



Williston Research Extension Center

NDSU NORTH DAKOTA STATE UNIVERSITY

Eastern Agricultural Research Center





Annual Research Report No. 30 | December 2024



Montana State University Eastern Agricultural Research Center

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North Dakota State University Williston Research Extension Center

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WREC Dryland S	ite	Ä	Willis	ston, l	ND
	Precip	oitation	Tem	peratu	re
Month	2024	Avg	2024	Avg	*
	- inc	hes -	- deę	grees F	-
Oct-Dec. 2023	3.12	1.84			
Jan-Mar 2024	0.41	1.19			
April	0.79	1.09	47	44.0	0
May	2.15	2.14	54	55.5	0
June	3.29	2.83	61	64.3	0
July	1.65	2.52	73	70.8	12
August	0.49	1.74	69	70.0	11
September	0.80	1.37	65	50.0	8
April-July	7.87	8.58	-		
April-Sept	9.16	11.69			
Total-Oct 21-Sept 22	13.75	14.77			
*Number of Days ove	r 89º F				

*Number of Days over 89° F

Last Spring Frost – April 2, 2024 (31.5° F) First Fall Frost, October 11, 2024 (31.9° F)

WREC Irrigated Site 축 Nesson Valley, ND

	Precip	oitation	Tem	peratu	re
Month	2024	Avg	2024	Avg	*
	- inc	hes -	- deg	grees F	-
Oct-Dec. 2023	1.97	2.35			
Jan-Mar 2024	0.47	1.62			
April	1.33	1.01	43	42.3	0
May	2.27	2.31	54	53.9	0
June	4.08	3.26	60	63.6	0
July	1.08	2.80	70	69.8	12
August	0.58	1.51	67	78.8	11
September	0.74	1.32	63	58.4	8
April-July	8.75	9.38			
April-Sept	10.07	12.21			
Total-Oct 21-Sept 22	12.51	16.18			

*Number of Days over 89° F

Hofflund Last Spring Frost - April 29, 2024 (24.0° F) Hofflund First Fall Frost , October 4, 2024 (30.6° F)

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EARC Irrigated Site	(<u> </u>	Sidr	ney, N	ſΤ
	Precip	itation	Tem	peratu	re
Month	2024	Avg	2024	Avg	*
	- incl	hes -	- deg	grees F	
Oct-Dec. 2023	2.87	1.84			
January-March	0.47	1.25			
April	0.33	1.11	47.3	44.3	0
Мау	3.27	2.22	54.8	56.0	0
June	1.84	2.67	65.5	64.6	0
July	0.49	2.01	72.7	70.2	17
August	0.49	1.44	69.7	68.8	8
September	0.59	1.34	64.8	58.2	7
April-July	11.92	8.01			
April-Sept	12.47	10.79			
Total- Oct 23-Sept 24	15.26	13.88			
*>> ()					

*Number of Days over 89º F

Last Spring Frost – May 4, 2024 (31.5° F)

First Fall Frost - October 4, 2024 (30.6° F)

Off-Statio	n Prec	cipitat	ion*		Мо	ntana
Site	April	Мау	June	July	Aug	Total
Dagmar	0.65	2.13	2.63	3.38	0.29	9.08
Nashua	0.33	2.00	1.60	1.12	1.45	6.50
Poplar	0.54	3.67	1.96	1.35	1.78	9.30
Richland	0.67	2.18	1.55	0.70	2.25	7.35
Vida	0.33	2.00	1.60	1.12	1.45	6.50

*Actual rainfall received at plot location may have been more or less.

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NDSU NORTH DAKOTA STATE UNIVERSITY

North Dakota Agricultural Experiment Station NDSU Extension

Off-Station Trial Cooperating Producers and CES Agents

COUNTIES FOR MONTANA

Sheridan County– Brian Kaae – Agent Jack Bazemore Valley County – Bill Laukner – Agent Shelley Mills Roosevelt County – Mark Swank – Agent Wendy Becker McCone County – Leonard Schock – Agent Tandi Kassner Richland Pulse Trial Site – Richard Fulton – Agent Shelley Mills



We would like to take this opportunity to thank the County Agents, the County Ag Improvement Associations and especially the farm operators who permit the location of off-station plots on their land. All are to be commended for their cooperative efforts in helping determine crops and variety performance in the MonDak region.

Results from tillage, chemical fallow, and field scale no-till trials, as well as other management trials on dryland and irrigated crops can be obtained by visiting with Center personnel.

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2025 WREC Seedstocks Available

Kyle Dragseth, WREC Foundation Seedstocks Manager 701-770-1652

Spring Wheat

ND Stampede –New NDSU release similar to Faller. High yield potential, high protein, short early maturing variety, with strong straw strength.

ND Heron – Good yield with high test weight and protein. good disease resistance to fusarium head blight, bacterial leaf streak and common rust races.

ND Elgin – Excellent resistance to disease with strong straw strength. High yield with high grain protein.

MT Dagmar – Solid stem, high Yield, high protein, good test weight, early maturing variety with moderate sawfly resistance. Performs well in diverse dryland environments. Good resistance to tan spot.

MN Torgy - Good combination of yield, protein, straw strength and disease resistance.

Durum

ND Riveland – High yield potential and excellent agronomic traits with good test weight, and above average resistance to diseases. Low DON accumulation and low cadmium uptake.

MT Raska – Early flowering semi dwarf variety with high yield potential. Excellent straw strength and a great fit for irrigation or dryland conditions.

Winter Wheat

ND Allison – High yield potential, tolerant of acidic soil and aluminum, winter hardy crop adapted across North Dakota.

Barley

ND Treasure – High yielding, strong straw semi dwarf variety intended for the pet food market.

MT Cowgirl - Tall high yielding awn-less forage barley

MT Lavina – Excellent yielding, two row hooded spring barley.

2025 WREC Seedstocks Available (continued)

Kyle Dragseth, WREC Foundation Seedstocks Manager 701-770-1652

Oats

CDC Haymaker – Yields high producing large plump seed with high seed weight. Forage oat with tall strong straw. Feed advantage over other oats with thinner stems, easily digestible compared to other oats.

ND Paul – Tall, late maturing, naked, high grain yield, spring oat with excellent resistance to prevalent races of stem rust and crown rust. Good tolerance to barley yellow dwarf virus. Strong straw and plump seeds.

CDC Douglas - High yielding grain variety. Good test weight and excellent fit for straight cutting.

Chickpeas

ND Crown – High yielding, large seeded, tall chickpea variety. Resistance to lodging. Moderate resistance to disease pressures.

Lentils

Richlea- Green lentil variety, medium green industry standard.

Flax

CDC Rowland – large brown seeded late maturing, high yield variety with good lodging resistance, that is well adapted for all ND regions. Resistant to Flax rust and moderately resistant to Fusarium Wilt and Powdery Mildew.

For seed availability and prices, please call our WREC Foundation Seedstocks Manager, Kyle Dragseth at (701) 770-1652.

ND Stampede Spring Wheat

Characteristics

- Similar to Faller with higher protein
- Short, early maturing variety
- Strong straw strength

TO ORDER:

Contact Kyle Dragseth at 701-770-1652



WILLISTON RESEARCH EXTENSION CENTER



Chickpea

Characteristics

- High Yield
- Large Seeded
- Tall variety with resistance to lodging
- Moderate resistance to disease pressures

To Order:

Contact Kyle Dragseth at 701-770-1652

NDSU

WILLISTON RESEARCH EXTENSION CENTER

							Rea	ction to]	Disease ⁵		
	Agent or	Year	Height	Straw	Days to	Stem	Leaf	Tan	Bact. Leaf	Head	Stripe
Variety	Origin ¹	Released	(inches) ²	Strength ³	$Head^4$	Rust ⁶	Rust	Spot	Streak	Scab	Rust
Ambush	Dyna-Gro	2016	33	5	57	2	9	NA	9	5	NA
AP Elevate	Syngenta/AgriPro	2024	32	4	09	6	4	NA	7	S	e
AP Gunsmoke CL2	Syngenta/AgriPro	2021	33	9	58	2	4	S	8	5	4
AP Murdock	Syngenta/AgriPro	2019	33	4	58	7	2	б	9	5	ю
AP Smith	Syngenta/AgriPro	2021	32	ω	09	1	ю	5	5	9	4
Ascend-SD	SD	2022	38	4	09	2	4	9	4	4	3
Ballistic	Dyna-Gro	2018	35	5	59		6	NA	7	4	NA
Bolles	MN	2015	34	4	61	2	1	4	9	5	4
Brawn-SD	SD	2022	36	4	59	7	0	4	5	7	9
CAG-Ceres	Champions Alliance Grp	2024	33	e	64	6	6	NA	L	٢	9
CAG-Justify	Champions Alliance Grp	2021	33	9	58	7	0	4	9	9	4
CAG-Reckless	Champions Alliance Grp	2021	36	4	60	2	2	7	9	4	4
CAG Recoil	Champions Alliance Grp	2022	36	2	59	7	6	NA	S	7	ю
Commander	Dyna-Gro	2019	34	4	57	0	0	NA	8	5	NA
CP3055 ⁷	Croplan	2023	35	e	67	9	×	NA	9	7	e
CP3099A	Croplan	2020	38	4	64	7	5	9	S	7	-
$CP3119A^7$	Croplan	2021	37	2	67	7	8	NA	5	7	1
CP3188	Croplan	2020	35	8	59	7	2	9	9	7	6
CP3322⁷	Croplan	2023	34	e	65	ę	×	NA	9	×	e
CP3360AX	Croplan	2024	33	4	57	7	9	NA	9	S	×
CP3915	Croplan	2019	33	4	59	2	1	NA	9	5	9
Driver	SD	2019	35	4	61	7	-	9	8	4	7
Faller	ND	2007	36	L	60	7	8	NA	9	5	8
Glenn	ND	2005	38	4	57	5	7	9	9	4	ю
Lanning	MT	2016	34	4	59	7	9	4	9	٢	4
LCS Ascent	Limagrain	2022	33	9	56	7	9	8	L	4	7
LCS Boom	Limagrain	2023	33	4	56	1	S	×	9	9	7
LCS Buster	Limagrain	2020	36	4	64	1	ω	4	4	4	4
LCS Cannon	Limagrain	2018	32	б	56	1	S	9	L	5	4
LCS Dual	Limagrain	2020	34	с	58	7	4	9	7	9	9
LCS Hammer AX	Limagrain	2022	33	2	58	7	٢	8	L	×	7
LCS Trigger	Limagrain	2016	36	S	65	7	1	с	4	33	9
MN- Rothsay	MN	2022	31	б	61	7	9	ŝ	9	9	9
MN-Torgy	MN	2020	34	4	59	7	б	4	9	4	ю
MS Charger	Meridian Seeds	2022	33	8	58	7	б	9	L	5	8
MS Cobra	Meridian Seeds	2022	33	5	59	1	5	∞	7	9	ю

Table 1. North Dakota hard red spring wheat variety descriptions, agronomic traits, 2024.

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							Rea	ction to	Disease ⁵		
	Agent or	Year	Height	Straw	Days to	Stem	Leaf	Tan	Bact. Leaf	Head	Stripe
Variety	Origin ¹	Released	(inches) ²	Strength ³	$Head^4$	Rust ⁶	Rust	Spot	Streak	Scab	Rust
MS Nova	Meridian Seeds	2024	33	4	57	NA	4	NA	8	S	3
MS Ranchero	Meridian Seeds	2020	38	7	62	7	9	9	9	5	4
MT Carlson	MT	2023	33	S	58	1	×	NA	7	æ	4
MT Dutton	MT	2023	34	4	59	ы	4	NA	×	9	9
MT Ubet	MT	2024	34	S	59	ы	×	NA	9	×	×
ND Frohberg	QN	2020	37	33	60	2	4	8	5	5	б
ND Heron	ND	2021	34	9	56	1	9	4	7	4	9
ND Stampede	QN	2024	34	4	58	1	9	NA	7	S	6
ND Thresher	ND	2023	33	w	09	6	w	4	4	4	9
ND VitPro	ND	2016	34	4	58	6	4	9	9	4	4
PFS Buns	Peterson Farm Seeds	2021	33	7	68	1	ю	4	4	9	6
PFS Rolls	Peterson Farm Seeds	2023	35	4	61	e	4	NA	w	×	9
Rocker	Dyna-Gro	2019	34	4	61	6	9	NA	7	8	NA
Shelly	MN	2016	33	5	61	7	9	4	L	5	4
SY 611CL2	Syngenta/AgriPro	2019	31	4	58	2	9	5	9	4	4
SY Ingmar	Syngenta/AgriPro	2014	33	4	60	6	ю	S	9	S	4
SY Longmire ⁷	Syngenta/AgriPro	2019	32	4	59	7	S	S	9	٢	б
SY Valda	Syngenta/AgriPro	2015	33	5	59	2	ю	5	7	5	8
TCG-Badlands	21st Century Genetics	2024	33	ę	59	1	9	NA	9	٢	e
TCG-Teddy	21st Century Genetics	2023	30	7	09	ы	4	9	9	7	ы
TCG-Wildcat	21st Century Genetics	2020	34	33	60	2	4	7	7	7	9
WB9590	WestBred	2017	30	ю	58	7	ю	7	8	8	8
WB9719	WestBred	2018	32	4	61	2	5	3	5	7	4
¹ Refers to agent or develop	er: MN = Univ of Minnesota; MT	= Montana Sta	te Univ; ND =	: North Dakota	State Univ; S	SD = South	Dakota St	tate Univ			

Table 1. North Dakota hard red spring wheat variety descriptions, agronomic traits, 2024.

Varieties in bold text = either recent release or first year in NDSU trials with limited data available and rating values may change.

²Height data averaged from 9 locations in 2024.

³Straw Strength = 1 to 9 scale, with 1 the strongest and 9 the weakest. These values are based on recent data and may change as more data become available.

⁴Days to Head = the number of days from planting to head emergence from the boot, averaged based on data from 7 locations in 2024.

⁵Disease reaction scores from 1 to 9, with 1 = resistant and 9 = very susceptible, NA = not available.

⁶Stem rust scores determined from field severity ratings and Puccinia graminis f. sp. tritici race QFCQ

⁷Solid stem or semi-solid stem for increased resistance to wheat stem sawfly.

Dryland Spring Wheat Advance Yield Trial- MSU

EARC, Sidney, MT 2024

Variety	Plant Height	Days to Heading	Test Weight	Protein	Grain Yield†
	(inch)	(Julian*)	(lb/bu)	(%)	(bu/ac)
AAC Concord	31.6	171	63.9	13.6	71.4
Allegiant 6284 HRS	26.7	169	65.1	14.4	70.2
Allegiant 811 HRS	27.7	171	64.1	12.8	70.3
AP Elevate	27.7	171	64.9	14.0	78.3
AP Gunsmoke	30.4	170	63.6	14.3	80.0
AP Smith	27.1	171	64.6	14.6	74.4
CP3055	30.6	175	58.7	13.9	70.8
CP3119A	30.3	177	58.2	13.2	72.8
CP3322	29.4	173	61.0	13.9	69.2
Dagmar	30.4	169	65.1	14.4	77.6
Duclair	30.4	168	64.0	13.3	73.5
Lanning	30.7	167	65.4	13.4	83.0
LCS Ascent	29.9	168	66.1	12.7	79.3
LCS Boom	29.5	166	65.3	14 1	74.9
LCS Buster	30.0	173	61.5	14.5	80.7
McNeal	31.5	172	62.2	14.2	78.6
MS Charger	29.7	168	64.9	11.0	82.4
MS Nova	30.4	168	65 3	13.6	84 0
MT 2049	29.8	167	65.7	12.8	79.7
MT 2043	31.0	169	65.1	12.0	88.7
MT 2003	27.4	171	64.4	13.3	68.2
MT 21074	20.3	160	66.0	13.5	80.5
MT 21104	29.0	169	64.9	14.2	77.9
MT 21174	20.2	109	64.2	14.3	70.1
MT 21170	29.3	170	62.6	13.3	22.0
MT 21220	30.3	109	03.0 64.E	13.5	02.0
MT 21220	30.3	169	04.0	14.4	80.1 82.0
NT 21224	31.0	169	00.0	12.2	02.0
MT 21473	31.0	169	64.Z	13.4	81.7
MT 21484	30.4	169	65.Z	13.0	81.0
MT 21485	30.7	168	65.3	12.4	82.3
MT 20074	31.2	168	65.0	13.5	80.8
MT 22071	29.1	170	64.3	12.9	82.4
MT 22072	28.9	167	64.8	12.9	76.7
MT 22073	30.3	168	64.0	13.5	83.0
MT 22083	29.8	167	66.3	12.6	82.1
MT 22093	28.0	167	65.6	12.8	75.5
MT 22099	28.5	166	64.7	13.9	78.4
MT 22102	30.4	167	64.9	14.8	85.0
MT 22151	29.3	169	64.9	12.2	80.6
MT 22172	32.7	169	65.1	14.0	79.6
MT 22177	33.9	169	65.2	13.7	83.8
MT 22179	29.8	167	65.2	12.0	76.0
MT 22182	30.4	167	64.2	12.6	82.4
MT 22184	30.2	167	66.2	14.6	83.9
MT 22204	29.1	168	65.6	13.5	81.3
MT 22205	29.4	167	65.0	12.2	82.9
MT 22270	30.3	168	66.0	12.5	83.4
MT 22324	30.7	168	65.8	13.8	88.5
MT 22345	28.0	169	64.1	13.2	77.5
MT 22361	31.8	169	63.8	13.9	84.8
MT Carlson	29.4	169	64.9	13.2	81.2
MT Dutton	30.2	169	64.5	13.9	83.5
MT Sidney	29.8	167	65.6	13.8	84.7
MT Ubet	29.9	168	65.3	12.6	85.5
ND Stampede	28.1	169	65.1	12.3	74.9
NS Pressser CLP	31.0	170	63.7	12.0	77.1
PG Predator	27.3	170	64.5	14.3	74.3

Continued on next page...

Dryland Spring Wheat	Advance Yield Trial-	MSU			EARC, Sidney, MT 2024
Variety	Plant Height (inch)	Days to Heading (Julian*)	Test Weight (lb/bu)	Protein (%)	Grain Yield† (bu/ac)
Reeder	29.5	170	65.1	13.0	74.0
Rocker	28.6	172	64.8	12.8	80.9
SY Ingmar	29.1	170	65.9	12.9	74.6
SY Longmire	29.3	169	65.5	13.8	75.9
SY Rockford	30.8	172	64.5	12.2	80.1
Thatcher	34.0	171	62.5	14.5	62.3
Vida	29.4	170	65.2	12.8	83.9
WB 9879 CLP	27.3	170	64.6	15.2	66.8
WB Gunnison	28.0	169	64.5	12.8	70.3
Mean	29.9	169	64.5	13.3	78.7
P-Value	0.0005	<0.0001	<0.0001	0.0017	0.3234
CV (%)	6.0	0.5	0.8	8.1	11.2
LSD (0.05)	2.9	1.4	0.8	1.7	14.3

(Julian*) is a continuous count of days since January 1

† Grain yield adjusted to 12.0% moisture

N Available: 22 lb/ac

N added: 50 lb/ac

P2O5 Available: 25 ppm

P2O5 added: 26 lb/ac

Herbicide Application: Opensky @ 16 oz/ac on 5/28/2024

Planted: 4/12/2024 Harvested: 7/31/2024 Previous crop: fallow Soil Type: Williams Clay Loam Crop Year Precipitation: 11.21 inch Plot Width: 5 ft

EARC Plant Pathology Program Staff at Field Day



EARC Shop and Seed Cleaning Lab

Dryland Spring Wheat Variety Trial

WREC, Williston, ND 2024

				Yield	
Variety	Heading	Height	2024	2-Yr	3-Yr
	(DAP)	(in)	(bu/a)	(bu/a)	(bu/a)
LCS Ascent	54	32.0	85.7	58.6	50.4
Lanning	56	32.8	81.1	57.6	50.0
MS Charger	55	32.7	73.7	55.3	49.9
AP Gunsmoke CL2	55	33.9	74.5	56.0	48.9
CP3119A	66	34.8	75.4	54.8	48.8
CP3188	57	34.3	71.0	53.1	48.5
CP3099A	62	35.0	75.2	54.8	48.1
SY Longmire	56	32.0	71.8	53.1	48.1
SY611CL2	55	31.0	66.7	53.8	48.0
Driver	60	33.7	70.4	54.7	47.1
Ascend-SD	58	37.7	75.9	48.6	45.0
LCS Buster	64	34.3	68.9	47.3	44.9
ND Heron	53	32.7	69.9	51.5	44.5
LCS Trigger	66	36.5	70.7	48.3	44.3
SY Valda	57	32.2	72.3	48.5	44.1
AAC Starbuck VB	56	33.9	71.1	49.3	44.0
MS Ranchero	62	37.3	67.4	49.2	43.9
MS Cobra	55	31.2	76.1	49.0	43.7
ND Frohberg	58	34.8	70.9	47.0	42.8
SY Ingmar	58	31.4	68.4	44.8	42.1
AP Smith	57	31.1	70.4	45.0	42.0
LCS Cannon	54	29.7	68.1	49.0	42.0
Shelly	62	30.7	67.1	46.7	41.8
LCS Dual	55	33.3	68.2	46.3	41.8
Boost	61	32.4	66.1	43.7	39.9
ND VItPro	58	32.0	64.0	42.3	37.8
Bolles	61	31.1	63.2	40.5	37.5
Glenn	56	37.5	55.8	42.5	37.3
AP Murdock	56	31.5	76.3	54.8	-
WB9719	63	31.0	73.1	53.0	-
LCS Boom	54	30.6	74 1	52.5	-
WB9590	55	29.0	73.0	51.8	-
CP3322	65	32.7	57.1	50.3	-
CP3055	65	32.4	69.2	48.4	-
Brawn-SD	57	35.4	74.6	47.3	-
Faller	59	33.7	58.4	44.8	-
ND Thresher	59	31.4	63.3	40.3	-
MT Libet	55	33.1	80.4	-	-
PG Predator	55	29.7	80.4	_	-
CAG Reckless	57	34.9	79.2	_	-
MT Carlson	55	31.6	78.8	-	-
DG Balistic	56	34.5	70.0	_	-
	57	30.1	77.1	_	_
MT Dutton	56	32.2	77.1	_	-
CAG Justify	50	34.6	76.9	-	_
LCS HammerAv	55	22.0	76.8	-	-
TCG Radiande	55	20.7	76.7	_	_
DG Commander	54	22.2	76 /	-	_
	54	22.2	76.0	-	-
ND Stompodo	54 57	20.0 22 0	70.0	-	-
TCC Wildoot	54 60	33.9 22.0	70.0 75 A	-	-
i CG WildCal	00	52.3	73.4	-	-

Continued on next page...

