

**PROJECT TITLE:** Evaluation of spring wheat, durum, barley, and oat varieties under minimum-till, continuous cropping conditions – 2002

**PROJECT LEADER:**

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**OBJECTIVE:** To determine the best adapted varieties of spring wheat, durum, and barley for production under no-till continuous cropping conditions in eastern Montana.

**RESULTS:**

**Spring wheat:** Twenty lines and varieties of spring wheat were tested under dryland recrop conditions (Table 1). Three varieties yielded significantly less than the check variety, McNeal. None yielded significantly more. Average yield was 17.2 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 2 through 5.

**Durum:** Sixteen durum varieties were tested under dryland recrop conditions (Table 6). AC Pathfinder, AC Avonlea, and AC Navigator yielded significantly more than the check variety, Renville. None yielded significantly less. Average yield was 22.6 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 7 through 10.

**Barley:** Sixteen barley lines and varieties were tested under dryland recrop conditions (Table 11). Haxby yielded significantly more than the check variety, Gallatin. None yielded significantly less. Average yield was 27.3 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 12 through 15.

**SUMMARY:** The experiments reported under this project are all of the replicated small plot type. The three-year crop rotation is commercial small grain, small grain yield trials, safflower. Bromoxynil at a rate of 1.5 pt/acre is used for broadleaf weed control in the small grain, and trifluralin at a rate of 1.5 pt/acre is used in the safflower. This weed control and crop rotation have been effective in controlling weeds in the yield trial plots, but volunteer small grain has been a problem in some years, although not a severe problem in 2002.

**FUTURE PLANS:** New varieties will continue to be tested under continuous cropping conditions to identify those which will perform best under these conditions. Closer cooperation with the Williston Research Center will allow testing of experimental lines from North Dakota as well as from Montana, so that when those lines are released as varieties, information will be available as to their performance under continuous cropping conditions.

Table 1. Agronomic data obtained from a dryland recrop spring wheat yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.

Planting date: 1 May 2002 Harvest date: 13 August 2002

| Variety             | Days to heading <sup>1</sup> | Height, inches | Protein content | Test wt, lb/bu | Yield bu/acre |
|---------------------|------------------------------|----------------|-----------------|----------------|---------------|
| Reeder              | 59                           | 22             | 15.6            | 57.5           | 20.7          |
| Outlook             | 61                           | 21             | 14.6            | 56.3           | 19.0          |
| Scholar             | 61                           | 23             | 15.4            | 59.0           | 19.0          |
| Express             | 58                           | 19             | 15.0            | 56.0           | 18.8          |
| McNeal              | 61                           | 21             | 14.4            | 57.0           | 18.7          |
| Conan               | 59                           | 20             | 14.2            | 58.5           | 18.6          |
| Explorer            | 57                           | 21             | 15.4            | 55.8           | 18.6          |
| Amidon              | 60                           | 22             | 14.3            | 57.2           | 18.0          |
| MT9806              | 60                           | 20             | 16.4            | 55.7           | 17.9          |
| MTHW9420            | 59                           | 20             | 14.5            | 55.7           | 16.8          |
| Parshall            | 59                           | 22             | 15.8            | 58.0           | 16.8          |
| Rambo               | 60                           | 19             | 14.8            | 57.7           | 16.7          |
| MT9929              | 59                           | 18             | 14.6            | 55.3           | 16.7          |
| Hank                | 57                           | 19             | 14.8            | 54.8           | 16.5          |
| Ernest              | 60                           | 24             | 15.0            | 57.2           | 16.4          |
| AC Barrie           | 60                           | 21             | 16.6            | 55.0           | 15.7          |
| Alsen               | 59                           | 19             | 15.4            | 57.0           | 15.6          |
| McKenzie            | 58                           | 24             | 15.5            | 56.0           | 15.1 x        |
| Gunner              | 61                           | 20             | 16.0            | 57.2           | 14.8 x        |
| Ember               | 57                           | 21             | 15.2            | 56.8           | 13.5 x        |
| mean                | 59                           | 21             | 15.2            | 56.7           | 17.2          |
| probability         | <0.001                       | 0.001          | <0.001          | <0.001         | 0.016         |
| CV (S/mean)         | 1.2                          | 7.5            | 3.2             | 1.4            | 11.8          |
| LSD <sub>0.05</sub> | 1.2                          | 2.6            | 0.8             | 1.3            | 3.4           |

