30.1	46.5	59.5	16.9	415	<b>1.0</b>
MT 1868	MT1053/LIMAGR1	176.3	28.8	<b>52.5</b>	58.8	14.9	423	11.7
MT 1870	VIDA/H0800103L	175.3	27.8	48.4	59.7	15.2	436	8.3
MT 1871	MT 1007/TRVERSE	177.0	29.2	<b>51.9</b>	59.0	15.8	448	<b>5.3</b>
MT 1872	MT1007/MO 09/3-4	174.0	29.0	<b>53.4</b>	59.0	15.5	468	15.0
EXPERIMENTAL MEANS		176.0	29.7	48.4	59.1	16.1	465.0	9.3
LSD (0.05)		1.7	2.3	5.5	0.7	0.4	-	6.5
C.V.: ( S / MEAN)*100		0.6	4.8	7.1	0.7	1.4	-	43.3
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 (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 wheat

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

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

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

Management Information (19-3102-SW)

Seeding Date: April 18, 2019  
Harvest Date: August 15, 2019  
Fertility: 100-20-10-10 side banded  
System: no till  
Herbicide: Bromac-16oz/ac  
Insecticide: none  
Previous Crop: Chemical Fallow-Spring Wheat  
Precipitation: 6.29" (seeding to harvest)



**TABLE 6. Ten-Year Yield Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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/
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019				
PI642366 VIDA (+)	10	58.3	44.6	35.1	67.2	47.9	45.9	40.5	35.6	44.4	53.1	47.3	137.9	<b>47.3</b>	
WB 173 WB 9719	3									31.9	48.2	50.6	43.6	131.1	<b>44.9</b>
PI679964 NS PRESSER CL (P+)	6			32.1	69.4				35.3	34.7	45.7	46.0	43.9	129.7	<b>44.5</b>
WA8166 ALUM	4							51.5	30.8	39.2	49.6	42.8	129.6	<b>44.4</b>	
04S0258-12 SY INGMAR (P+)	6					44.9	43.7	41.2	30.8	44.2	45.5	41.7	128.8	<b>44.1</b>	
PI676978 LANNING (++)	6					44.2	44.3	45.6	27.7	44.6	43.0	41.6	128.4	<b>44.0</b>	
ND695 REEDER (+)	10	54.6	41.8	31.4	62.7	45.7	42.3	44.7	29.0	44.6	42.8	44.0	128.3	<b>44.0</b>	
LNR10-0493 LCS PRO (P+)	5					39.8	43.4	48.9	27.3	39.0		39.7	126.3	<b>43.3</b>	
01S0263-28 SY SOREN (P+)	7		42.6	29.7	56.6	42.5	44.3	42.2	31.0			41.3	125.4	<b>43.0</b>	
PI660981 DUCLAIR (+)	10	55.5	41.0	34.9	61.7	46.9	43.2	38.6	26.2	33.9	47.7	43.0	125.3	<b>43.0</b>	
IMICHT-79 WB9879CLP (P+)	10	54.8	40.0	29.8	58.9	40.5	38.0	43.6	29.1	43.5	51.3	42.9	125.3	<b>42.9</b>	
BZ902-413R WB-GUNNISON (P+)	10	62.4	44.1	32.3	56.5	43.4	39.7	34.0	26.7	36.3	52.0	42.8	124.7	<b>42.8</b>	
MT 1621 DAGMAR	3								29.4	45.1	49.8	41.4	124.6	<b>42.7</b>	
BZ 996-434 CORBIN (P+)(saw fly tol)	10	53.3	45.5	31.3	59.3	38.8	42.3	45.7	25.3	40.8	44.8	42.7	124.6	<b>42.7</b>	
0150042-10 BRENNAN (P+)	8	53.9	35.8	38.4	56.3	41.5	46.3	38.4	24.5			41.9	123.6	<b>42.3</b>	
06S0385-5 SY VALDA (P+)	5						42.5	38.5	27.7	42.7	47.4	39.8	123.3	<b>42.3</b>	
04S0515-2-2 SY TYRA (P+)	8	51.0	39.7	26.6	64.2	46.3	41.7	32.8	31.5			41.7	123.1	<b>42.2</b>	
PI 671855 EGAN (+)	8			31.6	55.5	37.8	38.9	46.5	30.5	38.6	44.0	40.4	122.0	<b>41.8</b>	
AGRIPR161 SY ROCKFORD (P+)	4							41.4	30.9	44.5	44.2	40.2	121.9	<b>41.8</b>	
PI574642 McNEAL	10	49.9	36.4	34.1	53.0	41.5	43.4	39.2	32.2	41.1	46.8	41.8	121.8	<b>41.8</b>	
WF162 HRS 3504	3							42.2	27.2	42.3		37.2	117.7	<b>40.3</b>	
PI633974 CHOTEAU (+)(saw fly tol)	10	53.3	38.8	31.1	53.9	40.2	39.5	36.8	26.4	36.6	43.5	40.0	116.7	<b>40.0</b>	
WF161 HRS 3616	3							41.8	24.9	42.7		36.5	115.2	<b>39.5</b>	
CI13596 FORTUNA (saw fly tol)	10	50.1	40.5	33.6	49.3	37.2	34.2	36.4	27.5	37.6	41.7	38.8	113.2	<b>38.8</b>	
WB 171 WB 9590	3								23.4	39.1	46.5	36.3	109.3	<b>37.5</b>	
LIMAGR 171 LCS REBEL (P+)	3								24.5	36.3	43.7	34.8	104.7	<b>35.9</b>	
CI10003 THATCHER	10	40.6	37.0	25.9	44.9	33.0	29.2	32.3	28.1	34.5	37.1	34.3	100.0	<b>34.3</b>	
MEANS (For Entries Listed)		53.1	40.6	31.9	58.0	41.9	41.3	40.8	28.7	41.1	46.2			<b>41.9</b>	
April-July Precip. (in.)		9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64			
Total Annual Precip. (in.)		14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62			
Soil PAW (in.) to SD @ Planting		8.62	6.95	n/a	9.24	8.26	9.76	8.79	8.73	7.40	n/a	8.47			
Total Plant Available Water (in.)		18.31	15.70	7.33	22.52	13.13	17.28	21.03	11.14	11.42	6.33	15.32			
Soil NO <sub>3</sub> (lbs.) to SD at Planting		141	124	35	56	86	75	55	85	77	300	103			
SD (Sampling Depth in Inches)		48	36	48	48	48	48	48	45	42	47	46			
Fertilizer Applied															
	(# N)	70	70	100	100	100	100	125	125	100	100	99			
	(# P <sub>2</sub> O <sub>5</sub> )	40	40	20	20	20	20	20	20	20	20	24			
	(# K <sub>2</sub> O)	25	25	10	10	10	10	10	10	10	10	13			
	(# S)	0	0	0	0	0	0	10	10	10	10	4			

Long-term check variety is Thatcher.

