# RESULTS OF AGRONOMIC AND WEED SCIENCE RESEARCH CONDUCTED IN SOUTH CENTRAL MONTANA - 2014

The Annual Report of the Investigations at and Administration of the
Southern Agricultural Research Center, Huntley, Montana

http://www.sarc.montana.edu/

**PROJECT TITLE:**

Off-Station Spring Barley Variety Performance Trials in South Central Montana. This research is partially supported by the Montana Wheat and Barley Committee.


**PROJECT LEADERS:**

Kent A. McVay, Cropping System Specialist, SARC, Huntley
Qasim A. Khan, Research Associate, SARC, Huntley
Tom Blake, Barley Breeder, PSPP, Bozeman

**PROJECT PERSONNEL:**

Tom A. Fischer, Research Specialist and Farm Foreman, SARC, Huntley
Janna Kransky, Research Assistant III, SARC, Huntley
Steve Lackman, Yellowstone County Extension, Billings
Byron Hould, Rosebud/Treasure County Extension, Forsyth
Lee Schmelzer, Stillwater County Extension, Columbus
Molly Hammond, Big Horn County Extension, Hardin

**COOPERATORS:**

Greg Lackman, Hysham
Brett Nedens, Hardin
Ervin Schlemmer, Fromberg
Keith & Karen Schott, Broadview


**OBJECTIVES:**

To provide growers in south central Montana with a reliable, unbiased, up-to-date source of information that will permit valid comparisons among improved spring barley varieties. This information should help spring barley producers in south central Montana select varieties best suited to their particular area and growing conditions.

**METHODS:**

The 2014 off-station spring barley trials were conducted under dryland conditions near Huntley, Hardin and Broadview, and under irrigation near Fromberg and Hysham Montana (Fig. 1). Twenty spring barley entries comprised of 16 commercial cultivars and 4 experimental lines, representing both feed and malt types, were grown at all locations.

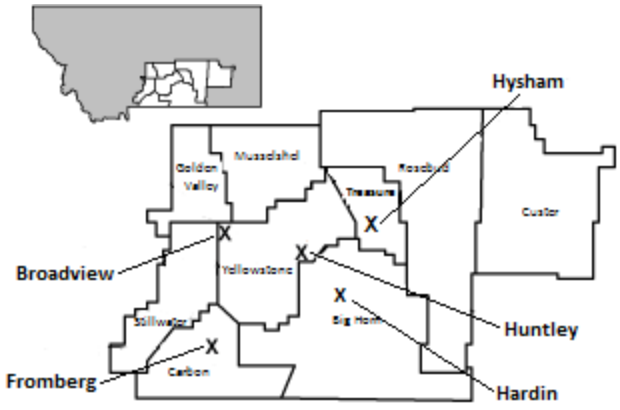


Figure 1. 2014 off-station spring barley trial locations in south central Montana.

All studies were planted using a randomized complete block design with three replications. All entries were seeded at approximately 0.6 million seeds per acre (~14 seed per foot$^2$) under dryland conditions and 1.0 million seeds per acre (~24 seed per foot$^2$) under irrigation.

Dryland and irrigated test plots consisted of a 15-foot, 7-row plot with 7-inch row spacing. All rows of each test plot were trimmed 36 inches and harvested using an experimental-plot combine. Recorded grain yields were adjusted to 13% grain moisture content, and are reported in bushels per acre based on a 48 pound standard bushel weight. Test weight (lb/bu, pounds per bushel) and grain moisture content (%, percent) were obtained for each plot using a Dickey-John™ GAC 2100 grain analyzer. Grain protein (%, percent) was estimated using near infrared spectroscopy and is reported on a 12% moisture basis. Plant height was measured in inches from the soil surface to the top of the head, excluding the awns if present. Lodging severity, where observed, was recorded on a 0 to 9 scale representing no lodging (0) to all stems lying flat on the ground (9). Percent plump and thin kernels were determined by measuring the amount of a ~100 gram sub-sample retained above a 6-64" slotted screen and passing through a 5½-64" slotted screen, respectively, following 30 oscillations on a Strand™ sizer shaker.

**RESULTS:**

The 2014 spring wheat test sites had above average rain or snow accumulation during winter months except in November with below average precipitation. Below-average precipitation occurred during April, May and July. This may have resulted in early season drought stress and poor spring barley establishment at some dryland sites. However, adequate moisture was available through-out the spring wheat growing season that resulted in higher grain yield in 2014 compared to last couple of years. Above average rainfall in August not only delayed harvesting at some sites but also enhanced lodging.

The dryland spring barley yield at Huntley averaged 82 bu/a in 2014 (Table 1). Yield ranged from 62 bu/a for 'Moravian 115' to 96 bu/a for 'Champion'. Commercial spring barley cultivars 'Baronesse' and 'Craft' also produced a yield that was statistically equal to the yield Champion. Test weight was relatively low due to pre-harvest sprouting and average only 43.4 lb/bu. All entries except 'Haxby' produced test weight values lower than 48 lb/bu. Grain protein content averaged 17.0 percent. Protein content ranged from 15.2 percent to 18.8 percent. Most spring barley cultivars produced low proportion of plump kernels, averaging only 19 percent of the harvested grain. Proportion of plump kernels ranged from 0.0 percent to 40.0 percent. The measured level of thin kernels averaged 30 percent and ranged from 12 to 48 percent. Two- and three-years (2012- 2014) average yield for barley cultivars tested at Huntley was 74 and 73 bu/a respectively. Champion was the highest yielding commercial cultivar over the past two- and three-years.

Hardin was a new dryland spring barley test site in 2014 replacing Billings, MT. Grain yield averaged 55 bu/a at Hardin (Table 2). Yields ranged from 49 bu/a for 'AC Metcalfe' to 64 bu/a for 'Tradition'. Commercial cultivars Champion and 'Eslick' also produced a yield that was statistically equal to the yield of highest yielding entry. Test weight averaged 49.3 lb/bu and ranged from 46.1 for Moravian 115 to 51.2 for Champion. Grain protein content averaged 12.2 percent and ranged from 10.8 to 13.4 percent. Plump and thin kernels averaged 68 and 11 percent, respectively. Proportion of plump kernels ranged from 35 percent for Eslick to 81 percent for experimental lines 'MT090180' and 'MT090190'. 'CDC Cowboy' produced the highest Proportion of plump kernels among Commercial cultivars

Dryland spring barley yield at Broadview averaged 44 bu/a (Table 3), about twice as much compared to 2013 at this site. Yield ranged from 30 bu/a for Moravian

115 to 55 bu/a for Haxby. Ten other entries produced yields, ranged from 45 to 50 bu/a, that was statistically equal to the highest yielding cultivar. Test weight was low and averaged 46.8 lb/bu. All entries, except Baronesse, Craft, and Haxby, produced test weight values lower than 48 lb/bu. Grain protein content averaged 18.0 percent and ranged from 16.3 to 19.9 percent. The percentage of plump kernels was only 27 percent in the harvested grain. Percentage of thin kernels averaged 48 percent. Two- and three-year averaged yield for barley cultivars tested during 2012 to 2014 at Broadview was 33 and 29 bu/a respectively. .

