

North Dakota

Barley, Oat and Rye

Variety Trial Results for 2013 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 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 summarizes several years and locations. Additional data from county sites are available at www.ag.ndsu.edu/varietytrials/ and from each Research Extension Center.

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 90 percent confidence (LSD probability 0.10), the higher-yielding variety has a significant yield advantage. 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, if appropriate footnotes are given and if the order of the data is not rearranged.

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Table 1. 2013 North Dakota barley variety descriptions.

Variety	Use ¹	Origin ²	Year Released	Awn Type ³	Rachilla Hair Length ⁴	Aleurone Color	Height	Straw Strength	Relative Maturity	Reaction to Disease ⁵			
										Stem Rust	Spot-form Net Blotch	Spot Blotch	Net Blotch
Six-rowed													
Celebration	M/F	BARI	2008	S	S	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Drummond	M/F	ND	2000	S	L	White	M.short	V.strg.	Med.	S	MR	MR/R	MS/S
Innovation	MT	BARI	2009	S	L	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Lacey	M/F	MN	1999	S	S	White	M.short	Strg.	Med.	S	MR	MR/R	MS/S
Legacy	M/F	BARI	2000	S	L	White	Med.	Strg.	M.late	S	MS	MR/R	MS/S
Quest ^{6,8}	M/F	MN	2010	S	L	White	M.short	V.strg.	Med.	S	MR	MR/R	MS/S
Rasmusson	M/F	MN	2008	S	S	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Robust	M/F	MN	1983	S	S	White	Med.	M.strg.	Med.	S	MS/S	MR/R	MS/S
Stellar-ND	M/F	ND	2005	S	L	White	M.short	V.strg.	Med.	S	MS	MR/R	MS/S
Tradition	M/F	BARI	2003	S	L	White	M.short	V.strg.	Med.	S	MS	MR/R	MS/S
Two-rowed													
AC Metcalfe	M	Canada	1997	R	L	White	Med.	Med.	Late	S	MS	MS	MS
CDC Copeland	M	Canada	1999	R	L	White	Tall	Med.	Late	S	MS	MS	MR
Champion	F	WestBred	2007	NA ⁷	L	White	Tall	NA	M.late	NA	NA	NA	NA
Conlon ⁸	M/F	ND	1996	S	L	White	M.short	Med.	M.early	S	MR	MS	MR/R
Conrad	M	BARI	2007	R	L	White	Tall	M.weak	Late	S	MS	NA	NA
Eslick	F	MT	2003	R	L	White	Med.	M.weak	M.late	S	NA	MS	NA
Harrington ⁹	F	Canada	1981	R	L	White	Med.	M.weak	Late	S	S	S	MS
Haxby	F	MT	2003	R	L	White	Med.	Med.	Med.	S	MS	MS	NA
Hockett	M/F	MT	2008	R	L	White	Med.	Med.	Med.	S	NA	NA	NA
Lilly	F	Germany	NA	R	L	White	Short	M.strg.	Late	S	MS/S	S	MR/R
Pinnacle	M/F	ND	2006	S	L	White	Med.	Strg.	M.late	S	S	MR	MS
Rawson	F	ND	2005	R	L	White	Med.	Med.	Med.	S	MS	MR	MS
Scarlett	M	Germany	1995	R	L	White	Short	Med.	Late	S	NA	S	MR
Sunshine	F	Germany	NA	R	L	White	Short	M.strg.	Late	S	S	S	MS
Specialty													
Enduro	SP	WestBred	2007	H	L	White	Med.	NA	M.late	NA	NA	NA	NA
Wanubet	SP	MT	1990	H	L	White	Med.	Weak	Late	S	NA	S	S

¹ M = malting; MT = being tested in plant-scale tests for malting and brewing quality; F = feed; SP = special uses (hull-less).

² BARI = Busch Agricultural Resources Inc.; MN = University of Minnesota; MT = Montana State University; ND = North Dakota State University.

³ R = rough; S = smooth; H = hull-less.

⁴ S = short; L = long.

⁵ R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible; NA = not available.