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 Thatcher 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 Thatcher for the same years, and z = 10-Yr average yield for the check variety Thatcher.

**TABLE 7. Ten-Year Test Weight Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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/	
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019				
WB 173	WB 9719	3								60.5	61.9	61.5	61.3	111.3	<b>61.5</b>	
WB 171	WB 9590	3								61.0	61.0	60.3	60.8	110.4	<b>61.0</b>	
LIMAGR 171	LCS REBEL (P+)	3								60.3	61.3	59.8	60.5	109.8	<b>60.7</b>	
04S0258-12	SY INGMAR (P+)	6					60.6	54.0	58.1	59.6	61.7	60.5	59.1	108.9	<b>60.2</b>	
MT 1621	DAGMAR	3								59.2	61.0	59.4	59.9	108.7	<b>60.0</b>	
06S0385-5	SY VALDA (P+)	5						54.9	58.5	60.0	59.8	59.9	58.6	108.2	<b>59.8</b>	
0150042-10	BRENNAN (P+)	8	58.4	62.4	56.5	63.3	61.5	56.6	59.8	59.1			59.7	107.8	<b>59.6</b>	
WA8166	ALUM	4								59.2	58.7	60.1	59.4	59.3	107.5	<b>59.4</b>
LNR10-0493	LCS PRO (P+)	5						58.1	51.7	59.1	60.4	60.0	57.8	106.4	<b>58.8</b>	
P676978	LANNING (++)	6						59.1	53.0	58.1	58.3	58.4	59.7	57.8	106.4	<b>58.8</b>
BZ902-413R	WB-GUNNISON (P+)	10	59.5	60.2	52.9	62.6	58.2	56.1	56.8	58.6	60.4	60.0	58.5	105.9	<b>58.5</b>	
WF161	HRS 3616	3								57.3	59.3	59.9	58.8	105.7	<b>58.4</b>	
ND695	REEDER (+)	10	57.8	61.3	52.9	62.8	58.5	54.4	58.2	58.4	59.7	59.8	58.4	105.6	<b>58.4</b>	
BZ 996-434	CORBIN (P+)(saw fly tol)	10	57.2	61.2	51.3	62.7	59.5	53.3	58.6	59.0	60.7	59.8	58.3	105.5	<b>58.3</b>	
CI13596	FORTUNA (saw fly tol)	10	57.7	60.7	54.6	61.9	58.7	54.6	59.0	57.9	59.2	58.2	58.2	105.4	<b>58.2</b>	
AGRIPR161	SY ROCKFORD (P+)	4								56.1	57.8	59.9	57.9	57.9	104.9	<b>58.0</b>
04S0515-2-2	SY TYRA (P+)	8	56.7	59.9	52.8	63.9	61.5	53.5	55.8	60.5			58.1	104.8	<b>57.9</b>	
01S0263-28	SY SOREN (P+)	7		61.3	51.5	63.0	59.5	53.1	58.5	58.9			58.0	104.7	<b>57.9</b>	
P642366	VIDA (+)	10	57.7	60.8	50.8	62.4	58.6	53.8	56.5	58.7	59.9	59.4	57.9	104.7	<b>57.9</b>	
IMICHT-79	WB9879CLP (P+)	10	56.9	60.2	51.9	61.7	58.6	53.8	57.7	58.2	59.7	58.8	57.8	104.5	<b>57.8</b>	
WF162	HRS 3504	3								56.5	59.4	58.0	58.0	104.2	<b>57.6</b>	
P633974	CHOTEAU (+)(saw fly tol)	10	56.5	59.6	52.0	61.5	58.3	52.8	58.1	57.8	59.8	58.7	57.5	104.1	<b>57.5</b>	
P660981	DUCLAIR (+)	10	57.3	59.1	51.6	61.2	58.1	52.5	57.5	57.2	59.8	58.4	57.3	103.6	<b>57.3</b>	
P671855	EGAN (+)	8			54.1	60.8	56.9	53.5	57.0	56.1	57.2	57.1	56.6	103.5	<b>57.2</b>	
P574642	McNEAL	10	57.4	59.1	52.3	61.8	56.8	54.5	55.7	57.1	57.5	58.5	57.1	103.3	<b>57.1</b>	
P679964	NS PRESSER CL (P+)	6			49.2	61.7				53.8	58.6	58.8	58.1	56.7	102.3	<b>56.6</b>
CI10003	THATCHER	10	55.5	59.8	50.2	61.5	54.7	50.1	55.6	55.8	55.5	54.0	55.3	100.0	<b>55.3</b>	
MEANS (For Entries Listed)			57.4	60.4	52.3	62.2	58.7	53.7	57.5	58.8	59.6	59.0			<b>58.5</b>	
April-July Precip. (in.)			9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64			
Total Annual Precip. (in.)			14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62			
Soil PAW (in.) to SD @ Planting			8.62	6.95	n/a	9.24	8.26	9.76	8.79	8.73	7.40	n/a	8.47			
Total Plant Available Water (in.)			18.31	15.70	7.33	22.52	13.13	17.28	21.03	11.14	11.42	6.33	15.32			
Soil NO <sub>3</sub> (lbs.) to SD at Planting			141	124	35	56	86	75	55	85	77	300	103			
SD (Sampling Depth in Inches)			48	36	48	48	48	48	48	45	42	47	46			
Fertilizer Applied																
		(# N)	70	70	100	100	100	100	125	125	100	100	99			
		(# P <sub>2</sub> O <sub>5</sub> )	40	40	20	20	20	20	20	20	20	20	24			
		(# K <sub>2</sub> O)	25	25	10	10	10	10	10	10	10	10	13			
		(# S)	0	0	0	0	0	0	10	10	10	10	4			

Long-term check variety is Thatcher.

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 Thatcher 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 Thatcher for the same years, and z = 10-Yr average test weight for the check variety Thatcher.

