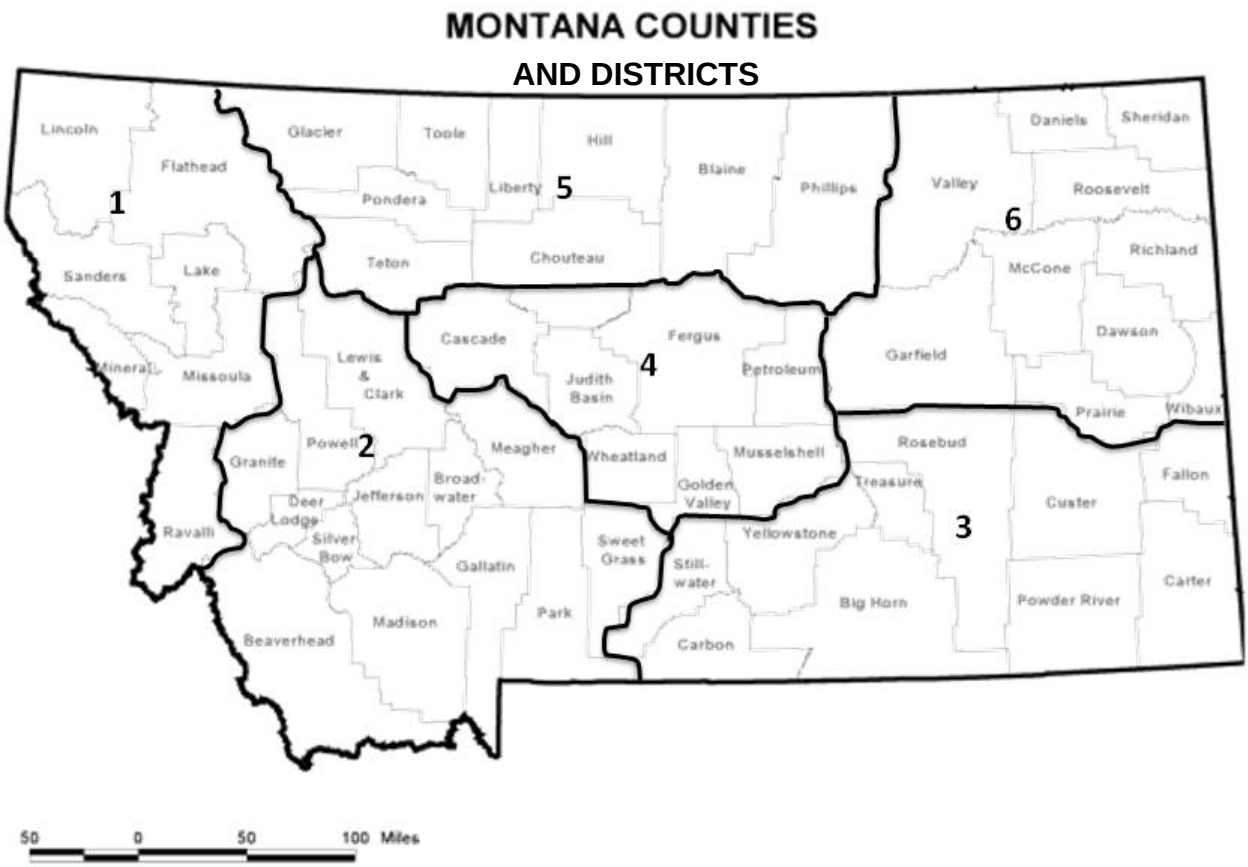
2011
WINTER WHEAT VARIETIES

Performance Evaluation and Recommendations

Recommendations are made for the districts shown on the map below



by the Montana State University
Agricultural Experiment Station
The information in this publication can also be found at a link on:
http://plantsciences.montana.edu/crops
Another variety selection tool is available at :
http://www.sarc.montana.edu/php/varieties.html