Dryland Spring Wheat Variety Trial

WREC, Williston, ND 2024

				Yield	
Variety	Heading	Height	2024	2-Yr	3-Yr
	(DAP)	(in)	(bu/a)	(bu/a)	(bu/a)
TCG Teddy	58	29.1	74.5	-	-
PFS Rolls	58	34.4	73.6	-	-
DG Rocker	59	33.5	73.4	-	-
MN Torgy	56	33.1	72.8	-	-
CAG Recoil	63	31.6	72.5	-	-
MS Nova	54	31.8	71.8	-	-
CP3360AX	54	32.8	69.8	-	-
CDC Landmark VB	55	34.1	69.5	-	-
DG Ambush	54	32.4	69.4	-	-
MN Rothsay	61	28.0	69.2	-	-
CAG Ceres	56	31.4	65.5	-	-
PFS Buns	66	32.2	64.8	-	-
CP3915	55	31.8	62.5	-	-
Mean	57.7	32.60	71.78	49.58	44.54
C.V.	2.3	4.91	6.69	-	-
LSD 0.05	2.1	2.61	7.72	-	-
LSD 0.10	1.8	2.19	6.46	-	-
Location: WREC; Latitu			Planted: 5/2/2024		
Rainfall: 7.4 inches (5/2	2 - 8/15)		Har	vested: 8/15/2024	

Soil type: Williams-Bowbells loam

Elevation: 2105 ft

Previous crop: Dry Pea

Plot size: 83 ft2

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.

The life of the earth comes up with a rush in the springtime. All the wild seeds of weed and thistle, the sprouts of vine and bush and tree, are trying to take the fields. Farmers must fight them with harrow and plow and hoe; they must plant the good seeds quickly. -Laura Ingalls Wilder

Irrigated Advanced Spring Wheat Trial - MSU

EARC, Sidney, MT 2024

Variety	Plant Height	Days to Heading	Test Weight	Protein	Grain Yield†
	(inch)	(Julian*)	(lb/bu)	(%)	(bu/ac)
AAC Concord	39.1	174	64.2	15.2	96.8
Allegiant 6284 HRS	27.7	172	65.7	13.8	98.3
Allegiant 811 HRS	31.6	173	65.9	13.1	110.7
AP Elevate	30.3	173	65.6	14.0	113.7
AP Gunsmoke	31.8	171	65.2	14 1	114.6
AP Smith	29.6	173	65.2	13.8	105.0
CP3055	33.2	180	62.6	11.9	112.2
CP3119A	34.1	181	60.3	12.1	100.9
CP3322	33.2	178	64.5	11.8	107.6
Dagmar	34.7	170	65.6	14.5	109.5
Duclair	33.0	170	63.0	13.0	108.2
Lopping	21.2	169	65.3	15.9	107.0
	21.5	160	00.0	12.0	112.6
	31.0	169	00.4	12.9	100.0
	32.4	100	00.7	14.2	109.9
LCS Busier	32.0	176	02.9	11.0	110.0
MC Charger	33.1	174	04.3	13.0	110.2
MS Charger	31.0	171	65.4	11.2	119.2
MS NOVA	32.8	170	66.0	14.1	112.4
MT 2049	32.8	168	66.1	13.6	108.5
MT 2063	32.6	171	65.2	12.9	111.8
MT 21074	34.5	173	64.4	14.1	95.2
MT 21104	32.6	173	66.0	13.1	105.0
MI 21174	35.7	170	64.9	14.2	106.1
MI 21176	35.9	173	64.5	13.9	120.2
MT 21186	33.6	171	64.3	13.7	109.3
MT 21220	32.8	173	65.3	13.8	121.0
MT 21224	36.5	171	65.0	13.9	111.0
MT 21473	34.0	171	64.8	14.5	114.3
MT 21484	33.1	169	65.9	14.3	115.5
MT 21485	33.3	170	65.5	14.5	104.4
MT 21487	34.1	170	66.0	14.1	116.2
MT 22071	35.4	174	64.3	14.0	112.6
MT 22072	30.7	169	65.4	13.7	101.1
MT 22073	31.4	169	64.9	14.5	105.5
MT 22083	31.5	168	66.2	14.5	98.8
MT 22093	30.0	167	65.5	15.3	101.7
MT 22099	29.6	168	65.5	14.1	103.6
MT 22102	33.2	167	65.4	14.9	108.9
MT 22151	33.2	171	65.6	13.0	113.1
MT 22172	33.6	170	65.3	14.7	98.3
MT 22177	35.8	170	65.9	14.0	112.1
MT 22179	32.8	169	64.8	14.1	103.9
MT 22182	33.0	168	63.9	13.7	118.4
MT 22184	32.4	168	66.4	14.5	108.2
MT 22204	31.2	169	65.4	14.5	102.7
MT 22205	30.3	169	64.9	14.5	109.5
MT 22270	31.6	171	65.3	13.8	104.8
MT 22324	30.8	169	65.7	14.2	113.6
MT 22345	33.8	171	64.4	13.4	118.4
MT 22361	32.7	173	65.1	13.8	110.4
MT Carlson	32.6	170	65.1	13.8	109.9
MT Dutton	33.4	173	64.8	14.0	112.1
MT Sidney	32.8	170	65.6	12.8	107.4
MT Ubet	32.1	170	65.6	14.3	113.9
ND Stampede	32.4	170	65.7	12.6	104.1
NS Presser CLP	36.3	174	63.8	13.1	105.7
PG Predator	30.3	173	65.1	13.5	107.8
Reeder	35.4	171	65.3	14.5	103.2
				-	

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Irrigated Advanced Spring Wheat Trial - MSU

EARC, Sidney, MT 2024

Variety	Plant Height (inch)	Days to Heading (Julian*)	Test Weight (lb/bu)	Protein (%)	Grain Yield† (bu/ac)
Rocker	34.0	174	64.9	13.4	107.4
SY Ingmar	32.8	173	66.1	14.1	106.5
SY Longmire	30.3	173	66.0	13.4	114.6
SY Rockford	32.8	174	64.2	12.7	95.7
Thatcher	43.2	174	64.1	14.2	91.8
Vida	34.3	172	65.0	13.9	107.8
WB 9879 CLP	32.9	173	65.2	13.7	106.0
WB Gunnison	29.8	172	64.5	13.4	94.9
Mean	32.9	171	65.1	13.8	108.1
P-Value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CV (%)	3.6	0.6	0.4	2.5	4.1
LSD (0.05)	1.9	1.7	0.5	0.6	7.1

(Julian*) is a continuous count of days since January 1

† Grain yield adjusted to 12.0% moisture

N Available: 39.6 lb/ac

N added: 70 lb/ac

P2O5 Available: 12.8 ppm

P2O5 added: 26 lb/ac

Herbicide Application: Opensky @ 16 oz/ac on 5/20/2024

Planted: 4/16/2024 Harvested: 8/6/2024 Previous crop: peas Soil Type: Savage Silty Clay Crop Year Precipitation: 10.35 inch Irrigation (Sprinkler): 2.45 inch Plot Width: 5 ft



2024 EARC Agronomy Program Summer Crew

2024 EARC Plant Pathology Staff



Irrigated Spring Wheat Variety Trial

WREC, Nesson Valley, ND 2024

	_	Yield				
	_		2-Yr	3-Yr		
Variety	Lodging	2024	Avg [†]	Avg [‡]		
	(0-9)	(bu/a)	(bu/a)	(bu/a)		
LCS Buster	2.0	105.4	95.8	93.3		
LCS Trigger	2.0	98.8	94.4	90.7		
CAG Reckless	5.0	102.0	97.6	88.5		
Glenn	2.0	104.4	91.3	85.5		
SY Ingmar	2.0	93.7	89.9	85.5		
Driver	2.0	92.5	87.0	82.9		
MN Torgy	3.0	76.3	86.3	82.5		
SY Longmire	5.0	90.9	84.9	80.8		
CAG Justify	2.0	84.0	83.7	80.0		
AP Gunsmoke CL2	4.0	88.9	87.6	79.1		
MS Cobra	2.0	84.3	81.8	78.9		
Faller	2.0	83.0	80.8	78.5		
CP3099A	2.0	80.7	81.7	78.4		
AP Smith	2.0	83.9	85.4	77.7		
MS Ranchero	3.0	75.0	74.1	77.5		
SY Valda	4.0	91.2	87.1	77.5		
WB9590	2.0	82.7	79.6	75.3		
TCG Wildcat	2.0	74.3	76.6	74.0		
ND VItPro	2.0	70.6	77.3	72.8		
Bolles	3.0	69.5	75.3	71.1		
MS Charger	6.0	102.2	96.1	-		
LCS Cannon	2.0	96.6	89.8	-		
AP Murdock	2.0	92.0	88.0	-		
LCS Dual	2.0	94.2	86.6	-		
LCS Ascent	4.0	78.2	84.4	-		
MN Rothsay	2.0	82.8	84.3	-		
CP3188	8.0	87.1	83.4	-		
CP3915	2.0	90.7	82.6	-		
Lanning	2.0	92.7	82.3	-		
DG Ambush	2.0	75.4	79.9	-		
Ascend-SD	2.0	69.8	79.7	-		
ND Frohberg	4.0	76.1	79.0	-		
CP3119A	2.0	91.7	78.8	-		
DG Commander	2.0	80.5	67.1	-		
PG Predator	2.0	111.9	-	-		
AP Elevate	5.0	110.4	-	-		
Brawn-SD	2.0	106.0	-	-		
TCG Zelda	3.0	105.3	-	-		
MS Nova	3.0	99.1	-	-		
ND Stampede	3.0	98.5	-	-		
DG Balistic	2.0	97.4	-	-		
PFS Rolls	2.0	96.4	-	-		
WB9719	2.0	96.0	-	-		
TCG Teddy	2.0	95.9	-	-		
DG Rocker	2.0	95.5	-	-		
MT Ubet	3.0	94.4	-	-		
CAG Ceres	2.0	94.0	-	-		
TCG Badlands	3.0	93.9	-	-		
LCS HammerAx	2.0	93.6	-	-		
Shelly	2.0	93.5	-	-		

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Irrigated Spring Wheat Variety Trial

WREC, Nesson Valley, ND 2024

		f leid				
			2-Yr	3-Yr		
Variety	Lodging (0-9)	2024 (bu/a)	Avg [†] (bu/a)	Avg [‡] (bu/a)		
MT Carlson	3.0	93.3	-	-		
LCS Boom	2.0	87.3	-	-		
PFS Buns	2.0	86.1	-	-		
ND Thresher	2.0	80.3	-	-		
CP3322	2.0	77.7	-	-		
MT Dutton	2.0	75.3	-	-		
CP3360AX	2.0	74.0	-	-		
ND Heron	5.0	71.5	-	-		
CP3055	2.0	70.4	-	-		
Boost	2.0	68.4	-	-		
CAG Recoil	2.0	67.4	-	-		
Mean	2.65	88.04	84.12	80.52		
C.V.	28.97	9.61	-	-		
LSD 0.05	1.14	13.78	-	-		
LSD 0.10	0.95	11.54	-	-		

†: Yields from 2024 and 2022
Location: Latitude 48 9.9222'N; Longitude 103 6.132'W
Rainfall: 7.3 inches (5/15 - 8/23)
Soil type: Lihen Loamy Fine Sand
Elevation: 1902 ft
Irrigation: 9.75 inches

‡: Yields from 2024, 2022, and 2021 Planted: 5/15/2024 Harvested: 8/23/2024 Previous crop: Soybean Plot size: 83 ft2

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.



Debbie Kunda driving the single row planter for the EARC Pathology Program's Fusarium Head Blight Nursery

Roosevelt County I	Poplar, MT 2024				
Variety	Plant Height	Test Weight	Protein	Sawfly Damage	Grain Yield†
	(inch)	(lb/bu)	(%)	(0-10)	(bu/ac)
AP Smith	25.5	60.3	17.5	2.0	32.1
CP3055	24.7	53.2	18.9	0.3	28.3
CP3119A	25.3	54.5	17.3	0.7	29.0
CP3322	24.4	56.3	18.3	2.3	27.8
Dagmar	27.3	60.4	16.5	1.0	42.9
Lanning	25.8	57.8	17.4	2.3	35.1
LCS Ascent	25.7	61.0	16.2	1.3	37.1
MT 2030	26.0	59.3	16.1	3.0	40.0
MT 2049	25.7	60.9	15.7	1.0	39.2
MT 21220	25.6	60.1	17.4	1.0	35.9
MT 21473	27.1	58.3	16.9	1.0	40.2
MT Carlson	25.3	59.5	15.9	1.3	38.7
MT Dutton	23.6	58.7	17.4	1.0	35.7
MT Sidney	26.0	60.8	17.1	1.3	34.3
PG Predator	23.7	59.2	17.6	2.3	32.3
Reeder	25.6	59.8	16.8	1.3	33.3
Rocker	25.8	60.3	17.0	1.0	25.7
SY Longmire	25.7	60.6	17.1	1.0	35.2
Vida	25.5	59.6	16.3	1.0	38.5
WB 9879CLP	24.9	60.3	17.1	0.7	34.6
Mean	25.5	59.1	17.0	1.4	34.8
P-Value	0.4881	<0.0001	<0.0001	<0.0001	0.0054
CV (%)	6.2	1.6	2.8	34.5	14.2
LSD (0.05)	2.6	1.6	0.8	0.8	8.1

† Grain yield adjusted to 12.0% moisture Fertilizer: 70 lbs/ac N; 13 lb/ac P2O5 Plot Width: 5 ft

Planted: 4/29/2024 Harvested: 8/13/2024

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Previous crop: yellow peas Crop Year Precipitation: 6.95 inch



Calla Carlson preparing to harvest plots at Swank site



Harrison Aubrey grading wheat for disease

Sheridan County D	Dagmar, MT 2024				
Variety	Plant Height (inch)	Test Weight (lb/bu)	Protein (%)	Sawfly Damage (0-10)	Grain Yield† (bu/ac)
AP Smith	28.5	61.2	14.4	0.3	48.9
CP3055	33.1	56.3	15.0	1.7	43.0
CP3119A	33.9	56.1	13.8	1.0	45.2
CP3322	32.7	58.4	14.5	1.0	41.5
Dagmar	34.0	61.3	13.4	0.3	57.5
Lanning	32.3	59.7	13.5	0.3	58.5
LCS Ascent	34.1	63.1	12.6	0.3	57.8
MT 2030	32.4	61.0	13.0	0.3	60.4
MT 2049	32.3	61.7	12.8	0.0	53.0
MT 21220	33.4	60.5	13.6	0.0	51.7
MT 21473	34.6	59.5	13.4	0.7	61.8
MT Carlson	32.2	60.7	12.9	0.3	53.2
MT Dutton	33.4	61.6	12.4	1.0	61.8
MT Sidney	32.3	62.5	12.6	0.0	55.4
PG Predator	29.2	60.8	14.1	0.7	53.4
Reeder	33.9	62.1	13.1	0.3	56.0
Rocker	33.3	63.3	12.3	2.0	54.7
SY Longmire	30.3	62.2	13.5	0.0	50.7
Vida	33.6	60.8	13.3	0.0	56.4
WB 9879CLP	31.8	62.9	13.6	0.0	51.7
Mean	32.6	60.8	13.4	0.5	53.6
P-Value	<0.0001	<0.0001	0.009957	<0.0001	<0.0001
CV (%)	3.7	1.2	5.9	90.1	6.0
LSD (.05)	2.0	1.2	1.3	0.8	5.3
† Grain yield adjuste	d to 12.0% moisture				Planted: 4/24/2024
Available N: 24 lb/ac					Harvested: 8/14/2024

Available P2O5: 13 ppm

Fertilizer: 70 lbs/ac N; 13 lb/ac P2O5

Harvested: 8/14/2024 Plot Width: 5 ft Previous crop: lentils Crop Year Precipitation: 9.08 inch

"No race can prosper until it learns there is as much dignity in tilling a field as in writing a poem." - Booker T. Washington

Valley County Dryla	Nashua, MT 2024				
Variety	Plant Height	Test Weight	Protein	Sawfly Damage	Grain Yield†
	(inch)	(lb/bu)	(%)	(0-10)	(bu/ac)
AP Smith	25.9	60.0	16.4	3.0	38.1
CP3055	28.2	54.1	17.0	1.3	33.8
CP3119A	29.1	54.8	15.6	1.7	35.7
CP3322	28.3	57.4	15.9	1.3	29.1
Dagmar	27.5	60.9	15.7	2.3	44.4
Lanning	27.0	58.9	15.1	5.0	40.4
LCS Ascent	28.4	61.7	14.7	3.3	43.8
MT 2030	28.5	59.0	15.2	3.7	43.2
MT 2049	26.9	61.1	15.0	3.0	41.7
MT 21220	29.5	59.3	15.5	3.0	42.4
MT 21473	30.0	58.7	15.4	2.7	46.0
MT Carlson	29.1	59.5	14.4	2.7	45.9
MT Dutton	28.0	59.1	15.4	3.7	44.7
MT Sidney	28.7	60.9	15.8	4.0	41.3
PG Predator	26.4	60.0	16.0	3.3	38.2
Reeder	28.9	60.2	15.5	4.7	32.7
Rocker	27.3	59.7	15.8	3.3	39.8
SY Longmire	28.1	60.9	15.8	3.0	33.3
Vida	28.7	59.5	14.6	2.7	41.8
WB 9879CLP	27.8	60.5	16.1	1.3	38.4
Mean	28.1	59.3	15.5	3.0	39.7
P-Value	0.1513	<0.0001	0.3651	0.0004	0.0028
CV (%)	5.3	1.5	6.4	31.9	12.4
LSD (0.05)	2.5	1.5	1.6	1.6	8.1

† Grain yield adjusted to 12.0% moisture Fertilizer: 70 lbs/ac N; 13 lb/ac P2O5 Plot Width: 5 ft Planted: 4/26/2024 Harvested: 8/19/2024 Previous crop: fallow

Crop Year Precipitation: 6.50 inch



Thomas Gross combining at Roosevelt off-station site

McCone County Dryland Spring Wheat - MSU

Variety	Plant Height	Test Weight	Protein	Sawfly Damage	Grain Yield†
	(inch)	(lb/bu)	(%)	(0-10)	(bu/ac)
AP Smith	25.9	60.0	16.4	3.0	38.1
CP3055	28.2	54.1	17.0	1.3	33.8
CP3119A	29.1	54.8	15.6	1.7	35.7
CP3322	28.3	57.4	15.9	1.3	29.1
Dagmar	27.5	60.9	15.7	2.3	44.4
Lanning	27.0	58.9	15.1	5.0	40.4
LCS Ascent	28.4	61.7	14.7	3.3	43.8
MT 2030	28.5	59.0	15.2	3.7	43.2
MT 2049	26.9	61.1	15.0	3.0	41.7
MT 21220	29.5	59.3	15.5	3.0	42.4
MT 21473	30.0	58.7	15.4	2.7	46.0
MT Carlson	29.1	59.5	14.4	2.7	45.9
MT Dutton	28.0	59.1	15.4	3.7	44.7
MT Sidney	28.7	60.9	15.8	4.0	41.3
PG Predator	26.4	60.0	16.0	3.3	38.2
Reeder	28.9	60.2	15.5	4.7	32.7
Rocker	27.3	59.7	15.8	3.3	39.8
SY Longmire	28.1	60.9	15.8	3.0	33.3
Vida	28.7	59.5	14.6	2.7	41.8
WB 9879CLP	27.8	60.5	16.1	1.3	38.4
Mean	28.1	59.3	15.5	3.0	39.7
P-Value	0.1513	<0.0001	0.3651	0.0004	0.0028
CV (%)	5.3	1.5	6.4	31.9	12.4
LSD (0.05)	2.5	1.5	1.6	1.6	8.1

† Grain yield adjusted to 12.0% moisture Available N: 33 lb/ac Available P2O5: 5 ppm Fertilizer added: 115 lb/ac N; 13 lb/ac P2O5 Planted: 5/15/2024 Harvested: 8/28/2024 Previous crop: fallow Crop Year Precipitation: 6.50 inch Plot Width: 5 ft



Marie Dorval and Caitlin Gross speaking at EARC Field Day

Dryland Statewide Durum - MSU					EARC, Sidney, MT 2024
Variety	Plant Height	Days to Heading	Test Weight	Protein	Grain Yield†
	(inch)	(Julian*)	(lb/bu)	(%)	(bu/ac)
Alzada	28.0	170	62.8	13.2	75.0
Carpio	31.5	174	62.0	14.5	69.8
Divide	32.6	173	62.7	13.4	72.3
Joppa	32.4	173	63.1	13.4	69.3
Lustre	33.1	173	62.0	13.7	73.9
Mountrail	31.8	173	62.3	13.9	75.6
MT Blackbeard	36.3	173	62.0	14.0	76.6
MT Raska	26.0	169	65.0	12.8	72.3
MTD19011	32.7	172	62.9	13.5	76.8
MTD19077	34.3	173	62.6	14.1	75.5
MTD19089	35.0	173	61.8	14.8	69.8
MTD19103	32.8	173	62.5	14.1	76.5
MTD19109	32.9	174	62.9	12.7	71.7
MTD19115	31.8	172	63.7	13.2	73.1
MTD19209	33.8	173	62.7	13.6	76.7
MTD19241	33.5	173	63.4	13.8	78.7
MTD19349	32.7	174	62.0	13.3	75.9
MTD19499	33.5	173	62.7	13.1	71.8
MTD19507	32.4	172	63.3	13.7	74.7
MTD19511	30.6	173	62.4	13.6	73.7
MTD19529	34.0	173	63.5	12.9	73.5
MTD19611	29.4	173	64.0	14.1	73.1
MTD19617	33.1	173	64.0	13.7	72.0
MTD19623	32.6	173	61.7	13.3	72.5
MTD19653	32.2	173	64.1	13.6	68.7
MTD19703	33.0	173	64.0	13.7	75.8
ND Grano	31.2	173	63.5	13.6	71.8
ND Riveland	35.2	173	62.4	13.9	71.3
ND Stanley	32.0	173	64.1	13.8	75.2
WB8148	25.3	172	62.4	13.6	75.4
Mean	32.2	173	63.0	13.6	73.6
P-Value	< 0.0001	<0.0001	<0.0001	0.4249	0.0293
CV (%)	4.4	0.4	0.9	5.6	4.4
LSD (0.05)	2.3	1.1	0.9	1.3	5.3