**TABLE 8. Ten-Year Sawfly Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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/
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019				
BZ902-413R	WB-GUNNISON (P+)	10	1.0	5.3	1.0	0.7	0.0	0.0	0.0	0.0	0.0	1.0	0.9	15.8	<b>0.9</b>
BZ 996-434	CORBIN (P+)(saw fly tol)	10	12.0	5.0	7.5	0.7	0.3	0.7	0.0	0.0	0.0	1.0	2.7	47.7	<b>2.7</b>
01S0263-28	SY SOREN (P+)	7		2.3	10.0	2.0	0.7	0.7	0.0	0.0			2.2	48.0	<b>2.7</b>
MT 1621	DAGMAR	3								0.0	0.0	2.3	0.8	53.9	<b>3.1</b>
PI642366	VIDA (+)	10	7.0	10.0	5.0	1.0	0.3	3.7	0.0	0.0	0.3	10.0	3.7	65.4	<b>3.7</b>
04S0515-2-2	SY TYRA (P+)	8	20.0	10.0	8.0	0.7	0.7	0.0	0.0	0.0			4.9	74.7	<b>4.3</b>
0150042-10	BRENNAN (P+)	8	18.3	11.7	12.5	0.7	0.7	2.3	0.0	0.0			5.8	87.7	<b>5.0</b>
PI660981	DUCLAIR (+)	10	13.3	28.3	7.5	1.0	0.3	1.0	0.0	0.0	0.3	2.3	5.4	95.0	<b>5.4</b>
CI 13596	FORTUNA (saw fly tol)	10	20.0	18.3	10.0	2.3	1.0	1.0	0.0	0.0	0.7	3.7	5.7	100.0	<b>5.7</b>
WF162	HRS 3504	3							0.0	0.0	0.7		0.2	100.1	<b>5.7</b>
WF161	HRS 3616	3							0.0	0.0	0.7		0.2	100.1	<b>5.7</b>
IMICHT-79	WB9879CLP (P+)	10	18.3	28.3	10.0	0.7	0.3	1.0	0.0	0.0	0.0	1.0	6.0	104.7	<b>6.0</b>
PI633974	CHOTEAU (+)(saw fly tol)	10	31.7	28.3	8.0	1.0	0.7	0.7	0.0	0.0	0.3	3.7	7.4	130.4	<b>7.4</b>
PI 679964	NS PRESSER CL (P+)	6			15.0	1.0			0.0	0.0	0.3	8.3	4.1	148.0	<b>8.4</b>
CI 10003	THATCHER	10	30.0	15.0	17.5	2.3	3.7	2.3	0.0	0.0	3.7	16.7	9.1	159.9	<b>9.1</b>
ND 695	REEDER (+)	10	33.3	16.7	20.0	2.3	2.3	2.3	0.0	0.0	2.3	16.7	9.6	168.4	<b>9.6</b>
WB 171	WB 9590	3							0.0	1.0	8.3	3.1	215.5	<b>12.3</b>	
PI574642	McNEAL	10	25.0	36.7	30.0	7.0	5.0	5.0	0.0	0.3	0.3	18.3	12.8	224.0	<b>12.8</b>
PI671855	EGAN (+)	8			15.0	2.3	2.3	1.0	0.0	0.0	2.0	26.7	6.2	264.3	<b>15.1</b>
LNR10-0493	LCS PRO (P+)	5					2.3	5.0	0.0	0.3	0.7		1.7	311.4	<b>17.8</b>
WSCIA	ALUM (+)	4							0.0	0.0	0.3	13.3	3.4	315.5	<b>18.0</b>
WB 173	WB 9719	3								0.0	0.3	15.0	5.1	354.0	<b>20.2</b>
06S0385-5	SY VALDA (P++)	5						0.3	0.0	0.0	2.7	16.7	3.9	368.6	<b>21.0</b>
04S0258-12	SY INGMAR (P+)	6					1.0	1.0	0.0	0.0	2.3	20.0	4.1	384.0	<b>21.9</b>
PI 676978	LANNING (++)	6					1.0	2.3	0.0	0.0	0.3	21.7	4.2	399.8	<b>22.8</b>
AGRIPR161	SY ROCKFORD (P+)	4							0.0	0.0	1.0	16.7	4.4	407.8	<b>23.2</b>
LIMAGR 171	LCS REBEL (P+)	3								0.0	2.3	16.7	6.3	438.6	<b>25.0</b>
<b>MEANS (For Entries Listed)</b>			19.2	16.6	11.8	1.7	1.3	1.7	0.0	0.0	0.9	11.4			<b>10.9</b>
April-July Precip. (in.)			9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64		
Total Annual Precip. (in.)			14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62		
Soil PAW (in.) to SD @ Planting			8.62	6.95	n/a	9.24	8.26	9.76	8.79	8.73	7.40	n/a	8.47		
Total Plant Available Water (in.)			18.31	15.70	7.33	22.52	13.13	17.28	21.03	11.14	11.42	6.33	15.32		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			141	124	35	56	86	75	55	85	77	300	103		
SD (Sampling Depth in Inches)			48	36	48	48	48	48	48	45	42	47	46		
Fertilizer Applied		(# N)	70	70	100	100	100	100	125	125	100	100	99		
		(# P <sub>2</sub> O <sub>5</sub> )	40	40	20	20	20	20	20	20	20	20	24		
		(# K <sub>2</sub> O)	25	25	10	10	10	10	10	10	10	10	13		
		(# S)	0	0	0	0	0	0	10	10	10	10	4		

Long-term check variety is Fortuna.

1/ See MCES Bulletin 1093 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include protein, quality, disease resistance, etc. before making cultivar selection decisions.

