RESULTS OF AGRONOMIC AND WEED SCIENCE RESEARCH CONDUCTED IN SOUTH CENTRAL MONTANA - 2014

The Annual Report of the Investigations at the
Southern Agricultural Research Center, Huntley, Montana
http://www.sarc.montana.edu/

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 2014 off-station spring wheat trials in south central Montana were established under dryland conditions near Broadview, Hardin 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 20 commercial cultivars and 5 experimental lines.

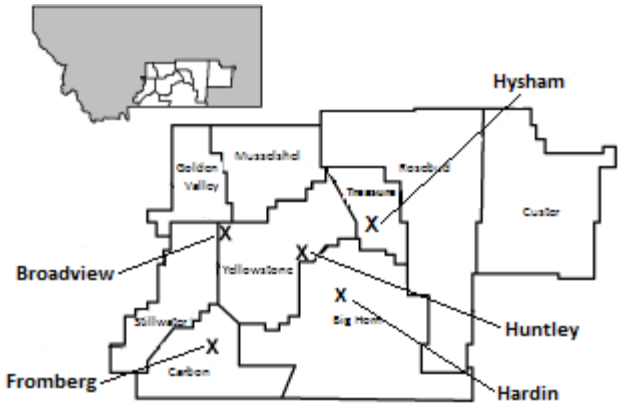

Figure 1. 2014 off-station spring wheat trial locations in south central Montana.

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 (~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.

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 2014 spring wheat test sites had above average rain or snow accumulation during winter months except in November with below average precipitation. Below-average precipitation occurred during April, May and July. This may have resulted in early season drought stress and poor spring wheat establishment at some dryland sites. However, adequate moisture was available through-out the spring wheat growing season that resulted in higher grain yield in 2014 compared to last couple of years. Above average rainfall in August not only delayed Harvesting at some sites but also enhanced lodging.

The average dryland spring wheat yield near Huntley in 2014 was 50 bu/a (Table 2), 8 bushels more per acre than the trial harvested the previous year. The yield at this site was the highest among all dryland locations tested in 2014. Yield ranged from 41 bu/a for 'MT1103' to 66 bu/a for experimental entry 'MT1172'. 'Volt' was the highest yielding cultivar at Huntley. Test weight was low and averaged only 52.3 lb/bu. All entries produced test weight lower than 60 bu/a. Grain protein was relatively high and averaged 17.3 percent. Protein content ranged from 15.5 percent for MT1172 to 20.7 percent for 'Vantage'. Two- and Three-year average yield for spring wheat varieties tested during 2012 - 2014, was 46 and 45 bu/a respectively

Dryland spring wheat yields at Broadview averaged 30 bu/a in 2014,(Table 3) nine bu/a more than the previous year. Lower yield at this location last year was mainly attributed to dry conditions at planting. Yield ranged from 25 bu/a for Vantage to 40 bu/a for MT 1172. Spring wheat test weights averaged 59.4 lb/bu and ranged from 57.4 lb/bu for 'Hank' to 62 for 'Brennan'. Grain protein averaged 15.9 percent, varying from 14.2 for 'Duclair' to 17.6 percent for Vantage. 'Reader' was the highest yielding commercial cultivars at Broadview averaged over the past two- and three-year.

Hardin was the new spring wheat dryland test site in 2014 replacing Billings, MT. Spring wheat yield at Hardin averaged 30 bu/a (Table 4). 'Vida' was the highest yielding cultivar with 42 bu/a. Two other entries produced yield of 39 bu/a, statistically equal to that of highest yielding entry at Hardin. Test weight averaged 58.9 lb/bu. Test weight varied from 57.0 lb/bu for Duclair to 61.4 lb/bu for Brennan. Grain protein levels averaged 17.9 percent and ranged from 16.1 percent for 'Sy Tyra' to 19.5 percent for Vantage.

Irrigated spring wheat yield averaged 78 bu/a at Huntley in 2014 (Table 5). Some lodging occurred at this location averaging a score 2.3 out of 9. Cultivars Brennan, 'Corbin' and 'Fortuna' exhibited high lodging score ranging from 5.3 to 7.0. Grain yield varied from 48 bu/a for 'Jedd' to 101 bu/a for Volt. Two other entries produced yield statistically equal to that of highest yielding cultivar Volt. Test weight was relatively low and averaged 58.3 lb/bu. Test weight ranged from 53.1 for 'Hank' to 61.9 lb/bu for Vantage. Grain protein levels were high and averaged 16.0 percent. Protein content varied from 14.6 for 'Mott' to 17.3 percent for 'Cap400-1'. Two- and Three-year average yield for spring wheat entries tested during 2012 - 2014, was 73 and 83 bu/a respectively at Huntley.