Check variety is McNeal with an average yield of 18.7 bu/acre.

x indicates significantly lower yield than check variety, McNeal

\* hard white wheat

<sup>1</sup> Heading date is number of days from planting

Table 2. Relative yields of spring wheat varieties as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar  | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of<br>McNeal |
|-----------|------|------|------|------|------|------|-------------------|
| Reeder    | 42.6 | 53.3 | 17.0 | 55.6 | 20.7 | 37.8 | 114.7             |
| Outlook   | --   | --   | --   | 53.8 | 19.0 | 36.4 | 114.3             |
| Scholar   | 37.7 | 49.8 | 15.8 | 52.2 | 19.0 | 34.9 | 105.8             |
| Express   | --   | --   | --   | 48.2 | 18.8 | 33.5 | 105.2             |
| Alsen     | --   | --   | 15.4 | 52.4 | 15.6 | 27.8 | 105.2             |
| Parshall  | 35.4 | 54.6 | 16.0 | 50.6 | 16.8 | 34.7 | 105.2             |
| Amidon    | 37.3 | 50.1 | 15.8 | 47.1 | 18.0 | 33.7 | 102.1             |
| Gunner    | --   | --   | --   | 50.2 | 14.8 | 32.5 | 102.0             |
| MT9929    | --   | --   | --   | 47.3 | 16.7 | 32.0 | 100.5             |
| McNeal    | 38.4 | 47.2 | 15.6 | 45.0 | 18.7 | 33.0 | 100.0             |
| Conan     | --   | 48.2 | 16.5 | 43.2 | 18.6 | 31.6 | 100.0             |
| MTHW9420  | 36.0 | 50.2 | 15.2 | 46.3 | 16.8 | 32.9 | 99.8              |
| Ernest    | 32.8 | 50.5 | 15.8 | 43.4 | 16.4 | 31.8 | 96.4              |
| MT9806    | --   | --   | --   | --   | 17.9 | 17.9 | 95.7              |
| Explorer  | --   | --   | 13.7 | 39.2 | 18.6 | 23.8 | 90.2              |
| Rambo     | --   | --   | --   | --   | 16.7 | 16.7 | 89.3              |
| Hank      | --   | --   | --   | --   | 16.5 | 16.5 | 88.2              |
| AC Barrie | --   | --   | --   | --   | 15.7 | 15.7 | 84.0              |
| McKenzie  | --   | --   | --   | --   | 15.1 | 15.1 | 80.7              |
| Ember     | --   | --   | --   | --   | 13.5 | 13.5 | 72.2              |

NOTE: Average yields in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety.

Table 3. Relative test weights of spring wheat varieties as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar  | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of<br>McNeal |
|-----------|------|------|------|------|------|------|-------------------|
| Parshall  | 58.7 | 63.0 | 63.0 | 63.3 | 58.0 | 61.2 | 103.8             |
| Scholar   | 59.3 | 61.7 | 62.6 | 61.8 | 59.0 | 60.9 | 103.3             |
| Alsen     | --   | --   | 63.2 | 62.7 | 57.0 | 61.0 | 102.9             |
| Conan     | --   | 61.5 | 62.9 | 61.2 | 58.5 | 61.0 | 102.8             |
| Gunner    | --   | --   | --   | 62.5 | 57.2 | 59.9 | 102.6             |
| Ernest    | 58.2 | 62.2 | 62.7 | 60.8 | 57.2 | 60.2 | 102.2             |
| Reeder    | 57.0 | 61.2 | 63.0 | 61.3 | 57.5 | 60.0 | 101.8             |
| Rambo     | --   | --   | --   | --   | 57.7 | 57.7 | 101.2             |
| Amidon    | 57.2 | 60.5 | 61.8 | 61.0 | 57.2 | 59.5 | 101.0             |
| McNeal    | 57.2 | 59.7 | 61.1 | 59.7 | 57.0 | 58.9 | 100.0             |
| Outlook   | --   | --   | --   | 60.0 | 56.3 | 58.2 | 99.7              |
| Ember     | --   | --   | --   | --   | 56.8 | 56.8 | 99.6              |
| Express   | --   | --   | --   | 60.2 | 56.0 | 58.1 | 99.6              |
| MT9929    | --   | --   | --   | 60.7 | 55.3 | 58.0 | 99.4              |
| MTHW9420  | 55.0 | 61.2 | 61.3 | 59.0 | 55.7 | 58.4 | 99.2              |
| Explorer  | --   | --   | 60.7 | 58.2 | 55.8 | 58.2 | 98.3              |
| McKenzie  | --   | --   | --   | --   | 56.0 | 56.0 | 98.2              |
| MT9806    | --   | --   | --   | --   | 55.7 | 55.7 | 97.7              |
| AC Barrie | --   | --   | --   | --   | 55.0 | 55.0 | 96.5              |
| Hank      | --   | --   | --   | --   | 54.8 | 54.8 | 96.1              |

NOTE: Average test weights in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety.

