

**PROJECT TITLE:**

2021 STATEWIDE DURUM VARIETY TRIALS

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- Funding provided by the Montana Wheat and Barley Committee, U.S. Wheat and Barley Scab Initiative and The Montana Agricultural Experiment Station.

**OBJECTIVE:**

To test advanced experimental durum lines for agronomic and quality traits relative to currently grown cultivars under Montana growing conditions.

**METHODS:**

In 2021, 19 experimental durum lines developed at MSU and 10 elite durum varieties were tested under eight different environments across Montana. Experimental lines developed at MSU carry genetic markers associated with reduced cadmium accumulation and/or a licensed gene that increases pasta firmness (Table 1). Durum varieties tested include releases from North Dakota State University, University of Saskatchewan-Canadian Crop Development Center, and Montana State University (Table 1). Dryland experiments were grown in collaboration with the Montana Agricultural Experiment Station (MAES), on-station in Bozeman, MT (MSU-Post Agronomy Farm), and at off-campus Research Centers near Havre, MT (MSU-NARC), Sidney, MT (MSU-EARC), Huntley, MT (MSU-SARC), Conrad, MT (MSU-WTARC), and Moccasin, MT (MSU-CARC). Irrigated trials were grown in Bozeman, MT (MSU-Post Agronomy Farm) and Sidney, MT (MSU-EARC). There were two off-station experiments planted in Eastern Montana near Poplar and Dagmar by EARC staff and three off-station experiments planted in North Central Montana near Loring, Turner and Chester by NARC staff. Off-station trials did not encompass all experimental lines and consisted primarily of released varieties. The Poplar location was not harvested due to herbicide damage and drought conditions. There were three replicates of each line/variety grown at each location in either a randomized complete block design for off-station trials or an alpha-lattice design for on-station trials to determine statistical differences and seed was treated with CruiserMaxx Vibrance for Cereals® (Syngenta) (5 fl oz/100 lb). Cooperators provided agronomic data such as plant height, heading date, pest/disease pressure, grain protein content, grain test weight, and grain yield. On-station grain subsamples from the three replicates per line per location were bulked and submitted to Dr. Linda Dykes (USDA-ARS, Fargo, ND) for analysis of seed traits, milling and semolina quality, and semolina mixing strength.

Overall statewide agronomic performance for 2021 on-station trials can be found in Table 1. Agronomic performance for 2021 on-station trials separated by environment is presented in Tables 2 (irrigated) and 3 (dryland). Agronomic data for individual 2021 on-station trials is found in Tables 4-11 and data for off-station trials is found in Tables 12-15. Average seed quality is summarized in Table 16, milling data in Table 17, and semolina quality in Table 18. Disease evaluations for Fusarium head blight, stem rust, fungal leaf spot, and stripe rust are found in Tables 18-22.

Table 1. Agronomic Data All On-station 2021 Durum Variety Trials (n=8)

ID	Source <sup>1</sup>	Yield <sup>2</sup> bu/ac	Test Weight lb/bu	Protein <sup>3</sup> %	Plant Height Inches	Heading Date <sup>4</sup> Julian
Mountrail	NDSU	<b>55.6*</b>	59.0	15.5	28.9	180.2
Grenora	NDSU	<b>57.9*</b>	59.3	15.0	28.6	179.9
Divide	NDSU	53.8	59.6	15.5	30.2	180.4
Tioga	NDSU	52.9	59.8	15.5	<b>31.3*</b>	179.8
Carpio	NDSU	<b>56.0*</b>	58.8	15.5	29.8	181.3
Joppa	NDSU	<b>55.8*</b>	60.2	15.0	<b>30.1*</b>	179.8
ND-Riveland <sup>‡</sup>	NDSU	<b>58.7*</b>	59.7	15.2	<b>31.3*</b>	180.1
ND-Grano <sup>‡</sup>	NDSU	<b>57.1*</b>	60.0	15.4	29.3	181.0
CDC-Vivid <sup>‡</sup>	CDC	53.3	59.8	<b>16.2*</b>	29.5	180.3
Lustre <sup>+</sup>	MSU	53.5	58.2	15.7	28.9	180.2
MTD18155	MSU	54.4	59.1	15.7	27.6	180.3
MTD16001 <sup>+</sup>	MSU	52.8	58.7	14.9	30.1	180.1
MTD16002 <sup>‡</sup>	MSU	<b>55.8*</b>	59.3	15.1	<b>30.6*</b>	181.5
MTD18213	MSU	54.5	58.0	15.7	<b>30.6*</b>	182.3
MTD18486 <sup>‡</sup>	MSU	51.4	60.0	15.1	<b>30.6*</b>	<b>184.5**</b>
MTD18413 <sup>‡</sup>	MSU	<b>57.8*</b>	59.3	15.7	29.6	179.8
MTD18348 <sup>‡</sup>	MSU	<b>57.5*</b>	59.7	15.2	<b>31.3*</b>	181.4
MTD18091	MSU	53.9	59.1	15.8	29.6	181.7
MTD18430	MSU	49.4	58.0	15.7	<b>32.0**</b>	183.7
MTD18179 <sup>‡</sup>	MSU	52.1	57.5	<b>16.6**</b>	28.1	180.4
MTD18172	MSU	<b>60.4**</b>	60.7	15.7	30.1	181.4
MTD18067	MSU	<b>57.7*</b>	59.3	15.2	29.4	180.9
MTD18381 <sup>‡</sup>	MSU	49.5	59.1	15.5	28.2	178.9
MTD18181	MSU	49.4	59.6	<b>16.1*</b>	30.3	183.2
MTD18256 <sup>‡</sup>	MSU	<b>56.6*</b>	59.6	15.6	30.2	181.9
MTD18217	MSU	55.1	59.4	15.4	<b>31.2*</b>	<b>183.9*</b>
MTD18266 <sup>‡</sup>	MSU	54.8	60.5	16.0	30.0	182.3
MTD18148	MSU	53.6	60.4	15.4	22.3	178.8
MTD18313	MSU	54.3	<b>61.5**</b>	15.6	23.8	177.6
<b>Average</b>		54.7	59.5	15.5	29.4	180.9
<b>LSD (0.05)</b>		4.9	0.7	0.5	1.5	0.8
<b>Prob &gt; F</b>		0.0002	<0.001	<0.001	<0.001	<0.001
<b>CV (%)</b>		9.1	1.3	3.2	5.1	0.4

<sup>‡</sup>Low cadmium accumulation gene

<sup>+</sup>Pasta firmness gene

<sup>1</sup>NDSU-North Dakota State University, CDC-University of Saskatchewan Crop Development Center, MSU-Montana State University

<sup>2</sup>Grain yield reported on a 13% moisture basis

<sup>3</sup>Grain protein reported on a 12% moisture basis

<sup>4</sup>>50% of heads 100% out of boot

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

Table 2. Agronomic Data All Irrigated 2021 Durum Variety Trials (n=2)

ID	Yield	Test Weight	Protein	Plant Height	Heading Date <sup>3</sup>
	bu/ac	lb/bu	%	Inches	Julian
Mountrail	97.8	60.4	13.9	33.2	181.5
Grenora	102.1	61.0	13.1	31.7	181.2
Divide	93.1	60.8	13.8	33.3	181.6
Tioga	91.8	60.5	14.0	<b>34.4*</b>	180.8
Carpio	94.4	60.8	13.8	<b>33.7*</b>	182.4
Joppa	100.7	61.9	13.0	<b>34.1*</b>	180.7
ND-Riveland	103.2	61.8	13.8	<b>35.5*</b>	181.2
ND-Grano	100.6	61.8	13.9	33.3	182.0
CDC-Vivid	95.3	61.8	14.4	33.1	181.8
Lustre	93.6	59.5	13.9	33.3	181.7
MTD18155	96.5	60.7	14.0	31.0	181.1
MTD16001	92.4	59.7	13.0	33.0	181.2
MTD16002	97.2	60.7	13.6	35.1	182.5
MTD18213	97.1	60.3	13.6	33.0	183.2
MTD18486	94.0	61.2	13.5	<b>36.1*</b>	<b>186.0**</b>
MTD18413	99.1	60.6	14.3	33.4	181.5
MTD18348	94.6	61.0	13.7	<b>35.4*</b>	182.8
MTD18091	97.6	61.5	13.4	33.2	183.0
MTD18430	84.6	60.9	13.9	<b>34.8*</b>	<b>185.7*</b>
MTD18179	96.8	59.7	14.4	31.2	182.0
MTD18172	104.0	<b>62.2**</b>	14.0	<b>35.7</b>	182.6
MTD18067	<b>106.7**</b>	61.9	12.8	32.2	181.5
MTD18381	85.2	60.5	14.3	32.4	180.0
MTD18181	85.0	61.6	14.3	<b>35.0*</b>	<b>185.0*</b>
MTD18256	99.2	60.9	14.0	<b>35.7*</b>	183.5
MTD18217	94.9	61.5	13.8	<b>36.4**</b>	<b>185.8*</b>
MTD18266	94.3	61.7	<b>14.6**</b>	<b>34.2*</b>	184.1
MTD18148	94.4	61.6	14.0	23.5	178.8
MTD18313	92.2	61.9	14.4	27.1	179.1
Average	95.9	61.0	13.8	33.3	182.2
LSD (0.05)	13.3	1.9	1.0	2.8	1.5
Prob > F	0.253	0.342	0.111	<0.001	<0.001
CV (%)	6.8	1.6	3.6	4.1	0.4

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>>50% of heads 100% out of boot

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 3. Agronomic Data All On-station Dryland 2021 Durum Variety Trials (n=6)**

