

**Project Title:** 2013 Intra-State Winter Wheat Variety Performance

**Project Leader:** P. L. Bruckner Plant Science Bozeman, MT

**Project Personnel:**

|                 |                   |               |
|-----------------|-------------------|---------------|
| J. E. Berg      | RA- Plant Science | Bozeman, MT   |
| J. W. Bergman   | WREC              | Williston, ND |
| J. L. Eckhoff   | EARC              | Sidney, MT    |
| W. E. Grey      | Plant Science     | Bozeman, MT   |
| J. Johnston     | Plant Science     | Bozeman, MT   |
| K. D. Kephart   | SARC              | Huntley, MT   |
| P. F. Lamb      | NARC              | Havre, MT     |
| J. H. Miller    | WTARC             | Conrad, MT    |
| R. N. Stougaard | NWARC             | Kalispell, MT |
| D. M. Wichman   | CARC              | Moccasin, MT  |

**Objectives:**

To evaluate new and existing winter wheat lines and varieties in dryland under various growing conditions in Montana and Western North Dakota.

**Results:**

The 2014 Intrastate Winter Wheat Evaluation nursery was grown at Bozeman, Havre, Huntley, Conrad (hailed out), Kalispell, Moccasin, and Sidney, Montana and Williston, North Dakota. Most locations started the crop year with good September moisture and conditions varied widely across the rest of the year crop. Warm January temperatures and snow melt, followed by a cold February contributed to varying degrees of winter kill. The Sidney and Williston locations were not harvested due to winter kill. The Huntley location was lost to quarantine due to volunteer glyphosate tolerant wheat at SARC.

The overall mean yield, across the five locations, was 91.4 bushels per acre with NWARC and WTARC having the high mean yields at 136 and 107 bu/a, respectively. Twenty two entries had five location mean yields similar MT1138, the overall high yielder at 102 bu/a. Lima Company Seed's `Mint' was the top named cultivar (Table 1). Overall test weight means ranged from 63.8 to 57.6 lbs/bu. Jagalene continued being the high test weight entry (Table 2). Rampart and MTF1232 (F=forage) averaged 13.6% protein for the high average protein across the five locations and the overall protein mean was 12.8% (Table 3). The range of average heading dates was 10 days, 158.7 to 168.8, with `Freeman' having the earliest head date (Table 4). Average plant height ranged from 27" for WB405059CLP to 43.7" for MTF1232 (Table 5). Two MSU development lines had stem solidness scores similar to the top cultivars Warhorse, Bearpaw and Rampart (Table 6). Eight stripe rust infection evaluations are presented in Table 7. Yellowstone, along with several other entries, continues to exhibit good stripe rust resistance.

**Summary:**

The development of improved winter wheat lines and cultivars continues with improvements in yield, disease resistance and tolerance advances, combined with improved stem solidness to combat sawfly. New challenges arrive or former pest mutate to circumvent the remedies developed to thwart their damage and renew their attack on winter wheat and other crop species.

**Future Plans:** The intra-state winter wheat trial is not a component of the research center's "umbrella" project. This information is presented here for the convenience of the Mt Wheat & Barley Committee and the growers who generate the MWBC check-off dollars. Associate winter wheat breeder, Dr. Jim Berg, assembles the tables and only minor reformatting is done for this report.

Table 1. 2014 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Yield (bu/a)

| Cultivar/Line              | Bozeman<br>LAT   | Havre<br>LAT     | Sidney<br>Williston<br>Winterkilled - no harvest | Kalispell<br>RCB | Moccasin<br>LAT  | Huntley<br>no<br>data | Conrad<br>LAT    | 5 Loc<br>Avg.    |
|----------------------------|------------------|------------------|--|------------------|------------------|-----------------------|------------------|------------------|
| lattice efficiency         | 118%             | 159%             |  |                  | 119%             |                       | 148%             |                  |
| MT1138                     | 112.5*           | 61.0             |  | 151.2*           | 63.7*            |                       | 120.3*           | 101.7**          |
| + MT1257                   | 112.2*           | 62.6             |  | 145.1*           | 65.4**           |                       | 118.7*           | 100.8*           |
| + MT1265                   | 110.1*           | 59.0             |  | 148.9*           | 61.0*            |                       | 119.5*           | 99.7*            |
| +# LCS Mint                | 105.8*           | 58.6             |  | 151.8*           | 57.9             |                       | 122.7*           | 99.4*            |
| d MT1113                   | 108.0*           | 61.2             |  | 144.6*           | 59.9             |                       | 123.2**          | 99.4*            |
| MTCL1131                   | 107.1*           | 57.3             |  | 153.9**          | 64.6*            |                       | 113.8*           | 99.3*            |
| Yellowstone                | 108.4*           | 62.1             |  | 140.5            | 62.1*            |                       | 117.2*           | 98.1*            |
| WB3768                     | 105.3*           | 55.4             |  | 151.3*           | 60.6             |                       | 117.6*           | 98.0*            |
| MT1117                     | 103.4            | 62.3             |  | 145.7*           | 62.8*            |                       | 115.0*           | 97.8*            |
| + MT1286                   | 110.0*           | 57.0             |  | 147.5*           | 61.5*            |                       | 112.9*           | 97.8*            |
| +# Keldin                  | 113.0**          | 57.6             |  | 144.0*           | 56.5             |                       | 115.6*           | 97.3*            |
| Colter                     | 101.7            | 61.1             |  | 152.9*           | 62.6*            |                       | 107.2*           | 97.1*            |
| MT0978                     | 97.7             | 62.0             |  | 150.7*           | 58.1             |                       | 114.9*           | 96.7*            |
| Cowboy                     | 101.8            | 65.6*            |  | 142.1            | 57.8             |                       | 114.5*           | 96.4*            |
| # SY Wolf                  | 102.6            | 71.0**           |  | 137.4            | 59.3             |                       | 111.7*           | 96.4*            |