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

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

**Table 9. Montana Spring Durum Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, Montana. 2019. (Exp# 19-9802-DUR)**

Entry	Cultivar Source	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	3/ FN seconds	4/ Sawfly %
Alkabo	NDSU	176.7	31.2	47.3	58.9	13.9	509.4	5.0
Alzada	WestBred	175.0	26.3	49.9	58.8	14.1	<b>600.6</b>	<b>1.0</b>
Carpio	NDSU	178.7	32.8	47.4	58.4	13.8	526.4	<b>1.0</b>
Divide	NDSU	178.0	31.2	44.5	58.2	13.6	501.6	<b>1.0</b>
Dynamic	CDC	179.0	32.8	<b>53.1</b>	58.9	<b>14.7</b>	502.8	3.7
Fortitude	CDC	178.0	30.5	<b>50.5</b>	58.6	<b>14.6</b>	554.9	3.7
Grano	NDSU	179.0	30.3	47.2	<b>59.4</b>	13.9	544.3	5.0
Grenora	NDSU	177.0	29.8	49.2	58.4	<b>14.1</b>	555.8	5.0
Joppa	NDSU	177.3	34.3	43.0	58.3	<b>14.2</b>	505.3	3.7
Mountrail	NDSU	178.0	31.2	45.2	58.3	14.0	491.7	<b>2.3</b>
Precision	CDC	177.0	29.5	48.2	58.2	<b>14.8</b>	<b>597.6</b>	<b>1.0</b>
Riveland	NDSU	178.3	32.0	44.2	57.6	<b>14.5</b>	532.5	<b>2.3</b>
Tioga	NDSU	177.3	34.3	47.0	59.0	<b>14.1</b>	529.2	3.7
Vivid	CDC	177.7	31.3	<b>54.1</b>	<b>59.3</b>	<b>14.5</b>	521.1	<b>2.3</b>
MTD16001	MSU	178.0	30.5	<b>51.7</b>	57.7	12.9	499.7	<b>1.0</b>
MTD16002	MSU	179.7	33.1	43.1	56.9	13.5	535.7	<b>1.0</b>
MTD16004	MSU	178.0	30.3	49.2	<b>59.9</b>	13.4	466.0	<b>2.3</b>
MTD16005	MSU	178.0	32.0	<b>51.0</b>	58.6	13.7	507.7	<b>1.0</b>
MTD16006	MSU	178.0	32.4	<b>50.1</b>	58.8	13.7	485.8	<b>1.0</b>
MTD16007	MSU	178.0	31.8	<b>50.4</b>	<b>59.6</b>	13.6	505.7	<b>0.3</b>
MTD16008	MSU	177.0	31.7	47.4	57.1	<b>14.1</b>	499.4	<b>2.3</b>
MTD16009	MSU	178.0	32.5	42.8	53.8	<b>14.4</b>	492.6	<b>2.3</b>
MTD16010	MSU	178.0	32.5	45.2	57.8	<b>14.7</b>	531.9	<b>1.0</b>
MTD16011	MSU	179.7	32.4	49.6	58.6	12.8	533.8	<b>2.3</b>
EXPERIMENTAL MEANS		177.9	31.5	48.0	58.3	14.0	522.1	2.3
LSD (0.05)		1.4	2.4	3.9	0.8	0.7	25.4	2.6
C.V.: ( S / MEAN)*100		0.5	4.6	5.0	0.9	3.1	3.0	69.0
P-VALUE (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0041

1/ No. of Days from January 1 (178 = June 27).

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.

**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.

Management Information (19-9802-DUR)

Seeding Date: April 18, 2019

Harvest Date: August 15, 2019

Fertility: 100-20-10-10

System: no till

Herbicide: Bromac, 16 oz/ac

Insecticide: none

Previous Crop: Chemical Fallow-Spring Wheat

Precipitation: 6.29" (seeding to harvest)

**TABLE 10. Ten-Year Yield Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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/	
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019				
CDC Dynamic	CDC DYNAMIC (P+)	3								28.1	41.2	53.1	40.8	109.8	<b>44.0</b>
CDC Vivid	CDC VIVID (P+)	3								24.5	40.5	54.1	39.7	106.7	<b>42.7</b>
YU894-75	ALZADA (P+)	9	58.4	43.9	34.4	58.7	40.6		36.4	24.1	37.9	49.9	42.7	106.3	<b>42.5</b>
D03028	CARPIO (+)	7				59.8	39.7	34.6	41.3	26.7	35.8	47.4	40.7	105.7	<b>42.3</b>
CDC Precision	CDC PRECISION (P+)	3								29.7	39.5	48.2	39.1	105.2	<b>42.1</b>
CDC Fortitude	CDC FORTITUDE (P+)	3								27.6	37.9	50.5	38.7	104.0	<b>41.6</b>
D96604	ALKABO (+)	10	62.7	39.5	29.7	61.3	42.2	35.0	29.5	27.0	41.3	47.3	41.6	103.8	<b>41.6</b>
D00095	TIOGA (+)	10	64.1	41.9	30.1	54.1	36.3	34.4	35.9	30.8	40.3	47.0	41.5	103.7	<b>41.5</b>
D04581	JOPPA (+)	6					41.3	34.8	31.5	28.0	41.1	43.0	36.6	103.2	<b>41.3</b>
D97780	GREMORA (+)	10	57.7	36.5	26.0	62.3	37.0	31.3	36.2	30.8	40.2	49.2	40.7	101.7	<b>40.7</b>
D9715-11	DIVIDE (+)	10	60.1	36.4	28.0	55.7	38.6	34.9	39.7	27.4	41.1	44.5	40.6	101.5	<b>40.6</b>
D901313	MOUNTRAIL (+)	10	63.2	39.4	27.9	57.0	32.4	38.8	30.1	28.2	38.2	45.2	40.0	100.0	<b>40.0</b>
MEANS (For Entries Listed)			61.0	39.6	29.3	58.4	38.5	34.8	35.1	27.7	39.6	48.3			<b>41.8</b>
April-July Precip. (in.)			9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64		
Total Annual Precip. (in.)			14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62		
Soil PAW (in.) to SD @ Planting			8.62	6.95	n/a	9.13	8.26	9.76	8.21	8.73	9.15	n/a	8.60		
Total Plant Available Water (in.)			18.31	15.70	7.33	22.41	13.13	17.28	20.45	11.14	13.17	6.33	14.53		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			141	124	60	22	86	75	28	85	112	268	100		
SD (Sampling Depth in Inches)			48	36	n/a	48	48	48	48	45	48	48	46		
Fertilizer Applied															
			(# N)	70	70	100	100	100	100	125	125	100	100	99	
			(# P <sub>2</sub> O <sub>5</sub> )	40	40	20	20	20	20	20	20	20	24		
			(# K <sub>2</sub> O)	25	25	10	10	10	10	10	10	10	13		
			(# S)	0	0	0	0	0	0	10	10	10	4		

