Title: Winter Wheat, Spring Wheat, Spring Durum and Spring Barley Variety Performance Evaluations Under Dryland Chemical Fallow Conditions On-Station at Northern Agricultural Research Center, Havre, Montana. 2013-2022.

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Content:

This report is intended to serve as a popularized 2022 summary of "primary" on-going cereal variety investigations traditionally conducted on-station by the Variety Testing Program at Northern Agricultural Research Center. These data represent approximately 17 percent of NARC Variety Testing Programs total research project effort on-station at Havre. The remaining 83 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 or 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 107 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 2022. Abridged, multi-year summaries for each wheat cereal trial are limited to four crop characters (yield, test weight, protein and sawfly rating). Individuals desiring additional detailed data may contact the research center or refer to current and previous editions of this and other reports at https://agresearch.montana.edu/narc/.

2022 Data:

It should be noted that 2022 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, 2022 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.

During the fall of 2021 and the spring of 2022, northcentral Montana received below average precipitation, with a continuation of the drought that began during the previous crop year. The growing season started out in April with below average temperatures, which was the norm through mid-July. With the first two weeks of June came the first significant and timely rains totaling nearly three inches, which saved both the spring and fall seeded crops. Meaningful rain events were minimal from late June through August, however cool temperature during the first part

of July allowed for prolonged flowering, head fill and pod fill, resulting in higher than anticipated seed yields as northcentral Montana remained in extreme drought during 2022, as classified by the National Oceanic and Atmospheric Administration U. S. Drought Monitor. At Havre, annual growing season precipitation (9/1/21 through 8/31/22) was 8.15 inches, 3.87 inches lower than the average for all years since 1916. April 1 through July 31 precipitation was 5.51 inches, just 81 percent of the 107-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July totaled 1286, or 98 percent of the average for the last 72 years (1951-2022). The last spring frost was on May 22 and the first fall frost of 2022 was on September 21, resulting in 122 frost-free days. The minimum winter temperature was -29 degrees F on December 28, 2021. Overall, the 2021-2022 average crop year temperatures were 1.4 degrees F warmer than the long-term average, mainly due to warmer winter months. The April through July growing season saw an average daily temperature of 55.7 degrees F, 1.4 degrees F lower than historical temperatures, with June, July, and August average temperatures 2.6 degrees F lower than normal. The high temperature for 2022 was recorded on August 2 at 99 degrees F, and there were 26 days with temperatures 90 degrees F or above, and 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 January-February annually)
Spring Wheat Varieties, Extension Service 2B 1093 (Revised January-February annually)
Barley Varieties, Extension Service 2B 1094 (Revised January-February annually)

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

Recognition:

This research would not have been possible without the assistance of the following seasonal employees:
Tracy Gorecki, Cleta Lamb, Kyla McNamara, Teresa Miller, and Emily Tripp.

LIST OF TABLES

Summary of climatic data by months for the 2021-2022 crop year (September to August) and averages for the period 1916-2022 at the Northern Agricultural Research Center. Havre, Montana.

Month Year	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Crop Year
Precipitation (inches)													**Total**
Current Year	0.11	0.48	0.36	0.46	0.12	0.14	0.37	0.17	0.41	3.18	1.75	0.60	8.15
Average (1916-2022)	1.18	0.69	0.45	0.45	0.43	0.35	0.53	0.99	1.85	2.53	1.41	1.17	12.02
Difference	-1.07	-0.21	-0.09	0.01	-0.31	-0.21	-0.16	-0.82	-1.44	0.65	0.34	-0.57	-3.87
Mean Temperature (^{o}F)													**Average**
Current Year	60.7	48.0	35.3	14.0	20.1	21.5	34.0	37.4	52.7	61.4	71.4	73.8	44.2
Average (1916-2022)	56.4	45.5	30.2	19.7	15.9	19.7	30.1	43.4	53.9	61.9	69.3	67.4	42.8
Difference	4.3	2.5	5.1	-5.7	4.2	1.8	3.9	-6.0	-1.2	-0.5	2.1	6.4	1.4

Last killing frost in spring*

2022 — **May 22nd (25.8˚)**

Ave. 1916-2022 — **May 14th**

First killing frost in fall*

2022 — **September 21st (31.4˚)**

Ave. 1916-2022 — **September 20th**

Frost free period

2022 — **122 days**

Ave. 1916-2022 — **129 days**

Growing degree days (base 50)

May 23-Sept. 17, 2022 — **2073.1**

May 1-Sept. 30, 2022 — **2352.2**

Ave. 1951-2022 (May 1-Sept. 30) — **2181.6**

Maximum summer temperature — **98.8˚ F on August 2, 2022**

Minimum winter temperature — **-29.4˚ F on December 28, 2021**

*In this summary 32^{o} is considered a killing frost.

2022
INDIVIDUAL CROP EXPERIMENT IDENTIFICATION & DESCRIPTION RECORD
Variety Testing Program
Northern Agricultural Research Center
Havre, Montana

Experiment No.	*	Description	Crop	Ents	Reps	Plots	Loc-Field	Legal Desc	Leader	Sponsor	Cooperator
WINTER WHEAT (WW) INVESTIGATIONS											
ON-STATION											
22-3502-WW		Intrastate Cultivar Nursery	WW	49	3	147	A-7-2	33 32N 15E	Mondal	MAES-MWBC	Lamb
22-1402-WW		Advanced Cultivar Nursery	WW	36	3	108	A-7-2	33 32N 15E	Mondal	MAES-MWBC	Lamb
22-5802-WW		Sawfly Line Evaluation Nursery	WW	49	2	98	A-7-2	33 32N 15E	Mondal	MAES-MWBC	Lamb
22-WQDS-WW		Winter Wheat Quality Drill Strips	WW	7	1	7	B-2-3	32 32N 15E	Mondal	MAES-MWBC	Lamb
Sub-Totals:			4	141		360	7.58%	of Total Plot Inventory			
OFF-STATION											
22-3851-WW	f	Off-Station Cultivar Eval Nursery	WW	25	3	75	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
22-3853-WW		Off-Station Cultivar Eval Nursery	WW	25	3	75	Loma	20 27N 10E	Lamb	MWBC-MAES	McKeever Farm
22-5852-WW		Sawfly Line Evaluation Nursery	WW	49	2	98	Kremlin	22 32N 12E	Mondal	MAES-MWBC	McCormick Farm
22-SR02-WW	v	Single-Row Line Eval Nursery	WW	1000	1	1000	Kremlin	22 32N 12E	Mondal	MAES-MWBC	McCormick Farm
22-3952-WW		Prelim C Sawfly Line Evaluation	WW	49	2	98	Kremlin	22 32N 12E	Mondal	MAES-MWBC	McCormick Farm
Sub-Totals:			5	1148		1346	28.35%	of Total Plot Inventory			
SPRING WHEAT & DURUM (SW & DUR) INVESTIGATIONS											
ON-STATION											
22-3102-SW		Advanced Yield Nursery	SW	64	3	192	A-7-4	33 32N 15E	Cook	MAES-MWBC	Lamb
22-9802-DUR		Montana Durum Cultivar Nursery	DUR	30	3	90	A-7-4	33 32N 15E	Giroux	MAES-MWBC	Lamb
22-3302-SW		Preliminary Yield Nursery	SW	121	2	242	A-7-4	33 32N 15E	Cook	MAES-MWBC	Lamb
22-SWQAC-SW		Spring Wheat Quality Assessm't	SW	3	1	3	An-5-5	33 32N 15E	MWBC	Wht Qual Cncl	Lamb
Sub-Totals:			4	218		527	11.10%	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										
22-9951-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
22-9953-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Chester	11 31N 5E	Lamb	MWBC-MAES	Kammerzell Farm
22-9955-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
22-9957-SW	Off-Station Cultivar Eval Nursery	SW	25	3	75	Loma	20 27N 10E	Lamb	MWBC-MAES	McKeever Farm
22-9851-DUR	Off-Station Cultivar Eval Nursery	DUR	15	3	45	Turner	13 36N 25E	Lamb	MWBC-MAES	Cederberg Farm
22-9853-DUR	Off-Station Cultivar Eval Nursery	DUR	15	3	45	Chester	11 31N 5E	Lamb	MWBC-MAES	Kammerzell Farm
22-9855-DUR	Off-Station Cultivar Eval Nursery	DUR	15	3	45	Loring	24 35N 29E	Lamb	MWBC-MAES	Flansaas/Lumsden
Sub-Totals:		7	145		435	9.16%	of Total Plot Inventory			
SPRING BARLEY (SB) INVESTIGATIONS										
ON-STATION										
22-2102-SB	Intrastate Cultivar Eval Nursery	SB	49	3	147	A-7-3	33 32N 15E	Sherman	MAES-MWBC	Lamb
22-3102-SB	Early Yield Evaluation Nursery	SB	64	3	192	A-7-3	33 32N 15E	Sherman	MAES-MWBC	Lamb
22-2502-SB	Hulless Intrastate Eval Nursery	SB	16	3	48	A-7-4	33 32N 15E	Sherman	MAES-MWBC	Lamb
22-2702-SB	Off-station Spring Barley	SB	25	3	75	A-7-1	33 32N 15E	Sherman	MAES-MWBC	Lamb
22-FR07-SB	Barley Sawfly Observartion	SB	10	3	30	A-7-1	33 32N 15E	Sherman	MAES-MWBC	Lamb
Sub-Totals:		5	164		492	10.36%	of Total Plot Inventory			
WINTER BARLEY (WB) INVESTIGATIONS										
ON-STATION										
22-2602-SB	Winter Malt/Feed Barley Trial	WB	25	3	75	A-7-2	33 32N 15E	Sherman	MAES-MWBC	Lamb
Sub-Totals:		1	25		75	1.58%	of Total Plot Inventory			
BRASSICA (B_) INVESTIGATIONS										
ON-STATION										
22-CN02-CN	Statewide Canola Trial	CN	25	4	100	B-2-1	32 32N 15E	Beiermann	Var. Industry	Lamb
22-OC02-BJ	BASF Brassica juncea Trial	BJ	8	3	24	B-2-1	32 32N 15E	Harder	BASF	Lamb
Sub-Totals:		2	33		124	2.61%	of Total Plot Inventory			