2B-1093 Revised February 2011

2011 Recommended Varieties: Hard Winter Wheat and Soft White Winter Wheat for Montana by District

Variety	Districts (see map on cover)					
	1	2	3	4	5	6
	Northwest	Southwest	Southeast	Central	North Central	Northeast
Hard Red and Hard White Winter Wheat						
Bynum (P) [2/] +				D	D	
Carter (P)+		D	D	D	D	D
CDC Falcon (P)+		DI	DI	DI	DI	DI
Decade ++			D	D	D	D
Genou +[2/]			D	D	D	
Hyalite (HWW, P)+		D	D	D	D	
Jagalene (P)+	D	D	D	D	D	
Jerry						D
Ledger (P)+		D		D	D	
Morgan (P)+		D	D	D	D	D
Neeley		D	D	D	D	
Norris (P)+		D	D	D		
Promontory [1/]	D	D	DI	D		
Pryor (P)+		D	D	D	D	D
Rampart [2/]			D	D	D	
Rocky (P)			D	D	D	
Wahoo +			D	D		
Yellowstone +	D	D	D	D	D	
Soft White Winter Wheat						
Eltan	D	D				
Hill 81	D	D				
Lewjain	D					
Malcolm	D	D				

HWW = Hard White Winter Wheat
D = Dryland
I = Irrigated
(P) = a Private Variety
+ = a "Protected" variety under the Plant Variety Protection Act
++ = PVP Title V pending
[1/] = dwarf smut resistant
[2/] = sawfly areas only

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WINTER WHEAT VARIETY PERFORMANCE SUMMARY IN MONTANA

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Introduction

The agronomic characteristics of winter wheat varieties recently developed or evaluated by the Montana Agricultural Experiment Station are compared in this publication with other varieties grown in the state. Varieties recommended for production in the respective districts of Montana are designated by an **R**. A brief description of each variety is given which may include a variety's particular advantages or disadvantages. The information was extracted from the Intrastate Winter Wheat Nursery and the Soft White Winter Wheat Nursery Reports. These reports are prepared by research personnel of the Montana Agricultural Experiment Station. Where available, up to four years of yield data are shown for the varieties. In some years data are not available because of hail, frost, or other unavoidable causes.

Variety Testing Procedures

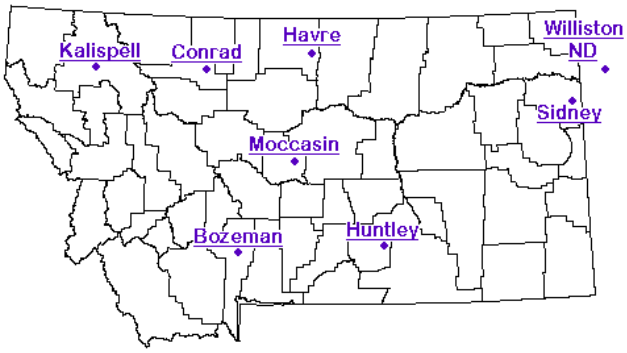

Fig. 1. Test Locations for Montana winter wheat performance tests in 2010.

Locations

Hard winter wheats were planted at 7 Montana and 1 North Dakota location (Fig. 1) including Conrad and Havre in the North Central district, Moccasin in the Central district, Huntley in the Southern district, Sidney and Williston, ND representing the Northeast district, Kalispell in the Northwest and Bozeman in the Southwest districts of the state. A separate test comparing soft white winter wheat varieties was planted at Bozeman.

Entries

Names of commercially available entries evaluated in 2009 are listed with their origins, experimental designation, release year, and pedigrees in Table 2 for the hard winter wheats and in Table 15 for the soft white wheats. Forty-nine hard wheats are included in this summary comprising 32 varieties (17 public and 15 private) and 17 experimental lines (15 public and 2 private). Numbered entries preceded by a state designation [e.g. MT06103 (Montana), MTS0808 (Montana)] are experimental lines provided by the breeder of the originating state. Private experimental lines [e.g. BZ9W05-2039 (WestBred)] are submitted for testing on a fee basis. The soft white evaluation contains 14 varieties [11 public, 2 private, and one hard wheat check (Neeley).]