Table 4. Relative heights of spring wheat varieties as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar  | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of<br>McNeal |
|-----------|------|------|------|------|------|------|-------------------|
| McKenzie  | --   | --   | --   | --   | 24   | 24.0 | 114.3             |
| Ernest    | 33   | 34   | 21   | 33   | 24   | 29.0 | 110.7             |
| Amidon    | 33   | 36   | 18   | 33   | 22   | 28.4 | 108.4             |
| Gunner    | --   | --   | --   | 32   | 20   | 26.0 | 106.1             |
| Outlook   | --   | --   | --   | 31   | 21   | 26.0 | 106.1             |
| Scholar   | 31   | 35   | 18   | 32   | 23   | 27.8 | 106.1             |
| Parshall  | 32   | 34   | 18   | 32   | 22   | 27.6 | 105.3             |
| McNeal    | 32   | 30   | 20   | 28   | 21   | 26.2 | 100.0             |
| AC Barrie | --   | --   | --   | --   | 21   | 21.0 | 100.0             |
| Ember     | --   | --   | --   | --   | 21   | 21.0 | 100.0             |
| Reeder    | 30   | 29   | 20   | 28   | 22   | 25.8 | 98.5              |
| Explorer  | --   | --   | 19   | 27   | 21   | 22.3 | 97.1              |
| Conan     | --   | 30   | 19   | 27   | 20   | 24.0 | 97.0              |
| Alsen     | --   | --   | 18   | 29   | 19   | 22.0 | 95.7              |
| MT9806    | --   | --   | --   | --   | 20   | 20.0 | 95.2              |
| MT9929    | --   | --   | --   | 27   | 18   | 22.5 | 91.8              |
| MTHW9420  | 27   | 28   | 18   | 27   | 20   | 24.0 | 91.6              |
| Rambo     | --   | --   | --   | --   | 19   | 19.0 | 90.5              |
| Hank      | --   | --   | --   | --   | 19   | 19.0 | 90.5              |
| Express   | --   | --   | --   | 25   | 19   | 22.0 | 89.8              |

NOTE: Average heights in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety.

Table 5. Relative protein contents of spring wheat varieties as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar  | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of<br>McNeal |
|-----------|------|------|------|------|------|------|-------------------|
| AC Barrie | --   | --   | --   | --   | 16.6 | 16.6 | 115.3             |
| Parshall  | 15.8 | 15.1 | 14.2 | 14.1 | 15.8 | 15.0 | 114.3             |
| MT9806    | --   | --   | --   | --   | 16.4 | 16.4 | 113.9             |
| Gunner    | --   | --   | --   | 12.7 | 16.0 | 14.4 | 113.4             |
| Reeder    | 15.2 | 14.8 | 14.8 | 14.2 | 15.4 | 14.9 | 113.4             |
| Alsen     | --   | --   | 14.7 | 14.0 | 15.4 | 14.7 | 110.8             |
| Ernest    | 15.4 | 14.4 | 14.6 | 13.1 | 15.0 | 14.5 | 110.5             |
| Express   | --   | --   | --   | 12.4 | 15.0 | 13.7 | 108.3             |
| McKenzie  | --   | --   | --   | --   | 15.5 | 15.5 | 107.6             |
| Scholar   | 14.9 | 13.0 | 14.0 | 12.9 | 15.4 | 14.0 | 107.0             |
| MT9929    | --   | --   | --   | 12.4 | 14.6 | 13.5 | 106.7             |
| Outlook   | --   | --   | --   | 12.3 | 14.6 | 13.5 | 106.3             |
| Explorer  | --   | --   | 14.0 | 12.9 | 15.4 | 14.1 | 106.3             |
| Ember     | --   | --   | --   | --   | 15.2 | 15.2 | 105.6             |
| Amidon    | 14.2 | 13.0 | 14.6 | 12.5 | 14.3 | 13.7 | 104.6             |
| Rambo     | --   | --   | --   | --   | 14.8 | 14.8 | 102.8             |
| Hank      | --   | --   | --   | --   | 14.8 | 14.8 | 102.8             |
| Conan     | --   | 11.6 | 14.1 | 12.2 | 14.2 | 13.0 | 101.2             |
| McNeal    | 14.1 | 11.7 | 14.5 | 10.9 | 14.4 | 13.1 | 100.0             |
| MTHW9420  | 14.9 | 10.8 | 12.7 | 11.4 | 14.5 | 12.9 | 98.0              |

