

North Dakota Durum Wheat

Variety Trial Results for 2010 and Selection Guide

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Durum was planted on 1.8 million acres in North Dakota in 2010, up from the 1.7 million acres planted in 2009. Precipitation was generally abundant in the durum-growing areas of North Dakota in 2010, and yields were a record 39.5 bushels per acre (bu/acre). The most commonly grown varieties in 2010 and the percent of the acreage they occupied were Divide (26.6), Mountrail (12.9), Lebsock (12.7), Alkabo (9.5), Pierce (7.9) and Grenora (7.0).

Durum varieties are tested each year at multiple sites throughout North Dakota. The relative performance of these varieties is presented in table form. Variety performance data are used to provide recommendations to producers. Some varieties may not be included in the tables due to insufficient testing or lack of seed availability, or they offer no yield or disease advantage over similar varieties.

The agronomic data presented in this publication are from replicated research plots using experimental designs that enable the use of statistical analysis. These analyses enable the reader to determine, at a predetermined level of confidence, if the differences observed among varieties are reliable or if they might be due to error inherent in the experimental process. The LSD (Least Significant Difference) numbers beneath the columns in tables are derived from these statistical analyses and only apply to the numbers in the column in which they appear. If the difference between two varieties exceeds the LSD value, it means that with 95 percent confidence (LSD probability 0.05), the higher-yielding variety has a significant yield advantage. When the difference between two varieties is less than the LSD value; there is no significant difference between those two varieties under those growing conditions. NS is used to indicate no significant difference for that trait among any of the varieties at the 95 percent level of confidence. The CV is a measure of variability in the trial. The CV stands for coefficient of variation and is expressed as a percentage. Large CVs mean a large amount of variation that could not be attributed to differences in the varieties.

Presentation of data for the entries tested does not imply approval or endorsement by the authors or agencies conducting the test. North Dakota State University approves the reproduction of any table in the publication only if no portion is deleted, appropriate footnotes are given and the order of the data is not rearranged. Additional data from county sites are available from each Research Extension Center at www.ag.ndsu.edu/varietytrials/durum. Use data from multiple locations and years when selecting a variety.

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Table 1. North Dakota durum wheat variety descriptions, agronomic traits, 2010.

Variety	Agent or Origin ¹	Year Released	Average			Reaction to Disease ⁴			
			Plant Height (in)	Straw Strength ²	Days to heading ³	Stem Rust	Leaf Rust	Foliar Disease	Head Scab
AC Commander	Can.	2002	32	5	68	R	R	MS	NA
AC Napoleon	Can.	2001	40	5	68	R	R	S	NA
AC Navigator	Can.	1999	32	5	66	R	R	M	S
Alkabo	ND	2005	36	2	67	R	R	M	MS
Alzada	WB	2004	30	6	63	R	R	S	VS
Belzer	ND	1997	39	5	66	R	R	M	MR
Ben	ND	1996	39	3	67	R	R	MR	S*
CDC Verona	Can.	2010	38	4	69	R	R	MR	S
DG Max	DGP	2008	38	5	66	R	MR	MR	MS
DG Star	DGP	2007	37	4	64	R	R	M	NA
Dilse	ND	2002	37	5	68	R	R	M	MS
Divide	ND	2005	38	5	68	R	R	M	MR
Grande D'Oro	WB/DGP	2005	37	4	68	R	R	M	NA
Grenora	ND	2005	35	5	67	R	R	M	MS
Kyle	Can.	1984	39	7	68	R	MR	M	NA
Lebsock	ND	1999	37	3	67	R	R	M	MS
Maier	ND	1998	37	5	67	R	R	M	S*
Mountrail	ND	1998	37	5	68	R	R	M	S*
Pierce	ND	2001	38	5	67	R	R	MS	S
Plaza	ND	1999	29	7	68	R	R	M	MS
Rugby	ND	1973	38	5	64	R	R	MR	S*
Strongfield	Can	2004	37	6	68	R	R	MS	S
Tioga	ND	2010	39	4	68	R	R	M	MS
Wales	WB	2008	36	3	67	R	R	M	S*
Westhope	WB	2009	36	3	67	R	R	MS	S

¹Refers to agent or developer: Can = Agriculture Canada, WB = Westbred, ND = North Dakota State University, DGP = Dakota Growers Pasta.²Straw Strength = 1-9 scale with 1 the strongest and 9 the weakest. Based on recent data. These values may change as more data become available.³Days to Head = the number of days from planting to head emergence from the boot. Averaged over several locations in 2010,⁴R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible; Foliar Disease = reaction to tan spot and septoria leaf spot complex..

