

North Dakota

Barley, Oat, Rye and Flax

Variety Trial Results for 2008 and Selection Guide

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Barley, oat, rye and flax varieties are tested each year at multiple sites throughout North Dakota. The relative performance of these varieties is shown in table form. Variety performance data are used to provide variety recommendations to producers.

Some varieties may not be included in the tables because of insufficient testing or lack of seed availability, or they offer no yield or disease advantage over similar varieties. Additional data from county sites are available at www.ag.ndsu.edu/variety/index.htm and from each Research Extension Center. Descriptions of the most commonly grown varieties in the region are included for informational purposes.

Information contained in this publication is based on research conducted by the following North Dakota Agricultural Experiment Station scientists, plant breeders, cereal scientists and plant pathologists:

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Barley, oat, rye and flax 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. The information included in this publication is meant to aid in selecting that variety or group of varieties. Characteristics to evaluate in selecting a variety are yield potential in your area, test weight, straw strength, plant height, reaction to important 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. Choose the variety that, on average, performs the best at multiple locations near you during several years.

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 the publication only if no portion is deleted, if appropriate footnotes are given and if the order of the data is not rearranged.

The agronomic data presented in this publication are from replicated research plots using experimental designs that enable the use of statistical analysis. These analyses enable the reader to determine, at a predetermined level of confidence, if the differences observed among varieties are reliable or if they might be due to error inherent in the experimental process. 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 percent confidence (LSD probability 0.05), the higher-yielding variety has a significant yield advantage. If the difference is less than the LSD value, the variety difference probably is due to environmental factors (for example, one plot may have been in an area of the experiment with better soil than the other). When no statistical difference occurs among any of the varieties at the 95 percent level of probability, NS is used. 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.

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Table 1. 2008 North Dakota barley variety descriptions.

										Reaction to Disease ⁵			
Variety	Use ¹	Origin ²	Year Released	Awn Type ³	Rachilla Hair Length ⁴	Aleurone Color	Height	Straw Strength	Relative Maturity	Stem Rust	Loose Smut	Spot Blotch	Net Blotch
Six-rowed													
Azure	M/F	ND	1982	S	L	Blue	Med.	M.strg.	M.early	S	S	MR-R	MS-S
Celebration	MT	BARI	2008	S	S	White	M.short	Strg.	Med.	S	S	MR-R	MS-MS
Drummond	M/F	ND	2000	S	L	White	M.short	V.strg.	Med.	S	S	MR-R	MS-S
Excel	M/F	MN	1990	S	L	White	M.short	Strg.	Med.	S	S	MR-R	MS-S
Foster	M/F	ND	1995	S	L	White	M.short	Strg.	Med.	S	S	MR-R	MS-S
Hazen	F	ND	1984	S	L	White	Med.	M.strg.	Med.	S	S	MR-R	MS-S
Lacey	M/F	MN	1999	S	S	White	M.short	Strg.	Med.	S	S	MR-R	MS-S
Legacy	M/F	BARI	2000	S	L	White	Med.	Strg.	M.late	S	S	MR-R	MS-S
MNBrite ⁶	F	MN	1997	S	S	White	Tall	Med.	Early	S	S	MR-R	MS-S
Morex	M/F	MN	1978	S	S	White	Tall	Med.	Early	S	S	MR	S
Rasmusson	MT	MN	2008	S	S	White	M.short	Strg.	Med.	S	S	MR-R	MS-S
Robust	M/F	MN	1983	S	S	White	Med.	M.strg.	Med.	S	S	MR-R	MS-S
Stander	F	MN	1993	S	S	White	M.short	V.strg.	M.late	S	S	MR-R	MS-S
Stellar-ND	M/F	ND	2005	S	L	White	M.short	V.strg.	Med.	S	S	MR-R	MS-S
Tradition	M/F	BARI	2003	S	L	White	M.short	V.strg.	Med.	S	S	MR-R	MS-S
Two-rowed													
AC Metcalfe	M	Can	1997	R	L	White	Med.	Med.	Late	S	NA	MS	MS
Bowman	F	ND	1984	S	L	White	M.short	Med.	Early	S	S	MS-S	S-MS
CDC Copeland	M	Can	1999	R	L	White	Tall	Med.	M.late	S	S	MS	MR
Conlon ⁷	M/F	ND	1996	S	L	White	M.short	Med.	Early	S	S	MS	MR-R
Conrad	M	BARI	2007	R	L	White	Tall	M.weak	Late	S	NA	NA	NA
Eslick	F	MT	2003	R	L	White	Med.	M.weak	M.late	S	NA	MS	NA
Gallatin	F	MT	1986	R	L	White	Med.	Med.	Late	S	S	MS-S	MS
Harrington ⁸	F	Can	1981	R	L	White	Med.	M.weak	V.late	S	S	S	MS
Haxby	F	MT	2003	R	L	White	Med.	Med.	Med.	S	NA	MS	NA
Logan	F	ND	1995	S	L	White	Med.	Strg.	Med.	S	S	MR	MR
Pinnacle	MT	ND	2006	S	L	White	Med.	Strg.	M.late	S	S	MR	MS
Rawson	F	ND	2005	R	L	White	Med.	Med.	Med.	S	S	MR	MS
Scarlett	M	Germany	1995	R	L	White	Short	Med.	Late	S	NA	NA	NA
Stark	F	ND	1991	S	L	White	M.tall	Med.	Late	S	S	S-MS	MS-S
Valier	F	Can	1999	R	L	White	Med.	M.weak	M.late	S	NA	MS	NA
Specialty													
Wanubet	SP	MT	1990	R	L	White	Med.	Weak	Late	S	S	S	S

