**PROJECT TITLE**: Evaluation of spring barley variety performance under no-till recrop conditions near Moccasin, Denton, and Fort Benton.

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**OBJECTIVES**:
To evaluate the performance of spring barley varieties in environments and cropping methods representative of the southern triangle and central Montana.

**RESULTS**:
Yield – Yields ranged from 47.3 to 59.7 bu/a at Moccasin and from 16.1 to 21.9 bu/a at Fort Benton (Table 1). Yields at Fort Benton were well below average due to low rainfall. Dry spring conditions contributed to uneven germination at the Denton site and the nursery was abandoned. The yield of Xena was high at both locations harvested although differences in yield between varieties were not significant at either site. Stressful growing conditions contributed to the increased variability. Multiple year yield summaries from each location are listed in Tables 3-5.

Test Weight – Test weights were near average this year with a nursery average of 49.6 lbs/bu at Moccasin and 48.1 lbs/bu at Fort Benton (Table 1).

Protein – Proteins were above average at both locations ranging from 15.5 to 18.3 percent at Moccasin and from 16.8 to 20.3 percent at Fort Benton (Table 1). High protein levels are not normally associated with average test weights.

Heading Date – Heading dates at Moccasin ranged from 183 to 188 days with all varieties heading within the first week of July (Table 2).

Plant Height – Plant heights ranged from 24 to 31 inches at Moccasin and from 16 to 22 inches at Fort Benton (Table 2). Lewis and Stark were among the tallest of the varieties grown at either location.

Plump Percent and Thin – Despite low moisture levels, the percentage of plump kernels for several varieties was satisfactory. Percent plump values for Moccasin ranged from 8.2 to 68 percent, with Xena, Harrington, Baronesse, and Stark all having values greater than 50 percent. Percent plump values at Fort Benton ranged from 24.3 to 80.1 percent.

**SUMMARY**: The trial at Moccasin was planted re-crop after canola and the trial at Fort Benton followed winter wheat. Barley yields ranged from average to well below average depending on the location and the amount of rainfall received.

**FUTURE PLANS**:
Spring barley variety evaluations will continue at Moccasin, Denton, and Fort Benton.

Table 1. 2001 Spring barley yield, test weight, and protein performance in Central Montana.
Exp. 3600 Central Agricultural Research Center, Moccasin, MT.

| | | ---------- Grain Yield ---------- | | | ---------- Test Weight ---------- | | | ------ Grain Protein ------ | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ID | Pedigree | Moccasin | Fort Benton | Average | Moccasin | Fort Benton | Average | Moccasin | Fort Benton | Average |
| | | bu/a | bu/a | bu/a | lbs/bu | lbs/bu | lbs/bu | % | % | % |
| BZ594-19 | Xena | **59.7** | 20.9 | 40.3 | 50.1 | 47.4 | 48.8 | 15.7 | 17.5 | 16.6 |
| SK76333 | Harrington | 57.2 | **16.1** | 36.7 | 48.1 | **46.6** | 47.3 | 16.6 | 18.6 | 17.6 |
| MTLB5 | MTLB5 | 55.0 | 17.7 | 36.4 | 50.5 | 47.0 | 48.8 | **15.5** | **20.3** | 17.9 |
| MT950186 | MT950186 | 50.5 | **21.9** | 36.2 | 50.0 | 49.8 | 49.9 | 16.9 | 17.1 | 17.0 |
| MTLB13 | MTLB13 | 53.5 | 18.7 | 36.1 | 47.9 | 46.7 | 47.3 | 16.9 | 19.2 | 18.1 |
| CI15856 | Lewis | 53.1 | 18.9 | 36.0 | 50.7 | 48.4 | 49.6 | 16.7 | 19.4 | 18.0 |
| PI568246 | Baronesse | 54.0 | 17.6 | 35.8 | 48.5 | 47.1 | 47.8 | 16.8 | 18.3 | 17.6 |
| PI491534 | Gallatin | 52.1 | 19.0 | 35.5 | 51.4 | 49.4 | 50.4 | 15.7 | 17.3 | 16.5 |
| MT970116 | Klages/Baronesse | 53.0 | 18.0 | 35.5 | **51.8** | **49.8** | 50.8 | 16.4 | 17.1 | 16.8 |
| MT960099 | Manley/Baronesse | 49.5 | 21.3 | 35.4 | **47.3** | 48.5 | 47.9 | 18.0 | 17.7 | 17.9 |
| H3860224 | Lewis/Apex | 53.6 | 16.9 | 35.3 | 50.0 | 48.6 | 49.3 | 16.8 | 19.6 | 18.2 |
| PI610264 | Valier | 53.3 | 17.2 | 35.3 | 50.0 | 48.0 | 49.0 | **18.3** | 18.5 | 18.4 |
| MT960228 | Stark/Baronesse | 49.8 | 19.5 | 34.7 | 48.1 | 46.9 | 47.5 | 17.9 | 17.2 | 17.6 |
| MT960100 | Manley/Baronesse | 51.8 | 17.2 | 34.5 | 49.6 | 49.4 | 49.5 | 17.5 | 19.0 | 18.3 |
| ND9866 | Stark | 48.8 | 17.8 | 33.3 | 51.6 | 49.7 | 50.7 | 15.8 | **16.8** | 16.3 |
| ND13299 | Conlin | **47.3** | 18.8 | 33.1 | 47.8 | **46.6** | 47.2 | 17.1 | 18.0 | 17.5 |
| Mean | | 52.6 | 18.6 | 35.6 | 49.6 | 48.1 | 48.9 | 16.8 | 18.2 | 17.5 |
| CV (s/mean)*100 | | 8.5 | 14.6 | | 2.2 | 2.2 | | 0.0 | | |
| LSD (0.05) | | ns | ns | | 1.8 | 1.7 | | 0.0 | | |