Experiment No. *	Description	Crop	Ents	Reps	Plots	Loc-Field	Legal Desc	Leader	Sponsor	Cooperator
				PULSE CROP (PC) INVESTIGATIONS						
ON-STATION										
22-PC01-PC	Statewide Pea Trial	PC	42	4	168	B-4-3	33 32N 15E	Chen	USADPLC-MAES	Lamb
22-PC02-PC	Statewide Lentil Trial	PC	13	4	52	B-4-2	32 32N 15E	Chen	USADPLC-MAES	Lamb
22-PC15-PEA	LCS Pea Trial	PC	20	3	60	B-4-3	32 32N 15E	Oberg	LCS	Lamb
22-2297-PEA	MSU Spring Pea Breeding Lines	PC	10	4	40	B-4-2	32 32N 15E	McPhee	MAES-MSU	Lamb
22-2277-PEA	MSU RMA Spring Pea	PC	10	4	40	B-4-2	32 32N 15E	McPhee	MAES-MSU	Lamb
22-2278-LN	MSU RMA Spring Lentil	PC	6	4	24	B-4-2	32 32N 15E	McPhee	MAES-MSU	Lamb
22-2279-CP	MSU RMA Chickpea	PC	6	4	24	B-4-1	32 32N 15E	McPhee	MAES-MSU	Lamb
22-2282-CP	MSU Advanced Chickpea Yield Trl	PC	30	3	90	B-4-1	32 32N 15E	McPhee	MAES-MSU	Lamb
22-2234-WPEA f	MSU Winter Pea Breeding Line Trl	PC	16	1	16	B-4-4	32 32N 15E	McPhee	MAES-MSU	Lamb
22-2241-WLEN	MSU Winter Lentil Adaptability Trl	PC	12	2	24	B-4-4	32 32N 15E	McPhee	MAES-MSU	Lamb
22-2221-WPEA	MSU Winter Pea Breeding Line Trl	PC	43	2	86	B-4-4	32 32N 15E	McPhee	MAES-MSU	Lamb
22-2223-WPEA	MSU Winter Pea Breeding Line Trl	PC	35	2	70	B-4-4	32 32N 15E	McPhee	MAES-MSU	Lamb
22-PC11-CP	Progene Chickpea Eval	PC	25	2	50	B-4-1	32 32N 15E	Powel	Progene	Lamb
22-PC10-WPEA	Progene Winter Pea Eval	PC	15	3	45	B-4-4	32 32N 15E	Powel	Progene	Lamb
22-CS05-LnVT	Lentil Variety Trial	PC	10	4	40	B-4-2	32 32N 15E	Burrows	USDA-MAES	Lamb
22-PC05-CP	Statewide Chickpea Trial	PC	17	4	68	B-4-1	32 32N 15E	Chen	USADPLC-MAES	Lamb
Sub-Totals:		16	310		897	18.89%	of Total Plot Inventory			
				FORAGE RESEARCH (FR) INVESTIGATIONS						
ON-STATION										
22-FR02-FR	Winter Cereal Forage Trial	FR	10	4	40	A-7-2	33 32N 15E	Carr	MAES-CARC	Lamb
22-FR03-FR	Spring Cereal Forage Trial	FR	15	4	60	A-7-1	33 32N 15E	Carr	MAES-CARC	Lamb
22-FR05-FR	Intrastate Spring Barley Forage	FR	25	3	75	A-7-2	33 32N 15E	Sherman	MAES-MSU	Lamb
22-FR06-FR	Winter Barley Forage	FR	16	3	48	A-7-2	33 32N 15E	Sherman	MAES-MSU	Lamb
Sub-Totals:		4	66		223	4.70%	of Total Plot Inventory			

Experiment No. *	Description	Crop	Ents	Reps	Plots	Loc-Field	Legal Desc	Leader	Sponsor	Cooperator
				NUTRIENT RESEARCH (NR) INVESTIGATIONS						
ON-STATION										
22-OC10-HP	Hemp N Fertility by Population	HP	20	4	80	B-2-1	32 32N 15E	Lamb	MFAC-MAES	Haney
22-CM05-CM	Camelina N & S Fertility Trial	CM	8	4	32	B-2-1	32 32N 15E	McVay	MFAC-MAES	Lamb
22-FR10-PF	N for Sustained Per. For. Grass	FR	16	4	64	B-8-1	32 32N 15E	Torrion	MFAC-MAES	Lamb
22-NM07-PeaDP	Pea following WW Deep P on WW	WW	9	4	36	B-8-3 & 4	32 32N 15E	Bourgault	MFAC-MAES	Lamb
22-PC20-PEA	Environ. Controls on Pea Protein	PC	5	5	25	B-4-4	32 32N 15E	Koeshall	USDA-MAES	Haney
Sub-Totals:		5	58		237	4.99%	of Total Plot Inventory			
				PEST MANAGEMENT (PM) INVESTIGATIONS						
ON-STATION										
22-CC02-DIS	Cover Crop Pulse Disease	CC	8	4	32	B-2-4	32 32N 15E	Crutcher	SCBG-MAES	Lamb
22-PM60-PM	Hill Plots	SW				A-7-1	33 32N 15E	Cook/Weaver	MAES-MSU	Lamb
Sub-Totals:		2	8		32	0.67%	of Total Plot Inventory			

2022 SUMMARY: Project Inventory - (Plots Established)

TOTALS - AGRONOMY PROJECTS

55 Experiments or Trials
2316 Entries in 4748 Plots
3673 Plots for Harvest

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

ON-STATION	=	62.49%
OFF-STATION	=	37.51%

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

* Blaine County	=	24.97%	1-Loc:	WW, SW, DUR, Vars
* Chouteau County	=	19.21%	1-Loc:	WW & SW Vars
* Hill County	=	25.10%	2-Loc:	WW & SW Sawfly
* Liberty County	=	15.36%	1-Loc:	SW, DUR Vars
* Phillips County	=	15.36%	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 Hill County is abnormally high due to extensive cooperative wheat stem sawfly work at the McCormick site south of Kremlin.

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 cooperator, 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

2020-2022
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		
		2020	2021	2022	2020	2021	2022	2020	2021	2022	2020	2021	2022
On-Station	Winter Wheat*	4	4	4	138	141	141	357	360	360	7.9%	7.8%	9.6%
Off-Station	Winter Wheat*	7	5	5	148	148	148	346	346	346	7.6%	7.5%	9.2%
On-Station	Spring Wheat and Durum*	4	5	4	173	213	218	511	510	527	11.3%	11.0%	14.1%
Off-Station	Spring Wheat and Durum*	7	9	7	147	330	145	441	869	435	9.7%	18.8%	11.6%
On-Station	Spring Barley	5	3	5	189	129	164	627	387	492	13.8%	8.4%	13.1%
On-Station	Winter Barley	0	0	1	0	0	25	0	0	75	0.0%	0.0%	2.0%
On-Station	Safflower	1	0	0	16	0	0	48	0	0	1.1%	0.0%	0.0%
On-Station	Brassica sp.	2	2	2	38	38	33	152	152	124	3.4%	3.3%	3.3%
On-Station	Pulse Crops	16	22	16	333	555	310	1002	1383	897	22.1%	30.0%	23.9%
On-Station	Other Crops	4	1	0	152	4	0	426	16	0	9.4%	0.3%	0.0%
On-Station	Forage	3	3	4	50	47	66	175	163	223	3.9%	3.5%	5.9%
On-Station	Nutrient Research	5	5	5	76	60	58	250	234	237	5.5%	5.1%	6.3%
On-Station	Pest Management	1	2	2	49	49	8	196	196	32	4.3%	4.2%	0.9%
Grand Total		61	61	55	1509	1714	1316	4531	4616	3748	100.0%	100.0%	100.0%
Harvested								4531	4563	3673	100.0%	98.9%	98.0%
Total On-Station Plots								3744	3401	2967	82.6%	73.7%	79.2%
Total Off-Station Plots								787	1215	781	17.4%	26.3%	20.8%

* Winter Wheat, Spring Wheat & Pest Management:
2020: 1703 single row plots along with individual hill plots are no longer included in count
2021: 1400 single row plots along with individual hill plots are no longer included in count
2022: 1000 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. 2022. (Exp# 22-3502-WW)

