RESULTS OF AGRONOMIC AND WEED SCIENCE RESEARCH CONDUCTED IN SOUTH CENTRAL MONTANA - 2012

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.

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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 2012 off-station spring barley trials were conducted under dryland conditions near Huntley, Billings and Broadview, and under irrigation near Fromberg and Hysham Montana (Fig. 1). Twenty spring barley entries comprised of 15 commercial cultivars and 5 experimental lines, representing both feed and malt types, were grown at all locations.

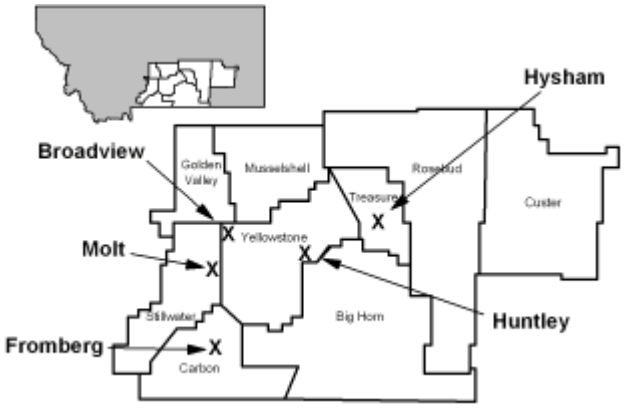

Figure 1. 2012 off-station spring barley trial locations in south central Montana.

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 2012 spring barley test sites were relatively dry during the winter months, with below average rain or snow accumulating in September, November, December and February. Below average precipitation occurred from April through August, while above average precipitation occurred only in March (1.04 inches). Drought throughout the growing season coupled with above averaged temperatures (4.5 degrees higher than long term average) resulted in early maturity and poor spring barley production under all dryland sites. Spring barley was harvested earlier at most sites this year.

The dryland spring barley yield at the Huntley location averaged 73 bu/a in 2012 (Table 1). Yields ranged from 60 bu/a for experimental line 'MT010158' to 80 bu/a for 'Haxby'. Eight other commercial spring barley cultivars produced yields from 72 to 78 bu/a, statistically equal to the yields of Haxby at this location. Average test weight was relatively low with an average of 45.7 lb/bu, with all entries except 'Baronesse', and Haxby having test weight values lower than 48 lb/bu. Grain protein content averaged 14.5 percent. Protein content ranged from 13.6 percent to 15.9 percent. Most spring barley cultivars produced low proportion of plump kernels, averaging only 24 percent of the harvested grain. Proportion of plump kernels ranged from 2.3 percent to 45.6 percent. The measured level of thin kernels averaged 28.2 percent and ranged from 15.7 to 48.8 percent. Two-year (2011 - 2012) average yield for barley cultivars tested at Huntley was 68 bu/a. 'Craft' was the highest yielding cultivar (76 bu/a) over the past two years.

Spring barley 2012 dryland trial at Billing averaged 41 bu/a (Table 2). Billings is the new dryland site replacing Molt in 2012. Yields ranged from 30 bu/a for 'CDC Cowboy' to 45 bu/a for 'Eslick'. Spring barley test weights were low and averaged only 46.6 lb/bu. Only three entries produced test weight values heavier than 48 lb/bu. Grain protein content averaged 15.4 percent. All barley entries have protein content over 14 percent. Plump and thin kernels averaged 27 and 39 percent, respectively. 'Moravian 115' was the only entry with moderately high plump kernels in the harvested grain with 63.4 percent plump kernels.

Dryland spring barley yields at Broadview were severely affected by drought and averaged only 21 bu/a, lowest among all locations tested in 2012. Yield varied from 16 bu/a for 'Tradition' to 26 bu/a for experimental lines MT070158 and 'MT070159' (Table 3). 'Baronesse' and 'Champion' were the highest yielding commercial cultivars yielding 25 bu/a. Average test weight was 49.5 lb/bu. All entries, except 'Gallatin', and Moravian 115, produced test weight values heavier

than 48 lb/bu. Grain protein content averaged 8.9 percent and ranged from 7.8 to 10.2 percent. The percentage of plump kernels was only 25 percent in the harvested grain. Moravian 115 was the only entry which produced more than 50 percent plump kernels. Percentage of thin kernels averaged 42.4 percent. Two-year and three-year average yield for barley varieties tested during 2010 to 2012 at Broadview did not differ significantly.

