

## RESULTS OF AGRONOMIC AND WEED SCIENCE RESEARCH CONDUCTED IN SOUTH CENTRAL MONTANA - 2007

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**PROJECT TITLE:** Off-Station Spring Wheat Variety Performance Trials in South Central Montana. (Exps. 079909, 079994, 079995, 079996 and 079997). 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 wheat varieties. This information should help spring wheat producers in south central Montana select varieties best suited to their particular area and growing conditions.

**METHODS:** The 2007 off-station spring wheat trials in south central Montana were established under dryland conditions near Molt and Broadview (formerly near Ryegate), and under irrigated conditions near Fromberg, Huntley and Hysham, Montana (Figure 1). The spring wheat trials for this region of Montana each possessed 25 entries made up of 22 commercial cultivars and three experimental lines.

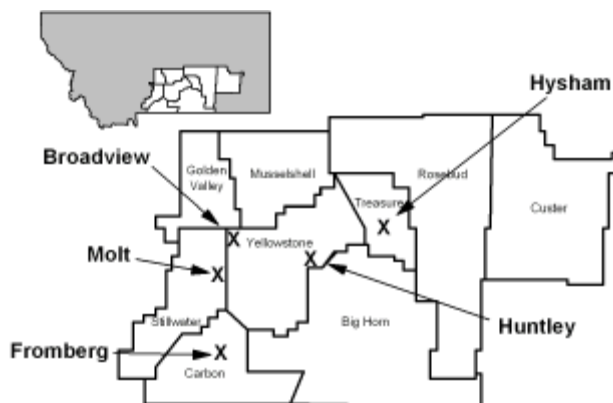


Figure 1. 2007 off-station spring wheat trial locations in south central Montana.

All studies were planted using a partially balanced lattice design with three replications. All entries were seeded at approximately 0.75 million seeds per acre under dryland conditions (~60 lb/a) and 1.5 million seeds per acre under irrigation (~90 lb/a). 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 71 pounds per acre for the dryland sites and from 78 to 142 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 14-inch row spacing. 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 (bu/a) based on a 60 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. Reported grain protein values are adjusted to a 12% grain moisture content. 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 at Fromberg and Huntley, representing no lodging to all stems lying flat on the ground, respectively. Information pertaining to the traits and characteristics of the 25 spring wheat entries are provided in Table 2.

Table 1. Adjusted seeding rates used to establish 25 spring wheat cultivars tested at five off-station sites in south central Montana during 2007.

Cultivar	Thousand Kernel Weight	Seeds per Pound	1/ Dryland Seeding Rate		2/ Irrigated Seeding Rate	
			per plot	per acre	per plot	per acre
	grams	#	grams	pounds	grams	pounds
Agawam	36.2	12,530	37.4	60	74.9	120
Briggs	33.2	13,684	34.3	55	68.6	110
Choteau	31.2	14,564	32.2	51	64.4	103
Conan	32.3	14,056	33.4	53	66.7	107
Corbin	40.6	11,196	41.9	67	83.8	134
Ernest	25.7	17,670	26.5	42	53.1	85
Explorer	24.1	18,814	24.9	40	49.9	80
Fortuna	32.3	14,038	33.4	53	66.8	107
Freyr	29.9	15,191	30.9	49	61.7	99
Granger	42.9	10,578	44.3	71	88.7	142
Hank	39.0	11,631	40.3	64	80.6	129
Jefferson	35.7	12,721	36.9	59	73.7	118
Jerome	41.1	11,050	42.4	68	84.9	136
Knudson	27.0	16,825	27.9	45	55.8	89
McNeal	32.0	14,174	33.1	53	66.2	106
Norpro	23.6	19,241	24.4	39	48.8	78
Outlook	27.9	16,253	28.9	46	57.7	92
Reeder	27.0	16,816	27.9	45	55.8	89
Scholar	30.9	14,691	31.9	51	63.8	102
Traverse	35.7	12,712	36.9	59	73.8	118
Vida	27.8	16,344	28.7	46	57.4	92
Westbred 926	41.2	11,023	42.5	68	85.1	136
MT0414	38.0	11,958	39.2	63	78.4	125
MT0415	32.3	14,047	33.4	53	66.8	107
MT0515	26.4	17,216	27.2	44	54.5	87

1/ Equivalent to 0.75 million seeds per acre on a mass basis.

