



RESULTS OF AGRONOMIC AND WEED SCIENCE RESEARCH CONDUCTED IN SOUTH CENTRAL MONTANA - 2002

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PROJECT TITLE: Dryland and Irrigated Spring Barley Performance Trials near Bridger, Hysham, Molt and Ryegate, Montana. (Exps. 023691, 023692, 023794 and 023795).

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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 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 established and harvested under dryland conditions near Molt, and under irrigation near Bridger and Hysham, Montana (Fig. 1). Eight spring barley entries were planted under dryland condition in Molt, while 24 entries were planted under irrigated conditions in Bridger and Hysham. The dryland sites were oriented towards feed-type cultivars whereas malt-types dominated the entries tested on irrigated sites.

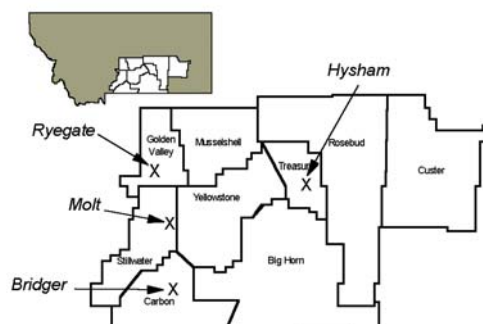


Figure 1. 2002 off-station spring barley trial locations in south central Montana.

All studies were planted using a randomized complete block design with three replications. Dryland test plots consisted of a 15-foot, 4-row plot with 12-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% grain moisture content, and are reported in bushels per acre based on a 48 pound standard bushel 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 plant height values have been rounded to the nearest inch. Lodging of some entries was noted at the irrigated locations. Lodging severity was recorded on a 0 to 9 scale representing no lodging to all stems lying flat on the ground, respectively. At Molt, sawfly damage was scored from 0 to 9 representing less than 10 percent to greater than 90 percent cut stems, respectively. Percent plump and thin kernels were determined by measuring the amount of a 100 gram subsample retained above a 6-64" slotted screen and passing through a 5½-64" slotted screen, respectively, following 30 oscillations on a sieve shaker.

RESULTS:

All four off-station spring barley trials were planted in the spring of 2002, but only three of the sites, Bridger, Hysham and Molt were harvested. Drought and sawfly damage was evident at the Molt location prior to harvest. The Ryegate trial suffered from extreme drought conditions throughout the growing season and experienced substantial feeding damage from grasshoppers. The Ryegate site was not harvested in 2002.

Spring barley yields under dryland condition in Molt were very low (Table 1). The average yield was 14.7 bu/ac, and ranged from 9.9 to 19.6 bu/ac. There was no significant difference in yield among entries.

The irrigated off-station spring barley trial grown at Bridger during 2002 did not yield as good as spring barley studies grown at this location during previous years (Table 2). The average yield was 60.4 bu/ac and ranged from 79.3 bu/ac for 'Baronesse' to 35.7 bu/ac for 'Robust'. Five entries ('Calgary', 'Garnett', 'H3860224', 'Harrington', 'Moravian 37') had yields from 66.5 to 77.5 bu/ac, which was equal with the highest yield. Average test weight for 2002 was 47.0 lb/bu. Two-year average yield for spring barley varieties tested during 2001 and 2002 in Bridger averaged 71.9 bu/ac with Baronesse producing the highest average seed yield at 86.4 bu/ac. 'Gallatin', Garnett, Harrington, Moravian 37 and 'Stander' produced yields from 70.4 to 84.0 bu/ac, which was equal with the highest yield. Three-year average yield for spring barley varieties tested during 2000 to 2002 averaged 101.2 bu/ac with Baronesse producing the highest average seed yield at 116.3 bu/ac. Gallatin, Harrington, 'Merit' and Moravian 37 produced yields from 103.3 to 110.0 bu/ac, which was equal with the highest yield. Baronesse, Harrington and Moravian 37 had consistent high yields during the three years of the experiment. Baronesse was the highest yielder for each year. Mean percent plump and thin kernels were 64.0 and 18.3 percent, respectively.

The average spring barley yields under irrigated condition in Hysham was 99.6 bu/ac, with 'Busch Ag 1202' producing the highest yield at 122.1 bu/ac (Table 3). Baronesse, Calgary, 'Conlon', Garnett, 'Legacy', Merit, 'Metcalfe' and 'Stratus' produced yields from 104.8 to 116.2, which was equal with the highest yield. Average test weight was 49.2 lb/bu. Mean percent plump and thin kernels were 79.4 and 7.8 percent, respectively.

SUMMARY:

Based on three-year averages analyzed for the Bridger site, Baronesse (feed type), Harrington (malt) and Moravian 37 (malt) have been the highest yielding spring barleys under irrigated conditions in Bridger.

