



## RESULTS OF AGRONOMIC AND WEED SCIENCE RESEARCH CONDUCTED IN SOUTH CENTRAL MONTANA - 2005

The Annual Report of the Investigations at and Administration of the  
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- PROJECT TITLE:** Off-Station Spring Barley Variety Performance Trials in South Central Montana. (Exps. 053691, 053692, 053794 and 053795). 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:** Off-station spring barley trials were conducted under dryland conditions near Molt and Ryegate, and under flood irrigation near Fromberg and Hysham, Montana (Fig. 1). Twenty spring barley entries (16 commercial cultivars, 4 experimental lines) were planted at Molt and Ryegate, while 22 entries (18 commercial cultivars, 4 experimental lines) were planted at Fromberg and Hysham. Both feed and malt type cultivars were grown at all locations, but the dryland sites were more oriented towards feed and hay type barley cultivars whereas malt types dominated the barley entries tested on the irrigated sites. The Ryegate trial was no-till recropped into pea stubble.
- 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<sup>2</sup>) under dryland conditions and 1.1 million seeds per acre (~24 seed per foot<sup>2</sup>) under irrigation. Actual seeding rates were calculated from the thousand kernel weight determined for the seed lot of each cultivar (Table 1), and varied from 39 to 73 pounds per acre for the dryland sites and from 67 to 124 pounds per acre under irrigation. Seeding rates were not adjusted for germination. Dryland test plots established on conventional summer fallow consisted of a 15-foot, 4-row plot with 12-inch row spacing. Dryland test plots no-till planted into chemical fallow consisted of a 15-foot, 4-row plot with 14-inch row spacing. Irrigated test plots consisted of a 15-foot, 7-row plot with 6-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%

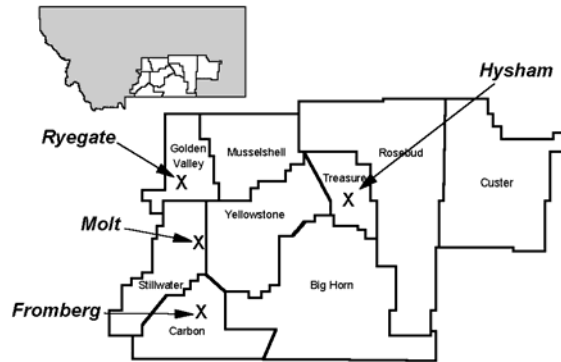


Figure 1. 2005 off-station spring barley trial locations in south central Montana.

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 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. Lodging severity was recorded on a 0 to 9 scale representing no lodging to all stems lying flat on the ground, respectively. 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.

Table 1. Adjusted seeding rates used to establish 22 spring barley cultivars tested at four off-station sites in south central Montana during 2005.

Cultivar	Thousand Kernel Weight	Seeds per Pound	1/ Dryland Seeding Rate		2/ Irrigated Seeding Rate	
			grams per plot	pounds per acre	grams per plot	pounds per acre
	grams	#	grams	pounds	grams	pounds
Haxby	41.7	10,878	35.8	57	53.0	97
Baronesse	42.6	10,660	36.5	58	54.1	99
MT970229	49.8	9,116	42.7	68	63.3	116
Boulder	48.0	9,461	41.2	66	61.0	111
Eslick	44.2	10,269	37.9	61	56.2	103
Xena	40.8	11,132	35.0	56	51.8	95
Calgary	37.8	12,004	--	--	48.1	88
Harrington	45.0	10,097	38.6	62	57.1	104
Copeland	40.6	11,177	34.8	56	51.6	94
Conrad	42.4	10,696	36.4	58	53.9	99
Kendall	28.7	15,817	24.6	39	36.5	67
Merit	37.4	12,140	32.1	51	47.5	87
Metcalfe	43.3	10,487	37.1	59	55.0	101
MT910189	51.0	8,907	43.7	70	64.8	118
MT960101	42.3	10,742	36.3	58	53.7	98
MT970116	53.5	8,481	45.9	73	68.0	124
Drummond	30.4	14,928	26.1	42	38.7	71
Legacy	33.6	13,520	28.8	46	42.7	78
Morex	36.5	12,449	--	--	46.4	85
Robust	36.6	12,412	31.4	50	46.5	85
Tradition	28.7	15,808	24.6	39	36.5	67
Hays	47.1	9,643	40.4	65	59.8	109

1/ Equivalent to 0.6 million seeds per acre (14 seeds per foot<sup>2</sup>) on a mass basis.

