

## North Dakota

# Barley, Oat and Rye

## Variety Trial Results for 2011 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/](http://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 95 percent confidence (LSD probability 0.05), 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. 2011 North Dakota barley variety descriptions.**

| Variety                 | Use <sup>1</sup> | Origin <sup>2</sup> | Year Released | Awn Type <sup>3</sup> | Rachilla Hair Length <sup>4</sup> | Aleurone Color | Height  | Straw Strength | Relative Maturity | Reaction to Disease <sup>5</sup> |                      |             |            |
|-------------------------|------------------|---------------------|---------------|-----------------------|-----------------------------------|----------------|---------|----------------|-------------------|----------------------------------|----------------------|-------------|------------|
|                         |                  |                     |               |                       |                                   |                |         |                |                   | Stem Rust                        | Spot-form Net Blotch | Spot Blotch | Net Blotch |
| <b>Six-rowed</b>        |                  |                     |               |                       |                                   |                |         |                |                   |                                  |                      |             |            |
| 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 <sup>6,8</sup>    | 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       |
| <b>Two-rowed</b>        |                  |                     |               |                       |                                   |                |         |                |                   |                                  |                      |             |            |
| 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 <sup>7</sup>       | L                                 | White          | Tall    | NA             | M.late            | NA                               | NA                   | NA          | NA         |
| Conlon <sup>8</sup>     | 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 <sup>9</sup> | 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         |
| <b>Specialty</b>        |                  |                     |               |                       |                                   |                |         |                |                   |                                  |                      |             |            |
| 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          |

<sup>1</sup> M = malting; MT = Being tested in plant-scale tests for malting and brewing quality; F = feed; SP = special uses (hullless).

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

<sup>3</sup> R = rough; S = smooth; H = hullless.

<sup>4</sup> S = short; L = long.

<sup>5</sup> R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible; NA = not available.

<sup>6</sup> Moderately resistant to Fusarium head blight.

<sup>7</sup> NA = Not available.

<sup>8</sup> Lower DON accumulations than other varieties tested.

<sup>9</sup> 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, 2009-2011.**

| Variety          | <u>Dazey</u>     |              |       | <u>Wishek</u>    |              |      | <u>Langdon</u>   |              |       | <u>Average 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) |      |
| <b>Six-rowed</b> |                  |              |       |                  |              |      |                  |              |       |                             |              |      |
| Celebration      | 36.4             | 58.4         | 92.8  | 41.6             | 42.9         | 67.6 | 49.3             | 107.6        | 121.5 | 42.4                        | 69.6         | 94.0 |
| Innovation       | 37.5             | 69.3         | 95.5  | 42.3             | 47.1         | 73.4 | 48.7             | 116.8        | --    | 42.8                        | 77.7         | --   |
| Lacey            | 39.7             | 71.3         | 94.2  | 43.9             | 47.7         | 68.4 | 49.6             | 109.6        | 119.6 | 44.4                        | 76.2         | 94.1 |
| Quest            | 37.4             | 61.0         | --    | 43.1             | 53.5         | --   | 48.7             | 107.6        | 123.4 | 43.1                        | 74.0         | --   |
| Rasmussen        | 38.3             | 67.9         | 95.8  | --               | --           | --   | 49.5             | 117.3        | 130.4 | --                          | --           | --   |
| Robust           | 38.3             | 58.2         | 80.9  | 43.3             | 55.1         | 68.2 | --               | --           | --    | --                          | --           | --   |
| Stellar-ND       | 38.6             | 63.5         | 89.7  | 42.3             | 52.3         | 72.7 | 48.6             | 115.5        | 122.0 | 43.2                        | 77.1         | 94.8 |
| Tradition        | 38.2             | 68.5         | 101.5 | 43.0             | 54.8         | 73.6 | 49.3             | 114.0        | 123.4 | 43.5                        | 79.1         | 99.5 |
| <b>Two-rowed</b> |                  |              |       |                  |              |      |                  |              |       |                             |              |      |
| AC Metcalfe      | --               | --           | --    | --               | --           | --   | 49.4             | 92.7         | 113.0 | --                          | --           | --   |
| CDC Copeland     | 39.0             | 47.4         | --    | 42.6             | 38.0         | 64.8 | 49.2             | 89.1         | 119.3 | 43.6                        | 58.2         | --   |
| Conlon           | --               | --           | --    | --               | --           | --   | 51.6             | 98.6         | 112.5 | --                          | --           | --   |
| Conrad           | 39.1             | 50.0         | 91.3  | --               | --           | --   | 50.1             | 97.9         | --    | --                          | --           | --   |
| Haxby            | 39.3             | 58.5         | --    | 43.7             | 46.0         | --   | --               | --           | --    | --                          | --           | --   |
| Lilly            | 39.3             | 55.8         | --    | --               | --           | --   | 48.8             | 92.4         | --    | --                          | --           | --   |
| Pinnacle         | 36.9             | 55.2         | 97.5  | 41.5             | 47.9         | 70.6 | 51.1             | 115.2        | 126.3 | 43.2                        | 72.8         | 98.1 |
| Rawson           | --               | --           | --    | 41.1             | 41.8         | 66.2 | 49.4             | 107.3        | 126.3 | --                          | --           | --   |
| Mean             | 38.3             | 60.4         | 93.2  | 42.6             | 47.9         | 69.5 | 49.5             | 105.8        | 121.6 | 43.3                        | 73.1         | 96.1 |
| CV %             | 3.0              | 9.6          | --    | 2.4              | 11.9         | --   | 1.2              | 7.3          | --    | --                          | --           | --   |
| LSD 0.05         | 1.7              | 8.1          | --    | 1.4              | 8.3          | --   | 0.8              | 10.9         | --    | --                          | --           | --   |