Experimental Design and Seeding Methods

The Intrastate Winter Wheat Test consisted of a 49 entry test with 3 replicates. It was planted in the form of 7x7 lattice at all. Plot size varied by location, from 35 ft^2 at Conrad to 60 ft^2 at Havre. Row number varies: Bozeman and Havre are 3-row,Conrad, Huntley, and Sidney are 4-row, Moccasin (5-row), Kalispell (7-row), and Williston (8-row) Row spacing at all locations was on 1 ft. centers, except at Williston and Kalispell (6" centers). All plots were seeded at 0.6 grams seeds/ft^2, which is roughly equivalent to 1 bushel per acre, except at Williston where the seeding rate was about 77 pounds per acre. Information on previous crop, planting date, fertilizer use and harvest date is available in Table 1.

A soft white winter wheat nursery was planted similar to the hard wheat test, except the test was planted in a randomized complete block design.

All seed for each nursery was treated with Dividend-XL seed treatment at recommended rates before planting.

Table 1. Summary of agronomic practices used on hard winter wheat performance trials in Montana in 2009. Fall nitrogen (N), phosphorus (P_20_5) and potassium (K_2O) were preplant applied and incorporated.

Location	2009 Crop	2008 Crop	2009 Planting Date	Fertilizer N Fall	Fertilizer N Spring	Fertilizer P_2O_5	Fertilizer K_2O	2010 Harvest Date
				--------- Pounds per acre ---------				
Kalispell	**fallow**	**barley**	**Sep 24**	**30**	**70**	**30**	**60**	**Aug 25**
Bozeman	**fallow**	**spring wheat**	**Sep 29**	**130**	**-**	**0**	**0**	**Hail out**
Huntley	**chem. fallow**	**fallow**	**Sep 28**	**80**	**-**	**30**	**0**	**Aug 2**
Moccasin	**chem. fallow**	**barley**	**Oct 17**	**10**	**60**	**10**	**10**	**Aug 12**
Conrad	**fallow**	**barley**	**Sep 18**	**132**	**-**	**20**	**20**	**Sep 4**
Havre	**fallow**	**spring wheat**	**Sep 17**	**70**	**-**	**40**	**25**	**Aug 7**
Sidney	**fallow**	**safflower**	**Sep 24**	**0**	**-**	**0**	**0**	**Aug 3**
Williston, ND	**fallow**	**safflower**	**Sep 29**	**28**	**-**	**21**	**0**	**winterkill**

Description of Data Collected

Yield

All rows of each plot were trimmed and measured and harvested using an experimental plot combine. Grain yields are reported in bushels per acre based on a 60 pound standard bushel weight. In addition to yields obtained in 2010, data is provided for two (2009-2010), three (2008-2010) and four (2007-2010) year averages for both hard and soft wheat entries tested during previous cropping seasons.

Test Weight

Test weight (pounds per bushel) were obtained for each plot by using Dickey-John Grain Analysis Computer (GAC) at some locations. Other locations use a Seedburo test weight apparatus. In this case, a sample is dropped through a funnel at a given height into a quart brass bucket, excess grain is removed by a flat stick then weighed on a gram scale, and grams per quart are converted into pounds per bushels.

Heading Date

Heading date is taken when 50% of the heads in a plot were extended above the flag leaf collar. Heading dates are recorded both in ordinal date (number of days from January 1) and the actual calendar date.

Plant Height

Plant height was measured in inches from the soil surface to the top of the head, excluding the awns.

Grain Protein

Grain protein is sampled from a composite of all 3 replicated plots at each location. It is determined as a % by NIR (near infrared reflectance) on the Infratec whole grain analyzer. Samples are adjusted to a 12% moisture basis.

Winter Survival

Percent winter survival is estimated for each plot after initial spring green-up at locations where significant winter injury occurred. In 2010, Williston had extreme winter kill and the test was abandoned.

Table 11 contains information on % winter survival and associated yield in winter-kill environments from 2003 to 2010. The data summarizes 14 tests in which significant winter-kill occurred (test average for winter survival was less than 90%). Twelve testing sites with winter-kill were in District 6 (Sidney and Williston) which is the most severe location for winter wheat survival of our testing locations.

