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:

2012 Off-Station Winter Wheat Variety Performance Trials in South Central Montana. This research is partially supported by Montana farmers through the Montana Wheat and Barley Committee.

PROJECT LEADERS:

Kent A. McVay, Cropping System Specialist, SARC, Huntley
Qasim A. Khan, Research Associate, SARC, Huntley
Phil L. Bruckner, Winter Wheat Breeder, PSPP, Bozeman
James E. Berg, Winter 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:

Todd Tibbets, Forsyth
Mike Brown, Fly Creek (Hardin)
Alex Smith, Fort Smith
Dave Kelsey, Molt
Gary Broyles, Rapelje

OBJECTIVES:

To provide wheat growers in south central Montana with a reliable, unbiased and up-to-date source of information that will permit valid comparisons among improved winter wheat varieties. This information should help winter wheat producers in south central Montana select varieties best suited to their particular area and growing conditions.

METHODS:

The 2012 off-station winter wheat trials were established under irrigation at Huntley and under dryland conditions near Molt under conventional summer fallow conditions; near Forsyth, Hardin, Fort Smith and Rapelje under no-till, chemical fallow conditions (Fig. 1). Each trial contained 25 winter wheat cultivars (17 commercial, 8 experimental), and was planted using a partially-balanced lattice design under dryland and a randomized complete block design under irrigated conditions with three replications. All entries were seeded at approximately 1 million seeds per acre under dryland conditions (~60 lb/a) and 1.5 million seeds per acre under irrigation (~90 lb/a). Dryland test plots consisted of a 15-foot, 4-row plot with 14-inch row spacing. Irrigated test plots consisted of a 15-foot, 7-row plot with 7-inch row spacing. All rows of each harvested test plot were trimmed 36 inches and harvested using a plot combine. Information pertaining to the traits and characteristics of the winter wheat entries are provided in Table 1.

Recorded grain yields were adjusted to 13% grain moisture content, and are reported in bushels per acre based on a 60 pound standard bushel weight. Two year (2011-12) and three year (2010-12) yield averages are provided for cultivars tested during previous years. Test weight (pounds per bushel) and grain

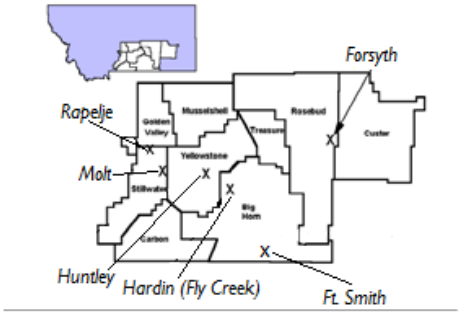

Figure1. 2012 off-station winter wheat trial locations in south central Montana.

moisture content (percent) were obtained for each plot using a Dickey-john™ GAC 2100 grain analyzer. Grain protein content (percent) was determined by near-infrared reflectance for each harvested sample, and 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. Corresponding calendar dates also are presented. Information pertaining to the specific cultural management of each study site is listed at the bottom of their respective data table (Tables 2 through 7).

RESULTS:

Surface soil moisture conditions were averaged at all winter wheat test locations planted in the fall of 2011. The 2012 winter 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 winter wheat production under all dryland sites. Overall, winter wheat yields were average to below average under dryland. Test weight values were also average to below average. Grain protein content fluctuated greatly from site-to-site in 2012, but on average was higher comparable to the protein content measured in the trials harvested last year.

Average winter wheat yield under irrigated condition at Huntley during 2012 was 124 bu/a (Table 2). Lodging was limited in most entries averaging a 2.1 score out of 9. 'Genou', 'Jerry', 'Norris, and 'Rampart showed high lodging score (>5). Yields ranged from 99 bu/a for Jerry to 150 bu/a for 'AP503 CL2'. Seven other entries produced yield that were statistically equal to the yield of AP503 CL2. Test weight values were excellent under irrigated conditions at Huntley in 2012, averaging 62.9 lb/bu. All commercial entries possessed test weight values heavier than 62 lb/bu. Grain protein content averaged 12.1 percent and ranged from 10.0 for 'Pryor' to 14.0 percent for Jerry.

Average yield under dryland conditions at Rapelje in 2012 was 50 bu/a (Table 3), about 12 bushels per acre higher than winter wheat yields observed at this site in 2011. Yields ranged from 36 bu/a for cultivar Genou to 73 bu/a for commercial cultivar 'Overland'. Only one entry 'MTCL1077' produced yields statistically equal with that of Overland. Test weight was low and average only 55.7 lb/bu, with all entries producing test weights lower than 60 lb/bu. Grain protein averaged 17.9 percent and ranged from 16.1 percent for Overland to 19.4 percent for Genou Two-year average yield for winter wheat varieties tested at Rapelje during 2011 and 2012 averaged 42.2 bu/a. Three-year average yield from 2010 through 2012 averaged 45.5 bu/a.

