2015 Hard Red Winter Wheat Field Crop Trials Results

Minnesota Agricultural Experiment Station and the College of Food, Agricultural and Natural Resource Sciences

The success of a winter wheat variety depends largely on its ability to survive Minnesota winters. Research on the northern plains has shown that planting winter wheat in standing stubble using no-till methods will decrease winterkill considerably. A stubble height of 4 to 6 inches is ideal but even shorter soybean stubble provides some protection. Trapped snow provides additional protection that increases the odds that the young seedlings will survive.

These performance evaluations are not designed for crop comparisons, because the spring and winter wheat trials are grown on different fields and with different management. The data should be used only to compare varieties within a table. Nonetheless, yield potential of winter wheat - if the crop maintains a stand of 23 plants per square foot or better – is routinely higher than spring wheat, especially in the southern half of the state.

The results of the variety performance evaluations are summarized in Tables 1 through 3. The winter wheat performance trials were grown in Roseau, Crookston, Kimball, St. Paul, Le Center, and Lamberton in 2015. The trial in Roseau was abandoned due to nearly complete winterkill while

Table 1. Agronomic characteristics of winter wheat varieties.

Entry	Agent or Breeder[1]	Year of Release	Class[2]	PVP	Winterhardiness[3]	Maturity[4]	Plant Heigth[5]	Lodging[3]	Test Weight[3]	Grain Protein[3]
AAC Gateway[6]	Seed Depot	2012	CWRW	PVP(94)	3	6	2	1	2	3
AC Broadview	Meridian Seeds	2008	CWRW	PVP(94)	4	9	3	4	4	9
AC Emerson	Meridian Seeds	2010	CWRW	PVP(94)	2	8	6	2	4	1
Arapahoe	NE	1998	HRWW	—	3	6	6	5	4	5
Branson[6]	Syngenta	2005	SRWW	PVP(94)	9	1	1	1	5	9
CDC Chase[6]	Canterra Seeds	2013	CWRW	PVP(94)	2	5	6	4	2	2
CDC Falcon	WestBred	2000	CWRW	PVP(94)	5	8	1	4	5	5
Decade	MT/NDSU	2010	HRWW	PVP(94)	3	8	4	5	6	1
Expedition	SDSU	2002	HRWW	PVP(94)	2	1	3	7	1	4
Flourish	SeCan	2010	CWRW	PVP(94)	6	7	3	3	6	9
Freeman	USDA-ARS/NE	2013	HRWW	PVP Pending	4	3	1	6	5	9
Jerry	NDSU	2001	HRWW	—	4	7	7	7	3	5
Millenium	NE	2000	HRWW	PVP (94)	3	4	6	6	2	4
Moats	SeCan	2010	HRWW	PVP Pending	6	8	8	4	3	3
Overland	NE	2006	HRWW	PVP (94)	3	6	3	3	2	4
Redfield[6]	SDSU	2013	HRWW	PVP Pending	2	5	2	3	2	9
Roughrider	NDSU	1975	HRWW	—	1	7	9	9	2	3
SY Wolf	Syngenta	2010	HRWW	PVP(94)	8	5	1	1	3	9
WB 4614[6]	WestBred	2013	HRWW	PVP(94)	1	1	2	8	7	9
WB Grainfield	WestBred	2013	HRWW	PVP(94)	6	2	2	6	2	6
WB Matlock	WestBred	2010	HRWW	PVP(94)	2	7	5	4	1	3
Yellowstone[6]	MT	2005	HRWW	PVP(94)	4	6	3	2	9	9
LSD (0.10)					**2**	**1**	**1**	**4**	**7**	**4**

[1]MT = Montana State University, NDSU = North Dakota State University, NE= University of Nebraska, SDSU = South Dakota State University, USDA-ARS = USDA Agricultural Research Service.
[2]CWRW = Canadian Western Red Winter Wheat, HRWW=Hard Red Winter Wheat, SRWW=Soft Red Winter Wheat.
[3]1=best 9=worst.
[4]1=earliest 9=latest.
[5]1=shortest 9=tallest.
[6]Single year data.

all other locations showed varying degrees of winter survival following a relatively mild but very bare winter. A very dry spring caused drought stress in the trial in Crookston as is evidenced by the relatively low average grain yield attained (Table 2). The trial in St. Paul was not included due to excessive black bird damage, a perennial challenge in the urban setting of the St. Paul campus.

Winter hardiness, relative maturity - as measured by the number of days to heading - plant height, and resistance to lodging have been converted to a 1-9 scale to allow for easier interpretation of the data (Table 1). Differences for all four characteristics are generally much less in the southern half of the state. In the northern half of the state the gap in characteristics widens. Presenting averages of the actual data therefore can be misleading. Varieties with lodging scores greater than 4 should be chosen with caution as lodging problems can take away yield, quality, and reduce harvestability. This is especially important if your soils are highly fertile.

