

PROJECT TITLE: Off-Station Spring Wheat 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 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 2013 off-station spring wheat trials in south central Montana were established under dryland conditions near Billings, Broadview and Huntley, 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 21 commercial cultivars and 4 experimental lines.

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 (~45 lb/a) and 1.5 million seeds per acre under irrigation (~90 lb/a). Seeding rates were not adjusted for germination. Information pertaining to the traits and characteristics of the 22 commercial spring wheat cultivars are provided in Table 1.

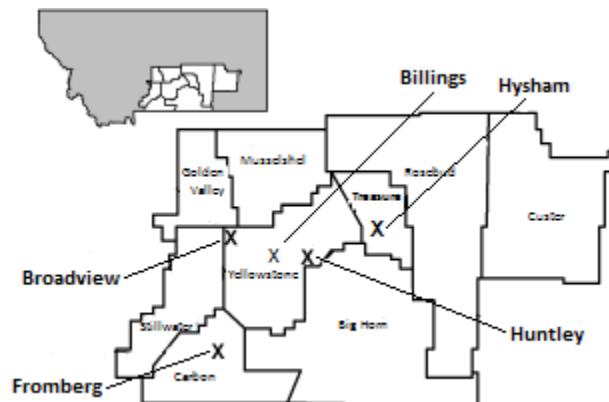


Figure 1. 2013 off-station spring wheat trial locations in south central Montana.

Test plots consisted of a 15-foot, 7-row plot with 7-inch row spacing under both irrigated and dryland conditions. 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 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 Huntley, Fromberg and Hysham, representing no lodging to all stems lying flat on the ground, respectively.

RESULTS:

The 2013 spring wheat test sites were dry during the winter months, with below average rain or snow accumulation except in October. Below average precipitation occurred from March through July except in May. Above average precipitation in May (5.16 inches) boosted wheat growth and enhanced grain yield. Early season drought coupled with above averaged temperatures resulted in poor spring wheat production under all dryland sites.

The average dryland spring wheat yield near Huntley in 2013 was 42 bu/a (Table 2), 12 bushels less per acre than the trial harvested the previous year. The yield at this site was the highest among all dryland locations tested in 2013. Yields ranged from 33 bu/a for 'Solano' to 53 bu/a for 'Jedd'. Six other entries produced yield from 46 to 79 bu/a, statistically equal to that of highest yielding cultivar at Huntley. Test weight averaged 61.6 lb/bu, and ranged from 59.6 lb/bu for Solano to 63.9 lb/bu for 'Vantage'. Grain protein was relatively low and averaged 11.3 percent. Protein content ranged from 10.6 percent for experimental entry 'MT1053' to 12.8 percent for 'Vantage'. 'Vida' was the highest yielding commercial cultivar at this location the past two years, averaging 50 bu/a. Five other commercial entries including 'Corbin', Jedd, 'Oneal', 'Reeder', and 'WB Gunnison' have produced yields from 44 to 47 bu/a the past two years, equal to the yield of Vida.

Dryland spring wheat yields at Broadview averaged 21 bu/a in 2013, doubled what was harvested the previous year (Table 3). Lower yield at this location in the last two years was mainly attributed to dry conditions at planting and lack of good stand establishment. Yield ranged from 17 bu/a for Vantage to 26 bu/a for Reader. Twelve other entries produced yield from 22 to 25 bu/a, statistically equal to that of highest yielding cultivar at Broadview. Spring wheat test weights averaged 59.3 lb/bu and ranged from 57.2 lb/bu for 'Hank' to 61.9 for 'Kelby' and 'Volt'. Grain protein was high and averaged 15.8 percent, varying from 15.1 to 17.7 percent. Reader and Vida was the highest yielding cultivars at Broadview averaged over the past two- and three-year respectively.

Spring wheat yields near Billings averaged 22 bu/a in 2013, about the same what was harvested the previous year (Table 4). Experimental line 'MT 1172' was the highest yielding entry with 27.3 bu/a, while Vida was the highest yielding commercial cultivar with 26.9 bu/a. Four other entries produced yield from 23 to 26 bu/a, statistically equal to that of highest yielding entry at Billings. Test weight averaged 60.4 lb/bu. Test weight varied from 55.6 lb/bu for 'Jerome' to 63.3 lb/bu for Volt. Grain protein levels averaged 14.5 percent and ranged from 13.1 percent for 'MT1053' to 16.1 percent for Vantage.

Irrigated spring wheat yield averaged 69 bu/a at Huntley in 2013 (Table 5). No lodging occurred at this location except in cultivar Solano that exhibited limited lodging with an average score of 2 out of 9. Grain yield varied from 58 bu/a for 'McNeal' to 83 bu/a for Vida. Eight other entries produced yield ranged from 71 to 82 bu/a, statistically equal to that of highest yielding cultivar Vida. Test weight was relatively low and averaged 59.4 lb/bu. Test weight ranged from 56.9 for 'Hank' to

62.7 lb/bu for Vantage. Grain protein levels were high and averaged 15.0 percent. Protein content varied from 13.9 for MT 1053 to 17.4 percent for Vantage. Hank was the highest yielding cultivar tested under irrigation at Huntley the past 2 and 3 years, averaging 98 and 89 bu/a, respectively.