¹ M = malting; MT = Being tested in plant scale tests for malting and brewing quality; F = feed; SP = special uses (hulless)

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

³ R = rough; S = smooth.

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 Lower DON accumulations than other varieties tested.

⁸ 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, 2006-2008.

Table 2: Yield and test weight of barley varieties at three locations in eastern North Dakota, 2006-2008.												
Variety	Test Wt.	Fargo		Test Wt.	Carrington		Test Wt.	Langdon		Average Eastern N.D.		
		Yield 2008	Yield 3 Yr.		Yield 2008	Yield 3 Yr.		Yield 2008	Yield 3 Yr.	Test Wt.	Yield 2008	Yield 3 Yr.
Six-rowed												
Drummond	51.1	95.6	111.1	46.9	97.0	72.9	49.3	128.1	110.5	49.1	106.9	98.2
Lacey	52.1	99.6	110.8	47.4	103.8	77.3	50.1	138.6	120.0	49.9	114.0	102.7
Legacy	51.9	91.7	101.8	45.7	86.6	68.3	49.3	144.7	114.5	49.0	107.7	94.9
Rasmusson	51.2	92.4	108.8	46.1	105.5	80.6	50.1	137.8	--	49.1	111.9	--
Robust	51.6	87.5	101.6	46.1	92.2	--	50.8	122.5	107.0	49.5	100.7	--
Stellar-ND	50.0	93.4	104.9	45.6	95.3	72.3	49.1	126.7	113.6	48.2	105.1	96.9
Tradition	52.2	91.6	107.2	48.6	107.8	79.4	50.2	124.7	110.0	50.3	108.0	98.9
Two-rowed												
AC Metcalfe	49.7	59.1	--	46.3	88.1	68.3	49.2	128.8	104.7	48.4	92.0	--
Bowman	52.6	74.3	84.6	49.0	85.3	71.8	50.5	125.3	104.6	50.7	95.0	87.0
CDC Copeland	--	--	--	44.9	80.2	--	48.6	129.1	--	--	--	--
Conlon	52.5	59.8	84.0	51.6	84.6	65.3	51.0	126.7	107.6	51.7	90.4	85.6
Conrad	--	--	--	48.6	92.6	--	49.1	128.1	--	--	--	--
Eslick	--	--	--	48.4	94.5	--	--	--	--	--	--	--
Geraldine	--	--	--	47.4	80.5	--	--	--	--	--	--	--
Haxby	52.6	93.9	--	51.1	115.8	85.3	--	--	--	--	--	--
Hockett	--	--	--	46.8	99.9	--	--	--	--	--	--	--
Pinnacle	53.0	93.9	--	48.3	96.1	73.4	51.1	134.4	111.0	50.8	108.1	--
Rawson	51.8	72.6	94.7	48.9	102.7	78.5	48.9	140.0	114.8	49.9	105.1	96.0
Scarlett	50.2	81.2	--	49.2	102.3	--	48.8	120.2	--	49.4	101.2	--
Mean	51.6	84.8	101.0	47.7	95.3	74.5	49.7	130.4	110.8	50.1	103.5	95.0
CV %		8.2		2.4	9.4		1.4	7.7				
LSD 0.05		11.8		1.6	12.8		1.0	14.4				

Table 3. Plump and protein of barley varieties at three locations in eastern North Dakota, 2008.

