

# Small grain varieties for grain and forage in Wisconsin



Shawn Conley, Heidi Kaepler, John Mochon, Mark Martinka, and John Gaska

Performance trials for small grain varieties are conducted each year at several locations throughout Wisconsin (table 1). Trials include released varieties, experimental lines from Wisconsin and neighboring states, and lines from private seed companies. The primary objective of these trials is to obtain data on how varieties perform in different locations and years. Growers use these data to help them in their choice of varieties to plant, and breeders use performance data to determine whether or not to release a new variety.

New varieties developed and released in Wisconsin are entered in the Wisconsin Certification Program. These varieties have demonstrated superior production qualities. In addition, superior varieties from other states may be recommended and/or certified in the state. As new varieties are released to the public, older varieties with inferior qualities are removed from the recommended list and eventually dropped from the certified list as seed production declines.

Occasionally, varieties are certified without being recommended to Wisconsin growers. Varieties in this

category may include commercial varieties developed by private seed companies or varieties where there is a substantial market for Wisconsin-produced seed. Thus, in Wisconsin, recommendation and certification do not mean the same thing. Recommended varieties are those with superior in-state production performance records, while certification provides the assurance of seed purity and seed quality.

## VARIETY SELECTION

Factors to consider when selecting small grain varieties include grain or forage yield, maturity, straw strength (or resistance to lodging), disease resistance, and winterhardiness. Disease ratings are performed by the Department of Agronomy for oats, barley, and wheat. Barley

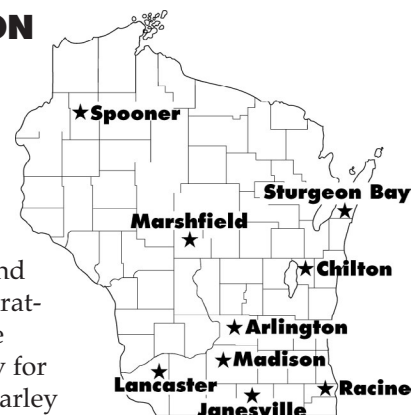


Table 1. Location and agronomics of small grain variety trials in Wisconsin

| Location                              | Cooperators             | Soil type  | Row spacing (inches) | Average nitrogen applied (lb/a) | Planting date | Harvest date |
|---------------------------------------|-------------------------|------------|----------------------|---------------------------------|---------------|--------------|
| Arlington (winter wheat)              | M. Martinka, J. Gaska   | silt loam  | 7.5                  | 80                              | 28-Sep-06     | 18-Jul-07    |
| Arlington (barley, oat)               | J. Albertson            | silt loam  | 6.0                  | 30*                             | 10-Apr-07     | 23-Jul-07    |
| Arlington (spring wheat)              | J. Gaska, M. Martinka   | silt loam  | 7.5                  | 70                              | 30-Apr-07     | 20-Jul-07    |
| Chilton (wheat)                       | Kolbe Seeds, M. Glewen  | red clay   | 7.5                  | 80                              | 09-Oct-06     | 23-Jul-07    |
| Chilton (barley, oat)                 | Kolbe Seeds, M. Glewen  | red clay   | 12.0                 | 180                             | 08-May-07     | 09-Aug-07    |
| Janesville                            | Rock Co. Farm, J. Stute | silt loam  | 7.5                  | 80                              | 08-Nov-06     | 13-Jul-07    |
| Lancaster                             | T. Wood                 | silt loam  | 7.5                  | 5*                              | 19-Apr-07     | 24-Jul-07    |
| Madison                               | J. Mochon               | silt loam  | 6.0                  | 30*                             | 20-Apr-07     | 24-Jul-07    |
| Marshfield                            | M. Bertram              | silt loam  | 6.0                  | 30                              | 24-Apr-07     | 24-Jul-07    |
| Racine                                | Henderson Seeds         | silt loam  | 7.0                  | 66                              | 15-Oct-06     | 12-Jul-07    |
| Spooner (spring wheat) —irrigated     | P. Holman               | sandy loam | 8.0                  | 80                              | 18-Apr-07     | 02-Aug-07    |
| Spooner (spring wheat) —non-irrigated | P. Holman               | silt loam  | 8.0                  | 44                              | 18-Apr-07     | 26-Jul-07    |
| Spooner (barley, oat)                 | P. Holman               | sandy loam | 7.3                  | 44                              | 20-Apr-07     | 26-Jul-07    |
| Sturgeon Bay                          | R. Weidman              | silt loam  | 12.0                 | 69                              | 01-May-07     | 02-Aug-07    |

\*Nitrogen credited from previous alfalfa or soybean.

growers should consider whether or not a variety is acceptable for malting. Several varieties are now being evaluated for forage yield (tables 3 and 5).

## Growing conditions

**2007 Season.** Wisconsin saw the highest number of all wheat acres planted since 1920, with 299,000 acres planted and 278,000 acres harvested. Entire wheat yield for 2007 was 68 bushels per acre, down 11 percent from last year. Winter wheat increased by 40,000 acres over the previous year. Planted acres were 290,000, while 270,000 acres were harvested, yielding 69 bushels per acre. This was down 9 bushels from 2006's record high, but matched 2003 as the second highest yield on record. Good soil moisture and favorable temperatures in September and October of 2006 allowed Wisconsin growers to establish their wheat crop and contributed to minimal winterkill this season. Some growers in the southern part of the state saw green-up and growth in early January due to warm temperatures. Cold weather quickly followed and dormancy resumed. Spring growing conditions were mostly favorable except for an early April frost that damaged some wheat stands. This hard frost resulted in reduced plant height and yield. Dry conditions in July and early August allowed for harvesting to be well ahead of normal.

Oat acres in Wisconsin declined by 100,000 acres from the previous year for a total of 270,000 acres. This is the first year on record that fewer acres were planted to oat than to wheat in the state. Oats in 2007 yielded 67 bushels per acre, an increase of 4 bushels from the previous year. Wisconsin ranked third for oat production this year after being first in 2006.

Barley yields increased 3 bushels from the previous year to 57 bushels per acre. Area of barley harvested fell 7,000 acres to 23,000 acres in 2007.

**2006 Season.** Wisconsin's 2006 winter wheat yield was the highest on record at 78 bushels per acre; a 9 bushel increase from the previous 2003 record yield of 69 bushels per acre. Increased yield can be attributed to a low winterkill rate and ample, timely moisture in the major growing areas of east central, south central, and southeast Wisconsin. For the 2006 growing season, 250,000 acres were planted to winter wheat, a 50,000 acre rise from 2005. Area harvested for grain was 230,000 acres, up 55,000 acres from the previous year. An increase in acres planted, acres harvested for grain, and yield resulted in record production at 17.9 million bushels, a jump of 80 percent over 2005's production of 9.98 million bushels.