Spring barley lodging was high at Fromberg in 2012 for most of the entries, averaging a lodging score of 7.6 out of 9. (Table 4). Lodging score varied from 4.3 for MT010158 to 9 for Moravian 115. The average spring barley yield at Fromberg in 2012 was 106 bu/a and ranged from 84 bu/a to 124 bu/a (Table 4). The entries were not significantly for grain yield. The test weight was low and averaged 45.6 lb/bu. Experimental line MT010158 was the only entry that produced test weight heavier than 48 lb/bu. Grain protein content was high and averaged 18.7 percent and ranged from 17.5 percent for Tradition to 20.3 percent for 'Conrad'. The average percentage of plump kernels was 57 percent in the harvested grain. Experimental line MT010158 produced the highest percent plump kernels. Among commercial entries 'CDC Cowboy' produced the highest percent plump kernels. Percentage of thin kernels averaged 27.3 percent. Two-year and three-year average yield for barley varieties tested during 2010 to 2012 at Fromberg did not differ significantly.

Average spring barley yield under irrigation at Hysham in 2012 was 107 bu/a (Table 5). Lodging was relatively low for most cultivars at Hysham in 2012 with an average lodging score of 2.7 out of 9. The tallest cultivar CDC Cowboy had the highest lodging score. Spring barley yield ranged from 73 bu/a for CDC cowboy to 156 bu/a for Moravian 115. Average test weight was 53.6 lb/bu. All entries tested at Hysham produced test weight more than 50 lb/bu. Grain protein averaged 14.0 percent and ranged from 11.9 to 15.2 percent. Barley quality was excellent at Hysham where mean percent plump and thin kernels were 95.6 and 1.4 percent, respectively. No statistical difference in two-year and three-year average yield was observed for spring barley entries tested at Hysham.

SUMMARY:

Drought throughout the 2012 growing season and higher than normal temperatures caused spring barley yield reduction at dryland sites and hasten spring barley maturity. At dryland test sites test weight and kernel plumpness were adversely affected by drought in 2012. Averaged across all locations as well as under irrigated conditions the commercial cultivar Moravian 115 was the highest yielding cultivar in 2012 (Tables 6 and 8). 'Champion' was the highest yielding commercial cultivar across dryland locations in 2012 with averaged yield of 49 bu/a (Tables 6 and 9). Averaged over the past two years (2011-2012) 'Craft' has been the highest yielding commercial barley grown under dryland conditions producing 49 bu/a (Table 9). Under irrigated condition for the past three years (2010-2012) malt barley cultivars Moravian 69 and Moravian 115 were the top performer averaging 112 and 125 bu/a respectively (Table 8).

Table 1. Performance of 20 spring barley cultivars and experimental lines tested under dryland conditions near Huntley, Montana during 2012. Cultivars listed alphabetically. (Exp. 123690).