Spring barley lodging was moderate at Fromberg in 2014 for most of the entries, averaging a lodging score of 4.3 out of 9. (Table 4). Lodging score varied from 2.3 for MT090180 and 'MT100128' to 7.3 for Champion. Spring barley yield was good and averaged 119 bu/a under irrigation. Yield was highest at Fromberg among all locations tested in 2014. Yield ranged from 104 bu/a for AC Metcalfe and 'Conrad' to 137 bu/a for 'Moravian 69' (Table 4). Nine other commercial spring barley cultivars produced yield, from 117 to 133 bu/a, statistically equal to the yield of Moravian 69. The test weight was excellent and averaged 52.2 lb/bu and ranged from 48.6 lb/bu to 54.3 lb/bu. Average grain protein content was 14.0 percent and ranged from 12.3 percent to 15.3 percent. The percentage of plump kernels averaged 76 percent in the harvested grain. CDC Cowboy and 'Moravian 165' produced the highest percentage of plump kernels. Percentage of thin kernels averaged 9.2 percent. Two- and three-years averaged yield for barley cultivars tested during 2012 to 2014 was 92 and 96 bu/a respectively. Moravian 115 was the highest yielding cultivar over the last three-year at Fromberg.

Spring barley yield under irrigation at Hysham in 2014 averaging 108 bu/a (Table 5). Lodging was relatively higher for barley cultivars at Hysham in 2014 with an average lodging score of 6.2 out of 9. Champion had the highest lodging score (8.0) among the commercial entries. Yield ranged from 90 bu/a for 'MT100120' to 133 bu/a for Moravian 69. Average test weight was 51.6 lb/bu. All entries produced test weight heavier than 48 lb/bu. Grain protein averaged 11.9 percent and ranged from 10.2 to 14.1 percent. Barley quality was acceptable at Hysham where mean percent plump and thin kernels were 80.5 and 10.7 percent, respectively. No statistical difference in two- and three-years averaged yield was observed for spring barley entries tested at Hysham.

**SUMMARY:**

Adequate soil moisture during the growing season resulted in high grain yield in 2014 at all test sites compared to last couple of years. Above average rain in August delayed harvest at some sites and resulted in pre-harvest sprouting at Huntley that resulted in lower test weight. Averaged across all locations experimental line MT090180 was the highest yielding entry, while commercial cultivar Moravian 165 was the highest yielding entry in 2014 (Tables 6 and 7). Champion was also the top yielding commercial cultivar under dryland condition averaged over the past two- and three-years (Table 9). Averaged over the past two- and three-years (2012-2014) Moravian 69 and Moravian 115 were highest yielding commercial cultivars respectively, under irrigated condition (Table 8).

Table 1. Performance of 20 spring barley cultivars and experimental lines tested under dryland conditions near Huntley, Montana during 2014. Cultivars listed alphabetically. (Exp. 143690).

| Cultivar | Grain Yield 1/ 2014 | Grain Yield 1/ 2013-2014 | Grain Yield 1/ 2012-2014 | Test Weight | Grain Moisture | Grain Protein 2/ | Plump Kernels | Thin Kernels | Plant Height | Heading date Julian | Heading date Calendar |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | - bushels/acre - | | | - lb/bu - | - % - | - % - | - % - | - % - | - inches | | |
| Commercial | | | | | | | | | | | |
| AC Metcalfe | 81.6 | **75.1*** | 72.4 | 44.1 | 10.9 | 17.4 | 27.8 | 19.2 | 40.5 | 174.0 | Jun-23 |
| Baronesse | **89.1*** | **78.9*** | **77.2*** | 46.0 | 10.8 | 16.4 | 29.6 | 21.7 | 37.6 | 174.0 | Jun-23 |
| CDC Cowboy | 72.3 | 66.3 | 64.9 | 44.2 | 10.8 | 17.4 | 23.2 | 26.3 | 47.7 | 175.0 | Jun-24 |
| Champion | **95.6**** | **81.4**** | **80.9**** | 45.1 | 10.7 | 15.2 | 18.0 | 26.2 | 36.0 | 174.0 | Jun-23 |
| Conrad | 85.5 | **76.9*** | **75.3*** | 43.8 | 10.9 | 18.0 | 13.8 | 31.9 | 35.2 | 174.0 | Jun-23 |
| Craft | **90.6*** | **80.7*** | **80.0*** | 47.5 | 10.9 | 15.9 | 39.8 | 15.3 | 37.8 | 174.0 | Jun-23 |
| Eslick | 82.4 | **75.9*** | **75.3*** | 41.9 | 10.6 | 17.6 | 0.0 | 58.3 | 32.9 | 175.0 | Jun-24 |
| Gallatin | 81.6 | **71.4*** | 71.9 | 44.1 | 10.6 | 17.3 | 4.7 | 40.9 | 36.8 | 173.0 | Jun-22 |
| Geraldine | 86.4 | **73.1*** | 70.3 | 44.5 | 10.6 | 17.0 | 9.4 | 36.1 | 37.9 | 172.0 | Jun-21 |
| Harrington | 73.9 | **71.3*** | 71.3 | 39.9 | 10.6 | 18.2 | 9.2 | 44.0 | 35.6 | 175.7 | Jun-24 |
| Haxby | 86.6 | **78.9*** | **79.3*** | 48.5 | 11.1 | 15.4 | 40.0 | 12.1 | 36.7 | 174.0 | Jun-23 |
| Hockett | 87.1 | **80.6*** | **78.5*** | 45.8 | 10.9 | 16.5 | 29.4 | 21.8 | 37.2 | 170.0 | Jun-19 |
| Moravian 115 | 61.8 | 62.9 | 64.0 | 34.9 | 10.3 | 18.8 | 11.0 | 31.1 | 28.7 | 176.7 | Jun-25 |
| Moravian 165 | 85.4 | | | 44.0 | 10.6 | 17.2 | 26.1 | 23.4 | 39.5 | 174.0 | Jun-23 |
| Moravian 69 | 70.7 | 65.2 | 69.6 | 37.7 | 10.1 | 18.1 | 0.0 | 51.9 | 28.4 | 177.7 | Jun-26 |
| Tradition | 77.1 | **69.9*** | 70.9 | 40.8 | 10.6 | 16.6 | 0.0 | 51.1 | 37.9 | 171.7 | Jun-20 |
| Experimental | | | | | | | | | | | |
| MT090180 | 85.8 | | | 44.3 | 10.8 | 15.8 | 33.7 | 16.4 | 36.6 | 175.3 | Jun-24 |
| MT090190 | 80.3 | | | 43.9 | 10.7 | 18.9 | 14.9 | 33.2 | 35.9 | 176.0 | Jun-25 |
| MT100120 | 85.8 | | | 43.6 | 10.7 | 15.9 | 29.7 | 19.1 | 37.7 | 175.7 | Jun-24 |
| MT100126 | 79.8 | | | 42.8 | 10.8 | 16.0 | 17.3 | 25.2 | 38.1 | 176.3 | Jun-25 |
| Average | 82.0 | 73.9 | 73.4 | 43.4 | 10.7 | 17.0 | 18.9 | 30.3 | 36.7 | 174.4 | Jun-23 |
| PLSD (p=0.05) | 7.4 | 11.7 | 8.4 | 1.5 | 0.2 | 1.0 | 15.1 | 9.1 | 2.6 | 1.4 | |
| CV% | 5.5 | 7.0 | 6.9 | 2.1 | 1.3 | 3.5 | 48.3 | 18.2 | 4.3 | 0.5 | |