At Hysham in 2014 cultivars Corbin, Fortuna, Mott, and Vida exhibited moderate lodging under irrigated condition (Table 6). Average yield at Hysham was 104 bu/a, about the same as last year. The yield at this site was the highest among all locations tested in 2014. Yield ranged from 88 bu/a for Mott to 120 bu/a for Volt. Eight other entries produced yield ranged from 109 to 119 bu/a, statistically equal to the yield of Volt. Test weight was excellent averaging 62.8 lb/bu, and ranged from 60.0 lb/bu for Sy Tyra to 65.3 for Vantage. Grain protein levels averaged 15.6 percent and varied from 14.1 percent for 'WB Gunnison' to 17.2 percent for Cao400-1.

Little or no lodging was observed for most commercial cultivars under irrigation at Fromberg in 2014 (Table 7). The yield at Fromberg in 2014 averaged 99 bu/a slightly lower than last year. Grain yield ranged from 86 bu/a for Vantage to 107 bu/a for Duclair and Volt. Fifteen other entries produced yield ranged from 99 to 106 bu/a, statistically equal to the highest yielding cultivars. Test weight was excellent at Fromberg averaging 63.4 lb/bu. All entries exhibited test weight greater than 60 lb/bu. Grain protein levels were good averaging 13.6 percent and ranged from 12.5 to 16.1 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 2012 - 2014, was 100 and 101 bu/a respectively. The commercial entry Volt was the best performing cultivar, averaged over the last thee-year, at Fromberg.

SUMMARY:

Adequate soil moisture during the growing season resulted in high grain yield in 2014 at all test sites compared to last couple of years. Above average rain in August delayed harvest at some sites and resulted in pre-harvest sprouting at Huntley dryland trial. In 2014 Volt was the highest yielding entry followed by experimental line MT 1172 averaging 74 and 73 bu/a respectively, across all locations tested in south central Montana (Tables 8). Experimental line MT 1172 exhibited highest average yield across dryland sites in 2014. Moreover, MT 1172 and Vida produced highest yield averaged over the past two-years across dryland sites (Table 11). Volt was the top yielding cultivar under irrigated condition over the past two- and three-years (Table 10). Long-term productivity based on last two and three years average yield across all locations were highest for MT 1172 and Volt (Table 9 and 10). Across all locations for the past three years, six other entries produced yields ranged from 68 to 72 bu/a, which was statistically equal to the yield of Volt (Table 9). In 2014 grain yield at most location was higher compared to 2013. Averaged across locations grain protein content was 16.0 percent (Table 9). Overall test weight averaged 56.9 lb/bu and 61.5 lb/bu across dryland and irrigated locations respectively (Table 10 and 11).

Table 1. Selected characteristics and traits of 20 commercial spring wheat cultivars performance tested at six off-station sites in south central Montana during 2014.

							6/ Disease Resistance					6/ Insect Resistance		7/ Quality		8/
Cultivar	1/ Origin	Year of Release	2/ Market Class	3/ PVP	4/ Maturity	5/ Straw Strength	Fusarium Head Blight (Scab)	Leaf Rust	Stem Rust	Stripe Rust	Wheat Stem Sawfly	Russian Wheat Aphid	Hessian Fly (GP)	Milling	Baking	Clearfield Type
				Yes/No										1-5	1-5	Yes/No
Brennan	Syngenta	2009	HRS	Y	E	S	MR	R	R	S	S	S	S	-	-	N
Cap400-1																
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
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
SY 605 CL	Syngenta	2009	HRS	Y	E	-	S	MR	R	-	-	-	-	-	-	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 2014. Cultivars listed alphabetically. (Exp. 149908).

