A-574 (Revised)

North Dakota
Hard Red Spring Wheat
Variety Trial Results for 2011 and Selection Guide

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Hard red spring (HRS) wheat was harvested from 5.5 million acres in 2011, down from 2010 due to large areas of the state that were not planted. Planting was delayed in many areas of the state due to wet spring conditions. The late planting, coupled with hot weather in July, had a detrimental impact on spring wheat yields. The estimated average yield of 31.5 bushels/acre was down sharply from the near record level of 44 bushels/acre in 2010.

Glenn was the most popular HRS wheat variety in 2011, occupying 18.1 percent of the planted acreage, followed by Faller (11.4 percent), Barlow (8.5 percent), RB07 (7 percent), Brennan and Kelby (5.4 percent), Briggs (4 percent), Vantage (3.5 percent) and Freyr (3.3 percent). Brennan, Freyr and Kelby were released by AgriPro; Briggs by South Dakota State University; Vantage by WestBred; and RB07 by the University of Minnesota. All other varieties are NDSU releases.

In 2010, new races of the wheat leaf rust pathogen *Puccinia triticina*, with virulence on resistance gene Lr21, were identified in three locations in North Dakota and Minnesota. These new races are a threat for wheat production in the northern Great Plains because more than 50 percent of the hard red spring wheat acreage in North Dakota and Minnesota is planted with cultivars that relied on Lr21 for effective leaf rust resistance. In 2011, the virulence of Lr21 was observed in rust nurseries in Fargo, Carrington and Langdon, N.D. Many cultivars that were resistant to moderately resistant prior to 2010 are moderately susceptible to susceptible to these new races. At the time of this publication, the frequency of these races in our region was unknown.

Successful wheat 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 may include yield potential, protein content when grown with proper fertility, straw strength, plant height, reaction to problematic pests (diseases, insects, etc.) and maturity. Every growing season differs; therefore, when selecting a variety, we recommend using data that summarize several years and locations. Choose the variety that, on average, performs the best at multiple locations near your farm during several years.

Selecting varieties with good milling and baking quality also is important to maintain market recognition and avoid discounts. Hard red spring wheat from the northern Great Plains is known around the world for its excellent end-use quality. Millers and bakers consider many factors in determining the quality and value

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of wheat they purchase. Several key parameters are: high test weight (for optimum milling yield and flour color), high falling number (greater than 300 seconds indicates minimal sprout damage), high protein content (the majority of HRS wheat export markets want at least 14 percent protein) and excellent protein quality (for superior bread-making quality as indicated by traditional strong gluten proteins, high baking absorption and large bread loaf volume).

Gluten strength, and milling and baking quality ratings, are provided for individual varieties in Tables 2 and 3, based on the results from the NDSU field plot variety trials. These ratings are applied to varieties grown for multiple years at seven NDSU Research Extension Centers across the state to provide producers and end users with end-use performance data. The wheat protein data often are higher than obtained in actual production fields but can be used to compare differences among 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 apply only 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 stands for coefficient of variation and is expressed as a percentage. The CV is a measure of variability in the trial. 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/spring-wheat*.

List of Tables

Table 1. North Dakota hard red spring wheat variety descriptions, agronomic traits, 2011.