<b>ID</b>	<b>Yield<sup>1</sup></b>	<b>Test Weight</b>	<b>Protein<sup>2</sup></b>	<b>Plant Height</b>	<b>Heading Date<sup>3</sup></b>
	<b>bu/ac</b>	<b>lb/bu</b>	<b>%</b>	<b>Inches</b>	<b>Julian</b>
<b>Mountrail</b>	41.5	58.5	16.1	27.4	179.7
<b>Grenora</b>	43.2	58.7	15.6	27.6	179.4
<b>Divide</b>	40.7	59.2	16.0	29.2	179.9
<b>Tioga</b>	39.9	59.6	16.1	30.3	179.4
<b>Carpio</b>	43.3	58.1	16.1	28.5	180.8
<b>Joppa</b>	40.8	59.6	15.7	28.8	179.4
<b>ND-Riveland</b>	43.9	59.0	15.7	29.9	179.6
<b>ND-Grano</b>	42.6	59.5	16.0	27.9	180.6
<b>CDC-Vivid</b>	39.3	59.2	<b>16.8*</b>	28.3	179.7
<b>Lustre</b>	40.1	57.8	16.3	27.5	179.7
<b>MTD18155</b>	40.4	58.6	16.2	26.5	179.9
<b>MTD16001</b>	39.6	58.4	15.6	29.1	179.7
<b>MTD16002</b>	42.0	58.9	15.6	29.2	181.1
<b>MTD18213</b>	40.3	57.2	16.4	29.8	181.9
<b>MTD18486</b>	37.2	59.5	15.6	28.8	<b>183.9**</b>
<b>MTD18413</b>	44.0	58.9	16.1	28.4	179.1
<b>MTD18348</b>	45.2	59.2	15.7	29.9	180.8
<b>MTD18091</b>	39.4	58.3	16.6	28.4	181.1
<b>MTD18430</b>	37.7	57.0	16.3	<b>31.1**</b>	183.0
<b>MTD18179</b>	37.2	56.8	<b>17.3**</b>	27.0	179.8
<b>MTD18172</b>	<b>45.9**</b>	60.2	16.3	28.3	180.9
<b>MTD18067</b>	41.4	58.5	16.0	28.4	180.6
<b>MTD18381</b>	37.6	58.7	15.9	26.8	178.5
<b>MTD18181</b>	37.6	59.0	16.7	28.8	182.4
<b>MTD18256</b>	42.4	59.2	16.2	28.4	181.2
<b>MTD18217</b>	41.8	58.7	16.0	29.5	<b>183.1*</b>
<b>MTD18266</b>	41.6	60.2	16.5	28.6	181.5
<b>MTD18148</b>	40.0	60.0	15.8	21.9	178.7
<b>MTD18313</b>	41.6	<b>61.4**</b>	16.0	22.7	177.0
<b>Average</b>	41.0	58.9	16.1	28.2	180.4
<b>LSD (0.05)</b>	5.2	0.7	0.6	1.7	0.9
<b>Prob &gt; F</b>	0.063	<0.001	<0.001	<0.001	<0.001
<b>CV (%)</b>	11.1	1.1	3.1	5.4	0.4

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>>50% of heads 100% out of boot

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 4. Agronomic Data Bozeman Irrigated 2021 Durum Variety Trial**

ID	Yield <sup>1</sup> bu/ac	Test weight lb/bu	Protein <sup>2</sup> %	Plant Height Inches	Heading Date <sup>3</sup> Julian	Maturity Date <sup>4</sup> Julian
<b>Mountrail</b>	<b>147.1*</b>	60.5	13.2	35.1	183.0	219.3
<b>Grenora</b>	<b>142.5*</b>	59.8	13.2	33.6	182.4	218.4
<b>Divide</b>	134.3	60.6	13.6	35.4	182.3	216.8
<b>Tioga</b>	131.4	59.6	<b>14.0*</b>	36.3	182.6	216.8
<b>Carpio</b>	<b>141.1*</b>	<b>62.3*</b>	12.9	<b>36.6*</b>	183.9	222.9
<b>Joppa</b>	<b>138.6*</b>	61.0	13.0	35.1	182.4	218.2
<b>ND-Riveland</b>	<b>144.1*</b>	61.4	13.3	<b>37.9*</b>	183.4	222.2
<b>ND-Grano</b>	<b>144.0*</b>	61.8	13.7	<b>37.0*</b>	183.0	221.8
<b>CDC-Vivid</b>	<b>140.4*</b>	61.5	13.9	36.0	183.7	218.5
<b>Lustre</b>	133.3	58.9	13.8	34.5	183.4	217.6
<b>MTD18155</b>	<b>135.8*</b>	59.5	13.6	31.6	183.3	218.6
<b>MTD16001</b>	135.1	59.4	12.6	34.6	182.4	218.4
<b>MTD16002</b>	<b>137.7*</b>	59.4	13.8	<b>37.1*</b>	184.0	218.5
<b>MTD18213</b>	<b>141.4*</b>	60.7	13.8	35.6	184.4	222.4
<b>MTD18486</b>	130.8	60.7	13.3	<b>39.0*</b>	<b>187.0**</b>	<b>225.3**</b>
<b>MTD18413</b>	<b>142.5*</b>	61.2	13.8	35.2	183.0	218.3
<b>MTD18348</b>	<b>139.2*</b>	61.0	13.6	38.5*	183.7	223.0
<b>MTD18091</b>	<b>146.0*</b>	<b>62.5**</b>	12.9	<b>37.0*</b>	184.0	<b>223.9*</b>
<b>MTD18430</b>	112.7	60.4	<b>14.3*</b>	37.6*	<b>186.4*</b>	222.0
<b>MTD18179</b>	<b>136.9*</b>	59.1	13.8	32.6	183.0	217.9
<b>MTD18172</b>	<b>147.9**</b>	<b>62.1*</b>	13.7	<b>38.6*</b>	184.3	221.9
<b>MTD18067</b>	<b>142.1*</b>	60.8	13.2	34.3	183.0	219.3
<b>MTD18381</b>	120.6	60.2	<b>14.1*</b>	31.9	181.0	216.2
<b>MTD18181</b>	121.2	60.5	<b>14.1*</b>	<b>38.8*</b>	186.0	221.7
<b>MTD18256</b>	135.2	60.2	<b>14.4**</b>	<b>38.3*</b>	184.0	220.0
<b>MTD18217</b>	143.5*	<b>62.0*</b>	13.5	<b>39.1**</b>	<b>186.6*</b>	<b>223.4*</b>
<b>MTD18266</b>	<b>138.8*</b>	61.4	<b>14.2*</b>	<b>36.9*</b>	184.3	<b>224.2*</b>
<b>MTD18148</b>	132.7	60.9	13.2	25.0	180.7	218.1
<b>MTD18313</b>	131.9	61.0	13.6	28.3	181.3	217.2
<b>Average</b>	137.0	60.7	13.6	35.5	183.5	220.1
<b>LSD (0.05)</b>	12.3	0.6	0.4	2.7	0.8	2.1
<b>Prob &gt; F</b>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<b>CV (%)</b>	5.0	0.6	1.7	4.5	0.3	0.6
<b>Lattice RE %<sup>5</sup></b>	155	127	240	103	102	115

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>>50% of heads 100% out of boot

<sup>4</sup>>50% of heads senesced

<sup>5</sup>Adjusted means provided for Lattice RE% values equal to or greater than 100%. Some lines used in analysis are excluded from data table

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 5. Agronomic Data Bozeman Dryland 2021 Durum Variety Trial**

ID	Yield <sup>1</sup>	Test Weight	Protein <sup>2</sup>	Plant Height	Heading Date <sup>3</sup>	Maturity Date <sup>4</sup>
	bu/ac	lb/bu	%	Inches	Julian	Julian
<b>Mountrail</b>	92.2	59.4	14.9	36.1	182.7	207.1
<b>Grenora</b>	<b>95.1*</b>	59.3	14.3	34.5	183.7	208.3
<b>Divide</b>	88.1	59.5	15.3	37.5	182.8	207.0
<b>Tioga</b>	87.2	59.4	15.3	37.9	182.4	205.8
<b>Carpio</b>	90.5	59.2	15.1	36.3	184.0	210.5
<b>Joppa</b>	88.8	59.7	14.7	35.2	182.6	207.7
<b>ND-Riveland</b>	92.6	59.3	15.5	<b>39.6*</b>	183.1	209.5
<b>ND-Grano</b>	<b>101.8**</b>	<b>60.5*</b>	14.7	36.9	183.8	208.9
<b>CDC-Vivid</b>	83.1	58.7	15.9	37.3	183.5	207.7
<b>Lustre</b>	<b>93.5*</b>	58.9	15.4	35.7	183.0	206.2
<b>MTD18155</b>	87.2	59.3	15.5	32.5	183.7	208.3
<b>MTD16001</b>	92.1	58.5	14.1	35.1	182.3	208.1
<b>MTD16002</b>	<b>93.3*</b>	58.8	15.3	<b>39.5*</b>	183.5	207.9
<b>MTD18213</b>	80.0	56.3	<b>16.1*</b>	36.8	185.0	209.9
<b>MTD18486</b>	83.5	58.4	15.8	39.0	<b>186.6*</b>	<b>211.8*</b>
<b>MTD18413</b>	<b>96.6*</b>	59.6	15.4	35.2	182.8	207.3
<b>MTD18348</b>	<b>93.4*</b>	59.3	15.0	38.1	183.5	210.5
<b>MTD18091</b>	89.1	58.9	15.0	35.9	183.4	209.6
<b>MTD18430</b>	77.6	55.5	<b>16.6**</b>	<b>41.0**</b>	<b>186.6*</b>	210.3
<b>MTD18179</b>	80.7	56.7	<b>16.3*</b>	33.9	183.2	205.9
<b>MTD18172</b>	<b>95.8*</b>	<b>60.8*</b>	15.5	36.8	184.3	210.3
<b>MTD18067</b>	87.1	57.8	15.3	35.7	183.6	207.2
<b>MTD18381</b>	88.3	59.2	15.1	31.8	181.6	205.7
<b>MTD18181</b>	80.7	58.5	15.8	37.5	186.0	<b>211.3*</b>
<b>MTD18256</b>	87.4	58.7	<b>16.2*</b>	38.8	183.9	210.3
<b>MTD18217</b>	80.6	58.2	15.9	39.0	<b>186.8**</b>	<b>213.4**</b>
<b>MTD18266</b>	88.6	59.4	<b>16.0*</b>	37.0	183.8	<b>211.2*</b>
<b>MTD18148</b>	92.5	59.8	15.3	25.1	180.1	207.6
<b>MTD18313</b>	89.2	<b>61.3**</b>	15.4	26.6	179.8	206.3
<b>Average</b>	89.0	59.0	15.4	35.9	183.5	208.6
<b>LSD (0.05)</b>	8.9	1.2	0.7	1.7	0.7	2.5
<b>Prob &gt; F</b>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<b>CV (%)</b>	5.4	1.1	2.3	2.8	0.2	0.7
<b>Lattice RE %<sup>5</sup></b>	218	153	229	103	173	111

