

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. 2011-2020.

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Content:

This report is intended to serve as a popularized 2020 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 16 percent of NARC Variety Testing Programs total research project effort on-station at Havre. The remaining 84 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 105 years beginning in 1916. Collection of wheat stem sawfly cutting data was added beginning in 2003.

Detailed data pertaining to multiple performance characters, along with associated climatic and management inputs are presented for 2020. Abridged, multi-year summaries for each wheat cereal trial are limited to four crop characters (yield, test weight, protein 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.

2020 Data:

It should be noted that 2020 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, 2020 data shall not constitute in any form a recommendation for or against any entry or practice included.

Please note that research trial seed yield results recorded under wheat stem sawfly pressure are likely much higher than a producer should expect. Small plot variety trials are managed to assess maximum yield potential and are harvested in such a way that all stems and heads are picked up by the combine, regardless of lodging or cutting due to sawfly. Pickup guards coupled with an extremely slow ground speed and an exceptionally low cutting height help researchers collect all heads in order to assess seed yield potential. If you are a producer in a wheat stem sawfly environment, although hollow stemmed varieties may be high yielding in research trials in your area, we strongly recommend against growing those hollow stemmed varieties. Please be aware that if you seed hollow stemmed varieties with sawfly present, you are only creating a breeding ground for future generations of sawfly in your area and not helping combat the pest population.

Crop year 2020 was nearly on par with the long-term temperature average for the year, however, April was five degrees cooler than normal, delaying ideal soil temperatures for seeding. 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 (9/1/19 through 8/31/20) was 10.52 inches, 1.53 inches lower than the average for all years since 1916. April 1 through July 31 precipitation was 5.55 inches, or 82 percent of the 105-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July totaled 1220, or 95 percent of the average for the last 70 years (1951-2020). The last spring frost was on May 12 and the first fall frost of 2020 was on October 1, resulting in 142 frost-free days. The minimum winter temperature was -24 degrees F on January 16, 2020. Overall, the 2019-2020 average crop year temperatures were 0.3 degrees F warmer than the long-term average. The April through July growing season saw an average daily temperature of 57 degrees F, 1.4 degrees F lower than historical temperatures. July and August temperatures were higher than the long-term averages, with the high for 2020 recorded on August 18 at 99 degrees F. There were 19 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 <https://plantsciences.montana.edu/crops/index.html>.

Recognition:

This research would not have been possible without the assistance of the following seasonal employees: Peyton Brown, Jonathan Erickson, Daisen Fox, Faith Gasvoda, Isabella Lawless, Tracey Reed, Erin Taylor and Ivy Thomas.

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Summary of climatic data by months for the 2019-2020 crop year (September to August) and averages for the period 1916-2020 at the Northern Agricultural Research Center. Havre, Montana.

Month	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Crop Year
Year	2019	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	
<u>Precipitation (inches)</u>													<u>Total</u>
Current Year	2.37	0.16	1.43	0.20	0.25	0.18	0.34	0.56	1.58	2.69	0.72	0.04	10.52
Average (1916-2020)	1.18	0.68	0.45	0.45	0.43	0.35	0.54	1.00	1.84	2.55	1.42	1.17	12.05
Difference	1.19	-0.52	0.98	-0.25	-0.18	-0.17	-0.20	-0.44	-0.26	0.14	-0.70	-1.13	-1.53
<u>Mean Temperature (°F)</u>													<u>Average</u>
Current Year	57.4	35.6	28.4	24.3	19.3	28.5	29.9	38.3	53.5	63.2	68.0	71.0	43.1
Average (1916-2020)	56.3	45.5	30.2	19.6	15.8	19.8	30.0	43.5	53.9	61.9	69.2	67.4	42.8
Difference	1.1	-9.9	-1.8	4.7	3.5	8.7	-0.1	-5.2	-0.4	1.3	-1.2	3.6	0.3

Last killing frost in spring*

2020 _____ May 12th (29.2°)
Ave. 1916-2020 _____ May 13th

First killing frost in fall*

2020 _____ October 1st (31.6°)
Ave. 1916-2020 _____ September 20th

Frost free period

2020 _____ 142 days
Ave. 1916-2020 _____ 129 days

Growing degree days (base 50)

May 12-Oct. 1, 2020 _____ 2111.3
May 1-Sept. 30, 2020 _____ 2180.8
Ave. 1951-2020 (May 1-Sept. 30) _____ 2177.1

Maximum summer temperature _____ 99.4° F on August 18, 2020
Minimum winter temperature _____ -23.6° F on January 16, 2020

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

2020
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
WINTER WHEAT (WW) INVESTIGATIONS										
ON-STATION										
20-3502-WW	Intrastate Cultivar Nursery	WW	49	3	147	A-5-4	33 32N 15E	Bruckner	MAES-MWBC	Lamb
20-1402-WW	Advanced Cultivar Nursery	WW	36	3	108	A-5-4	33 32N 15E	Bruckner	MAES-MWBC	Lamb
20-5802-WW	Sawfly Line Evaluation Nursery	WW	49	2	98	A-5-4	33 32N 15E	Bruckner	MAES-MWBC	Lamb
20-WQDS-WW	Winter Wheat Quality Drill Strips	WW	4	1	4	A-5-4	33 32N 15E	Bruckner	MAES-MWBC	Lamb
Sub-Totals:			4	138	357	5.73%	of Total Plot Inventory			
OFF-STATION										
20-3851-WW	Off-Station Cultivar Eval Nursery	WW	25	3	75	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
20-3853-WW	Off-Station Cultivar Eval Nursery	WW	25	3	75	Loma	28 27N 10E	Lamb	MWBC-MAES	McKeever Farm
20-5852-WW	Sawfly Line Evaluation Nursery	WW	49	2	98	Big Sandy	2 28N 9E	Bruckner	MAES-MWBC	Works Farm
20-SR01-WW	v Single-Row Yield Eval Nursery	WW	198	1	198	Big Sandy	2 28N 9E	Bruckner	MAES-MWBC	Works Farm
20-SR02-WW	v Single-Row Line Eval Nursery	WW	1000	1	1000	Big Sandy	2 28N 9E	Bruckner	MAES-MWBC	Works Farm
20-3RSP-WW	v 3-Row Segregating Populations	WW	109	1	109	Big Sandy	2 28N 9E	Bruckner	MAES-MWBC	Works Farm
20-3952-WW	Prelim C Sawfly Line Evaluation	WW	49	2	98	Big Sandy	2 28N 9E	Bruckner	MAES-MWBC	Works Farm
Sub-Totals:			7	1455	1653	26.52%	of Total Plot Inventory			
SPRING WHEAT & DURUM (SW & DUR) INVESTIGATIONS										
ON-STATION										
20-3102-SW	Advanced Yield Nursery	SW	64	3	192	A-5-3	33 32N 15E	Talbert	MAES-MWBC	Lamb
20-9802-DUR	Montana Durum Cultivar Nursery	DUR	24	3	72	A-5-3	33 32N 15E	Giroux	MAES-MWBC	Lamb
20-3302-SW	Preliminary Yield Nursery	SW	81	3	243	A-5-3	33 32N 15E	Talbert	MAES-MWBC	Lamb
20-SWQAC-SW	Spring Wheat Quality Assessm't	SW	4	1	4	B-2-1	32 32N 15E	MWBC	Wht Qual Cncl	Lamb
Sub-Totals:			4	173	511	8.20%	of Total Plot Inventory			

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

OFF-STATION

20-9951-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
20-9953-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Chester	10 31N 5E	Lamb	MWBC-MAES	Kammerzell Farm
20-9955-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
20-9957-SW	Off-Station Cultivar Eval Nursery	SW	27	3	81	Loma	28 27N 10E	Lamb	MWBC-MAES	McKeever Farm
20-9851-DUR	Off-Station Cultivar Eval Nursery	DUR	15	3	45	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
20-9853-DUR	Off-Station Cultivar Eval Nursery	DUR	15	3	45	Chester	10 31N 5E	Lamb	MWBC-MAES	Kammerzell Farm
20-9855-DUR	Off-Station Cultivar Eval Nursery	DUR	15	3	45	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
Sub-Totals:			7	147	441	7.07%	of Total Plot Inventory			

SPRING BARLEY (SB) INVESTIGATIONS

ON-STATION

20-2102-SB	Intrastate Cultivar Eval Nursery	SB	49	3	147	A-5-2	33 32N 15E	Sherman	MAES-MWBC	Lamb
20-3102-SB	Early Yield Evaluation Nursery	SB	64	3	192	A-5-2	33 32N 15E	Sherman	MAES-MWBC	Lamb
20-2502-SB	Hulless Intrastate Eval Nursery	SB	16	3	48	A-5-3	33 32N 15E	Sherman	MAES-MWBC	Lamb
20-SP03-SB	StayGreen Mapping Spring Barley	SB	48	4	192	A-5-2	33 32N 15E	Sherman	MAES-MWBC	Lamb
20-SP05-SB	Barley Roots	SB	12	4	48	A-5-1	33 32N 15E	Sherman	MAES-MWBC	Lamb
Sub-Totals:			5	189	627	10.06%	of Total Plot Inventory			

SAFFLOWER INVESTIGATIONS

ON-STATION

20-7702-SAF	Safflower Cultivar Eval. Nursery	SA	16	3	48	B-4-2	32 32N 15E	Bergman	NDSU-WREC	Lamb
Sub-Totals:			1	16	48	0.77%	of Total Plot Inventory			

BRASSICA (B_) INVESTIGATIONS

ON-STATION

20-CN02-CN	Statewide Canola Trial	CN	22	4	88	B-4-1	32 32N 15E	Fordyce	Var. Industry	Lamb
20-BJ02-BJ	BASF Brassica juncea Trial	BJ	16	4	64	B-4-1	32 32N 15E	Fordyce	Var. Industry	Lamb
Sub-Totals:			2	38	152	2.44%	of Total Plot Inventory			

PULSE CROP (PC) INVESTIGATIONS

ON-STATION

20-PC01-PC	Statewide Pea Trial	PC	46	4	184	B-6-1 & 2	32 32N 15E	Chen	USADPLC-MAES	Lamb
20-PC02-PC	Statewide Lentil Trial	PC	11	4	44	B-6-4	32 32N 15E	Chen	USADPLC-MAES	Lamb
20-2014-PEA	MSU Spring Pea Breeding Lines	PC	40	1	40	B-6-3	32 32N 15E	McPhee	MAES-MSU	Lamb
20-2064-LN	MSU Spring Lentil Breeding Lines	PC	30	1	30	B-6-4	32 32N 15E	McPhee	MAES-MSU	Lamb
20-2077-PEA	MSU RMA Spring Pea	PC	8	3	24	B-6-1	32 32N 15E	McPhee	MAES-MSU	Lamb
20-2078-LN	MSU RMA Spring Lentil	PC	6	3	18	B-6-4	32 32N 15E	McPhee	MAES-MSU	Lamb
20-2079-CP	MSU RMA Chickpea	PC	6	3	18	B-6-2	32 32N 15E	McPhee	MAES-MSU	Lamb
20-2081-CP	MSU Advanced Chickpea Yield Trl	PC	25	4	100	B-6-3	32 32N 15E	McPhee	MAES-MSU	Lamb
20-2034-WPEA	MSU Winter Pea Breeding Line Trl	PC	50	1	50	B-6-3	32 32N 15E	McPhee	MAES-MSU	Lamb
20-CS04-LnR	Lentil Rolling/Seeding Rate Trial	PC	50	5	250	B-5-1	32 32N 15E	Miller	USDA-MAES	Lamb
20-CS05-LnVT	Lentil Variety Trial	PC	10	4	40	H	27 32N 15E	Burrows	USDA-MAES	Lamb
20-CS06-LnTrt	Lentil Seed Trt Fusarium Fung. Trl	PC	10	4	40	H	27 32N 15E	Burrows	USDA-MAES	Lamb
20-CS03-LnF	Lentil Fertility-inoculants & fertility	PC	10	4	40	B-3-1	32 32N 15E	Miller	USDA-MAES	Lamb
20-CS01-PeaN	Peas - Increasing N Fixation	PC	10	4	40	B-3-1	32 32N 15E	Jones	USDA-MAES	Lamb
20-CS02-LenN	Lentils - Increasing N Fixation	PC	10	4	40	B-3-1	32 32N 15E	Jones	USDA-MAES	Lamb
20-PC05-PC	Statewide Chickpea Trial	PC	11	4	44	B-6-2	32 32N 15E	Chen	USADPLC-MAES	Lamb
Sub-Totals:			16	333	1002	16.07%	of Total Plot Inventory			