Average yield of the 25 winter wheat cultivars tested at Forsyth in 2012 was 24 bu/a (Table 4), 16 bushels per acre less than winter wheat entries harvested at Forsyth in 2011. Yields ranged from 20 bu/a for AP502 CL2 to 29 bu/a for the experimental entry 'MT0871'. The highest yielding commercial entry Norris, at 27 bu/a, was statistically equal to the yield of MT0871. Test weight was also lower at Forsyth averaging 58.3 lb/bu, with only three entries possessing test weight values equal or heavier than 60 lb/bu. Grain protein content was high averaging 16.8 percent and ranged from 15.2 percent for 'MTS0832' to 18.4 percent for 'Judee'. Two year average yield (2011-2012) was 32 bu/a and three year (2010-2012) average yield was 43 bu/a at Forsyth.

Average winter wheat yield at Hardin during 2012 was only 50 bu/a (Table 5), about half of last year yield at this site. Yields ranged from 43 bu/a for 'Accipiter' to 69 bu/a for commercial entry Overland. Only 'Jegalene' produces yield of 62 bu/a that was statistically equal to the yield of Overland. Test weight values were also low at Hardin in 2012, averaging only 52.5 lb/bu and ranged from 49.4 lb/bu for 'Curlew' to 57.1 lb/bu for Jagalene. All entries possessed test weight values lower than 60 lb/bu. Grain protein content was the highest at this site in 2012 and averaged 19.4 percent. Protein content ranged from 17.8 percent to 20.9 percent. Two-year average yield for winter wheat varieties tested during 2011 and 2012 averaged 81 bu/a. Three-year average yield for winter wheat varieties tested during 2010 to 2012 averaged 71 bu/a. Pryor was the top yielding cultivar at Hardin over the past three years.

Average yield under dryland conditions at Molt in 2012 was 25 bu/a (Table 6). Winter wheat yield was drastically affected by drought at Molt. Yield ranged from 19 bu/a for AP503 CL2 to 32 bu/a for the experimental line MT0871. The highest yielding commercial entry was 'Decade' with 31 bu/a. Nine other entries produced yield statistically equal with the yield of MT0871. Average test weight was 56.4 lb/bu, and none of the entries has test weight value heavier than 60 lb/bu. Grain protein content averaged 15.8 percent. All entries have protein content over 15 percent. Two-year and Three-year average yields for winter wheat varieties tested at Molt were 33 and 47 bu/a respectively.

Agronomic performance of the winter wheat cultivars tested under dryland conditions near 'Fort Smith' during 2012 is presented in Table 7. Winter wheat grown in this region of south central Montana frequently suffers from the occurrence of dwarf bunt (*aka*, dwarf smut, TCK smut, *Tilletia controversa* Kuhn), but this disease was not evident during the 2012 season. Averaged yield at Fort Smith location was 71 bu/a. Fort Smith has the highest yield among all the dryland locations in 2012. Yield ranged from 88 bu/a for Overland to 60 bu/a for Rampart. Only Pryor, among commercial entries, produced yield of about 84 bu/a which was statistically equal to the yield of Overland. Average test weight was 59.8 lb/bu and ranged from 57.1 for MT0871 to 62.9 for AP503 CL2. Eleven entries possessed test weight values equal or heavier than 60 lb/bu. Grain protein content averaged 14.8 percent and ranged from 13.2 percent for Pryor to 16.1 percent for 'Jerry'. Two-year average yield for winter wheat varieties tested during 2011 to 2012 averaged 78 bu/a. Experimental line 'MTCL1067' was the top yielding entry averaging 89 bu/a over the past three years.

SUMMARY:

Significant differences in yield among cultivars tested in 2012 were obtained under irrigated and dryland conditions (Tables 2 to 8). The entry Overland produced the highest yield of 67.4 bu/a, averaged across all six of the test locations harvested in 2012 (Table 8). Two experimental winter wheat entries MTCL1077 and MT0871 were among the top performer in 2012 trials. MT0871 was also the top yielding entry in 2011 in all dryland trials. Excellent yields were obtained under irrigated conditions at Huntley in 2012. Overhead sprinkler irrigation prevented severe lodging as it allows frequent incremental water application.

Since 2010, experiments representing 13 location-years of testing have uniformly tested 16 cultivars at several dryland locations in south central Montana (Table 10). Averaged over the past three years across all dryland locations, 'Bearpaw' hard red winter wheat has been the highest yielding cultivar averaging 55 bu/a. Eleven other entries including Accipiter, 'CDC Falcon', Decade, Jagalene, Norris, Pryor and 'Yellowstone' produced three year average yields across all locations that were statistically equal to the yield of Bearpaw.

