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North Dakota Barley, Oat and Rye

Variety Trial Results for 2021 and Selection Guide

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Barley, oat and rye varieties currently grown in North Dakota are described in the following tables. Successful production of these crops depends on numerous factors, including selecting the right variety for a particular area. Characteristics to evaluate in selecting a variety are: yield potential in your area, test weight, straw strength, plant height, reaction to problematic diseases and maturity.

Selecting varieties with good quality also is important to maintain market recognition. Because malting barley usually is purchased on an identity-preserved basis, producers are encouraged to determine which barley varieties are being purchased by potential barley buyers before selecting a variety. When selecting a high-yielding and good-quality variety, use data that summarize several years and locations. Additional data from county sites are available at <https://vt.ag.ndsu.edu> and from each Research Extension Center.

Yield is reported on a 14.5%, 14% and 14% moisture basis for barley, oats and rye respectively. Protein is reported on a 0% moisture basis for all crops in this report. The agronomic data presented in this publication are from replicated research plots using experimental designs that enable the use of statistical analysis. The LSD (least significant difference) numbers beneath the columns in tables are derived from these statistical analyses and apply only to the numbers in the column in which they appear. Differences between two varieties exceeding the LSD value mean that with 95% or 90% confidence (LSD probability 0.05 or 0.10), the higher-yielding variety has a significant yield advantage.

The abbreviation NS is used to indicate that no statistical difference occurs between varieties. The CV is a measure of variability in the trial. The CV stands for coefficient of variation and is expressed as a percentage. Large CVs mean a large amount of variation could not be attributed to differences in the varieties.

Presentation of data for the entries tested does not imply approval or endorsement by the authors or agencies conducting the test. North Dakota State University approves the reproduction of any table in this publication only if no portion is deleted, appropriate footnotes are given and the order of the data is not rearranged.

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Table 1. 2021 North Dakota barley variety descriptions.

Variety	Use ¹	Origin ²	Year Released	Awn ³ Type	Rachilla		Height (inch)	Days to Head	Straw ⁵ Strength	Reaction to Disease ⁶			
					Hair ⁴ Length	Aleurone Color				Stem Rust	Spot-form Net Blotch	Spot Blotch	Net Blotch
Six-rowed													
Tradition	M/F	BARI	2003	S	L	White	29	28	3	8	6	3	7
Two-rowed													
AAC Connect	M/F	Meridian	2017	R	L	White	27	31	4	4	5	4	5
AAC Synergy	M/F	Syngenta	2015	R	L	White	27	32	4	4	3	4	4
ABI Cardinal	M/F	BARI	2019	R	S	White	27	31	4	NA	NA	4	6
Brewski	M	ND	2021	S	L	White	27	32	4	NA	NA	4	4
CDC Austenson	F	CDC	2009	R	S	White	27	35	2	NA	NA	2	2
CDC Bow	M/F	CDC	2016	R	L	White	27	33	2	NA	NA	6	NA
CDC Churchill	M/F	CDC	2019	R	L	White	26	31	3	NA	NA	NA	NA
CDC Fraser	M/F	CDC	2016	R	L	White	27	32	2	NA	NA	4	4
Conlon ⁷	M/F	ND	1996	S	L	White	27	27	4	8	4	6	3
Esma	F	Ackermann	NA	R	L	White	26	30	2	NA	NA	NA	NA
Explorer	M	Secobra	NA	R	L	White	24	31	3	NA	NA	8	4
ND Genesis	M/F	ND	2015	S	L	White	28	30	4	8	4	4	6
Pinnacle	M/F	ND	2006	S	L	White	27	29	3	8	8	5	6

Bolded varieties were tested for the first time this year, so some ratings may change as new data become available.

¹M = malting; F = feed.

²BARI = Busch Agricultural Resources Inc.; CDC = Crop Development Centre, University of Saskatchewan; ND = North Dakota State University
Ackermann = Saatzucht Ackermann, Germany.

³R = rough; S = smooth.

⁴L = long S = short.

⁵Straw Strength scores from 1-9, with 1 = strongest and 9 = weakest.

⁶Disease reaction scores from 1-9, with 1 = resistant and 9 = very susceptible, NA – not available.