OTHER CROP (OC) INVESTIGATIONS

ON-STATION

20-CCSW-SW	Cover Crop WW/SW Rotation-SW	SW	51	3	153	B3	32 32N 15E	Bourgault	MAES-NARC	Lamb
20-CCWW-WW	Cover Crop WW/SW Rotation-WW	WW	51	3	153	B3	32 32N 15E	Bourgault	MAES-NARC	Lamb
20-SP04-QU	Quinoa Adaptability Trial	QU	30	2	60	B-4-2	32 32N 15E	Lamb	MAES-NARC	Lamb
20-CM05-CM	GCEH/SusOils Camelina	CM	20	3	60	B-4-1	32 32N 15E	Lamb	MAES-NARC	Lamb
Sub-Totals:			4	152	426	6.83%	of Total Plot Inventory			

FORAGE RESEARCH (FR) INVESTIGATIONS

ON-STATION

20-FR02-FR	Winter Cereal Forage Trial	FR	12	4	48	A-5-4	33 32N 15E	Carr	MAES-CARC	Lamb
20-FR03-FR	Spring Cereal Forage Trial	FR	13	4	52	A-5-1	33 32N 15E	Carr	MAES-CARC	Lamb
20-FR05-FR	Prelim Spring Barley Forage	FR	25	3	75	A-5-1	33 32N 15E	Sherman	MAES-MSU	Lamb
Sub-Totals:			3	50	175	2.81%	of Total Plot Inventory			

NUTRIENT RESEARCH (NR) INVESTIGATIONS

ON-STATION

20-NM03-SW	Mosaic SW MicroNutrients	SW	10	4	40	A-3-2	33 32N 15E	Mann	Mosaic	Lamb
20-NM05-Alf	Alfalfa Fertility	SW	30	3	90	H	27 32N 15E	Torrion	MFAC-MAES	Lamb
20-ZINC-WW	Zinc Fortified Winter Wheat	WW	12	4	48	An-3-5	33 32N 15E	Bruckner	MWBC-MAES	Lamb
20-NM06-PeaDP	Peas after Deep P on WW-yr3	Pea	12	3	36	B-9-3 & 4	32 32N 15E	Bourgault	MFAC-MAES	Lamb
20-NM07-WWDP	Deep P on Winter Wheat-yr1	WW	12	3	36	B-8-3 & 4	32 32N 15E	Bourgault	MFAC-MAES	Lamb
Sub-Totals:			5	76	250	4.01%	of Total Plot Inventory			

PEST MANAGEMENT (PM) INVESTIGATIONS

ON-STATION

20-PM36-WW	Wheat Curl Mite Tolerant WW	WW	49	4	196	An-3-5	33 32N 15E	Burrows	MWBC-MAES	Bruckner/Lamb
Sub-Totals:			1	49	196	3.14%	of Total Plot Inventory			

PEST MANAGEMENT (PM) INVESTIGATIONS

OFF-STATION

20-SR04-WW	v Single Row Conan Allele WW	SW	198	1	198	Big Sandy 2	28N 9E	Cook	MAES-MSU	Works Farm
20-SR05-SW	v Single Row Conan Allele SW	SW	198	1	198	Big Sandy 2	28N 9E	Cook	MAES-MSU	Works Farm
Sub-Totals:			2	396	396	6.35%	of Total Plot Inventory			

2018-2020
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		
		2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020
On-Station	Winter Wheat*	4	4	4	140	138	138	359	357	357	10.5%	10.5%	7.9%
Off-Station	Winter Wheat*	7	8	7	148	257	148	346	455	346	13.3%	13.3%	7.6%
On-Station	Spring Wheat and Durum	9	4	4	235	174	173	613	512	511	15.0%	15.0%	11.3%
Off-Station	Spring Wheat and Durum*	7	7	7	160	168	147	480	504	441	14.8%	14.8%	9.7%
On-Station	Spring Barley	3	3	5	129	129	189	387	384	627	11.3%	11.3%	13.8%
On-Station	Safflower	1	1	1	12	16	16	36	48	48	1.4%	1.4%	1.1%
On-Station	Brassica sp.	1	1	2	15	14	38	60	56	152	1.6%	1.6%	3.4%
On-Station	Pulse Crops	7	7	16	151	156	333	570	422	1002	12.4%	12.4%	22.1%
On-Station	Other Crops	1	3	4	24	50	152	144	228	426	6.7%	6.7%	9.4%
On-Station	Forage	3	3	3	45	36	50	145	128	175	3.8%	3.8%	3.9%
On-Station	Nutrient Research	6	3	5	137	41	76	434	147	250	4.3%	4.3%	5.5%
On-Station	Pest Management	4	2	1	55	12	49	226	36	196	1.1%	1.1%	4.3%
Off-Station	Pest Management*	7	3	2	99	64	0	368	136	0	4.0%	4.0%	0.0%
Grand Total		60	49	61	1350	1255	1509	4168	3413	4531	100.0%	100.0%	100.0%
Harvested								3880	2895	4531	93.1%	84.8%	100.0%
Total On-Station Plots								2974	2318	3744	71.4%	67.9%	82.6%
Total Off-Station Plots								1194	1095	787	28.6%	32.1%	17.4%

* Winter Wheat, Spring Wheat & Pest Management:

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

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

2020 SUMMARY: Project Inventory - (Plots Established)

TOTALS - AGRONOMY & LIVESTOCK PROJECTS	61 Experiments or Trials
	3212 Entries in 6234 Plots
	4531 Plots for Harvest

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

ON-STATION	=	60.06%
OFF-STATION	=	39.94%

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

* Blaine County	=	7.83%	1-Loc:	WW, SW, DUR, Vars
* Chouteau County	=	82.53%	2-Loc:	WW & SW Vars & Sawfly
* Hill County	=	0.00%	0-Loc:	WW Sawfly & WW Sawfly Insecticide
* Liberty County	=	4.82%	1-Loc:	SW, DUR Vars
* Phillips County	=	4.82%	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
- l = INSECT injury
- n = NATURAL calamity to include weather effects other than drought, freezing or hail
- o = OTHER (human error - staff or cooperators, 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

TABLE 1. Intrastate Winter Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2020. (Exp# 20-3502-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	163.5	24.7	52.0	61.5	13.8	400	52.4
Bobcat	Montana, 2019	161.6	24.0	59.5	62.6	14.4	382	19.0
Brawl CL Plus	Plainsgold/Colorado Wheat Res Fdn, 2011	155.7	24.8	47.1	63.4	14.0	399	30.7
Byrd CL Plus	Plainsgold/Col. Wheat Res Fdn, 2018	158.0	25.3	57.7	63.0	13.1	386	43.6
CP7909	Winfield United (Croplan), 2018	155.1	24.0	29.8	62.4	13.5	396	56.3
Flathead	Montana, 2019	157.3	26.3	50.4	63.1	13.9	418	33.7
FourOsix	Montana, 2018	159.2	26.2	53.1	62.2	14.2	398	62.4
Incline AX	Plainsgold/Colorado Wheat Res Fdn, 2017	161.4	24.7	52.0	61.9	12.9	346	33.7
Judee	Montana, 2011	162.0	24.9	50.8	63.6	15.2	389	31.3
Keldin	WestBred, 2011	161.3	25.1	58.1	62.0	14.3	400	61.1
Langin	Plainsgold/Colorado Wheat Res Fdn, 2016	156.2	24.5	49.9	62.3	13.0	374	50.2
LCS Jet	Limagrain Cereal Seeds, 2015	161.1	21.2	52.5	60.0	14.0	337	51.0
LCS Photon AX	Limagrain Cereal Seeds, 2019	156.6	24.0	49.9	63.6	14.0	404	52.3
Loma	Montana, 2016	164.3	24.0	53.0	62.1	14.7	422	37.8
Long Branch	Limagrain; Dyna-Gro Wheat, 2016	155.2	24.1	51.6	62.5	13.1	338	40.4
Mpress (SWW)	McGregor Co./Syngenta Participations AG, 2017	162.9	25.6	57.1	60.5	12.9	323	43.0
Northern	Montana, 2015	161.8	23.9	49.4	62.0	14.8	467	24.6
StandClear CLP	Montana/Loveland Products Inc., 2020	160.8	25.7	53.5	62.4	14.1	392	61.0
SY 517 CL2	Syngenta (AgriPro), 2017	156.2	23.9	44.7	63.7	14.3	395	33.9
SY Clearstone 2CL	Montana/Syngenta, 2012	161.5	26.6	52.4	61.6	14.7	452	55.1
SY Legend CL2	Syngenta, 2018	157.8	24.8	48.5	62.7	14.5	453	45.8
SY Monument	Syngenta (AgriPro), 2014	158.7	24.2	49.8	61.6	13.1	379	36.2
SY Wolverine	Syngenta 2019	156.7	22.5	49.0	63.1	14.5	347	48.3
Warhorse	Montana, 2013	161.7	22.9	51.4	62.1	14.8	499	34.6
WB4269	WestBred, 2017	156.2	23.3	49.0	62.4	12.8	370	20.4
WB4311	WestBred, 2017	158.7	23.2	50.0	62.8	14.2	386	54.6
WB4418	WestBred, 2018	156.4	21.9	46.3	61.4	13.5	353	31.6
WB4792	WestBred, 2019	160.8	24.0	54.0	64.5	13.1	409	30.7
Yellowstone	Montana 2005	162.4	27.5	53.5	61.5	14.4	433	38.4
LCS15ACC-8-21	Limagrain Cereal Seeds exp. line	156.6	23.4	51.8	63.2	13.1	336	40.0
LCS-18-7071	Limagrain Cereal Seeds exp. line	162.0	26.1	54.3	62.1	12.5	365	54.0
MT1642	Yellowstone/Madsen//Yellowstone	161.3	27.1	53.6	61.8	14.6	429	41.5
MT1683	Yellowstone(L)*2/CDC Buteo	161.5	27.7	53.6	61.4	14.5	428	38.5
MT1745	Decade*2/NI06732	161.7	24.8	50.1	62.9	13.6	431	31.4
MT1746	MT06103//MTW0881/SD06W166	160.9	23.8	49.3	62.9	13.7	384	35.5
MT1787	MT08185//YLL*2/PI640431/3/PROM/3*YLL//YLL*2/Pelsar	161.4	23.6	52.0	62.1	14.3	382	33.3
MT1793	Decade-Fhb1	158.2	22.2	46.2	62.3	15.5	404	34.1
MT1845	Yellowstone/493-22(Reeder/6*Paul)	159.7	23.7	53.3	61.5	14.7	481	31.0
MT1848	Northern//MT08184/MT0887	162.5	24.9	53.1	61.3	15.1	504	29.4
MT1855	05X438-aC 71(MT0097*2//Jagalene/Choteau)/Roughrider	162.4	23.7	53.1	62.4	14.3	403	57.1

TABLE 1. Intrastate Winter Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2020. (Exp# 20-3502-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 %
MT1866	MT0859//00X83cE45/MT0698	160.4	22.9	49.9	61.6	14.1	357	46.0
MT1867	MT0859//00X83cE45/MT0698	160.3	24.7	53.2	61.3	13.5	362	56.2
MT1872	MT0859//MT0840/MT0873	160.9	23.4	52.9	62.5	13.9	359	25.4
MTCL1732	AP035-8-1/5/MT08134/4/YLL*4/3/MTCL01158/CDCTeal	161.1	24.8	54.9	62.1	13.5	380	18.2
MTCL1737	YLL-2CL/3/YLL*2/Pelsart//PROM/3*YLL	163.2	22.8	51.8	61.1	14.5	402	27.6
MTS1810	08X350-A6/Warhorse	163.6	24.8	57.4	63.9	14.5	433	1.1
MTS18116	Loma*2/Warhorse	163.8	23.0	56.3	64.0	13.3	378	13.5
MTS18149	Loma*2/AAC Gateway	164.1	23.8	56.6	62.4	14.8	384	28.6
MTS1831	MTS0907/MTS0827	163.4	23.3	52.2	63.9	13.3	363	12.3
EXPERIMENTAL MEANS		160.2	24.3	51.7	62.4	14.0	396.2	38.1
LSD (0.05)		1.3	1.8	5.8	0.6	0.4	26.6	15.6
C.V.%		0.5	4.4	6.4	0.5	1.6	4.1	23.5
P-VALUE (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

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

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

1/ No. of Days from January 1 (160 = 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 (20-3502-WW)

Seeding Date:	September 25, 2019
Harvest Date:	July 31, 2020
Fertility:	125-20-10-10 side banded
System:	no till
Herbicide:	Bromac-16oz/ac
Insecticide:	none
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	9.31" (seeding to harvest)