Little or no lodging was observed for most commercial cultivars under irrigation at Hysham in 2013 except for 'Fortuna' (Table 6). Average yield at Hysham was 107 bu/a about 35 bu/a more than last year. The yield at this site was the highest among all locations tested in 2013. Yields ranged from 75 bu/a for Fortuna to 121 bu/a for experimental lines MT 1172 and MT 1053. Vida was the highest yielding commercial cultivars producing 117 bu/a. Four other commercial entries produced yield ranged from 112 to 116 bu/a, statistically equal to the yield of highest yielding entries. Average test weight was 60.7 lb/bu, and ranged from 56.8 lb/bu for 'Sy Tyra' to 64.1 for Vantage. Grain protein levels averaged 14.9 percent and varied from 13.3 percent for Volt to 16.4 percent for Solano.

At Fromberg in 2013 only three spring wheat entries exhibited lodging under irrigation (Table 7). Cultivars Fortuna, 'Mott', and Solano suffered lodging. The yield at Fromberg in 2013 averaged 103 bu/a about the same as last year. Grain yield ranged from 88 bu/a for Fortuna to 114 bu/a for 'Duclair' and Volt. Nine other entries produced yield ranged from 105 to 111 bu/a, statistically equal to the highest yielding cultivars. Test weight was excellent at Fromberg averaging 63.5 lb/bu. All entries exhibited test weight greater than 61 lb/bu. Grain protein levels were also excellent averaging 15.1 percent with all entries exceeding protein contents of 14 percent. Over the past three years average yield have been fairly stable at Fromberg. Two- and Three-year average yield for spring wheat varieties tested during 2011 - 2013, was 103 and 101 bu/a respectively. The commercial entry volt was the best performing cultivars at Fromberg.

SUMMARY:

Early season drought resulted in delayed planting and poor spring wheat stand establishment at some dryland locations in 2013. Rain shower in May (5.16 inches) and June (1.97 inches) boosted wheat growth and enhanced grain yield particularly at dryland locations. In 2013 experimental line MT 1172 was the highest yielding entry followed by commercial cultivar Hank, averaging 69 and 67 bu/a respectively, across all locations tested in south central Montana (Tables 8). Experimental line MT1172 and commercial cultivar Vida exhibited highest average yield across dryland sites in 2013. While MT 1053 and Vida produced highest yield averaged over the past two- and three-years respectively across dryland sites (Table 11). Hank and Volt were the top yielding cultivars under irrigated condition over the past two- and three-years respectively (Table 10). Long-term productivity based on last two and three years average yield across all locations were highest for Hank and Jerome (Table 9 and 10). Across all locations for the past three years, nine other entries produced yields ranged from 62 to 66 bu/a, which was statistically equal to the yield of Jerome (Table 9). In 2013 grain yield at most location was higher compared to 2012. Averaged across locations grain protein content was 14.4 percent (Table 9). Overall test weight averaged 60.4 lb/bu and 60.7 lb/bu across dryland and irrigated locations respectively (Table 10 and 11).

Table 1. Selected characteristics and traits of 21 commercial spring wheat cultivars performance tested at six off-station sites in south central Montana during 2013.

Cultivar	Origin	Year 1/ of Release	2/ Market Class	3/ PVP Yes/No	4/ Maturity	5/ Straw Strength	6/ Disease Resistance						6/ Insect Resistance				8/ Clearfield Type Yes/No		
							Fusarium			Wheat			Russian		Hessian			7/ Quality	
							Head Blight (Scab)	Leaf Rust	Stem Rust	Stripe Rust	Stem Sawfly	Wheat Aphid	Wheat Fly (GP)	Milling	Baking				
													1-5	1-5					
AP604 CL	AgriPro	2009	HRS	Y	M	S	MS	MS	MR	-	S	S	-	4	4	Y			
Choteau	MSU	2003	HRS	Y	E-M	VS	S	-	R	S	R	S	S	4	4	N			
Corbin	WestBred	2006	HRS	Y	E	MS	S	-	-	R	R	S	-	3	3	N			
Duclair	MSU	2011	HRS	Y	E-M	S	-	-	MR	MR	-	-	-	-	-	N			
Fortuna	NDSU	1966	HRS	N	E	MW	S	R	R	VS	R	S	S	5	4	N			
Hank	WestBred	1999	HRS	Y	E	S	S	R	R	MR	S	S	R	3	4	N			
Jedd	WestBred	2008	HRS	Y	E-M	S	S	-	-	MS	S	S	R	3	3	Y			
Jerome	UI	2004	HRS	Y	M	S	S	-	-	R	S	S	R	4	5	N			
Kelby	AgriPro	2006	HRS	Y	M	MS	MR	MR	R	-	S	S	-	3	3	N			
McNeal	MSU	1995	HRS	N	M	S	S	MS	MR	VS	S	S	S	3	5	N			
Mott	NDSU	2009	HRS	Y	M-L	-	S	MS	MR	-	R	-	-	4	4	N			
Oneal	WestBred	2008	HRS	Y	M	S	S	-	-	S	MS	S	-	3	3	N			
Reeder	NDSU	1999	HRS	Y	M-L	S	MS	MR	R	MR	S	S	S	3	3	N			
Solano	WestBred	2007	HRS	Y	-	-	-	MR	MR	MR	-	-	-	-	-	N			
Superb	AAFC	2001	HRS	Y	M-L	S	S	MS	R	-	S	S	-	-	-	N			
SY 503	Syngenta	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-			
SY Tyra	Syngenta	2011	HRS	Y	M	M	S	R	R	MR	MR	-	-	-	-	N			
Vantage	WestBred		HRS	Y	M-L	-	MS	MS	MR	MS	MS	-	-	-	-	N			
Vida	MSU	2006	HRS	Y	M-L	S	S	-	MS	MR	MS	S	S	4	4	N			
Volt	WestBred	2008	HRS	Y	M	S	MR	-	-	R	S	S	-	3	3	N			
WB																			
Gunnison	WestBred	2010	HRS	Y	-	-	-	-	-	-	MR	-	-	-	-	N			

1/ AAFC=Agriculture & Agri-Food Canada; AgriPro=AgriPro COKER, Berthoud, Colorado; MSU=Montana State University; NDSU=North Dakota State University; SDSU=South Dakota State University; UI=University of Idaho; WestBred=WestBred Group, Monsanto Co., 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.

