

PROJECT TITLE: Dryland and Irrigated Spring Barley Performance near Molt, Ryegate and Huntley, Montana. (Exps. 993691, 993692 and 993693).

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

METHODS: Each 1999 off-station spring barley trial had 16 entries and was planted using a randomized complete block design with three replications. Test plots consisted of a 15-foot, 4-row plot with 12-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 per bushel test weight. Test weight (pounds per bushel) and percent grain moisture content were obtained for each plot using a Dickey-john GAC 2100 grain analyzer. Grain protein (%) was determined for each entry bulked across replications and is reported on a 100% dry matter basis. Plant height was measured in inches from the soil surface to the top of the head, excluding the awns if present. Reported values have been rounded to the nearest inch. Heading date was noted at the Huntley dryland site when 50% of the heads in a plot had extended above the flag leaf collar. Heading dates were recorded in Julian days (number of days from January 1) for statistical purposes. Corresponding calendar dates also are presented.

RESULTS and SUMMARY: Agronomic performance of the spring barley cultivars and experimental lines tested during 1999 near Molt is presented in Table 1. The Molt site received severe hail damage close to boot stage thus affecting cultivar performance. Molt dryland spring barley yields averaged 38.8 bu/ac. Test weights averaged 45.0 lb/bu. There was no significant difference in grain yield or test weight between entries at Molt. Grain protein averaged 15.0 percent and ranged from 16.3 percent for 'Chinook' to 13.9 percent for 'MT960228'.

Agronomic performance of the spring barley cultivars and experimental lines tested during 1999 near Ryegate is presented in Table 2. Ryegate dryland spring barley yields averaged 63.8 bu/ac and ranged from 74.3 bu/ac for 'MT950186' to 47.3 bu/ac for 'Bowman'. 'Baronesse', 'Gallatin', 'MT920073', 'Stark' and 'Xena' produced grain yields between 66.6 and 72.7 bu/ac, which was equal to the yield of MT950186. Test weights averaged 45.2 lb/bu and no entry produced a test weight greater than 48 lb/bu. Grain protein averaged 16.6 percent and ranged from 17.6 percent for 'Valier' to 15.1 percent for Stark.

Agronomic performance of the spring barley cultivars and experimental lines tested during 1999 near Huntley is presented in Table 3. Huntley dryland spring barley yields averaged 64.4 bu/ac and ranged from 70.7 bu/ac for MT950186 to 56.0 bu/ac for 'Harrington'. Bowman, Chinook, 'Hector', MT920073, 'MTLB 13', 'MTLB 6', Stark and Xena produced grain yields between 64.1 and 70.2 bu/ac, which was equal to the yield of MT950186. Test weights averaged 46.5 lb/bu

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with Bowman, Hector, 'Lewis', MT950186 and Stark producing test weights greater than 48 lb/bu. Grain protein averaged 17.0 percent and ranged from 18.3 percent for MTLB 6 to 15.2 percent for Stark.

Multi-location yield comparisons are presented in Table 4. Multi-location average agronomic performance is presented in Table 5. Across the three locations, spring barley yields averaged 55.5 bu/ac. MT950186 at 63.6 bu/ac and Xena at 60.3 bu/ac were the highest yields cultivars overall. Across locations, average test weight was 45.6 lb/bu, with no entry producing an average test weight greater than 48 lb/bu. Grain protein averaged 16.2 percent across the three locations.

FUTURE PLANS:

Off-station dryland spring barley variety evaluations will continue in 2000 at Molt and Ryegate. Off station irrigated spring barley variety evaluations will be initiated at Bridger and Hysham in 2000.

Table 1. Performance of 16 spring barley cultivars and experimental lines tested under dryland conditions near Molt, Montana during 1999. Cultivars listed alphabetically. (Exp. 993691).

Cultivar	1/	Test Weight	Grain Moisture	Plant Height	2/
	Grain Yield				Grain Protein
	bu/ac	lb/bu	%	inches	%
Baronesse	35.9	43.7	7.8	20	14.2
Bowman	32.4	43.8	8.7	18	14.7
Chinook	33.2	47.2	8.3	21	16.3
Gallatin	42.4	45.6	9.5	20	14.9
Harrington	52.0	45.1	8.1	21	14.1
Hector	37.1	45.0	8.2	21	14.9
Lewis	31.5	46.6	8.9	18	16.4
MT920073	37.3	46.8	9.0	21	14.8
MT950186	45.7	48.8	8.6	21	14.1
MT960228	37.1	46.8	8.3	19	13.9
MTLB 13	38.5	43.4	8.3	18	15.6
MTLB 5	42.4	44.4	8.1	20	15.2
MTLB 6	32.9	44.2	8.4	18	15.8
Stark	33.0	42.5	8.0	19	14.9
Valier	41.6	45.7	8.4	19	15.5
Xena	40.0	41.1	8.2	20	14.2
Average	38.3	45.0	8.4	20	15.0
LSD (p=0.05)	ns	ns	ns	ns	-
CV%	18.4	7.0	9.8	8.8	-

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.