Oats yielded 63 bushels per acre in Wisconsin during 2006, a 1 bushel decrease from the previous year. Oats are grown in different regions of Wisconsin than winter wheat. Northwest Wisconsin, a major growing area, experienced dry growing conditions and lower yields compared to the rest of the state. In 2006, 370,000 acres were planted to oats, a 30,000 acre

decrease from 2005. Acres harvested for grain reached 230,000 acres, a 15,000 acre increase from last year. Even though oat yield and area planted to oats declined in Wisconsin during 2006, Wisconsin ranks first in U.S. oat production at 14.5 million bushels, 15 percent of the national total.

Barley yielded 54 bushels per acre, a 1 bushel increase from 2005. Area harvested was unchanged from last year at 30,000 acres. Area planted to barley, declined 5,000 acres from 2005 to 50,000 acres in 2006. Due to the slightly higher yield, 2006 production rose 2 percent, reaching 1.62 million bushels.

*Source: USDA National Agricultural Statistics Service (USDA-NASS). Agricultural Statistics Database.*

## Licensed varieties

The Wisconsin Agricultural Experiment Station has granted sole authority to the Wisconsin Crop Improvement Association to issue formal licenses for the production of certified seed of Chilton and Kewaunee barley; Bay, Belle, Dane, ForagePlus, Gem, Horicon, Prairie, and Vista oats; Spooner rye; and Glacier winter wheat. The Wisconsin Alumni Research Foundation has granted sole authority to the Wisconsin Crop Improvement Association to issue formal licenses for the production of certified seed of Moraine, Drumlin, Esker, and Kame oats. These procedures are intended to reinforce Plant Variety Protection regulations and to generate research and development funds for the Wisconsin small-grain breeding program. These varieties are "protected" and "licensed" and can be marketed only as certified seed. Each bag of seed will have a special red and white Licensed Variety tag attached or preprinted on the bag.

## Testing agencies

The small grain variety tests were conducted by the Department of Agronomy, College of Agricultural and Life Sciences and the University of Wisconsin-Extension in cooperation and with support from the Wisconsin Crop Improvement Association.

## ADDITIONAL INFORMATION

Check the following publications for additional information on small grain production and seed availability. Both are updated annually.

*Pest Management in Wisconsin Field Crops* (A3646)

—available at [learningstore.uwex.edu](http://learningstore.uwex.edu)

*The Wisconsin Certified Seed Directory*

—available at [www.wisc.edu/wcia](http://www.wisc.edu/wcia)

For information on seed availability of public varieties, contact the Wisconsin Crop Improvement Association, 554 Moore Hall, 1575 Linden Drive, Madison, WI 53706, (608) 262-1341, [www.wisc.edu/wcia](http://www.wisc.edu/wcia).

Table 2. Oat variety descriptions

**OAT**

| Variety                      | Origin    | Year released | Kernel color | Maturity <sup>a</sup> |                       | Lodging | Test wt <sup>c</sup> (lb/bu) | Kernel protein | Disease resistance <sup>d</sup> |           |           |      |                   | PVP <sup>f</sup> | Wis. cert. |
|------------------------------|-----------|---------------|--------------|-----------------------|-----------------------|---------|------------------------------|----------------|---------------------------------|-----------|-----------|------|-------------------|------------------|------------|
|                              |           |               |              | (head date)           | Ht <sup>b</sup> (in.) |         |                              |                | Leaf rust                       | Stem rust | Sep-toria | Smut | BYDV <sup>e</sup> |                  |            |
| <b>Recommended varieties</b> |           |               |              |                       |                       |         |                              |                |                                 |           |           |      |                   |                  |            |
| Dane                         | Wisconsin | 1990          | yellow       | 6-13                  | 34                    | med     | 37                           | med            | I                               | I         | S         | R    | I                 | yes              | yes        |
| Drumlin                      | Wisconsin | 2003          | yellow       | 6-20                  | 35                    | weak    | 38                           | med            | R                               | I         | —         | R    | R                 | yes              | yes        |
| Esker                        | Wisconsin | 2004          | yellow       | 6-17                  | 34                    | med     | 38                           | med            | R                               | I         | —         | R    | I                 | yes              | yes        |
| Excel                        | Indiana   | 2006          | white        | 6-14                  | 34                    | med     | 40                           | med            | R                               | S         | —         | I    | I                 | yes              | no         |
| Kame                         | Wisconsin | 2005          | yellow       | 6-15                  | 33                    | strong  | 37                           | med            | R                               | I         | —         | R    | S                 | yes              | yes        |
| Moraine                      | Wisconsin | 2001          | yellow       | 6-16                  | 36                    | weak    | 38                           | med            | R                               | —         | —         | R    | I                 | yes              | yes        |
| Vista                        | Wisconsin | 1999          | yellow       | 6-20                  | 38                    | weak    | 38                           | low            | R                               | R         | —         | R    | I                 | yes              | yes        |
| <b>Other varieties</b>       |           |               |              |                       |                       |         |                              |                |                                 |           |           |      |                   |                  |            |
| Belle                        | Wisconsin | 1995          | yellow       | late                  | med                   | strong  | med                          | low            | R                               | I         | I         | R    | I                 | yes              | yes        |
| Gem                          | Wisconsin | 1996          | yellow       | early                 | med                   | med     | high                         | med            | I                               | R         | —         | I    | R                 | yes              | yes        |
| Jim                          | Minnesota | 1996          | yellow       | med                   | med                   | med     | med                          | med            | I                               | I         | —         | —    | R                 | no               | yes        |
| Leonard                      | Minnesota | 2003          | yellow       | med                   | tall                  | med     | med                          | med            | R                               | I         | —         | R    | R                 | yes              | no         |
| Ogle                         | Illinois  | 1981          | yellow       | early                 | med                   | strong  | high                         | low            | S                               | S         | S         | S    | I                 | no               | yes        |
| Richard                      | Minnesota | 2000          | yellow       | early                 | tall                  | strong  | high                         | med            | R                               | R         | —         | R    | I                 | yes              | yes        |
| Sesqui                       | Minnesota | 2001          | yellow       | late                  | tall                  | med     | high                         | med            | I                               | —         | —         | R    | I                 | yes              | no         |
| Wabasha                      | Minnesota | 2001          | white        | early                 | tall                  | med     | high                         | med            | R                               | —         | —         | R    | R                 | yes              | yes        |
| Winona                       | Minnesota | 2005          | yellow       | early                 | med                   | strong  | high                         | med            | R                               | —         | —         | R    | I                 | no               | no         |

<sup>a</sup> Maturity (month-day) as indicated by heading date in 18 Wisconsin tests conducted 2005–2007.