FUTURE PLANS:

Off-station spring barley variety evaluations will continue in 2003 at Molt, Ryegate, Bridger and Hysham.

Table 1. Performance of 8 spring barley cultivars and experimental lines tested under dryland conditions near Molt, Montana during 2002. Cultivars listed alphabetically. (Exp. 023691).

Cultivar	1/	Test Weight	Grain Moisture	2/	Plump Kernels	Thin Kernels	Plant Height	3/
	Grain Yield			Grain Protein				Sawfly Index
	bu/ac	lb/bu	%	%	%	%	inches	0-9
Baronesse	14.9	39.5	9.5	17.9	11.4	67.2	16.8	1.3
Conlon	15.1	37.7	9.2	17.2	7.0	77.4	16.5	0.7
Gallatin	16.0	39.7	9.1	17.1	17.9	57.4	18.0	0.3
H3860224	14.8	41.4	10.1	19.6	25.7	52.6	17.4	1.0
Harrington	14.1	40.6	9.2	18.2	22.1	49.8	16.9	0.0
Haxby	19.6	43.2	9.5	17.0	12.6	67.6	17.8	1.0
MT970116	9.9	43.3	9.3	18.6	33.9	30.9	20.4	1.3
Valier	12.9	41.8	9.6	18.5	10.0	69.2	16.8	1.0
Average	14.7	40.9	9.4	18.0	17.6	59.0	17.6	0.8
LSD (p=0.05)	ns	3.1	0.3	--	9.1	12.9	1.7	ns
CV%	22.1	4.4	1.9	--	29.7	12.5	5.5	91.2

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 100 percent dry matter basis.

3/ Sawfly index scores of 0 to 9 represent less than 10 percent to greater than 90 percent cut stems, respectively.

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

Molt Dryland Spring Barley (Exp. 023691)

Planted: May 16, 2002
 Harvested: August 16, 2002
 Fertility: 11-52-00, 120 lb/a in-furrow, May 16, 2002
 Herbicide: n/a
 Insecticide: none
 Previous Crop: summer fallow
 Precipitation: n/a

Table 2. Performance of 24 spring barley cultivars and experimental lines tested under irrigated conditions near Bridger, Montana during 2002. Cultivars listed alphabetically. (Exp. 023794).

Entry	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein			Thin Kernels	Plant Height	3/ Lodging
	2002	2001-2002	2000-2002			Plump Kernels	Plump Kernels	Plump Kernels			
	-----	bushels/acre	-----	lb/bu	%	%	%	%	inches	0-9	
Baronesse	79.3**	86.4**	116.3**	49.1	10.0	16.1	77.8	9.3	26.7	1.3	
Busch Agr 1202	65.1	63.1	90.9	47.3	9.8	16.8	77.6	9.6	27.6	1.3	
Calgary	75.1*			47.9	9.9	15.9	68.9	14.7	21.5	2.7	
Conlon	64.6			47.9	9.8	16.1	63.8	16.0	27.3	3.0	
Drummond	57.3			45.4	9.6	15.6	50.8	25.8	30.7	2.7	
Excel	49.6			44.3	9.5	15.0	39.6	35.3	30.2	2.7	
Foster	45.8	57.6	83.5	43.7	9.4	15.4	50.2	25.6	30.5	2.0	
Gallatin	64.5	84.0*	109.7*	46.8	9.6	16.9	62.1	20.1	29.4	2.0	
Garnett	66.5*	82.1*		47.9	10.0	16.8	84.5	7.1	28.6	1.0	
H3860224	77.5*			47.0	10.1	17.0	69.9	15.5	26.5	1.3	
Harrington	70.6*	78.6*	103.4*	47.8	9.9	16.7	76.6	10.4	27.7	1.3	
Haxby	65.7			48.7	9.9	16.1	56.9	23.2	28.9	3.0	
Kendall	58.0			48.1	9.9	17.0	80.4	9.2	29.1	1.0	
Legacy	56.4	58.7		45.9	9.9	15.2	51.4	25.5	30.2	1.3	
Merit	53.4	64.7	103.3*	45.3	9.6	17.3	65.2	17.5	27.9	2.3	
Metcalfe	63.6			48.2	9.8	16.8	74.4	11.6	28.6	2.0	
Moravian 37	66.8*	77.7*	110.0*	48.6	9.8	16.8	77.6	9.9	24.8	1.0	
Morex	49.5	67.9	93.5	44.8	9.4	16.2	39.0	32.1	33.9	5.3	
MT960101	52.3			48.8	9.9	17.2	67.8	16.6	25.6	2.3	
MT970116	64.6			49.6	10.1	16.4	76.3	10.9	30.0	2.0	
Robust	35.7			45.7	9.7	15.9	48.5	29.1	32.0	2.3	
Stander	56.6	70.4*	100.4	44.6	9.4	15.7	50.8	26.5	27.4	1.3	
Stratus	49.4			46.5	9.8	16.4	59.9	21.0	25.9	2.0	
Valier	62.1			48.6	9.9	17.8	64.6	17.9	28.0	2.0	
Average	60.4	71.9	101.2	47.0	9.8	16.4	64.0	18.3	28.3	2.1	
LSD (p=0.05)	13.6	18.2	13.8	2.3	0.3	--	11.9	9.6	1.8	1.8	
CV%	13.7	21.7	14.2	3.0	2.0	--	11.3	31.8	3.8	52.6	