2/ Equivalent to 1.1 million seeds per acre (24 seeds per foot<sup>2</sup>) on a mass basis.

## **RESULTS:**

All spring barley test locations planted in the spring of 2005 experienced dry conditions over-winter, but either possessed enough surface soil moisture or received enough precipitation to facilitate germination and emergence. Spring barley stands appeared fairly uniform at all sites two to three weeks after planting. Moisture conditions below the top few inches of the soil surface remained marginal for extended growth at the dryland sites. Dry conditions prevailed during spring growth until mid-May, when late-spring rains produced above average precipitation for the region during May, June and into early July. Huntley received slightly more than 8 inches of precipitation during this period in 2005, nearly double the 4.5 inches this location normally receives from May 1 through the first week of July. Hot, dry weather resumed in early July, hastening maturation of the crop.

The 2005 spring barley trial at Molt produced an average yield of 12.6 bu/ac (Table 2), about 1/4 the average yield produced by spring barley tested at this location in 2004. Grain yields ranged from 19.3 bu/ac for 'Conrad' to 3.6 bu/ac for 'Hays'. Seven commercial entries ('Boulder', 'Eslick', 'Baronesse', 'Harrington', 'Xena', 'Merit' and 'CDC Copeland') produced yields that ranged from 16.3 to 14.2 bu/ac, statistically equal to that of the highest yielding entry. Average test weight was 45.7 pounds per bushel. Grain protein content averaged 12.0 percent and ranged from 10.9 to 13.1 percent. Two-year average yield for barley varieties tested during 2004 and 2005 at Molt averaged 29.5 bu/ac. Three-year average yield for barley varieties tested during 2003, 2004 and 2005 in Molt averaged 24.6 bu/ac. There was no significant difference in yield between entries tested for the past two or three years at this location.

The Ryegate trial suffered from grasshopper damage, but was harvested in 2005 (Table 3). The trial averaged 26.0 bu/ac. Grain yields ranged from 46.0 bu/ac for Boulder to 7.5 bu/ac for 'Haxby'. Three commercial entries (Hays, Merit and Baronesse) produced yields that ranged from 36.2 to 33.1 bu/ac, statistically equal to that of Boulder, the highest yielding entry at this location. Average barley test weight at Ryegate was 42.9 pounds per bushel, nearly 3 pounds per bushel lighter than the barley test weight observed at the Molt dryland location. Grain protein content averaged 13.2 percent and ranged from 10.9 to 15.7 percent.

The average spring barley yield at Fromberg in 2005 was 107.7 bu/ac and ranged from 128.2 for Xena to 79.2 bu/ac for 'Robust' (Table 5). No statistical differences in grain yield were detected between spring barleys tested at Fromberg during 2005. Average test weight across all entries tested at Fromberg for 2005 was 50.8 lb/bu. Grain protein averaged 14.1 percent and ranged from 13.1 to 15.1 percent. Mean percent plump and thin kernels were 88.0 and 5.3 percent, respectively. Two-year average yield for spring barley varieties tested during 2004 and 2005 at Fromberg averaged 101.1 bu/ac. Three-year average yield for spring barley varieties tested during 2003 to 2005 averaged 105.2 bu/ac with 'Craft', a new malt barley release from MSU, producing the highest yield at 115.1 bu/ac. Baronesse, 'Legacy', Merit, 'Drummond', 'AC Metcalfe' and 'Harrington' produced yields from 102.9 to 115.0 bu/ac, statistically equal to the yield of Craft for past three years of testing at this location.

The average spring barley yields under irrigated condition at Hysham was 101.6 bu/ac (Table 6). Spring barley yields ranged from 84.5 bu/ac for Eslick to 117.2 for Harrington. No statistical differences in grain yield were detected between spring barleys tested at Hysham during 2005. Average test weight across all entries tested at Hysham for 2005 was 50.1 lb/bu. Grain protein averaged 13.6 percent and ranged from 12.6 to 14.8 percent. Mean percent plump and thin kernels were 86.1 and 6.3 percent, respectively. Two-year average yield for barley varieties tested during 2004 and 2005 in Hysham averaged 115.2 bu/ac. Three-year average yield for barley varieties tested from 2003 to 2005 in Hysham averaged 107.2 bu/ac.