| SY Clearstone 2C           | 106.4*           | 58.5             |  | 146.1*           | 61.4*            |                       | 108.6*           | 96.2*            |
| MT1078                     | 106.9*           | 57.5             |  | 144.5*           | 59.6             |                       | 108.6*           | 95.4*            |
| d Promontory               | 108.6*           | 60.1             |  | 142.6*           | 59.8             |                       | 105.7            | 95.4*            |
| + d MT1246                 | 100.9            | 55.7             |  | 146.9*           | 55.2             |                       | 112.3*           | 94.2*            |
| + d MT1262                 | 105.6*           | 51.4             |  | 148.3*           | 54.3             |                       | 111.3*           | 94.2*            |
| + Freeman                  | 100.8            | 55.4             |  | 146.5*           | 60.0             |                       | 106.6            | 93.9*            |
| d MTS1024                  | 104.1            | 56.3             |  | 147.0*           | 57.4             |                       | 103.2            | 93.6*            |
| d Jagalene                 | 104.1            | 52.8             |  | 141.9            | 56.2             |                       | 110.4*           | 93.1             |
| d MT1090                   | 103.7            | 59.8             |  | 142.2            | 64.2*            |                       | 94.4             | 92.9             |
| + MTS1224                  | 103.9            | 50.8             |  | 139.8            | 57.6             |                       | 107.8*           | 92.0             |
| + d MTS1228                | 105.8*           | 62.6             |  | 129.6            | 57.6             |                       | 103.5            | 91.8             |
| d McGill                   | 100.7            | 64.2*            |  | 127.6            | 57.2             |                       | 106.7*           | 91.3             |
| # Broadview                | 97.0             | 62.3             |  | 128.9            | 55.5             |                       | 109.6*           | 90.7             |
| +# WB4614                  | 97.7             | 58.9             |  | 138.9            | 56.8             |                       | 100.2            | 90.5             |
| +# d LCS Colonia           | 103.0            | 37.4             |  | 139.0            | 54.4             |                       | 112.7*           | 89.3             |
| Judee                      | 98.6             | 61.0             |  | 136.4            | 50.0             |                       | 97.5             | 88.7             |
| +# T158                    | 94.5             | 66.7*            |  | 120.7            | 59.8             |                       | 100.5            | 88.4             |
| CDC Falcon                 | 95.3             | 60.1             |  | 125.0            | 56.3             |                       | 104.4            | 88.2             |
| +# d Emerson               | 88.6             | 56.0             |  | 140.5            | 48.3             |                       | 106.9*           | 88.1             |
| + d MTCS1204               | 92.7             | 53.4             |  | 137.1            | 52.5             |                       | 102.4            | 87.6             |
| + MTF1232                  | 94.8             | 46.5             |  | 142.2            | 52.9             |                       | 98.3             | 86.9             |
| # d Radiant                | 89.7             | 59.8             |  | 133.6            | 49.8             |                       | 101.4            | 86.9             |
| +# d LCS Wizard            | 91.0             | 62.6             |  | 117.4            | 53.2             |                       | 109.2*           | 86.7             |
| Decade                     | 94.7             | 55.9             |  | 113.1            | 57.4             |                       | 109.6*           | 86.1             |
| Ledger                     | 94.6             | 60.7             |  | 126.9            | 51.4             |                       | 94.4             | 85.6             |
| Jerry                      | 99.0             | 50.7             |  | 120.8            | 51.4             |                       | 97.5             | 83.9             |
| d Carter                   | 89.2             | 58.8             |  | 112.3            | 54.4             |                       | 104.2            | 83.8             |
| MTS0826-63                 | 91.1             | 57.8             |  | 128.8            | 45.8             |                       | 95.3             | 83.8             |
| Genou                      | 90.4             | 57.3             |  | 119.4            | 47.7             |                       | 103.0            | 83.6             |
| Rampart                    | 89.1             | 56.5             |  | 126.0            | 44.2             |                       | 99.7             | 83.1             |
| Bearpaw                    | 92.9             | 53.3             |  | 118.9            | 49.6             |                       | 98.5             | 82.6             |
| Warhorse                   | 91.5             | 48.0             |  | 129.3            | 51.8             |                       | 91.9             | 82.5             |
| WB-Quake                   | 92.6             | 46.7             |  | 122.6            | 48.8             |                       | 97.2             | 81.6             |
| +# WB4059CLP               | 87.9             | 55.0             |  | 86.8             | 51.4             |                       | 67.3             | 69.7             |
| <b>Average</b>             | <b>100.1</b>     | <b>57.6</b>      |  | <b>136.2</b>     | <b>56.3</b>      |                       | <b>106.6</b>     | <b>91.4</b>      |
| <b>LSD (0.05)</b>          | <b>8.8</b>       | <b>7.1</b>       |  | <b>11.3</b>      | <b>4.6</b>       |                       | <b>16.5</b>      | <b>8.2</b>       |
| <b>C. V. (%)</b>           | <b>5.1</b>       | <b>7.0</b>       |  | <b>5.1</b>       | <b>4.8</b>       |                       | <b>8.8</b>       | <b>7.2</b>       |
| <b>P-value (Varieties)</b> | <b>&lt;.0001</b> | <b>&lt;.0001</b> |  | <b>&lt;.0001</b> | <b>&lt;.0001</b> |                       | <b>&lt;.0001</b> | <b>&lt;.0001</b> |