**Table 3. Plump and protein of barley varieties at three locations in eastern North Dakota, 2011**

| Variety          | <u>Dazey</u> |         | <u>Wishek</u> |         | <u>Langdon</u> |         | <u>Average Eastern N.D.</u> |         |
|------------------|--------------|---------|---------------|---------|----------------|---------|-----------------------------|---------|
|                  | Plump        | Protein | Plump         | Protein | Plump          | Protein | Plump                       | Protein |
| <b>Six-rowed</b> |              |         |               |         |                |         |                             |         |
| Celebration      | 70.8         | 14.3    | 79            | 14.9    | 95             | 13.7    | 81.6                        | 14.3    |
| Innovation       | 72.8         | 13.8    | 85            | 14.0    | 92             | 12.5    | 83.3                        | 13.4    |
| Lacey            | 75.3         | 14.1    | 88            | 14.9    | 94             | 13.3    | 85.8                        | 14.1    |
| Quest            | 64.4         | 13.8    | 80            | 14.7    | 87             | 12.7    | 77.1                        | 13.7    |
| Rasmussen        | 72.1         | 13.4    | --            | --      | 94             | 12.5    | --                          | --      |
| Robust           | 73.3         | 13.6    | 82            | 14.3    | --             | --      | --                          | --      |
| Stellar-ND       | 79.2         | 13.3    | 82            | 13.6    | 95             | 12.4    | 85.4                        | 13.1    |
| Tradition        | 73.3         | 13.2    | 87            | 13.9    | 92             | 12.7    | 84.1                        | 13.3    |
| <b>Two-rowed</b> |              |         |               |         |                |         |                             |         |
| AC Metcalfe      | --           | --      | --            | --      | 88             | 13.7    | --                          | --      |
| CDC Copeland     | 72.4         | 13.7    | 85            | 15.1    | 92             | 12.9    | 83.1                        | 13.9    |
| Conlon           | --           | --      | --            | --      | 97             | 12.7    | --                          | --      |
| Conrad           | 73.7         | 14.4    | --            | --      | 92             | 12.7    | --                          | --      |
| Haxby            | 64.1         | 14.1    | 72            | 13.9    | --             | --      | --                          | --      |
| Lilly            | 70.7         | 13.9    | --            | --      | 87             | 12.1    | --                          | --      |
| Pinnacle         | 80.0         | 12.3    | 76            | 12.8    | 95             | 12.0    | 83.7                        | 12.4    |
| Rawson           | --           | --      | 83            | 14.0    | 95             | 11.9    | --                          | --      |
| Mean             | 72.5         | 13.7    | 81.7          | 14.2    | 92.5           | 12.7    | 83.0                        | 13.5    |
| CV %             | 5.8          | 3.4     | 6.0           | 4.2     | 2.5            | 3.8     | --                          | --      |
| LSD 0.05         | 6.1          | 0.7     | 7.1           | 0.9     | 3.3            | 0.7     | --                          | --      |