⁶ Moderately resistant to Fusarium head blight.

⁷ NA = not available.

⁸ Lower DON accumulations than other varieties tested.

⁹ Recommended as a malting barley in western U.S.

Table 2. Yield and test weight of barley varieties at three locations in eastern North Dakota, 2011-2013.

Variety	<u>Fargo</u>			<u>Carrington</u>			<u>Langdon</u>			<u>Average Eastern N.D.</u>		
	Test	Yield		Test	Yield		Test	Yield		Test	Yield	
	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.
	(lb/bu)	-----(bu/a)-----		(lb/bu)	-----(bu/a)-----		(lb/bu)	-----(bu/a)-----		(lb/bu)	-----(bu/a)-----	
Six-rowed												
Celebration	46.2	71.6	68.4	46.5	73.6	88.8	50.3	165.1	117.5	47.7	103.4	91.6
Innovation	47.6	67.1	72.1	48.2	69.2	85.2	50.2	160.0	122.6	48.7	98.8	93.3
Lacey	50.3	72.4	70.1	47.6	71.4	87.4	50.9	163.7	123.3	49.6	102.5	93.6
Quest	49.7	56.1	63.9	46.8	70.0	84.3	49.3	162.9	121.5	48.6	96.3	89.9
Robust	48.1	67.6	66.0	47.2	69.4	81.2	--	--	--	--	--	--
Stellar-ND	46.1	60.9	65.0	47.9	64.8	81.5	50.0	158.9	122.8	48.0	94.9	89.8
Tradition	48.1	76.2	73.5	48.7	67.9	85.9	50.9	162.7	115.3	49.2	102.3	91.6
Two-rowed												
AC Metcalfe	49.0	60.6	--	47.5	81.9	77.1	52.5	154.2	105.8	49.7	98.9	--
CDC Copeland	47.9	66.8	57.8	45.6	71.6	71.4	49.9	171.8	115.5	47.8	103.4	81.6
Conlon	49.4	54.2	--	49.0	76.0	--	52.5	138.2	106.5	50.3	89.5	--
Conrad	49.1	61.5	60.3	47.5	75.0	79.2	51.2	154.5	109.8	49.3	97.0	83.1
Pinnacle	45.3	57.0	63.8	48.5	77.7	85.2	53.1	179.5	128.5	49.0	104.7	92.5
Rawson	46.7	62.1	--	46.4	73.1	--	51.8	166.3	118.7	48.3	100.5	--
Mean	48.0	64.2	66.1	47.8	75.7	83.3	50.8	165.0	117.3	48.8	99.3	89.6
CV %	--	10.2	--	1.2	11.9	--	0.8	4.4	--	--	--	--
LSD 0.10	--	8.8	--	0.7	10.6	--	0.5	8.6	--	--	--	--

Table 3. Plump and protein of barley varieties at three locations in eastern North Dakota, 2013.

Variety	<u>Fargo</u>		<u>Carrington</u>		<u>Langdon</u>		<u>Average Eastern N.D.</u>	
	Plump	Protein	Plump	Protein	Plump	Protein	Plump	Protein
	------(%)-----							
Six-rowed								
Celebration	73.2	12.7	92.9	14.6	97.8	13.6	88.0	13.6
Innovation	80.9	11.3	97.1	14.4	98.1	12.4	92.0	12.7
Lacey	86.5	12.2	93.5	13.7	97.9	12.5	92.7	12.8
Quest	76.5	11.4	89.4	14.8	96.2	12.2	87.3	12.8
Robust	83.9	12.3	92.3	14.3	--	--	--	--
Stellar-ND	83.7	11.6	95.9	13.1	98.7	12.5	92.9	12.4
Tradition	82.1	11.7	96.5	14.3	97.8	12.5	92.2	12.8
Two-rowed								
AC Metcalfe	70.0	11.5	93.4	14.1	96.6	11.7	86.8	12.4
CDC Copeland	76.6	10.9	94.8	13.5	95.7	11.8	89.1	12.1
Conlon	92.7	11.5	97.8	13.2	98.7	11.7	96.5	12.1
Conrad	86.4	11.9	95.1	14.1	96.6	12.3	92.8	12.8
Pinnacle	83.5	9.8	96.6	12.0	98.2	11.3	92.7	11.0
Rawson	89.7	10.9	98.3	11.9	99.1	10.8	95.7	11.2
Mean	82.0	11.5	95.3	13.4	97.8	11.8	91.6	12.4
CV %	--	--	2.3	4.0	0.5	3.7	--	--
LSD 0.10	--	--	2.6	0.6	0.6	0.5	--	--