2/ Equivalent to 1.5 million seeds per acre on a mass basis.

## **RESULTS:**

The 2007 spring wheat test sites were unusually dry over-winter, with very little rain or snow accumulating during November, December and January. Spring rains produced average precipitation levels during most of the spring growth period. All five of the test locations planted in the spring of 2007 possessed

adequate soil moisture to facilitate germination and emergence. Spring wheat stands appeared fairly uniform at all sites before the middle of May.

The region remained marginally dry for spring wheat production until late May, when 6 to 8 inches of precipitation occurred at most test sites over a 14 day interval lasting into the first week of June. Hot, dry weather resumed in mid-June and continued throughout July. Accumulated heat units at Huntley were 15 percent above normal from May 1 to the middle of July in 2007. Occurrence of stripe rust (*Puccinia striiformis*) was rare, but could easily be found on the most susceptible cultivars at the irrigated locations. The trial at Hysham was severely damaged by hail in June and was not harvested in 2007. Overall, irrigated off-station spring wheat yields were average in 2007, with above average test weight values and average to below average grain protein content comparable to studies conducted at these sites the previous year. Post-heading heat and moisture stress dampened the performance of spring cultivars tested under dryland conditions near Molt. The wet conditions in May prevented a pre-emergence application of Roundup™ herbicide at the Broadview locations which resulted in a heavy infestation of volunteer 'Tiber' winter wheat. The spring wheat trial at the Broadview location also was not harvested in 2007.

Molt spring wheat yields averaged 12.7 bu/a in 2007 (Table 3), which was nearly the same as spring wheat yields experienced at this site in 2006. Grain yields ranged from 5.8 bu/a for 'Briggs' to 21.1 bu/a for 'Jefferson'. 'Hank' spring wheat averaged 17.3 bu/a, which is statically equal to the yield of Jefferson. Average test weight at Molt in 2006 was 59.5 pounds per bushel, and varied from 48.3 lb/bu for 'Choteau' to 62.3 lb/bu for 'Reeder'. Nineteen of the 25 spring wheat entries possessed test weight values heavier than 58 lb/bu. Grain protein levels averaged 11.3 percent or 1.5 percent lower than protein levels measured for spring wheat entries grown at this location in 2006. Grain protein levels varied from 8.5 percent for Jefferson to 14.4 percent for the hard white entry 'Agawam'. Choteau possessed the highest protein levels (14.3 %) among the hard red entries. Two-year average yield for spring wheat varieties tested during 2006 and 2007 at Molt averaged 13.1 bu/a. Three-year average yield for spring wheat varieties tested during 2005, 2006 and 2007 in Molt averaged 12.0 bu/a. No statistical differences in grain yield were detected between spring wheat cultivars tested at Molt for either the past two or three years.

Irrigated spring wheat yields at Huntley varied from 102.2 bu/a for the experimental line 'MT0515' to 69.6 bu/a for 'Westbred 926' (Table 4). The highest yielding commercial cultivar tested at Huntley was 'Jerome', averaging 99.3 bu/a. No statistical differences in grain yield were detected among the 25 spring wheat entries tested at this location in 2007. Average test weight was 62.9 lb/bu, with all of the spring wheat entries having test weights greater than 60 lb/bu. Grain protein levels only averaged 8.5 percent and varied from 7.6 percent for Jerome to 9.6 percent for 'Conan'. Except for the cultivars 'Fortuna' and 'Scholar', minor lodging was observed among the entries tested. No lodging was observed for most of the remaining entries, and the modest amount of lodging observed for 'Vida', 'Ernest', 'Traverse' and 'Granger' did not appear to deleteriously affect the overall performance of those cultivars.

