

2020 Winter 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. These 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. Trials were conducted near Lamberton, Le Center and Becker in 2020. The past three growing seasons have been more challenging when compared to the previous three years. The extremely wet fall in 2019 resulted in the trial near Roseau not

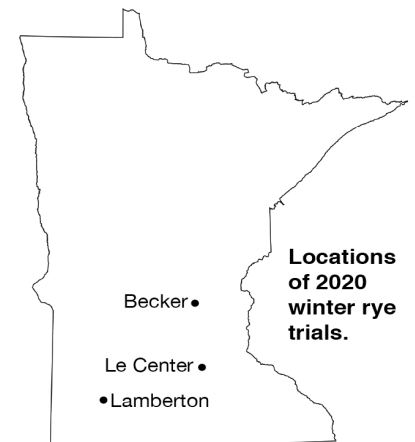


Table 1. Origin and agronomic characteristics of winter rye varieties in Minnesota in single-year (2020) and multiple-year comparisons (2018-2020).

Entry	Agent or Breeder ¹	Year of Release	Type ²	Legal Status ³	Primary Use	Seed Color	Winter Hardiness	Days to Plant Heading	Straw Height	Straw Strength	Test		
											Ergot Weight	Grain Protein	
Danko	Danko Hodowla Roślin	1976	OPV	None	Grain	Blue/Grey	1	4	5	1	3	2	9
Elbon	OK	1956	OPV	None	Forage	Green	6	1	8	9	9	9	1
Hazlet	SeCan	2006	OPV	None	Grain	Blue/Grey	2	5	7	6	1	3	9
KWS Bono ⁵	KWS	2013	Hybrid	N/A	Grain	Green	2	9	1	1	1	2	9
KWS Brasetto	KWS	2007	Hybrid	N/A	Grain	Blue/Grey	3	8	1	1	1	9	9
KWS Serafino	KWS	2017	Hybrid	PVP (Pending)	Grain	Green	2	9	2	1	1	3	9
KWS Tayo ⁶	KWS	2018	Hybrid	PVP (Pending)	Grain	Green	2	7	2	1	1	3	9
Musketeer	SeCan	1981	OPV	None	Grain	Green	4	3	7	9	4	9	5
ND Dylan	NDSU	2016	OPV	PVP(94)	Dual Purpose	Green	2	4	8	8	2	9	7
ND Gardner	NDSU	2019	OPV	PVP (Pending)	Dual Purpose	Green/Yellow	3	1	9	9	3	9	6
Prima	SeCan	1984	OPV	None	Grain	Green	3	5	7	6	4	9	7
Rymin	MN	1973	OPV	None	Grain	Blue/Grey	1	4	6	7	4	1	6
Spooner	WI	1992	OPV	None	Grain	Yellow	5	1	9	6	4	9	4
LSD (0.1)							3	1	2	1	1	2	2

¹OK = Oklahoma State University; NDSU = North Dakota State University; UM = University of Minnesota; WI = University of Wisconsin.

²OPV= Open Pollinated Variety.

³Status under the Plant Variety Protection Act.

⁴1 = best and 9 = worst.

⁵Not tested in 2020, the 3 year data is a statistical prediction.

⁶Not tested in 2018, the 3 year data is a statistical prediction.

being seeded while the trial near Crookston was abandoned due to severe spring flooding. The trial near Becker, where irrigation is usually required, was rainfed and growth was severely limited due to drought stress; consequently, grain was greatly reduced. Yield data of the trial near Becker was not included in the single or multiple-year comparisons across the locations in the state.

Cereal rye's yield potential is reduced when encountering unusually cold and late springs. This is the result of a shorter period of vegetative growth and therefore the inability of the crop to take up sufficient nitrogen to maximize grain yield.

The primary use, agronomic characteristics, and grain quality of winter rye are summarized in Table 1. Winter hardiness, days to heading, plant height, straw strength, test weight and grain protein were converted to a 1-9 scale to allow for more straightforward interpretation of the data. For example, differences in days to heading, plant height and

straw strength are generally much less in the northern half of the state. Also, in the south, differences between varieties are greater as the period of vegetative growth is generally longer, especially with early and mild springs. 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-year average of relative grain yield of tested varieties is presented in Table 2. The average yield across the two testing locations was 85.8 bu/acre in 2020. This compares to the 3-year average of 85.2 bu/acre. Danko, Hazlet and Rymin were the most productive and best adapted of the open-pollinated varieties. Hybrid winter rye varieties that are commercially available yielded 30% to 40% 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 the disease. Note that no variety tested is resistant to ergot, a disease fungicides do not control. 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.

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Table 2. Relative grain yield of winter rye varieties in five Minnesota locations in single-year (2020) and multiple-year comparisons (2018-2020).

Entry	Lamberton		Le Center		Becker	Kimball	Roseau	State	
	2020	2 Yr ¹	2020	3 Yr	2020	2 Yr ²	2 Yr ²	2020	3 Yr
Danko	99	94	103	94	108	99	96	108	101
Elbon	68	68	64	55	79	54	57	73	66
Hazlet	85	99	94	83	87	86	99	95	94
KWS Bono ³	—	146	—	120	—	125	126	—	132
KWS Brasetto	110	129	123	113	125	128	122	122	125
KWS Serafino	145	121	144	140	119	140	120	151	145
KWS Tayo ⁴	133	117	148	147	122	109	154	145	140
Musketeer	95	79	71	64	88	61	83	92	80
ND Dylan	84	97	76	73	79	84	90	88	91
ND Gardner	74	106	76	69	87	89	81	82	87
Prima	79	83	84	76	72	94	95	88	93
Rymin	80	86	82	72	86	74	94	86	89
Spooner	83	74	76	68	88	68	83	87	82
Mean (Bu/Acre)	65.3	86.1	112.9	96.0	21.2	82.2	96.1	85.8	85.2
LSD (0.1)	5	8	10	10	9	13	12	12	9

¹2019 and 2020 data.

²2018 and 2019 data.

³Not tested in 2020, the 3 year data is a statistical prediction.

⁴Not tested in 2018, the 3 year data is a statistical prediction.