

North Dakota

Barley, Oat and Rye

Variety Trial Results for 2014 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 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 means 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. 2014 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 | 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 |
| Conlon ⁷ | 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 ⁸ | 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 | | | | | | | | | | | | | |
| 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 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 two locations in eastern North Dakota, 2012-2014.

| Variety | <u>Carrington</u> | | | <u>Langdon</u> | | | <u>Average Eastern N.D.</u> | | |
|------------------|-------------------|----------------|-------|----------------|----------------|-------|-----------------------------|----------------|-------|
| | Test | Yield | | Test | Yield | | Test | Yield | |
| | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. |
| | (lb/bu) | ----(bu/a)---- | | (lb/bu) | ----(bu/a)---- | | (lb/bu) | ----(bu/a)---- | |
| Six-rowed | | | | | | | | | |
| Celebration | 48.8 | 131.4 | 88.9 | 51.9 | 143.8 | 129.5 | 50.4 | 137.6 | 109.2 |
| Innovation | 49.3 | 136.2 | 88.1 | 51.8 | 138.3 | 129.8 | 50.6 | 137.3 | 109.0 |
| Lacey | 49.8 | 129.2 | 88.2 | 52.1 | 133.7 | 131.3 | 51.0 | 131.5 | 109.8 |
| Quest | 47.4 | 126.8 | 85.9 | 50.3 | 129.5 | 128.8 | 48.9 | 128.2 | 107.4 |
| Stellar-ND | 48.2 | 133.7 | 85.4 | 50.9 | 124.5 | 125.8 | 49.6 | 129.1 | 105.6 |
| Tradition | 48.8 | 126.9 | 83.6 | 51.9 | 133.4 | 121.8 | 50.4 | 130.2 | 102.7 |
| Two-rowed | | | | | | | | | |
| AC Metcalfe | 50.7 | 126.5 | 84.2 | 53.3 | 125.2 | 116.7 | 52.0 | 125.9 | 100.5 |
| CDC Copeland | 48.5 | 122.7 | 80.0 | 50.9 | 127.4 | 128.3 | 49.7 | 125.1 | 104.2 |
| Conlon | 52.1 | 133.7 | -- | 52.4 | 125.8 | 115.6 | 52.3 | 129.8 | 115.6 |
| Conrad | 50.2 | 107.2 | 78.2 | 52.7 | 125.0 | 118.8 | 51.5 | 116.1 | 98.5 |
| Pinnacle | 48.8 | 131.7 | 90.8 | 53.9 | 138.0 | 136.1 | 51.4 | 134.9 | 113.5 |
| Rawson | 49.1 | 124.5 | -- | 52.1 | 121.6 | 123.5 | 50.6 | 123.1 | -- |
| Mean | 49.3 | 127.5 | 85.6 | 51.8 | 130.6 | 125.5 | 50.6 | 128.0 | 103.8 |
| CV % | 1.2 | 7.3 | -- | 1.2 | 3.6 | -- | -- | -- | -- |
| LSD 0.10 | 0.5 | 8.5 | -- | 0.7 | 5.5 | -- | -- | -- | -- |

Table 3. Plump and protein of barley varieties at two locations in eastern North Dakota, 2014.