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>>50% of heads visible

<sup>4</sup>>50% of heads senesced

<sup>5</sup>Adjusted means provided for Lattice RE% values equal to or greater than 100%. Some lines used in analysis are excluded from data table

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 6. Agronomic Data SARC Dryland 2021 Durum Variety Trial**

<b>ID</b>	<b>Yield<sup>1</sup></b>	<b>Test Weight</b>	<b>Protein<sup>2</sup></b>	<b>Plant Height</b>
	<b>bu/ac</b>	<b>lb/bu</b>	<b>%</b>	<b>Inches</b>
<b>Mountrail</b>	15.3	58.7	<b>17.7*</b>	28.1
<b>Grenora</b>	<b>24.2*</b>	59.4	17.1	<b>29.1*</b>
<b>Divide</b>	<b>22.5*</b>	59.5	<b>17.8*</b>	<b>29.5*</b>
<b>Tioga</b>	16.6	<b>60.5*</b>	17.2	<b>31.1*</b>
<b>Carpio</b>	<b>25.1*</b>	58.6	17.1	<b>29.4*</b>
<b>Joppa</b>	<b>27.4*</b>	<b>60.3*</b>	16.7	<b>31.8**</b>
<b>ND-Riveland</b>	<b>24.1*</b>	59.4	16.3	<b>29.7*</b>
<b>ND-Grano</b>	<b>23.3*</b>	60.0	17.3	<b>28.7*</b>
<b>CDC-Vivid</b>	21.6	<b>60.4</b>	<b>18.3*</b>	<b>30.5*</b>
<b>Lustre</b>	22.0	58.1	17.3	28.5
<b>MTD18155</b>	20.5	58.5	16.8	26.9
<b>MTD16001</b>	21.7	59.5	16.9	<b>29.8*</b>
<b>MTD16002</b>	17.0	59.0	17.2	28.4
<b>MTD18213</b>	<b>32.3*</b>	58.1	16.7	<b>30.8*</b>
<b>MTD18486</b>	<b>23.3*</b>	<b>61.0**</b>	15.7	<b>29.4*</b>
<b>MTD18413</b>	21.7	59.8	17.6	<b>29.4*</b>
<b>MTD18348</b>	<b>30.5*</b>	60.1	16.6	<b>29.3*</b>
<b>MTD18091</b>	<b>26.8*</b>	59.1	17.5	27.9
<b>MTD18430</b>	<b>31.7*</b>	59.4	17.4	28.9
<b>MTD18179</b>	21.5	58.6	<b>19.3**</b>	25.9
<b>MTD18172</b>	<b>31.3*</b>	<b>60.5*</b>	17.0	<b>31.1*</b>
<b>MTD18067</b>	<b>26.2*</b>	59.6	17.3	<b>30.7*</b>
<b>MTD18381</b>	20.6	59.3	17.6	27.0
<b>MTD18181</b>	<b>34.4*</b>	60.0	17.5	<b>29.4*</b>
<b>MTD18256</b>	<b>25.2*</b>	<b>60.4*</b>	16.5	<b>30.1*</b>
<b>MTD18217</b>	<b>34.5**</b>	<b>60.3*</b>	15.6	<b>30.8*</b>
<b>MTD18266</b>	16.3	<b>61.3*</b>	17.8	26.2
<b>MTD18148</b>	5.3	59.8	-	19.6
<b>MTD18313</b>	20.5	<b>60.6*</b>	<b>18.0*</b>	22.9
<b>Average</b>	23.7	59.7	17.1	28.7
<b>LSD (0.05)</b>	12.2	1.2	1.5	3.2
<b>Prob &gt; F</b>	0.011	<0.001	0.008	<0.001
<b>CV (%)</b>	30.4	1.2	5.2	6.8
<b>Lattice RE%<sup>3</sup></b>	102	100	100	100

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>Adjusted means provided for Lattice RE% values greater than 100%

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level



Table 7. Agronomic Data CARC Dryland 2021 Durum Variety Trial

ID	Yield <sup>1</sup>	Test Weight	Protein <sup>2</sup>	Plant Height	Heading Date <sup>3</sup>
	bu/ac	lb/bu	%	Inches	Julian
Mountrail	22.0	56.5	17.6	20.3	181.1
Grenora	23.3	56.9	16.7	21.1	180.2
Divide	23.9	57.9	16.9	<b>23.3</b>	180.8
Tioga	25.0	58.1	17.0	<b>23.5**</b>	180.6
Carpio	24.0	56.0	17.2	21.3	181.5
Joppa	22.3	58.6	16.7	<b>22.4*</b>	180.1
ND-Riveland	21.3	57.3	17.0	<b>22.4*</b>	181.2
ND-Grano	21.3	57.6	<b>17.5*</b>	20.3	180.6
CDC-Vivid	22.6	57.9	<b>17.6*</b>	<b>23.2*</b>	180.9
Lustre	22.3	56.4	17.0	<b>22.0*</b>	180.4
MTD18155	24.2	57.7	17.3	20.7	181.0
MTD16001	22.7	57.3	16.5	<b>22.1*</b>	181.4
MTD16002	20.8	58.0	16.7	20.4	181.4
MTD18213	25.3	56.2	17.1	21.3	183.0
MTD18486	22.5	57.6	16.8	22.5	<b>185.4*</b>
MTD18413	25.1	56.5	17.0	21.6	180.2
MTD18348	24.1	57.9	16.5	23.3	183.2
MTD18091	20.3	57.0	<b>18.3**</b>	21.3	182.5
MTD18430	21.5	57.1	16.5	<b>23.3*</b>	<b>186.0**</b>
MTD18179	22.3	55.3	<b>17.7*</b>	<b>22.3*</b>	181.3
MTD18172	23.0	59.2	17.3	21.4	182.7
MTD18067	23.5	57.5	16.7	21.1	181.5
MTD18381	21.8	57.7	16.3	<b>22.2*</b>	180.7
MTD18181	20.1	58.7	<b>17.7*</b>	<b>22.2*</b>	183.8
MTD18256	22.0	57.8	<b>17.5*</b>	19.7	182.7
MTD18217	21.9	56.5	<b>17.5*</b>	<b>23.2*</b>	<b>185.0*</b>
MTD18266	<b>27.3**</b>	59.6	16.8	<b>23.3*</b>	183.1
MTD18148	23.5	59.7	16.4	18.7	180.2
MTD18313	24.1	<b>60.9**</b>	16.8	20.1	178.5
<b>Average</b>	22.9	57.7	17.0	21.7	181.7
<b>LSD (0.05)</b>	4.7	0.5	0.9	2.0	1.0
<b>Prob &gt; F</b>	0.570	<0.001	0.011	<0.001	<0.001
<b>CV (%)</b>	11.5	0.5	3.2	5.2	0.3
<b>Lattice RE %<sup>4</sup></b>	125	116	104	118	121

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>>50% of heads visible

<sup>4</sup>Adjusted means provided for Lattice RE% values equal to or greater than 100%

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 8. Agronomic Data WTARC Dryland 2021 Durum Variety Trial**