Varieties with generalized ratings indicate the following: early = before June 25, med = June 25–28, late = after June 28.

<sup>b</sup> Height (inches) at maturity in 21 Wisconsin tests conducted 2005–2007.

Varieties with generalized ratings indicate the following: short = <33 inches, med = 33–40 inches, tall = >40 inches.

<sup>c</sup> Test weight (pounds/bushel) in 21 Wisconsin tests conducted 2005–2007.

Varieties with generalized ratings indicate the following: low = <33 lb/bu, med = 33–35 lb/bu, high = >35 lb/bu.

<sup>d</sup> Disease resistance: R = resistant or moderately resistant, I = intermediate or some tolerance, S = moderately susceptible or susceptible.

<sup>e</sup> BYDV=Barley yellow dwarf virus or red leaf disease.

<sup>f</sup> PVP = Plant Variety Protection. A “yes” indicates that the variety cannot be reproduced and sold as seed by variety name without certification.

- = information not available.

Table 3. Forage dry matter yield of spring oat varieties harvested at late boot/early heading

| Variety     | Yield (t/a) |           |      | Harvest date (June) | Crude protein (%) | RFQ <sup>a</sup> | Yield (t/a) | Harvest date (June) |
|-------------|-------------|-----------|------|---------------------|-------------------|------------------|-------------|---------------------|
|             | Madison     | Arlington | Mean |                     |                   |                  |             |                     |
|             | 2007        |           |      |                     | 2004–2006         |                  | 2005–2007   |                     |
| Dane        | 0.71        | 0.97      | 0.84 | 5                   | 13.0*             | 138.5            | 1.19        | 8                   |
| Drumlin     | 1.30        | 1.43      | 1.37 | 12                  | 12.4*             | 137.5            | 1.73        | 13                  |
| Esker       | 0.99        | 1.20      | 1.09 | 8                   | 12.7*             | 136.7            | 1.51        | 11                  |
| Excel       | 0.95        | 1.32      | 1.13 | 9                   | —                 | —                | 1.21        | 9                   |
| Forage Plus | 1.59*       | 1.81      | 1.70 | 18                  | 10.7              | 132.2            | 2.18        | 21                  |
| Kame        | 0.72        | 1.02      | 0.87 | 6                   | 12.9*             | 145.5*           | 1.26        | 10                  |
| Moraine     | 0.90        | 1.08      | 0.99 | 7                   | 12.5*             | 142.5*           | 1.32        | 10                  |
| Ogle        | 0.85        | 1.27      | 1.06 | 9                   | 13.0*             | 143.4*           | 1.34        | 11                  |
| Vista       | 1.37*       | 1.64      | 1.51 | 11                  | 11.3              | 129.2            | 1.79        | 14                  |
| LSD (0.05)  | 0.27        | 0.13      | 0.14 |                     | 0.59              | 4.82             | 0.12        |                     |

\*Varieties not significantly different from highest yielding variety in the trial.

<sup>a</sup> RFQ = Relative feed quality. Relative feed quality can be used to make comparisons among varieties listed in this table, but should not be used to compare with other crops such as alfalfa.

| Variety                    | Mean | Southern  |           |         | Northern |          |              |            |
|----------------------------|------|-----------|-----------|---------|----------|----------|--------------|------------|
|                            |      | Arlington | Lancaster | Madison | Chilton  | Spoooner | Sturgeon Bay | Marshfield |
| <b>2007 YIELDS</b>         |      |           |           |         |          |          |              |            |
| —2007 yields (bu/a)—       |      |           |           |         |          |          |              |            |
| <b>Early maturing</b>      |      |           |           |         |          |          |              |            |
| Dane                       | 103  | 117       | 117       | 99      | 96*      | 103*     | 77           | 114*       |
| Kame                       | 104  | 137*      | 112       | 123*    | 98*      | 85       | 75           | 95         |
| Moraine                    | 103  | 115       | 126*      | 111     | 99*      | 79       | 81           | 114*       |
| Excel                      | 111  | 139*      | 131*      | 122*    | 96*      | 94*      | 80           | 117*       |
| <b>Midseason</b>           |      |           |           |         |          |          |              |            |
| Esker                      | 118* | 134*      | 139*      | 127*    | 101*     | 101*     | 100*         | 122*       |
| Ogle                       | 112  | 132*      | 128*      | 124*    | 102*     | 93*      | 90*          | 113        |
| <b>Mid- to late-season</b> |      |           |           |         |          |          |              |            |
| Drumlin                    | 115* | 129*      | 125*      | 127*    | 98*      | 95*      | 100*         | 132*       |
| Vista                      | 108  | 117       | 131*      | 140*    | 89       | 85       | 93*          | 104        |
| Mean                       | 109  | 128       | 126       | 122     | 97       | 92       | 87           | 114        |
| LSD (0.05) <sup>a</sup>    | 5    | 12        | 14        | 18      | 12       | 12       | 14           | 18         |
| <b>HISTORIC YIELDS</b>     |      |           |           |         |          |          |              |            |
| —2005–2007—                |      |           |           |         |          |          |              |            |
| <b>Early maturing</b>      |      |           |           |         |          |          |              |            |
| Dane                       | 96   | 124       | 76        | 117     | 60       | 75*      | 102          | 120*       |
| Kame                       | 99   | 141*      | 76        | 131*    | 67*      | 79*      | 94           | 102        |
| Moraine                    | 97   | 119       | 81        | 124     | 65*      | 69       | 103          | 115*       |
| Excel                      | 99   | 135       | 79        | 124     | 62       | 79*      | 101          | 113        |
| <b>Midseason</b>           |      |           |           |         |          |          |              |            |
| Esker                      | 111* | 142*      | 99*       | 139*    | 70*      | 84*      | 119*         | 123*       |
| Ogle                       | 105  | 132       | 95*       | 140*    | 69*      | 83*      | 107          | 107        |
| <b>Mid- to late-season</b> |      |           |           |         |          |          |              |            |
| Drumlin                    | 110* | 138*      | 91*       | 143*    | 71*      | 81*      | 124*         | 124*       |
| Vista                      | 101  | 126       | 92*       | 142*    | 66*      | 68       | 118*         | 95         |
| Mean                       | 102  | 132       | 86        | 133     | 66       | 77       | 109          | 112        |
| LSD (0.05) <sup>a</sup>    | 4    | 6         | 9         | 13      | 8        | 9        | 11           | 10         |

\*Varieties not significantly different from the highest yielding variety in the trial.