| Variety | <u>Carrington</u> | | <u>Langdon</u> | | <u>Average Eastern N.D.</u> | |
|------------------|-------------------|---------|----------------|---------|-----------------------------|---------|
| | Plump | Protein | Plump | Protein | Plump | Protein |
| | (%) | (%) | (%) | (%) | (%) | (%) |
| Six-rowed | | | | | | |
| Celebration | 95.8 | 15.0 | 98.0 | 12.9 | 96.9 | 14.0 |
| Innovation | 97.1 | 13.9 | 99.1 | 13.0 | 98.1 | 13.5 |
| Lacey | 97.5 | 13.8 | 98.8 | 12.2 | 98.2 | 13.0 |
| Quest | 92.6 | 13.6 | 96.0 | 12.2 | 94.3 | 12.9 |
| Stellar-ND | 96.6 | 13.5 | 98.5 | 12.3 | 97.6 | 12.9 |
| Tradition | 96.9 | 13.3 | 98.3 | 12.0 | 97.6 | 12.7 |
| Two-rowed | | | | | | |
| AC Metcalfe | 96.0 | 13.6 | 97.4 | 12.6 | 96.7 | 13.1 |
| CDC Copeland | 95.5 | 12.8 | 97.3 | 12.2 | 96.4 | 12.5 |
| Conlon | 98.5 | 11.9 | 99.0 | 12.4 | 98.8 | 12.2 |
| Conrad | 96.4 | 14.0 | 97.6 | 12.7 | 97.0 | 13.4 |
| Pinnacle | 95.2 | 12.0 | 98.1 | 11.5 | 96.7 | 11.8 |
| Rawson | 96.6 | 11.7 | 99.0 | 11.7 | 97.8 | 11.7 |
| Mean | 96.3 | 13.1 | 98.1 | 12.1 | 97.0 | 12.9 |
| CV % | 1.1 | 3.2 | 0.7 | 4.6 | -- | -- |
| LSD 0.10 | 1.0 | 0.5 | 0.8 | 0.7 | -- | -- |

Table 4. Yield and test weight of barley varieties at four locations in western North Dakota, 2012-2014.

| 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. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 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 | 44.7 | 124.1 | 99.5 | 50.0 | 115.3 | 108.5 | 48.1 | 96.7 | 72.0 | 49.1 | 84.4 | 72.1 | 48.0 | 105.1 | 88.0 |
| Innovation | 44.9 | 135.7 | 103.0 | 50.8 | 122.3 | 115.7 | 45.3 | 90.2 | 74.6 | 46.6 | 72.4 | 71.3 | 46.9 | 105.2 | 91.2 |
| Lacey | 46.2 | 133.9 | 103.4 | 51.3 | 114.2 | 107.2 | 46.7 | 93.2 | 75.7 | 49.9 | 75.5 | 67.6 | 48.5 | 104.2 | 88.5 |
| Quest | 44.9 | 133.2 | 103.2 | 49.8 | 110.4 | 105.0 | 45.0 | 99.5 | 76.7 | 48.9 | 79.3 | 64.9 | 47.2 | 105.6 | 87.5 |
| Stellar-ND | 44.0 | 142.6 | 107.7 | 50.3 | 122.2 | 108.1 | 44.9 | 97.5 | 72.1 | 45.9 | 66.8 | 67.6 | 46.3 | 107.3 | 88.9 |
| Tradition | 45.5 | 140.6 | 97.8 | 50.7 | 120.2 | 112.6 | 46.7 | 87.9 | 70.6 | 48.9 | 82.9 | 72.4 | 48.0 | 107.9 | 88.4 |
| Two-rowed | | | | | | | | | | | | | | | |
| AC Metcalfe | 47.5 | 122.8 | 88.5 | 50.4 | 86.9 | 76.3 | 46.7 | 88.2 | 67.9 | 46.9 | 65.4 | 66.4 | 47.9 | 90.8 | 74.8 |
| CDC Copeland | 45.1 | 130.7 | 99.6 | 50.4 | 110.0 | 97.5 | 46.5 | 100.7 | 76.3 | 45.6 | 63.8 | 64.9 | 46.9 | 101.3 | 84.6 |
| Conlon | 46.6 | 106.8 | 80.8 | 52.9 | 118.2 | 100.2 | 49.8 | 93.7 | 68.6 | 51.5 | 83.0 | 71.4 | 50.2 | 100.4 | 80.3 |
| Conrad | 48.2 | 144.0 | 105.0 | 51.4 | 109.3 | 101.0 | 46.6 | 90.5 | 68.4 | 48.0 | 66.1 | 67.9 | 48.6 | 102.5 | 85.6 |
| Pinnacle | 47.5 | 130.3 | 98.6 | 52.3 | 115.1 | 99.1 | 45.0 | 94.4 | 70.7 | 48.2 | 80.01 | 74.7 | 48.3 | 105.0 | 85.8 |
| Rawson | 46.2 | 120.4 | 99.0 | 50.4 | 102.1 | 101.8 | 46.7 | 89.3 | 65.3 | 49.4 | 83.5 | 76.9 | 48.2 | 98.8 | 85.8 |
| Mean | 45.9 | 130.4 | 98.8 | 50.9 | 112.2 | 102.8 | 46.5 | 93.5 | 71.6 | 48.2 | 75.3 | 69.8 | 47.9 | 102.8 | 85.8 |
| CV % | 1.1 | 9.5 | -- | 0.7 | 3.0 | -- | 2.8 | 5.7 | -- | 1.8 | 9.0 | -- | -- | -- | -- |
| LSD 0.10 | 0.6 | 14.9 | -- | 0.4 | 4.1 | -- | 1.5 | 6.5 | -- | 1.1 | 8.3 | -- | -- | -- | -- |