High and low entries for each location are in bold and entries are listed by mean yield.

| | | |
|---|---|---|
| Planting Date: | 4/19/01 | 4/23/01 |
| Harvest Date: | 8/13/01 | 8/16/01 |
| Previous Crop: | Canola | Winter Wheat |
| Fertilizer (lbs N/a) | 77.0 | 90.0 |
| Growing Season Precipitation: | 7.3 | 4.7 |
| Producer/Cooperator: | | Birkeland |

Table 2. 2001 Spring barley heading date, lodging, plant height, and grain plumpness in Central Montana.
Exp. 3600 Central Agricultural Research Center, Moccasin, MT.

| ID | Pedigree | Heading Date* | Lodging Prevalence** | Lodging Severity*** | ---------- Plant Height ---------- Moccasin | F Benton | Average | ---- Plump ---- Moccasin | F Benton | ------ Thin ------ Moccasin | F Benton |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | day | % | degree | inches | inches | inches | % | % | % | % |
| BZ594-19 | Xena | 186 | 100 | 10 | 28.7 | 20.0 | 24.3 | 65.0 | 64.8 | 11.5 | 12.0 |
| SK76333 | Harrington | 186 | 90 | 10 | 27.7 | 18.0 | 22.8 | 55.5 | 54.6 | 16.9 | 16.0 |
| MTLB5 | MTLB5 | 186 | 0 | 0 | 28.0 | 18.0 | 23.0 | 35.8 | 30.9 | 26.4 | 32.2 |
| MT950186 | MT950186 | 184 | 90 | 10 | 28.0 | 17.0 | 22.5 | 28.2 | 57.5 | 29.8 | 13.5 |
| MTLB13 | MTLB13 | 185 | 80 | 10 | 27.0 | 18.0 | 22.5 | 20.1 | **24.3** | 43.5 | **36.9** |
| CI15856 | Lewis | 185 | 100 | 10 | 30.0 | 20.0 | 25.0 | 44.1 | 48.4 | 23.1 | 21.7 |
| PI568246 | Baronesse | 187 | 90 | 10 | 25.3 | 19.0 | 22.2 | 59.3 | 58.3 | 15.2 | 14.6 |
| PI491534 | Gallatin | 184 | 100 | 10 | 29.0 | 20.0 | 24.5 | 41.2 | 61.3 | 24.0 | 13.5 |
| MT970116 | Klages/Baronesse | **183** | 100 | 10 | 30.7 | 18.0 | 24.3 | 67.6 | **80.1** | **10.2** | **5.7** |
| MT960099 | Manley/Baronesse | **188** | 0 | 0 | 24.0 | **16.0** | 20.0 | **8.2** | 35.1 | **61.8** | 27.6 |
| H3860224 | Lewis/Apex | **188** | 40 | 30 | 28.0 | 20.0 | 24.0 | 67.9 | 59.7 | 10.0 | 15.3 |
| PI610264 | Valier | 186 | 80 | 10 | 29.0 | 18.0 | 23.5 | 35.7 | 38.9 | 28.0 | 23.6 |
| MT960228 | Stark/Baronesse | 186 | 100 | 10 | 27.3 | 18.0 | 22.7 | 22.4 | 43.1 | 37.3 | 24.4 |
| MT960100 | Manley/Baronesse | **188** | 0 | 0 | **24.3** | **16.0** | 20.2 | 27.6 | 56.4 | 30.0 | 13.8 |
| ND9866 | Stark | **183** | 20 | 45 | **31.0** | **22.0** | 26.5 | **68.0** | 75.4 | 10.9 | 7.1 |
| ND13299 | Conlin | 184 | 0 | 0 | 27.7 | **22.0** | 24.8 | 23.9 | 43.9 | 37.4 | 21.4 |
| Mean | | 185.4 | 61.9 | 10.9 | 27.9 | 18.8 | 23.3 | 41.9 | 52.0 | 26.0 | 18.7 |
| CV (s/mean)*100 | | 0.6 | 0.0 | 0.0 | 4.6 | 2.2 | | 29.6 | 17.7 | 31.6 | 31.2 |
| LSD (0.05) | | 1.8 | 0.0 | 0.0 | 2.1 | 1.7 | | 20.7 | 15.3 | 13.7 | 9.7 |