The average spring wheat yield at Fromberg in 2007 was 104.1 bu/a (Table 5), nearly the same for yields observed at this site in 2006 and approximately 15 bu/a more than yields observed in 2005. Yields ranged from 113.6 bu/a for MT0515 to 93.5 bu/a for Westbred 926, but no statistical differences in grain yield were detected among the 25 spring wheat entries tested at this location in 2007. Average test weight was 63.0 lb/bu, with all 25 entries having test weights greater than 60 lb/bu. Grain protein levels averaged 11.2 percent and varied from 10.3 percent for 'Knudson' to 12.0 percent for 'McNeal'. More lodging was observed among the entries at Fromberg compared to the irrigated site at Huntley in 2007, with Ernest, Fortuna, Granger, Jefferson, 'Outlook' and Vida exhibiting a higher degree of lodging compared to the remaining 19 entries.

Yield differences have been evident at Fromberg for spring wheat entries tested the past two and three years. Two year average yield for spring wheat varieties tested during 2006 and 2007 averaged 105.1 bu/a, with the cultivar Choteau producing the highest two year of 112.8 bu/a. Three-year average yield for spring wheat cultivars tested during 2005 to 2007 was 98.6 bu/a. Hank has been the highest yielding spring wheat tested at Fromberg the past three years, averaging 109.4 bu/a.

**SUMMARY:**

The Broadview and Hysham spring wheat sites were not harvested in 2007. The Molt trial suffered from drought conditions through the summer growth period, which once again reduced yields in 2007. Grain quality of the spring wheat harvested at Molt was not as adversely affected as yield. This was likely due to more favorable soil moisture conditions at planting, but lingering effects of the prolonged drought were still evident during grain fill. Discerning yield differences and predicting overall performance among entries for dryland production has been difficult under such stressful conditions (Table 3).

No differences in yield were evident at either of two irrigated test sites harvested at Huntley and Fromberg (Tables 4, 5), but significant differences in yield were detected for the 25 entries averaged across these locations (Table 8). The highest yielding spring wheat cultivars tested under irrigation in 2007 include the experimental line MT0515 and the commercial cultivars Vida, Hank, Jerome, Jefferson, Choteau, 'Freyr' and 'Corbin'. Across both dryland and irrigated locations, the top yielding spring wheat cultivars were Jefferson, MT0515, Hank, Vida, Jerome, Freyr, Choteau, Outlook, 'Norpro', Corbin, Ernest, McNeal and 'MT0414' (Tables 6, 7).

**FUTURE PLANS:**

Off-station spring wheat variety performance trials will continue in 2008 at the Broadview, Molt, Huntley, Hysham and Fromberg locations.

Table 2. Selected characteristics and traits of 25 spring wheat cultivars performance tested at five off-station sites in south central Montana during 2007.

Cultivar	1/ Origin	Year of Release	2/ Market Class	3/ PVP	4/ Maturity	5/ Straw Strength	6/ Disease Resistance				6/ Insect Resistance			7/ Quality	
							Fusarium Head Blight (Scab)	Leaf Rust	Stem Rust	Stripe Rust	Wheat Stem Sawfly	Russian Wheat Aphid	Hessian Fly (GP Biotype)	Milling	Baking
							Yes/No							1-5	1-5
<u>Commercial Entries</u>															
Agawam	WestBred	2005	HW	Y	E	VS	S	-	-	R	R	S	S	3	2
Briggs	SDSU	2002	HRS	Y	E-M	M	S	R	MR	MR	S	S	S	2	2
Choteau	MSU	2003	HRS	Y	E-M	VS	S	-	R	S	R	S	S	4	4
Conan	WestBred	1997	HRS	Y	E	S	S	R	-	R	MS	S	S	3	3
Corbin	WestBred	2006	HRS	Y	E	MS	S	-	-	R	R	S	-	3	3
Ernest	NDSU	1995	HRS	Y	M-L	M	S	R	R	R	MR	S	S	5	4
Explorer	MSU	2002	HW	Y	E	S	S	MR	R	MR	S	S	S	4	5
Fortuna	NDSU	1966	HRS	N	E	MW	S	R	R	VS	R	S	S	5	4
Freyr	AgriPro	2004	HRS	Y	M	S	MR	MR	MR	MR	S	S	S	3	3
Glenn	NDSU	2005	HRS	Y	M	S	MR	R	R	MR	S	S	S	4	4
Granger	SDSU	2004	HRS	Y	M	M	MS	MR	R	R	S	S	-	3	3
Hank	WestBred	1999	HRS	Y	E	S	S	R	R	MR	S	S	R	3	4
Jefferson	UI	1998	HRS	Y	M	S	S	MS	-	MR	S	S	MR	4	5
Jerome	UI	2004	HRS	Y	M	S	S	-	-	R	S	S	R	4	5
Knudson	AgriPro	2001	HRS	Y	M	M	MR	MR	MR	S	S	S	S	3	4
McNeal	MSU	1995	HRS	N	M	S	S	MS	MR	VS	S	S	S	3	5
Norpro	AgriPro	1999	HRS	Y	M	S	MS	MR	R	VS	S	S	S	3	3
Outlook	MSU	2003	HRS	Y	M-L	S	S	MR	R	S	S	R	S	3	4
Reeder	NDSU	1999	HRS	Y	M-L	S	MS	MR	R	MR	S	S	S	3	3
Scholar	MSU	1998	HRS	Y	M-L	VS	S	MR	R	MR	MR	S	S	5	4
Traverse	SDSU	2006	HRS	Y	E-M	M	MR	MR	R	MR	S	S	-	1	1
Vida	MSU	2006	HRS	Y	M-L	S	S	-	MS	MR	MS	S	S	4	4
Westbred 926	WestBred	1987	HRS	Y	E-M	S	S	R	R	MR	S	S	R	4	4
<u>Experimental Entries</u>															
MT0415	MSU	-	HRS	-	M	M	S	-	R	MS	S	S	S	3	3
MT0415	MSU	-	HRS	-	M-L	M	S	-	R	MR	S	S	S	3	3
MT0515	MSU	-	HRS	-	M-L	M	S	-	R	MR	MR	S	S	3	2