Table 5. Plump and protein of barley varieties at four locations in western North Dakota, 2014.

| 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 | 99.1 | 11.7 | 97 | 13.1 | 99 | 15.2 | 70.0 | 13.9 | 91.3 | 13.5 |
| Innovation | 99.5 | 11.8 | 97 | 12.5 | 98 | 13.8 | 65.6 | 12.7 | 90.0 | 12.7 |
| Lacey | 98.8 | 11.8 | 98 | 12.6 | 98 | 14.0 | 73.5 | 13.4 | 92.1 | 13.0 |
| Quest | 98.5 | 11.9 | 94 | 12.6 | 96 | 12.6 | 69.1 | 13.9 | 89.4 | 12.8 |
| Stellar-ND | 99.3 | 11.3 | 98 | 12.3 | 98 | 13.8 | 57.6 | 13.1 | 88.2 | 12.6 |
| Tradition | 99.3 | 12.8 | 97 | 12.9 | 98 | 13.8 | 65.5 | 13.6 | 90.0 | 13.3 |
| Two-Rowed | | | | | | | | | | |
| AC Metcalfe | 98.9 | 11.2 | 96 | 13.9 | 97 | 12.8 | 59.9 | 14.4 | 88.0 | 13.1 |
| CDC Copeland | 98.7 | 11.2 | 97 | 11.7 | 98 | 11.7 | 53.9 | 13.3 | 86.9 | 12.0 |
| Conlon | 99.3 | 11.8 | 98 | 12.6 | 99 | 12.5 | 91.6 | 13.4 | 97.0 | 12.6 |
| Conrad | 99.0 | 12.4 | 96 | 11.9 | 96 | 13.1 | 79.1 | 13.9 | 90.4 | 12.8 |
| Pinnacle | 99.0 | 11.9 | 96 | 10.6 | 98 | 10.9 | 87.4 | 12.7 | 95.1 | 11.5 |
| Rawson | 99.2 | 12.0 | 95 | 11.7 | 98 | 12.7 | 96.8 | 12.9 | 97.3 | 12.3 |
| Mean | 99.1 | 11.8 | 96 | 12.4 | 98 | 13.1 | 72.5 | 13.4 | 91.3 | 12.7 |
| CV % | 0.3 | 7.3 | 0.8 | 4.8 | 1.4 | 5.3 | 9.3 | 4.0 | -- | -- |
| LSD 0.10 | 0.3 | NS | 1 | 0.7 | 2 | 0.8 | 8.3 | 0.7 | -- | -- |

