

North Dakota

Hard Winter Wheat

Variety Trial Results for 2015 and Selection Guide

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During the 2014-15 growing season, 250,000 acres of winter wheat were planted and 235,000 acres were harvested. The state's winter wheat yield this season was estimated at 51 bushels per acre (bu/a), which is up significantly from last year's yield of 44 bu/a. Generally, conditions were favorable for winter wheat development and yield. Yellow rust developed at damaging levels in some areas of the state. Fusarium head blight (scab) was problematic in a few regions of the state, but generally the crop was of a better quality than last year, when scab was more widespread.

Jerry was the most popular variety in 2014-15, occupying 21 percent of the acres planted. Decade, SY Wolf, Ideal and WB Matlock followed Jerry in popularity, with 17, 9, 5 and 5 percent of the acreage, respectively.

Characteristics of hard red winter wheat varieties adapted for production in North Dakota are described in Table 1. Information on the agronomic performance of selected varieties is summarized in subsequent tables. Yields are expressed on 13 percent moisture.

Successful winter wheat production depends on numerous production practices, including selecting the right variety for a particular area. The information included in this publication is meant to help growers choose that variety or group of varieties. Characteristics to consider when selecting a variety are winter hardiness, yield potential in your area, test weight, protein content when grown with proper fertility, straw strength, plant height, reaction to important diseases and maturity.

The recommended seeding dates for winter wheat are Sept. 1-15 north of North Dakota Highway 200 and Sept. 15-30 in southern regions. Planting after the recommended dates reduces winter survival and grain yield. Planting prior to the recommended date may deplete soil moisture reserves unnecessarily. It also increases the risk of wheat streak mosaic virus and may reduce winter survival.

Winter wheat should be seeded at a rate of 1 million to 1.2 million viable seeds per acre, or about 80 to 100 pounds per acre. Higher seeding rates should be used for late seeding or poor seedbed conditions. Producers should consider only the most winter-hardy varieties available when growing winter wheat in North Dakota. Relative ratings for winter hardiness are found in Table 1.

Phosphorus aids overwinter survival by stimulating root growth and fall tillering. The secondary root system that develops during tillering is essential for a healthy, deep-rooted plant capable of withstanding stress. If winter wheat is planted on bare soil, an application of phosphorus is recommended if soil phosphorous levels are known to be low. While important, the contribution of phosphorus to overwinter survival is secondary to varietal hardiness.

Data from several years and locations should be used when selecting varieties. The idea that data from a single location nearest your farm will indicate which variety will perform the best for you next year is incorrect. You should select varieties that, on average, perform the best at multiple trial locations near your farm across several years.

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List of Tables

Table 1. 2015 North Dakota hard winter wheat variety description and agronomic traits.

Table 2. Analytical milling and baking characteristics of selected varieties evaluated across five localities (Carrington, Dickinson, Hettinger, Langdon and Minot) in 2014.

Table 3. Yield of winter wheat varieties grown at four locations in western North Dakota in 2015, with three-year averages (2013-15).

Table 4. Yield of winter wheat varieties grown at four locations in eastern North Dakota in 2015, with three-year averages (2013-15).

Table 5. Test weight of winter wheat varieties grown at eight locations in North Dakota in 2015.

Table 6. Grain protein content of winter wheat varieties grown at eight locations in North Dakota in 2015.

Table 1. 2015 North Dakota hard winter wheat variety description and agronomic traits.