**SUMMARY:**

Higher spring barley yields were observed under dryland conditions at the Ryegate in 2005 compared to the previous year. This improvement was largely due to more favorable soil moisture conditions at planting and during early growth periods before flowering occurred. Lingering effects of the prolonged drought were still evident during grain fill. The Molt trial also suffered from drought conditions. Discerning yield differences and predicting relative performance among barley entries is difficult under such stressful conditions.

Averaged across both the Hysham and Fromberg locations for the past three years, Baronesse has been the highest yielding barley grown under irrigation averaging 115.0 bu/ac (Table 7). Merit, AC Metcalfe, Legacy, Craft, Harrington and Drummond produced irrigated yields equal to those of Baronesse for the past three years.

**FUTURE PLANS:**

Off-station spring barley variety evaluations will continue in 2006 at the Molt, Ryegate, Fromberg and Hysham locations.

Table 2. Performance of 20 spring barley cultivars and experimental lines tested under dryland conditions near Molt, Montana during 2005. Cultivars listed alphabetically. (Exp. 053691).

Cultivar	1/			Test Weight	Grain Moisture	2/			Plant Height
	2005	Grain Yield 2004-2005	2003-2005			Grain Protein	Plump Kernels	Thin Kernels	
	bushels/acre			lb/bu	%	%	%	%	inches
AC Metcalfe	9.1	22.0		44.6	9.3	13.0	55.0	19.3	20.9
Baronesse	<b>15.5*</b>	33.0	28.1	46.5	9.4	11.9	56.5	18.0	21.7
Boulder	<b>16.3*</b>			47.0	9.5	11.1	60.4	16.9	20.0
CDC Copeland	<b>14.2*</b>	33.4		44.7	9.5	11.7	67.9	14.5	22.8
CDC Kendall	12.0			45.3	9.5	13.1	71.7	12.4	21.8
Conrad	<b>19.3**</b>			46.3	9.2	12.6	69.1	13.3	23.4
Craft (MT970116)	10.5	25.2	23.5	46.7	9.2	11.2	64.9	13.7	22.5
Drummond	9.7			45.0	8.9	11.9	50.3	21.7	21.0
Eslick	<b>16.0*</b>	30.6	25.2	47.0	9.4	11.4	44.8	22.6	21.7
Harrington	<b>15.4*</b>	29.3	25.0	44.5	9.1	13.0	68.3	13.8	23.0
Haxby	10.2	31.8	26.5	50.7	9.8	11.1	54.5	19.4	21.5
Hays	3.6	23.5	17.8	41.9	9.3	13.1	25.5	45.1	17.8
Legacy	11.0			45.4	8.9	10.9	42.3	25.7	20.3
Merit	<b>14.5*</b>			43.8	9.4	12.3	59.7	18.3	22.4
Robust	7.9			44.7	9.2	11.7	36.4	33.5	21.1
Tradition	9.2	31.2		45.0	8.7	12.2	50.0	22.6	21.1
Xena	<b>14.6*</b>			46.2	9.3	12.0	54.4	19.4	20.7
MT910189	<b>13.0*</b>	31.9		45.1	9.3	10.9	65.8	13.5	21.4
MT960101	<b>14.3*</b>			45.4	9.2	11.4	42.9	27.5	20.2
MT970229	<b>15.5*</b>	32.9	26.5	47.8	9.6	12.8	74.2	8.7	23.2
Average	12.6	29.5	24.6	45.7	9.3	12.0	55.7	20.0	21.4
PLSD (p=0.05)	6.7	ns	ns	--	--	--	--	--	ns
CV%	32.4	25.9	27.2	--	--	--	--	--	9.0

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

2/ Grain protein values determined from bulked samples and adjusted to a 100 percent dry matter 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).

#### Molt Dryland Spring Barley (Exp. 053691)

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Planted: April 4, 2005  
Harvested: August 16, 2005  
Fertility: 11-52-00, 100 lbs/a at planting  
Herbicide: none applied  
Insecticide: none applied  
Previous Crop: summer fallow  
Precipitation: n/a

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Table 3. Performance of 20 spring barley cultivars and experimental lines tested under dryland conditions near Ryegate, Montana during 2005. Cultivars listed alphabetically. (Exp. 053691).