ID	Cultivar Source or Selection	1/ Head Date	1/ Maturity Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
AAC Wildfire	Alberta/SECAN, 2015	168.3	201.0	27.7	47.8	55.9	**15.7**	80.0
AP Bigfoot	Syngenta 2021	**156.3**	**194.0**	**23.1**	54.0	60.8	14.4	75.0
AP Solid	Syngenta 2021	160.3	197.0	25.2	60.1	**62.5**	13.8	86.7
AP18 AX	Syngenta 2020	159.0	196.7	**24.0**	59.4	59.9	13.6	68.3
Balance	Nutrien, 2020	164.0	200.3	25.8	55.0	57.7	**15.5**	81.7
Battle AX	Colorado Wheat Fdn/Montech, 2019	159.0	197.7	25.0	63.1	59.8	13.9	65.0
Bobcat	Montana, 2019	162.0	197.0	26.1	**65.6**	60.5	14.6	**20.0**
Brawl CL Plus	Plainsgold/Colorado Wheat Res Fdn, 2011	157.3	**194.0**	24.1	57.7	**61.8**	**15.4**	48.3
Flathead	Montana, 2019	157.0	**193.0**	**23.8**	56.6	60.6	14.4	71.7
Fortify SF	Plainsgold/Colorado Wheat Res Fdn, 2019	160.3	196.0	25.3	61.9	61.0	13.9	73.3
FourOsix	Montana, 2018	161.7	197.0	25.7	58.9	58.2	14.7	96.3
Judee	Montana, 2011	163.3	197.3	25.0	50.6	59.6	15.3	56.7
Keldin	WestBred, 2011	162.7	197.7	26.5	61.7	59.2	14.7	90.0
LCS Helix AX	Limagrain Cereal Seeds, 2020	156.7	197.3	**23.2**	57.6	**61.5**	13.9	71.7
LCS Julep	Limagrain Cereal Seeds, 2020	158.7	198.3	**24.1**	57.9	**62.0**	14.7	68.3
LCS Steel AX	Limagrain Cereal Seeds, 2021	163.3	197.7	27.9	62.5	59.0	13.0	84.7
Loma	Montana, 2016	166.7	199.0	26.5	53.4	57.2	**15.4**	**31.7**
Milestone	Nutrien, 2020	161.7	197.3	24.2	64.5	57.8	14.4	85.0
MS Iceman	Meridian, 2020	159.7	198.3	**22.3**	63.9	**61.8**	**15.3**	43.3
MS Maverick	Meridian, 2021	161.3	196.0	25.0	61.4	60.7	14.6	89.7
MT WarCat	Loma*2/AAC Gateway	167.3	200.0	24.1	57.3	57.7	15.2	**10.0**
Northern	Montana, 2015	165.3	198.3	25.3	58.1	58.0	14.7	91.3
Ramsay	Nutrien, 2021	163.7	197.3	25.9	**66.4**	59.8	14.6	93.3
StandClear CLP	Nutrien, 2020	162.0	197.0	27.8	57.4	60.8	14.6	51.7
SY Clearstone 2CL	Montana/Syngenta, 2012	164.7	197.7	26.5	55.7	57.7	14.5	93.0
SY Wolverine	Syngenta 2019	157.3	194.7	24.6	54.9	60.2	**15.3**	75.0
Warhorse	Montana, 2013	165.7	197.7	26.5	54.0	58.0	**15.9**	**8.3**
WB4510 CLP	WestBred, 2021	161.0	195.3	27.0	50.0	60.1	14.6	85.0
WB4619	WestBred, 2021	160.0	197.3	24.1	58.4	59.4	13.5	83.3
Whistler	Plainsgold/Colorado Wheat Res Fdn, 2018	162.3	196.0	26.6	54.5	58.3	14.1	97.7
Yellowstone	Montana 2005	163.0	197.7	28.4	63.0	58.3	14.0	99.0
20Nord148	CM82036/Jerry//WB Matlock	161.0	196.0	**23.5**	56.8	59.2	14.5	73.3
CP7017AX	Winfield United (Croplan), 2020	158.7	**193.3**	24.5	62.3	60.7	13.5	94.7
CP7050AX	Winfield United (Croplan), 2020	**155.3**	194.7	**23.8**	50.4	**61.6**	15.2	81.7
CP7909	Winfield United (Croplan), 2018	**153.3**	**192.3**	**21.6**	56.8	59.9	14.7	70.0
MS 1022	Meridian experimental line	**155.0**	**192.3**	24.6	55.4	61.0	14.6	71.7
MT1745	Decade*2/NI06732	165.0	199.0	27.1	62.8	59.9	13.7	83.3
MT19159	Northern//02X22cE38/MT10121	163.0	197.7	24.2	58.9	57.6	14.5	97.7
MT19175	SD08198/Northern	163.0	197.7	**23.4**	59.9	58.7	14.0	80.0
MT2019	MT10114/MT10128//MTW1251	161.7	196.3	**23.2**	58.9	59.5	14.0	85.0

TABLE 1. Continued **Intrastate Winter Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2022. (Exp# 22-3502-WW)**

Cultivar/Line	Cultivar Source or Selection	1/ Head Date	1/ Maturity Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
MTCL19151	MT0871/(06X445B1-2, SY Clearstone sib)	159.0	197.7	**23.6**	58.9	60.0	14.4	83.3
MTCL2010	MT0871/(06X445B1-2, SY Clearstone sib)	161.0	198.0	**22.1**	56.4	60.6	14.3	68.3
MTCS20156	Bobcat//(Bobcat sib, MTS1589)/StandClear CLP	163.3	196.7	28.4	**72.9**	61.1	14.2	**20.0**
MTF20189	MT10121*2/MV11-04	164.3	197.3	37.9	55.3	59.5	15.0	88.3
MTFH19132	MT1078//Colter/Emerson	162.7	196.3	27.9	58.2	57.9	14.1	91.7
MTFH20166	DecadeFhb1-DH11/Overland FHB-1	160.3	196.0	25.2	53.2	60.2	14.5	91.7
MTS1903	(Judee sib, MTS0819)//08X350-A6/Warhorse	166.3	198.7	25.7	59.8	58.2	**15.3**	**13.3**
MTS1908	(Judee sib, MTS0819)//08X350-A6/Warhorse	165.7	198.3	28.1	60.6	59.0	14.9	**18.3**
MTS2068	(Judee sib, MTS0819)//08X350-A6/Warhorse	165.0	198.0	27.9	61.2	58.9	14.8	**20.0**
EXPERIMENTAL MEANS		161.5	196.9	25.5	54.2	59.6	14.5	69.5
LSD (0.05)		3.1	1.7	2.4	7.5	1.3	0.6	28.8
C.V.%		1.2	0.5	5.9	8.6	1.3	2.7	25.6
P-VALUE (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

1/ No. of Days from January 1 (161 = June 10, 197= July 16).

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

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

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

Bold indicates either the highest or lowest value within a column (whichever is most desirable for the specific characteristic).

Bold indicates values equal to the underlined value within a column based on Fisher's protected LSD (P=0.05).

Management Information (22-3502-WW)

Seeding Date:	September 15, 2021
Harvest Date:	August 5, 2022
Fertility:	125-20-10-10 side banded
System:	no till
Herbicide:	Vendetta (20 oz/ac)
Insecticide:	Baythroid (2.4 oz/ac)
Previous Crop:	Chemical Fallow - Spring Barley
Precipitation:	7.44" (seeding to harvest)

TABLE 2. Ten-Year Yield and Test Weight Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2013-2022. (Exp# 3502-WW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ YIELD (Bushels Per Acre) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	**10-YR COMP. AVE. YIELD 5/**	TEST WEIGHT (Pounds Per Bushel) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/	**10-YR COMP. AVE. TEST WT 5/**
MTS1588	BOBCAT (++)(saw fly tol)	6	62.7	62.6	59.5	25.5	65.6	55.4	112.2	**66.3**	62.7	60.6	62.6	54.8	60.5	60.6	102.0	**61.1**
LCS	LCS STEEL AX (P+)	3			54.3	25.8	62.5	47.6	109.5	**64.7**			62.1	54.6	59.0	58.6	102.4	**61.3**
MTS18149	MT WARCAT (++)	3			56.6	25.9	57.3	46.6	107.3	**63.4**			62.4	54.5	57.7	58.2	101.7	**60.9**
ACS55017	KELDIN (P+)	9	68.6	52.4	58.1	28.5	61.7	61.1	106.2	**62.7**	63.1	59.9	62.0	52.7	59.2	60.3	100.8	**60.3**
MT00159	YELLOWSTONE (+)	9	61.9	54.8	53.5	27.9	63.0	62.2	103.8	**61.3**	61.7	59.5	61.5	53.5	58.3	59.4	99.8	**59.7**
MTCS1601	STANDCLEAR CLP (P+,CL)	5	55.5	61.6	53.5	23.7	57.4	50.3	102.9	**60.8**	62.9	60.7	62.4	54.4	60.8	60.2	102.4	**61.3**
MT1564	FLATHEAD (++)	6	61.2	49.1	50.4	35.2	56.6	50.6	102.6	**60.6**	63.6	60.4	63.1	51.8	60.6	60.3	101.6	**60.8**
MT1465	FOUROSIX (++)	7	60.3	57.5	53.1	23.7	58.9	57.5	100.7	**59.4**	62.6	60.0	62.2	53.3	58.2	59.8	100.8	**60.3**
MT0978	NORTHERN (+)	10	56.5	57.7	49.4	22.8	58.1	59.0	100.0	**59.0**	62.3	60.3	62.0	51.6	58.0	59.8	100.0	**59.8**
SECAN, 2015	AAC WILDFIRE (+)	5	72.5	54.0	52.0	17.6	47.8	48.8	99.7	**58.9**	62.2	58.8	61.5	54.1	55.9	58.5	99.4	**59.5**
MTCL1077	SY CLEARSTONE 2CL (P+)	10	61.8	56.8	52.4	18.8	55.7	57.9	98.0	**57.9**	61.4	59.5	61.6	54.6	57.7	59.6	99.7	**59.7**
Syngenta 2019	SY WOLVERINE (P+)	4		48.9	49.0	28.3	54.9	45.3	96.3	**56.9**		60.3	63.1	54.5	60.2	59.5	102.7	**61.5**
MTS0713	JUDEE (+)(saw fly tol)	10	55.7	52.6	50.8	18.7	50.6	55.1	93.4	**55.1**	63.6	61.3	63.6	55.0	59.6	61.1	102.2	**61.2**
CO06052	BRAWL CL PLUS (+)	8	57.6	52.2	47.1	29.5	57.7	53.1	93.0	**54.9**	64.3	62.0	63.4	52.1	61.8	61.2	102.4	**61.3**
Winfield, 2018	CP7909 (P+)	3			29.8	34.5	56.8	40.4	92.9	**54.9**			62.4	52.3	59.9	58.2	101.8	**60.9**
MTS1224	LOMA (++)	9	60.5	51.1	53.0	24.2	53.4	52.7	91.7	**54.1**	62.6	59.7	62.1	53.2	57.2	59.7	99.7	**59.7**
MTS0808	WARHORSE (+)(saw fly tol)	10	57.0	46.5	51.4	20.6	54.0	53.4	90.4	**53.4**	62.5	60.2	62.1	51.5	58.0	59.8	99.9	**59.8**
MEANS (For Entries Listed)			60.9	54.1	51.4	25.4	57.2			**59.1**	62.7	60.2	62.4	53.4	59.0			**60.5**
April-July Precip. (in.)			4.0	6.3	5.6	4.1	5.5	6.6										
Total Annual Precip. (in.)			13.2	11.3	10.5	10.0	8.2	12.5										
Soil PAW (in.) to SD @ Planting			8.6	7.7	9.4	6.4	7.8	8.6										
Total Plant Available Water (in.)			12.6	14.0	15.0	10.5	13.3	14.3										
Soil NO_3 (lbs.) to SD at Planting			272	117	419	77	56	126										
SD (Sampling Depth in Inches)			48	46	47	47	48	48										
Fertilizer Applied		(# N)	125	125	125	125	125	113										
		(# P_2O_5)	20	20	20	20	20	20										
		(# K_2O)	10	10	10	10	10	10										
		(# S)	10	10	10	10	10	6										

