

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. 2009-2018.

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Content:

This report is intended to serve as a popularized 2018 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 20 percent of NARC Variety Testing Programs total research project effort on-station at Havre. The remaining 80 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, 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 103 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 2018. 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.

2018 Data:

It should be noted that 2018 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, 2018 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.

Although winter months of crop year 2018 were colder and wetter than normal, spring and summer months during the growing season resulted in drought conditions persisting across north central Montana. At Havre, annual growing season precipitation (9/1/17 through 8/31/18) was 13.15 inches, 1.1 inches higher than the average for all years since 1916 due to an abundance of winter snowfall. April 1 through July 31 precipitation was only 4.02 inches,

just 59 percent of the 103-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July totaled 1392, or 108 percent of the average for the last 68 years (1951-2018). The last spring frost was on May 14 and the first fall frost of 2018 was on September 28, resulting in 137 frost-free days. The minimum winter temperature was -33 degrees F on February 12, 2018. Overall, the 2017-2018 average crop year temperatures were very similar to the long-term average. The April through July growing season saw an average daily temperature of 57 degrees F, 0.75 degrees F lower than historical temperatures. July and August temperatures were also nearly identical to the long-term averages with the high for 2018 recorded on August 2 at 103 degrees F. There were 23 days with temperatures 90 degrees F or above, with only two 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, Daisen Fox, Marca Herron and Cordell King.

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Summary of climatic data by months for the 2017-2018 crop year (September to August) and averages for the period 1916-2018 at the Northern Agricultural Research Center. Havre, Montana.

Month Year	Sep 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Crop Year
Precipitation (inches)													Total
Current Year	1.08	0.95	0.66	1.90	0.20	2.59	1.25	0.24	1.10	2.50	0.18	0.50	13.15
Average (1916-2018)	1.16	0.69	0.44	0.46	0.43	0.34	0.54	1.00	1.84	2.54	1.43	1.18	12.05
Difference	-0.08	0.26	0.22	1.44	-0.23	2.25	0.71	-0.76	-0.74	-0.04	-1.25	-0.68	1.10
Mean Temperature (°F)													Average
Current Year	57.5	43.0	28.5	21.2	14.6	1.9	20.8	36.0	58.9	63.3	69.5	67.2	40.2
Average (1916-2018)	56.3	45.6	30.2	19.5	15.6	19.9	30.1	43.6	54.0	61.8	69.3	67.3	42.8
Difference	1.1	-2.7	-1.6	1.7	-1.1	-18.0	-9.3	-7.6	4.9	1.5	0.2	-0.1	-2.6

Last killing frost in spring*

2018 _____ May 14th (29.0°)
Ave. 1916-2018 _____ May 14th

First killing frost in fall*

2018 _____ September 28th (28.9°)
Ave. 1916-2018 _____ September 20th

Frost free period

2018 _____ 137 days
Ave. 1916-2018 _____ 130 days

Growing degree days (base 50)

May 14-Sept. 28, 2018 _____ 1930.1
May 1-Sept. 30, 2018 _____ 2111.7
Ave. 1951-2018 (May 1 - Sept. 30) _____ 2181.3

Maximum summer temperature _____ 102.6° F on August 2, 2018
Minimum winter temperature _____ -33.7° F on February 12, 2018

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

2018
INDIVIDUAL CROP EXPERIMENT IDENTIFICATION & DESCRIPTION RECORD
Agronomy and Livestock
Northern Agricultural Research Center
Have, Montana

Experiment No. *	Description	Crop	Ents	Reps	Plots	Loc-Field	Legal Desc	Leader	Sponsor	Cooperator
WINTER WHEAT (WW) INVESTIGATIONS										
ON-STATION										
18-3502-WW	Intrastate Cultivar Nursery	WW	49	3	147	A-3-4	33 32N 15E	Bruckner	MAES-MWBC	Lamb
18-1402-WW	Advanced Cultivar Nursery	WW	36	3	108	A-3-4	33 32N 15E	Bruckner	MAES-MWBC	Lamb
18-5802-WW	Sawfly Line Evaluation Nursery	WW	49	2	98	A-3-4	33 32N 15E	Bruckner	MAES-MWBC	Lamb
18-WQDS-WW	Winter Wheat Quality Drill Strips	WW	6	1	6	A-3-4	33 32N 15E	Bruckner	MAES-MWBC	Lamb
Sub-Totals:			4	140	359	6.59%	of Total Plot Inventory			
OFF-STATION										
18-3851-WW	Off-Station Cultivar Eval Nursery	WW	25	3	75	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
18-3853-WW	Off-Station Cultivar Eval Nursery	WW	25	3	75	Loma	21 27N 10E	Lamb	MWBC-MAES	McKeever Farm
18-5852-WW	Sawfly Line Evaluation Nursery	WW	49	2	98	Big Sandy	21 29N 11E	Lamb	MWBC-MAES	Works Farm
18-SR01-WW	v Single-Row Yield Eval Nursery	WW	198	1	198	Big Sandy	21 29N 11E	Bruckner	MAES-MWBC	Works Farm
18-SR02-WW	v Single-Row Line Eval Nursery	WW	1000	1	1000	Big Sandy	21 29N 11E	Bruckner	MAES-MWBC	Works Farm
18-3RSP-WW	v 3-Row Segregating Populations	WW	79	1	79	Big Sandy	21 29N 11E	Bruckner	MAES-MWBC	Works Farm
18-3952-WW	Prelim C Sawfly Line Evaluation	WW	49	2	98	Big Sandy	21 29N 11E	Bruckner	MAES-MWBC	Works Farm
Sub-Totals:			7	1425	1623	29.81%	of Total Plot Inventory			
SPRING WHEAT & DURUM (SW & DUR) INVESTIGATIONS										
ON-STATION										
18-3102-SW	Advanced Yield Nursery	SW	64	3	192	A-3-2	33 32N 15E	Talbert	MAES-MWBC	Lamb
18-9802-DUR	Montana Durum Cultivar Nursery	DUR	24	3	72	A-7-4	33 32N 15E	Giroux	MAES-MWBC	Lamb
18-3302-SW	Preliminary Yield Nursery	SW	81	3	243	A-3-2	33 32N 15E	Talbert	MAES-MWBC	Lamb
18-SWQAC-SW	Spring Wheat Quality Assessm't	SW	5	1	5	A-5-4	33 32N 15E	MWBC	Wht Qual Cncl	Lamb
18-SP02-SW	Spring Wheat Blend Quality Trial	SW	10	3	30	A-6-1	33 32N 15E	Stougaard	MAES-MWBC	Lamb
18-CG05-SW	SW World Collection Eval	SW	10	3	30	A-7-4	33 32N 15E	Budak	MAES-MFAC	Lamb
18-CG08-SW	SW World Collection Increase	SW	20	1	20	A-7-4	33 32N 15E	Budak	MAES-MFAC	Lamb
18-CG07-DUR	Durum Genotype Seed Increase	DUR	9	1	9	A-7-4	33 32N 15E	Budak	MAES-MFAC	Lamb
18-CG06-SW	SW Genotype Seed Increase	SW	12	1	12	A-7-4	33 32N 15E	Budak	MAES-MFAC	Lamb
Sub-Totals:			9	235	613	11.26%	of Total Plot Inventory			

Experiment No. *	Description	Crop	Ents	Reps	Plots	Loc-Field	Legal Desc	Leader	Sponsor	Cooperator
SPRING WHEAT & DURUM (SW & DUR) INVESTIGATIONS continued . . .										
OFF-STATION										
18-9951-SW	Off-Station Cultivar Eval Nursery	SW	22	3	66	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
18-9953-SW	Off-Station Cultivar Eval Nursery	SW	22	3	66	Chester	10 31N 05E	Lamb	MWBC-MAES	Kammerzell Farm
18-9955-SW	Off-Station Cultivar Eval Nursery	SW	22	3	66	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
18-9957-SW	Off-Station Cultivar Eval Nursery	SW	22	3	66	Loma	21 27N 10E	Lamb	MWBC-MAES	McKeever Farm
18-9851-DUR	Off-Station Cultivar Eval Nursery	DUR	24	3	72	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
18-9853-DUR	Off-Station Cultivar Eval Nursery	DUR	24	3	72	Chester	10 31N 05E	Lamb	MWBC-MAES	Kammerzell Farm
18-9855-DUR	Off-Station Cultivar Eval Nursery	DUR	24	3	72	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
Sub-Totals:			7	160	480	8.82%	of Total Plot Inventory			
SPRING BARLEY (SB) INVESTIGATIONS										
ON-STATION										
18-2102-SB	Intrastate Cultivar Eval Nursery	SB	49	3	147	A-3-1	33 32N 15E	Sherman	MAES-MWBC	Lamb
18-3102-SB	Early Yield Evaluation Nursery	SB	64	3	192	A-3-1	33 32N 15E	Sherman	MAES-MWBC	Lamb
18-2502-SB	e Hulless Intrastate Eval Nursery	SB	16	3	48	A-3-1	33 32N 15E	Sherman	MAES-MWBC	Lamb
Sub-Totals:			3	129	387	7.11%	of Total Plot Inventory			
SAFFLOWER INVESTIGATIONS										
ON-STATION										
18-7702-SAF	Cultivar Evaluation Nursery	SA	12	3	36	A-7-3	33 32N 15E	Bergman	NDSU-WREC	Lamb
Sub-Totals:			1	12	36	0.66%	of Total Plot Inventory			
BRASSICA INVESTIGATIONS										
ON-STATION										
18-CN02-CN	Statewide Canola Trial	CN	15	4	60	A-7-3	33 32N 15E	Fordyce	Var. Industry	Lamb
Sub-Totals:			1	15	60	1.10%	of Total Plot Inventory			
PULSE CROP (PC) INVESTIGATIONS										
ON-STATION										
18-PC01-PC	Statewide Pea Trial	PC	45	4	180	A-7-2	33 32N 15E	Chen	MAES-EARC	Lamb
18-PC02-PC	Statewide Lentil Trial	PC	17	4	68	A-7-1	33 32N 15E	Chen	MAES-EARC	Lamb
18-PC08-PC	WA Crop Imp. Yellow Pea	PC	19	3	57	A-7-2	33 32N 15E	McGee	WA Crop Imp.	Lamb
18-PC03-PC	Western Regional Pea Trial	PC	8	3	24	A-7-2	33 32N 15E	Vandemark	USDA	Lamb
18-PC04-PC	Western Regional Lentil Trial	PC	7	3	21	A-7-1	33 32N 15E	Vandemark	USDA	Lamb
18-1851-PC	Red Lentil Prelim Trial	PC	30	4	120	A-7-1	33 32N 15E	McPhee	MAES-MSU	Lamb
18-1852-PC	Green Lentil Prelim Trial	PC	25	4	100	A-7-1	33 32N 15E	McPhee	MAES-MSU	Lamb
Sub-Totals:			7	151	570	10.47%	of Total Plot Inventory			

Experiment No. *	Description	Crop	Ents	Reps	Plots	Loc-Field	Legal Desc	Leader	Sponsor	Cooperator
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OTHER CROP (OC) INVESTIGATIONS

ON-STATION

18-OC20-SO	Sorghum Seeding Date/Rate Trial	SR	24	6	144	A-7-4	33 32N 15E	Lamb	MAES-NARC	Lamb
Sub-Totals:		1	24		144	2.64%	of Total Plot Inventory			

FORAGE RESEARCH (FR) INVESTIGATIONS

ON-STATION

18-FR02-FR	Winter Cereal Forage Trial	FR	19	3	57	A-3-3	33 32N 15E	Carr	MAES-CARC	Lamb/Boss
18-FR03-FR	Spring Cereal Forage Trial	FR	10	4	40	A-3-1	32 32N 15E	Carr	MAES-CARC	Lamb/Boss
18-FR05-FR	Prelim Spring Barley Forage	FR	16	3	48	A-3-1	33 32N 15E	Sherman	MAES-MSU	Lamb/Boss
Sub-Totals:		3	45		145	2.66%	of Total Plot Inventory			