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety.

Table 6. Agronomic data obtained from a dryland recrop durum yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.

Planting date: 1 May 2002 Harvest date: 13 August 2002

| Variety             | Days to heading <sup>1</sup> | Height, inches | Protein content | Test wt, lb/bu | Yield bu/acre |
|---------------------|------------------------------|----------------|-----------------|----------------|---------------|
| AC Pathfinder       | 60                           | 21             | 14.9            | 59.3           | 25.5 a        |
| AC Avonlea          | 60                           | 22             | 15.4            | 58.8           | 24.2 a        |
| AC Navigator        | 61                           | 19             | 15.6            | 60.2           | 23.8 a        |
| Munich              | 59                           | 20             | 15.9            | 57.0           | 23.6          |
| Lebsock             | 59                           | 20             | 15.4            | 59.2           | 22.9          |
| Maier               | 60                           | 20             | 16.5            | 58.3           | 22.7          |
| AC Napoleon         | 60                           | 23             | 16.4            | 56.0           | 22.7          |
| Ben                 | 59                           | 21             | 16.1            | 58.3           | 22.7          |
| Belzer              | 61                           | 21             | 15.8            | 56.5           | 22.3          |
| Dilse               | 61                           | 19             | 16.6            | 57.8           | 22.2          |
| Plaza               | 61                           | 18             | 15.6            | 58.2           | 22.2          |
| Kyle                | 62                           | 23             | 16.5            | 59.3           | 21.6          |
| Pierce              | 59                           | 21             | 16.6            | 57.0           | 21.4          |
| Renville            | 59                           | 22             | 16.6            | 57.3           | 21.3          |
| Mountrail           | 61                           | 20             | 16.3            | 56.5           | 21.3          |
| AC Morse            | 60                           | 20             | 15.9            | 58.3           | 20.9          |
| mean                | 60                           | 21             | 16.0            | 58.0           | 22.6          |
| probability         | 0.010                        | 0.041          | 0.002           | <0.001         | 0.024         |
| CV (S/mean)         | 1.6                          | 7.1            | 3.1             | 1.3            | 6.1           |
| LSD <sub>0.05</sub> | 1.6                          | 2.4            | 0.8             | 1.3            | 2.3           |

Check variety is Renville with an average yield of 21.3 bu/acre.

a indicates significantly greater yield than check variety, Renville, at a probability of <0.05

<sup>1</sup> Heading date is number of days from planting

Table 7. Relative yields of durum varieties compared to Renville when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar      | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of Renville |
|---------------|------|------|------|------|------|------|------------------|
| Mountrail     | 33.7 | 61.2 | 15.6 | 53.6 | 21.3 | 37.1 | 104.9            |
| AC Napoleon   | --   | --   | --   | 51.1 | 22.7 | 36.9 | 104.8            |
| Dilse         | --   | --   | --   | --   | 22.2 | 22.2 | 104.2            |
| Plaza         | 36.1 | 55.4 | 13.5 | 55.2 | 22.2 | 36.5 | 103.2            |
| AC Morse      | 35.8 | 58.7 | 16.9 | 49.8 | 20.9 | 36.4 | 103.0            |
| Maier         | 34.2 | 57.2 | 14.4 | 52.6 | 22.7 | 36.2 | 102.4            |
| AC Avonlea    | --   | --   | 17.3 | 43.0 | 24.2 | 28.2 | 100.6            |
| Pierce        | --   | --   | --   | 49.2 | 21.4 | 35.3 | 100.3            |
| Renville      | 34.7 | 58.1 | 13.6 | 49.1 | 21.3 | 35.4 | 100.0            |
| Ben           | 33.4 | 54.6 | 13.4 | 49.8 | 22.7 | 34.8 | 98.4             |
| Lebsock       | --   | 51.4 | 13.8 | 51.3 | 22.9 | 34.9 | 98.1             |
| Kyle          | 33.0 | 54.7 | 12.4 | 50.4 | 21.6 | 34.4 | 97.3             |
| AC Navigator  | --   | --   | --   | 42.9 | 23.8 | 33.4 | 94.7             |
| Munich        | 32.8 | 50.4 | 14.1 | --   | 23.6 | 30.2 | 94.7             |
| AC Pathfinder | --   | --   | --   | 40.7 | 25.5 | 33.1 | 94.0             |
| Belzer        | 29.2 | 49.7 | 13.4 | 49.6 | 22.3 | 32.8 | 92.9             |