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 selecton decisions.

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

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

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

5/ 10-Yr Comparable Average = (x/y) * z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Northern for the same years, and z = 10-Yr average yield or test weight for the check variety Northern.

TABLE 3. **Ten-Year Protein and Sawfly Summary on Selected Entries from Dryland Intrastate Winter Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2013-2022. (Exp# 3502-WW)**

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ PROTEIN % (Values Adjusted to 13% Grain Moisture) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK PROTEIN 4/	**10-YR COMP. AVE. PROTEIN 5/**	SAWFLY RATING (% Cut and Lodged) 2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK SAWFLY 4/	**10-YR COMP. AVE. SAWFLY 5/**
MTS1588	BOBCAT (++)(saw fly tol)	6	14.3	14.9	14.4	17.8	14.6	15.0	98.4	**14.2**	0.6	19.0	8.8	20.0	8.4	26.6	**5.4**
MTS0808	WARHORSE (+)(saw fly tol)	10	14.9	16.2	14.8	18.3	15.9	14.4	102.8	**14.8**	2.8	34.6	13.3	8.3	6.5	32.1	**6.5**
MTS18149	MT WARCAT (++)	3			14.8	18.2	15.2	16.0	100.8	**14.5**		28.6	19.5	10.0	19.4	39.0	**7.9**
MTS1224	LOMA (++)	9	14.4	15.2	14.7	18.3	15.4	14.4	101.0	**14.5**	15.4	37.8	10.3	31.7	11.6	53.4	**10.8**
CO06052	BRAWL CL PLUS (+)	8	14.0	15.3	14.0	17.6	15.4	14.4	100.5	**14.5**	13.9	30.7	23.7	48.3	15.6	64.9	**13.1**
MTS0713	JUDEE (+)(saw fly tol)	10	15.5	15.8	15.2	18.4	15.3	14.2	101.1	**14.6**	11.4	31.3	40.7	56.7	15.2	75.3	**15.2**
MT1564	FLATHEAD (++)	6	13.8	15.1	13.9	17.1	14.4	14.7	96.3	**13.9**	27.4	33.7	34.9	71.7	28.4	89.5	**18.1**
Syngenta 2019	SY WOLVERINE (P+)	4		15.7	14.5	16.9	15.3	15.6	99.7	**14.3**	28.9	48.3	19.8	75.0	43.0	92.1	**18.6**
MTCS1601	STANDCLEAR CLP (P+,CL)	5	14.7	11.6	14.1	17.9	14.6	14.6	95.0	**13.7**	11.6	61.0	55.1	51.7	36.7	96.3	**19.4**
SECAN, 2015	AAC WILDFIRE (+)	5	13.8	14.6	13.8	17.6	15.7	15.1	98.3	**14.1**	32.4	52.4	17.3	80.0	37.5	98.5	**19.9**
MT0978	NORTHERN (+)	10	14.2	14.8	14.8	18.2	14.7	14.0	100.0	**14.4**	37.6	24.6	33.3	91.3	20.2	100.0	**20.2**
MT00159	YELLOWSTONE (+)	9	14.2	15.1	14.4	17.5	14.0	13.7	97.8	**14.1**	30.2	38.4	27.5	99.0	24.2	107.7	**21.7**
Winfield, 2018	CP7909 (P+)	3			13.5	16.5	14.7	14.9	93.5	**13.5**		56.3	37.8	70.0	54.7	110.0	**22.2**
MT1465	FOUROSIX (++)	7	14.9	14.9	14.2	17.4	14.7	14.5	99.5	**14.3**	38.6	62.4	27.1	96.3	32.6	119.8	**24.2**
LCS, 2021	LCS STEEL AX (P+)	3			12.5	16.8	13.0	14.1	88.5	**12.7**		54.0	41.1	84.7	59.9	120.5	**24.3**
MTCL1077	SY CLEARSTONE 2CL (P+)	10	14.3	15.3	14.7	17.6	14.5	13.9	99.0	**14.2**	44.0	55.1	25.5	93.0	25.6	126.5	**25.6**
ACS55017	KELDIN (+)	9	13.7	15.1	14.3	18.7	14.7	13.8	97.4	**14.0**	45.9	61.1	37.2	90.0	28.8	132.8	**26.8**
MEANS (For Entries Listed)			14.4	15.0	14.3	17.7	14.8			**14.1**	24.3	42.9	27.8	63.4			**17.6**
April-July Precip. (in.)			4.0	6.3	5.6	4.1	5.5	6.6									
Total Annual Precip. (in.)			13.2	11.3	10.5	10.0	8.2	12.5									
Soil PAW (in.) to SD @ Planting			8.6	7.7	9.4	6.4	7.8	8.6									
Total Plant Available Water (in.)			12.6	14.0	15.0	10.5	13.3	14.3									
Soil NO_3 (lbs.) to SD at Planting			272	117	419	77	56	126									
SD (Sampling Depth in Inches)			48	46	47	47	48	48									
Fertilizer Applied		(# N)	125	125	125	125	125	113									
		(# P_2O_5)	20	20	20	20	20	20									
		(# K_2O)	10	10	10	10	10	10									
		(# S)	10	10	10	10	10	6									

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 selecton decisions.

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

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

4/ Percent of Northern protein or wheat stem saw fly rating for the same data years as those in which a given entry was tested.

5/ 10-Yr Comparable Average = (x/y) * z where x = average protein or saw fly percent of a given entry for years tested, y = average protein or saw fly percent for Northern for the same years, and z = 10-Yr average protein or saw fly percent for the check variety Northern.

TABLE 4. Advanced Yield Spring Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. (Exp# 22-3102-SW)