(Julian*) is a continuous count of days since January 1

† Grain yield adjusted to 12.0% moisture

N Available: 22 lb/ac

N added: 50 lb/ac

P2O5 Available: 25 ppm

P2O5 added: 26 lb/ac

Herbicide Application: Opensky @ 16 oz/ac on 5/28/2024

Planted: 4/15/2024 Harvested: 8/1/2024 Previous crop: fallow Soil Type: Williams Clay Loam Crop Year Precipitation: 11.21 inch Plot Width: 5 ft



Irrigated Statewide Durum - MSU					EARC, Sidney, MT 2024
Variety	Plant Height	Days to Heading	Test Weight	Protein	Grain Yield†
	(inch)	(Julian*)	(lb/bu)	(%)	(bu/ac)
Alzada	36.0	172	62.6	14.2	98.8
Carpio	42.5	177	64.9	13.8	110.6
Divide	44.2	176	64.9	13.8	114.1
Joppa	44.0	175	65.3	13.3	114.6
Lustre	42.6	177	64.4	13.4	117.2
Mountrail	43.4	174	64.4	13.3	118.6
MT Blackbeard	45.2	177	64.8	13.4	110.6
MT Raska	31.0	172	64.5	13.3	95.3
MTD19011	41.8	174	63.7	13.7	111.7
MTD19077	43.3	176	64.6	14.0	112.2
MTD19089	42.2	175	64.7	14.2	117.1
MTD19103	41.6	176	64.5	13.9	113.6
MTD19109	41.2	176	64.1	12.7	115.8
MTD19115	40.6	174	65.0	13.3	111.3
MTD19209	44.0	176	65.0	13.3	112.0
MTD19241	38.5	175	64.8	13.8	116.5
MTD19349	41.8	175	64.4	13.5	120.9
MTD19499	40.4	175	63.4	13.9	105.0
MTD19507	37.8	174	64.4	14.1	110.9
MTD19511	37.3	174	64.1	13.6	113.3
MTD19529	42.0	174	64.1	13.3	105.8
MTD19611	37.7	173	65.0	14.3	108.7
MTD19617	41.6	175	65.3	14.3	116.5
MTD19623	41.8	175	63.8	13.1	110.3
MTD19653	40.0	174	65.5	13.7	110.2
MTD19703	42.1	174	64.6	12.8	102.3
ND Grano	42.6	176	65.6	13.4	121.8
ND Riveland	44.0	176	64.6	13.8	114.7
ND Stanley	42.0	175	65.7	14.0	119.5
WB8148	28.4	174	63.9	13.4	105.2
Mean	40.7	174.9	64.6	13.6	112.2
P-Value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CV (%)	4.5	0.6	0.5	2.6	2.8
LSD (0.05)	3.0	1.8	0.6	0.6	5.1

(Julian*) is a continuous count of days since January 1

† Grain yield adjusted to 12.0% moisture

N Available: 38 lb/ac

N added: 70 lb/ac

P2O5 Available: 13 ppm

P2O5 added: 26 lb/ac

Herbicide Application: Opensky @ 16 oz/ac on 5/28/2024



Karyna Herhalo preparing ground samples for Nitrogen analysis Planted: 4/23/2024 Harvested: 8/14/2024 Previous crop: peas Soil Type: Savage Silty Clay Crop Year Precipitation: 10.35 inch Irrigation (sprinkler): 2.18 inch Plot Width: 5 ft

Irrigated Durum	Variety Trial			V	VREC, Nesson V	√alley, ND 2024
					Yield	
					2-Yr	3-Yr
Variety	Lodging	Protein	тw	2024	Avg [†]	Avg [‡]
-	(0-9)	(%)	(lb/bu)	(bu/a)	(bu/a)	(bu/a)
ND Grano	5	17.3	60.7	88.5	87.4	81.7
ND Riveland	4	17.1	60.5	85.0	87.5	79.2
Joppa	4	17.4	61.3	84.7	86.5	77.9
CDC Defy	3	17.9	59.2	75.4	79.5	76.1
ND Stanley	2	16.8	61.8	79.1	79.4	75.9
Tioga	4	17.9	58.3	78.8	82.1	74.4
AAC Spitfire	3	19.3	58.9	72.9	74.2	69.3
Mountrail	4	17.9	59.1	77.8	82.3	69.2
Divide	2	17.5	59.7	74.2	77.6	69.0
Maier	3	17.6	60.2	78.2	79.8	68.7
CDC Verona	4	17.2	59.6	65.9	70.5	66.5
Strongfield	4	17.5	60.9	60.5	66.5	63.3
Rugby	3	17.6	61.6	75.7	73.1	63.0
MT Blackbeard	4	18.3	60.4	76.1	84.5	-
MT Lustre	3	17.2	61.6	72.9	76.7	-
MT Raska	4	18.1	55.9	55.9	65.5	-
CDC Vantta	3	17.1	61.0	53.8	65.1	-
Grenora	4	18.1	59.9	69.7	63.6	-
TCG Bright	4	19.1	58.1	77.3	-	-
Ben	4	17.2	61.9	77.3	-	-
Lebsock	2	17.9	61.2	73.2	-	-
Mean	3.3	17.69	60.01	74.98	76.77	71.87
C.V.	56.4	5.64	1.59	9.93	-	-
LSD 0.05	2.6	1.42	1.35	10.50	-	-
LSD 0.10	2.2	1.18	1.12	8.78	-	-
†: Yields from 202	24 and 2022			‡: Yi	elds from 2024,	2022, and 2021
Location: Latitude	e 48 9.9222'N; L	ongitude 103 6.1	132'W		Pla	nted: 5/15/2024
Rainfall: 7.3 inche	s (5/15 - 8/30)				Harve	sted: 8/30/2024

Soil type: Lihen Loamy Fine Sand

Elevation: 1902 ft

Irrigation: 9.75 inches

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.

Previous crop: Soybean

Plot size: 83 ft2

Spring is nature's way of saying, "Let's party" -Robin Williams

Roosevelt Count	y Dryland Durum	- MSU			Poplar, MT 2024
Variety	Plant Height	Test Weight	Protein	Sawfly Damage	Grain Yield†
	(inch)	(lb/bu)	(%)	(0-10)	(bu/ac)
Alzada	25.6	58.3	17.0	0.7	31.9
Carpio	32.0	58.3	19.7	1.3	26.2
Divide	31.2	59.6	18.8	1.7	29.1
Joppa	29.3	59.7	19.0	3.0	27.2
Lustre	29.8	58.5	19.8	1.3	28.3
Mountrail	29.4	58.7	19.0	1.3	28.0
MT Blackbeard	32.6	59.0	18.9	1.0	30.0
MT Raska	22.9	60.1	18.6	1.0	31.1
MTD19011	29.0	60.2	17.3	1.7	32.7
ND Riveland	28.7	58.2	19.5	1.7	25.4
Tioga	30.0	58.9	20.2	1.7	25.8
WB8148	23.0	58.7	18.4	1.3	29.6
Mean	28.6	59.0	18.9	1.5	28.8
P-Value	<0.0001	0.1034	0.0173	0.0358	0.0011
CV (%)	7.5	1.5	5.3	43.8	6.8
LSD (0.05)	3.6	1.5	1.7	1.1	3.3

† Grain yield adjusted to 12.0% moisture Fertilizer: 70 lb/ac N; 13 lb/ac P2O5 Plot Width: 5 ft

Planted: 4/29/2024

Harvested: 8/13/2024 Previous crop: yellow peas Crop Year Precipitation: 6.95 inch

Sheridan County Dryland Durum - MSC

Sheridan County	y Dryland Durum -		Dagmar, MT 2024		
Variety	Plant Height (inch)	Test Weight (lb/bu)	Protein (%)	Sawfly Damage (0-10)	Grain Yield† (bu/ac)
Alzada	27.6	56.4	16.7	0.7	40.8
Carpio	36.3	59.7	17.4	1.3	39.5
Divide	36.6	60.8	16.3	1.3	39.6
Joppa	35.4	60.8	16.4	1.3	41.1
Lustre	36.2	59.5	17.1	1.7	40.8
Mountrail	36.9	59.3	16.5	1.0	43.5
MT Blackbeard	39.8	59.7	15.9	1.0	38.4
MT Raska	25.2	60.1	16.7	0.3	38.9
MTD19011	36.5	60.4	15.8	0.3	45.1
ND Riveland	37.3	59.7	16.6	1.7	41.5
Tioga	38.3	60.7	16.7	1.3	42.4
WB8148	24.3	58.5	16.3	0.7	40.0
Mean	34.2	59.6	16.5	1.1	41.0
P-Value	<0.0001	<0.0001	0.8458	0.2042	0.0021
CV (%)	3.5	1.2	6.2	63.2	4.1
LSD (0.05)	2.0	1.3	1.7	1.1	2.8

† Grain yield adjusted to 12.0% moisture

Available N: 24 lb/ac

Available P2O5: 13 ppm Fertilizer: 70 lb/ac N; 13 lb/ac P2O5

Planted: 4/24/2024

Harvested: 8/14/2024 Plot Width: 5 ft

Previous crop: lentil

Crop Year Precipitation: 9.08 inch

Valley County D	ryland Durum - M	SU			Nashua, MT 2024
Variety	Plant Height (inch)	Test Weight (lb/bu)	Protein (%)	Sawfly Damage (0-10)	Grain Yield† (bu/ac)
Alzada	27.1	59.3	16.2	2.3	34.5
Carpio	29.2	59.5	18.2	2.3	25.3
Divide	31.2	60.9	17.2	3.0	28.0
Joppa	32.4	60.6	17.0	3.3	27.2
Lustre	30.3	59.5	18.2	3.0	27.5
Mountrail	29.7	60.3	17.0	4.0	27.3
MT Blackbeard	34.6	59.0	17.6	1.7	26.4
MT Raska	23.6	62.2	16.6	1.3	30.1
MTD19011	29.0	60.4	17.0	3.7	28.0
ND Riveland	33.6	59.7	17.5	3.0	28.5
Tioga	32.8	60.4	18.2	2.0	25.4
WB8148	22.9	60.2	16.1	3.3	31.6
Mean	29.7	60.2	17.2	2.8	28.3
P-Value	<0.0001	<0.0001	0.0174	0.0253	0.0445
CV (%)	5.3	0.8	4.5	32.1	10.6
LSD (0.05)	2.7	0.8	1.3	1.5	5.1
+ (Proin viold adju	rated to 12.00 moin	turo			Plantad: 1/26/2021

† Grain yield adjusted to 12.0% moisture Fertilizer: 70 lb/ac N; 13 lb/ac P2O5 Plot Width: 5 ft Planted: 4/26/2024 Harvested: 8/19/2024 Previous crop: fallow Crop Year Precipitation: 6.50 inch

Vida, MT 2024

McCone County Dryland Durum - MSU

Variety	Plant Height (inch)	Test Weight (lb/bu)	Protein (%)	Sawfly Damage (0-10)	Grain Yield† (bu/ac)
Alzada	29.6	63.4	15.3	2.3	46.4
Carpio	35.3	63.6	14.1	1.3	57.1
Divide	35.4	64.2	14.9	0.7	53.4
Joppa	37.3	64.5	14.5	2.3	51.2
Lustre	36.2	63.3	15.2	1.0	56.8
Mountrail	35.2	64.1	15.2	1.3	55.6
MT Blackbeard	39.6	64.5	14.9	2.0	51.6
MT Raska	27.6	64.6	16.0	0.3	43.1
MTD19011	35.3	63.3	15.0	1.3	55.0
ND Riveland	37.9	61.2	15.7	1.0	50.6
Tioga	38.7	63.8	15.4	1.7	48.4
WB8148	26.8	54.5	15.5	1.0	50.0
Mean	34.6	63.1	15.1	1.4	51.6
P-Value	<0.0001	0.5478	<0.0001	0.0295	0.0442
CV (%)	4.0	7.9	2.1	50.5	9.6
LSD (0.05)	2.3	8.4	0.5	1.2	8.3

† Grain yield adjusted to 12.0% moisture

Available N: 33 lb/ac

Available P2O5: 5 ppm

Fertilizer added: 115 lb/ac N; 13 lb/ac P2O5

Planted: 5/15/2024

Harvested: 8/28/2024 Previous crop: fallow

Crop Year Precipitation: 6.50 inch

Plot Width: 5 ft

Irrigated Intrastate Barley Evaluation - MSU

EARC, Sidney, MT 2024

Variety	Plant	Days to	Lodging	Plump >6/64	Regular >5/64	Test Weight	Protein	Grain Yield†
•	(inch)	(Julian*)	(%)	(%)	(%)	(lb/bu)	(%)	(bu/ac)
AAC Synergy	39.8	175	0	85	12	55.3	12.4	127.0
Buzz	35.9	170	0	94	4	56.5	11.1	135.5
FHB-2017-59-2	37.7	169	0	92	5	58.1	12.6	135.7
Havener	38.7	175	7	74	21	65.2	12.5	123.2
Hockett	36.9	171	5	89	8	56.8	12.3	131.8
Merit 57	37.1	175	8	78	17	54.9	12.3	141.0
MT Boy Howdy	40.3	173	0	90	7	56.3	10.5	150.1
MT Endurance	38.8	169	0	93	5	55.3	12.1	129.4
MT17M01908	38.5	169	0	95	4	56.2	11.2	130.4
MT17M05808	38.5	171	8	90	9	55.7	12.4	117.4
MT18H02702	40.4	175	0	78	14	63.8	13.6	115.6
MT18M06008	34.1	165	2	91	6	56.2	11.5	125.7
MT18M10106	39.3	174	0	92	6	56.6	10.6	140.1
MT18M11004	37.4	175	0	84	12	56.2	12.0	139.6
MT18M11106	38.5	173	0	92	6	56.4	11.2	127.1
MT19_H09_09	41.4	176	27	59	32	62.9	15.4	100.2
MT19_H11_04	41.9	176	0	71	22	63.2	14.5	102.6
MT19_H11_05	39.3	175	0	63	28	62.1	13.5	108.7
MT19_M022_10	32.7	177	5	73	22	52.5	11.9	114.7
MT19_M034_16	36.7	174	2	89	8	56.5	11.6	156.5
MT19_M061_19	38.3	172	0	92	7	55.7	11.4	132.8
MT19_M064_04	37.4	172	17	87	10	54.9	11.1	134.6
MT19_M067_02	35.2	170	0	95	4	56.0	11.1	127.1
MT19_M080_13	35.0	168	0	93	6	55.3	11.4	139.5
MT19_M095_04	34.2	169	0	91	7	57.1	11.2	133.5
MT20_H092_03	38.3	176	0	53	38	60.0	14.0	94.9
MT20_H092_13	41.2	175	0	70	23	62.0	15.3	100.0
MT20_M008_04	37.9	169	0	93	5	55.8	11.0	131.4
MT20_M033_14	37.9	1/1	2	91	1	55.5	11.6	137.8
MT20_M047_16	34.7	171	0	95	4	56.6	10.9	138.5
MT20_M053_02	37.9	171	8	79	14	54.6	12.3	122.0
MT20_M062_04	34.4	170	0	94	5	50.7	11.3	122.9
MT20_M072_04	31.3 24.4	100	0	92	0	57.6 54.6	11.0	101.0
MT20_M1073_12	31.4	174	0	76	20	54.0 54.7	11.2	120.2
MT20_M120_05	39.0	175	0	90	9	56.0	10.7	147.2
MT21_027_01	38.2	170	0	93	7	56.3	13.3	140.4
MT21_027_01	30.2 30 N	172	0	91	6	57.7	12.0	150.3
MT21_050_01 MT21_062_02	38.3	172	5	91	7	55 1	12.0	132.7
MT21_069_02	32.0	177	0	84	12	53.1	11.0	133.0
MT21_000_02	39.4	172	0	91	7	57.3	11.4	135.7
MT21_094_06	38.1	173	3	89	7	55.4	12.0	131 1
MT21_004_08	38.1	173	42	72	19	54 0	12.0	123.0
MT21 100 02	38.5	170	8	94	5	55.4	13.9	136.2
MT21_102_02	37.1	174	20	81	13	55.8	13.7	120.7
MT21 129 01	30.8	176	0	85	11	53.4	11.2	132.5
MT21 M009 02	39.5	173	3	86	10	56.5	11.0	126.8
MT21 M011 01	35.8	174	0	92	6	56.8	11.3	120.0
MT21_M014_04	34.9	172	0	86	11	56.3	11.1	124.7
MT21_M015_04	36.2	171	7	75	20	54.5	10.7	126.1
MT21_M021_05	39.3	174	18	80	16	54.1	12.2	136.0

Continued on next page...

Irrigated Intrastate Barley Evaluation - MSU

EARC, Sidney, MT 2024

Variety	Plant Height	Days to Heading	Lodging	Plump >6/64	Regular >5/64	Test Weight	Protein	Grain Yield†
	(inch)	(Julian*)	(%)	(%)	(%)	(lb/bu)	(%)	(bu/ac)
MT21_M036_01	36.1	171	0	94	5	56.4	10.9	141.3
MT21_M053_06	40.0	171	58	83	13	50.3	11.7	122.4
MT21_M064_01	38.1	172	5	82	14	53.2	10.6	127.3
MT21_M070_01	37.0	173	0	94	5	54.3	10.7	136.8
MT21_M072_02	38.7	172	37	71	22	51.1	11.8	110.7
MT21_M089_01	36.5	172	0	88	9	56.4	10.8	149.1
MT21_M090_04	34.1	168	0	92	6	56.7	10.8	127.8
MT21_M098_01	40.0	173	25	93	6	55.1	12.3	135.8
MT21_M104_05	36.3	169	0	95	4	54.7	11.6	134.6
MT21_M110_02	37.9	171	2	89	9	56.0	12.0	128.5
MT21_M113_02	36.3	170	27	77	17	54.5	11.8	125.3
MT21_M115_01	38.7	173	42	86	10	53.2	11.7	120.3
MT21_M126_03	39.5	173	68	84	13	53.7	12.1	127.2
Mean	37.3	172	7	85.5	11.1	56.2	11.9	129.2
P-Value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CV (%)	9.0	0.6	143.1	4.5	23.2	1.2	3.0	5.9
LSD (0.05)	5.5	1.6	16.6	6.2	4.2	1.1	0.6	12.2

(Julian*) is a continuous count of days since January 1

† Grain yield adjusted to 12.0% moisture

N Available: 38 lb/ac

N added: 70 lb/ac

P2O5 Available: 13 ppm

P2O5 added: 26 lb/ac

Herbicide Application: Huskie FX @18 oz/ac & Axial Bold @ 15 oz/ac on 5/20/2024

Planted: 4/23/2024 Harvested: 8/2/2024 Previous crop: peas Soil Type: Savage Silty Clay Crop Year Precipitation: 10.35 inch Irrigation (sprinkler): 1.94 inch Plot Width: 5 ft

Dryland Barley Vari	ety Trial			WREC, W	illiston, ND 2024
				Yield	
	Days to			2-Yr	3-Yr
Variety	Head	тพ	2024	Avg	Avg
	(DAP)	(lb/bu)	(bu/a)	(bu/a)	(bu/a)
Explorer	55	46.7	77.1	54.6	50.2
Tradition	54	47.2	86.3	54.2	50.1
CDC Fraser	61	44.4	80.0	50.0	45.9
ND Genesis	53	49.2	52.6	45.1	45.1
Conlon	51	50.9	75.6	48.7	41.6
ABI Cardinal	60	45.6	92.3	69.8	-
Pinnacle	56	47.5	96.4	65.2	-
AAC Synergy	60	45.5	81.9	62.0	-
AAC Connect	60	45.7	75.1	58.2	-
ND Treasure	56	44.0	62.5	44.7	-
Brewski	57	46.9	62.4	-	-
Mean	56.7	46.70	76.57	55.25	46.58
C.V.	2.7	2.32	6.86	-	-
LSD 0.05	2.5	1.82	9.30	-	-
LSD 0.10	2.1	1.51	7.73	-	-

Location: WREC; Latitude 48° 8' N; Longitude 103° 44' W Rainfall: 7.2 inches (5/2 - 8/9) Soil type: Williams-Bowbells loam Elevation: 2105 ft Planted: 5/2/2024 Harvested: 8/9/2024 Previous crop: Dry Pea Plot size: 83 ft2