1/ AgriPro=AgriPro Seeds Inc. Berthoud, Colorado; MSU=Montana State University; NDSU=North Dakota State University; SDSU=South Dakota State University; UI=University of Idaho; WestBred=WestBred LLC, Bozeman, Montana.

2/ HRS=hard red spring wheat market class; HW=hard white wheat market class.

3/ Indicates a cultivar is protected under the Federal Plant Variety Protection Act of 1970 and amended in 1995.

4/ E=early maturity, M=medium maturity, L=late maturity.

5/ S=strong straw strength, MS=moderately strong straw strength, M=medium straw strength, MW=moderately weak straw strength, W=weak straw strength.

6/ R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible, VS=very susceptible.

7/ Milling and baking quality rated from 1 to 5 where 1=poor and 5=superior quality, respectively.

Table 3. Performance of 25 spring wheat cultivars and experimental lines tested under conventional dryland conditions near Molt, Montana during 2007. Cultivars listed alphabetically. (Exp. 079994).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein		Plant Height
	2007	2006-07	2005-07			Grain Protein	Grain Protein	
	----- bushels/acre -----			lb/bu	%	%	inches	
Agawam	7.0	10.7	9.6	55.8	11.9	14.4	22.8	
Briggs	5.8	10.8	10.4	52.6	11.3	13.6	23.9	
Choteau	7.8	9.7	9.2	48.3	10.5	14.3	16.5	
Conan	10.9	11.0	10.5	58.7	12.2	12.5	20.2	
Corbin	8.6			56.6	11.8	14.3	21.7	
Ernest	15.9	13.2	12.0	61.1	11.5	10.6	23.1	
Explorer	14.2	14.1	12.3	61.2	11.3	11.5	18.9	
Fortuna	12.7	11.5	10.0	58.9	11.2	12.3	23.8	
Freyr	14.4	14.6		61.3	12.5	10.9	21.5	
Granger	13.7			61.4	11.8	10.5	22.0	
Hank	<b>17.3*</b>	16.5	14.6	61.4	12.3	10.3	21.2	
Jefferson	<b>21.1**</b>	18.7	15.2	62.1	12.0	8.5	21.3	
Jerome	15.4	14.3	12.4	62.0	11.7	10.3	22.4	
Knudson	7.6	9.7	10.2	61.7	11.2	13.3	20.8	
McNeal	16.3	14.2	12.8	60.9	11.8	10.1	20.5	
Norpro	13.1	12.4	11.6	60.9	11.9	10.6	19.9	
Outlook	15.5	15.2	14.0	60.8	12.1	10.0	19.6	
Reeder	15.5	14.7	14.1	62.3	12.1	9.6	19.9	
Scholar	11.1	12.0	11.3	59.9	13.0	10.1	23.3	
Traverse	9.2			56.9	11.0	11.3	22.4	
Vida	14.4	14.8	13.4	62.0	12.6	9.1	19.4	
Westbred 926	14.1	14.0	12.7	62.0	11.2	10.9	20.5	
MT0414	15.4			60.5	11.3	11.3	19.6	
MT0415	12.9			60.5	11.9	11.1	20.3	
MT0515	7.3	10.8		57.5	12.4	11.7	17.8	
Average	12.7	13.1	12.0	59.5	11.8	11.3	20.9	
PLSD (p=0.05)	4.7	ns	ns	4.1	0.6	1.3	2.4	
CV%	20.6	40.1	38.5	4.2	3.1	6.3	6.9	
Lattice RE%	138	--	--	101	98	140	102	