Table 6. 2014 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 | | |
| AAC Justice | Can. | 2015 | White | Tall | Strong | L | S | R | NA | Good | NA |
| AC Assiniboia | Can. Proven Seed | 1997 | Red | Med. | Strong | L | S | S | T | Good | M/L |
| AC Kaufman | Can. | 2000 | Yellow | Tall | Strong | L | S | S | MT | V.good | M/L |
| AC Pinnacle | Can. QAS | 1999 | White | Tall | Med. | L | S | S | S | V.good | L |
| Beach | ND | 2004 | White | Tall | M.strg. | M/L | 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 Weaver | Can. | 2005 | Yellow | Med. | M.strg. | L | S | S | S | Good | M |
| Deon | MN | 2013 | Yellow | Tall | Strong | L | S | R | T | V.good | |
| Furlong | AAFC Winnipeg | 2003 | Red | Tall | M.strg. | L | S | S | T | V.good | M |
| Goliath | SD | 2013 | White | Tall | Med. | L | NA | MR/MS | NA | Good | M |
| HiFi | ND | 2001 | White | Tall | Strong | L | MR/MS | S | T | Good | M |
| Horsepower | SD | 2012 | White | Short | Strong | E/M | MS | S | MT | V.good | M/H |
| Hyttest | SD | 1986 | White | Tall | M.strg. | E | S | MS | S | V.good | H |
| Jury | ND | 2012 | White | Tall | M.strg. | M | R | S | 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 |
| Loyal | SD | 2000 | Ivory | Tall | M.strg. | L | S | MR | T | Good | M/H |
| Maida | ND | 2005 | Yellow | Med. | Strong | M | R | S | MS | V.good | M/H |
| Morton | ND | 2001 | White | Tall | V.strg. | L | S | S | MT | V.good | M |
| Newburg | ND | 2011 | White | Tall | Med. | L | R | S | MT | Good | M |
| Otana | MT | 1977 | White | M.tall | M.weak | L | S | S | S | V.good | M/L |
| Paul | ND | 1994 | Hull-less | V.tall | Strong | L | R | MR/MS | T | Good | H |
| Rockford | ND | 2008 | White | Tall | Strong | L | S | S | 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 | S | NA | V.good | NA |
| Souris | ND | 2006 | White | Med. | Strong | M | MS | S | 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 | M/H |
| Summit | AAFC Winnipeg | 2008 | White | Med. | Strong | L | S | S | 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; NA = not available; 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 four locations in eastern North Dakota, 2012-2014.

