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North Dakota Durum Wheat

Variety Trial Results for 2013 and Selection Guide

Joel Ransom, Elias Elias, Maricelis Acevedo, Tim Friesen and Frank Manthey (NDSU Main Station); John Rickertsen (Hettinger Research Extension Center); Eric Eriksmoen (North Central Research Extension Center, Minot); Bryan Hanson (Langdon Research Extension Center); and Chelsey Penuel and Diana Amiot (Williston Research Extension Center); Blaine Schatz (Carrington Research Extension Center)

Durum was planted on 795,000 acres in North Dakota in 2013, down from the 1.4 million acres planted in 2012. Average yield is estimated at 38 bushels per acre, up from the yield of 32 bu per acre recorded last year. The most commonly grown varieties in 2013 and the percent of the acreage they occupied were Divide (33.4), Alkabo (19.0), Mountrail (12.7), Tioga (10.7) and Lebsock (10.3).

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. Yield is reported at 13.5% moisture, while protein content is reported for 12% moisture content.

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 90 percent confidence (LSD probability 0.10), 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 90 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. Descriptions and agronomic traits of durum wheat varieties grown in North Dakota, 2013.

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[6]
CDC Verona	Can.	2010	38	4	69	R	R	MR	S
Carpio	ND	2012	37	5	69	R	R	M	M
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
Joppa	**ND**	**2013**	**38**	**5**	**68**	**R**	**R**	**M**	**MR**
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[6]
Mountrail	ND	1998	37	5	68	R	R	M	S[6]
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[6]
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[6]
WB-Belfield	WB	2011	30	2	62	R	R	S	S
Westhope	WB	2009	36	3	67	R	R	MS	S

[1]Refers to agent or developer: Can. = Agriculture Canada, WB = Westbred, ND = North Dakota State University, DGP = Dakota Growers Pasta.
[2]Straw 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.
[3]Days to Head = the number of days from planting to head emergence from the boot. Averaged from several locations in 2010,
[4]R = 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.
[5]Alzada has a disease-resistance package that make it more adapted to (drier growing conditions (i.e. western North Dakota).
[6] Indicates yields and/or quality often have been higher than would be expected based on visual symptoms. NA = Not adequately tested.

Table 2. Durum wheat variety quality descriptions, milling and processing data averaged for five years (2008-2012) from 33 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	58.7	96	46	503	14.9	93	9.1	5.8	Good
AC Navigator	59.2	97	43	486	14.9	77	8.9	5.7	Good
Alkabo	60.3	89	46	411	14.3	58	9.0	5.1	Average
Alzada	58.2	95	55	466	14.9	94	8.8	5.7	Good
Ben	59.3	96	50	401	15.2	59	8.5	5.1	Average
Carpio	60.4	88	53	450	14.4	93	9.0	5.6	Good
Dilse	59.7	96	39	398	15.8	59	8.9	5.9	Good
Divide	59.8	91	47	454	14.8	79	8.8	5.3	Good
Grenora	59.5	94	47	435	14.4	70	9.0	5.3	Good
Lebsock	60.4	93	43	419	14.6	49	8.6	5.1	Average
Maier	59.4	95	40	407	15.4	62	8.7	5.7	Good
Mountrail	58.9	93	37	420	14.7	30	8.4	4.9	Fair
Pierce	60.1	96	37	427	14.9	70	8.9	5.5	Good
Strongfield	59.5	93	46	421	15.6	74	8.7	5.6	Good
Tioga	60.0	92	46	417	14.5	85	9.0	5.2	Good
Average	59.6	94	45	434	14.9	70	8.8	5.4	