Variety	Agent or Origin[1]	Year Released	Height (in)	Straw Strength[2]	Days to Head[3]	Reaction to Disease[4]			
						Stem Rust	Leaf Rust	Leaf Spot[5]	Head Scab
Agawam[6]	WestBred	2008	30	7	58	NA	MR/MS	NA	MS
Albany	Limagrain	2008	32	5	62	MR	S	MS	M
Alpine[7]	AgriPro	2008	34	6	62	NA	S	MS	MS
Alsen	ND	2000	34	3	63	R	MR/MS	S	MR
Barlow	ND	2009	35	6	62	R	MR/MS[9]	MR	M
Blade	WestBred/Sabre	2007	33	4	64	R	MS[9]	MS	M
Breaker	WestBred	2007	34	3	64	R	MR/MS[9]	MS	M
Brennan	AgriPro	2009	30	4	62	R	MR	M	MS
Brick	SD	2009	35	5	60	R/MR	MR/MS	MS/S	MR
Briggs	SD	2002	35	7	61	R/MR	MR/MS	MS	S
Brogan	WestBred	2009	32	3	64	MR	MR/MS	MS	S
Carberry	Can.	2009	32	4	57	NA	MR/MS	NA	NA
Choteau[6]	MT	2004	32	7	66	NA	MR/MS	NA	NA
Cromwell	Thunder Seed	2007	33	5	67	R	MR	MR	S
Dapps	ND	2003	39	5	59	R	MS[9]	M	S
Edge	WestBred/Sabre	2008	33	5	62	NA	S	MS	MS
Faller	ND	2007	35	5	65	R	S[9]	MR	M
Freyr	AgriPro	2004	34	6	64	R	S	MS	MR
Glenn	ND	2005	37	4	61	R	MR/MS[9]	M	MR
Hat Trick	Limagrain	2007	34	5	61	R	MR/MS[9]	M	MS
Howard	ND	2006	36	7	63	R	MS[9]	M	M
Jenna	AgriPro	2009	32	4	66	R	MR/MS	M	M
Kelby	AgriPro	2006	30	4	62	MR	MR/MS[9]	M	M
Kuntz	AgriPro	2007	31	4	65	R	MS[9]	MS	M
Mott[6]	ND	2009	36	3	66	MR	S[9]	MS	MS
Muchmore	Can.	2009	32	4	57	NA	MR/MS	NA	NA
ND 901CL PLUS[8]	ND	2010	36	4	60	R/MR	MR	NA	M
Pivot	WestBred	2010	27	3	67	MS	S[9]	MR	S
Powerplay	**Limagrain**	**2011**	**33**	**NA**	**65**	**NA**	**NA**	**NA**	**NA**
Prosper	**NDSU**	**2011**	**35**	**5**	**65**	**R**	**S[9]**	**M**	**M**
RB07	MN	2007	32	5	62	R	R/MR	MS	MR
Reeder	ND	1999	35	3	63	R	S	S	S
Rollag	MN	2011	35	3	63	R	MS[9]	MR	MR
Sabin	MN	2009	33	6	65	R	MR	MS	M
Samson	WestBred	2007	31	2	63	R	MR/MS	MS	S
Select	SD	2010	35	6	60	R/MR	R/MR	R/MR	MR
Steele-ND	ND	2004	35	7	63	R	MS/S[9]	MS	M
SY Soren	**Syngenta/AgriPro**	**2011**	**30**	**4**	**63**	**R**	**MR**	**M**	**M**
SY Tyra[6]	**Syngenta/AgriPro**	**2011**	**30**	**NA**	**62**	**R**	**MR**	**NA**	**S**
SY605 CL[8]	AgriPro	2009	34	7	62	R/MR	MR/MS	MS	S
Tom	MN	2008	34	6	64	R	MR/MS	NA	M
Traverse	SD	2006	37	6	60	R	MR	NA	M
Vantage	WestBred	2007	32	2	67	MR	MR/MS	MS	MS
Velva	**NDSU**	**2012**	**35**	**4**	**63**	**R**	**MR/MS[9]**	**M**	**MS**
WB Digger	WestBred	2009	34	6	63	MR	MR/MS	NA	MS
WB Mayville	**Monsanto/WB**	**2011**	**30**	**4**	**63**	**R**	**MR/MS**	**MS**	**S**

[1] Refers to agent or developer: MN = University of Minnesota; MT = Montana State University; ND = North Dakota State University; SD = South Dakota State University; Can. = varieties developed in Canada. **Bold** varieties are those recently released, so data is limited and rating values may change. NA indicates insufficient information is available to make an accurate assessment.

[2]Straw Strength = 1 to 9 scale, with 1 the strongest and 9 the weakest. These values are based on recent data and 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 and 2011.

[4] R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible.

[5]Leaf spot refers to the leaf fungal diseases such as tan spot and septoria. It does not include bacterial leaf streak.