Table 4. Yield and test weight of barley varieties at four locations in western North Dakota, 2011-2013.

Variety	<u>Dickinson</u>			<u>Hettinger</u>			<u>Minot</u>			<u>Williston</u>			<u>Average Western N.D.</u>		
	Test	Yield		Test	Yield		Test	Yield		Test	Yield		Test	Yield	
	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.	Wt.	2013	3 Yr. ¹	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.
	(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---		(lb/bu)	---(bu/a)---	
Six-rowed															
Celebration	44.3	78.6	84.0	44.2	110.7	93.5	47.6	66.9	76.5	47.9	72.6	67.9	46.0	82.2	80.5
Innovation	45.5	76.3	85.8	44.4	122.4	104.8	48.3	85.8	78.3	47.8	80.4	69.9	46.5	91.2	84.7
Lacey	46.5	82.3	84.4	46.4	116.5	97.2	46.8	73.6	78.1	48.3	71.9	63.3	47.0	86.1	80.8
Quest	45.0	84.9	83.2	43.5	114.0	92.3	46.2	71.2	76.2	49.2	65.6	62.1	46.0	83.9	78.5
Stellar-ND	45.4	79.0	86.2	44.4	107.9	88.0	46.7	75.7	72.2	47.7	78.5	65.1	46.1	85.3	77.9
Tradition	47.3	74.4	79.5	45.0	124.1	102.9	47.3	68.3	72.7	48.5	74.5	66.8	47.0	85.3	80.5
Two-rowed															
AC Metcalfe	47.8	70.9	67.8	46.1	87.4	66.3	48.8	69.7	68.2	50.1	81.1	63.7	48.2	77.3	66.5
CDC Copeland	47.2	87.0	76.5	45.2	103.5	82.0	48.6	81.4	74.4	48.5	78.0	63.2	47.4	87.5	74.0
Conlon	47.7	62.8	67.0	48.9	102.1	87.7	49.4	62.3	69.4	50.5	74.0	66.4	49.1	75.3	72.6
Conrad	49.9	84.4	73.7	46.5	102.7	88.3	48.5	71.8	72.6	49.1	80.2	69.0	48.5	84.8	75.9
Pinnacle	50.3	76.3	80.7	47.1	110.5	80.5	47.7	73.5	73.4	50.4	86.4	70.3	48.9	86.7	76.2
Rawson	51.2	83.5	79.2	46.2	116.1	90.0	47.3	62.8	67.5	50.3	81.4	71.7	48.8	86.0	77.1
Mean	47.1	81.4	79.0	45.8	115.5	89.4	47.8	77.4	73.0	48.9	78.2	66.6	47.4	84.3	77.1
CV %	2.2	10.7	--	1.4	5.6	--	2.0	6.2	--	1.1	9.1	--	--	--	--
LSD 0.10	1.2	10.3	--	0.8	7.6	--	1.2	5.7	--	0.6	8.4	--	--	--	--

¹Average from 2010, 2011 and 2013 trial data.

Table 5. Plump and protein of barley varieties at four locations in western North Dakota, 2013.