8/ Signifies a cultivar possessing the Clearfield trait imparting tolerance to Beyond® (imazamox) herbicide.

Table 2. Performance of 25 spring wheat cultivars tested under no-till, dryland conditions near Huntley, Montana during 2013. Cultivars listed alphabetically. (Exp. 139908).

Cultivar	1/ Grain Yield			Test Weight	2/ Grain		Plant Height	Heading Date	
	2013	2012-13	2011-13		Moisture	Protein		Julian	Calendar
	----- bushels/acre -----				lb/bu	%		%	inches
<u>Commercial</u>									
AP604 CL	38.3	41.8	49.0	62.4	11.9	10.9	33.8	168.1	Jun-17
Choteau	38.3	40.6	45.5	61.7	11.7	11.2	29.8	170.9	Jun-19
Corbin	42.8	44.0*	47.5	61.1	11.7	11.3	31.3	168.8	Jun-17
Duclair	46.2*	43.3	48.6	61.3	11.7	11.0	32.2	168.5	Jun-17
Fortuna	43.3	41.4	45.2	60.6	11.8	11.5	40.3	167.9	Jun-16
Hank	44.4	43.3	47.2	59.8	11.5	11.1	30.3	168.7	Jun-17
Jedd	52.6**	47.4*	49.0	62.0	11.8	11.2	27.0	170.1	Jun-19
Jerome	44.9	43.5	50.1	61.4	11.8	11.0	32.4	168.7	Jun-17
Kelby	37.4			62.9	11.7	12.1	30.0	169.2	Jun-18
McNeal	37.5	43.0	42.6	60.9	11.7	11.5	33.1	171.6	Jun-20
Mott	33.6	37.0	41.3	61.6	11.7	11.9	34.6	170.1	Jun-19
Oneal	46.4*	46.7*	48.5	61.8	11.8	11.2	33.5	170.9	Jun-19
Reeder	37.4	45.1*	47.8	62.3	11.3	11.2	31.7	170.5	Jun-19
Solano	33.1	37.1	42.2	59.6	11.6	12.4	34.6	170.2	Jun-19
Superb	43.0	41.4	45.2	60.9	11.7	11.6	34.7	170.3	Jun-19
SY 503	43.9			62.7	11.7	11.3	35.4	168.8	Jun-17
SY Tyra	48.0*			62.6	12.0	10.7	29.8	168.5	Jun-17
Vantage	34.8	36.9		63.9	11.8	12.8	31.5	172.1	Jun-21
Vida	46.3*	50.1*	53.9	61.0	11.8	10.8	32.6	169.1	Jun-18
Volt	40.2	43.5	48.4	63.1	12.0	10.8	30.1	169.7	Jun-18
WB Gunnison	44.9	45.4*	47.6	62.0	11.7	11.4	30.5	168.2	Jun-17
<u>Experimental</u>									
WB9879CLP	41.8			62.5	12.0	11.0	30.8	170.3	Jun-19
MT 1142	40.6			61.4	11.9	12.0	33.4	168.9	Jun-17
MT 1172	48.6*			59.9	11.5	11.0	31.9	170.5	Jun-19
MT1053	48.3*	51.7**		61.3	12.0	10.6	31.3	170.2	Jun-19
Average	42.3	43.3	47.0	61.6	11.7	11.3	32.3	169.6	Jun-18
PLSD (p=0.05)	7.3	8.0	ns	0.7	0.2	0.5	1.8	1.8	
CV%	10.5	10.6	9.1	0.6	1.3	2.4	3.3	0.6	

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).

Huntley Dryland Spring Wheat (Exp. 139908)

Planted: March 14, 2013
Harvested: August 8, 2013
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
Insecticide: none applied
Previous Crop: chemical fallow
Precipitation: n/a