[6]Solid stemmed or semisolid stem, imparting resistance to sawfly.

[7]Hard white wheat.

[8]CL = refers to a Clearfield variety, with tolerance to Beyond™ family of herbicide.

[9] These lines were resistant to moderately resistant to races prevalent prior to 2011. Resistance may have been defeated by new races of the pathogen that exist at an unknown prevalence in natural population.

Table 2. Analytical milling and baking data from field plot variety trials at Carrington, Casselton, Dickinson, Hettinger, Langdon, Minot and Williston, 2009 and 2010 (unless otherwise noted).

Variety	2011 N.D. Planted	Test Weight	Protein 12% MB	Vitreous Kernels	Falling Number	Farinograph Classification	Farinograph Stability	Farinograph Absorption	Loaf Volume	Gluten Strength	Mill and Bake Quality Rating
	(% area)	(lb/bu)	(%)	(%)	(seconds)	(1-8)[1]	(minutes)	(%)	(cc)	Description	(1-5)[2]
Alsen	1.6	61.3	14.9	81	375	4.7	10.1	66.1	1008	Trad. Strong	3
Barlow	8.5	62.3	14.3	82	389	4.3	8.9	68.3	972	Mellow	3
Brennan	5.4	61.7	14.2	68	396	4.0	7.9	67.2	936	Mellow	2
Brick	2.1	62.5	13.9	77	407	5.3	11.9	64.8	960	Trad. Strong	3
Briggs	4.0	61.6	14.4	78	453	4.4	8.9	66.3	928	Mellow	2
Faller	11.4	60.3	13.7	66	384	4.2	9.1	64.3	977	Mellow	3
Freyr	3.3	60.8	14.1	76	453	4.8	10.2	67.0	959	Trad. Strong	3
Glenn[4]	18.1	63.5	15.1	93	357	5.3	12.3	66.2	1035	Trad. Strong	5
Howard	2.6	61.7	14.5	71	391	4.4	9.0	65.8	994	Mellow	3
Jenna	3.1	60.5	13.9	66	428	4.5	9.2	66.1	979	Mellow	3
Kelby	5.4	61.9	14.6	65	395	4.1	8.0	66.8	942	Mellow	3
Knudson	0.8	61.1	13.3	67	404	5.3	11.7	66.4	955	Trad. Strong	3
Kuntz[3]	0.0	61.3	13.4	76	439	5.3	11.4	65.4	960	Trad. Strong	3
Mott[3]	1.2	61.4	14.1	79	372	4.8	10.1	64.5	951	Trad. Strong	3
ND901CL PLUS	0.0	61.3	15.7	69	358	5.3	11.8	66.0	1081	Trad. Strong	3
Prosper	0.0	60.8	13.7	67	385	4.2	8.8	65.0	955	Mellow	3
RB07	7.0	61.3	14.1	75	384	5.4	13.1	65.2	1013	Trad. Strong	4
Reeder[3]	1.8	61.2	14.7	78	400	4.2	7.8	65.0	952	Mellow	3
Sabin[3]	0.0	61.0	14.3	88	446	4.5	8.8	67.8	929	Mellow	2
Select[3]	0.0	62.1	13.8	67	406	4.2	8.6	66.1	961	Mellow	3
Steele-ND	3.2	61.3	14.7	69	391	4.5	9.3	66.6	1019	Mellow	3
Tom[3]	0.0	61.7	14.3	88	442	4.7	10.0	65.8	943	Trad. Strong	2
Velva	0.0	60.5	13.9	79	418	4.3	8.8	65.0	923	Mellow	2

Analyses conducted at the NDSU Hard Red Spring Wheat Quality Laboratory in Fargo, N.D.

For footnotes, see bottom of Table 3.

Table 3. Analytical milling and baking data from field plot variety trials at Carrington, Casselton, Dickinson, Hettinger, Langdon, Minot and Williston, 2010 (unless otherwise noted).

