

North Dakota Durum Wheat

Variety Trial Results for 2008 and Selection Guide

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Durum was planted on 1.7 million acres in North Dakota in 2008, up from the previous year but down from historic highs. Most durum is grown in northwestern North Dakota. Conditions in that region in 2008 were generally dry, so yields were lower than the long-term average. The most commonly grown varieties in 2008 were Lebsock, Mountrail and Ben, occupying 26.7 percent, 21.0 percent and 10.3 percent of the acreage planted, respectively. Divide and Pierce were the next most important varieties, with each being planted on about 8 percent of the area.

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 variety 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. Additional data from county sites are available in "Crop Production Guide 2009" (No. 19) and from each Research Extension Center at www.ag.ndsu.edu/variety/durum.html. Descriptions of the most commonly grown varieties in the region are included for informational purposes. Use data from multiple locations and years when selecting a variety.

Information contained in this publication is based on research conducted by the following North Dakota Agricultural Experiment Station scientists, plant breeders, cereal chemists and plant pathologists:

Blaine Schatz – Carrington
Steve Zwinger – Carrington
Glenn Martin – Dickinson
Eric Eriksmoen – Hettinger
Bryan Hanson – Langdon
Mark Halvorson – Minot
Neil Riveland – Williston

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Successful durum production depends on numerous factors, including selecting the right variety for a particular area. The information included in this publication is meant to aid in selecting that variety or group of varieties. Characteristics to consider in selecting a variety are yield potential in your area, test weight, straw strength and plant height, reaction to important diseases and maturity. Selecting varieties with good milling and pasta quality also is important to maintain market recognition.

Every growing season differs; therefore, when selecting a top-yielding variety, use data that summarize several years and locations. Choose the variety that, on average, performs the best at multiple locations near you, and if data are available, for several years.

Durum wheat varieties currently grown in North Dakota are described in the following tables. 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.

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) that the higher-yielding variety has a significant yield advantage. If the difference is less than the LSD value, the variety difference is probably due to environmental factors (for example, one plot may have been in an area of the experiment with better soil than the other). NS is used to indicate no significant difference for that trait among any of the varieties at the 95 percent level of probability. 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.

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Table 1. North Dakota durum wheat variety descriptions, agronomic traits, 2008.

Variety	Agent or Origin ¹	Year Released	Chaff Color	Height	Straw Strength	Maturity	Reaction to Disease ²			
							Stem Rust	Leaf Rust	Foliar Disease	Scab
AC Avonlea	Can.	1997	White	Med.	Med.	Med.	R	R	MS	S
AC Commander	Can.	2002	White	S.dwf.	Med.	Med.	R	R	MS	NA
AC Melita	Can.	1995	White	Tall	Med.	Med.	R	NA	NA	S
AC Morse	Can.	1996	White	S.dwf.	Strong	Med.	R	R	M	NA
AC Napoleon	Can.	2001	White	S.dwf.	Med.	Med.	R	R	S	NA
AC Navigator	Can.	1999	White	S.dwf.	Weak	Med.	R	R	M	S
AC Pathfinder	Can.	1999	White	Med.	Weak	Med.	R	R	M	S
Alkabo	ND	2005	White	Med.	V.strong	Med.	R	R	M	MS
Alzada	WB	2004	White	S.dwf.	Strong	Early	R	R	S	VS
Belzer	ND	1997	White	Tall	Med.	Late	R	R	M	MR
Ben	ND	1996	White	Med.	Strong	Med.	R	R	MR	S*
Cando	ND	1975	Tan	S.dwf.	V.strong	Med.	R	R	M	VS
DG Max	DGP	2008	White	Med.	Strong	Med.	R	MR	MR	MS
DG Star	DGP	2007	White	Med.	Strong	Early	R	R	M	NA
Dilse	ND	2002	White	Med.	Strong	Late	R	R	M	MS
Divide	ND	2005	White	Med.	Strong	Med.	R	R	M	MR
Dressler	AgriPro	1996	White	Tall	Med.	Med.	R	MR	NA	VS
Fjord	AgriPro	1986	White	Tall	Strong	M.early	R	R	M	S
Grande D'Oro	WB/DGP	2005	White	Med.	Strong	Med.	R	R	M	NA
Grenora	ND	2005	White	Med.	Strong	Med.	R	R	M	MS
Kari	AgriPro	1998	White	Med.	Strong	Med.	R	R	M	S
Kyle	Can.	1984	White	Tall	Weak	Med.	R	MR	M	NA
Laker	WB	1985	White	S.dwf.	Strong	Med.	R	MR	S	S
Lebsock	ND	1999	White	Med.	Strong	Med.	R	R	M	MS
Lloyd	ND	1983	White	S.dwf.	V.strong	Med.	R	MR	S	VS
Maier	ND	1998	White	Med.	Strong	M.late	R	R	M	S*
Medora	Can.	1983	White	Tall	Strong	M.early	R	R	MS	VS
Monroe	ND	1985	White	Tall	Med.	Early	R	R	M	VS
Mountrail	ND	1998	White	Med.	Strong	Late	R	R	M	S*
Munich	ND	1995	White	Med.	V.strong	Med.	R	R	MR	S*
Pierce	ND	2001	White	Med.	M.strong	Med.	R	R	MS	S
Plaza	ND	1999	White	S.dwf.	V strong	Late	R	R	M	MS
Plenty	Can.	1990	White	Tall	Weak	Late	R	R	MR	MS
Primo D'Oro	WB/DGP	2004	White	Tall	Med.	M.early	R	R	MS	NA
Renville	ND	1988	White	Tall	Med.	Med.	R	R	M	S*
Rugby	ND	1973	Tan	Tall	Strong	M.early	R	R	MR	S*
Strongfield	Can	2004	White	Med.	Med.	Med.	R	R	MS	NA
Vic	ND	1979	White	Tall	Med.	M.early	R	R	MR	S*
Voss	AgriPro	1994	White	S.dwf.	V.strong	Med.	R	MR	MS	S
Wales	Westbred	2008	White	Med.	M.strong	Med.	R	R	M	S*