**Table 4. Yield and test weight of barley varieties at four locations in western North Dakota, 2009-2011.**

| 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.              | 2011         | 3 Yr. | Wt.              | 2011         | 3 Yr. | Wt.          | 2011         | 3 Yr. | Wt.              | 2011         | 3 Yr. | Wt.                         | 2011         | 3 Yr. |
|                  | (lb/bu)          | ---(bu/a)--- |       | (lb/bu)          | ---(bu/a)--- |       | (lb/bu)      | ---(bu/a)--- |       | (lb/bu)          | ---(bu/a)--- |       | (lb/bu)                     | ---(bu/a)--- |       |
| <b>Six-rowed</b> |                  |              |       |                  |              |       |              |              |       |                  |              |       |                             |              |       |
| Celebration      | 37.9             | 77.9         | 70.1  | 37.9             | 70.2         | 86.0  | 37.6         | 52.3         | 90.7  | 45.9             | 71.9         | 69.1  | 39.8                        | 68.1         | 79.0  |
| Innovation       | 38.7             | 84.0         | --    | 39.9             | 89.4         | --    | 38.2         | 47.8         | --    | 45.7             | 68.2         | --    | 40.6                        | 72.4         | --    |
| Lacey            | 40.2             | 77.0         | 68.5  | 41.8             | 84.1         | 91.0  | 40.6         | 60.2         | 87.2  | 46.0             | 62.7         | 64.8  | 42.2                        | 71.0         | 77.9  |
| Quest            | 38.1             | 73.2         | 65.8  | 39.9             | 72.3         | 80.6  | 41.1         | 59.5         | 86.4  | 47.1             | 70.9         | 67.3  | 41.6                        | 69.0         | 75.0  |
| Rasmusson        | 41.1             | 82.5         | 74.1  | 40.5             | 84.3         | 89.1  | 40.5         | 63.7         | 91.7  | 46.6             | 70.6         | 68.0  | 42.2                        | 75.3         | 80.7  |
| Robust           | --               | --           | --    | --               | --           | --    | 39.0         | 46.4         | 78.1  | 46.8             | 61.1         | 63.6  | --                          | --           | --    |
| Stellar-ND       | 39.4             | 78.0         | 66.8  | 38.9             | 61.7         | 80.0  | 38.7         | 43.2         | 81.3  | 45.2             | 59.3         | 63.0  | 40.6                        | 60.6         | 72.8  |
| Tradition        | 41.9             | 85.7         | 70.5  | 40.3             | 91.1         | 93.3  | 39.6         | 55.6         | 85.1  | 47.7             | 66.2         | 69.2  | 42.4                        | 74.7         | 79.5  |
| <b>Two-rowed</b> |                  |              |       |                  |              |       |              |              |       |                  |              |       |                             |              |       |
| AC Metcalfe      | 33.8             | 60.5         | 73.3  | 41.9             | 56.8         | 75.8  | 41.2         | 45.7         | 82.7  | 46.7             | 57.2         | 61.6  | 40.9                        | 55.1         | 73.4  |
| CDC Copeland     | 34.0             | 61.3         | 72.4  | 41.1             | 63.4         | 80.4  | 39.6         | 46.7         | 84.5  | 45.3             | 58.7         | 60.6  | 40.0                        | 57.5         | 74.5  |
| Conlon           | 41.7             | 65.4         | 63.0  | 42.9             | 80.9         | 87.4  | 45.6         | 49.8         | 84.7  | 47.2             | 67.8         | 71.5  | 44.4                        | 66.0         | 76.7  |
| Conrad           | 32.4             | 50.2         | 69.5  | 50.7             | 71.1         | --    | 40.2         | 43.0         | 86.4  | 47.8             | 69.6         | 68.1  | 42.8                        | 58.5         | --    |
| Harrington       | --               | --           | --    | --               | --           | --    | 41.6         | 34.5         | 79.0  | 48.1             | 49.9         | 59.9  | --                          | --           | --    |
| Haxby            | 42.7             | 82.4         | 80.8  | 43.1             | 82.1         | 92.1  | 43.0         | 53.4         | 95.9  | 48.3             | 68.8         | 73.0  | 44.3                        | 71.7         | 85.5  |
| Lilly            | 36.5             | 66.7         | --    | 39.1             | 81.6         | --    | 37.5         | 42.2         | --    | 46.1             | 64.9         | --    | 39.8                        | 63.9         | --    |
| Pinnacle         | 39.3             | 76.8         | 73.4  | 41.1             | 59.4         | 84.1  | 39.8         | 44.1         | 87.4  | 46.6             | 66.9         | 67.7  | 41.7                        | 61.8         | 78.2  |
| Rawson           | 38.6             | 60.9         | 65.7  | 41.4             | 66.7         | 79.8  | 40.8         | 43.8         | 83.1  | 49.5             | 67.8         | 68.2  | 42.6                        | 59.8         | 74.2  |
| Mean             | 38.4             | 72.2         | 70.3  | 41.4             | 74.3         | 85.0  | 40.3         | 48.9         | 85.6  | 46.9             | 64.9         | 66.4  | 41.7                        | 65.7         | 77.3  |
| CV %             | 2.6              | 4.6          | --    | 1.6              | 6.8          | --    | 3.5          | 10.0         | --    | 1.9              | 8.8          | --    | --                          | --           | --    |
| LSD 0.05         | 1.4              | 4.7          | --    | 0.9              | 7.4          | --    | 2.3          | 8.0          | --    | 1.8              | 7.2          | --    | --                          | --           | --    |