	Grain Yield 1/			Test	Grain	Grain 2/	Plant	Heading Date	
Cultivar	**2014**	**2013-14**	**2012-14**	**Weight**	**Moisture**	**Protein**	**Height**	**Julian**	**Calendar**
	------- bushels/acre -------			lb/bu	%	%	inches		
Commercial									
Brennan	59.7			56.2	10.1	16.5	33.9	173.0	Jun-22
Cap400-1	58.7			51.3	9.8	19.0	36.4	175.3	Jun-24
Choteau	45.1	41.7	42.1	51.5	9.3	17.4	35.8	174.0	Jun-23
Corbin	51.7	46.8	46.6	51.4	9.7	17.2	36.3	174.0	Jun-23
Duclair	54.1	49.4	46.9	51.6	9.5	17.3	35.9	172.0	Jun-21
Fortuna	50.5	46.0	44.4	52.9	9.6	16.4	45.8	176.0	Jun-25
Hank	37.6	40.8	41.4	46.6	8.9	18.6	34.5	172.0	Jun-21
Jedd	36.9	44.3	43.9	51.2	9.3	17.9	30.6	173.0	Jun-22
Kelby	58.9	48.2		55.8	10.1	16.8	33.6	172.0	Jun-21
McNeal	49.3	43.7	45.1	51.7	9.8	17.0	36.8	175.3	Jun-24
Mott	41.6	38.4	38.5	53.0	9.6	17.3	39.4	176.0	Jun-25
Oneal	36.9	42.2	43.5	50.1	9.3	17.7	35.7	175.3	Jun-24
Reeder	48.7	43.9	46.3	51.3	9.4	17.3	38.2	175.3	Jun-24
Solano	57.6	46.0	44.0	52.3	9.5	17.0	29.8	175.3	Jun-24
SY 605	54.6			55.0	10.3	17.2	39.7	173.0	Jun-22
Sy Tyra	43.5			51.6	9.4	16.5	32.1	174.0	Jun-23
Vantage	47.4	41.4	40.4	55.2	9.4	20.7	35.2	177.7	Jun-26
Vida	49.3	48.3	49.8	50.6	9.2	16.9	35.8	173.7	Jun-22
Volt	**62.6***	52.0	49.9	54.9	9.9	16.9	35.0	178.0	Jun-27
WB Gunnison	48.2	46.8	46.3	53.0	10.0	16.1	34.5	174.0	Jun-23
Experimental									
MT 1103	40.9			51.5	9.1	17.5	34.3	176.7	Jun-25
MT 1172	**66.1****	57.1		51.8	9.7	15.5	36.0	176.0	Jun-25
MT 1203	56.8			52.7	10.0	17.0	36.4	171.0	Jun-20
MT 1236	55.5			51.0	9.3	18.1	35.7	174.0	Jun-23
WB9879CL	48.0			52.4	9.5	17.0	35.8	174.0	Jun-23
Average	50.4	45.7	44.6	52.3	9.6	17.3	35.7	174.4	Jun-23
PLSD (p=0.05)	4.9	ns	ns	1.8	0.4	0.9	1.5	1.9	
CV%	5.9	8.0	8.7	2.2	2.3	3.3	2.6	0.7	

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).

Huntley Dryland Spring Wheat (Exp. 149908)

Planted:	March 14, 2014
Harvested:	September 1 , 2014
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 2014. Cultivars listed alphabetically. (Exp. 149995).

Cultivar	Grain Yield 1/ 2014	Grain Yield 1/ 2013-14	Grain Yield 1/ 2012-14	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height
	------- bushels/acre -------			lb/bu	%	%	inches
Commercial							
Brennan	32.0			62.0	9.9	15.9	33.2
Cap400-1	28.3			58.5	9.8	17.2	27.7
Choteau	28.5	24.4	19.1	59.4	10.1	16.1	25.9
Corbin	29.5	25.0	20.0	58.3	10.3	16.1	29.5
Duclair	30.1	26.5	**22.0***	59.2	10.0	14.2	26.9
Fortuna	30.3	25.7	**20.9***	59.0	10.0	15.4	27.0
Hank	31.9	27.8	**21.7***	57.4	10.2	15.8	28.5
Jedd	30.1	27.0	**21.9***	60.8	10.5	14.3	27.7
Kelby	28.7	24.1		60.7	9.9	16.3	25.2
McNeal	30.5	25.1	20.6	58.7	11.0	16.0	28.5
Mott	28.3	23.9	18.7	60.4	10.1	16.5	27.3
Oneal	30.6	26.3	**21.1***	60.4	11.5	15.7	32.8
Reeder	31.3	**29.4***	**23.2****	59.3	10.2	15.9	29.3
Solano	29.6	23.4	18.6	57.5	9.8	16.9	27.3
SY 605	27.4			59.4	10.0	16.0	28.9
Sy Tyra	32.7			58.9	10.0	16.0	26.9
Vantage	25.1	20.9	17.2	61.4	10.6	17.6	26.4
Vida	31.3	27.2	**22.0***	59.5	10.2	14.8	27.6
Volt	25.5	23.3	17.8	60.7	10.5	15.7	28.9
WB Gunnison	31.5	27.2	**22.7***	57.9	10.5	16.3	26.6
Experimental							
MT 1103	28.5			60.9	10.8	14.8	31.0
MT 1172	**40.4****	**32.2****		57.5	10.6	16.9	30.6
MT 1203	31.0			60.0	10.5	15.4	26.8
MT 1236	29.3			58.8	9.6	15.1	27.4
WB9879CL	27.4			59.4	9.9	16.2	28.0
Average	30.0	25.8	20.5	59.4	10.3	15.9	28.2
PLSD (p=0.05)	5.6	3.2	2.3	1.6	0.6	1.6	ns
CV%	11.9	13.8	16.7	1.8	4.1	6.2	11.4

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.
** 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. 149995)	
Planted:	May 2, 2014
Harvested:	August 12, 2014
Fertility:	n/a
Herbicide:	n/a
Insecticide:	none applied
Previous Crop:	fallow
Precipitation:	n/a

Table 4. Performance of 25 spring wheat cultivars tested under conventional dryland conditions near Hardin, Montana during 2014. Cultivars listed alphabetically. (Exp. 14999---).