Dryland Forage B	arley - MSU				EAF	RC, Sidney, MT 2024
Variety	Plant Height	Days to Heading	Test Weight	Protein	Forage Yield	Grain Yield†
	(inch)	(Julian*)	(lb/bu)	(%)	(ton/ac)	(bu/ac)
Haymaker	28.8	169	55.1	14.1	2.5	86.1
Lavine	29.9	168	54.1	13.7	2.7	102.2
MT Cowgirl	32.9	168	54.5	12.7	2.8	99.0
MT16F01601	30.2	168	55.2	13.7	2.8	98.0
MT17F02410	30.6	171	55.5	13.1	2.7	106.7
MT20_F097_01	32.8	171	54.2	13.2	2.8	91.0
MT20_F098_01	29.9	170	53.9	13.0	2.4	102.3
MT20_F098_24	29.9	170	54.7	12.8	2.4	93.8
MT20_F099_05	28.9	169	55.4	14.3	2.2	92.4
MT20_F108_13	30.1	171	56.4	13.2	2.3	104.8
MT20_F109_08	27.0	171	55.2	12.8	2.5	85.2
MT20_F109_22	29.8	169	55.5	13.0	2.7	104.7
MT20_F110_19	33.1	172	55.3	13.5	2.6	89.1
MT20_F111_15	32.3	170	54.6	13.8	2.5	93.5
MT21_F001_05	34.0	172	54.8	14.4	2.8	89.1
MT21_F002_09	33.1	167	54.6	15.0	2.5	68.7
MT21_F002_11	33.0	170	54.1	14.1	2.4	77.4
MT21_F003_01	28.9	170	55.9	13.8	2.3	79.9
MT21_F003_03	29.9	171	54.4	13.3	2.9	97.6
MT21_F003_05	32.2	169	54.1	13.5	2.9	94.1
MT21_F005_09	25.9	173	54.7	13.8	2.2	89.2
MT21_F005_10	30.3	172	54.4	13.8	2.5	90.1
MT21_F006_07	31.4	168	53.4	14.8	2.4	72.3
MT21_F109_03	36.9	170	54.4	15.4	2.5	75.5
MT21_F109_11	31.5	169	55.3	14.5	2.7	75.2
Mean	30.9	170	54.8	13.7	2.6	90.3
P-Value	0.1361	< 0.0001	<0.0001	< 0.0001	0.7691	<0.0001
CV (%)	10.9	0.6	0.7	2.6	17.0	7.9
LSD (0.05)	5.5	1.6	0.6	0.6	0.7	11.7

(Julian*) is a continuous count of days since January 1 $% \left({{\left[{{J_{{\rm{s}}}} \right]}} \right)$

† Grain yield adjusted to 12.0% moisture

N Available: 22 lb/ac

N added: 40 lb/ac

P2O5 Available: 25 ppm

P2O5 added: 21 lb/ac

Herbicide Application: Huskie FX @ 18oz/ac & Axial Bold @ 15oz/ac on 5/22/2024

Planted: 4/12/2024 Harvested: 7/30/2024 Previous crop: fallow Soil Type: Williams Clay Loam Crop Year Precipitation: 11.21 inch Plot Width: 5 ft

I'm sorry for the things I said when it was winter. -Anonymous

Dryland Offstation	on Barley-MSU	l				EARC, S	idney, MT 2024
Variety	Plant Height	Days to Heading	Plump >6/64	Regular > 5/64	Test Weight	Protein	Grain Yield†
	(inch)	(Julian*)	(%)	(%)	(lb/bu)	(%)	(bu/ac)
AAC Synergy	25.9	171	97	3	55.7	10.6	93.1
ABI Eagle	25.3	175	91	8	56.9	9.7	95.6
ABI Voyager	27.2	174	94	5	55.9	11.6	85.2
AC Metcalfe	25.5	170	97	3	58.1	10.1	91.2
BC Lexy	21.9	178	95	5	54.5	9.4	99.9
Buzz	22.9	171	98	2	57.4	9.8	79.0
Hockett	25.5	172	96	3	57.9	10.1	89.1
KWS Enduris	24.4	174	97	3	54.8	10.0	96.7
KWS Imagis	22.0	176	93	6	54.3	10.9	87.4
LCS Genie	21.8	174	93	6	57.7	10.2	96.5
LCS Odyssey	22.8	178	97	3	56.3	9.8	104.2
LG-8016	22.8	177	94	5	52.7	9.8	98.7
LG Diablo	24.0	177	94	6	55.0	11.2	89.6
Merit 57	25.2	174	89	10	56.3	10.2	98.4
MT Boy Howdy	24.5	170	96	4	57.2	9.3	96.7
Mt Endurance	25.2	170	97	3	57.0	11.0	81.4
MT17M01908	25.9	169	98	2	57.6	10.1	79.1
MT17M05808	24.5	169	97	3	57.4	10.6	86.6
MT18M11004	25.3	171	94	5	57.9	10.8	94.1
MT19_M022_10	23.6	176	97	3	56.3	10.6	87.0
MT19_M061_19	23.2	171	97	2	57.2	10.5	91.8
MT19_M064_04	26.0	172	96	3	56.5	9.6	90.4
MT19_M067_02	22.2	170	98	2	56.8	9.8	82.3
MT19_M080_13	22.0	169	97	2	56.8	10.7	85.1
S14230	22.5	175	94	5	55.3	10.1	96.1
Mean	24.1	172.9	95.4	4.1	56.4	10.3	90.9
P-Value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CV (%)	12.4	0.7	0.8	15.5	0.5	4.7	5.4
LSD (0.05)	4.9	2.1	1.3	1.0	0.4	0.8	8.0

(Julian*) is a continuous count of days since January 1

† Grain yield adjusted to 12.0% moisture

N Available: 22 lb/ac

N added: 40 lb/ac

P2O5 Available: 25 ppm

P2O5 added: 21 lb/ac

Herbicide Application: Huskie FX @ 18oz/ac & Axial Bold @ 15oz/ac on 5/22/2024



Planted: 4/12/2024 Harvested: 7/30/2024 Previous crop: fallow Soil Type: Williams Clay Loam Annual Precipitation: 11.21 inch Plot Width: 5 ft

Variety Winter Survival (%) Plant Height (inch) Days to Heading (Julian') Test Weight (Jb/Jul) Protein Grain Yield† (b/Jac) AAC Coldfront 88.3 28.9 162 66.5 11.1 92.9 AAC Vortex 91.7 28.3 163 66.2 12.1 89.2 AAC Wildfire 91.7 30.2 165 65.7 11.8 83.7 ACC Goldrush 91.7 33.2 165 65.7 11.8 83.7 ApplifySF 93.3 28.5 158 66.2 9.8 91.5 AP Solid 93.3 28.5 159 65.3 10.8 77.9 AP2AAX 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 161 65.7 11.4 95.5 Brawl C. Plus 90.0 28.5 157 65.7 11.3 84.1 CO21SF191RA 86.7 29.5 163 64.4 11.9 92.9	Dryland Intrastate Wir	nter Wheat Evaluatio		EARC, Sidney, MT 2023-2024			
(%) (inch) (Julian*) (Ib/bu) (%) (bu/ac) AAC Coldfront 88.3 28.9 162 66.5 11.1 92.9 AAC Vortex 91.7 28.3 163 66.2 12.1 89.2 AAC Wildfire 91.7 30.2 165 65.2 11.3 96.4 ACC Goldrush 91.7 33.2 165 65.3 9.9 89.6 AP Bigfoot 96.7 28.0 158 66.2 9.8 91.5 AP Solid 93.3 28.5 159 65.3 10.8 77.9 AP24AX 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 161 65.7 11.4 95.5 Brawl CL Plus 90.0 28.5 157 65.7 11.3 84.1 CO21SF191RA 86.7 29.5 163 65.5 10.7 96.3 CP 7869 96.7 25.6 158	Variety	Winter Survival	Plant Height	Days to Heading	Test Weight	Protein	Grain Yield†
AAC Coldfront 88.3 28.9 162 66.5 11.1 92.9 AAC Vortex 91.7 28.3 163 66.2 12.1 89.2 AAC Widfire 91.7 30.2 165 65.2 11.3 96.4 ACC Goldrush 91.7 33.2 165 65.7 11.8 83.7 Amplify SF 93.3 28.5 158 66.2 9.8 91.5 AP Bigfoot 96.7 28.0 158 66.2 9.8 91.5 AP Solid 93.3 28.5 159 65.3 10.8 77.9 AP2AdX 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 163 65.7 11.3 84.1 CO21SF191RA 86.7 29.5 163 65.7 11.3 84.1 CO21SF263RA 91.7 32.2 163 64.4 11.9 92.9 CP 7266 95.0 28.1 <td< th=""><th></th><th>(%)</th><th>(inch)</th><th>(Julian*)</th><th>(lb/bu)</th><th>(%)</th><th>(bu/ac)</th></td<>		(%)	(inch)	(Julian*)	(lb/bu)	(%)	(bu/ac)
AAC Vortex 91.7 28.3 163 66.2 12.1 89.2 AAC Wildfire 91.7 30.2 165 65.2 11.3 96.4 ACC Goldrush 91.7 33.2 165 65.7 11.8 83.7 Amplify SF 93.3 28.5 158 65.3 9.9 89.6 AP Solid 93.3 28.5 159 65.3 10.8 77.9 AP24AX 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 161 65.7 11.4 95.5 Brawl CL Plus 90.0 28.5 157 65.7 11.3 84.1 CO21SF191RA 86.7 29.5 163 64.4 11.9 92.9 CP 7266 95.0 28.3 158 65.5 10.7 96.3 CP 7266 96.7 25.6 158 65.5 10.7 96.3 Flathead 91.7 30.7 158 66.5 10.0 02.2 LCS Julep 90.0 28.7	AAC Coldfront	88.3	28.9	162	66.5	11.1	92.9
AAC Wildfire 91.7 30.2 165 65.2 11.3 96.4 ACC Goldrush 91.7 33.2 165 65.7 11.8 83.7 Amplify SF 93.3 28.5 158 65.3 9.9 89.6 AP Bigfoot 96.7 28.0 158 66.2 9.8 91.5 AP Solid 93.3 28.5 159 65.3 10.8 77.9 AP24AX 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 161 65.7 11.3 84.1 CO21SF263RA 91.7 32.2 163 64.4 11.9 92.9 CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7266 95.0 28.3 158 63.9 9.4 85.6 Flathead 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160	AAC Vortex	91.7	28.3	163	66.2	12.1	89.2
ACC Goldrush 91.7 33.2 165 65.7 11.8 83.7 Amplify SF 93.3 28.5 158 65.3 9.9 89.6 AP Bigfoot 96.7 28.0 158 66.2 9.8 91.5 AP Solid 93.3 28.5 159 65.3 10.8 77.9 AP244X 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 161 65.7 11.3 84.1 CO21SF191RA 86.7 29.5 163 65.0 11.6 90.6 CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7869 96.7 25.6 158 65.5 10.7 96.3 CP 15CW3388#011 91.7 28.1 158 66.0 10.9 103.4 Judee 93.3 28.7 161 65.5 12.0 84.9 Keldin 90.0 28.7 158	AAC Wildfire	91.7	30.2	165	65.2	11.3	96.4
Amplify SF 93.3 28.5 158 65.3 9.9 89.6 AP Bigfoot 96.7 28.0 158 66.2 9.8 91.5 AP Solid 93.3 28.5 159 65.3 10.8 77.9 AP24AX 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 161 65.7 11.4 95.5 Brawl CL Plus 90.0 28.5 157 65.7 11.6 90.6 CO21SF263RA 91.7 32.2 163 64.4 11.9 92.9 CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7869 96.7 25.6 158 65.5 10.7 96.3 Flathead 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 158	ACC Goldrush	91.7	33.2	165	65.7	11.8	83.7
AP Bigroot 96.7 28.0 158 66.2 9.8 91.5 AP Solid 93.3 28.5 159 65.3 10.8 77.9 AP24AX 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 161 65.7 11.4 95.5 Brawl CL Plus 90.0 28.5 157 65.7 11.3 84.1 CO21SF1263RA 91.7 32.2 163 64.4 11.9 92.9 CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7869 96.7 25.6 158 65.5 10.7 96.3 CP13CW3388#011 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 158 66.5 10.6 89.5 LCS Julep 90.0 28.7 158 <td>Amplify SF</td> <td>93.3</td> <td>28.5</td> <td>158</td> <td>65.3</td> <td>9.9</td> <td>89.6</td>	Amplify SF	93.3	28.5	158	65.3	9.9	89.6
AP Solid 93.3 28.5 159 65.3 10.8 77.9 AP24AX 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 161 65.7 11.4 95.5 Brawl CL Plus 90.0 28.5 157 65.7 11.3 84.1 CO21SF191RA 86.7 29.5 163 64.4 11.9 92.9 CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7869 96.7 25.6 158 65.5 10.7 96.3 CP1SCW3388#011 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 161 65.5 12.0 84.9 Keldin 90.0 29.1 163 65.2 10.0 102.2 LCS Julep 90.0 28.7 158 66.6 11.0 89.1 LCS Steel AX 96.7 30.8	AP Bigfoot	96.7	28.0	158	66.2	9.8	91.5
AP24AX 95.0 31.4 160 64.3 10.3 102.2 Bobcat 93.3 26.0 161 65.7 11.4 95.5 Brawl CL Plus 90.0 28.5 157 65.7 11.3 84.1 CO21SF191RA 86.7 29.5 163 64.4 11.9 92.9 CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7266 95.0 28.1 158 63.9 9.4 85.6 Flathead 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 161 65.5 12.0 84.9 Keldin 90.0 28.7 158 66.6 11.0 89.5 LCS Julep 90.0 28.7 158 66.6 10.0 98.3 LCS Steel AX 96.7 30.8 161	AP Solid	93.3	28.5	159	65.3	10.8	77.9
Bobcat 93.3 26.0 161 65.7 11.4 95.5 Brawl CL Plus 90.0 28.5 157 65.7 11.3 84.1 CO21SF191RA 86.7 29.5 163 65.0 11.6 90.6 CO21SF263RA 91.7 32.2 163 64.4 11.9 92.9 CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7869 96.7 25.6 158 63.9 9.4 85.6 Flathead 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 161 65.5 10.0 102.2 LCS Julep 90.0 28.7 158 66.5 10.6 89.5 LCS Steel AX 96.7 30.8 161 64.6 9.8 99.2 Loma 90.0 29.7 163	AP24AX	95.0	31.4	160	64.3	10.3	102.2
Brawl CL Plus90.028.515765.711.384.1CO21SF191RA86.729.516365.011.690.6CO21SF263RA91.732.216364.411.992.9CP 726695.028.315966.710.097.1CP 786996.725.615865.510.796.3CP15CW3388#01191.730.715866.010.9103.8FourOsix96.729.016066.911.2103.4Judee93.328.716165.512.084.9Keldin90.029.116365.210.0102.2LCS Julep90.028.715866.611.089.1LCS Steel AX96.730.816164.69.899.2Loma90.029.716365.010.996.3Milestone91.727.816163.610.098.3MS Maverick93.329.016066.010.7101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT227096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCX2015191.729.016065.711.2104.8	Bobcat	93.3	26.0	161	65.7	11.4	95.5
CO21SF191RA 86.7 29.5 163 65.0 11.6 90.6 CO21SF263RA 91.7 32.2 163 64.4 11.9 92.9 CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7869 96.7 25.6 158 65.5 10.7 96.3 CP15CW3388#011 91.7 28.1 158 63.9 9.4 85.6 Flathead 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 161 65.5 12.0 84.9 Keldin 90.0 28.7 158 66.6 11.0 89.1 LCS Julep 90.0 28.7 158 66.6 11.0 89.1 LCS Steel AX 96.7 30.8 161 64.6 9.8 99.2 Loma 90.0 29.7 163	Brawl CL Plus	90.0	28.5	157	65.7	11.3	84.1
CO21SF263RA 91.7 32.2 163 64.4 11.9 92.9 CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7869 96.7 25.6 158 65.5 10.7 96.3 CP15CW3388#011 91.7 28.1 158 66.0 10.9 103.8 Flathead 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 161 65.5 12.0 84.9 Keldin 90.0 29.1 163 65.2 10.0 102.2 LCS Julep 90.0 28.7 158 66.6 11.0 89.1 LCS Radar 91.7 27.6 158 66.6 11.0 89.1 LCS Steel AX 96.7 30.8 161 63.6 10.9 96.3 Milestone 91.7 27.8 161<	CO21SF191RA	86.7	29.5	163	65.0	11.6	90.6
CP 7266 95.0 28.3 159 66.7 10.0 97.1 CP 7869 96.7 25.6 158 65.5 10.7 96.3 CP15CW3388#011 91.7 28.1 158 63.9 9.4 85.6 Flathead 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 161 65.5 12.0 84.9 Keldin 90.0 29.1 163 65.2 10.0 102.2 LCS Julep 90.0 28.7 158 66.6 11.0 89.1 LCS Steel AX 96.7 30.8 161 64.6 9.8 99.2 Loma 90.0 29.7 163 65.0 10.9 96.3 Milestone 91.7 27.8 161 63.6 10.0 98.3 MS Maverick 93.3 29.0 160	CO21SF263RA	91.7	32.2	163	64.4	11.9	92.9
CP 786996.725.615865.510.796.3CP15CW3388#01191.728.115863.99.485.6Flathead91.730.715866.010.9103.8FourOsix96.729.016066.911.2103.4Judee93.328.716165.512.084.9Keldin90.029.116365.210.0102.2LCS Julep90.028.715866.510.689.5LCS Radar91.727.615866.611.089.1LCS Steel AX96.730.816164.69.899.2Loma90.029.716365.010.996.3Milestone91.727.816163.610.098.3MS Maverick93.329.016066.010.7101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT201995.027.816264.810.6104.2MT227096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCL1915191.729.016065.711.2104.8MTCS2015188.330.316566.631.1298.9	CP 7266	95.0	28.3	159	66.7	10.0	97.1
CP15CW3388#011 91.7 28.1 158 63.9 9.4 85.6 Flathead 91.7 30.7 158 66.0 10.9 103.8 FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 161 65.5 12.0 84.9 Keldin 90.0 29.1 163 65.2 10.0 102.2 LCS Julep 90.0 28.7 158 66.6 11.0 89.5 LCS Radar 91.7 27.6 158 66.6 11.0 89.1 LCS Steel AX 96.7 30.8 161 64.6 9.8 99.2 Loma 90.0 29.7 163 65.0 10.9 96.3 Milestone 91.7 27.8 161 63.6 10.0 98.3 MS Maverick 93.3 29.0 160 66.5 10.4 93.1 MS Sundown 91.7 31.2 157 66.5 10.4 93.1 MT2270 96.7 30.1 <td< td=""><td>CP 7869</td><td>96.7</td><td>25.6</td><td>158</td><td>65.5</td><td>10.7</td><td>96.3</td></td<>	CP 7869	96.7	25.6	158	65.5	10.7	96.3
Flathead91.730.715866.010.9103.8FourOsix96.729.016066.911.2103.4Judee93.328.716165.512.084.9Keldin90.029.116365.210.0102.2LCS Julep90.028.715866.611.089.5LCS Radar91.727.615866.611.089.1LCS Steel AX96.730.816164.69.899.2Loma90.029.716365.010.996.3Milestone91.727.816163.610.098.3MS Maverick93.329.016066.010.7101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT227096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCL1915191.729.016065.711.2104.8MTCS2015188.330.316566.311.298.9	CP15CW3388#011	91.7	28.1	158	63.9	9.4	85.6
FourOsix 96.7 29.0 160 66.9 11.2 103.4 Judee 93.3 28.7 161 65.5 12.0 84.9 Keldin 90.0 29.1 163 65.2 10.0 102.2 LCS Julep 90.0 28.7 158 66.5 10.6 89.5 LCS Radar 91.7 27.6 158 66.6 11.0 89.1 LCS Steel AX 96.7 30.8 161 64.6 9.8 99.2 Loma 90.0 29.7 163 65.0 10.9 96.3 Milestone 91.7 27.8 161 63.6 10.0 98.3 MS Maverick 93.3 29.0 160 66.5 10.4 93.1 MT WarCat 90.0 27.6 166 65.8 11.5 94.2 MT2019 95.0 27.8 162 64.8 10.6 104.2 MT2270 96.7 30.1 161 67.3 9.7 109.2 MTAX22120 95.0 29.1 158 <td>Flathead</td> <td>91.7</td> <td>30.7</td> <td>158</td> <td>66.0</td> <td>10.9</td> <td>103.8</td>	Flathead	91.7	30.7	158	66.0	10.9	103.8
Judee 93.3 28.7 161 65.5 11.2 1861 Judee 93.3 28.7 161 65.5 12.0 84.9 Keldin 90.0 29.1 163 65.2 10.0 102.2 LCS Julep 90.0 28.7 158 66.5 10.6 89.5 LCS Radar 91.7 27.6 158 66.6 11.0 89.1 LCS Steel AX 96.7 30.8 161 64.6 9.8 99.2 Loma 90.0 29.7 163 65.0 10.9 96.3 Milestone 91.7 27.8 161 63.6 10.0 98.3 MS Maverick 93.3 29.0 160 66.5 10.4 93.1 MS Sundown 91.7 31.2 157 66.5 10.4 93.1 MT WarCat 90.0 27.6 166 65.8 11.5 94.2 MT2270 96.7 30.1 161 67.3 9.7 109.2 MTAX22120 95.0 29.1 158 <td>FourOsix</td> <td>96.7</td> <td>29.0</td> <td>160</td> <td>66.9</td> <td>11.2</td> <td>103.4</td>	FourOsix	96.7	29.0	160	66.9	11.2	103.4
Keldin90.029.116365.210.0102.2LCS Julep90.028.715866.510.689.5LCS Radar91.727.615866.611.089.1LCS Steel AX96.730.816164.69.899.2Loma90.029.716365.010.996.3Milestone91.727.816163.610.098.3MS Maverick93.329.016066.010.7101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT201995.027.816264.810.6104.2MTX27096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCL1915191.729.016065.711.2104.8MTCS2015188.330.316566.311.298.9	Judee	02.2	28.7	161	65.5	12.0	84.9
LCS Julep90.028.715866.510.689.5LCS Radar91.727.615866.611.089.1LCS Steel AX96.730.816164.69.899.2Loma90.029.716365.010.996.3Milestone91.727.816163.610.098.3MS Maverick93.329.016066.010.7101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT201995.027.816264.810.6104.2MT227096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCL1915191.729.016065.711.2104.8MTCS2015188.330.316566.311.298.9	Keldin	93.3	29.1	163	65.2	10.0	102.2
LCS outop50.0LC.110060.010.060.0LCS Radar91.727.615866.611.089.1LCS Steel AX96.730.816164.69.899.2Loma90.029.716365.010.996.3Milestone91.727.816163.610.098.3MS Maverick93.329.016066.010.7101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT201995.027.816264.810.6104.2MT227096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCL1915191.729.016065.711.2104.8MTCS2015188.330.316566.311.298.9	LCS.Julep	90.0	28.7	158	66.5	10.6	89.5
LCS Steel AX96.730.816164.69.899.2Loma90.029.716365.010.996.3Milestone91.727.816163.610.098.3MS Maverick93.329.016066.010.7101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT201995.027.816264.810.6104.2MT227096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCL1915191.729.016065.711.2104.8MTCS2015188.330.316566.311.298.9	LCS Radar	91 7	27.6	158	66.6	11.0	89.1
Loma90.029.716365.010.996.3Milestone91.727.816163.610.098.3MS Maverick93.329.016066.010.7101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT201995.027.816264.810.6104.2MT227096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCL1915191.729.016065.711.2104.8MTCS2015188.330.316566.311.298.9	LCS Steel AX	96.7	30.8	161	64.6	9.8	99.2
Milestone 91.7 27.8 161 63.6 10.0 98.3 MS Maverick 93.3 29.0 160 66.0 10.7 101.4 MS Sundown 91.7 31.2 157 66.5 10.4 93.1 MT WarCat 90.0 27.6 166 65.8 11.5 94.2 MT2019 95.0 27.8 162 64.8 10.6 104.2 MT2270 96.7 30.1 161 67.3 9.7 109.2 MTAX22120 95.0 29.1 158 64.4 10.3 101.7 MTCL19151 91.7 29.0 160 65.7 11.2 104.8 MTCS20151 88.3 30.3 165 66.3 11.2 98.9	Loma	90.0	29.7	163	65.0	10.9	96.3
Millosteric01.121.010100.010.000.0MS Maverick93.329.016066.010.7101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT201995.027.816264.810.6104.2MT227096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCL1915191.729.016065.711.2104.8MTCS2015188.330.316566.311.298.9	Milestone	91 7	27.8	161	63.6	10.0	98.3
MC Matchok50.020.0100100101.4MS Sundown91.731.215766.510.493.1MT WarCat90.027.616665.811.594.2MT201995.027.816264.810.6104.2MT227096.730.116167.39.7109.2MTAX2212095.029.115864.410.3101.7MTCL1915191.729.016065.711.2104.8MTCS2015188.330.316566.311.298.9	MS Mayerick	93.3	29.0	160	66.0	10.0	101.4
MC Guildown 51.7 51.2 167 60.5 10.4 50.1 MT WarCat 90.0 27.6 166 65.8 11.5 94.2 MT2019 95.0 27.8 162 64.8 10.6 104.2 MT2270 96.7 30.1 161 67.3 9.7 109.2 MTAX22120 95.0 29.1 158 64.4 10.3 101.7 MTCL19151 91.7 29.0 160 65.7 11.2 104.8 MTCS20151 88.3 30.3 165 66.3 11.2 98.9	MS Sundown	90.0 91 7	20.0	157	66 5	10.7	93.1
MT Valoat 30.0 27.8 160 60.0 11.0 04.2 MT2019 95.0 27.8 162 64.8 10.6 104.2 MT2270 96.7 30.1 161 67.3 9.7 109.2 MTAX22120 95.0 29.1 158 64.4 10.3 101.7 MTCL19151 91.7 29.0 160 65.7 11.2 104.8 MTCS20151 88.3 30.3 165 66.3 11.2 98.9	MT WarCat	90.0	27.6	166	65.8	11.5	94.2
MT2013 30.0 27.0 102 04.0 10.0 104.2 MT2270 96.7 30.1 161 67.3 9.7 109.2 MTAX22120 95.0 29.1 158 64.4 10.3 101.7 MTCL19151 91.7 29.0 160 65.7 11.2 104.8 MTCS20151 88.3 30.3 165 66.3 11.2 98.9	MT2019	95.0	27.8	162	64.8	10.6	104.2
MTAX22120 95.0 29.1 158 64.4 10.3 101.7 MTCL19151 91.7 29.0 160 65.7 11.2 104.8 MTCS20151 88.3 30.3 165 66.3 11.2 98.9	MT2010 MT2270	96.7	30.1	161	67.3	9.7	109.2
MTCL19151 91.7 29.0 160 65.7 11.2 104.8 MTCS20151 88.3 30.3 165 66.3 11.2 98.9	MTAX22120	05.0	20.1	158	64.4	10.3	103.2
MTCS20151 88.3 30.3 165 66.3 11.2 98.9	MTCI 19151	90.0 91 7	29.1	160	65.7	11.2	104.8
	MTCS20151	88.3	20.0	165	66.3	11.2	98.9
MTCS20156 91.7 28.3 163 66.9 11.3 92.3	MTCS20156	00.0 01 7	28.3	163	66.9	11.2	92.3
MT 51908 91.7 31.2 166 66.0 11.0 103.5	MTS1908	01.7 01.7	20.0	166	66.0	11.0	103.5
MTS1300 31.7 31.2 100 00.0 11.0 103.3 MTS21103 05.0 28.1 163 64.6 11.5 103.2	MTS21103	91.7	28.1	163	64.6	11.0	103.3
MTS21103 35.0 20.1 103 04.0 11.5 105.2 MTS22100 91.7 27.7 161 63.9 11.0 80.3	MTS21103	95.0 Q1 7	20.1	161	63.9	11.0	80.3
MTS22100 91.7 27.7 101 03.9 11.0 00.5 MTS22104 96.7 20.4 162 65.2 0.0 04.9	MTS22100	91.7	21.1	162	65.2	0.0	04.9
MTS22104 00.7 50.4 105 05.2 9.9 94.0 MTS2286 88.3 28.2 163 64.6 10.0 00.4	MTS2286	88.3	28.2	163	64.6	9.9 10 0	94.0
MT 52200 00.5 20.2 105 04.0 10.9 90.4	MTV2164	00.0	20.2	161	64.7	10.5	30.4 102.0
ND Allicon OF 0 21 2 161 04.7 10.3 102.0		95.0	24.0	101	65.0	10.0	97.0
Northorn 05.0 31.4 162 65.4 14.2 409.4	Northorp	95.0	SI.∠ 24 4	100	00.9 65 4	10.3	07.9
NULLIEITI 93.0 31.4 102 03.4 11.2 108.4 Demony 02.2 20.7 462 64.2 44.0 400.0	Pomooy	90.U	৩।.4 ১০ ব	102	00.4 64 2	11.2	100.4
Kallisay \$3.3 29.7 102 04.3 11.0 100.0 StandClose CLD 05.0 24.5 46.0 00.0 00.0	Rallisay	93.3 05 0	29.1	102	04.3	11.0	0.01
Statiuoidal OLF 30.0 31.0 102 00.7 11.0 98.9 SV Clearstone 2CL 05.0 31.0 162 64.2 11.2 104.7	SV Cloaratono 201	93.0 05.0	31.3 31.0	102	64.2	11.0	90.9 104 7