Variety	Agent or Origin ²	Year	Reaction to Disease ¹				Maturity ³	Straw ⁴ Strength	Height ⁵ (inches)	Winter ⁶ Hardiness
			Stripe Rust	Leaf Rust	Stem Rust	Scab				
AAC Gateway	A.Can.	2012	R/MR	MR/MS	R	MS	0	3	30	3
Accipiter	CDC	2008	R/MR	MS	R	S	0	4	36	2
Art	Agripro	2008	R	R	R	MS	-6	4	33	8
Boomer	WB	2009	MS	MR	R	S	-2	4	34	3
Broadview	A.Can.	2008	MR/MS	R	R	S/VS	-2	5	32	4
Carter	WB	2010	S	NA	NA	S	-2	4	32	6
CDC Chase	CDC	2013	R	R	R	MS	-2	6	37	4
CDC Falcon	WB	2000	R	MS	NA	S	-2	5	34	4
Colter	MT	2013	MR	S	R	S	-1	3	36	5
Darrell	SD	2006	NA	S	R	MS	-4	4	35	6
Decade	MT/ND	2010	S	VS	R	VS	-4	4	35	2
Emerson	A.Can.	2011	R	MS	R	MR	-2	4	33	3
Flourish	A.Can.	2010	R/MR	MS	MS	S	-4	5	35	2
Hawken	Agripro	2007	S	MR	MR	S	-5	4	28	7
Ideal	SD	2011	MR/MS	R	MR	S	-3	5	33	5
Jerry	ND	2001	S	MR	R	S	0	4	37	3
Lyman	SD	2008	MR/MS	R	R	MR	-4	7	35	5
McGill	ARS-NE	2010	MS	MS	MR	MS	-5	4	36	4
Moats	A.Can.	2010	R	R	R	MR	0	5	38	2
Northern	MT	2015	R	S	R	S	+1	NA	35	6
Overland	NE	2006	MR	MR/R	MR	S	-4	4	35	5
Peregrine	CDC	2008	R	MR	R	MS	+1	4	39	2
Radiant ⁷	A.Can.	2001	R	S	S	S	+1	2	36	2
Redfield	SDSU	2013	MR/MS	MS	S	MR	-3	R	33	5
Smoky Hill	WB	2007	S	R	R	S	0	5	35	7
Striker	WB	2009	MS	MR	R	S	-4	4	32	5
SY Wolf	Agripro	2010	MR	MR	R	MS	-4	4	33	6
WB-Grainfield	WB	2013	MS	MS	NA	S	-5	6	33	6
WB-Matlock	WB	2010	MS	MS	R	MS	+1	4	36	2
WB4614	WB	2013	R	NA	NA	S	0	5	35	3
Wesley	NE/SD/WY	2000	MR	MS	R	S	-5	5	32	6
Yellowstone	MT	2005	R	S	S	VS	+2	6	33	5

¹R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible; VS = very susceptible; NA = not available.

²A.Can. = Agriculture and Agri-Food Canada; CDC = Crop Development Centre, University of Saskatchewan; WB = WestBred; SD = South Dakota State University; MT = Montana State University; ND = North Dakota State University; ARS = USDA Agricultural Research Service; NE = University of Nebraska; WY = Wyoming.

³Days to heading relative to Jerry.

⁴Straw strength = 1 to 9 scale, with 1 strongest and 9 weakest. These ratings may change as additional data become available.

⁵Based on the average of several environments, and should be used for comparing varieties. The environment can impact the height of varieties.

⁶Relative winter hardiness rating: 1 = excellent, 10 = very poor. These values are subject to change as additional information becomes available.

⁷Curl mite resistant.

Table 2. Analytical milling and baking characteristics of selected varieties evaluated across five localities (Carrington, Dickinson, Hettinger, Langdon and Minot) in 2014.