<b>ID</b>	<b>Yield<sup>1</sup></b>	<b>Test Weight</b>	<b>Protein<sup>2</sup></b>	<b>Plant Height</b>	<b>Heading Date<sup>3</sup></b>
	<b>bu/ac</b>	<b>lb/bu</b>	<b>%</b>	<b>Inches</b>	<b>Julian</b>
<b>Mountrail</b>	<b>52.6*</b>	61.2	13.6	30.0	188.0
<b>Grenora</b>	<b>52.5*</b>	60.6	13.6	30.3	188.0
<b>Divide</b>	<b>46.2*</b>	61.0	13.5	30.1	<b>188.7*</b>
<b>Tioga</b>	<b>48.8*</b>	62.1	13.0	<b>33.5*</b>	187.5
<b>Carpio</b>	<b>55.9*</b>	60.2	13.7	<b>32.6*</b>	<b>188.4*</b>
<b>Joppa</b>	<b>43.5*</b>	61.4	13.4	30.3	187.3
<b>ND-Riveland</b>	<b>57.0**</b>	61.2	13.2	<b>33.3*</b>	187.0
<b>ND-Grano</b>	<b>44.0*</b>	61.7	13.6	31.4	<b>188.8*</b>
<b>CDC-Vivid</b>	<b>47.0*</b>	61.9	<b>14.0*</b>	29.9	186.6
<b>Lustre</b>	41.1	60.3	<b>14.1*</b>	27.8	187.2
<b>MTD18155</b>	<b>44.4*</b>	60.4	<b>14.2*</b>	31.8	187.7
<b>MTD16001</b>	38.3	59.8	13.6	<b>34.6*</b>	187.1
<b>MTD16002</b>	<b>44.8*</b>	60.4	<b>13.8*</b>	30.3	<b>190.0*</b>
<b>MTD18213</b>	<b>44.0*</b>	60.5	13.4	<b>35.9**</b>	<b>189.9*</b>
<b>MTD18486</b>	35.8	60.4	12.2	28.6	<b>190.9**</b>
<b>MTD18413</b>	<b>52.2*</b>	61.1	<b>13.9*</b>	31.9	187.1
<b>MTD18348</b>	<b>53.5*</b>	61.3	13.4	33.9	<b>189.1*</b>
<b>MTD18091</b>	38.8	60.1	13.5	31.7	<b>189.4*</b>
<b>MTD18430</b>	35.3	58.7	13.3	35.6	<b>189.2*</b>
<b>MTD18179</b>	40.3	59.0	<b>14.2*</b>	29.1	186.9
<b>MTD18172</b>	<b>50.9*</b>	62.1	<b>14.7**</b>	29.5	<b>189.3*</b>
<b>MTD18067</b>	<b>50.7*</b>	60.4	13.7	31.0	<b>189.2*</b>
<b>MTD18381</b>	35.3	60.2	13.7	29.4	186.5
<b>MTD18181</b>	34.4	60.3	<b>14.4*</b>	<b>32.3*</b>	<b>190.6*</b>
<b>MTD18256</b>	<b>54.3*</b>	61.7	13.3	28.2	<b>189.3*</b>
<b>MTD18217</b>	<b>50.9*</b>	60.1	12.7	31.7	<b>190.8*</b>
<b>MTD18266</b>	<b>52.0*</b>	61.9	13.7	31.7	<b>189.4*</b>
<b>MTD18148</b>	<b>54.1*</b>	61.9	<b>13.9*</b>	24.7	188.7
<b>MTD18313</b>	<b>47.3*</b>	<b>63.2**</b>	13.5	24.5	187.6
<b>Average</b>	46.4	60.9	13.6	30.9	188.4
<b>LSD (0.05)</b>	14.1	0.7	0.9	3.7	2.7
<b>Prob &gt; F</b>	0.030	<0.001	0.004	<0.001	0.026
<b>CV (%)</b>	17.0	0.7	3.6	6.8	0.8
<b>Lattice RE %<sup>4</sup></b>	129	133	183	118	143

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>>50% of heads 100% out of the boot

<sup>4</sup>Adjusted means provided for Lattice RE% values equal to or greater than 100%

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

Table 9. Agronomic Data NARC Dryland 2021 Durum Variety Trial

ID	Yield <sup>1</sup>	Test Weight	Protein <sup>2</sup>	Plant Height	Stand <sup>3</sup>	Sawfly <sup>4</sup>	Heading Date <sup>5</sup>	Falling Number
	bu/ac	lb/bu	%	Inches	%	%	Julian	Seconds
Mountrail	23.5	57.3	17.3	25.5	97.2	30.0*	175.7	443.3
Grenora	21.4	57.1	17.3	24.8	98.5	25.0	174.3	461.4
Divide	24.4	57.6	17.4	28.2*	98.0	20.0	175.0	452.7
Tioga	21.4	57.3	18.0	28.0*	96.8	21.7	174.3	519.7*
Carpio	24.8	55.3	17.7	25.3	95.6	15.0	177.3	491.1
Joppa	24.4	57.8	17.0	26.1*	96.9	21.7	175.0	454.3
ND-Riveland	26.0	57.3	16.6	26.7*	98.6	31.7*	174.7	499.6
ND-Grano	24.5	57.0	16.9	23.6	96.6	30.0*	176.7	434.1
CDC-Vivid	22.3	56.8	18.5*	25.5	98.6	5.3	175.3	510.9*
Lustre	23.9	55.5	17.9	25.6	95.5	18.3	175.7	483.5
MTD18155	22.6	56.5	18.1	22.6	98.1	3.7	175.3	428.1
MTD16001	22.0	56.9	17.4	25.5	96.9	13.3	175.7	480.6
MTD16002	31.1**	57.4	16.1	28.3**	98.9	10.0	176.7	487.4
MTD18213	21.1	54.4	18.6*	25.8	97.2	23.3	177.7*	531.3
MTD18486	22.1	59.5*	17.1	25.5	95.6	1.0	178.7**	484.5
MTD18413	21.7	56.5	17.9	25.0	98.1	30.0*	174.3	422.1
MTD18348	23.9	57.0	17.5	26.2*	96.4	10.0	176.3	520.6*
MTD18091	23.8	56.0	17.9	27.5*	97.7	16.7	176.3	468.2
MTD18430	25.6	54.3	17.6	27.6*	97.5	5.0	177.0	518.1*
MTD18179	21.3	54.9	19.1**	26.0*	99.0	5.0	175.7	487.3
MTD18172	30.4*	57.5	17.7	24.5	97.7	13.3	175.3	406.2
MTD18067	23.3	56.7	17.1	26.2*	99.0	31.7*	175.7	420.9
MTD18381	19.3	56.6	18.1	24.2	97.7	38.3**	173.7	430.6
MTD18181	21.7	57.1	18.5*	25.3	93.5	5.3	177.7*	484.7
MTD18256	23.4	57.9	18.1	26.0*	98.6	15.0	176.3	495.6
MTD18217	22.0	57.6	17.7	24.6	97.5	5.3	178.0*	496.4
MTD18266	24.6	58.5	17.9	26.7*	94.9	3.7	177.3	495.4
MTD18148	20.0	59.5*	17.2	21.0	96.8	11.7	174.7	530.4**
MTD18313	24.6	60.4**	17.4	21.5	98.1	2.3	172.3	468.6
Average	23.4	57.1	17.6	25.4	97.3	16.6	175.8	474.6
LSD (0.05)	3.4	1.0	0.7	2.3	2.9	8.5	1.2	27.7
Prob > F	<0.001	<0.001	<0.001	<0.001	0.077	<0.001	<0.001	<.001
CV (%)	8.7	1.1	2.3	5.5	1.7	31.0	0.4	3.5
Lattice RE % <sup>6</sup>	100	100	100	100	108	100	100	100

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>Visual rating of percent stand at early tillering

<sup>4</sup>Lodging due to sawfly cutting

<sup>5</sup>>50% of heads 100% out of boot

<sup>6</sup>Adjusted means provided for Lattice RE% values equal to or greater than 100%

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 10. Agronomic Data EARC Dryland 2021 Durum Variety Trial**

<b>ID</b>	<b>Yield<sup>1</sup></b>	<b>Test Weight</b>	<b>Protein<sup>2</sup></b>	<b>Plant Height</b>	<b>Heading Date<sup>3</sup></b>
	<b>bu/ac</b>	<b>lb/bu</b>	<b>%</b>	<b>Inches</b>	<b>Julian</b>
<b>Mountrail</b>	43.2	58.0	15.6	24.5	171.0
<b>Grenora</b>	42.4	58.9	14.9	25.9	171.0
<b>Divide</b>	39.2	59.7	15.3	26.4	172.0
<b>Tioga</b>	40.6	60.3	15.9	27.5	172.0
<b>Carpio</b>	39.2	59.3	16.1	26.3	173.0
<b>Joppa</b>	38.2	59.8	15.5	27.1	172.0
<b>ND-Riveland</b>	42.4	59.6	15.6	27.9	172.0
<b>ND-Grano</b>	40.8	60.1	15.8	26.7	173.0
<b>CDC-Vivid</b>	39.2	59.4	16.4	23.6	172.0
<b>Lustre</b>	37.8	57.9	16.4	25.2	172.0
<b>MTD18155</b>	43.5	59.5	15.6	24.6	172.0
<b>MTD16001</b>	40.9	58.7	15.0	27.3	172.0
<b>MTD16002</b>	<b>44.8*</b>	59.9	14.7	28.1	174.0
<b>MTD18213</b>	38.8	58.0	<b>16.6*</b>	27.9	174.0
<b>MTD18486</b>	35.9	60.4	16.0	27.5	<b>178.0**</b>
<b>MTD18413</b>	<b>46.6**</b>	60.2	15.1	27.0	171.0
<b>MTD18348</b>	<b>45.6*</b>	59.8	15.1	<b>28.4*</b>	172.0
<b>MTD18091</b>	37.4	58.7	<b>17.2*</b>	26.3	174.0
<b>MTD18430</b>	34.6	56.9	<b>16.7*</b>	<b>30.2**</b>	176.0
<b>MTD18179</b>	37.3	56.3	<b>17.3**</b>	24.9	172.0
<b>MTD18172</b>	43.8	60.9	15.8	26.4	173.0
<b>MTD18067</b>	37.4	58.8	15.8	25.8	173.0
<b>MTD18381</b>	40.3	59.2	14.8	26.0	170.0
<b>MTD18181</b>	34.3	59.4	16.5	26.1	174.0
<b>MTD18256</b>	41.9	59.0	15.6	27.4	174.0
<b>MTD18217</b>	40.9	59.4	16.4	27.6	175.0
<b>MTD18266</b>	40.6	60.4	<b>16.6*</b>	26.7	174.0
<b>MTD18148</b>	<b>44.4*</b>	59.6	15.4	22.2	171.0
<b>MTD18313</b>	44.0	<b>62.0**</b>	14.9	20.8	167.0
<b>Average</b>	40.6	59.4	15.8	26.3	173.0
<b>LSD (0.05)</b>	2.6	0.7	0.8	2.1	1.1
<b>Prob &gt; F</b>	<0.001	<0.001	<0.001	<0.001	<0.001
<b>CV (%)</b>	3.5	0.7	3.0	4.5	0.4
<b>Lattice RE %<sup>4</sup></b>	223	133	118	125	100