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

2/ Grain protein values 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).

Bridger Irrigated Spring Barley (Exp. 023794)

Planted: May 3, 2002
Harvested: August 16, 2002
Fertility: 11-52-00, 120 lb/a in-furrow, May 3, 2001
Herbicide: Harmony Extra, 0.5 oz/a; Bronate, 1 pt/a; R-11, 1 pt/a, June 4, 2002
Insecticide: none
Previous Crop: summer fallow
Irrigation: n/a
Precipitation: n/a

Table 3. Performance of 24 spring barley cultivars and experimental lines tested under irrigated conditions near Hysham, Montana during 2002. Cultivars listed alphabetically. (Exp. 023795).

Cultivar	1/		2/				Plant Height	3/
	Grain Yield	Test Weight	Grain Moisture	Grain Protein	Plump Kernels	Thin Kernels		
	bu/ac	lb/bu	%	%	%	%	inches	0-9
Baronesse	112.1*	48.5	10.8	15.3	69.1	13.4	40.8	7.3
Busch Agr 1202	122.1**	49.6	10.5	15.7	83.6	5.3	39.1	3.7
Calgary	116.2*	50.3	10.6	14.3	86.8	4.3	36.4	2.7
Conlon	109.7*	49.4	10.7	15.3	82.3	4.8	40.5	6.0
Drummond	94.4	48.0	10.4	14.8	74.2	10.5	44.3	4.3
Excel	93.5	47.0	10.3	15.1	66.8	12.4	42.1	6.0
Foster	89.3	48.7	10.2	14.9	84.1	4.7	44.4	6.0
Gallatin	96.4	50.2	10.6	16.1	71.7	12.8	40.6	6.3
Garnett	104.8*	48.9	10.5	16.0	88.2	4.1	44.1	7.0
H3860224	85.8	48.0	10.6	16.6	77.0	9.6	42.5	7.3
Harrington	89.9	49.0	10.4	15.6	85.0	5.4	41.8	5.7
Haxby	101.8	51.6	10.8	15.3	84.8	5.9	42.5	5.7
Kendall	104.2	49.6	10.7	16.4	89.9	3.8	43.4	6.3
Legacy	108.5*	48.2	10.5	14.6	69.1	10.3	44.4	5.0
Merit	109.6*	47.9	10.4	15.8	84.4	6.0	40.8	5.3
Metcalfe	110.2*	51.5	10.8	15.6	89.9	3.8	43.9	5.0
Moravian 37	84.9	47.6	10.4	16.5	76.2	9.8	36.0	6.0
Morex	93.1	47.9	10.2	16.4	68.0	11.6	46.8	6.3
MT960101	87.2	48.4	10.7	16.4	69.2	13.1	39.3	5.0
MT970116	103.1	51.5	10.8	15.5	86.4	5.2	43.9	5.7
Robust	87.0	49.9	10.5	15.5	80.4	6.8	49.1	4.3
Stander	83.5	50.2	10.7	14.0	90.7	2.7	44.1	3.0
Stratus	105.4*	50.2	10.6	16.3	87.7	4.5	40.7	5.0
Valier	98.0	48.9	10.4	16.1	59.5	16.2	42.3	7.0
Average	99.6	49.2	10.5	15.6	79.4	7.8	42.2	5.5
LSD (p=0.05)	17.4	1.8	0.4	--	13.1	6.8	3.4	3.5
CV%	10.6	2.3	2.1	--	10.0	53.2	5.0	39.2

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 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).

Hysham Irrigated Spring Barley (Exp. 02795)

Planted: April 5, 2002
 Harvested: August 14, 2002
 Fertility: 11-52-00, 120 lb/a in-furrow, April 5, 2002
 Herbicide: n/a
 Insecticide: none
 Previous Crop: sugar beets
 Irrigation: n/a
 Precipitation: n/a