Table 3. Performance of 25 spring wheat cultivars tested under no-till, dryland conditions near Broadview, Montana during 2013. Cultivars listed alphabetically. (Exp. 139995).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain	Plant Height
	2013	2012-13	2011-13			Protein	
	----- bushels/acre -----			lb/bu	%	%	inches
<u>Commercial</u>							
AP604 CL	19.8	15.3	17.3*	59.9	7.8	15.7	30.3
Choteau	18.8	14.2	15.7*	59.4	7.8	16.0	26.6
Corbin	20.2	15.3	14.5	58.2	7.7	16.2	27.2
Duclair	22.7*	17.8*	17.2*	58.0	8.0	15.6	26.9
Fortuna	20.0	15.9*	14.5	59.0	8.0	16.1	33.2
Hank	22.9*	16.5*	16.8*	57.2	8.0	16.0	26.4
Jedd	23.6*	17.6*	16.9*	59.9	8.2	15.1	25.7
Jerome	22.6*	15.9*	19.2*	57.4	7.9	15.9	27.7
Kelby	18.3			61.9	8.0	16.9	25.5
McNeal	20.4	16.0*	15.0	57.5	8.0	15.6	28.9
Mott	20.1	14.0	16.1*	60.0	7.8	17.0	27.0
Oneal	22.4*	16.5*	16.8*	60.3	8.3	15.5	28.0
Reeder	26.1**	19.2**	17.7*	60.8	8.0	15.8	27.7
Solano	18.9	13.4	15.3*	57.7	7.8	15.7	30.8
Superb	22.8*	16.6*	17.3*	59.0	8.0	16.0	30.1
SY 503	22.7*			59.8	8.3	15.2	30.6
SY Tyra	23.2*			61.2	8.4	15.2	25.9
Vantage	17.3	13.4		61.3	8.0	17.7	25.7
Vida	21.8	17.3*	20.6**	58.3	8.0	15.1	26.8
Volt	21.0	13.7	15.0	61.9	8.3	15.5	28.6
WB Gunnison	22.9*	18.5*	16.2*	59.5	8.1	15.6	27.6
<u>Experimental</u>							
WB9879CLP	23.5*			59.6	7.8	16.4	26.0
MT 1142	19.7			58.0	8.2	15.2	27.0
MT 1172	25.4*			58.7	7.7	15.5	27.2
MT1053	24.8*	17.0*		58.2	8.2	15.4	29.4
Average	21.7	16.0	16.6	59.3	8.0	15.8	27.9
PLSD (p=0.05)	3.8	3.5	5.3	1.5	0.3	1.1	3.0
CV%	9.9	18.7	24.9	1.4	2.4	3.9	6.7

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)

Broadview Dryland Spring Wheat (Exp. 139995)

Planted: April 19, 2013
 Harvested: August 20, 2013
 Fertility: n/a
 Herbicide: na
 Insecticide: none applied
 Previous Crop: fallow
 Precipitation: n/a

Table 4. Performance of 25 spring wheat cultivars tested under conventional dryland conditions near Billings, Montana during 2013. Cultivars listed alphabetically. (Exp. 13999---).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain	Plant Height
	2013	2012-13	2011-13			Protein	
	----- bushels/acre -----			lb/bu	%	%	inches
<u>Commercial</u>							
AP604 CL	21.0	21.4	19.3	61.8	8.7	14.6	21.9
Choteau	22.5	21.5	19.4	61.0	7.8	14.5	20.8
Corbin	20.9	21.4	19.0	59.4	10.2	14.7	21.2
Duclair	23.3*	21.8	20.2	57.3	9.1	14.3	22.0
Fortuna	16.1	18.3	15.7	59.1	9.4	14.7	24.6
Hank	21.5	22.3	19.4	59.7	10.3	14.3	20.5
Jedd	18.7	21.0	17.8	61.1	8.8	14.3	17.9
Jerome	22.7	23.1	20.2	55.6	8.6	13.5	22.7
Kelby	17.5			60.4	9.5	15.7	19.5
McNeal	19.6	20.0	19.3	60.0	7.8	15.0	22.3
Mott	21.9	20.4	18.8	61.9	7.9	15.0	21.7
Oneal	22.1	23.1	20.3	60.4	9.5	14.2	22.3
Reeder	23.8*	24.1	21.2	61.8	7.8	13.8	21.9
Solano	19.5	21.0	18.7	59.1	8.5	15.4	24.2
Superb	20.6	20.9	18.6	58.4	10.1	14.8	23.0
SY 503	20.0			61.5	8.8	15.0	23.1
SY Tyra	19.7			63.0	9.0	14.3	19.5
Vantage	18.4	19.4		61.6	8.8	16.1	20.1
Vida	26.9*	24.8	22.8	61.9	8.3	13.1	23.4
Volt	22.4	22.5	19.4	63.3	8.1	13.9	22.0
WB Gunnison	23.0	22.3	18.4	61.1	9.7	15.1	22.3
<u>Experimental</u>							
WB9879CLP	21.6			61.3	7.9	14.5	20.7
MT 1142	24.6*			57.8	9.5	14.2	21.9
MT 1172	27.3**			59.6	10.6	13.6	20.7
MT1053	25.5*	24.4		62.3	8.1	13.1	20.7
Average	21.6	21.8	19.3	60.4	8.9	14.5	21.6
PLSD (p=0.05)	4.0	ns	ns	2.3	1.7	0.8	2.3
CV%	10.3	13.0	16.2	2.1	11.5	3.2	5.8

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.

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

Billings Dryland Spring Wheat (Exp. 13999-)

Planted: April 26, 2013
Harvested: August 12, 2013
Fertility: 11-52-0, 60 lb/a in Furrows at planting.
Herbicide: na
Insecticide: none applied
Previous Crop: fallow
Precipitation: n/a