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Dryland Intrastate Wint		EARC, Sidney, MT 2023-2024				
Variety	Winter Survival (%)	Plant Height (inch)	Days to Heading (Julian*)	Test Weight (lb/bu)	Protein (%)	Grain Yield† (bu/ac)
SY Wolverine	88.3	27.7	158	64.6	10.1	73.4
Warhorse	93.3	28.3	163	65.4	11.8	88.2
WestBred1 (WB4483)	83.3	29.9	165	64.7	11.0	88.7
WestBred2 (DA220553	91.7	29.5	162	62.3	10.7	86.1
Yellowstone	93.3	31.1	161	64.5	11.7	104.2
Mean	92.3	29.4	161	65.3	10.9	94.8
P-Value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CV (%)	5.2	4.6	0.6	0.8	4.6	5.0
LSD (.05)	7.8	2.2	1.6	0.8	0.8	7.7

(Julian*) is a continuous count of days since January 1

† Grain yield adjusted to 12.0% moisture

N Available: 46 lb/ac

N added: 42 lb/ac in furrow + 46 lb/ac topdressed on 4/15

P2O5 available: 29.5 ppm

P2O5 applied: 21 lb/ac

Herbicide Application: Opensky @ 16 oz/ac on 5/12/2024

Planted: 9/29/2023 Harvested: 7/29/2024 Previous crop: fallow Soil Type: William Clay Loam Crop year precip: 11.21 inch Plot Width: 5 ft



EARC Plant Pathology Planting FHB Hill Plots

Dryland Winter Wheat Variety Trial ·

Planted: 10/11/2023

Harvested: 7/30/2024

Previous crop: Dry Pea

	Winter	Days to	Plant						
Variety	Survival	Heading	Height	Lodging	Protein	тw		Yield	
							2024	2-Yr. Avg.	3-Yr. Avg.
	(%)	(Julian [⁺])	(in)	(0-9 [*])	(%)	(lb/bu)		(bu/a)	
ND Noreen	88.0	162	28.5	2	14.5	64.4	82.4	59.4	51.5
SD Andes	91.0	162	27.1	2	13.0	64.6	82.9	58.2	49.9
Northern	86.3	164	25.1	2	13.3	62.8	84.4	59.1	49.1
AAC Vortex	91.0	163	25.2	1	14.1	63.4	71.6	54.9	47.8
SD Midland	85.7	162	26.4	2	12.7	63.4	79.2	57.4	47.2
Winner	79.7	158	25.0	2	13.9	63.7	83.5	58.6	47.1
MS Maverick	81.3	159	24.4	2	13.1	62.7	74.9	53.5	41.7
SY Monument	85.3	160	23.9	2	12.2	58.5	64.8	48.9	41.3
Keldin	59.0	164	21.9	2	14.9	60.0	52.9	44.7	40.6
WB4309	88.0	158	20.8	2	12.6	61.8	64.2	46.4	38.9
Jerry	90.3	162	27.4	1	11.0	60.6	59.9	44.9	37.5
AC Emerson	67.3	163	28.9	1	13.1	63.0	59.2	45.3	37.5
Goldrush	81.3	164	28.5	1	13.5	62.2	74.5	55.8	-
SD Pheasant	79.0	161	28.0	2	11.3	60.3	55.1	55.1	-
AAC Coldfront	90.0	162	25.3	2	12.4	63.2	78.0	-	-
AAC-Wildfire	90.3	166	27.9	1	11.3	62.5	72.9	-	-
ND Allison	71.3	163	28.3	2	12.0	62.1	72.3	-	-
LCS Chrome	85.7	162	24.1	2	13.4	62.0	70.5	-	-
LCS Steel AX	76.7	164	26.8	1	11.8	61.1	69.5	-	-
AAC Overdrive	90.0	163	26.2	2	12.1	61.4	67.9	-	-
WB4422	85.3	159	21.3	1	13.1	59.8	57.1	-	-
Mean	82.61	162.04	25.77	1.71	12.76	61.89	69.59	53.01	44.19
CV	0.65	13.2	9.41	24.9	8.04	1.73	8.66	-	-
LSD 0.05	17.98	1.7	10.12	0.7	1.69	1.76	9.91	-	-
LSD 0.1	14.99	1.4	8.44	0.6	1.41	1.47	8.26	-	-
+: Days after Ja	nuary 1, 20	24			* 0: r	no lodging -	9: plants l	ying flat on	the ground

Location: WREC; Latitude 48° 8' N; Longitude 103° 44' W Rainfall: 9.3 inches (1/1 - 7/30)

Soil type: Williams-Bowbells loam

Elevation: 2105 ft

2105 ft Plot size: 45 ft2

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.

I have touched the richness of soil I've born the wind and sun on my face And I would choose this life and this land Over any other place -Furrows and Fields (Anon.)

Irrigated Corn Vari	ety Trial			WREC, Nesson Valley, ND 2024			
			Yield				
	Harvest			2-Yr	3-Yr		
Hybrid	Moisture	TW	2024	Avg [†]	Avg [‡]		
	(%)	(lb/bu)	(bu/a)	(bu/a)	(bu/a)		
3009 VT2P RIB	14.4	58.1	159.7	150.3	156.0		
3431 VT2P RIB	15.6	58.8	224.1	-	-		
G85B04-AA	14.5	57.4	224.1	-	-		
G87U44-V	15.1	56.2	219.2	-	-		
G82B12-AA	14.9	56.9	212.5	-	-		
3114 VT2P RIB	14.3	56.1	206.9	-	-		
G80Q01-V	16.5	56.6	172.0	-	-		
Mean	15.04	57.17	202.63	150.33	155.95		
C.V.	3.21	1.02	6.43	-	-		
LSD 0.05	0.82	1.01	23.17	-	-		
LSD 0.10	0.68	0.83	18.95	-	-		
†: Yields from 2024	and 2022			‡: Yields from 202	24, 2022, and 2021		

Location: Latitude 48 9.9222'N; Longitude 103 6.132'W

Rainfall: 8.4 inches (5/13 - 10/25)

Soil type: Lihen Loamy Fine Sand

Yields from 2024, 2022, and 2021
 Planted: 5/13/2024
 Harvested: 10/25/2024
 Previous crop: Durum
 Plot size: 83 ft2

Irrigation: 12.75 inches

Elevation: 1902 ft

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.

The rose may bloom for England, The lily for France unfold; Ireland may honor the shamrock Scotland her thistle bold; But the shield of the great republic, The glory of the West, Shall bear a stalk of the tasseled corn, Of all our wealth the best

-The Tasseled Corn by Edna Dean Proctor

Safflower Variety Trial EARC, Sidney, MT 2024 **Grain Yield** (cm) (Julian*) (lb/bu) (%) (lb/ac) Cardinal 41.9 43.8 33.3 211 3288.4 Chickadee 212 41.2 41.4 3728.0 31.0 Hybrid 200 29.0 210 41.1 35.6 2975.5 Hybrid 446 32.0 210 41.8 41.9 3574.3 Nutrasaff 30.8 211 53.5 2616.4 38.0 STI 1401 31.0 211 36.4 52.0 2883.8 211 40.1 31.2 44.7 3177.7 Mean P-Value 0.01551 < 0.001 < 0.001 0.0056 0.00013 LSD (0.05) 408.4 2.1 0.8 1.3 9.2 4.6 0.3 2.2 13.9 8.7 CV (%)

(Julian*) is a continuous count of days since January 1

N Available: 41 lb/ac

N added: 70 lb/ac

P2O5 Available: 12 ppm

P2O5 added: 26 lb/ac

Herbicide Applied: Sonalan HFP 32 o/ac on 4/29/2024

Fungicide Applied: Quadris @ 16 oz/ac on 7/30/24

Planted: 5/16/2024 Harvested: 9/24/24 Previous crop: wheat Soil Type: Savage Silty Clay Crop Year Precipitation: 10.35 inch Irrigation (sprinkler): 3.32 inch Plot Width: 5 ft



Irrigated Pulse plots at the EARC

Statewide Canola Variety TrialEARC, Sidney, MT 2024								
Variety	Plant Height	Days to Flowering	Test Weight	Oil (%)	Grain Yield†			
	(11)	(Julian)	(15/50)	(70)				
BY 02191F	40.2	102	52.5	43.7	1490.0			
Chip CP	44.7	182	53.4	44.1	1547.0			
Colette CP	48.9	185	53.5	45.7	1202.2			
CP7130LL	48.6	183	53.7	44.4	1982.7			
CP7250LL	49.2	185	53.4	43.9	1429.0			
CP9221TF	41.3	180	53.5	44.6	1977.8			
CP9978TF	43.8	182	51.4	43.8	1574.1			
DG 661 LCM	47.1	182	53.3	45.7	1747.8			
DG 760 TM	43.3	181	53.0	44.2	1610.3			
DG 781 TCM	46.4	182	52.6	46.4	1980.2			
L340PC	47.0	183	53.6	43.0	1746.6			
L343PC	45.2	183	53.0	43.8	1680.3			
L345PC	52.8	183	52.3	43.2	1933.8			
L350PC	51.3	187	52.8	45.3	1701.5			
LR344PC	48.9	183	53.5	45.2	2199.7			
LR354PC	52.1	185	53.1	43.9	1643.5			
NC527CR TF	43.2	182	52.9	44.3	1573.0			
NCC101S	39.5	177	52.5	38.7	1538.6			
StarFlex	44.3	182	52.4	46.3	1626.9			
Mean	46.6	183	52.9	44.2	1693.9			
P-Value	<0.0001	<0.0001	0.5062	<0.0001	<.0001			
CV (%)	6.6	0.4	2.2	3.0	11.6			
LSD (0.05)	4.3	1.0	1.7	1.9	278.7			

(Julian*) is a continuous count of days since January 1

† Grain yield adjusted to 12.0% mc

N Available: 41 lb/ac

N added: 70 lb/ac

P2O5 Available: 12 ppm

P2O5 added: 26 lb/ac

Pesticide Applied: Mustang Maxx @ 4 oz/ac on 6/1/24 Herbicide Applied: Sonalan HFP 32 o/ac on 4/29/2024 Planted: 5/16/2024 Harvested: 8/16/24 Previous crop: wheat Soil Type: Savage Silty Clay Crop Year Precipitation: 10.35 inch Irrigation (sprinkler): 3.32 inch Plot Width: 5 ft

Dr. Chen and Chris Kuester speaking in front of the camelina trials at EARC Field Day



Irrigated LL C	anola Variety 1	Frial	WREC, Nesson Valley, ND 2024				
				Yield	3-Yr Avg (lb/a) 2675 - - - - 2674.6 - - 2674.6 - - - - - - - - - - - - -		
				2-Yr	3-Yr		
Hybrid	Oil	TW	2024	Avg	Avg		
	(%)	(lb/bu)	(lb/a)	(lb/a)	(lb/a)		
CP7130LL	46.9	49.8	2871	2405	2675		
L340PC	45.8	50.7	3608	3315	-		
L343PC	47.2	49.8	3010	2925	-		
LR344PC	47.6	50.9	2941	2771	-		
L350PC	49.8	51.0	3379	-	-		
LR354PC	49.1	51.4	3207	-	-		
CP7250LL	47.2	50.5	2946	-	-		
Mean	47.56	50.64	3101.9	2853.9	2674.6		
C.V.	1.89	0.75	9.9	-	-		
LSD 0.05	1.31	0.55	450.0	-	-		
LSD 0.10	1.09	0.46	373.1	-	-		
†: Yields from 2024 and 2022 ‡: Yields from 2024, 2022, and 202							

Location: Latitude 48 9.9222'N; Longitude 103 6.132'W Rainfall: 7.4 inches (5/16 - 9/15) Soil type: Lihen Loamy Fine Sand Elevation: 1902 ft

‡: Yields from 2024, 2022, and 2021 Planted: 5/16/2024 Harvested: 9/15/2024 Previous crop: Durum Plot size: 83 ft2

Irrigation: 11.5 inches

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.

Irrigated RR C	anola Variety	Trial		WREC, Nesson Valley, ND 2024		
			Yield			
		-		2-Yr	3-Yr	
Hybrid	Oil	тw	2024	Avg [†]	Avg [‡]	
	(%)	(lb/bu)	(lb/a)	(lb/a)	(lb/a)	
CP9978TF	48.2	50.4	3550	2980.4	3030.3	
Starflex	48.4	50.1	3134	3051.7	2813.8	
NC527CR 1	47.6	49.2	3650	3045.6	-	
LR354PC	48.7	51.3	3574	-	-	
LR344PC	47.0	50.4	3494	-	-	
BY 6219TF	47.1	49.6	3450	-	-	
CP9221TF	46.7	50.4	3374	-	-	
Mean	47.73	50.23	3449.2	3025.9	2922.1	
C.V.	2.30	0.78	8.1	-	-	
LSD 0.05	1.60	0.57	406.7	-	-	
LSD 0.10	1.33	0.47	337.1	-	-	
†: Yields from 2	2024 and 2022			‡: Yields from 202	4, 2022, and 2021	

Location: Latitude 48 9.9222'N; Longitude 103 6.132'W Rainfall: 7.4 inches (5/16 - 9/15) Soil type: Lihen Loamy Fine Sand Elevation: 1902 ft Irrigation: 11.5 inches

Planted: 5/16/2024 Harvested: 9/15/2024 Previous crop: Durum Plot size: 83 ft2

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.

Dryland LL Canola Variety Trial

WREC, Williston, ND 2024

Planted: 5/20/2024

Harvested: 9/25/2024

	10%	90%	Flower				
Cultivar	Flower	Flower	Duration	Height	Oil	TW	Yield
	(DAP)	(DAP)	(Days)	(in)	(%)	(lb/bu)	(lb/a)
LR354PC	45	62	17	45	42.3	52.6	2008
BY 7204LL	44	61	17	39	43.5	51.9	1988
DL231558LL	44	64	20	43	43.8	52.4	1867
DK400TL	42	61	19	38	44.2	50.2	1854
L343PC	46	62	16	40	44.0	50.9	1771
DL231439LL	45	62	17	44	41.6	52.6	1717
L345PC	47	62	15	39	44.2	51.4	1703
DL226031LL	48	64	16	42	42.3	52.1	1688
L350PC	48	63	15	45	40.4	52.4	1682
DL231732LL	46	63	17	40	46.3	50.7	1668
DL231958LL	49	65	16	48	41.0	52.8	1637
LR344PC	46	61	15	43	43.4	51.5	1626
L340PC	45	61	17	39	42.7	52.5	1591
DL231851LL	46	62	16	43	44.4	52.2	1508
CP7130LL	45	61	16	41	40.5	51.4	1494
CP7250LL	47	63	17	40	40.8	50.8	1465
DL231434LL	49	65	16	48	41.4	52.9	1410
CS4000 LL	46	62	16	46	41.4	51.2	1270
DL231727LL	48	64	16	43	42.9	51.8	1269
Mean	45.9	62.4	16.5	42.1	42.77	51.79	1626.6
C.V.	2.5	1.4	8.2	9.8	4.15	2.42	9.7
LSD 0.05	1.9	1.5	2.2	6.8	2.93	2.07	260.4
LSD 0.10	1.6	1.2	1.9	5.7	2.44	1.72	216.9

Location: WREC; Latitude 48° 8' N; Longitude 103° 44' W

Rainfall: 7.2 inches (5/20 - 9/25)

Soil type: Williams-Bowbells loam

Elevation: 2105 ft

Previous crop: Dry Pea Plot size: 45 ft2

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.