TABLE 2. Nine-Year Yield Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/	
		2011 3/	2012	2013	2014	2015	2016	2017	2018	2019	2020				
MTS1588 BOBCAT (++) (saw fly res)	4							56.4	62.7	62.6	59.5	60.3	112.1	70.3	
CO Wht Res. Fdn. INCLINE AX	3								63.7	63.1	52.0	59.6	109.3	68.5	
AB; (SECAN) AAC WILDFIRE	3								72.5	54.0	52.0	59.5	109.0	68.4	
LCH12-012 LONG BRANCH (P+)	4							49.3	64.6	61.5	51.6	56.8	105.5	66.1	
ACS55017 KELDIN (P+)	7				61.5	54.8	107.8	56.2	68.6	52.4	58.1	65.6	105.3	66.0	
MTCS1601 STANDCLEAR CLP	3								55.5	61.6	53.5	56.9	104.3	65.4	
04BC74-2 SY MONUMENT (P+)	6					61.0	103.3	53.0	59.3	57.4	49.8	64.0	102.1	64.0	
NSA10-7208 LCS JET (P+)	4							48.8	59.5	58.9	52.5	54.9	102.1	64.0	
MT00159 YELLOWSTONE (+)	8		52.1	68.2	64.1	62.4	103.6		61.9	54.8	53.5	65.1	101.5	63.7	
CO13003C BYRD CL PLUS	4							51.0	58.8	51.0	57.7	54.6	101.5	63.6	
MT1465 FOUROSIX (++)	5							98.7	50.4	60.3	57.5	53.1	64.0	100.3	62.9
MT0978 NORTHERN (+)	9		54.8	73.1	60.5	56.9	103.8	51.6	56.5	57.7	49.4	62.7	100.0	62.7	
MTCL1077 SY CLEARSTONE 2CL (P+)	9		59.6	75.4	57.3	53.5	98.4	48.5	61.8	56.8	52.4	62.6	99.9	62.6	
MT1564 FLATHEAD (++)	4							51.2	61.2	49.1	50.4	53.0	98.5	61.7	
Syngenta SY LEGEND CL2	3								55.0	53.6	48.5	52.4	96.0	60.2	
MTS0713 JUDEE (+) (saw fly tol)	9		48.9	70.6	61.5	56.9	85.2	48.9	55.7	52.6	50.8	59.0	94.1	59.0	
MTS1224 LOMA (++)	7				50.5	52.9	80.8	48.0	60.5	51.1	53.0	56.7	90.9	57.0	
MTS0808 WARHORSE (+) (saw fly res)	9		51.7	65.1	47.9	57.7	89.8	43.8	57.0	46.5	51.4	56.8	90.5	56.8	
CO06052 BRAWL CL PLUS (+)	6					47.2	89.7	43.8	57.6	52.2	47.1	56.3	89.8	56.3	
Syngenta SY 517 CL2	3								51.3	46.4	44.7	47.5	87.0	54.6	
MEANS (For Entries Listed)			53.4	70.5	57.6	55.9	96.1	50.1	60.2	55.1	52.0			62.7	
April-July Precip. (in.)		8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2			
Total Annual Precip. (in.)		15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2			
Soil PAW (in.) to SD @ Planting		9.7	n/a	9.1	n/a	9.4	10.0	9.3	8.6	7.7	9.4	9.1			
Total Plant Available Water (in.)		18.4	7.3	22.4	4.9	17.0	22.2	11.7	12.6	14.0	15.0	14.5			
Soil NO ₃ (lbs.) to SD at Planting		32	60	59	48	37	113	65	272	117	419	122			
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	48	46	47	48			
Fertilizer Applied	(# N)	70	100	100	100	100	100	100	125	125	125	105			
	(# P ₂ O ₅)	40	20	20	20	20	20	20	20	20	20	22			
	(# K ₂ O)	25	10	10	10	10	10	10	10	10	10	12			
	(# S)	0	0	0	0	0	0	10	10	10	10	4			

Check variety is Northern.

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

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

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

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

TABLE 3. Nine-Year Test Weight Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/	
			2011 3/	2012	2013	2014	2015	2016	2017	2018	2019				2020
Syngenta	SY 517 CL2	3								64.1	61.3	63.7	63.1	102.5	62.3
CO06052	BRAWL CL PLUS (+)	6					62.1	61.0	62.6	64.3	62.0	63.4	62.6	102.0	62.0
MTS0713	JUDEE (+)(saw fly tol)	9		56.9	60.2	61.8	61.8	61.3	62.9	63.6	61.3	63.6	61.5	101.2	61.5
MT1564	FLATHEAD (++)	4							62.4	63.6	60.4	63.1	62.4	101.1	61.5
Syngenta	SY LEGEND CL2	3								63.2	60.6	62.7	62.2	101.1	61.5
ACS55017	KELDIN (P+)	7				61.1	61.7	61.2	62.2	63.1	59.9	62.0	61.6	100.7	61.2
CO13003C	BYRD CL PLUS	4							61.3	63.4	60.6	63.0	62.1	100.6	61.2
MTS1588	BOBCAT (++) (saw fly res)	4							62.2	62.7	60.6	62.6	62.0	100.6	61.1
MTCS1601	STANDCLEAR	3								62.9	60.7	62.4	61.8	100.5	61.1
MT1465	FOUROSIX (++)	5						59.9	62.5	62.6	60.0	62.2	61.4	100.4	61.0
LCH12-012	LONG BRANCH (P+)	4							60.1	63.2	60.9	62.5	61.7	100.0	60.8
MT0978	NORTHERN (+)	9		58.5	59.6	61.0	62.1	59.2	62.2	62.3	60.3	62.0	60.8	100.0	60.8
CO Wht Res. Fdn.	INCLINE AX	3								62.6	59.8	61.9	61.4	99.9	60.7
MTS0808	WARHORSE (+)(saw fly res)	9		57.6	59.0	61.1	60.6	60.4	62.2	62.5	60.2	62.1	60.6	99.7	60.6
MTS1224	LOMA (++)	7				60.5	61.0	58.6	62.1	62.6	59.7	62.1	61.0	99.6	60.6
04BC74-2	SY MONUMENT (P+)	6					60.9	59.6	61.5	62.4	59.5	61.6	60.9	99.3	60.4
MT00159	YELLOWSTONE (+)	8		58.1	59.3	60.7	60.9	59.4		61.7	59.5	61.5	60.1	99.2	60.3
MTCL1077	SY CLEARSTONE 2CL (P+)	9		57.1	58.2	60.8	60.9	59.5	62.0	61.4	59.5	61.6	60.1	98.9	60.1
AB; (SECAN)	AAC WILDFIRE	3								62.2	58.8	61.5	60.8	98.9	60.1
NSA 10-7208	LCS Jet (P+)	4							60.2	60.7	57.5	60.0	59.6	96.6	58.7
MEANS (For Entries Listed)				57.6	59.3	61.0	61.4	60.0	61.9	62.8	60.2	62.3			60.9
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			9.7	n/a	9.1	n/a	9.4	10.0	9.3	8.6	7.7	9.4	9.1		
Total Plant Available Water (in.)			18.4	7.3	22.4	4.9	17.0	22.2	11.7	12.6	14.0	15.0	14.5		
Soil NO ₃ (lbs.) to SD at Planting			32	60	59	48	37	113	65	272	117	419	122		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	48	48	46	47	48		
Fertilizer Applied															
(# N)			70	100	100	100	100	100	100	125	125	125	105		
(# P ₂ O ₅)			40	20	20	20	20	20	20	20	20	20	22		
(# K ₂ O)			25	10	10	10	10	10	10	10	10	10	12		
(# S)			0	0	0	0	0	0	10	10	10	10	4		

Check variety is Northern.

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

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

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

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

TABLE 4. Nine-Year Protein Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (Exp# 3502-WW)

			1/ PROTEIN % (Values Adjusted to 13% Grain Moisture)										AVE. for YEARS TESTED	% of CHECK PROTEIN 4/	9-YR COMP. AVE. PROTEIN 5/
2/ VARIETY or SELECTION	No. of YEARS TESTED	2011 3/	2012	2013	2014	2015	2016	2017	2018	2019	2020				
MTS0808	WARHORSE (+)(saw fly res)	9		13.1	12.3	13.5	12.8	10.7	14.8	14.9	16.2	14.8	13.7	102.1	13.7
MTS0713	JUDEE (+)(saw fly tol)	9		14.6	12.1	12.8	12.6	9.8	14.4	15.5	15.8	15.2	13.6	101.8	13.6
Syngenta	SY 517 CL2	3								14.1	16.0	14.3	14.8	101.3	13.6
CO06052	BRAWL CL PLUS (+)	6					13.9	11.1	14.1	14.0	15.3	14.0	13.7	100.6	13.5
MTS1224	LOMA (++)	7			13.5	13.5	10.2	14.0	14.4	15.2	14.7	13.6	100.5	13.5	
MT1465	FOUROSIX (++)	5					11.2	14.4	14.9	14.9	14.2	13.9	100.5	13.5	
MT0978	NORTHERN (+)	9		13.3	12.3	13.1	12.7	10.8	14.6	14.2	14.8	14.8	13.4	100.0	13.4
MTCL1077	SY CLEARSTONE 2CL (P+)	9		13.3	12.1	12.4	12.8	10.4	14.8	14.3	15.3	14.7	13.3	99.5	13.3
MT00159	YELLOWSTONE (+)	8		13.5	11.9	12.6	12.6	10.6		14.2	15.1	14.4	13.1	99.0	13.3
Syngenta	SY LEGEND CL2	3								14.0	14.8	14.5	14.4	98.8	13.2
MTS1588	BOBCAT (++) (saw fly res)	4							14.0	14.3	14.9	14.4	14.4	98.6	13.2
MT1564	FLATHEAD (++)	4							13.8	13.8	15.1	13.9	14.1	96.9	13.0
AB; (SECAN)	AAC WILDFIRE	3								13.8	14.6	13.8	14.1	96.3	12.9
ACS55017	KELDIN (+)	7			12.4	12.6	10.6	12.5	13.7	15.1	14.3	13.0	13.0	96.0	12.9
NSA 10-7208	LCS Jet (P+)	4							13.0	13.8	14.6	14.0	13.9	94.9	12.7
CO13003C	BYRD CL PLUS	4							13.8	12.6	15.3	13.1	13.7	93.9	12.6
MTCS1601	STANDCLEAR	3								14.7	11.6	14.1	13.5	92.3	12.4
04BC74-2	SY MONUMENT (P+)	6					11.2	10.3	12.7	13.0	14.0	13.1	12.4	90.7	12.2
LCH12-012	LONG BRANCH (P+)	4							13.4	12.2	13.9	13.1	13.1	90.0	12.1
CO Wht Res. Fdn.	INCLINE AX	3								12.5	13.7	12.9	13.0	89.4	12.0
MEANS (For Entries Listed)				13.6	12.1	12.9	12.7	10.6	13.9	13.9	14.8	14.1			13.0
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			9.7	n/a	9.1	n/a	9.4	10.0	9.3	8.6	7.7	9.4	9.1		
Total Plant Available Water (in.)			18.4	7.3	22.4	4.9	17.0	22.2	11.7	12.6	14.0	15.0	14.5		
Soil NO ₃ (lbs.) to SD at Planting			32	60	59	48	37	113	65	272	117	419	122		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	48	48	46	47	48		
Fertilizer Applied															
(# N)			70	100	100	100	100	100	100	125	125	125	105		
(# P ₂ O ₅)			40	20	20	20	20	20	20	20	20	20	22		
(# K ₂ O)			25	10	10	10	10	10	10	10	10	10	12		
(# S)			0	0	0	0	0	0	10	10	10	10	4		

Check variety is Northern.

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

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

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

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

5/ 9-Yr Comparable Average = (x/y) * z w here x = average protein percent of a given entry for years tested, y = average protein percent for Northern for the same years, and z = 9-Yr average protein percent for the check variety Northern.