<sup>a</sup>The LSD (least significant difference) figures listed under the yield columns are a statistical measure of variation within the trial. If the difference in yield of two varieties is equal to or greater than LSD, the yields are significantly different. If the difference is less than the LSD, the yield difference may have been due to environmental factors.

## BARLEY

Table 5. Forage dry matter yield of barley varieties harvested at late boot/early heading

| Variety     | Yield (t/a) |           |       | Harvest date (June) | Crude protein (%) | RFQ <sup>a</sup> | Yield (t/a) | Harvest date (June) |
|-------------|-------------|-----------|-------|---------------------|-------------------|------------------|-------------|---------------------|
|             | Madison     | Arlington | Mean  |                     |                   |                  |             |                     |
| —2007—      |             |           |       |                     |                   |                  |             |                     |
| Hazen       | 0.97*       | 1.26*     | 1.11* | 7                   | 12.6*             | 139.6            | 1.39        | 9                   |
| Kewaunee    | 0.95*       | 1.13*     | 1.04* | 7                   | 12.5*             | 138.9            | 1.52        | 8                   |
| Royal       | 0.73*       | 1.10      | 0.92  | 8                   | 14.8              | 155.4            | 1.20        | 9                   |
| LSD (0.05)  | 0.27        | 0.13      | 0.14  |                     | 0.59              | 4.82             | 0.12        |                     |
| —2004–2006— |             |           |       |                     |                   |                  |             |                     |
| —2005–2007— |             |           |       |                     |                   |                  |             |                     |

\*Varieties not significantly different from highest yielding variety in the trial.

<sup>a</sup>RFQ=Relative feed quality. Relative feed quality can be used to make comparisons among varieties, but should not be used to compare with other crops such as alfalfa.

Table 6. Barley variety descriptions

| Variety                      | Origin    | Year released | Awns   | Quality | Maturity <sup>a</sup><br>(head date) | Ht <sup>b</sup><br>(in.) | Lodging <sup>c</sup><br>(%) | Test wt <sup>d</sup><br>(lb/bu) | Disease resistance <sup>e</sup> |           |            |              |   | Spot blotch PVP <sup>f</sup> | Wis cert. |
|------------------------------|-----------|---------------|--------|---------|--------------------------------------|--------------------------|-----------------------------|---------------------------------|---------------------------------|-----------|------------|--------------|---|------------------------------|-----------|
|                              |           |               |        |         |                                      |                          |                             |                                 | Leaf rust                       | Stem rust | Loose smut | Powd. mildew |   |                              |           |
| <b>Recommended varieties</b> |           |               |        |         |                                      |                          |                             |                                 |                                 |           |            |              |   |                              |           |
| Drummond                     | N. Dakota | 2001          | Smooth | malt    | 6-13                                 | 31                       | strong                      | 46                              | —                               | R         | S          | —            | R | yes                          | no        |
| Hazen                        | N. Dakota | 1984          | Smooth | feed    | 6-13                                 | 32                       | med                         | 45                              | S                               | I         | S          | I            | R | no                           | yes       |
| Kewaunee                     | Wisconsin | 1997          | Smooth | feed    | 6-13                                 | 32                       | med                         | 45                              | R                               | R         | —          | R            | R | yes                          | yes       |
| Robust                       | Minnesota | 1983          | Smooth | malt    | 6-14                                 | 33                       | med                         | 46                              | S                               | I         | S          | S            | R | yes                          | yes       |
| Stander                      | Minnesota | 1993          | Smooth | feed    | 6-13                                 | 31                       | med                         | 46                              | —                               | R         | S          | S            | R | yes                          | no        |
| <b>Other varieties</b>       |           |               |        |         |                                      |                          |                             |                                 |                                 |           |            |              |   |                              |           |
| Bounty                       | Canada    | 1989          | Smooth | feed    | med                                  | med                      | med                         | med                             | I                               | I         | S          | R            | S | yes                          | yes       |
| Chilton                      | Wisconsin | 1990          | Smooth | feed    | med                                  | med                      | med                         | high                            | R                               | R         | —          | R            | R | yes                          | no        |
| Excel                        | Minnesota | 1990          | Smooth | malt    | early                                | med                      | med                         | med                             | S                               | R         | S          | S            | R | yes                          | no        |
| Lacey                        | Minnesota | 2000          | Smooth | malt    | early                                | med                      | med                         | high                            | —                               | R         | S          | —            | R | yes                          | no        |
| MNBrite                      | Minnesota | 1998          | Smooth | —       | early                                | med                      | med                         | med                             | R                               | R         | S          | S            | R | yes                          | no        |

<sup>a</sup>Maturity (month-day) as indicated by heading date in 18 Wisconsin tests conducted 2005–2007. Varieties with generalized ratings indicate the following: early = before June 21, med = June 21–25, late = after June 25.

<sup>b</sup>Height (inches) at maturity in 20 Wisconsin tests conducted 2005–2007. Varieties with generalized ratings were included in other tests and indicate the following: short = <30 inches, med = 30–36 inches, tall = >36 inches.

<sup>c</sup>Lodging: strong = <15%, med = 15–35%, weak = >35%.

<sup>d</sup>Test weight (pounds/bushel) in 19 Wisconsin tests conducted 2005–2007. Varieties with generalized ratings were included in other tests and indicate the following: low = <42 lb/bu, med = 42–46 lb/bu, high = >46 lb/bu.

<sup>e</sup>Disease resistance: R = resistant or moderately resistant, I = intermediate or some tolerance, S = moderately susceptible or susceptible.

<sup>f</sup>PVP = Plant Variety Protection. A “yes” indicates that the variety cannot be reproduced and sold as seed by variety name without certification. — = Information not available.