+ = new for 2014, # = paid entry

d = cultivars/lines dropped for 2015 test

\*\* = indicates highest value within a column

\* = indicates varieties with values equal to highest variety within a column based on Fisher's Protected LSD (p =0.05)

**Table 2. 2014 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Test Weight (lb/bu)**

| Cultivar/Line              | Bozeman<br>LAT   | Havre<br>LAT     | Sidney<br>no | Williston<br>no | Kalispell<br>bulk | Moccasin<br>RCB  | Huntley<br>no | Conrad<br>LAT    | 5 Loc<br>Avg.    |
|----------------------------|------------------|------------------|--------------|-----------------|-------------------|------------------|---------------|------------------|------------------|
| lattice efficiency         | 273%             | 148%             | data         | data            |                   |                  | data          | 148%             |                  |
| d Jagalene                 | 65.0*            | 62.7             |              |                 | 63.7              | 64.2**           |               | 63.2*            | 63.8**           |
| +# LCS Mint                | 65.0**           | 63.6**           |              |                 | 60.3              | 63.7*            |               | 63.7**           | 63.3*            |
| d Promontory               | 64.6*            | 62.3             |              |                 | 64.0              | 62.7             |               | 63.0*            | 63.3*            |
| +# T158                    | 63.6             | 62.1             |              |                 | 62.5              | 62.8             |               | 63.2*            | 62.8             |
| +# d LCS Wizard            | 63.6             | 62.4             |              |                 | 63.1              | 62.7             |               | 61.9             | 62.7             |
| + MT1286                   | 63.4             | 61.3             |              |                 | 62.7              | 62.8             |               | 61.4             | 62.3             |
| d MT1113                   | 63.3             | 61.4             |              |                 | 62.8              | 61.5             |               | 62.1             | 62.2             |
| Judee                      | 63.7             | 61.9             |              |                 | 62.6              | 60.1             |               | 62.1             | 62.1             |
| # SY Wolf                  | 63.8             | 62.2             |              |                 | 61.8              | 61.3             |               | 61.6             | 62.1             |
| +# d Emerson               | 63.1             | 61.3             |              |                 | 62.7              | 61.2             |               | 61.4             | 61.9             |
| Ledger                     | 63.2             | 61.6             |              |                 | 62.3              | 61.2             |               | 61.4             | 61.9             |
| MT1117                     | 62.5             | 61.7             |              |                 | 63.0              | 60.6             |               | 61.6             | 61.9             |
| +# WB4614                  | 62.9             | 62.4             |              |                 | 62.5              | 60.7             |               | 60.9             | 61.9             |
| MTCL1131                   | 62.5             | 61.5             |              |                 | 62.7              | 60.8             |               | 61.4             | 61.8             |
| + d MTCS1204               | 62.7             | 60.9             |              |                 | 62.2              | 61.5             |               | 61.6             | 61.8             |
| +# Keldin                  | 63.2             | 61.0             |              |                 | 61.9              | 60.7             |               | 61.5             | 61.7             |
| + d MT1262                 | 63.1             | 61.4             |              |                 | 62.0              | 60.7             |               | 61.5             | 61.7             |
| # d Radiant                | 62.9             | 61.5             |              |                 | 62.7              | 60.5             |               | 60.9             | 61.7             |
| Cowboy                     | 62.7             | 61.6             |              |                 | 61.9              | 60.6             |               | 61.2             | 61.6             |
| + d MTS1228                | 62.3             | 60.4             |              |                 | 64.2              | 60.7             |               | 60.4             | 61.6             |
| Bearpaw                    | 63.0             | 60.6             |              |                 | 61.9              | 61.8             |               | 60.1             | 61.5             |
| d McGill                   | 62.7             | 60.8             |              |                 | 61.5              | 61.5             |               | 60.9             | 61.5             |
| MT0978                     | 62.5             | 61.0             |              |                 | 63.0              | 60.3             |               | 60.1             | 61.4             |
| + d MT1246                 | 62.9             | 60.8             |              |                 | 62.9              | 60.1             |               | 60.3             | 61.4             |
| + MTS1224                  | 62.8             | 60.5             |              |                 | 62.2              | 61.5             |               | 60.0             | 61.4             |
| WB3768                     | 62.4             | 61.5             |              |                 | 62.8              | 59.6             |               | 60.6             | 61.4             |
| CDC Falcon                 | 62.7             | 60.9             |              |                 | 61.6              | 60.4             |               | 60.7             | 61.3             |
| Genou                      | 63.2             | 61.4             |              |                 | 62.1              | 58.5             |               | 61.3             | 61.3             |
| MT1138                     | 62.0             | 60.7             |              |                 | 62.2              | 61.3             |               | 60.5             | 61.3             |
| MTS0826-63                 | 62.6             | 61.0             |              |                 | 62.3              | 61.0             |               | 59.5             | 61.3             |
| WB-Quake                   | 62.3             | 60.9             |              |                 | 62.6              | 60.3             |               | 60.2             | 61.3             |
| # Broadview                | 62.4             | 60.3             |              |                 | 61.9              | 60.9             |               | 60.6             | 61.2             |
| Colter                     | 62.6             | 61.3             |              |                 | 61.7              | 60.2             |               | 60.2             | 61.2             |
| Decade                     | 62.4             | 60.8             |              |                 | 60.1              | 62.0             |               | 60.5             | 61.2             |
| Yellowstone                | 61.8             | 60.7             |              |                 | 62.0              | 61.7             |               | 59.9             | 61.2             |
| + MT1257                   | 61.3             | 60.8             |              |                 | 62.3              | 60.5             |               | 60.5             | 61.1             |
| Rampart                    | 62.4             | 60.9             |              |                 | 62.3              | 59.1             |               | 61.0             | 61.1             |
| Warhorse                   | 62.0             | 61.0             |              |                 | 61.6              | 60.9             |               | 60.1             | 61.1             |
| d Carter                   | 62.0             | 60.9             |              |                 | 59.7              | 61.9             |               | 60.1             | 60.9             |
| + MT1265                   | 61.1             | 61.0             |              |                 | 61.4              | 60.1             |               | 60.9             | 60.9             |
| SY Clearstone 2CL          | 61.4             | 60.7             |              |                 | 62.1              | 59.7             |               | 60.6             | 60.9             |
| + MTF1232                  | 61.9             | 60.4             |              |                 | 62.7              | 58.7             |               | 60.2             | 60.8             |
| MT1078                     | 61.9             | 60.4             |              |                 | 61.3              | 60.5             |               | 59.4             | 60.7             |
| d MT1090                   | 61.9             | 61.1             |              |                 | 61.6              | 59.4             |               | 59.2             | 60.6             |
| Jerry                      | 61.9             | 60.1             |              |                 | 61.0              | 59.6             |               | 59.9             | 60.5             |
| + Freeman                  | 61.7             | 60.4             |              |                 | 61.0              | 59.8             |               | 58.7             | 60.3             |
| +# WB4059CLP               | 62.2             | 60.3             |              |                 | 59.1              | 59.6             |               | 60.0             | 60.2             |
| d MTS1024                  | 61.4             | 60.2             |              |                 | 61.1              | 59.0             |               | 59.0             | 60.1             |
| +# d LCS Colonia           | 58.7             | 58.3             |              |                 | 57.7              | 56.7             |               | 56.5             | 57.6             |
| <b>Average</b>             | <b>62.6</b>      | <b>61.1</b>      |              |                 | <b>62.0</b>       | <b>60.7</b>      |               | <b>60.8</b>      | <b>61.4</b>      |
| <b>LSD (0.05)</b>          | <b>0.6</b>       | <b>0.5</b>       |              |                 |                   | <b>1.2</b>       |               | <b>1.4</b>       | <b>0.9</b>       |
| <b>C. V. (%)</b>           | <b>0.5</b>       | <b>0.4</b>       |              |                 |                   | <b>1.0</b>       |               | <b>1.3</b>       | <b>1.1</b>       |
| <b>P-value (Varieties)</b> | <b>&lt;.0001</b> | <b>&lt;.0001</b> |              |                 |                   | <b>&lt;.0001</b> |               | <b>&lt;.0001</b> | <b>&lt;.0001</b> |

+ = new for 2014, # = paid entry

d = cultivars/lines dropped for 2015 test

\*\* = indicates highest value within a column

\* = indicates varieties with values equal to highest variety within a column based on Fisher's Protected LSD (p = 0.05)