1 Refers to agent or developer: Can = Agriculture Canada, WB = Westbred, ND = North Dakota State University, DGP = Dakota Growers Pasta.

2 R = resistant; MR = moderately resistant (slow rusters); M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible; Foliar Disease = reaction to tan spot and septoria leaf spot complex. Letter ratings for head blight (scab) based on visual head symptoms. * 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 (2003-2007) from advanced yield trials.

Variety	Test Weight	Vitreous Kernels	Large Kernels	Falling Number	Wheat Protein	Mixograph Score	Pasta Color	Spaghetti Firmness	Overall Quality
	(lb/bu)	(%)	(%)	(sec)	(%) ¹	(1-8) ²	(1-12) ³	(g-cm)	⁴
AC Avonlea	60.0	95	54	479	15.3	5.6	9.1	6.7	good
AC Navigator	59.8	95	46	445	14.6	7.1	9.0	6.5	good
Alkabo	61.2	90	49	396	14.5	6.5	9.2	6.1	good
Ben	61.0	95	55	395	15.0	6.4	8.7	6.2	average
Dilse	60.6	95	44	385	15.5	6.5	9.0	6.9	excellent
Divide	60.3	93	49	427	15.0	7.2	9.0	6.5	excellent
Grande D'Oro	60.5	90	43	386	14.7	5.8	8.8	6.1	average
Grenora	59.9	95	50	439	14.6	6.7	9.1	6.3	good
Lebsock	61.5	93	50	410	14.4	5.6	8.9	5.9	good
Maier	60.7	95	48	414	15.2	6.6	9.0	6.8	excellent
Monroe	60.8	95	67	387	14.5	6.0	8.9	6.1	average
Mountrail	60.1	94	42	406	14.6	5.1	8.7	5.8	average
Munich	60.1	93	49	395	14.5	5.3	9.2	6.2	good
Pierce	61.2	95	42	403	14.7	7.0	9.2	6.3	excellent
Plaza	59.8	90	41	432	14.4	5.9	8.8	5.9	average
Primo D'Oro	60.9	93	43	385	14.8	6.0	9.1	6.3	good
Renville	60.3	93	44	394	14.9	6.0	9.1	6.6	good
Rugby	60.5	94	44	383	15.0	3.2	8.8	4.9	⁵
Average	60.5	94	48	409	14.8	6.0	9.0	6.2	

For footnotes see bottom of Table 3.

Table 3. North Dakota durum wheat variety quality descriptions, milling and processing data for 2007 at all locations in the advanced yield trials.