⁷Lower DON accumulations than other varieties tested.

Table 2. Yield and test weight of barley varieties at three locations in eastern North Dakota, 2019-2021.

Variety	<u>Casselton¹</u>			<u>Carrington</u>			<u>Langdon</u>			<u>Avg. eastern N.D.</u>		
	Test Wt. (lb/bu)	Yield (bu/a)		Test Wt. (lb/bu)	Yield (bu/a)		Test Wt. (lb/bu)	Yield (bu/a)		Test Wt. (lb/bu)	Yield (bu/a)	
Six-rowed												
Tradition	54.0	131.0	108.8	52.2	53.1	73.8	47.2	79.3	106.3	51.1	87.8	96.3
Two-rowed												
AAC Connect	53.4	134.1	96.6	53.1	52.1	66.9	47.1	89.5	112.2	51.2	91.9	91.9
AAC Synergy	53.5	120.0	93.3	52.7	52.4	65.8	48.2	92.3	115.6	51.5	88.2	91.6
ABI Cardinal	54.1	125.3	93.3	51.1	57.9	--	46.9	82.7	103.9	50.7	88.6	98.6
Brewski	53.4	115.2	--	52.0	50.9	--	48.3	90.9	--	51.2	85.7	--
CDC Austenson	--	112.6	--	51.9	53.0	--	--	--	--	--	--	--
CDC Bow	52.5	116.2	--	51.5	47.2	57.9	47.8	81.7	--	50.6	81.7	--
CDC Churchill	--	134.1	--	51.8	52.4	--	--	--	--	--	--	--
CDC Fraser	52.4	105.2	--	50.7	51.5	--	46.3	81.5	--	49.8	79.4	--
Conlon	53.3	105.6	86.5	52.9	44.2	57.7	49.9	57.4	92.0	52.0	69.1	78.7
Esmas	--	132.9	--	52.5	55.9	--	--	--	--	--	--	--
Explorer	54.3	118.4	86.5	53.4	50.8	61.0	48.2	80.3	100.8	52.0	83.2	82.8
ND Genesis	53.3	121.5	101.2	51.8	50.7	59.5	48.8	91.0	115.1	51.3	87.7	91.9
Pinnacle	54.7	113.8	91.1	53.1	50.3	61.1	50.2	84.3	105.8	52.7	82.8	86.0
Mean	53.5	119.9	94.7	51.7	50.4	63.0	47.7	84.6	106.5	51.3	84.2	89.7
CV %	--	8.9	--	1.1	13.8	--	1.5	9.9	--	1.4	7.4	5.7
LSD 0.05	--	14.6	--	0.8	NS	--	0.8	9.9	--	1.2	10.6	8.8
LSD 0.10	--	12.2	--	0.7	8.2	--	0.6	7.7	--	1.0	8.8	7.2

¹Data from Casselton were used because of non-uniform plots in Fargo due to poor plot emergence.

Table 3. Plump and protein of barley varieties at three locations in eastern North Dakota, 2020.

Variety	<u>Casselton</u>		<u>Carrington</u>		<u>Langdon</u>		<u>Avg. eastern N.D.</u>	
	Plump (%)	Protein (%)	Plump (%)	Protein (%)	Plump (%)	Protein (%)	Plump (%)	Protein (%)
Six-rowed								
Tradition	87.4	11.9	93.1	15.0	92.9	13.5	91.1	13.5
Two-rowed								
AAC Connect	91.3	12.3	91.6	15.5	89.8	14.5	90.9	14.1
AAC Synergy	94.0	11.8	93.0	14.9	94.3	13.6	93.8	13.4
ABI Cardinal	90.5	11.3	92.7	15.1	93.1	14.2	92.1	13.5
Brewski	95.2	11.7	93.5	14.5	97.8	13.0	95.5	13.1
CDC Austenson	--	--	85.0	15.6	--	--	--	--
CDC Bow	94.1	12.2	92.6	15.2	96.4	14.2	94.4	13.9
CDC Churchill	--	--	90.2	15.0	--	--	--	--
CDC Fraser	89.8	12.2	92.2	15.1	95.4	13.7	92.5	13.7
Conlon	96.2	13.1	96.7	15.0	98.3	14.1	97.1	14.1
Esmas	--	--	93.4	15.2	--	--	--	--
Explorer	93.1	12.6	94.9	15.5	96.0	13.9	94.7	14.0
ND Genesis	94.0	10.6	93.8	13.5	98.1	12.5	95.3	12.2
Pinnacle	95.8	10.5	93.9	13.6	98.7	13.7	96.1	12.6
Mean	93.3	11.5	93.1	14.5	95.8	13.2	93.9	13.5
CV %	--	--	2.5	2.4	2.8	3.7	1.6	2.8
LSD 0.05	--	--	3.3	0.5	3.2	0.6	2.6	0.7
LSD 0.10	--	--	2.8	0.4	2.4	0.4	2.2	0.5