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>>50% of heads 100% out of the boot

<sup>4</sup>Adjusted means provided for Lattice RE% values equal to or greater than 100%

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 11. Agronomic Data EARC Irrigated 2021 Durum Variety Trial**

<b>ID</b>	<b>Yield<sup>1</sup></b>	<b>Test weight</b>	<b>Protein<sup>2</sup></b>	<b>Plant Height</b>	<b>Heading Date<sup>3</sup></b>
	<b>bu/ac</b>	<b>lb/bu</b>	<b>%</b>	<b>Inches</b>	<b>Julian</b>
<b>Mountrail</b>	48.5	60.2	<b>14.5*</b>	<b>31.4*</b>	180.1
<b>Grenora</b>	61.7	<b>62.2*</b>	12.9	29.8	179.6
<b>Divide</b>	51.9	61.0	14.0	<b>31.2*</b>	180.7
<b>Tioga</b>	52.1	61.4	14.0	<b>32.5*</b>	179.4
<b>Carpio</b>	47.6	59.2	<b>14.6*</b>	30.8	180.8
<b>Joppa</b>	62.8	<b>62.7*</b>	13.0	<b>33.1*</b>	179.2
<b>ND-Riveland</b>	62.2	<b>62.1*</b>	<b>14.3*</b>	<b>33.1*</b>	179.4
<b>ND-Grano</b>	57.2	61.7	14.0	29.6	180.8
<b>CDC-Vivid</b>	50.2	<b>62.0*</b>	<b>14.9*</b>	30.3	180.2
<b>Lustre</b>	53.9	60.0	13.9	<b>32.1*</b>	180.0
<b>MTD18155</b>	57.1	61.8	<b>14.3*</b>	30.5	179.2
<b>MTD16001</b>	49.6	59.9	13.4	<b>31.5*</b>	180.0
<b>MTD16002</b>	56.6	<b>61.9*</b>	13.3	<b>33.1*</b>	181.1
<b>MTD18213</b>	52.8	59.8	13.3	30.4	182.3
<b>MTD18486</b>	57.1	61.7	13.6	<b>33.2*</b>	<b>184.8*</b>
<b>MTD18413</b>	55.7	59.9	<b>14.7*</b>	<b>31.6*</b>	180.2
<b>MTD18348</b>	49.9	61.0	13.8	<b>32.4*</b>	182.4
<b>MTD18091</b>	49.2	60.5	13.9	29.5	182.1
<b>MTD18430</b>	56.4	61.4	13.4	<b>32.1*</b>	<b>185.1*</b>
<b>MTD18179</b>	56.6	60.2	<b>15.0*</b>	29.9	180.5
<b>MTD18172</b>	60.0	<b>62.3*</b>	<b>14.2*</b>	<b>32.8*</b>	181.2
<b>MTD18067</b>	<b>71.3**</b>	62.9*	12.4	30.2	180.4
<b>MTD18381</b>	49.7	60.8	<b>14.5*</b>	<b>32.9*</b>	179.0
<b>MTD18181</b>	48.7	<b>62.6*</b>	<b>14.5*</b>	<b>31.2*</b>	<b>184.4*</b>
<b>MTD18256</b>	<b>63.2*</b>	61.5	13.6	<b>33.2*</b>	182.5
<b>MTD18217</b>	46.3	60.9	14.1	<b>33.8**</b>	<b>185.2**</b>
<b>MTD18266</b>	49.8	61.9	<b>14.9*</b>	<b>31.5*</b>	183.6
<b>MTD18148</b>	56.1	<b>62.3*</b>	<b>14.8*</b>	22	177.3
<b>MTD18313</b>	52.5	<b>62.7**</b>	<b>15.1**</b>	26	176.9
<b>Average</b>	54.7	61.3	14	31.1	180.9
<b>LSD (0.05)</b>	8.2	1.0	0.8	2.8	1.3
<b>Prob &gt; F</b>	<0.001	<0.001	<0.001	<0.001	<0.001
<b>CV (%)</b>	8.5	0.9	3.3	5.0	0.4
<b>Lattice RE%<sup>4</sup></b>	114	108	144	130	116

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>>50% of heads 100% out of the boot

<sup>4</sup>Adjusted means provided for Lattice RE% values equal to or greater than 100%

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 12. Agronomic Data Turner Dryland Off-station 2021 Durum Variety Trial**

<b>ID</b>	<b>Yield<sup>1</sup></b>	<b>Test Weight</b>	<b>Protein<sup>2</sup></b>	<b>Plant Height</b>	<b>Stand<sup>3</sup></b>	<b>Sawfly<sup>4</sup></b>	<b>Falling number</b>
	<b>bu/ac</b>	<b>lb/bu</b>	<b>%</b>	<b>Inches</b>	<b>%</b>	<b>%</b>	<b>Seconds</b>
<b>Mountrail</b>	6.7	56.1	<b>17.4**</b>	13.1	98.4	0.3	294.8
<b>Grenora</b>	6.2	55.7	16.0	16.7	97.1	0.7	243.8
<b>Divide</b>	11.3	57.1	16.1	18.1	98.7	1.0	335.7
<b>Tioga</b>	12.3	58.8	16.1	18.4	98.4	2.3	297.4
<b>Carpio</b>	<b>14.0*</b>	57.3	15.8	17.5	99.4	1.0	347.9
<b>Joppa</b>	12.0	58.3	15.9	18.3	98.4	2.3	286.8
<b>ND-Riveland</b>	<b>15.2**</b>	58.6	15.5	<b>20.9*</b>	95.2	2.3	<b>399.2**</b>
<b>ND-Grano</b>	<b>13.6*</b>	<b>59.1*</b>	16.0	16.6	96.2	0.7	347.1
<b>CDC-Vivid</b>	12.5	58.6	16.4	17.0	<b>99.4**</b>	<b>2.3**</b>	341.8
<b>Lustre</b>	9.9	56.0	16.8	18.2	97.8	2.3	372.5
<b>MTD-16001</b>	6.8	55.7	16.2	<b>19.1*</b>	98.7	1.0	293.1
<b>MTD16002</b>	9.4	56.9	16.6	17.0	98.4	0.7	319.3
<b>MTD18348</b>	13.0	57.5	16.1	<b>21.2**</b>	98.1	1.0	<b>374.9*</b>
<b>MTD18313</b>	8.7	<b>60.0*</b>	<b>17.1*</b>	14.4	97.4	0.7	351.9
<b>Average</b>	10.7	57.5	16.2	17.5	98.0	1.3	322.1
<b>LSD (0.05)</b>	1.7	1.2	0.7	2.7	2.4	2.2	25.4
<b>Prob &gt; F</b>	<0.001	<0.001	<0.001	<0.001	0.071	0.400	<0.001
<b>CV (%)</b>	9.4	1.2	2.4	9.1	1.5	101.2	4.7

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>Percent stand visually estimated at early tillering

<sup>4</sup>Lodging due to sawfly cutting visually estimated at maturity

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 13. Agronomic Data Chester Dryland Off-station 2021 Durum Variety Trial**

<b>ID</b>	<b>Yield<sup>1</sup></b>	<b>Test Weight</b>	<b>Protein<sup>2</sup></b>	<b>Plant Height</b>	<b>Stand<sup>3</sup></b>	<b>Sawfly<sup>4</sup></b>	<b>Falling Number</b>
	<b>bu/ac</b>	<b>lb/bu</b>	<b>%</b>	<b>Inches</b>	<b>%</b>	<b>%</b>	<b>Seconds</b>
<b>Mountrail</b>	22.3	55.4	17.1	23.0	99.4	5.3	189.1
<b>Grenora</b>	<b>26.3*</b>	55.0	16.3	22.6	98.7	3.7	106.5
<b>Divide</b>	24.6	56.3	16.7	<b>25.2*</b>	97.5	1.0	209.3
<b>Tioga</b>	20.2	56.1	<b>17.4*</b>	<b>25.7**</b>	98.6	5.3	92.3
<b>Carpio</b>	23.2	54.4	17.1	24.1	99.4	0.7	201.4
<b>Joppa</b>	21.8	56.4	16.9	24.0	99.0	5.3	163.2
<b>ND-Riveland</b>	24.0	56.8	16.9	<b>24.5*</b>	99.3	1.0	<b>224.1*</b>
<b>ND-Grano</b>	22.1	56.1	16.8	22.2	98.4	<b>10.0**</b>	168.7
<b>CDC-Vivid</b>	<b>25.2*</b>	56.7	17.0	22.9	96.9	2.3	142.5
<b>Lustre</b>	21.1	55.0	<b>17.6**</b>	25.2	99.0	1.0	185.8
<b>MTD-16001</b>	<b>26.9*</b>	56.1	16.4	<b>24.3*</b>	99.0	1.0	205.9
<b>MTD16002</b>	19.9	55.5	<b>17.4*</b>	24.0	99.0	1.8	202.9
<b>MTD18348</b>	<b>26.3*</b>	57.4	16.2	<b>25.0*</b>	98.4	2.3	150.2
<b>MTD18313</b>	<b>27.9**</b>	<b>58.6**</b>	16.4	20.6	98.4	0.5	<b>242.1**</b>
<b>Average</b>	23.8	56.1	16.8	23.7	98.6	3.2	171.6
<b>LSD (0.05)</b>	2.7	0.6	0.4	1.6	2.5	4.2	24.4
<b>Prob &gt; F</b>	<0.001	<0.001	<0.001	<0.001	0.780	0.001	<0.001
<b>CV (%)</b>	6.3	0.6	1.2	3.7	1.5	74.9	7.9