TABLE 5. Ten-Year Sawfly Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
MTS1588	BOBCAT (++) (saw fly res)	4							0.3	1.9	0.6	19.0	5.5	57.8	2.7
MTS0808	WARHORSE (+) (saw fly res)	10	1.0	2.3	2.3	1.0	2.0	0.0	0.3	0.2	2.8	34.6	4.7	100.0	4.7
MTS0713	JUDEE (+) (saw fly tol)	10	4.0	2.1	5.3	1.0	0.7	0.0	0.0	5.0	11.4	31.3	6.1	130.7	6.1
CO06052	BRAWL CL PLUS (+)	6					1.0	0.0	1.0	6.6	13.9	30.7	8.9	133.2	6.2
CO Wht Res. Fdn.	INCLINE AX	3								2.8	14.8	33.7	17.1	136.7	6.4
Syngenta	SY 517 CL2	3								1.6	16.0	33.9	17.2	137.1	6.4
LCH12-012	LONG BRANCH (P+)	4							1.0	3.7	12.4	40.4	14.4	151.5	7.0
MTS1224	LOMA (++)	7				2.3	2.3	0.0	0.3	4.1	15.4	37.8	8.9	152.1	7.1
MT1564	FLAHEAD (++)	4							0.7	2.3	27.4	33.7	16.0	168.8	7.9
CO13003C	BYRD CL PLUS	4							0.3	3.6	21.0	43.6	17.1	180.8	8.4
04BC74-2	SY MONUMENT (P+)	6					3.7	0.0	0.3	3.4	32.4	36.2	12.7	190.3	8.9
MT0978	NORTHERN (+)	10	2.3	9.3	6.7	2.3	2.3	0.0	0.0	3.9	37.6	24.6	8.9	191.1	8.9
MTCS1601	STANDCLEAR	3								4.2	11.6	61.0	25.6	204.5	9.5
Syngenta	SY LEGEND CL2	3								6.7	26.9	45.8	26.5	211.2	9.8
MT00159	YELLOWSTONE (+)	9	5.3	8.9	10.0	2.3	2.3	0.0		7.7	30.2	38.4	11.7	227.6	10.6
NSA10-7208	LCS JET (P+)	4							0.3	5.1	34.7	51.0	22.8	240.4	11.2
AB; (SECAN)	AAC WILDFIRE	3								5.5	32.4	52.4	30.1	240.6	11.2
MT1465	FOUROSIX (++)	5						0.0	0.3	3.6	38.6	62.4	21.0	276.6	12.9
ACS55017	KELDIN (+)	7				2.3	15.0	0.0	0.7	7.2	45.9	61.1	18.9	323.1	15.0
MTCL1077	SY CLEARSTONE 2CL (P+)	9		11.0	13.3	2.3	11.7	0.0	0.0	10.6	44.0	55.1	16.4	325.1	15.1
MEANS (For Entries Listed)			3.2	6.7	7.5	2.0	4.6	0.0	0.4	4.5	23.5	41.3			8.8
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			9.7	n/a	9.1	n/a	9.4	10.0	9.3	8.6	7.7	9.4	9.1		
Total Plant Available Water (in.)			18.4	7.3	22.4	4.9	17.0	22.2	11.7	12.6	14.0	15.0	14.5		
Soil NO ₃ (lbs.) to SD at Planting			32	60	59	48	37	113	65	272	117	419	122		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	48	48	46	47	48		
Fertilizer Applied															
(# N)			70	100	100	100	100	100	100	125	125	125	105		
(# P ₂ O ₅)			40	20	20	20	20	20	20	20	20	20	22		
(# K ₂ O)			25	10	10	10	10	10	10	10	10	10	12		
(# S)			0	0	0	0	0	0	10	10	10	10	4		

Check variety is Northern.

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

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

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

TABLE 6. Advanced Yield Spring Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2020. (Exp# 20-3102-SW)

ID	Cultivar or Selection	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
ALUM	WSCIA	177.3	28.7	56.6	60.3	14.0	2.3
AP MURDOCK	SYN 201	175.3	27.3	56.0	60.4	14.8	8.3
CHOTEAU	PI 633974	175.0	26.8	64.9	61.0	14.2	2.0
CORBIN	BZ 996434	174.7	29.0	56.8	60.4	14.7	2.0
DAGMAR	PI 690450	173.7	30.5	71.9	61.4	14.2	0.3
DUCLAIR	PI 660981	174.0	29.6	64.8	59.4	14.3	2.3
EGAN	PI 671855	175.7	30.0	63.6	58.3	15.1	6.7
FORTUNA	CI 13596	176.0	35.1	50.9	60.9	14.0	7.0
LANNING	PI 676978	175.3	28.4	66.4	60.5	14.1	6.7
LCS CANNON	LIMAGR 181	172.3	26.7	61.5	62.8	13.7	5.3
LCS REBEL	LIMAGR 171	173.7	32.0	62.8	61.3	14.4	6.7
LNR 2076	LIMAGR 201	181.0	29.7	61.1	55.8	13.3	1.0
MCNEAL	PI 574642	176.7	30.1	55.8	58.4	14.3	13.3
MS Barracuda	MS 202	172.3	27.0	54.1	61.5	15.0	8.7
MS Chevelle	MS 203	174.3	27.0	56.3	60.2	13.4	2.3
MS Rancho	MS 201	174.3	30.1	55.4	59.5	14.2	12.0
NP 12100559-16	SYN 202	176.0	25.6	62.2	61.6	14.2	2.3
NS PRESSER CLP	PI 679964	176.0	28.9	59.9	58.4	14.8	10.0
REEDER	ND 695	175.3	28.8	61.1	61.1	13.9	5.3
SY 611 CL2	SYN 183	175.3	28.5	60.6	61.5	14.2	2.0
SY INGMAR	AGRIPR 141	175.0	28.2	56.4	61.2	14.3	8.3
SY LONGMIRE	SYN 182	176.0	28.5	66.8	60.9	13.6	3.7
SY McCLOUD	SYN 181	174.0	28.6	59.0	62.6	14.6	7.0
SY Rockford	AGRIPR 161	177.0	30.3	61.8	60.0	13.7	2.3
SYN 203	NP 11100135-1 CL2	174.7	28.2	63.5	60.1	14.9	3.7
VIDA	PI 642366	176.3	30.1	64.4	60.1	13.7	2.0
WB 9590	WB 171	174.7	26.2	57.8	61.9	14.4	5.0
WB 9707	WB 201	172.3	28.6	51.2	61.3	14.5	26.7
WB 9719	WB 173	177.0	28.7	61.7	61.8	13.6	5.7
WB 9879 CLP	CHOTEAU*3/CHOTEAU/IMI8134	177.0	27.9	64.6	61.0	14.1	0.7
WB GUNNISON	BZ 92413R	175.3	28.1	61.0	61.3	13.7	0.0
MT 1716	MT1274/RB07	173.7	29.5	63.5	61.0	14.3	8.7
MT 1743	MT1274///MT0801//CHOTEAU/SD3851	176.7	31.1	66.4	59.2	13.8	0.7
MT 1750	MT0747/PF906409 (HANK*6/CHOTEAU)//MT082	174.7	29.9	56.7	61.9	14.1	8.3
MT 1775	MT0801/09SR49//MT0928/MOTT	177.0	30.1	59.9	59.4	13.4	3.7
MT 1809	VIDA/MO 09/3-4	176.0	28.3	71.0	60.6	13.8	3.7
MT 1815	MT1206/MT1203	176.7	29.9	62.6	60.7	14.2	2.0
MT 1824	MT1206/MT1273	174.7	28.7	59.9	59.8	14.7	2.3
MT 1853	MT1053/MT1273	175.7	29.2	68.8	61.6	13.4	5.0
MT 1855	MT1053/MO8/3-4	176.7	33.6	57.7	58.9	14.2	2.3
MT 1857	MT1142/MT1273	176.0	31.5	71.5	60.5	14.0	2.3
MT 1862	MT1142/MT1264	174.3	28.4	63.0	60.2	14.3	3.7
MT 1866	Vida*4/Conan	176.0	29.5	63.4	60.2	14.0	0.7

TABLE 6. Advanced Yield Spring Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2020. (Exp# 20-3102-SW)

ID	Cultivar or Selection	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
MT 1868	MT1053/BUCKFRONTO	176.0	29.9	58.4	58.5	14.1	5.3
MT 1871	MT1007/TRVERSE	175.3	29.2	60.2	59.7	14.1	6.7
MT 1872	MT1007/M0 09/3-4	173.3	28.3	61.1	59.4	14.3	6.7
MT 1902	MT1316/MT1103	174.7	28.3	64.4	61.8	13.8	12.0
MT 1904	VIDA//MT1018//CHOTEAU/YELLOWSTONE-26	176.0	28.4	67.3	62.1	13.5	2.0
MT 1905	VIDA//MT1018//CHOTEAU/YELLOWSTONE-26	175.7	28.2	69.2	61.1	13.8	2.3
MT 1906	VIDA/IDO1202S	176.0	28.6	62.7	59.6	13.7	1.0
MT 1909	MT1338//MT1018//CHOTEAU/YELLOWSTONE-26	173.7	26.6	61.9	62.9	14.1	13.3
MT 1922	VIDA/MT1236	175.7	28.2	64.4	59.8	13.9	4.0
MT 1927	MT1203/MT1234	175.3	29.6	62.3	58.8	14.6	5.3
MT 1931	MT1316/MT1319	175.0	29.8	64.3	60.8	13.9	2.3
MT 1932	VIDA/MT1319	174.7	29.0	59.1	59.6	14.2	3.3
MT 1934	VIDA/MT1319	174.7	30.0	68.7	61.4	13.4	8.3
MT 1935	VIDA/MT1319	175.3	30.2	51.7	60.6	13.8	5.0
MT 1936	MT1338/SD4299	176.0	30.7	61.0	60.5	14.1	11.7
MT 1938	MT1316//MT1018//CHOTEAU/YELLOWSTONE-26	174.0	27.9	67.4	60.7	14.4	8.3
MT 1939	MT1316//MT1018//CHOTEAU/YELLOWSTONE-26	175.3	28.1	64.5	61.4	13.7	4.0
MT 1943	MT1203/9263	173.3	29.5	60.2	61.6	15.0	2.3
MT 1951	MT1316/EGAN	176.0	28.9	62.3	57.5	14.7	3.7
MT 1959	0249XExGlupro	174.3	30.2	67.4	60.2	14.6	4.0
MT 1961	0249XExGlupro	174.7	29.0	64.2	60.8	14.6	1.0
EXPERIMENTAL MEANS		175.3	29.1	61.8	60.5	14.1	5.1
LSD (0.05)		1.3	2.1	6.7	1.0	0.6	7.0
C.V.: (S / MEAN)*100		0.5	4.5	6.7	1.1	2.8	84.1
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 (175 = June 23).

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 (20-3102-SW)

Seeding Date: April 29, 2020
Harvest Date: August 10, 2020
Fertility: 100-20-10-10 side banded
System: no till
Herbicide: Bromac-16oz/ac
Insecticide: none
Previous Crop: Chemical Fallow-Spring Wheat
Precipitation: 5.01" (seeding to harvest)

TABLE 7. Ten-Year Yield Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
PI642366	VIDA (+)	10	44.6	35.1	67.2	47.9	45.9	40.5	35.6	44.4	53.1	64.4	47.9	100.0	47.9
MT 1621	DAGMAR	4							29.4	45.1	49.8	71.9	49.0	99.3	47.5
SYN 182	SY LONGMIRE (P+)	3								41.4	50.4	66.8	52.9	97.9	46.9
WB 173	WB 9719	4							31.9	48.2	50.6	61.7	48.1	97.4	46.6
WA8166	ALUM	5						51.5	30.8	39.2	49.6	56.6	45.5	95.7	45.8
PI676978	LANNING (++)	7			44.2	44.3	45.6	27.7	44.6	43.0	66.4	45.1	95.2	95.2	45.6
PI679964	NS PRESSER CL (P+)	7		32.1	69.4			35.3	34.7	45.7	46.0	59.9	46.1	94.9	45.4
AGRIPR161	SY ROCKFORD (P+)	5						41.4	30.9	44.5	44.2	61.8	44.6	93.6	44.8
ND695	REEDER (+)	10	41.8	31.4	62.7	45.7	42.3	44.7	29.0	44.6	42.8	61.1	44.6	93.2	44.6
SYN 183	SY 611 CL2 (P+)	3								43.9	46.3	60.6	50.2	93.0	44.5
04S0258-12	SY INGMAR (P+)	7				44.9	43.7	41.2	30.8	44.2	45.5	56.4	43.8	92.4	44.2
IMICHT-79	WB9879CLP (P+)	10	40.0	29.8	58.9	40.5	38.0	43.6	29.1	43.5	51.3	64.6	43.9	91.7	43.9
PI660981	DUCLAIR (+)	10	41.0	34.9	61.7	46.9	43.2	38.6	26.2	33.9	47.7	64.8	43.9	91.7	43.9
BZ 996-434	CORBIN (P+)(saw fly tol)	10	45.5	31.3	59.3	38.8	42.3	45.7	25.3	40.8	44.8	56.8	43.0	89.9	43.0
PI 671855	EGAN (+)	9		31.6	55.5	37.8	38.9	46.5	30.5	38.6	44.0	63.6	43.0	89.2	42.7
BZ902-413R	WB-GUNNISON (P+)	10	44.1	32.3	56.5	43.4	39.7	34.0	26.7	36.3	52.0	61.0	42.6	89.0	42.6
PI574642	McNEAL	10	36.4	34.1	53.0	41.5	43.4	39.2	32.2	41.1	46.8	55.8	42.3	88.4	42.3
SYN 181	SY MCCLOUD (P+)	3								40.1	40.4	59.0	46.5	86.1	41.2
PI633974	CHOTEAU (+)(saw fly tol)	10	38.8	31.1	53.9	40.2	39.5	36.8	26.4	36.6	43.5	64.9	41.2	86.0	41.2
LIMAGR 171	LCS REBEL (P+)	4							24.5	36.3	43.7	62.8	41.8	84.7	40.5
WB 171	WB 9590	4							23.4	39.1	46.5	57.8	41.7	84.5	40.4
CI13596	FORTUNA (saw fly tol)	10	40.5	33.6	49.3	37.2	34.2	36.4	27.5	37.6	41.7	50.9	38.9	81.2	38.9
MEANS (For Entries Listed)			41.4	32.5	58.9	42.4	41.3	41.4	29.1	41.3	46.5	61.3			43.8
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			7.0	n/a	9.2	8.3	9.8	8.8	8.7	7.4	n/a	8.7	8.5		
Total Plant Available Water (in.)			15.7	7.3	22.5	13.1	17.3	21.0	11.1	11.4	n/a	14.2	14.9		
Soil NO ₃ (lbs.) to SD at Planting			124	35	56	86	75	55	85	77	300	171	106		
SD (Sampling Depth in Inches)			36	48	48	48	48	48	45	42	47	45	45		
Fertilizer Applied															
(# N)			70	100	100	100	100	125	125	100	100	100	102		
(# P ₂ O ₅)			40	20	20	20	20	20	20	20	20	20	22		
(# K ₂ O)			25	10	10	10	10	10	10	10	10	10	12		
(# S)			0	0	0	0	0	10	10	10	10	10	5		

Long-term check variety is Vida.