NUTRIENT RESEARCH (NR) INVESTIGATIONS

ON-STATION

18-NM03-SW	Mosaic SW MicroNutrients	SW	12	4	48	B-2-1	32 32N 15E	Mann	Mosaic	Lamb
18-CG01-SW	Foliar Zinc on Spring Wheat	SW	24	3	72	A-3-2	33 32N 15E	Budak	MAES-MFAC	Lamb
18-CG03-SW	Soil & Foliar Zinc on Spr. Wheat	SW	48	3	144	A-3-2	33 32N 15E	Budak	MAES-MFAC	Lamb
18-CG18-WW	Foliar Zinc on Winter Wheat	WW	24	3	72	A-3-4	33 32N 15E	Budak	MAES-MFAC	Lamb
18-CG04-SW	Zinc Treatments on Spr. Wheat	SW	11	4	44	A-7-4	33 32N 15E	Budak	MAES-MFAC	Lamb
18-CG02-DUR	Foliar Zinc on Durum	DUR	18	3	54	A-7-4	33 32N 15E	Budak	MAES-MFAC	Lamb
Sub-Totals:		6	137		434	7.97%	of Total Plot Inventory			

PEST MANAGEMENT (PM) INVESTIGATIONS

ON-STATION

18-PM34-WW	WW Seeding Date/Rate/Variety	WW	24	4	96	An-3-5	33 32N 15E	Burrows	Industry-MAES	Lamb
18-PM35-SW	SW Seeding Date/Rate/Variety	SW	24	4	96	An-3-5	33 32N 15E	Burrows	Industry-MAES	Lamb
18-PM37-SW	Spring Wheat Insecticide	SW	3	6	18	An-3-6	33 32N 15E	Burrows	Industry-MAES	Lamb
18-PM36-WW	Wheat Curl Mite Tolerant WW	WW	4	4	16	An-3-5	33 32N 15E	Bruckner	MAES-MWBC	Lamb
Sub-Totals:		4	55		226	4.15%	of Total Plot Inventory			

PEST MANAGEMENT (PM) INVESTIGATIONS

OFF-STATION

18-PM42-SW	Thimet Insecticide on Reeder SW	SW	6	6	36	Big Sandy	29 29N 11E	Weaver	MAES-MSU	Edwards Farm
18-PM44-SW	Insecticide for WSF on SW	SW	3	12	36	Big Sandy	29 29N 11E	Weaver	MAES-MSU	Edwards Farm
18-PM43-SW	SW Tiller and Spike	SW	4	5	20	Big Sandy	21 29N 11E	Talbert/Weaver	MAES-MSU	Works Farm
18-PM45-SW	Products for SW Stem Solidness	SW	6	6	36	Big Sandy	21 29N 11E	Jarek	StollerUSA	Works Farm
18-PM10-WW	Bayer Sawfly Cutting WW	WW	40	3	120	Big Sandy	21 29N 11E	Gautam	BASF	Works Farm
18-PM11-SW	Bayer Sawfly Cutting SW	SW	40	3	120	Big Sandy	21 29N 11E	Gautam	BASF	Works Farm
18-PM60-PM	Hill Plots	SW				Big Sandy	29 29N 11E	Talbert/Weaver	MAES-MSU	Edwards Farm
Sub-Totals:		7	99		368	6.76%	of Total Plot Inventory			

2018 SUMMARY: Project Inventory - (Plots Established)

TOTALS - AGRONOMY & LIVESTOCK PROJECTS 60 Experiments or Trials
2627 Entries in 5445 Plots
3880 Plots for Harvest

GEOGRAPHIC DISTRIBUTION OF PLOT WORK: (by plot count only, not by resources expended. Demos not included.)

ON-STATION = 54.62%
OFF-STATION = 45.38%

(Percent of TOTAL OFF-STATION by County): (by plot count only, not by resources expended. Demos not included.)

* Blaine County = 8.62% 1-Loc: WW, SW, DUR, Vars
* Chouteau County = 80.21% 2-Loc: WW & SW Vars & Sawfly, Multi-specie Hill Plots, WW & SW Inse
* Hill County = 0.00% 1-Loc: WW Sawfly & WW Sawfly Insecticide
* Liberty County = 5.58% 1-Loc: SW, DUR Vars
* Phillips County = 5.58% 1-Loc: SW, DUR Vars + 3 Spring Crop Demos by M.Manoukian

* Denotes counties traditionally served by NARC-Agronomy (Current off-station plot inventory for Chouteau County is abnormally high due to extensive cooperative wheat stem sawfly work at the Works' farm near Big Sandy. This site alone had 33.8% of NARC-Agronomy's total inventory of plots managed for 2018, but such is somewhat misleading due to all the breeder and entomology observation plots there.

Note: A code letter after an experiment number signifies that the trial listed was not carried through to final report status due to one or more conditions outline below. Where more than one condition was involved, the code used denote the factor most responsible.

- c = experiment planned, but CANCELLED 'prior' to actual plot establishment (proposal rejection or other reasons)
- d = severe DROUGHT stress not associated with treatment differences
- e = stand ESTABLISHMENT problems not associated with treatment differences
- f = FROST or winter injury not associated with treatment differences
- g = GRANT proposal submitted / preliminary establishment only - subject to cancellation if funding not received
- h = HAIL injury
- I = INSECT injury
- n = NATURAL calamity to include weather effects other than drought, freezing or hail
- o = OTHER (human error - staff or cooperater, equipment malfunction, animal damage, vandalism, etc.)
- p = PATHOGEN effects not associated with treatment differences
- r = Grant proposal REJECTED 'after' significant establishment effort put forth - ie, continued in reduced format
- s = SPRAY damage not associated with treatment differences
- t = proposed grant project TERMINATED (after preliminary establishment) due to proposal rejection
- u = undue, non-partitionable VARIABILITY
- w = WEED infestation effects not associated with treatment differences
- v = VIEW only - no formal data collection or analysis
- x = plots in place, from previous endeavor - inactive current year, but retained for future viewing/reference

2016-2018
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		
		2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
On-Station	Winter Wheat*	4	4	4	140	140	140	359	359	359	10.8%	9.7%	8.6%
Off-Station	Winter Wheat*	6	6	7	214	196	148	363	345	346	10.9%	9.3%	8.3%
On-Station	Spring Wheat and Durum	4	5	9	163	186	235	483	554	613	14.6%	14.9%	14.7%
Off-Station	Spring Wheat and Durum*	7	7	7	145	128	160	435	384	480	13.1%	10.3%	11.5%
On-Station	Spring Barley	3	3	3	129	129	129	387	387	387	11.7%	10.4%	9.3%
On-Station	Safflower	2	1	1	34	14	12	102	42	36	3.1%	1.1%	0.9%
On-Station	Brassica sp.	5	3	1	57	54	15	228	216	60	6.9%	5.8%	1.4%
On-Station	Pulse Crops	7	6	7	133	133	151	424	456	570	12.8%	12.3%	13.7%
On-Station	Other Crops	4	2	1	36	31	24	112	165	144	3.4%	4.4%	3.5%
On-Station	Forage	2	2	3	31	38	45	93	114	145	2.8%	3.1%	3.5%
On-Station	Nutrient Research	1	2	6	16	34	137	64	112	434	1.9%	3.0%	10.4%
On-Station	Pest Management	2	6	4	61	118	55	183	451	226	5.5%	12.1%	5.4%
Off-Station	Pest Management*	4	6	7	24	34	99	84	132	368	2.5%	3.6%	8.8%
Grand Total		51	53	60	1183	1235	1350	3317	3717	4168	100.0%	100.0%	100.0%
Harvested								3202	3266	3880	96.5%	87.9%	93.1%
On-Station Plots								2435	2856	2974	73.4%	76.8%	71.4%
Off-Station Plots								882	861	1194	26.6%	23.2%	28.6%

* Winter Wheat, Spring Wheat & Pest Management:

2016: 1223 single row plots along with individual hill plots are no longer included in count

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

TABLE 1. Intrastate Winter Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2018. (Exp# 18-3502-WW)

Cultivar/Line	Release/Pedigree	Stand %	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	98.5	163.0	25.3	72.5	62.2	13.8	355	5.5
Bearpaw	Montana, 2011	94.3	160.0	21.7	57.9	62.8	14.9	345	2.4
Brawl CLP	Colorado Wheat Res. Fdn., 2011	97.3	153.7	27.2	57.6	64.3	14.0	341	6.6
Byrd CL Plus	Colorado, 2018	93.0	154.9	25.0	58.8	63.4	12.6	334	3.6
Decade	Montana/North Dakota, 2010	94.9	158.4	25.8	53.6	62.6	14.7	366	4.1
FourOsix	Montana, 2018 (MT1465)	94.1	158.0	25.1	60.3	62.6	14.9	354	3.6
Incline AX	Colorado Wheat Res. Fdn., 2017	97.4	157.7	25.0	63.7	62.6	12.5	341	2.8
Judee	Montana, 2011	99.9	158.9	24.6	55.7	63.6	15.5	346	5.0
Keldin	WestBred, 2011	97.7	159.4	25.4	68.6	63.1	13.7	365	7.2
Langin	Colorado Wheat Res. Fdn., 2016	94.8	153.6	22.4	62.3	63.2	12.9	346	1.9
LCS Chrome	Limagrain Cereal Seeds, 2016	90.1	158.6	23.5	54.5	63.0	14.6	346	7.6
LCS Jet	Limagrain Cereal Seeds, 2015	96.4	160.4	21.8	59.5	60.7	13.8	340	5.1
LCS Link	Limagrain Cereal Seeds, 2017	90.1	156.7	24.3	49.5	63.4	14.9	355	6.9
LCS Zoom	LCS Zoom	94.9	156.3	23.2	53.8	60.9	13.8	312	6.9
Loma	Montana, 2016	97.1	162.6	23.4	60.5	62.6	14.4	345	4.1
Long Branch	Dyna-Gro Wheat, 2015	97.6	154.3	23.6	64.6	63.2	12.2	336	3.7
Northern	Montana, 2015	97.1	160.0	24.3	56.5	62.3	14.2	385	3.9
NSA10-2196	Limagrain Cereal Seeds exp. line	91.6	159.0	23.7	56.2	60.5	13.3	341	7.7
Oahe	South Dakota, 2016	100.3	155.4	26.8	49.2	63.4	14.3	354	3.0
PSB13NEDH-7-140	Limagrain Cereal Seeds exp. line	95.9	156.7	26.0	48.9	62.2	16.1	369	4.8
Ray	Montana, 2018 (MTF1432)	99.6	162.7	29.9	60.6	59.8	14.3	370	15.2
SY 517 CL2	Syngenta (AgriPro), 2017	97.6	154.6	25.2	51.3	64.1	14.1	343	1.6
SY Clearstone 2CL	Montana/Syngenta, 2012	93.5	160.7	27.5	61.8	61.4	14.3	378	10.6
SY Legend CL2	Syngenta, 2018	93.6	156.0	24.7	55.0	63.2	14.0	373	6.7
SY Monument	Syngenta (AgriPro), 2015	91.1	158.0	24.2	59.3	62.4	13.0	339	3.4
SY Sunrise	Syngenta (AgriPro), 2015	94.6	156.6	21.3	61.0	63.8	12.8	354	2.6
SY Wolf	Syngenta (AgriPro), 2010	96.3	155.7	23.8	59.7	63.4	14.2	330	3.8
Warhorse	Montana, 2013	98.9	159.9	23.3	57.0	62.5	14.9	378	0.2
WB4483	WestBred, 2016	95.9	161.7	24.2	61.2	63.0	14.8	368	3.3
WB4575	WestBred, 2016	95.5	158.6	23.3	61.7	64.3	14.6	363	2.2
WB4614	WestBred, 2013	93.7	160.7	23.7	56.9	62.9	14.7	365	7.0
WB4623CLP	WestBred, 2015	95.1	160.0	22.7	52.7	62.1	14.8	351	7.5
Yellowstone	Montana 2005	97.8	161.0	26.8	61.9	61.7	14.2	376	7.7
MT1265	Yellowstone*4/KS96WGRC40 (Lr41, wcm)	89.8	162.3	23.5	58.0	61.7	14.5	373	13.1
MT1547	Yellowstone/MT0684	98.5	158.6	25.9	59.4	62.7	14.1	351	3.7
MT1563	Yellowstone*2/PI640431	99.2	161.0	25.8	61.0	62.0	14.0	362	8.7
MT1564	Yellowstone*2/PI640431	98.1	156.0	26.9	61.2	63.6	13.8	353	2.3
MT16101	MT08185//YLL*2/PI640431/3/Promontory/3	96.6	156.0	26.0	55.8	62.5	14.5	354	2.2
MT1642	Yellowstone/Madsen//Yellowstone	97.4	164.4	27.2	60.1	60.6	15.3	372	12.7
MT1683	Yellowstone(L)*2/CDC Buteo	93.6	159.7	26.2	61.5	61.4	14.6	369	7.7