Table 4. Yield and test weight of barley varieties at four locations in western North Dakota, 2019-2021.

Variety	<u>Dickinson</u>			<u>Hettinger</u>			<u>Minot</u>			<u>Williston</u>			<u>Avg. western N.D.</u>		
	Test	<u>Yield</u>		Test	<u>Yield</u>		Test	<u>Yield</u>		Test	<u>Yield</u>		Test	<u>Yield</u>	
	Wt.	2021	3 Yr.	Wt.	2021	3 Yr.	Wt.	2021	3 Yr. ¹	Wt.	2021	3 Yr.	Wt.	2021 ²	3 Yr. ³
	(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---	
Six-rowed															
Tradition	44.5	22.2	43.4	43.8	50.4	66.0	46.1	31.9	--	49.8	25.7	42.3	46.0	36.3	50.6
Two-rowed															
AAC Connect	48.0	10.9	44.7	45.2	46.4	66.4	46.0	20.6	--	48.3	13.7	49.0	46.9	28.7	53.4
AAC Synergy	48.5	11.4	45.2	44.0	47.5	68.7	46.0	36.7	107.9	47.4	15.8	52.5	46.5	29.4	55.5
ABI Cardinal	48.7	12.3	46.5	45.1	50.3	66.9	47.6	29.8	--	49.0	22.4	--	47.6	31.3	56.7
Brewski	46.7	23.8	--	44.5	60.1	--	43.6	35.6	--	49.0	29.4	--	46.0	42.0	--
CDC Austenson	--	--	--	46.5	44.7	--	46.4	33.1	--	49.4	19.0	--	--	--	--
CDC Bow	48.5	11.3	--	43.8	46.4	--	47.1	36.6	--	46.8	14.5	49.5	46.6	28.9	--
CDC Churchill	--	--	--	44.2	55.7	--	47.3	36.0	--	49.2	20.2	--	--	--	--
CDC Fraser	47.4	9.2	--	43.5	45.9	--	45.1	34.7	--	46.4	16.4	--	45.6	27.6	--
Conlon	46.5	21.5	42.6	44.1	43.9	53.1	45.4	30.4	90.5	50.6	22.8	50.3	46.6	32.7	48.7
Esmas	--	--	--	44.7	57.3	--	48.9	37.5	--	50.5	37.0	--	--	--	--
Explorer	45.8	20.1	53.2	44.9	54.3	62.5	46.5	27.7	106.8	50.5	25.7	56.4	46.9	37.2	57.4
ND Genesis	46.3	19.2	46.3	45.0	57.5	76.6	45.8	37.6	109.0	47.3	18.8	56.4	46.1	38.3	59.8
Pinnacle	49.0	22.0	49.2	46.0	54.8	58.3	48.1	41.4	106.8	49.3	20.0	56.5	48.1	38.4	54.7
Mean	47.3	18.9	46.4	44.5	53.1	64.8	46.4	30.2	104.2	48.7	23.9	51.6	46.6	33.7	54.6
CV %	1.5	13.1	--	2.1	9.4	--	3.7	24.2	--	1.7	25.8	--	2.4	--	--
LSD 0.05	1.0	3.5	--	1.3	5.9	--	NS	14.6	--	1.4	10.1	--	NS	--	--
LSD 0.10	0.9	2.9	--	1.1	4.6	--	NS	12.3	--	1.2	8.4	--	1.4	--	--

¹Three-year average does not include 2021 data.

²State-wide averages exclude Minot and Williston data due to high variability caused by drought conditions.