Variety	2011 N.D. Planted	Test Weight	Protein 12% MB	Vitreous Kernels	Falling Number	Farinograph Classification	Farinograph Stability	Farinograph Absorption	Loaf Volume	Gluten Strength	Mill & Bake Quality Rating
	(% area)	(lb/bu)	(%)	(%)	(seconds)	(1-8)[1]	(minutes)	(%)	(cc)	Description	(1-5)[2]
Alsen	1.6	61.0	15.1	84	376	4.7	10.0	64.2	1,003	Mellow	3
Barlow	8.5	61.9	13.8	74	377	4.2	9.3	65.4	955	Mellow	3
Brennan	5.4	61.1	13.7	64	405	3.8	7.8	64.5	948	Mellow	3
Brick	2.1	62.2	13.5	76	402	5.0	11.0	62.2	942	Trad. Strong	3
Briggs	4.0	61.3	14.0	74	436	4.5	9.3	63.3	930	Mellow	2
Brogan[3]	0.0	60.9	13.5	80	427	4.0	8.7	59.2	924	Mellow	2
Faller	11.4	59.7	13.4	65	371	4.0	9.2	62.1	957	Mellow	3
Freyr	3.3	60.3	13.7	73	426	4.7	10.7	64.3	948	Trad. Strong	3
Glenn[4]	18.1	63.5	15.0	93	350	5.0	11.6	64.4	1,000	Trad. Strong	5
Howard	2.6	61.4	14.4	77	375	4.3	9.1	64.2	982	Mellow	3
Jenna	3.1	60.5	13.4	65	444	4.3	9.0	63.0	985	Mellow	3
Kelby	5.4	61.6	14.4	61	418	4.2	8.3	64.3	948	Mellow	2
Knudson	0.8	60.8	13.0	66	408	5.5	11.8	63.5	941	Trad. Strong	3
Kuntz[3]	0.0	61.0	13.0	79	438	5.4	11.6	63.0	949	Trad. Strong	3
Mott[3]	1.2	61.5	13.3	72	346	4.4	9.4	61.6	945	Mellow	3
ND901CL PLUS	0.0	61.0	15.1	73	358	4.8	10.8	64.0	1,051	Trad. Strong	3
Prosper	0.0	60.3	13.7	67	370	4.2	8.9	62.5	940	Mellow	3
RB07	7.0	61.3	13.8	78	387	5.2	12.3	62.0	992	Trad. Strong	4
Reeder[3]	1.8	61.0	14.5	73	392	4.0	7.8	62.7	937	Mellow	2
Select[3]	0.0	61.8	13.0	62	407	3.8	7.7	63.1	942	Mellow	2
Steele-ND	3.2	60.9	14.9	77	379	4.3	9.1	64.6	1,032	Mellow	3
Tom[3]	0.0	61.3	14.0	90	451	4.4	9.1	63.3	952	Mellow	3
Velva	0.0	59.5	13.9	79	422	4.0	8.7	62.3	918	Mellow	2
WB Digger[3]	0.0	60.2	12.8	68	423	4.4	8.6	62.9	969	Mellow	3

Analyses conducted at the NDSU Hard Red Spring Wheat Quality Laboratory in Fargo, N.D.

[1] Scale 1 to 8, where 1 = weak and 8 = very strong dough-mixing properties. Farinograph properties affected by growing conditions, so compare varieties.

[2] Mill and Bake Quality Rating scale 1 to 5, with 1 being low and 5 being superior.

[3] Varieties were not tested at all locations.

[4] Glenn is the current Wheat Quality Council check variety for comparing new experimental lines and newly released varieties.

Table 4. Yield of hard red spring wheat varieties grown at three locations in eastern North Dakota, 2009-2011.