Cultivar	Grain Yield 1/ 2012	Grain Yield 1/ 2011-2012	Grain Yield 1/ 2010-2012	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	67.0	65.4	76.0	45.5	8.8	15.6	22.7	27.3	29.7	170.7	18-Jun
Baronesse	**73.8***	**69.8***	82.9	48.1	8.8	14.5	39.7	15.7	30.7	172.3	20-Jun
CDC Cowboy	62.0			47.3	9.0	15.8	44.4	16.6	38.2	169.0	17-Jun
Champion	**79.7***			47.7	8.9	14.2	10.2	37.5	26.9	169.3	17-Jun
Conrad	72.1	67.5	78.9	45.0	8.7	14.3	37.8	19.9	26.4	174.0	22-Jun
Craft	**78.4***	**76.3***	81.8	46.1	8.8	14.4	17.5	34.7	27.6	173.0	21-Jun
Eslick	**74.2***			45.2	8.6	14.7	2.3	53.9	25.9	174.3	22-Jun
Gallatin	**72.8***	**70.6****	81.0	46.9	8.9	13.7	23.9	27.3	29.9	170.7	18-Jun
Geraldine	64.7	65.1	80.1	44.3	8.6	15.4	13.3	48.8	27.3	174.3	22-Jun
Harrington	71.2	66.2	76.7	44.5	8.7	14.7	30.1	21.5	27.2	170.7	18-Jun
Haxby	**80.2****	**73.9***	78.9	48.6	9.1	14.4	8.6	46.2	29.7	172.3	20-Jun
Hockett	**74.4***	**70.5***	81.1	46.7	9.1	13.7	32.4	20.4	28.3	171.0	19-Jun
Moravian 115	66.4	59.4	72.0	40.2	8.2	15.8	44.6	14.7	22.3	174.3	22-Jun
Moravian 69	**78.4***	**72.6***	82.8	47.2	8.8	13.6	45.6	22.3	31.1	172.7	20-Jun
Tradition	**73.0***	**70.2***		46.7	8.7	14.1	15.3	35.6	33.1	169.0	17-Jun
Experimental											
MT010158	59.6	60.7	70.9	45.3	8.7	15.9	24.0	22.7	26.4	172.7	20-Jun
MT010160	70.4	66.3	76.5	44.9	8.7	14.5	11.2	32.4	27.3	171.3	19-Jun
MT070158	**77.3***			45.5	8.8	13.7	27.2	19.2	25.3	174.0	22-Jun
MT070159	**78.2***			44.7	8.8	13.6	17.7	24.9	24.7	174.0	22-Jun
MT080279	**77.9***			44.1	8.6	13.8	18.3	25.1	25.3	172.3	20-Jun
Average	72.6	68.2	78.4	45.7	8.8	14.5	24.3	28.3	28.2	172.1	20-Jun
PLSD (p=0.05)	7.7	7.2	ns	1.3	0.2	0.9	8.2	8.6	3.6	3.1	
CV%	6.4	6.8	6.7	1.8	1.5	3.8	20.3	18.4	7.8	1.1	

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 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. 123690)

Planted:	April 9, 2012
Harvested:	July 26, 2012
Fertility:	60-20-0, 220 lb/a, preplant application
Herbicide:	Harmony Extra 0.66/a, Axial XL 16 oz/a, and Hat Trick 32 oz/a
Previous Crop:	chemical fallow
Precipitation:	3.48 inches

Table 2. Performance of 20 spring barley cultivars and experimental lines tested under dryland conditions near Billings, Montana during 2012. Cultivars listed alphabetically. (Exp. 123691).

Cultivar	1/ Grain Yield 2012	2011-2012	2010-2012	Test Weight	Grain Moisture	2/ Grain Protein	Plump Kernels	Thin Kernels	Plant Height
	-------- bushels/acre --------			- lb/bu -	- % -	- % -	- % -	- % -	- inches -
Commercial									
AC Metcalfe	**41.6***	--	--	46.6	8.7	15.4	36.1	31.2	24.8
Baronesse	**43.7***	--	--	49.0	8.8	15.2	36.1	29.0	24.7
CDC Cowboy	30.0	--	--	46.3	8.7	17.0	26.7	33.2	28.9
Champion	**42.7***	--	--	47.8	8.8	15.6	12.8	51.1	23.4
Conrad	**39.4***	--	--	45.9	8.5	15.4	36.1	35.1	23.6
Craft	**43.8***	--	--	45.6	8.6	14.7	15.9	50.9	18.6
Eslick	**44.6****	--	--	44.4	8.1	16.4	2.5	76.2	18.5
Gallatin	**40.0***	--	--	45.5	8.5	15.7	27.9	36.2	21.0
Geraldine	**42.9***	--	--	45.5	8.6	15.3	7.6	60.3	20.5
Harrington	**43.2***	--	--	46.7	8.7	15.8	26.0	40.9	21.9
Haxby	**41.5***	--	--	49.0	8.7	15.7	17.5	41.4	21.7
Hockett	**40.4***	--	--	48.4	8.8	14.2	36.6	30.5	20.5
Moravian 115	**41.1***	--	--	46.0	8.7	14.3	63.4	14.6	17.8
Moravian 69	**41.8***	--	--	47.6	8.8	14.7	47.0	25.0	22.2
Tradition	37.0	--	--	47.9	8.5	15.1	26.4	37.1	25.7
Experimental									
MT010158	33.9	--	--	46.7	8.6	16.4	19.0	41.2	24.5
MT010160	**40.5***	--	--	46.6	8.7	15.3	14.7	45.0	23.6
MT070158	**40.6***	--	--	46.7	8.7	15.4	28.9	34.6	18.8
MT070159	**43.0***	--	--	45.5	8.6	15.2	25.5	41.0	21.0
MT080279	**41.0***	--	--	45.3	8.4	15.4	25.3	24.1	20.6
Average	40.6			46.6	8.6	15.4	26.6	38.9	22.1
PLSD (p=0.05)	6.3			1.4	0.3	ns	10.6	14.3	3.7
CV%	9.4			1.8	1.8	6.4	24.2	22.4	10.1