ID	Cultivar Source or Selection	1/ Head Date	1/ Maturity Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
AAC CONCORD	MS 211	172.7	205.0	26.8	34.4	58.9	15.7	**1.0**
AP GUNSMOKECL2	SYN 212	170.3	207.7	**22.1**	36.7	58.6	**16.5**	50.0
AP SMITH	SYN 211	172.7	208.7	**22.3**	40.6	59.2	15.2	23.3
CHOTEAU	PI 633974	174.0	207.7	23.6	37.5	58.2	15.4	3.7
CORBIN	BZ 996434	170.0	**203.0**	25.2	37.3	58.4	15.9	3.7
DAGMAR	PI 690450	170.0	206.7	25.7	**45.6**	59.4	15.4	**1.0**
DUCLAIR	PI 660981	172.7	206.0	25.0	39.4	57.7	15.7	3.7
LANNING	PI 676978	**168.7**	205.0	**23.2**	35.2	57.2	15.4	45.0
LCS ASCENT	LIMAGR 211 (LNR 0046)	169.3	207.3	23.8	**42.1**	60.3	14.2	23.3
LCS DUAL	LIMAGR 221	170.0	207.0	25.5	38.4	59.2	14.9	35.0
LCS HAMMERAX	LIMAGR 222	171.7	204.7	24.5	40.6	58.5	14.4	63.3
MCNEAL	PI 574642	173.3	207.0	25.8	35.3	57.9	15.3	26.7
MS COBRA	MS 212	170.7	207.0	23.7	38.2	58.7	15.2	26.7
MS RANCHERO	MS 201	171.7	207.0	**22.9**	36.7	57.7	14.7	18.3
MT SIDNEY	MT 1716	171.3	208.7	**22.7**	36.1	59.7	15.8	8.3
ND HERON	ND HERON	169.3	208.0	24.6	38.3	60.5	15.4	25.0
NS PRESSER CLP	PI 679964	175.7	208.0	26.3	40.0	57.0	15.0	20.0
REEDER	ND 695	171.3	208.7	25.3	38.7	58.5	15.3	41.7
ROCKER	BZ 917-277	172.3	207.7	26.5	**46.2**	59.4	15.2	8.3
SY 611 CL2	SYN 183	171.3	206.7	**22.3**	33.7	59.8	15.3	33.3
SY INGMAR	AGRIPR 141	172.7	207.7	24.1	37.9	60.0	15.1	30.0
SY LONGMIRE	SYN 182	171.0	204.7	25.2	37.5	59.3	15.6	18.3
SY ROCKFORD	AGRIPR 161	173.3	209.3	24.4	37.8	59.7	15.1	31.7
THATCHER	CI 10003	176.0	206.3	31.7	28.4	57.1	15.8	23.3
VIDA	PI 642366	174.0	207.0	25.2	**42.6**	58.2	14.8	15.0
WB 9516	WB 211	172.0	208.0	25.7	**43.7**	60.6	14.5	23.3
WB 9668	WB 222	**168.3**	204.0	**21.4**	34.5	59.4	**16.5**	13.3
WB 9719	WB 173	172.0	209.3	23.6	40.0	60.4	14.9	38.3
WB 9879 CLP	CHOTEAU*3/CHOTEAU/IMI8134	172.3	**203.3**	26.6	39.3	58.7	15.7	5.0
WB 9929	WB 221	170.7	205.7	27.3	40.0	56.7	15.9	26.7
WB GUNNISON	BZ 92413R	172.7	207.7	25.1	36.0	59.3	14.4	**2.3**
MT 1809	VIDA/M0 09/3-4	173.0	206.7	24.4	**42.9**	57.5	15.4	18.3
MT 1939	LANNING///MT1018//CHOTEAU/YELLOWS	171.3	**203.3**	24.8	**43.4**	58.1	15.1	21.7
MT 2007	LANNING/ND819	169.7	205.7	**21.5**	38.4	59.4	15.0	33.3
MT 2013	MT 1542/ND819	169.3	**203.0**	24.4	38.8	60.0	15.0	15.0
MT 2022	MT 1401/ND 819	169.0	205.7	**22.8**	40.8	59.9	14.7	10.0
MT 2030	LANNING/MT 1338	169.3	205.0	**23.1**	**42.2**	57.3	15.1	45.0
MT 2038	LANNING/MT1133//MT0744/MT0614	169.0	205.3	25.7	**41.2**	59.3	15.4	21.7
MT 2049	LANNING/MT 1415	169.7	204.3	**23.2**	40.0	56.8	15.2	43.3
MT 2050	MT 1542/MT 1415	170.7	204.7	23.5	**46.3**	59.2	14.5	10.0
MT 2054	LANNING/MT 1528	169.7	205.7	26.4	**42.0**	59.7	14.8	4.0
MT 2063	MT 1572/MT1133//CHOTEAU/YELLOWST	171.3	208.7	24.1	**42.5**	60.0	14.6	18.3
MT 21003	MT 1451/MT 1866	171.3	206.0	24.4	40.9	58.0	**16.0**	15.0

TABLE 4. Continued **Advanced Yield Spring Wheat Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. (Exp# 22-3102-SW)**

ID	Cultivar Source or Selection	1/ Head Date	1/ Maturity Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	3/ Protein %	4/ Sawfly %
MT 21005	MT1274/12F5 827//MT 1652	169.0	206.7	23.7	38.9	58.2	15.2	3.7
MT 21016	MT 1542/LANNING	170.0	205.7	23.8	37.1	58.2	**16.1**	5.3
MT 21019	MT 1570/MT 1666	170.0	206.0	25.9	**42.4**	59.9	15.3	6.7
MT 21021	MT 1570/MT 1651	171.3	207.3	**23.2**	38.9	**61.0**	15.0	6.7
MT 21023	MT 1570/MT 1651	171.0	204.0	26.8	**42.5**	59.6	15.9	8.3
MT 21024	MT 1570/MT 1651	**168.7**	204.0	23.3	39.5	58.7	**16.2**	**2.3**
MT 21031	MT 1525/LANNING	173.3	208.3	24.9	39.4	**61.7**	15.5	13.3
MT 21037	MT 1570//MT1274/12F5 827	170.0	205.3	24.0	**44.9**	58.8	15.1	**1.0**
MT 21062	MT 1525//MT1253/12SR 37	172.3	205.7	25.0	40.0	60.1	15.1	13.3
MT 21073	MT 1525/MT 1348	169.0	205.7	23.3	40.5	60.3	14.8	8.3
MT 21074	MT 1525/MT 1348	174.7	207.0	25.6	42.3	59.7	**16.1**	7.0
MT 21075	MT 1525/MT 1348	172.7	206.0	24.5	39.8	59.3	**16.4**	8.3
MT 21076	NS-Presser*2/3/MT1317*2//UC1110/ABG2	174.7	209.3	26.1	37.8	58.5	**16.2**	3.7
MT 21082	MT 1867*2/3/Lanning*2//UC1110/ABG282-	**168.7**	204.7	25.8	39.8	58.0	**16.4**	8.3
MT 21089	Lanning*3//UC1110/ABG282-290	**168.7**	207.3	23.8	35.4	54.3	15.8	55.0
MT 21091	Lanning*3//UC1110/ABG282-290	170.0	206.7	**22.4**	37.3	57.1	15.6	25.0
MT 21099	MT 1866*1/Yr53	174.3	208.0	24.2	36.7	57.8	15.7	3.7
MT 21102	2016SMABC121//Patwin515/MN-11394-6	172.3	208.0	24.8	36.0	60.0	15.2	28.3
MT 21104	MT 1451/MT 1866	172.3	206.0	25.0	**41.4**	58.7	15.5	16.7
MT 21105	MT 1570/VIDA	173.3	208.7	23.8	**43.2**	60.3	14.8	**2.3**
MT 21111	MT1317*3//UC1110/ABG282-290	169.7	205.7	24.1	37.6	59.8	15.7	10.0
EXPERIMENTAL MEANS		171.3	206.4	24.5	39.4	58.9	15.3	18.5
LSD (0.05)		1.4	3.1	1.9	5.2	1.1	0.5	15.4
C.V.: (S / MEAN)*100		0.5	0.9	4.8	8.2	1.1	2.1	51.7
P-VALUE (Entries)		<.0001	0.0001	<.0001	<.0001	<.0001	<.0001	<.0001

1/ No. of Days from January 1 (171 = June 20, 206= July 25).
2/ Volumetric yields are based on plot weights adjusted to uniform 13 percent grain moisture and 60 lbs/bu as the standard test weight for wheat.
3/ Protein values are adjusted to 13 percent grain moisture.
4/ Sawfly rating is reported as the percentage of cut stems.
Bold indicates either the highest or lowest value within a column (whichever is most desirable for the specific characteristic).
Bold indicates values equal to the underlined value within a column based on Fisher's protected LSD (P=0.05).

Management Information (22-3102-SW)

Seeding Date:	April 11, 2022
Harvest Date:	August 10, 2022
Fertility:	46-9-5-5 side banded
System:	no till
Herbicide:	Vendetta-20oz/ac
Insecticide:	Baythroid (2.4 oz/ ac)
Previous Crop:	Chemical Fallow-Spring Barley
Precipitation:	5.38" (seeding to harvest maturity)