Cultivar	1/ Grain Yield 2014	2013-14	2012-14	Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	------- bushels/acre -------			lb/bu	%	%	inches
Commercial							
Brennan	24.9			61.4	7.8	17.7	23.0
Cap400-1	32.3			57.5	7.3	18.6	27.6
Choteau	28.5			58.5	7.5	17.6	25.1
Corbin	26.0			59.0	7.4	18.7	26.9
Duclair	30.8			57.1	7.4	18.1	24.9
Fortuna	33.8			59.4	7.7	17.2	35.3
Hank	30.3			57.7	7.7	16.8	25.1
Jedd	26.0			59.8	8.1	17.1	21.9
Kelby	22.0			61.0	7.6	18.3	22.0
McNeal	19.8			57.4	7.7	18.8	25.1
Mott	36.2			59.8	7.4	18.7	30.7
Oneal	20.4			57.4	8.7	18.0	26.9
Reeder	29.5			57.5	7.3	19.2	27.6
Solano	33.3			59.5	7.4	17.7	23.1
SY 605	**38.6***			60.8	7.7	16.6	29.0
Sy Tyra	35.1			60.5	8.0	16.1	26.4
Vantage	26.0			59.8	8.1	19.5	24.8
Vida	**42.0****			58.2	7.7	17.7	26.9
Volt	31.6			61.2	8.0	17.4	24.4
WB Gunnison	32.8			58.3	8.1	17.1	27.3
Experimental							
MT 1103	23.9			57.8	7.5	18.3	24.7
MT 1172	**39.0***			58.6	7.8	17.2	26.2
MT 1203	25.6			58.3	7.6	18.2	25.7
MT 1236	31.7			57.4	7.1	18.6	25.3
WB9879CL	32.7			59.3	8.0	17.9	26.0
Average	30.1			58.9	7.7	17.9	26.1
PLSD (p=0.05)	4.0			1.3	0.4	1.4	2.1
CV%	8.6			1.5	3.7	5.2	5.2

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

Hardin Dryland Spring Wheat (Exp. 14999-)	
Planted:	April 23, 2014
Harvested:	August 7, 2014
Fertility:	80 lb/a N as 46-0-0 at planting
Herbicide:	RT3 @ 24 oz/a pre-plant
Insecticide:	none applied
Previous Crop:	fallow
Precipitation:	n/a

Table 5. Performance of 25 spring wheat cultivars tested under irrigation near Huntley, Montana during 2014 Cultivars listed alphabetically. (Exp. 149909).

	1/ Grain Yield			Test	Grain	2/ Grain	Plant		Heading Date	
Cultivar	**2014**	**2013-14**	**2012-14**	**Weight**	**Moisture**	**protein**	**Height**	**Lodging**	**Julian**	**Calendar**
	------- bushels/acre -------			lb/bu	%	%	inches	0-9		
Commercial										
Brennan	84.7			60.4	11.1	15.8	33.5	5.6	173.3	Jun-21
Cap400-1	80.2			59.9	11.6	17.3	36.4	1.2	176.3	Jun-24
Choteau	73.7	73.8	86.9	56.6	11.1	15.7	35.8	0.0	175.0	Jun-23
Corbin	71.3	69.2	82.8	58.1	11.9	15.6	36.0	5.3	173.3	Jun-21
Duclair	84.3	70.6	84.4	57.4	11.4	16.1	38.6	3.3	171.7	Jun-19
Fortuna	65.9	63.8	73.4	59.1	11.7	16.0	47.3	7.0	174.7	Jun-22
Hank	62.4	72.9	86.4	53.1	10.7	16.1	38.0	2.3	171.7	Jun-19
Jedd	48.2	64.0	79.9	54.3	10.8	16.0	32.9	0.6	172.3	Jun-20
Kelby	75.6	70.3		60.1	11.4	16.5	33.3	3.5	172.3	Jun-20
McNeal	76.7	67.4	80.1	58.1	11.5	15.6	37.5	2.0	175.0	Jun-23
Mott	75.9	75.6	83.2	59.6	11.6	14.6	43.0	1.9	176.3	Jun-24
Oneal	43.8	60.2	80.1	54.0	11.0	17.1	37.8	0.0	175.0	Jun-23
Reeder	**94.0***	80.4	88.0	60.0	11.5	16.7	39.6	3.1	173.3	Jun-21
Solano	90.5	77.9	78.4	58.9	11.0	15.8	32.5	0.9	174.0	Jun-22
SY 605	90.0			61.3	11.5	16.6	39.8	0.4	171.0	Jun-19
Sy Tyra	72.6			56.0	11.1	14.8	33.9	0.0	175.7	Jun-23
Vantage	77.8	65.1	71.6	61.9	11.8	17.2	39.2	0.1	176.7	Jun-24
Vida	81.0	79.2	88.0	57.0	11.2	16.5	37.8	2.9	173.7	Jun-21
Volt	**101.3****	89.1	97.2	60.8	11.5	15.7	35.3	2.7	176.7	Jun-24
WB Gunnison	85.8	76.8	90.0	60.6	12.0	14.8	36.0	1.1	174.7	Jun-22
Experimental										
MT 1103	77.9			58.1	11.5	15.3	34.9	3.0	176.0	Jun-24
MT 1172	88.6	85.8		58.1	11.4	16.6	37.9	5.6	174.0	Jun-22
MT 1203	**93.3***			59.3	11.7	15.9	37.5	0.7	170.3	Jun-18
MT 1236	82.2			58.0	11.2	16.1	36.0	3.6	173.7	Jun-21
WB9879CL	70.8			57.0	11.0	15.6	36.7	0.0	176.0	Jun-24
Average	77.9	73.1	83.4	58.3	11.4	16.0	37.1	2.3	174.1	Jun-22
PLSD (p=0.05)	9.5	ns	ns	1.1	0.4	0.7	2.7	2.3	1.8	
CV%	7.6	12.8	10.5	1.1	1.9	2.5	4.7	68.4	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.
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. 149909)