Table 1. Selected characteristics and traits of 25 commercial and experimental winter 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/ Coleoptile Length	Chaff Color	6/ Winter Survival	7/ Straw Strength	Solid Stem Type	8/ Disease Resistance: Leaf Rust	Stem Rust	Stripe Rust	Dwarf Bunt	9/ Quality: Milling	Baking	10/ Clearfield Type
				Yes/No				1-5		Yes/No					1-5	1-5	Yes/No
Commercial																	
Accipiter	CDC	2008	HRW	Y	M-L	M	White	5	S	N	R	MR	S	S	2	3	N
AP503 CL2	Syngenta	2007	HRW	Y	M	M	White	2	S	N	S	MR	R	S	3	4	Y
Bearpaw	MSU	2011	HRW	Y	M	M	White	2	M	Y	S	R	S	S	4	3	N
CDC Falcon	CDC	1999	HRW	Y	M	S	White	4	S	N	R	R	S	S	3	3	N
Colter	MSU	2013	HRW		M	S	White	3	S	N	-	R	R	S	3	4	N
Curlew	USU	2009	HRW	Y	M	S	Brown	2	S	N	S	S	R	R	4	3	N
Decade	MSU	2010	HRW	Y	M	M	White	4	S	N	S	R	R	S	3	4	N
Genou	MSU	2004	HRW	Y	M	M	White	2	M	Y	M	S	S	S	4	4	N
Jagalene	Syngenta	2002	HRW	Y	E	M	White	2	S	N	S	MR	MR	S	3	3	N
Jerry	NDSU	2001	HRW	N	M-L	M	White	5	M	N	R	R	S	S	3	3	N
Judee	MSU	2011	HRW	Y	M	M	White	2	S	Y	S	S	R	S	3	4	N
Ledger	WestBred	2005	HRW	Y	M-L	M	White	2	S	Y	MS	S	S	S	4	3	N
Norris§	MSU	2005	HRW	Y	E	M	Brown	3	S	N	MS	S	S	S	3	3	Y
Overland	Nebraska	2007	HRW	Y	E	M	White	4	S	N	R	R	S	S	3	2	N
Pryor	WestBred	2002	HRW	Y	M	S	White	3	S	N	S	S	S	S	3	3	N
Rampart	MSU	1996	HRW	N	M	L	Brown	2	W	Y	S	MR	MR	S	4	4	N
Warhorse	MSU	2013	HRW		M	M	White	3	S	Y	MR	R	R	S	3	3	N
WB Quake	WestBred	2011	HRW	Y	M	S	White	3	S	Y	R	MR	R	S	4	3	N
Yellowstone	MSU	2005	HRW	Y	M	S	White	4	MS	N	MS	S	R	S	3	4	N
Experimental																	
MT0871	MSU		HRW		M	S	White	4	S	N	MR	R	MS	S	3	3	N
MTCL1067	MSU		HRW		M	S	White	3	S	N	-	MS	R	S	3	3	Y
MTCL1077	MSU		HRW		M	S	White	4	S	N	-	MR	R	S	3	3	Y
MTS0819	MSU		HRW		M	M	White	3	S	Y	-	R	MR	S	3	3	N
MTS0826	MSU		HRW		M-L	M	White	3	MS	Y	MR	R	S	S	3	3	N
MTS0832	MSU		HRW		M-L	S	White	4	S	Y	S	R	VS	S	3	4	N

1/ CDC=Crop Development Centre, University of Saskatchewan; MSU=Montana State University; NDSU=North Dakota State University; UNL=University of Nebraska-Lincoln; Syngenta=Syngenta Cerreals, Berthoud, Colorado; USU=Utah State University; WestBred=WestBred Unit of Monsanto Co., Bozeman, Montana.

2/ HRW=hard red winter 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/ L=long coleoptile length, M=medium coleoptile length, S=short coleoptile length.

6/ Winter survival rated from 1 to 5 where 1=poor and 5=best winter survival, respectively, based on years of observations at Sidney, Moccasin and Williston.

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

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

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

10/ Signifies a cultivar possessing the Clearfield trait imparting tolerance to products containing imazamox herbicide.

§ 'Bynum', and 'Norris' licensed for sale on an exclusive basis by WestBred LLC, Bozeman, Montana.

Table 2. Performance of 25 commercial and experimental winter wheat cultivars tested under no-till, irrigated conditions near Huntley, Montana during 2012. Cultivars listed alphabetically. (Exp. 123880).