1/ Yields are based on a 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to a 12% moisture basis.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Huntley Dryland Spring Barley (Exp. 143690)

| | |
|---|---|
| Planted: | March 27, 2014 |
| Harvested: | September 3, 2014 |
| Fertility: | 60-20-0, 220 lb/a, preplant application |
| Herbicide: | n/a |
| Previous Crop: | chemical fallow |
| Precipitation: | 9.7 inches |

Table 2. Performance of 20 spring barley cultivars and experimental lines tested under dryland conditions near Hardin, Montana during 2014. Cultivars listed alphabetically. (Exp. 143691).

| Cultivar | 1/ Grain Yield 2014 | 2013-2014 | 2012-2014 | Test Weight | Grain Moisture | 2/ Grain Protein | Plump Kernels | Thin Kernels | Plant Height |
|---|---|---|---|---|---|---|---|---|---|
| | -------- bushels/acre -------- | | | - lb/bu - | - % - | - % - | - % - | - % - | - inches - |
| Commercial | | | | | | | | | |
| AC Metcalfe | 49.1 | -- | -- | 49.3 | 11.3 | 13.2 | 73.0 | 8.5 | 28.9 |
| Baronesse | 55.4 | -- | -- | 50.6 | 11.1 | 12.0 | 77.8 | 7.1 | 29.0 |
| CDC Cowboy | 50.0 | -- | -- | 49.4 | 11.6 | 13.3 | 79.6 | 6.7 | 36.0 |
| Champion | **60.6*** | -- | -- | 51.2 | 11.3 | 10.8 | 63.6 | 10.1 | 27.0 |
| Conrad | 56.0 | -- | -- | 48.6 | 11.2 | 12.9 | 73.7 | 10.8 | 27.2 |
| Craft | 56.1 | -- | -- | 50.7 | 11.0 | 12.6 | 76.4 | 7.9 | 32.3 |
| Eslick | **57.8*** | -- | -- | 48.9 | 11.2 | 12.2 | 34.5 | 25.9 | 24.9 |
| Gallatin | 54.9 | -- | -- | 48.4 | 11.3 | 12.2 | 62.7 | 13.9 | 31.5 |
| Geraldine | 54.4 | -- | -- | 47.4 | 11.0 | 13.4 | 56.4 | 17.1 | 30.7 |
| Harrington | 57.7 | -- | -- | 48.7 | 10.9 | 12.6 | 72.8 | 10.5 | 26.5 |
| Haxby | 57.1 | -- | -- | 50.9 | 10.9 | 11.9 | 42.4 | 21.2 | 27.2 |
| Hockett | 54.7 | -- | -- | 49.7 | 11.1 | 11.9 | 73.6 | 9.7 | 29.7 |
| Moravian 115 | 53.2 | -- | -- | 46.1 | 10.8 | 12.8 | 75.3 | 10.6 | 22.3 |
| Moravian 165 | 56.0 | -- | -- | 47.8 | 10.9 | 13.1 | 61.3 | 16.9 | 30.8 |
| Moravian 69 | 57.2 | -- | -- | 47.6 | 10.9 | 11.3 | 68.2 | 10.2 | 23.4 |
| Tradition | **64.3**** | -- | -- | 50.6 | 10.7 | 11.7 | 56.5 | 9.7 | 30.7 |
| Experimental | | -- | -- | | | | | | |
| MT090180 | 54.2 | -- | -- | 49.3 | 11.6 | 11.1 | 76.6 | 7.8 | 28.2 |
| MT090190 | 54.4 | -- | -- | 50.9 | 11.1 | 12.1 | 81.2 | 5.4 | 26.1 |
| MT100120 | 55.5 | -- | -- | 49.9 | 11.6 | 10.8 | 81.0 | 6.5 | 30.2 |
| MT100126 | 51.3 | -- | -- | 49.6 | 12.1 | 11.4 | 77.8 | 7.3 | 28.9 |
| Average | 55.5 | -- | -- | 49.3 | 11.2 | 12.2 | 68.2 | 11.2 | 28.6 |
| PLSD (p=0.05) | 6.5 | -- | -- | 1.1 | 0.4 | 1.9 | 10.9 | 5.4 | 2.6 |
| CV% | 7.1 | -- | -- | 1.3 | 2.2 | 9.3 | 9.6 | 29.1 | 5.5 |