Variety	<u>Dickinson</u>		<u>Hettinger</u>		<u>Minot</u>		<u>Williston</u>		<u>Average Western N.D.</u>	
	Plump	Protein	Plump	Protein	Plump	Protein	Plump	Protein	Plump	Protein
	------(%)-----									
Six-rowed										
Celebration	99.7	13.3	88	13.8	94.0	14.9	91.7	15.6	93.4	14.4
Innovation	99.7	12.5	91	13.5	96.2	13.8	88.9	14.8	93.9	13.7
Lacey	99.6	12.4	93	13.6	96.2	12.9	85.3	15.0	93.5	13.5
Quest	98.9	12.6	89	13.3	95.8	13.2	86.8	14.3	92.7	13.4
Stellar-ND	99.6	13.1	92	13.1	95.3	13.1	88.5	14.6	93.8	13.5
Tradition	99.7	12.6	92	12.6	95.7	12.9	87.2	14.8	93.7	13.2
Two-Rowed										
AC Metcalfe	99.0	10.6	92	14.9	94.6	13.9	89.0	14.4	93.8	13.5
CDC Copeland	99.1	11.2	91	12.7	96.0	12.7	89.5	14.0	93.9	12.7
Conlon	99.6	11.9	96	13.2	97.1	12.9	97.2	14.4	97.5	13.1
Conrad	99.5	11.5	89	13.3	94.7	13.9	93.9	15.0	94.4	13.4
Pinnacle	99.6	11.0	95	11.8	93.7	11.4	94.6	12.6	95.8	11.7
Rawson	99.8	11.0	92	11.7	96.6	12.1	97.0	13.2	96.5	12.0
Mean	99.5	11.8	92	12.7	96.0	13.0	90.2	14.0	94.4	13.2
CV %	0.2	3.8	3.4	3.5	1.6	3.8	3.9	5.5	--	--
LSD 0.10	0.3	0.8	4	0.5	2.0	0.6	4.1	0.9	--	--

Table 6. 2013 North Dakota oat variety descriptions.

Variety	Origin ¹	Year Released	Grain Color	Height	Straw Strength	Maturity ²	Reaction to Diseases			Bu/Wt.	Protein ⁵
							Stem Rust ³	Crown Rust ³	Barley Y.Dwf ⁴		
AC Assiniboia	Can. Proven Seed	1997	Red	Med.	Strong	L	S	S	T	Good	ML
AC Gwen	Can. SeCan	2000	Hull-less	Tall	Strong	L	S	S	R	Good	L
AC Kaufman	Can.	2000	Yellow	Tall	Strong	L	S	S	MT	V.good	ML
AC Pinnacle	Can. QAS	1999	White	Tall	Med.	L	S	S	S	V.good	L
AC Ronald	Can. SeCan	2001	White	M.short	V.strg.	L	S	S	T	V.good	M
Beach	ND	2004	White	Tall	M.strg.	ML	S	MR/MS	MS	V.good	M
Buff	SD	2002	Hull-less	Med.	M.strg.	L	S	MR/MS	MT	Good	H
CDC Dancer	Can. Cargill	2000	White	Tall	Strong	L	S	MS	S	V.good	M
CDC Minstrel	Sask.	2006	White	Tall	M.strg.	L	S	S	S	Good	M
CDC Orrin	Can. QAS/Cargill	2001	White	Tall	Strong	L	S	S	S	Good	ML
CDC Weaver	Can.	2005	Yellow	Med.	M.strg.	L	S	S	S	Good	M
Furlong	AAFC Winnipeg	2003	Red	Tall	M.strg.	L	S	S	T	V.good	M
Goliath	SD	2013	White	Tall	Med.	L	NA	NA	NA	Good	M
HiFi	ND	2001	White	Tall	Strong	L	MR/MS	R	T	Good	M
Horsepower	SD	2012	White	Short	Strong	EM	MS	R	MT	V.good	MH
Hyttest	SD	1986	White	Tall	M.strg.	E	S	MS	S	V.good	H
Jury	ND	2012	White	Tall	M.strg.	M	R	R	MT	V.good	M
Killdeer	ND	2000	White	Med.	Strong	M	S	MS	MT	Good	M
Leggett	AAFC Winnipeg	2005	White	Tall	Strong	L	MR	R	S	Good	M
Leonard	MN	2001	Yellow	Tall	M.strg.	L	S	S	T	Fair	ML
Loyal	SD	2000	Ivory	Tall	M.strg.	L	S	MR	T	Good	MH
Maida	ND	2005	Yellow	Med.	Strong	M	R	S	MS	V.good	MH
Minstrel	Sask.	2008	White	M.tall	Strong	L	MR/MS	S	S	Good	M
Morton	ND	2001	White	Tall	V.strg.	L	S	S	MT	V.good	M
Newburg	ND	2011	White	Tall	Med.	L	R	R	MT	Good	M
Otana	MT	1977	White	M.tall	M.weak	L	S	S	S	V.good	ML
Paul	ND	1994	Hull-less	V.tall	Strong	L	R	MR/MS	T	Good	H
Reeves	SD	2002	White	M.tall	Med.	E	S	MR	MT	Good	H
Rockford	ND	2008	White	Tall	Strong	L	S	R	MT	V.good	M
Sesqui	MN	2001	Yellow	M.tall	Strong	L	S	S	T	Good	M
Shelby 427	SD	2008	White	Med.	Strong	E	S	R	NA	V.good	NA
Souris	ND	2006	White	Med.	Strong	M	MS	R	MS	V.good	M
Stallion	SD	2006	White	Tall	Med.	L	S	MR	NA	V.good	M
Stark	ND	2004	Hull-less	Tall	M.strg.	L	R	MR/MS	T	V.good	M
Streaker	SD	2008	Hull-less	Tall	M.weak	M	S	R/MR	NA	V.good	MH
Summit	AAFC Winnipeg	2008	White	Med.	Strong	L	S	R	MT	Good	M