TABLE 1. Intrastate Winter Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2018. (Exp# 18-3502-WW)

Cultivar/Line	Release/Pedigree	Stand %	1/	2/	3/	4/	5/		
			Head Date	Plant HT Inches	Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	FN Sec	Sawfly %
MT1687	Yellowstone(L)*2/(OK00611W, OK Rising sit	96.9	156.0	26.4	58.7	63.1	14.4	383	8.9
MT1688	Yellowstone(L)*2/(OK00611W, OK Rising sit	98.1	156.0	26.2	60.0	63.2	14.4	377	6.9
MT1695	Yellowstone*2/PI640431	95.4	156.1	26.5	56.5	62.6	13.9	343	6.1
MTCS1601	MTS0531/7/MTS0532/6/96X17E69/3/MTCL	96.8	159.3	25.1	55.5	62.9	14.7	358	4.2
MTF1435	MT08186//Yellowstone(L)*2/98X168E1	96.6	161.4	32.1	55.0	60.6	14.2	358	7.1
MTF1631	MT08184*3//YLL(L)*2/98X168E1	97.8	160.3	29.1	57.5	62.0	14.4	367	8.4
MTS1588	MT0598/98X366E29-1	93.5	160.0	22.2	62.7	62.7	14.3	349	1.9
MTV1681	Yellowstone*2//WillowCreek/MT06129	96.7	158.7	25.6	61.7	62.1	14.1	368	4.3
MTW1491	MT08189//MT08187/(MTW08166, WB3768	95.0	159.7	25.9	60.5	62.4	14.0	372	10.7
EXPERIMENTAL MEANS		95.8	158.6	25.1	58.6	62.5	14.2	357	5.7
LSD (0.05)		ns	1.6	2.2	7.3	0.4	0.7	7.3	5.7
C.V.%		4.5	0.6	5.3	7.1	0.4	2.7	1.3	6.4
P-VALUE (Entries)		0.5383	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0036

Bold Indicates highest yielding entry based on Fisher's Protected LSD at the 0.05 probability level.

Bold Indicates cultivars yielding equal to the highest yielding entry based on Fisher's Protected LSD at the 0.05 probability level.

1/ No. of Days from January 1 (159 = June 8).

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 (18-3502-WW)

Seeding Date:	September 21, 2017
Harvest Date:	July 24, 2018
Fertility:	125-20-10-10 side banded
System:	No-till
Herbicide:	Bromac-16oz/ac, Affinity-.6oz/ac
Insecticide:	none
Previous Crop:	Chemical Fallow - Barley
Precipitation:	11.45" (seeding to harvest)

TABLE 2. Nine-Year Yield Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2009-2018. (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/
		2009	2010	2011 3/	2012	2013	2014	2015	2016	2017	2018			
ACS55017 KELDIN (P+)	5						61.5	54.8	107.8	56.2	68.6	69.8	119.7	69.3
04BC74-2 SY MONUMENT (P+)	4							61.0	103.3	53.0	59.3	69.1	117.8	68.1
MT1465 FOUROSIX (++)	3								98.7	50.4	60.3	69.8	115.3	66.7
BC01007-7 SY WOLF (P+)	7				56.2	70.4	69.4	56.5	97.8	53.2	59.7	66.2	111.8	64.7
BZ9W07-2034 WB4614 (P+)	4							55.9	97.5	50.0	56.9	65.1	110.8	64.1
06BC796#68 SY SUNRISE (P+)	4							55.5	92.8	50.8	61.0	65.0	110.7	64.1
MT00159 YELLOWSTONE (+)	8	39.7	70.7		52.1	68.2	64.1	62.4	103.6		61.9	65.3	110.4	63.9
MT0978 NORTHERN (+)	7				54.8	73.1	60.5	56.9	103.8	51.6	56.5	65.3	110.4	63.9
MT08172 COLTER (+)	5				70.7	56.9	60.9	60.9	94.7			68.8	109.8	63.5
MTCL1077 SY CLEARSTONE 2CL (P+)	7				59.6	75.4	57.3	53.5	98.4	48.5	61.8	64.9	109.7	63.5
BZ9W09-2212 WB4483 (P+)	3								87.6	49.1	61.2	66.0	109.0	63.1
MTW08168 WB3768 (P+,HW)	5				52.1	68.3	53.7	61.1	100.6			67.2	107.1	62.0
LE1911 BROADVIEW (P)	6		73.8		52.8	67.2	58.3	66.9	83.4			67.1	105.2	60.9
BZ9W09-2075 WB4575 (P+)	3								75.8	52.8	61.7	63.4	104.8	60.7
MTS0713 JUDEE (+)(saw fly tol)	9	42.4	72.2		48.9	70.6	61.5	56.9	85.2	48.9	55.7	60.3	104.1	60.3
S94-4 CDC FALCON (P+)	7	42.1	72.5		53.3	55.9	58.7	64.4	87.3			62.0	103.4	59.8
CO06052 BRAWL CL PLUS (+)	4							47.2	89.7	43.8	57.6	59.6	101.5	58.7
MTS1224 LOMA (++)	5						50.5	52.9	80.8	48.0	60.5	58.5	100.3	58.1
MT0552 DECADE (+)	9	37.3	69.3		55.8	66.9	56.7	53.3	80.7	47.3	53.6	57.9	100.0	57.9
MTS0808 WARHORSE (+)(saw fly res)	7				51.7	65.1	47.9	57.7	89.8	43.8	57.0	59.0	99.7	57.7
BZ9WM09- 1663 WB4623CLP (P+)	4							52.9	84.9	42.4	52.7	58.2	99.1	57.4
BZ9W05-2043 WB-QUAKE (P+)	6				48.4	70.0	51.2	55.8	87.4	43.3		59.3	98.7	57.1
MTS0721 BEARPAW (+)(saw fly tol)	9	38.4	67.1		55.4	64.0	51.8	60.4	64.1	42.9	57.9	55.8	96.4	55.8
P1593889 RAMPART (saw fly res)	7	37.8	59.9		46.6	62.3	57.2	56.8	81.1			57.4	95.7	55.4
BZ9WM07- 1516 WB4059CLP (P+)	3						56.9	47.4	74.4			59.6	93.7	54.2
ND9257 JERRY	7	38.3	67.6		44.2	66.2	51.3	51.6	69.9			55.6	92.7	53.6
MEANS (For Entries Listed)		39.4	69.1		53.5	66.7	57.2	56.6	89.3	48.7	59.1			60.9
April-July Precip. (in.)		6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)		12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting		9.34	9.43	9.66	n/a	9.12	n/a	9.43	9.95	9.26	8.61	9.35		
Total Plant Available Water (in.)		15.63	19.12	18.41	7.33	22.40	4.87	16.95	22.19	11.67	12.63	15.12		
Soil NO ₃ (lbs.) to SD at Planting		172	204	32	60	59	48	37	113	65	272	106		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	48	48	48	48		
Fertilizer Applied														
	(# N)	70	70	70	100	100	100	100	100	100	100	125	94	
	(# P ₂ O ₅)	40	40	40	20	20	20	20	20	20	20	20	26	
	(# K ₂ O)	25	25	25	10	10	10	10	10	10	10	15		
	(# S)	0	0	0	0	0	0	0	0	10	10	2		

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. 2009-2018. (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/
			2009	2010	2011 3/	2012	2013	2014	2015	2016	2017	2018			
CO06052	BRAWL CL PLUS (+)	4							62.1	61.0	62.6	64.3	62.5	102.6	62.5
BZ9W09-2075	WB4575 (P+)	3								59.3	62.9	64.3	62.2	102.5	62.2
06BC796#68	SY SUNRISE (P+)	4							62.2	61.0	62.1	63.8	62.3	102.2	62.3
BC01007-7	SY WOLF (P+)	7				60.7	58.4	62.2	62.2	61.4	63.1	63.4	61.6	102.0	61.6
MT1465	FOUROSIX (++)	3								59.9	62.5	62.6	61.7	101.6	61.7
BZ9W07-2034	WB4614 (P+)	4							61.4	61.1	62.1	62.9	61.9	101.6	61.9
ACS55017	KELDIN (P+)	5							61.1	61.7	61.2	62.2	63.1	101.5	61.9
BZ9W09-2212	WB4483 (P+)	3									59.1	62.3	63.0	101.2	61.4
BZWM07-1663	WB4623CLP (P+)	4							60.9	61.7	62.0	62.1	61.7	101.2	61.7
MTW08168	WB3768 (P+,HW)	5				59.0	60.2	61.5	60.5	60.8			60.4	101.2	60.4
MTS0713	JUDEE (+)(saw fly tol)	9	62.2	61.0		56.9	60.2	61.8	61.8	61.3	62.9	63.6	61.3	100.9	61.3
MT0978	NORTHERN (+)	7				58.5	59.6	61.0	62.1	59.2	62.2	62.3	60.7	100.5	60.7
BZ9WM07-1516	WB4059CLP (P+)	3							60.1	61.6	59.4		60.4	100.4	60.4
MT08172	COLTER (+)	5				58.7	59.4	61.3	60.9	59.4			59.9	100.4	59.9
04BC74-2	SY MONUMENT (P+)	4							60.9	59.6	61.5	62.4	61.1	100.3	61.1
BZ9W05-2043	WB-QUAKE (P+)	6				58.8	58.0	60.7	60.7	60.0	62.7		60.1	100.2	60.1
MTS0808	WARHORSE (+)(saw fly res)	7				57.6	59.0	61.1	60.6	60.4	62.2	62.5	60.5	100.1	60.5
MTS1224	LOMA (++)	5							60.5	61.0	58.6	62.1	62.6	100.1	61.0
MT0552	DECADE (+)	9	61.5	62.3		59.7	58.6	61.0	61.6	57.8	61.7	62.6	60.7	100.0	60.7
S94-4	CDC FALCON (P+)	7	61.8	61.5		59.3	58.7	60.8	60.2	59.8			60.3	99.9	60.3
MT00159	YELLOWSTONE (+)	8	61.7	61.2		58.1	59.3	60.7	60.9	59.4		61.7	60.4	99.6	60.4
P1593889	RAMPART (saw fly res)	7	61.3	60.4		58.7	57.9	61.0	59.6	60.8			60.0	99.4	60.0
MTCL1077	SY CLEARSTONE 2CL (P+)	7				57.1	58.2	60.8	60.9	59.5	62.0	61.4	60.0	99.3	60.0
MTS0721	BEARPAW (+)(saw fly tol)	9	61.1	61.4		58.8	57.6	60.6	60.6	57.3	61.5	62.8	60.2	99.1	60.2
LE1911	BROADVIEW (P)	6				58.2	57.7	60.3	60.0	59.4			59.4	98.8	59.4
ND9257	JERRY	7	60.5	61.1		57.7	57.5	60.1	60.2	57.7			59.2	98.2	59.2
MEANS (For Entries Listed)			61.5	61.2		58.5	58.7	60.9	61.1	59.8	62.3	62.9			60.9
April-July Precip. (in.)			6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)			12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting			9.34	9.43	9.66	n/a	9.12	n/a	9.43	9.95	9.26	8.61	9.35		
Total Plant Available Water (in.)			15.63	19.12	18.41	7.33	22.40	4.87	16.95	22.19	11.67	12.63	15.12		
Soil NO ₃ (lbs.) to SD at Planting			172	204	32	60	59	48	37	113	65	272	106		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	48	48	48	48	48		
Fertilizer Applied															
(# N)			70	70	70	100	100	100	100	100	100	100	125	94	
(# P ₂ O ₅)			40	40	40	20	20	20	20	20	20	20	20	26	
(# K ₂ O)			25	25	25	10	10	10	10	10	10	10	15		
(# S)			0	0	0	0	0	0	0	0	10	10	2		