Wheat Stem Sawfly

Wheat stem sawfly (WSS) is a persistent and economic problem for wheat growers in Montana. Currently, Montana wheat acreage infested by WSS is primarily in the north central (District 5), central (District 4) and south central (District 3) cropping districts. Host plant resistance in the form of stem solidness has been effective in reducing sawfly losses in both spring and winter wheat.

Solid-stemmed winter wheats, 'Vanguard' (dropped from testing in 2009) and 'Rampart' were released in 1995 and 1996, respectively. These 2 varieties were planted on 8% of the winter wheat acreage in the 2010 crop year (Rampart was the leading variety planted in the 2003 to 2006 crop years). Both these varieties have marginal winter hardiness. 'Genou', released in 2004, has been the leading variety the past four years. In 2010, Genou was planted on 30% of the winter wheat acreage. Genou has better winter hardiness and yield than Rampart or Vanguard.

Table 12 contains information on yield and % sawfly cutting at 13 testing locations where sawfly pressure was present during the years 2003-2010. The data is from Havre, North Havre (a site 25 miles north of Havre), and Loma (15 miles northeast of Ft. Benton). Solidness scores (rated on a 5-25 scale are shown for solid and semi-solid varieties in Table 14.

Coleoptile Length

Coleoptile length evaluation was performed in Bozeman under controlled (growth chamber) conditions. Twenty-five seeds per variety were planted in wetted vermiculite. After 15 days the coleoptile (sheath covering the emerging shoot that helps penetration to the soil surface) was measured. This test was replicated 3 times for each variety. Results from previous years are reported in Table 14. Long coleoptiles are generally longer than 4 inches, medium from 2.7-4 in, and short are under 2.7 in. Care should be taken not to plant short coleoptile varieties too deep.

Other Agronomic Characters

Table 14 contains information on grain maturity, chaff color, relative winter survival and straw strength for the hard wheat varieties listed in this publication. Table 18 has information on maturity, winter survival and lodging for soft white winter wheats.

Cereal Quality

Milling and baking characteristics for varieties are presented in Table 14. They are rated for each variety on a 1-5 scale (5 = superior). A quantitative polyphenol oxidase (PPO) has been determined for varieties since the 2006 mill and bake evaluation. These varieties are reported in Table 14 as low to high. A lower value is associated with better Asian noodle quality.

Disease Reactions

Disease reactions for hard red wheat varieties are listed in Table 14. There is information on dwarf smut, stripe rust, stem rust and general leaf spot complex. Table 18, for soft white winter wheat, contains information on dwarf smut, snow mold, stem rust and stripe rust.

Statistical Analyses and Interpretation

The data collected at each winter wheat location was analyzed as a three-replication lattice or randomized complete block design. Least significant difference at the 0.05 probability level (LSD, p = 0.05) and coefficients of variation (CV) were calculated from analysis of variance at each location. The LSD is used to compare the performance of two specific varieties at a time. If the difference between two varieties exceeds the LSD this is interpreted as a true difference, because a difference between two varieties this large will only occur 5% of the time due to chance.

Tables 3 through 10 show 2010 data for hard winter wheat collected at all harvested experiment station sites. Table 17 contains 2009 data for the soft white wheats (2010 test, at Bozeman, not harvested due to hail). Where a variety has been in the test for two, three or four years, combined analyses of the yield data over years are presented.

Variety selection should be based on yield stability at a particular location over a period of years. Selection should also consider test weight, winter-hardiness, heading date, plant height, protein and disease resistance.

2010 Test Conditions

Statewide winter wheat yields were record breaking and projected by the Montana Agricultural Statistics Service at 48 bu/a for 2010 compared to 37 bu/a for the 2009 harvest year. The harvested acreage in 2010 was 1.95 million acres (total production = 93.6 million bu) compared to 2.42 million acres in 2009 (89.5 million bu). Rainfall for the 2009-2010 winter

crop year was above average at all locations tested (Table 13). Test weight averaged 60.7 lb/bu across all locations Sidney (59.4) and Conrad (59.7) were below 60 lb/bu.