TABLE 5. Ten-Year Yield and Test Weight Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2013-2022. (Exp# 3102-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ YIELD (Bushels Per Acre) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	**10-YR COMP. AVE. YIELD 5/**	TEST WEIGHT (Pounds Per Bushel) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/	**10-YR COMP. AVE. TEST WT 5/**
MT 1621	DAGMAR (++)(saw fly tol)	6	45.1	49.8	71.9	25.3	45.6	44.5	100.9	**47.0**	61.0	59.4	61.4	59.7	59.4	60.0	101.6	**59.5**
PI642366	VIDA (+)	10	44.4	53.1	64.4	24.7	42.6	46.6	100.0	**46.6**	59.9	59.4	60.1	58.3	58.2	58.6	100.0	**58.6**
PI679964	NS PRESSER CL (P+)	8	45.7	46.0	59.9	26.5	40.0	44.7	96.0	**44.7**	58.8	58.1	58.4	58.4	57.0	58.1	98.2	**57.5**
WB 173	WB 9719 (P+)	6	48.2	50.6	61.7	20.8	40.0	42.2	95.6	**44.6**	61.9	61.5	61.8	59.2	60.4	60.9	103.0	**60.4**
SYN 182	SY LONGMIRE (P+)	5	41.4	50.4	66.8	22.4	37.5	43.7	95.3	**44.4**	60.7	60.9	60.9	59.0	59.3	60.2	101.7	**59.6**
MT 1716	MT SIDNEY (++)	5	44.0	51.6	63.5	22.5	36.1	43.5	95.0	**44.3**	61.2	59.9	61.0	57.9	59.7	60.0	101.3	**59.4**
PI676978	LANNING (++)	9	44.6	43.0	66.4	21.5	35.2	41.4	93.3	**43.5**	58.4	59.7	60.5	58.2	57.2	58.0	99.8	**58.5**
AGRIPR161	SY ROCKFORD (P+)	7	44.5	44.2	61.8	24.3	37.8	40.7	93.3	**43.5**	59.9	57.9	60.0	56.9	59.7	58.3	99.3	**58.2**
IMICHT-79	WB9879CLP (P+)	10	43.5	51.3	64.6	25.0	39.3	43.4	93.0	**43.4**	59.7	58.8	61.0	57.7	58.7	58.6	100.0	**58.6**
ND695	REEDER (+)	10	44.6	42.8	61.1	21.1	38.7	43.3	92.8	**43.3**	59.7	59.8	61.1	58.3	58.5	59.0	100.6	**59.0**
04S0258-12	SY INGMAR (P+)	9	44.2	45.5	56.4	23.7	37.9	40.9	92.3	**43.0**	61.7	60.5	61.2	59.2	60.0	59.4	102.2	**59.9**
PI660981	DUCLAIR (+)	10	33.9	47.7	64.8	21.2	39.4	42.4	90.8	**42.4**	59.8	58.4	59.4	56.6	57.7	57.8	98.7	**57.8**
BZ 996-434	CORBIN (P+)(saw fly tol)	10	40.8	44.8	56.8	28.8	37.3	42.0	90.0	**42.0**	60.7	59.8	60.4	59.6	58.4	59.2	101.0	**59.2**
BZ902-413R	WB-GUNNISON (P+)	10	36.3	52.0	61.0	29.3	36.0	41.5	89.0	**41.5**	60.4	60.0	61.3	58.5	59.3	59.2	101.0	**59.2**
SYN 183	SY 611 CL2 (P+)	5	43.9	46.3	60.6	18.3	33.7	40.5	88.4	**41.2**	61.0	61.1	61.5	59.1	59.8	60.5	102.3	**59.9**
MS 201	MS RANCHERO (P+)	3			55.4	24.2	36.7	38.8	88.4	**41.2**			59.5	58.5	57.7	58.6	99.6	**58.3**
PI574642	McNEAL	10	41.1	46.8	55.8	21.5	35.3	41.0	87.9	**41.0**	57.5	58.5	58.4	57.5	57.9	57.6	98.3	**57.6**
PI633974	CHOTEAU (+)(saw fly tol)	10	36.6	43.5	64.9	24.6	37.5	40.4	86.6	**40.4**	59.8	58.7	61.0	57.6	58.2	58.4	99.7	**58.4**
CI10003	THATCHER	9	34.5	37.1		16.3	28.4	31.5	70.6	**32.9**	55.5	54.0		55.3	57.1	55.5	95.0	**55.7**
MEANS (For Entries Listed)			42.1	47.0	62.1	23.3	37.6			**42.7**	59.9	59.3	60.5	58.2	58.6			**58.7**
April-July Precip. (in.)			4.0	6.3	5.6	3.9	5.5	6.6										
Total Annual Precip. (in.)			13.2	11.3	10.5	10.0	8.2	12.5										
Soil PAW (in.) to SD @ Planting			7.4	n/a	8.7	8.3	8.3	8.6										
Total Plant Available Water (in.)			11.4	n/a	14.2	12.2	13.8	15.2										
Soil NO_3 (lbs.) to SD at Planting			77	300	171	120	211	124										
SD (Sampling Depth in Inches)			42	47	45	45	48	46										
Fertilizer Applied	(# N)		100	100	100	100	46	100										
	(# P_2O_5)		20	20	20	20	9	19										
	(# K_2O)		10	10	10	10	5	10										
	(# S)		10	10	10	10	5	7										

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 selecton decisions.

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

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

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

5/ 10-Yr Comparable Average = (x/y) * z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Vida for the same years, and z = 10-Yr average yield or test weight for the check variety Vida.

TABLE 6. Ten-Year Protein and Wheat Stem Sawfly Summary on Selected Entries from Dryland Advanced Spring Wheat Nursery. Northern Agricultural Research Center. Havre, Montana. 2013-2022. (Exp# 3102-SW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ PROTEIN % (Values Adjusted to 13% Grain Moisture) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK PROTEIN 4/	**10-YR COMP. AVE. PROTEIN 5/**	1/ SAWFLY RATING (% Cut and Lodged) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK SAWFLY 4/	**10-YR COMP. AVE. SAWFLY 5/**
BZ902-413R	WB-GUNNISON (P+)	10	15.3	15.1	13.7	15.5	14.4	15.0	99.1	**15.0**	0.0	1.0	0.0	1.0	2.3	0.5	10.6	**0.5**
MT 1621	DAGMAR (++)(saw fly tol)	6	15.9	16.3	14.2	16.5	15.4	15.8	105.0	**15.9**	0.0	2.3	0.3	3.7	1.0	1.2	17.3	**0.8**
IMICHT-79	WB9879CLP (P+)	10	15.3	16.6	14.1	16.7	15.7	15.8	104.7	**15.8**	0.0	1.0	0.7	3.7	5.0	1.2	26.1	**1.2**
PI660981	DUCLAIR (+)	10	15.9	16.1	14.3	16.9	15.7	15.7	104.1	**15.7**	0.3	2.3	2.3	5.0	3.7	1.6	33.8	**1.6**
BZ 996-434	CORBIN (P+)(saw fly tol)	10	16.7	16.6	14.7	16.2	15.9	15.9	105.1	**15.9**	0.0	1.0	2.0	8.3	3.7	1.7	35.2	**1.7**
PI633974	CHOTEAU (+)(saw fly tol)	10	16.1	16.5	14.2	16.3	15.4	15.9	105.0	**15.9**	0.3	3.7	2.0	6.7	3.7	1.9	39.5	**1.9**
PI642366	VIDA (+)	10	15.0	15.4	13.7	15.6	14.8	15.1	100.0	**15.1**	0.3	10.0	2.0	15.0	15.0	4.7	100.0	**4.7**
SYN 182	SY LONGMIRE (P+)	5	16.6	16.5	13.6	16.5	15.6	15.8	106.0	**16.0**	0.3	13.3	3.7	11.7	18.3	9.5	111.8	**5.3**
MT 1716	MT SIDNEY (++)	5	15.6	15.8	14.3	16.5	15.8	15.6	104.9	**15.9**	0.7	18.3	8.7	25.0	8.3	12.2	144.1	**6.8**
PI 679964	NS PRESSER CL (P+)	8	15.2	15.6	14.8	15.2	15.0	15.1	101.4	**15.3**	0.3	8.3	10.0	23.3	20.0	7.9	145.4	**6.9**
CI 10003	THATCHER	9	16.9	16.5		16.7	15.8	16.4	107.1	**16.2**	3.7	16.7		25.0	23.3	8.6	170.0	**8.0**
04S0258-12	SY INGMAR (P+)	9	15.7	16.2	14.3	16.7	15.1	15.9	104.2	**15.7**	2.3	20.0	8.3	45.0	30.0	12.0	232.6	**11.0**
MS 201	MS RANCHERO (P+)	3			14.2	15.6	14.7	14.8	100.8	**15.2**			12.0	50.0	18.3	26.8	251.0	**11.9**
ND 695	REEDER (+)	10	15.8	15.8	13.9	16.0	15.3	15.6	103.2	**15.6**	2.3	16.7	5.3	46.7	41.7	12.0	253.0	**12.0**
PI574642	McNEAL	10	15.8	15.6	14.3	15.8	15.3	15.6	103.0	**15.6**	0.3	18.3	13.3	48.3	26.7	12.4	262.9	**12.4**
AGRIPR161	SY ROCKFORD (P+)	7	15.5	15.8	13.7	16.2	15.1	15.4	102.1	**15.4**	1.0	16.7	2.3	65.0	31.7	16.7	275.6	**13.0**
PI 676978	LANNING (++)	9	16.0	16.9	14.1	16.4	15.4	16.1	105.4	**15.9**	0.3	21.7	6.7	56.7	45.0	14.9	288.7	**13.7**
SYN 183	SY 611 CL2 (P+)	5	15.8	16.1	14.2	16.2	15.3	15.5	104.3	**15.8**	3.7	15.0	2.0	68.3	33.3	24.5	289.0	**13.7**
WB 173	WB 9719 (P+)	6	15.4	15.4	13.6	15.9	14.9	15.1	100.6	**15.2**	0.3	15.0	5.7	63.3	38.3	20.4	289.7	**13.7**
MEANS (For Entries Listed)			15.8	16.0	14.1	16.2	15.3			**15.6**	0.9	11.2	4.9	30.1	19.4			**7.4**
April-July Precip. (in.)			4.0	6.3	5.6	3.9	5.5	6.6										
Total Annual Precip. (in.)			13.2	11.3	10.5	10.0	8.2	12.5										
Soil PAW (in.) to SD @ Planting			7.4	n/a	8.7	8.3	7.8	8.5										
Total Plant Available Water (in.)			11.4	n/a	14.2	12.2	13.3	15.1										
Soil NO_3 (lbs.) to SD at Planting			77	300	171	120	211	124										
SD (Sampling Depth in Inches)			42	47	45	45	48	46										
Fertilizer Applied	(# N)		100	100	100	100	46	100										
	(# P_2O_5)		20	20	20	20	9	19										
	(# K_2O)		10	10	10	10	5	10										
	(# S)		10	10	10	10	5	7										

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 selecton decisions.

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

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

4/ Percent of Vida protein or wheat stem sawfly cutting for the same data years as those in which a given entry was tested.