³Excludes Minot 3 Yr. data

Table 5. Plump and protein of barley varieties at four locations in western North Dakota, 2021.

Variety	<u>Dickinson</u>		<u>Hettinger</u>		<u>Minot</u>		<u>Williston</u>		<u>Avg. western N.D.</u>	
	Plump	Protein	Plump	Protein	Plump	Protein	Plump	Protein	Plump	Protein
	------(%)-----									
Six-rowed										
Tradition	48	17.2	56	16.7	89	14.5	68	14.1	65.2	15.6
Two-rowed										
AAC Connect	72	18.2	80	17.4	93	18.0	90	16.0	83.7	17.4
AAC Synergy	82	17.5	80	17.1	96	15.4	88	16.0	86.5	16.5
ABI Cardinal	74	18.9	84	17.0	96	15.4	91	15.4	86.2	16.7
Brewski	63	16.2	80	15.7	96	14.8	80	13.4	79.9	15.0
CDC Austenson	--	--	76	16.7	93	14.8	78	14.8	82.3	15.4
CDC Bow	90	17.1	83	17.3	97	14.7	93	15.4	90.8	16.1
CDC Churchill	--	--	61	17.8	96	14.7	89	15.3	81.9	15.9
CDC Fraser	91	17.3	85	17.4	96	15.2	91	14.8	90.6	16.2
Conlon	86	17.4	93	16.3	96	15.6	95	15.0	92.4	16.1
Esmas	--	--	68	17.7	96	13.8	84	13.9	82.7	15.1
Explorer	64	18.5	79	17.0	96	15.9	88	16.4	81.6	17.0
ND Genesis	60	15.2	85	14.3	95	13.2	83	13.2	80.8	14.0
Pinnacle	82	16.3	86	15.2	97	12.5	86	12.5	87.8	14.1
Mean	74	16.7	78	15.9	95	14.7	86	14.0	83.7	15.8
CV %	12.1	2.6	7.4	4.9	2.0	8.7	3.5	5.6	7.6	4.0
LSD 0.05	12	0.6	8.2	0.9	4.0	2.6	4.9	1.3	9.1	0.9
LSD 0.10	11	0.5	6.9	0.6	3.0	2.1	4.1	1.1	7.6	0.7

Table 6. 2021 North Dakota oat variety descriptions.

Variety	Origin ¹	Year Released	Grain Color	Height (inch)	Straw Strength	Days to Heading ²	Reaction to Diseases			Test Weight	Protein ⁵
							Stem Rust ³	Crown Rust ³	Barley Y.Dwf ⁴		
Beach	ND	2004	White	22	M.strg.	61	8	4	6	V.good	M
CDC Minstrel	Sask.	2006	White	21	M.strg.	62	8	8	8	Good	M
CS Camden	Meridian	2016	White	21	Strong	64	8	6	NA	Good	M
Deon	MN	2013	Yellow	22	Strong	63	8	2	2	V.good	M
Hayden	SD	2014	White	20	Med.	62	8	6	NA	V.good	M
HiFi	ND	2001	White	22	Strong	64	4	8	2	Good	M
Hyttest	SD	1986	White	23	M.strg.	62	8	6	8	V.good	H
Jury	ND	2012	White	23	M.strg.	62	1	8	4	V.good	M
Killdeer	ND	2000	White	21	Strong	62	8	6	4	Good	M
Leggett	AAFC	2005	White	21	Strong	64	3	1	8	Good	M
ND Heart	ND	2020	White	22	Strong	62	3	6	4	Good	H
Newburg	ND	2011	White	20	Med.	65	1	8	4	Good	M
Otana	MT	1977	White	23	M.weak	64	8	8	8	V.good	M/L
Paul ⁶	ND	1994	Hull-less	23	Strong	65	1	4	2	V.good	H
Rockford	ND	2008	White	22	Strong	63	8	8	4	V.good	M
Warrior	SD	2018	White	20	Strong	62	6	1	NA	V.good	M

Bolded varieties were tested for the first time this year, so some ratings may change as new data become available.

¹AAFC = Agriculture & Agri-Food Canada; MN = University of Minnesota; ND = North Dakota State University; SD = South Dakota State University; Sask. = University of Saskatchewan; MT = Montana State University.