	1/ Grain Yield			Test	Grain	2/ Grain	Plant	Lodging	Heading Date	
Cultivar	2012	2011-12	2010-12	Weight	Moisture	Protein	Height	Index	Julian	Calendar
	---------- bushels/acre ----------			lb/bu	%	%	inches	0-9		
Commercial										
Accipiter	129.9	111.6	107.2	63.0	8.3	12.3	44.8	1.0	155.0	Jun 3
AP503 CL2	**149.8****			64.0	8.1	12.0	39.9	4.0	144.7	May 23
Bearpaw	129.3	117.1		62.7	8.1	11.7	40.9	2.7	151.0	May 30
CDC Falcon	**143.4***	112.7	106.3	63.1	8.2	11.5	41.6	0.0	153.3	Jun 1
Colter	**131.9***			64.1	7.9	11.2	42.3	0.0	154.7	Jun 2
Curlew	116.4	101.7	95.8	62.4	8.0	12.2	46.6	3.3	153.0	Jun 1
Decade	**139.5***	121.9	112.7	62.1	7.9	13.0	42.7	2.3	149.7	May 28
Genou	101.7	97.3	91.6	62.2	7.9	13.9	42.8	7.0	152.0	May 31
Jagalene	121.8	120.4	112.5	64.2	8.3	11.1	41.7	0.0	144.3	May 23
Jerry	98.7	94.5	88.5	61.1	8.0	14.0	46.9	6.3	153.0	Jun 1
Judee	131.0	118.1	110.0	62.7	8.2	13.1	39.6	4.7	151.7	May 30
Ledger	114.9	104.8	101.1	63.0	8.2	11.6	40.4	0.0	149.3	May 28
Norris	105.7	87.4	94.4	63.7	8.0	12.0	47.2	5.7	143.7	May 22
Overland	120.9			62.3	8.3	11.5	44.6	1.3	145.0	May 24
Pryor	**141.0***	111.7	101.7	62.5	8.2	10.0	40.3	0.0	151.3	May 30
Rampart	102.3	94.7	94.5	62.5	7.8	12.9	43.6	8.0	150.3	May 29
WB-Quake	119.6			63.0	8.2	11.1	41.9	0.0	153.0	Jun 1
Warhorse	108.7			63.7	8.2	12.4	39.9	0.0	153.7	Jun 1
Yellowstone	**134.9***	119.7	111.0	62.5	8.2	11.1	42.8	0.0	152.0	May 31
Experimental										
MT0871	**146.2***			62.2	7.8	12.2	40.4	0.0	153.7	Jun 1
MTCL1067	124.2			61.2	7.8	13.6	46.6	3.3	153.0	Jun 1
MTCL1077	**133.0***			61.8	7.9	12.5	44.1	0.7	152.7	May 31
MTS0819	131.0			62.9	8.2	12.2	40.4	0.3	152.7	May 31
MTS0826	105.5	89.5		64.7	8.5	11.4	44.2	2.3	152.7	May 31
MTS0832	119.4	105.2		64.5	8.4	12.5	43.3	0.7	153.3	Jun 1
Average	124.0	106.8	102.1	62.9	8.1	12.1	42.8	2.1	151.1	May 30
PLSD (p=0.05)	17.9	ns	ns	1.5	ns	ns	3.2	2.8	2.7	
CV%	8.8	12.0	11.9	1.4	3.2	13.4	4.6	80.9	1.1	

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13 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.

Table 2 continued.

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

** 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).

Huntley Irrigated Winter Wheat (Exp. 123880)

Planted:	September 13 2011	Harvested:	August 7, 2012
Fertility:	11-52-00, 75 lb/a + 200-25-30 mix 80 lbs/acre at planting.		
Herbicide:	Roundup RT3, 22 oz/a, Preplant; Huskie 11 oz/a on May 2 2012.		
Previous crop:	spring barley		
Irrigation:	overhead sprinkler		
Precipitation:	3.1 inches.		

Table 3. Performance of 25 commercial and experimental winter wheat cultivars tested under no-till, dryland conditions near Rapelje, Montana during 2012. Cultivars listed alphabetically. (Exp. 123881).

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							
Accipiter	48.9	47.5	48.9	55.5	7.3	17.4	34.9
AP503 CL2	51.5	39.3		55.4	7.2	17.5	33.3
Bearpaw	49.9	40.9	49.0	55.9	7.1	18.5	35.7
CDC Falcon	52.3	46.3	44.7	53.4	7.0	17.6	32.9
Colter	56.1			55.6	7.4	17.9	37.0
Curlew	47.6	37.8	40.7	53.6	7.1	17.8	40.4
Decade	40.5	40.4	44.5	54.6	7.4	18.5	34.3
Genou	35.6	37.1	38.3	55.4	7.1	19.4	39.0
Jagalene	53.5	45.3	47.9	56.7	7.6	17.7	35.0
Jerry	47.3	43.5	44.6	56.7	7.6	18.4	40.0
Judee	43.3	29.6	37.6	54.1	7.3	19.1	34.0
Ledger	47.6	43.2	45.0	56.3	7.6	16.7	34.6
Norris	58.5	47.0	49.0	55.5	7.1	18.0	38.2
Overland	**73.1****			58.7	7.6	16.1	36.2
Pryor	45.0	38.7	45.3	55.7	7.3	18.2	34.3
Rampart	46.0	37.4	42.3	58.1	7.4	17.9	37.8
WB-Quake	45.5	33.4		57.2	7.4	17.5	34.4
Warhorse	47.4	44.4		55.5	7.5	18.5	34.8
Yellowstone	59.5	49.8	53.0	55.0	7.5	17.3	36.7
Experimental							
MT0871	50.6	51.0		53.5	7.1	18.0	33.7
MTCL1067	58.1	45.1		54.7	7.3	17.5	38.8
MTCL1077	**62.9***			54.0	7.2	17.3	37.3
MTS0819	43.7			54.8	7.3	17.1	33.7
MTS0826	47.7	47.0	52.0	58.8	7.7	18.2	38.6
MTS0832	43.3	42.6	45.1	58.1	7.7	18.0	37.3
Average	50.2	42.2	45.5	55.7	7.4	17.9	36.1
PLSD (p=0.05)	10.4	ns	ns	1.9	0.3	1.4	2.2
CV%	12.6	18.9	16.8	2.0	2.4	4.9	3.7

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13 percent moisture content.
2 Grain protein values adjusted to 12 percent grain moisture content.
ns Indicates no significant difference between cultivars within a column of data based on Fisher's protected LSD (p=0.05).
** 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).