* Indicates yields and/or quality often have been higher than would be expected based on visual symptoms. NA = Not adequately tested.

Table 2. North Dakota durum wheat variety quality descriptions, milling and processing data averaged for five years (2005-2009) in drill strip trials.

Variety	Test Weight (lb/bu)	Vitreous Kernels (%)	Large Kernels (%)	Falling Number (sec)	Wheat Protein ¹ (%)	Gluten Index ² (1-12)	Pasta Color ³ (g-cm)	Spaghetti Firmness	Overall Quality ⁴
AC Navigator	59.7	97	42	482	14.9	79	9.1	6.4	Good
Alkabo	60.6	90	45	407	14.5	63	9.2	5.8	Excellent
Ben	60.4	96	50	393	15.2	63	8.7	6.1	Average
Dilse	60.1	96	39	387	15.6	61	9.1	6.7	Excellent
Divide	59.7	92	44	441	14.9	82	9.0	6.2	Good
Grenora	59.5	95	46	442	14.6	74	9.2	6.0	Good
Lebsock	60.8	94	43	420	14.6	51	8.9	5.8	Good
Maier	60.1	96	41	418	15.4	64	9.0	6.6	Excellent
Mountrail	59.4	94	38	412	14.7	34	8.6	5.6	Average
Pierce	60.5	96	37	417	14.8	76	9.1	6.2	Excellent
Rugby	59.9	94	39	391	15.0	7	8.7	5.0	⁵
Tioga	60.1	93	50	388	14.9	--	8.8	6.8	Good
Average	60.1	94	43	416	14.9	59	8.9	6.1	

Table 3. North Dakota durum wheat variety quality descriptions, milling and processing data for 2009 at all locations in the drill strip trials.

Variety	Test Weight (lb/bu)	Vitreous Kernels (%)	Large Kernels (%)	Falling Number (sec)	Wheat Protein ¹ (%)	Gluten Index ² (1-12)	Pasta Color ³ (g-cm)	Spaghetti Firmness	Overall Quality ⁴
AC Commander	59.9	98	70	447	13.8	93	9.2	5.0	Good
AC Napoleon	59.7	95	67	459	13.6	64	9.3	4.8	Good
AC Navigator	60.4	98	67	452	13.8	79	9.0	5.1	Good
Alkabo	61.4	85	65	383	13.4	63	9.1	4.8	Good
Alzada ⁶	59.6	94	73	392	14.1	95	8.8	5.0	Good
Ben	58.3	97	70	369	14.4	63	8.3	4.7	Average
DG Max	61.2	94	71	344	14.1	74	8.9	4.7	Good
DG Star	60.2	93	63	318	14.0	91	8.8	4.8	Good
Dilse	61.1	94	61	364	14.6	62	9.0	5.3	Excellent
Divide	60.4	89	63	460	13.8	84	9.0	4.8	Good
Grenora	60.7	94	68	417	13.5	74	9.2	4.8	Good
Lebsock	61.8	92	65	399	13.8	53	8.6	4.7	Average
Maier	61.3	95	63	388	14.5	61	8.6	5.1	Average
Mountrail	60.7	91	59	389	13.4	35	8.4	4.4	Average
Pierce	61.6	96	59	423	13.8	75	9.1	5.1	Excellent
Rugby	60.6	92	63	370	13.7	3	8.8	4.3	⁵
Strongfield	60.5	93	66	349	14.5	73	8.8	4.9	Good
Tioga	61.0	93	63	391	13.9	82	8.8	4.8	Excellent
Wales	61.0	89	70	345	13.7	77	8.8	4.7	Good
Average	60.6	93	66	393	13.9	68	8.9	4.8	

¹ Wheat protein is reported on a 12 percent moisture basis.

² Gluten index is unitless. Numbers less than 15 = very weak and greater than 80 = very strong gluten proteins.

³ Pasta Color Score: Higher number indicates better color, with 8.5+ typically considered good.

⁴ Overall Quality is determined based on agronomic, milling and spaghetti processing performance.

⁵ Rugby has weak gluten but is desired for crimped pastas such as ravioli and bow-ties but not for spaghetti.

⁶ Alzada has a disease resistance package that is best suited for western North Dakota (drier growing conditions).