While all winter wheat varieties should be considered susceptible to very susceptible to Fusarium head blight (scab), they head earlier than spring wheat varieties and thus have a chance of escaping losses in grain yield losses and test weight and presence of deoxynivalenol or vomitoxin, a major food safety concern and basis of steep discounts. AC Emerson and Moats, two recent Canadian Western Red Winter Wheat varieties provide the best genetic resistance among winter wheat varieties (Table 3). However, still consider these varieties to be more susceptible to Fusarium head blight than most spring wheat varieties. Most winter wheat varieties are also susceptible to very susceptible to the leaf diseases - including powdery mildew. Disease ratings for leaf stem, stem rust and scab are provided by North Dakota State University. Limited data on powdery mildew and stripe rust as observed in trials across Minnesota in 2015 is also presented. Research results in the region indicate that fungicides to control leaf diseases early in the season and suppress scab at anthesis are nearly always warranted and should be considered an integral part of your production practices.

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Table 2. Relative grain yield of winter wheat cultivars in Minnesota in single year (2015) and mutiple year comparisons (2013-2015).

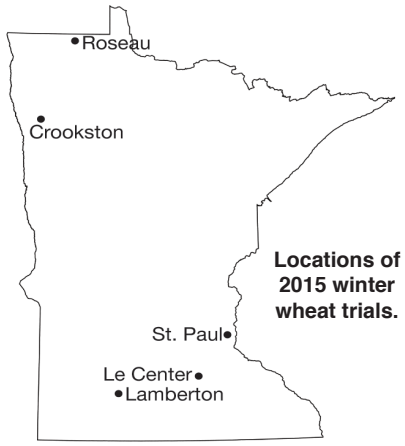
	Crookston		Kimball	Lamberton		Le Center		State	
Entry	1-Year	3-Year	1-Year	1-Year	2-Year[1]	1-Year	3-Year	1-Year	3-Year[2]
	(% of Mean)		(% of Mean)	(% of Mean)		(% of Mean)		(% of Mean)	
AAC Gateway	108	—	97	105	—	106	—	104	—
AC Broadview	97	112	147	126	114	96	119	111	114
AC Emerson	118	110	122	109	107	93	116	107	108
Arapahoe	91	103	82	91	100	82	96	89	98
Branson	95	—	46	74	—	123	—	92	—
CDC Chase	116	—	147	117	—	92	—	112	—
CDC Falcon	99	110	144	107	109	110	99	112	99
Decade	100	86	95	119	89	95	96	105	94
Expedition	89	86	100	79	92	106	87	94	99
Flourish	111	101	91	98	101	99	104	100	101
Freeman	85	103	85	97	101	109	90	99	93
Jerry	96	116	133	114	114	105	106	109	107
Millenium	109	96	80	113	83	112	89	106	91
Moats	113	103	114	108	99	102	105	109	109
Overland	108	120	114	109	113	111	113	112	106
Redfield	104	—	95	112	—	104	—	107	—
Roughrider	91	94	103	95	94	80	95	91	93
SY Wolf	99	68	56	90	76	104	90	91	88
WB 4614	90	—	36	74	—	78	—	70	—
WB Grainfield	92	87	113	84	93	115	84	100	88
WB Matlock	109	105	153	108	114	105	113	115	113
Yellowstone	99	—	74	101	—	97	—	93	—
Mean (Bu/Acre)	**40.2**	**51.9**	**40.5**	**80.3**	**51.8**	**92.1**	**49.8**	**64.2**	**54.1**
LSD (0.10)	**7**	**5**	**14**	**11**	**8**	**12**	**10**	**9**	**10**

[1]2014 and 2015 data.
[2]Includes data from St. Paul (2014) and Roseau (2013).

Table 3. Disease reactions to economically important diseases of winter wheat.

Entry	Powdery Mildew	Leaf Spotting Diseases[1]	Stripe Rust	Leaf Rust[2]	Stem Rust[2]	FHB[2]
	(1-9)					
AAC Gateway	4	4	3	5	1	6
AC Broadview	6	6	5	1	1	9
AC Emerson	5	5	1	6	1	4
Arapahoe	8	8	5	—	—	—
Branson	1	1	2	—	—	—
CDC Chase	5	5	1	1	1	6
CDC Falcon	5	5	1	6		8
Decade	9	9	8	9	1	9
Expedition	8	8	6	—	—	—
Flourish	5	5	3	6	6	8
Freeman	5	5	5	—	—	—
Jerry	4	4	8	4	1	8
Millenium	6	6	1	—	—	—
Moats	5	5	1	1	1	4
Overland	5	5	4	3	4	8
Redfield	4	4	5	6	8	4
Roughrider	5	5	8	—	—	—
SY Wolf	3	3	4	4	1	6
WB 4614	8	8	1	—	—	8
WB Grainfield	6	6	6	6	—	8
WB Matlock	4	4	6	6	1	6
Yellowstone	4	4	1	8	8	9
LSD(0.10)	**1**	**1**				

[1]Includes tan spot and Septoria complex.
[2]Data provided by NDSU.
[3]1=most resistant 9=least resistant.



Hard Red Winter Wheat Planting Rate and Date

Bushel Weight, Pounds.....60

Seeds/Pound.....14,500

Planting Rate, Pounds/Acre.....75+

Planting Rate, Seeds/Sq. Ft.....25

Planting Date.....Aug. 20 - Sept. 20