Planted:	April 18, 2014
Harvested:	August 18, 2014
Fertility:	175 N lbs/acre in Fall 2013 as 46-0-0
Herbicide:	Huskie @ 12 oz/ac + Rimfire @ 2 oz/a on May 12, 2014.
Insecticide:	none
Previous Crop:	spring barley
Irrigation:	overhead sprinkler
Precipitation:	9.7 inches

Table 6. Performance of 25 spring wheat cultivars tested under irrigation near Hysham during 2014. Cultivars listed alphabetically. (Exp. 149996).

Cultivar	Grain Yield 1/ 2014	Grain Yield 1/ 2013-14	Grain Yield 1/ 2012-14	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height	Lodging
	------- bushels/acre -------			lb/bu	%	%	inches	0-9
Commercial								
Brennan	103.9			64.6	10.0	16.2	38.6	0.0
Cap400-1	94.2			63.3	10.3	17.2	41.3	0.7
Choteau	**116.9***	112.0	95.9	63.8	11.0	15.5	40.5	0.0
Corbin	94.4	95.9	91.8	60.5	12.6	16.5	40.1	2.7
Duclair	105.9	108.5	95.8	62.7	10.6	15.1	40.0	0.7
Fortuna	89.8	80.6	80.6	62.8	10.5	16.5	50.3	4.0
Hank	**118.5***	118.2	100.8	61.6	10.5	15.0	39.2	0.0
Jedd	94.0	102.9	90.4	61.7	10.6	14.5	34.3	0.0
Kelby	89.0	99.4		64.8	10.1	16.5	39.2	0.0
McNeal	**109.9***	106.9	94.8	62.1	12.3	15.9	42.1	0.7
Mott	87.5	99.6	86.9	62.9	10.6	15.7	44.9	3.0
Oneal	93.5	101.4	89.1	60.2	11.9	14.7	41.9	0.7
Reeder	105.3	107.1	100.9	63.4	11.7	14.8	43.6	0.0
Solano	**113.6***	95.1	86.2	64.0	10.7	15.5	33.4	0.0
SY 605	101.5			64.3	10.3	16.7	42.4	1.0
Sy Tyra	**116.6***			60.0	14.4	14.8	35.4	0.0
Vantage	104.5	106.2	98.1	65.3	12.1	15.9	42.0	0.0
Vida	100.5	107.9	97.5	61.2	11.8	15.4	41.6	3.0
Volt	**119.8****	115.9	97.6	64.8	11.3	14.7	39.8	0.0
WB Gunnison	103.9	104.1	94.0	61.2	13.9	14.1	37.3	0.0
Experimental								
MT 1103	**108.7***			63.6	11.5	15.0	40.3	0.7
MT 1172	106.7	114.1		60.3	12.4	16.4	38.2	1.7
MT 1203	**111.5***			63.0	10.8	15.8	41.4	0.0
MT 1236	103.0			63.0	10.2	16.1	38.5	1.0
WB9879CL	**109.9***			64.1	10.8	15.6	39.3	0.0
Average	104.1	104.5	93.4	62.8	11.3	15.6	40.2	0.8
PLSD (p=0.05)	11.6	ns	ns	1.8	1.0	1.4	1.7	1.6
CV%	6.8	5.8	9.7	1.7	5.4	5.3	3.5	124.1

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

Hysham Irrigated Spring Wheat (Exp. 149996)	
Planted:	April 21, 2014
Harvested:	August 8, 2014
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 2014. Cultivars listed alphabetically. (Exp. 149997).

