The MONTANA STATE UNIVERSITY
MONTANA AGRICULTURAL EXPERIMENT STATION

RESULTS OF AGRONOMIC AND WEED SCIENCE RESEARCH CONDUCTED IN SOUTH CENTRAL MONTANA - 2012

Annual Report of the Investigations at and Administration of 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.

PROJECT LEADERS:

Kent A. McVay, Cropping System Specialist, SARC, Huntley
Qasim A. Khan, Research Associate, SARC, Huntley
Luther E. Talbert, Spring Wheat Breeder, PSPP, Bozeman
Susan P. Lanning, Spring Wheat Research Associate, PSPP, Bozeman

PROJECT PERSONNEL:

Tom A. Fischer, Research Specialist and Farm Foreman, SARC, Huntley
Steve Lackman, Yellowstone County Extension, Billings
Lee Schmelzer, Stillwater County Extension, Columbus
Byron Hould, Rosebud-Treasure County Extension, Forsyth
Breanne Ilse, Big Horn County Extension, Hardin

COOPERATORS:

Greg Lackman, Hysham
Frank Sindelar, Billings
Ervin Schlemmer, Fromberg
Keith & Karen Schott, Broadview

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 2012 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 22 commercial cultivars and 3 experimental lines.

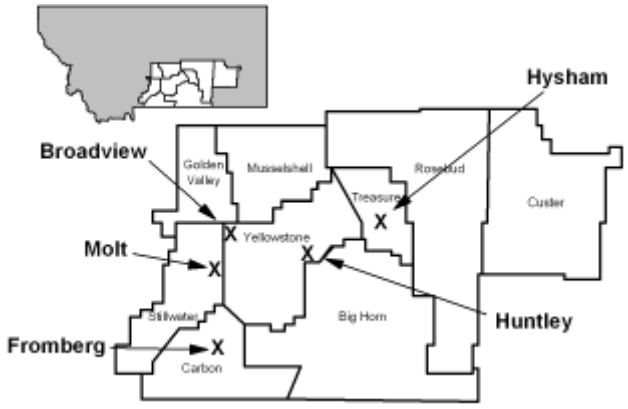

Figure 1. 2012 off-station spring wheat trial locations in south central Montana.

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 2012 spring wheat test sites were relatively dry during the winter months, with below average rain or snow accumulating in September, November, December and February. Below average precipitation occurred from April through August, while above average precipitation occurred only in March (1.04 inches). Unusually dryer condition throughout the growing season coupled with above averaged temperatures (4.5 degrees higher than long term average) resulted in earlier maturity and poor spring wheat production under all dryland sites. Spring wheat was harvested earlier at most sites this year.

The average dryland spring wheat yield near Huntley in 2012 was 54 bu/a (Table 2), nine bushels less per acre than the trial harvested the previous year. Yields ranged from 38 bu/a for 'Solano' to 54 bu/a for 'Reeder'. Seven other entries produced yield from 47 to 54 bu/a, statistically equal to that of highest yielding cultivar at Huntley. Test weight averaged 59.4 lb/bu, and ranged from 55.3 lb/bu for 'Hank' to 61.5 lb/bu for 'Kelby'. Grain protein averaged 16.7 percent and varied from 15.1 percent for experimental entry 'MT1053' to 19.2 percent for 'Vantage'. 'Vida' has been the highest yielding entry tested at this location the past three years, averaging 63 bu/a. Nine other commercial entries including 'AP604 CL, 'Corbin', 'Duclair' 'Hank', 'Jerome', 'Kelby' 'Oneal' 'Outlook, Reeder, and 'Volt' have produced yields from 57 to 61 bu/a the past three years, equal to the yield of Vida.

Dryland spring wheat yields at Broadview averaged only 10 bu/a in 2012, about half of what was harvested the previous year (Table 3). Lower yield was mainly attributed to dry conditions at planting and lack of good stand establishment. The entries were not significantly different for grain yield at this site. Spring wheat test weights averaged 60.9 lb/bu and ranged from 58.3 lb/bu for 'SY605 CL' to 3.4 for 'Sy Tyra'. Grain protein averaged 11.6 percent, varying from 10.5 to 13 percent. The average plant height at Broadview was 21 inches.

Spring wheat yields near Billings averaged 22 bu/a in 2012 (Table 4). Billings is the new dryland site replacing Molt in 2012. Yield was not significantly different among entries in 2012 at Billings and ranged from 17 bu/a to 25 bu/a. test weight was low and averaged 56.0 lb/bu. Test weight varied from 53.4 lb/bu for Outlook to 60.5 lb/bu for Kelby. All entries, except Kelby, had test weight lower than 60 lb/bu. Grain protein levels averaged 17.8 percent. All entries have grain protein content higher than 16 percent.

Irrigated spring wheat yield was good at Huntley and averaged 107 bu/a. (Table 5). The yield at this site was the highest among all the locations tested in 2012 averaging 102 bu/a. Lodging was limited with an average score of 0.8 out of 9.