Table 5. Performance of 25 spring wheat cultivars tested under irrigation near Huntley, Montana during 2013 Cultivars listed alphabetically. (Exp. 139909).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain		Plant Height	Lodging 0-9	Heading Date	
	2013	2012-13	2011-13			protein	%			inches	Julian
	----- bushels/acre -----			lb/bu	%	%	inches	0-9			
<u>Commercial</u>											
AP604 CL	60.4	83.2*	77.3	60.0	11.1	15.4	37.9	0.0	164.8	Jun-12	
Choteau	73.7*	93.7*	85.7*	59.2	11.1	15.3	34.6	0.0	167.4	Jun-15	
Corbin	61.9	88.9*	81.2*	60.3	11.3	14.8	36.0	0.0	165.6	Jun-13	
Duclair	66.5	84.8*	83.2*	58.0	11.0	14.2	36.8	0.0	164.8	Jun-12	
Fortuna	62.2	76.7	69.7	59.7	11.3	14.5	41.7	0.0	167.0	Jun-15	
Hank	74.9*	98.3**	89.2**	56.9	10.7	14.9	35.2	0.0	165.3	Jun-13	
Jedd	68.0	95.8*	86.8*	58.1	10.9	15.0	30.5	0.0	165.0	Jun-13	
Jerome	70.9*	90.5*	85.4*	59.0	11.2	14.2	35.1	0.0	165.0	Jun-13	
Kelby	66.5			61.9	11.2	15.0	34.4	0.0	164.7	Jun-12	
McNeal	58.0	81.7	72.9	59.3	11.3	15.0	34.3	0.0	168.0	Jun-16	
Mott	74.2*	87.9*	77.9*	60.3	11.2	15.3	41.6	0.0	169.2	Jun-17	
Oneal	68.7	98.3**	87.0*	59.0	11.1	15.1	35.6	0.0	168.7	Jun-16	
Reeder	69.1	85.6*	79.0*	60.3	10.9	14.8	37.3	0.0	166.5	Jun-14	
Solano	59.1	71.7	68.1	58.3	10.8	16.9	41.8	2.0	170.0	Jun-18	
Superb	67.6	76.7	70.3	58.9	11.0	15.4	39.2	0.0	168.0	Jun-16	
SY 503	58.9			61.3	11.0	15.6	36.4	0.0	164.2	Jun-12	
SY Tyra	67.7			58.4	11.0	14.0	32.1	0.0	168.4	Jun-16	
Vantage	63.6	68.7		62.7	11.2	17.4	33.9	0.0	170.7	Jun-18	
Vida	83.4**	92.1*	82.8*	59.2	11.1	14.4	36.6	0.0	168.3	Jun-16	
Volt	76.1*	95.0*	85.3*	60.0	11.2	14.5	35.0	0.0	165.9	Jun-13	
WB Gunnison	68.5	91.9*	83.8*	60.0	11.1	14.7	34.4	0.0	164.5	Jun-12	
<u>Experimental</u>											
WB9879CLP	81.5*			60.4	11.2	14.6	35.7	0.0	167.6	Jun-15	
MT 1142	67.6			58.0	11.0	16.0	37.5	0.0	167.2	Jun-15	
MT 1172	76.6*			57.7	10.8	14.4	35.2	0.0	167.1	Jun-15	
MT1053	78.5*	90.9*		59.0	11.2	13.9	35.0	0.0	167.5	Jun-15	
Average	69.0	87.0	80.3	59.4	11.1	15.0	36.2	0.1	166.9	Jun-14	
PLSD (p=0.05)	13.3	16.2	11.7	1.8	0.3	1.0	3.0	0.7	1.3		
CV%	10.5	11.5	11.1	1.7	1.3	3.6	4.7	500.0	0.4		

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.

Table 6 Continued.

** 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 Irrigated Spring Wheat (Exp. 139909)

Planted: March 20, 2013

Harvested: August 8, 2013

Fertility: 100-0-0, spread fall 2012

Herbicide: RT3 22 Oz/a in the fall 2012; Bronate adv. 16 oz/a on May 9, 2013.

Insecticide: none

Previous Crop: spring barley

Irrigation: overhead sprinkler

Precipitation: 11.05 inches

Table 6. Performance of 25 spring wheat cultivars tested under irrigation near Hysham during 2013. Cultivars listed alphabetically. (Exp. 139996).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein		Plant Height	Lodging
	2013	2012-13	2011-13			Protein	Plant		
	----- bushels/acre -----			lb/bu	%	%	inches	0-9	
<u>Commercial</u>									
AP604 CL	115.4*	88.7	87.2	61.8	13.1	14.2	38.1	0.3	
Choteau	105.8	85.4	83.0	61.2	14.2	14.1	37.9	0.0	
Corbin	97.3	90.4	90.5	59.6	13.9	15.4	34.6	1.0	
Duclair	111.3	90.8	89.9	60.5	13.4	14.4	37.9	0.0	
Fortuna	74.8	75.9	74.9	59.6	13.3	16.1	43.0	8.0	
Hank	116.0*	92.0	89.6	59.8	13.3	14.7	34.5	0.0	
Jedd	111.6	88.6	84.3	60.5	14.2	15.0	31.5	0.0	
Jerome	112.0*	98.2	93.4	60.6	13.4	14.8	39.4	2.7	
Kelby	108.4			61.8	12.7	15.7	33.3	2.0	
McNeal	103.2	87.2	88.2	61.6	15.1	14.8	40.0	0.3	
Mott	109.5	86.6	88.6	61.4	13.9	14.8	42.8	0.0	
Oneal	112.2*	87.0	87.8	59.8	16.0	14.7	39.9	2.3	
Reeder	108.9	98.7	90.8	60.9	14.0	14.8	39.0	1.7	
Solano	76.6	72.6	72.9	58.3	13.3	16.7	43.2	1.7	
Superb	105.1	87.2	79.8	60.9	13.4	15.9	40.8	1.3	
SY 503	106.6			62.0	13.3	15.4	37.5	0.0	
SY Tyra	104.4			56.8	17.5	13.6	34.0	0.0	
Vantage	107.2	94.9		64.1	14.1	15.2	37.7	0.0	
Vida	116.8*	96.0	92.4	60.0	14.7	14.4	37.8	0.3	
Volt	110.2	86.4	90.3	62.6	13.3	13.3	35.6	0.0	
WB Gunnison	103.4	89.0	86.9	61.1	15.8	14.5	38.8	0.3	
<u>Experimental</u>									
WB9879CLP	108.8			62.1	13.9	14.3	38.2	0.0	
MT 1142	99.0			60.8	13.5	15.3	38.3	0.3	
MT 1172	121.3**			59.4	14.4	14.7	36.2	0.0	
MT1053	121.3**	88.1		59.1	15.0	15.1	35.7	0.0	
Average	106.7	88.6	86.5	60.7	14.1	14.9	37.8	0.9	
PLSD (p=0.05)	9.4	ns	ns	1.6	0.9	1.2	2.9	2.3	
CV%	5.0	10.6	10.3	1.6	3.7	4.9	4.7	156.6	