NOTE: Average yields in this summary should not be compared to each other since they are not grown in the same years. Compare yields only to the check variety.

Table 8. Relative test weights of durum varieties as compared to Renville when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar      | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of Renville |
|---------------|------|------|------|------|------|------|------------------|
| Lebsock       | --   | 59.5 | 63.0 | 62.0 | 59.2 | 60.9 | 101.5            |
| Dilse         | --   | --   | --   | --   | 57.8 | 57.8 | 100.9            |
| AC Pathfinder | --   | --   | --   | 60.7 | 59.3 | 60.0 | 100.8            |
| AC Navigator  | --   | --   | --   | 59.8 | 60.2 | 60.0 | 100.8            |
| AC Avonlea    | --   | --   | 63.3 | 60.5 | 58.8 | 60.9 | 100.6            |
| Maier         | 59.2 | 59.3 | 63.3 | 61.5 | 58.3 | 60.3 | 100.4            |
| Pierce        | --   | --   | --   | 62.5 | 57.0 | 59.8 | 100.4            |
| Ben           | 59.2 | 58.2 | 62.8 | 63.0 | 58.3 | 60.3 | 100.4            |
| Kyle          | 59.0 | 57.9 | 62.4 | 62.8 | 59.3 | 60.3 | 100.4            |
| Renville      | 60.3 | 58.4 | 62.6 | 61.7 | 57.3 | 60.1 | 100.0            |
| Plaza         | 57.7 | 58.3 | 63.3 | 60.7 | 58.2 | 59.6 | 99.3             |
| Munich        | 58.3 | 58.5 | 62.2 | --   | 57.0 | 59.0 | 98.9             |
| AC Morse      | 58.8 | 57.8 | 62.0 | 60.0 | 58.3 | 59.4 | 98.9             |
| Mountrail     | 58.0 | 57.7 | 62.3 | 62.2 | 56.5 | 59.3 | 98.8             |
| AC Napoleon   | --   | --   | --   | 59.8 | 56.0 | 57.9 | 97.3             |
| Belzer        | 56.8 | 56.1 | 61.8 | 59.8 | 56.5 | 58.2 | 96.9             |

NOTE: Average test weights in this summary should not be compared to each other since they are not grown in the same years. Compare test weights only to the check variety.

Table 9. Relative heights of durum varieties as compared to Renville when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar      | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of Renville |
|---------------|------|------|------|------|------|------|------------------|
| Kyle          | 35   | 38   | 19   | 38   | 23   | 30.6 | 106.3            |
| Renville      | 33   | 36   | 20   | 33   | 22   | 28.8 | 100.0            |
| Belzer        | 31   | 36   | 21   | 33   | 21   | 28.4 | 98.6             |
| AC Avonlea    | --   | --   | 20   | 31   | 22   | 24.3 | 97.3             |
| Ben           | 30   | 35   | 21   | 33   | 21   | 28.0 | 97.2             |
| AC Napoleon   | --   | --   | --   | 30   | 23   | 26.5 | 96.4             |
| Mountrail     | 30   | 36   | 18   | 33   | 20   | 27.4 | 95.1             |
| Pierce        | --   | --   | --   | 31   | 21   | 26.0 | 94.5             |
| AC Pathfinder | --   | --   | --   | 31   | 21   | 26.0 | 94.5             |
| Lebsock       | --   | 32   | 18   | 30   | 20   | 25.0 | 90.1             |
| Maier         | 29   | 31   | 18   | 31   | 20   | 25.8 | 89.6             |
| AC Morse      | 28   | 29   | 19   | 29   | 20   | 25.0 | 86.8             |
| Dilse         | --   | --   | --   | --   | 19   | 19.0 | 86.4             |
| Munich        | 28   | 28   | 19   | --   | 20   | 23.8 | 85.6             |
| AC Navigator  | --   | --   | --   | 27   | 19   | 23.0 | 83.6             |
| Plaza         | 27   | 27   | 18   | 25   | 18   | 23.0 | 79.9             |

NOTE: Average heights in this summary should not be compared to each other since they are not grown in the same years. Compare heights only to the check variety.

