

North Dakota Durum Wheat

Variety Trial Results for 2011 and Selection Guide

Joel Ransom, Elias Elias, Maricelis Acevedo, Tim Friesen, Frank Manthey and Marcia McMullen (NDSU Main Station); Eric Eriksmoen (Hettinger Research Extension Center); Bryan Hanson (Langdon Research Extension Center); Mark Halvorson (North Central Research Extension Center, Minot); and Gordon Bradbury (Williston Research Extension Center)

Durum was planted on 750,000 acres in North Dakota in 2011, down from the 1.8 million acres planted in 2010. Flooding and excessively wet conditions during spring and early summer reduced acres available for planting and hampered crop development throughout the growing season. In North Dakota, planted and harvested acres were record lows. Average yield is estimated at 26 bushels per acre (bu/a), down significantly from the yield of 37.5 bu/a recorded in 2010. The most commonly grown varieties in 2011 and the percent of the acreage they occupied were Divide (32.5), Mountrail (13), Alkabo (11.7), Lebsock (9.5), Grenora (6.2) and Ben (2.9).

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, no significant difference occurs 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.

List of Tables

- Table 1. North Dakota durum wheat variety descriptions, agronomic traits, 2011.
 Table 2. North Dakota durum wheat variety quality descriptions, milling and processing data averaged for five years (2006-2010) from drill strip trials.
 Table 3. North Dakota durum wheat variety quality descriptions, milling and processing data for 2010 at all locations in the drill strip trials.
 Table 4. Yield of durum varieties at four locations in North Dakota, 2009-2011.
 Table 5. Test weight and protein at 12 percent moisture of durum varieties at four locations in North Dakota, 2011.

Table 1. North Dakota durum wheat variety descriptions, agronomic traits, 2011.

Variety	Agent or Origin ¹	Year Released	Average Plant Height (in)	Straw Strength ²	Days to Heading ³	Reaction to Disease ⁴			
						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 ⁵	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*
WB-Belfield	WB	2011	30	2	62	R	R	S	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 from 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.

⁵Alzada has a disease-resistance package that is best suited for western North Dakota (drier growing conditions).

* 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 (2006-2010) in drill strip trials.

Variety	Test Weight	Vitreous Kernels	Large Kernels	Falling Number	Wheat Protein ¹	Gluten Index ²	Pasta Color ³	Spaghetti Firmness	Overall Quality ⁴
	(lb/bu)	(%)	(%)	(sec)	(%)		(1-12)	(g-cm)	
AC Commander	59.1	97	48	490	14.6	94	9.1	5.9	good
AC Navigator	59.9	97	43	479	14.6	80	9.0	6.1	good
Alkabo	60.6	90	45	408	14.3	63	9.0	5.6	good
Alzada	58.7	96	59	469	14.6	95	8.9	5.9	good ⁵
Ben	60.0	95	51	390	15.0	62	8.5	5.6	average
Dilse	60.1	96	40	385	15.6	61	8.9	6.3	good
Divide	60.0	92	45	443	14.7	81	8.9	5.9	good
Grenora	59.7	95	46	432	14.4	74	9.0	5.8	good
Lebsock	60.9	94	44	414	14.5	52	8.7	5.5	average
Maier	60.0	96	41	406	15.2	66	8.8	6.2	good
Mountrail	59.5	93	38	412	14.6	30	8.5	5.4	fair
Pierce	60.6	96	38	421	14.8	76	9.0	6.0	good
Rugby	60.2	94	42	388	14.7	8	8.6	4.7	fair ⁶
Strongfield	59.7	94	46	421	15.5	77	8.8	6.1	good
Tioga	60.1	93	52	384	14.8	84	8.9	6.1	good
Average	59.9	94	45	423	14.8	67	8.8	5.8	

Table 3. North Dakota durum wheat variety quality descriptions, milling and processing data for 2010 at all locations in the drill strip trials.