1/ Yields are based on 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.

2/ Grain protein values adjusted to 12 percent grain 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).

Molt Dryland Spring Wheat (Exp. 079994)

Planted: April 30, 2007  
Harvested: July 31, 2007  
Fertility: 11-52-00, 100 lbs/a in-furrow at planting  
Herbicide: Bronate, 16 oz/a + Clarity, 3 oz/a + Harmony Extra 0.5 oz/a + R-11 4 oz/a + AMS 1.5 lb/a, June 19, 2007  
Insecticide: none applied  
Previous Crop: summer fallow  
Precipitation: n/a

Table 4. Performance of 25 spring wheat cultivars and experimental lines tested under irrigation near Huntley, Montana during 2007. Cultivars listed alphabetically. (Exp. 079909).

Cultivar	1/	Test Weight	Grain Moisture	2/	Plant Height	3/	Heading Date	
	Grain Yield			Grain Protein			Lodging	Julian
	bu/a	lb/bu	%	%	inches	0-9		
Agawam	89.2	64.2	9.9	8.8	33.1	0.0	158.5	Jun 6
Briggs	83.4	62.8	9.5	8.4	40.1	0.0	160.3	Jun 8
Choteau	91.7	63.9	9.7	8.5	36.4	0.0	163.1	Jun 11
Conan	85.6	62.9	9.2	9.6	35.6	0.0	162.1	Jun 10
Corbin	93.2	63.2	9.7	8.0	36.5	0.0	161.4	Jun 9
Ernest	89.7	62.5	9.7	8.8	46.8	1.3	163.5	Jun 11
Explorer	84.4	63.1	9.4	8.9	34.3	0.0	159.7	Jun 7
Fortuna	69.6	63.6	9.5	8.2	44.4	3.0	163.3	Jun 11
Freyr	90.3	63.2	9.4	8.6	39.4	0.0	162.3	Jun 10
Granger	81.0	62.2	9.6	8.7	43.7	1.7	161.6	Jun 9
Hank	97.9	61.7	9.2	8.6	33.0	0.0	161.6	Jun 9
Jefferson	91.6	62.7	9.2	7.9	35.4	0.0	161.8	Jun 9
Jerome	99.3	61.9	9.5	7.6	33.4	0.0	161.1	Jun 9
Knudson	88.2	62.8	9.6	8.1	35.5	0.0	163.0	Jun 11
McNeal	83.2	63.2	9.0	8.0	37.9	0.0	166.0	Jun 14
Norpro	83.0	62.5	9.4	7.7	35.5	0.0	164.0	Jun 12
Outlook	87.4	62.4	9.0	8.3	37.7	0.0	166.9	Jun 14
Reeder	75.8	63.7	9.1	8.4	37.9	0.0	161.9	Jun 9
Scholar	84.2	63.0	9.2	8.7	45.7	4.7	164.8	Jun 12
Traverse	85.2	60.9	9.3	7.9	43.0	0.3	162.1	Jun 10
Vida	99.3	63.0	9.6	8.8	38.5	0.3	163.4	Jun 11
Westbred 926	93.9	61.6	9.4	8.6	34.2	0.0	159.5	Jun 7
MT0414	86.4	63.4	9.4	9.3	40.6	0.0	162.3	Jun 10
MT0415	82.0	63.5	9.1	9.2	41.7	0.0	162.7	Jun 10
MT0515	102.2	64.2	9.5	9.1	39.8	0.0	164.3	Jun 12
Average	87.9	62.9	9.4	8.5	38.4	0.5	162.5	Jun 10
PLSD (p=0.05)	ns	0.3	0.4	ns	2.1	1.2	1.1	
CV%	12.9	0.3	2.4	8.6	3.4	147.7	0.4	
Lattice RE%	85	99	86	91	102	101	118	

1/ Yields are based on 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.