Dr. Rahman, NDSU canola and flax breeder at WREC field day

Dryland RR Canola Variety Trial

WREC, Williston, ND 2024

	10%	90%	Flower				
Cultivar	Flower	Flower	Duration	Height	Oil	TW	Yield
	(DAP)	(DAP)	(Days)	(in)	(%)	(lb/bu)	(lb/a)
LR344PC	45	61	16	41	44.0	54.3	2043
CS3300 TF	43	62	20	40	44.6	54.0	1956
LR354PC	47	63	16	43	44.2	54.8	1679
NC527CR TF	45	62	17	38	43.2	51.6	1603
DK400TL	42	62	20	36	45.7	52.8	1536
CS3100 TF	48	64	16	40	45.1	52.6	1480
CP9221TF	45	63	18	38	43.5	51.7	1444
DL226040TF	49	65	16	44	44.0	51.2	1399
CS3200 TF	45	63	18	43	46.2	54.1	1365
DL226196TF	48	64	16	51	43.7	53.4	1339
CP9978TF	46	62	16	40	43.3	51.4	1279
Starflex	45	63	18	42	45.1	53.0	1275
BY 6219TF	44	63	19	44	43.7	50.7	1269
DK902TF	45	62	17	38	44.6	50.1	1115
Mean	45.4	62.7	17.3	41.3	44.44	52.46	1485.6
C.V.	2.0	1.1	6.5	8.3	4.37	3.39	13.2
LSD 0.05	1.5	1.1	1.9	5.8	NS	2.98	326.9
LSD 0.10	1.3	0.9	1.6	4.8	2.70	2.47	271.5
Location: WREC; Latitude 48° 8' N; Longitude 103° 44' W Planted: 5/20/202							

Rainfall: 7.2 inches (5/20 - 9/25)

Soil type: Williams-Bowbells loam

Elevation: 2105 ft

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.

Agriculture is our wisest pursuit, because it will in the end contribute most to real wealth, good morals, and happiness. - Thomas Sefferson

Planted: 5/20/2024 Harvested: 9/25/2024

Previous crop: Dry Pea

Plot size: 45 ft2

Irrigated Soybean Variety Evaluation - MSU

Sidney, MT 2024

Variety	Days to Flower	Days to Maturity	Plant Height	Test Weight	Oil	Protein	Adjusted Grain Yield
	(DAP) ¹	(DAP) ¹	(in)	(lb/bu)	(%)	(%)	(lb/a)
CP00926X	43	116	35.1	59.7	17.7	32.3	4100
CP0337x	43	115	36.0	59.1	18.9	31.1	3934
R0422XF	49	119	33.2	58.3	19.2	32.5	4052
R0743XF	54	124	33.8	57.0	19.0	32.6	3706
RX0228	43	113	37.6	58.7	19.2	32.9	4045
Mean	46	117	35.1	58.5	18.8	32.3	3967
P-Value	<0.0001	<0.0001	0.08	<0.0001	<0.0001	0.002	0.2
LSD (0.05)	1.6	2.1	NS	0.7	0.4	0.8	NS
CV (%)	2.3	1.2	6.3	0.8	1.4	1.7	6.4

Location: EARC; Sidney, MT

Planted: 5-29-2024

Applied fertilizers: 10 lb/a N and 26 lb/a P2O5 at planting rowing season precipitation (May - Sept): 6.7 inches
Yield, Protein and Oil adjusted to 13% moisture content
Herbicide: Outlook @ 16 oz/a & Cornerstone @ 24 oz/a on 5-29
Insecticide: Lambda Cy @ 2oz/a & Vantacor @ 1.5 oz/a on 8-9

Previous crop: Spring Wheat Harvested: 9-26-24, 10-1-24 Soil type: Savage Silty Clay Loam Irrigation: 11.25 inches DAP¹ = Days after planting





Thistle caterpillar on soybean leaves

Irrigated Dry Bean Va	Sidney, MT 2024			
Variety	Days to Flower Plant Height		Protein	Adjusted Grain Yield
	(DAP) ¹	(in)	(%)	(lb/a)
Cowboy (Pinto)	52	21.3	23.8	2957
Othello (Pinto)	47	18.6	22.9	2564
USDA Rattler (Pinto)	55	20.4	23.5	3048
Viper (Red)	52	19.1	23.4	2996
Mean	51	19.8	23.4	2891
P-Value	<0.0001	0.3	0.03	0.001
LSD (0.05)	0.9	NS	0.6	214.8
CV (%)	1.1	10.5	1.6	4.8

Location: EARC; Sidney, MT

Previous crop: Spring Wheat Planted: 5-29-2024 Harvested: 9-9-24 Applied fertilizers: 10 lb/a N and 26 lb/a P2O5 at planting Growing season precipitation (May-Aug): 6.1 inches Irrigation: 8.5 inches Yield adjusted to 13% moisture content Herbicide: Outlook @ 16 oz/a & Cornerstone @ 24 oz/a on 5-29 DAP¹ = Days after planting



Dr. Bill Franck speaking in front of the Dry Bean Rotation Study at EARC Field Day

Irrigated Dry Bean Variety T	WREC, Ness	on Valley, ND 2024		
			Yield	
			2-Yr	3-Yr
Cultivar	TW	2024	Avg [†]	Avg [‡]
	(lb/bu)	(lb/a)	(lb/a)	(lb/a)
PINTO BEAN				
Monterrey	63.4	4244	3587	2981
LaPaz	63.5	4005	3227	2807
Cowboy	61.7	3987	3227	2694
Torreon	63.3	3974	3190	2680
Vibrant	63.7	3968	2979	2583
Lariat	62.3	3459	2984	2547
ND-Falcon	60.2	2761	2749	2370
Windbreaker	60.8	3215	2657	2330
ND-Palomino	60.8	2914	2463	2278
ND181664	60.0	3979	-	-
USDA Diamondback	62.9	3932	-	-
USDA Rattler	62.9	3725	-	-
Bronco	66.0	3575	-	-
ND-Rodeo	64.5	3118	-	-
SMALL RED				
Viper	66.1	4048	3333	2903
Merlot	63.9	3179	2543	2019
NDF151006-2	63.7	3077	-	-
GREAT NORTHERN				
ND-Pegasus	63.3	3745	3431	2829
Powderhorn	59.9	3323	-	-
BLACK BEAN				
Eclipse	65.1	3269	2450	2361
Blacktails	65.5	3027	2176	1908
ND-Twilight	66.2	2628	2050	1860
ND151355	71.1	3182	-	-
NAVY BEAN				
HMS Medalist	64.4	3038	2387	2143
T9905	65.4	3220	2460	2086
Blizzard	66.3	2699	2100	2040
ND-Polar	65.7	2022	2046	-
PINK BEAN				
ND-Rosalind	66.1	3443	-	-
Mean	63.88	3384.1	2738.6	2412.2
C.V.	1.57	10.6	-	-
LSD 0.05	1.63	587.3	-	-
LSD 0.10	1.36	490.2	-	-
t: Yields from 2024 and 2022			t: Yields from 202	24, 2022 and 2021
Location: Latitude 48 9 9222	, N: Longitude 103 6 132		T	Planted: 5/23/2024
Growing season precipitation	7 8 inches (5/22 - 10/2		Ца	rvested: 10/2/2024
Soil type: Liben Loomy Fine 9	7.0 110103 (0/20 - 10/0 Sand	')	l lo Dro	vious crop: Durum
Elevation: 1002 ft			FIG	
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Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.

Irrigated Lentil Variety Evaluation - MSU

Sidney, MT 2024

Variety	Days to Flower	Plant Height	Test Weight	1000 Seed Weight	Adjusted Grain Yield
	(DAP) ¹	(in)	(lb/bu)	(g)	(lb/a)
Avondale	55	16.8	61.2	47.9	3462
CDC Greenstar	60	15.7	58.6	64.4	2991
CDC Impala CL	60	16.6	64.1	29.7	2708
CDC Richlea	57	16.1	60.1	49.8	3388
CDC Viceroy	60	16.6	63.9	31.7	3042
LC06601616R	56	15.6	60.3	55.5	3281
LC14600016P	53	14.8	63.5	47.2	2886
LC14600017P	55	15.3	63.7	45.0	3418
LC14600027P	55	15.5	63.8	47.5	3160
LC14600088R	55	16.7	60.6	54.2	3396
LC19640192R	55	17.0	61.0	46.7	3589
LC19640193R	55	16.6	61.3	45.1	3468
LC19640586R	53	16.1	61.6	48.5	3194
Pardina	53	15.2	64.8	38.6	3268
Mean	56	16.1	62.0	46.5	3232
P-Value	<0.0001	0.6	<0.0001	<0.0001	0.004
LSD (0.05)	1.0	NS	0.4	2.4	418
CV (%)	1.3	9.6	0.5	3.7	9.1

Location: EARC; Sidney, MT

Planted: 4-25-2024

Applied fertilizers in lb/a: None

Growing season precipitation (May-Aug) : 6.4 inches

Yield adjusted to 13% moisture content

Herbicide:Outlook @ 14 oz/a on 4-25-2024

Previous crop: Spring Wheat Harvested: 8-3-2024 Soil type: Savage Silty Clay Loam Irrigation: 2.1 inches DAP¹ = Days after planting

Dryland I	Lentil Variety Ev	aluation - MSU	Ric	hland, MT 2024
Variety	Plant Height	Test Weight	1000 Seed Weight	Adjusted Grain Yield
	(in)	(lb/bu)	(g)	(lb/a)
Avondale	13.6	62.3	44.8	1254
CDC Greenstar	14.0	59.9	60.1	1025
CDC Impala CL	12.2	65.7	25.1	890
CDC Richlea	13.3	61.5	46.6	1148
CDC Viceroy	12.0	64.9	28.8	900
LC06601616R	12.5	61.6	50.4	1163
LC14600016P	12.8	64.8	41.8	922
LC14600017P	13.1	64.6	39.5	1008
LC14600027P	11.9	65.1	42.4	875
LC14600088R	13.5	61.5	47.3	1068
LC19640192R	13.6	62.0	40.1	1058
LC19640193R	13.0	62.0	39.7	1011
LC19640586R	10.2	62.6	44.0	931
Pardina	10.5	65.5	33.5	861
Mean	12.6	63.1	41.7	1008
P-Value	<0.0001	<0.0001	<0.0001	0.02
LSD (0.05)	1.5	0.3	1.7	225
CV (%)	8.3	0.3	2.9	15.6

Location: Richland, MT

Planted: 5-14-2024

Applied fertilizers in lb/a: None

Yield adjusted to 13% moisture content Herbicide: Fall-Valor, Preplant-RoundUp & Sharpen Previous crop: Durum Harvested: 8-21-2024 Soil type: Farnuf Loam

Precipitation (May-Aug): 4.1 inches

Irrigated Chickpea Variety Evaluation - MSU

Variety	Days to Flower	Plant Height	Test Weight	Seed size greater than 22/64 inches	Adjusted Grain Yield
	(DAP) ¹	(in)	(lb/bu)	(%)	(lb/a)
CDC Anna	51	24.5	64.8	0	3714
CDC Frontier	55	22.3	64.0	6.4	3941
CDC Leader	55	19.2	63.4	17.5	3995
CDC Orion	51	21.7	62.2	59.3	3713
MT Bridger (NDC160236)	53	23.6	64.1	16.4	4099
Myles	51	21.6	62.3	0.0	3608
Nash	55	23.1	61.7	84.9	3171
ND Crown	55	22.9	63.6	47.9	4092
Royal	58	24.0	62.2	69.7	3884
Sawyer	51	22.4	63.3	13.2	3868
Sierra	51	23.2	61.5	75.8	3594
Mean	53	22.6	63.0	35.5	3789
P-Value	<0.0001	0.0003	<0.0001	<0.0001	0.007
LSD (0.05)	0.7	1.9	0.7	6.5	441
CV (%)	0.9	5.9	0.8	12.7	8.1

Location: EARC; Sidney, MT Planted: 4-27-2024 Applied fertilizers in Ib/a: None Growing season precipitation (May- Aug): 6.4 inches

Herbicide: Panther @ 2 oz/ac on 10/16/23; Cleanse @ 8 oz/ac & Tough @ 20 oz/ac on 6/3/24 Fungicide: Miravis Top at 13.7 oz/a on 6-26, 7-19 & 8-1; and Miravis Neo at 14 oz/a on 6-14 & 7-9 Previous crop: Spring Wheat Harvested: 8-15-2024 Soil type: Savage Silty Clay Loam Irrigation: 2.2 inches DAP¹ = Days after planting Yield adjusted to 13% moisture content



2024 EARC Field Day

Dryland Chickpea Variety Evaluation - MSU

Richland, MT 2024

Variety	Plant Height	Test Weight	Seed sizes greater than 22/64 inches	Adjusted Grain Yield
	(in)	(lb/bu)	(%)	(lb/a)
CDC Anna	14.2	64.2	0	912
CDC Frontier	13.5	63.4	10.8	884
CDC Leader	15.0	62.8	22.6	1080
CDC Orion	14.1	62.2	35.8	1037
CDC Palmer	14.8	62.9	28.6	1186
MT Bridger (NDC160236)	16.3	63.0	23.6	758
Myles	14.3	60.5	0.0	886
Nash	15.2	60.7	78.5	368
ND Crown	16.9	63.4	45.2	740
New Hope	17.7	62.8	34.3	495
Royal	15.6	61.3	68.9	818
Sawyer	15.6	63.2	24.8	969
Sierra	15.0	61.9	63.4	629
Mean	15.2	62.5	33.6	828
P-Value	0.0008	<0.0001	<0.0001	<0.0001
LSD (0.05)	1.8	0.7	9.3	256
CV (%)	8.1	0.8	19.4	21.6
Location: Richland, MT			Previ	ous crop: Durum
Planted: 5-15-2024			Har	vested: 9-4-2024
Applied fertilizers in lb/a: Nor	e		Soil ty	pe: Farnuf Loam
Yield adjusted to 13% moistu	ire content		Precipitation (May-	-Aug): 4.1 inches

Note: Antelope damage was substantial in this trial for cultivars New Hope and Nash

Luck? I don't know anything about luck. Luck to me is something else: hard work and realizing what is opportunity and what isn't. -Lucille Ball

Irrigated Green Dry Pea Variety Evaluation - MSU

Sidney, MT 2024

Variety	Days to Flower	Plant Height	Test Weight	1000 Seed Weight	Protein	Adjusted Grain Yield
	(DAP) ¹	(in)	(lb/bu)	(g)	(%)	(lb/a)
Aragorn	53	17.5	62.6	221	24.4	3909
Hampton	55	19.5	62.7	210	26.3	4530
MT 457	52	21.9	63.2	252	26.1	4526
PG Greenback	62	28.8	63.7	223	24.9	4584
PS16100017	56	20.5	62.7	211	26.5	4031
PS17100182	59	24.9	64.1	206	26.7	4407
Mean	56	22.2	63.1	221	25.8	4331
P-Value	<0.0001	<0.0001	0.001	<0.0001	<0.0001	0.001
LSD (0.05)	1.1	2.6	0.7	6	0.6	334
CV (%)	1.3	7.9	0.8	2.0	1.5	5.2

Irrigated Yellow Dry Pea Variety Evaluation - MSU

Irrigated Yellow	Dry Pea Variety Eva	luation - MSU			ç	Sidney, MT 2024
Variety	Days to Flower	Plant Height	Test Weight	1000 Seed Weight	Protein	Adjusted Grain Yield
	(DAP) ¹	(in)	(lb/bu)	(g)	(%)	(lb/a)
6020-11	59	28.8	63.1	216	26.3	4572
6242-1	62	27.9	62.8	227	26.0	4576
AAC Carver	56	24.4	63.4	221	22.6	5318
AAC Profit	59	23.0	62.6	209	25.2	5069
CDC 5791	62	26.6	63.6	207	27.0	4209
CDC 5845	60	28.9	62.5	226	25.5	4730
CDC Inca	62	28.0	63.6	207	26.4	4575
CDC Meadow	55	23.8	64.5	209	23.7	5074
CP5222Y	54	22.8	65.1	236	24.6	4509
CP5244Y	54	21.7	64.9	271	24.8	4957
DS-Admiral	57	21.8	63.4	221	23.8	4796
GTPC001	56	21.5	63.2	218	24.9	4578
GTPR004	61	23.9	63.3	212	26.0	4304
GTPR005	62	24.1	63.1	209	26.3	4205
LG Sunrise	55	24.9	64.5	220	23.3	4956
LGPN4184	56	23.4	63.1	232	25.7	4826
LGPN4258	53	20.8	63.8	230	25.2	5131
LGPN4260	53	23.0	63.5	267	25.1	5147
N15058-11	55	22.6	64.1	228	25.3	4914
ND Dawn	55	20.4	63.7	235	24.0	4802
Orchestra	55	23.4	64.8	272	26.0	4881
PG Bank	59	28.4	63.2	251	26.8	4108
PG Cash	55	23.2	64.7	250	25.8	4823
PS16NZ0003	56	24.0	64.3	267	26.3	4272
PS17100008	55	18.3	64.4	241	24.3	4906
PS17100022	58	26.0	64.4	257	25.6	4888
PS17100120	54	20.9	63.1	259	24.8	3768
PS22100020	56	21.3	63.2	245	24.3	4767
PS22100111	59	29.7	63.6	253	24.5	4273
Mean	57	24.1	63.7	234	25.2	4687
P-Value	< 0.0001	< 0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001
LSD (0.05)	1.5	2.7	0.8	10	0.7	345
CV (%)	1.9	8.0	0.9	3.2	2.0	5.2

Location: EARC; Sidney, MT

Planted: 4-23-2024

Applied fertilizers in lb/a: None

Growing seasn precipitation (May-Aug): 6.4 inches

Yield adjusted to 13% moisture content

Protein presented on a dry matter basis

Herbicide: Panther @ 2 oz/a on 10-16-23; Varisto @ 21 oz/a and Cleanse @ 8 oz/a on 5-28-24

Previous crop: Spring Wheat Harvested: 7-29-2024 Soil type: Savage Silty Clay Loam Irrigation: 2.2 inches $DAP^{1} = Days$ after planting

Dryland Green Dry Pea Variety Evaluation - MSU

Richland, MT 2024

Variety	Plant Height	Test Weight	1000 Seed Weight	Protein	Adjusted Grain Yield
	(in)	(lb/bu)	(g)	(%)	(lb/a)
Aragorn	23.3	62.1	198	25.0	1839
B202318	26.9	64.8	191	22.9	2095
Banner	27.3	65.0	187	23.3	2138
Fairway	22.9	62.3	171	26.0	1802
Ginny 2	20.3	62.4	200	24.8	2016
Hampton	19.5	64.6	205	25.9	1953
MT 457	26.8	63.9	220	25.5	2156
Passion	21.2	63.4	197	23.7	1812
PG Greenback	28.1	63.6	199	24.0	1991
Pro 171-7665	19.8	63.3	216	23.6	1609
PS16100017	20.4	62.3	188	25.2	1637
PS17100182	27.1	64.3	194	26.2	1707
Mean	25.0	63.5	197	24.7	1896
P-Value	<0.0001	<0.0001	<0.0001	<0.0001	0.02
LSD (0.05)	3.1	0.6	9	0.7	338
CV (%)	9.2	0.6	3.2	2.0	12.4

Dryland Yellow Dry Pea Variety Evaluation - MSU

Richland, MT 2024

Variety	Plant Height	Test Weight	1000 Seed Weight	Protein	Adjusted Grain Yield
	(in)	(lb/bu)	(g)	(%)	(lb/a)
AAC Beyond	25.6	63.8	195	25.3	2112
AAC Carver	27.0	63.6	217	23.5	1874
AAC Profit	24.4	64.3	226	24.6	1906
Caphorn	26.1	63.8	239	25.8	1887
CDC Inca	25.7	63.9	205	25.7	1755
CDC Meadow	27.9	64.0	198	24.2	2142
CP5222Y	27.5	65.7	210	24.3	1910
CP5244Y	24.3	64.0	247	24.7	1983
DS-Admiral	26.9	62.9	225	24.6	1914
Hyline	25.6	62.7	217	23.6	1953
LG Sunrise	27.5	63.2	209	23.5	2015
MS GrowPro	28.8	63.8	262	26.0	2174
MS Prostar	25.3	62.3	221	26.1	2077
ND Dawn	23.8	62.2	216	24.2	1945
Orchestra	24.0	63.7	233	26.6	2056
PG Bank	26.8	64.0	227	25.9	1888
PG Cash	25.3	63.3	214	25.1	2152
Pizzazz	24.7	65.1	257	25.0	2234
Pro 143-6230	23.5	63.2	198	24.3	1885
PS16NZ0003	30.1	66.0	232	25.6	1720
PS16NZ0004	31.2	65.9	243	25.1	1960
PS17100008	22.0	62.8	231	24.2	1864
PS17100022	29.2	64.8	223	24.5	2034
PS17100120	24.0	65.5	242	23.9	1285
PS22100020	26.0	63.1	234	24.8	1784
PS22100111	28.4	64.6	231	23.3	1897
Mean	26.2	63.9	225	24.8	1939
P-Value	0.0003	<0.0001	<0.0001	<0.0001	0.03
LSD (0.05)	3.7	0.9	10	0.8	392
CV (%)	10.0	1.0	3.1	2.3	14.3

Location: Richland, MT

Planted: 5-14-2024

Applied fertilizers in lb/a: None

Growing Season Precipitation (May-Aug): 4.1 inches

Yield adjusted to 13% moisture content

Protein presented on a dry matter basis

Herbicide: Fall-Valor, Preplant-RoundUp & Sharpen

Previous crop: Durum Harvested: 8-12-2024 Soil type: Farnuf Loam DAP¹ = Days after planting