Table 3. Durum wheat variety quality descriptions, milling and processing data for 2012 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	59.0	95	37	566	15.1	95	9.3	5.5	Good
AC Navigator	59.5	97	39	531	15.2	76	9.1	5.4	Good
Alkabo	60.4	88	41	439	14.8	58	9.3	4.9	Good
Alzada	57.6	93	48	566	15.6	94	8.8	5.2	Average
Carpio	60.3	84	47	469	14.8	90	9.3	4.9	Good
DG Max	60.7	97	41	439	15.5	70	9.0	4.7	Good
Divide	59.9	91	40	490	15.1	78	8.9	4.9	Good
Grenora	59.2	94	40	491	14.8	67	9.0	4.9	Good
Lebsock	60.3	93	35	462	15.0	45	9.1	4.6	Average
Maier	59.9	96	34	444	15.6	60	9.1	5.2	Good
Mountrail	58.5	96	29	465	15.5	31	8.8	4.3	Fair
Pierce	59.9	95	32	444	15.3	69	9.1	5.1	Good
Strongfield	59.5	91	39	499	15.6	80	9.0	5.1	Good
Tioga	59.7	92	42	459	15.1	81	8.9	5.2	Good
Westhope	60.2	94	45	432	15.4	75	8.8	4.3	Average
Average	59.6	93	39	480	15.2	71	9.0	4.9	

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

Table 4. Yield of durum varieties at six locations in North Dakota, 2011-2013.

	Carrington		Langdon		Dickinson		Hettinger		Minot		Williston		Average	
Variety	2013	3 Yr.	2013	3 Yr.	2013	3 Yr.	2013	3 Yr.	2013	3 Yr.	2013	3 Yr.	2013	3 Yr.
	(bu/a)													
AC Commander	53.7	53.5	94.7	73.4	35.6	53.0	43.7	50.0	64.6	50.0	47.4	38.4	56.6	53.1
AC Navigator	53.5	50.4	88.5	66.4	34.5	46.1	42.3	47.3	55.9	42.4	41.8	34.4	52.8	47.8
Alkabo	49.9	57.6	97.2	79.1	39.9	47.8	50.5	50.1	56.8	51.4	46.6	35.9	56.8	53.7
Alzada	49.7	47.6	73.1	61.3	35.2	45.9	42.3	47.2	59.1	--	39.7	34.2	49.9	47.2
Ben	50.6	53.3	90.2	76.2	36.7	48.8	53.2	51.0	60.3	49.9	46.8	36.2	56.3	52.6
CDC Verona	54.4	56.8	--	--	39.5	49.5	55.6	50.4	64.4	--	42.4	32.5	51.3	47.3
Carpio	58.6	58.5	105.1	85.0	43.9	53.1	50.3	48.3	64.5	55.9	43.6	--	61.0	60.2
DG Max	53.8	54.8	90.1	76.5	31.6	48.0	53.9	54.3	52.2	46.9	43.7	36.5	54.2	52.8
Divide	51.3	54.5	94.1	77.9	40.3	50.4	55.1	47.4	60.9	49.0	43.1	35.5	57.5	52.5
Grenora	54.7	56.0	98.3	79.5	35.1	50.8	52.6	48.5	63.9	54.4	48.7	37.0	58.9	54.4
Joppa	--	--	101.5	83.9	41.1	53.2	51.1	54.9	65.5	51.7	55.5	--	62.9	60.9
Lebsock	54.9	57.2	89.4	79.2	32.2	49.9	49.5	48.9	59.5	51.3	42.5	32.6	54.7	53.2
Maier	53.1	55.5	91.1	76.0	36.3	51.3	42.3	47.2	62.6	53.2	47.9	38.6	55.6	53.6
Mountrail	53.0	55.5	103.0	80.2	44.6	53.9	55.3	47.8	61.5	55.3	48.4	35.5	61.0	54.7
Pierce	54.3	55.7	100.9	81.3	31.7	48.2	47.2	48.7	64.1	57.5	51.3	37.5	58.3	54.8
Rugby	48.1	52.8	86.2	70.4	32.6	43.8	51.3	50.6	62.1	--	40.9	35.3	53.5	50.6
Strongfield	51.5	53.0	102.0	79.1	37.6	50.0	52.4	48.9	58.6	49.4	44.7	35.2	57.8	52.6
Tioga	55.6	58.3	95.5	79.4	37.5	49.8	59.9	50.7	68.1	52.4	49.7	--	61.1	58.1
VT Peak	52.7	--	97.0	--	38.9	--	63.3	--	60.4	--	52.4	--	60.8	--
Mean	53.0	54.8	94.3	76.8	37.1`	49.6	51.1	49.6	61.3	51.4	46.2	35.7	57.2	53.0
CV %	8.9	--	4.7	--	17.9	--	7.0		5.1	--	8.3	--	--	--
LSD 0.10	5.6	--	5.3	--	8.0	--	4.6		3.6	--	5.2	--	--	--

Table 5. Test weight and protein of durum varieties in North Dakota, 2013.