Cultivar	1/ Grain Yield 2014	2013-14	2012-14	Test Weight	Grain Moisture	2/ Grain Protein	Plant Height	Lodging
	------- bushels/acre -------			lb/bu	%	%	inches	0-9
Commercial								
Brennan	**100.2***			64.8	8.7	14.2	37.4	0.0
Cap400-1	94.9			62.7	8.5	15.3	40.3	0.0
Choteau	**102.7***	105.8	**109.1***	63.6	8.9	13.6	38.6	0.0
Corbin	**103.9***	102.0	97.0	63.8	9.3	13.3	38.1	0.0
Duclair	**107.4****	109.5	**109.5***	63.3	8.9	13.1	39.5	0.0
Fortuna	87.6	88.9	88.2	63.5	9.1	13.4	47.5	0.7
Hank	**106.7***	108.7	**111.1***	60.4	8.7	13.6	37.3	0.0
Jedd	84.0	94.1	**100.9***	61.9	8.7	13.2	32.4	0.0
Kelby	96.2	95.1		64.8	8.7	14.8	38.3	0.0
McNeal	**106.0***	100.1	**102.4***	63.0	9.2	13.5	42.9	0.0
Mott	93.0	102.2	**100.7***	63.5	8.9	12.9	44.2	0.0
Oneal	91.7	98.8	**103.8***	60.9	8.7	13.3	41.2	0.0
Reeder	**102.6***	102.6	**101.2***	63.8	9.2	13.2	42.7	0.0
Solano	**103.4***	96.1	88.9	63.5	9.3	13.9	32.5	0.0
SY 605	**99.2*-**			64.5	9.1	13.1	41.5	0.0
Sy Tyra	**100.1***			64.3	9.3	12.7	36.1	0.0
Vantage	86.3	89.0	95.7	64.9	9.6	16.1	40.7	0.0
Vida	**102.2***	103.4	**98.2***	62.6	9.1	13.1	40.2	0.0
Volt	**104.8***	109.1	**112.8****	64.6	9.5	13.3	37.5	0.0
WB Gunnison	**99.6***	98.6	**100.7***	62.6	10.0	14.1	38.1	0.3
Experimental								
MT 1103	**99.1***			64.7	9.1	12.5	38.7	0.0
MT 1172	98.6	102.5		62.7	9.5	13.3	37.4	0.0
MT 1203	**103.2***			63.1	9.0	13.9	39.8	0.0
MT 1236	**103.1***			63.3	8.9	13.8	37.8	0.0
WB9879CL	**99.3***			64.3	8.9	13.0	39.4	0.0
Average	99.0	100.4	101.4	63.4	9.1	13.6	39.2	0.0
PLSD (p=0.05)	8.4	ns	14.7	0.9	0.6	1.2	2.3	ns
CV%	5.2	5.7	5.5	0.9	3.8	5.5	3.6	634.6

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

Fromberg Irrigated Spring Wheat (Exp. 149997)	
Planted:	April 22, 2014
Harvested:	August 11, 2014
Fertility:	100 lb N/a preplant; 120 lb N/a top dress in May, 2014
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 2014. Varieties listed by declining six-location average yield.

	Dryland				Irrigated				Six Location
	Huntley	Hardin	Broadview	Ave.	Huntley	Hysham	Fromberg	Ave.	Average
	bushels/acre								
Volt	**62.6***	31.6	25.5	**39.9***	**101.3****	**119.8****	**104.8***	**108.7****	**74.3****
MT 1172	**66.1****	**39.0***	**40.4****	**48.1****	88.6	106.7	98.6	**98.2***	**73.1***
Solano	57.6	33.3	29.6	**40.1***	90.5	**113.6***	**103.4***	**103.0***	**71.6***
MT 1203	56.8	25.6	31.0	38.3	**93.3***	**111.5***	**103.2***	**102.7***	**70.5***
Duclair	54.1	30.8	30.1	38.3	84.3	105.9	**107.4****	**98.9***	**68.6***
SY 605	54.6	**38.6***	27.4	**40.1***	90.0	101.5	**99.2*-**	**97.2***	**68.6***
Reeder	48.7	29.5	31.3	36.2	**94.0***	105.3	**102.6***	**100.3***	**68.2***
Brennan	59.7	24.9	32.0	**39.3***	84.7	103.9	**100.2***	**96.2***	**67.7***
MT 1236	55.5	31.7	29.3	39.0	82.2	103.0	**103.1***	**96.4***	**67.7***
Vida	49.3	**42.0****	31.3	**40.6***	81.0	100.5	**102.2***	94.4	**67.5***
WB Gunnison	48.2	32.8	31.5	37.2	85.8	103.9	**99.6***	**96.5***	**66.9***
Sy Tyra	43.5	35.1	32.7	36.7	72.6	**116.6***	**100.1***	**96.7***	**66.7***
Choteau	45.1	28.5	28.5	34.4	73.7	**116.9***	**102.7***	**97.6***	66.0
McNeal	49.3	19.8	30.5	33.0	76.7	**109.9***	**106.0***	**97.6***	65.3
Cap400-1	58.7	32.3	28.3	**39.5***	80.2	94.2	94.9	89.9	64.7
Hank	37.6	30.3	31.9	33.6	62.4	**118.5***	**106.7***	95.9	64.7
WB9879CL	48.0	32.7	27.4	35.7	70.8	**109.9***	**99.3***	93.3	64.5
MT 1103	40.9	23.9	28.5	31.1	77.9	**108.7***	**99.1***	94.9	63.0
Corbin	51.7	26.0	29.5	35.7	71.3	94.4	**103.9***	89.6	62.7
Kelby	58.9	22.0	28.7	36.8	75.6	89.0	96.2	87.5	62.1
Vantage	47.4	26.0	25.1	32.6	77.8	104.5	86.3	89.4	61.0
Mott	41.6	36.2	28.3	35.6	75.9	87.5	93.0	84.7	60.2
Fortuna	50.5	33.8	30.3	38.4	65.9	89.8	87.6	81.4	59.9
Jedd	36.9	26.0	30.1	31.3	48.2	94.0	84.0	75.3	53.3
Oneal	36.9	20.4	30.6	29.4	43.8	93.5	91.7	76.3	52.8
Average	50.4	30.1	30.0	36.8	77.9	104.1	99.0	93.7	65.3
PLSD (p=0.05)	4.9	4.0	5.6	8.9	9.5	11.6	8.4	12.6	8.1
CV%	5.9	8.6	11.9	8.3	7.6	6.8	5.2	6.4	7.4