High and low entries for each location are in bold and entries are listed by mean yield.

* Heading date is the day from January 1, 2001 and was recorded for the Moccasin site only.

** Lodging prevalence is the percentage of plot that is lodged and ranges from 0-100; lodging notes were taken at the Moccasin site only.

*** Lodging severity is the angle of lodging from vertical measured in degrees; 0=vertical, 90= horizontal.

Table 3. 2001 Moccasin re-crop barley multi-year yield summary of selected varieties.

Exp. 3670 Central Agricultural Research Center, Moccasin, MT.

| Selected Varieties | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Average | Hector Same Years |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ---------- | ---------- | ---------- | bu/a | ---------- | ---------- | ---------- | ---------- | | | |
| Hector | 58 | 66 | 47 | 66 | 30 | 69 | 43 | 57 | 53 | - | 54.3 | - |
| Harrington | 45 | 62 | 44 | 65 | 31 | 71 | 36 | 50 | 51 | 57 | 51.2 | 54.3 |
| Lewis | 55 | 66 | 44 | 58 | 33 | 76 | 37 | 58 | 54 | 53 | 53.4 | 54.3 |
| Bowman | 56 | 62 | 35[1/] | 63 | 33 | 64 | 39 | 58 | 52 | - | 51.3 | 54.3 |
| Gallatin | 53 | 58 | 48 | 56 | 30 | 67 | 39 | 60 | 49 | 52 | 51.2 | 54.3 |
| Chinook | 48 | 68 | 40 | 68 | 28 | 73 | 43 | 52 | 51 | - | 52.3 | 54.3 |
| Stark | 58 | 60 | 38 | 58 | 32 | 70 | 42 | 51 | 51 | 49 | 50.9 | 54.3 |
| Baronesse | 59 | 76 | 44 | 63 | 33 | 73 | 44 | 54 | 57 | 54 | 55.7 | 54.3 |
| Xena | | | | | | | | 53 | 57 | 60 | 56.6 | 55.0 |
| Valier | | | | | | | | 56 | 50 | 53 | 53.1 | 55.0 |
| Nursery Mean | 52.6 | 64.3 | 42.1 | 63.5 | 30.6 | 71.7 | 41.8 | 54.9 | 53.2 | 52.6 | | |
| Precipitation in inches: (Apr - Jul) | 9.1 | 12.1 | 8.0 | 13.4 | 5.7 | 11.3 | 9.4 | 6.6 | 7.3 | 7.3 | | |

[1/] Bowman experienced animal damage in the 1994 trial.

Table 4. 2001 Denton re-crop barley multi-year yield summary of selected varieties.