Variety	Test Weight	Vitreous Kernels	Large Kernels	Falling Number	Wheat Protein	Mixograph Score	Pasta Color	Spaghetti Firmness	Overall Quality
	(lb/bu)	(%)	(%)	(sec)	(%) ¹	(1-8) ²	(1-12) ³	(g-cm)	⁴
AC Commander	58.6	98	41	453	15.0	7	9.1	6.4	good
AC Navigator	59.0	99	32	437	15.2	7	8.8	6.5	good
Alkabo	60.2	95	39	372	14.7	6	8.7	6.0	good
Alzada ⁶	57.3	98	57	423	14.8	8	8.6	6.2	good
Ben	60.1	97	42	369	15.2	6	8.4	6.1	good
Dilse	59.6	97	33	357	15.8	6	8.6	6.6	excellent
Divide	59.0	95	36	410	15.2	7	8.8	6.2	good
Grande D'Oro	59.3	90	41	331	14.7	5	8.3	5.8	average
Grenora	58.6	98	35	411	14.7	6	8.6	6.1	good
Lebsock	60.2	95	33	394	14.3	5	8.9	5.4	good
Maier	59.7	98	33	402	15.3	6	8.7	6.6	excellent
Mountrail	59.1	96	30	393	15.0	5	8.4	5.6	average
Pierce	60.3	98	32	386	14.9	7	8.8	6.1	excellent
Plaza	59.2	94	33	412	14.2	5	8.7	5.6	average
Primo D'Oro	60.3	94	38	338	14.6	6	8.5	5.7	good
Rugby	59.9	98	33	371	15.2	3	8.5	4.8	⁵
Strongfield	58.9	96	37	424	15.6	7	8.6	6.2	good
Average	59.4	96	37	393	15.0	6	8.6	6.0	

¹ Wheat protein is reported on a 12% moisture basis

² Mixograph: 1 = very weak and 8 = very strong dough-mixing properties indicating strong gluten proteins

³ Spaghetti 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 certain pastas, such as 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, 2006-2008.

Variety	<u>Carrington</u>		<u>Langdon</u>		<u>Average</u>	
	2008	2 Yr.	2008	3 Yr.	2008	3 Yr.
	------(bu/a)-----					
AC Commander	53.9	--	75.6	--	64.8	--
AC Napoleon	51.5	--	85.7	--	68.6	--
AC Navigator	57.3	48.3	78.3	64.4	67.8	56.4
Alkabo	59.9	49.8	77.1	75.2	68.5	62.5
Alzada	61.7	--	60.2	--	61.0	--
Ben	54.9	47.4	79.9	69.7	67.4	58.6
DG Star	55.3	--	77.7	65.4	66.5	--
Dilse	57.8	48.7	83.0	71.3	70.4	60.0
Divide	58.7	49.2	84.3	71.2	71.5	60.2
Grande D'Oro	50.8	45.4	85.7	72.9	68.3	59.2
Grenora	58.4	48.0	86.7	74.2	72.6	61.1
Lebsock	57.3	47.2	87.7	73.6	72.5	60.4
Maier	60.7	50.0	82.3	69.9	71.5	60.0
Mountrail	50.0	45.4	85.3	74.4	67.7	59.9
Pierce	50.2	44.9	79.8	65.8	65.0	55.4
Strongfield	38.5	39.0	83.0	67.6	60.8	53.3
Wales	47.5	--	75.8	--	61.7	--
Mean	54.4	46.9	80.5	70.4	67.4	58.9
CV %	12.6	--	4.3	--		
LSD 0.05	9.3	--	4.9	--		

Table 5. Yield of durum varieties at four locations in western North Dakota, 2006-2008.

Variety	<u>Dickinson</u>		<u>Hettinger</u>		<u>Minot</u>		<u>Williston</u>		<u>Average</u>	
	2008	3 Yr.	2008	3 Yr.	2008	3 Yr.	2008	3 Yr.	2008	3 Yr.
	------(bu/a)-----									
AC Commander	12.3	--	45.1	--	64.7	--	36.6	35.1	39.7	--
AC Napoleon	13.8	--	25.9	--	51.7	--	31.5	31.4	30.7	--
AC Navigator	12.7	38.6	37.5	--	64.5	58.2	36.1	32.2	37.7	--
Alkabo	13.5	38.4	30.3	32.8	81.9	66.9	35.9	36.0	40.4	43.5
Alzada	17.5	--	39.1	38.5	66.7	54.8	35.3	33.5	39.7	--
Ben	13.2	35.2	28.2	34.4	65.6	60.0	35.8	32.6	35.7	40.6
DG Star	11.2	--	37.1	--	59.1	54.7	32.7	32.1	35.0	--
Dilse	13.6	36.2	28.4	32.3	62.9	60.7	34.4	30.0	34.8	39.8
Divide	16.6	37.2	30.3	31.7	78.5	65.3	34.5	33.6	40.0	42.0
Grand D'Oro	11.5	--	28.1	--	70.9	63.2	33.7	31.7	36.1	--
Grenora	13.7	37.9	33.3	35.2	72.1	68.3	34.2	35.5	38.3	44.2
Lebsock	15.0	37.0	33.8	--	69.2	60.4	33.5	32.1	37.9	--
Maier	14.7	36.6	31.0	--	74.2	61.9	34.6	32.2	38.6	--
Mountrail	12.4	37.4	23.2	32.0	81.5	67.5	33.3	34.8	37.6	42.9
Pierce	17.5	37.7	27.5	32.0	68.4	60.8	32.5	31.1	36.5	40.4
Rugby	14.3	34.8	27.3	29.5	69.3	59.7	--	--	--	--
Strongfield	13.2	38.2	32.2	--	73.0	66.8	32.4	31.1	37.7	--
Wales	14.2	--	25.9	--	65.7	--	32.3	--	34.5	--
Mean	13.9	37.1	31.3	33.2	68.9	61.9	34.1	32.8	37.1	41.9
CV %	19.5		11.6		19.1		5.0			
LSD 0.05	NS		5.1		NS		2.4			