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 2014. Cultivars listed alphabetically.

Cultivar	Grain Yield 1/ 2014	Grain Yield 1/ 2013-14	Grain Yield 1/ 2012-14	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height
	------- bushels/acre -------			lb/bu	%	%	inches
Commercial							
Brennan	**67.7***			61.6	9.6	16.0	33.1
Cap400-1	64.7			58.8	9.5	17.5	34.8
Choteau	66.0	67.7	**68.0***	59.0	9.6	15.9	33.6
Corbin	62.7	64.0	65.0	58.5	10.2	16.2	34.6
Duclair	**68.6***	**69.0***	**69.1***	58.6	9.6	15.6	34.3
Fortuna	59.9	58.5	59.8	59.6	9.8	15.8	42.2
Hank	64.7	**69.8***	**69.7***	56.2	9.4	16.0	33.6
Jedd	53.3	62.8	64.8	58.4	9.7	15.4	29.9
Kelby	62.1	63.3		61.3	9.7	16.6	31.8
McNeal	65.3	64.2	65.6	58.4	10.2	16.2	35.7
Mott	60.2	65.1	63.8	59.8	9.7	16.0	38.4
Oneal	52.8	61.7	64.6	57.1	10.1	16.2	36.0
Reeder	**68.2***	**68.7***	**69.2***	59.2	9.9	16.2	36.9
Solano	**71.6***	64.6	61.4	59.3	9.6	16.1	29.9
SY 605	**68.6***			60.9	9.8	16.1	36.8
Sy Tyra	**66.7***			58.5	10.4	15.2	31.8
Vantage	61.0	61.0	62.2	61.5	10.3	17.8	34.7
Vida	**67.5***	**70.3***	**69.3***	58.1	9.9	15.7	35.0
Volt	**74.3****	**73.6***	**72.3****	61.3	10.1	15.5	33.6
WB Gunnison	**66.9***	67.2	**68.3***	58.9	10.7	15.4	33.3
Experimental							
MT 1103	63.0			59.3	9.9	15.6	34.0
MT 1172	**73.1***	**74.8***		58.2	10.2	16.0	34.6
MT 1203	**70.5***			59.4	9.9	16.0	34.3
MT 1236	**67.7***			58.6	9.4	16.3	33.4
WB9879CL	64.5			59.4	9.7	15.9	34.3
Average	65.3	66.3	66.2	59.2	9.9	16.0	34.4
PLSD (p=0.05)	8.1	6.9	6.0	1.2	0.6	0.7	2.0
CV%	7.4	8.8	9.7	1.5	3.8	4.8	5.3
Location Years	6	11	16	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 2014. Cultivars listed alphabetically.