**Table 5. Plump and protein of barley varieties at four locations in western North Dakota, 2011.**

| Variety          | <u>Dickinson</u> |         | <u>Hettinger</u> | <u>Minot</u> |         | <u>Williston</u> |         | <u>Average Western N.D.</u> |         |  |
|------------------|------------------|---------|------------------|--------------|---------|------------------|---------|-----------------------------|---------|--|
|                  | Plump            | Protein | Protein          | Plump        | Protein | Plump            | Protein | Plump                       | Protein |  |
|                  | ------(%)-----   |         |                  |              |         |                  |         |                             |         |  |
| <b>Six-rowed</b> |                  |         |                  |              |         |                  |         |                             |         |  |
| Celebration      | 92               | 14.1    | 14.2             | 55           | 15.0    | 44.2             | 14.7    | 63.7                        | 14.5    |  |
| Innovation       | 90               | 13.7    | 12.3             | 61           | 13.7    | 40.6             | 14.2    | 63.9                        | 13.5    |  |
| Lacey            | 93               | 13.2    | 13.1             | 64           | 14.3    | 41.9             | 13.9    | 66.3                        | 13.6    |  |
| Quest            | 88               | 14.0    | 13.4             | 64           | 14.0    | 47.7             | 13.3    | 66.6                        | 13.7    |  |
| Rasmusson        | 92               | 12.9    | 12.8             | 58           | 13.6    | --               | --      | --                          | --      |  |
| Robust           | --               | --      | --               | 58           | 14.7    | 43.4             | 14.6    | --                          | --      |  |
| Stellar-ND       | 93               | 13.0    | 13.4             | 69           | 13.9    | 49.4             | 14.0    | 70.5                        | 13.6    |  |
| Tradition        | 94               | 13.0    | 12.6             | 59           | 13.9    | 49.4             | 13.5    | 67.5                        | 13.3    |  |
| <b>Two-Rowed</b> |                  |         |                  |              |         |                  |         |                             |         |  |
| AC Metcalfe      | 85               | 14.6    | 14.4             | 63           | 15.3    | 53.8             | 15.7    | 67.3                        | 15.0    |  |
| CDC Copeland     | 83               | 14.6    | 13.5             | 56           | 15.1    | 43.8             | 16.3    | 60.9                        | 14.9    |  |
| Conlon           | 96               | 13.6    | 13.7             | 78           | 13.9    | 72.4             | 14.4    | 82.1                        | 13.9    |  |
| Conrad           | 75               | 15.6    | 13.7             | 56           | 15.0    | 64.8             | 14.3    | 65.3                        | 14.7    |  |
| Harrington       | --               | --      | --               | 26           | 15.2    | 37.0             | 16.5    | --                          | --      |  |
| Haxby            | 90               | 13.8    | 13.2             | 58           | 14.7    | 53.9             | 14.8    | 67.3                        | 14.1    |  |
| Lilly            | 60               | 14.0    | 13.4             | 54           | 13.4    | 61.5             | 14.3    | 58.5                        | 13.8    |  |
| Pinnacle         | 89               | 13.2    | 12.7             | 74           | 13.1    | 58.8             | 12.5    | 73.9                        | 12.9    |  |
| Rawson           | 91               | 13.0    | 12.6             | 78           | 13.0    | 81.5             | 12.6    | 83.5                        | 12.8    |  |
| Mean             | 87               | 13.8    | 13.3             | 61           | 14.2    | 52.8             | 14.4    | 68.4                        | 13.9    |  |
| CV %             | 3.5              | 3.2     | 2.7              | 8.9          | 3.0     | 36.8             | 4.8     | --                          | --      |  |
| LSD 0.05         | 6                | 0.9     | 0.5              | 9            | 0.7     | 33.2             | 1.4     | --                          | --      |  |