Winterkill at Sidney (50% survival across varieties, range 23-78%) reduced yields of susceptible varieties. As previously mentioned, severe winterkill destroyed the nursery at Williston. The test at Bozeman was not harvested due to golf ball size hail on June 30.

Stripe rust at Kalispell was a factor in yield reduction for highly susceptible varieties (Decade, Norris, Pryor, and Rocky), even though the yield average at this location was 142 bu/a. There was sawfly cutting at the Havre Experiment Station averaging 12% of stems cut across varieties (range = 0 – 36%).

Protein content averaged 11.9% across all locations (location range = 10.7 – 12.9%) tested. Havre, Sidney, and Moccasin were below 12%. The range of genotype means across all locations was 11.0 (Accipiter) – 13.1 (Bynum) %.

Leading winter wheat varieties planted for 2010 were Genou (29.9%), Yellowstone (18.0%), Rampart (7.0%), CDC Falcon (6.8%), Jagalene (4.9%), and Ledger (4.2%).

Dwarf Smut (TCK)

Dwarf smut (TCK) can be controlled with 'Dividend' seed treatment (see page 5). Dwarf smut or dwarf bunt (*Tilletia controversa* Kuhn) is a fungal disease that occurs in areas where winter wheat is subjected to prolonged snow cover or unfrozen ground. The planting of dwarf smut resistant varieties (Promontory and Lewjain are currently recommended) as one practical means of control.
The amount of wheat lost each year because of dwarf smut is small in relation to the state's total crop, but individual operators may experience severe losses in heavily infested, localized areas.

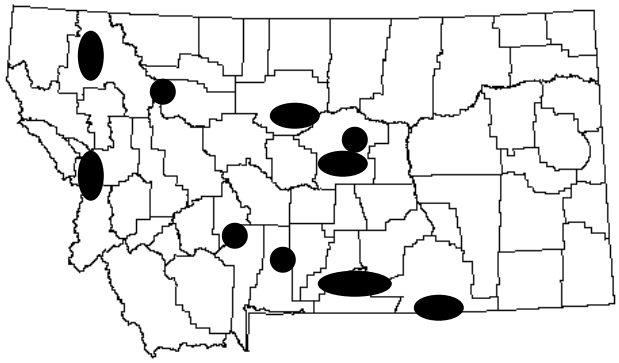

Fig. 2. Known areas of dwarf smut (TCK) infestations.

If you farm in the vicinity of one of the shaded areas in the map (Figure 2.), you would be well advised to observe closely your winter wheat crop and consider planting a resistant variety (Tables 14 and 18) or use 'Dividend' seed treatment, only.

What Recommendation by MAES Means

Classification of winter wheat varieties is determined on a yearly basis by the Montana Agricultural Experiment Station (MAES) Wheat Variety Release Committee. This 16 member committee is composed of one wheat breeder, one cereal or forage quality scientist, one plant pathologist, one entomologist, one weed scientist, one cropping systems specialist, six Research Center agronomists, one manager from both the Montana Foundation Seed program and the Montana Seed Growers Association, one Montana Wheat and Barley Committee member and one representative of the Montana Agricultural Experiment Station Advisory Board.

A variety is eligible for recommendation when a minimum of 16 location-years of performance data is obtained from the Montana State University statewide winter wheat performance trials. Test results indicate that the variety is equal to or superior in overall merit to specified check cultivars and has end-use quality equal to or exceeding currently recommended varieties. For varieties originating from private companies, recommendation is considered only at the request of the company when adequate data is available.

Recommendations of varieties are considered on a case by case basis. Yield performance of a variety is an important criteria, but also considered are test weight, grain protein content, winter survival, pest resistance and end-use quality data. In general,

yield needs to be at least equal to currently recommended varieties in a particular district, unless the variety is being recommended for a specific purpose, e.g. winter hardiness, sawfly resistance. For example, Rampart, which is not competitive in the absence of wheat stem sawfly, is recommended in Districts 3, 4 and 5 for sawfly areas only. Only six varieties are recommended for the Northeast district due to severe winter conditions and a higher probability of stem rust in this region. Thus varieties recommended for District 6 must have higher winter survival and stem rust resistance.