Cultivar	1/	Test Weight	Grain Moisture	2/	Plump Kernels	Thin Kernels	Plant Height
	Grain Yield			Grain Protein			
	bu/ac	lb/bu	%	%	%	%	inches
AC Metcalfe	24.9	40.9	8.3	15.7	21.1	37.8	35.4
Baronesse	<b>33.1*</b>	42.0	8.2	12.9	55.3	16.0	33.0
Boulder	<b>46.0**</b>	45.5	8.9	12.3	63.1	14.0	32.0
CDC Copeland	32.3	39.6	8.2	15.2	42.1	26.7	38.1
CDC Kendall	18.1	42.2	8.5	13.5	77.9	10.6	35.7
Conrad	29.9	39.7	8.5	14.7	20.0	44.7	32.1
Craft (MT970116)	27.6	45.9	8.9	11.5	75.5	10.3	36.3
Drummond	13.0	44.1	8.2	13.3	63.7	15.5	35.1
Eslick	13.6	43.3	8.5	12.9	39.9	27.0	37.2
Harrington	20.4	39.4	8.3	14.5	48.4	22.5	37.2
Haxby	7.5	44.2	7.9	14.4	31.6	34.2	35.3
Hays	<b>36.2*</b>	42.6	8.3	12.0	61.4	14.0	32.5
Legacy	18.7	43.5	8.6	13.0	61.9	16.6	37.8
Merit	<b>35.6*</b>	38.9	8.3	14.5	41.5	26.6	32.4
Robust	24.9	43.6	8.5	12.2	66.6	15.0	36.9
Tradition	19.0	45.4	9.0	12.7	67.1	14.1	32.9
Xena	25.7	43.8	8.6	11.6	69.6	12.1	35.5
MT910189	17.2	46.5	8.8	10.9	82.8	7.5	33.3
MT960101	<b>38.6*</b>	42.1	8.7	12.3	49.3	23.1	36.5
MT970229	<b>37.9*</b>	43.9	8.6	13.2	54.2	15.4	34.8
Average	26.0	42.9	8.5	13.2	54.7	20.2	35.0
PLSD (p=0.05)	13.1	--	--	--	--	--	ns
CV%	30.5	--	--	--	--	--	8.0

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

2/ Grain protein values determined from bulked samples and adjusted to a 100 percent dry matter 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).

#### Ryegate Dryland Spring Barley (Exp. 053692)

Planted:	March 31, 2005
Harvested:	August 23, 2005
Fertility:	11-52-00, 100 lbs/a at planting
Herbicide:	Roundup Ultra, 16 oz/a, April 1, 2005
Insecticide:	none applied
Previous Crop:	peas
Precipitation:	n/a

Table 4. Performance of 20 spring barley cultivars and experimental lines tested under dryland conditions at two locations in south central Montana during 2005. Cultivars listed alphabetically.

Cultivar	1/	Test Weight	Grain Moisture	2/	Plump Kernels	Thin Kernels	Plant Height
	Grain Yield			Grain Protein			
	bu/ac	lb/bu	%	%	%	%	inches
AC Metcalfe	17.0	42.8	8.8	14.4	38.1	28.6	28.1
Baronesse	24.3	44.3	8.8	12.4	55.9	17.0	27.3
Boulder	31.2	46.3	9.2	11.7	61.8	15.5	26.0
CDC Copeland	23.3	42.2	8.9	13.5	55.0	20.6	30.5
CDC Kendall	15.0	43.8	9.0	13.3	74.8	11.5	28.8
Conrad	24.6	43.0	8.9	13.7	44.6	29.0	27.7
Craft (MT970116)	19.1	46.3	9.1	11.4	70.2	12.0	29.4
Drummond	11.4	44.6	8.6	12.6	57.0	18.6	28.0
Eslick	14.8	45.2	9.0	12.2	42.4	24.8	29.4
Harrington	17.9	42.0	8.7	13.8	58.4	18.2	30.1
Haxby	8.9	47.5	8.9	12.8	43.1	26.8	28.4
Hays	19.9	42.3	8.8	12.6	43.5	29.6	25.1
Legacy	14.8	44.5	8.8	12.0	52.1	21.2	29.0
Merit	25.1	41.4	8.9	13.4	50.6	22.5	27.4
Robust	16.4	44.2	8.9	12.0	51.5	24.3	29.0
Tradition	14.1	45.2	8.9	12.5	58.6	18.4	27.0
Xena	20.2	45.0	9.0	11.8	62.0	15.8	28.1
MT910189	15.1	45.8	9.1	10.9	74.3	10.5	27.3
MT960101	26.5	43.8	9.0	11.9	46.1	25.3	28.4
MT970229	26.7	45.9	9.1	13.0	64.2	12.1	29.0
Average	19.3	44.3	8.9	12.6	55.2	20.1	28.2
PLSD (p=0.05)	ns	ns	0.3	1.8	ns	ns	ns
CV%	62.5	3.7	2.7	6.7	28.9	48.0	9.6
Location Years	2	2	2	2	2	2	2