| Variety | <u>Carrington</u> | | | <u>Fargo</u> | | | <u>Edgeley</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> | | Test | <u>Yield</u> | |
| | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 2 Yr. | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. |
| | (lb/bu) | ---(bu/a)--- | | (lb/bu) | ---(bu/a)--- | | (lb/bu) | ---(bu/a)--- | | (lb/bu) | ---(bu/a)--- | | (lb/bu) | ---(bu/a)--- | |
| AAC Justice | -- | -- | -- | 38.6 | 161.0 | -- | 39.3 | 144.8 | -- | -- | -- | -- | -- | -- | -- |
| AC Pinnacle | 33.9 | 140.6 | 116.0 | 36.6 | 183.7 | 180.1 | 36.7 | 166.9 | -- | 38.9 | 180.2 | 196.1 | 36.5 | 167.9 | -- |
| Beach | 36.9 | 146.8 | 115.3 | 41.9 | 176.4 | 169.3 | 41.5 | 157.8 | 140.6 | 42.3 | 138.4 | 172.0 | 40.7 | 154.9 | 149.3 |
| Beta-Gene | -- | -- | -- | 41.8 | 171.5 | 171.3 | 38.3 | 150.1 | -- | -- | -- | -- | -- | -- | -- |
| CDC Dancer | 36.1 | 129.7 | 102.3 | 40.1 | 160.5 | 145.9 | 40.3 | 136.3 | 108.6 | 38.5 | 174.9 | 189.9 | 38.8 | 150.4 | 136.7 |
| CDC Minstrel | 32.7 | 137.7 | 114.2 | 35.5 | 166.3 | 164.2 | 36.5 | 133.4 | 129.6 | 39.5 | 177.6 | 192.8 | 36.1 | 153.8 | 150.2 |
| Deon | 35.1 | 146.8 | -- | 39.2 | 175.8 | 168.3 | 39.6 | 151.0 | -- | 40.5 | 163.4 | -- | 38.6 | 159.3 | -- |
| Furlong | 33.6 | 142.9 | 105.4 | 37.1 | 157.6 | 157.1 | -- | -- | -- | 38.8 | 186.0 | 187.3 | -- | -- | -- |
| Goliath | 36.8 | 144.1 | -- | 41.6 | 177.3 | 175.9 | 41.6 | 158.2 | -- | 43.8 | 164.7 | -- | 41.0 | 161.1 | -- |
| HiFi | 34.5 | 124.4 | 109.0 | 42.4 | 154.1 | 155.2 | 39.3 | 143.3 | 125.8 | 40.1 | 170.6 | 185.5 | 39.1 | 148.1 | 143.9 |
| Horsepower | 36.3 | 141.8 | 115.3 | 42.8 | 154.0 | 149.7 | 40.3 | 131.0 | -- | 40.6 | 160.2 | 163.5 | 40.0 | 146.8 | -- |
| Hyttest | 35.9 | 107.1 | 97.5 | 45.4 | 126.4 | 135.0 | -- | -- | -- | 42.0 | 126.5 | 147.6 | -- | -- | -- |
| Jury | 35.2 | 110.3 | 107.5 | 42.8 | 175.7 | 174.9 | 40.3 | 156.3 | 136.1 | 41.1 | 165.9 | 184.3 | 39.9 | 152.1 | 150.7 |
| Killdeer | 34.1 | 136.2 | 112.0 | 37.7 | 182.5 | 173.3 | 37.3 | 140.4 | -- | 39.4 | 178.2 | 185.0 | 37.1 | 159.3 | -- |
| Leggett | 35.1 | 134.2 | 107.9 | 40.8 | 183.6 | 167.7 | 39.5 | 157.8 | 127.9 | 40.9 | 164.6 | 179.8 | 39.1 | 160.1 | 145.8 |
| Maida | -- | -- | -- | 41.7 | 168.6 | 163.3 | 40.2 | 139.9 | 122.1 | -- | -- | -- | -- | -- | -- |
| Newburg | 32.9 | 105.1 | 105.6 | 36.0 | 160.7 | 163.1 | 39.8 | 159.2 | 135.8 | 40.0 | 175.9 | 190.5 | 37.2 | 150.2 | 148.8 |
| Otana | 32.6 | 112.7 | 108.4 | 35.5 | 104.8 | 117.5 | 36.0 | 111.1 | 117.6 | 39.2 | 144.3 | 158.7 | 35.8 | 118.2 | 125.6 |
| Paul ¹ | 43.9 | 60.1 | -- | 47.3 | 119.1 | 117.8 | 43.5 | 100.3 | -- | 43.9 | 133.5 | -- | 44.7 | 103.3 | -- |
| Rockford | 36.7 | 132.4 | 112.9 | 39.4 | 146.7 | 151.6 | 40.6 | 136.7 | 130.2 | 41.3 | 151.5 | 176.1 | 39.5 | 141.8 | 142.7 |
| Souris | 34.7 | 137.2 | 113.9 | 41.5 | 123.4 | 136.6 | 39.1 | 140.1 | 118.8 | 40.7 | 183.5 | 184.0 | 39.0 | 146.1 | 138.3 |
| Stallion | 37.2 | 131.2 | 117.9 | 42.7 | 168.0 | 163.0 | 41.3 | 141.3 | -- | 41.9 | 157.2 | 168.3 | 40.8 | 149.4 | -- |
| Summit | -- | -- | -- | 35.4 | 144.0 | 152.0 | 39.8 | 135.5 | 129.3 | -- | -- | -- | -- | -- | -- |
| Mean | 35.2 | 125.0 | 110.1 | 39.6 | 154.9 | 156.9 | 39.5 | 145.8 | 126.9 | 40.6 | 162.8 | 178.8 | 39.0 | 148.4 | 147.5 |
| CV % | 2.4 | 10.8 | -- | 2.3 | 10.3 | -- | 2.3 | 7.7 | -- | 3.3 | 6.8 | -- | -- | -- | -- |
| LSD 0.10 | 1.0 | 15.9 | -- | 2.0 | 34.0 | -- | 1.9 | 24.2 | -- | 1.6 | 13.0 | -- | -- | -- | -- |