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 11. Ten-Year Test Weight Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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/
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019			
D96604	ALKABO (+)	10	58.7	60.9	57.7	63.6	57.8	56.7	54.9	59.4	59.6	58.9	58.8	101.8	<b>58.8</b>
D9715-11	DIVIDE	10	58.2	60.0	56.6	63.6	57.6	55.4	56.5	58.7	59.7	58.2	58.5	101.2	<b>58.5</b>
YU894-75	ALZADA (P+)	9	58.2	59.9	55.8	62.8	58.1		54.5	59.4	59.3	58.8	58.5	100.9	<b>58.3</b>
D04581	JOPPA (+)	6					58.1	55.8	53.7	58.6	59.7	58.3	57.4	100.6	<b>58.2</b>
D00095	TIOGA	10	58.0	60.7	55.7	64.0	56.9	55.7	54.9	58.3	58.3	59.0	58.2	100.6	<b>58.2</b>
D97780	GREMORA (+)	10	58.0	60.6	55.2	63.3	56.9	55.8	54.5	58.4	58.2	58.4	57.9	100.2	<b>57.9</b>
CDC Vivid	CDC VIVID (P+)	3								58.6	58.1	59.3	58.7	100.2	<b>57.9</b>
D901313	MOUNTRAIL (+)	10	58.4	59.9	54.2	63.4	56.3	55.9	54.3	58.6	58.8	58.3	57.8	100.0	<b>57.8</b>
D03028	CARPIO (+)	7				63.4	56.7	56.2	56.3	56.2	57.4	58.4	57.8	99.8	<b>57.7</b>
CDC Fortitude	CDC FORTITUDE (P+)	3								58.3	58.3	58.6	58.4	99.7	<b>57.6</b>
CDC Precision	CDC PRECISION (P+)	3								58.5	57.9	58.2	58.2	99.4	<b>57.4</b>
CDC Dynamic	CDC DYNAMIC (P+)	3								57.6	57.5	58.9	58.0	99.0	<b>57.2</b>
MEANS (For Entries Listed)			58.2	60.3	55.9	63.4	57.3	55.9	55.0	58.4	58.6	58.6			<b>58.0</b>
April-July Precip. (in.)			9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64		
Total Annual Precip. (in.)			14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62		
Soil PAW (in.) to SD @ Planting			8.62	6.95	n/a	9.13	8.26	9.76	8.21	8.73	9.15	n/a	8.60		
Total Plant Available Water (in.)			18.31	15.7	7.33	22.41	13.13	17.28	20.45	11.14	13.17	6.33	14.53		
Soil NO <sub>3</sub> (lbs.) to SD at Planting			141	124	60	22	86	75	28	85	112	268	100		
SD (Sampling Depth in Inches)			48	36	n/a	48	48	48	48	45	48	48	46		
Fertilizer Applied															
			(# N)	70	70	100	100	100	100	125	125	100	100	99	
			(# P <sub>2</sub> O <sub>5</sub> )	40	40	20	20	20	20	20	20	20	20	24	
			(# K <sub>2</sub> O)	25	25	10	10	10	10	10	10	10	13		
			(# S)	0	0	0	0	0	10	10	10	10	4		

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 12. Ten-Year Sawfly Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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/	
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019				
CDC Precision	CDC PRECISION	3									0.0	0.0	1.0	0.3	42.8	<b>2.9</b>
YU894-75	ALZADA (P+)	9	8.3	18.3	2.3	2.3	0.3		0.0	0.0	0.3	1.0	3.7	49.5	<b>3.3</b>	
D9715-11	DIVIDE	10	10.0	23.3	6.7	1.0	1.0	0.3	0.0	0.0	0.0	1.0	4.3	65.0	<b>4.3</b>	
D00095	TIOGA	10	13.3	18.3	6.7	2.3	1.0	2.3	0.0	0.3	0.0	3.7	4.8	71.9	<b>4.8</b>	
D97780	GRENORA (+)	10	16.7	25.0	8.3	2.3	0.7	0.3	0.0	0.0	0.7	5.0	5.9	88.5	<b>5.9</b>	
D901313	MOUNTRAIL (+)	10	18.3	30.0	13.3	2.3	0.3	0.0	0.0	0.0	0.0	2.3	6.7	100.0	<b>6.7</b>	
CDC Vivid	CDC VIVID	3									0.0	0.3	2.3	0.9	114.3	<b>7.6</b>
D96604	ALKABO (+)	10	26.7	30.0	16.7	2.3	1.0	0.7	0.0	0.3	0.3	5.0	8.3	124.6	<b>8.3</b>	
D03028	CARPIO (+)	7				3.7	1.0	1.0	0.0	0.0	0.0	1.0	1.0	134.1	<b>8.9</b>	
CDC Dynamic	CDC DYNAMIC	3									0.0	0.0	3.7	1.2	157.1	<b>10.5</b>
CDC Fortitude	CDC FORTITUDE	3									0.0	0.3	3.7	1.3	171.4	<b>11.4</b>
D04581	JOPPA (+)	6					2.3	2.0	0.0	0.0	0.0	3.7	1.3	300.3	<b>20.0</b>	
MEANS (For Entries Listed)			15.6	24.2	9.0	2.3	1.0	0.9	0.0	0.1	0.2	2.8			<b>7.9</b>	
April-July Precip. (in.)			9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64			
Total Annual Precip. (in.)			14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62			
Soil PAW (in.) to SD @ Planting			8.62	6.95	n/a	9.13	8.26	9.76	8.21	8.73	9.15	n/a	8.60			
Total Plant Available Water (in.)			18.31	15.7	7.33	22.41	13.13	17.28	20.45	11.14	13.17	6.33	14.53			
Soil NO <sub>3</sub> (lbs.) to SD at Planting			141	124	60	22	86	75	28	85	112	268	100			
SD (Sampling Depth in Inches)			48	36	n/a	48	48	48	48	45	48	48	46			
Fertilizer Applied																
	(# N)	70	70	100	100	100	100	125	125	100	100	99				
	(# P <sub>2</sub> O <sub>5</sub> )	40	40	20	20	20	20	20	20	20	20	24				
	(# K <sub>2</sub> O)	25	25	10	10	10	10	10	10	10	10	13				
	(# S)	0	0	0	0	0	0	10	10	10	10	4				

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 13. Intrastate Spring Barley Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions at Northern Agricultural Research Center. Havre, MT. 2019. (Exp# 19-2102-SB)**