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

2/ Grain protein values determined from bulked samples and adjusted to a 100 percent dry matter basis.

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

Table 5. Performance of 22 spring barley cultivars and experimental lines tested under irrigated conditions near Fromberg, Montana during 2005. Cultivars listed alphabetically. (Exp. 053794).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein		Plump Kernels	Thin Kernels	Plant Height	Lodging
	2005	2004-05	2003-05			- % -	- % -				
	-----	bushels/acre	-----	- lb/bu -	- % -	- % -	- % -	- % -	- inches -	0-9	
AC Metcalfe	108.3	106.6	<b>107.9*</b>	49.4	10.6	14.7	82.5	8.0	47.8	4.0	
Baronesse	109.1	104.8	<b>115.0*</b>	50.8	10.6	14.5	87.1	6.0	50.8	2.0	
Boulder	114.8			51.7	10.8	14.4	88.9	5.2	46.3	0.3	
Calgary	125.4			51.7	10.7	13.1	88.4	4.7	42.9	0.3	
CDC Copeland	102.3	104.5		49.4	10.7	14.2	86.6	6.3	51.7	2.7	
CDC Kendall	100.7	95.7	99.5	50.0	10.6	15.0	86.9	6.7	51.0	4.7	
Conrad	108.0			50.9	10.5	15.1	85.9	7.2	48.5	2.0	
Craft (MT970116)	116.1	106.7	<b>115.1**</b>	51.2	11.0	13.6	89.6	5.0	49.1	1.3	
Drummond	103.4	100.5	<b>108.2*</b>	49.7	10.5	14.2	91.6	3.3	51.6	0.0	
Eslick	112.9			51.4	10.6	13.6	91.0	4.5	46.5	2.0	
Harrington	102.5	98.8	<b>102.9*</b>	50.9	10.7	13.4	86.7	6.2	47.0	1.0	
Haxby	116.9	109.9		51.9	10.9	14.6	87.8	6.8	45.2	2.0	
Hays	96.3			49.2	10.7	14.3	78.6	10.1	45.4	0.3	
Legacy	111.9	105.6	<b>112.9*</b>	49.5	10.3	14.2	89.5	4.5	52.1	1.3	
Merit	109.3	109.5	<b>109.5*</b>	49.4	10.7	15.0	84.3	7.4	47.2	1.7	
Morex	81.7	89.4	93.0	49.6	10.2	14.0	81.4	1.7	54.8	0.0	
Robust	79.2	87.9	87.5	51.6	10.8	13.9	90.4	4.1	53.3	0.7	
Tradition	98.4	94.0		50.5	10.4	14.1	94.8	1.8	50.4	0.0	
Xena	128.2			50.8	10.6	13.7	86.2	7.3	47.6	1.0	
MT910189	99.8	101.9		52.4	10.7	13.9	94.1	2.6	45.9	5.7	
MT960101	124.4			51.6	10.7	13.7	87.5	5.9	47.2	1.0	
MT970229	119.2			53.1	10.8	14.0	95.2	2.0	49.2	0.0	
Average	107.7	101.1	105.2	50.8	10.6	14.1	88.0	5.3	48.7	1.5	
PLSD (p=0.05)	ns	ns	14.8	1.9	0.3	--	ns	4.4	2.9	2.3	
CV%	15.0	12.9	14.2	2.3	2.0	--	8.0	50.9	3.6	94.7	

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

2/ Grain protein values determined from bulked samples and adjusted to a 100 percent dry matter 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).