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 percent of the weight).

Table 8. Yield and test weight of oat varieties at four locations in western North Dakota, 2012-2014.

| 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. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. | Wt. | 2014 | 3 Yr. |
| | (lb/bu) | ----(bu/a)---- | | (lb/bu) | ----(bu/a)---- | | (lb/bu) | ----(bu/a)---- | | (lb/bu) | ----(bu/a)---- | | (lb/bu) | ----(bu/a)---- | |
| AC Pinnacle | 34.3 | 216.2 | 159.6 | 32.6 | 173.5 | 151.8 | 36.9 | 132.8 | 125.9 | 39.0 | 87.2 | 91.5 | 35.7 | 152.4 | 132.2 |
| Beach | 36.9 | 169.9 | 143.4 | 35.9 | 171.0 | 147.8 | 40.3 | 159.3 | 124.7 | 39.4 | 64.7 | 74.6 | 38.1 | 141.2 | 122.6 |
| CDC Dancer | 34.5 | 170.9 | 139.2 | 32.9 | 165.2 | 145.2 | 37.3 | 147.2 | 130.5 | 37.9 | 79.3 | 84.1 | 35.7 | 140.7 | 124.8 |
| CDC Minstrel | 32.8 | 193.7 | 146.6 | 33.1 | 191.5 | 166.6 | 34.3 | 157.4 | 126.4 | 37.9 | 82.6 | 85.0 | 34.5 | 156.3 | 131.2 |
| Deon | 35.0 | 175.4 | -- | 36.0 | 200.9 | -- | 37.3 | 159.9 | -- | 39.2 | 81.1 | -- | 36.9 | 154.3 | -- |
| Furlong | 32.1 | 165.7 | 142.3 | 33.5 | 192.8 | 162.0 | 37.4 | 143.1 | 117.7 | 38.4 | 66.3 | 80.2 | 35.4 | 142.0 | 125.6 |
| Goliath | 35.6 | 160.3 | -- | 36.5 | 195.8 | -- | 38.0 | 115.8 | -- | -- | -- | -- | -- | -- | -- |
| HiFi | 34.3 | 162.9 | 132.6 | 32.8 | 130.1 | 125.7 | 37.1 | 111.7 | 122.6 | 38.8 | 63.1 | 74.3 | 35.8 | 117.0 | 113.8 |
| Horsepower | 35.1 | 141.2 | 115.3 | 37.2 | 192.0 | 161.5 | 38.1 | 145.1 | 130.4 | 40.0 | 76.2 | 82.0 | 37.6 | 138.6 | 122.3 |
| Hytest | 34.8 | 178.8 | 145.2 | 37.5 | 109.0 | 119.9 | 38.6 | 142.6 | 111.2 | 41.2 | 53.7 | 61.8 | 38.0 | 121.0 | 109.5 |
| Jury | 35.0 | 151.2 | 135.7 | 37.5 | 196.0 | 164.8 | 37.7 | 136.3 | 130.3 | 38.9 | 78.3 | 75.7 | 37.3 | 140.5 | 126.6 |
| Killdeer | 33.9 | 152.0 | 137.3 | 35.3 | 185.5 | 160.2 | 37.4 | 129.6 | 124.8 | 38.5 | 67.2 | 79.1 | 36.3 | 133.6 | 125.4 |
| Leggett | 35.7 | 197.1 | 144.5 | 35.5 | 193.2 | 160.1 | 35.9 | 148.5 | 129.9 | 40.3 | 66.3 | 75.5 | 36.9 | 151.3 | 127.5 |
| Newburg | 33.7 | 178.0 | 153.9 | 36.0 | 192.7 | 163.8 | 39.1 | 144.3 | 141.2 | 37.3 | 80.8 | 81.8 | 36.5 | 149.0 | 135.2 |
| Otana | 35.4 | 178.5 | 150.5 | 37.2 | 181.3 | 163.5 | 35.8 | 120.1 | 105.1 | 38.2 | 89.4 | 87.1 | 36.7 | 142.3 | 126.6 |
| Paul | 39.1 | 132.3 | -- | 39.4 | 131.7 | -- | 41.6 | 111.8 | -- | 46.3 | 33.4 | -- | 41.6 | 102.3 | -- |
| Rockford | 36.8 | 174.4 | 146.8 | 37.8 | 199.8 | 160.9 | 38.5 | 123.9 | 127.8 | 38.9 | 71.8 | 75.4 | 38.0 | 142.5 | 127.7 |
| Souris | 34.6 | 173.5 | 144.1 | 32.6 | 128.9 | 128.0 | 38.0 | 135.8 | 130.6 | 38.6 | 72.0 | 79.0 | 36.0 | 127.6 | 120.4 |
| Stallion | 37.6 | 176.1 | 151.0 | 37.7 | 157.1 | 149.0 | 37.0 | 174.1 | 142.7 | 37.6 | 59.6 | 73.4 | 37.5 | 141.7 | 129.0 |
| Mean | 35.1 | 168.6 | 143.0 | 35.8 | 175.8 | 151.9 | 37.3 | 137.8 | 126.4 | 39.2 | 71.0 | 78.7 | 36.9 | 139.5 | 125.0 |
| CV % | 1.5 | 7.7 | -- | 2.4 | 6.3 | -- | 2.1 | 6.4 | -- | 1.8 | 11.3 | -- | -- | -- | -- |
| LSD 0.10 | 0.6 | 15.2 | -- | 1.0 | 13.0 | -- | 0.9 | 10.3 | -- | 0.8 | 9.1 | -- | -- | -- | -- |