If a serious defect in the variety is identified during performance testing, the variety will not be recommended. Examples of defects resulting in non-recommendation include: high probability of winter-kill, low grain protein, low baking quality, etc.

Lack of variety recommendation by MAES may occur due to a decision by the originating company not to test the variety in statewide performance trials. In this case the lack of recommendation is due to inadequate or no data rather than a specific varietal defect.

Montana produces primarily hard red winter and hard red spring wheats. Continuous improvement of the milling and/or baking quality of Montana grown winter wheat is one of many objectives of the Montana Agricultural Experiment Station breeding and cultivar development program. All varieties recommended by the Montana Agricultural Experiment Station have been evaluated and found to be acceptable for milling and baking performance by the Cereal Quality Laboratory at Montana State University.

The quality of Montana recommended varieties, if grown and marketed within their respective classes, is acceptable by domestic users. Montana's future as a hard red and hard white winter wheat producing state for both the domestic and export markets rests on the quality of the product.

Producing Winter Wheat

Plant **CERTIFIED CLASS SEED** of varieties **RECOMMENDED** by the Montana Agricultural Experiment Station.

Seed Treatment

Treat all winter wheat seed with a recommended fungicide to reduce losses caused by cereal smut or other seed-borne diseases. Several non-mercurial compounds are registered for grain seed treatment.

Dwarf smut (bunt) can be controlled with difenoconazole. Dividend® contains this compound and is available in Montana. If you farm in a dwarf smut area contact your seed dealer or chemical representative for more information about this seed treatment. See page 4 for known areas of dwarf smut infestations.

Diseases are best controlled when all seeds are coated with a seed treatment. Do not over-treat--Follow recommendation of manufacturer of product as to rate.

Truck-mounted seed treaters, which apply the fungicide as the seed is augered into the drill box, do a good job of treating if operated according to manufacturer's specifications.

Drill box treatments are not effective for general use.

When using any pesticide materials, read the information on the label as to rate of application, specific uses, methods of handling, precautions, etc.

Seeding Rate and Date

The following rates and dates for seeding are general (Figure 3). The heavier seeding rate, where indicated, is applicable to plump seed of high test weight (above 60 lbs/bu) or for seed having a kernel size larger than normal for most other varieties. The lighter rates are for the smaller seeded varieties or when test weight is below normal for larger seeded varieties. Seeding rates may be lower if adequate nitrogen and phosphorus amounts are applied at planting.

Winter wheat seed lots may vary in the number of seeds per pound depending on the ratio of large-to-small seeds in a seed lot. The average is approximately 15,000 seeds per pound. A precise count of the number of seeds per pound should be made on your seed lot to help calibrate your drill. You can also calculate how many pounds of seed you will need to plant an acre.

Figure 3. Seeding rate and date for winter wheat

Districts	Dryland	Irrigated	Date of Seeding
5,6 1,2,3,4	30-60 30-60 (10-20 seeds/sq. ft.)	60-75 60-75 (20-25 seeds/sq. ft.)	Sept. 1-15 Sept. 10-25

As to seeding date -- DO NOT SEED TOO EARLY in areas where root rot diseases are prevalent. In areas where *Cephalosporium* stripe, wheat streak mosaic virus or other root rot diseases have caused losses, delay seeding until the soil temperature in the seed zone will stay below 55°F except for brief periods during the day. In the southern half of Montana, this is usually September 10 to 20. In Districts 5 and 6, seed between September 1 and 15. Cooler soil temperatures slow root development and reduce the probability of winter root injury and invasion by soil-borne organisms. To reduce the incidence of root and foot rots, plant winter wheat on land previously seeded to other crops such as barley, oats or spring wheat. Extreme seeding delay, however, reduces seedling vigor and increases chances of winter-kill.