1/ Yields are based on a 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12% moisture basis.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Hardin Dryland Spring Barley (Exp. 143691)

| | |
|---|---|
| Planted: | April 23, 2014 |
| Harvested: | August 7, 2014 |
| Fertility: | 80 lb/a N as 46-0-0 at planting |
| Herbicide: | RT3 @ 24 oz/a pre-plant |
| Previous Crop: | fallow |
| Precipitation: | n/a |

Table 3. Performance of 20 spring barley cultivars and experimental lines tested under dryland conditions near Broadview, Montana during 2014. Cultivars listed alphabetically. (Exp. 143692).

| Cultivar | Grain Yield 1/ 2014 | Grain Yield 1/ 2013-2014 | Grain Yield 1/ 2012-2014 | Test Weight | Grain Moisture | Grain Protein 2/ | Plump Kernels | Thin Kernels | Plant Height |
|---|---|---|---|---|---|---|---|---|---|
| | -------- bushels/acre -------- | | | - lb/bu - | - % - | - % - | - % - | - % - | - inches - |
| Commercial | | | | | | | | | |
| AC Metcalfe | 40.4 | 29.4 | 25.8 | 47.0 | 9.8 | 19.9 | 28.5 | 49.8 | 30.6 |
| Baronesse | **48.1*** | 36.2 | 32.3 | 48.2 | 9.8 | 18.2 | 31.9 | 40.7 | 31.6 |
| CDC Cowboy | 37.2 | 28.1 | 25.4 | 47.3 | 9.7 | 18.7 | 39.2 | 35.1 | 31.6 |
| Champion | **49.7*** | 36.8 | 32.7 | 46.7 | 9.7 | 17.3 | 14.9 | 63.1 | 30.6 |
| Conrad | **47.4*** | 34.2 | 29.0 | 46.6 | 9.6 | 18.7 | 27.5 | 47.8 | 30.3 |
| Craft | 42.9 | 32.4 | 28.5 | 48.8 | 9.5 | 18.5 | 29.3 | 45.6 | 32.5 |
| Eslick | **50.1*** | 35.7 | 30.0 | 45.5 | 9.4 | 18.5 | 12.4 | 70.2 | 27.4 |
| Gallatin | 43.6 | 32.8 | 28.9 | 46.6 | 9.7 | 17.9 | 26.6 | 52.1 | 30.8 |
| Geraldine | **44.7*** | 31.7 | 27.9 | 47.4 | 9.2 | 18.1 | 26.2 | 50.6 | 29.3 |
| Harrington | 37.5 | 27.6 | 25.8 | 46.1 | 9.7 | 17.8 | 25.5 | 55.0 | 30.8 |
| Haxby | **54.6**** | 38.2 | 32.0 | 48.4 | 9.6 | 16.7 | 13.0 | 40.2 | 29.8 |
| Hockett | **46.0*** | 33.4 | 29.3 | 47.4 | 9.8 | 17.5 | 29.4 | 44.9 | 29.3 |
| Moravian 115 | 43.1 | 30.8 | 27.1 | 45.7 | 9.8 | 18.8 | 35.4 | 40.4 | 23.6 |
| Moravian 165 | **45.4*** | | | 46.7 | 9.5 | 18.9 | 26.4 | 50.0 | 31.2 |
| Moravian 69 | 29.8 | 26.7 | 25.5 | 45.2 | 9.2 | 19.3 | 33.5 | 31.9 | 25.1 |
| Tradition | **50.3*** | 36.1 | 29.4 | 43.7 | 9.1 | 16.3 | 12.2 | 67.7 | 32.0 |
| Experimental | | | | | | | | | |
| MT090180 | **48.4*** | | | 46.9 | 9.8 | 16.7 | 32.8 | 38.9 | 29.1 |
| MT090190 | 41.1 | | | 47.7 | 9.6 | 19.7 | 24.1 | 50.5 | 28.3 |
| MT100120 | 39.4 | | | 46.9 | 9.8 | 17.5 | 34.4 | 39.9 | 28.9 |
| MT100126 | **48.8*** | | | 47.3 | 9.9 | 17.5 | 32.4 | 41.8 | 28.3 |
| Average | 44.4 | 32.7 | 28.6 | 46.8 | 9.6 | 18.1 | 26.8 | 47.8 | 29.6 |
| PLSD (p=0.05) | 10.8 | ns | ns | 1.6 | 0.4 | 1.6 | 15.4 | 21.6 | 4.0 |
| CV% | 14.7 | 16.4 | 15.5 | 2.0 | 2.5 | 5.4 | 37.7 | 27.3 | 8.1 |

1/ Yields are based on a 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12% moisture basis.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Broadview Dryland Spring Barley (Exp. 143692)

| | | | |
|---|---|---|---|
| Planted: | May 2, 2014 | | |
| Harvested: | August 12, 2014 | Fertility: | n/a |
| Herbicide: | n/a | | |
| Previous Crop: | summer fallow | | |
| Precipitation: | n/a | | |

Table 4. Performance of 20 spring barley cultivars and experimental lines tested under irrigated conditions near Fromberg, Montana during 2014. Cultivars listed alphabetically. (Exp. 143794).