Variety	Fargo		Carrington		Langdon		Average Eastern N.D.	
	Plump	Protein	Plump	Protein	Plump	Protein	Plump	Protein
	----- (%) -----							
Six-rowed								
Drummond	88.6	13.2	75.4	13.1	94	13.2	86.0	13.2
Lacey	94.2	13.3	74.7	12.6	91	13.4	86.6	13.1
Legacy	91.9	13.7	66.5	13.0	91	12.7	83.1	13.1
Rasmusson	90.1	13.2	68.3	12.6	93	12.3	83.8	12.7
Robust	90.0	13.8	77.7	12.8	95	12.8	87.6	13.1
Stellar-ND	91.3	13.5	81.5	12.4	96	12.6	89.6	12.8
Tradition	93.7	13.5	84.5	12.5	96	12.7	91.4	12.9
Two-rowed								
AC Metcalfe	79.2	12.9	75.2	14.2	88	12.9	80.8	13.3
Bowman	91.3	13.9	91.7	13.1	91	13.3	91.3	13.4
CDC Copeland	--	--	65.5	13.8	93	11.6	--	--
Conlon	94.1	13.1	94.9	12.6	95	12.6	94.7	12.8
Conrad	--	--	92.1	13.6	88	13.0	--	--
Eslick	--	--	83.2	12.4	--	--	--	--
Geraldine	--	--	65.5	13.6	--	--	--	--
Haxby	88.6	13.2	84.2	12.6	--	--	--	--
Hockett	--	--	78.4	12.7	--	--	--	--
Pinnacle	96.0	11.0	90.1	11.7	95	11.2	93.7	11.3
Rawson	93.2	11.9	97.2	11.3	94	12.2	94.8	11.8
Scarlett	86.9	13.5	92.4	12.8	90	12.8	89.8	13.0
Mean	90.7	13.1	81.0	12.8	92.7	12.6	88.7	12.8
CV %	--	--	10.3	4.4	3.5	6.5		
LSD 0.05	--	--	11.6	0.8	4.6	1.2		

Table 4. Yield and test weight of barley varieties at four locations in western North Dakota, 2006-2008.

Variety	<u>Dickinson</u>			<u>Hettinger</u>			<u>Minot</u>			<u>Williston</u>			<u>Average 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.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.
	(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----		(lb/bu)	----- (bu/a)-----	
Six-rowed															
Drummond	42.9	53.8	71.7	44.1	66.2	73.3	48.7	116.4	94.9	46.9	62.1	67.8	45.7	74.6	76.9
Lacey	43.9	53.6	73.8	43.5	76.7	81.6	49.5	128.1	102.1	47.1	64.2	72.5	46.0	80.7	82.5
Legacy	41.3	51.7	65.3	40.5	69.0	74.7	47.6	118.5	92.6	44.3	60.2	65.9	43.4	74.9	74.6
Rasmusson	43.0	53.5	77.2	43.5	63.7	--	49.7	125.0	94.1	46.2	61.0	69.6	45.6	75.8	60.2
Robust	44.1	49.2	69.9	46.6	64.2	71.5	49.3	116.2	87.8	46.8	57.1	66.0	46.7	71.7	73.8
Stellar-ND	41.1	50.4	67.8	40.0	60.4	73.6	46.8	120.2	86.7	44.8	57.8	67.3	43.2	72.2	73.9
Tradition	42.3	53.3	70.3	45.7	88.0	83.0	48.7	126.8	97.2	48.2	67.4	76.1	46.2	83.9	81.7
Two-rowed															
AC Metcalfe	45.2	52.3	70.6	42.5	67.4	72.7	50.2	120.8	85.3	44.6	58.1	65.4	45.6	74.7	73.5
Bowman	46.3	55.4	70.6	47.8	88.1	87.8	51.2	107.6	90.0	50.4	68.0	72.2	48.9	79.8	80.2
CDC Copeland	43.4	45.8	65.1	42.4	73.9	--	47.6	130.7	--	43.7	54.2	--	44.3	76.2	--
Conlon	46.7	49.1	65.1	47.7	102.7	86.3	51.3	99.1	73.3	50.9	73.9	76.9	49.2	81.2	75.4
Conrad	47.0	52.7	--	44.7	78.3	--	49.4	134.7	--	45.4	58.2	--	46.6	81.0	--
Eslick	47.3	58.5	78.4	45.6	86.3	84.8	50.4	140.0	105.4	46.3	66.0	71.7	47.4	87.7	85.1
Geraldine	44.8	51.6	--	43.9	70.4	--	49.0	140.5	--	45.4	63.2	--	45.8	81.4	--
Harrington	43.8	47.5	63.1	40.2	58.7	64.2	49.5	128.0	85.3	45.6	62.2	66.6	44.8	74.1	69.8
Haxby	48.7	55.1	75.3	46.0	91.1	91.1	51.1	149.4	104.7	49.0	68.5	75.1	48.7	91.0	86.6
Hockett	46.7	55.1	--	43.2	75.1	--	51.2	137.8	--	47.9	65.5	--	47.3	83.4	--
Pinnacle	47.2	54.1	72.2	47.2	94.0	83.9	50.2	133.7	98.8	46.0	66.1	70.8	47.7	87.0	81.4
Rawson	47.5	54.9	70.8	45.7	80.6	82.3	49.7	122.4	99.5	49.1	70.6	74.5	48.0	82.1	81.8
Scarlett	46.4	50.4	--	44.6	89.5	--	49.4	126.9	--	47.4	66.4	--	47.0	83.3	--
Mean	45.0	52.4	70.5	44.3	77.2	79.3	49.5	126.1	93.2	46.8	63.5	70.6	46.4	79.8	58.7
CV %	3.0	7.1	--	2.5	8.4	--	1.4	7.5	--	1.5	5.2	--			
LSD 0.05	1.9	5.2	--	1.5	9.0	--	1.0	13.3	--	1.4	4.4	--			