Table 4. Yield of durum varieties at two locations in eastern North Dakota, 2008-2010.

Variety	Carrington		Langdon		Average	
	2010	3 Yr.	2010	3 Yr.	2010	3 Yr.
(bu/a)						
AC Commander	65.0	59.8	72.4	69.7	68.7	64.8
AC Navigator	59.8	59.6	62.8	66.5	61.3	63.1
Alkabo	72.8	66.6	89.2	84.7	81.0	75.7
Alzada	54.9	58.4	58.1	54.2	56.5	56.3
Ben	67.1	62.4	90.0	84.7	78.6	73.6
CDC Verona	--	--	81.3	--	--	--
DG Max	67.5	61.6	78.1	79.0	72.8	70.3
DG Star	62.6	58.3	80.0	74.8	71.3	66.6
Dilse	62.8	63.2	84.2	82.5	73.5	72.9
Divide	65.2	62.5	90.1	--	77.7	31.3
Grande D'Oro	70.3	62.1	86.7	86.6	78.5	74.4
Grenora	65.9	60.7	94.8	92.4	80.4	76.6
Lebsock	72.8	64.4	87.3	90.4	80.1	77.4
Maier	66.8	64.3	80.7	80.6	73.8	72.5
Mountrail	70.7	63.0	86.7	87.0	78.7	75.0
Pierce	66.5	56.9	87.2	83.9	76.9	70.4
Strongfield	62.5	54.7	81.4	79.8	72.0	67.3
Tioga	71.4	63.2	90.3	91.9	80.9	77.6
Wales	63.2	59.5	83.6	79.2	73.4	69.4
Westhope	59.2	--	85.2	78.1	72.2	39.1
Mean	65.6	61.2	82.6	80.3	74.1	67.0
CV %	6.5	--	4.5	--	--	--
LSD 0.05	5.9	--	5.5	--	--	--

Table 5. Yield of durum varieties at four locations in western North Dakota, 2008-2010.

Variety	Dickinson		Hettinger		Minot		Williston		Average	
	2010	3 Yr.	2010	3 Yr.	2010	3 Yr.	2010	3 Yr.	2010	3 Yr.
(bu/a)										
AC Commander	62.0	55.9	81.7	59.5	67.4	74.0	40.6	37.9	62.9	56.8
AC Navigator	51.8	49.5	77.9	56.0	52.6	68.3	38.4	35.7	55.2	52.4
Alkabo	50.7	46.4	75.5	52.6	71.0	78.5	42.3	38.8	59.9	54.1
Alzada	53.2	46.7	74.6	51.0	50.4	64.5	36.8	36.0	53.8	49.6
Ben	50.0	46.2	76.2	50.8	67.9	68.0	36.3	35.7	57.6	50.2
CDC Verona	56.8	--	80.5	--	67.4	--	32.9	33.6	59.4	--
DG Max	55.1	51.6	77.2	54.8	65.6	72.6	38.3	34.9	59.1	--
DG Star	51.5	47.7	74.9	51.9	66.4	68.1	36.5	34.3	57.3	50.5
Dilse	58.0	52.0	79.3	52.5	68.0	73.9	37.5	34.9	60.7	53.3
Divide	51.8	51.8	77.5	51.6	69.3	79.4	32.9	34.6	57.9	54.4
Grand D'Oro	53.4	--	77.0	51.7	69.2	75.4	37.1	35.7	59.2	--
Grenora	56.0	53.1	77.6	53.1	69.7	71.5	39.1	36.6	60.6	53.6
Lebsock	52.8	48.6	77.4	54.1	71.2	70.1	37.1	35.0	59.6	52.0
Maier	57.3	52.4	80.4	54.6	66.1	72.2	37.4	35.0	60.3	53.6
Mountrail	58.1	54.2	81.4	51.8	72.1	80.7	35.0	36.3	61.7	55.8
Pierce	54.3	53.2	75.6	49.9	74.8	76.7	36.2	34.3	60.2	53.5
Rugby	44.7	--	71.8	44.1	61.2	70.6	33.6	--	52.8	--
Strongfield	57.3	49.5	79.5	51.6	61.6	72.1	39.6	35.8	59.5	52.3
Tioga	56.0	50.9	74.8	51.4	70.8	76.2	37.7	36.8	59.8	53.8
Wales	60.1	55.7	85.4	53.1	67.2	68.3	39.4	35.7	63.0	53.2
Westhope	57.4	--	79.8	--	61.9	74.5	36.3	--	58.9	--
Mean	54.7	50.9	77.9	52.4	66.3	72.8	37.2	35.8	59.0	53.1
CV %	6.2	--	4.4	--	6.9	--	8.1	--	--	--
LSD 0.05	4.9	--	4.9	--	6.8	--	4.2	--	--	--

Table 6. Protein at 12 percent moisture of durum varieties at five locations in North Dakota, 2010.