Variety	Dazey		Wishek		Langdon		Avg. eastern N.D.	
	2011	3 Yr.	2011	3 Yr.	2011	3 Yr.	2011	3 Yr.
	(bu/a)							
Albany	44.9	71.0	40.2	53.9	71.8	84.0	52.3	69.6
Alpine	26.1	60.8	--	--	60.4	--	--	--
Alsen	--	--	--	--	53.5	70.5	--	--
Barlow	41.7	67.7	35.3	51.9	65.6	78.8	47.5	66.1
Breaker	36.9	66.9	34.6	52.8	67.4	80.4	46.3	66.7
Brennan	36.0	64.3	32.2	50.9	61.3	71.4	43.2	62.2
Brick	43.6	64.2	31.9	43.9	67.4	80.3	47.6	62.8
Briggs	38.8	64.5	30.6	49.2	66.7	77.5	45.4	63.7
Brogan	--	--	--	--	66.1	70.2	--	--
Choteau	--	--	27.3	43.1	--	--	--	--
Faller	43.0	73.3	41.8	56.6	78.9	91.4	54.6	73.8
Freyr	28.5	63.2	--	--	59.9	72.0	--	--
Glenn	38.5	62.7	36.5	50.1	57.8	73.2	44.3	62.0
Howard	41.8	66.4	38.2	51.1	66.0	81.2	48.7	66.2
Jenna	35.9	67.8	32.7	50.2	72.4	79.2	47.0	65.7
Kelby	32.5	61.8	28.3	47.9	57.6	71.2	39.5	60.3
Kuntz	36.4	65.1	25.9	49.5	63.6	72.2	42.0	62.3
Mott	--	--	35.9	50.4	--	--	--	--
ND 901CL PLUS	--	--	35.8	49.9	--	--	--	--
Powerplay	40.1	--	34.4	--	66.6	--	47.0	--
Prosper	40.2	74.4	42.4	52.4	77.2	88.9	53.3	71.9
RB07	29.9	62.6	26.8	53.5	70.2	74.6	42.3	63.6
Reeder	--	--	31.6	--	--	--	--	--
Rollag	32.3	--	27.8	--	63.2	--	41.1	--
Sabin	37.2	67.3	--	--	66.1	76.8	--	--
Samson	--	--	--	--	61.7	74.1	--	--
Select	41.6	--	38.1	--	71.0	73.1	50.2	--
Steele-ND	36.8	64.9	36.3	48.1	66.3	79.5	46.5	64.2
SY Soren	38.6	--	34.7	--	64.4	--	45.9	--
SY Tyra	--	--	27.8	--	--	--	--	--
Tom	31.7	66.2	32.6	55.8	--	--	--	--
Traverse	43.3	70.3	53.8	54.1	--	--	--	--
Vantage	38.9	62.3	34.6	--	58.4	71.0	44.0	--
Velva	25.7	65.8	32.8	55.9	69.2	75.7	42.6	65.8
WB Digger	32.4	--	30.4	--	65.7	--	42.8	--
WB Mayville	40.5	--	29.1	--	57.8	--	42.5	--
Mean	36.9	66.1	34.0	51.0	65.3	76.9	46.1	61.6
CV%	9.5	--	13.3	--	5.1	--	--	--
LSD 0.05	4.9	--	6.3	--	4.6	--	--	--

Table 5. Yield of hard red spring wheat varieties grown at four locations in western North Dakota, 2009-2011.