Table 10. Relative protein contents of durum varieties as compared to Renville when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar      | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of Renville |
|---------------|------|------|------|------|------|------|------------------|
| Maier         | 16.4 | 15.5 | 14.3 | 14.2 | 16.5 | 15.4 | 103.6            |
| Kyle          | 15.7 | 15.6 | 15.2 | 13.6 | 16.5 | 15.3 | 103.2            |
| AC Morse      | 15.5 | 15.2 | 15.2 | 14.6 | 15.9 | 15.3 | 103.0            |
| AC Avonlea    | --   | --   | 14.7 | 14.6 | 15.4 | 14.9 | 102.5            |
| Ben           | 16.0 | 15.4 | 14.8 | 13.6 | 16.1 | 15.2 | 102.3            |
| Munich        | 15.8 | 15.6 | 14.0 | --   | 15.9 | 15.3 | 101.3            |
| Belzer        | 15.8 | 15.0 | 13.6 | 14.1 | 15.8 | 14.9 | 100.1            |
| Renville      | 15.2 | 15.4 | 13.3 | 13.7 | 16.6 | 14.8 | 100.0            |
| AC Napoleon   | --   | --   | --   | 13.9 | 16.4 | 15.2 | 100.0            |
| Dilse         | --   | --   | --   | --   | 16.6 | 16.6 | 100.0            |
| Pierce        | --   | --   | --   | 13.4 | 16.6 | 15.0 | 99.0             |
| Mountrail     | 15.6 | 14.8 | 13.5 | 12.9 | 16.3 | 14.6 | 98.5             |
| AC Navigator  | --   | --   | --   | 14.1 | 15.6 | 14.9 | 98.0             |
| Lebsock       | --   | 15.5 | 13.9 | 12.9 | 15.4 | 14.4 | 97.8             |
| Plaza         | 15.5 | 14.2 | 14.0 | 13.2 | 15.6 | 14.5 | 97.7             |
| AC Pathfinder | --   | --   | --   | 13.5 | 14.9 | 14.2 | 93.7             |

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety.

Table 11. Agronomic data obtained from a dryland recrop barley yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.

Planting date: 1 May 2002 Harvest date: 7 August 2002

| Variety             | Days to heading <sup>1</sup> | Height, inches | Protein content | Test wt, lb/bu | Yield bu/acre |
|---------------------|------------------------------|----------------|-----------------|----------------|---------------|
| Haxby               | 60                           | 20             | 12.5            | 47.3           | 35.4 a        |
| MT970116            | 61                           | 22             | 15.7            | 47.8           | 29.5          |
| MT960228            | 62                           | 19             | 14.5            | 45.2           | 28.9          |
| Lewis               | 63                           | 20             | 15.6            | 45.7           | 28.9          |
| Xena                | 63                           | 20             | 14.2            | 45.7           | 28.6          |
| MT970229            | 62                           | 19             | 16.6            | 46.8           | 27.6          |
| Gallatin            | 62                           | 20             | 13.4            | 46.3           | 27.6          |
| H3860224            | 62                           | 19             | 14.4            | 43.7           | 27.2          |
| Harrington          | 62                           | 18             | 13.8            | 43.8           | 27.1          |
| MT960226            | 62                           | 19             | 14.4            | 47.2           | 26.6          |
| Valier              | 63                           | 19             | 13.9            | 46.5           | 26.5          |
| Baronesse           | 62                           | 17             | 13.8            | 45.2           | 26.1          |
| Conlon              | 62                           | 19             | 13.2            | 44.2           | 25.1          |
| MT960099            | 63                           | 16             | 15.2            | 46.1           | 24.4          |
| MT960100            | 63                           | 17             | 16.6            | 47.0           | 23.9          |
| MT960101            | 65                           | 16             | 16.6            | 46.2           | 23.5          |
| mean                | 62                           | 19             | 14.6            | 45.9           | 27.3          |
| probability         | <0.001                       | <0.001         | 0.009           | <0.001         | 0.010         |
| CV (S/mean)         | 0.4                          | 6.0            | 9.1             | 1.6            | 11.2          |
| LSD <sub>0.05</sub> | 1.2                          | 1.9            | 2.2             | 1.2            | 5.1           |