2/ Proteins are reported on a 100% dry matter basis.

ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Molt Dryland Spring Barley (Exp. 993691)

Planted: April 20, 1999
Harvested: August 11, 1999
Fertility: 46-00-00, 100 lb/ac, preplant incorporated, by cooperators, date unknown
11-52-00, 100 lb/ac, in-furrow, April 20, 1999
34-00-00, 88 lb/ac, broadcast, June 5, 1999
Herbicide: Buctril, 1 pt/ac; Harmony Extra, 0.3 oz/ac; R-11, 1 % v/v, June 18, 1999
Insecticide: none
Previous Crop: summer fallow
Precipitation: not available
Other: hit by severe hailstorm, June 17, 1999

Table 2. Performance of 16 spring barley cultivars and experimental lines tested under dryland conditions near Ryegate, Montana during 1999. Cultivars listed alphabetically. (Exp. 993692).

Cultivar	1/	Test Weight	Grain Moisture	Plant Height	2/
	Grain Yield				Grain Protein
	bu/ac	lb/bu	%	inches	%
Baronesse	72.3*	44.0	7.4	30	17.3
Bowman	47.3	45.8	7.1	32	15.9
Chinook	63.0	45.9	7.4	33	16.9
Gallatin	67.0*	46.6	7.4	31	17.3
Harrington	64.3	43.2	7.2	30	17.4
Hector	55.0	44.7	7.4	33	16.6
Lewis	56.3	45.0	7.7	31	17.2
MT920073	67.0*	46.3	7.3	30	16.8
MT950186	74.3**	47.7	7.1	32	16.2
MT960228	62.7	44.1	6.8	30	16.4
MTLB 13	63.0	43.7	7.2	28	16.6
MTLB 5	62.7	44.9	7.4	30	16.4
MTLB 6	63.7	44.9	7.4	28	16.8
Stark	66.7*	47.2	7.3	32	15.1
Valier	63.3	45.8	7.5	30	17.6
Xena	72.7*	44.1	7.2	32	15.7
Average	63.8	45.2	7.3	31	16.6
LSD (p=0.05)	9.0	1.3	ns	ns	-
CV%	8.5	1.7	4.1	5.6	-

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.

2/ Proteins are reported on a 100% dry matter basis.

** Indicates highest yielding cultivar.

* Indicates cultivars yielding equal to highest yielding cultivar 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).

Ryegate Dryland Spring Barley (Exp. 993692)

Planted: March 26, 1999
 Harvested: August 10, 1999
 Fertility: 11-52-00, 100 lb/ac, in-furrow, March 26, 1999
 34-00-00, 88 lb/ac, broadcast, June 5, 1999
 Herbicide: Buctril, 1 pt/ac; Harmony Extra, 0.3 oz/ac; R-11, 1 % v/v,
 June 18, 1999
 Insecticide: none
 Previous Crop: summer fallow
 Precipitation: not available

Table 3. Performance of 16 spring barley cultivars and experimental lines tested under dryland conditions near Huntley, Montana during 1999. Cultivars listed alphabetically. (Exp. 993693).

Cultivar	1/	Test Weight	Grain Moisture	Plant Height	2/	Heading Date	
	Grain Yield				Grain Protein	Julian	Calendar
	bu/ac	lb/bu	%	inches	%		
Baronesse	61.3	44.4	8.2	27	17.6	179	Jun 28
Bowman	70.2*	50.9	8.3	32	15.4	163	Jun 12
Chinook	64.1*	47.5	8.4	30	18.1	175	Jun 24
Gallatin	61.4	46.4	8.3	30	17.8	165	Jun 14
Harrington	56.0	44.1	8.3	29	17.4	177	Jun 26
Hector	67.0*	48.5	8.1	32	17.1	167	Jun 16
Lewis	62.2	48.1	8.4	29	17.9	169	Jun 18
MT920073	65.2*	45.6	8.1	29	17.0	165	Jun 14
MT950186	70.7**	49.0	8.5	31	15.5	170	Jun 19
MT960228	60.7	42.4	8.3	28	16.8	179	Jun 28
MTLB 13	67.4*	45.4	8.2	28	17.2	177	Jun 26
MTLB 5	60.7	44.9	8.4	28	18.4	179	Jun 28
MTLB 6	65.1*	47.7	8.5	27	18.3	176	Jun 25
Stark	66.6*	50.2	8.5	35	15.2	166	Jun 15
Valier	63.1	45.6	8.5	29	17.7	179	Jun 28
Xena	68.2*	42.6	8.3	32	15.4	176	Jun 25
Average	64.4	46.5	8.3	30	17.0	173	Jun 22
LSD (p=0.05)	6.9	2.4	0.2	2.1	-	1	
CV%	6.4	3.1	1.4	4.3	-	0.4	

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.