Commercial entry ‘Superb’ exhibited highest level of lodging (6.3 score) fallowed by Fortuna and Solana. Grain yield varied from 84 bu/a for Solano to 121 bu/a for Sy Tyra. Nine other entries produced yield ranged from 111 to 116 bu/a, statistically equal to that of highest yielding cultivar Sy Tyra. Average test weight was 62.7 lb/bu, and ranged from 59.9 for Hank to 65.1 lb/bu for Vantage. Grain protein levels were high and averaged 15.9 percent. Protein content varied from 13.6 for Sy Tyra to 18.1 percent for Vantage. Duclair and Jerome were the highest yielding cultivar tested under irrigation at Huntley the past 2 and 3 years, averaging 96 and 98 bu/a, respectively.

Little or no lodging was observed for most commercial cultivars under irrigation at Hysham in 2012 (Table 6). Average yield at Hysham was 73 bu/a about 9 bu/a lower than last year. The lower yield was attributed to poor stand establishment at this site in 2012. Yields ranged from 56 bu/a for MT1053 to 91 bu/a for Sy Tyra. Eleven other commercial produced yield ranged from 76 to 90 bu/a, statistically equal to the yield of Sy Tyra. Average test weight was 60.1 lb/bu, ranged from 56.5 lb/bu for ‘IMICHT79’ to 63.5 for Kelby. Grain protein levels averaged 16.5 percent and varied from 13.9 percent for ‘McNeal’ to 18.4 percent for ‘Mott and Vantage

At Fromberg in 2011 most of the spring wheat entries exhibited lodging under irrigation (Table 7). Cultivars Fortuna, Solano, Superb and Vida suffered high degree of lodging. The yield at Fromberg in 2012 averaged 104 bu/a about the same as last year. Grain yield ranged from 75 bu/a for Solano to 120 bu/a for Volt. Eight other entries produced yield ranged from 114 to 120 bu/a, statistically equal to the yield of Volt. Average test weight was 61.1 lb/bu, and ranged from 57.1 lb/bu for Vida to 64.5 lb/bu for Vantage. Grain protein levels were excellent averaging 17.6 percent with all entries exceeding protein contents of 15 percent. Yield variations have been evident at Fromberg for spring wheat entries tested over the past two and three years mainly due to the diverse environmental conditions. Two year averaged yield, for spring wheat varieties tested during 2011 - 2012, was 101 bu/a. The commercial entry volt was the highest yielding entry averaging 122 bu/a over the last two years.

SUMMARY:

Drought throughout the spring wheat growing season and higher than normal temperatures caused yield reduction at dryland site and hasten spring wheat maturity that resulted in early harvest in 2012. In 2012 'Jerome' hard red spring wheat was the highest yielding entry across all locations tested in south central Montana (Tables 8), averaging 65 bu/a. Experimental line MT1053 and commercial cultivar Reeder exhibited highest average yielding across dryland sites in 2012. While Vida produce highest average yields the past two and three years across dryland sites (Table 11). Long-term productivity based on last two and three years average yield across irrigated and all locations were highest for Jerome (Table 9 and 10). Across all locations for the past three years, 10 other entries produced yields ranged from 65 to 69 bu/a, which was statistically equal to the yield of Jerome during the same period of testing (Table 9). In 2012 grain yield at most location was lower compared to past years but the protein levels were excellent, except for Broadview, ranging from 11.6 percent Broadview dryland to 17.8 percent for billings dryland. Averaged across locations grain protein content was averaging 16.0 percent (Table 9). Overall test weight was averaging 58.8 lb/bu and 61.3 lb/bu across dryland and irrigated locations respectively (Table 10 and 11).

Table 1. Selected characteristics and traits of 24 commercial spring wheat cultivars performance tested at six off-station sites in south central Montana during 2012.

Cultivar	1/ Origin	Year of Release	2/ Market Class	3/ PVP	4/ Maturity	5/ Straw Strength	6/ Disease Resistance: Fusarium Head Blight (Scab)	Leaf Rust	Stem Rust	Stripe Rust	Wheat Stem Sawfly	6/ Insect Resistance: Russian Wheat Aphid	Hessian Fly (GP)	7/ Quality: Milling	Baking	8/ Clearfield Type
				Yes/No										1-5	1-5	Yes/No
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
Outlook	MSU	2003	HRS	Y	M-L	S	S	MR	R	S	S	R	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	-	M-L	S	S	MS	R	-	S	S	-	-	-	N
SY 605 CL	Syngenta															
SY Tyra	Syngenta	2011	HRS	Y	M	M	S	R	R	MR	MR	-	-	-	-	N
Vantage																
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																

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 2012. Cultivars listed alphabetically. (Exp. 129908).