ID	Cultivar or Selection	1/ Head Date	Plant Ht Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Plump %	Thin %	3/ Protein %
1	Bow	181.0	27.0	49.1	49.4	86.0	2.9	10.1
2	Buzz	175.7	24.6	54.0	48.9	89.1	1.9	10.0
3	Ellinor	178.3	22.5	<b>62.0</b>	51.7	94.0	1.4	<b>9.1</b>
4	Fraser	173.3	24.0	<b>61.7</b>	51.8	93.9	1.5	9.9
5	Genie	175.3	24.9	54.8	47.9	78.9	4.6	9.6
6	Hockett	173.3	26.4	52.7	51.1	92.3	1.6	10.5
7	Leandra	180.0	22.5	<b>61.7</b>	50.1	95.4	1.0	<b>8.8</b>
8	Merit 57	176.0	25.3	55.7	49.9	95.1	1.1	9.6
9	Metcalfe	176.3	23.0	57.0	49.5	83.7	3.5	9.5
10	Odyssey	172.3	24.5	<b>62.2</b>	49.3	87.8	2.6	<b>9.3</b>
11	Opera	178.3	27.5	<b>67.3</b>	48.5	98.2	0.5	<b>9.3</b>
13	2IM14-8212	172.0	23.8	50.0	49.6	97.8	0.6	9.7
12	IK14-8413	171.0	25.5	52.3	51.6	98.5	0.5	10.8
14	MT090202	171.3	23.8	56.0	48.9	97.4	0.6	9.9
15	MT16M00209	172.0	26.3	53.6	49.1	99.3	0.1	10.1
16	MT16M00305	172.0	26.4	50.8	49.1	98.9	0.3	10.3
17	MT16M00406	173.0	25.2	52.7	49.6	98.9	0.2	10.2
18	MT16M00407	174.7	28.3	<b>63.1</b>	51.7	96.5	1.1	9.6
19	MT16M00408	171.7	24.9	51.2	51.5	97.7	0.6	9.9
20	MT16M00504	172.3	27.9	57.4	50.6	98.4	0.3	<b>9.1</b>
21	MT16M00603	172.7	25.8	60.6	51.3	96.8	0.5	9.6
22	MT16M00610	171.7	23.7	49.9	50.3	98.6	0.3	10.4
23	MT16M00707	172.3	29.7	57.0	50.9	99.0	0.3	10.3
24	MT16M00709	171.7	24.2	<b>62.8</b>	50.7	95.1	1.1	9.5
25	MT16M00806	168.0	23.7	57.1	51.3	95.1	1.4	9.6
26	MT16M00807	172.7	23.3	57.1	49.5	97.3	0.6	<b>9.3</b>
27	MT16M01204	175.0	26.6	59.6	50.6	97.5	0.7	<b>8.9</b>
28	MT16M01405	172.3	23.4	50.8	50.1	97.7	0.6	9.8
29	MT16M01705	172.3	25.4	59.5	49.3	97.6	0.7	9.6
30	MT16M01801	173.0	24.8	56.3	50.4	95.4	1.2	9.7
31	MT16M01803	170.0	25.3	52.6	50.6	97.4	0.6	10.2
32	MT16M01806	172.3	23.8	53.6	51.3	96.3	1.1	<b>9.4</b>
33	MT16M01819	170.3	25.6	56.7	51.2	97.5	0.7	9.9
34	MT16M01901	170.7	24.3	56.8	50.2	98.1	0.5	<b>9.2</b>
35	MT16M01902	173.7	25.4	57.0	49.8	95.4	1.0	<b>9.2</b>
36	MT16M02003	172.3	28.0	<b>63.2</b>	50.1	94.7	0.9	<b>9.3</b>
37	MT16M02008	171.3	27.4	59.1	51.8	96.4	1.0	10.0
38	MT16M02101	172.3	22.9	56.7	52.1	97.5	0.7	9.9
39	MT16M02106	172.3	28.8	50.9	<b>53.0</b>	92.0	1.9	10.5
40	MT16M02107	172.7	26.3	57.5	51.6	96.9	0.8	<b>9.1</b>
41	MT16M02201	173.0	24.5	59.7	51.2	95.5	1.1	9.5
42	MT16M05403	174.7	27.1	54.7	51.9	96.1	0.9	10.4
43	MT16M05610	173.0	28.0	57.2	52.1	96.1	0.8	10.7



**TABLE 13. Intrastate Spring Barley Cultivar Evaluation Nursery Grown On-Station Under No-Till  
Continued Dryland Fallow Conditions at Northern Agricultural Research Center. Havre, MT. 2019.  
(Exp# 19-2102-SB)**

ID	Cultivar or Selection	1/ Head Date	Plant Ht Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Plump %	Thin %	3/ Protein %
44	MT16M05902	172.3	28.9	53.7	<b>53.0</b>	97.7	0.6	10.4
45	MT16M06110	175.0	24.6	60.3	50.6	96.8	0.8	9.8
46	MT16M06404	173.7	24.4	59.4	<b>52.6</b>	96.1	0.9	<b>9.1</b>
47	MT16M07806	175.3	24.3	<b>62.2</b>	52.2	93.6	1.6	9.6
48	MT16M09602	172.3	25.6	58.8	50.5	84.0	4.0	10.3
49	MT16M10204	172.3	24.2	59.3	51.7	96.4	0.8	<b>9.2</b>
EXPERIMENTAL MEANS		173.3	25.4	56.8	50.6	95.2	1.1	9.7
LSD (0.05)		1.7	1.3	5.6	0.7	2.4	0.7	0.6
C.V.		0.6	3.3	6.0	0.9	1.5	36.6	4.0
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 (173 = June 22).

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 (19-2102-SB)

Seeding Date: April 17, 2019  
Harvest Date: August 14, 2019  
Fertility: 14-3-1-1 side banded  
System: no till  
Herbicide: Bromac-16oz/ac  
Insecticide: none  
Previous Crop: Chemical Fallow - Spring Wheat  
Precipitation: 6.32" (seeding to harvest)