5/ 10-Yr Comparable Average = (x/y) * z where x = average protein or sawfly percent of a given entry for years tested, y = average protein or sawfly percent for Vida for the same years, and z = 10-Yr average protein or sawfly percent for the check variety Vida.

Table 7. Montana Spring Durum Cultivar Evaluation Nursery Grown On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, MT. 2022. (Exp# 22-9802-DUR)

ID	Culitvar Source	1/ Head Date	Plant HT Inches	2/ Yield Bu/Ac	Test Wt Lbs/Bu	Protein %	3/ FN seconds	4/ Sawfly %
Alzada	MSU	**169.0**	**23.9**	37.0	58.1	15.7	**511**	**4.0**
Carpio	NDSU	174.3	28.5	35.3	57.7	16.7	421	**3.7**
Divide	NDSU	172.7	28.7	36.9	58.3	16.3	420	6.7
Joppa	NDSU	171.3	27.9	32.5	57.4	16.5	414	13.3
Lustre	MSU	173.3	29.1	36.9	56.8	16.9	426	**5.0**
Mountrail	NDSU	173.7	26.1	32.6	56.7	16.8	441	6.7
MT Blackbeard	MSU	174.3	30.1	36.1	57.2	17.0	**494**	**1.7**
MT Raska	MSU	**169.0**	**23.0**	39.3	**60.0**	16.1	425	**1.0**
ND-Grano	NDSU	175.0	29.3	**40.7**	58.6	16.4	419	15.0
ND-Riveland	NDSU	173.7	30.4	**39.7**	57.8	16.5	448	11.7
MTD18148	MSU	**170.0**	**22.4**	**40.2**	58.6	15.8	**505**	6.7
MTD19011	MSU	172.7	29.9	**42.4**	58.7	16.0	487	**1.0**
MTD19077	MSU	175.0	29.5	38.9	57.9	17.2	433	5.3
MTD19089	MSU	174.0	29.0	36.8	57.4	**17.7**	427	6.7
MTD19103	MSU	175.3	28.9	**41.4**	57.5	16.9	411	**1.0**
MTD19109	MSU	174.7	28.9	35.6	57.1	17.0	471	6.7
MTD19115	MSU	174.0	28.1	**40.7**	58.9	16.5	431	**2.0**
MTD19209	MSU	176.3	31.0	**42.6**	58.7	16.4	433	**0.3**
MTD19241	MSU	173.0	27.5	**42.3**	58.2	16.1	443	**2.0**
MTD19349	MSU	173.7	26.7	35.9	56.2	17.2	404	8.3
MTD19375	MSU	174.7	27.6	38.6	55.2	**18.0**	400	**3.7**
MTD19499	MSU	174.0	27.9	33.8	54.9	**17.6**	386	**0.3**
MTD19507	MSU	172.3	27.3	35.0	56.5	16.9	441	**3.7**
MTD19511	MSU	171.3	27.7	35.9	56.4	16.7	438	7.0
MTD19529	MSU	172.0	27.9	36.3	56.1	17.1	367	6.7
MTD19611	MSU	173.0	27.2	38.7	58.8	17.0	433	**1.0**
MTD19617	MSU	174.0	28.1	33.5	58.2	**17.8**	479	**0.7**
MTD19623	MSU	173.3	29.1	**40.3**	57.3	16.4	449	**5.0**
MTD19653	MSU	173.0	28.8	35.3	**59.2**	**17.8**	470	11.7
MTD19703	MSU	173.0	29.6	**40.3**	58.6	16.8	425	**4.0**
EXPERIMENTAL MEANS		173.2	28.0	37.7	57.6	16.8	438.4	5.1
LSD (0.05)		1.7	1.6	3.1	0.8	0.5	21.0	4.8
C.V.: (S / MEAN)*100		0.6	3.6	5.0	0.9	1.9	2.9	57.7
P-VALUE (Entries)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

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 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 and lodged stems.

Bold indicates either the highest or lowest value within a column (whichever is most desirable for the specific characteristic).

Bold indicates values equal to the underlined value within a column based on Fisher's protected LSD (P=0.05).

Management Information (22-9802-DUR)

Seeding Date:	April 11, 2022
Harvest Date:	August 9, 2022
Fertility:	46-9-5-5
System:	no till
Herbicide:	Vendetta, 20 oz/ac
Insecticide:	Baythroid (2.4 oz/ ac)
Previous Crop:	Chemical Fallow-Spring Wheat
Precipitation:	5.38" (seeding to harvest maturity)

TABLE 8. Ten-Year Yield and Test Weight Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2013-2022. (Exp# 9802-DUR)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ YIELD (Bushels Per Acre) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	**10-Yr COMP. AVE. YIELD 5/**	1/ TEST WEIGHT (Pounds Per Bushel) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/	**10-Yr COMP. AVE. TEST WT 5/**
D04581	JOPPA (+)	9	41.1	43.0	54.2	24.4	32.5	36.8	113.0	**43.2**	59.7	58.3	60.0	57.8	57.4	57.7	100.7	**58.3**
MSU, 2022	MT RASKA (++)	3			61.0	24.6	39.3	41.6	111.1	**42.5**			62.0	60.4	60.0	60.8	105.1	**60.9**
YU894-75	ALZADA (P+)	8	37.9	49.9	57.3		37.0	42.7	106.8	**40.8**	59.3	58.8	59.5		58.1	58.8	101.0	**58.5**
MTD16005	LUSTRE (++)	6	41.1	51.0	54.4	23.9	36.9	39.1	104.7	**40.0**	58.0	58.6	58.9	55.5	56.8	57.6	99.0	**57.3**
D9715-11	DIVIDE	10	41.1	44.5	55.2	24.4	36.9	39.9	104.3	**39.9**	59.7	58.2	60.1	57.6	58.3	58.6	101.2	**58.6**
NDSU	GRANO (P+)	4		47.2	50.9	24.5	40.7	40.8	103.6	**39.6**		59.4	59.8	57.0	58.6	58.7	101.2	**58.6**
NDSU	RIVELAND (P+)	4		44.2	53.4	26.0	39.7	40.8	103.6	**39.6**		57.6	59.2	57.3	57.8	58.0	100.0	**57.9**
MSU, 2022	MT BLACKBEARD (++)	3			55.4	23.9	36.1	38.4	102.5	**39.2**			58.6	57.0	57.2	57.6	99.5	**57.6**
D03028	CARPIO (+)	10	35.8	47.4	48.7	24.8	35.3	39.4	101.4	**38.8**	57.4	58.4	58.2	55.3	57.7	57.6	99.4	**57.6**
D901313	MOUNTRAIL (+)	10	38.2	45.2	56.4	23.5	32.6	38.2	100.0	**38.2**	58.8	58.3	59.6	57.3	56.7	57.9	100.0	**57.9**
MEANS (For Entries Listed)			39.2	46.6	54.7	24.4	36.7			**40.2**	58.8	58.5	59.6	57.2	57.9			**58.3**
April-July Precip. (in.)			4.0	6.3	5.6	4.1	5.5	6.6										
Total Annual Precip. (in.)			13.2	11.3	10.5	10.0	8.15	12.5										
Soil PAW (in.) to SD @ Planting			9.2	n/a	7.7	7.6	8.21	8.5										
Total Plant Available Water (in.)			13.2	6.3	13.2	11.5	13.7	14.2										
Soil NO_3 (lbs.) to SD at Planting			112	268	72	56	129	93										
SD (Sampling Depth in Inches)			48	48	40	39	45	46										
Fertilizer Applied	(# N)		100	100	100	100	46	100										
	(# P_2O_5)		20	20	20	20	9	19										
	(# K_2O)		10	10	10	10	5	10										
	(# S)		10	10	10	10	5	7										

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 selecton decisions.

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

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

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

5/ 10-Yr Comparable Average = (x/y) * z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Mountrail for the same years, and z = 10-Yr average yield or test weight for the check variety Mountrail.