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. 2009-2018. (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/
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
BZ9W09-2075 WB4575 (P+)	3								0.0	0.0	2.2	0.7	42.9	1.1
MTS0808 WARHORSE (+)(saw fly res)	8			1.0	2.3	2.3	1.0	2.0	0.0	0.3	0.2	1.1	50.1	1.3
P1593889 RAMPART (saw fly res)	8	1.0	3.7	1.0	0.0	3.7	1.0	1.0	0.0			1.4	53.7	1.4
BZ9W09-2212 WB4483 (P+)	3								0.0	0.0	3.3	1.1	66.2	1.7
MT1465 FOUROSIX (++)	3								0.0	0.3	3.6	1.3	77.4	2.0
MTS0721 BEARPAW (+)(saw fly tol)	10	4.0	2.3	1.0	2.5	5.3	1.0	2.3	0.0	0.7	2.4	2.1	82.1	2.1
MTS0713 JUDEE (+)(saw fly tol)	10	4.0	4.0	4.0	2.1	5.3	1.0	0.7	0.0	0.0	5.0	2.6	100.0	2.6
BZ9WM07-1516 WB4059CLP (P+)	4			3.7			1.0	1.0	0.0			1.4	100.6	2.6
06BC796#68 SY SUNRISE (P+)	4							3.7	0.0	0.7	2.6	1.7	121.7	3.2
BZ9W05-2043 WB-QUAKE (P+)	7			2.3	4.3	3.7	5.0	0.7	0.0	0.3		2.3	123.8	3.2
04BC74-2 SY MONUMENT (P+)	4							3.7	0.0	0.3	3.4	1.8	129.2	3.4
MTS1224 LOMA (++)	5						2.3	2.3	0.0	0.3	4.1	1.8	135.9	3.6
MT0978 NORTHERN (+)	8			2.3	9.3	6.7	2.3	2.3	0.0	0.0	3.9	3.3	147.6	3.9
CO06052 BRAWL CL PLUS (+)	4							1.0	0.0	1.0	6.6	2.2	151.5	4.0
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	4.9
S94-4 CDC FALCON (P+)	8	13.3	7.0	1.0	6.9	5.0	1.0	6.7	0.0			5.1	193.7	5.1
BZ9W07-2034 WB4614 (P+)	4							3.7	0.0	0.7	7.0	2.8	199.0	5.2
LE1911 BROADVIEW (P)	7		8.7	3.7	9.1	10.0	2.3	2.3	0.0			5.2	211.2	5.5
MT0552 DECADE (+)	10	16.7	3.7	6.7	9.5	8.3	1.0	13.3	0.0	1.0	4.1	6.4	246.1	6.4
MT00159 YELLOWSTONE (+)	9	23.3	11.7	5.3	8.9	10.0	2.3	2.3	0.0		7.7	7.9	273.6	7.2
MT08172 COLTER (+)	6			6.7	10.7	13.3	1.0	8.3	0.0			6.7	305.9	8.0
BZWM07-1663 WB4623CLP (P+)	4							10.0	0.0	0.0	7.5	4.4	306.9	8.0
MTCL1077 SY CLEARSTONE 2CL (P+)	7				11.0	13.3	2.3	11.7	0.0	0.0	10.6	7.0	345.9	9.0
ACS55017 KELDIN (+)	5						2.3	15.0	0.0	0.7	7.2	5.0	375.8	9.8
MTW08168 WB3768 (P+,HW)	6			5.3	18.0	15.0	3.7	13.3	0.0			9.2	422.1	11.0
ND9257 JERRY	8	40.0	28.3	5.3	14.2	10.0	2.3	3.7	0.0			13.0	491.8	12.9
MEANS (For Entries Listed)		14.6	8.7	3.7	7.6	8.0	2.0	5.2	0.0	0.4	4.7			5.0
April-July Precip. (in.)		6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)		12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting		9.34	9.43	9.66	n/a	9.12	n/a	9.43	9.95	9.26	8.61	9.35		
Total Plant Available Water (in.)		15.63	19.12	18.41	7.33	22.40	4.87	16.95	22.19	11.67	12.63	15.12		
Soil NO ₃ (lbs.) to SD at Planting		172	204	32	60	59	48	37	113	65	272	106		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	48	48	48	48		
Fertilizer Applied	(# N)	70	70	70	100	100	100	100	100	100	125	94		
	(# P ₂ O ₅)	40	40	40	20	20	20	20	20	20	20	26		
	(# K ₂ O)	25	25	25	10	10	10	10	10	10	10	15		
	(# S)	0	0	0	0	0	0	0	0	10	10	2		

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. 2018. (Exp# 18-3102-SW)

ID	Cultivar or Selection	Stand %	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
WSCIA	ALUM	96.2	173.0	27.1	39.2	60.1	15.9	0.3
PI 633974	CHOTEAU	94.4	171.3	25.1	36.6	59.8	16.1	0.3
WB 9879 CLP	CHOTEAU*3/CHOTEAU/IMI8134	95.8	172.3	26.3	43.5	59.7	16.4	0.0
BZ 996434	CORBIN	93.0	169.7	28.3	40.8	60.7	16.7	0.0
PI 660981	DUCLAIR	93.0	169.0	24.8	33.9	59.8	15.9	0.3
PI 671855	EGAN	97.2	172.0	28.0	38.6	57.2	17.4	2.0
CI 13596	FORTUNA	94.7	170.7	32.6	37.6	59.2	15.4	0.7
WF 181	HRS 3419	93.0	175.3	26.9	37.5	58.4	16.6	0.7
WF 162	HRS 3504	93.3	172.3	26.8	42.3	58.0	15.4	0.7
WF 161	HRS 3616	90.9	172.7	25.9	42.7	59.9	17.0	0.7
PI 676978	LANNING	93.6	172.0	29.7	44.6	58.4	16.0	0.3
LIMAGR 181	LCS CANNON	97.2	167.7	24.9	36.1	62.9	16.3	3.3
LIMAGR 143	LCS PRO	95.4	170.3	30.0	39.0	60.0	16.2	0.7
LIMAGR 171	LCS REBEL(LNR 13-0594)	93.0	169.0	29.1	36.3	61.3	16.4	2.3
PI 574642	MCNEAL	88.7	172.3	30.9	41.1	57.5	15.8	0.3
PI 679964	NS PRESSER CLP	96.2	174.7	30.5	45.7	58.8	15.2	0.3
ND 695	REEDER	98.6	171.7	29.3	44.6	59.7	15.8	2.3
AGRIPR 141	SY INGMAR	98.9	170.3	27.1	44.2	61.7	15.7	2.3
AGRIPR 161	SY Rockford	97.9	171.3	27.5	44.5	59.9	15.5	1.0
AGRIPR 151	SY Valda	95.4	172.0	26.6	42.7	59.8	16.1	2.7
CI 10003	THATCHER	99.3	174.3	37.3	34.5	55.5	16.9	3.7
PI 642366	VIDA	91.9	172.3	27.3	44.4	59.9	15.0	0.3
BZ 92413R	WB GUNNISON	90.5	172.0	25.9	36.3	60.4	15.3	0.0
MT 1451	MT0827/09SR27	95.8	170.7	26.1	39.6	59.8	15.8	0.3
MT 1509	MT1002/MT1034	97.2	173.3	26.8	41.1	58.8	15.7	0.0
MT 1601	DUCLAIR/AC BARRIE	97.9	169.0	30.0	44.2	59.3	16.1	2.7
MT 1617	CHOTEAU/NICK//MT1103	94.8	173.3	27.5	41.9	57.9	16.4	0.0
MT 1621	MT1148/MT1133	93.7	168.7	28.1	45.1	61.0	15.9	0.0
MT 1625	MT1148/MT1133	98.3	169.3	26.1	36.2	61.6	17.0	1.0
MT 1653	MT1167/MT1172	96.9	172.3	29.3	44.3	60.1	15.1	0.3
MT 1673	Duclair x McNeal/Glupro, +, fam 72-17	98.6	169.0	25.3	33.9	59.4	16.9	0.3
MT 1711	12F5 2124/12F5 1215	90.6	172.3	23.7	37.9	59.9	16.3	0.3
MT 1713	MT1274/12F5 1215	96.1	167.0	23.4	37.9	62.3	15.7	2.0
MT 1714	MT1274/12F5 827	95.8	170.0	24.3	42.7	61.1	16.1	0.0
MT 1716	MT1274/RB07	96.2	168.3	27.0	44.0	61.2	15.6	0.7
MT 1719	12F5 827/12F5 2124	96.8	169.0	27.3	37.3	60.4	16.6	0.3
MT 1729	12SR93/CDC OSLER	88.1	169.0	29.9	36.0	58.7	16.6	1.0
MT 1731	12F5 827/RB07	98.9	168.7	27.3	40.4	58.4	16.5	2.0
MT 1732	MT1253/12F5 827	92.6	169.3	30.7	38.9	61.0	16.1	2.0
MT 1734	12SR93/12F5 1215	97.5	169.0	26.9	34.5	60.6	16.6	2.0
MT 1736	12F5 2124/12SR 37	98.6	172.3	30.0	45.6	59.0	15.7	0.3
MT 1738	12SR37/MT1214	88.8	173.0	27.8	37.0	59.6	16.7	0.0
MT 1739	MT1274/12F5 1215	95.8	169.0	27.6	44.8	61.4	15.5	0.7

TABLE 5. Advanced Yield Spring Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2018. (Exp# 18-3102-SW)

ID	Cultivar or Selection	Stand %	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
MT 1742	MT1274/12F5 827	95.4	167.0	26.3	45.6	60.3	15.4	0.7
MT 1743	MT1274/12F5 827	97.9	173.3	27.2	44.0	58.6	16.1	0.0
MT 1745	MT1274/12SR 37	95.1	171.0	30.5	40.4	60.3	15.7	0.7
MT 1748	12F5 2124/IDO868	95.8	174.7	31.2	41.8	57.4	16.5	0.7
MT 1749	IDO868/MT1253	94.4	171.0	27.2	41.0	59.0	16.7	0.0
MT 1750	12SR93/12F5 1215	95.1	168.7	28.7	43.8	61.4	15.8	2.0
MT 1754	MT1253/12SR 37	98.2	173.7	35.4	45.6	57.9	15.3	0.3
MT 1756	MT1253/12F5 1215	97.2	169.7	28.8	43.5	58.6	15.4	0.3
MT 1764	SD4250/12F5 2124	97.5	170.7	29.2	39.4	59.8	17.0	1.0
MT 1766	MT1274/12SR 225	97.5	168.0	24.5	37.8	61.1	15.8	0.7
MT 1767	12SR225/12F5 827	95.8	169.7	27.8	42.5	57.4	16.5	0.7
MT 1770	MT1214/MT 1253	92.0	172.7	23.9	36.0	58.9	17.2	0.3
MT 1773	MT1253/MT1274	95.8	172.0	30.7	40.1	59.6	15.3	0.7
MT 1775	12F5 827/12F5 2124	93.7	172.7	28.7	44.7	60.0	15.4	0.7
ND 828	ND 828	97.9	172.7	32.0	40.8	60.9	16.7	1.7
SYN 181	10S0059-28	94.0	170.0	25.6	40.1	62.5	16.5	3.3
SYN 182	09S0306-24 SS	93.4	170.3	24.0	41.4	60.7	16.6	0.3
SYN 183	10S0176-18 CL	96.9	169.7	25.7	43.9	61.0	15.8	3.7
WB 171	WB 9590	97.2	169.0	25.2	39.1	61.0	16.4	1.0
WB 173	WB 9719	97.2	173.0	25.9	48.2	61.9	15.3	0.3
WB 181	WB 9653	91.6	170.7	26.1	39.5	60.6	15.4	2.3
EXPERIMENTAL MEANS		95.3	171.0	27.8	40.8	59.8	16.1	1.0
LSD (0.05)		8.0	1.6	2.9	6.3	1.0	0.6	2.2
C.V.: (S / MEAN)*100		5.2	0.6	6.4	9.5	1.0	2.4	138.5
P-VALUE (Entries)		0.7192	<.0001	<.0001	<.0001	<.0001	<.0001	0.0090

Bold Indicates highest yielding entry based on Fisher's Protected LSD at the 0.05 probability level.