**Table 6. 2011 North Dakota oat variety descriptions.**

| Variety       | Origin <sup>1</sup> | Year Released | Grain Color | Height  | Straw Strength | Maturity <sup>2</sup> | Reaction to Diseases   |                         |                           | Bu/Wt. | Protein <sup>5</sup> |
|---------------|---------------------|---------------|-------------|---------|----------------|-----------------------|------------------------|-------------------------|---------------------------|--------|----------------------|
|               |                     |               |             |         |                |                       | Stem Rust <sup>3</sup> | Crown Rust <sup>3</sup> | Barley Y.Dwf <sup>4</sup> |        |                      |
| 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 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 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                    |
| Drumlin       | WI                  | 2003          | Yellow      | Med.    | Strong         | M                     | S                      | MR                      | VT                        | Good   | M                    |
| Excel         | IN                  | 2006          | White       | Med.    | Strong         | M                     | S                      | MS                      | 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                    |
| Hyttest       | 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    | 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                    |
| Monida        | MT/ID               | 1985          | White       | M.tall  | Strong         | L                     | S                      | S                       | S                         | Fair   | ML                   |
| 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          | Hulless     | 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                    |
| Shelby427     | 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          | Hulless     | Tall    | M.strg.        | L                     | R                      | MR/MS                   | T                         | V.good | M                    |
| Streaker      | SD                  | 2008          | Hulless     | Tall    | M.weak         | M                     | S                      | R/MR                    | NA                        | V.good | MH                   |
| Summit        | AAFC Winnipeg       | 2008          | White       | Med.    | Strong         | L                     | S                      | R                       | MT                        | 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                    |

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

<sup>2</sup> E = early; M = medium; L = late; V = very late.

<sup>3</sup> R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible.

<sup>4</sup> 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.

<sup>5</sup> H = high; M = medium; L = low.