²Days after planting.

³Disease reaction scores from 1-9, with 1 = resistant and 9 = very susceptible.

⁴Disease reaction scores from 1-9, with 1 = resistant and 9 = very susceptible, NA – not available.

⁵H = high; M = medium; L = low.

⁶Hull-less variety.

Table 7. Yield and test weight of oat varieties at three locations in eastern North Dakota, 2019-2021.

Variety	<u>Fargo</u>			<u>Casselton</u>			<u>Carrington (organic)</u>			<u>Average Eastern N.D.</u>		
	<u>Test</u>	<u>Yield</u>		<u>Test</u>	<u>Yield</u>		<u>Test</u>	<u>Yield</u>		<u>Test</u>	<u>Yield</u>	
	<u>Wt.</u>	<u>2021</u>	<u>3 Yr.</u>	<u>Wt.</u>	<u>2021</u>	<u>3 Yr.</u>	<u>Wt.</u>	<u>2021</u>	<u>3 Yr.</u>	<u>Wt.</u>	<u>2021</u>	<u>3 Yr. Avg.</u>
	(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	-----(bu/a)-----		(lb/bu)	------(bu/a)-----	
Beach	40.4	143.3	111.9	43.3	104.8	92.1	37.2	42.7	--	40.3	96.9	102.0
CDC Minstrel	--	--	--	--	--	--	35.1	59.6	93.1	--	--	--
CS Camden	33.4	147.2	113.3	39.3	128.5	93.5	34.4	58.4	99.1	35.7	111.4	102.0
Deon	38.7	136.4	119.5	42.3	105.2	96.6	37.4	62.2	94.2	39.5	101.3	103.4
HiFi	37.0	139.6	103.1	39.5	111.7	83.0	34.6	56.3	83.2	37.0	102.5	89.8
Hyttest	--	--	--	--	--	--	37.5	53.0	--	--	--	--
Jury	37.0	163.8	107.0	42.2	129.6	89.5	35.7	60.9	90.6	38.3	118.1	95.7
Killdeer	34.6	132.3	97.1	40.0	120.9	87.2	35.9	61.4	89.9	36.8	104.9	91.4
Leggett	37.6	143.8	124.6	40.6	99.0	103.8	36.4	53.0	86.0	38.2	98.6	104.8
ND Heart	37.5	146.3	--	41.1	100.2	--	35.3	56.2	82.0	38.0	100.9	--
Newburg	37.2	149.7	101.5	41.5	100.1	69.3	33.8	60.2	87.3	37.5	103.3	86.0
Otana	35.8	150.0	96.0	40.6	115.3	80.8	37.2	55.3	--	37.9	106.9	88.4
Paul ¹	42.4	114.3	63.8	45.2	69.4	50.0	44.4	39.6	51.2	44.0	74.4	55.0
Rockford	39.5	142.9	91.9	41.9	117.4	77.5	36.8	54.6	85.0	39.4	105.0	84.8
Warrior	37.5	142.9	126.0	41.2	110.0	101.6	36.3	56.7	81.2	38.3	103.2	102.9
Mean	37.6	142.5	104.6	41.4	108.6	85.4	37.0	52.9	85.2	38.5	102.1	92.2
CV %	6.2	8.0	--	3.9	14.4	--	2.4	12.9	--	2.9	7.8	7.7
LSD 0.05	1.3	18.0	--	1.2	21.9	--	1.3	9.7	--	1.9	13.1	12
LSD 0.10	0.9	11.7	--	1.0	17.0	--	1.1	8.1	--	1.6	10.9	10

¹Hull-less varieties. When comparing yield of hull-less oat varieties with varieties with hulls, multiply the yield of the hull-less oats by 1.35 (the hull of a hulled kernel comprises 35% of the weight).

Table 8. Yield and test weight of oat varieties at four locations in western North Dakota, 2019-2021.