Variety	Test Weight	Vitreous Kernels	Large Kernels	Falling Number	Wheat Protein ¹	Gluten Index ²	Pasta Color ³	Spaghetti Firmness	Overall Quality ⁴
	(lb/bu)	(%)	(%)	(sec)	(%)		(1-12)	(g-cm)	
AC Commander	59.1	95	45	498	13.9	94	9.1	5.7	good
AC Navigator	59.8	97	39	471	13.9	82	8.9	5.5	good
Alkabo	60.7	90	45	405	13.5	62	8.8	5.0	good
Alzada	58.8	96	53	476	14.4	95	8.8	5.7	good ⁵
Ben	60.8	94	51	390	14.0	61	8.2	5.1	average
CDC Verona	60.5	94	50	431	14.5	66	8.7	5.5	good
DG Max	61.4	97	53	403	14.3	71	8.6	5.0	good
DG Star	60.0	96	47	383	14.1	90	8.4	5.3	good
Dilse	60.4	95	42	394	15.0	57	8.6	5.7	good
Divide	60.7	91	51	437	14.0	78	8.4	5.3	good
Grenora	60.2	94	47	411	13.6	77	8.9	5.4	good
Lebsock	61.3	92	46	406	13.9	50	8.3	5.0	average
Maier	59.4	95	38	394	14.5	60	8.6	5.4	good
Mountrail	59.9	92	39	395	13.7	21	8.2	4.8	average
Pierce	61.2	96	36	416	13.9	74	8.6	5.3	good
Rugby	60.9	93	47	369	13.7	2	8.4	4.2	fair ⁶
Strongfield	60.1	90	47	423	14.7	72	8.6	5.6	good
Tioga	60.4	91	57	407	13.8	81	8.6	5.2	good
Wales	60.9	93	52	406	13.8	75	8.6	5.2	good
Westhope	61.1	96	55	397	14.1	74	8.6	5.0	good
Average	60.4	94	47	416	14.1	67	8.6	5.3	

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

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

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

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

⁵Alzada has good quality when grown in environments where it is adapted. Low test weight can affect quality in some environments.

⁶Rugby has weak gluten but has very good characteristics for crimped pastas such as ravioli and bow-ties but not for spaghetti.

Table 4. Yield of durum varieties at four locations in North Dakota, 2009-2011.

Variety	<u>Hettinger</u>		<u>Langdon</u>		<u>McClusky</u>		<u>Williston</u>		<u>Average</u>	
	2011	3 Yr.	2011	3 Yr.	2011	2 Yr.	2011	3 Yr.	2011	3 Yr.
	------(bu/a)-----									
AC Commander	33.5	55.6	54.2	62.6	--	--	29.1	35.4	--	--
AC Navigator	26.4	52.3	46.8	56.0	--	--	26.0	32.3	--	--
Alkabo	34.8	54.1	64.6	76.9	44.8	54.5	25.6	35.4	42.5	55.2
Alzada	28.9	47.6	50.0	50.8	--	--	24.7	32.5	--	--
Ben	37.2	53.8	64.2	79.4	44.6	55.3	29.4	33.6	43.9	55.5
CDC Verona	35.2	--	56.7	--	--	--	25.5	31.6	--	--
DG Max	39.0	55.6	63.9	73.2	40.0	55.8	28.7	34.2	42.9	54.7
DG Star	32.8	50.4	68.6	71.8	32.7	47.3	27.2	32.4	40.3	50.5
Dilse	34.7	54.6	61.3	75.3	40.2	54.8	24.8	31.7	40.3	54.1
Divide	30.5	51.6	64.6	--	48.5	59.3	29.3	32.8	43.2	--
Grand D'Oro	36.2	54.4	--	--	--	--	28.6	34.0	--	--
Grenora	34.6	53.5	63.7	84.8	54.8	65.3	29.3	34.9	45.6	59.6
Lebsock	33.7	54.1	68.9	84.1	44.4	57.9	24.3	31.9	42.8	57.0
Maier	34.4	55.7	64.3	74.6	--	--	29.6	33.3	--	--
Mountrail	34.5	55.5	60.9	78.9	46.1	59.2	26.0	33.9	41.9	56.9
Pierce	35.9	52.7	65.8	79.2	44.7	58.0	28.7	33.0	43.8	55.7
Rugby	40.1	48.3	58.5	--	--	--	31.1	--	--	--
Strongfield	28.0	50.2	62.6	73.0	40.6	51.8	26.2	33.7	39.4	52.2
Tioga	28.1	50.2	65.1	84.4	51.3	58.2	31.3	36.0	44.0	57.2
Wales	39.0	57.5	68.1	76.7	39.2	54.7	30.1	35.0	44.1	56.0
WB Belfield	32.7	--	44.8	--	--	--	25.7	--	--	--
Westhope	43.1	57.5	74.9	77.0	42.8	52.7	28.5	33.7	47.3	55.2
Mean	34.2	53.3	61.5	74.0	43.9	56.1	27.7	33.6	43.0	55.4
CV %	5.7	--	7.3	--	10.4	--	7.4	--	--	--
LSD 0.05	3.0	--	6.5	--	6.7	--	2.9	--	--	--

Table 5. Test weight and protein at 12 percent moisture of durum varieties at four locations in North Dakota, 2011.