	1/ Grain Yield			Test	Grain	2/ Grain	Plant	Heading Date	
Cultivar	**2012**	**2011-12**	**2010-12**	**Weight**	**Moisture**	**Protein**	**Height**	**Julian**	**Calendar**
	------- bushels/acre -------			lb/bu	%	%	inches		
Commercial									
AP604 CL	46.3	55.7	**60.4***	60.7	8.0	15.9	32.7	163.0	Jun 11
Choteau	43.0	49.1	56.5	59.6	7.9	17.4	27.8	162.3	Jun 10
Corbin	46.0	50.3	**59.0***	59.4	7.9	16.8	33.6	163.3	Jun 11
Duclair	41.1	50.5	**59.1***	57.3	7.7	16.4	31.0	163.7	Jun 11
Fortuna	40.7	47.0	53.7	59.1	7.9	17.2	37.1	163.0	Jun 11
Hank	41.5	48.8	**57.9***	55.3	7.6	17.5	29.0	162.3	Jun 10
Jedd	42.7	47.7	54.8	58.9	7.9	16.7	28.1	163.0	Jun 11
Jerome	44.2	53.3	**61.1***	58.4	7.9	15.9	31.3	163.7	Jun 11
Kelby	45.2	50.3	**57.4***	61.5	7.7	17.6	28.2	161.3	Jun 9
McNeal	**49.2***	44.8	52.3	57.4	7.6	16.5	33.1	163.7	Jun 11
Mott	39.7	44.3	50.6	59.6	7.8	18.2	34.0	162.7	Jun 10
Oneal	**46.8***	49.0	**57.7***	59.0	7.9	17.1	31.7	163.7	Jun 11
Outlook	**50.6***	52.3	**58.5***	58.6	7.6	15.9	32.3	163.3	Jun 11
Reeder	**54.3****	52.2	**58.9***	59.8	7.8	16.0	32.1	163.3	Jun 11
Solano	37.8	46.1	55.2	58.4	7.8	18.1	35.6	163.0	Jun 11
Superb	40.0	46.4	54.8	59.4	8.0	17.1	33.1	163.3	Jun 11
SY 605 CL	45.6			61.0	8.0	16.7	30.8	163.0	Jun 11
Sy Tyra	45.9			60.7	8.1	15.8	28.6	163.0	Jun 11
Vantage	39.1			61.0	7.7	19.2	29.9	163.3	Jun 11
Vida	**51.1***	57.2	**63.2****	59.9	8.1	15.4	29.8	163.3	Jun 11
Volt	45.6	52.0	**59.4***	61.3	8.2	15.9	32.9	163.0	Jun 11
WB Gunnison	45.9	48.7		59.3	7.9	16.7	28.9	163.3	Jun 11
Experimental									
IMICHT79	**47.0***	53.3		60.1	7.9	16.7	30.1	163.0	Jun 11
MT1008	**47.3***			60.1	8.2	15.5	32.0	163.0	Jun 11
MT1053	**53.9***			59.5	8.2	15.1	30.2	163.3	Jun 11
Average	45.2	50.0	57.3	59.4	7.9	16.7	31.4	163.1	Jun 11
PLSD (p=0.05)	7.5	ns	6.1	1.2	0.2	0.9	3.6	1.0	
CV%	10.1	7.7	7.4	1.2	1.9	3.5	6.9	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.
** 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. 129908)

Planted:	March 23, 2012
Harvested:	August 2 , 2012
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 2012. Cultivars listed alphabetically. (Exp. 129995).

Cultivar	1/ Grain Yield 2012	2011-12	2010-12	Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	------- bushels/acre -------			lb/bu	%	%	inches
Commercial							
AP604 CL	10.9	16.4	22.1	62.2	8.1	12.2	22.5
Choteau	7.9	13.7	22.6	60.6	8.0	11.7	20.9
Corbin	11.0	11.5	19.4	62.1	8.0	10.8	22.6
Duclair	13.5	14.6	25.2	60.1	8.2	11.1	21.0
Fortuna	10.1	11.4	19.3	60.0	8.0	13.0	23.1
Hank	10.8	13.4	21.4	59.5	8.1	11.3	23.9
Jedd	12.0	13.6	20.0	61.8	8.1	11.6	21.1
Jerome	9.6	17.9	23.7	59.9	8.1	11.1	20.4
Kelby	6.2	10.6	18.2	61.4	8.3	13.3	20.1
McNeal	11.3	12.2	19.6	59.2	7.7	11.6	22.6
Mott	9.1	14.3	21.7	61.4	7.9	12.1	21.8
Oneal	10.5	14.1	23.5	60.9	8.3	10.5	23.9
Outlook	11.2	14.0	19.9	60.5	7.8	11.9	22.8
Reeder	11.3	12.8	21.5	60.7	8.1	10.5	21.4
Solano	9.7	14.1	20.1	58.8	7.8	12.3	19.3
Superb	11.1	14.3	21.9	59.5	8.0	12.6	22.3
SY 605 CL	7.3			58.3	8.4	11.3	24.9
Sy Tyra	9.3			63.4	8.5	10.5	20.8
Vantage	10.7			63.1	7.8	12.3	20.2
Vida	11.9	19.4	26.4	61.7	8.4	10.5	21.3
Volt	6.5	12.2	19.1	62.0	8.1	12.7	19.1
WB Gunnison	13.4	12.6		62.4	8.0	10.9	20.7
Experimental							
IMICHT79	7.4	10.4		61.6	8.0	12.3	18.8
MT1008	9.8			59.5	7.9	11.9	21.0
MT1053	10.9			61.8	8.2	10.9	19.2
Average	10.1	13.7	21.4	60.9	8.1	11.6	21.4
PLSD (p=0.05)	ns	ns	ns	2.1	0.3	1.4	2.3
CV%	27.3	37.2	24.1	2.1	2.2	7.1	6.0

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.
** 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. 129995)	
Planted:	April 2, 2012
Harvested:	August 9, 2012
Fertility:	n/a
Herbicide:	RT3 22 oz/a pre emergence, April 5, 2012.
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 2012. Cultivars listed alphabetically. (Exp. 12999---).