Table 5. Plump and protein of barley varieties at four locations in western North Dakota, 2008.

Variety	Dickinson		Hettinger		Minot		Williston		Avg. Western N.D.	
	Plump	Protein	Plump	Protein	Plump	Protein	Plump	Protein	Plump	Protein
	----- (%) -----									
Six-rowed										
Drummond	64.9	15.2	75	14.8	94	13.0	27.8	16.0	65.4	14.8
Lacey	56.8	14.2	64	14.2	95	12.7	25.4	15.7	60.3	14.2
Legacy	61.1	14.5	50	14.8	95	12.4	16.2	15.6	55.6	14.3
Rasmusson	62.8	14.0	41	15.0	96	12.2	20.5	14.8	55.1	14.0
Robust	57.9	14.8	59	14.8	95	12.9	24.4	15.1	59.1	14.4
Stellar-ND	67.5	13.8	60	14.9	94	12.2	26.8	14.9	62.1	14.0
Tradition	66.8	14.7	82	14.6	95	12.8	32.9	15.7	69.2	14.5
Two-Rowed										
AC Metcalfe	87.1	14.7	62	16.6	95	13.0	36.5	16.3	70.2	15.2
Bowman	87.8	15.1	86	14.6	98	13.5	74.8	14.9	86.7	14.5
CDC Copeland	81.9	15.5	69	15.3	95	12.5	23.2	17.2	67.3	15.1
Conlon	95.2	14.6	94	14.9	98	12.7	86.3	14.4	93.4	14.2
Conrad	83.1	15.8	81	15.9	96	12.4	42.5	16.3	75.7	15.1
Eslick	81.3	14.6	77	14.0	95	11.1	31.5	14.2	71.2	13.5
Geraldine	57.4	15.9	70	14.3	91	12.4	19.9	17.3	59.6	15.0
Harrington	74.5	15.8	31	16.9	88	12.8	48.6	14.7	60.5	15.1
Haxby	83.4	15.3	88	16.5	95	12.3	31.0	15.2	74.4	14.8
Hockett	86.8	14.4	58	16.2	96	12.1	45.0	15.0	71.5	14.4
Pinnacle	92.5	13.3	91	13.5	98	11.3	61.3	14.6	85.7	13.2
Rawson	93.3	13.7	87	13.8	99	11.5	84.0	13.0	90.8	13.0
Scarlett	89.0	15.0	81	14.5	96	12.0	34.0	15.5	75.0	14.3
Mean	76.6	14.7	70.3	15.0	95.2	12.4	39.6	15.3	70.4	14.4
CV %	7.0	--	12.8	4.6	2.6	3.6	9.7	3.1		
LSD 0.05	7	--	13	1.0	3	0.6	6.5	1.0		