Rapelje Dryland Winter Wheat (Exp. 123881)

Planted:	September 27, 2011
Harvested:	July 27, 2012
Fertility:	11-52-00, 75 lb/a in-furrow at planting; 100 lb/a as 46-0-0 fall.
Herbicide:	n/a
Previous crop:	chemical fallow

Table 4. Performance of 25 commercial and experimental winter wheat cultivars tested under no-till, dryland conditions near Forsyth, Montana during 2012. Cultivars listed alphabetically. (Exp. 123882).

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							
Accipiter	22.0	30.7	39.7	57.2	9.3	16.1	22.8
AP503 CL2	20.1	27.0		60.4	9.3	16.2	21.5
Bearpaw	24.9	35.4	45.6	57.8	9.1	16.9	23.1
CDC Falcon	25.9	29.3	40.3	57.8	9.5	15.8	22.4
Colter	24.9			58.1	9.1	17.5	27.2
Curlew	23.9	33.4	46.4	58.3	9.2	16.5	28.3
Decade	25.5	32.9	49.9	59.3	9.2	17.7	23.2
Genou	23.4	33.9	41.9	57.5	9.2	18.0	26.4
Jagalene	25.7	34.2	47.2	60.3	9.4	15.9	24.8
Jerry	23.1	29.6	39.6	58.0	9.4	16.4	27.3
Judee	21.4	38.7	46.9	58.4	9.2	18.4	24.3
Ledger	23.9	32.2	41.9	57.9	9.3	15.6	24.4
Norris	**27.3***	33.6	42.4	60.1	9.2	15.3	23.9
Overland	23.8			58.3	9.2	17.5	23.2
Pryor	25.0	35.4	46.0	58.3	9.2	16.3	25.3
Rampart	22.3	30.6	38.8	57.5	9.1	17.7	26.5
WB-Quake	24.4	33.4		56.5	8.9	17.8	23.5
Warhorse	23.5	30.0		57.6	9.1	17.8	23.8
Yellowstone	24.6	28.9	41.7	58.0	9.2	17.2	24.9
Experimental							
MT0871	**29.5****	40.0		57.2	9.0	17.2	24.5
MTCL1067	24.3	33.1		58.6	9.4	15.9	26.6
MTCL1077	22.6			58.2	9.1	17.7	26.6
MTS0819	22.8			59.0	9.3	17.0	22.7
MTS0826	26.3	34.5	40.3	59.3	9.4	15.8	24.4
MTS0832	**27.1***	31.4	40.3	59.2	9.5	15.2	24.8
Average	24.3	32.8	43.1	58.3	9.2	16.8	24.7
PLSD (p=0.05)	3.0	ns	ns	1.3	ns	ns	1.9
CV%	7.5	10.2	11.0	1.2	2.3	8.0	4.7

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13 percent moisture content.
2/ Grain protein values adjusted to 12 percent grain moisture content.
ns Indicates no significant difference between cultivars within a column of data based on Fisher's protected LSD (p=0.05).
** 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).

Forsyth Dryland Winter Wheat (Exp. 123882)

Planted:	October 5, 2011
Harvested:	July 30, 2012
Fertility:	100 lbs/a 46-0-0 and 75 lb/a 11-52-00 in-furrow at planting.
Pesticide:	n/a
Previous crop:	chemical fallow,

Table 5. Performance of 25 commercial and experimental winter wheat cultivars tested under no-till, dryland conditions near Hardin, Montana during 2012. Cultivars listed alphabetically. (Exp. 123884).

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							
Accipiter	42.5	72.2	**71.0***	51.2	7.6	19.1	33.3
AP503 CL2	53.5	75.7		54.9	8.1	18.9	30.8
Bearpaw	52.0	71.0	**73.9***	53.1	7.6	19.1	32.0
CDC Falcon	52.4	77.9	**75.9***	51.2	7.7	19.2	33.5
Colter	47.6			52.0	7.3	20.4	34.3
Curlew	49.6	63.2	56.8	49.4	7.2	20.5	38.8
Decade	51.1	79.6	**75.6***	51.2	7.8	19.9	32.8
Genou	43.6	59.2	64.4	53.2	7.6	20.5	38.3
Jagalene	**61.7***	86.0	**77.9***	57.1	8.2	17.8	32.9
Jerry	51.2	72.0	**71.5***	52.7	7.9	19.6	39.1
Judee	44.0	58.3	58.1	50.7	7.9	20.9	32.7
Ledger	54.5	73.6	**70.4***	54.6	7.9	18.3	33.2
Norris	49.8	73.4	66.1	54.7	7.7	18.3	38.7
Overland	**68.8****			54.6	8.1	17.9	35.6
Pryor	53.9	78.0	**80.1****	51.5	7.5	19.6	33.5
Rampart	45.1	61.9	64.7	53.8	7.6	20.0	37.4
WB-Quake	47.8	79.9		52.3	7.6	19.4	32.8
Warhorse	48.7	72.1		50.8	7.6	20.4	32.9
Yellowstone	46.4	76.4	**78.9***	50.7	7.5	19.7	34.6
Experimental							
MT0871	47.6	74.1		49.7	7.2	20.6	31.5
MTCL1067	55.6	84.8		52.6	7.6	19.5	39.0
MTCL1077	52.0			51.2	7.4	19.9	35.7
MTS0819	47.3			50.3	7.6	19.0	30.3
MTS0826	47.4	69.3	**71.0***	55.2	7.9	18.7	37.7
MTS0832	48.8	72.2	**73.7***	54.5	7.9	19.1	34.9
Average	50.5	72.9	70.6	52.5	7.7	19.4	34.7
PLSD (p=0.05)	7.6	ns	13.5	1.5	1.9	0.9	2.2
CV%	9.2	9.5	14.9	1.6	1.9	2.1	3.8

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13 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).
** 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).