**Table 7. Yield and test weight of oat varieties at two locations in eastern North Dakota, 2009-2011.**

| Variety               | Dickey County (Fullerton) |                    |       | Langdon |                    |       | Average Eastern N.D. |                    |       |
|-----------------------|---------------------------|--------------------|-------|---------|--------------------|-------|----------------------|--------------------|-------|
|                       | Test                      | Yield              |       | Test    | Yield              |       | Test                 | Yield              |       |
|                       | Wt.                       | 2011               | 3 Yr. | Wt.     | 2011               | 3 Yr. | Wt.                  | 2011               | 3 Yr. |
|                       | (lb/bu)                   | ----- (bu/a) ----- |       | (lb/bu) | ----- (bu/a) ----- |       | (lb/bu)              | ----- (bu/a) ----- |       |
| AC Pinnacle           | 35.7                      | 76.2               | 145.7 | 37.1    | 184.5              | 193.8 | 36.4                 | 130.4              | 169.8 |
| Beach                 | 37.3                      | 100.8              | 160.2 | 41.9    | 147.3              | 170.2 | 39.6                 | 124.1              | 165.2 |
| Buff <sup>1</sup>     | 44.0                      | 68.1               | 107.8 | 48.6    | 103.6              | 122.4 | 46.3                 | 85.9               | 115.1 |
| CDC Dancer            | 37.1                      | 92.7               | 132.9 | 42.0    | 152.2              | 181.0 | 39.6                 | 122.5              | 157.0 |
| Drumlin               | 34.9                      | 103.5              | 147.7 | --      | --                 | --    | --                   | --                 | --    |
| Excel                 | 36.0                      | 107.7              | --    | --      | --                 | --    | --                   | --                 | --    |
| Furlong               | 34.9                      | 64.9               | 148.9 | 38.4    | 141.0              | 156.6 | 36.7                 | 103.0              | 152.8 |
| HiFi                  | 37.1                      | 106.6              | 163.3 | 40.7    | 177.4              | 192.9 | 38.9                 | 142.0              | 178.1 |
| Hystest               | 39.3                      | 69.5               | 102.9 | 42.8    | 122.8              | 136.5 | 41.1                 | 96.2               | 119.7 |
| Jerry                 | 36.5                      | 89.5               | 134.1 | 40.2    | 121.4              | 137.8 | 38.4                 | 105.5              | 136.0 |
| Killdeer              | 33.8                      | 98.1               | 156.6 | 38.3    | 158.2              | 168.6 | 36.1                 | 128.2              | 162.6 |
| Leggett               | 35.8                      | 69.5               | 131.3 | 41.3    | 185.0              | 201.6 | 38.6                 | 127.3              | 166.5 |
| Maida                 | 36.5                      | 101.8              | --    | --      | --                 | --    | --                   | --                 | --    |
| Minstrel              | 33.9                      | 87.7               | 168.2 | 36.3    | 154.4              | 163.9 | 35.1                 | 121.1              | 166.1 |
| Monida                | 31.2                      | 59.6               | 128.2 | 34.0    | 119.3              | --    | 32.6                 | 89.5               | --    |
| Morton                | 36.8                      | 77.9               | 143.4 | 40.5    | 129.6              | 151.2 | 38.7                 | 103.8              | 147.3 |
| Newburg               | 34.9                      | 82.4               | 160.1 | 40.1    | 177.1              | 211.4 | 37.5                 | 129.8              | 185.8 |
| Otana                 | 33.3                      | 59.3               | 116.5 | 36.5    | 112.1              | 128.2 | 34.9                 | 85.7               | 122.4 |
| Paul <sup>1</sup>     | 43.5                      | 52.0               | 108.5 | --      | --                 | --    | --                   | --                 | --    |
| Rockford              | 37.7                      | 82.0               | 144.4 | 42.0    | 180.1              | 192.5 | 39.9                 | 131.1              | 168.5 |
| Shelby 427            | 37.1                      | 87.1               | --    | 41.9    | 152.4              | --    | 39.5                 | 119.8              | --    |
| Souris                | 36.5                      | 96.8               | 147.5 | 41.1    | 161.6              | 187.6 | 38.8                 | 129.2              | 167.6 |
| Stallion              | 37.6                      | 92.4               | 135.7 | 42.3    | 156.6              | 166.6 | 40.0                 | 124.5              | 151.2 |
| Stark <sup>1</sup>    | 41.3                      | 50.1               | 115.5 | 45.4    | 138.9              | 143.9 | 43.4                 | 94.5               | 129.7 |
| Streaker <sup>1</sup> | 42.7                      | 66.7               | --    | 49.5    | 112.7              | --    | 46.1                 | 89.7               | --    |
| Summit                | 36.2                      | 85.0               | --    | --      | --                 | --    | --                   | --                 | --    |
| Youngs                | --                        | --                 | --    | 39.1    | 131.0              | 153.3 | --                   | --                 | --    |
| Mean                  | 37.0                      | 81.8               | 138.1 | 40.9    | 146.3              | 166.3 | 38.9                 | 113.5              | 153.4 |
| CV %                  | 2.8                       | 17.0               | --    | 1.9     | 6.1                | --    | --                   | --                 | --    |
| LSD 0.05              | 1.7                       | 23.4               | --    | 1.1     | 13.4               | --    | --                   | --                 | --    |