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).

Billings Dryland Spring Barley (Exp. 123691)

Planted:	March 23, 2013
Harvested:	August 3, 2012
Fertility:	46-0-0, 100 lb/a preplant; 11-52-0, 60 lb/in Furrows at planting
Herbicide:	RT3 22 oz./a pre-emerged application on March 26, 2012
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 2012. Cultivars listed alphabetically. (Exp. 123692).

Cultivar	Grain Yield 1/ 2012	Grain Yield 1/ 2011-2012	Grain Yield 1/ 2010-2012	Test Weight	Grain Moisture	Grain Protein 2/	Plump Kernels	Thin Kernels	Plant Height
	-------- bushels/acre --------			- lb/bu -	- % -	- % -	- % -	- % -	- inches -
Commercial									
AC Metcalfe	18.5	26.2	32.5	49.4	8.8	9.6	25.1	38.6	21.1
Baronesse	**24.5***	28.1	38.4	53.1	8.9	7.8	44.0	24.3	20.7
CDC Cowboy	20.0			49.2	8.7	10.1	34.6	33.8	22.8
Champion	**24.6***			51.5	8.9	7.8	10.2	61.4	19.6
Conrad	18.4	24.4	37	48.1	8.6	9.2	38.5	30.9	20.2
Craft	**20.8***	24.8	30.8	48.0	8.5	9.0	16.8	51.3	16.5
Eslick	18.6			51.1	9.1	7.9	3.9	73.3	17.7
Gallatin	**20.9***	27.6	34.4	46.1	8.2	9.1	18.3	48.3	19.9
Geraldine	20.2	24.9	34.4	49.5	8.8	9.7	12.7	59.8	19.2
Harrington	**22.0***	23.9	30.9	50.1	8.8	7.9	24.7	41.6	19.4
Haxby	19.7	22.7	28.7	52.7	9.1	8.5	18.3	44.0	20.6
Hockett	**21.1***	22.8	28.5	51.9	8.9	8.4	34.7	29.9	18.2
Moravian 115	19.8	24.1	34.9	45.7	8.0	10.0	51.9	21.5	17.3
Moravian 69	**23.1***	27.7	37.8	49.0	8.3	8.7	33.9	33.5	21.0
Tradition	16.1	27.8		48.5	8.2	9.2	21.6	47.0	22.4
Experimental									
MT010158	18.5	22.9	34.2	49.2	8.5	10.2	30.9	32.2	22.3
MT010160	**23.2***	25.3	34.8	49.8	8.7	9.2	26.1	37.8	19.9
MT070158	**25.5***			49.7	8.7	9.3	18.5	50.9	18.8
MT070159	**25.5****			48.2	8.4	8.9	21.1	41.9	17.8
MT080279	**24.4***			49.7	8.7	8.4	19.9	46.5	18.8
Average	21.3	25.2	33.6	49.5	8.6	8.9	25.3	42.4	19.7
PLSD (p=0.05)	5.2	ns	ns	3.0	0.6	ns	10.9	11.2	1.7
CV%	14.7	21.5	15.7	3.6	4.2	13.1	20.1	16.0	5.4

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. 123692)

Planted:	April 2, 2012
Harvested:	August 9, 2012
Fertility:	n/a
Herbicide:	RT3 22 oz/a pre-emergence, April 5, 2012
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 2012. Cultivars listed alphabetically. (Exp. 123794).