Hardin Dryland Winter Wheat (Exp. 123884)

Planted:	September 19, 2011
Harvested:	July 25, 2012
Fertility:	11-52-0, 75 lb/a, at planting; 100 lb N/a as 46-0-0 in fall 2011;
Pesticide:	n/a
Previous crop:	chemical fallow

Table 6. Performance of 25 commercial and experimental winter wheat cultivars tested under conventional, dryland conditions near Molt, Montana during 2012. Cultivars listed alphabetically. (Exp. 123885).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	2012	2011-12	2010-12				
	---------- bushels/acre ----------			lb/bu	%	%	inches
Commercial							
Accipiter	23.8	37.1	49.4	55.1	8.0	15.9	24.4
AP503 CL2	19.3	28.6		58.3	8.3	16.4	23.4
Bearpaw	21.5	37.8	52.1	56.8	8.0	15.7	24.3
CDC Falcon	**25.6***	30.1	44.4	56.7	8.2	15.0	24.3
Colter	**29.7***			57.1	8.3	15.9	27.7
Curlew	20.5	29.0	46.2	56.0	7.9	15.6	27.9
Decade	**31.4***	33.7	49.4	57.2	8.4	15.8	26.4
Genou	18.9	28.5	43.8	54.7	7.9	16.2	28.2
Jagalene	**26.1***	29.7	44.7	59.9	8.4	15.3	24.9
Jerry	23.2	30.7	42.4	53.9	8.0	16.4	26.6
Judee	21.2	36.1	49.0	54.7	8.2	17.4	23.9
Ledger	24.9	35.7	50.3	56.2	8.2	16.2	26.7
Norris	**26.0***	33.5	47.1	57.6	8.0	15.8	25.5
Overland	**30.7***			55.2	8.0	16.2	27.0
Pryor	**26.0***	31.5	45.1	55.6	8.0	15.6	24.5
Rampart	21.5	24.5	39.3	55.4	7.8	16.7	26.0
WB-Quake	24.1	33.1		55.6	7.8	15.5	25.5
Warhorse	24.3	34.6		57.3	8.2	16.1	22.8
Yellowstone	**29.6***	37.1	50.0	56.0	8.2	15.5	27.6
Experimental							
MT0871	**31.7****	40.6		57.2	8.3	15.7	27.7
MTCL1067	24.9	33.6		56.4	8.1	15.3	28.3
MTCL1077	24.9			55.8	8.1	15.3	26.6
MTS0819	24.5			57.0	8.2	15.8	25.6
MTS0826	**28.0***	35.2	47.2	57.5	8.2	16.0	26.5
MTS0832	**28.2***	39.7	49.0	57.1	8.2	15.0	25.8
Average	25.2	33.4	46.8	56.4	8.1	15.8	25.9
PLSD (p=0.05)	6.3	ns	ns	1.8	0.3	1.5	2.7
CV%	14.1	20.5	19.9	1.9	2.3	5.4	5.8

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13 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).
** 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).

Molt Dryland Winter Wheat (Exp. 123885)

Planted:	October 13, 2011
Harvested:	July 27, 2012
Fertility:	11-52-00, 75 lb/a in furrow at planting; 105 lb/a as 46-0-0, April 2, 2012
Herbicide:	n/a
Previous crop:	summer fallow

Table 7. Performance of 25 commercial and experimental winter wheat cultivars tested under no-till, dryland conditions near Fort Smith, Montana during 2012. Cultivars listed alphabetically. (Exp. 123886).