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

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

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

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

TABLE 8. Ten-Year Test Weight Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/	
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020				
SYN 181	SY MCCLOUD (P+)	3								62.5	60.5	62.6	61.9	103.5	60.1	
WB 173	WB 9719	4							60.5	61.9	61.5	61.8	61.4	103.2	59.9	
WB 171	WB 9590	4							61.0	61.0	60.3	61.9	61.1	102.6	59.6	
SYN 183	SY 611 CL2 (P+)	3								61.0	61.1	61.5	61.2	102.4	59.5	
04S0258-12	SY INGMAR (P+)	7				60.6	54.0	58.1	59.6	61.7	60.5	61.2	59.4	102.2	59.3	
LIMAGR 171	LCS REBEL	4							60.3	61.3	59.8	61.3	60.7	101.9	59.2	
SYN 182	SY LONGMIRE (P+)	3								60.7	60.9	60.9	60.8	101.7	59.1	
MT 1621	DA GMAR	4							59.2	61.0	59.4	61.4	60.3	101.2	58.8	
BZ902-413R	WB-GUNNISON (P+)	10	60.2	52.9	62.6	58.2	56.1	56.8	58.6	60.4	60.0	61.3	58.7	101.1	58.7	
ND695	REEDER (+)	10	61.3	52.9	62.8	58.5	54.4	58.2	58.4	59.7	59.8	61.1	58.7	101.0	58.7	
WA8166	ALUM	5							59.2	58.7	60.1	59.4	60.3	59.5	101.0	58.7
BZ 996-434	CORBIN (P+)(saw fly tol)	10	61.2	51.3	62.7	59.5	53.3	58.6	59.0	60.7	59.8	60.4	58.6	101.0	58.6	
CH13596	FORTUNA (saw fly tol)	10	60.7	54.6	61.9	58.7	54.6	59.0	57.9	59.2	58.2	60.9	58.6	100.8	58.6	
IMICHT-79	WB9879CLP (P+)	10	60.2	51.9	61.7	58.6	53.8	57.7	58.2	59.7	58.8	61.0	58.2	100.1	58.2	
PI676978	LANNING (++)	7				59.1	53.0	58.1	58.3	58.4	59.7	60.5	58.2	100.0	58.1	
PI642366	VIDA (+)	10	60.8	50.8	62.4	58.6	53.8	56.5	58.7	59.9	59.4	60.1	58.1	100.0	58.1	
PI633974	CHOTEAU (+)(saw fly tol)	10	59.6	52.0	61.5	58.3	52.8	58.1	57.8	59.8	58.7	61.0	58.0	99.8	58.0	
AGRIPR161	SY ROCKFORD (P+)	5							56.1	57.8	59.9	57.9	60.0	58.3	99.0	57.5
PI660981	DUCLAIR (+)	10	59.1	51.6	61.2	58.1	52.5	57.5	57.2	59.8	58.4	59.4	57.5	98.9	57.5	
PI574642	McNEAL	10	59.1	52.3	61.8	56.8	54.5	55.7	57.1	57.5	58.5	58.4	57.2	98.4	57.2	
PI671855	EGAN (+)	9				54.1	60.8	56.9	53.5	57.0	56.1	57.2	57.1	58.3	56.8	57.1
PI679964	NS PRESSER CL (P+)	7				49.2	61.7			53.8	58.6	58.8	58.1	58.4	57.0	56.8
MEANS (For Entries Listed)			60.2	52.1	61.9	58.5	53.9	57.4	58.6	60.1	59.5	60.6			58.5	
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2			
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2			
Soil PAW (in.) to SD @ Planting			7.0	n/a	9.2	8.3	9.8	8.8	8.7	7.4	n/a	8.7	8.5			
Total Plant Available Water (in.)			15.7	7.3	22.5	13.1	17.3	21.0	11.1	11.4	n/a	14.2	14.9			
Soil NO ₃ (lbs.) to SD at Planting			124	35	56	86	75	55	85	77	300	171	106			
SD (Sampling Depth in Inches)			36	48	48	48	48	48	45	42	47	45	45			
Fertilizer Applied																
(# N)			70	100	100	100	100	125	125	100	100	100	102			
(# P ₂ O ₅)			40	20	20	20	20	20	20	20	20	20	22			
(# K ₂ O)			25	10	10	10	10	10	10	10	10	10	12			
(# S)			0	0	0	0	0	10	10	10	10	10	5			

Long-term check variety is Vida.

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

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

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

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

TABLE 9. Ten-Year Protein Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (Exp# 3102-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ PROTEIN % (Values Adjusted to 13% Grain Moisture)										AVE. for YEARS TESTED	% of CHECK PROTEIN 3/	10-YR COMP. AVE. PROTEIN 4/
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
PI671855	EGAN (+)	9		18.3	15.7	17.3	18.2	17.4	16.9	17.4	17.1	15.1	17.0	111.3	16.8
SYN 181	SY MC CLOUD (P+)	3								16.5	17.2	14.6	16.1	109.7	16.6
LIMAGR 171	LCS REBEL (P+)	4							16.7	16.4	16.6	14.4	16.0	107.6	16.3
WB 171	WB 9590	4							16.3	16.4	16.5	14.4	15.9	106.7	16.1
SYN 182	SY LONGMIRE (P+)	3								16.6	16.5	13.6	15.6	106.2	16.1
PI 676978	LANNING (++)	7				16.3	16.6	16.0	16.8	16.0	16.9	14.1	16.1	105.5	16.0
BZ 996-434	CORBIN (P+)(saw fly tol)	10	13.8	18.5	13.8	16.4	17.3	15.0	16.2	16.7	16.6	14.7	15.9	105.1	15.9
PI633974	CHOTEAU (+)(saw fly tol)	10	14.5	17.5	15.1	16.3	16.7	15.7	16.4	16.1	16.5	14.2	15.9	105.1	15.9
MT 1621	DAGMAR	4							16.2	15.9	16.3	14.2	15.6	105.0	15.9
SYN 183	SY 611 CL2 (P+)	3								15.8	16.1	14.2	15.4	104.8	15.9
IMICHT-79	WB9879CLP (P+)	10	14.5	17.4	14.8	16.4	16.7	15.8	16.3	15.3	16.6	14.1	15.8	104.3	15.8
04S0258-12	SY INGMAR (P+)	7				15.7	17.0	15.9	16.3	15.7	16.2	14.3	15.9	104.0	15.7
PI660981	DUCLAIR (+)	10	14.3	18.0	14.1	15.7	17.0	15.4	16.3	15.9	16.1	14.3	15.7	103.8	15.7
ND 695	REEDER (+)	10	14.2	17.5	15.3	15.9	17.2	15.1	16.0	15.8	15.8	13.9	15.7	103.5	15.7
PI574642	McNEAL	10	13.8	16.9	14.8	15.8	17.0	15.4	16.0	15.8	15.6	14.3	15.5	102.7	15.5
WSCIA	ALUM (+)	5							15.7	15.8	15.9	15.5	14.0	102.3	15.5
PI 679964	NS PRESSER CL (P+)	7		17.6	14.4				15.5	15.4	15.2	15.6	14.8	102.2	15.5
CI 13596	FORTUNA (saw fly tol)	10	14.1	16.7	15.5	15.5	16.2	15.9	15.6	15.4	15.7	14.0	15.4	102.1	15.4
AGRIPR161	SY ROCKFORD (P+)	5							15.4	16.0	15.5	15.8	13.7	101.7	15.4
WB 173	WB 9719	4								15.3	15.4	15.4	13.6	100.2	15.2
PI642366	VIDA (+)	10	13.4	17.1	14.0	15.1	16.6	15.6	15.6	15.0	15.4	13.7	15.1	100.0	15.1
BZ902-413R	WB-GUNNISON (P+)	10	13.4	17.0	14.0	15.1	16.6	15.0	15.1	15.3	15.1	13.7	15.0	99.4	15.0
MEANS (For Entries Listed)			14.0	17.5	14.7	16.0	16.9	15.7	16.1	15.9	16.1	14.2			15.8
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			7.0	n/a	9.2	8.3	9.8	8.8	8.7	7.4	n/a	8.7	8.5		
Total Plant Available Water (in.)			15.7	7.3	22.5	13.1	17.3	21.0	11.1	11.4	n/a	14.2	14.9		
Soil NO ₃ (lbs.) to SD at Planting			124	35	56	86	75	55	85	77	300	171	106		
SD (Sampling Depth in Inches)			36	48	48	48	48	48	45	42	47	45	45		
Fertilizer Applied															
(# N)			70	100	100	100	100	125	125	100	100	100	102		
(# P ₂ O ₅)			40	20	20	20	20	20	20	20	20	20	22		
(# K ₂ O)			25	10	10	10	10	10	10	10	10	10	12		
(# S)			0	0	0	0	0	10	10	10	10	10	5		

Long-term check variety is Vida.

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

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

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

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

TABLE 10. Ten-Year Sawfly Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
MT 1621	DAGMAR	4							0.0	0.0	2.3	0.3	0.7	21.6	0.7
BZ902-413R	WB-GUNNISON (P+)	10	5.3	1.0	0.7	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.8	24.8	0.8
BZ 996-434	CORBIN (P+)(saw fly tol)	10	5.0	7.5	0.7	0.3	0.7	0.0	0.0	0.0	1.0	2.0	1.7	53.1	1.7
P1642366	VIDA (+)	10	10.0	5.0	1.0	0.3	3.7	0.0	0.0	0.3	10.0	2.0	3.2	100.0	3.2
WB 171	WB 9590	4							0.0	1.0	8.3	5.0	3.6	116.2	3.8
WSCIA	ALUM (+)	5						0.0	0.0	0.3	13.3	2.3	3.2	129.7	4.2
IMICHT-79	WB9879CLP (P+)	10	28.3	10.0	0.7	0.3	1.0	0.0	0.0	0.0	1.0	0.7	4.2	130.0	4.2
P1660981	DUCLAIR (+)	10	28.3	7.5	1.0	0.3	1.0	0.0	0.0	0.3	2.3	2.3	4.3	133.6	4.3
CI 13596	FORTUNA (saw fly tol)	10	18.3	10.0	2.3	1.0	1.0	0.0	0.0	0.7	3.7	7.0	4.4	136.2	4.4
P1633974	CHOTEAU (+)(saw fly tol)	10	28.3	8.0	1.0	0.7	0.7	0.0	0.0	0.3	3.7	2.0	4.5	138.3	4.5
SYN 182	SY LONGMIRE (P+)	3								0.3	13.3	3.7	5.8	140.5	4.5
AGRIPR161	SY ROCKFORD (P+)	5						0.0	0.0	1.0	16.7	2.3	4.0	162.1	5.2
SYN 183	SY 611 CL2 (P+)	3								3.7	15.0	2.0	6.9	167.6	5.4
WB 173	WB 9719	4							0.0	0.3	15.0	5.7	5.3	170.3	5.5
PI 679964	NS PRESSER CL (P+)	7		15.0	1.0			0.0	0.0	0.3	8.3	10.0	5.0	189.1	6.1
PI 676978	LANNING (++)	7				1.0	2.3	0.0	0.0	0.3	21.7	6.7	4.6	196.3	6.3
04S0258-12	SY INGMAR (P+)	7				1.0	1.0	0.0	0.0	2.3	20.0	8.3	4.7	200.4	6.5
LIMAGR 171	LCS REBEL (P+)	4							0.0	2.3	16.7	6.7	6.4	208.1	6.7
ND 695	REEDER (+)	10	16.7	20.0	2.3	2.3	2.3	0.0	0.0	2.3	16.7	5.3	6.8	210.5	6.8
SYN 181	SY MCCLOUD (P+)	3								3.3	18.3	7.0	9.6	232.4	7.5
P1671855	EGAN (+)	9		15.0	2.3	2.3	1.0	0.0	0.0	2.0	26.7	6.7	6.2	251.1	8.1
P1574642	McNEAL	10	36.7	30.0	7.0	5.0	5.0	0.0	0.3	0.3	18.3	13.3	11.6	359.1	11.6
MEANS (For Entries Listed)			19.7	11.7	1.8	1.2	1.6	0.0	0.0	1.0	11.5	4.6			5.1
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			7.0	n/a	9.2	8.3	9.8	8.8	8.7	7.4	n/a	8.7	8.5		
Total Plant Available Water (in.)			15.7	7.3	22.5	13.1	17.3	21.0	11.1	11.4	n/a	14.2	14.9		
Soil NO ₃ (lbs.) to SD at Planting			124	35	56	86	75	55	85	77	300	171	106		
SD (Sampling Depth in Inches)			36	48	48	48	48	48	45	42	47	45	45		
Fertilizer Applied															
(# N)			70	100	100	100	100	125	125	100	100	100	102		
(# P ₂ O ₅)			40	20	20	20	20	20	20	20	20	20	22		
(# K ₂ O)			25	10	10	10	10	10	10	10	10	10	12		
(# S)			0	0	0	0	0	10	10	10	10	10	5		

Long-term check variety is Vida.