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. 2014 North Dakota winter rye variety descriptions.

| Variety | Origin ¹ | Year Released | Height | Straw Strength | Maturity | Seed Color | Seed Size | Test Weight | Winter Hardiness |
|---------------|---------------------|---------------|--------|-------------------|----------|-----------------|-----------|-------------|-------------------|
| AC Hazlet | Canada | 2006 | Med. | Good | Med. | Blue | Large | Good | V.good |
| 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 ⁴ |
| 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 | Test Wt. | Carrington | | Test Wt. | Carrington (Organic) | |
|-----------|----------|--------------------|------------|----------|----------------------|------------|
| | | 2014 | 3-yr. Avg. | | 2014 | 3-yr. Avg. |
| | (lb/bu) | ----- (bu/a) ----- | | (lb/bu) | ----- (bu/a) ----- | |
| AC Hazlet | 55.1 | 81.0 | -- | 55.1 | 37.0 | -- |
| Aroostok | 52.9 | 49.9 | 53.0 | 51.5 | 19.4 | 31.5 |
| Dacold | 48.8 | 51.6 | 60.6 | 46.3 | 29.5 | 41.3 |
| Hancock | 55.1 | 65.2 | 70.3 | 54.6 | 33.5 | 44.2 |
| Rymin | 54.3 | 64.0 | -- | 54.4 | 32.7 | -- |
| Mean | 53.4 | 66.5 | 61.3 | 52.7 | 31.6 | 39.0 |
| CV % | 0.7 | 5.9 | -- | 1.9 | 11.6 | -- |
| LSD 0.10 | 0.5 | 4.9 | -- | 1.3 | 4.5 | -- |

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