	Test Weight	1000-KW	Hardness	Falling Number	Protein 12 MB	Flour Extraction	Wet Gluten	Flour Ash	Farinograph				Baking Abs	Loaf Volume
									Abs	Peak Time	Stab	MTI		
	(lb/bu)	(gram)	(score)	(seconds)	(%)	(%)	(%)	(%)	%	(min)	(min)	(BU)	(%)	(cc)
AAC Gateway	60.9	31.6	68.9	395	12.8	68.6	32.7	0.51	56.7	6.7	11.7	26.4	63.2	1,080
Accipiter	61.5	29.2	71.4	410	11.9	67.2	29.5	0.52	56.4	5.4	9.9	25.6	62.7	1,042
Art	61.3	31.0	68.4	416	12.9	64.2	32.1	0.50	57.5	6.2	9.1	30.8	63.7	957
Broadview	60.0	31.5	62.0	414	12.0	67.3	36.7	0.52	57.8	4.4	5.3	47.2	63.9	991
CDC Falcon	60.4	30.3	64.7	398	12.4	67.1	30.6	0.53	55.8	5.0	10.2	22.6	62.7	1,042
Decade	60.4	33.1	70.7	411	13.3	66.5	31.4	0.51	57.6	7.2	17.6	17.8	64.2	1,080
Emerson	61.9	30.7	64.5	346	13.2	68.5	32.2	0.49	55.4	6.3	22.3	14.4	61.6	1,073
Flourish	59.4	33.7	62.2	369	12.4	68.1	31.2	0.52	57.2	6.2	11.6	27.2	64.4	1,129
Freeman	59.8	34.4	54.0	416	12.4	67.2	29.9	0.50	54.8	5.0	11.3	23.8	62.4	994
Grainfield	60.7	34.0	74.5	402	12.8	66.3	32.5	0.51	58.7	6.1	8.4	33.4	65.0	1,000
Ideal	61.0	34.5	67.7	371	12.2	68.7	27.9	0.51	57.0	3.8	12.8	20.0	64.1	993
Jerry	60.5	38.2	61.8	346	12.8	70.6	32.4	0.51	58.0	5.3	7.5	38.2	65.3	1,011
Lyman	61.3	39.9	73.8	399	13.8	68.3	37.7	0.51	59.7	6.7	8.9	28.6	66.1	1,074
McGill	61.1	31.5	70.0	379	12.1	67.5	31.1	0.47	58.1	6.8	8.8	35.6	64.8	1,094
Moats	61.8	34.2	77.6	420	12.9	67.2	31.7	0.51	57.4	5.5	11.6	25.6	63.2	1,073
Overland	61.3	35.4	70.0	418	12.7	68.0	35.8	0.51	58.3	4.0	4.5	49.0	64.3	908
Peregrine	61.7	32.8	78.2	393	12.2	68.5	30.0	0.50	57.1	5.6	10.7	25.4	63.4	972
Robidoux	59.9	30.9	69.6	405	12.3	64.9	28.9	0.49	56.1	4.7	10.9	21.0	62.6	995
SY Wolf	60.8	34.8	73.5	319	12.8	66.2	31.4	0.49	58.3	7.1	8.7	33.4	64.6	977
WB-Matlock	61.7	33.7	69.5	418	13.0	65.7	33.9	0.52	59.5	6.0	9.7	27.6	66.0	973
Mean	60.9	33.4	68.3	391	12.6	67.4	32.0	0.51	57.4	5.7	10.5	28.9	63.9	1,021
LSD (5%)	0.9	2.4	3.5	36	0.5	2.1	3.0	0.02	0.7	1.6	4.0	8.2	1.2	67

Table 3. Yield of winter wheat varieties grown at four locations in western North Dakota in 2015, with three-year averages (2013-15).

Variety	<u>Dickinson</u>		<u>Hettinger</u>		<u>Minot</u>		<u>Williston</u>		<u>Avg. Western N.D.</u>	
	2015	3-Yr. Avg.	2015	3-Yr. Avg.	2015	3-Yr. Avg.	2015	2-Yr. Avg.	2015	2-/3-Yr. Avg.
	-----(bu/a)-----									
AAC Gateway	71.5	--	79.3	--	30.4	--	43.5	--	56.2	--
Accipiter	83.9	83.9	77.5	72.3	34.3	73.0	50.4	45.0	61.5	68.6
Broadview	75.1	81.3	71.7	--	30.4	72.6	54.5	51.4	57.9	--
CDC Chase	76.3	--	83.7	--	32.7	--	46.5	--	59.8	--
CDC Falcon	73.1	79.6	73.3	--	28.6	69.4	49.3	38.7	56.1	--
Colter	75.0	--	80.4	--	43.0	--	50.5	--	62.2	--
Decade	66.2	81.3	81.1	84.1	33.1	71.6	47.6	38.5	57.0	68.9
Emerson	79.7	82.6	86.9	--	36.7	--	47.3	--	62.7	--
Flourish	72.1	79.9	75.9	--	32.0	69.9	32.6	30.8	53.2	--
Ideal	55.5	74.3	80.8	81.0	32.0	71.9	46.0	40.0	53.6	66.8
Jerry	65.7	76.4	72.2	74.6	28.2	65.3	55.4	52.1	55.4	67.1
Lyman	75.6	75.7	80.4	81.7	25.3	65.5	49.8	40.3	57.8	65.8
Moats	67.2	73.7	70.6	--	37.3	72.9	46.0	50.8	55.3	--
Northern	81.0	--	84.0	--	43.8	--	52.6	--	65.4	--
Overland	77.5	78.4	86.3	83.9	33.9	66.0	45.7	37.6	60.9	66.5
Peregrine	79.1	82.5	80.6	74.6	30.2	71.3	45.9	43.1	59.0	67.9
Redfield	70.2	--	78.4	--	34.3	72.1	46.5	--	57.4	--
SY Wolf	77.0	81.8	96.8	84.9	33.6	69.4	38.5	31.8	61.5	67.0
WB-Matlock	75.3	80.1	75.2	76.3	41.9	75.9	52.1	45.3	61.1	69.4
WB4614	67.8	--	78.1	--	29.8	--	52.4	--	57.0	--
Mean	73.2	79.4	79.7	79.3	33.6	70.5	47.7	42.0	58.5	67.5
CV (%)	13.0	--	4.3	--	6.4	--	12.6	--	--	--
LSD 0.05	13.3	--	4.8	--	3.5	--	8.3	--	--	--
LSD 0.10	11.1	--	4.0	--	2.9	--	7.0	--	--	--

Table 4. Yield of winter wheat varieties grown at four locations in eastern North Dakota in 2015, with three-year averages (2013-15).