	Dickinson		Hettinger		Minot		Williston		Avg. western N.D.	
Variety	**2011**	**3 Yr.**	**2011**	**3 Yr.**	**2011**	**3 Yr.**	**2011**	**3 Yr.**	**2011**	**3 Yr.**
	(bu/a)									
Agawam[1]	--	--	--	--	15.0	--	27.6	36.3	--	--
Albany	--	--	--	--	30.0	67.6	30.3	--	--	--
Alpine	55.1	--	--	--	--	--	31.6	40.4	--	--
Alsen	54.3	59.2	32.1	47.4	23.1	52.9	25.6	35.8	33.8	48.8
Barlow	60.7	63.1	45.5	50.5	23.5	58.4	34.2	39.8	41.0	53.0
Blade	57.9	65.2	40.5	55.0	20.9	58.8	27.0	36.5	36.6	53.9
Breaker	60.0	64.7	44.2	52.7	21.1	55.4	28.0	36.1	38.3	52.2
Brennan	55.7	63.3	49.9	54.1	22.9	55.1	30.1	38.8	39.7	52.8
Brick	54.9	55.7	47.7	53.0	29.4	58.0	27.0	35.2	39.8	50.5
Briggs	--	--	43.3	46.1	26.1	55.2	29.7	37.0	--	--
Brogan	56.0	62.5	44.6	52.9	21.5	59.4	33.6	39.5	38.9	53.6
Carberry	--	--	--	--	30.0	--	26.9	--	--	--
Choteau	49.5	62.7	27.9	44.9	14.6	55.6	26.7	41.7	29.7	51.2
Edge	55.1	--	48.5	--	21.3	--	32.3	--	39.3	--
Faller	48.6	61.4	38.0	47.8	24.9	60.6	31.4	43.5	35.7	53.3
Freyr	52.8	61.1	35.8	47.0	20.9	55.0	30.8	44.2	35.1	51.8
Glenn	60.7	56.5	39.5	44.5	--	--	28.5	41.9	--	--
Howard	53.0	62.4	46.1	53.4	--	--	28.7	42.3	--	--
Jenna	60.6	67.4	48.9	55.8	28.3	61.5	31.7	45.8	42.4	57.6
Kelby	54.0	61.2	49.9	50.3	--	--	31.5	44.8	--	--
Kuntz	--	--	39.4	52.1	--	--	30.6	43.5	--	--
Lochsa[1]	--	--	--	--	21.4	--	32.6	--	--	--
Mott	--	--	39.3	49.4	26.1	54.5	28.7	41.9	--	--
ND 901CL PLUS	49.6	54.1	38.9	51.9	23.6	53.6	31.1	43.3	35.8	50.7
O'Neal	--	--	36.0	--	--	--	29.4	--	--	--
Otis	--	--	--	--	15.7	--	31.3	45.2	--	--
Powerplay	55.0	--	--	--	--	--	33.2	--	--	--
Prosper	55.8	62.5	40.0	52.2	--	--	27.7	42.0	--	--
RB07	51.3	62.3	35.8	47.3	20.1	55.0	32.3	44.5	34.9	52.3
Reeder	--	--	49.4	60.3	--	--	35.0	47.0	--	--
Rollag	--	--	35.2	--	--	--	30.2	--	--	--
Sabin	56.4	65.9	47.5	61.5	--	--	29.4	45.5	--	--
Samson	62.3	65.6	53.2	51.6	--	--	--	--	--	--
Select	57.0	58.3	44.7	--	27.9	59.0	34.1	--	40.9	--
Snowstar[1]	--	--	--	--	15.1	--	30.7	--	--	--
Steele-ND	50.3	61.2	38.6	52.2	--	--	31.6	43.8	--	--
SY605 CL	--	--	51.7	54.7	--	--	31.7	--	--	--
SY Soren	54.5	--	48.8	--	28.2	--	29.3	--	40.2	--
SY Tyra	50.8	--	39.0	--	--	--	31.7	--	--	--
Tom	56.0	64.4	44.7	55.9	--	--	--	--	--	--
Vantage	47.4	57.5	37.8	49.8	25.4	56.2	27.2	42.5	34.5	51.5
Velva	55.7	63.0	49.0	55.8	27.6	64.9	--	--	--	--
WB Digger	54.5	--	38.6	--	21.2	--	30.8	--	36.3	--
WB Gunnison	37.9	--	30.3	--	14.9	--	31.5	--	28.7	--
WB Mayville	54.6	--	41.6	--	24.7	--	33.3	--	38.6	--
Mean	54.3	61.7	42.2	51.8	23.2	57.2	30.4	41.4	37.0	52.4
CV %	8.0	--	6.6	--	14.9	--	6.7	--	--	--
LSD 0.05	6.1	--	4.5	--	7.0	--	2.8	--	--	--

[1]Hard white spring wheat variety.

Table 6. Protein at 12 percent moisture of hard red spring wheat varieties grown at seven locations in North Dakota, 2011.