Check variety is Gallatin with an average yield of 27.6 bu/acre.

a indicates significantly greater yield than check variety, Gallatin, at a probability of <0.05

<sup>1</sup> Heading date is number of days from planting

Table 12. Relative yields of barley varieties compared to Gallatin when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar   | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of Gallatin |
|------------|------|------|------|------|------|------|------------------|
| MT960228   | --   | 94.1 | 25.9 | 71.8 | 28.9 | 55.2 | 107.3            |
| Xena       | --   | 88.7 | 26.1 | 67.7 | 28.6 | 52.8 | 102.6            |
| Lewis      | 58.1 | 93.0 | 26.3 | 63.4 | 28.9 | 53.9 | 101.8            |
| Valier     | 53.7 | 97.9 | 25.2 | 65.9 | 26.5 | 53.8 | 101.6            |
| Gallatin   | 59.3 | 85.2 | 25.8 | 67.1 | 27.6 | 53.0 | 100.0            |
| MT970229   | --   | --   | --   | --   | 27.6 | 27.6 | 100.0            |
| Baronesse  | 49.7 | 87.3 | 26.4 | 72.0 | 26.1 | 52.3 | 98.7             |
| MT970116   | --   | --   | --   | 62.9 | 29.5 | 46.2 | 97.6             |
| MT960099   | --   | --   | 26.3 | 66.3 | 24.4 | 39.0 | 97.1             |
| Harrington | 52.6 | 93.3 | 21.8 | 60.8 | 27.1 | 51.1 | 96.5             |
| MT960226   | --   | --   | --   | --   | 26.6 | 26.6 | 96.4             |
| Conlon     | --   | --   | --   | 62.9 | 25.1 | 44.0 | 92.9             |
| MT960100   | --   | --   | 20.3 | 62.6 | 23.9 | 35.6 | 88.6             |
| H3860224   | --   | --   | --   | 53.9 | 27.2 | 40.6 | 85.6             |
| Haxby      | --   | 50.8 | 26.0 | 63.3 | 35.4 | 43.9 | 85.3             |
| MT960101   | --   | --   | --   | --   | 23.5 | 23.5 | 85.1             |

NOTE: Average yields in this summary should not be compared to each other since they are not grown in the same years. Compare yields only to the check variety.

Table 13. Relative test weights of barley varieties compared to Gallatin when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar   | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of Gallatin |
|------------|------|------|------|------|------|------|------------------|
| MT960226   | --   | --   | --   | --   | 47.2 | 47.2 | 101.9            |
| Haxby      | --   | 50.8 | 52.8 | 49.8 | 47.3 | 50.2 | 101.7            |
| MT970116   | --   | --   | --   | 48.7 | 47.8 | 48.3 | 101.3            |
| MT970229   | --   | --   | --   | --   | 46.8 | 46.8 | 101.1            |
| Lewis      | 50.8 | 49.8 | 53.5 | 48.5 | 45.7 | 49.7 | 100.3            |
| Valier     | 50.5 | 48.9 | 52.0 | 49.7 | 46.5 | 49.5 | 100.0            |
| Gallatin   | 50.2 | 48.7 | 53.3 | 49.0 | 46.3 | 49.5 | 100.0            |
| MT960101   | --   | --   | --   | --   | 46.2 | 46.2 | 99.8             |
| MT960100   | --   | --   | 52.0 | 48.7 | 47.0 | 49.2 | 99.4             |
| Baronesse  | 48.7 | 48.8 | 52.2 | 48.5 | 45.2 | 48.7 | 98.3             |
| MT960228   | --   | 48.1 | 52.3 | 47.8 | 45.2 | 48.4 | 98.0             |
| Xena       | --   | 48.0 | 52.3 | 46.7 | 45.7 | 48.2 | 97.7             |
| MT960099   | --   | --   | 51.5 | 47.5 | 46.0 | 48.3 | 97.6             |
| Conlon     | --   | --   | --   | 46.8 | 44.2 | 45.5 | 95.5             |
| Harrington | 46.2 | 46.4 | 51.5 | 47.0 | 43.8 | 47.0 | 94.9             |
| H3860224   | --   | --   | --   | 46.5 | 43.7 | 45.1 | 94.6             |

NOTE: Average test weights in this summary should not be compared to each other since they are not grown in the same years. Compare test weights only to the check variety.