Variety	<u>Carrington</u>		<u>Wishek</u>		<u>Langdon</u>		<u>Forman</u>		<u>Avg. Eastern N.D.</u>	
	2015	3-Yr. Avg.	2015	3-Yr. Avg.	2015	3-Yr. Avg.	2015	3-Yr. Avg.	2015	3-Yr. Avg.
	-----(bu/a)-----									
AAC Gateway	55.9	--	40.3	--	78.8	--	38.7	--	53.4	--
Accipiter	58.9	62.5	41.3	38.6	72.9	84.5	34.7	37.2	52.0	55.7
Broadview	67.6	63.3	43.2	43.0	76.2	81.7	39.6	38.0	56.7	56.5
CDC Chase	57.6	--	50.3	--	85.2	--	52.1	--	61.3	--
CDC Falcon	63.6	62.5	40.1	40.5	76.2	84.1	38.9	37.4	54.7	56.1
Colter	59.1	--	43.3	--	82.4	--	32.6	--	54.4	--
Decade	64.1	61.4	39.8	45.6	84.4	80.9	37.1	38.2	56.4	56.5
Emerson	60.8	62.7	48.4	45.9	85.0	80.1	52.0	--	61.6	--
Flourish	57.5	57.9	37.5	39.7	74.7	82.3	37.0	33.1	51.7	53.3
Ideal	64.0	63.9	48.5	46.5	80.1	73.8	36.8	38.7	57.4	55.7
Jerry	64.7	65.2	36.2	41.6	75.5	81.0	33.5	38.1	52.5	56.5
Lyman	56.5	57.0	55.1	48.1	84.2	85.3	36.2	40.0	58.0	57.6
Moats	62.5	60.1	43.5	42.1	77.1	77.1	39.4	35.6	55.6	53.7
Northern	59.1	--	40.0	--	83.5	--	44.3	--	56.7	--
Overland	55.9	56.4	58.9	48.6	89.8	89.8	40.8	37.0	59.0	58.0
Peregrine	66.4	65.3	60.1	54.2	78.2	80.1	49.6	41.9	66.5	60.4
Redfield	59.3	--	54.3	--	79.2	--	40.2	--	58.0	--
SY Wolf	56.8	56.1	69.2	50.9	83.7	83.7	46.1	37.6	62.8	57.1
WB-Matlock	62.4	61.8	46.2	39.1	69.8	82.7	39.3	37.7	57.9	55.3
WB4614	68.2	--	37.5	--	--	--	36.4	--	53.0	--
Mean	61.0	61.2	46.7	44.6	79.8	81.9	40.3	37.7	58.6	56.3
CV (%)	12.9	--	27.5	--	7.2	--	20.8	--	--	--
LSD 0.05	5.9	--	9.7	--	8.1	--	19.6	--	--	--
LSD 0.10	4.1	--	8.1	--	6.7	--	16.3	--	--	--

Table 5. Test weight of winter wheat varieties grown at eight locations in North Dakota in 2015.