Cultivar	1/ Grain Yield 2014	2013-14	2012-14	Test Weight	Grain Moisture	2/ Grain Protein	Plant Height	Lodging
	------- bushels/acre -------			lb/bu	%	%	inches	0-9
Commercial								
Brennan	**96.2***			63.3	10.0	15.4	36.3	2.1
Cap400-1	89.9			62.0	10.2	16.6	39.1	0.4
Choteau	**97.6***	**97.2***	**97.3***	61.3	10.3	14.9	38.2	0.1
Corbin	89.6	89.0	90.5	60.7	11.2	15.1	38.4	2.9
Duclair	**98.9***	**96.2***	**96.6***	61.1	10.3	14.8	39.4	1.3
Fortuna	81.4	77.7	80.7	61.9	10.4	15.3	48.3	3.9
Hank	95.9	**100.0***	**99.4***	58.4	9.9	14.9	37.9	0.7
Jedd	75.3	87.0	90.4	59.4	10.1	14.6	33.0	0.0
Kelby	87.5	88.3		63.3	10.1	15.9	36.7	1.1
McNeal	**97.6***	91.5	92.4	61.0	11.0	15.0	41.3	0.9
Mott	84.7	92.5	90.3	61.9	10.3	14.4	44.3	1.8
Oneal	76.3	86.8	91.0	58.4	10.5	15.0	40.2	0.2
Reeder	**100.3***	**96.7***	**96.7***	62.4	10.8	14.9	42.2	1.1
Solano	**103.0***	89.7	84.5	62.2	10.3	15.1	33.0	0.0
SY 605	**97.2***			63.3	10.3	15.5	41.0	0.7
Sy Tyra	**96.7***			60.1	11.6	14.1	35.1	0.0
Vantage	89.4	86.7	88.5	64.0	11.1	16.4	40.6	0.0
Vida	94.4	**96.9***	**94.7***	60.2	10.7	15.0	39.8	1.9
Volt	**108.7****	**104.7****	**102.5****	63.4	10.8	14.5	37.8	1.0
WB Gunnison	**96.5***	93.2	**94.9***	61.4	12.0	14.3	37.1	0.4
Experimental								
MT 1103	94.9			62.1	10.7	14.2	38.1	1.0
MT 1172	**98.2***	**100.8***		60.4	11.1	15.5	38.1	2.3
MT 1203	**102.7***			61.8	10.5	15.2	39.0	0.2
MT 1236	**96.4***			61.5	10.1	15.3	37.4	1.6
WB9879CL	93.3			61.8	10.2	14.7	38.7	0.0
Average	93.7	92.6	92.7	61.5	10.6	15.1	38.8	1.0
PLSD (p=0.05)	12.6	11.1	9.7	1.8	1.0	1.0	1.6	2.0
CV%	6.4	7.8	8.6	1.3	4.0	4.4	3.9	105.1
Location Years	3	6	9	3	3	3	3	3.0

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 2014 Cultivars listed alphabetically.

Cultivar	Grain Yield 1/ 2014	Grain Yield 1/ 2013-14	Grain Yield 1/ 2012-14	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height
	------- bushels/acre -------			lb/bu	%	%	inches
Commercial							
Brennan	**39.3***			59.9	9.3	16.6	30.0
Cap400-1	**39.5***			55.5	8.9	18.4	30.5
Choteau	34.4	32.3	30.4	56.7	9.0	16.9	28.9
Corbin	35.7	33.9	32.2	56.2	9.1	17.3	30.9
Duclair	38.3	36.4	33.9	56.0	9.0	16.4	29.3
Fortuna	38.4	35.4	32.8	57.3	9.2	16.3	36.1
Hank	33.6	33.7	31.5	54.0	8.9	17.1	29.4
Jedd	31.3	33.8	32.0	57.4	9.4	16.3	26.7
Kelby	36.8	33.4		59.2	9.2	17.2	26.9
McNeal	33.0	31.6	31.0	55.7	9.4	17.4	30.1
Mott	35.6	32.3	29.8	57.6	9.0	17.6	32.5
Oneal	29.4	31.5	30.7	55.8	9.8	17.3	31.8
Reeder	36.2	35.0	33.9	56.0	9.0	17.4	31.7
Solano	**40.1***	34.5	31.6	56.5	8.9	17.2	26.7
SY 605	**40.1***			58.4	9.3	16.7	32.5
Sy Tyra	36.7			57.0	9.1	16.3	28.4
Vantage	32.6	30.1	28.4	59.0	9.4	19.2	28.8
Vida	**40.6***	**38.4***	36.7	56.0	9.0	16.4	30.1
Volt	**39.9***	36.3	33.4	59.1	9.5	16.5	29.4
WB Gunnison	37.2	36.1	34.2	56.3	9.5	16.5	29.5
Experimental							
MT 1103	31.1			56.6	9.1	16.9	30.0
MT 1172	**48.1****	**43.5****		56.0	9.3	16.6	31.0
MT 1203	38.3			57.0	9.3	16.9	29.6
MT 1236	39.0			55.8	8.7	17.2	29.5
WB9879CL	35.7			57.0	9.1	17.1	29.9
Average	36.8	34.6	32.2	56.9	9.2	17.0	30.0
PLSD (p=0.05)	8.9	6.4	ns	1.6	ns	1.1	3.5
CV%	8.3	10.0	11.1	1.8	3.5	5.0	6.9
Location Years	3	5	7	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.