Fromberg Irrigated Spring Barley (Exp. 053794)

Planted:	March 7, 2005
Harvested:	August 16, 2005
Fertility:	80 lbs/a N, 50 lbs/a P, preplant incorporated, March 4, 2005 11-52-00, 100 lbs/a at planting
Herbicide:	Bronate Advanced, 12 oz/a; Starane 0.33 pt/a, May 12, 2005
Previous Crop:	sugar beets
Irrigation:	flood
Precipitation:	n/a

Table 6. Performance of 22 spring barley cultivars and experimental lines tested under irrigated conditions near Hysham, Montana during 2005. Cultivars listed alphabetically. (Exp. 053795).

Cultivar	1/ Grain Yield			Test Weight	2/ Grain		Plump Kernels	Thin Kernels	Plant Height	3/ Lodging
	2005	2004-2005	2003-2005		Moisture	Protein				
	----- bu/ac -----			lb/bu	%	%	%	%	inches	0-9
AC Metcalfe	106.9	122.6	114.9	51.5	11.6	13.6	91.1	4.2	46.6	1.7
Baronesse	104.7	128.2	114.9	50.5	11.6	14.5	83.5	8.5	44.4	2.3
Boulder	90.5			50.2	11.4	12.8	89.6	4.5	50.2	2.3
Calgary	100.3			49.1	11.2	13.9	78.4	9.6	44.7	3.7
CDC Copeland	108.3	128.3		49.9	11.5	12.6	89.0	4.7	48.1	1.7
CDC Kendall	87.2	106.1	100.8	51.0	11.6	13.7	91.2	4.3	47.0	2.3
Conrad	97.5			50.6	11.1	14.3	88.5	4.6	48.2	1.3
Craft (MT970116)	114.6	113.8	106.8	51.6	11.6	13.4	90.1	4.1	45.7	1.0
Drummond	112.6	113.4	103.6	49.2	11.2	12.8	89.9	3.7	46.3	0.7
Eslick	84.5			49.0	10.9	13.2	82.0	9.4	49.6	2.3
Harrington	117.2	124.4	115.4	51.6	11.7	13.9	90.7	4.1	45.5	2.0
Haxby	103.1	99.2		50.7	11.3	13.3	86.2	7.7	47.0	3.0
Hays	96.7			49.9	11.2	13.6	80.9	9.6	44.0	2.3
Legacy	93.0	115.7	109.4	48.2	10.8	13.7	77.1	9.8	48.1	2.7
Merit	90.4	117.1	114.8	50.6	11.4	14.4	88.9	5.3	46.8	2.7
Morex	103.6	102.2	100.7	49.3	10.7	13.0	86.6	5.4	48.6	1.7
Robust	98.7	102.1	90.5	49.8	11.1	12.8	89.2	4.2	49.3	1.0
Tradition	100.4	117.6		49.0	10.7	13.2	92.6	2.5	48.3	0.7
Xena	111.3			50.4	11.4	14.1	84.5	6.8	45.1	3.7
MT910189	104.1	121.8		49.8	10.9	13.7	84.4	7.7	44.2	2.0
MT960101	100.3			48.4	11.3	14.1	72.8	13.1	44.1	3.3
MT970229	108.8			51.3	11.0	14.8	87.8	5.8	43.7	1.3
Average	101.6	115.2	107.2	50.1	11.2	13.6	86.1	6.3	46.6	2.1
PLSD (p=0.05)	ns	ns	ns	ns	ns	--	ns	ns	ns	ns
CV%	16.1	22.5	20.6	2.8	3.8	--	8.1	62.6	5.8	84.0

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

2/ Grain protein values determined from bulked samples and adjusted to a 100 percent dry matter basis.

3/ Lodging severity scores of 0 to 9 represent no lodging to all stems flat on the ground, respectively.

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

Hysham Irrigated Spring Barley (Exp. 053795)

Planted:	March 7, 2005
Harvested:	August 4, 2005
Fertility:	80 lbs/a N, 40 lbs/a P, 40 lbs/a K, 25 lbs/a S, preplant incorporated, March 4, 2005 30 lb/ac N, broadcast, May 18, 2005
Herbicide:	Bronate Advanced, 32 oz/a; Harmony Extra 0.5 oz/a; R-11, 16 oz/a; Amm Sulfate, 3 lb/a, May 19, 2005
Previous Crop:	sugar beets
Irrigation:	flood
Precipitation:	n/a

Table 7. Performance of 22 spring barley cultivars and experimental lines tested under irrigated conditions at two locations in south central Montana during 2005. Cultivars listed alphabetically.