Table 7. Barley variety grain yield comparisons in Wisconsin

| Variety                 | Mean | Southern  |           |         | Northern |            |         |              |
|-------------------------|------|-----------|-----------|---------|----------|------------|---------|--------------|
|                         |      | Arlington | Lancaster | Madison | Chilton  | Marshfield | Spooner | Sturgeon Bay |
| <b>2007 YIELDS</b>      |      |           |           |         |          |            |         |              |
| —2007 yields (bu/a)—    |      |           |           |         |          |            |         |              |
| Drummond                | 62*  | 74*       | 70        | 61*     | 60*      | 77*        | 48*     | 45*          |
| Hazen                   | 60*  | 73*       | 67        | 69*     | 48       | 75*        | 53*     | 37*          |
| Kewaunee                | 61*  | 72*       | 71        | 70*     | 51*      | 81*        | 50*     | 34           |
| MNBrite                 | 52   | 64        | 45        | 70*     | 51*      | 70*        | 49*     | 17           |
| Robust                  | 54   | 65        | 66        | 57      | 47       | 73*        | 47*     | 23           |
| Stander                 | 57   | 65        | 81        | —       | 48       | 74*        | 51*     | 25           |
| Mean                    | 58   | 69        | 67        | 65      | 51       | 75         | 50      | 30           |
| LSD (0.05) <sup>a</sup> | 4    | 7         | 8         | 11      | 11       | 15         | 11      | 9            |
| <b>HISTORIC YIELDS</b>  |      |           |           |         |          |            |         |              |
|                         |      | 2005–2007 |           |         | 2007     | 2005–2007  |         |              |
| Drummond                | 65*  | 82        | 57        | 76*     | 60*      | 65*        | 51*     | 58           |
| Hazen                   | 63*  | 86*       | 57        | 74*     | 48       | 63*        | 56*     | 48           |
| Kewaunee                | 65*  | 88*       | 59        | 80*     | 51*      | 69*        | 51*     | 48           |
| MNBrite                 | 51   | 71        | 38        | 60      | 51*      | 55         | 46      | 37           |
| Robust                  | 60   | 84*       | 51        | 73*     | 47       | 61         | 49      | 44           |
| Stander                 | 64*  | 87*       | 70        | 78*     | 48       | 63*        | 51*     | 47           |
| Mean                    | 61   | 83        | 55        | 74      | 51       | 63         | 51      | 47           |
| LSD (0.05) <sup>a</sup> | 3    | 4         | 7         | 8       | 11       | 7          | 6       | 6            |

\*Varieties not significantly different from highest yielding variety in the trial.

<sup>a</sup>The LSD (least significant difference) figures listed under the yield columns are a statistical measure of variation within the trial. If the difference in yield of two varieties is equal to or greater than the LSD, then the yields are significantly different. If the difference is less than the LSD, then the yield difference may have been due to environmental factors.

# WHEAT

Table 8. Public variety descriptions for winter wheat and spring wheat

| Variety             | Origin | Year released | Class    | Awns | Ht. <sup>a</sup> | Stem strength | Test wt. <sup>b</sup> | Winter hardiness | Disease resistance <sup>c</sup> |           |           |              |      | Wis PVP <sup>e</sup> cert. |   |
|---------------------|--------|---------------|----------|------|------------------|---------------|-----------------------|------------------|---------------------------------|-----------|-----------|--------------|------|----------------------------|---|
|                     |        |               |          |      |                  |               |                       |                  | BYDV <sup>d</sup>               | Leaf rust | Stem rust | Powd. mildew | Scab |                            |   |
| <b>Winter wheat</b> |        |               |          |      |                  |               |                       |                  |                                 |           |           |              |      |                            |   |
| Kaskaskia           | IL     | 1998          | soft red | Y    | med              | strong        | high                  | excel            | —                               | MS/R      | S         | HT           | R    | Y                          | Y |
| Cardinal            | OH     | 1986          | soft red | N    | short            | strong        | high                  | excel            | —                               | R         | —         | MS/R         | —    | Y                          | Y |
| Hopewell            | OH     | 1995          | soft red | N    | med              | strong        | med                   | excel            | —                               | S         | —         | MS/R         | S    | Y                          | Y |
| Truman              | MO     | 2003          | soft red | N    | tall             | med           | high                  | good             | S                               | MS/R      | MS/R      | HT           | R    | Y                          | Y |
| Bess                | MO     | 2005          | soft red | N    | med              | med+          | high                  | good             | S                               | S         | S         | HT           | N    | N                          | N |
| Arapahoe            | NE     | 1989          | hard red | Y    | tall             | med           | high                  | excel            | —                               | MR        | MR        | —            | —    | Y                          | N |
| Jerry               | ND     | 2001          | hard red | Y    | tall             | med           | high                  | excel            | —                               | MR        | R         | —            | MS   | N                          | N |
| <b>Spring wheat</b> |        |               |          |      |                  |               |                       |                  |                                 |           |           |              |      |                            |   |
| Ada                 | MN     | 2006          | hard red | Y    | short            | high          | high                  |                  |                                 | MR        | S         | MR           | N    | Y                          | N |
| Alsen               | ND     | 2000          | hard red | Y    | med              | high          | med                   |                  |                                 | MR        | R         | MS/R         | N    | Y                          | N |
| Briggs              | SD     | 2002          | hard red | Y    | short            | high          | med                   |                  |                                 | R         | S         | MR           | N    | Y                          | Y |
| Glen                | ND     | 2005          | hard red | Y    | tall             | high          | high                  |                  |                                 | R         | R         | MR           | N    | Y                          | Y |
| Oklee               | MN     | 2003          | hard red | Y    | short            | high          | high                  |                  |                                 | MR        | S         | M            | N    | Y                          | N |
| Oxen                | SD     | 1996          | hard red | Y    | med              | med           | high                  |                  |                                 | R         | MS/R      | MS/R         | N    | Y                          | N |
| Steele              | ND     | 2004          | hard red | Y    | med              | high          | med                   |                  |                                 | MR        | R         | MR           | N    | Y                          | N |
| Ulen                | MN     | 2005          | hard red | Y    | tall             | high          | med                   |                  |                                 | MR        | R         | MS           | N    | Y                          | N |

<sup>a</sup> Height at maturity relative to other varieties in the trial.

<sup>b</sup> Grain test weight relative to other varieties in the trial.

<sup>c</sup> Disease resistance: HT = highly tolerant, MR = moderately resistant, MS/R = moderately susceptible/moderately resistant, R = resistant, S = susceptible, — = information not available.

<sup>d</sup> BYDV = barley yellow dwarf virus.

<sup>e</sup> PVP = Plant Variety Protection. A “yes” indicates that the variety cannot be reproduced and sold as seed by variety name without certification.