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)

Hysham Irrigated Spring Wheat (Exp. 139996)

Planted:	April 2, 2013
Harvested:	August 5, 2013
Fertility:	60 lb N/a preplant, 70 lb/a 11-52-0 at planting; 140 lb N/a top dress in spring
Herbicide:	none
Previous Crop:	n/a
Irrigation:	flood
Precipitation:	n/a

Table 7. Performance of 25 spring wheat cultivars tested under irrigation near Fromberg, Montana during 2032. Cultivars listed alphabetically. (Exp. 139997).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain		Plant Height	Lodging
	2013	2012-13	2011-13			Protein	Plant		
	----- bushels/acre -----					lb/bu	%		
<u>Commercial</u>									
AP604 CL	105.2*	106.7*	107.0*	65.3	11.1	14.4	42.3	0.0	
Choteau	111.6*	112.3*	110.1*	63.8	11.1	15.0	36.8	0.0	
Corbin	100.5	93.6	99.8	63.2	11.1	14.6	38.7	0.0	
Duclair	113.6**	110.5*	105.3*	63.0	11.4	14.1	40.0	0.0	
Fortuna	87.5	88.5	88.8	63.8	11.1	15.3	48.5	2.3	
Hank	106.5*	113.4*	108.4*	61.4	10.8	15.5	36.4	0.0	
Jedd	101.1	109.3*	103.9	62.8	10.9	15.7	30.8	0.0	
Jerome	109.0*	110.9*	110.9*	62.8	11.1	14.4	39.0	0.0	
Kelby	97.1			64.5	10.8	15.7	36.8	0.0	
McNeal	97.8	100.7*	95.7	63.1	11.1	14.8	38.3	0.0	
Mott	110.5*	104.6*	103.0	64.3	11.0	15.0	46.4	0.3	
Oneal	105.1	109.8*	104.3	62.5	11.5	14.9	39.4	0.0	
Reeder	105.1	100.5*	102.0	64.0	11.2	15.4	42.2	0.0	
Solano	87.9	81.7	83.4	62.1	10.7	16.3	47.2	1.7	
Superb	101.2	88.8	86.4	63.7	10.8	16.0	43.1	0.0	
SY 503	105.0			64.4	11.1	15.4	41.7	0.0	
SY Tyra	107.8*			63.8	11.7	14.5	34.3	0.0	
Vantage	93.9	100.4*		65.2	11.1	16.4	40.4	0.0	
Vida	107.1*	96.3	100.0	62.6	11.6	15.1	39.5	0.0	
Volt	113.6**	116.8**	119.1**	65.3	11.0	14.7	37.5	0.0	
WB Gunnison	96.5	101.3*	103.2	63.1	11.5	15.4	39.1	0.0	
<u>Experimental</u>									
WB9879CLP	110.9*			64.2	11.2	14.5	39.1	0.0	
MT 1142	105.4*			63.0	11.0	14.8	39.8	0.0	
MT 1172	102.7			62.5	11.0	15.3	38.3	0.0	
MT1053	101.9	110.9*		62.1	11.3	14.8	37.3	0.0	
Average	103.4	103.0	101.9	63.5	11.1	15.1	39.7	0.2	
PLSD (p=0.05)	8.4	18.1	13.9	0.8	0.4	0.6	1.6	383.2	
CV%	4.5	5.8	6.1	0.7	2.2	2.0	2.3	1.1	

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. 139997)

Planted:	April 3,, 2013
Harvested:	August 13, 2013
Fertility:	100 lb N/a preplant; 70 lb/a 11-52-0 at planting; 120 lb N/a top dress in May, 2013
Herbicide:	n/a
Previous Crop:	n/a
Irrigation:	overhead sprinkler
Precipitation:	n/a

Table 8. Grain yield^{1/} of 25 spring wheat cultivars tested at six locations in south central Montana during 2013. Varieties listed by declining six-location average yield.