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	2012	2011-12	2010-12				
	---------- bushels/acre ----------			lb/bu	%	%	inches
Commercial							
Accipiter	65.2	74.9		59.6	9.1	14.7	33.2
AP503 CL2	74.3	**80.8***		62.9	9.1	13.8	32.9
Bearpaw	73.6	**84.1***		59.9	9.1	14.6	35.3
CDC Falcon	67.4	74.6		59.7	9.3	14.2	31.1
Colter	69.4			58.2	8.7	15.4	34.6
Curlew	71.2	74.7		60.1	9.0	14.0	39.8
Decade	73.5	**81.3***		58.1	9.1	15.6	34.3
Genou	60.7	68.7		60.3	9.3	15.5	39.8
Jagalene	80.2	**82.6***		62.8	9.3	14.3	36.1
Jerry	62.2	70.7		57.7	9.1	16.1	38.8
Judee	65.5	69.8		59.2	9.1	15.5	32.4
Ledger	65.8	74.9		60.4	9.3	14.3	34.0
Norris	75.8	**84.2***		60.3	8.8	14.9	38.6
Overland	**88.3****			60.2	9.4	14.2	37.9
Pryor	**83.6***	**83.7***		60.6	9.2	13.2	33.2
Rampart	59.8	71.2		59.3	8.9	15.7	39.0
WB-Quake	61.5	76.5		59.6	9.1	14.4	33.9
Warhorse	66.4	77.6		60.4	8.8	15.3	32.5
Yellowstone	74.2	**83.3***		58.8	8.9	14.7	35.3
Experimental							
MT0871	76.0	**80.7***		57.1	8.7	14.1	33.6
MTCL1067	80.3	**89.2****		59.6	8.9	15.2	39.6
MTCL1077	**83.6***			59.3	8.8	14.2	37.4
MTS0819	67.2			59.3	8.7	14.8	32.5
MTS0826	67.5	74.5		60.4	9.0	15.1	37.5
MTS0832	63.5	73.9		60.5	9.0	15.5	37.9
Average	71.1	77.7	--	59.8	9	14.8	35.7
PLSD (p=0.05)	7.7	9.4	--	1.6	0.2	1.3	2.3
CV%	6.2	10.1	--	1.5	1.1	5.0	3.8

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13 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).

Fort Smith Winter Wheat (Exp. 123886)

Planted:	September 19, 2011
Harvested:	July 25, 2012
Fertility:	11-52-00, 75 lb/a at planting; 75 lbs/a N as 46-0-0 on March 31, 2012
Pesticide:	n/a
Previous crop:	fallow

Table 8. Grain yield[1/] of 25 commercial and experimental winter wheat cultivars tested at five locations in south central Montana during 2012. Varieties listed by declining average yield across all locations.

Cultivar	Rapelje No-Till Dryland	Forsyth No-Till Dryland	Hardin No-Till Dryland	Molt No-Till Dryland	Fort Smith No-Till Dryland	Dryland Locations Average	Huntley Min. Till Irrigated	All Locations Average
	----------bushels/acre ----------							
Overland	**73.1****	23.8	**68.8****	**30.7***	**88.3****	**56.7****	120.9	**67.4****
MT0871	50.6	**29.5****	47.6	**31.7****	76.0	47.1	**146.2***	**63.6***
MTCL1077	**62.9***	22.6	52.0	24.9	**83.6***	49.2	**133.0***	**63.1***
Pryor	45.0	25.0	53.9	**26.0***	**83.6***	46.9	**141.0***	**62.6***
Yellowstone	59.5	24.6	46.4	**29.6***	74.2	47.0	**134.9***	**61.7***
AP503 CL2	51.5	20.1	53.5	19.3	74.3	43.8	**149.8****	**61.5***
Jagalene	53.5	25.7	**61.7***	**26.1***	80.2	49.4	121.8	**61.5***
CDC Falcon	52.3	25.9	52.4	**25.6***	67.4	44.5	**143.4***	**61.0***
MTCL1067	58.1	24.3	55.6	24.9	80.3	48.3	124.2	**60.9***
Decade	40.5	25.5	51.1	**31.4***	73.5	44.3	**139.5***	**60.1***
Colter	56.1	24.9	47.6	**29.7***	69.4	45.3	**131.9***	**59.8***
Bearpaw	49.9	24.9	52.0	21.5	73.6	44.4	129.3	58.6
Norris	58.5	**27.3***	49.8	**26.0***	75.8	47.6	105.7	57.2
MTS0819	43.7	22.8	47.3	24.5	67.2	40.9	131.0	55.9
Accipiter	48.9	22.0	42.5	23.8	65.2	40.5	129.9	55.4
Ledger	47.6	23.9	54.5	24.9	65.8	43.5	114.9	55.4
MTS0832	43.3	**27.1***	48.8	**28.2***	63.5	42.3	119.4	55.1
Curlew	47.6	23.9	49.6	20.5	71.2	42.7	116.4	55.0
Judee	43.3	21.4	44.0	21.2	65.5	38.9	131.0	54.2
MTS0826	47.7	26.3	47.4	**28.0***	67.5	43.6	105.5	53.9
WB-Quake	45.5	24.4	47.8	24.1	61.5	40.6	119.6	53.8
Warhorse	47.4	23.5	48.7	24.3	66.4	42.5	108.7	53.5
Jerry	47.3	23.1	51.2	23.2	62.2	41.3	98.7	50.9
Rampart	46.0	22.3	45.1	21.5	59.8	39.1	102.3	49.6
Genou	35.6	23.4	43.6	18.9	60.7	36.7	101.7	47.5
Average	50.2	24.3	50.5	25.2	71.1	44.3	124.0	57.6
PLSD (p=0.05)	10.4	3.0	7.6	6.3	7.7	5.8	17.9	8.1
CV%	12.6	7.5	9.2	14.1	6.2	10.3	8.8	10.6

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).

Table 9. Performance of 25 commercial and experimental winter wheat cultivars tested under dryland and irrigated conditions at six locations in south central Montana during 2012. Cultivars listed alphabetically.