Table 6. 2008 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.Dw ⁴		
AC Assiniboia	Can. Proven Seed	1997	Red	Med.	Strong	L	S	S	T	Good	ML
AC Gwen	Can. SeCan	2000	Hulless	Tall	Strong	L	S	S	R	Good	L
AC Kaufman	Can.	2000	Yellow	Tall	Strong	L	S	S	MT	V.good	ML
AC Medallion	Can. Cargill	1997	White	Tall	Med.	L	S	S	MT	Good	ML
AC Morgan	Can. SeCan	1999	White	Med.	Strong	L	S	S	S	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	Hulless	Med.	M.strg.	L	S	MR/MS	MT	Good	H
CDC Boyer	Sask. Value Added	1994	White	Tall	M.strg.	L	S	MS	S	V.good	ML
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 Pacer	Sask. Value Added	1996	White	Tall	M.strg.	L	S	S	S	Good	L
CDC Weaver	Can.	2005	White	Med.	M.strg.	L	R	R	S	Good	M
Drumlin	WI	2003	Yellow	Med.	Strong	M	S	MR	VT	Good	M
Ebeltoft	ND	1999	White	Tall	Strong	V	S	MS	S	V.good	M
Excel	IN	2006	White	Med.	Strong	M	S	MR	T	V.good	M
Furlong	AAFC Winnipeg	2003	Red	Tall	M.strg.	L	S	S	T	V.good	M
HiFi	ND	2001	White	Tall	Strong	L	MR/MS	R	T	Good	M
Hytest	SD	1986	White	Tall	M.strg.	E	S	MS	S	V.good	H
Jerry	ND	1994	White	Tall	Strong	M	S	MS	MT	V.good	M
Jud	ND	1997	Ivory	Tall	Med.	L	R	MR/MS	T	Good	MH
Killdeer	ND	2000	White	Med.	Strong	M	S	MS	MT	Good	M
Leggett	AAFC Winnipeg	2005	White	Tall	M.strg.	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
Monida	MT/ID	1985	White	M.tall	Strong	L	S	S	NA	Good	ML
Morton	ND	2001	White	Tall	V.strg.	L	S	R	MT	V.good	M
Otana	MT	1977	White	M.tall	M.weak	L	S	S	S	V.good	ML
Paul	ND	1994	Hulless	V.tall	Strong	L	R	MR/MS	T	Good	H
Reeves	SD	2002	White	M.tall	Med.	E	S	MR	MT	Good	H
Sesqui	MN	2001	Yellow	M.tall	Strong	L	S	S	T	Good	M
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	Hulless	Tall	M.strg.	L	R	MR/MS	T	V.good	M
Vista	WI	2000	Yellow	Tall	Strong	L	S	R	MT	Good	M
Youngs	ND	1999	White	Med.	Strong	L	S	MS/S	MT	Good	M

¹ Can = Canada; ND = North Dakota State University; SD = South Dakota State University; WI = University of Wisconsin; IN = Purdue University; MT = Montana; ID = Idaho; Sask. = Saskatchewan.

² E = Early; M = medium; L = Late; V = very late.

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

⁴ Barley Yellow Dwarf Virus; S = susceptible; MS = moderately susceptible; MT = moderately tolerant; T = tolerant; VT = very tolerant; NA = not available. Varieties rated MT or T have a relatively good degree of protection against barley yellow dwarf virus.

⁵ H = high; M = medium; L = low.

Table 7. Yield and test weight of oat varieties at three locations in eastern North Dakota, 2006-2008.

Variety	<u>Carrington</u>			<u>Fargo</u>			<u>Langdon</u>			<u>Average Eastern N.D.</u>		
	Test	<u>Yield</u>		Test	<u>Yield</u>		Test	<u>Yield</u>		Test	<u>Yield</u>	
	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.
	(lb/bu)	----- (bu/a) -----		(lb/bu)	----- (bu/a) -----		(lb/bu)	----- (bu/a) -----		(lb/bu)	----- (bu/a) -----	
AC Pinnacle	33.8	144.3	111.4	36.2	231	179	36.0	196.9	165.8	35.3	190.7	152.1
Beach	37.5	141.8	112.0	39.6	219	164	38.8	183.4	154.6	38.6	181.4	143.5
Buff ¹	42.3	79.6	68.0	45.4	168	140	44.7	129.4	108.0	44.1	125.7	105.3
CDC Dancer	35.2	139.0	105.0	38.5	216	159	38.2	186.0	156.4	37.3	180.3	140.1
CDC Minstrel	34.1	152.1	--	35.0	227	--	35.9	185.4	--	35.0	188.2	--
Furlong	34.3	126.1	--	38.3	218	--	36.0	176.5	--	36.2	173.5	--
HiFi	35.4	137.4	104.8	38.4	224	179	38.4	175.3	165.1	37.4	178.9	149.6
Hystest	39.3	124.9	94.5	42.1	185	152	41.6	152.3	131.3	41.0	154.1	125.9
Jerry	37.6	138.9	111.9	39.8	199	166	39.1	169.6	141.9	38.8	169.2	139.9
Killdeer	34.9	141.3	107.3	37.3	241	187	37.5	185.4	151.7	36.6	189.2	148.7
Maida	35.3	132.8	105.7	38.5	204	171	37.4	156.2	142.7	37.1	164.3	139.8
Monida	--	--	--	34.8	223	170	--	--	--	--	--	--
Morton	36.5	139.4	--	41.1	207	164	39.2	165.9	155.2	38.9	170.8	--
Otana	36.9	145.1	118.2	36.6	203	158	38.1	186.3	134.8	37.2	178.1	137.0
Paul ¹	43.2	95.9	83.7	47.0	156	127	43.7	125.2	108.0	44.6	125.7	106.2
Souris	35.9	137.7	106.8	39.2	229	187	37.6	186.5	165.9	37.6	184.4	153.2
Stallion	36.0	148.7	--	38.5	205	172	40.3	170.9	--	38.3	174.9	--
Stark ¹	41.3	75.6	72.2	43.3	171	139	41.7	130.5	117.3	42.1	125.7	109.5
Youngs	35.3	132.8	111.4	36.0	208	169	36.9	182.7	154.5	36.1	174.5	145.0
Mean	36.9	129.6	100.9	39.2	207.1	163.7	39.0	169.1	143.5	38.5	168.3	133.5
CV %	2.3	7.7		1.56	3.32		1.7	6.3				
LSD 0.05	1.2	14.6		0.98	11.19		0.9	15.5				