	Dryland				Irrigated				Six Location Average
	Huntley	Billings	Broadview	Ave.	Huntley	Hysham	Fromberg	Ave.	
	----- bushels/acre -----								
MT 1172	48.6*	27.3**	25.4*	33.8**	76.6*	121.3**	102.7	103.4*	68.6**
Hank	44.4	21.5	22.9*	30.1*	74.9*	116.0*	106.5*	104.0**	67.0*
MT1053	48.3*	25.5*	24.8*	32.2*	78.5*	121.3**	101.9	100.0*	66.1*
Vida	46.3*	26.9*	21.8	32.1*	83.4**	116.8*	107.1*	99.4*	65.7*
WB9879CLP	41.8	21.6	23.5*	29.0	81.5*	108.8	110.9*	101.7*	65.4*
Jedd	52.6**	18.7	23.6*	31.7*	68.0	111.6	101.1	98.7*	65.2*
Volt	40.2	22.4	21.0	28.2	76.1*	110.2	113.6**	100.6*	64.4*
Oneal	46.4*	22.1	22.4*	30.2*	68.7	112.2*	105.1	97.3*	63.8*
Mott	33.6	21.9	20.1	26.0	74.2*	109.5	110.5*	100.2*	63.1*
Jerome	44.9	22.7	22.6*	29.4*	70.9*	112.0*	109.0*	95.*2	62.3*
Choteau	38.3	22.5	18.8	27.1	73.7*	105.8	111.6*	96.*8	61.9
Duclair	46.2*	23.3*	22.7*	30.2*	66.5	111.3	113.6**	93.*5	61.9
Reeder	37.4	23.8*	26.1**	30.1*	69.1	108.9	105.1	93.*2	61.6
SY Tyra	48.0*	19.7	23.2*	30.5*	67.7	104.4	107.8*	92.0	61.2
WB Gunnison	44.9	23.0	22.9*	30.4*	68.5	103.4	96.5	89.8	60.1
SY 503	43.9	20.0	22.7*	28.6	58.9	106.6	105.0	91.2	59.9
MT 1142	40.6	24.6*	19.7	28.3	67.6	99.0	105.4*	90.1	59.2
Superb	43.0	20.6	22.8*	28.8	67.6	105.1	101.2	89.1	59.0
AP604 CL	38.3	21.0	19.8	25.2	60.4	115.4*	105.2*	92.3	58.7
Corbin	42.8	20.9	20.2	27.6	61.9	97.3	100.5	88.4	58.0
Kelby	37.4	17.5	18.3	25.1	66.5	108.4	97.1	89.0	57.1
McNeal	37.5	19.6	20.4	25.8	58.0	103.2	97.8	85.4	55.6
Vantage	34.8	18.4	17.3	23.8	63.6	107.2	93.9	84.1	53.9
Solano	33.1	19.5	18.9	24.0	59.1	76.6	87.9	76.4	50.2
Fortuna	43.3	16.1	20.0	25.7	62.2	74.8	87.5	74.1	49.9
Average	42.3	21.6	21.7	28.6	69.0	106.7	103.4	106.7	60.8
PLSD (p=0.05)	7.3	4.0	3.8	4.7	13.3	9.4	8.4	11.2	6.6
CV%	10.5	10.3	9.9	11.5	10.5	5.0	4.5	9.4	10.8

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).

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

Table 9. Performance of 25 spring wheat cultivars tested under both dryland and irrigated conditions at six locations in south central Montana during 2013. Cultivars listed alphabetically.

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	2013	2012-13	2011-13				
	----- bushels/acre -----			lb/bu	%	%	inches
<u>Commercial</u>							
AP604 CL	58.7	59.5*	62.1*	61.6	10.6	14.3	34.0
Choteau	61.9	61.3*	62.5*	61.1	10.6	14.3	31.1
Corbin	58.0	58.9*	61.4	60.2	11.0	14.4	31.5
Duclair	61.9	61.5*	63.3*	59.6	10.7	14.1	32.7
Fortuna	49.9	52.8	53.9	60.4	10.8	14.9	38.5
Hank	67.0*	64.3**	64.6*	59.4	10.8	14.2	30.6
Jedd	65.2*	63.3*	62.6*	60.9	10.8	14.3	27.4
Jerome	62.3*	63.7*	66.1**	59.3	10.7	14.1	32.7
Kelby	57.1			62.5	10.7	15.0	30.1
McNeal	55.6	58.1	57.8	60.5	10.8	14.4	32.7
Mott	63.1*	58.4	60.1	61.7	10.6	14.8	35.8
Oneal	63.8*	63.6*	63.5*	60.6	11.4	14.3	33.1
Reeder	61.6	62.2*	62.4*	61.8	10.6	14.2	33.3
Solano	50.2	49.6	52.2	59.0	10.4	15.7	37.0
Superb	59.0	55.2	55.2	60.3	10.8	14.9	35.1
SY 503	59.9			61.7	10.7	14.9	34.5
SY Tyra	61.2			60.9	11.6	13.6	29.1
Vantage	53.9	55.6		62.9	10.8	15.9	31.6
Vida	65.7*	62.8*	64.6*	60.4	10.9	13.9	32.7
Volt	64.4*	63.0*	65.8*	62.6	10.7	13.7	31.5
WB Gunnison	60.1	61.4*	62.2*	61.3	11.3	14.5	32.0
<u>Experimental</u>							
WB9879CLP	65.4*			61.8	10.7	14.1	31.8
MT 1142	59.2			60.0	10.8	14.5	33.0
MT 1172	68.6**			59.8	11.0	14.0	31.7
MT1053	66.1*	63.8*		60.0	10.9	13.8	31.5
Average	60.8	59.9	61.2	60.8	10.8	14.4	32.6
PLSD (p=0.05)	6.6	5.8	4.6	1.1	0.7	0.6	1.7
CV%	10.8	11.0	10.6	1.9	4.5	4.8	4.9
Location Years	6	12	17	6	6	6	6

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).

Table 10. Performance of 25 spring wheat cultivars tested under irrigated conditions only in south central Montana during 2013. Cultivars listed alphabetically.