**TABLE 14. Ten-Year Yield Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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/
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019			
ODYSSEY (P+) Odyssey	5				65.6			90.4	41.7	57.0	62.2	63.4	102.0	<b>69.8</b>
GENIE (P+) Genie	5				67.2			87.0	46.3	57.4	54.8	62.6	100.7	<b>68.9</b>
HOCKETT (+) MT910189	10	77.7	76.3	54.4	70.7	88.6	76.1	97.1	37.4	52.7	52.7	68.4	100.0	<b>68.4</b>
SYNERGY (P+) Synergy	3							87.0	39.6	59.4		62.0	99.4	<b>68.0</b>
BUZZ (++) MT124112	4						73.2	86.2	41.2		54.0	63.6	96.7	<b>66.1</b>
COPELAND Copeland	4	77.0	72.9					82.1	45.4			69.3	96.1	<b>65.7</b>
HARRINGTON SK76333	8	82.4	76.5	37.7	71.3	82.5	61.0	85.6	41.4			67.3	93.1	<b>63.7</b>
METCALFE TR232	9	77.9	70.9	39.5		76.3	59.1	76.1	40.1	61.7	57.0	62.1	91.1	<b>62.3</b>
CRAFT MT970116	7	37.3	80.8	31.4	60.2	74.9	70.2		33.7			55.5	80.7	<b>55.2</b>
MEANS (For Entries Listed)		70.5	75.5	40.8	67.0	80.6	67.9	86.4	40.7	57.6	56.2			<b>65.3</b>
April-July Precip. (in.)		9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64		
Total Annual Precip. (in.)		14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62		
Soil PAW (in.) to SD @ Planting		n/a	7.45	7.45	8.52	7.82	8.85	8.68	9.09	9.99	8.67	8.50		
Total Plant Available Water (in.)		9.69	16.2	14.78	21.8	12.69	16.37	20.92	11.5	14.01	15	15.30		
Soil NO3 (lbs.) to SD at Planting		204	374	60	415	57	123	28	103	94	48	151		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	41	45	46	47		
Fertilizer Applied														
	(# N)	70	70	100	100	100	100	125	90	14	14	78		
	(# P <sub>2</sub> O <sub>5</sub> )	40	40	20	20	20	20	20	30	3	3	22		
	(# K <sub>2</sub> O)	25	25	10	10	10	10	10	10	1	1	11		
	(# S)	0	0	0	0	0	0	10	0	1	1	1		

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 15. Ten-Year Test Weight Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (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/
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019			
SYNERGY (P+) Synergy	3							52.3	53.4	52.6		52.8	100.1	<b>51.7</b>
HOCKETT (+) MT910189	10	51.2	52.2	46.2	53.2	54.2	50.7	54.7	54.0	49.6	51.1	51.7	100.0	<b>51.7</b>
CRAFT MT970116	7	50.6	53.0	43.9	53.2	53.1	51.4		54.3			51.4	99.4	<b>51.4</b>
BUZZ (++) MT124112	4						51.3	53.8	53.5		48.9	51.9	98.6	<b>51.0</b>
ODYSSEY (P+) Odyssey	5				52.5			53.0	53.5	49.5	49.3	51.6	98.2	<b>50.8</b>
GENIE (P+) Genie	5				52.1			53.8	52.8	50.6	47.9	51.5	98.0	<b>50.7</b>
METCALFE TR232	9	48.4	51.6	43.8		51.1	48.4	52.4	54.0	50.1	49.5	49.9	96.9	<b>50.1</b>
HARRINGTON SK76333	8	49.2	51.0	42.1	52.3	51.0	49.4	53.5	53.2			50.2	96.5	<b>49.9</b>
COPELAND Copeland	4	48.4	48.7					51.8	52.3			50.3	94.9	<b>49.0</b>
<b>MEANS (For Entries Listed)</b>		<b>49.6</b>	<b>51.3</b>	<b>44.0</b>	<b>52.7</b>	<b>52.3</b>	<b>50.2</b>	<b>53.2</b>	<b>53.4</b>	<b>50.5</b>	<b>49.4</b>			<b>50.7</b>
April-July Precip. (in.)		9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	6.33	7.64		
Total Annual Precip. (in.)		14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62		
Soil PAW (in.) to SD @ Planting		n/a	7.45	7.45	8.52	7.82	8.85	8.68	9.09	9.99	8.67	8.50		
Total Plant Available Water (in.)		9.69	16.2	14.78	21.8	12.69	16.37	20.92	11.5	14.01	15	15.30		
Soil NO3 (lbs.) to SD at Planting		204	374	60	415	57	123	28	103	94	48	151		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	41	45	46	47		
Fertilizer Applied		70	70	100	100	100	100	125	90	14	14	78		
	(# N)	40	40	20	20	20	20	20	30	3	3	22		
	(# P <sub>2</sub> O <sub>5</sub> )	25	25	10	10	10	10	10	10	1	1	11		
	(# K <sub>2</sub> O)	0	0	0	0	0	0	10	0	1	1	1		

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 16. Eight-Year Yield Summary on Selected Entries from Dryland Safflower Nursery. Northern Agricultural Research Center. Havre, Montana. 2010-2019. (Exp# 7702-SA)**

1/ VARIETY or SELECTION		No. of YEARS TESTED	YIELD (Lbs Per Acre)									AVE for YEARS TESTED	% of CHECK YIELD 3/	8-Yr COMP. AVE. YIELD 4/
			2010	2011	2012	2013	2014	2015	2016	2017 2/	2018			
Hybrid 446	HYBRID 446	5				1947	1831	1820	3442		2832	2374	285.8	<b>2571</b>
Hybrid 200	HYBRID 200	5				1866	2008	1938	3138		2730	2336	281.2	<b>2529</b>
Rubis Red	RUBIS RED	3						1449	2619		2382	2150	265.3	<b>2387</b>
HYBRID 1601	HYBRID 1601(+)	8	2117	2559	1858	1588	1280	2657	3602		2929	2324	258.3	<b>2324</b>
HYBRID 621	HYBRID 621	5			1421	1620	1241	1169	2489			1588	245.1	<b>2205</b>
HYBRID 528	HYBRID 528	3			1685	1721	1313					1573	230.6	<b>2075</b>
CARDINAL	CARDINAL(+)	8	2014	2077	1651	1721	1802	1512	2791		2088	1957	217.5	<b>1957</b>
HYBRID 9049	HYBRID 9049(+)	5	2229	2201		1816	1988	1872				2021	217.1	<b>1953</b>
MON-DAK	MON-DAK(+)	8	2070	1967	1559	1814	1303	1678	2532		2328	1906	211.9	<b>1906</b>
Baldy	BALDY	5				1500	1681	1477	2129		1739	1705	205.2	<b>1846</b>
WILL 95FI	FINCH	8	1580	2064	1565	1566	1495	1466	2323		2051	1764	196.0	<b>1764</b>
Will WOMA2003	MONTOLA 2003 (+)	7	1741	1839		1932	1219	1634	2240		1949	1793	182.6	<b>1643</b>
011-2180	MORLIN (+)	7	1924	1927	1253	1828	1002	870			1786	1513	170.4	<b>1533</b>
WILL	MONTOLA 2000 (++)	3	1676	1836				467				1326	135.7	<b>1221</b>
91B3842	NUTRASAFF (+)	8	1541	1179	323	1289	435	212	982		1237	900	100.0	<b>900</b>
MEANS (For Entries Listed)			1877	1961	1414	1708	1431	1444	2571		2186			<b>1921</b>
April-July Precip. (in.)			9.69	8.75	7.33	11.88	4.87	7.52	12.24	2.41	4.02	6.33	7.50	
Total Annual Precip. (in.)			14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.62	
Soil PAW (in.) to SD @ Planting			6.73	7.31	n/a	9.58	9.38	8.29	9.24	8.92	6.84	6.73	8.11	
Total Plant Available Water (in.)			16.42	16.06	7.33	21.46	14.25	15.81	21.48	11.33	10.86	13.06	14.81	
Soil NO3 (lbs.) to SD at Planting			115	99	35	78	58	115	25	53	92	116	79	
SD (Sampling Depth in Inches)			48	36	48	48	48	48	48	48	39	44	46	
Fertilizer Applied														
		(# N)	0	0	0	0	0	50	50	50	50	50	25	
		(# P <sub>2</sub> O <sub>5</sub> )	45	45	45	45	45	15	15	15	15	15	30	
		(# K <sub>2</sub> O)	0	0	0	0	0	0	0	0	0	0	0	
		(# S)	0	0	0	0	0	20	20	20	20	20	10	