**Table 3. 2014 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Grain Protein (%)**

| Cultivar/Line              | Bozeman<br>bulk | Havre<br>bulk | Sidney<br>no<br>data | Williston<br>no<br>data | Kalispell<br>bulk | Moccasin<br>bulk | Huntley<br>bulk | Conrad<br>bulk | 5 Loc<br>Avg.    |
|----------------------------|-----------------|---------------|----------------------|-------------------------|-------------------|------------------|-----------------|----------------|------------------|
| lattice efficiency         |                 |               |                      |                         |                   |                  |                 |                |                  |
| Rampart                    | 14.1            | 12.7          |                      |                         | 13.3              | 14.5             |                 | 13.4           | <b>13.6**</b>    |
| + MTF1232                  | 14.3            | 13.3          |                      |                         | 13.1              | 13.6             |                 | 13.6           | <b>13.6*</b>     |
| MTS0826-63                 | 13.7            | 13.3          |                      |                         | 12.9              | 14.5             |                 | 13.1           | <b>13.5*</b>     |
| + d MT1262                 | 13.7            | 13.5          |                      |                         | 13.0              | 14.5             |                 | 12.4           | <b>13.4*</b>     |
| Warhorse                   | 13.8            | 13.5          |                      |                         | 13.3              | 13.5             |                 | 13.0           | <b>13.4*</b>     |
| +# d Emerson               | 13.8            | 13.5          |                      |                         | 13.1              | 13.5             |                 | 12.8           | <b>13.3*</b>     |
| +# WB4059CLP               | 14.2            | 12.5          |                      |                         | 12.9              | 13.9             |                 | 12.8           | <b>13.3*</b>     |
| Jerry                      | 13.7            | 13.1          |                      |                         | 11.6              | 15.4             |                 | 12.2           | <b>13.2*</b>     |
| Colter                     | 13.6            | 13.1          |                      |                         | 12.8              | 13.0             |                 | 12.9           | 13.1             |
| Judee                      | 13.5            | 12.8          |                      |                         | 12.4              | 14.1             |                 | 12.6           | 13.1             |
| + d MTCS1204               | 13.7            | 13.2          |                      |                         | 13.2              | 13.1             |                 | 12.3           | 13.1             |
| Bearpaw                    | 13.6            | 13.2          |                      |                         | 12.3              | 12.9             |                 | 12.8           | 13.0             |
| MT0978                     | 13.3            | 13.1          |                      |                         | 12.4              | 13.8             |                 | 12.3           | 13.0             |
| MT1117                     | 13.4            | 13.0          |                      |                         | 12.1              | 13.8             |                 | 12.6           | 13.0             |
| + d MT1246                 | 13.4            | 13.8          |                      |                         | 12.6              | 13.0             |                 | 12.3           | 13.0             |
| WB-Quake                   | 13.4            | 12.8          |                      |                         | 12.5              | 13.5             |                 | 12.7           | 13.0             |
| Genou                      | 13.3            | 12.2          |                      |                         | 12.1              | 14.3             |                 | 12.4           | 12.9             |
| d Carter                   | 13.1            | 12.9          |                      |                         | 11.8              | 13.6             |                 | 12.6           | 12.8             |
| Decade                     | 13.3            | 12.5          |                      |                         | 12.2              | 13.3             |                 | 12.5           | 12.8             |
| d Jagalene                 | 13.4            | 12.5          |                      |                         | 12.5              | 13.0             |                 | 12.4           | 12.8             |
| +# d LCS Wizard            | 13.7            | 12.4          |                      |                         | 12.4              | 13.0             |                 | 12.3           | 12.8             |
| + MTS1224                  | 12.8            | 13.5          |                      |                         | 12.6              | 12.9             |                 | 12.4           | 12.8             |
| + d MTS1228                | 13.2            | 12.7          |                      |                         | 12.2              | 13.7             |                 | 12.4           | 12.8             |
| # d Radiant                | 13.0            | 12.7          |                      |                         | 11.9              | 13.6             |                 | 12.6           | 12.8             |
| # SY Wolf                  | 13.3            | 12.6          |                      |                         | 12.7              | 12.8             |                 | 12.4           | 12.8             |
| +# Keldin                  | 13.4            | 12.4          |                      |                         | 12.6              | 13.0             |                 | 12.2           | 12.7             |
| + MT1257                   | 13.2            | 12.7          |                      |                         | 12.1              | 13.6             |                 | 12.0           | 12.7             |
| + MT1265                   | 13.3            | 12.7          |                      |                         | 12.0              | 13.5             |                 | 12.0           | 12.7             |
| MTCL1131                   | 13.3            | 12.8          |                      |                         | 11.9              | 13.6             |                 | 12.0           | 12.7             |
| CDC Falcon                 | 13.0            | 12.6          |                      |                         | 11.9              | 13.4             |                 | 12.0           | 12.6             |
| d MT1090                   | 12.5            | 12.5          |                      |                         | 11.9              | 13.5             |                 | 12.5           | 12.6             |
| MT1138                     | 12.9            | 12.7          |                      |                         | 12.0              | 13.1             |                 | 12.1           | 12.6             |
| WB3768                     | 13.0            | 13.2          |                      |                         | 11.7              | 12.5             |                 | 12.4           | 12.6             |
| # Broadview                | 13.1            | 12.5          |                      |                         | 11.9              | 13.0             |                 | 12.0           | 12.5             |
| d MT1113                   | 13.2            | 12.8          |                      |                         | 11.7              | 12.8             |                 | 12.1           | 12.5             |
| +# WB4614                  | 12.8            | 12.2          |                      |                         | 12.3              | 13.2             |                 | 12.2           | 12.5             |
| Yellowstone                | 13.2            | 12.6          |                      |                         | 11.9              | 12.9             |                 | 12.1           | 12.5             |
| + Freeman                  | 12.8            | 11.5          |                      |                         | 12.3              | 13.1             |                 | 12.4           | 12.4             |
| +# d LCS Colonia           | 12.4            | 12.8          |                      |                         | 12.1              | 12.8             |                 | 11.9           | 12.4             |
| +# LCS Mint                | 12.9            | 11.4          |                      |                         | 12.7              | 13.0             |                 | 11.9           | 12.4             |
| d McGill                   | 13.0            | 12.3          |                      |                         | 12.0              | 12.6             |                 | 12.1           | 12.4             |
| + MT1286                   | 13.1            | 13.0          |                      |                         | 11.5              | 12.3             |                 | 12.2           | 12.4             |
| SY Clearstone 2CL          | 13.3            | 12.4          |                      |                         | 11.8              | 12.7             |                 | 11.8           | 12.4             |
| Ledger                     | 12.5            | 12.0          |                      |                         | 12.1              | 13.0             |                 | 11.8           | 12.3             |
| MT1078                     | 12.4            | 12.0          |                      |                         | 11.9              | 12.8             |                 | 11.9           | 12.2             |
| d MTS1024                  | 12.4            | 12.4          |                      |                         | 12.1              | 12.5             |                 | 11.6           | 12.2             |
| +# T158                    | 12.8            | 10.7          |                      |                         | 12.6              | 12.8             |                 | 12.1           | 12.2             |
| d Promontory               | 12.3            | 11.4          |                      |                         | 11.6              | 12.8             |                 | 11.1           | 11.8             |
| Cowboy                     | 12.1            | 11.6          |                      |                         | 10.8              | 12.8             |                 | 11.4           | 11.7             |
| <b>Average</b>             | <b>13.2</b>     | <b>12.6</b>   |                      |                         | <b>12.3</b>       | <b>13.3</b>      |                 | <b>12.3</b>    | <b>12.8</b>      |
| <b>LSD (0.05)</b>          |                 |               |                      |                         |                   |                  |                 |                | <b>0.5</b>       |
| <b>C. V. (%)</b>           |                 |               |                      |                         |                   |                  |                 |                | <b>3.1</b>       |
| <b>P-value (Varieties)</b> |                 |               |                      |                         |                   |                  |                 |                | <b>&lt;.0001</b> |

+ = new for 2014, # = paid entry

d = cultivars/lines dropped for 2015 test

\*\* = indicates highest value within a column

\* = indicates varieties with values equal to highest variety within a column based on Fisher's Protected LSD (p = 0.05)