2/ Grain protein values adjusted to 12 percent grain moisture content.

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).

#### Huntley Irrigated Spring Wheat (Exp. 079909)

Planted: March 26, 2007  
Harvested: August 7, 2007  
Fertility: 100-0-0, PPI, March 21, 2007  
Herbicide: Curtail M 1.75 pt/a + Harmony Extra 0.33 oz/a + Puma 0.66 pt/a + R-11 4 oz/a + AMS 2 lb/a, POST, May 4, 2007  
Insecticide: Warrior, 3.0 oz/a, POST, June 18, 2007  
Previous Crop: small grains  
Irrigation: profile flooded May 18 and June 25, 2007  
Precipitation: 9.95 inches

Table 5. Performance of 25 spring wheat cultivars and experimental lines tested under irrigation near Fromberg, Montana during 2007. Cultivars listed alphabetically. (Exp. 079997).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein	Plant Height	Lodging
	2007	2006-07	2005-07			%		
	----- bushels/acre -----			lb/bu	%	%	inches	0-9
Agawam	103.3	<b>109.8*</b>	<b>101.8*</b>	64.4	11.3	11.0	33.8	0.0
Briggs	104.8	<b>107.7*</b>	<b>98.6*</b>	63.2	10.6	11.7	36.4	0.2
Choteau	112.1	<b>112.8**</b>	<b>104.9*</b>	63.2	11.1	11.5	34.0	0.1
Conan	93.5	94.3	89.1	63.1	11.0	11.3	33.9	0.0
Corbin	101.6			63.4	11.1	11.9	35.6	0.5
Ernest	99.5	99.9	89.9	62.7	11.2	11.2	40.9	1.0
Explorer	97.5	92.4	93.2	62.1	10.7	11.7	33.1	0.0
Fortuna	97.1	99.7	90.0	63.5	10.8	11.4	41.9	4.0
Freyr	109.4	<b>107.2*</b>		64.0	10.9	11.6	36.4	0.2
Granger	100.3			63.0	11.1	11.3	41.7	2.0
Hank	108.2	<b>110.4*</b>	<b>109.4**</b>	62.3	10.8	11.0	33.6	0.0
Jefferson	113.3	<b>110.7*</b>	<b>105.4*</b>	63.5	10.5	10.9	34.3	1.4
Jerome	106.2	<b>108.7*</b>	<b>108.1*</b>	63.5	11.0	10.4	35.5	0.1
Knudson	102.4	100.4	96.4	62.6	11.0	10.3	35.3	0.4
McNeal	104.4	<b>106.5*</b>	95.9	62.6	10.1	12.0	37.8	1.0
Norpro	109.5	<b>109.3*</b>	<b>105.5*</b>	62.9	10.9	11.2	34.7	0.1
Outlook	106.0	<b>104.4*</b>	<b>97.8*</b>	62.0	10.4	10.9	37.9	2.3
Reeder	106.9	<b>104.7*</b>	<b>98.3*</b>	63.7	10.8	11.2	38.1	0.3
Scholar	105.6	102.5	90.9	63.6	10.9	11.1	38.0	0.3
Traverse	104.0			60.7	10.8	10.4	38.6	0.5
Vida	107.9	<b>111.2*</b>	<b>103.5*</b>	62.1	11.2	10.9	35.6	2.3
Westbred 926	93.5	98.0	95.5	62.4	10.8	11.9	32.6	0.0
MT0414	101.1			63.2	10.7	11.7	38.9	0.6
MT0415	100.5			63.4	10.9	11.9	38.9	0.2
MT0515	113.6	<b>111.3*</b>		64.0	11.1	10.6	36.0	0.8
Average	104.1	105.1	98.6	63.0	10.9	11.2	36.5	0.7
PLSD (p=0.05)	ns	8.7	11.6	0.8	0.4	0.7	2.0	1.8
CV%	9.0	6.9	12.3	0.7	2.2	3.8	3.3	144.0
Lattice RE%	101	.-	.-	110	100	111	91	110

1/ Yields are based on 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.