Long-term check variety is Nutrasaff.

1/ + = Protected Variety, ++ = PVP Title 5 or Title 5 Pending.

2/ No harvest in 2017 due to poor stand and drought. No harvest in 2019 due to deer and bird damage.

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

4/ 8-Yr Comparable Average = (x/y) \* z where x = average yield of a given entry for years tested, y = average yield for Nutrasaff for the same years, and z = 8-Yr average yield for the check variety Nutrasaff.

**TABLE 17. Nine-Year Percent Oil Summary on Selected Entries from Dryland Safflower Nursery. Northern Agricultural Research Center. Havre, Montana 2010-2019. (Exp# 7702-SA)**

1/ VARIETY or SELECTION		No. of YEARS TESTED	Oil (%) @ 8% Seed Moisture									AVE for YEARS TESTED	% of CHECK Oil 3/	10-Yr COMP. AVE. Oil 4/
			2010	2011	2012	2013	2014	2015	2016	2017 2/	2018			
91B3842	NUTRASAFF (+)	8	36.9	52.4	54.1	52.5	52.8	51.9	46.3		43.1	48.8	100.7	<b>48.8</b>
HYBRID 528	HYBRID 528	3			54.4	48.4	48.2					50.3	94.7	<b>45.9</b>
HYBRID 621	HYBRID 621	5			53.5	45.2	46.3	43.4	35.1			44.7	86.8	<b>42.0</b>
WILL	MONTOLA 2000 (++)	3	38.8	43.3				37.7				39.9	85.5	<b>41.4</b>
011-2180	MORLIN (+)	7	39.5	41.8	43.7	43.6	43.5	41.9			34.8	41.2	84.7	<b>41.0</b>
Will WOMA2003	MONTOLA 2003 (+)	7	39.3	41.8		41.5	42.7	41.7	34.0		33.2	39.2	82.1	<b>39.8</b>
HYBRID 1601	HYBRID 1601(+)	8	39.6	40.3	44.0	43.4	43.6	39.5	34.2		32.5	39.6	81.8	<b>39.6</b>
WILL 95FI	FINCH	8	43.6	40.9	42.6	39.1	41.5	41.2	32.9		32.9	39.3	81.2	<b>39.3</b>
MON-DAK	MON-DAK(+)	8	41.1	40.5	44.0	39.8	40.3	39.8	32.4		32.2	38.8	80.1	<b>38.8</b>
CARDINAL	CARDINAL(+)	8	43.6	39.2	42.2	39.3	40.5	39.9	32.5		32.1	38.7	79.8	<b>38.7</b>
HYBRID 9049	HYBRID 9049(+)	5	42.8	34.6		34.1	35.3	33.6				36.1	74.0	<b>35.8</b>
Hybrid 200	HYBRID 200	5				38.5	36.6	35.2	30.7		28.4	33.9	68.7	<b>33.3</b>
Hybrid 446	HYBRID 446	5				39.5	37.0	35.6	28.4		27.8	33.7	68.3	<b>33.1</b>
Rubis Red	RUBIS RED	3						31.8	26.9		26.4	28.4	60.2	<b>29.1</b>
Baldy	BALDY	5				30.0	29.6	29.2	24.5		23.9	27.5	55.7	<b>27.0</b>
MEANS (For Entries Listed)			40.6	41.7	47.3	41.2	41.4	38.7	32.5		31.6			<b>38.2</b>
April-July Precip. (in.)			9.69	8.75	7.33	11.88	4.87	7.52	12.24	2.41	4.02	6.33	7.50	
Total Annual Precip. (in.)			14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	13.73	
Soil PAW (in.) to SD @ Planting			6.73	7.31	n/a	9.58	9.38	8.29	9.24	8.92	6.84	6.73	8.50	
Total Plant Available Water (in.)			16.42	16.06	7.33	21.46	14.25	15.81	21.48	11.33	10.86	13.06	15.15	
Soil NO3 (lbs.) to SD at Planting			115	99	35	78	58	115	25	53	92	116	89	
SD (Sampling Depth in Inches)			36	36	48	48	48	48	48	48	48	44	46	
Fertilizer Applied														
		(# N)	0	0	0	0	0	50	50	50	50	50	20	
		(# P <sub>2</sub> O <sub>5</sub> )	45	45	45	45	45	15	15	15	15	15	33	
		(# K <sub>2</sub> O)	0	0	0	0	0	0	0	0	0	0	0	
		(# S)	0	0	0	0	0	20	20	20	20	20	8	

Long-term check variety is Nutrasaff.

1/ + = Protected Variety, ++ = PVP Title 5 or Title 5 Pending.

2/ No harvest in 2017 due to poor stand and drought. No harvest in 2019 due to deer and bird damage.

3/ Percent of Nutrasaff oil % for the same data years as those in which a given entry was tested.

4/ 9-Yr Comparable Average = (x/y) \* z where x = average oil % of a given entry for years tested, y = average yield for Nutrasaff for the same years, and z = 9-Yr average oil % for the check variety Nutrasaff.