Table 9. Performance of winter wheat varieties in Wisconsin (2006–2007)

| Variety  | Entry     | Class <sup>a</sup> | — 2007 means — |                         |           |                        | Arlington    |                         | Janesville   |                         | Racine       |                         | Chilton      |                         | 2-yr mean yield (bu/a) |
|----------|-----------|--------------------|----------------|-------------------------|-----------|------------------------|--------------|-------------------------|--------------|-------------------------|--------------|-------------------------|--------------|-------------------------|------------------------|
|          |           |                    | Yield (bu/a)   | TW <sup>b</sup> (lb/bu) | Ht. (in.) | Lodg. <sup>c</sup> (%) | Yield (bu/a) | TW <sup>b</sup> (lb/bu) | Yield (bu/a) | TW <sup>b</sup> (lb/bu) | Yield (bu/a) | TW <sup>b</sup> (lb/bu) | Yield (bu/a) | TW <sup>b</sup> (lb/bu) |                        |
| Public   | Cardinal  | SR                 | 71             | 59.2                    | 35        | 1                      | 79           | 59.6                    | 69           | 58.6                    | 72           | 58.8                    | 64           | 59.9                    | 78                     |
|          | Bess      | SR                 | 79             | 59.8                    | 32        | 1                      | 77           | 60.5                    | 77           | 58.4                    | 86           | 59.7                    | 75           | 60.7                    |                        |
|          | Hopewell  | SR                 | 77             | 58.9                    | 31        | 0                      | 78           | 58.9                    | 75           | 57.3                    | 76           | 59.0                    | 77           | 60.3                    | 83                     |
|          | Kaskaskia | SR                 | 76             | 60.5                    | 34        | 1                      | 72           | 61.2                    | 74           | 60.1                    | 83           | 60.0                    | 74           | 61.0                    | 86                     |
|          | Truman    | SR                 | 86*            | 60.2                    | 35        | 1                      | 85*          | 60.4                    | 79           | 59.0                    | 96*          | 60.8                    | 84*          | 60.7                    | 88                     |
|          | Arapahoe  | HR                 | 73             | 60.1                    | 35        | 2                      | 77           | 60.5                    | 69           | 59.3                    | 74           | 60.0                    | 72           | 60.7                    |                        |
|          | Jerry     | HR                 | 76             | 60.4                    | 38        | 2                      | 80           | 61.1                    | 75           | 59.7                    | 77           | 59.4                    | 73           | 61.3                    |                        |
| Agripro  | Benton    | SR                 | 82*            | 59.0                    | 30        | 0                      | 88*          | 59.5                    | 73           | 58.3                    | 93*          | 58.4                    | 75           | 59.7                    |                        |
| Coker    | Branson   | SR                 | 80             | 58.9                    | 29        | 0                      | 76           | 59.4                    | 73           | 57.5                    | 94*          | 59.1                    | 76           | 59.6                    |                        |
|          | M 01-4377 | SR                 | 84*            | 61.6                    | 32        | 0                      | 83           | 61.9                    | 89*          | 61.2                    | 90*          | 61.2                    | 75           | 62.0                    |                        |
| Diener   | D 490 W   | SR                 | 83*            | 59.0                    | 30        | 0                      | 87*          | 59.4                    | 82           | 57.6                    | 87*          | 58.9                    | 76           | 60.1                    | 91*                    |
|          | D 510 W   | SR                 | 78             | 59.9                    | 33        | 0                      | 85*          | 59.8                    | 74           | 59.2                    | 72           | 59.3                    | 80*          | 61.3                    | 84                     |
|          | D 502 W   | SR                 | 82*            | 58.3                    | 32        | 1                      | 93*          | 59.2                    | 77           | 57.3                    | 92*          | 57.8                    | 66           | 59.0                    |                        |
|          | XW 60     | SR                 | 82*            | 58.5                    | 33        | 1                      | 83           | 59.5                    | 79           | 57.3                    | 94*          | 58.3                    | 71           | 59.1                    |                        |
| Dyna-Gro | DG 410    | SR                 | 77             | 59.4                    | 34        | 1                      | 83           | 60.4                    | 75           | 58.7                    | 81           | 58.9                    | 68           | 59.5                    | 86                     |
|          | DG 421    | SR                 | 78             | 60.0                    | 29        | 1                      | 75           | 59.9                    | 69           | 58.9                    | 87*          | 60.0                    | 80*          | 61.1                    |                        |

(continued)

Table 9. Performance of winter wheat varieties in Wisconsin (2006–2007)—continued