Cultivar	Grain Yield	Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	bu/a	lb/bu	%	%	inches
Commercial					
AP604 CL	21.3	57.0	7.8	17.4	24.5
Choteau	19.6	56.0	7.6	18.0	22.3
Corbin	22.1	57.2	7.9	17.8	25.5
Duclair	21.1	54.2	7.6	18.5	25.6
Fortuna	21.0	55.9	7.7	17.6	29.5
Hank	22.4	55.7	7.9	18.6	24.9
Jedd	22.4	58.3	8.1	16.8	22.7
Jerome	24.3	56.0	7.7	18.8	25.3
Kelby	22.6	60.5	8.2	17.5	25.6
McNeal	21.5	53.4	7.3	16.2	26.8
Mott	17.7	54.3	7.3	17.2	24.9
Oneal	25.4	56.8	7.9	18.0	26.1
Outlook	25.2	53.3	7.4	17.5	25.6
Reeder	23.7	56.5	7.7	18.3	23.5
Solano	22.5	54.4	7.6	18.0	27.3
Superb	21.4	55.2	7.5	16.7	28.5
SY 605 CL	20.1	58.8	8.0	16.5	24.8
Sy Tyra	19.2	56.9	8.0	18.1	23.4
Vantage	20.2	56.5	7.4	17.8	24.3
Vida	23.2	54.4	7.6	18.8	25.6
Volt	22.5	57.9	8.1	19.2	22.4
WB Gunnison	23.0	56.2	7.8	19.1	24.4
Experimental					
IMICHT79	20.6	55.0	7.5	18.0	24.0
MT1008	20.2	54.4	7.7	16.4	24.3
MT1053	24.0	55.2	7.9	19.3	23.4
Average	21.9	56.0	7.7	17.8	25.0
PLSD (p=0.05)	ns	1.9	0.4	ns	2.7
CV%	12.3	1.5	2.3	8.4	6.5

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. 12999-)

Planted:	March 23, 2012
Harvested:	August 3, 2012
Fertility:	46-0-0, 100 lb/a preplant; 11-52-0, 60 lb/a in Furrows at planting.
Herbicide:	RT3 22 oz./a pre-emerged application on March 26, 2012
Insecticide:	none applied
Previous Crop:	fallow
Precipitation:	n/a

Table 5. Performance of 25 spring wheat cultivars tested under irrigation near Huntley, Montana during 2011. Cultivars listed alphabetically. (Exp. 129909).

	1/ Grain Yield			Test	Grain	2/ Grain	Plant		Heading Date	
Cultivar	**2012**	**2011-12**	**2010-12**	**Weight**	**Moisture**	**protein**	**Height**	**Lodging**	**Julian**	**Calendar**
	------- bushels/acre -------			lb/bu	%	%	inches	0-9		
Commercial										
AP604 CL	**112.5***	**87.7***	**89.8***	64.6	8.3	15.7	40.4	0.0	161.7	Jun 9
Choteau	**112.5***	**91.3***	**91.5***	62.5	8.0	15.8	40.3	0.0	165.0	Jun 13
Corbin	108.4	**87.9***	84.5	62.6	8.2	16.0	38.6	4.0	162.7	Jun 10
Duclair	**112.2***	**95.9****	**94.4***	62.1	8.2	15.3	38.9	0.0	164.3	Jun 12
Fortuna	94.7	74.1	74.0	62.5	8.2	16.2	43.7	5.3	166.0	Jun 14
Hank	**116.0****	**92.2***	**96.5***	59.9	7.7	16.5	36.2	0.0	165.0	Jun 13
Jedd	**111.1***	**90.3***	**91.6***	61.8	8.2	15.5	32.4	0.0	164.7	Jun 12
Jerome	**111.0***	**94.5***	**97.5****	61.9	8.1	15.6	38.0	1.0	163.0	Jun 11
Kelby	108.3	**86.4***	**88.8***	63.5	8.0	16.0	34.2	0.0	162.3	Jun 10
McNeal	107.8	80.3	83.9	62.1	7.8	16.4	40.6	0.0	166.3	Jun 14
Mott	97.7	78.1	81.8	62.6	7.9	16.7	45.1	0.0	166.7	Jun 14
Oneal	**116.4***	**92.2***	**90.7***	62.1	8.2	15.3	42.7	0.0	167.0	Jun 15
Outlook	106.2	**87.9***	**88.7***	62.1	7.9	16.1	40.3	0.0	168.0	Jun 16
Reeder	100.7	**84.6***	86.8	63.1	8.0	16.1	44.2	0.0	165.0	Jun 13
Solano	83.6	70.3	79.2	61.2	7.9	17.5	44.0	3.7	167.3	Jun 15
Superb	91.6	73.7	79.4	62.4	8.2	16.4	42.9	6.3	164.3	Jun 12
SY 605 CL	104.8			63.7	8.2	17.0	38.0	0.0	162.3	Jun 10
Sy Tyra	**121.2****			63.5	8.4	13.5	35.3	0.0	166.3	Jun 14
Vantage	87.8			65.1	8.2	18.1	38.7	0.0	169.7	Jun 17
Vida	108.7	**84.9***	85.1	62.1	8.2	15.4	39.9	0.0	165.3	Jun 13
Volt	109.0	**89.7***	**93.3***	64.2	8.4	15.0	36.8	0.0	165.3	Jun 13
WB Gunnison	**113.5***	**91.9***		63.3	8.2	15.2	35.7	0.0	165.3	Jun 13
Experimental										
IMICHT79	107.7	**88.3***		63.1	8.1	15.6	39.5	0.0	166.3	Jun 14
MT1008	**115.5***			63.3	8.5	14.6	41.0	0.3	166.7	Jun 14
MT1053	103.7			61.9	8.5	15.2	38.8	0.0	165.7	Jun 13
Average	106.5	86.1	87.6	62.7	8.1	15.9	39.5	0.8	165.3	Jun 13
PLSD (p=0.05)	11.3	11.5	10.6	1.0	0.2	0.8	2.4	1.6	1.8	
CV%	5.9	7.8	7.3	1.0	1.6	3.0	3.7	118.4	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.