<sup>1</sup>Hulless 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 three locations in western North Dakota, 2009-2011.**

| Variety               | Dickinson |       |       | Hettinger |       |       | Minot    |       |       | Average Western N.D. |       |       |
|-----------------------|-----------|-------|-------|-----------|-------|-------|----------|-------|-------|----------------------|-------|-------|
|                       | Test Wt.  | Yield |       | Test Wt.  | Yield |       | Test Wt. | Yield |       | Test Wt.             | Yield |       |
|                       | (lb/bu)   | 2011  | 3 Yr. | (lb/bu)   | 2011  | 3 Yr. | (lb/bu)  | 2011  | 3 Yr. | (lb/bu)              | 2011  | 3 Yr. |
| AC Pinnacle           | 32.4      | 154.1 | 185.5 | 32.9      | 117.5 | 125.2 | 28.9     | 98.5  | 163.4 | 31.4                 | 123.4 | 158.0 |
| Beach                 | 36.1      | 129.0 | 157.2 | 34.8      | 113.9 | 114.5 | 33.1     | 91.5  | 134.6 | 34.7                 | 111.5 | 135.4 |
| Buff <sup>1</sup>     | 35.1      | 106.9 | 136.0 | 36.8      | 114.5 | 91.8  | 44.7     | 67.3  | 90.1  | 38.9                 | 96.2  | 106.0 |
| CDC Dancer            | 31.2      | 118.8 | 150.2 | 30.3      | 67.7  | 96.2  | 31.6     | 86.2  | 135.8 | 31.0                 | 90.9  | 127.4 |
| CDC Minstrel          | 30.0      | 120.5 | 164.3 | 32.8      | 112.1 | 123.0 | 28.2     | 98.1  | 151.4 | 30.3                 | 110.2 | 146.2 |
| Furlong               | 31.9      | 139.2 | 168.5 | 32.1      | 122.7 | 125.3 | 27.0     | 74.2  | 150.5 | 30.3                 | 112.0 | 148.1 |
| HiFi                  | 31.8      | 114.9 | 158.3 | 31.8      | 103.8 | 82.8  | 33.3     | 119.1 | 153.6 | 32.3                 | 112.6 | 131.6 |
| Hytest                | 33.4      | 105.9 | 139.5 | 34.6      | 70.2  | 86.3  | 30.4     | 73.5  | 117.1 | 32.8                 | 83.2  | 114.3 |
| Jerry                 | 33.3      | 113.1 | 140.6 | 34.2      | 92.0  | 98.7  | 28.2     | 80.1  | 118.5 | 31.9                 | 95.1  | 119.3 |
| Killdeer              | 34.3      | 138.5 | 171.5 | 31.7      | 113.7 | 120.6 | 26.7     | 88.6  | 154.4 | 30.9                 | 113.6 | 148.8 |
| Leggett               | 34.6      | 139.5 | 170.3 | 31.7      | 95.4  | 114.9 | 33.6     | 114.9 | 156.2 | 33.3                 | 116.6 | 147.1 |
| Monida                | 31.7      | 126.1 | 163.6 | 28.1      | 102.9 | 117.8 | 24.3     | 73.4  | 151.3 | 28.0                 | 100.8 | 144.2 |
| Morton                | 33.4      | 126.9 | 149.6 | 33.7      | 112.1 | 103.1 | 28.6     | 76.3  | 127.0 | 31.9                 | 105.1 | 126.6 |
| Newburg               | 33.0      | 128.2 | 160.1 | 32.3      | 122.9 | 120.9 | 32.9     | 122.4 | 159.9 | 32.7                 | 124.5 | 147.0 |
| Otana                 | 32.8      | 110.7 | 147.6 | 26.6      | 67.2  | 93.2  | 24.6     | 48.4  | 130.3 | 28.0                 | 75.4  | 123.7 |
| Paul <sup>1</sup>     | --        | --    | --    | 40.3      | 47.1  | --    | 42.6     | 59.1  | 102.2 | --                   | --    | --    |
| Rockford              | 35.0      | 139.4 | 171.6 | 36.2      | 113.5 | 116.6 | 34.6     | 116.4 | 155.8 | 35.3                 | 123.1 | 148.0 |
| Shelby 427            | 35.8      | 117.9 | --    | 35.5      | 127.5 | --    | 36.1     | 122.6 | --    | 35.8                 | 122.7 | --    |
| Souris                | 32.1      | 115.4 | 153.0 | 33.3      | 113.5 | 117.2 | 34.4     | 129.1 | 161.9 | 33.3                 | 119.3 | 144.0 |
| Stallion              | 36.4      | 141.0 | 156.1 | 32.7      | 120.6 | 121.0 | 34.7     | 104.5 | 139.8 | 34.6                 | 122.0 | 139.0 |
| Stark <sup>1</sup>    | 34.2      | 111.0 | 140.6 | 36.1      | 90.9  | 82.1  | 42.1     | 91.9  | 125.7 | 37.5                 | 97.9  | 116.1 |
| Streaker <sup>1</sup> | 38.2      | 90.5  | --    | 42.3      | 81.1  | --    | 43.5     | 73.8  | --    | 41.3                 | 81.8  | --    |
| Mean                  | 33.7      | 123.2 | 157.1 | 33.7      | 101.0 | 108.0 | 32.9     | 91.4  | 139.0 | 33.2                 | 106.6 | 135.3 |
| CV %                  | 4.2       | 10.2  | --    | 3.7       | 4.1   | --    | 4.1      | 8.3   | --    | --                   | --    | --    |
| LSD 0.05              | 2.0       | 17.6  | --    | 1.7       | 6.0   | --    | 1.9      | 11.9  | --    | --                   | --    | --    |