Bold Indicates cultivars yielding equal to the highest yielding entry based on Fisher's Protected LSD at the 0.05 probability level.

1/ No. of Days from January 1 (171 = June 20).

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 (18-3102-SW)

Seeding Date: April 29, 2018
Harvest Date: August 8, 2018
Fertility: 100-20-10-10 side banded
System: no till
Herbicide: Bromac-16oz/ac, Affinity-.6oz/ac
Insecticide: none
Previous Crop: Chemical Fallow-Barley
Precipitation: 3.84" (seeding to harvest)

TABLE 6. Ten-Year Yield Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2009-2018. (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/
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
PI642366	VIDA (+)	10	55.6	58.3	44.6	35.1	67.2	47.9	45.9	40.5	35.6	44.4	47.5	135.3	47.5
PI676978	LANNING (++)	5						44.2	44.3	45.6	27.7	44.6	41.3	131.4	46.1
PI679964	NS PRESSER CL (P+)	5				32.1	69.4			35.3	34.7	45.7	43.4	131.0	46.0
04S0258-12	SY INGMAR (P+)	5						44.9	43.7	41.2	30.8	44.2	40.9	130.3	45.7
WA8166	ALUM (+)	3								51.5	30.8	39.2	40.5	127.9	44.9
ND695	REEDER (+)	10	49.9	54.6	41.8	31.4	62.7	45.7	42.3	44.7	29.0	44.6	44.7	127.2	44.7
LNR10-0493	LCS PRO (P+)	5						39.8	43.4	48.9	27.3	39.0	39.7	126.3	44.3
01S0263-28	SY SOREN (P+)	7			42.6	29.7	56.6	42.5	44.3	42.2	31.0		41.3	125.4	44.0
IMICHT-79	WB9879CLP (P+)	9		54.8	40.0	29.8	58.9	40.5	38.0	43.6	29.1	43.5	42.0	123.7	43.4
AGRIPR161	SY ROCKFORD (P+)	3								41.4	30.9	44.5	38.9	123.0	43.2
0150042-10	BRENNAN (P+)	9	54.2	53.9	35.8	38.4	56.3	41.5	46.3	38.4	24.5		43.2	122.9	43.2
PI 671855	EGAN (+)	7				31.6	55.5	37.8	38.9	46.5	30.5	38.6	39.9	122.6	43.0
06S0385-5	SY VALDA (P+)	4							42.5	38.5	27.7	42.7	37.8	121.9	42.8
BZ 996-434	CORBIN (P+)(saw fly tol)	10	45.2	53.3	45.5	31.3	59.3	38.8	42.3	45.7	25.3	40.8	42.7	121.7	42.7
PI660981	DUCLAIR (+)	10	42.3	55.5	41.0	34.9	61.7	46.9	43.2	38.6	26.2	33.9	42.4	120.8	42.4
BZ902-413R	WB-GUNNISON (P+)	10	46.6	62.4	44.1	32.3	56.5	43.4	39.7	34.0	26.7	36.3	42.2	120.2	42.2
04S0515-2-2	SY TYRA (P+)	9	44.8	51.0	39.7	26.6	64.2	46.3	41.7	32.8	31.5		42.1	119.6	42.0
WF162	HRS 3504 (P+)	3								42.2	27.2	42.3	37.2	117.7	41.3
PI574642	McNEAL	10	41.9	49.9	36.4	34.1	53.0	41.5	43.4	39.2	32.2	41.1	41.3	117.5	41.3
WF161	HRS 3616 (P+)	3								41.8	24.9	42.7	36.5	115.2	40.5
PI633974	CHOTEAU (+)(saw fly tol)	10	42.3	53.3	38.8	31.1	53.9	40.2	39.5	36.8	26.4	36.6	39.9	113.6	39.9
CI13596	FORTUNA (saw fly tol)	10	45.6	50.1	40.5	33.6	49.3	37.2	34.2	36.4	27.5	37.6	39.2	111.6	39.2
CI10003	THATCHER	10	45.5	40.6	37.0	25.9	44.9	33.0	29.2	32.3	28.1	34.5	35.1	100.0	35.1
MEANS (For Entries Listed)			46.7	53.1	40.6	31.9	58.0	41.9	41.3	40.8	28.9	40.8			42.9
April-July Precip. (in.)			6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)			12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting			10.32	8.62	6.95	n/a	9.24	8.26	9.76	8.79	8.73	7.40	8.67		
Total Plant Available Water (in.)			16.61	18.31	15.7	7.33	22.52	13.13	17.28	21.03	11.14	11.42	15.45		
Soil NO ₃ (lbs.) to SD at Planting			139	141	124	35	56	86	75	55	85	77	87		
SD (Sampling Depth in Inches)			48	48	36	48	48	48	48	48	45	41.5	46		
Fertilizer Applied															
(# N)			70	70	70	100	100	100	100	125	125	100	96		
(# P ₂ O ₅)			40	40	40	20	20	20	20	20	20	20	26		
(# K ₂ O)			25	25	25	10	10	10	10	10	10	10	15		
(# S)			0	0	0	0	0	0	0	10	10	10	3		

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. 2009-2018. (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/
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
04S0258-12 SY INGMAR (P+)	5						60.6	54.0	58.1	59.6	61.7	58.8	108.2	58.8
06S0385-5 SY VALDA (P+)	4							54.9	58.5	60.0	59.8	58.3	107.4	58.3
0150042-10 BRENNAN (P+)	9	59.3	58.4	62.4	56.5	63.3	61.5	56.6	59.8	59.1		59.7	106.9	59.7
WA8166 ALUM (+)	3								59.2	58.7	60.1	59.3	106.6	59.3
LNR10-0493 LCS PRO (P+)	5						58.1	51.7	59.1	60.4	60.0	57.8	106.4	57.8
WF161 HRS 3616 (P+)	3								57.3	59.3	59.9	58.8	105.7	58.8
PI676978 LANNING (++)	5							59.1	53.0	58.1	58.3	58.4	105.6	57.4
BZ902-413R WB-GUNNISON (P+)	10	60.2	59.5	60.2	52.9	62.6	58.2	56.1	56.8	58.6	60.4	58.5	105.0	58.5
ND695 REEDER (+)	10	60.0	57.8	61.3	52.9	62.8	58.5	54.4	58.2	58.4	59.7	58.4	104.7	58.4
01S0263-28 SY SOREN (P+)	7			61.3	51.5	63.0	59.5	53.1	58.5	58.9		58.0	104.7	58.0
C113596 FORTUNA (saw fly tol)	10	59.4	57.7	60.7	54.6	61.9	58.7	54.6	59.0	57.9	59.2	58.4	104.7	58.4
BZ 996-434 CORBIN (P+)(saw fly tol)	10	59.9	57.2	61.2	51.3	62.7	59.5	53.3	58.6	59.0	60.7	58.3	104.6	58.3
04S0515-2-2 SY TYRA (P+)	9	59.4	56.7	59.9	52.8	63.9	61.5	53.5	55.8	60.5		58.2	104.3	58.2
WF162 HRS 3504 (P+)	3								56.5	59.4	58.0	58.0	104.2	58.0
AGRIPR161 SY ROCKFORD (P)	3								56.1	57.8	59.9	57.9	104.2	57.9
IMICHT-79 WB9879CLP (P+)	9		56.9	60.2	51.9	61.7	58.6	53.8	57.7	58.2	59.7	57.6	104.0	57.6
PI642366 VIDA (+)	10	58.8	57.7	60.8	50.8	62.4	58.6	53.8	56.5	58.7	59.9	57.8	103.7	57.8
PI671855 EGAN (+)	7				54.1	60.8	56.9	53.5	57.0	56.1	57.2	56.5	103.1	56.5
PI633974 CHOTEAU (+)(saw fly tol)	10	57.9	56.5	59.6	52.0	61.5	58.3	52.8	58.1	57.8	59.8	57.4	103.0	57.4
PI660981 DUCLAIR (+)	10	57.8	57.3	59.1	51.6	61.2	58.1	52.5	57.5	57.2	59.8	57.2	102.6	57.2
PI574642 McNEAL	10	58.5	57.4	59.1	52.3	61.8	56.8	54.5	55.7	57.1	57.5	57.1	102.4	57.1
PI679964 NS PRESSER CL (P+)	5				49.2	61.7			53.8	58.6	58.8	56.4	101.3	56.4
C110003 THATCHER	10	58.9	55.5	59.8	50.2	61.5	54.7	50.1	55.6	55.8	55.5	55.8	100.0	55.8
MEANS (For Entries Listed)		59.1	57.4	60.4	52.3	62.2	58.7	53.7	57.5	58.5	59.3			57.9
April-July Precip. (in.)		6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)		12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting		10.32	8.62	6.95	n/a	9.24	8.26	9.76	8.79	8.73	7.40	8.67		
Total Plant Available Water (in.)		16.61	18.31	15.7	7.33	22.52	13.13	17.28	21.03	11.14	11.42	15.45		
Soil NO ₃ (lbs.) to SD at Planting		139	141	124	35	56	86	75	55	85	77	87		
SD (Sampling Depth in Inches)		48	48	36	48	48	48	48	48	45	41.5	46		
Fertilizer Applied	(# N)	70	70	70	100	100	100	100	125	125	100	96		
	(# P ₂ O ₅)	40	40	40	20	20	20	20	20	20	20	26		
	(# K ₂ O)	25	25	25	10	10	10	10	10	10	10	15		
	(# S)	0	0	0	0	0	0	0	10	10	10	3		