¹Hulless varieties. When comparing yield of hulless oat varieties with varieties with hulls, multiply the yield of the hulless 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, 2006-2008.

Variety	<u>Dickinson</u>			<u>Hettinger</u>			<u>Minot</u>			<u>Williston</u>			<u>Average</u>		
	Test	<u>Yield</u>		Test	<u>Yield</u>		Test	<u>Yield</u>		Test	<u>Yield</u>		Test	<u>Yield</u>	
	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.
	(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----		(lb/bu)	----(bu/a)----	
AC Pinnacle	38.6	55.2	90.6	33.5	115.3	97.2	35.5	131.3	142.4	31.8	78.7	89.3	34.9	95.1	104.9
Beach	39.6	51.2	82.7	37.0	108.7	87.5	38.1	121.3	132.2	35.7	78.8	84.5	37.6	90.0	96.7
Buff ¹	38.5	48.9	60.4	39.9	82.0	67.1	41.2	60.9	83.9	38.5	57.6	56.7	39.5	62.4	67.0
CDC Dancer	39.0	57.8	88.6	34.4	110.7	84.3	35.7	122.5	127.9	34.3	80.7	86.3	35.9	92.9	96.8
CDC Minstrel	38.4	52.1	--	33.2	112.0	--	35.0	134.0	--	33.8	84.2	--	35.1	95.6	--
Furlong	36.9	57.4	--	34.1	115.4	--	33.8	115.4	--	32.7	81.6	88.7	34.4	92.5	--
HiFi	36.0	50.7	77.5	34.0	108.8	88.8	35.8	111.2	125.8	32.5	77.9	83.8	34.6	87.2	94.0
Hystest	39.0	57.0	81.3	37.6	96.5	85.1	37.9	102.0	104.2	37.3	76.7	80.1	38.0	83.1	87.7
Jerry	38.1	53.5	84.6	36.2	101.4	88.1	36.7	112.9	120.0	34.1	81.2	84.1	36.3	87.3	94.2
Killdeer	37.1	56.3	88.5	34.2	101.7	94.8	36.2	119.8	130.1	32.6	79.6	84.6	35.0	89.4	99.5
Maida	37.6	50.4	78.4	34.5	108.6	89.2	34.6	104.3	119.7	34.9	71.9	80.2	35.4	83.8	91.9
Monida	36.0	60.1	87.1	29.7	112.8	93.5	34.0	123.5	132.8	28.9	83.1	94.9	32.2	94.9	102.1
Morton	38.3	49.2	83.7	33.9	98.1	83.8	36.1	113.0	128.3	32.9	74.4	81.0	35.3	83.7	94.2
Otana	39.4	66.0	90.7	33.3	90.7	74.2	37.4	114.8	117.2	32.4	79.0	87.1	35.6	87.6	92.3
Paul ¹	40.4	33.7	58.0	35.5	62.3	44.0	39.9	64.6	89.7	41.3	48.9	50.0	39.3	52.4	60.4
Souris	37.0	55.9	88.6	34.4	108.2	88.4	35.3	115.0	131.8	34.1	78.4	86.1	35.2	89.4	98.7
Stallion	38.9	61.8	90.5	34.8	111.1	99.3	38.5	123.2	127.3	33.5	81.1	86.4	36.4	94.3	100.9
Stark ¹	42.0	39.9	60.4	33.0	75.8	62.4	37.2	56.8	89.9	34.2	50.9	57.9	36.6	55.9	67.7
Youngs	36.5	52.1	89.0	31.6	106.7	86.4	35.2	123.2	126.0	32.2	66.6	83.1	33.9	87.2	96.1
Mean	38.3	53.1	81.2	34.5	101.4	83.2	36.5	108.9	119.4	34.1	74.3	80.3	35.8	84.4	90.9
CV %	3.0	9.3		2.2	5.3		1.8	6.9		2.5	3.8				
LSD 0.05	1.6	6.9		1.1	7.8		0.9	10.8		1.7	4.7				

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

Table 9. 2008 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	Can.	1994	Short	V.good	Med.	Blue	Med.	Med.	V.good
AC Remington	Can.	1998	Short	V.good	Med.	--	Med.	Good	Good
Dacold	ND	1989	Med.	Good ²	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 ³
Musketeers	Can.	1980	Tall	Good	M.early	Blue	Large	Med.	V.good
Prima	Can.	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.	--	Large	Low	Good

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

²Under certain environments, lodging has been observed.