Variety	<u>Dickinson</u>			<u>Hettinger</u>			<u>Minot</u>			<u>Williston</u>			<u>Average Western N.D.</u>		
	Test Wt. (lb/bu)	Yield 2021 3 Yr. ----(bu/a)----		Test Wt. (lb/bu)	Yield 2021 3 Yr. ----(bu/a)----		Test Wt. (lb/bu)	Yield 2021 2 Yr. ¹ ----(bu/a)----		Test Wt. (lb/bu)	Yield 2021 3 Yr. ----(bu/a)----		Test Wt. (lb/bu)	Yield 2021 ² 3 Yr. ----(bu/a)----	
AAC Douglas	--	--	--	33.5	96.0	--	28.7	31.4	--	41.0	29.8	--	--	--	--
Beach	37.1	18.4	72.4	32.9	63.0	87.3	31.2	14.7	119.0	39.9	21.0	73.8	35.3	42.0	77.8
CDC Minstrel	36.7	18.3	79.9	34.2	72.6	101.3	24.1	19.3	115.4	39.2	18.8	85.6	33.6	45.7	88.9
CS Camden	30.9	15.3	72.1	29.2	88.1	106.1	26.8	31.4	127.2	41.7	34.2	100.3	32.1	61.2	92.8
Deon	35.8	18.5	87.6	31.8	81.0	93.9	30.8	25.7	113.2	43.2	31.7	89.5	35.4	56.4	90.3
Hayden	36.4	22.0	81.5	34.5	81.3	101.2	29.5	21.3	121.4	--	--	--	--	--	--
HiFi	32.0	13.6	75.0	31.7	68.7	93.7	27.0	17.9	109.1	36.9	13.2	79.5	31.9	40.9	82.7
Hyttest	36.2	19.1	65.5	33.6	74.6	89.9	28.3	17.1	113.8	36.2	14.0	65.7	33.6	44.3	73.7
Jury	34.6	27.5	81.2	31.6	80.5	97.0	29.7	19.5	105.7	39.7	21.2	91.1	33.9	50.9	89.8
Killdeer	34.6	21.7	83.3	32.7	78.4	92.5	30.8	22.0	107.4	41.8	24.4	98.0	35.0	51.4	91.3
Leggett	36.4	15.6	67.3	32.8	67.2	92.5	25.5	20.5	116.4	40.6	16.5	90.4	33.8	41.8	83.4
ND Heart	33.9	25.1	72.4	31.4	67.6	88.2	27.5	12.0	112.7	41.9	28.9	--	33.7	48.3	--
Newburg	34.3	16.0	74.9	33.2	78.2	92.6	26.1	14.1	99.3	41.6	27.1	81.6	33.8	52.7	83.0
Otana	33.8	17.0	73.2	33.8	81.9	94.7	28.7	21.7	106.9	38.1	31.6	89.5	33.6	56.8	85.8
Paul ³	42.1	9.5	53.1	39.7	44.3	60.9	29.7	7.9	87.6	--	4.8	55.3	37.2	24.6	56.4
Rockford	35.3	17.1	77.0	35.1	86.7	103.4	30.0	18.5	120.2	42.0	32.9	95.3	35.6	59.8	91.9
Warrior	35.5	22.1	70.2	34.2	91.1	102.2	29.6	17.1	--	41.8	29.2	85.7	35.3	60.2	86.0
Mean	35.5	20.2	74.2	33.4	77.1	93.6	29.2	18.9	111.7	38.9	20.5	84.4	34.2	49.1	83.9
CV %	4.2	30.5	--	4.2	7.9	--	5.2	32.5	--	3.9	14.8	--	5.2	--	--
LSD 0.05	2.1	8.6	--	2.0	7.2	--	2.5	10.0	--	2.5	5.0	--	2.5	--	--
LSD 0.10	1.7	7.2	--	1.6	5.6	--	2.1	8.4	--	2.1	4.1	--	2.1	--	--

¹Two-year Average includes 2019 and 2020.

²Excludes Dickinson and Minot data due to high variability caused by drought conditions.

³Hull-less varieties. When comparing yield of hull-less oat varieties with varieties with hulls, multiply the yield of the hull-less oats by 1.35 (the hull of a hulled kernel is 35% of the weight).

Table 9. 2021 North Dakota winter rye variety descriptions.