| Cultivar | 1/ Grain Yield 2014 | 2013-2014 | 2012-2014 | Test Weight | Grain Moisture | 2/ Grain Protein | Plump Kernels | Thin Kernels | Plant Height | 3/ Lodging |
|---|---|---|---|---|---|---|---|---|---|---|
| | -------- bushels/acre -------- | | | - lb/bu - | - % - | - % - | - % - | - % - | - inches - | 0-9 |
| Commercial | | | | | | | | | | |
| AC Metcalfe | 103.6 | 83.7 | 88.2 | 51.5 | 10.5 | 14.4 | 72.5 | 10.9 | 43.4 | 4.7 |
| Baronesse | **132.6*** | 103.0 | **100.2*** | 53.9 | 10.7 | 14.3 | 85.8 | 7.0 | 43.2 | 2.7 |
| CDC Cowboy | **117.4*** | 88.1 | 90.5 | 52.1 | 10.7 | 14.1 | 86.6 | 6.4 | 49.2 | 4.3 |
| Champion | **116.6*** | 97.0 | **104.3*** | 51.4 | 10.5 | 15.1 | 58.2 | 18.2 | 43.0 | 7.3 |
| Conrad | 104.0 | 80.4 | 88.9 | 50.5 | 10.4 | 15.1 | 68.3 | 14.2 | 40.4 | 5.0 |
| Craft | **120.2*** | 96.2 | **98.0*** | 53.8 | 10.6 | 14.0 | 81.1 | 5.9 | 44.4 | 3.7 |
| Eslick | **118.7*** | 95.4 | **98.2*** | 53.1 | 10.7 | 14.4 | 76.6 | 11.1 | 35.4 | 3.3 |
| Gallatin | 109.3 | 87.0 | **92.7*** | 52.7 | 10.6 | 15.2 | 68.8 | 9.8 | 43.0 | 5.3 |
| Geraldine | 109.7 | 88.6 | 91.1 | 53.5 | 10.9 | 14.1 | 78.6 | 9.7 | 40.9 | 3.0 |
| Harrington | 104.2 | 83.8 | 84.0 | 48.6 | 10.2 | 15.2 | 60.4 | 17.2 | 42.5 | 6.7 |
| Haxby | 107.3 | 90.5 | 91.5 | 52.4 | 10.5 | 13.7 | 73.2 | 12.1 | 42.8 | 6.7 |
| Hockett | **122.0*** | 92.6 | **95.5*** | 54.3 | 11.0 | 14.3 | 84.0 | 2.0 | 39.0 | 4.0 |
| Moravian 115 | **131.6*** | 96.8 | **106.2**** | 49.7 | 10.4 | 12.8 | 79.7 | 5.5 | 29.9 | 4.7 |
| Moravian 165 | **132.1*** | | | 53.0 | 10.6 | 14.3 | 86.8 | 6.8 | 43.2 | 3.0 |
| Moravian 69 | **137.1**** | 98.6 | **105.6*** | 49.7 | 10.6 | 12.9 | 55.4 | 9.8 | 31.0 | 5.0 |
| Tradition | **120.4*** | 92.5 | **100.6*** | 51.3 | 10.4 | 13.1 | 69.0 | 7.3 | 42.7 | 4.7 |
| Experimental | | | | | | | | | | |
| MT090180 | **130.0*** | | | 53.3 | 11.0 | 12.3 | 81.2 | 5.2 | 42.7 | 2.3 |
| MT090190 | 109.4 | | | 52.3 | 10.4 | 15.3 | 81.7 | 9.8 | 38.7 | 4.3 |
| MT100120 | 111.0 | | | 52.6 | 10.7 | 13.2 | 76.7 | 9.1 | 44.4 | 3.7 |
| MT100126 | **131.9*** | | | 53.5 | 11.0 | 12.4 | 87.4 | 5.6 | 43.8 | 2.3 |
| Average | 118.5 | 91.6 | 95.7 | 52.2 | 10.6 | 14.0 | 75.6 | 9.2 | 41.2 | 4.3 |
| PLSD (p=0.05) | 22.7 | ns | 14.3 | 2.3 | 0.4 | 2.0 | 15.6 | 9.0 | 2.5 | ns |
| CV% | 11.6 | 11.3 | 13.8 | 2.6 | 2.2 | 8.8 | 12.4 | 59.1 | 3.7 | 50.2 |

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12% moisture basis.
3/ Lodging severity scores of 0 to 9 represent no lodging to all stems flat on the ground, respectively.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

| Fromberg Irrigated Spring Barley (Exp. 143794) | |
|---|---|
| Planted: | April 22, 2014 |
| Harvested: | August 11, 2014 |
| Fertility: | 100 lb N/a preplant; 120 lb N/a top dress in May, 2014 |
| Herbicide: | n/a |
| Previous Crop: | Sugar beet |
| Irrigation: | overhead sprinkler |

Table 5. Performance of 20 spring barley cultivars and experimental lines tested under irrigated conditions near Hysham, Montana during 2014. Cultivars listed alphabetically. (Exp. 143795).

| Cultivar | 1/ Grain Yield 2014 | 2013-2014 | 2012-2014 | Test Weight | Grain Moisture | 2/ Grain Protein | Plump Kernels | Thin Kernels | Plant Height | 3/ Lodging |
|---|---|---|---|---|---|---|---|---|---|---|
| | -------- bushels/acre -------- | | | - lb/bu - | - % - | - % - | - % - | - % - | - inches - | 0-9 |
| Commercial | | | | | | | | | | |
| AC Metcalfe | 103.7 | 111.1 | 103.5 | 52.6 | 12.4 | 13.9 | 86.1 | 8.2 | 47.6 | 5.7 |
| Baronesse | **116.3*** | 128.3 | 116.2 | 52.7 | 12.6 | 11.2 | 86.1 | 7.9 | 46.5 | 5.7 |
| CDC Cowboy | 103.3 | 108.8 | 96.7 | 52.0 | 12.3 | 13.0 | 86.5 | 7.7 | 50.8 | 5.0 |
| Champion | 109.2 | 125.6 | 121.2 | 50.7 | 12.2 | 14.1 | 64.8 | 20.8 | 47.4 | 8.0 |
| Conrad | 102.8 | 112.7 | 113.3 | 51.5 | 12.2 | 13.2 | 82.9 | 9.1 | 46.1 | 6.0 |
| Craft | 110.6 | 117.7 | 119.0 | 52.6 | 12.2 | 12.1 | 85.6 | 7.6 | 47.8 | 4.7 |
| Eslick | 111.4 | 117.2 | 117.2 | 51.1 | 12.7 | 10.7 | 74.1 | 15.0 | 43.2 | 6.3 |
| Gallatin | 100.7 | 121.9 | 113.9 | 51.0 | 11.9 | 12.8 | 71.9 | 15.7 | 44.1 | 6.3 |
| Geraldine | 105.9 | 114.8 | 113.6 | 51.6 | 12.3 | 11.7 | 80.4 | 10.6 | 45.7 | 5.7 |
| Harrington | 102.4 | 109.7 | 100.7 | 49.1 | 11.8 | 13.4 | 77.0 | 12.4 | 46.3 | 6.3 |
| Haxby | 106.1 | 124.6 | 114.0 | 53.8 | 12.4 | 13.1 | 90.0 | 5.7 | 45.3 | 5.7 |
| Hockett | 100.3 | 113.8 | 106.7 | 53.2 | 11.9 | 10.7 | 80.9 | 10.4 | 42.3 | 6.7 |
| Moravian 115 | **131.1*** | 117.4 | 130.3 | 50.4 | 11.4 | 10.9 | 85.7 | 6.5 | 35.6 | 6.7 |
| Moravian 165 | **115.4*** | | | 52.1 | 11.9 | 12.2 | 79.3 | 11.7 | 48.4 | 5.0 |
| Moravian 69 | **132.9**** | 137.2 | 121.0 | 50.2 | 12.0 | 10.8 | 67.7 | 14.9 | 38.8 | 7.7 |
| Tradition | 108.6 | 133.1 | 125.4 | 52.5 | 11.1 | 11.4 | 89.6 | 4.4 | 47.6 | 2.7 |
| Experimental | | | | | | | | | | |
| MT090180 | 107.7 | | | 51.3 | 12.6 | 10.2 | 81.9 | 10.8 | 44.9 | 7.0 |
| MT090190 | 90.8 | | | 49.2 | 12.0 | 12.2 | 73.8 | 14.6 | 45.8 | 8.3 |
| MT100120 | 89.7 | | | 51.3 | 12.4 | 10.6 | 80.5 | 11.8 | 46.2 | 7.7 |
| MT100126 | **114.5*** | | | 52.5 | 13.2 | 9.7 | 84.7 | 7.7 | 46.5 | 7.0 |
| Average | 108.2 | 119.6 | 114.2 | 51.6 | 12.2 | 11.9 | 80.5 | 10.7 | 45.3 | 6.2 |
| PLSD (p=0.05) | 20.7 | ns | ns | 2.6 | 0.9 | 2.2 | 13.8 | ns | 3.0 | 2.5 |
| CV% | 11.6 | 10.9 | 14.2 | 3.0 | 4.3 | 11.3 | 10.4 | 54.3 | 4.0 | 24.0 |