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. 2009-2018. (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/
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018				
BZ902-413R	WB-GUNNISON (P+)	10	2.3	1.0	5.3	1.0	0.7	0.0	0.0	0.0	0.0	0.0	1.0	15.1	1.0
BZ 996-434	CORBIN (P+)(saw fly tol)	10	5.3	12.0	5.0	7.5	0.7	0.3	0.7	0.0	0.0	0.0	3.1	46.1	3.1
01S0263-28	SY SOREN (P+)	7			2.3	10.0	2.0	0.7	0.7	0.0	0.0	2.2	48.0	3.3	
WSCIA	ALUM (+)	3								0.0	0.0	0.3	0.1	50.1	3.4
PI642366	VIDA (+)	10	8.7	7.0	10.0	5.0	1.0	0.3	3.7	0.0	0.0	0.3	3.6	52.6	3.6
04S0515-2-2	SY TYRA (P+)	9	6.7	20.0	10.0	8.0	0.7	0.7	0.0	0.0	0.0	5.1	68.0	4.6	
0150042-10	BRENNAN (P+)	9	5.3	18.3	11.7	12.5	0.7	0.7	2.3	0.0	0.0	5.7	76.1	5.2	
PI660981	DUCLAIR (+)	10	10.0	13.3	28.3	7.5	1.0	0.3	1.0	0.0	0.0	0.3	6.2	90.5	6.2
CI 13596	FORTUNA (saw fly tol)	10	15.0	20.0	18.3	10.0	2.3	1.0	1.0	0.0	0.0	0.7	6.8	100.0	6.8
WF162	HRS 3504 (P+)	3								0.0	0.0	0.7	0.2	100.1	6.8
WF161	HRS 3616 (P+)	3								0.0	0.0	0.7	0.2	100.1	6.8
IMICHT-79	WB9879CLP (P+)	9		18.3	28.3	10.0	0.7	0.3	1.0	0.0	0.0	6.5	110.0	7.5	
PI633974	CHOTEAU (+)(saw fly tol)	10	10.0	31.7	28.3	8.0	1.0	0.7	0.7	0.0	0.0	0.3	8.1	118.1	8.1
CI 10003	THATCHER	10	10.0	30.0	15.0	17.5	2.3	3.7	2.3	0.0	0.0	3.7	8.5	123.7	8.5
PI 679964	NS PRESSER CL (P+)	5			15.0	1.0				0.0	0.0	0.3	3.3	125.6	8.6
ND 695	REEDER (+)	10	6.7	33.3	16.7	20.0	2.3	2.3	2.3	0.0	0.0	2.3	8.6	125.9	8.6
PI 676978	LANNING (++)	5						1.0	2.3	0.0	0.0	0.3	0.7	137.6	9.4
AGRIPR161	SY ROCKFORD (P+)	3								0.0	0.0	1.0	0.3	150.2	10.3
PI671855	EGAN (+)	7			15.0	2.3	2.3	1.0	0.0	0.0	2.0	3.2	151.1	10.3	
04S0258-12	SY INGMAR (P+)	5						1.0	1.0	0.0	0.0	2.3	0.9	162.6	11.1
06S0385-5	SY VALDA (P++)	4						0.3	0.0	0.0	2.7	0.8	179.9	12.3	
PI574642	McNEAL	10	18.3	25.0	36.7	30.0	7.0	5.0	5.0	0.0	0.3	0.3	12.8	186.8	12.8
LNR10-0493	LCS PRO (P+)	5						2.3	5.0	0.0	0.3	0.7	1.7	311.4	21.3
MEANS (For Entries Listed)			8.9	19.2	16.6	11.8	1.7	1.3	1.7	0.0	0.0	1.0			7.8
April-July Precip. (in.)			6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)			12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting			10.32	8.62	6.95	n/a	9.24	8.26	9.76	8.79	8.73	7.40	8.67		
Total Plant Available Water (in.)			16.61	18.31	15.7	7.33	22.52	13.13	17.28	21.03	11.14	11.42	15.45		
Soil NO ₃ (lbs.) to SD at Planting			139	141	124	35	56	86	75	55	85	77	87		
SD (Sampling Depth in Inches)			48	48	36	48	48	48	48	48	45	41.5	46		
Fertilizer Applied															
	(# N)	70	70	70	100	100	100	100	125	125	100	96			
	(# P ₂ O ₅)	40	40	40	20	20	20	20	20	20	20	26			
	(# K ₂ O)	25	25	25	10	10	10	10	10	10	10	15			
	(# S)	0	0	0	0	0	0	0	10	10	10	3			

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. 2018. (Exp# 18-9802-DUR)

Entry	Cultivar Source	Stand %	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	3/ FN seconds	4/ Sawfly %
Alkabo	NDSU	98.2	175.3	29.9	41.3	59.6	17.2	365.1	0.3
Alzada	WestBred	95.5	172.0	25.6	37.9	59.3	17.3	398.0	0.3
Carpio	NDSU	99.3	176.0	29.4	35.8	57.4	18.6	364.9	0.0
Divide	NDSU	98.6	176.7	32.3	41.1	59.7	17.8	361.0	0.0
Dynamic	CDC	99.0	175.7	31.4	41.2	57.5	19.3	328.2	0.0
Fortitude	CDC	96.9	176.0	29.4	37.9	58.3	18.6	347.7	0.3
Grenora	NDSU	99.3	175.0	30.4	40.2	58.2	17.7	377.0	0.7
Joppa	NDSU	98.3	174.7	29.7	41.1	59.7	17.5	358.9	0.0
Mountrail	NDSU	97.9	176.0	26.3	38.2	58.8	18.4	365.0	0.0
Precision	CDC	96.8	175.3	31.3	39.5	57.9	18.7	371.0	0.0
Tioga	NDSU	99.0	175.3	33.1	40.3	58.3	18.7	352.8	0.0
Vivid	CDC	97.9	175.7	32.4	40.5	58.1	18.8	368.8	0.3
MT112219	MSU	99.3	171.3	25.8	48.4	61.1	16.3	362.3	0.0
MTD16001	MSU	98.6	178.0	32.3	44.6	57.9	17.7	335.7	0.0
MTD16002	MSU	98.6	179.0	35.2	45.8	58.6	17.5	354.1	0.0
MTD16003	MSU	99.7	175.0	31.5	41.2	59.1	17.0	353.2	0.0
MTD16004	MSU	99.3	174.7	29.5	43.8	59.8	17.6	362.9	0.0
MTD16005	MSU	99.7	177.0	31.9	41.1	58.0	18.8	350.4	0.0
MTD16006	MSU	99.3	175.7	34.4	42.2	59.0	17.7	354.4	0.0
MTD16007	MSU	98.6	175.0	32.1	44.2	58.3	18.1	360.0	0.0
MTD16008	MSU	99.0	173.7	32.8	40.0	57.9	17.8	368.2	0.0
MTD16009	MSU	99.0	178.7	33.8	39.7	54.8	18.8	371.0	0.0
MTD16010	MSU	99.0	176.0	32.8	39.4	58.5	18.1	374.5	0.0
MTD16011	MSU	99.3	178.0	32.2	45.1	58.7	18.0	363.1	0.3
EXPERIMENTAL MEANS		98.6	175.7	31.1	41.3	58.5	18.0	361.2	0.1
LSD (0.05)		2.5	1.4	2.9	4.5	0.7	0.5	16.3	-
C.V.: (S / MEAN)*100		1.5	0.5	5.7	6.7	0.7	1.7	2.7	-
P-VALUE (Entries)		0.2311	<.0001	<.0001	0.0003	<.0001	<.0001	<.0001	-

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.

Bold indicates highest value within a column.

Bold indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05).

Management Information (18-9802-DUR)

Seeding Date: May 1, 2018

Harvest Date: August 9, 2018

Fertility: 100-20-10-10

System: no till

Herbicide: Bromac, 16 oz/ac; Affinity 0.6 oz

Insecticide: none

Previous Crop: Chemical Fallow-Spring Wheat

Precipitation: 3.84" (seeding to harvest)

TABLE 10. Ten-Year Yield Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2009-2018. (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/
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
D03028 CARPIO (+)	6					59.8	39.7	34.6	41.3	26.7	35.8	39.6	105.8	41.9
D04581 JOPPA (+)	5						41.3	34.8	31.5	28.0	41.1	35.3	105.4	41.8
YU894-75 ALZADA (P+)	9	39.5	58.4	43.9	34.4	58.7	40.6		36.4	24.1	37.9	41.5	104.6	41.4
D00095 TIOGA (+)	9		64.1	41.9	30.1	54.1	36.3	34.4	35.9	30.8	40.3	40.9	103.6	41.1
D96604 ALKABO (+)	10	41.4	62.7	39.5	29.7	61.3	42.2	35.0	29.5	27.0	41.3	41.0	103.4	41.0
D9715-11 DIVIDE (+)	10	44.7	60.1	36.4	28.0	55.7	38.6	34.9	39.7	27.4	41.1	40.7	102.6	40.7
D97780 GRENORA (+)	10	42.8	57.7	36.5	26.0	62.3	37.0	31.3	36.2	30.8	40.2	40.1	101.2	40.1
MT03012 SILVER (+)	8	40.1	55.3	40.4	28.3	54.9	41.2	35.2	35.6			41.4	100.3	39.8
D901313 MOUNTRAIL (+)	10	41.1	63.2	39.4	27.9	57.0	32.4	38.8	30.1	28.2	38.2	39.6	100.0	39.6
MEANS (For Entries Listed)		41.6	60.2	39.7	29.2	58.0	38.8	34.9	35.1	27.9	39.5			40.8
April-July Precip. (in.)		6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)		12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting		10.32	8.62	6.95	n/a	9.13	8.26	9.76	8.21	8.73	9.15	8.79		
Total Plant Available Water (in.)		16.61	18.31	15.70	7.33	22.41	13.13	17.28	20.45	11.14	13.17	15.55		
Soil NO ₃ (lbs.) to SD at Planting		139	141	124	60	22	86	75	28	85	112	87		
SD (Sampling Depth in Inches)		48	48	36	n/a	48	48	48	48	45	48	46		
Fertilizer Applied	(# N)	70	70	70	100	100	100	100	125	125	100	96		
	(# P ₂ O ₅)	40	40	40	20	20	20	20	20	20	20	26		
	(# K ₂ O)	25	25	25	10	10	10	10	10	10	10	15		
	(# S)	0	0	0	0	0	0	0	10	10	10	3		

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. 2009-2018. (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/
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
D96604	ALKABO (+)	10	58.6	58.7	60.9	57.7	63.6	57.8	56.7	54.9	59.4	59.6	58.8	101.7	58.8
D9715-11	DIVIDE	10	58.4	58.2	60.0	56.6	63.6	57.6	55.4	56.5	58.7	59.7	58.5	101.2	58.5
D04581	JOPPA (+)	5						58.1	55.8	53.7	58.6	59.7	57.2	100.7	58.2
MT03012	SILVER (+)	8	58.2	56.6	60.4	57.2	62.9	58.8	54.2	55.5			58.0	100.7	58.2
D00095	TIOGA	9		58.0	60.7	55.7	64.0	56.9	55.7	54.9	58.3	58.3	58.1	100.5	58.1
YU894-75	ALZADA (P+)	9	58.9	58.2	59.9	55.8	62.8	58.1		54.5	59.4	59.3	58.5	100.5	58.1
D97780	GRENORA (+)	10	57.5	58.0	60.6	55.2	63.3	56.9	55.8	54.5	58.4	58.2	57.8	100.0	57.8
D901313	MOUNTRAIL (+)	10	58.4	58.4	59.9	54.2	63.4	56.3	55.9	54.3	58.6	58.8	57.8	100.0	57.8
D03028	CARPIO (+)	6					63.4	56.7	56.2	56.3	56.2	57.4	57.7	99.7	57.6
MEANS (For Entries Listed)			58.3	58.0	60.4	56.1	63.4	57.5	55.7	55.0	58.5	58.9			58.1
April-July Precip. (in.)			6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)			12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting			10.32	8.62	6.95	n/a	9.13	8.26	9.76	8.21	8.73	9.15	8.79		
Total Plant Available Water (in.)			16.61	18.31	15.7	7.33	22.41	13.13	17.28	20.45	11.14	13.17	15.55		
Soil NO ₃ (lbs.) to SD at Planting			139	141	124	60	22	86	75	28	85	112	87		
SD (Sampling Depth in Inches)			48	48	36	n/a	48	48	48	48	45	48	46		
Fertilizer Applied															
	(# N)		70	70	70	100	100	100	100	125	125	100	96		
	(# P ₂ O ₅)		40	40	40	20	20	20	20	20	20	20	26		
	(# K ₂ O)		25	25	25	10	10	10	10	10	10	10	15		
	(# S)		0	0	0	0	0	0	0	10	10	10	3		