Variety	Dickinson	Hettinger	Minot	Williston	Carrington	Wishek	Langdon	Forman	Average
	----- (lb/bu) -----								
AAC Gateway	57.0	61.4	59.8	60.7	61.9	57.0	61.3	52.5	59.0
Accipiter	61.0	60.0	59.8	60.0	61.5	56.0	59.7	55.3	59.2
Broadview	58.3	59.4	58.1	59.9	60.3	55.0	58.9	56.5	58.3
CDC Chase	61.5	62.7	59.6	60.8	61.1	55.8	61.6	56.5	60.0
CDC Falcon	59.5	59.2	59.3	59.7	59.9	55.2	58.6	57.1	58.6
Colter	56.3	54.8	54.6	58.3	60.0	50.1	57.1	53.4	55.6
Decade	59.0	59.9	59.4	61.9	61.4	54.1	61.3	52.6	58.7
Emerson	59.5	62.9	59.4	60.3	61.9	58.2	62.0	58.1	60.3
Flourish	58.3	58.3	59.4	59.5	60.1	55.3	59.1	53.4	57.9
Ideal	58.8	60.5	59.5	61.3	60.9	56.1	60.9	55.2	59.2
Jerry	59.3	60.4	59.1	59.9	59.3	55.4	59.7	54.6	58.5
Lyman	61.0	62.6	59.7	60.7	60.8	59.9	61.2	55.5	60.2
Moats	60.8	61.6	59.4	59.7	60.1	55.4	59.7	56.2	59.1
Northern	58.8	59.7	60.1	60.3	61.4	52.5	59.8	49.8	57.8
Overland	60.5	62.0	59.9	61.0	59.3	59.6	59.7	55.0	59.6
Peregrine	60.8	62.1	58.0	59.8	61.2	57.6	61.2	59.1	60.0
Redfield	61.0	60.7	59.9	61.1	60.9	57.2	60.5	55.1	59.6
SY Wolf	57.8	61.6	58.7	61.5	61.1	58.7	61.6	56.1	59.6
WB-Matlock	60.8	61.1	60.3	61.0	60.3	58.1	60.6	58.9	60.1
WB4614	57.5	57.9	58.7	60.5	61.3	52.0	--	54.5	--
Mean	59.4	60.4	59.1	60.4	60.7	56.0	60.2	55.3	59.0
CV (%)	2.8	1.0	0.9	1.1	1.7	5.7	1.0	6.5	--
LSD 0.05	3.5	0.9	0.9	0.9	1.0	2.4	0.8	5.9	--
LSD 0.10	2.9	0.8	0.8	0.8	0.8	2.0	0.7	4.9	--

Table 6. Grain protein content of winter wheat varieties grown at eight locations in North Dakota in 2015.

Variety	Dickinson	Hettinger	Minot	Williston	Carrington	Wishek	Langdon	Forman	Average
	------(%)-----								
AAC Gateway	14.4	12.2	10.5	13.1	13.9	14.4	12.3	14.1	13.1
Accipiter	12.6	11.1	9.0	12.6	12.2	12.8	11.8	12.9	11.9
Broadview	13.2	11.8	10.1	11.3	12.1	13.0	11.3	12.1	11.9
CDC Chase	13.7	12.0	9.5	11.6	12.5	13.2	11.2	13.8	12.2
CDC Falcon	12.8	11.9	9.6	12.5	12.4	13.6	11.7	12.9	12.2
Colter	13.5	12.1	10.4	12.9	12.6	13.9	11.4	14.0	12.6
Decade	13.2	11.7	10.3	13.4	14.4	13.5	12.0	12.5	12.6
Emerson	13.9	12.5	10.5	15.1	13.9	13.6	11.8	13.8	13.8
Flourish	13.4	11.8	10.3	13.6	13.4	13.4	11.9	13.6	12.7
Ideal	12.3	11.1	10.1	12.9	12.1	12.3	11.3	12.5	11.8
Jerry	12.7	11.9	9.9	13.0	13.3	13.6	12.0	13.2	12.5
Lyman	13.0	12.7	10.2	14.1	13.5	13.1	11.6	12.9	12.6
Moats	13.5	12.2	10.4	14.1	12.4	13.9	11.7	14.3	12.8
Northern	13.4	11.8	9.9	13.6	13.6	14.5	11.7	13.9	12.8
Overland	12.7	11.6	10.1	12.5	13.3	12.4	11.4	13.3	12.2
Peregrine	12.7	10.9	9.6	12.3	11.7	12.3	10.9	13.2	11.7
Redfield	13.2	12.0	10.4	13.3	13.0	13.3	11.5	13.5	12.5
SY Wolf	13.8	12.4	10.5	12.9	13.0	12.8	11.4	13.1	12.5
WB-Matlock	13.3	12.0	10.3	13.5	13.1	13.5	12.2	13.1	12.6
WB4614	14.2	12.3	10.0	13.3	13.0	14.6	--	13.4	--
Mean	13.3	11.9	10.1	13.1	13.0	13.4	11.6	13.3	12.5
CV (%)	2.3	2.9	5.1	5.3	5.7	5.9	2.8	3.7	--
LSD 0.05	0.6	0.5	NS	1.0	0.4	0.5	0.4	0.8	--
LSD 0.10	0.5	0.4	NS	0.8	0.3	0.4	0.5	0.7	--

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