¹Can = Canada; ND = North Dakota State University; SD = South Dakota State University; MT = Montana State University; Sask. = Saskatchewan.

²E = early; M = medium; L = late.

³R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible.

⁴Barley Yellow Dwarf Virus; S = susceptible; MS = moderately susceptible; MT = moderately tolerant; T = tolerant; NA = not available.

Varieties rated MT or T have a relatively good degree of protection against barley yellow dwarf virus.

⁵H = high; M = medium; L = low.

Bolded varieties are new releases.

Table 7. Yield and test weight of oat varieties at three locations in eastern North Dakota, 2011-2013.

Variety	<u>Carrington</u>			<u>LaMoure County (Edgeley)</u>			<u>Langdon</u>			<u>Average Eastern N.D.</u>		
	Test	Yield		Test	Yield		Test	Yield		Test	Yield	
	Wt.	2013	3 Yr. ¹	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.
	(lb/bu)	------(bu/a)-----		(lb/bu)	------(bu/a)-----		(lb/bu)	------(bu/a)-----		(lb/bu)	------(bu/a)-----	
AC Pinnacle	37.0	86.1	132.6	40.8	155.7	--	40.2	235.3	197.5	39.3	159.1	--
Beach	36.9	81.2	125.9	43.8	148.0	110.9	40.9	204.3	175.0	40.5	144.5	150.5
CDC Dancer	35.4	63.8	115.6	42.6	97.6	75.0	39.9	228.9	182.3	39.3	130.2	149.0
Furlong	36.8	79.2	118.1	--	--	--	38.5	217.6	172.3	--	--	--
Goliath	36.7	89.0	--	43.5	144.5	--	39.7	211.5	--	40.0	148.2	--
HiFi	36.8	85.6	128.2	42.1	134.1	105.1	38.7	216.0	187.7	39.2	145.2	158.0
Horsepower	38.6	87.0	--	42.6	125.6	--	39.1	170.7	--	40.1	127.9	--
Hyttest	37.1	74.5	113.0	--	--	--	41.3	176.3	146.4	--	--	--
Jury	35.8	81.2	--	43.4	144.3	110.9	39.7	225.3	182.5	39.6	150.2	--
Killdeer	36.0	84.8	122.5	--	--	--	38.1	207.5	178.3	--	--	--
Leggett	36.9	76.1	119.1	43.2	129.7	95.1	38.8	220.6	186.6	39.6	145.2	152.9
Minstrel	36.0	84.7	--	40.1	125.2	108.8	37.7	231.7	185.0	37.9	147.1	--
Morton	38.5	92.7	123.5	--	--	--	39.2	194.8	157.9	--	--	--
Newburg	38.5	85.3	--	42.0	149.8	112.3	38.2	227.6	190.9	39.6	154.3	--
Otana	38.1	88.8	128.2	40.2	136.7	88.8	37.5	188.0	147.9	38.6	137.9	138.1
Rockford	37.7	85.8	126.3	43.5	154.3	113.6	39.5	210.9	185.6	40.2	150.2	156.0
Shelby 427	37.0	93.0	124.5	43.0	119.6	102.4	40.7	189.3	161.5	40.2	134.1	143.0
Souris	36.4	82.2	124.2	42.1	122.9	94.2	38.7	202.1	176.7	39.1	135.8	150.5
Stallion	39.1	86.5	132.4	--	--	--	40.8	193.6	168.1	--	--	--
Stark ²	40.9	87.4	111.1	47.4	107.3	77.4	42.8	180.1	149.7	43.7	124.8	130.4
Mean	37.3	82.1	123.0	42.8	136.0	100.8	39.5	209.5	173.9	39.8	142.3	147.6
CV %	5.2	11.8	--	1.5	8.8	--	2.4	4.9	--	--	--	--
LSD 0.10	2.6	13.2	--	0.9	16.1	--	1.1	12.0	--	--	--	--