Cultivar	1/ Grain Yield 2012	2011-2012	2010-2012	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	97.3	98.6	105.1	45.8	8.6	20.2	39.3	38.3	39.5	7.7
Baronesse	94.7			46.6	8.4	19.2	56.4	26.9	37.5	8.0
CDC Cowboy	95.2			48.5	8.6	17.7	72.4	17.3	37.8	6.0
Champion	118.9			46.4	8.6	18.8	49.9	31.9	35.8	8.0
Conrad	106.0	110.7	109.4	44.3	8.5	20.3	59.1	26.8	35.3	7.7
Craft	101.7	122.1	114.0	44.4	8.4	19.5	54.0	32.5	34.6	7.7
Eslick	103.7			46.0	8.4	18.2	42.6	36.5	33.3	7.7
Gallatin	104.0	109.3	104.7	46.5	8.6	19.0	56.0	30.1	36.0	8.0
Geraldine	96.1			45.7	8.5	19.3	53.8	31.9	36.1	7.3
Harrington	84.3			42.4	8.3	19.3	46.8	34.3	37.0	8.7
Haxby	93.6	108.4	102.1	47.5	8.6	19.3	61.6	26.0	34.8	8.3
Hockett	101.1			47.0	8.9	18.9	65.8	21.3	33.7	7.7
Moravian 115	124.8	123.3	127.0	42.2	8.4	17.7	59.6	21.5	33.7	9.0
Moravian 69	119.4	127.8	125.5	46.4	8.8	16.8	66.9	21.5	36.7	7.0
Tradition	116.9	111.4		46.6	8.4	17.5	70.5	14.2	37.8	6.7
Experimental										
MT010158	125.3	127.1	122.1	50.4	9.0	16.4	83.4	7.9	37.7	4.3
MT010160	113.6	116.3	112.3	45.4	8.6	20.1	53.1	30.7	34.8	7.3
MT070158	100.6			45.2	8.6	19.4	58.0	26.7	33.6	7.3
MT070159	113.0			43.1	8.4	18.7	48.5	33.6	33.1	8.3
MT080279	108.1			42.6	8.3	18.4	44.9	35.5	31.5	8.3
Average	105.9	115.5	113.6	45.6	8.5	18.7	57.1	27.3	35.5	7.6
PLSD (p=0.05)	ns	ns	ns	2.9	ns	1.6	19.1	14.5	3.8	1.8
CV%	16.3	12.8	14.6	3.9	4.2	5.3	20.3	32.3	6.4	15.0

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. 123794)

Planted:	March 22,, 2012
Harvested:	August 8, 2012
Fertility:	100 lb N/a preplant; 70 lb/a 11-52-0 at planting
Herbicide:	n/a
Previous Crop:	n/a
Irrigation:	overhead sprinkler

Table 5. Performance of 20 spring barley cultivars and experimental lines tested under irrigated conditions near Hysham, Montana during 2012. Cultivars listed alphabetically. (Exp. 123795).