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. 129909)

Planted:	March 26, 2012
Harvested:	August 7, 2012
Fertility:	100-40-0, spread on November 3, 2011
Herbicide:	RT3 22 0z/a in the fall 2011; Huskie 11 oz/a on May 2, 2012.
Insecticide:	none
Previous Crop:	spring barley
Irrigation:	overhead sprinkler
Precipitation:	3.48 inches

Table 6. Performance of 25 spring wheat cultivars tested under irrigation near Hysham during 2012. Cultivars listed alphabetically. (Exp. 129996).

Cultivar	Grain Yield 1/ 2012	Grain Yield 1/ 2011-12	Grain Yield 1/ 2010-12	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height	Lodging
	------- bushels/acre -------			lb/bu	%	%	inches	0-9
Commercial								
AP604 CL	63.4	73.8	76.1	61.2	8.0	16.3	36.6	0.3
Choteau	63.8	71.0	73.6	59.7	8.0	16.6	35.8	0.0
Corbin	**83.5***	87.1	80.5	62.0	8.3	15.0	37.8	0.0
Duclair	70.5	79.2	78.3	59.4	8.0	16.3	39.5	0.0
Fortuna	**80.5***	76.7	72.6	57.3	7.8	15.8	45.3	0.0
Hank	66.1	75.4	74.0	60.2	8.1	15.4	35.8	0.0
Jedd	65.3	70.5	77.0	58.7	7.8	16.7	31.4	0.0
Jerome	**85.1***	84.4	79.8	60.3	8.3	18.0	38.3	0.0
Kelby	69.0	76.5	74.2	63.5	8.3	16.1	34.3	0.0
McNeal	70.5	80.2	79.9	58.7	7.8	13.9	38.7	0.0
Mott	61.5	77.1	74.8	60.9	8.0	18.4	41.9	0.3
Oneal	64.6	77.0	74.5	61.9	8.5	16.7	37.1	0.0
Outlook	**76.3***	81.1	74.7	60.9	8.0	16.5	37.7	0.0
Reeder	**88.5***	81.7	75.4	62.6	8.2	15.2	41.6	0.0
Solano	68.4	71.0	73.7	60.5	8.1	16.7	44.4	0.7
Superb	**71.7***	68.4	63.3	57.8	7.7	16.1	43.3	0.3
SY 605 CL	**91.2****			61.1	8.2	17.0	38.7	0.0
Sy Tyra	**78.6***			60.3	8.2	15.9	33.2	0.0
Vantage	**81.9***			61.0	7.8	18.4	35.8	0.0
Vida	**76.8***	80.9	77.0	59.8	8.1	17.1	36.9	1.7
Volt	60.9	79.4	77.8	62.9	8.5	16.4	34.3	1.0
WB Gunnison	**73.7***	78.2		59.0	7.9	18.0	34.6	0.0
Experimental								
IMICHT79	**89.9***	88.5		56.5	7.5	15.6	35.6	0.0
MT1008	62.4			59.0	8.1	16.9	36.1	0.7
MT1053	56.0			58.4	8.1	17.7	37.8	0.0
Average	72.8	77.9	75.4	60.1	8.1	16.5	37.7	0.2
PLSD (p=0.05)	19.9	ns	ns	3.6	ns	2.3	3.2	ns
CV%	16.7	12.7	15.7	3.7	4.1	8.7	5.1	305.5

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. 119996)	
Planted:	April 10, 2012
Harvested:	August 2, 2012
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 2012. Cultivars listed alphabetically. (Exp. 129997).