TABLE 9. Ten-Year Protein and Wheat Stem Sawfly Summary on Selected Entries from Dryland Montana Spring Durum Nursery. Northern Agricultural Research Center. Havre, Montana. 2013-2022. (Exp# 9802-DUR)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ PROTEIN % (Values Adjusted to 13% Grain Moisture) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK PROTEIN 4/	**10-Yr COMP. AVE. PROTEIN 5/**	1/ SAWFLY RATING (% Cut and Lodged) 2018	2019	2020	2021	2022	AVE. for YEARS TESTED 3/	% of CHECK SAWFLY 4/	**10-Yr COMP. AVE. SAWFLY 5/**
MSU, 2022	MT RASKA (++)	3			14.4	17.4	16.1	16.0	97.8	**16.1**			0.3	1.0	1.0	0.8	6.4	**0.3**
MSU, 2022	MT BLACKBEARD (++)	3			15.2	17.5	17.0	16.6	101.5	**16.7**			0.7	6.7	1.7	3.0	24.5	**1.0**
D03028	CARPIO (+)	10	18.6	13.8	15.5	17.7	16.7	16.5	100.3	**16.5**	0.0	1.0	0.7	11.7	3.7	2.3	54.4	**2.3**
D9715-11	DIVIDE	10	17.8	13.6	15.0	17.4	16.3	16.4	99.8	**16.4**	0.0	1.0	0.7	15.0	6.7	2.6	61.6	**2.6**
MTD16005	LUSTRE (++)	6	18.8	13.7	15.1	17.9	16.9	16.5	101.1	**16.6**	0.0	1.0	2.0	18.3	5.0	4.4	67.5	**2.8**
YU894-75	ALZADA (P+)	8	17.3	14.1	15.0		15.7	16.0	97.7	**16.1**	0.3	1.0	7.0		4.0	1.9	81.8	**3.4**
D901313	MOUNTRAIL (+)	10	18.4	14.0	14.9	17.3	16.8	16.5	100.0	**16.5**	0.0	2.3	6.7	23.3	6.7	4.2	100.0	**4.2**
NDSU	RIVELAND (P+)	4		14.5	15.0	16.6	16.5	15.6	99.4	**16.4**		2.3	5.0	21.7	11.7	10.2	104.3	**4.3**
D04581	JOPPA (+)	9	17.5	14.2	14.3	17.0	16.5	16.4	99.1	**16.3**	0.0	3.7	3.7	21.7	13.3	5.2	118.7	**4.9**
NDSU	GRANO (P+)	4		13.9	15.2	16.9	16.4	15.6	99.1	**16.3**		5.0	8.7	25.0	15.0	13.4	137.6	**5.7**
MEANS (For Entries Listed)			18.1	14.0	15.0	17.3	16.5			**16.4**	0.1	2.2	3.5	16.0	6.9			**3.2**
April-July Precip. (in.)			4.0	6.3	5.6	4.1	5.5	6.6										
Total Annual Precip. (in.)			13.2	11.3	10.5	10.0	8.2	12.5										
Soil PAW (in.) to SD @ Planting			9.2	n/a	7.7	7.6	8.2	8.5										
Total Plant Available Water (in.)			13.2	6.3	13.2	11.5	13.7	14.2										
Soil NO_3 (lbs.) to SD at Planting			112	268	72	56	129	93										
SD (Sampling Depth in Inches)			48	48	40	39	45	46										
Fertilizer Applied	(# N)		100	100	100	100	46	100										
	(# P_2O_5)		20	20	20	20	9	19										
	(# K_2O)		10	10	10	10	5	10										
	(# S)		10	10	10	10	5	7										

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 selecton decisions.

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

3/ Only the most recent 5 years are shown, but summary calculations include all years noted.

4/ Percent of Mountrail protein or wheat stem sawfly cutting for the same data years as those in which a given entry was tested.

5/ 10-Yr Comparable Average = (x/y) * z where x = average protein or sawfly percent of a given entry for years tested, y = average protein or sawfly percent for Mountrail for the same years, and z = 10-Yr protein or sawfly percent for the check variety Mountrail.

TABLE 10. MALT & FEED - Dryland Fallow Spring Barley Evaluation Nursery Grown On-Station at Havre. Northern Agricultural Research Center. Havre, MT. 2022. (Exp# 22-2702-SB)

ID	BARLEY TYPE	HEAD	MATURE	PLNT HT	1/ YIELD	TEST WT	2/ PROTEIN	PLUMP	3/ SAWFLY
		Date	Date	Inches	Bu/Ac	Lbs/Bu	%	%	%
Haxby	Feed	173.0	**199.0**	23.6	**78.6**	**52.2**	14.3	59.0	**1.0**
Hockett	Feed	172.0	**199.7**	**26.1**	63.4	49.0	13.7	63.2	6.7
ABI Eagle	Malt	176.0	201.3	21.9	60.5	48.2	14.5	64.0	**2.0**
Buzz	Malt	171.7	200.7	23.7	67.8	50.6	**12.3**	**79.4**	5.3
Diablo	Malt	177.7	204.7	22.2	68.9	44.8	13.5	**79.9**	**0.3**
Ellinor	Malt	178.3	205.7	23.2	66.8	46.6	13.4	**81.7**	**0.3**
Leandra	Malt	175.3	**199.7**	20.2	68.7	46.6	13.3	58.1	**1.7**
Lexy	Malt	176.3	201.0	20.7	69.6	46.7	13.0	**76.6**	**0.0**
Merit 57	Malt	177.7	203.0	**25.5**	57.7	47.8	15.5	60.3	**0.7**
Odyssey	Malt	178.0	202.0	23.8	65.7	47.5	13.7	**82.0**	**1.7**
Opera	Malt	179.7	203.3	21.4	67.3	46.0	13.7	64.5	**0.3**
2IM14-8212	Malt	173.3	200.3	23.5	69.8	47.5	14.0	**82.7**	**1.0**
2IM16-0154	Malt	175.0	**198.7**	23.3	68.7	48.8	13.8	69.3	**0.7**
MT16M02101	Malt	170.0	**198.0**	**26.7**	66.9	45.4	13.1	67.2	6.7
MT16M02201	Malt	170.7	200.0	**25.4**	64.5	46.6	13.2	**77.7**	7.0
MT17M01711	Malt	171.7	**198.0**	24.6	**72.9**	45.7	13.0	66.4	**2.3**
MT17M02507	Malt	173.7	201.3	23.8	**75.3**	50.0	**12.5**	**79.9**	**1.0**
MT18M06011	Malt	**165.0**	**199.7**	24.3	**74.1**	49.4	13.0	69.7	**3.7**
EXPERIMENTAL MEANS		174.2	200.9	23.6	68.2	47.8	13.5	71.2	2.4
LSD (0.05)		2.3	2.0	2.0	6.8	1.1	0.6	9.1	3.9
C.V.%		0.8	0.6	5.0	6.0	1.4	2.5	7.7	100.6
P-VALUE (Varieties)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0022

1/ 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.

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

3/ Sawfly rating is reported as the percentage of cut and lodged stems.

Bold indicates either the highest or lowest value within a column (whichever is most desirable for the specific characteristic).

Bold indicates values equal to the underlined value within a column based on Fisher's protected LSD (P=0.05).

Management Information (22-2702-SB)

Seeding Date:	April 9, 2022
Harvest Date:	August 1, 2022
Fertility:	46-9-5-5
System:	No-Till
Herbicide:	Vendetta (20 oz/ac)
Insecticide:	Baythroid (2.4 oz/ ac)
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	3.95" seeding to harvest maturity

TABLE 11. HULL-LESS FOOD - Dryland Fallow Spring Barley Evaluation Nursery Grown On-Station at Havre. Northern Agricultural Research Center. Havre, MT. 2022. (Exp# 22-2702-SB)

ID	BARLEY TYPE	HEAD Date	MATURE Date	PLNT HT Inches	1/ YIELD Bu/Ac	TEST WT Lbs/Bu	2/ PROTEIN %	3/ SAWFLY %
Havener	Food	175.7	199.7	24.3	60.2	58.3	14.6	0.0
MT16H09302	Food	175.0	202.3	27.6	61.4	**59.8**	14.7	0.3
MT18H02702	Food	173.3	199.0	27.3	63.9	56.7	14.6	3.7
EXPERIMENTAL MEANS		174.7	200.3	26.4	61.8	58.3	14.6	1.3
LSD (0.05)		NS	NS	NS	NS	1.5	NS	NS
C.V.%		0.5	0.6	4.1	5.6	1.2	2.5	-
P-VALUE (Varieties)		NS	NS	NS	NS	0.012	NS	NS

1/ 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.

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

3/ Sawfly rating is reported as the percentage of cut and lodged stems.

Bold indicates either the highest or lowest value within a column (whichever is most desirable for the specific characteristic).

Bold indicates values equal to the underlined value within a column based on Fisher's protected LSD (P=0.05).

Management Information (22-2702-SB)

Seeding Date:	April 9, 2022
Harvest Date:	August 1, 2022
Fertility:	46-9-5-5
System:	No-Till
Herbicide:	Vendetta (20 oz/ac)
Insecticide:	Baythroid (2.4 oz/ ac)
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	3.95" seeding to harvest maturity

TABLE 12. FORAGE SEED - Dryland Fallow Spring Barley Evaluation Nursery Grown On-Station at Havre. Northern Agricultural Research Center. Havre, MT. 2022. (Exp# 22-2702-SB)

ID	BARLEY TYPE	HEAD Date	MATURE Date	PLNT HT Inches	1/ YIELD Bu/Ac	TEST WT Lbs/Bu	2/ PROTEIN %	PLUMP %	3/ SAWFLY %
Haymaker	Forage	174.7	**198.0**	**27.8**	64.6	**48.6**	**16.0**	35.2	5.3
Lavina	Forage	**171.7**	**198.0**	25.3	**73.1**	45.6	14.3	13.3	5.3
MT Cowgirl	Forage	174.0	200.7	**27.7**	65.1	46.1	15.0	34.0	6.7
MT16F01601	Forage	**170.7**	**198.7**	**27.2**	**69.5**	45.8	14.6	**50.3**	7.0
EXPERIMENTAL MEANS		174.2	200.9	23.6	68.2	47.8	13.5	71.2	2.4
LSD (0.05)		2.3	2.0	2.0	6.8	1.1	0.6	9.1	NS
C.V.%		0.8	0.6	5.0	6.0	1.4	2.5	7.7	-
P-VALUE (Varieties)		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	NS

1/ 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.

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

3/ Sawfly rating is reported as the percentage of cut and lodged stems.

Bold indicates either the highest or lowest value within a column (whichever is most desirable for the specific characteristic).

Bold indicates values equal to the underlined value within a column based on Fisher's protected LSD (P=0.05).

Management Information (22-2702-SB)

Seeding Date:	April 9, 2022
Harvest Date:	August 1, 2022
Fertility:	46-9-5-5
System:	No-Till
Herbicide:	Vendetta (20 oz/ac)
Insecticide:	Baythroid (2.4 oz/ ac)
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	3.95" seeding to harvest maturity