³Varieties with fair winter hardiness should not be seeded on bare soil.

Table 10. Yield and test weight of winter rye varieties at three locations in North Dakota, 2006-2008.

Variety	<u>Carrington</u>			<u>Hettinger</u>			<u>Williston</u>		<u>State Average</u>	
	Test	<u>Yield</u>		Test	<u>Yield</u>		Test	<u>Yield</u>	Test	<u>Yield</u>
	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	Wt.	2008
	(lb/bu)	------(bu/a)-----		(lb/bu)	------(bu/a)-----		(lb/bu)	------(bu/a)-----	(lb/bu)	-----(bu/a)---
AC Remington	54.7	77.4	62.0	50.8	36.2	45.3	51.7	21.3	52.4	45.0
Dacold	54.6	144.0	82.2	--	--	--	--	--	--	--
DR02	--	--	--	51.3	35.0	49.1	51.3	20.2	--	--
DR0207	--	--	--	50.7	37.7	--	51.9	20.8	--	--
Rymin	56.4	120.6	76.0	50.7	31.4	--	53.2	20.6	53.6	76.0
Mean	55.3	119.8	73.4	50.9	35.1	47.2	52.0	20.7	53.0	60.5
CV %	1.2	13.9		1.1	9.5					
LSD 0.05	1.0	25.7		NS	NS					

Table 11. 2008 North Dakota flax variety descriptions.

Variety¹	Origin²	Year Released	Relative Maturity	Seed Color	Plant Height	Wilt³
AC Carnduff	Can.	1998	Med.late	Brown	Med.tall	MR
AC Emerson	Can.	1994	Med.	Brown	Med.	R
AC Lightning	Can.	2002	Late	Brown	Med.tall	R
AC Linora	Can.	1993	Late	Brown	Tall	R
AC Watson	Can.	1996	Early	Brown	Short	MR
Carter	ND	2004	Med.	Yellow	Med.	R
Cathay	ND	1998	Med.	Brown	Med.	MR
CDC Arras	Can.	1999	Med.	Brown	Med.	MR
CDC Bethune	Can.	1999	Med.late	Brown	Med.tall	MR
CDC Mons	Can.	2003	Med.late	Brown	Med.	MR
CDC Normandy	Can.	1995	Med.	Brown	Short	MR
CDC Sorrel	Can.	2007	Med.late	Brown	Med.tall	MR
CDC Valour	Can.	1996	Early	Brown	Short	MR
Flanders	Can.	1989	Late	Brown	Med.	MS
Hanley	Can.	2002	Med.early	Brown	Med.	R
McDuff	Can.	1993	Late	Brown	Med.tall	MR
Nече	ND	1988	Med.	Brown	Med.	R
Nekoma	ND	2002	Late	Brown	Med.	MR
NorLin	Can.	1982	Early	Brown	Med.	MS
Omega	ND	1989	Med.	Yellow	Med.	MS
Pembina	ND	1998	Med.	Brown	Med.	MR
Prairie Blue	Can.	2003	Med.late	Brown	Med.tall	MR
Prairie Grande	Can.	2008	Med.early	Brown	Med.	MR
Prairie Thunder	Can.	2006	Med.	Brown	Short	MR
Prompt	SD	1988	Early	Brown	Med.	MR
Rahab 94	SD	1994	Med.	Brown	Med.	MR
Selby	SD	2000	Late	Brown	Tall	MR
Taurus	Can.	2003	Med.late	Brown	Med.	MR
Webster	SD	1998	Late	Brown	Tall	MR
York	ND	2002	Late	Brown	Med.	R

¹ All varieties have resistance to prevalent races of rust; all have good oil yield and oil quality.² Can. = Canada; ND = North Dakota State University; SD = South Dakota State University.³ R = resistant; MR = moderately resistant; MS = moderately susceptible; NA = not available.

Table 12. Yield and test weight of flax varieties at two locations in eastern North Dakota, 2006-2008.