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

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

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

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

Table 11. Montana Spring Durum Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, Montana. 2020. (Exp# 20-9802-DUR)

Entry	Cultivar Source	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	3/ FN seconds	4/ Sawfly %
Alzada	WestBred	174.7	28.3	57.3	59.5	15.0	516	7.0
Carpio	NDSU	181.3	31.2	48.7	58.2	15.5	434	0.7
CDC-Vivid	CDC	179.3	33.3	54.6	59.4	16.2	451	2.3
Divide	NDSU	178.0	33.6	55.2	60.1	15.0	450	0.7
Grenora	NDSU	177.7	30.9	51.1	59.1	15.3	497	3.7
Joppa	NDSU	180.0	34.1	54.2	60.0	14.3	444	3.7
Lustre	MSU	180.0	32.8	54.4	58.9	15.1	442	2.0
Mountrail	NDSU	178.0	31.9	56.4	59.6	14.9	477	6.7
ND-Grano	NDSU	180.7	30.9	50.9	59.8	15.2	441	8.7
ND-Riveland	NDSU	178.7	32.0	53.4	59.2	15.0	451	5.0
Tioga	NDSU	179.7	31.8	52.9	59.4	15.3	462	0.7
MTD16001	MSU	178.0	32.3	57.1	59.4	14.5	446	0.7
MTD16002	MSU	179.7	33.1	60.5	59.6	14.7	501	1.0
MTD18067	MSU	180.0	34.3	57.5	58.8	14.3	396	5.3
MTD18091	MSU	181.0	31.8	48.5	58.4	15.8	439	2.3
MTD18148	MSU	178.0	23.6	53.5	59.2	14.9	504	1.0
MTD18155	MSU	179.0	29.7	58.6	59.3	14.9	412	0.3
MTD18172	MSU	179.0	31.0	57.1	60.6	15.2	433	5.3
MTD18179	MSU	178.0	29.3	48.6	56.3	16.7	431	2.3
MTD18181	MSU	181.7	35.5	49.0	58.5	16.2	420	2.3
MTD18213	MSU	181.3	34.0	49.1	56.3	16.0	463	0.7
MTD18217	MSU	182.3	31.3	45.8	58.0	16.3	452	0.7
MTD18256	MSU	181.7	32.4	51.1	59.2	16.8	489	0.7
MTD18266	MSU	181.7	32.6	49.1	59.1	16.9	468	0.7
MTD18313	MSU	174.7	25.9	61.0	62.0	14.4	457	0.3
MTD18348	MSU	181.0	34.0	55.4	58.6	15.2	529	0.7
MTD18381	MSU	177.3	30.6	47.2	58.9	15.7	444	18.3
MTD18413	MSU	178.0	33.0	53.4	58.9	15.4	423	1.0
MTD18430	MSU	183.3	36.2	48.9	56.0	16.0	513	1.0
MTD18486	MSU	183.0	34.1	50.4	58.6	15.4	470	0.3
EXPERIMENTAL MEANS		179.6	31.9	53.0	59.0	15.4	458.6	2.9
LSD (0.05)		1.7	2.7	6.4	1.0	1.1	22.4	5.8
C.V.: (S / MEAN)*100		0.6	5.1	7.4	1.0	4.4	3.0	123.3
P-VALUE (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

1/ No. of Days from January 1 (180 = June 28).

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 (20-9802-DUR)

Seeding Date: April 29, 2020
 Harvest Date: August 10, 2020
 Fertility: 100-20-10-10
 System: no till
 Herbicide: Bromac, 16 oz/ac
 Insecticide: none
 Previous Crop: Chemical Fallow-Spring Wheat
 Precipitation: 5.01" (seeding to harvest)

TABLE 12. Ten-Year Yield Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
YU894-75	ALZADA (P+)	9	43.9	34.4	58.7	40.6		36.4	24.1	37.9	49.9	57.3	42.6	108.0	42.5
MTD16005	LUSTRE	4							27.2	41.1	51.0	54.4	43.4	103.4	40.7
CDC Vivid	CDC VIVID (P+)	4							24.5	40.5	54.1	54.6	43.4	103.4	40.7
D00095	TIOGA (+)	10	41.9	30.1	54.1	36.3	34.4	35.9	30.8	40.3	47.0	52.9	40.4	102.6	40.4
D03028	CARPIO (+)	8			59.8	39.7	34.6	41.3	26.7	35.8	47.4	48.7	41.7	102.3	40.3
D9715-11	DIVIDE (+)	10	36.4	28.0	55.7	38.6	34.9	39.7	27.4	41.1	44.5	55.2	40.2	102.1	40.2
D97780	GRENORA (+)	10	36.5	26.0	62.3	37.0	31.3	36.2	30.8	40.2	49.2	51.1	40.1	101.8	40.1
D04581	JOPPA (+)	7				41.3	34.8	31.5	28.0	41.1	43.0	54.2	39.1	101.8	40.0
D901313	MOUNTRAIL (+)	10	39.4	27.9	57.0	32.4	38.8	30.1	28.2	38.2	45.2	56.4	39.4	100.0	39.4
MEANS (For Entries Listed)			39.6	29.3	57.9	38.0	34.8	35.9	27.5	39.6	47.9	53.9			40.5
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			7.0	n/a	9.1	8.3	9.8	8.2	8.7	9.2	n/a	7.7	8.5		
Total Plant Available Water (in.)			15.7	7.3	22.4	13.1	17.3	20.5	11.1	13.2	6.3	6.3	13.3		
Soil NO ₃ (lbs.) to SD at Planting			124	60	22	86	75	28	85	112	268	72	93		
SD (Sampling Depth in Inches)			36	n/a	48	48	48	48	45	48	48	40	45		
Fertilizer Applied															
		(# N)	70	100	100	100	100	125	125	100	100	100	102		
		(# P ₂ O ₅)	40	20	20	20	20	20	20	20	20	20	22		
		(# K ₂ O)	25	10	10	10	10	10	10	10	10	10	12		
		(# S)	0	0	0	0	0	10	10	10	10	10	5		

Long-term check variety is Mountrail.

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

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

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

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

TABLE 13. Ten-Year Test Weight Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020				
D9715-11	DIVIDE	10	60.0	56.6	63.6	57.6	55.4	56.5	58.7	59.7	58.2	60.1	58.7	101.3	58.7
YU894-75	ALZADA (P+)	9	59.9	55.8	62.8	58.1		54.5	59.4	59.3	58.8	59.5	58.7	100.9	58.5
D00095	TIOGA	10	60.7	55.7	64.0	56.9	55.7	54.9	58.3	58.3	59.0	59.4	58.3	100.6	58.3
D04581	JOPPA (+)	7				58.1	55.8	53.7	58.6	59.7	58.3	60.0	57.8	100.6	58.3
D97780	GRE Nora (+)	10	60.6	55.2	63.3	56.9	55.8	54.5	58.4	58.2	58.4	59.1	58.0	100.2	58.0
CDC Vivid	CDC VIVID (P+)	4							58.6	58.1	59.3	59.4	58.8	100.0	57.9
D901313	MOUNTRAIL (+)	10	59.9	54.2	63.4	56.3	55.9	54.3	58.6	58.8	58.3	59.6	57.9	100.0	57.9
D03028	CARPIO (+)	8			63.4	56.7	56.2	56.3	56.2	57.4	58.4	58.2	57.9	99.5	57.6
MTD16005	LUSTRE	4							57.9	58.0	58.6	58.9	58.3	99.2	57.4
MEANS (For Entries Listed)			60.2	55.5	63.4	57.2	55.8	55.0	58.3	58.6	58.6	59.4			58.1
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			7.0	n/a	9.1	8.3	9.8	8.2	8.7	9.2	n/a	7.7	8.5		
Total Plant Available Water (in.)			15.7	7.3	22.4	13.1	17.3	20.5	11.1	13.2	6.3	6.3	13.3		
Soil NO ₃ (lbs.) to SD at Planting			124	60	22	86	75	28	85	112	268	72	93		
SD (Sampling Depth in Inches)			36	n/a	48	48	48	48	45	48	48	40	45		
Fertilizer Applied															
			(# N)	70	100	100	100	100	125	125	100	100	100	102	
			(# P ₂ O ₅)	40	20	20	20	20	20	20	20	20	22		
			(# K ₂ O)	25	10	10	10	10	10	10	10	10	12		
			(# S)	0	0	0	0	0	10	10	10	10	5		

Long-term check variety is Mountrail.

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

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

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

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

TABLE 14. Ten-Year Protein Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (Exp# 9802-DUR)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ PROTEIN % (Values Adjusted to 13% Grain Moisture)										AVE. for YEARS TESTED	% of CHECK PROTEIN 3/	10-Yr COMP. AVE. PROTEIN 4/
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
CDC Vivid	CDC VIVID (+)	4							17.3	18.8	14.5	16.2	16.7	104.6	16.9
D00095	TIOGA (+)	10	14.2	16.3	16.0	17.6	17.3	17.4	16.4	18.7	14.1	15.3	16.3	100.8	16.3
MTD16005	LUSTRE	4							16.7	18.8	13.7	15.1	16.1	100.6	16.3
D03028	CARPIO (+)	8			15.5	16.7	17.0	17.4	16.3	18.6	13.8	15.5	16.4	100.2	16.2
D901313	MOUNTRAIL (+)	10	14.0	17.4	16.0	16.5	16.5	17.7	16.6	18.4	14.0	14.9	16.2	100.0	16.2
D04581	JOPPA (+)	7				16.7	16.6	17.8	16.6	17.5	14.2	14.3	16.2	99.3	16.1
D9715-11	DIVIDE (+)	10	14.1	15.8	16.2	17.0	17.2	17.6	16.3	17.8	13.6	15.0	16.1	99.1	16.1
D97780	GRE Nora (+)	10	13.6	15.4	15.3	16.5	16.2	17.3	16.3	17.7	14.1	15.3	15.8	97.3	15.8
YU894-75	ALZADA (P+)	9	13.8	14.4	16.0	15.9		17.5	16.3	17.3	14.1	15.0	15.6	96.4	15.6
MEANS (For Entries Listed)			13.9	15.9	15.8	16.7	16.8	17.5	16.5	18.2	14.0	15.2			16.2
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			7.0	n/a	9.1	8.3	9.8	8.2	8.7	9.2	n/a	7.7	8.5		
Total Plant Available Water (in.)			15.7	7.3	22.4	13.1	17.3	20.5	11.1	13.2	6.3	6.3	13.3		
Soil NO ₃ (lbs.) to SD at Planting			124	60	22	86	75	28	85	112	268	72	93		
SD (Sampling Depth in Inches)			36	n/a	48	48	48	48	45	48	48	40	45		
Fertilizer Applied															
		(# N)	70	100	100	100	100	125	125	100	100	100	102		
		(# P ₂ O ₅)	40	20	20	20	20	20	20	20	20	20	22		
		(# K ₂ O)	25	10	10	10	10	10	10	10	10	10	12		
		(# S)	0	0	0	0	0	10	10	10	10	10	5		

Long-term check variety is Mountrail.