Variety	Carrington	Dickinson	Hettinger	Minot	Williston	Average
(%)						
AC Commander	14.3	13.9	14.4	15.1	15.0	14.5
AC Navigator	14.5	14.1	14.3	15.7	14.9	14.7
Alkabo	13.9	13.2	14.0	14.1	15.0	14.0
Alzada	14.1	13.8	14.5	15.5	15.1	14.6
Ben	14.6	14.4	13.8	15.5	16.2	14.9
CDC Verona	--	14.5	15.2	15.6	15.9	--
DG Max	14.3	14.0	14.8	15.4	14.5	14.6
DG Star	14.3	14.3	14.3	15.1	13.6	14.3
Dilse	15.2	15.5	15.0	16.4	15.2	15.5
Divide	14.4	14.1	14.6	15.5	15.4	14.8
Grande D'Oro	14.3	13.6	14.2	14.5	15.2	14.4
Grenora	14.5	13.8	14.5	14.9	14.9	14.5
Lebsock	14.5	13.9	13.9	15.0	14.0	14.3
Maier	14.1	13.4	15.1	15.9	14.4	14.6
Mountrail	14.3	13.5	14.2	15.0	15.9	14.6
Pierce	14.0	13.9	14.3	14.9	14.5	14.3
Rugby	14.9	14.3	14.4	14.6	15.6	14.8
Strongfield	15.0	14.8	15.1	16.3	15.5	15.3
Tioga	14.3	14.1	15.1	14.8	15.5	14.8
Wales	14.0	14.5	14.6	15.0	14.9	14.6
Westhope	14.6	13.9	15.0	15.3	16.3	15.0
Mean	14.4	14.1	14.3	15.1	15.1	14.7
CV %	2.2	2.8	3.7	3.9	4.1	--
LSD 0.05	0.4	0.8	0.7	0.8	1.3	--

Table 7. Test weight of durum varieties at six locations in North Dakota, 2010.

Variety	Carrington	Dickinson	Hettinger	Langdon	Minot	Williston	Average
(lb/bu)							
AC Commander	60.0	58.5	58.7	54.1	54.6	59.2	57.5
AC Navigator	60.6	59.2	59.7	54.0	53.0	59.7	57.7
Alkabo	62.1	60.0	59.5	58.1	56.8	60.3	59.5
Alzada	60.0	53.9	58.1	53.5	54.1	58.2	56.3
Ben	61.8	58.8	60.0	59.4	57.9	60.0	59.7
CDC Verona	--	60.8	59.5	55.8	55.6	58.7	--
DG Max	61.6	59.3	60.6	57.2	56.8	60.9	59.4
DG Star	61.0	58.1	59.7	56.5	55.1	60.3	58.5
Dilse	60.7	58.3	60.3	57.0	56.3	59.8	58.7
Divide	61.6	59.6	59.8	56.7	55.8	59.4	58.8
Grande D'Oro	61.7	60.2	60.2	59.2	58.5	60.4	60.0
Grenora	60.7	58.8	59.8	57.6	55.8	58.7	58.6
Lebsock	62.1	60.2	60.0	58.7	57.7	61.3	60.0
Maier	61.4	58.6	59.8	56.1	54.9	59.6	58.4
Mountrail	60.4	58.5	59.7	57.7	57.3	57.7	58.6
Pierce	61.9	59.8	61.0	58.4	57.6	60.6	59.9
Rugby	61.3	59.9	59.6	--	57.2	59.7	59.5
Strongfield	60.9	57.9	58.8	55.3	53.7	58.1	57.5
Tioga	61.8	60.7	59.6	57.1	55.4	59.5	59.0
Wales	60.7	57.1	62.3	57.1	56.2	60.2	58.9
Westhope	60.7	57.9	60.6	58.2	56.3	60.1	59.0
Mean	61.2	58.9	69.9	56.9	56.0	59.6	58.7
CV %	0.8	1.8	1.5	1.3	1.7	0.6	--
LSD 0.05	0.7	1.5	1.2	1.0	1.3	0.7	--

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