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>Percent stand visually estimated at early tillering

<sup>4</sup>Lodging due to sawfly cutting visually estimated at maturity

<sup>5</sup>Falling number reported on a 14% moisture basis

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 14. Agronomic Data Loring Dryland Off-station 2021 Durum Variety Trial**

<b>ID</b>	<b>Yield<sup>1</sup></b>	<b>Test Weight</b>	<b>Protein<sup>2</sup></b>	<b>Plant Height</b>	<b>Stand<sup>3</sup></b>	<b>Sawfly<sup>4</sup></b>	<b>Falling Number</b>
	<b>bu/ac</b>	<b>lb/bu</b>	<b>%</b>	<b>inches</b>	<b>%</b>	<b>%</b>	<b>Seconds</b>
<b>Mountrail</b>	26.6	58.4	16.2	20.3	99.3	2.3	415.4
<b>Grenora</b>	26.3	58.9	15.6	20.8	98.7	<b>8.3*</b>	389.7
<b>Divide</b>	22.9	59.6	16.0	21.3	97.4	<b>8.3*</b>	406.4
<b>Tioga</b>	25.5	59.6	16.1	<b>23.1*</b>	98.1	2.3	395.4
<b>Carpio</b>	27.0	58.7	15.5	21.6	96.8	1.0	429.4
<b>Joppa</b>	24.7	59.9	15.9	<b>22.3*</b>	98.7	2.3	428.5
<b>ND-Riveland</b>	24.8	59.1	16.0	<b>23.2*</b>	97.4	1.0	<b>467.2*</b>
<b>ND-Grano</b>	<b>27.3*</b>	59.8	16.3	20.9	98.4	2.3	443.0
<b>CDC-Vivid</b>	23.9	59.5	<b>16.9**</b>	22.1	98.7	<b>8.3**</b>	<b>457.3*</b>
<b>Lustre</b>	24.1	58.0	16.3	21.7	100.0	3.7	<b>471.5**</b>
<b>MTD-16001</b>	23.7	59.4	15.9	19.9	100.0	2.3	440.0
<b>MTD16002</b>	22.8	59.4	16.1	<b>23.8**</b>	99.7	3.7	<b>459.8*</b>
<b>MTD18348</b>	<b>29.3**</b>	59.1	15.5	21.9	97.4	2.3	<b>462.5*</b>
<b>MTD18313</b>	<b>28.1*</b>	<b>62.0**</b>	15.8	19.9	99.4	3.7	<b>461.5*</b>
<b>Average</b>	25.7	59.4	16.0	21.5	98.5	3.7	436.9
<b>LSD (0.05)</b>	2.0	0.4	0.3	1.6	2.3	3.5	18.7
<b>Prob &gt; F</b>	<0.001	<0.001	<0.001	<0.001	0.116	<0.001	<0.001
<b>CV (%)</b>	4.7	0.4	1.2	4.5	1.4	57.2	2.6

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

<sup>3</sup>Percent stand visually estimated at early tillering

<sup>4</sup>Lodging due to sawfly cutting visually estimated at maturity

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level



**Table 15. Agronomic Data EARC Dagmar Dryland Off-station 2021 Durum Variety Trial**

<b>ID</b>	<b>Yield<sup>1</sup></b>	<b>Test Weight</b>	<b>Protein<sup>2</sup></b>	<b>Plant Height</b>
	<b>bu/ac</b>	<b>lb/bu</b>	<b>%</b>	<b>Inches</b>
<b>Mountrail</b>	16.1	63.1	17.3	<b>19.8*</b>
<b>Grenora</b>	19.3	63.2	16.5	18.8
<b>Divide</b>	19.5	63.6	16.6	<b>21.0*</b>
<b>Tioga</b>	19.1	63.6	<b>17.2*</b>	<b>22.4**</b>
<b>Carpio</b>	17.8	63.1	16.5	<b>19.3*</b>
<b>Joppa</b>	18.5	<b>64.0*</b>	16.5	<b>20.3*</b>
<b>ND-Riveland</b>	22.1	63.8	16.4	<b>22.2*</b>
<b>ND-Grano</b>	16.2	63.8	<b>17.4*</b>	<b>19.8*</b>
<b>CDC-Vivid</b>	18.4	<b>63.9*</b>	<b>18.2**</b>	<b>22.0*</b>
<b>Lustre</b>	16.1	62.4	<b>17.9*</b>	17.2
<b>MTD16001</b>	18.6	63.2	<b>16.2*</b>	<b>19.4*</b>
<b>MTD16002</b>	20.5	62.9	16	<b>20.9*</b>
<b>MTD18348</b>	<b>24.8**</b>	63.5	16	<b>22.6*</b>
<b>MTD18313</b>	16.1	<b>64.9**</b>	<b>17.2*</b>	17.3
<b>Average</b>	18.7	63.5	16.8	20.1
<b>LSD (0.05)</b>	6.6	1.0	1.0	3.0
<b>Prob &gt; F</b>	0.371	0.016	0.002	0.008
<b>CV (%)</b>	21.0	1.0	3.6	9.0

<sup>1</sup>Grain yield reported on a 13% moisture basis

<sup>2</sup>Grain protein reported on a 12% moisture basis

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

Table 16. Seed Quality Data All On-station 2021 Durum Variety Trials (n=8)

ID	Test weight <sup>1</sup>	Large seeds <sup>1</sup>	Small seeds <sup>1</sup>	Hardness index <sup>1</sup>	Individual Seed Weight <sup>1,2</sup>	Individual Seed Diameter <sup>1,2</sup>	Grain Protein <sup>3</sup>	Grain ash <sup>1,4</sup>	Falling number
	lbs/bu	%	%		mg	mm	%	%	Seconds
Mountrail	58.3	28.0	<b>26.3*</b>	74.2	34.8	2.63	15.4	<b>1.56*</b>	438.3
Grenora	58.9	33.1	21.7	79.2	<b>35.6*</b>	2.66	14.6	<b>1.58*</b>	436.9
Divide	59.1	32.9	21.3	77.4	34.5	2.62	15.1	1.52	414.7
Tioga	59.2	38.0	19.1	76.5	<b>35.6*</b>	<b>2.68*</b>	15.3	<b>1.56*</b>	402.2
Carpio	58.3	37.1	19.6	76.5	33.9	2.61	15.3	<b>1.56*</b>	416.6
Joppa	59.8	29.7	<b>22.7</b>	77.6	<b>35.5*</b>	2.64	14.7	1.52	415.1
ND-Riveland	59.1	41.1	15.9	75.4	<b>36.8*</b>	<b>2.69*</b>	15.2	<b>1.57*</b>	439.0
ND-Grano	59.7	31.3	<b>24.3*</b>	77.5	34.0	2.61	15.0	1.52	419.5
CDC-Vivid	59.3	40.0	17.9	80.7	34.6	2.63	<b>15.9*</b>	<b>1.56*</b>	437.9
Lustre	57.7	23.1	<b>24.9*</b>	77.2	33.3	2.58	15.4	1.53	446.7
MTD18155	59.0	44.1	14.7	80.6	35.3	<b>2.73*</b>	15.4	<b>1.57*</b>	377.6
MTD16001	58.5	28.3	<b>24.4*</b>	78.4	34.4	2.61	14.5	1.50	430.9
MTD16002	59.1	27.1	<b>24.4*</b>	<b>84.0**</b>	32.0	2.60	14.9	1.49	437.3
MTD18213	57.7	39.6	20.1	71.2	<b>36.2*</b>	2.62	15.2	<b>1.60*</b>	449.4
MTD18486	60.1	<b>55.1**</b>	12.0	80.4	<b>36.0*</b>	<b>2.72*</b>	14.8	<b>1.56</b>	426.8
MTD18413	58.9	44.7	14.9	75.5	35.2	2.65	15.4	1.54	373.5
MTD18348	59.4	<b>52.1*</b>	11.7	77.0	<b>37.0**</b>	<b>2.74*</b>	15.0	<b>1.57*</b>	434.8
MTD18091	58.8	30.7	<b>26.4**</b>	77.3	32.7	2.57	15.4	<b>1.56*</b>	405.6
MTD18430	57.8	33.7	20.3	77.0	34.2	2.61	15.5	<b>1.61**</b>	<b>467.5*</b>
MTD18179	57.1	29.9	<b>24.3*</b>	79.7	32.2	2.56	<b>16.1**</b>	<b>1.59*</b>	413.2
MTD18172	<b>60.5*</b>	46.6	13.1	79.7	<b>36.4*</b>	<b>2.74*</b>	15.4	1.52	379.3
MTD18067	59	35.4	19.0	77.1	<b>36.6*</b>	<b>2.68*</b>	15.0	1.54	385.6
MTD18381	58.9	34.9	18.7	78.8	34.5	<b>2.68*</b>	15.2	<b>1.58*</b>	421.4
MTD18181	59.6	34.0	18.7	80.8	34.1	2.65	<b>16.0*</b>	1.53	417.7
MTD18256	59.3	41.0	17.1	79.0	35.2	<b>2.68*</b>	15.3	<b>1.61*</b>	433.1
MTD18217	59.1	47.7	13.7	74.7	<b>35.8*</b>	<b>2.67*</b>	15.0	<b>1.57*</b>	424.4
MTD18266	60.1	43.6	14.4	80.6	<b>36.7*</b>	<b>2.72*</b>	<b>15.7*</b>	<b>1.58*</b>	438.9
MTD18148	59.6	38.6	17.4	<b>81.6*</b>	35.4	<b>2.71*</b>	15.4	<b>1.58*</b>	<b>486.5**</b>
MTD18313	<b>61.3**</b>	42.6	14.9	<b>82.6*</b>	34.2	<b>2.72*</b>	15.3	1.53	435.6
Average	59.1	37.4	19.1	78.2	34.9	2.7	15.3	1.55	424.4
LSD (0.05)	1.2	6.7	4.6	2.8	1.5	0.06	0.5	0.06	34.2
Prob > F	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
CV (%)	2.1	17.0	23.0	3.4	4.2	2.3	3.5	3.5	7.6