¹Three-year average is for 2010, 2012 and 2013 because this study was lost to hail in 2011.

²Hull-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 percent of the weight).

Table 8. Yield and test weight of oat varieties at four locations in western North Dakota, 2011-2013.

Variety	<u>Dickinson</u>			<u>Hettinger</u>			<u>Minot</u>			<u>Williston</u>			<u>Average Western N.D.</u>		
	Test	Yield		Test	Yield		Test	Yield		Test	Yield		Test	Yield	
	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.	Wt.	2013	3 Yr.
	(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----	
AC Pinnacle	33.9	150.7	138.9	32.9	148.8	133.1	33.6	98.8	114.5	42.2	102.0	80.0	35.7	125.1	116.6
Beach	39.2	142.4	129.8	35.1	152.2	128.8	36.1	79.3	102.1	44.0	76.7	69.4	38.6	112.7	107.5
CDC Dancer	35.1	132.5	121.8	33.7	151.5	112.7	39.0	107.8	110.1	43.9	89.0	67.7	37.9	120.2	103.1
CDC Minstrel	30.8	112.7	122.2	33.0	167.9	140.1	30.8	82.4	106.7	44.7	89.8	65.4	34.8	113.2	108.6
Furlong	33.6	131.0	133.5	30.2	162.2	138.7	33.8	88.3	94.8	41.8	89.1	75.3	34.9	117.7	110.6
Goliath	37.0	116.3	--	36.1	161.0	--	37.2	96.9	--	41.6	72.0	--	38.0	111.6	--
HiFi	32.9	117.3	116.5	32.6	135.6	117.0	37.9	114.3	125.0	42.3	91.0	69.7	36.4	114.6	107.1
Horsepower	36.5	111.7	--	35.2	159.5	--	37.8	110.9	--	44.0	84.4	--	38.4	116.6	--
Hytest	34.5	124.0	120.9	36.7	130.2	107.0	36.0	60.9	88.2	43.5	66.6	52.3	37.7	95.4	92.1
Jury	36.6	124.1	127.0	34.1	163.1	138.2	37.1	128.4	125.6	43.5	76.0	68.1	37.8	122.9	114.7
Killdeer	35.7	135.1	132.8	34.0	164.0	136.2	34.8	100.6	111.1	41.5	95.3	66.8	36.5	123.8	111.7
Leggett	35.9	118.7	125.3	33.5	162.4	127.5	35.2	117.5	118.7	42.6	79.7	72.2	36.8	119.6	110.9
Morton	36.1	131.0	129.5	31.9	156.8	128.1	36.6	75.8	96.9	42.9	80.3	63.5	36.9	111.0	104.5
Newburg	35.4	143.9	137.3	32.0	172.5	140.5	36.9	127.2	133.9	42.7	89.4	70.8	36.8	133.3	120.6
Otana	36.8	139.5	127.9	33.7	167.6	125.5	30.4	60.8	--	43.9	89.0	70.1	36.2	114.2	--
Rockford	35.2	136.2	135.1	35.6	156.1	132.2	38.0	116.4	125.3	42.9	78.6	68.9	37.9	121.8	115.4
Shelby 427	36.8	109.5	117.5	36.5	145.9	133.5	39.0	126.5	128.5	44.3	87.2	66.4	39.2	117.3	111.5
Souris	35.1	131.2	124.8	32.7	136.7	122.8	36.3	111.2	128.4	43.3	83.9	74.8	36.9	115.8	112.7
Stallion	38.2	129.5	139.3	36.4	150.8	136.8	37.1	86.2	119.5	43.7	81.6	69.0	38.9	112.0	116.2
Stark ¹	37.6	123.9	114.3	35.4	138.2	108.0	38.8	70.0	92.6	46.2	75.2	53.8	39.5	101.8	92.2
Mean	35.2	128.1	127.5	34.5	154.2	128.1	36.7	98.0	113.0	43.1	83.8	68.0	37.3	116.0	109.2
CV %	3.2	10.4	--	2.9	5.0	--	3.6	7.4	--	2.5	8.3	--	--	--	--
LSD 0.10	1.3	15.4	--	1.2	9.3	--	1.6	9.1	--	1.3	8.2	--	--	--	--