**Table 4. 2014 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Heading Date (days after Jan 1)**

| Cultivar/Line              | Bozeman<br>LAT   | Havre<br>LAT     | Sidney<br>no | Williston<br>no | Kalispell<br>RCB | Moccasin<br>LAT  | Huntley<br>no | Conrad<br>LAT    | 5 Loc<br>Avg.    |
|----------------------------|------------------|------------------|--------------|-----------------|------------------|------------------|---------------|------------------|------------------|
| lattice efficiency         | 104%             | 112%             | data         | data            |                  | 108%             | data          | 104%             |                  |
| + <b>Freeman</b>           | 158.1            | 156.2            |              |                 | 152.3            | 160.1            |               | 166.7            | 158.7            |
| +# <b>T158</b>             | 158.3            | 155.3            |              |                 | 152.7            | 163.9            |               | 166.0            | 159.2            |
| +# <b>WB4059CLP</b>        | 160.3            | 156.7            |              |                 | 153.0            | 161.6            |               | 166.5            | 159.6            |
| +# <b>LCS Mint</b>         | 160.7            | 155.8            |              |                 | 153.7            | 162.9            |               | 166.7            | 160.0            |
| d <b>McGill</b>            | 161.3            | 158.1            |              |                 | 156.3            | 162.6            |               | 168.5            | 161.4            |
| +# d <b>LCS Wizard</b>     | 161.8            | 158.0            |              |                 | 157.0            | 165.9            |               | 169.4            | 162.4            |
| # <b>SY Wolf</b>           | 163.0            | 159.0            |              |                 | 156.7            | 164.8            |               | 168.8            | 162.5            |
| <b>Decade</b>              | 163.3            | 159.5            |              |                 | 157.7            | 165.0            |               | 167.7            | 162.6            |
| d <b>Jagalene</b>          | 162.7            | 159.0            |              |                 | 157.3            | 166.0            |               | 169.6            | 162.9            |
| d <b>Carter</b>            | 163.0            | 160.3            |              |                 | 158.3            | 164.4            |               | 169.1            | 163.0            |
| <b>Judee</b>               | 163.0            | 159.8            |              |                 | 159.3            | 164.9            |               | 169.4            | 163.3            |
| <b>Ledger</b>              | 163.4            | 161.0            |              |                 | 158.3            | 165.0            |               | 170.0            | 163.5            |
| <b>Bearpaw</b>             | 163.7            | 161.2            |              |                 | 158.7            | 164.7            |               | 170.7            | 163.8            |
| d <b>Promontory</b>        | 163.3            | 159.9            |              |                 | 157.7            | 166.2            |               | 171.7            | 163.8            |
| <b>Cowboy</b>              | 163.3            | 159.7            |              |                 | 158.0            | 166.7            |               | 171.6            | 163.9            |
| <b>CDC Falcon</b>          | 163.8            | 159.1            |              |                 | 159.3            | 167.0            |               | 171.5            | 164.1            |
| # <b>Broadview</b>         | 164.1            | 160.0            |              |                 | 159.7            | 166.7            |               | 170.5            | 164.2            |
| +# <b>WB4614</b>           | 164.1            | 161.6            |              |                 | 159.0            | 167.8            |               | 172.0            | 164.9            |
| <b>Genou</b>               | 164.0            | 159.7            |              |                 | 161.3            | 167.8            |               | 172.8            | 165.1            |
| +# <b>Keldin</b>           | 164.1            | 159.7            |              |                 | 159.0            | 170.0            |               | 172.8            | 165.1            |
| + <b>MT1257</b>            | 164.7            | 160.2            |              |                 | 160.7            | 166.9            |               | 173.1            | 165.1            |
| <b>Warhorse</b>            | 166.4            | 161.1            |              |                 | 160.3            | 166.1            |               | 171.8            | 165.1            |
| <b>MT1138</b>              | 165.4            | 161.0            |              |                 | 160.0            | 167.1            |               | 172.5            | 165.2            |
| <b>Rampart</b>             | 164.7            | 161.2            |              |                 | 161.3            | 167.4            |               | 171.3            | 165.2            |
| <b>MT1078</b>              | 165.5            | 160.8            |              |                 | 160.3            | 167.8            |               | 173.2            | 165.5            |
| + <b>MT1286</b>            | 164.6            | 162.1            |              |                 | 159.3            | 168.0            |               | 173.7            | 165.5            |
| +# d <b>Emerson</b>        | 165.3            | 159.4            |              |                 | 159.7            | 168.1            |               | 175.5            | 165.6            |
| <b>SY Clearstone 2CL</b>   | 165.5            | 160.9            |              |                 | 160.3            | 167.3            |               | 173.8            | 165.6            |
| d <b>MT1090</b>            | 165.7            | 161.5            |              |                 | 161.3            | 166.9            |               | 173.1            | 165.7            |
| d <b>MTS1024</b>           | 165.6            | 161.3            |              |                 | 160.3            | 168.6            |               | 173.0            | 165.8            |
| + d <b>MTCS1204</b>        | 164.1            | 161.3            |              |                 | 160.0            | 169.7            |               | 174.7            | 166.0            |
| + d <b>MTS1228</b>         | 165.6            | 162.3            |              |                 | 161.3            | 167.2            |               | 173.8            | 166.0            |
| <b>Jerry</b>               | 165.4            | 161.4            |              |                 | 161.0            | 169.4            |               | 173.4            | 166.1            |
| <b>MT0978</b>              | 165.4            | 162.1            |              |                 | 160.7            | 169.5            |               | 173.5            | 166.2            |
| <b>MT1117</b>              | 167.3            | 162.3            |              |                 | 161.0            | 168.8            |               | 171.6            | 166.2            |
| + d <b>MT1246</b>          | 165.1            | 162.5            |              |                 | 161.0            | 170.5            |               | 172.6            | 166.3            |
| + d <b>MT1262</b>          | 165.7            | 161.6            |              |                 | 160.3            | 170.3            |               | 173.8            | 166.3            |
| <b>Yellowstone</b>         | 165.4            | 161.3            |              |                 | 161.7            | 168.8            |               | 175.5            | 166.5            |
| d <b>MT1113</b>            | 166.3            | 161.3            |              |                 | 161.0            | 167.8            |               | 176.5            | 166.6            |
| # d <b>Radiant</b>         | 167.0            | 162.0            |              |                 | 162.3            | 168.1            |               | 173.4            | 166.6            |
| <b>Colter</b>              | 166.3            | 162.7            |              |                 | 161.3            | 169.1            |               | 174.6            | 166.8            |
| <b>MTCL1131</b>            | 166.3            | 162.0            |              |                 | 161.0            | 169.6            |               | 175.9            | 167.0            |
| <b>WB-Quake</b>            | 167.0            | 162.8            |              |                 | 161.0            | 169.9            |               | 174.2            | 167.0            |
| + <b>MT1265</b>            | 167.0            | 161.4            |              |                 | 160.7            | 170.6            |               | 175.7            | 167.1            |
| + <b>MTS1224</b>           | 167.0            | 163.6            |              |                 | 162.3            | 168.9            |               | 176.1            | 167.6            |
| <b>MTS0826-63</b>          | 168.7            | 163.1            |              |                 | 163.7            | 170.7            |               | 175.3            | 168.3            |
| +# d <b>LCS Colonia</b>    | 168.1            | 164.6            |              |                 | 163.0            | 170.6            |               | 177.6            | 168.8            |
| + <b>MTF1232</b>           | 169.8            | 164.4            |              |                 | 162.7            | 170.8            |               | 176.4            | 168.8            |
| <b>WB3768</b>              | 169.1            | 163.8            |              |                 | 163.0            | 171.1            |               | 176.8            | 168.8            |
| <b>Average</b>             | <b>164.7</b>     | <b>160.7</b>     |              |                 | <b>159.6</b>     | <b>167.3</b>     |               | <b>172.3</b>     | <b>164.9</b>     |
| <b>LSD (0.05)</b>          | <b>1.3</b>       | <b>1.4</b>       |              |                 | <b>1.5</b>       | <b>2.3</b>       |               | <b>3.0</b>       | <b>1.2</b>       |
| <b>C. V. (%)</b>           | <b>0.5</b>       | <b>0.5</b>       |              |                 | <b>0.6</b>       | <b>0.8</b>       |               | <b>1.0</b>       | <b>0.6</b>       |
| <b>P-value (Varieties)</b> | <b>&lt;.0001</b> | <b>&lt;.0001</b> |              |                 | <b>&lt;.0001</b> | <b>&lt;.0001</b> |               | <b>&lt;.0001</b> | <b>&lt;.0001</b> |

+ = new for 2014, # = paid entry

d = cultivars/lines dropped for 2015 test

\*\* = indicates highest value within a column

\* = indicates varieties with values equal to highest variety within a column based on Fisher's Protected LSD (p=0.05)