**WHEAT**

| Variety           | Entry            | Class <sup>a</sup> | — 2007 means — |                         |           |                      | Arlington    |                         | Janesville   |                         | Racine       |                         | Chilton      |                         | 2-yr mean yield (bu/a) |
|-------------------|------------------|--------------------|----------------|-------------------------|-----------|----------------------|--------------|-------------------------|--------------|-------------------------|--------------|-------------------------|--------------|-------------------------|------------------------|
|                   |                  |                    | Yield (bu/a)   | TW <sup>b</sup> (lb/bu) | Ht. (in.) | Lodging <sup>c</sup> | Yield (bu/a) | TW <sup>b</sup> (lb/bu) | Yield (bu/a) | TW <sup>b</sup> (lb/bu) | Yield (bu/a) | TW <sup>b</sup> (lb/bu) | Yield (bu/a) | TW <sup>b</sup> (lb/bu) |                        |
| Growmark          | FS 628           | SR                 | 83*            | 58.5                    | 33        | 1                    | 82           | 59.3                    | 77           | 57.4                    | 100*         | 58.4                    | 74           | 59.1                    |                        |
|                   | FS 634           | SR                 | 78             | 59.5                    | 34        | 1                    | 75           | 60.1                    | 77           | 58.8                    | 83           | 58.9                    | 77           | 60.2                    | 86                     |
|                   | FS 637           | SR                 | 83*            | 59.1                    | 30        | 1                    | 75           | 59.3                    | 78           | 57.5                    | 95*          | 59.4                    | 84*          | 60.3                    | 91*                    |
|                   | FS 645           | SR                 | 72             | 59.7                    | 30        | 0                    | 71           | 60.0                    | 67           | 58.8                    | 81           | 59.9                    | 69           | 60.1                    | 84                     |
|                   | FS 8309          | SR                 | 83*            | 59.9                    | 30        | 0                    | 79           | 60.1                    | 81           | 58.7                    | 86           | 60.0                    | 85*          | 60.8                    | 87                     |
| JGL               | Exp 701          | SR                 | 84*            | 57.0                    | 31        | 0                    | 83           | 57.2                    | 77           | 55.3                    | 93*          | 57.7                    | 81*          | 57.9                    |                        |
|                   | Exp 702          | SR                 | 80             | 58.2                    | 30        | 0                    | 82           | 58.3                    | 73           | 56.6                    | 88*          | 58.3                    | 76           | 59.7                    |                        |
|                   | Exp 703          | SR                 | 83*            | 59.1                    | 33        | 0                    | 77           | 59.5                    | 75           | 57.8                    | 94*          | 58.9                    | 86*          | 60.3                    |                        |
| Jung              | 5804             | SR                 | 77             | 59.9                    | 32        | 1                    | 73           | 59.9                    | 73           | 59.2                    | 90*          | 60.1                    | 73           | 60.5                    | 86                     |
|                   | 5988             | SR                 | 83*            | 59.5                    | 32        | 0                    | 84           | 59.8                    | 77           | 58.6                    | 84           | 58.5                    | 85*          | 61.2                    | 89                     |
|                   | 5932             | SR                 | 80             | 58.0                    | 30        | 0                    | 78           | 57.9                    | 72           | 56.8                    | 91*          | 58.4                    | 77           | 59.2                    |                        |
| Kaltenberg        | KW 51            | SR                 | 74             | 59.6                    | 30        | 0                    | 77           | 60.7                    | 73           | 59.0                    | 86           | 59.6                    | 59           | 59.2                    | 85                     |
|                   | KW 53            | SR                 | 83*            | 59.0                    | 31        | 0                    | 84           | 59.4                    | 81           | 57.6                    | 93*          | 59.0                    | 75           | 60.2                    | 90*                    |
|                   | KW 55            | SR                 | 79             | 60.2                    | 34        | 0                    | 77           | 60.6                    | 72           | 58.8                    | 87*          | 60.0                    | 81*          | 61.2                    | 89                     |
|                   | KW 60            | SR                 | 83*            | 59.6                    | 32        | 0                    | 82           | 60.1                    | 77           | 58.5                    | 91*          | 58.8                    | 82*          | 61.0                    | 89                     |
|                   | KW 61            | SR                 | 78             | 58.9                    | 33        | 0                    | 71           | 59.1                    | 75           | 57.8                    | 89*          | 58.6                    | 78           | 60.1                    |                        |
|                   | KW 62            | SR                 | 82*            | 58.9                    | 33        | 1                    | 80           | 59.3                    | 76           | 57.4                    | 92*          | 59.4                    | 81*          | 59.5                    |                        |
|                   | KW 63            | SR                 | 82*            | 59.6                    | 30        | 0                    | 75           | 59.6                    | 81           | 58.3                    | 95*          | 59.7                    | 77           | 60.7                    |                        |
| Pioneer           | 25R37            | SR                 | 78             | 60.2                    | 28        | 0                    | 79           | 60.6                    | 74           | 59.3                    | 82           | 60.0                    | 75           | 60.9                    | 86                     |
|                   | 25R47            | SR                 | 89*            | 58.6                    | 29        | 0                    | 86*          | 58.7                    | 94*          | 58.0                    | 91*          | 57.6                    | 86*          | 60.0                    | 95*                    |
|                   | 25R51            | SR                 | 84*            | 59.2                    | 29        | 0                    | 78           | 60.4                    | 87*          | 58.3                    | 91*          | 58.2                    | 79*          | 59.7                    | 91*                    |
|                   | 25R56            | SR                 | 82*            | 57.9                    | 27        | 0                    | 75           | 58.3                    | 80           | 56.8                    | 83           | 57.4                    | 89*          | 59.3                    |                        |
| Pro Seed Genetics | Pro 200          | SR                 | 81             | 59.5                    | 33        | 1                    | 84           | 60.1                    | 79           | 58.8                    | 86           | 59.7                    | 74           | 59.5                    | 86                     |
|                   | Pro 220          | SR                 | 79             | 61.1                    | 34        | 1                    | 77           | 61.4                    | 81           | 60.7                    | 78           | 60.3                    | 79*          | 61.9                    | 85                     |
|                   | Pro Ex 230       | SR                 | 75             | 59.9                    | 29        | 0                    | 75           | 59.7                    | 68           | 59.2                    | 83           | 60.1                    | 73           | 60.8                    |                        |
|                   | Pro Ex 240       | SR                 | 84*            | 58.3                    | 33        | 1                    | 84           | 59.2                    | 79           | 57.0                    | 90*          | 57.9                    | 82*          | 59.1                    |                        |
| Seed-link         | Carlisle         | HR                 | 71             | 62.1                    | 30        | 0                    | 70           | 62.3                    | 68           | 61.1                    | 69           | 61.7                    | 76           | 63.2                    | 79                     |
|                   | Harvard          | HR                 | 67             | 60.3                    | 32        | 0                    | 61           | 61.3                    | 55           | 59.8                    | 73           | 58.9                    | 77           | 61.2                    | 76                     |
| Welter            | Excel 399        | SR                 | 75             | 59.3                    | 34        | 1                    | 76           | 59.8                    | 80           | 58.5                    | 77           | 58.8                    | 67           | 60.3                    | 86                     |
|                   | Excel 410TW      | SR                 | 70             | 59.9                    | 34        | 1                    | 68           | 60.1                    | 70           | 58.8                    | 71           | 59.6                    | 69           | 61.1                    | 84                     |
| Public - exp      | IL 99-15867      | SR                 | 79             | 60.2                    | 32        | 1                    | 77           | 60.6                    | 80           | 59.3                    | 82           | 60.0                    | 75           | 61.1                    | 86                     |
|                   | MO 11126         | SR                 | 74             | 60.4                    | 31        | 0                    | 70           | 61.1                    | 70           | 59.7                    | 80           | 60.0                    | 74           | 60.7                    |                        |
|                   | P 99840C4-8-4-12 | SR                 | 73             | 61.3                    | 33        | 0                    | 73           | 61.3                    | 68           | 61.1                    | 74           | 60.6                    | 78           | 62.2                    | 85                     |
|                   | VA 02W-513       | SR                 | 75             | 61.0                    | 27        | 0                    | 71           | 61.6                    | 78           | 60.2                    | 88*          | 60.8                    | 62           | 61.6                    | 87                     |
|                   | VA 03W-409       | SR                 | 82*            | 59.2                    | 28        | 0                    | 84           | 59.8                    | 75           | 58.0                    | 96*          | 58.4                    | 73           | 60.7                    |                        |
| M01-0960          | SR               | 74                 | 59.2           | 30                      | 0         | 78                   | 58.4         | 69                      | 58.3         | 79                      | 58.9         | 70                      | 61.3         |                         |                        |
| Mean              |                  |                    | 79             | 59.5                    | 32        | 1                    | 78           | 60.0                    | 76           | 58.5                    | 85           | 59.3                    | 76           | 60.4                    | 86                     |
| LSD(.10)          |                  |                    | 7              | 0.5                     | 1         | 1                    | 8            | 0.8                     | 8            | 0.5                     | 13           | 0.7                     | 10           | 0.9                     | 5                      |

\* Varieties not significantly different (0.10 level) from the highest yielding cultivar.

<sup>a</sup> Class abbreviations: SR= soft red winter, HR= hard red winter.

<sup>b</sup> TW = test weight.

<sup>c</sup> Lodging rankings are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

<sup>d</sup> The LSD (least significant difference) figures are a statistical measure of variation within the trial. If the differences between two varieties is equal to or greater than the LSD, then the values are significantly different. If the difference is less than the LSD, then the value difference may have been due to other factors.