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	2012	2011-12	2010-12				
	---------- lb/bu ----------			lb/bu	%	%	inches
Commercial							
Accipiter	55.4	**59.5***	**62.4***	57.0	8.2	15.9	32.1
AP503 CL2	**61.5***	**59.3***		59.3	8.4	15.8	30.3
Bearpaw	58.6	**60.7***	**65.6***	57.6	8.2	16.1	31.9
CDC Falcon	**61.0***	**60.0***	**61.2***	57.0	8.3	15.5	30.8
Colter	**59.8***			57.6	8.1	16.4	33.8
Curlew	55.0	53.9	57.6	56.5	8.1	16.1	37.0
Decade	**60.1***	**61.4***	**65.2***	57.2	8.3	16.7	32.3
Genou	47.5	50.6	54.6	57.2	8.2	17.3	35.8
Jagalene	**61.5***	**61.6***	**66.0***	60.2	8.6	15.3	32.6
Jerry	50.9	53.8	56.8	56.8	8.3	16.7	36.6
Judee	54.2	54.2	59.3	56.6	8.3	17.3	31.2
Ledger	55.4	57.6	**61.2***	58.2	8.4	15.4	32.3
Norris	57.2	59.0	60.4	58.6	8.1	15.7	35.3
Overland	**67.4****			58.2	8.4	15.6	34.1
Pryor	**62.6***	**61.4***	**63.5***	57.3	8.2	15.5	31.9
Rampart	49.6	50.3	54.4	57.7	8.1	16.9	35.0
WB-Quake	53.8	57.5		57.5	8.1	15.9	32.0
Warhorse	53.5	56.9		57.6	8.2	16.8	31.2
Yellowstone	**61.7***	**62.4***	**66.1****	56.8	8.2	16.0	33.8
Experimental							
MT0871	**63.6***	**65.4****		56.1	8.0	16.3	32.0
MTCL1067	**60.9***	**63.2***		57.2	8.2	16.2	36.3
MTCL1077	**63.1***			56.7	8.1	16.2	34.5
MTS0819	55.9			57.2	8.2	15.9	30.9
MTS0826	53.9	57.0	59.5	59.2	8.5	15.9	34.9
MTS0832	55.1	58.1	60.5	59.0	8.5	15.8	34.0
Average	57.6	58.3	60.9	57.6	8.3	16.1	33.3
LSD (0.05)	8.1	6.1	5.5	1.2	0.2	0.7	1.4
CV %	10.6	11.5	12.6	1.8	2.3	6.7	4.6
Year x Location	6	11	14	6	6	6	6

1/ Yields are based on a 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 commercial and experimental winter wheat cultivars tested under dryland conditions at five locations in south central Montana during 2012. Cultivars listed alphabetically.

Cultivar	1/ Grain Yield			Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	2012	2011-12	2010-12				
	---------- lb/bu ----------			lb/bu	%	%	inches
Commercial							
Accipiter	40.5	**52.5***	**50.3***	55.8	8.2	16.7	29.6
AP503 CL2	43.8	50.3		58.3	8.4	16.5	28.4
Bearpaw	44.4	**53.8***	**55.0****	56.6	8.2	17.0	30.1
CDC Falcon	44.5	51.7	**50.3***	55.8	8.3	16.3	28.7
Colter	45.3			56.2	8.2	17.4	32.2
Curlew	42.7	47.6	47.1	55.3	8.1	16.8	35.1
Decade	44.3	**53.6***	**52.9***	56.2	8.4	17.5	30.2
Genou	36.7	45.5	47.1	56.2	8.2	17.9	34.4
Jagalene	49.4	**55.6***	**52.5***	59.4	8.6	16.1	30.8
Jerry	41.3	49.3	45.2	55.9	8.4	17.3	34.5
Judee	38.9	46.5	**48.7***	55.4	8.3	18.2	29.5
Ledger	43.5	**51.9***	48.3	57.2	8.4	16.2	30.6
Norris	47.6	**54.4***	**49.1***	57.6	8.2	16.5	32.9
Overland	**56.7****			57.4	8.5	16.4	32.0
Pryor	46.9	**53.4***	**54.7***	56.3	8.3	16.6	30.2
Rampart	39.1	45.1	44.3	56.7	8.2	17.7	33.3
WB-Quake	40.6	51.3		56.4	8.1	16.9	30.1
Warhorse	42.5	51.7		56.4	8.3	17.6	29.5
Yellowstone	47.0	**55.1***	**52.6***	55.7	8.3	16.9	32.0
Experimental							
MT0871	47.1	**57.3****		54.9	8.0	17.2	30.3
MTCL1067	48.3	**57.2***		56.3	8.3	16.7	34.3
MTCL1077	49.2			55.6	8.1	16.9	32.6
MTS0819	40.9			56.1	8.2	16.7	29.0
MTS0826	43.6	**52.1***	**51.2***	58.1	8.4	16.8	33.0
MTS0832	42.3	**51.9***	**49.4***	57.9	8.5	16.5	32.2
Average	44.3	51.8	49.9	56.6	8.3	16.9	31.4
LSD (0.05)	5.8	5.4	6.3	1.4	0.2	0.8	1.5
CV %	10.3	12.0	18.8	1.9	2.1	5.6	4.5
Year x Location	6	10	13	6	6	6	6

1/ Yields are based on a 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).