	1/ Grain Yield			Test	Grain	2/ Grain	Plant	
Cultivar	2012	2011-12	2010-12	Weight	Moisture	Protein	Height	Lodging
	------- bushels/acre -------			lb/bu	%	%	inches	0-9
Commercial								
AP604 CL	106.8	**107.2***	102.2	61.9	8.9	17.9	38.1	5.7
Choteau	**115.6***	**110.7***	102.7	61.5	9.0	17.5	38.6	2.0
Corbin	87.2	99.7	94.3	59.7	8.8	18.5	34.3	5.7
Duclair	109.4	**102.1***	101.6	59.1	8.8	17.8	36.7	4.3
Fortuna	86.8	88.2	88.5	59.5	8.7	18.1	42.0	8.3
Hank	**116.0***	**107.2***	109.7	60.0	8.8	17.0	34.9	0.0
Jedd	**114.5***	**103.8***	98.7	62.2	9.0	16.7	31.6	0.0
Jerome	**114.7***	**112.9***	105.1	60.1	9.0	17.6	36.2	5.3
Kelby	102.7	**109.7***	102.2	63.2	9.1	17.2	35.8	2.0
McNeal	107.0	96.4	92.3	61.5	9.0	17.2	39.6	1.7
Mott	97.8	98.9	91.7	61.2	8.8	18.0	43.2	2.7
Oneal	**113.8***	**103.5***	103.1	60.7	9.4	17.2	37.1	1.7
Outlook	100.2	**103.5***	99.3	59.2	8.7	17.6	39.4	4.3
Reeder	98.4	101.7	92.7	62.1	8.6	17.8	40.4	3.7
Solano	74.7	80.7	87.1	58.5	8.3	20.0	40.4	7.0
Superb	76.2	78.9	87.0	58.9	8.3	18.8	40.8	9.0
SY 605 CL	**115.5***			63.1	9.0	17.9	38.7	1.0
Sy Tyra	109.2			62.4	9.0	15.7	32.9	0.3
Vantage	109.1			64.5	9.2	18.9	38.1	0.0
Vida	88.0	97.6	90.8	57.1	8.6	19.0	37.3	7.3
Volt	**120.1****	**122.0****	111.2	64.0	9.3	16.3	35.6	0.0
WB Gunnison	104.8	**105.9***		61.9	9.1	16.2	36.4	1.0
Experimental								
IMICHT79	110.1	**105.8***		61.7	8.8	17.3	36.4	2.7
MT1008	**113.0***			62.0	9.4	16.3	38.5	1.0
MT1053	**119.8***			60.9	9.1	16.8	36.2	0.3
Average	104.4	101.8	97.8	61.1	8.9	17.6	37.6	3.1
PLSD (p=0.05)	9.8	20.1	ns	1.0	0.5	0.6	2.0	1.9
CV%	5.7	6.0	9.4	1.0	3.4	1.9	3.3	36.9

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. 129997)	
Planted:	March 22,, 2012
Harvested:	August 8, 2012
Fertility:	100 lb N/a preplant; 70 lb/a 11-52-0 at planting; 120 lb N/a top dress in May, 2012
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 2012. Varieties listed by declining six-location average yield.