Table 6. Protein at 12% moisture of durum varieties at five locations in North Dakota, 2008.

Variety	Carrington	Dickinson	Hettinger	Minot	Williston	Average
	------(%)-----					
AC Commander	16.4	17.7	15.6	16.1	17.5	16.7
AC Napoleon	16.6	18.5	17.5	16.1	17.7	17.3
AC Navigator	15.8	17.2	16.9	15.5	16.6	16.4
Alkabo	15.2	16.9	17.5	14.8	16.8	16.2
Alzada	14.9	16.7	17.1	15.0	16.2	16.0
Ben	15.8	18.2	17.8	16.1	16.9	17.0
DG Star	15.8	18.0	17.2	14.8	16.7	16.5
Dilse	15.7	19.1	17.7	16.6	17.6	17.3
Divide	16.1	17.1	17.2	15.3	16.5	16.4
Grande D'Oro	16.3	17.2	17.6	15.4	16.9	16.7
Grenora	15.6	17.6	17.5	15.5	16.9	16.6
Lebsock	15.6	17.4	16.8	15.4	16.6	16.4
Maier	15.2	18.4	16.4	15.7	17.3	16.6
Mountrail	17.1	18.2	17.9	15.2	17.0	17.1
Pierce	16.3	17.1	17.4	14.9	16.7	16.5
Rugby	16.8	17.9	16.7	14.9	--	--
Strongfield	17.2	18.9	17.4	15.5	18.7	17.5
Wales	16.4	17.5	17.9	15.3	17.3	16.9
Mean	16.0	17.8	17.2	15.5	17.1	16.7
CV %	5.0	--	1.9	3.2	2.1	
LSD 0.05	1.1	--	0.4	0.7	0.7	

Table 7. Test weight of durum varieties at six locations in North Dakota, 2008.

Variety	Carrington	Dickinson	Hettinger	Langdon	Minot	Williston	Average
	------(lb/bu)-----						
AC Commander	55.9	60.6	56.0	54.3	58.8	58.7	57.4
AC Napoleon	53.5	59.3	54.2	57.9	58.7	56.8	56.7
AC Navigator	58.5	61.0	55.8	57.2	60.5	60.0	58.8
Alkabo	60.2	60.8	54.2	59.5	61.1	60.0	59.3
Alzada	56.3	60.3	55.7	56.7	59.8	58.2	57.8
Ben	59.4	60.1	53.7	59.5	60.8	59.6	58.9
DG Star	57.4	59.3	55.8	57.4	59.3	58.7	58.0
Dilse	59.6	59.6	55.2	58.6	60.0	58.9	58.7
Divide	58.6	60.3	54.2	58.4	60.3	59.2	58.5
Grande D'Oro	59.3	59.5	55.4	59.9	60.9	59.7	59.1
Grenora	58.0	59.8	54.4	58.2	59.9	57.8	58.0
Lebsock	59.3	60.4	53.4	60.2	61.0	59.8	59.0
Maier	59.9	60.4	55.7	57.8	60.5	58.8	58.9
Mountrail	55.8	59.3	51.9	59.4	59.6	57.6	57.3
Pierce	58.6	60.9	54.0	59.6	61.2	59.2	58.9
Rugby	57.4	60.0	55.6	--	59.0	--	--
Strongfield	56.0	59.8	54.1	57.3	59.8	57.3	57.4
Wales	58.4	60.1	55.5	56.1	59.9	59.8	58.3
Mean	57.9	60.1	54.7	58.1	60.1	58.8	58.3
CV %	2.5	0.8	2.0	1.6	1.1	0.6	
LSD 0.05	2.0	0.6	1.6	1.3	0.9	0.7	

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