2/ Proteins are reported on a 100% dry matter basis.

** Indicates highest yielding cultivar.

* Indicates cultivars yielding equal to highest yielding cultivar based on Fisher's protected LSD (p=0.05).

Huntley Dryland Spring Barley (Exp. 993693)

Planted: April 6, 1999
 Harvested: August 4, 1999
 Fertility: 18-46-00, 100 lb/ac, preplant incorporated, September 15, 1998
 34-00-00, 88 lb/ac, broadcast, May 28, 1999
 Herbicide: Buctril, 1 pt/ac; Harmony Extra, 0.3 oz/ac; R-11, 1 % v/v, May 27, 1999
 Insecticide: Malathion 5EC, 1 pt/ac; R-11, 1 % v/v, June 21, 1999
 Previous Crop: summer fallow
 Precipitation: 5.69 inches

Table 4. Grain yield^{1/} of 16 spring barley cultivars and experimental lines tested across three dryland locations in south central Montana during 1999. Cultivars listed by three location average yield. (Exps. 993691, 993692, 993693).

Cultivar	Location			Average	Location
	Molt	Ryegate	Huntley		
	-----bu/ac-----				
MT950186	45.7		74.3**	70.7**	63.6**
Xena	40.0		72.7*	68.2*	60.3*
Harrington	52.0		64.3	56.0	57.4
Gallatin	42.4		67.0*	61.4	56.9
Baronesse	35.9		72.3*	61.3	56.5
MT920073	37.3		67.0*	65.2*	56.5
MTLB 13	38.5		63.0	67.4*	56.3
Valier	41.6		63.3	63.1	56.0
Stark	33.0		66.7*	66.6*	55.4
MTLB 5	42.4		62.7	60.7	55.3
MTLB 6	32.9		63.7	65.1*	53.9
MT960228	37.1		62.7	60.7	53.5
Chinook	33.2		63.0	64.1*	53.4
Hector	37.1		55.0	67.0*	53.0
Lewis	31.5		56.3	62.2	50.0
Bowman	32.4		47.3	70.2*	50.0
Average	38.3		63.8	64.4	55.5
LSD (p=0.05)	ns		9.0	6.9	5.3
CV%	18.4		8.5	6.4	10.2

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.

** Indicates highest yielding cultivar.

* Indicates cultivars yielding equal to highest yielding cultivar 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 5. Performance of 16 spring barley cultivars and experimental lines tested across three dryland locations in south central Montana during 1999. Cultivars listed alphabetically. (Exps. 993691, 993692, 993693).

Cultivar	1/	Test Weight	Grain Moisture	Plant Height	2/	Heading Date	
	Grain Yield				Grain Protein	Julian	Calendar
	bu/ac	lb/bu	%	inches	%		
Baronesse	56.5	44.1	7.8	26	16.4	179	Jun 28
Bowman	50.0	46.8	8.0	27	15.4	163	Jun 12
Chinook	53.4	46.9	8.0	28	17.1	175	Jun 24
Gallatin	56.9	46.2	8.4	27	16.7	165	Jun 14
Harrington	57.5	44.1	7.9	27	16.3	177	Jun 26
Hector	53.0	46.0	7.9	29	16.2	167	Jun 16
Lewis	50.0	46.6	8.4	26	17.1	169	Jun 18
MT920073	56.5	46.2	8.1	27	16.2	165	Jun 14
MT950186	63.6**	48.5	8.1	28	15.3	170	Jun 19
MT960228	53.5	44.4	7.8	26	15.7	179	Jun 28
MTLB 13	56.3	44.2	8.0	25	16.5	177	Jun 26
MTLB 5	55.3	44.7	8.0	26	16.7	179	Jun 28
MTLB 6	53.9	45.2	8.1	24	17.0	176	Jun 25
Stark	55.4	46.6	8.0	29	15.0	166	Jun 15
Valier	56.0	45.7	8.1	26	16.9	179	Jun 28
Xena	60.3*	42.6	7.9	28	15.1	176	Jun 25
Average	55.5	45.6	8.0	27	16.2	173	Jun 22
LSD (p=0.05)	5.3	1.9	0.4	1.5	-	<1	
CV%	10.2	4.5	6.4	5.9	-	0.3	
Location Years	3	3	3	3	3	1	

1/ Yields are based on 48 pound standard bushel weight and adjusted to 13.0 percent moisture content.

2/ Proteins are reported on a 100% dry matter basis.

** Indicates highest yielding cultivar within a column.

* Indicates cultivars yielding equal to highest yielding cultivar in a column based on Fisher's protected LSD (p=0.05).