Cultivar	1/ Grain Yield 2012	2011-2012	2010-2012	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	88.3	95.6	86.5	53.8	8.9	14.0	95.6	1.5	45.3	1.7
Baronesse	91.9	101.0	96.0	53.9	8.8	15.0	95.8	1.6	46.2	3.0
CDC Cowboy	72.5			52.8	8.9	15.2	95.3	1.7	55.0	7.0
Champion	112.3			54.4	8.8	14.8	96.2	1.2	42.8	4.0
Conrad	114.7	109.4	99.2	54.0	8.9	14.9	97.2	0.9	41.2	1.3
Craft	121.5	111.4	101.8	53.6	8.7	13.8	94.6	1.7	42.1	3.0
Eslick	117.1			54.1	8.9	13.4	93.1	1.8	40.7	3.0
Gallatin	97.9	104.5	92.4	54.6	9.1	14.2	95.2	1.3	44.5	1.3
Geraldine	111.1	105.3	96.3	54.1	8.8	14.2	94.4	2.0	42.8	2.3
Harrington	82.8	92.1	91.1	53.3	8.8	14.5	95.0	1.3	44.1	2.3
Haxby	93.0	101.1	93.1	54.4	8.7	13.1	97.6	0.6	42.1	2.3
Hockett	92.5	104.1	95.6	54.4	9.0	14.0	96.3	1.3	43.2	4.0
Moravian 115	**156.2****	131.0	122.6	51.4	8.8	12.8	93.8	2.6	34.6	1.3
Moravian 69	88.5	97.3	97.8	53.3	8.7	11.9	96.5	1.6	43.2	2.3
Tradition	110.0	111.7		51.6	8.4	14.0	94.9	1.2	42.5	3.3
Experimental										
MT010158	102.8	100.7	92.3	53.5	8.7	13.5	96.8	1.1	43.0	1.0
MT010160	105.1	101.3	90.3	54.2	8.9	13.8	96.2	1.0	44.2	0.3
MT070158	114.1			53.7	8.8	14.3	96.0	1.2	41.5	3.7
MT070159	138.4			53.5	8.9	13.8	96.2	1.1	38.2	3.0
MT080279	134.2			53.4	8.7	13.7	96.3	1.2	40.7	2.7
Average	107.2	104.7	96.5	53.6	8.8	14.0	95.6	1.4	42.9	2.7
PLSD (p=0.05)	14.3	ns	ns	0.6	0.2	1.2	2.1	ns	2.3	2.6
CV%	8.1	10.3	13.6	0.7	1.5	5.1	1.3	41.7	3.3	58.3

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. 123795)	
Planted:	April 10, 2012
Harvested:	August 2, 2012
Fertility:	60 lb N/a preplant, 70 lb/a 11-52-0 at planting; 100 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 2012. Varieties listed by declining five-location average yield.

Cultivar	Dryland				Irrigated			Five Location Average
	Huntley	Billings	Broadview	Ave.	Fromberg	Hysham	Ave.	
	bushels/acre							
Moravian 115	66.4	**41.1***	19.8	42.4	124.8	**156.2****	**140.5****	**81.7****
MT070159	**78.2***	**43.0***	**25.5****	**48.9***	113.0	138.4	**125.7***	**79.6***
MT080279	**77.9***	**41.0***	**24.4***	**47.8***	108.1	134.2	**121.2***	**77.1***
Champion	**79.7***	**42.7***	**24.6***	**49.0****	118.9	112.3	**115.6***	**75.6***
Craft	**78.4***	**43.8***	**20.8***	**47.7***	101.7	121.5	111.6	**73.2***
Eslick	**74.2***	**44.6****	18.6	**45.8***	103.7	117.1	110.4	**71.6***
MT070158	**77.3***	**40.6***	**25.5***	**47.8***	100.6	114.1	107.3	**71.6***
Tradition	**73.0***	37.0	16.1	42.0	116.9	110.0	113.4	**70.6***
MT010160	70.4	**40.5***	**23.2***	**44.7***	113.6	105.1	109.3	**70.5***
Moravian 69	**78.4***	**41.8***	**23.1***	**47.8***	119.4	88.5	103.9	**70.2***
Conrad	72.1	**39.4***	18.4	43.3	106.0	114.7	110.3	**70.1***
MT010158	59.6	33.9	18.5	37.4	125.3	102.8	114.1	68.0
Gallatin	**72.8***	**40.0***	**20.9***	**44.6***	104.0	97.9	101.0	67.1
Geraldine	64.7	**42.9***	20.2	42.6	96.1	111.1	103.6	67.0
Hockett	**74.4***	**40.4***	**21.1***	**45.3***	101.1	92.5	96.8	65.9
Baronesse	**73.8***	**43.7***	**24.5***	**47.3***	94.7	91.9	93.3	65.7
Haxby	**80.2****	**41.5***	19.7	**47.1***	93.6	93.0	93.3	65.6
AC Metcalfe	67.0	**41.6***	18.5	42.4	97.3	88.3	92.8	62.5
Harrington	71.2	**43.2***	**22.0***	**45.5***	84.3	82.8	83.5	60.7
CDC Cowboy	62.0	30.0	20.0	37.3	95.2	72.5	83.9	56.0
Average	72.6	40.6	21.3	44.8	105.9	107.2	106.6	69.5
PLSD (p=0.05)	7.7	6.3	5.2	5.3	ns	14.3	25.6	12.6
CV%	6.4	9.4	14.7	8.8	16.3	8.1	12.8	13.2

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 2012. Cultivars listed alphabetically.