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. 2009-2018. (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/
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
YU894-75	ALZADA (P+)	9	15.0	8.3	18.3	2.3	2.3	0.3		0.0	0.0	0.3	5.2	56.8	4.7
D00095	TIOGA	9		13.3	18.3	6.7	2.3	1.0	2.3	0.0	0.3	0.0	4.9	68.8	5.7
D9715-11	DIVIDE	10	15.0	10.0	23.3	6.7	1.0	1.0	0.3	0.0	0.0	0.0	5.7	69.3	5.7
MT03012	SILVER (+)	8	11.7	23.3	30.0	4.0	2.3	1.0	1.0	0.0		9.2	88.7	7.3	
D97780	GRENORA (+)	10	20.0	16.7	25.0	8.3	2.3	0.7	0.3	0.0	0.0	0.7	7.4	89.5	7.4
D901313	MOUNTRAIL (+)	10	18.3	18.3	30.0	13.3	2.3	0.3	0.0	0.0	0.0	8.3	100.0	8.3	
D96604	ALKABO (+)	10	21.7	26.7	30.0	16.7	2.3	1.0	0.7	0.0	0.3	0.3	10.0	120.6	10.0
D03028	CARPIO (+)	6					3.7	1.0	1.0	0.0	0.0	0.0	0.9	215.1	17.8
D04581	JOPPA (+)	5						2.3	2.0	0.0	0.0	0.0	0.9	1293.5	106.9
MEANS (For Entries Listed)			16.9	16.7	25.0	8.3	2.3	1.0	1.0	0.0	0.1	0.2			19.3
April-July Precip. (in.)			6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)			12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting			10.32	8.62	6.95	n/a	9.13	8.26	9.76	8.21	8.73	9.15	8.79		
Total Plant Available Water (in.)			16.61	18.31	15.7	7.33	22.41	13.13	17.28	20.45	11.14	13.17	15.55		
Soil NO ₃ (lbs.) to SD at Planting			139	141	124	60	22	86	75	28	85	112	87		
SD (Sampling Depth in Inches)			48	48	36	n/a	48	48	48	48	45	48	46		
Fertilizer Applied															
	(# N)		70	70	70	100	100	100	100	125	125	100	96		
	(# P ₂ O ₅)		40	40	40	20	20	20	20	20	20	20	26		
	(# K ₂ O)		25	25	25	10	10	10	10	10	10	10	15		
	(# S)		0	0	0	0	0	0	0	10	10	10	3		

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. 2018. (Exp# 18-2102-SB)

ID	Cultivar or Selection	Stand %	1/ Head Date	Plant Ht Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Plump %	Thin %	3/ Protein %
27	Bow	92.3	175.0	26.6	59.6	50.6	97.5	0.7	8.9
6	Fraser	94.4	173.3	26.4	52.7	51.1	92.3	1.6	10.5
20	Genie	92.3	172.3	27.9	57.4	50.6	98.4	0.3	9.1
17	Hockett	92.0	173.0	25.2	52.7	49.6	98.9	0.2	10.2
22	Merit 57	78.5	171.7	23.7	49.9	50.3	98.6	0.3	10.4
7	Metcalf	97.9	180.0	22.5	61.7	50.1	95.4	1.0	8.8
9	Odyssey	89.8	176.3	23.0	57.0	49.5	83.7	3.5	9.5
46	Synergy	95.0	173.7	24.4	59.4	52.6	96.1	0.9	9.1
29	2B11-4949	96.1	172.3	25.4	59.5	49.3	97.6	0.7	9.6
31	2B11-5166	90.9	170.0	25.3	52.6	50.6	97.4	0.6	10.2
30	MT16M00105	96.2	173.0	24.8	56.3	50.4	95.4	1.2	9.7
38	MT16M00202	92.3	172.3	22.9	56.7	52.1	97.5	0.7	9.9
47	MT16M00305	95.4	175.3	24.3	62.2	52.2	93.6	1.6	9.6
11	MT16M00307	85.7	178.3	27.5	67.3	48.5	98.2	0.5	9.3
5	MT16M00407	92.3	175.3	24.9	54.8	47.9	78.9	4.6	9.6
12	MT16M00508	81.1	171.0	25.5	52.3	51.6	98.5	0.5	10.8
40	MT16M00603	89.1	172.7	26.3	57.5	51.6	96.9	0.8	9.1
35	MT16M00707	92.6	173.7	25.4	57.0	49.8	95.4	1.0	9.2
25	MT16M00801	86.3	168.0	23.7	57.1	51.3	95.1	1.4	9.6
10	MT16M00806	86.4	172.3	24.5	62.2	49.3	87.8	2.6	9.3
2	MT16M01106	88.5	175.7	24.6	54.0	48.9	89.1	1.9	10.0
48	MT16M01204	88.4	172.3	25.6	58.8	50.5	84.0	4.0	10.3
43	MT16M01409	93.3	173.0	28.0	57.2	52.1	96.1	0.8	10.7
28	MT16M01701	91.9	172.3	23.4	50.8	50.1	97.7	0.6	9.8
13	MT16M01705	94.4	172.0	23.8	50.0	49.6	97.8	0.6	9.7
14	MT16M01709	91.6	171.3	23.8	56.0	48.9	97.4	0.6	9.9
16	MT16M01801	88.5	172.0	26.4	50.8	49.1	98.9	0.3	10.3
21	MT16M01804	90.6	172.7	25.8	60.6	51.3	96.8	0.5	9.6
4	MT16M01805	93.7	173.3	24.0	61.7	51.8	93.9	1.5	9.9
24	MT16M01809	91.6	171.7	24.2	62.8	50.7	95.1	1.1	9.5
8	MT16M01812	88.1	176.0	25.3	55.7	49.9	95.1	1.1	9.6
36	MT16M01901	91.6	172.3	28.0	63.2	50.1	94.7	0.9	9.3
18	MT16M01903	94.7	174.7	28.3	63.1	51.7	96.5	1.1	9.6
44	MT16M01904	96.1	172.3	28.9	53.7	53.0	97.7	0.6	10.4
26	MT16M02004	86.0	172.7	23.3	57.1	49.5	97.3	0.6	9.3
45	MT16M02106	95.4	175.0	24.6	60.3	50.6	96.8	0.8	9.8
15	MT16M02107	95.5	172.0	26.3	53.6	49.1	99.3	0.1	10.1
32	MT16M02204	93.0	172.3	23.8	53.6	51.3	96.3	1.1	9.4
34	MT16M05909	95.8	170.7	24.3	56.8	50.2	98.1	0.5	9.2
42	MT16M06110	88.4	174.7	27.1	54.7	51.9	96.1	0.9	10.4
1	MT16M06402	91.6	181.0	27.0	49.1	49.4	86.0	2.9	10.1
37	MT16M06404	86.3	171.3	27.4	59.1	51.8	96.4	1.0	10.0
41	MT16M06409	93.7	173.0	24.5	59.7	51.2	95.5	1.1	9.5

**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. 2018.
(Exp# 18-2102-SB)**

ID	Cultivar or Selection	Stand %	1/ Head Date	Plant Ht Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Plump %	Thin %	3/ Protein %
19	MT16M07108	91.3	171.7	24.9	51.2	51.5	97.7	0.6	9.9
33	MT16M07706	90.5	170.3	25.6	56.7	51.2	97.5	0.7	9.9
49	MT16M07806	90.2	172.3	24.2	59.3	51.7	96.4	0.8	9.2
23	MT16M08502	90.9	172.3	29.7	57.0	50.9	99.0	0.3	10.3
3	MT16M08601	95.4	178.3	22.5	62.0	51.7	94.0	1.4	9.1
39	MT16M08808	80.3	172.3	28.8	50.9	53.0	92.0	1.9	10.5
EXPERIMENTAL MEANS		91.1	173.3	25.4	56.8	50.6	95.2	1.1	9.7
LSD (0.05)		9.4	1.7	1.3	5.6	0.7	2.4	0.7	0.6
C.V.		6.4	0.6	3.3	6.0	0.9	1.5	36.6	4.0
P-Value (Entries)		0.0301	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Bold Indicates highest yielding entry based on Fisher's Protected LSD at the 0.05 probability level.

Bold Indicates cultivars yielding equal to the highest yielding entry 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 (18-2102-SB)

Seeding Date: May 2, 2018
 Harvest Date: July 26, 2018
 Fertility: 100-20-10-10 side banded
 System: no till
 Herbicide: Bromac-16oz/ac, Affinity-.6oz/ac
 Insecticide: none
 Previous Crop: Chemical Fallow - Sorghum
 Precipitation: 3.78" (seeding to harvest)

TABLE 14. Ten-Year Yield Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2009-2018. (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/	
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018				
CHAMPION (P+) YU501385	7	80.5		95.9	47.0	69.7	86.3	78.5	95.0				79.0	103.6	72.7
GENIE (P+) Genie	4					67.2			87.0	46.3	57.4		64.5	100.0	70.2
HOCKETT (+) MT910189	10	70.4	77.7	76.3	54.4	70.7	88.6	76.1	97.1	37.4	52.7		70.1	100.0	70.1
SYNERGY (P+) Synergy	3								87.0	39.6	59.4		62.0	99.4	69.7
ODYSSEY (P+) Odyssey	4					65.6			90.4	41.7	57.0		63.7	98.7	69.3
COPELAND Copeland	4		77.0	72.9					82.1	45.4			69.3	96.1	67.4
HARRINGTON SK76333	9	71.0	82.4	76.5	37.7	71.3	82.5	61.0	85.6	41.4			67.7	94.0	65.9
METCALFE TR232	9	68.7	77.9	70.9	39.5		76.3	59.1	76.1	40.1	61.7		63.4	90.4	63.4
HAXBY MT950186	8	48.2	51.5	82.6	25.1	67.3	78.1	79.4	80.9				64.1	83.9	58.9
CRAFT MT970116	8	37.2	37.3	80.8	31.4	60.2	74.9	70.2		33.7			53.2	77.2	54.1
MEANS (For Entries Listed)		62.7	67.3	79.4	39.2	67.4	81.1	70.7	86.8	40.7	57.6				66.2
April-July Precip. (in.)		6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02		7.64		
Total Annual Precip. (in.)		12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15		13.73		
Soil PAW (in.) to SD @ Planting		9.63	n/a	7.45	7.45	8.52	7.82	8.85	8.68	9.09	9.99		8.61		
Total Plant Available Water (in.)		15.92	9.69	16.2	14.78	21.8	12.69	16.37	20.92	11.5	14.01		15.39		
Soil NO3 (lbs.) to SD at Planting		88	204	374	60	415	57	123	28	103	94		155		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	48	41	45		47		
Fertilizer Applied		70	70	70	100	100	100	100	125	90	100		93		
	(# N)	40	40	40	20	20	20	20	20	30	20		27		
	(# P ₂ O ₅)	25	25	25	10	10	10	10	10	10	10		15		
	(# K ₂ O)	0	0	0	0	0	0	0	10	0	10		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 15. Ten-Year Test Weight Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2009-2018. (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/
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
CHAMPION (P+) YU501385	7	51.7		52.9	47.5	53.1	53.3	51.4	54.7			52.1	100.6	52.0
SYNERGY (P+) Synergy	3								52.3	53.4	52.6	52.8	100.1	51.7
HOCKETT (+) MT910189	10	51.2	51.2	52.2	46.2	53.2	54.2	50.7	54.7	54.0	49.6	51.7	100.0	51.7
HAXBY MT950186	8	52.0	50.6	53.8	43.2	53.9	53.8	51.9	53.3			51.6	99.8	51.6
CRAFT MT970116	8	51.5	50.6	53.0	43.9	53.2	53.1	51.4		54.3		51.4	99.6	51.5
GENIE (P+) Genie	4					52.1			53.8	52.8	50.6	52.3	99.0	51.2
ODY SSEY (P+) Odyssey	4					52.5			53.0	53.5	49.5	52.2	98.7	51.0
METCALFE TR232	9	50.7	48.4	51.6	43.8		51.1	48.4	52.4	54.0	50.1	50.0	97.1	50.2
HARRINGTON SK76333	9	49.8	49.2	51.0	42.1	52.3	51.0	49.4	53.5	53.2		50.2	96.6	49.9
COPELAND Copeland	4		48.4	48.7					51.8	52.3		50.3	94.9	49.1
MEANS (For Entries Listed)		51.2	49.7	51.9	44.4	52.9	52.7	50.5	53.3	53.4	50.5			51.0
April-July Precip. (in.)		6.29	9.69	8.75	7.33	13.28	4.87	7.52	12.24	2.41	4.02	7.64		
Total Annual Precip. (in.)		12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting		9.63	n/a	7.45	7.45	8.52	7.82	8.85	8.68	9.09	9.99	8.61		
Total Plant Available Water (in.)		15.92	9.69	16.2	14.78	21.8	12.69	16.37	20.92	11.5	14.01	15.39		
Soil NO3 (lbs.) to SD at Planting		88	204	374	60	415	57	123	28	103	94	155		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	48	41	45	47		
Fertilizer Applied		70	70	70	100	100	100	100	125	90	100	93		
	(# N)	40	40	40	20	20	20	20	20	30	20	27		
	(# P ₂ O ₅)	25	25	25	10	10	10	10	10	10	10	15		
	(# K ₂ O)	0	0	0	0	0	0	0	10	0	10	2		
	(# S)													