	Carrington		Langdon	Dickinson		Hettinger		Minot		Williston		Average	
Variety	Test Wt.	Protein	Test Wt.	Test Wt.	Protein	Test Wt.	Protein	Test Wt.	Protein	Test Wt.	Protein	Test Wt.	Protein
	(lb/bu)	(%)	(lb/bu)	(lb/bu)	(%)	(lb/bu)	(%)	(lb/bu)	(%)	(lb/bu)	(%)	(lb/bu)	(%)
AC Commander	61.7	12.8	59.9	62.3	13.2	60.2	13.6	60.5	12.2	61.0	14.4	60.9	13.2
AC Navigator	61.7	13.0	60.1	62.3	13.4	61.3	13.5	60.6	11.9	61.5	14.5	61.3	13.3
Alkabo	61.6	12.4	61.5	62.5	13.1	61.4	12.7	60.8	11.4	61.4	14.1	61.5	12.7
Alzada	60.6	12.4	59.6	61.8	12.8	60.0	13.2	60.9	11.1	60.2	13.9	60.5	12.7
Ben	62.0	12.7	61.3	62.8	14.3	62.1	13.5	61.5	11.4	61.0	15.3	61.8	13.4
CDC Verona	61.2	13.0	--	62.3	14.7	59.6	14.2	61.2	12.0	61.0	14.8	61.1	13.7
Carpio	61.4	12.0	61.9	62.8	12.8	59.8	12.7	59.7	12.9	61.2	15.3	61.1	13.1
DG Max	62.2	13.0	61.0	62.5	13.0	62.7	13.6	60.5	12.1	61.8	14.7	61.8	13.3
Divide	61.0	13.2	60.2	61.8	14.0	62.4	13.4	60.6	12.2	61.6	15.0	61.3	13.6
Grenora	62.1	12.5	60.8	62.0	13.2	61.1	13.1	60.6	11.8	60.2	14.1	61.1	12.9
Joppa	--	--	60.7	62.5	12.7	61.0	12.4	60.8	11.4	61.0	14.2	61.2	12.7
Lebsock	63.3	12.3	61.2	62.8	13.5	62.3	12.7	62.0	10.7	61.1	14.9	62.1	12.8
Maier	61.7	11.6	60.4	62.3	14.2	61.1	14.4	60.8	11.8	61.1	15.4	61.2	13.5
Mountrail	61.4	12.6	60.3	61.3	13.3	61.1	12.3	60.3	12.0	60.2	15.3	60.8	13.1
Pierce	61.9	12.8	61.9	63.3	13.4	61.2	13.2	60.7	12.4	61.2	14.2	61.7	13.2
Rugby	61.7	12.6	60.6	62.3	14.0	62.1	13.0	60.4	11.8	60.4	15.9	61.3	13.5
Strongfield	60.9	14.2	61.2	61.0	14.5	61.2	14.3	60.4	11.4	60.7	14.8	60.9	13.8
Tioga	62.4	12.7	60.9	63.0	13.0	62.9	12.5	60.5	11.3	61.6	14.5	61.9	12.8
VT Peak	63.0	12.8	61.7	62.8	14.8	63.5	12.9	60.6	12.0	62.6	14.7	62.4	13.4
Mean	61.8	12.7	60.8	62.3	13.6	61.4	13.2	60.7	11.8	61.1	14.7	61.4	13.2
CV %	1.5	4.6	0.6	0.8	3.3	0.9	2.1	1.0	4.3	0.8	4.2	--	--
LSD 0.10	1.1	0.7	0.4	0.8	0.7	0.6	0.3	0.7	0.6	0.7	0.8	--	--