

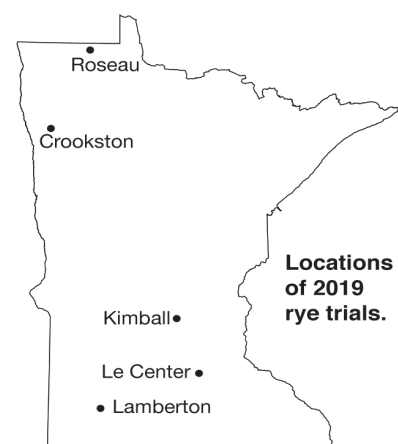
# 2019 Rye Field Crop Trials Results

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

Winter rye (*Secale cereale* L.), also known as cereal rye, is the most winter hardy and drought tolerant of all small grains. Winter rye performs best in sandy loam, well-drained soils compared to fine textured soils with poor internal drainage. Soil pH for optimum growth ranges from 5.6 to 7 but rye can tolerate pH as low as 4.5 and as high as 8. Expect winter rye to be more productive than other small grains on infertile, sandy soils. Winter rye will continue to grow until late fall, overwinter, and resume growth quickly in the early spring. The aforementioned attributes explain

the popularity of winter rye as a cover crop/green manure in both organic and conventional production systems. Other primary uses of winter rye are pasture/forage and grain crop.

Results of the University of Minnesota's variety performance evaluations are summarized in Tables 1 and 2. The rye performance trials were grown near Lamberton, Le Center, Kimball, Crookston and Roseau in 2019. The past two growing seasons have been more challenging when compared to the previous three years. Like the 2018 growing season, 2019 was challenging



**Table 1. Origin and agronomic characteristics of winter rye varieties in Minnesota in single-year (2019) and multiple-year comparisons (2017-2019).**

Cultivar	Agent or Breeder <sup>1</sup>	Year of Release	Type <sup>2</sup>	Legal Status <sup>3</sup>	Primary Use	Seed Color	Winter	Days to	Straw	Test			Grain
							Hardiness	Heading	Height	Strength	Ergot	Weight	Protein
							----- (1-9) <sup>4</sup> -----						
Danko	Danko Hodowla Roślin	1976	OPV	None	Grain	Blue/Grey	1	4	4	1	3	1	7
Elbon	OK	1956	OPV	None	Forage	Green	6	1	8	9	9	9	1
Hazlet	SeCan	2006	OPV	None	Grain	Blue/Grey	2	5	6	6	2	4	9
KWS Bono	KWS	2013	Hybrid	N/A	Grain	Green	2	9	7	1	2	1	9
KWS Brasetto	KWS	2007	Hybrid	N/A	Grain	Blue/Grey	3	8	1	1	2	9	9
KWS Serafino <sup>5</sup>	KWS	2017	Hybrid	N/A	Grain	Green	2	9	1	1	2	3	9
KWS Tayo <sup>6</sup>	KWS	2018	Hybrid	N/A	Grain	Green	2	7	2	1	2	5	6
Musketeer	SeCan	1981	OPV	None	Grain	Green	4	3	2	9	4	9	5
ND Dylan	NDSU	2016	OPV	PVP (Pending)	Dual Purpose	Green	2	4	8	8	2	9	7
ND Gardner <sup>5</sup>	NDSU	2019	OPV	PVP (Pending)	Dual Purpose	Green/Yellow	3	4	9	9	3	9	7
Prima	SeCan	1984	OPV	None	Grain	Green	3	4	7	7	4	9	7
Rymin	MN	1973	OPV	None	Grain	Blue/Grey	1	4	8	6	4	1	6
Spooner	WI	1992	OPV	None	Grain	Yellow	5	1	8	5	4	9	5
<b>LSD(0.1)</b>							<b>3</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>

<sup>1</sup>OK = Oklahoma State University, NDSU = North Dakota State University, UM = University of Minnesota, WI = University of Wisconsin.

<sup>2</sup>OPV = Open Pollinated Variety.

<sup>3</sup>Status under the Plant Variety Protection Act.

<sup>4</sup>1 = best and 9 = worst.

<sup>5</sup>Tested in 2018 and 2019, the 3 year data is a statistical prediction.

<sup>6</sup>Tested in 2019, the 3 year data is a statistical prediction.

for even the winter-hardy cereal rye crop. The wet and cold fall of 2018 resulted in more variable initial stands in the cereal rye variety trials, while the 2019 spring was once again unusually cold and late.