<sup>1</sup>Hulless 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 is 35 percent of the weight).

**Table 9. 2011 North Dakota winter rye variety descriptions.**

| Variety       | Origin <sup>1</sup> | 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         | Med.      | Good        | Good              |
| Aroostok      | USDA                | 1999          | Tall   | Fair              | Early    | NA         | Small     | High        | V.good            |
| <b>Ensi</b>   | Finland             | 1933          | Tall   | Fair              | Late     | NA         | Small     | Low         | NA                |
| Dacold        | ND                  | 1989          | Med.   | Good <sup>2</sup> | 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 <sup>3</sup> |
| 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 <sup>3</sup> |
| 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              |

<sup>1</sup>ND = North Dakota State University; SD = South Dakota State University; WI = University of Wisconsin; MN = University of Minnesota; MI = Michigan State University.

<sup>2</sup>Under certain environments, lodging has been observed.

<sup>3</sup>Varieties 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, 2011.**

| Variety       | <u>Carrington<sup>1</sup></u> |              | <u>Hettinger</u> |              | <u>Williston</u> |              | <u>State Average</u> |              |
|---------------|-------------------------------|--------------|------------------|--------------|------------------|--------------|----------------------|--------------|
|               | Test Wt.                      | Yield 2011   | Test Wt.         | Yield 2011   | Test Wt.         | Yield 2011   | Test Wt.             | Yield 2011   |
|               | (lb/bu)                       | ---(bu/a)--- | (lb/bu)          | ---(bu/a)--- | (lb/bu)          | ---(bu/a)--- | (lb/bu)              | ---(bu/a)--- |
| Aroostok      | 51.5                          | 40.2         | 50.3             | 73.6         | 55.3             | 46.0         | 52.4                 | 53.3         |
| Boreal        | --                            | --           | 50.1             | 71.8         | 52.6             | 34.1         | --                   | --           |
| Dacold        | 51.1                          | 64.9         | 47.5             | 103.2        | 53.1             | 55.8         | 50.6                 | 74.6         |
| Ensi          | 48.3                          | 50.2         | --               | --           | --               | --           | --                   | --           |
| Hancock       | 53.5                          | 62.9         | 51.4             | 93.1         | 55.7             | 58.6         | 53.5                 | 71.5         |
| Rymin         | --                            | --           | 43.7             | 30.1         | 53.7             | 30.0         | --                   | --           |
| Spooner       | 53.1                          | 54.9         | 50.1             | 78.2         | 55.7             | 54.0         | 53.0                 | 62.4         |
| Wheeler       | 50.0                          | 20.9         | 48.3             | 43.9         | 53.8             | 28.6         | 50.7                 | 31.1         |
| Wrens Abruzzi | 52.5                          | 37.6         | 51.3             | 62.5         | 55.7             | 36.9         | 53.2                 | 45.7         |
| Mean          | 51.4                          | 47.4         | 49.1             | 69.6         | 54.5             | 43.0         | 52.2                 | 56.4         |
| CV %          | 3.4                           | 12.2         | 1.8              | 4.2          | 1.9              | 18.0         | --                   | --           |
| LSD 0.05      | 2.6                           | 8.4          | 1.3              | 4.5          | 2.0              | 10.5         | --                   | --           |

<sup>1</sup>Trial experienced hail on July 24.

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