Variety	Dazey	Wishek	Dickinson	Hettinger	Langdon	Minot	Williston	State Avg.
	---------- (%)----------							
Agawam[1]	--	--	--	--	--	15.0	14.6	--
Albany	15.9	16.3	--	--	14.2	17.8	16.2	--
Alpine	17.5	--	15.3	--	15.2	--	15.1	--
Alsen	--	--	16.9	16.6	15.9	18.3	16.6	--
Barlow	16.8	16.9	16.5	16.0	15.6	17.9	15.5	16.5
Blade	--	--	16.3	15.8	--	18.4	16.9	--
Breaker	16.8	17.4	16.0	15.9	14.9	18.7	16.6	16.6
Brennan	17.1	17.1	16.4	15.5	15.1	18.2	16.4	16.5
Brick	16.4	17.0	15.6	15.4	14.3	17.1	15.4	15.9
Briggs	17.0	17.5	--	15.8	15.4	18.0	15.1	--
Brogan	--	--	16.3	15.9	14.6	18.1	16.2	--
Carberry	--	--	--	--	--	17.5	16.0	--
Choteau	--	17.0	16.3	16.4	--	18.1	16.7	--
Edge	--	--	16.5	15.8	--	17.8	16.2	--
Faller	16.9	16.0	15.9	15.8	14.4	17.4	15.6	16.0
Freyr	17.9	--	15.6	15.8	15.5	17.7	15.7	--
Glenn	17.4	17.5	16.8	16.1	15.6	--	16.0	--
Howard	16.4	16.9	16.5	15.7	15.4	--	15.8	--
Jenna	17.7	17.9	16.3	15.7	14.8	18.4	16.0	16.7
Kelby	17.3	17.3	16.6	15.9	15.3	--	16.3	--
Kuntz	16.4	17.0	--	15.1	14.9	--	14.4	--
Lochsa[1]	--	--	--	--	--	16.7	15.5	--
Mott	--	17.2	--	16.6	--	18.4	17.0	--
ND 901CL PLUS	--	17.1	16.9	16.5	--	17.8	17.0	--
O'Neal	--	--	--	15.9	--	--	16.1	--
Otis	--	--	--	--	--	16.0	15.2	--
Powerplay	16.9	17.2	16.4	--	15.0	--	15.7	--
Prosper	17.1	16.9	15.9	15.8	14.8	--	16.1	--
RB07	17.2	17.4	15.9	16.4	15.2	17.4	15.5	16.4
Reeder	--	16.5	--	15.7	--	--	15.8	--
Rollag	18.1	17.4	--	16.3	16.1	--	16.4	--
Sabin	17.9	--	16.4	15.8	15.4	--	15.9	--
Samson	--	--	15.7	15.2	15.1	--	--	--
Select	16.7	17.4	15.4	16.0	15.1	17.3	14.7	16.1
Snowstar[1]	--	--	--	--	--	18.2	15.0	--
Steele-ND	16.9	17.2	16.4	16.1	15.3	--	15.7	--
SY605 CL	--	--	--	15.8	--	--	16.0	--
SY Soren	17.0	17.5	16.4	16.0	15.6	18.2	16.6	16.8
SY Tyra	--	16.1	15.6	15.1	--	--	15.7	--
Tom	17.2	16.8	15.9	15.6	--	--	--	--
Traverse	16.7	16.9	--	--	--	--	--	--
Vantage	17.7	17.7	17.7	17.3	16.0	19.3	17.1	17.5
Velva	17.7	17.1	15.9	15.3	14.7	17.3	--	--
WB Digger	17.0	17.0	15.8	15.6	14.4	17.4	15.6	16.1
WB Gunnison	--	--	16.0	15.3	--	16.6	15.5	--
WB Mayville	16.4	17.4	16.9	16.0	15.6	17.3	16.4	16.6
Mean	17.1	17.1	16.2	15.9	15.2	17.8	15.9	16.3
CV %	1.5	1.4	1.4	1.6	2.6	2.6	2.3	--
LSD 0.05	0.4	0.3	0.4	0.4	0.6	0.9	0.7	--

[1]Hard white spring wheat variety.

Table 7. Test weight of hard red spring wheat varieties grown at seven locations in North Dakota, 2011.