**Table 5. 2014 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Plant Height (in)**

| Cultivar/Line              | Bozeman<br>LAT   | Havre<br>LAT     | Sidney<br>no | Williston<br>no | Kalispell<br>RCB | Moccasin<br>LAT  | Huntley<br>no | Conrad<br>LAT    | 5 Loc<br>Avg.    |
|----------------------------|------------------|------------------|--------------|-----------------|------------------|------------------|---------------|------------------|------------------|
| lattice efficiency         | 102%             | 184%             | data         | data            |                  |                  | data          | 170%             |                  |
| +# <b>WB4059CLP</b>        | 28.7             | 22.6             |              |                 | 29.0             | 29.4             |               | 25.3             | 27.0             |
| +# <b>T158</b>             | 30.5             | 23.6             |              |                 | 31.5             | 28.8             |               | 25.9             | 28.1             |
| +# d <b>LCS Wizard</b>     | 31.1             | 22.5             |              |                 | 33.3             | 31.4             |               | 26.6             | 29.0             |
| d <b>Carter</b>            | 32.1             | 23.5             |              |                 | 33.7             | 28.2             |               | 28.5             | 29.2             |
| <b>CDC Falcon</b>          | 32.6             | 23.0             |              |                 | 35.0             | 30.3             |               | 28.7             | 29.9             |
| +# d <b>LCS Colonia</b>    | 32.1             | 25.0             |              |                 | 33.5             | 31.7             |               | 27.0             | 29.9             |
| + <b>MTS1224</b>           | 33.0             | 25.0             |              |                 | 34.9             | 31.0             |               | 27.9             | 30.4             |
| +# <b>Keldin</b>           | 33.1             | 23.5             |              |                 | 36.6             | 30.6             |               | 29.8             | 30.7             |
| d <b>MTS1024</b>           | 32.6             | 25.0             |              |                 | 35.6             | 32.1             |               | 28.7             | 30.8             |
| <b>Bearpaw</b>             | 34.0             | 23.2             |              |                 | 36.7             | 31.5             |               | 29.7             | 31.0             |
| # <b>SY Wolf</b>           | 34.5             | 25.7             |              |                 | 36.7             | 31.5             |               | 27.3             | 31.1             |
| +# <b>WB4614</b>           | 34.0             | 24.1             |              |                 | 36.0             | 31.4             |               | 30.1             | 31.1             |
| + <b>Freeman</b>           | 32.8             | 25.3             |              |                 | 36.7             | 33.8             |               | 27.3             | 31.2             |
| + d <b>MTS1228</b>         | 33.8             | 25.9             |              |                 | 36.6             | 30.3             |               | 29.7             | 31.3             |
| <b>Warhorse</b>            | 35.0             | 25.6             |              |                 | 36.7             | 30.1             |               | 29.0             | 31.3             |
| +# <b>LCS Mint</b>         | 34.3             | 24.8             |              |                 | 37.7             | 30.5             |               | 30.4             | 31.5             |
| <b>Ledger</b>              | 34.5             | 26.2             |              |                 | 35.6             | 32.7             |               | 30.2             | 31.8             |
| <b>MT1078</b>              | 32.7             | 27.0             |              |                 | 37.8             | 32.0             |               | 29.8             | 31.9             |
| <b>Decade</b>              | 35.7             | 24.1             |              |                 | 37.1             | 32.2             |               | 30.7             | 32.0             |
| # <b>Broadview</b>         | 35.3             | 24.7             |              |                 | 37.7             | 31.3             |               | 31.5             | 32.1             |
| <b>Cowboy</b>              | 35.7             | 21.8             |              |                 | 39.5             | 32.1             |               | 31.3             | 32.1             |
| <b>Judee</b>               | 36.3             | 26.0             |              |                 | 37.0             | 31.4             |               | 30.2             | 32.2             |
| d <b>Jagalene</b>          | 35.7             | 24.9             |              |                 | 36.0             | 32.4             |               | 32.5             | 32.3             |
| <b>MT0978</b>              | 35.3             | 24.5             |              |                 | 40.9             | 31.7             |               | 30.5             | 32.6             |
| + d <b>MT1246</b>          | 35.7             | 25.5             |              |                 | 40.3             | 29.3             |               | 32.2             | 32.6             |
| <b>WB-Quake</b>            | 37.1             | 25.7             |              |                 | 37.8             | 31.8             |               | 31.5             | 32.8             |
| d <b>Promontory</b>        | 37.8             | 25.1             |              |                 | 36.6             | 32.4             |               | 32.7             | 32.9             |
| + d <b>MTCS1204</b>        | 36.3             | 26.2             |              |                 | 38.8             | 32.3             |               | 31.8             | 33.1             |
| + d <b>MT1262</b>          | 39.5             | 25.4             |              |                 | 40.0             | 31.1             |               | 30.8             | 33.4             |
| <b>Yellowstone</b>         | 37.6             | 26.3             |              |                 | 38.3             | 33.9             |               | 32.7             | 33.8             |
| <b>Colter</b>              | 36.8             | 26.2             |              |                 | 39.5             | 34.0             |               | 32.9             | 33.9             |
| <b>MT1117</b>              | 36.8             | 28.2             |              |                 | 41.1             | 30.8             |               | 33.3             | 34.0             |
| d <b>MT1090</b>            | 37.0             | 28.3             |              |                 | 39.5             | 34.1             |               | 31.6             | 34.1             |
| d <b>McGill</b>            | 39.0             | 27.3             |              |                 | 38.2             | 32.9             |               | 33.4             | 34.2             |
| + <b>MT1257</b>            | 38.7             | 28.2             |              |                 | 38.2             | 34.5             |               | 32.0             | 34.3             |
| + <b>MT1265</b>            | 39.0             | 27.7             |              |                 | 41.2             | 33.1             |               | 31.7             | 34.5             |
| d <b>MT1113</b>            | 38.7             | 26.7             |              |                 | 40.8             | 35.3             |               | 32.6             | 34.8             |
| # d <b>Radiant</b>         | 38.7             | 27.6             |              |                 | 40.7             | 31.5             |               | 35.4             | 34.8             |
| <b>MTS0826-63</b>          | 39.1             | 27.0             |              |                 | 40.6             | 32.6             |               | 35.6             | 35.0             |
| +# d <b>Emerson</b>        | 38.0             | 28.2             |              |                 | 42.3             | 33.7             |               | 33.5             | 35.1             |
| <b>SY Clearstone 2CL</b>   | 37.7             | 28.9             |              |                 | 39.9             | 35.3             |               | 33.7             | 35.1             |
| <b>MT1138</b>              | 38.3             | 29.2             |              |                 | 40.3             | 35.4             |               | 32.9             | 35.2             |
| + <b>MT1286</b>            | 38.7             | 27.5             |              |                 | 43.8             | 34.9             |               | 31.9             | 35.4             |
| <b>Genou</b>               | 39.5             | 26.4             |              |                 | 40.0             | 37.6             |               | 34.4             | 35.6             |
| <b>MTCL1131</b>            | 39.5             | 27.1             |              |                 | 42.3             | 35.8             |               | 33.7             | 35.7             |
| <b>Rampart</b>             | 41.0             | 27.6             |              |                 | 41.3             | 34.8             |               | 33.7             | 35.7             |
| <b>Jerry</b>               | 42.5             | 26.0             |              |                 | 46.3             | 36.0             |               | 34.0             | 37.0             |
| <b>WB3768</b>              | 41.4             | 32.6             |              |                 | 42.4             | 36.3             |               | 36.0             | 37.7             |
| + <b>MTF1232</b>           | 48.2             | 35.9             |              |                 | 51.2             | 41.4             |               | 42.0             | 43.7             |
| <b>Average</b>             | <b>36.3</b>      | <b>26.1</b>      |              |                 | <b>38.4</b>      | <b>32.6</b>      |               | <b>31.3</b>      | <b>33.0</b>      |
| <b>LSD (0.05)</b>          | <b>1.3</b>       | <b>2.5</b>       |              |                 | <b>2.9</b>       | <b>2.8</b>       |               | <b>1.9</b>       | <b>1.8</b>       |
| <b>C. V. (%)</b>           | <b>2.2</b>       | <b>5.4</b>       |              |                 | <b>4.7</b>       | <b>5.1</b>       |               | <b>3.4</b>       | <b>4.3</b>       |
| <b>P-value (Varieties)</b> | <b>&lt;.0001</b> | <b>&lt;.0001</b> |              |                 | <b>&lt;.0001</b> | <b>&lt;.0001</b> |               | <b>&lt;.0001</b> | <b>&lt;.0001</b> |