	Dryland				Irrigated				Six Location
	Huntley	Billings	Broadview	Ave.	Huntley	Hysham	Fromberg	Ave.	Average
	bushels/acre								
Jerome	44.2	24.3	9.6	25.6	**111.0***	**85.1***	**114.7***	104.6	**65.1****
SY 605 CL	45.6	20.1	7.3	24.8	104.8	**91.2****	**115.5***	103.4	**64.1***
Sy Tyra	45.9	19.2	9.3	24.4	**121.2****	**78.6***	109.2	103.4	**63.9***
IMICHT79	**47.0***	20.6	7.4	25.3	107.7	**89.9***	110.1	102.0	**63.7***
Oneal	**46.8***	25.4	10.5	**27.4***	**116.4***	64.6	**113.8***	99.4	**63.4***
Reeder	**54.3****	23.7	11.3	**28.8***	100.7	**88.5***	98.4	96.7	**62.8***
WB Gunnison	45.9	23.0	13.4	**27.1***	**113.5***	**73.7***	104.8	98.3	**62.7***
MT1008	**47.3***	20.2	9.8	**26.4***	**115.5***	62.4	**113.0***	97.5	**62.0***
Outlook	**50.6***	25.2	11.2	**29.3***	106.2	**76.3***	100.2	94.8	**62.0***
MT1053	**53.9***	24.0	10.9	**29.8****	103.7	56.0	**119.8***	93.3	**61.6***
Hank	41.5	22.4	10.8	24.7	**116.0****	66.1	**116.0***	98.4	**61.5***
Volt	45.6	22.5	6.5	24.9	109.0	60.9	**120.1****	98.1	**61.5***
Jedd	42.7	22.4	12.0	25.7	**111.1***	65.3	**114.5***	97.1	**61.4***
Duclair	41.1	21.1	13.5	25.1	**112.2***	70.5	109.4	97.3	**61.2***
Choteau	43.0	19.6	7.9	23.8	**112.5***	63.8	**115.6***	97.5	**60.7***
McNeal	**49.2***	21.5	11.3	**26.9***	107.8	70.5	107.0	94.3	**60.6***
AP604 CL	46.3	21.3	10.9	**27.1***	**112.5***	63.4	106.8	93.4	**60.2***
Corbin	46.0	22.1	11.0	26.1	108.4	**83.5***	87.2	93.6	**59.8***
Vida	**51.1***	23.2	11.9	**29.4***	108.7	**76.8***	88.0	90.2	**59.8***
Kelby	45.2	22.6	6.2	24.8	108.3	69.0	102.7	93.2	**59.0***
Vantage	39.1	20.2	10.7	22.6	87.8	**81.9***	109.1	91.9	**57.3***
Fortuna	40.7	21.0	10.1	24.7	94.7	**80.5***	86.8	86.7	55.7
Mott	39.7	17.7	9.1	21.6	97.7	61.5	97.8	85.9	53.7
Superb	40.0	21.4	11.1	23.8	91.6	**71.7***	76.2	79.3	51.5
Solano	37.8	22.5	9.7	23.7	83.6	68.4	74.7	74.2	49.0
Average	45.2	21.9	10.1	25.8	106.5	72.8	104.4	94.6	60.2
PLSD (p=0.05)	7.5	ns	ns	3.4	11.3	19.9	9.8	ns	9.0
CV%	10.1	12.3	27.3	14.3	5.9	16.7	5.7	9.6	11.5

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 2012. Cultivars listed alphabetically.

Cultivar	Grain Yield 1/ 2012	Grain Yield 1/ 2011-12	Grain Yield 1/ 2010-12	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height
	------- bushels/acre -------			lb/bu	%	%	inches
Commercial							
AP604 CL	**60.2***	**64.0***	**67.1***	61.2	8.2	15.8	32.5
Choteau	**60.7***	**62.9***	**66.3***	60.1	8.1	16.2	30.9
Corbin	**59.8***	**63.2***	64.7	60.5	8.2	15.8	32.1
Duclair	**61.2***	**64.1***	**68.5***	58.7	8.1	15.9	32.1
Fortuna	55.7	56.0	59.1	59.0	8.1	16.3	36.9
Hank	**61.5***	**63.3***	**68.8***	58.4	8.0	16.0	30.8
Jedd	**61.4***	61.3	**65.5***	60.3	8.2	15.7	27.9
Jerome	**65.1****	**68.2****	**70.3****	59.5	8.2	16.2	31.7
Kuntz	**59.0***	**62.7***	**65.3***	62.2	8.3	16.3	29.7
McNeal	**60.6***	59.0	62.8	58.7	7.9	15.4	33.6
Mott	53.7	58.5	61.2	60.0	7.9	16.7	35.1
Oneal	**63.4***	**63.4***	**67.1***	60.3	8.4	15.8	33.1
Outlook	**62***	**63.9***	**65.6***	59.1	7.9	15.9	33.0
Reeder	**62.8***	**62.8***	64.4	60.9	8.1	15.7	33.8
Solano	49.0	53.3	60.5	58.6	7.9	17.1	35.2
Superb	51.5	53.2	58.8	58.9	8.0	16.3	35.1
SY 605 CL	**64.1***			61.0	8.3	16.1	32.8
Sy Tyra	**63.9***			61.2	8.4	14.9	29.0
Vantage	**57.3***			61.9	8.0	17.5	31.2
Vida	**59.8***	**64***	**65.7***	59.1	8.2	16.0	31.8
Volt	**61.5***	**66.6***	**69.0***	62.1	8.4	15.9	30.2
WB Gunnison	**62.7***	**63.4***		60.4	8.1	16.0	30.1
Experimental							
IMICHT79	**63.7***	**64.9***		59.6	8.0	15.9	30.7
MT1008	**62***			59.8	8.3	15.3	32.2
MT1053	**61.6***			59.7	8.4	15.8	30.9
Average	60.2	61.9	65.0	60.0	8.1	16.0	32.1
LSD (0.05)	9.0	5.8	5.0	1.6	0.2	1.0	2.0
CV %	11.5	10.4	11.8	2.0	2.9	6.1	5.2
Location x 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 2012. Cultivars listed alphabetically.