Cultivar	1/ Grain Yield 2012	1/ Grain Yield 2011-2012	1/ Grain Yield 2010-2012	Test Weight	Grain Moisture	2/ Grain Protein	Plump Kernels	Thin Kernels	Plant Height
	-------- bushels/acre --------			- lb/bu -	- % -	- % -	- % -	- % -	- inches -
Commercial									
AC Metcalfe	62.5	68.1	68.7	48.2	8.8	14.1	43.8	27.4	32.1
Baronesse	65.7			50.1	8.7	13.4	54.4	19.5	32.0
CDC Cowboy	56.0			48.8	8.8	14.3	54.7	20.5	36.5
Champion	**75.6***			49.6	8.8	13.4	35.8	36.6	29.7
Conrad	**70.1***	73.7	**75.5***	47.4	8.7	13.9	53.8	22.7	29.3
Craft	**73.2***	79.2	**77.6***	47.5	8.6	13.4	39.7	34.2	27.9
Eslick	**71.6***			48.2	8.6	13.3	28.9	48.3	27.2
Gallatin	67.1	73.8	73.5	47.9	8.7	13.4	44.2	28.6	30.2
Geraldine	67.0			47.8	8.6	13.9	36.4	40.5	29.2
Harrington	60.7			47.4	8.7	13.5	44.5	27.9	29.9
Haxby	65.6	72.6	71.7	50.4	8.8	13.3	40.7	31.7	29.8
Hockett	65.9			49.7	8.9	13.0	53.2	20.7	28.8
Moravian 115	**81.7****	79.6	**81.4****	45.1	8.4	13.3	62.7	15.0	25.2
Moravian 69	**70.2***	76.9	**79.4***	48.7	8.7	12.3	58.0	20.8	30.8
Tradition	**70.6***	75.5		48.3	8.5	13.2	45.7	27.0	32.3
Experimental									
MT010158	68.0	73.0	73.3	49.0	8.7	13.6	50.8	21.0	30.8
MT010160	**70.5***	73.2	73.1	48.2	8.7	13.7	40.3	29.4	30.0
MT070158	**71.6***			48.2	8.7	13.5	45.7	26.5	27.6
MT070159	**79.6***			47.0	8.6	13.2	41.8	28.5	27.0
MT080279	**77.1***			47.0	8.5	13.1	41.0	26.5	27.4
Average	69.5	74.6	74.9	48.2	8.7	13.4	45.8	27.7	29.7
PLSD (p=0.05)	12.6	ns	7.6	1.6	0.2	ns	10.3	9.6	2.1
CV%	13.2	12.8	13.5	2.6	2.9	6.5	15.3	24.4	6.4
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 2012. Cultivars listed alphabetically.