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. Montana Safflower Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions at Northern Agricultural Research Center. Havre, Montana. 2018. (Exp# 18-7702-SA)

ENTRY	OIL TYPE	1/		2/		YIELD	TEST WT	MOIST	OIL %		
		STAND %	PLANTS SqFt	FLWR DATE	PLNT HT Inches				Lbs/Ac	Lbs/Bu	0%Mois.
Baldy	Linoleic	85.4	4.3	199.0	27.9	1738.8	49.4	5.0	26.0	23.9	416.3
Cardinal	Linoleic	93.7	5.9	202.3	29.3	2088.0	46.0	4.8	34.9	32.1	671.3
Finch	Linoleic	89.1	3.3	201.3	28.6	2050.8	45.7	4.8	35.8	32.9	674.7
Morlin	Linoleic	94.3	5.8	201.0	26.4	1786.1	41.0	4.5	37.8	34.8	621.4
NutraSaff	Linoleic	95.3	5.6	201.0	25.0	1237.4	38.5	3.9	46.9	43.1	533.6
Rubis Red	Linoleic	90.1	4.8	198.3	27.9	2381.8	49.2	5.0	28.6	26.4	628.3
Hybrid 1601	Oleic	94.2	4.0	198.7	28.0	2928.8	42.3	4.6	35.3	32.5	951.1
Hybrid 200	Oleic	84.3	3.5	199.3	27.6	2729.6	45.8	4.8	30.9	28.4	775.3
Hybrid 446	Oleic	75.3	2.9	199.7	26.8	2832.1	46.0	4.8	30.3	27.8	788.5
MonDak	Oleic	95.3	4.8	199.7	27.1	2328.4	43.6	4.6	35.0	32.2	750.7
Montola 2003	Oleic	95.8	7.6	200.0	26.7	1948.6	42.0	4.6	36.1	33.2	646.7
STI 1201	Oleic	97.9	6.0	199.0	24.2	1866.5	36.3	4.0	42.3	38.9	726.2
EXPERIMENTAL MEANS		90.9	4.9	199.9	27.1	2159.8	43.8	4.6	35.0	32.2	682.0
LSD (0.05)		8.6	1.1	2.0	3.1	279.3	1.5	0.1	0.6	0.6	94.8
C.V.: (S / MEAN)*100		5.6	13.3	0.6	6.7	7.6	2.0	1.2	1.1	1.1	8.2
P-VALUE (Entries)		0.0	<.0001	0.0093	0.0939	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Bold Indicates cultivars yielding equal to the highest yielding entry based on Fisher's Protected LSD at the 0.05 probability level.

1/ No. Days from January 1 (200 = July 19)

2/ Volumetric yields are based on plot weights adjusted to uniform 8 percent grain moisture.

Management Information (18-7702-SAF)

Seeding Date: April 30, 2018
 Harvest Date: October 9, 2018
 Fertility: 50-15-0-20 side banded
 System: no till
 Herbicide: none
 Fungicide: none
 Previous Crop: Chemical Fallow - Spring Barley
 Precipitation: 4.52" (April 1 to August 30)

TABLE 17. Nine-Year Yield Summary on Selected Entries from Dryland Safflower Nursery. Northern Agricultural Research Center. Havre, Montana. 2009-2018. (Exp# 7702-SA)

1/ VARIETY or SELECTION		No. of YEARS TESTED	YIELD (Lbs Per Acre)									AVE. for YEARS TESTED	% of CHECK YIELD 3/	10-Yr COMP. AVE. YIELD 4/	
			2009	2010	2011	2012	2013	2014	2015	2016	2017 2/				2018
Hybrid 446	HYBRID 446	5					1947	1831	1820	3442		2832	2374	285.8	2790
Hybrid 200	HYBRID 200	5					1866	2008	1938	3138		2730	2336	281.2	2745
Rubis Red	RUBIS RED	3							1449	2619		2382	2150	265.3	2590
HYBRID 621	HYBRID 621	5				1421	1620	1241	1169	2489			1588	245.1	2393
HYBRID 1601	HYBRID 1601(+)	9	2839	2117	2559	1858	1588	1280	2657	3602		2929	2381	243.9	2381
HYBRID 528	HYBRID 528	3				1685	1721	1313					1573	230.6	2252
CARDINAL	CARDINAL(+)	9	2462	2014	2077	1651	1721	1802	1512	2791		2088	2013	206.2	2013
Baldy	BALDY	5				1500	1681	1477	2129			1739	1705	205.2	2004
HYBRID 9049	HYBRID 9049(+)	6	2606	2229	2201		1816	1988	1872				2119	203.6	1987
MON-DAK	MON-DAK(+)	9	2078	2070	1967	1559	1814	1303	1678	2532		2328	1926	197.2	1926
WILL 95FI	FINCH	9	2086	1580	2064	1565	1566	1495	1466	2323		2051	1800	184.3	1800
Will WOMA2003	MONTOLA 2003 (+)	8	2042	1741	1839		1932	1219	1634	2240		1949	1824	172.5	1684
011-2180	MORLIN (+)	8	2077	1924	1927	1253	1828	1002	870			1786	1583	162.3	1584
WILL	MONTOLA 2000 (++)	4	2003	1676	1836				467				1496	132.3	1292
91B3842	NUTRASAFF (+)	9	1589	1541	1179	323	1289	435	212	982		1237	976	100.0	976
MEANS (For Entries Listed)			2198	1877	1961	1414	1708	1431	1444	2571		2186			2028
April-July Precip. (in.)			6.29	9.69	8.75	7.33	11.88	4.87	7.52	12.24	2.41	4.02	7.50		
Total Annual Precip. (in.)			12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting			10.26	6.73	7.31	n/a	9.58	9.38	8.29	9.24	8.92	6.84	8.50		
Total Plant Available Water (in.)			16.55	16.42	16.06	7.33	21.46	14.25	15.81	21.48	11.33	10.86	15.15		
Soil NO3 (lbs.) to SD at Planting			219	115	99	35	78	58	115	25	53	92	89		
SD (Sampling Depth in Inches)			48	48	36	48	48	48	48	48	48	39	46		
Fertilizer Applied															
		(# N)	0	0	0	0	0	0	50	50	50	50	20		
		(# P ₂ O ₅)	45	45	45	45	45	45	15	15	15	15	33		
		(# K ₂ O)	0	0	0	0	0	0	0	0	0	0	0		
		(# S)	0	0	0	0	0	0	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.

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

TABLE 18. Nine-Year Percent Oil Summary on Selected Entries from Dryland Safflower Nursery. Northern Agricultural Research Center. Havre, Montana. 2009-2018. (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/	
		2009	2010	2011	2012	2013	2014	2015	2016	2017 2/	2018				
91B3842	NUTRASAFF (+)	9	45.8	36.9	52.4	54.1	52.5	52.8	51.9	46.3		43.1	48.4	100.0	48.4
HYBRID 528	HYBRID 528	3				54.4	48.4	48.2					50.3	94.7	45.9
HYBRID 621	HYBRID 621	5				53.5	45.2	46.3	43.4	35.1			44.7	86.8	42.0
WILL	MONTOLA 2000 (++)	4	37.3	38.8	43.3				37.7				39.3	84.0	40.7
011-2180	MORLIN (+)	8	35.3	39.5	41.8	43.7	43.6	43.5	41.9			34.8	40.5	83.2	40.3
Will WOMA 2003	MONTOLA 2003 (+)	8	34.5	39.3	41.8		41.5	42.7	41.7	34.0		33.2	38.6	80.9	39.2
HYBRID 1601	HYBRID 1601(+)	9	34.7	39.6	40.3	44.0	43.4	43.6	39.5	34.2		32.5	39.1	80.7	39.1
WILL 95FI	FINCH	9	34.9	43.6	40.9	42.6	39.1	41.5	41.2	32.9		32.9	38.9	80.2	38.9
MON-DAK	MON-DAK(+)	9	34.4	41.1	40.5	44.0	39.8	40.3	39.8	32.4		32.2	38.3	79.1	38.3
CARDINAL	CARDINAL(+)	9	34.8	43.6	39.2	42.2	39.3	40.5	39.9	32.5		32.1	38.2	79.0	38.2
HYBRID 9049	HYBRID 9049(+)	6	29.1	42.8	34.6		34.1	35.3	33.6				34.9	71.6	34.7
Hybrid 200	HYBRID 200	5					38.5	36.6	35.2	30.7		28.4	33.9	68.7	33.3
Hybrid 446	HYBRID 446	5					39.5	37.0	35.6	28.4		27.8	33.7	68.3	33.1
Rubis Red	RUBIS RED	3							31.8	26.9		26.4	28.4	60.2	29.1
Baldy	BALDY	5					30.0	29.6	29.2	24.5		23.9	27.5	55.7	27.0
MEANS (For Entries Listed)			35.6	40.6	41.7	47.3	41.2	41.4	38.7	32.5		31.6			37.9
April-July Precip. (in.)			6.29	9.69	8.75	7.33	11.88	4.87	7.52	12.24	2.41	4.02	7.50		
Total Annual Precip. (in.)			12.46	14.61	15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	13.73		
Soil PAW (in.) to SD @ Planting			10.26	6.73	7.31	n/a	9.58	9.38	8.29	9.24	8.92	6.84	8.50		
Total Plant Available Water (in.)			16.55	16.42	16.06	7.33	21.46	14.25	15.81	21.48	11.33	10.86	15.15		
Soil NO3 (lbs.) to SD at Planting			219	115	99	35	78	58	115	25	53	92	89		
SD (Sampling Depth in Inches)			48	48	36	48	48	48	48	48	48	39	46		
Fertilizer Applied															
	(# N)		0	0	0	0	0	0	50	50	50	50	20		
	(# P ₂ O ₅)		45	45	45	45	45	45	15	15	15	15	33		
	(# K ₂ O)		0	0	0	0	0	0	0	0	0	0	0		
	(# S)		0	0	0	0	0	0	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.

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.