Table 10. Performance of spring wheat varieties in Wisconsin (2007)

| Variety                 | Origin     | Class <sup>a</sup> | —Arlington— |     |                        |          |           |                       |                 | —Spooner, irrigated— |     |                        |          | —Spooner, non-irrigated— |       |         |                        |          |           |
|-------------------------|------------|--------------------|-------------|-----|------------------------|----------|-----------|-----------------------|-----------------|----------------------|-----|------------------------|----------|--------------------------|-------|---------|------------------------|----------|-----------|
|                         |            |                    | Yield       | Ht. | Lodg- ing <sup>b</sup> | Test wt. | Head date | —Dis— PM <sup>c</sup> | LS <sup>d</sup> | Yield                | Ht. | Lodg- ing <sup>b</sup> | Test wt. | Head date                | Yield | Ht.     | Lodg- ing <sup>c</sup> | Test wt. | Head date |
|                         |            | (bu/a)             | (in)        |     | (lb/bu)                |          | (%)       | (%)                   | (bu/a)          | (in)                 |     | (lb/bu)                | (bu/a)   | (in)                     |       | (lb/bu) |                        | (lb/bu)  |           |
| 01S0202-2S              | AgriPro    | SR                 | 47          | 27  | 1.0                    | 59.6     | 6-16      | 88                    | 0               | 44*                  | 27  | 2.3                    | 54.3     | 6-11                     | 29    | 25      | 1.0                    | 55.0     | 6-11      |
| Freyer                  | AgriPro    | HR                 | 61*         | 32  | 1.7                    | 60.6     | 6-18      | 26                    | 0               | 34                   | 32  | 1.8                    | 56.5     | 6-13                     | 25    | 28      | 1.0                    | 56.1     | 6-12      |
| Kelby                   | AgriPro    | HR                 | 57          | 29  | 1.0                    | 60.9     | 6-17      | 49                    | 0               | 38                   | 28  | 1.0                    | 57.5     | 6-11                     | 27    | 24      | 1.0                    | 57.4     | 6-11      |
| Knudson                 | AgriPro    | HR                 | 60*         | 28  | 1.0                    | 61.3     | 6-18      | 59                    | 1               | 39*                  | 26  | 1.3                    | 57.1     | 6-14                     | 27    | 25      | 1.0                    | 57.6     | 6-12      |
| Kuntz                   | AgriPro    | HR                 | 59          | 29  | 1.0                    | 60.5     | 6-17      | 52                    | 0               | 31                   | 28  | 1.0                    | 54.6     | 6-14                     | 25    | 26      | 1.0                    | 55.8     | 6-14      |
| Ada                     | MN         | HR                 | 53          | 29  | 1.8                    | 62.5     | 6-17      | 70                    | 0               | 37                   | 26  | 1.0                    | 53.9     | 6-14                     | 26    | 26      | 1.0                    | 56.9     | 6-13      |
| Oklee                   | MN         | HR                 | 57          | 29  | 1.3                    | 61.6     | 6-17      | 52                    | 0               | 34                   | 29  | 1.5                    | 56.2     | 6-11                     | 28    | 24      | 1.0                    | 56.1     | 6-11      |
| Ulen                    | MN         | HR                 | 65*         | 32  | 1.7                    | 60.8     | 6-16      | 10                    | 0               | 30                   | 32  | 1.8                    | 56.2     | 6-11                     | 24    | 29      | 1.0                    | 56.3     | 6-11      |
| Mercury                 | North Star | HR                 | 57          | 27  | 1.2                    | 60.9     | 6-17      | 52                    | 0               | 36                   | 27  | 1.0                    | 55.7     | 6-12                     | 30*   | 24      | 1.0                    | 55.5     | 6-11      |
| Alsen                   | ND         | HR                 | 58          | 31  | 1.3                    | 60.3     | 6-18      | 19                    | 26              | 30                   | 31  | 1.0                    | 56.1     | 6-14                     | 25    | 27      | 1.0                    | 57.6     | 6-14      |
| Glen                    | ND         | HR                 | 62*         | 33  | 1.5                    | 62.2     | 6-16      | 19                    | 0               | 35                   | 34  | 1.0                    | 55.7     | 6-11                     | 29    | 28      | 1.0                    | 57.2     | 6-11      |
| Steele                  | ND         | HR                 | 60*         | 32  | 1.7                    | 60.8     | 6-16      | 9                     | 0               | 38                   | 31  | 1.5                    | 53.9     | 6-12                     | 30*   | 28      | 1.0                    | 56.9     | 6-12      |
| Oxen                    | SD         | HR                 | 60*         | 30  | 1.8                    | 59.7     | 6-17      | 52                    | 0               | 42*                  | 30  | 1.0                    | 54.8     | 6-11                     | 29    | 26      | 1.0                    | 56.6     | 6-12      |
| Briggs                  | SD         | HR                 | 65*         | 31  | 2.5                    | 61.5     | 6-16      | 27                    | 0               | 40*                  | 30  | 2.0                    | 54.1     | 6-10                     | 33*   | 28      | 1.0                    | 57.1     | 6-10      |
| Mean                    |            |                    | 59          | 30  | 1.5                    | 60.9     | 6-16      | 42                    | 2               | 36                   | 29  | 1.4                    | 55.5     | 6-12                     | 28    | 26      | 1.0                    | 56.6     | 6-11      |
| LSD (0.10) <sup>e</sup> |            |                    | 5           | 1   | 0.5                    | 0.5      | 1         | 14                    | 4               | 5                    | 2   | 0.5                    | 1.3      | 1                        | 3     | 1       |                        |          | 1         |

\*Varieties not significantly different from highest yielding variety in the trial.

<sup>a</sup> Class abbreviations: SR = soft red, HR = hard red.

<sup>b</sup> Lodging scores range from 1 = upright to 5 = flat.

<sup>c</sup> PM = Powdery mildew, percent of canopy infected, as measured on June 25, 2007.

<sup>d</sup> LS = Loose smut, percent of heads infected, as measured on June 25, 2007.

<sup>e</sup> The LSD (least significant difference) figures are a statistical measure of variation within the trial. If the differences between two varieties is equal to or greater than the LSD, then the values are significantly different. If the difference is less than the LSD, then the value difference may have been due to other factors.



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Authors: Shawn Conley is assistant professor, Heidi Kaeppler is associate professor, and John Mochon, Mark Martinka, and John Gaska are program managers in agronomy, College of Agricultural and Life Sciences, University of Wisconsin-Madison. Produced by Cooperative Extension Publishing.

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