Dryland Dry Pea Variety Trial

WREC, Williston, ND 2024

	Days to	Days to	Plant				
Variety	Flowering	Maturity	Height	Lodging	Protein	TW	Yield
	(DAP)	(DAP)	(in)	(0-9)	(%)	(lb/bu)	(bu/a)
11/1/6020	61	92	32.4	2	25.7	64.3	46.6
Iconic	60	95	34.2	2	26.0	64.7	53.3
PS1710022	61	90	22.6	2	24.8	64.0	54.3
AAC Beyond	60	92	29.5	2	24.9	64.0	54.0
DS Admiral	61	90	30.4	2	23.8	64.3	52.5
NDP150231Y	59	91	29.0	2	27.0	65.0	52.4
CDC 5845	59	92	35.2	2	25.2	64.0	51.9
5206	59	92	33.1	2	25.2	65.0	51.8
AAC Carver	61	90	30.4	3	23.3	63.3	51.3
LGPN4258	57	94	28.7	2	25.1	63.3	51.1
MS Prostar	59	92	33.9	2	26.0	62.7	50.6
AAC Chromne	58	93	27.4	2	22.8	64.0	50.5
GTPR004	60	92	29.1	1	26.1	64.3	50.2
ND Dawn	61	92	27.2	1	24.6	62.7	50.0
CDC Boundless	60	91	30.7	1	26.4	64 7	49.4
AAC Profit	59	93	31.4	1	25.8	63.0	49.2
McMurphy	59	91	29.1	1	26.4	64.3	49.2
	60	91	31.3	2	25.0	65.0	46.6
FP 6816	60	93	29.4	3	25.0	64.0	46.5
Arcadia	60	91	23.4	2	23.7	63.7	45.0
CDC Inca	59	01	20.4	1	25.8	66.0	44.6
Caphorn	60	95	31.5	2	25.0	64.0	44.0
	50	02	20.5	2	20.0	64.0	44.2
	60	92	23.5	2	25.2	64.7	43.8
CTPR005	60	90	20.1	1	20.0	65.0	43.5
1/1/62/2	60	02	23.1	1	20.0	63.7	38.4
NDD150412C	61	92	20.2	1	20.1	64.7	30.4 42.7
CDC Spectrum	60	91	20.5	2	21.2	61.3	42.7
	50	94	32.5	<u>ک</u>	20.0	65.3	42.1
2822	59	92	30.0	1 2	25.5	63.0	42.0
ZOZZ PG Groopback	61	95	30.0	2	23.2	62.7	42.2
Aragorp	60	95	34.3	2	24.0	62.7	41.0
	50	91	24.7	3	25.1	62.3	41.3
DC Book	59	92	29.1	2	20.0	61 7	41.3
	60	94	34.0 22 E	2	20.1	64.0	41.1
EF_0301	50	01	32.5	2	20.2	64.0	40.9
L C DN4260	59	91	27.0	2	23.2	62.0	40.5
2110	61	94	20.0	<u> </u>	21.3	62.2	40.5
	60	92	33.7 28 0	I E	20.0	02.3 65.0	39.Z
Lauruss	60	93	20.0	3	23.0	61.7	39.1
PG-Cash	60	94	30.8	1	26.0	61.7	38.7
EP_8971	59	95	33.9	2	28.5	64.0	33.0
	61	94	31.1	2	26.3	63.0	37.9
Shamrock	59	93	30.0	1	25.2	63.3	37.9
MS GrowPro	59	93	36.5	2	26.9	62.7	37.8
CP5222Y	61	98	32.6	3	26.5	62.7	37.6
PG-Prairie	62	94	32.6	2	25.9	64.0	37.2
ND Victory	61	96	30.8	3	25.2	64.7	36.4
CDC Striker	59	92	28.1	2	25.8	63.7	35.7

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Dryland Dry Pea Variety Trial

WREC, Williston, ND 2024

Planted: 4/25/2024

Plot size: 45 ft2

Harvested: 8/9/2024

Previous crop: Durum

Variety	Days to Flowering (DAP)	Days to Maturity (DAP)	Plant Height (in)	Lodging (0-9)	Protein (%)	TW (lb/bu)	Yield (bu/a)
Orchestra	61	94	30.5	1	28.2	61.3	35.2
N15058-11	59	96	29.5	2	27.5	62.7	34.6
Majoret	60	94	28.5	2	25.4	60.7	34.4
GTPC001	59	91	28.5	1	25.9	64.0	37.9
Mean	59.9	92.7	30.42	1.9	25.66	63.10	44.23
C.V.	3.3	1.0	7.08	33.3	3.08	2.95	8.37
LSD 0.05	3.2	1.5	3.49	1.0	1.28	3.04	5.96
LSD 0.10	2.7	1.3	2.92	0.8	1.07	2.54	4.99

Location: WREC; Latitude 48° 8' N; Longitude 103° 44' W

Rainfall: 7.95 inches (5/2 - 8/9)

Soil type: Williams-Bowbells loam

Elevation: 2105 ft

Data includes only released varieties. Experimental lines are not included. Statistics reflect the entire trial.



Combination of Nitrogen Fertilizer and Rhizobium to Improve Yield and Quality of Soybean and Dry Bean in Montana

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Introduction

Historically, sugar beets were an important cash crop in eastern Montana. The cash receipts from marketing of sugar beet in Montana was \$42.4 million in 2020. The closure of the Sidney Sugars beet processing plant in February 2023 left growers in need of a crop(s) to replace sugar beet. Soybean and dry bean are two crops that growers are transitioning towards. However, little research-based information is available for soybean and dry bean in the irrigated production systems of eastern Montana, especially regarding fertility management. In 2023, producers who grew soybean and dry beans in the Lower Yellowstone River Valley (Sidney area) had yields varying from 20 to 60 bu ac⁻¹, likely attributed to differences in variety selection and agronomic practices. Therefore, producers in this region of Montana urgently need agronomic research, including variety selection and fertility management, to provide them useful information about best management practices.

Objectives

The objectives of this study are to: 1) evaluate the response of soybean and dry bean to commercial rhizobial inoculants; 2) examine the need for the addition of nitrogen fertilizer at planting.

Methods

Two soybean (CP0337x and R0422XF) and two dry bean varieties (Cowboy (pinto) and Viper (red)) were grown at EARC under irrigation in 2024. The soybean and dry bean seeding rates were 4 and 2 seeds per ft², respectively. A total of six treatments were applied as follows: untreated control (UTC), inoculated (Inoc), inoculated with a starter fertilizer (Inoc + SF), starter fertilizer (SF), nitrogen fertilizer (HN), and inoculated with nitrogen fertilizer (Inoc + HN). Fertilizer rates were 5.5 lb a^{-1} N and 26 lb a^{-1} P₂O₅ for the SF treatment and 50 lb a⁻¹ N and 26 lb a⁻¹ P₂O₅ for the HN treatment. Rhizobium inoculants were applied per the manufacturer's instructions and included a granular inoculant, Primo GX2 (Verdesian Life Sciences, Cary, NC), for soybean and a powder inoculant, N-Charge (Verdesian Life Sciences, Cary, NC), for dry bean. Trials for soybean and dry bean were planted separately to facilitate irrigation management and harvest timing. Each trial was organized in a randomized complete block design and planted on May 21st. At the R3 growth stage, plants were dug, and nodulation was evaluated by scoring for three categories: plant growth and vigor, nodule color and number, and nodule position. Each category was scored with either a 0, 1, 3, or 5 and a total nodulation score was derived by summing the scores from each category. Above ground biomass was also collected at this time. Dry beans were harvested on September 3rd and soybeans on September 25th. Grain yields were adjusted to 13% moisture content. Soybean grain protein and oil were analyzed by near-infrared spectroscopy.

Results and Discussion

Soybean

Soybean variety had significant effects on both grain yield and protein (Table 1). R0422XF had an average yield of 4140 lb a⁻¹ and was significantly higher than the average yield of CP0337x at 3959 lb a⁻¹. Likewise, grain protein was significantly higher for R0422XF at 31.1% compared to CP0337x at 29.1%. No variety level effects were observed for grain oil content, biomass yield or nodulation score.

Significant treatment level effects were observed for all measured soybean parameters. The inoculation treatment (Inoc) produced the highest grain yield at 4451 lb a^{-1} followed by the inoculation plus starter fertilizer (Inoc + SF) and inoculation plus nitrogen fertilizer treatments (Inoc + HN) at 4445 and 4081 lb a^{-1} , respectively. Starter fertilizer (SF) or nitrogen fertilizer alone (HN) did not produce significant grain yield improvements relative to the untreated control. Treatments effects on grain protein showed the same pattern as grain yield (Table 1) with the inoculation treatment (Inoc) producing the highest protein level at 32.1%. Treatment effects on grain oil were exactly the opposite of that for grain protein. Treatment levels affected biomass yield in a manner different than that of grain yield and grain protein. Biomass yield showed no significant differences amongst treatments except between the inoculation plus nitrogen fertilizer treatment (Inoc + HN), where the inoculation plus nitrogen fertilizer treatment (Inoc + HN), where the inoculation scores for the inoculation scores for the nodule color and number as well as nodule position categories were near zero for the other four treatments reflecting very poor nodulation in the absence of inoculation or upon addition of 50 lb a^{-1} nitrogen (Figure 1).

Source of Variation	Grain Yield	Grain Protein	Grain Oil	Biomass Yield	Nodulation Score
	Pr>F	Pr>F	Pr>F	Pr>F	Pr>F
Variety	0.0164	<0.0001	0.7307	0.7310	0.6934
Treatment	<0.0001	<0.0001	<0.0001	0.0119	<0.0001
Variety x Treatment	0.6199	0.4081	0.4792	0.5679	0.8161
Variety	lb a-1	%	%	lb a ⁻¹	
R0422XF	4140a	31.1a	19.7	3421	6.7
CP0337x	3959b	29.1b	19.7	3367	6.5
Treatment	lb a ⁻¹	%	%	lb a ⁻¹	
Untreated	3667c	28.1c	20.4a	3341ab	4.5b
Inoc	4451a	32.1a	19.0c	3834a	11a
Inoc + SF	4445a	31.7a	19.2c	3782ab	11.5a
SF	3837bc	29.0bc	20.1ab	3375ab	4.75b
HN	3813bc	29.2bc	20.0ab	3042ab	3.25b
Inoc + HN	4081ab	30.6ab	19.4bc	2989b	4.5b

Table 1. ANOVA table characterizing the effects of variety and treatment on measured soybean parameters. Different letters within columns indicate significant differences at a 0.05 probability level as determined by Tukey's HSD test.

The results presented here indicate that variety selection and agronomic practices can have positive impacts on soybean grain yield and grain protein. At the variety level, significant differences were observed for both grain yield and grain protein indicating that an expansion of variety testing in the region may be warranted to ensure that growers can access the best available genetics. Regarding agronomic practices, a granular inoculant alone was sufficient to attain the highest grain yield and grain protein. The addition of 50 lb a⁻¹ nitrogen resulted in grain yield gains intermediate to that of the control and inoculation only treatments indicating that higher levels of nitrogen are likely required to support full yield realization in the absence of adequate nitrogen fixation. Furthermore, the nodule evaluation

presented here indicates that 50 lb a⁻¹ nitrogen is sufficient to inhibit nodulation whereas 5.5 lb a⁻¹ nitrogen has no inhibitory effect. As neither high fertilization treatment (alone or in combination with inoculation) produced yield or protein gains beyond that of inoculation only, it seems reasonable to conclude that nitrogen fertilization of soybean at planting is not warranted and in fact the addition of too much nitrogen at planting can reduce the positive benefits of inoculation. Finally, it is important to note that the field location utilized in this study had no history of soybean and the benefits of inoculation observed here may not translate to fields with a recent history of soybean.



Figure 1. Nodulation scores for (A) Soybean, (B) Viper and (C) Cowboy collected at the R3 growth stage. The y axis represents the total nodulation score derived by summing three evaluation categories: Nodule Color and Number, Nodule Position, and Plant Growth and Vigor. Each category was scored on a 0-5 basis.

Dry Bean

Variety and treatment also significantly affected dry bean grain yield (Table 2). Grain yield was highest for the red bean, Viper, at 3119 lb a⁻¹ compared to 2993 lb a⁻¹ for the pinto bean, Cowboy. However, nodulation scores were higher for Cowboy (9.42) than Viper (5.92). No differences in biomass yield were observed between the varieties.

With respect to treatments, the starter fertilizer treatment (SF) produced the highest observed grain yield at 3340 lb a^{-1} . The addition of a starter fertilizer, although not statistically significant, did result in a 215 lb a^{-1} increase in dry bean yield. The magnitude of increase was highly similar for both dry bean types (data not shown) and is sufficient to justify the added fertilizer cost. Additional years of trial data may aid in solidifying the confidence of this response. Interestingly, the inoculation plus nitrogen fertilizer treatment (Inoc + HN) generated the lowest grain yield at 2815 lb a^{-1} . No significant differences between treatments were observed for biomass yield.

Source of Variation	Grain Yield	Biomass Yield	Nodulation Score
	Pr>F	Pr>F	Pr>F
Variety	0.0231	0.2192	<0.0001
Treatment	<0.0001	0.5281	0.0140
Variety x Treatment	0.9964	0.1780	0.1619
Variety	lb a ⁻¹	lb a ⁻¹	
Viper	3119a	3536	5.92b
Cowboy	2993b	3358	9.42a
Treatment	lb a ⁻¹	lb a ⁻¹	
Untreated	3125ab	3360	9.75a
Inoc	3064abc	3294	8.25ab
Inoc + SF	3094ab	3358	7ab
SF	3340a	3723	9ab
HN	2899bc	3550	6b
Inoc + HN	2815c	3396	6b

Table 2. ANOVA table characterizing the effects of variety and treatment on measured dry bean parameters. Different letters within columns indicate significant differences at a 0.05 probability level as determined by Tukey's HSD test.

In this trial, neither dry bean type responded positively to inoculation. The highest nodulation score was observed for the untreated control, which was significantly different from the nitrogen fertilizer treatments (HN and Inoc + HN) with the remaining treatments falling in between. As with the soybean trial above, there is no dry bean history at this field location. Therefore, the presence of a rhizobium population well adapted to dry bean is unlikely. However, the presence of indigenous soil rhizobia capable of nodulating dry bean and supporting modest N fixation is likely. Scores for the nodule color and number and nodule position categories indicate dry bean nodulation was inhibited by both fertilization and inoculation particularly in the case of Viper (Figure 1). Based upon these observations, further screening of commercial inoculants that perform well in Eastern Montana environments is important to determine the necessity of inoculation inputs for dry beans.

Optimizing Irrigation Practices for Soybean Production in Semi-Arid Western North Dakota

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Background

In irrigated agriculture, the amount and timing of irrigation play a crucial role in obtaining a sustainable higher yield with a minimum adverse effect on the environment. Insufficient irrigation results in lesser crop yield than the genetic potentiality of a given variety, while excessive irrigation escalates pumping costs, hastens the depletion of water resources, induces nutrient leaching, and contributes to environmental pollution. Soybean is the second largest irrigated crop in ND preceded by corn. There is a lack of information on the timing and amount of irrigation needed for soybeans under the semi-arid conditions of Western ND.

Objectives of the Research Project

The primary objective of this research is to determine the optimal amount and timing of irrigation required to maximize soybean yield, quality, and water productivity in Western North Dakota's semi-arid conditions.

Materials and Methods

- A roundup-ready soybean variety S01XF25 was seeded at the Nesson Valley Irrigation Site, Ray, ND (Longitude: -103.10511160, Latitude: 48.1639434) on May 29, 2024, under randomized complete block design with four replications. The seeding rate was 188,000 PLS/ac with a Row-to-Row distance of 30 in and a gross plot size of 59' X 50'.
- There were 12 irrigation treatments:
 - 1. Full irrigation (I)
 - 2. Deficit irrigation during vegetative $[(VE V(n)] \text{ stage } (DI_v)]$
 - 3. Deficit irrigation during flowering [R1-R2] stage (DIf)
 - 4. Deficit irrigation during pod development [R3-R4] stage (DI_p)
 - 5. Deficit irrigation during seed filling [R5-R6] stage (DIs)
 - 6. Deficit irrigation during maturity [R7-R8] stage (DI_m)
 - 7. Deficit Irrigation during vegetative + flowering stages (DIvf)
 - 8. Deficit irrigation during vegetative + pod development stages (DIvp)
 - 9. Deficit irrigation during vegetative + seed filling stages (DI_{vs})
 - 10. Deficit irrigation during vegetative + maturity stages (Dlvm)
 - 11. Deficit irrigation during seed filling + maturity stages (DIsm),
 - 12. Rainfed (R)
- Soil water contents at six different depths (from 6" to 36") were measured using a neutron soil moisture gauge.
- Unmanned aircraft systems equipped with a visual camera were flown over the experimental field at different dates to assess plant growth.
- Data were analyzed using the SAS Glimmix Procedure, with irrigation treated as a fixed effect and replication as a random effect. When the irrigation effect was statistically significant, means were separated at p = 0.05. The results presented here focus on the effects of irrigation on soybean growth and yield.

Preliminary Results

Aerial Imageries: Aerial imagery captured on July 26, August 19, and September 10, 2024, reveals noticeable differences in soybean growth across various treatments (Figure 1). Soybeans grown under rainfed conditions (R) displayed consistently poor growth on all three dates. On August 19, the imagery showed clear signs of stress from deficit irrigation during the pod development stage (DIp), with the effects becoming more pronounced by September 10. By that date, soybeans under rainfed conditions had already entered senescence.







9/10/2024

Figure 1. Aerial images illustrating the effect of irrigation treatments on soybeans at different development stages. Since all four replications showed similar conditions, an image from replication one is presented here. For treatment abbreviations, please refer to the Materials and Method section.

Plant Height: Irrigation treatments had a significant impact on soybean plant height (P<0.0001). Deficit irrigation during flowering (DIf) and during both the vegetative and flowering stages (DIvf) reduced plant height by 25% and 21%, respectively, compared to plants under full irrigation (I). Under rainfed conditions, plant height decreased by 31% (Figure 2).

Grain Yield: Irrigation treatments significantly affected soybean grain yield (P<0.0001). Soybeans under full irrigation (I) and deficit irrigation during the flowering stage (DIf) produced 51 and 52 bushels of grains per acre, respectively. Compared to full irrigation deficit irrigation during the pod development stage (DIp) and during both the vegetative and pod development stages (DIvp) resulted in a 21% and 26% reduction in yield, respectively. Rainfed conditions caused a yield decrease of up to 63%. Other irrigation treatments showed a yield decline of 2 to 15% compared to full irrigation, but these differences were not statistically significant.



Figure 2. Soybean plant heights under different irrigation treatments. The bars with the same letter on top are statistically not significantly different at P = 0.05.



Figure 3. Soybean grain yields under different irrigation treatments. The bars with the same letter on top are statistically not significantly different at P = 0.05.

Summary: Preliminary data suggest that irrigation water can be conserved without significantly reducing soybean grain yield, as long as deficit irrigation does not occur at the pod development stages. We are currently analyzing biomass to further investigate the impact of different irrigation treatments on yield parameters, which will provide more insight into these findings.

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Optimizing Nodulation in Chickpea for Enhanced Nitrogen Fixation

Edson Ncube, Destiney Haug, and Jim Staricka

Introduction

N-fixation by rhizobia bacteria such as *Mesorhizobium ciceri* is important for chickpea production and can result in reduced dependency on nitrogenous fertilizers. The chickpea plants form a symbiotic relationship with the bacteria in which the bacteria convert atmospheric nitrogen into ammonium for use by the chickpea plant and the plant in turn provides nourishment to the bacteria. This symbiotic relationship results in the formation of root nodules where N-fixation takes place. Nodulation is dependent on environmental conditions such as soil moisture, pH, and plant nutrient availability in soils as well as the biological interaction between the bacteria and the plant host. Understanding the effect of chickpea genotypes on nodulation is essential in order to maximize the benefit of the chickpea-rhizobia symbiosis. Therefore, this study evaluated selected breeding lines and existing varieties for nodulation capabilities at the Williston REC.

Methods

The trial was set up in a randomized complete block design, with 5 x 25 ft. plots and five replicates. A total of eleven selected breeding lines and existing varieties were evaluated (Table 1). All seed was treated with Cruiser Maxx Vibrance Pulses[®] (Thiamethoxam, Thiabendazole, Sedaxane, Mefenoxam, and Fludioxonil) at the recommended rate of 5 fl oz/100 lb of seed to control root rot diseases. A 9 g/plot granular rhizobia inoculant (Primo GX, Verdesian) was added to seed at planting on 4/26/2024. Spartan 4F[®] (Sulfentrazone) at 4 fl oz/ac was applied as a pre-emergence herbicide while Miravis Ace[®] fungicide at 13.7 fl oz/ac was sprayed at the V11 growth stage to manage Ascochyta blight.

Plant population was assessed at V4, and Fractional green canopy cover was taken at V3 growth stage using the Canopeo App (<u>https://canopeoapp.com</u>). To assess nodulation, 15 plants were dug-up from each plot at the R1 growth stage and washed in a tub containing tap water. Nodules were counted on each plant root system and fresh weights determined. Next, nodules were oven-dried for 48 hours at 130°F and nodule dry weights determined. Similarly, shoot dry weights were measured on the same 15 plants' shoots after drying at 130°F for 48 h. Biomass crude protein content of the dry shoots was analyzed at Cumberland Valley Analytical Services, Waynesboro, PA. The crop was desiccated on 8/16/2024 followed by harvesting on 8/22/2024. Grain yield, protein, test weight (TW), and thousand kernel weight (TKW) data was collected post-harvest.

Soil cores were obtained on September 24-25, 2024, for residual nitrogen analysis using a truck-mounted hydraulic-powered sampler. Four cores, 1.5 inches in diameter and 24 inches in length, were obtained from each plot. The cores were separated into two depth

increments (0-6 and 6-24 inches), and the subsections from each core combined to form a four-core composite sample of each depth for the plot. Samples were dried for 48 hours at 130°F and stored at room temperature until analysis at Agvise Laboratories, Northwood, ND.

Statistical analysis was performed using JMP[®] Pro 17 statistical software (JMP Statistical Discovery LLC, Cary, NC). When significant, means were separated using Tukey's honestly significant difference (HSD) with an α <0.05, p <0.05, and n = 5. Regression analysis was performed to determine the correlation between nodulation and shoot dry weight, TW, as well as TKW.