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain		Plant Height	Lodging
	2013	2012-13	2011-13			Protein	Plant		
	----- bushels/acre -----			lb/bu	%	%	inches	0-9	
<u>Commercial</u>									
AP604 CL	92.3	92.8*	90.5*	62.2	11.7	14.8	39.5	0.1	
Choteau	96.*8	97.1*	92.9*	61.4	12.1	14.6	36.5	0.0	
Corbin	88.4	91.0*	90.5*	61.2	12.1	14.8	36.6	0.3	
Duclair	93.*5	95.4*	92.8*	60.3	11.9	14.5	38.4	0.0	
Fortuna	74.1	80.4	77.8	61.0	11.9	15.5	44.5	3.4	
Hank	104.0**	101.2**	95.7*	59.8	11.6	14.8	35.5	0.0	
Jedd	98.7*	97.9*	91.7*	60.9	12.1	15.0	31.1	0.0	
Jerome	95.*2	99.9*	96.6*	60.6	11.9	14.7	38.1	0.9	
Kelby	89.0			62.6	11.5	15.5	35.1	0.7	
McNeal	85.4	89.9	85.6	61.1	12.4	14.8	37.6	0.1	
Mott	100.2*	93.0*	89.9	62.2	12.1	14.9	43.7	0.1	
Oneal	97.3*	98.4*	93.1*	60.5	12.9	14.9	38.4	0.8	
Reeder	93.*2	94.9*	90.6*	61.7	12.1	15.0	39.6	0.6	
Solano	76.4	75.3	74.8	59.7	11.6	16.5	43.9	1.8	
Superb	89.1	84.2	78.8	61.0	11.7	15.9	40.9	0.4	
SY 503	91.2			62.4	12.1	15.7	38.1	0.0	
SY Tyra	92.0			59.5	13.4	14.0	33.2	0.0	
Vantage	84.1	88.0		63.7	12.1	16.3	37.1	0.0	
Vida	99.4*	94.8*	91.7*	60.6	12.5	14.7	37.7	0.1	
Volt	100.6*	99.4*	98.2**	62.8	11.9	14.1	36.0	0.0	
WB Gunnison	89.8	94.1*	91.3*	61.4	12.8	14.8	37.1	0.1	
<u>Experimental</u>									
WB9879CLP	101.7*			62.2	12.1	14.5	37.8	0.0	
MT 1142	90.1			60.6	11.8	15.3	38.3	0.1	
MT 1172	103.4*			60.1	12.1	14.8	36.6	0.0	
MT1053	100.0*	96.6*		59.9	12.4	14.6	36.0	0.0	
Average	106.7	88.6	86.5	60.7	14.1	14.9	37.8	0.9	
PLSD (p=0.05)	11.2	10.7	7.7	1.4	1.0	0.9	2.2	1.5	
CV%	9.4	9.3	9.1	1.8	3.0	4.7	4.4	241.6	
Location Years	3	6	9	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.

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 11. Performance of 25 spring wheat cultivars tested under dryland conditions only in south central Montana during 2013 Cultivars listed alphabetically.

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	2013	2012-13	2011-13				
	----- bushels/acre -----			lb/bu	%	%	inches
<u>Commercial</u>							
AP604 CL	25.2	26.1	30.2	61.0	9.5	13.9	28.5
Choteau	27.1	25.5	28.3	60.8	9.1	14.0	25.7
Corbin	27.6	26.9	28.6	59.2	9.9	14.1	26.4
Duclair	30.2*	27.7	30.1	58.9	9.6	13.7	27.0
Fortuna	25.7	25.2	27.0	59.8	9.7	14.2	32.5
Hank	30.1*	27.4	29.6	58.9	9.9	13.7	25.7
Jedd	31.7*	28.7*	30.0	61.0	9.6	13.5	23.8
Jerome	29.4*	27.5	31.8*	58.1	9.5	13.5	27.3
Kelby	25.1			62.4	9.8	14.6	25.1
McNeal	25.8	26.3	26.6	59.8	9.2	14.0	27.7
Mott	26.0	23.8	26.6	61.1	9.1	14.6	28.0
Oneal	30.2*	28.8*	30.2	60.6	9.9	13.8	27.8
Reeder	30.1*	29.4*	30.6	62.0	9.0	13.4	26.9
Solano	24.0	23.8	26.8	58.3	9.2	14.8	30.1
Superb	28.8	26.3	28.7	59.6	9.9	13.9	29.4
SY 503	28.6			60.9	9.4	14.1	30.9
SY Tyra	30.5*			62.2	9.8	13.3	25.0
Vantage	23.8	23.2		62.2	9.5	15.5	26.0
Vida	32.1*	30.7*	34.1*-*	60.2	9.3	13.2	27.7
Volt	28.2	26.6	29.4	62.4	9.4	13.3	27.0
WB Gunnison	30.4*	28.8*	29.5	61.1	9.8	14.2	26.8
<u>Experimental</u>							
WB9879CLP	29.0			61.4	9.3	13.8	25.8
MT 1142	28.3			59.3	9.9	13.7	27.6
MT 1172	33.8**			59.5	10.0	13.2	26.8
MT1053	32.2*	31.0**		60.1	9.4	13.0	27.0
Average	28.6	27.0	29.3	60.4	9.6	13.9	27.3
PLSD (p=0.05)	4.7	3.1	3.2	1.5	ns	0.7	1.8
CV%	11.5	13.1	13.3	2.0	6.0	4.9	5.5
Location Years	3	6	8	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.