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to12 percent moisture basis.
3/ Lodging severity scores of 0 to 9 represent no lodging to all stems flat on the ground, respectively.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

| Hysham Irrigated Spring Barley (Exp. 143795) | |
|---|---|
| Planted: | April 21, 2014 |
| Harvested: | August 8, 2014 |
| Fertility: | 60 lb N/a preplant, 140 lb N/a top dress in spring |
| Previous Crop: | n/a |
| Irrigation: | flood |
| Precipitation: | n/a |

Table 6. Grain yield[1/] of 20 spring barley cultivars tested at five locations in south central Montana during 2014. Varieties listed by declining five-location average yield.

| Cultivar | Dryland | | | | Irrigated | | | Five Location Average |
|---|---|---|---|---|---|---|---|---|
| | Huntley | Hardin | Broadview | Ave. | Fromberg | Hysham | Ave. | |
| | bushels/acre | | | | | | | |
| MT090180 | 85.8 | 54.2 | **48.4*** | **62.8*** | **130.0*** | 107.7 | 118.9 | **88.3**** |
| Moravian 165 | 85.4 | 56.0 | **45.4*** | **62.3*** | **132.1*** | **115.4*** | **123.8*** | **86.9*** |
| MT100126 | 79.8 | 51.3 | **48.8*** | 60.0 | **131.9*** | **114.5*** | 123.2 | **86.3*** |
| Hockett | 87.1 | 54.7 | **46.0*** | **62.6*** | **122.0*** | 100.3 | 111.2 | **85.5*** |
| Moravian 115 | 61.8 | 53.2 | 43.1 | 52.7 | **131.6*** | **131.1*** | **131.4*** | **85.3*** |
| Tradition | 77.1 | **64.3**** | **50.3*** | **63.9*** | **120.4*** | 108.6 | 114.5 | **85.2*** |
| MT090190 | 80.3 | 54.4 | 41.1 | 58.6 | 109.4 | 90.8 | 100.1 | **84.2*** |
| MT100120 | 85.8 | 55.5 | 39.4 | 60.2 | 111.0 | 89.7 | 100.4 | **84.2*** |
| Haxby | 86.6 | 57.1 | **54.6**** | **66.1*** | 107.3 | 106.1 | 106.7 | **84.1*** |
| AC Metcalfe | 81.6 | 49.1 | 40.4 | 57.1 | 103.6 | 103.7 | 103.7 | **84.1*** |
| Harrington | 73.9 | 57.7 | 37.5 | 56.3 | 104.2 | 102.4 | 103.3 | **82.4*** |
| Geraldine | 86.4 | 54.4 | **44.7*** | **61.8*** | 109.7 | 105.9 | 107.8 | **82.0*** |
| Craft | **90.6*** | 56.1 | 42.9 | **63.2*** | **120.2*** | 110.6 | 115.4 | **80.2*** |
| Eslick | 82.4 | **57.8*** | **50.1*** | **63.4*** | **118.7*** | 111.4 | 115.1 | **79.2*** |
| Gallatin | 81.6 | 54.9 | 43.6 | 60.1 | 109.3 | 100.7 | 105.0 | 78.0 |
| Baronesse | **89.1*** | 55.4 | **48.1*** | **64.2*** | **132.6*** | **116.3*** | **124.5*** | 76.3 |
| Champion | **95.6**** | **60.6*** | **49.7*** | **68.7**** | **116.6*** | 109.2 | 112.9 | 76.0 |
| CDC Cowboy | 72.3 | 50.0 | 37.2 | 53.2 | **117.4*** | 103.3 | 110.3 | 75.7 |
| Moravian 69 | 70.7 | 57.2 | 29.8 | 52.6 | **137.1**** | **132.9**** | **135.0**** | 75.2 |
| Conrad | 85.5 | 56 | **47.4*** | **63.0*** | 104.0 | 102.8 | 103.4 | 75.1 |
| Average | 82.0 | 55.5 | 44.4 | 60.6 | 118.5 | 108.2 | 113.3 | 81.7 |
| PLSD | 7.4 | 6.5 | 10.8 | 8.0 | 22.7 | 20.7 | 11.5 | 9.9 |
| CV% | 5.5 | 7.1 | 14.7 | 8.4 | 11.6 | 11.6 | 11.6 | 11.3 |

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Table 7. Performance of 20 spring barley cultivars and experimental lines tested under dryland and irrigated conditions at five locations in south central Montana during 2014. Cultivars listed alphabetically.

