

2016 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 insulation 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 2016. All the locations showed varying degrees of winter survival, resulting in variable stands within the plots. This in

Table 1. Agronomic characteristics of winter wheat varieties.

Entry	Agent or Breeder ¹	Year of Release	Class ²	PVP	Winterhardiness ³	Maturity ⁴	Plant Height ⁵	Lodging ⁶	Test Weight ³	Grain Protein ³
(1-9)										
AAC Gateway	Seed Depot	2012	CWRW	PVP(94)	2	6	2	1	2	2
AC Broadview	Meridian Seeds	2008	CWRW	PVP(94)	9	9	1	8	5	6
AC Emerson	Meridian Seeds	2010	CWRW	PVP(94)	1	8	5	1	3	2
Branson	Syngenta	2005	SRWW	PVP(94)	3	2	1	1	7	9
CDC Chase	Canterra Seeds	2013	CWRW	PVP(94)	2	5	9	9	1	4
CDC Falcon	WestBred	2000	CWRW	PVP(94)	3	7	1	7	4	5
Decade	MT/NDSU	2010	HRWW	PVP(94)	1	7	2	4	5	5
Expedition	SDSU	2002	HRWW	PVP(94)	1	1	3	4	5	5
Flourish	SeCan	2010	CWRW	PVP(94)	3	6	2	5	8	4
Freeman	USDA-ARS/NE	2013	HRWW	Pending	2	2	2	6	6	6
Jerry	NDSU	2001	HRWW	—	2	7	7	7	3	5
Millenium	NE	2000	HRWW	PVP (94)	2	4	6	5	4	5
Moats	SeCan	2010	HRWW	PVP(94)	5	7	7	7	2	1
Overland	NE	2006	HRWW	PVP (94)	1	5	4	2	2	6
Redfield	SDSU	2013	HRWW	PVP(94)	2	4	2	9	2	5
Ruth	NE	2015	HRWW	Pending	2	2	3	3	3	7
SY Wolf	Syngenta	2010	HRWW	PVP(94)	3	4	2	1	4	4
WB 4614	WestBred	2013	HRWW	PVP(94)	1	4	1	6	6	3
WB Grainfield	WestBred	2013	HRWW	PVP(94)	3	1	1	8	2	5
WB Matlock	WestBred	2010	HRWW	PVP(94)	2	7	4	2	1	3
Yellowstone	MT	2005	HRWW	PVP(94)	2	6	4	1	9	7
LSD (0.10)					1	2	1	3	2	1

¹MT = Montana State University, NDSU = North Dakota State University, NE= University of Nebraska/Husker Genetics, SDSU = South Dakota State University, USDA-ARS = USDA Agricultural Research Service

²CWRW = Canadian Western Red Winter Wheat, HRWW=Hard Red Winter Wheat, SRWW=Soft Red Winter Wheat

³1=highest 9=lowest

⁴1=earliest 9=latest

⁵1=shortest 9=tallest

⁶1=least prone 9=most prone

turn increases the experimental error. Ultimately this hampers the ability to detect differences between varieties as illustrated by the relatively large LSD values.

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 can reduce harvestability, yield and

quality. 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 and test weight and presence of deoxynivalenol or vomitoxin, a major food safety concern that can result in steep discounts. AC Emerson, Moats and Redfield 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 dis-

eases - 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 and 2016 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.

Project Leaders

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Test Plot Managers

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Table 2. Relative grain yield of winter wheat cultivars in Minnesota in single year (2016) and multiple year comparisons (2014-2016).

Entry	Lamberton		Le Center		St. Paul		Kimball		Crookston		Roseau	State	
	2016	3-Year	2016	3-Year	2016	3-Year	2016	2-Year ¹	2016	3-Year	2016	2016	3-Year
AAC Gateway	112	107	93	103	141	127	98	100	104	101	114	108	109
AC Broadview	76	117	82	90	102	109	89	89	109	118	81	86	97
AC Emerson	109	108	84	89	88	98	85	80	103	112	90	86	93
Branson	80	78	137	121	78	75	145	147	104	93	138	132	123
CDC Chase	134	117	97	92	73	73	99	99	101	101	99	99	102
CDC Falcon	105	100	104	108	109	116	101	101	95	114	96	100	102
Decade	94	112	92	93	104	97	97	90	94	88	78	87	88
Expedition	83	76	82	99	115	103	96	94	86	80	97	94	93
Flourish	115	98	104	94	127	126	95	88	104	104	94	96	97
Freeman	100	94	122	109	99	109	127	128	95	107	130	123	111
Jerry	77	103	84	99	80	90	90	95	103	115	94	92	95
Millenium	101	114	106	108	72	82	92	94	108	101	104	100	102
Moats	114	115	91	97	70	63	97	104	105	98	96	98	100
Overland	104	111	107	108	120	114	103	108	115	123	108	108	106
Redfield	113	110	114	106	142	136	123	118	98	95	112	115	115
Ruth	122	96	133	115	95	96	118	116	94	88	117	116	112
SY Wolf	137	93	112	103	136	129	108	100	105	73	127	116	105
WB 4614	106	74	83	78	62	61	70	67	107	91	72	75	76
WB Grainfield	55	79	126	114	92	92	123	127	66	87	96	106	94
WB Matlock	80	106	84	104	112	116	95	101	106	108	103	102	106
Yellowstone	113	105	105	94	121	111	87	87	106	96	88	94	96
Mean (bu/acre)	81.5	80.0	98.4	92.8	58.1	56.4	64.4	65.2	82.8	56.6	63.1	66.8	65.9
LD(0.10)	22	12	13	10	27	26	11	15	17	14	14	11	10

¹2015 and 2016 data.

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

Entry	Powdery Mildew	Leaf Spotting Diseases ¹			Leaf Rust ²	Stem Rust ²	FHB ²
		Stripe Rust	(1-9)				
AAC Gateway	3	5	3	5	1	6	
AC Broadview	5	7	5	1	1	9	
AC Emerson	4	6	1	6	1	4	
Branson	1	2	2	—	—	—	
CDC Chase	4	6	1	1	1	6	
CDC Falcon	4	6	1	6	—	8	
Decade	6	9	8	9	1	9	
Expedition	6	8	6	—	—	—	
Flourish	4	6	3	6	6	8	
Freeman	4	6	5	—	—	7	
Jerry	3	5	8	4	1	8	
Millenium	5	7	1	—	—	—	
Moats	4	6	1	1	1	4	
Overland	4	6	4	3	4	8	
Redfield	3	5	5	6	8	4	
Ruth	5	5	2	—	—	8	
SY Wolf	3	4	4	4	1	6	
WB 4614	6	8	1	—	—	8	
WB Grainfield	5	7	6	6	1	8	
WB Matlock	3	5	6	6	1	6	
Yellowstone	3	5	1	8	8	9	
LSD (0.10)	1	1					

¹Includes tan spot and Septoria complex.

²Data provided by NDSU.

³1=most resistant 9=least resistant.



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.....Sept. 1 - Oct. 1