Cultivar	Grain Yield 1/ 2012	Grain Yield 1/ 2011-2012	Grain Yield 1/ 2010-2012	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	92.8	97.1	95.8	49.8	8.8	15.5	67.5	19.9	42.4	4.7
Baronesse	93.3			50.3	8.6	15.5	76.1	14.2	41.9	5.5
CDC Cowboy	83.9			50.6	8.8	14.9	83.9	9.5	46.4	6.5
Champion	**115.6***			50.4	8.7	15.2	73.0	16.6	39.3	6.0
Conrad	110.3	110.1	104.3	49.1	8.7	16.0	78.2	13.8	38.3	4.5
Craft	111.6	116.7	107.9	49.0	8.6	15.1	74.3	17.1	38.4	5.3
Eslick	110.4			50.0	8.6	14.4	67.9	19.2	37.0	5.3
Gallatin	101.0	106.9	98.5	50.6	8.9	15.1	75.6	15.7	40.2	4.7
Geraldine	103.6			49.9	8.6	15.2	74.1	16.9	39.4	4.8
Harrington	83.5			47.9	8.5	15.4	70.9	17.8	40.6	5.5
Haxby	93.3	104.7	97.6	50.9	8.7	14.7	79.6	13.3	38.5	5.3
Hockett	96.8			50.7	9.0	14.9	81.0	11.3	38.5	5.8
Moravian 115	**140.5****	127.2	**124.8****	46.8	8.6	13.8	76.7	12.0	34.2	5.2
Moravian 69	103.9	112.5	**111.6***	49.9	8.8	13.0	81.7	11.6	40.0	4.7
Tradition	113.4	111.5		49.1	8.4	14.4	82.7	7.7	40.2	5.0
Experimental										
MT010158	114.1	113.9	107.2	51.9	8.9	13.6	90.1	4.5	40.4	2.7
MT010160	109.3	108.8	101.3	49.8	8.8	15.4	74.7	15.9	39.5	3.8
MT070158	107.3			49.4	8.7	15.3	77.0	14.0	37.5	5.5
MT070159	**125.7***			48.3	8.7	14.7	72.4	17.4	35.6	5.7
MT080279	**121.2***			48.0	8.5	14.6	70.6	18.4	36.1	5.5
Average	106.6	110.9	105.4	49.6	8.7	14.8	76.4	14.3	39.2	5.1
PLSD (p=0.05)	25.6	ns	13.6	ns	ns	1.4	ns	ns	4.5	ns
CV%	12.8	12.1	13.7	2.6	3.1	5.3	10.8	43.5	4.8	26.5
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 2012. Cultivars listed alphabetically.

Cultivar	1/ Grain Yield 2012	2011-2012	2010-2012	Test Weight	Grain Moisture	2/ Grain Protein	Plump Kernels	Thin Kernels	Plant Height
	-------- bushels/acre --------			- lb/bu -	- % -	- % -	- % -	- % -	- inches -
Commercial									
AC Metcalfe	42.4	**45.0***	52.5	47.1	8.8	13.1	28.0	32.3	25.2
Baronesse	**47.3***	**47.9***	58.2	50.1	8.8	12.0	39.9	23.0	25.4
CDC Cowboy	37.3			47.6	8.8	13.8	35.2	27.9	30.0
Champion	**49.0****			49.0	8.9	12.1	11.1	50.0	23.3
Conrad	43.3	**44.6***	55.3	46.3	8.6	12.5	37.5	28.7	23.4
Craft	**47.7***	**49.2****	54.5	46.6	8.6	12.3	16.7	45.6	20.9
Eslick	**45.8***			46.9	8.6	12.6	2.9	67.8	20.7
Gallatin	**44.6***	**47.3***	55.2	46.2	8.5	12.4	23.3	37.3	23.6
Geraldine	42.6	**44.6***	55.2	46.4	8.7	13.0	11.2	56.3	22.3
Harrington	**45.5***	**44.7***	52.3	47.1	8.8	12.3	26.9	34.7	22.8
Haxby	**47.1***	**46.9***	52.1	50.1	9.0	12.4	14.8	43.9	24.0
Hockett	**45.3***	**45.4***	52.8	49.0	8.9	11.7	34.6	26.9	22.4
Moravian 115	42.4	41.6	51.7	43.9	8.3	12.9	53.3	16.9	19.2
Moravian 69	**47.8***	**48.5***	57.7	47.9	8.6	11.9	42.1	26.9	24.8
Tradition	42.0	**46.6***		47.7	8.5	12.4	21.1	39.9	27.1
Experimental									
MT010158	37.4	40.2	49.9	47.1	8.6	13.7	24.6	32.1	24.4
MT010160	**44.7***	**44.7***	53.5	47.1	8.7	12.6	17.3	38.4	23.6
MT070158	**47.8***			47.3	8.8	12.4	24.9	34.9	21.0
MT070159	**48.9***			46.1	8.6	12.1	21.4	35.9	21.2
MT080279	**47.8***			46.3	8.6	12.1	21.2	31.9	21.5
Average	44.8	45.5	53.9	47.3	8.7	12.5	25.4	36.6	23.3
PLSD (p=0.05)	5.3	4.7	ns	1.9	0.3	1.0	8.7	9.1	2.5
CV%	8.8	10.6	9.4	2.6	2.7	7.3	23.8	19.3	8.2
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).