| Cultivar | 1/ Grain Yield 2014 | 2013-2014 | 2012-2014 | Test Weight | Grain Moisture | 2/ Grain Protein | Plump Kernels | Thin Kernels | Plant Height |
|---|---|---|---|---|---|---|---|---|---|
| | -------- bushels/acre -------- | | | - lb/bu - | - % - | - % - | - % - | - % - | - inches - |
| Commercial | | | | | | | | | |
| AC Metcalfe | 75.7 | 72.0 | 70.7 | 48.9 | 11.0 | 15.8 | 57.6 | 19.3 | 38.2 |
| Baronesse | 88.3 | **83.1**** | **79.5*** | 50.3 | 11.0 | 14.4 | 62.2 | 16.9 | 37.6 |
| CDC Cowboy | 76.0 | 70.3 | 67.9 | 49.0 | 11.0 | 15.3 | 63.0 | 16.4 | 43.1 |
| Champion | 86.3 | **82.5*** | **82.9**** | 49.0 | 10.9 | 14.5 | 43.9 | 27.7 | 36.8 |
| Conrad | 79.2 | 73.8 | 75.0 | 48.2 | 10.9 | 15.6 | 53.2 | 22.8 | 35.8 |
| Craft | 84.1 | **78.9*** | **79.4*** | 50.7 | 10.8 | 14.6 | 62.4 | 16.4 | 39.0 |
| Eslick | 84.1 | **78.4*** | **78.4*** | 48.1 | 10.9 | 14.7 | 39.5 | 36.1 | 32.8 |
| Gallatin | 78.0 | 75.7 | 75.1 | 48.6 | 10.8 | 15.1 | 46.9 | 26.5 | 37.3 |
| Geraldine | 80.2 | 74.5 | 74.1 | 48.9 | 10.8 | 14.9 | 50.2 | 24.8 | 36.9 |
| Harrington | 75.1 | 71.4 | 69.5 | 46.5 | 10.7 | 15.5 | 49.0 | 27.8 | 36.4 |
| Haxby | 82.4 | **80.2*** | **77.5*** | 50.8 | 10.9 | 14.2 | 51.7 | 18.3 | 36.3 |
| Hockett | 82.0 | **77.3*** | 75.7 | 50.1 | 10.9 | 14.2 | 59.5 | 17.8 | 35.5 |
| Moravian 115 | 84.2 | 74.3 | **79.7*** | 45.3 | 10.5 | 14.8 | 57.4 | 18.8 | 28.0 |
| Moravian 165 | 86.9 | | | 48.7 | 10.7 | 15.1 | 56.0 | 21.8 | 38.6 |
| Moravian 69 | 85.5 | **79.2*** | **78.6*** | 46.1 | 10.6 | 14.5 | 44.9 | 23.7 | 29.3 |
| Tradition | 84.2 | **80.8*** | **80.3*** | 47.8 | 10.4 | 13.8 | 45.4 | 28.0 | 38.2 |
| Experimental | | | | | | | | | |
| MT090180 | 85.2 | | | 49.0 | 11.2 | 13.2 | 61.2 | 15.8 | 36.3 |
| MT090190 | 75.2 | | | 48.8 | 10.8 | 15.6 | 55.2 | 22.7 | 35.0 |
| MT100120 | 76.3 | | | 48.9 | 11.1 | 13.6 | 60.5 | 17.3 | 37.5 |
| MT100126 | 85.3 | | | 49.1 | 11.4 | 13.4 | 59.9 | 17.5 | 37.1 |
| Average | 81.7 | 76.8 | 76.3 | 48.6 | 10.9 | 14.6 | 54.0 | 21.8 | 36.3 |
| PLSD (p=0.05) | ns | 7.2 | 6.9 | 1.7 | 0.3 | 1.0 | 10.6 | 8.8 | 2.0 |
| CV% | 11.3 | 11.3 | 12.1 | 2.3 | 2.8 | 7.4 | 16.0 | 34.0 | 5.0 |
| Location Years | 5 | 9 | 13 | 5 | 5 | 5 | 5 | 5 | 5 |

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12% moisture basis.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Table 8. Performance of 20 spring barley cultivars and experimental lines tested under irrigated conditions at two locations in south central Montana during 2014. Cultivars listed alphabetically.

| Cultivar | Grain Yield 1/ 2014 | Grain Yield 1/ 2013-2014 | Grain Yield 1/ 2012-2014 | Test Weight | Grain Moisture | Grain Protein 2/ | Plump Kernels | Thin Kernels | Plant Height | Lodging 3/ |
|---|---|---|---|---|---|---|---|---|---|---|
| | -------- bushels/acre -------- | | | - lb/bu - | - % - | - % - | - % - | - % - | - inches - | 0-9 |
| Commercial | | | | | | | | | | |
| AC Metcalfe | 103.7 | 97.4 | 95.8 | 52.1 | 11.5 | 14.2 | 79.3 | 9.6 | 45.5 | 5.2 |
| Baronesse | **124.5*** | **115.6*** | **108.2*** | 53.3 | 11.7 | 12.8 | 86.0 | 7.4 | 44.8 | 4.2 |
| CDC Cowboy | 110.3 | 98.5 | 93.6 | 52.1 | 11.5 | 13.5 | 86.5 | 7.0 | 50.0 | 4.7 |
| Champion | 112.9 | **111.3*** | **112.8*** | 51.0 | 11.4 | 14.6 | 61.5 | 19.5 | 45.2 | 7.7 |
| Conrad | 103.4 | 96.5 | 101.1 | 51.0 | 11.3 | 14.2 | 75.6 | 11.6 | 43.2 | 5.5 |
| Craft | 115.4 | **107.0*** | **108.5*** | 53.2 | 11.4 | 13.1 | 83.4 | 6.7 | 46.1 | 4.2 |
| Eslick | 115.1 | **106.3*** | **107.7*** | 52.1 | 11.7 | 12.5 | 75.4 | 13.0 | 39.3 | 4.8 |
| Gallatin | 105.0 | **104.5*** | 103.3 | 51.9 | 11.2 | 14.0 | 70.3 | 12.8 | 43.6 | 5.8 |
| Geraldine | 107.8 | 101.7 | 102.3 | 52.5 | 11.6 | 12.9 | 79.5 | 10.1 | 43.3 | 4.3 |
| Harrington | 103.3 | 96.8 | 92.4 | 48.8 | 11.0 | 14.3 | 68.7 | 14.8 | 44.4 | 6.5 |
| Haxby | 106.7 | **107.5*** | 102.8 | 53.1 | 11.5 | 13.4 | 81.6 | 8.9 | 44.0 | 6.2 |
| Hockett | 111.2 | 103.2 | 101.1 | 53.7 | 11.5 | 12.5 | 82.5 | 6.2 | 40.6 | 5.3 |
| Moravian 115 | **131.4*** | **107.1*** | **118.2**** | 50.0 | 10.9 | 11.8 | 82.7 | 6.0 | 32.7 | 5.7 |
| Moravian 165 | **123.8*** | | | 52.6 | 11.2 | 13.2 | 83.1 | 9.2 | 45.8 | 4.0 |
| Moravian 69 | **135.0**** | **117.9**** | **113.3*** | 50.0 | 11.3 | 11.9 | 61.5 | 12.4 | 34.9 | 6.3 |
| Tradition | 114.5 | **112.8*** | **113.0*** | 51.9 | 10.7 | 12.3 | 79.3 | 5.9 | 45.1 | 3.7 |
| Experimental | | | | | | | | | | |
| MT090180 | 118.9 | | | 52.3 | 11.8 | 11.2 | 81.6 | 8.0 | 43.8 | 4.7 |
| MT090190 | 100.1 | | | 50.7 | 11.2 | 13.8 | 77.8 | 12.2 | 42.3 | 6.3 |
| MT100120 | 100.4 | | | 52.0 | 11.6 | 11.9 | 78.6 | 10.4 | 45.3 | 5.7 |
| MT100126 | 123.2 | | | 53.0 | 12.1 | 11.1 | 86.1 | 6.7 | 45.1 | 4.7 |
| Average | 113.3 | 105.6 | 104.9 | 51.9 | 11.4 | 13.0 | 78.0 | 9.9 | 43.3 | 5.3 |
| PLSD (p=0.05) | 11.5 | 13.7 | 13.2 | 1.9 | 0.5 | 1.3 | 12.4 | 6.0 | 2.9 | 2.7 |
| CV% | 11.6 | 11.2 | 12.1 | 2.8 | 3.6 | 10.0 | 11.4 | 56.6 | 3.9 | 35.4 |
| Location Years | 2 | 4 | 6 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12% moisture basis.
3/ Lodging severity scores of 0 to 9 represent no lodging to all stems flat on the ground, respectively.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Table 9. Performance of 20 spring barley cultivars and experimental lines tested under dryland conditions at three locations in south central Montana during 2014. Cultivars listed alphabetically.