Variety	<u>Carrington</u>			<u>Langdon</u>			<u>Average Eastern N.D.</u>		
	Test	Yield		Test	Yield		Test	Yield	
	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.	Wt.	2008	3 Yr.
	(lb/bu)	----- (bu/a) -----		(lb/bu)	----- (bu/a) -----		(lb/bu)	----- (bu/a) -----	
AC Lightning	51.2	27.3	--	53.7	35.0	34.7	52.5	31.2	--
Carter ¹	55.4	29.5	18.9	53.7	34.3	35.6	54.6	31.9	27.3
CDC Arras	51.5	26.8	17.9	53.1	36.9	34.0	52.3	31.9	26.0
CDC Bethune	51.7	27.4	18.1	53.0	38.1	35.0	52.4	32.8	26.6
CDC Sorrel	54.5	30.0	--	53.5	40.0	--	54.0	35.0	--
Hanley	52.7	26.6	--	53.6	35.6	35.3	53.2	31.1	--
Neché	54.0	26.9	18.3	53.6	36.9	30.2	53.8	31.9	24.3
Nekoma	54.6	29.0	17.7	53.7	35.5	34.6	54.2	32.3	26.2
Omega ¹	55.0	26.4	17.1	53.4	35.6	33.2	54.2	31.0	25.2
Pembina	53.7	28.7	18.7	53.6	35.3	34.9	53.7	32.0	26.8
Prairie Blue	52.2	29.7	19.9	52.9	38.5	36.7	52.6	34.1	28.3
Prairie Grande	50.3	24.8	--	53.5	14.4	--	51.9	19.6	--
Prairie Thunder	53.9	27.8	--	53.5	37.4	--	53.7	32.6	--
Rahab 94	50.2	25.2	17.2	53.0	35.8	35.7	51.6	30.5	26.5
Webster	52.7	27.7	15.9	53.8	37.5	35.7	53.3	32.6	25.8
York	53.5	26.9	18.1	54.3	36.6	35.0	53.9	31.8	26.6
Mean	52.9	27.5	18.0	53.5	35.2	34.7	53.2	31.4	26.3
CV %	1.4	7.9		0.5	6.1				
LSD 0.05	1.1	NS		0.4	3.2				

¹Yellow seeded.**Table 13. Yield and test weight of flax varieties at three locations in western North Dakota, 2006-2008.**

Variety	Hettinger			Minot			Williston			Average Western N.D.		
	Yield		Test Wt.	Yield		Test Wt.	Yield		Test Wt.	Yield		
	2008	3 Yr.		2008	3 Yr.		2008	3 Yr.		2008	3 Yr.	
	----- (bu/a) -----		(lb/bu)	----- (bu/a) -----		(lb/bu)	----- (bu/a) -----		(lb/bu)	----- (bu/a) -----		
AC Lightning	12.3	--	50.2	15.7	--	54.0	13.4	13.5	52.1	13.8	--	
Bison ¹	--	--	49.4	17.2	--	54.1	13.1	13.2	51.8	--	--	
Carter ²	11.3	11.9	51.1	15.4	23.1	54.3	13.5	12.8	52.7	13.4	15.9	
CDC Arras	12.4	15.9	49.6	21.7	--	53.5	13.1	13.5	51.6	15.7	--	
CDC Bethune	10.1	12.7	49.5	12.3	--	53.4	13.2	12.9	51.5	11.9	--	
CDC Sorrel	10.4	--	49.3	11.4	--	53.3	14.5	--	51.3	12.1	--	
Hanley	9.6	12.5	50.7	13.5	--	53.9	11.7	12.9	52.3	11.6	--	
Linott ¹	--	--	51.1	16.4	--	54.0	12.7	13.2	52.6	--	--	
McGregor ¹	--	--	50.9	14.8	--	54.5	12.7	11.8	52.7	--	--	
Neché	6.9	13.6	50.8	19.9	25.4	54.3	14.1	13.2	52.6	13.6	17.4	
Nekoma	11.2	14.6	51.0	17.2	24.7	54.4	13.6	13.0	52.3	14.0	17.4	
Omega ²	4.7	6.9	49.9	15.4	19.4	54.1	12.6	12.9	52.0	10.9	13.1	
Pembina	11.6	12.9	50.8	13.9	23.1	53.6	13.2	13.3	52.2	12.9	16.4	
Prairie Blue	9.5	13.1	50.0	14.1	--	53.4	13.4	13.7	51.7	12.3	--	
Prairie Thunder	8.2	--	49.1	12.7	--	53.7	14.4	10.9	51.4	11.8	--	
Rahab 94	10.3	13.4	49.1	13.5	23.3	52.9	13.6	13.9	51.0	12.5	16.9	
Webster	11.1	14.0	50.9	18.0	--	53.8	12.8	12.1	52.4	14.0	--	
York	13.4	14.4	50.5	12.8	23.7	54.2	13.5	13.0	52.4	13.2	17.0	
Mean	10.2	13.0	50.2	15.3	23.2	53.9	13.3	12.9	52.0	12.9	16.3	
CV %	11.8		1.6	18.8		0.6	6.4					
LSD 0.05	1.8		1.3	4.6		0.7	1.2					

¹Long-term check.²Yellow seeded.

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