Cereal rye's yield potential is reduced when encountering unusually cold and late springs. This yield reduction is the result of a shorter period of vegetative growth and the inability of the crop to take up sufficient nitrogen to maximize grain yield as it is applied too late for the crop to take advantage of it. This has been especially evident in the past two growing seasons in the trials near Crookston, which are no-till seeded into standing barley stubble.

Testing of Aroostook, Oklon, Maton II, Oklon and Wheeler was discontinued. Danko, KWS Serafino and ND Gardner were tested for the first time in 2018 and their performance data has been included in the results for the first time in this report KWS Tayo was tested for the first time in 2019, and the results are included as well.

The primary use, agronomic characteristics and grain quality are summarized in Table 1. Winter hardiness, days to heading, plant height, straw

strength, test weight and grain protein have been converted to a 1-9 scale to allow for more straightforward interpretation of the data. Differences in days to heading, plant height and straw strength are generally much less in the northern half of the state. In the southern half of Minnesota, the differences between varieties for these characteristics are greater as the period of vegetative growth is generally longer in the south, especially with early and mild springs. Therefore, the averages of the actual data can be misleading. Varieties with lodging scores greater than 6 should be chosen with caution as lodging can reduce harvestability, yield and quality. This is especially important if soils are highly fertile.

For comparison, the 3-yr average of relative grain yield of tested varieties is presented in Table 2. The average yield across the five testing locations was 68 bu/acre in 2019. This compares to a three-year average of 85 bu/acre. Rymin and Hazlet are the most productive and best adapted of the open pollinated varieties. Hybrid winter rye varieties that are commercially available yield 30 to 50% more compared to the best performing open pollinated varieties.

Varieties differ in their susceptibility to several economically important fungal pathogens, including powdery mildew, leaf rust, leaf spotting diseases, Fusarium head blight and ergot. Not enough observations have been made to-date to reliably differentiate winter rye varieties based on their susceptibility to these diseases. A preliminary rating to susceptibility to ergot is included due to the economic importance of this disease. Note that no variety tested is immune to ergot and that fungicides do not provide control of ergot. Application of a fungicide should be considered if powdery mildew is present before jointing. Likewise, control of leaf rust may be warranted if the disease is found near the top of the canopy just as the flag leaf is emerging.

### Authors and Researchers

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**Table 2. Relative grain yield of winter rye varieties in five Minnesota locations in single-year (2019) and multiple year comparisons (2017-2019).**

Cultivar	Lamberton		Le Center		Kimball		Crookston		Roseau		State	
	2019	3 Yr	2019	3 Yr	2019	3 Yr	2019	3 Yr	2019	3 Yr	2019	3 Yr
Danko <sup>1</sup>	90	94	80	97	89	109	100	100	99	95	97	98
Elbon	94	68	63	65	72	57	59	76	54	58	79	67
Hazlet	78	99	67	85	105	92	94	97	99	99	97	94
KWS Bono	131	146	141	147	124	136	151	128	134	126	124	136
KWS Brasetto	84	129	139	118	109	141	124	115	129	122	111	123
KWS Serafino <sup>1</sup>	130	121	163	146	131	152	161	131	151	117	130	137
KWS Tayo <sup>2</sup>	124	117	151	147	111	113	147	124	159	154	122	124
Musketeer	114	79	81	73	92	65	94	95	73	84	95	79
ND Dylan	94	97	96	95	92	91	84	92	86	90	92	93
ND Gardner <sup>1</sup>	107	106	90	91	91	92	48	74	83	80	81	91
Prima	84	83	74	76	103	101	92	95	87	96	96	90
Rymin	84	86	71	84	93	79	62	82	74	94	84	89
Spooner	87	74	83	78	88	73	85	91	72	84	91	79
<b>Mean (Bu/Acre)</b>	<b>58.7</b>	<b>86.1</b>	<b>71.2</b>	<b>77.0</b>	<b>81.0</b>	<b>77.1</b>	<b>28.6</b>	<b>57.6</b>	<b>93.4</b>	<b>96.3</b>	<b>67.9</b>	<b>85.0</b>
<b>LSD (0.1)</b>	<b>25</b>	<b>8</b>	<b>35</b>	<b>17</b>	<b>19</b>	<b>12</b>	<b>21</b>	<b>10</b>	<b>22</b>	<b>14</b>	<b>8</b>	<b>10</b>

<sup>1</sup>Tested in 2018 and 2019, the 3 year data is a statistical prediction.

<sup>2</sup>Tested in 2019, the 3 year data is a statistical prediction.