2/ Grain protein values adjusted to 12 percent grain moisture content.

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 Wheat (Exp. 079997)

Planted: March 20, 2007  
Harvested: August 7, 2007  
Fertility: Preplant applications rate unavailable. 40-0-0, POST, June 13, 2007  
Herbicide: n/a  
Insecticide: none  
Previous Crop: sugar beets  
Irrigation: flood  
Precipitation: n/a

Table 6. Grain yield<sup>1/</sup> of 25 spring wheat cultivars tested at four locations in south central Montana during 2007. Varieties listed by declining three-location average yield.

Cultivars	Molt Dryland	Huntley Irrigated	Fromberg Irrigated	Irrigated Average	Three Location Average
	-----bushels per acre -----				
Jefferson	<b>21.1**</b>	83.0	113.3	<b>102.5*</b>	<b>75.7**</b>
MT0515	7.3	102.2	113.6	<b>107.9**</b>	<b>74.8*</b>
Hank	<b>17.3*</b>	83.2	108.2	<b>103.0*</b>	<b>74.6*</b>
Vida	14.4	81.0	107.9	<b>103.6*</b>	<b>74.3*</b>
Jerome	15.4	87.4	106.2	<b>102.8*</b>	<b>73.3*</b>
Freyr	14.4	97.9	109.4	<b>99.8*</b>	<b>71.4*</b>
Choteau	7.8	85.6	112.1	<b>101.9*</b>	<b>69.9*</b>
Outlook	15.5	93.9	106.0	96.7	<b>69.9*</b>
Norpro	13.1	99.3	109.5	96.3	<b>68.6*</b>
Corbin	8.6	89.7	101.6	<b>97.4*</b>	<b>68.1*</b>
Ernest	15.9	84.4	99.5	94.6	<b>68.1*</b>
McNeal	16.3	84.2	104.4	93.8	<b>68.1*</b>
MT0414	15.4	86.4	101.1	93.8	<b>67.5*</b>
Scholar	11.1	99.3	105.6	94.9	67.1
Westbred 926	14.1	85.2	93.5	93.7	66.9
Agawam	7.0	89.2	103.3	96.2	66.4
Traverse	9.2	83.4	104.0	94.6	66.3
Knudson	7.6	75.8	102.4	95.3	65.7
Reeder	15.5	91.6	106.9	91.3	65.6
MT0415	12.9	82.0	100.5	91.3	65.4
Explorer	14.2	69.6	97.5	90.9	65.3
Granger	13.7	88.2	100.3	90.6	65.3
Briggs	5.8	91.7	104.8	94.1	65.0
Conan	10.9	93.2	93.5	89.6	63.2
Fortuna	12.7	90.3	97.1	83.4	59.0
Average	12.7	87.9	104.1	96.0	68.2
PLSD (p=0.05)	4.7	ns	ns	10.7	8.5
CV%	20.6	12.9	9.0	9.3	13.2

1/ Yields are based on 60 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).

Table 7. Performance of 25 spring wheat cultivars and experimental lines tested under both dryland and irrigated conditions at three locations in south central Montana during 2007. Cultivars listed alphabetically.