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 is 35 percent of the weight).

Table 9. 2013 North Dakota winter rye variety descriptions.

Variety	Origin ¹	Year Released	Height	Straw Strength	Maturity	Seed Color	Seed Size	Test Weight	Winter Hardiness
AC Rifle	Canada	1994	Short	V.good	Med.	Blue	Med.	Med.	V.good
AC Remington	Canada	1998	Short	V.good	Med.	NA ²	Med.	Good	Good
Aroostok	USDA	1999	Tall	Fair	Early	NA	Small	High	V.good
Ensi	Finland	1933	Tall	Fair	Late	NA	Small	Low	NA
Dacold	ND	1989	Med.	Good ³	V.late	Bl-grn.	Med.	Low	Good
Frederick	SD	1984	Tall	Fair	Late	Tan	Med.	High	Good
Hancock	WI	1979	Tall	Good	Med.	Tan	Large	High	Fair ⁴
Musketeers	Canada	1980	Tall	Good	M.early	Blue	Large	Med.	V.good
Prima	Canada	1984	Tall	Good	Med.	Blue	Large	Med.	V.good
Rymin	MN	1973	Tall	V.good	Late	Grn-gray	Large	High	Fair ³
Spooner	WI	1993	Tall	V.good	Med.	Tan	Large	High	Good
Wheeler	MI	1971	Tall	Fair	Med.	NA	Large	Low	Good
Wrens Abruzzi	GA	1953	Tall	Fair	Early	NA	Small	High	Good

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

²NA = not available.

³Under certain environments, lodging has been observed.

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

Table 10. Yield and test weight of winter rye varieties at Carrington, conventional and organic.

Variety	Carrington			Carrington (Organic)		
	Test Wt.	Seed Yield		Test Wt.	Seed Yield	
	(lb/bu)	2013	3-yr. Avg.	(lb/bu)	2013	3-yr. Avg.
		----- (bu/a) -----			----- (bu/a) -----	
Aroostok	55.0	56.1	49.8	52.6	23.1	--
Dacold	50.3	57.7	65.1	48.8	28.4	49.7
Hancock	54.6	76.7	69.6	53.5	42.7	50.5
Rymin	54.2	64.4	--	53.5	42.3	--
Mean	53.5	63.7	61.5	52.1	34.1	
CV %	1.3	9.3	--	1.8	15.6	--
LSD 0.10	0.9	7.8	--	1.2	7.9	--

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