Table 14. Relative heights of barley varieties in inches compared to Gallatin when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar   | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of Gallatin |
|------------|------|------|------|------|------|------|------------------|
| Gallatin   | 28   | 31   | 18   | 28   | 20   | 25.0 | 101.9            |
| MT970116   | --   | --   | --   | 28   | 22   | 25.0 | 101.7            |
| Lewis      | 27   | 28   | 16   | 27   | 20   | 23.6 | 101.3            |
| Xena       | --   | 29   | 17   | 26   | 20   | 23.0 | 101.1            |
| Valier     | 26   | 31   | 15   | 26   | 19   | 23.4 | 100.3            |
| Conlon     | --   | --   | --   | 26   | 19   | 22.5 | 100.0            |
| MT960228   | --   | 30   | 16   | 25   | 19   | 22.5 | 100.0            |
| Harrington | 25   | 29   | 15   | 25   | 18   | 22.4 | 99.8             |
| Haxby      | --   | 28   | 17   | 25   | 20   | 22.5 | 99.4             |
| Baronesse  | 23   | 28   | 15   | 23   | 17   | 21.2 | 98.3             |
| H3860224   | --   | --   | --   | 24   | 19   | 21.5 | 98.0             |
| MT960100   | --   | --   | 14   | 24   | 17   | 18.3 | 97.7             |
| MT960099   | --   | --   | 12   | 23   | 16   | 17.0 | 97.6             |
| MT970229   | --   | --   | --   | --   | 19   | 19.0 | 95.5             |
| MT960226   | --   | --   | --   | --   | 19   | 19.0 | 94.9             |
| MT960101   | --   | --   | --   | --   | 16   | 16.0 | 94.6             |

NOTE: Average heights in this summary should not be compared to each other since they are not grown in the same years. Compare heights only to the check variety.

Table 15. Relative protein contents of barley varieties compared to Gallatin when grown under dryland continuous cropping at the EARC, Sidney, Montana.

| Cultivar   | 1998 | 1999 | 2000 | 2001 | 2002 | Ave  | as % of Gallatin |
|------------|------|------|------|------|------|------|------------------|
| MT970229   | --   | --   | --   | --   | 16.6 | 16.6 | 123.9            |
| MT960101   | --   | --   | --   | --   | 16.1 | 16.1 | 120.1            |
| MT960226   | --   | --   | --   | --   | 14.4 | 14.4 | 107.5            |
| MT960100   | --   | --   | 11.9 | 9.5  | 16.6 | 12.7 | 106.1            |
| MT970116   | --   | --   | --   | 9.7  | 15.7 | 12.7 | 104.1            |
| Lewis      | 11.1 | 11.8 | 11.5 | 10.2 | 15.6 | 12.0 | 104.0            |
| Valier     | 10.9 | 11.8 | 12.2 | 10.2 | 13.9 | 11.8 | 101.9            |
| Baronesse  | 11.0 | 12.0 | 12.2 | 10.0 | 13.8 | 11.8 | 101.9            |
| Harrington | 10.8 | 11.7 | 12.4 | 9.8  | 13.8 | 11.7 | 101.0            |
| MT960099   | --   | --   | 11.9 | 8.8  | 15.2 | 12.0 | 100.3            |
| Gallatin   | 10.3 | 11.8 | 11.4 | 11.0 | 13.4 | 11.6 | 100.0            |
| H3860224   | --   | --   | --   | 9.4  | 14.4 | 11.9 | 97.5             |
| MT960228   | --   | 11.3 | 10.7 | 8.5  | 14.5 | 11.3 | 94.5             |
| Xena       | --   | 10.8 | 11.0 | 8.8  | 14.2 | 11.2 | 94.1             |
| Conlon     | --   | --   | --   | 9.3  | 13.2 | 11.3 | 92.2             |
| Haxby      | --   | 10.9 | 10.4 | 8.8  | 12.5 | 10.7 | 89.5             |

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare protein contents only to the check variety.