Exp. 3671 Central Agricultural Research Center, Moccasin, MT.

| Selected Varieties | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001* | Average | Hector Same Years |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | bu/a | | | | | | | |
| Hector | 68 | 45 | 90 | 41 | 66 | 32 | 67 | 40 | 37 | 52 | - | 53.8 | - |
| Harrington | 59 | 37 | 102 | 33 | 70 | 25 | 68 | 40 | 33 | 47 | - | 51.4 | 53.8 |
| Lewis | 68 | 33 | 101 | 41 | 69 | 31 | 79 | 34 | 31 | 55 | - | 54.2 | 53.8 |
| Bowman | 51 | 37 | 99 | 42 | 67 | 29 | 65 | 37 | 29 | 56 | - | 51.2 | 53.8 |
| Gallatin | 65 | 39 | 100 | 40 | 68 | 31 | 78 | 38 | 31 | 55 | - | 54.5 | 53.8 |
| Chinook | 72 | 30 | 106 | 37 | 70 | 30 | 79 | 41 | 30 | 50 | - | 54.6 | 53.8 |
| Stark | 70 | 36 | 105 | 41 | 71 | 32 | 75 | 40 | 30 | 53 | - | 55.3 | 53.8 |
| Baronesse | 71 | 37 | 121 | 38 | 73 | 31 | 73 | 41 | 27 | 52 | - | 56.4 | 53.8 |
| Xena | | | | | | | | | 34 | 56 | - | 44.7 | 44.4 |
| Valier | | | | | | | | | 27 | 48 | - | 37.5 | 44.4 |
| Nursery Mean | 65.0 | 36.8 | 104.0 | 38.0 | 67.9 | 29.8 | 72.3 | 39.3 | 31.6 | 51.8 | | | |
| Precipitation in inches (Apr - Jul) | 8.6 | 6.8 | 15.6 | 7.3 | 12.7 | 5.4 | 10.8 | 11.7 | 5.3 | 8.3 | 5.8 | | |

* Trial was not harvested in 2001 because of extreme uneven germination throughout the trial.

1992 trial was planted re-crop on pea ground in 1992. 1996 trial was planted re-crop following buckwheat. 1997 trial was planted re-crop following millet. Only two reps were harvested in 1998 due to extremely uneven germination in one replication.

Table 5. 2001 Fort Benton re-crop barley multi-year yield summary of selected varieties.

Exp. 3672 Central Agricultural Research Center, Moccasin, MT.

| Selected Varieties | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Average | Hector Same Years |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ---------- bu/a ---------- | | | | | | | | | | | |
| Hector | 21 | 69 | 65 | 56 | 48 | 74 | 31 | 76 | 21 | - | 51.2 | - |
| Harrington | 21 | 68 | 54 | 64 | 51 | 68 | 23 | 67 | 19 | 16 | 45.1 | 51.2 |
| Lewis | 19 | 73 | 61 | 50 | 53 | 77 | 31 | 72 | 27 | 19 | 48.2 | 51.2 |
| Bowman | 20 | 75 | 59 | 59 | 44 | 84 | 35 | 73 | 30 | - | 53.2 | 51.2 |
| Gallatin | 28 | 66 | 63 | 52 | 46 | 67 | 29 | 77 | 14 | 19 | 46.1 | 51.2 |
| Chinook | 20 | 74 | 66 | 67 | 55 | 80 | 29 | 74 | 28 | - | 54.8 | 51.2 |
| Stark | 19 | 71 | 62 | 51 | 52 | 71 | 34 | 74 | 37 | 18 | 48.9 | 51.2 |
| Baronesse | 24 | 75 | 72 | 73 | 49 | 81 | 34 | 82 | 29 | 18 | 53.7 | 51.2 |
| Xena | | | | | | | | 82 | 32 | 21 | 45.0 | 48.5 |
| Valier | | | | | | | | 75 | 27 | 17 | 39.7 | 48.5 |
| Nursery Mean | 22.5 | 71.2 | 63.0 | 62.2 | 49.8 | 71.3 | 30.6 | 75.4 | 26.8 | 18.8 | | |
| Precipitation in inches (Apr - Jul) | 9.3 | 18.4 | 4.9 | 14.9 | 6.3 | 8.7 | 5.5 | 7.1 | 3.9 | 4.7 | | |

All trials were planted on re-crop ground. The 1992-1996 trials were located on Ron Long's farm and the 1997-2001 trials were located at the Birkeland farm.