Variety	Origin ¹	Year Released	Height (inches)	Straw Strength	Days to Head	Seed Color	Seed Size	Winter Hardiness
AC Hazlet	Canada	2006	35	Good	156	Bl-grn.	Small	Good
Aroostok	USDA	1981	35	Fair	153	Tan	Small	V.good
Bono ³	KWS	2013	27	Good	158	Green	Med.	Good
Brasetto ³	KWS	2007	28	V.good	159	Bl-grey	Large	Good
Danko	Poland	1976	31	Good	159	Green	Large	Poor
ND Dylan	ND	2016	36	Good	158	Blue	Med.	V.good
ND Gardner	ND	2019	35	Fair	154	Bl-grn.	Small	V.good
Rymin	MN	1973	33	V.good	158	Grn-gray	Large	Fair ⁴
Serfanio ³	KWS	2019	28	V.good	158	Green	Large	V.good
Spooner	WI	1993	34	V.good	156	Tan	Large	Good
Tayo ³	KWS	2020	28	V.good	158	Green	Med.	Good

¹ND = North Dakota State University; WI = University of Wisconsin; MN = University of Minnesota; MI = Michigan State University.

KWS = KWS Cereals, USA

²NA = not available.

³Hybrid.

⁴Varieties with fair or poor winter hardiness should not be seeded in bare soil.

Table 10. Yield and test weight of winter rye varieties at four locations in North Dakota, 2019-2021.

Variety	<u>Carrington (organic)</u>			<u>Hettinger</u>			<u>Langdon</u>			<u>Minot</u>			<u>Average</u>		
	Test	<u>Seed Yield</u>		Test	<u>Seed Yield</u>		Test	<u>Seed Yield</u>		Test	<u>Seed Yield</u>		Test	<u>Seed Yield</u>	
	Wt.	2021	3-yr.	Wt.	2021	3-Yr.	Wt.	2021	3-Yr.	Wt.	2021	3-yr.	Wt.	2021 ¹	3-yr.
	(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---	
AC Hazlet	56.6	27.2	45.7	50.4	29.7	49.5	54.7	75.6	--	53.1	38.0	72.7	53.7	44.2	56.0
Aroostok	55.3	15.1	34.3	51.2	28.4	39.7	53.0	59.9	50.7	51.9	16.5	50.2	52.9	34.5	43.7
Bono	55.5	35.0	58.2	50.7	39.6	68.9	54.7	97.0	79.5	52.9	39.8	92.7	53.4	57.2	74.8
Brasetto	54.5	25.2	48.4	50.9	39.5	64.6	52.9	90.9	80.6	51.8	40.8	90.8	52.5	51.9	71.1
Danko	52.1	8.2	--	50.5	31.8	--	54.0	68.2	--	51.4	18.4	--	52.0	36.1	--
ND Dylan	54.9	26.4	45.9	49.6	28.4	49.5	53.3	67.1	66.1	52.3	26.1	67.4	52.5	40.6	57.2
ND Gardner	54.3	14.6	37.4	51.6	32.1	44.0	53.8	66.7	57.2	52.8	21.7	55.2	53.1	37.8	48.5
Rymin	53.3	14.5	40.8	50.6	29.7	46.4	53.6	66.7	62.3	52.0	18.7	57.5	52.4	37.0	51.8
Serfanio	54.3	28.1	--	48.2	43.0	--	54.0	94.8	--	52.6	36.7	--	52.3	55.3	--
Spooner	55.1	22.6	39.6	51.5	29.9	45.1	53.0	58.5	54.8	51.9	21.7	54.0	52.9	37.0	48.4
Tayo	--	--	--	48.4	37.3	--	53.5	111.8	--	52.5	43.2	--	--	--	--
Mean	54.6	21.7	43.8	50.1	32.7	51.0	53.7	77.1	64.5	52.3	29.2	67.6	52.8	43.2	56.4
CV %	1.1	10.9	--	2.3	9.0	--	0.9	9.5	--	1.8	30.3	--	1.7	18.1	--
LSD 0.05	0.9	3.4	--	1.4	3.5	--	0.7	10.5	--	NS	15.1	--	NS	14.0	--
LSD 0.10	0.7	2.8	--	1.1	2.7	--	0.6	8.8	--	1.3	12.5	--	NS	11.5	--

¹Average does not include Minot data due to high variability caused by drought conditions.

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