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

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

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

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

TABLE 15. Ten-Year Sawfly Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
MTD16005	LUSTRE	4							0.0	0.0	1.0	2.0	0.8	33.3	1.8
CDC Vivid	CDC VIVID (+)	4							0.0	0.3	2.3	2.3	1.3	55.6	3.1
YU894-75	ALZADA (P+)	9	18.3	2.3	2.3	0.3		0.0	0.0	0.3	1.0	7.0	3.5	57.6	3.2
D9715-11	DIVIDE (+)	10	23.3	6.7	1.0	1.0	0.3	0.0	0.0	0.0	1.0	0.7	3.4	61.8	3.4
D03028	CARPIO (+)	8			3.7	1.0	1.0	0.0	0.0	0.0	1.0	0.7	0.9	63.0	3.5
D00095	TIOGA (+)	10	18.3	6.7	2.3	1.0	2.3	0.0	0.3	0.0	3.7	0.7	3.5	64.2	3.5
D97780	GRENORA (+)	10	25.0	8.3	2.3	0.7	0.3	0.0	0.0	0.7	5.0	3.7	4.6	83.6	4.6
D901313	MOUNTRAIL (+)	10	30.0	13.3	2.3	0.3	0.0	0.0	0.0	0.0	2.3	6.7	5.5	100.0	5.5
D04581	JOPPA (+)	7				2.3	2.0	0.0	0.0	0.0	3.7	3.7	1.7	125.0	6.9
MEANS (For Entries Listed)			23.0	7.5	2.3	1.0	1.0	0.0	0.0	0.1	2.3	3.0			3.9
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			7.0	n/a	9.1	8.3	9.8	8.2	8.7	9.2	n/a	7.7	8.5		
Total Plant Available Water (in.)			15.7	7.3	22.4	13.1	17.3	20.5	11.1	13.2	6.3	6.3	13.3		
Soil NO ₃ (lbs.) to SD at Planting			124	60	22	86	75	28	85	112	268	72	93		
SD (Sampling Depth in Inches)			36	n/a	48	48	48	48	45	48	48	40	45		
Fertilizer Applied															
	(# N)	70	100	100	100	100	125	125	100	100	100	102			
	(# P ₂ O ₅)	40	20	20	20	20	20	20	20	20	20	22			
	(# K ₂ O)	25	10	10	10	10	10	10	10	10	10	12			
	(# S)	0	0	0	0	0	10	10	10	10	10	5			

Long-term check variety is Mountrail.

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

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

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

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

TABLE 16. Intrastate Spring Barley Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions at Northern Agricultural Research Center. Havre, MT. 2020. (Exp# 20-2102-SB)

ID	Cultivar or Selection	1/ Head Date	Plant Ht Inches	1/ Maturity Date	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Plump %	3/ Protein %
45	AAC Connect	178.0	21.8	202.7	71.7	52.9	92.5	10.6
46	ABI Eagle	178.0	22.4	204.7	84.4	52.8	93.8	10.1
1	Buzz	174.7	22.9	204.7	65.0	53.6	97.7	9.7
43	Hockett	178.0	23.4	203.0	77.1	54.4	96.4	10.4
49	KWS Fantex	181.0	17.8	207.0	76.0	52.8	95.8	9.6
48	KWS Jessie	178.3	20.9	205.7	88.7	53.4	96.6	10.2
47	2IM14-8212	175.0	23.2	203.0	85.6	53.0	97.8	10.8
44	Merit 57	177.7	22.1	204.7	74.5	52.1	91.5	9.8
41	MT16M00209	176.3	22.4	206.3	74.3	50.4	99.3	10.1
39	MT16M00305	177.0	22.1	206.7	64.1	51.4	98.3	10.6
38	MT16M00406	178.7	24.3	207.3	78.3	53.0	98.4	10.2
37	MT16M00407	174.0	25.3	205.3	78.4	51.6	98.7	10.6
36	MT16M00504	177.7	22.8	204.7	68.4	52.7	98.3	11.0
34	MT16M00603	178.7	23.3	206.7	56.3	51.9	98.8	10.6
33	MT16M00610	172.7	23.9	205.3	74.1	53.8	98.2	11.8
32	MT16M00707	179.0	22.6	204.7	72.3	53.6	97.1	9.8
30	MT16M00709	175.0	27.6	206.7	89.3	53.1	96.7	9.6
28	MT16M00806	175.7	26.2	205.7	79.0	53.9	98.4	10.3
26	MT16M01405	177.3	22.4	207.7	80.3	53.1	98.8	10.1
25	MT16M01705	172.7	22.3	206.0	67.8	53.1	97.8	10.4
23	MT16M01801	177.7	25.6	206.7	81.8	52.6	97.6	9.7
20	MT16M01819	173.3	23.4	204.3	69.6	53.1	98.7	11.5
19	MT16M01901	174.7	22.5	205.7	64.8	53.3	97.9	10.0
18	MT16M01902	175.7	24.6	205.7	76.4	51.8	97.4	10.3
16	MT16M02101	172.7	25.1	204.7	72.3	51.8	96.9	9.4
13	MT16M02107	173.7	25.1	203.3	66.8	54.2	97.7	10.5
12	MT16M02201	176.3	22.8	206.0	71.7	51.7	98.6	10.1
10	MT16M05403	178.7	24.0	207.7	78.2	54.4	94.9	9.3
9	MT16M05610	178.7	23.7	206.0	71.0	52.6	98.4	10.8
7	MT16M06404	176.7	25.6	204.3	78.9	54.8	97.9	10.8
6	MT16M07806	177.7	25.1	206.0	76.8	54.7	97.1	10.1
5	MT16M09602	174.3	22.1	206.7	73.7	54.6	96.5	10.5
42	MT17M00302	178.3	24.5	207.7	64.1	53.9	97.3	9.6
40	MT17M00504	173.3	23.4	204.7	81.6	53.1	97.6	10.7
35	MT17M01711	176.0	25.1	204.7	78.5	51.8	94.2	9.7
31	MT17M01906	174.0	24.5	204.7	94.8	52.9	97.7	10.6
29	MT17M01908	174.7	23.5	204.0	75.8	53.3	98.7	10.3
27	MT17M02009	173.7	25.2	204.7	71.8	52.4	98.0	9.8
24	MT17M02507	174.3	24.1	205.3	83.8	53.6	96.7	9.1
22	MT17M02510	172.0	21.1	204.0	77.0	53.9	97.2	10.1
21	MT17M04801	176.0	26.1	205.0	82.7	54.2	97.2	10.5
17	MT17M05416	178.3	23.2	204.3	61.9	52.7	93.7	9.7
15	MT17M05502	177.7	25.4	204.0	73.1	54.5	96.8	10.0

**TABLE 16. Intrastate Spring Barley Cultivar Evaluation Nursery Grown On-Station Under No-Till
Continued Dryland Fallow Conditions at Northern Agricultural Research Center. Havre, MT. 2020.
(Exp# 20-2102-SB)**

ID	Cultivar or Selection	1/ Head Date	Plant Ht Inches	1/ Maturity Date	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Plump %	3/ Protein %
14	MT17M05508	178.0	24.7	204.3	80.9	53.5	96.5	10.5
11	MT17M05808	175.7	25.2	202.7	73.8	53.1	95.8	9.8
8	MT17M07704	176.0	22.4	205.7	70.6	53.5	96.0	10.4
4	MT17M08702	175.7	23.8	207.3	76.1	54.6	97.8	9.9
3	MT17M08808	173.7	23.3	205.3	89.2	54.1	96.9	9.5
2	MT17M09602	177.3	23.7	208.0	76.8	54.0	97.2	9.3
EXPERIMENTAL MEANS		176.1	23.6	205.3	75.5	53.2	97.1	10.2
LSD (0.05)		2.1	1.8	1.8	10.7	0.6	0.9	0.9
C.V.		0.7	4.8	0.6	8.7	0.7	0.6	5.5
P-Value (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

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

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

1/ No. of Days from January 1 (176 = June 24).

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 (20-2102-SB)

Seeding Date: April 27, 2020
 Harvest Date: August 5, 2020
 Fertility: 20-40-2-2 side banded
 System: no till
 Herbicide: Vendetta-16oz/ac
 Insecticide: none
 Previous Crop: Chemical Fallow - Spring Wheat
 Precipitation: 5.01" (seeding to harvest)

TABLE 17. Ten-Year Yield Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
COPELAND	Copeland	3	72.9					82.1	45.4				66.8	107.5	73.4
HARRINGTON	SK76333	7	76.5	37.7	71.3	82.5	61.0	85.6	41.4				65.2	104.9	71.7
ODYSSEY (P+)	Odyssey	5			65.6			90.4	41.7	57.0	62.2		63.4	102.0	69.7
CHAMPION (P+)	YU501385	6	95.9	47.0	69.7	86.3	78.5	95.0					78.7	102.0	69.7
GENIE (P+)	Genie	5			67.2			87.0	46.3	57.4	54.8		62.6	100.7	68.8
HOCKETT (+)	MT910189	10	76.3	54.4	70.7	88.6	76.1	97.1	37.4	52.7	52.7	77.1	68.3	100.0	68.3
SYNERGY (P+)	Synergy	3						87.0	39.6	59.4			62.0	99.4	67.9
CRAFT	MT970116	6	80.8	31.4	60.2	74.9	70.2		33.7				58.5	94.2	64.3
MERIT 57	Merit 57	4					63.1			49.9	55.7	74.5	60.8	94.1	64.2
BUZZ	MT124112	5					73.2	86.2	41.2		54.0	65.0	63.9	93.9	64.1
METCALFE	TR232	8	70.9	39.5		76.3	59.1	76.1	40.1	61.7	57.0		60.1	89.8	61.3
HAXBY	MT950186	6	82.6	25.1	67.3	78.1	79.4	80.9					68.9	89.2	61.0
MEANS (For Entries Listed)			79.4	39.2	67.4	81.1	70.1	86.7	40.7	56.3	56.1	72.2			67.0
April-July Precip. (in.)			8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			7.5	7.5	8.5	7.8	8.9	8.7	9.1	10.0	8.7	9.7	8.6		
Total Plant Available Water (in.)			16.2	14.8	21.8	12.7	16.4	20.9	11.5	14.0	15.0	15.2	15.8		
Soil NO3 (lbs.) to SD at Planting			374	60	415	57	123	28	103	94	48	114	142		
SD (Sampling Depth in Inches)			48	48	48	48	48	48	41	45	46	48	47		
Fertilizer Applied															
		(# N)	70	100	100	100	100	125	90	20	20	20	75		
		(# P ₂ O ₅)	40	20	20	20	20	20	30	4	4	4	18		
		(# K ₂ O)	25	10	10	10	10	10	10	2	2	2	9		
		(# S)	0	0	0	0	0	10	0	2	2	2	2		

Check variety is Hockett.

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

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

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

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

TABLE 18. Ten-Year Test Weight Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (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/
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
CHAMPION (P+) YU501385	6	52.9	47.5	53.1	53.3	51.4	54.7					52.1	100.6	52.3
SYNERGY (P+) Synergy	3						52.3	53.4	52.6			52.8	100.1	52.0
HOCKETT (+) MT910189	10	52.2	46.2	53.2	54.2	50.7	54.7	54.0	49.6	51.1	54.4	52.0	100.0	52.0
HAXBY MT950186	6	53.8	43.2	53.9	53.8	51.9	53.3					51.6	99.6	51.8
CRAFT MT970116	6	53.0	43.9	53.2	53.1	51.4		54.3				51.5	99.5	51.8
BUZZ MT124112	5					51.3	53.8	53.5		48.9	53.6	52.2	98.6	51.3
ODYSSEY (P+) Odyssey	5			52.5			53.0	53.5	49.5	49.3		51.6	98.2	51.1
GENIE (P+) Genie	5			52.1			53.8	52.8	50.6	47.9		51.5	98.0	51.0
MERIT 57 Merit 57	4					47.8			50.3	49.9	52.1	50.0	97.2	50.6
METCALFE TR232	8	51.6	43.8		51.1	48.4	52.4	54.0	50.1	49.5		50.1	97.2	50.5
HARRINGTON SK76333	7	51.0	42.1	52.3	51.0	49.4	53.5	53.2				50.4	96.5	50.2
COPELAND Copeland	3	48.7					51.8	52.3				50.9	95.0	49.4
MEANS (For Entries Listed)		51.9	44.4	52.9	52.7	50.3	53.3	53.4	50.5	49.4	53.3			51.2
April-July Precip. (in.)		8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)		15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting		7.5	7.5	8.5	7.8	8.9	8.7	9.1	10.0	8.7	9.7	8.6		
Total Plant Available Water (in.)		16.2	14.8	21.8	12.7	16.4	20.9	11.5	14.0	15.0	15.2	15.8		
Soil NO3 (lbs.) to SD at Planting		374	60	415	57	123	28	103	94	48	114	142		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	41	45	46	48	47		
Fertilizer Applied	(# N)	70	100	100	100	100	125	90	20	20	20	75		
	(# P ₂ O ₅)	40	20	20	20	20	20	30	4	4	4	18		
	(# K ₂ O)	25	10	10	10	10	10	10	2	2	2	9		
	(# S)	0	0	0	0	0	10	0	2	2	2	2		

Check variety is Hockett.