Results and discussion

Results showed that the NDC 160190 breeding line produced the highest number of nodules per plant (Figure 1). It had significantly higher nodulation than the NDC 160095 breeding line and the Sierra variety. Although, it did not differ with the rest of the breeding lines and varieties. NDC 160019 also performed better than Sierra at nodulation. NDC 160145 produced more canopy cover than Sierra, but there was no significant difference between the rest of the breeding lines and varieties with either NDC 160145 or Sierra (Figure 2).

The study showed a positive non-linear correlation between nodulation and shoot dry weight (Figure 3) with a correlation coefficient (r) of 0.62 indicating that nodulation is linked to plant growth traits such as above ground biomass. However, postharvest data showed that the chickpea genotypes did not differ in grain yield and protein (Table 1). Differences in TW and TKW were observed, with the Sierra variety having the lowest TW and one of the highest TKW, likely due to differences in plant genetics. Incidentally, the Seira variety had the lowest level of nodule formation. Furthermore, nodulation positively correlated with TW (r = 0.31, p = 0.0200) while negatively corelating with TKW (r = -0.45, p = 0.0006). Nodulation is known to be impacted by plant genetics and environmental conditions such as soil moisture, pH, and plant nutrient in the soil. The average soil pH in this study was 5.9 and 8.1 at the 0-6 inches and 6-24 inches depth, respectively. Acidic pH levels below 4.8 are known to limit nodulation and the survival of rhizobia.

There was no significant difference in residual nitrogen, shoot dry weight, and biomass crude protein among breeding lines. Chickpea nodulation and N-fixation are also sensitive to the plant available N concentrations in soils. Nitrogen availability in the soil reduces the effectiveness of N-fixation by chickpea plants. Furthermore, chickpea is known to fix nitrogen that is only sufficient for its growth. This limits the ability of chickpea to enhance soil N for a following crop and reduces its sustainability in agriculture rotations. However, the nitrogen benefit from legumes is also attributable to the lower carbon-to-nitrogen ratio

in legume residues which unbinds higher levels of nitrogen upon decay, which becomes readily available for use by the subsequent crop.

Conclusion

This study suggests that poor nodulation capacity negatively impacts chickpea shoot and leaf growth, thereby reducing the green canopy cover which can cause losses in grain yield and quality.

Variety/ Breeding Y Line	Yield (lb/ac)	Protein (%)	TW ^z (bu/lb)	TKW ^y (g)	Shoot DW ^x (g)	Crude Protein (% dry	Total R N (lt	esidual b/ac)
						matter)	0-6"	6-24"
CDC Leader	1746	22.6	63.21ab*	352b	25.6	19.9	5.4	16.8
ND Crown	1788	22.08	63.19ab	395a	21	21.5	6.2	16.2
NDC160019	1356	22.5	63.92ab	306d	24.1	20.8	5	11.4
NDC160095	1369	22.32	64.04a	330bcd	20.1	21.6	4.8	11.4
NDC160129	1304	21.76	63.86ab	334bcd	24.8	21.1	4.8	13.2
NDC160132	1741	21.98	63.86ab	338bc	23.3	22.3	5.2	17.4
NDC160145	1114	21.84	62.96bc	343b	23.9	21.4	3.8	9.6
NDC160146	1623	21.88	63.38ab	332bcd	22.2	20.7	5	10.2
NDC160156	1874	21.62	64.10a	326bcd	23.2	19.5	4.8	23.4
NDC160190	1494	21.68	62.97bc	310cd	27.4	21.2	4.2	10.8
Sierra	1226	22.1	62.04c	387a	19.5	20.9	6.4	12
F>P	0.1143	0.2711	<0.0001	<0.0001	0.6156	0.1145	0.0864	0.3633

Table 1. Yield (lb/ac), protein (%), test weight (bu/ac), TKW (g), shoot dry weight (g), biomass crude protein (% dry matter), and residual N (lb/ac).

*In each column, figures with a common letter are not significantly different as determined by Tukey's HSD ($\alpha < 0.05$, n = 5). *z* = Test weight, *y* = Thousand kernel weight, *x* = Shoot dry weight



Nodule formation in breeding line NDC160190



Figure 1. Nodule quantity by variety (p = 0.0014), bars with a common letter are not significantly different as determined by Tukey's HSD ($\alpha < 0.05$, n = 5).



Figure 2. Percent canopy cover at V3 growth stage (p = 0.0126), bars with a common letter are not significantly different as determined by Tukey's HSD ($\alpha < 0.05$, n = 5).



Figure 3. Correlation between nodulation and shoot dry weight (r = 0.62, p < 0.0001).

Acknowledgements

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2024 Durum Fungicide Trial

Frankie Crutcher, Alma Chinchilla, Caitlin Gross, Debra Kunda

OBJECTIVE: Test the efficacy of different fungicide combinations for control of Fusarium Head Blight on irrigated durum wheat.

MATERIALS AND METHODS:

Irrigated	Residual Soil N to 3 ft: NTot 19.7 lbs/A
Variety: Joppa	Residual Soil P to 6 in: P 16 ppm
Location: Sidney, MT	Irrigated (sprinkler) on: Jun 5 and Jun 25 (2.18 in total)
Planted: May 4	Chemical Applications: Mustang Maxx and Lambda for grasshoppers,
Harvested:	2,4D, Panoflex, Discovery, and Wolverine for weeds.
Plot Size: 5' x 10'	Precipitation April – September: 7.01 inches
Seeding Rate: 90 lbs/A	Treatments: 6
Soil Type: Savage silty clay loam	Date of fungicide application: Jul 5
Previous Crops: Soybean	Disease assessment: Jul 25

COMMENTS:

Applications were applied at 19 GPA. Teejet AI 3070-15 (Air Induction Dual Pattern Flat Spray Tips) spray nozzles were used. Corn spawn inoculated with five isolates of *F. graminearum* was applied to the field May 29. Misting to increase humidity was applied from Jun 14 – Aug 1. There were no significant differences in protein between treatments, so data is not included here.

RESULTS:

Treatment #	Severity (%) ^a	Incidence (%) ^b	Index ^c	%FDK ^d	Test Weight (Ibs/Bu)	Adj. Yield (lbs/A) ^e
1	33.3 A	85.0 A	28.6 A	45.0 A	58.2 B	3260.4 B
2	18.7 B	64.2 B	12.2 B	28.8 AB	61.3 A	4047.5 A
3	18.7 B	63.3 B	12.0 B	20.0 B	62.0 A	4168.1 A
4	16.0 B	65.8 B	10.6 B	22.5 B	61.7 A	4338.7 A
5	21.0 AB	67.5 B	14.1 B	22.5 B	61.1 A	4151.8 A
6	23.0 AB	68.3 B	16.1 B	25.0 B	61.5 A	4045.0 A
Mean	21.8	69.0	15.6	27.3	61.0	4001.9
CV (%)	36.0	14.0	49.8	39.7	2.7	11.7
HSD (0.05)	13.7	15.4	11.9	16.9	2.6	779.1
P-value	0.0129	0.0030	0.0016	0.0021	0.0025	0.0060

Table 1: Effect of Fungicide Treatments on Durum to Control FHB

Letters in common did not differ significantly according to a Tukey's HSD test at a significance level of 5%. ^aPest Severity: Average percent area of head covered by disease. Thirty heads were evaluated for each plot. ^bPest Incidence: Percent of thirty plants per plot that had visible FHB symptoms.

^cDisease Index: Severity X Incidence/100

^dFusarium diseased kernels.

^eGrain yield adjusted to 12.0% moisture.

Table 2: Fungicide Treatments for Irrigated Durum Wheat

Treatment #	Fungicide*	Application Timing (A,B,C)	Rate	
1	Untreated	N/A	N/A	
2	Prosaro 421SC	Early Flowering	8.2 fl oz/A	
3	Prosaro Pro	Early Flowering	10.3 fl oz/A	
4	Prosaro Pro	Early Flowering	13.6 fl oz/A	
5	Miravis Ace	Early Flowering	13.7 fl oz/A	
6	Sphaerex	Early Flowering	7.3 fl oz/A	

*All treatments contained 0.125% v/v (NIS) Induce.

2024 Resistance of Spring Wheat Varieties to Fusarium Head Blight

Sidney, MT

Frankie Crutcher, Jason Cook, Alma Chinchilla, Caitlin Gross, Debra Kunda

OBJECTIVE: Test the resistance of different spring wheat varieties to Fusarium head blight caused by *F. graminearum*.

MATERIALS AND METHODS:

Irrigated
Variety: Misc.
Location: Sidney, MT
Planted: May 4
Harvested: Aug 21
Plot Size: 2.5' x 10'
Seeding Rate: 90 lbs/A
Soil Type: Savage silty clay loam
Previous Crops: Soybean

Residual Soil N to 3 ft: NTot 19.7 lbs/A Residual Soil P to 6 in: 16 ppm Applied Fertilizer: 70-26-0 190 lbs/A Irrigated (sprinkler) on: Jun 5 and Jun 25 (2.18 in total) Herbicide Applications: Mustang Maxx, Lambda, 2,4D,Panoflex, Discover, Wolverine Precipitation April – September: 7.01 in Disease assessment: July 25

COMMENTS:

Corn spawn inoculated with five isolates of *F. graminearum* was applied to the field May 29. Misting to increase humidity was applied from Jun 14 – Aug 1.

RESULTS:

		_		
Table 1: Spring	Wheat Variet	v Reponses to	Fusarium	Head Blight

Varioty	Sovority		Indox	% EDKd	
variety	(%) ^a	incluence (76)*	muex	/0 FDK	Tield (Bu/A) ²
AAC CONCORD	21.7 I-X	73.3 A-I	15.9 J-W	10.0 D-G	5320.8 A-I
Allegiant 6284 HRS	10.8 S-X	63.3 A-M	6.8 P-W	18.3 A-G	5067.5 B-L
Allegiant 811 HRS	27.3 E-S	81.1 A-G	22.2 G-U	31.7 AB	3641.1 D-R
AP Elevate	6.1 X	41.1 J-N	2.6 W	18.3 A-G	6433.1 A-F
AP Gunsmoke	10.7 S-X	51.1 G-N	5.5 R-W	21.7 A-F	5788.6 A-G
AP Smith	11.6 R-X	57.8 D-N	7.9 O-W	20.0 A-G	4625.3 B-O
CP3055	55.0 A	88.9 A-C	48.9 A	13.3 B-G	1215.1 QR
CP3119A	50.3 A-C	87.8 A-C	44.2 A-C	13.3 B-G	1262.0 Q-R
Dagmar	34.1 C-M	87.8 A-D	30.9 A-L	20.0 A-G	4254.8 D-Q
Duclair	13.0 Q-X	52.2 F-N	6.9 P-W	13.3 B-G	4894.1 B-M
Lanning	24.4 H-V	74.4 A-I	18.4 I-W	23.3 A-E	2691.2 H-R
LCS Ascent	4.9 X	36.7 MN	1.8 W	3.7 FG	8331.2 A
LCS Boom	5.6 X	40.0 K-N	2.5 W	8.0 E-G	7616.4 AB
LCS Buster	5.0 X	32.2 N	1.8 W	2.3 G	7347.1 A-C
McNeal	39.5 A-H	86.7 A-D	34.2 A-J	16.7 A-G	1235.2 QR
MS Charger	5.7 X	38.9 K-N	2.2 W	21.7 A-F	5094.5 B-L
MS Nova	8.3 U-X	37.8 L-N	3.1 VW	10.3 D-G	6600.7 A-E
MT 2030	21.0 I-X	73.3 A-I	15.6 J-W	25.0 A-E	3980.7 D-R
MT 2049	10.8 S-X	65.6 A-M	7.2 P-W	25.0 A-E	5811.4 A-G
MT 2063	30.6 D-P	72.2 A-I	22.7 F-S	35.0 A	3128.5 G-R
MT 21074	34.3 C-N	90.0 A-C	30.9 A-L	17.5 A-G	1839.6 L-R
MT 21104	16.0 P-X	57.8 D-N	9.1 N-W	13.3 B-G	3496.1 F-R
MT 21174	28.9 E-Q	76.7 A-H	22.3 G-U	15.0 B-G	3417.2 F-R
MT 21176	34.0 C-N	81.1 A-G	27.4 C-N	20.0 A-G	3675.2 D-R
MT 21186	37.9 B-I	83.3 A-E	31.8 A-L	13.3 B-G	2207.8 J-R
MT 21214	32.0 D-P	72.2 A-I	23.1 F-R	16.7 A-G	3639.6 D-R
MT 21220	19.1 L-X	72.2 A-I	14.1 LW	21.7 A-F	3934.2 D-R
MT 21473	18.9 L-X	71.1 A-J	13.7 L-W	18.3 A-G	4355.1 C-P
MT 21484	21.6 I-X	75.6 A-I	16.9 J-W	20.0 A-G	4630.0 B-O
MT 21485	32.9 D-O	83.3 A-E	27.8 C-M	28.3 A-D	3670.8 D-R

Continued on next page...

Variety	Severity (%)ª	Incidence (%) ^b	Index ^c	% FDK ^d	Yield (Bu/A) ^e
MT 21487	24.8 H-U	85.6 A-D	21.3 G-V	20.0 A-G	4351.8 C-P
MT 22071	35.0 C-M	75.0 A-I	26.3 C-O	22.5 A-F	1688.6 O-R
MT 22072	34.0 C-N	77.8 A-H	26.5 C-O	18.3 A-G	2173.7 K-R
MT 22073	36.3 C-K	86.7 A-D	31.6 A-L	21.7 A-F	1763.2 M-R
MT 22083	26.6 F-T	83.3 A-E	22.1 G-V	22.5 A-F	4235.1 D-Q
MT 22093	24.8 G-U	91.1 AB	22.6 F-S	14.3 B-G	4095.4 D-R
MT 22099	24.0 H-V	71.1 A-J	17.3 J-W	23.3 A-E	3589.5 E-R
MT 22102	43.4 A-F	91.1 AB	39.6 A-G	20.0 A-G	2333.1 I-R
MT 22151	36.5 C-J	72.2 A-I	26.5 C-O	25.0 A-E	4803.4 B-N
MT 22172	19.6 K-X	72 2 A-I	14.5 L-W	13 3 B-G	4086 7 D-R
MT 22177	18.6 M-X	61 1 B-N	11.4 M-W	11 7 C-G	6366 3 A-F
MT 22179	32 0 D-P	81 1 A-G	26 0 C-O	16.7 A-G	3844 7 D-R
MT 22182	54 0 AB	87.8 A-D	48.0 AB	28.3 A-D	1850 7 L-R
MT 22184	47 2 A-D	86.7 A-D	41 0 A-F	20.0 A-G	1761 3 N-R
MT 22204	44.1 A-F	87.8 A-D	38.6 A-G	15.0 R-G	1569 3 P-R
MT 22204	34.4 C-M	85.6 A-D	29.5 B-M	25 0 A-E	4029.6 D-R
MT 22200	16 0 O-X	67.8 A-I	11 5 M-\\/	16.7 A-G	4202 8 D-O
MT 22270	30 / A-H	85.6 A-D	33 6 A-K	26.7 A-E	4202.0 D-Q
MT 22324	10.1 L_Y	80.0 A-C	15.5 K-W	20.7 A-L	3857 4 D-P
MT 22343	28.2 E-D	86.7 A-D	24 4 E-O	20.0 A-C	2/30 1 L-P
MT 22007			13 3 A-D	18 3 A-G	1561 5 D-D
MT 22005	40.7 A-D	92.2 A	43.3 A-D	16.7 A G	5222 5 P I
MT 22045	9.4 I-A	40.0 I-IN 75.6 A I	4.3 3-W	10.7 A-G	0200.0 D-J
MT 22043	20.3 G-1	75.0 A-I	19.3	21.7 A-F	4170.3 D-Q
IVIT 23007	32.1 D-P	01.1 A-G		20.7 A-E	2270.0 I-R
MT 22079	42.2 A-G	00.9 A-C	37.0 A-H	10.0 D-G	2600 0 D P
IVIT 23000		74.4 A-1	10.1 J-VV	20.7 A-E	5000.0 D-R
IVIT 23094		00.0 A-G		20.0 A-G	3100.9 D-L
IVIT 23097	21.2 E-3	07.0 A-D	23.0 F-R	16.7 A-G	1924.0 L-R
IVIT 23107	45.9 A-D	92.2 A	42.6 A-E	25.0 A-E	1455.1 P-R
IVIT 23187	18.4 IVI-X	03.3 A-IVI		20.0 A-G	4403.0 C-P
IVIT 23297	19.1 L-X	73.3 A-I	14.0 L-VV	20.0 A-G	3996.3 D-R
IVIT 23301	18.3 IVI-X	12.2 A-I	13.4 L-VV	30 A-C	4677.4 B-U
MT 23308	41.9 A-G	85.6 A-D	36.0 A-I	16.7 A-G	1061.6 K
IVIT 23360	35.6 C-L	87.8 A-D	31.5 A-L	21.7 A-F	2119.6 K-R
MT Carison	41.7 A-H	70.0 A-K	29.8 A-M	25.0 A-E	2064.7 K-R
MT Dutton	13.2 Q-X	63.3 A-M	8.6 0-11	25.0 A-E	5/64./ A-F
MT Sidney	7.0 WX	48.9 H-N	3.8 U-V	10.3 D-G	5936.2 A-G
ND Stampede	7.6 V-X	51.1 G-N	3.9 1-00	26.7 A-E	4763.0 B-O
NS Presser CLP	20.9 J-X	83.3 A-E	17.5 I-VV	21.7 A-F	2123.6 K-R
Reeder	27.3 E-S	82.2 A-F	22.5 F-1	18.3 A-G	2428.5 I-R
Rocker	30.4 D-P	85.6 A-D	26.1 C-O	23.3 A-E	3439.8 F-R
SY Ingmar	17.2 N-X	76.7 A-H	13.6 L-W	23.3 A-E	5725.6 A-H
SY Longmire	35.2 C-M	71.1 A-J	25.3 C-P	20.0 A-G	2902.9 G-R
SY Rockford	10.9 S-X	53.3 E-N	5.8 Q-W	12.0C-G	6650.6 A-D
Thatcher	26.9 F-S	60.0 C-N	16.0 J-W	10.0 D-G	4741.6 B-O
Vida	18.8 L-X	68.9 A-K	13.3 L-W	23.3 A-E	3260.3 G-R
WB 9879 CLP	43.2 A-F	77.8 A-H	34.0 A-K	21.7 A-F	2468.8 I-R
WB Gunnison	28.2 E-R	88.9 A-C	25.1 D-P	16.7 A-G	2568.0 I-R
Mean	26.1	73.0	20.8	19.4	3799.7
% CV	50.9	23.1	62.2	38.5	47.5
HSD (0.05)	16.9	30.5	18.65	19.1	3055.5
P-value	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001

Letters in common did not differ significantly according to a Tukey's HSD test at a significance level of 5%. ^aPest Severity: Average percent area of head covered by disease. Thirty heads were evaluated for each plot. ^bPest Incidence: Percent of thirty plants per plot that had visible FHB symptoms. ^cIndex: Severity X Incidence / 100 ^dFusarium diseased kernels.

^eGrain yield adjusted to 12.0% moisture.

2024 Screening Chickpea Varieties for Resistance to Ascochyta Blight Sidney, MT

Frankie Crutcher, Kevin McPhee, Alma Chinchilla, Caitlin Gross, Debra Kunda

OBJECTIVE: Test the resistance of different chickpea varieties to Ascochyta blight caused by *Ascochyta rabiei* under irrigation.

MATERIALS AND METHODS:

Irrigated	Previous Crops: Wheat
Variety: Misc.	Residual Soil N to 3 ft: 70.5 lbs/A
Location: Sidney, MT	Residual Soil P to 6 in: 18.25 ppm
Planted: Apr 24	Applied Fertilizer: None
Harvested: Aug 31	Irrigated (sprinkler) on Jun 15 and June 29 - 2.23 in total (56.64 mm)
Plot Size: 5' x 20'	Herbicide Applications: Panther 2 oz/A (fall)
Seeding Rate: 4 LS/ft ²	Precipitation April – September: 6.42 in (163.1 mm)
Soil Type: Savage silty clay loam	Disease assessments: Jul 3, Jul 19, Aug 1

COMMENTS:

Seeds were inoculated with peat-based commercial Exceed[®] (Visjon Biologics, Henrietta, TX). The trial was desiccated with Gramoxone (1.3 pts/A) on Aug 22.

RESULTS:

Table 1: Screening of chickpea cultivars for resistance to A. rabiei							
Variety	% Sev ^a	% Sev	% Sev	Test Weight	Adj. Yield ^b		
	7/3	7/19	8/1	(lbs/bu)	(lbs/acre)		
MT Bridger	44.5 A	55.83 CD	58.67 BC	62.30 AB	3047.3 AB		
ND Crown	24.17 B	43.5 C	38.33 E	62.23 AB	3473.2 A		
CDC Frontier	33.00 B	45.93 D	41.83 DE	62.98 A	3485.8 A		
CDC Leader	32.92 B	62.17 BC	59.33 BC	61.95 AB	2952.3 AB		
CDC Palmer	32.33 B	59.83 C	53.83 CD	61.78 A-C	2891.8 B		
CDC Orion	47.17 A	74.33 AB	70.50 AB	60.15 CD	2497.9 B		
Sierra	48.83 A	76.67 A	81.00 A	60.85 B-D	1463.4 C		
Dwelley	49.83 A	73.5 AB	81.33 A	60.05 D	1375.8 C		
Mean	39.1	61.5	60.6	61.5	2648.4		
P-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
CV (%)	25.0	21.2	26.9	1.9	30.6		
HSD (0.05)	9.3	12.5	13.9	1.6	575.6		

Letters in common did not differ significantly according to a Tukey's HSD test at a significance level of 5%. ^aSeverity: Average percent area of plant covered by disease. Fifteen plants were evaluated for each plot. ^bAdj. Yield: Yield was adjusted to 13% moisture.

Incidence: Percent of ten plants per plot that had visible Ascochyta blight symptoms. Because disease incidence was near or at 100% with no significant differences at all time points, it was not included in this report.

EARC Pathology department washing plant sample roots





Photo courtesy of Thomas Gross







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