Cultivar	Grain Yield 1/ 2012	Grain Yield 1/ 2011-12	Grain Yield 1/ 2010-12	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height	Lodging
	------- bushels/acre -------			lb/bu	%	%	inches	0-9
Commercial								
AP604 CL	93.4	**89.6***	**89.4***	62.5	8.4	16.6	38.5	2.0
Choteau	97.5	**91.0***	**89.3***	61.3	8.3	16.6	38.2	0.7
Corbin	93.6	**91.6***	**86.4***	61.4	8.4	16.5	37.0	3.2
Duclair	97.3	**92.4***	**91.5***	60.2	8.3	16.5	38.2	1.4
Fortuna	86.7	79.7	78.4	59.7	8.2	16.7	43.7	4.6
Hank	98.4	**91.6***	**93.4***	59.9	8.2	16.3	35.7	0.0
Jedd	97.1	**88.2***	**89.1***	60.9	8.3	16.3	31.8	0.0
Jerome	104.6	**97.3****	**94.1****	60.9	8.5	17.1	37.5	2.1
Kuntz	93.2	**90.9***	**88.4***	63.3	8.5	16.5	34.8	0.7
McNeal	94.3	85.7	85.4	60.8	8.2	15.9	39.6	0.6
Mott	85.9	84.7	82.8	61.5	8.2	17.7	43.4	1.0
Oneal	99.4	**90.9***	**89.4***	61.7	8.7	16.5	39.1	0.6
Outlook	94.8	**90.8***	**87.6***	60.7	8.2	16.7	39.1	1.4
Reeder	96.7	**89.3***	84.9	62.7	8.3	16.4	42.1	1.2
Solano	74.2	74.0	80.0	60.0	8.1	18.1	43.0	3.8
Superb	79.3	73.7	76.6	59.8	8.1	17.1	42.3	5.2
SY 605 CL	103.4			62.7	8.5	17.4	38.5	0.3
Sy Tyra	103.4			62.1	8.5	15.1	33.8	0.1
Vantage	91.9			63.5	8.4	18.5	37.6	0.0
Vida	90.2	87.8	84.3	59.6	8.3	17.1	38.1	3.0
Volt	98.1	**97.0***	**94.1****	63.7	8.7	15.8	35.4	0.3
WB Gunnison	98.3	**92.0***		61.5	8.4	16.5	35.5	0.3
Experimental								
IMICHT79	102.0	**94.2***		60.3	8.1	16.1	37.2	0.9
MT1008	97.5			61.5	8.6	15.9	38.4	0.7
MT1053	93.3			60.4	8.6	16.6	37.6	0.1
Average	94.6	88.6	86.9	61.3	8.4	16.6	38.2	1.4
LSD (0.05)	ns	9.3	8.2	2.0	0.3	1.4	2.2	2.6
CV %	9.6	8.8	10.8	2.2	3.3	5.4	4.1	67.7
Location x 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 2012 Cultivars listed alphabetically.

Cultivar	1/ Grain Yield 2012	2011-12	2010-12	Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	------- bushels/acre -------			lb/bu	%	%	inches
Commercial							
AP604 CL	**27.1***	**33.2***	**38.4***	59.8	7.9	15.1	26.6
Choteau	23.8	29.1	36.8	58.8	7.8	15.7	23.6
Corbin	26.1	29.2	36.8	59.5	7.9	15.1	27.2
Duclair	25.1	30.1	**39.1***	57.2	7.8	15.3	25.9
Fortuna	24.7	27.7	34.4	58.2	7.9	15.9	30.1
Hank	24.7	29.3	37.2	56.8	7.8	15.8	25.9
Jedd	25.7	29.0	35.2	59.8	8.0	15.1	24.0
Jerome	25.6	**33.2***	**39.7***	58.1	7.9	15.2	25.8
Kuntz	24.8	28.9	35.6	61.1	8.1	16.1	24.7
McNeal	**26.9***	27.1	33.9	56.7	7.5	14.9	27.5
Mott	21.6	27.0	33.5	58.4	7.6	15.8	26.9
Oneal	**27.4***	30.3	**38.4***	58.9	8.0	15.2	27.2
Outlook	**29.3***	**31.7***	37.3	57.4	7.6	15.1	26.8
Reeder	**28.8***	30.9	37.9	59.0	7.9	15.0	25.5
Solano	23.7	28.5	35.4	57.2	7.7	16.1	27.4
Superb	23.8	28.6	35.9	58.1	7.8	15.5	27.9
SY 605 CL	24.8			59.4	8.2	14.8	27.1
Sy Tyra	24.4			60.3	8.2	14.8	24.1
Vantage	22.6			60.3	7.7	16.5	24.7
Vida	**29.4***	**35.4****	**41.8****	58.7	8.0	14.8	25.5
Volt	24.9	30.1	36.8	60.4	8.1	15.9	24.9
WB Gunnison	**27.1***	29.0		59.3	7.9	15.6	24.7
Experimental							
IMICHT79	25.3	29.8		58.9	7.8	15.7	24.2
MT1008	**26.4***			58.0	7.9	14.6	25.9
MT1053	**29.8****			58.9	8.1	15.1	24.3
Average	25.8	29.9	36.9	58.8	7.9	15.4	25.9
LSD (0.05)	3.4	4.1	3.5	1.9	0.3	1.5	2.4
CV %	14.3	14.2	12.2	1.7	2.2	6.8	6.9
Location x 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.