Cultivar	1/ Grain Yield			Test Weight	2/ Grain		Plump Kernels	Thin Kernels	Plant Height	3/ Lodging
	2005	2004-2005	2003-2005		Moisture	Protein				
	----- bu/ac -----			lb/bu	%	%	%	%	inches	0-9
AC Metcalfe	107.6	114.6	<b>111.4*</b>	50.4	11.1	14.2	86.8	6.1	47.2	2.8
Baronesse	106.9	116.5	<b>115.0**</b>	50.7	11.1	14.5	85.3	7.2	47.6	2.2
Boulder	102.6			51.0	11.1	13.6	89.3	4.9	48.3	1.3
Calgary	112.8			50.4	11.0	13.5	83.4	7.1	43.8	2.0
CDC Copeland	105.3	116.4		49.7	11.1	13.4	87.8	5.5	49.9	2.2
CDC Kendall	94.0	100.9	100.1	50.5	11.1	14.4	89.1	5.5	49.0	3.5
Conrad	102.8			50.8	10.8	14.7	87.2	5.9	48.3	1.7
Craft (MT970116)	115.4	110.3	<b>111.0*</b>	51.4	11.3	13.5	89.9	4.5	47.4	1.2
Drummond	108.0	107.0	<b>105.9*</b>	49.5	10.8	13.5	90.8	3.5	49.0	0.3
Eslick	98.7			50.2	10.8	13.4	86.5	6.9	48.1	2.2
Harrington	109.9	111.6	<b>109.2*</b>	51.3	11.2	13.7	88.7	5.2	46.3	1.5
Haxby	110.0	104.5		51.3	11.1	14.0	87.0	7.3	46.1	2.5
Hays	96.5			49.5	10.9	14.0	79.7	9.8	44.7	1.3
Legacy	102.5	110.6	<b>111.1*</b>	48.9	10.5	14.0	83.3	7.2	50.1	2.0
Merit	99.9	113.3	<b>112.1*</b>	50.0	11.1	14.7	86.6	6.4	47.0	2.2
Morex	92.7	95.8	96.8	49.5	10.5	13.5	84.0	3.5	51.7	0.8
Robust	89.0	95.0	89.0	50.7	11.0	13.4	89.8	4.1	51.3	0.8
Tradition	99.4	105.8		49.7	10.6	13.7	93.7	2.1	49.4	0.3
Xena	119.8			50.6	11.0	13.9	85.3	7.0	46.4	2.3
MT910189	101.9	111.8		51.1	10.8	13.8	89.2	5.1	45.1	3.8
MT960101	112.3			50.0	11.0	13.9	80.2	9.5	45.6	2.2
MT970229	114.0			52.2	10.9	14.4	91.5	3.9	46.5	0.7
Average	104.6	108.1	106.2	50.4	10.9	13.9	87.1	5.8	47.7	1.8
PLSD (p=0.05)	ns	ns	12.0	ns	0.4	ns	ns	ns	4.2	ns
CV%	17.4	17.8	16.9	3.5	3.1	3.9	8.8	66.2	7.4	116.8
Location Years	2	4	6	2	2	2	2	2	2	2

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

2/ Grain protein values determined from bulked samples and adjusted to a 100 percent dry matter 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 8. Performance of 20 spring barley cultivars and experimental lines tested under dryland and irrigated conditions in south central Montana during 2005. Cultivars listed alphabetically.