<sup>1</sup>n=7

<sup>2</sup>Determined using the single kernel characterization system

<sup>3</sup>Grain protein reported on a 12% moisture basis

<sup>4</sup>Grain ash reported on a 14% moisture basis

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

Table 17. Milling Data All On-station 2021 Durum Variety Trials (n=8)

ID	Bran <sup>1</sup>	Shorts <sup>1</sup>	Semolina <sup>1</sup>	Semolina Protein <sup>2</sup>	Semolina ash <sup>2</sup>
	%	%	%	%	%
Mountrail	27.4	13.0	59.6	<b>14.3*</b>	<b>0.68*</b>
Grenora	28.4	13.3	58.3	13.2	0.65
Divide	27.8	12.7	59.4	13.5	0.63
Tioga	27.0	12.7	<b>60.4*</b>	13.9	0.65
Carpio	27.6	13.4	58.9	13.8	<b>0.66*</b>
Joppa	26.9	12.9	<b>60.2*</b>	13.2	0.64
ND-Riveland	<b>29.3**</b>	<b>14.0*</b>	56.7	13.4	0.64
ND-Grano	27.1	12.7	<b>60.2*</b>	13.5	0.64
CDC-Vivid	27.7	<b>14.4**</b>	58.0	<b>14.4*</b>	<b>0.69*</b>
Lustre	27.7	13.6	58.7	14.0	<b>0.67*</b>
MTD18155	27.8	13.5	58.7	14.0	0.63
MTD16001	27.5	13.0	59.5	13.1	0.63
MTD16002	28.0	13.2	58.8	13.5	0.62
MTD18213	<b>28.7*</b>	13.2	58.1	13.7	<b>0.67*</b>
MTD18486	28.3	14.0	57.7	13.3	<b>0.69*</b>
MTD18413	<b>28.9*</b>	12.8	58.3	13.8	0.64
MTD18348	27.0	13.3	59.7	13.2	<b>0.67*</b>
MTD18091	27.7	13.2	59.2	14.0	<b>0.68*</b>
MTD18430	<b>28.6*</b>	<b>14.1*</b>	57.3	14.2	<b>0.69**</b>
MTD18179	<b>29.2*</b>	13.9	56.9	<b>14.7**</b>	0.66
MTD18172	26.4	12.9	<b>60.6*</b>	13.9	0.61
MTD18067	26.7	12.5	<b>60.8**</b>	13.7	0.66
MTD18381	26.2	13.3	<b>60.4*</b>	13.6	<b>0.67*</b>
MTD18181	27.8	12.6	59.6	<b>14.3*</b>	0.59
MTD18256	27.3	13.6	59.1	13.8	<b>0.67*</b>
MTD18217	26.6	13.2	<b>60.3*</b>	13.5	0.66
MTD18266	27.1	<b>14.2*</b>	58.7	14.1	0.66
MTD18148	26.9	<b>14.5*</b>	58.6	14.1	<b>0.68*</b>
MTD18313	26.3	13.5	<b>60.2*</b>	13.6	0.62
Average	27.6	13.3	59.1	13.8	0.65
LSD (0.05)	0.8	0.5	1.0	0.5	0.03
Prob > F	<0.001	<0.001	<0.001	<0.001	<0.001
CV (%)	3.0	1.2	1.8	3.9	4.2

<sup>1</sup>Milling fractions obtained from Brabender Quadramat Jr. milling and separated with a U.S. #35 sieve

<sup>2</sup>Semolina protein and ash reported on a 14% moisture basis

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

Table 18. Semolina Quality Data All On-station 2021 Durum Variety Trials (n=8)

ID	CIELAB Color Space <sup>1</sup>			Mix Time <sup>2</sup>	Peak Integral <sup>2</sup>	Gluten Index <sup>3</sup>
	L*	b*	a*	min	%TQ*min	
Mountrail	84.6	27.1	-2.51**	2.1	95.6	37.0
Grenora	84.8*	30.1	-2.96	2.9	138.8	69.5
Divide	84.6	28.7	-2.69	3.2	151.5	83.5
Tioga	84.5	30.6	-2.81	3.7	174.6	87.5*
Carpio	84.5	31.5	-3.10	4.2	217.1	97.0**
Joppa	84.5	31.2	-2.90	3.9	178.8	90.5*
ND-Riveland	84.6	31.5	-3.09	4.0	197.7	95.5*
ND-Grano	84.7	31.5	-3.15	3.2	157.6	89.0*
CDC-Vivid	83.9	32.5	-2.80	5.3**	237.6**	93.5*
Lustre	84.3	29.4	-2.56*	3.1	149.0	71.5
MTD18155	84.6	28.1	-2.65*	4.0	173.6	71.5
MTD16001	84.6	29.4	-2.76	3.2	156.7	74.0
MTD16002	84.4	28.8	-2.75	2.7	127.0	55.0
MTD18213	84.1	34.0**	-3.21	3.2	160.2	87.5*
MTD18486	84.3	32.8	-3.12	4.5	223.0*	94.5*
MTD18413	84.6	28.9	-2.79	3.5	167.7	89.0*
MTD18348	84.3	32.0	-3.05	4.4	219.9	96.0*
MTD18091	84.6	30.5	-3.04	3.2	156.9	89.0*
MTD18430	84.5	31.1	-3.18	3.7	193.8	94.0*
MTD18179	83.9	31.9	-2.85	4.5	209.3	89.0*
MTD18172	85.1**	27.2	-2.78	2.7	119.6	68.0
MTD18067	84.7	29.5	-2.86	3.3	155.8	88.0*
MTD18381	84.6	30.3	-2.96	3.3	148.8	74.0
MTD18181	84.3	32.0	-2.92	3.7	181.4	93.0*
MTD18256	84.3	31.1	-2.94	4.2	197.0	87.0*
MTD18217	84.6	31.4	-3.15	4.3	212.8	96.0*
MTD18266	84.5	29.9	-2.91	3.2	151.2	75.0
MTD18148	83.9	31.8	-2.74	4.2	200.5	96.0*
MTD18313	84.2	29.3	-2.62*	3.9	167.6	75.5
Average	84.5	30.5	-2.89	3.6	173.1	83.0
LSD (0.05)	0.4	0.9	0.14	0.3	16.9	12.9
Prob > F	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CV (%)	0.4	3.0	5.1	8.3	9.9	7.6

<sup>1</sup>CIELAB Color Space L\*=whiteness, b\*=yellowness, a\*redness

<sup>2</sup>Mixograph midline analysis

<sup>3</sup>n=2, Bozeman dryland and NARC dryland

\*\* Indicates highest entry within a column

\* Indicates entries ranking equal to the highest entry based on Fisher's Unrestricted LSD at the 0.05 probability level

**Table 19: Durum Fusarium Head Blight Evaluation 2021 (Dr. Frankie Crutcher, EARC, Sidney, MT)**

<b>ID</b>	<b>Severity<sup>1</sup></b>	<b>Incidence<sup>2</sup></b>	<b>Index<sup>3</sup></b>	<b>FDK<sup>4</sup></b>	<b>Yield</b>
	<b>%</b>	<b>%</b>		<b>%</b>	<b>bu/ac</b>
<b>Mountrail</b>	34.8 AB	92.2	32.3 AB	16.7 AB	31.4 AB
<b>Grenora</b>	21.6 B	72.2	15.8 B	10.0 B	32.0 AB
<b>Divide</b>	28.4 AB	88.9	25.3 AB	21.7 AB	33.7 AB
<b>Tioga</b>	21.6 B	85.6	18.8 AB	15.0 AB	36.0 AB
<b>Carpio</b>	26.7 AB	83.3	22.3 AB	25.0 AB	37.5 AB
<b>Joppa</b>	19.9 B	81.1	16.3 B	18.3 AB	43.0 AB
<b>ND-Riveland</b>	15.1 B	83.3	12.6 B	16.7 AB	46.0 A
<b>ND-Grano</b>	18.9 B	82.2	16.2 B	13.3 AB	36.1 AB
<b>CDC-Vivid</b>	33.9 AB	94.4	32.1 AB	26.7 AB	32.8 AB
<b>Lustre</b>	27.4 AB	75.6	21.9 AB	16.7 AB	31.9 AB
<b>MTD18155</b>	25.8 AB	90	23.9 AB	16.7 AB	35.3 AB
<b>MTD16001</b>	26.3 AB	82.2	22.3 AB	11.7 AB	35.5 AB
<b>MTD16002</b>	28.6 AB	78.9	22.9 AB	18.3 AB	33.6 AB
<b>MTD18213</b>	22.9 B	80	18.7 AB	23.3 AB	40.3 AB
<b>MTD18486</b>	20.0 B	78.9	16.3 B	33.3 AB	27.2 AB
<b>MTD18413</b>	17.1 B	78.9	13.7 B	21.7 AB	40.6 AB
<b>MTD18348</b>	23.4 B	86.7	20.3 AB	26.7 AB	35.2 AB
<b>MTD18091</b>	24.0 B	88.9	21.4 AB	21.7 AB	37.1 AB
<b>MTD18430</b>	23.0 B	71.1	16.5 B	36.7 AB	31.1 AB
<b>MTD18179</b>	34.7 AB	90	31.4 AB	26.7 AB	35.6 AB
<b>MTD18172</b>	34.3 AB	90	31.1 AB	30.0 AB	24.5 AB
<b>MTD18067</b>	23.6 B	88.9	20.9 AB	35.0 AB	27.6 AB
<b>MTD18381</b>	49.0 A	88.9	43.4 A	20.0 AB	23.4 AB
<b>MTD18181</b>	28.8 AB	86.7	25.0 AB	25.0 AB	23.6 AB
<b>MTD18256</b>	20.6 B	82.2	16.9 B	16.7 AB	33.9 AB
<b>MTD18217</b>	13.5 B	70	9.7 B	23.3 AB	36.1 AB
<b>MTD18266</b>	17.9 B	76.7	14.0 B	25.0 AB	38.6 AB
<b>MTD18148</b>	27.8 AB	86.7	25.1 AB	28.3 AB	21.5 B
<b>MTD18313</b>	27.2 AB	90	24.8 AB	43.3 A	32.4 AB
<b>Average</b>	25.2	83.5	21.6	22.5	33.5
<b>Prob &gt; F</b>	<0.001	0.160	0.001	0.030	0.040
<b>CV (%)</b>	37	12	44.1	50.9	25.2
<b>HSD (5%)<sup>5</sup></b>	23.5	N/A	25.1	32.7	24.4