+ = new for 2014, # = paid entry

d = cultivars/lines dropped for 2015 test

\*\* = indicates highest value within a column

\* = indicates varieties with values equal to highest variety within a column based on Fisher's Protected LSD (p=0.05)

**Table 6. 2014 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Stem Solidness (5-25)**

| Cultivar/Line                 |                                    | Bozeman          | Havre            | Moccasin         | Conrad           | 4 Loc Avg.       |
|-------------------------------|------------------------------------|------------------|------------------|------------------|------------------|------------------|
| <b>MTS0826-63</b>             | MT9524/G15048//Rampart             | <b>21.3**</b>    | <b>21.3*</b>     | <b>24.0**</b>    | <b>23.0*</b>     | <b>22.4**</b>    |
| <b>Warhorse</b>               | Montana, 2013                      | <b>19.3*</b>     | <b>21.5*</b>     | <b>23.9*</b>     | <b>23.7**</b>    | <b>22.1*</b>     |
| <b>Bearpaw</b>                | Montana, 2011                      | 18.6             | <b>22.5*</b>     | <b>22.8*</b>     | <b>22.6*</b>     | <b>21.6*</b>     |
| <b>Rampart</b>                | Montana, 1996                      | 18.4             | 20.6             | <b>22.1*</b>     | <b>23.2*</b>     | <b>21.1*</b>     |
| + <b>MTS1224</b>              | Yellowstone//MTS0112/MTS0125       | 17.2             | <b>23.3**</b>    | 20.5             | <b>22.1*</b>     | <b>20.8*</b>     |
| <b>WB-Quake</b>               | WestBred, 2011                     | 16.4             | <b>21.9*</b>     | 21.8             | <b>22.9*</b>     | 20.8             |
| <b>Judee</b>                  | Montana, 2011                      | 18.0             | 19.2             | 20.7             | <b>22.9*</b>     | 20.2             |
| + <b>MTCS1204</b>             | MTCL0510/4/Paul/3/98X96C16cl/CDC T | 16.6             | 18.3             | 21.3             | <b>22.4*</b>     | 19.7             |
| <b>Genou</b>                  | Montana, 2004                      | 16.4             | 17.4             | 20.5             | 20.9             | 18.8             |
| <b>MTS1024</b>                | MT02113*4/MTS0359                  | 15.1             | 17.6             | 20.5             | <b>21.3*</b>     | 18.6             |
| + <b>MTS1228</b>              | MT9982*4/MTS0222                   | 15.5             | 18.6             | 17.5             | 20.5             | 18.0             |
| <b>Carter</b>                 | WestBred, 2006                     | 11.6             | 13.9             | 15.2             | 14.1             | 13.7             |
| <b>Ledger</b>                 | WestBred, 2004                     | 8.2              | 11.4             | 9.2              | 11.6             | 10.1             |
| <b>CDC Falcon</b>             | Sask/WestBred, 1999                | 7.0              | 7.1              | 7.2              | 8.2              | 7.4              |
| <b>Average</b>                |                                    | <b>15.7</b>      | <b>18.2</b>      | <b>19.1</b>      | <b>20.0</b>      | <b>18.2</b>      |
| <b>LSD (0.05)</b>             |                                    | <b>2.6</b>       | <b>2.1</b>       | <b>2.0</b>       | <b>2.5</b>       | <b>1.6</b>       |
| <b>C. V. (%)</b>              |                                    | <b>9.7</b>       | <b>6.7</b>       | <b>6.1</b>       | <b>7.6</b>       | <b>7.5</b>       |
| <b>P-value (Varieties)</b>    |                                    | <b>&lt;.0001</b> | <b>&lt;.0001</b> | <b>&lt;.0001</b> | <b>&lt;.0001</b> | <b>&lt;.0001</b> |
| <b>% stems with tunneling</b> |                                    | <b>none</b>      | <b>14.8</b>      | <b>0.5</b>       | <b>0.5</b>       |                  |

**Locations were significant ( $P = <.0001$ ), there was a significant Entry x Location Interaction ( $P = .0013$ )**

+ = new for 2014, # = paid entry

\*\* = indicates highest value within a column

\* = indicates varieties with values equal to highest variety within a column based on Fisher's Protected LSD ( $p = 0.05$ )

**Table 7. 2014 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Plant Disease Evaluation, including stripe rust at Pullman and Mt. Vernon, WA + Fort Ellis Stem Rust evaluations**