Cultivar	1/			Test Weight	Grain Moisture	2/		Thin Kernels	Plant Height
	2005	Grain Yield				Grain Protein	Plump Kernels		
	bushels/acre			lb/bu	%	%	%	%	inches
AC Metcalfe	62.3	75.3		48.5	10.0	14.3	74.6	11.7	37.7
Baronesse	65.6	80.7	80.7	49.1	9.9	13.5	78.0	9.7	37.5
Boulder	66.9			49.8	10.2	12.7	82.4	7.5	37.1
CDC Copeland	64.3	80.7		47.8	10.0	13.4	79.6	9.3	40.2
CDC Kendall	54.5			48.8	10.0	13.8	85.5	7.0	38.9
Conrad	63.7			48.8	9.8	14.2	76.6	11.7	38.0
Craft (MT970116)	67.2	74.2	76.4	50.1	10.2	12.4	85.0	6.4	38.4
Drummond	59.7			48.2	9.7	13.1	82.3	7.3	38.5
Eslick	56.7			48.9	9.9	12.8	75.5	11.4	38.8
Harrington	63.9	75.1	75.0	48.9	9.9	13.7	81.1	8.4	38.2
Haxby	59.4	69.9		50.4	10.0	13.4	76.0	12.1	37.2
Hays	58.2			47.7	9.9	13.3	70.7	14.8	34.9
Legacy	58.7			47.8	9.6	13.0	75.5	10.7	39.6
Merit	62.5			47.9	10.0	14.1	77.6	10.4	37.2
Robust	52.7			49.1	9.9	12.7	80.2	9.2	40.2
Tradition	56.7	72.1		48.6	9.7	13.1	84.9	6.2	38.2
Xena	70.0			49.2	10.0	12.9	79.5	9.2	37.2
MT910189	58.5	75.5		49.8	9.9	12.4	85.5	6.5	36.2
MT960101	69.4			48.4	10.0	12.9	71.7	13.5	37.0
MT970229	70.3			50.6	10.0	13.7	84.7	5.9	37.7
Average	62.1	75.4	77.4	48.9	9.9	13.2	79.3	9.4	37.9
PLSD (p=0.05)	ns	ns	ns	1.7	ns	1.0	ns	ns	2.5
CV%	23.6	21.0	19.1	3.6	4.4	5.6	15.3	75.6	8.1
Location Years	4	7	10	4	4	4	4	4	4

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

2/ Grain protein values determined from bulked samples and adjusted to a 100 percent dry matter 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 9. Grain yield<sup>1/</sup> of 22 spring barley cultivars tested at three locations in south central Montana during 2005. Cultivars listed alphabetically.

Cultivar	Molt Dryland	Ryegate Dryland	Dryland Average	Fromberg Irrigated	Hysham Irrigated	Irrigated Average	Four Location Average
	----- bushels/acre -----						
AC Metcalfe	9.1	24.9	17.0	108.3	106.9	107.6	62.3
Baronesse	<b>15.5*</b>	<b>33.1*</b>	24.3	109.1	104.7	106.9	65.6
Boulder	<b>16.3*</b>	<b>46.0**</b>	31.2	114.8	90.5	102.6	66.9
Calgary	--	--	--	125.4	100.3	112.8	--
CDC Copeland	<b>14.2*</b>	32.3	23.3	102.3	108.3	105.3	64.3
CDC Kendall	12.0	18.1	15.0	100.7	87.2	94.0	54.5
Conrad	<b>19.3**</b>	29.9	24.6	108.0	97.5	102.8	63.7
Craft (MT970116)	10.5	27.6	19.1	116.1	114.6	115.4	67.2
Drummond	9.7	13.0	11.4	103.4	112.6	108.0	59.7
Eslick	<b>16.0*</b>	13.6	14.8	112.9	84.5	98.7	56.7
Harrington	<b>15.4*</b>	20.4	17.9	102.5	117.2	109.9	63.9
Haxby	10.2	7.5	8.9	116.9	103.1	110.0	59.4
Hays	3.6	<b>36.2*</b>	19.9	96.3	96.7	96.5	58.2
Legacy	11.0	18.7	14.8	111.9	93.0	102.5	58.7
Merit	<b>14.5*</b>	<b>35.6*</b>	25.1	109.3	90.4	99.9	62.5
Morex	--	--	--	81.7	103.6	92.7	--
Robust	7.9	24.9	16.4	79.2	98.7	89.0	52.7
Tradition	9.2	19.0	14.1	98.4	100.4	99.4	56.7
Xena	<b>14.6*</b>	25.7	20.2	128.2	111.3	119.8	70.0
MT910189	<b>13.0*</b>	17.2	15.1	99.8	104.1	101.9	58.5
MT960101	<b>14.3*</b>	<b>38.6*</b>	26.5	124.4	100.3	112.3	69.4
MT970229	<b>15.5*</b>	<b>37.9*</b>	26.7	119.2	108.8	114.0	70.3
Average	12.6	26.0	19.3	107.7	101.6	104.6	62.1
PLSD (p=0.05)	6.7	13.1	ns	ns	ns	ns	ns
CV%	32.4	30.5	62.5	15.0	16.1	17.4	23.6

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).