<sup>1</sup>Pest Severity: Average percent area of head covered by disease. Thirty heads were evaluated for each plot

<sup>2</sup>Pest Incidence: Percent of thirty plants per plot that had visible FHB symptoms

<sup>3</sup>Index: Severity X Incidence / 100

<sup>4</sup>Percent of Fusarium diseased kernels

<sup>5</sup>Letters in common did not differ significantly according to a Tukey's HSD test at a significance level of 5%

**Table 20. Durum Stem Rust Evaluation 2021 (Dr. Li Huang, MSU, Bozeman, MT)**

<b>ID</b>	<b>Infection Type<sup>1</sup></b>	<b>Level of Reaction</b>
<b>Mountrail</b>	;	VR
<b>Grenora</b>	;1=	R
<b>Divide</b>	1=1C	R
<b>Tioga</b>	1=	R
<b>Carpio</b>	;	VR
<b>Joppa</b>	1=~2C	R~MR
<b>ND-Riveland</b>	1=	R
<b>ND-Grano</b>	;	VR
<b>CDC-Vivid</b>	1=1+C	R
<b>Lustre</b>	1=1+C	R
<b>MTD18155</b>	1=2C	R
<b>MTD16001</b>	1=	R
<b>MTD16002</b>	2-C	MR
<b>MTD18213</b>	;1+C	R
<b>MTD18486</b>	1=	R
<b>MTD18413</b>	1=C	R
<b>MTD18348</b>	1-	R
<b>MTD18091</b>	1=	R
<b>MTD18430</b>	1-C~2C	R~MR
<b>MTD18179</b>	1=C	R
<b>MTD18172</b>	1 2 C	R
<b>MTD18067</b>	1=C	R
<b>MTD18381</b>	1-2+C	R
<b>MTD18181</b>	2C	MR
<b>MTD18256</b>	2 3-C	MS
<b>MTD18217</b>	1-C	R
<b>MTD18266</b>	1 2 C	MR
<b>MTD18148</b>	1-C	R
<b>MTD18313</b>	1-C	R

<sup>1</sup>Inoculated with *Puccinia graminis* isolate TPMKC on 4/19/2021 scored 5/3/2021. 0 = immune (R), “;” = Very Resistant (VR), 1=Resistant (R), 2 = Moderately resistant (MR), 3 = Moderately susceptible (MS), 4 = Susceptible (S), Chlorosis (C). Variations are given by + and = to indicate more or less than usual

**Table 21. Durum Fungal Leaf Spot Evaluation 2021 (Dr. Zhaohui Liu, NDSU, Fargo, ND)**

<b>ID</b>	<b>Ptr ToxA<sup>1</sup></b>	<b>Ptr Race 1<sup>2</sup></b>	<b>Ptr Race 5<sup>2</sup></b>	<b>Sn4</b>
<b>Mountrail</b>	ND	3.0	2.0	2.0
<b>Grenora</b>	1	3.0	2.0	2.0
<b>Divide</b>	1	2.5	1.5	3.0
<b>Tioga</b>	1	1.5	1.5	1.0
<b>Carpio</b>	1	2.0	1.5	2.5
<b>Joppa</b>	1	3.5	3.5	3.0
<b>ND-Riveland</b>	0	2.5	2.5	2.0
<b>ND-Grano</b>	1	2.5	2.0	3.0
<b>CDC-Vivid</b>	1	1.5	1.0	3.5
<b>Lustre</b>	1	1.0	1.0	2.5
<b>MTD18155</b>	1	2.0	1.0	2.0
<b>MTD16001</b>	0	3.5	2.5	1.5
<b>MTD16002</b>	0	1.5	2.5	1.5
<b>MTD18213</b>	1	2.0	1.0	2.5
<b>MTD18486</b>	1	3.5	3.0	1.0
<b>MTD18413</b>	ND	1.5	1.5	2.5
<b>MTD18348</b>	1	1.0	3.0	2.0
<b>MTD18091</b>	1	2.5	2.5	2.0
<b>MTD18430</b>	0	1.0	ND	1.0
<b>MTD18179</b>	ND	1.0	ND	1.0
<b>MTD18172</b>	1	3.0	3.0	2.5
<b>MTD18067</b>	1	2.0	1.5	2.5
<b>MTD18381</b>	1	1.5	3.0	2.0
<b>MTD18181</b>	ND	ND	ND	3.0
<b>MTD18256</b>	1	2.5	2.5	3.0
<b>MTD18217</b>	1	2.5	1.5	3.0
<b>MTD18266</b>	0	2.0	2.5	1.0
<b>MTD18148</b>	1	2.0	3.5	2.0
<b>MTD18313</b>	1	1.0	2.0	1.0
<b>Salamouni (check)</b>	0	1.5	1.0	1.0
<b>Glenelea (check)</b>	1	4.0	2.5	4.0

<sup>1</sup>*P. tritici-repentis* (Ptr) ToxA: 0=insensitive; 1=sensitive, ND=no data. ToxA sensitivity is conferred by wheat *Tsn1*

<sup>2</sup>Evaluation with Ptr races 1 (predominant in North Dakota) and 5 using a 0-5 scale, 1,2=resistant, 3=moderately susceptible, 4, 5=highly susceptible, ND=no data

<sup>3</sup>Evaluation with *Septoria nodorum* isolate Sn4 (predominant in North Dakota) using 0-5 scale, 0-2=resistant, 3=moderately susceptible, 4,5=highly susceptible

**Table 22. Durum Stripe Rust Evaluation 2021 (Dr. Xianming Chen, USDA-ARS, Pullman, WA)**

ID	MOUNT VERNON <sup>2</sup>			
	5/26		6/22	
	Fks 3 <sup>3</sup>		Fks 10.53 <sup>3</sup>	
	IT <sup>1</sup>	%	IT <sup>1</sup>	%
<b>Mountrail</b>	<b>8</b>	80	2	15
<b>Grenora</b>	8	70	2	10
<b>Divide</b>	<b>5</b>	40	2	10
<b>Tioga</b>	5	40	2	15
<b>Carpio</b>	5	40	2	15
<b>Joppa</b>	<b>8</b>	70	3	20
<b>ND-Riveland</b>	<b>5</b>	40	3	20
<b>ND-Grano</b>	<b>5</b>	40	2	10
<b>CDC-Vivid</b>	5	40	2	10
<b>Lustre</b>	5	40	2	10
<b>MTD18155</b>	8	70	3	20
<b>MTD16001</b>	8	70	3	20
<b>MTD16002</b>	5	30	2	10
<b>MTD18213</b>	5	40	2	10
<b>MTD18486</b>	5	40	2	5
<b>MTD18413</b>	8	70	5	30
<b>MTD18348</b>	5	40	5	30
<b>MTD18091</b>	8	70	5	30
<b>MTD18430</b>	8	70	2	10
<b>MTD18179</b>	5	40	2	5
<b>MTD18172</b>	5	40	2	5
<b>MTD18067</b>	5	40	3	20
<b>MTD18381</b>	5	30	3	20
<b>MTD18181</b>	5	30	2	5
<b>MTD18256</b>	8	70	2	5
<b>MTD18217</b>	8	70	2	5
<b>MTD18266</b>	8	70	2	10
<b>MTD18148</b>	8	80	3	20
<b>MTD18313</b>	8	80	8	80
<b>Check</b>	9	80	9	100
<b>Check</b>	9	80	9	100

<sup>1</sup>Infection with naturally occurring *Puccinia striiformis*. Infection Type (IT) was recorded based on the 0-9 scale with ITs 8 and 9 combined as 8 (the most susceptible reaction) in field data. Generally, 0-3 are considered resistant, 4-6 intermediate, and 7-9 susceptible. Heterogenous reactions of an entry were indicated by two or more ITs separated by "," for most plants with the first IT and few plants with the second IT or connected with "-" for entries containing plants with continuous ITs

<sup>2</sup>Entries with a high IT in the first note, but a low IT in the second note at Mt. Vernon may indicate that they have high-temperature, adult-plant (HTAP) resistance

<sup>3</sup>Feekes (Fks) scale for wheat growth stages. 3=late tillering, 10.53=flowering