| Cultivar/Line                             | Stem Rus<br>Ft. Ellis | Physiological   |       |        | Stripe Rust |             |        |    |                  |             |                  |                   |    |           |    |
|---|-----------------------|-----------------|-------|--------|-------------|-------------|--------|----|------------------|-------------|------------------|-------------------|----|-----------|----|
|   |                       | Leaf Spot (0-3) |       |        | Montana (%) |             |        |    |                  | Pullman, WA |                  | MT. Vernon, WA    |    |           |    |
|   |                       | BZ              | BZ    | FE     | KS          | HUI         | BZ     | BZ | FE               | Milk        | Stem elong.      | Heading/flowering |    |           |    |
| d = cultivars/lines dropped for 2015 test | 0-4                   | Int             | Incs  | Off    | int         | Incs        |        |    | IT <sup>1/</sup> | %           | IT <sup>1/</sup> | %                 |    |           |    |
| + = new for 2014, # = paid entry          | 4 = worst             |                 |       |        |             |             |        |    |                  |             |                  |                   |    |           |    |
|   | 22-Jul                | 13-Jun          | 7-Jul | 22-Jul | 1-Jul       | 7-Jul       | 22-Jul |    |                  |             |                  |                   |    |           |    |
| <b>Bearpaw</b>                            |                       |                 |       |        | 18          | 37          |        | 8  | 5                | 8           | 100              | 8                 | 60 | 7         | 60 |
| # <b>Broadview</b>                        |                       | 1               | 1     | 1      | 7           |             | tr     |    |                  | 8           | 100              | 8                 | 80 | 8         | 50 |
| d <b>Carter</b>                           |                       | 1               | 1     | 2      | 17          |             | 3      | 5  |                  | 8           | 100              | 8                 | 80 | 8         | 90 |
| <b>CDC Falcon</b>                         |                       | 2               | 2     | 2      | 3           | 13          |        | 1  |                  | 8           | 100              | 8                 | 80 | 5         | 70 |
| <b>Colter</b>                             |                       |                 |       |        | 0           | 2           |        | tr |                  | 2           | 10               | 2                 | 10 | 2         | 5  |
| <b>Cowboy</b>                             |                       |                 |       |        | 10          | 57          |        | 2  | 10               | 8           | 30               | 8                 | 80 | 8         | 80 |
| <b>Decade</b>                             |                       |                 |       |        | 32          | 57          | 31     | 2  | 5                | 8           | 20               | 8                 | 80 | 6         | 70 |
| +# d <b>Emerson</b>                       |                       | 1.5             | 2     | 1      | 2           |             |        |    |                  | 2           | 5                | 2                 | 5  | 2         | 10 |
| + <b>Freeman</b>                          |                       |                 |       |        | 0           |             |        | tr |                  | 5           | 15               | 8                 | 40 | 3         | 20 |
| <b>Genou</b>                              | 1                     |                 |       |        | 35          | 27          | 1      | 5  |                  | 8           | 50               | 8                 | 80 | 7         | 80 |
| d <b>Jagalene</b>                         |                       |                 |       |        | 8           | 3           | 1      | 2  |                  | 8           | 60               | 5                 | 30 | 5         | 40 |
| <b>Jerry</b>                              |                       |                 |       |        | 53          | 50          | tr     | 10 |                  | 8           | 100              | 8                 | 80 | 8         | 60 |
| <b>Judee</b>                              |                       |                 |       |        | 0           | 0           |        |    |                  | 2           | 20               | 3                 | 20 | 2         | 10 |
| +# <b>Keldin</b>                          |                       |                 |       |        | 0           |             | tr     |    |                  | 8           | 20               | 2                 | 10 | 3         | 30 |
| +# d <b>LCS Colonia</b>                   |                       |                 |       |        | 5           |             |        |    |                  | 2           | 1                | 2                 | 2  | 2         | 5  |
| +# <b>LCS Mint</b>                        |                       |                 |       |        | 0           |             |        | tr |                  | 5           | 20               | 2                 | 10 | 4         | 30 |
| +# d <b>LCS Wizard</b>                    | 1                     |                 |       |        | 24          |             | 1      | 5  |                  | 8           | 100              | 8                 | 60 | 7         | 60 |
| <b>Ledger</b>                             |                       |                 |       |        | 3           |             | 1      | 1  |                  | 8           | 100              | 5                 | 20 | 3         | 30 |
| d <b>McGill</b>                           |                       |                 |       |        | 12          |             |        | 2  | 5                | 8           | 100              | 8                 | 60 | 5         | 60 |
| <b>MT0978</b>                             |                       |                 |       |        | 0           | 0           |        |    |                  | 2           | 20               | 3                 | 20 | 2         | 15 |
| <b>MT1078</b>                             |                       |                 | 2     | 1      | 0           | 1           |        |    |                  | 8           | 20               | 5                 | 30 | 2         | 20 |
| d <b>MT1090</b>                           |                       |                 |       |        | 2           | 2           | tr     |    |                  | 5           | 20               | 3                 | 20 | 2         | 10 |
| d <b>MT1113</b>                           |                       |                 |       |        | 0           |             |        |    |                  | 8           | 25               | 3                 | 15 | 2         | 20 |
| <b>MT1117</b>                             |                       |                 |       |        | 0           | 1           |        |    |                  | 3           | 10               | 3                 | 15 | 2         | 10 |
| <b>MT1138</b>                             |                       |                 |       |        | 0           | 1           |        |    |                  | 5           | 10               | 2                 | 15 | 2         | 10 |
| + d <b>MT1246</b>                         |                       |                 |       | 1      | 1           |             | tr     |    |                  | 2           | 20               | 2                 | 5  | 2         | 10 |
| + <b>MT1257</b>                           |                       |                 |       |        | 0           |             |        | tr |                  | 2           | 10               | 2                 | 5  | 2         | 10 |
| + d <b>MT1262</b>                         |                       | tr              | tr    |        | 0           |             |        |    |                  | 5           | 10               | 5                 | 20 | 3         | 20 |
| + <b>MT1265</b>                           | 1                     |                 |       |        | 0           |             |        |    |                  | 5           | 5                | 2                 | 10 | 2         | 5  |
| + <b>MT1286</b>                           | 2                     |                 |       |        | 5           | 7           | tr     |    |                  | 8           | 50               | 5                 | 30 | 3         | 20 |
| <b>MTCL1131</b>                           |                       |                 |       |        | 0           |             |        |    |                  | 5           | 10               | 3                 | 15 | 2         | 10 |
| + d <b>MTCS1204</b>                       |                       |                 |       |        | 2           | 5           | tr     |    |                  | 5           | 20               | 5                 | 40 | 2         | 30 |
| + <b>MTF1232</b>                          | 1                     |                 |       |        | 8           |             | 1      | 3  |                  | 8           | 50               | 5                 | 40 | 3         | 30 |
| <b>MTS0826-63</b>                         |                       |                 |       | 2      | 0           | 0           |        |    |                  | 2           | 10               | 2                 | 10 | 2         | 20 |
| d <b>MTS1024</b>                          |                       | tr              | 3     | 1      | 0           | 1           |        |    |                  | 8           | 20               | 8                 | 30 | 2         | 20 |
| + <b>MTS1224</b>                          |                       |                 |       |        | 2           |             |        |    |                  | 2           | 10               | 8                 | 40 | 2         | 1  |
| + d <b>MTS1228</b>                        | 2                     |                 | tr    |        | 0           |             |        |    |                  | 2           | 5                | 2                 | 5  | 2         | 10 |
| d <b>Promontory</b>                       | 2                     | 1               | 1     | 0.5    | 0           |             |        |    |                  | 2           | 10               | 2                 | 10 | 8         | 20 |
| # d <b>Radiant</b>                        |                       | 3               | 3     | 3      | 0           |             |        |    |                  | 8           | 5                | 2                 | 10 | 2         | 20 |
| <b>Rampart</b>                            |                       |                 |       |        | 4           | 3           | 1      |    |                  | 8           | 60               | 5                 | 30 | 3         | 30 |
| <b>SY Clearstone 2CL</b>                  |                       |                 |       |        | 0           | 0           |        | tr |                  | 5           | 15               | 2                 | 10 | 2         | 5  |
| # <b>SY Wolf</b>                          |                       |                 |       |        | 0           |             |        |    |                  | 8           | 20               | 2                 | 5  | 3         | 20 |
| +# <b>T158</b>                            |                       |                 |       |        | 0           |             |        |    |                  | 2           | 10               | 2                 | 10 | 4         | 20 |
| <b>Warhorse</b>                           |                       |                 |       |        | 0           | 0           |        |    |                  | 2           | 5                | 3                 | 30 | 3         | 10 |
| <b>WB3768</b>                             |                       |                 |       |        | 0           | 2           |        |    |                  | 5           | 10               | 2                 | 10 | 2         | 5  |
| +# <b>WB4059CLP</b>                       |                       |                 |       |        | 62          |             | tr     | 15 |                  | 8           | 10               | 8                 | 80 | 8         | 80 |
| +# <b>WB4614</b>                          |                       |                 |       |        | 2           |             | tr     | 5  |                  | 8           | 30               | 8                 | 80 | 3         | 30 |
| <b>WB-Quake</b>                           |                       |                 |       |        | 3           | 1           |        |    |                  | 3           | 10               | 3                 | 20 | 3         | 20 |
| <b>Yellowstone</b>                        | 1                     |                 |       |        | 2           | 1           |        |    |                  | 8           | 5                | 2                 | 15 | 2         | 5  |
| <b>Average</b>                            |                       |                 |       |        | <b>6.6</b>  | <b>11.8</b> |        |    |                  | <b>32</b>   |                  | <b>32</b>         |    | <b>28</b> |    |
| <b>LSD (0.05)</b>                         |                       |                 |       |        | <b>13.1</b> | <b>9.2</b>  |        |    |                  |             |                  |                   |    |           |    |

1/ Infection Type (IT) was recorded based on the 0-9 scale with ITs 8 and 9 combined as 8 (the most susceptible reaction) in field data. Generally IT 0-3 are considered resistant, 4-6 intermediate, and 7-9 susceptible. Heterogeneous reactions of an entry were indicated by two or more ITs separated by "," for most plants with the first IT and few plants with the second IT or connected with "-" for entries containing plants with continuous ITs. d = cultivars/lines dropped for 2014 test

\*\* = indicates highest value within a column

\* = indicates varieties with values equal to highest variety within a column based on Fisher's Protected LSD (p =0.05)