Cultivar	1/	Test Weight	Grain Moisture	2/	Plant Height
	Grain Yield			Grain Protein	
	bu/a	lb/bu	%	%	inches
Agawam	66.4	61.4	11.1	11.4	29.9
Briggs	65.0	59.5	10.5	11.3	33.4
Choteau	<b>69.9*</b>	58.5	10.4	11.5	29.0
Conan	63.2	61.6	10.8	11.2	29.9
Corbin	<b>68.1*</b>	61.0	10.9	11.4	31.3
Ernest	<b>68.1*</b>	62.1	10.8	10.1	36.9
Explorer	65.3	62.1	10.5	10.8	28.8
Fortuna	59.0	62.0	10.5	10.8	36.7
Freyr	<b>71.4*</b>	62.8	10.9	10.4	32.4
Granger	65.3	62.1	10.8	10.3	35.8
Hank	<b>74.6*</b>	61.8	10.8	10.1	29.3
Jefferson	<b>75.7**</b>	62.7	10.6	9.2	30.3
Jerome	<b>73.3*</b>	62.5	10.7	9.5	30.4
Knudson	65.7	62.4	10.6	10.5	30.5
McNeal	<b>68.1*</b>	62.2	10.3	10.1	32.1
Norpro	<b>68.6*</b>	62.1	10.7	9.7	30.0
Outlook	<b>69.9*</b>	61.7	10.5	9.7	31.7
Reeder	65.6	63.3	10.6	9.7	32.0
Scholar	67.1	62.2	11.0	10.0	35.7
Traverse	66.3	59.5	10.4	9.7	34.7
Vida	<b>74.3*</b>	62.4	11.1	9.7	31.2
Westbred 926	66.9	62.0	10.5	10.3	29.1
MT0414	<b>67.5*</b>	62.4	10.5	10.7	33.1
MT0415	65.4	62.5	10.6	10.7	33.7
MT0515	<b>74.8*</b>	61.9	11.0	10.5	31.2
Average	68.2	61.8	10.7	10.4	32.0
PLSD (p=0.05)	8.5	ns	ns	ns	3.4
CV%	13.2	5.9	6.3	16.4	11.1
Location Years	3	3	3	3	3

1/ Yields are based on 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.

2/ Grain protein values adjusted to 12 percent grain 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 8. Performance of 25 spring wheat cultivars and experimental lines tested under irrigated conditions only in south central Montana during 2007. Cultivars listed alphabetically.

Cultivar	1/	Test Weight	Grain Moisture	2/	Plant Height	Lodging
	Grain Yield			Grain Protein		
	bu/a	lb/bu	%	%	inches	0-9
Agawam	96.2	64.3	10.6	9.9	33.4	0.0
Briggs	94.1	63.0	10.1	10.1	38.2	0.0
Choteau	<b>101.9*</b>	63.6	10.4	10.0	35.2	0.0
Conan	89.6	63.0	10.1	10.5	34.7	0.0
Corbin	<b>97.4*</b>	63.3	10.4	10.0	36.0	0.3
Ernest	94.6	62.6	10.4	10.1	43.8	1.2
Explorer	90.9	62.6	10.0	10.3	33.7	0.0
Fortuna	83.4	63.6	10.1	9.8	43.2	3.5
Freyr	<b>99.8*</b>	63.6	10.2	10.1	37.9	0.0
Granger	90.6	62.5	10.4	10.1	42.7	2.0
Hank	<b>103.0*</b>	62.0	10.0	9.9	33.3	0.0
Jefferson	<b>102.5*</b>	63.1	9.9	9.4	34.8	0.8
Jerome	<b>102.8*</b>	62.8	10.3	8.9	34.5	0.0
Knudson	95.3	62.7	10.3	9.2	35.4	0.2
McNeal	93.8	62.8	9.5	10.0	37.8	0.7
Norpro	96.3	62.7	10.2	9.5	35.1	0.0
Outlook	96.7	62.2	9.7	9.6	37.8	1.2
Reeder	91.3	63.8	9.9	9.7	38.0	0.0
Scholar	94.9	63.4	10.0	9.8	41.8	2.3
Traverse	94.6	60.8	10.1	9.2	40.8	0.3
Vida	<b>103.6*</b>	62.5	10.4	9.9	37.0	1.3
Westbred 926	93.7	62.0	10.1	10.3	33.4	0.0
MT0414	93.8	63.4	10.0	10.4	39.8	0.2
MT0415	91.3	63.5	10.0	10.5	40.3	0.0
MT0515	<b>107.9**</b>	64.1	10.3	9.9	37.9	0.5
Average	96.0	62.9	10.1	9.9	37.5	0.6
PLSD (p=0.05)	10.7	0.9	0.3	ns	3.2	1.8
CV%	9.3	1.2	2.3	7.6	7.1	254.8
Location Years	2	2	2	2	2	2

1/ Yields are based on 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.

2/ Grain protein values adjusted to 12 percent grain 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).