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

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

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

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

TABLE 19. Ten-Year Protein Summary on Selected Entries from Dryland Intrastate Spring Barley Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (EXP# 2102-SB)

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ Proten % (Values Adjusted to 13% Grain moisture)										AVE. for YEARS TESTED	% of CHECK PROTEIN 3/	10-YR COMP. AVE. PROTEIN 4/
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
BUZZ MT124112	5					14.6	11.8	12.1		10.0	9.7	11.6	92.0	12.0
GENIE (P+) Genie	5			14.2			13.8	13.8	9.1	9.6		12.1	97.3	12.6
ODYSSEY (P+) Odyssey	5			14.2			13.6	14.3	9.5	9.3		12.2	97.8	12.7
SYNERGY (P+) Synergy	3						13.6	13.5	9.1			12.1	98.1	12.8
HOCKETT (+) MT910189	10	13.8	14.7	14.8	13.3	15.6	12.5	14.2	10.2	10.5	10.4	13.0	100.0	13.0
CHAMPION (P+) YU501385	6	13.3	15.1	14.0	13.9	15.6	13.5					14.2	100.9	13.1
MERIT 57 Merit 57	4					18.5			10.4	9.6	9.8	12.1	103.2	13.4
CRAFT MT970116	6	13.9	16.0	15.1	14.6	16.3		14.0				15.0	104.2	13.5
HAXBY MT950186	6	13.3	15.6	15.1	14.2	16.0	14.4					14.8	104.6	13.6
HARRINGTON SK76333	7	14.1	16.2	14.8	14.1	16.9	14.3	14.5				15.0	106.1	13.8
COPELAND Copeland	3	13.9					15.6	14.0				14.5	107.5	14.0
METCALFE TR232	8	14.9	17.1		15.5	18.1	14.6	14.6	8.8	9.5		14.1	107.8	14.0
MEANS (For Entries Listed)		13.9	15.8	14.6	14.3	16.5	13.8	13.9	9.5	9.7	10.0			13.2
April-July Precip. (in.)		8.8	7.3	13.3	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.2		
Total Annual Precip. (in.)		15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting		7.5	7.5	8.5	7.8	8.9	8.7	9.1	10.0	8.7	9.7	8.6		
Total Plant Available Water (in.)		16.2	14.8	21.8	12.7	16.4	20.9	11.5	14.0	15.0	15.2	15.8		
Soil NO3 (lbs.) to SD at Planting		374	60	415	57	123	28	103	94	48	114	142		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	41	45	46	48	47		
Fertilizer Applied														
	(# N)	70	100	100	100	100	125	90	20	20	20	75		
	(# P ₂ O ₅)	40	20	20	20	20	20	30	4	4	4	18		
	(# K ₂ O)	25	10	10	10	10	10	10	2	2	2	9		
	(# S)	0	0	0	0	0	10	0	2	2	2	2		

Check variety is Hockett.

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

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

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

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

TABLE 20. Montana Safflower Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions at Northern Agricultural Research Center. Havre, Montana. 2020. (Exp# 20-7702-SA)

ENTRY	OIL TYPE	1/		2/			OIL %		OIL Lbs/Ac	3/*
		FLWR DATE	PLNTHT Inches	YIELD Lbs/Ac	TEST WT Lbs/Bu	MOIST %	0%Mois.	8%Mois.	8%Mois.	DEP. %
Cardinal	Linoleic	207.7	27.2	1834	43.0	5.1	42.7	39.2	720.1	0.0
Chickadee	Linoleic	208.0	23.4	1853	40.8	4.9	40.8	37.5	695.6	1.7
Finch	Linoleic	206.3	27.0	1985	42.8	5.0	42.7	39.3	781.0	3.3
Morlin	Linoleic	209.0	24.2	1266	39.5	4.9	44.4	40.8	516.7	5.0
Rubis Red	Linoleic	206.0	27.2	2102	45.4	5.4	37.4	34.4	724.0	0.0
Hybrid 1601	Oleic	206.7	26.9	1459	36.6	4.6	42.6	39.1	571.2	0.0
Hybrid 200	Oleic	208.0	25.7	2179	41.5	5.1	36.0	33.1	721.9	0.0
Hybrid 446	Oleic	207.3	24.6	2351	42.3	5.4	34.8	32.0	752.2	0.0
MonDak	Oleic	206.0	24.7	1784	41.4	5.1	38.9	35.7	637.5	0.0
Montola 2000	Oleic	206.3	21.5	1921	39.8	4.8	42.6	39.2	752.5	0.0
Montola 2001	Oleic	207.0	23.0	1385	37.2	5.1	39.5	36.4	503.9	3.3
Montola 2003	Oleic	209.0	22.8	1539	40.7	4.8	40.7	37.5	576.7	0.0
STI 1201	Oleic	206.7	21.2	925	36.5	4.4	43.0	39.5	365.2	13.3
STI 1593/STI 2019	Oleic	208.7	26.0	1860	40.4	5.0	44.1	40.6	755.9	0.0
EXPERIMENTAL MEANS		207.3	24.7	1745.8	40.6	5.0	40.7	37.5	648.2	1.9
LSD (0.05)		1.2	1.8	188.9	0.7	0.3	1.5	1.4	78.8	2.5
C.V.: (S / MEAN)*100		0.3	4.4	6.4	1.0	3.2	2.2	2.2	7.2	78.6
P-VALUE (Entries)		<.0001	<.0001	<.0001	<.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 (207 = July 25)

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

3/ Dep. is bird and wildlife depredation, recorded as the percentage of missing seed from the safflower heads in each plot.

*Varieties NutraSaff and STI 1401 were totally consumed by birds in 2020, so they were removed from the analyses.

Management Information (20-7702-SAF)

Seeding Date:	April 28, 2020
Harvest Date:	September 29, 2020
Fertility:	50-15-0-20 side banded
System:	no till
Herbicide:	none
Fungicide:	none
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	5.59" (April 1 to August 30)

TABLE 21. Eight-Year Yield Summary on Selected Entries from Dryland Safflower Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (Exp# 7702-SA)

1/ VARIETY or SELECTION		No. of YEARS TESTED	YIELD (Lbs Per Acre)									AVE. for YEARS TESTED	% of CHECK YIELD	8-Yr COMP. AVE. YIELD	
			2011	2012	2013	2014	2015	2016	2017 2/	2018	2019 2/				2020 3/
Hybrid 446	HYBRID 446	6			1947	1831	1820	3442		2832		2351	2370	121.1	2342
Hybrid 200	HYBRID 200	6			1866	2008	1938	3138		2730		2179	2310	118.0	2282
HYBRID 1601	HYBRID 1601(+)	8	2559	1858	1588	1280	2657	3602		2929		1459	2242	115.9	2242
Rubis Red	RUBIS RED	4					1449	2619		2382		2102	2138	104.0	2011
CARDINAL	CARDINAL(+)	8	2077	1651	1721	1802	1512	2791		2088		1834	1934	100.0	1934
MON-DAK	MON-DAK(+)	8	1967	1559	1814	1303	1678	2532		2328		1784	1871	96.7	1871
WILL 95FI	FINCH	8	2064	1565	1566	1495	1466	2323		2051		1985	1814	93.8	1814
Will WOMA2003	MONTOLA 2003 (+)	7	1839		1932	1219	1634	2240		1949		1539	1765	89.3	1728
10B 6015	10B 6015	4		1413	1767	1383		2302				1716	86.2	1667	
Baldy	BALDY	5			1500	1681	1477	2129		1739		1705	86.0	1664	
011-2180	MORLIN (+)	7	1927	1253	1828	1002	870			1786		1266	1419	78.3	1515
WILL	MONTOLA 2000 (++)	3	1836				467					1921	1408	77.9	1507
STI 1201	STI 1201	6			1882	1318	549	2271		1867		925	1469	75.0	1451
991-122-6503	MONTOLA 2001	3	1618				110					1385	1037	57.4	1110
91B3842	NUTRASAFF (+)	7	1179	323	1289	435	212	982		1237		808	41.5	802	
MEANS (For Entries Listed)			1896	1374	1725	1396	1274	2531		2160		1727			1729
April-July Precip. (in.)			8.8	7.3	11.9	4.9	7.5	12.2	2.4	4.0	6.3	5.6	7.1		
Total Annual Precip. (in.)			15.5	9.5	18.5	13.3	12.1	18.9	9.5	13.2	11.3	10.5	13.2		
Soil PAW (in.) to SD @ Planting			7.3	n/a	9.6	9.4	8.3	9.2	8.9	6.8	6.7	26.2	10.3		
Total Plant Available Water (in.)			16.1	7.3	21.5	14.2	15.8	21.5	11.3	10.9	13.1	31.7	16.3		
Soil NO3 (lbs.) to SD at Planting			99	35	78	58	115	25	53	92	116	206	88		
SD (Sampling Depth in Inches)			36	48	48	48	48	48	48	39	44	41	45		
Fertilizer Applied															
(# N)			0	0	0	0	50	50	50	50	50	50	30		
(# P ₂ O ₅)			45	45	45	45	15	15	15	15	15	15	27		
(# K ₂ O)			0	0	0	0	0	0	0	0	0	0	0		
(# S)			0	0	0	0	20	20	20	20	20	20	12		

Long-term check variety is Cardinal.

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/ Varieties NutraSaff and STI 1401 were totally consumed by birds in 2020.

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

5/ 8-Yr Comparable Average = (x/y) * z where x = average yield of a given entry for years tested, y = average yield for Cardinal for the same years, and z = 8-Yr average yield for the check variety Cardinal.

TABLE 22. Eight-Year Percent Oil Summary on Selected Entries from Dryland Safflower Nursery. Northern Agricultural Research Center. Havre, Montana. 2011-2020. (Exp# 7702-SA)

1/ VARIETY or SELECTION		No. of YEARS TESTED	Oil (%) @ 8% Seed Moisture										AVE. for YEARS TESTED	% of CHECK Oil	8-Yr COMP. AVE. Oil
			2011	2012	2013	2014	2015	2016	2017 2/	2018	2019 2/	2020 3/			
91B3842	NUTRASAFF (+)	7	52.4	54.1	52.5	52.8	51.9	46.3		43.1		50.4	132.9	50.7	
STI 1201	STI 1201	6			53.1	48.4	47.0	41.0		38.9	39.5	44.7	119.9	45.7	
011-2180	MORLIN (+)	7	41.8	43.7	43.6	43.5	41.9		34.8		40.8	41.4	106.5	40.6	
HYBRID 1601	HYBRID 1601(+)	8	40.3	44.0	43.4	43.6	39.5	34.2		32.5	39.1	39.6	103.8	39.6	
Will WOMA2003	MONTOLA 2003 (+)	7	41.8		41.5	42.7	41.7	34.0		33.2	37.5	38.9	103.7	39.5	
10B 6015	10B 6015	4		45.0	39.3	41.1		33.4				39.7	102.9	39.2	
WILL 95FI	FINCH	8	40.9	42.6	39.1	41.5	41.2	32.9		32.9	39.3	38.8	101.8	38.8	
WILL	MONTOLA 2000 (++)	3	43.3				37.7				39.2	40.1	101.5	38.7	
CARDINAL	CARDINAL(+)	8	39.2	42.2	39.3	40.5	39.9	32.5		32.1	39.2	38.1	100.0	38.1	
MON-DAK	MON-DAK(+)	8	40.5	44.0	39.8	40.3	39.8	32.4		32.2	35.7	38.1	100.0	38.1	
991-122-6503	MONTOLA 2001	3	41.9				37.3				36.4	38.5	97.6	37.2	
Hybrid 200	HYBRID 200	6			38.5	36.6	35.2	30.7		28.4	33.1	33.8	90.6	34.5	
Hybrid 446	HYBRID 446	6			39.5	37.0	35.6	28.4		27.8	32.0	33.4	89.7	34.2	
Rubis Red	RUBIS RED	4					31.8	26.9		26.4	34.4	29.9	83.1	31.7	
Baldy	BALDY	5			30.0	29.6	29.2	24.5		23.9		27.5	74.5	28.4	
MEANS (For Entries Listed)			42.5	45.1	41.6	41.5	39.3	33.1		32.2			37.2	38.3	
April-July Precip. (in.)			8.75	7.33	11.88	4.87	7.52	12.24	2.41	4.02	6.33	5.55	7.09		
Total Annual Precip. (in.)			15.45	9.46	18.46	13.34	12.05	18.86	9.48	13.15	11.29	10.52	13.21		
Soil PAW (in.) to SD @ Planting			7.31	n/a	9.58	9.38	8.29	9.24	8.92	6.84	6.73	26.15	10.27		
Total Plant Available Water (in.)			16.06	7.33	21.46	14.25	15.81	21.48	11.33	10.86	13.06	31.70	16.33		
Soil NO3 (lbs.) to SD at Planting			99	35	78	58	115	25	53	92	116	206	88		
SD (Sampling Depth in Inches)			36	48	48	48	48	48	48	39	44	41	45		
Fertilizer Applied															
(# N)			0	0	0	0	50	50	50	50	50	50	30		
(# P ₂ O ₅)			45	45	45	45	15	15	15	15	15	15	27		
(# K ₂ O)			0	0	0	0	0	0	0	0	0	0	0		
(# S)			0	0	0	0	20	20	20	20	20	20	12		

Long-term check variety is Cardinal.

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/ Varieties NutraSaff and STI 1401 were totally consumed by birds in 2020.

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

5/ 8-Yr Comparable Average = (x/y) * z where x = average oil % of a given entry for years tested, y = average yield for Cardinal for the same years, and z = 8-Yr average oil % for the check variety Cardinal.