| Cultivar | 1/ Grain Yield 2014 | 2013-2014 | 2012-2014 | Test Weight | Grain Moisture | 2/ Grain Protein | Plump Kernels | Thin Kernels | Plant Height |
|---|---|---|---|---|---|---|---|---|---|
| | -------- bushels/acre -------- | | | - lb/bu - | - % - | - % - | - % - | - % - | - inches - |
| Commercial | | | | | | | | | |
| AC Metcalfe | 57.1 | 51.6 | 49.1 | 46.8 | 10.7 | 16.9 | 43.1 | 25.8 | 33.3 |
| Baronesse | **64.2*** | **57.1*** | **54.8*** | 48.3 | 10.5 | 15.5 | 46.4 | 23.2 | 32.7 |
| CDC Cowboy | 53.2 | 47.8 | 45.8 | 47.0 | 10.7 | 16.5 | 47.3 | 22.7 | 38.4 |
| Champion | **68.7**** | **59.4**** | **57.4**** | 47.7 | 10.6 | 14.4 | 32.2 | 33.1 | 31.2 |
| Conrad | **63.0*** | **55.7*** | **52.7*** | 46.3 | 10.6 | 16.5 | 38.3 | 30.2 | 30.9 |
| Craft | **63.2*** | **56.5*** | **54.5*** | 49.0 | 10.5 | 15.7 | 48.5 | 22.9 | 34.2 |
| Eslick | **63.4*** | **56.2*** | **53.4*** | 45.4 | 10.4 | 16.1 | 15.6 | 51.5 | 28.4 |
| Gallatin | 60.1 | 52.7 | 51.0 | 46.4 | 10.5 | 15.8 | 31.3 | 35.6 | 33.0 |
| Geraldine | **61.8*** | 52.8 | 49.8 | 46.4 | 10.3 | 16.2 | 30.7 | 34.6 | 32.6 |
| Harrington | 56.3 | 51.1 | 49.8 | 44.9 | 10.4 | 16.2 | 35.8 | 36.5 | 31.0 |
| Haxby | **66.1*** | **58.3*** | **55.9*** | 49.3 | 10.5 | 14.7 | 31.8 | 24.5 | 31.2 |
| Hockett | **62.6*** | **56.5*** | **54.0*** | 47.6 | 10.6 | 15.3 | 44.1 | 25.5 | 32.1 |
| Moravian 115 | 52.7 | 48.1 | 46.7 | 42.2 | 10.3 | 16.8 | 40.6 | 27.4 | 24.9 |
| Moravian 165 | **62.3*** | | | 46.2 | 10.3 | 16.4 | 37.9 | 30.1 | 33.8 |
| Moravian 69 | 52.6 | 48.2 | 48.9 | 43.5 | 10.1 | 16.2 | 33.9 | 31.3 | 25.6 |
| Tradition | **63.9*** | **55.3*** | 52.2 | 45.0 | 10.1 | 14.8 | 22.9 | 42.8 | 33.5 |
| Experimental | | | | | | | | | |
| MT090180 | **62.8*** | | | 46.9 | 10.7 | 14.6 | 47.7 | 21.1 | 31.3 |
| MT090190 | 58.6 | | | 47.5 | 10.5 | 16.9 | 40.1 | 29.7 | 30.1 |
| MT100120 | 60.2 | | | 46.8 | 10.7 | 14.7 | 48.4 | 21.8 | 32.2 |
| MT100126 | 60.0 | | | 46.5 | 10.9 | 15.0 | 42.5 | 24.8 | 31.8 |
| Average | 60.6 | 53.8 | 51.7 | 46.5 | 10.5 | 15.8 | 38.0 | 29.8 | 31.6 |
| PLSD (p=0.05) | 8.0 | 5.9 | 4.7 | 2.5 | 0.3 | 1.0 | 14.7 | 13.2 | 2.6 |
| CV% | 8.4 | 9.0 | 9.0 | 1.8 | 2.0 | 5.9 | 22.2 | 28.2 | 6.0 |
| Location Years | 3 | 5 | 7 | 3 | 3 | 3 | 3 | 3 | 3 |

1/ Yields are based on a 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12% moisture basis.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).