Variety	<u>Hettinger</u>		<u>Langdon</u>		<u>McClusky</u>		<u>Williston</u>		<u>Average</u>	
	Test Wt.	Protein	Test Wt.	Test Wt.	Protein	Test Wt.	Protein	Test Wt.	Protein	
	(lb/bu)	(%)	(lb/bu)	(lb/bu)	(%)	(lb/bu)	(%)	(lb/bu)	(%)	
AC Commander	54.0	15.1	57.1	--	--	59.7	15.2	--	--	
AC Navigator	54.3	15.2	57.3	--	--	60.1	15.2	--	--	
Alkabo	55.5	14.8	60.5	56.4	13.7	59.9	14.6	58.1	14.4	
Alzada	51.8	15.5	56.5	--	--	58.1	14.9	--	--	
Ben	55.9	15.2	60.1	56.4	13.9	59.5	15.4	58.0	14.8	
CDC Verona	52.8	15.6	59.4	--	--	58.8	15.5	--	--	
DG Max	56.8	15.7	60.4	55.6	14.3	59.9	14.8	58.2	14.9	
DG Star	53.6	15.9	60.4	53.4	14.8	58.6	14.8	56.5	15.2	
Dilse	53.3	16.4	59.7	56.1	14.8	59.3	15.6	57.1	15.6	
Divide	55.2	15.7	59.9	56.8	13.8	59.3	14.6	57.8	14.7	
Grand D'Oro	56.0	15.0	--	--	--	60.0	14.8	--	--	
Grenora	53.3	15.2	59.0	55.9	13.7	58.8	14.7	56.8	14.5	
Lebsock	55.9	15.0	60.6	58.6	13.0	60.4	14.8	58.9	14.3	
Maier	54.5	16.0	59.2	--	--	59.8	15.0	--	--	
Mountrail	54.4	15.0	59.1	55.9	13.8	58.9	14.6	57.1	14.5	
Pierce	56.7	15.0	60.7	57.0	14.0	59.8	14.8	58.6	14.6	
Rugby	55.2	14.9	59.8	--	--	59.0	15.3	--	--	
Strongfield	53.1	16.5	59.9	53.5	15.0	57.8	15.4	56.1	15.6	
Tioga	54.3	16.0	59.5	57.4	13.2	59.8	14.8	57.8	14.7	
Wales	55.8	15.2	60.8	54.9	14.4	59.3	14.2	57.7	14.6	
WB Belfield	52.7	14.8	55.8	--	--	59.6	15.0	--	--	
Westhope	55.7	14.8	61.2	53.9	14.3	59.2	14.8	57.5	14.6	
Mean	54.6	15.4	59.4	55.8	14.1	59.3	14.9	57.6	14.8	
CV %	1.8	2.0	1.0	2.1	1.6	0.6	2.1	--	--	
LSD 0.05	1.4	0.4	0.8	1.7	0.3	0.7	0.6	--	--	

For more information on this and other topics, see: www.ag.ndsu.edu

NDSU encourages you to use and share this content, but please do so under the conditions of our Creative Commons license. You may copy, distribute, transmit and adapt this work as long as you give full attribution, don't use the work for commercial purposes and share your resulting work similarly. For more information, visit www.ag.ndsu.edu/agcomm/creative-commons.

North Dakota State University does not discriminate on the basis of age, color, disability, gender expression/identity, genetic information, marital status, national origin, public assistance status, sex, sexual orientation, status as a U.S. veteran, race or religion. Direct inquiries to the Vice President for Equity, Diversity and Global Outreach, 205 Old Main, (701) 231-7708.

County Commissions, NDSU and U.S. Department of Agriculture Cooperating. This publication will be made available in alternative formats for people with disabilities upon request, (701) 231-7881.