Variety	Dazey	Wishek	Dickinson	Hettinger	Langdon	Minot	Williston	State Avg.
	(lb/bu)							
Agawam	--	--	--	--	--	53.5	59.6	--
Albany	55.5	53.7	--	--	61.1	57.9	56.8	--
Alpine	51.7	--	55.6	--	58.7	--	57.9	--
Alsen	--	--	56.0	55.4	60.4	55.3	57.8	--
Barlow	55.3	58.1	56.9	56.7	61.7	55.2	60.1	57.7
Blade	--	--	58.3	57.3	--	58.0	59.3	--
Breaker	56.6	57.4	58.4	57.8	62.2	56.8	59.9	58.4
Brennan	53.8	58.4	56.3	57.1	60.0	53.2	58.6	56.8
Brick	57.7	58.9	56.9	59.0	61.7	58.4	59.5	58.9
Briggs	55.5	57.2	--	55.3	60.7	55.3	58.1	--
Brogan	-	--	54.8	55.8	61.0	55.1	57.4	--
Carberry	--	--	--	--	--	55.1	57.9	--
Choteau	--	54.4	49.4	51.4	--	50.2	56.2	--
Edge	--	--	54.0	55.8	--	53.1	57.2	--
Faller	55.9	57.4	51.5	55.9	60.8	53.2	55.6	55.8
Freyr	52.0	--	56.6	54.8	59.5	52.4	59.0	--
Glenn	58.0	60.1	58.4	59.2	62.9	--	61.9	--
Howard	57.0	59.5	53.4	55.4	61.8	--	58.1	--
Jenna	54.0	56.5	56.2	56.5	59.4	54.8	56.8	56.3
Kelby	53.8	56.7	56.4	57.3	59.1	--	58.6	--
Kuntz	54.3	54.8	--	54.3	59.7	--	58.0	--
Lochsa[1]	--	--	--	--	--	48.4	54.3	--
Mott	--	56.7	--	58.0	--	55.7	58.0	--
ND 901CL PLUS	--	56.4	54.9	56.3	--	53.6	58.6	--
O'Neal	--	--	--	53.1	--	--	57.0	--
Otis	--	--	--	--	--	52.7	58.0	--
Powerplay	56.9	57.5	54.0	--	61.1	--	57.4	--
Prosper	55.1	57.0	54.5	55.7	60.8	--	55.5	--
RB07	53.9	54.7	54.5	55.2	60.3	54.8	58.6	56.0
Reeder	--	55.4	--	55.9	--	--	58.5	--
Rollag	55.3	56.0	--	56.5	61.4	--	58.2	--
Sabin	54.2	--	56.0	57.9	59.9	--	57.9	--
Samson	--	--	53.8	56.3	59.2	--	--	--
Select	55.1	57.9	56.1	55.5	61.9	57.6	58.6	57.5
Snowstar[1]	--	--	--	--	--	54.4	57.8	--
Steele-ND	56.9	58.6	54.4	55.5	61.4	--	58.1	--
SY605 CL		--	--	55.5	--	--	57.6	--
SY Soren	55.1	57.1	56.0	55.4	60.6	55.0	57.3	56.6
SY Tyra		54.4	50.2	52.7	--	--	57.7	--
Tom	54.5	57.8	58.1	56.9	--	--	--	--
Traverse	52.3	53.8	--	--	--	--	--	--
Vantage	58.2	57.2	56.4	60.3	61.8	57.3	59.0	58.6
Velva	51.2	54.4	52.8	55.8	60.1	52.4	--	--
WB Digger	53.5	53.1	53.2	52.0	59.5	51.8	56.5	54.2
WB Gunnison	--	--	48.0	53.2	--	52.8	58.5	--
WB Mayville	55.3	54.9	49.7	51.6	59.9	53.2	58.0	54.7
Mean	55.0	56.5	54.7	55.8	60.6	54.4	58.0	56.8
CV %	1.8	3.8	2.0	1.4	0.6	2.9	1.0	--
LSD 0.05	1.4	3.0	1.5	1.3	0.5	3.1	1.2	--

[1]Hard white spring wheat variety.