Seeding Depth

Set the drill to place the seed 1 to 2 inches below the soil surface. Deeper seeding reduces tillering and lowers crop yields. With the furrow drills, wind-driven soil particles settle in the furrows covering the seed deeper than desired.

Yield in Winter Wheat as Influenced by Percent Stand

During periods of winter injury farmers are frequently faced with a decision as to whether or not a field should be torn up and re-seeded. A 40 to 50 percent winter wheat stand, if general over field, may produce as much as re-seeded spring wheat. Thinner stands will likely demand more attention for weed control.

The guidelines for evaluating winter wheat stands are to determine the average number of healthy plants per square yard. We suggest making a square frame out of 3/8 inch rod. Walk the field in a zigzag pattern counting at ten random locations.

Fields that have 80 or more plants per square yard will probably produce more than if replanted to spring wheat (information taken from 1995 Master's Thesis, "Critical Overwintering Plant Population for Successful Winter Wheat Production in Montana" by Doug Holen).

Table 2. List of public and private hard winter wheat varieties.

Variety	Experimental Designation	Origin	Release Year	Pedigree
Public Varieties				
Accipiter	**DH00-18-196**	Saskatchewan	**2008**	CDC Raptor/CDC Falcon
Bearpaw	**MTS0721**	Montana	**2011**	selection from a composite of 5 crosses: 99X96, DMS/Rampart// Pronghorn/3/2*Rampart; 99X97, DMS/Rampart//Pronghorn/3/ Rampart/4/(MTW9806, Redwin/Rio Blanco//NuWest) ; 99X98, DMS/Rampart//Pronghorn/3/Rampart/4/NuPlains; 99X99, DMS/Rampart//Pronghorn/3/Rampart/4/(MT9513, NuWest/5/(TAM W-103/Froid/4/Yogo//Turkey Red/3/Centurk, MT8030)); and 99X100, DMS/Rampart//Pronghorn/3/Rampart/6/(MT98113, Judith/5/ (MT8764, Crest/(VT1230, French male sterile line)/4/((PI178383/ Cheyenne//3*Tendoy, ID5011)/3/(ID5006, Norin 10/Staring// 2*Cheyenne), ID745101)))
Broadview	**LE1911**	Alberta	**2009**	KS92WGRC15/CDC Kestrel//CDC Falcon
Curlew	**UT9325-55**	Utah	**2009**	Golden Spike sib/3/Manning/R-82-1859//Weston
Decade	**MT0552**	Montana, North Dakota	**2010**	selection from a composite of 3 crosses:((Sumner sib, KS831936-3, (Plainsman V/Odesskaya 51)//(NE86501, Colt/Cody), N95L159, Wesley sib)/3/ CDC Clair, N95L159//(MT9602, NuWest/Tiber) and N95L159/4/ (MT9609, Froid/SD1287// Redwin/3/NuWest)
Genou	**MTS0031**	Montana	**2004**	(Lew/Tiber//Redwin, MTS92015)/3/Vanguard/ Norstar
Jerry	**ND9257**	North Dakota	**2001**	Roughrider//(ND7571, Winoka/NB66425)/3/ Arapahoe
Judee	**MTS0713**	Montana	**2011**	(Vanguard/Norstar//Judith dwf, 93X312E14)/3/ NuHorizon
Neeley	**IDO158**	Idaho	**1980**	Heglar/3/Norin 10/Staring//2*Cheyenne
Overland	**NE01643**	Nebraska, South Dakota	**2007**	(Millenium sib, NE94482)//(ND8974, Seward/ Archer)
Peregrine	**DH99-37-100**	Saskatchewan	**2008**	McClintock/S86-808
Promontory	**UT1567-51**	Utah	**1990**	Manning/Bezostaya-1
Rampart	**MTS92042**	Montana	**1996**	Lew/Tiber//Redwin
Robidoux	**NI04421**	Nebraska	**2010**	(Odesskaya polukarlikovaya/Cody//Pavon/ 3*Scout 66, NE96644)/3/Wahoo sib
Settler CL	**NH03614**	Nebraska, South Dakota, Wyoming	**2008**	(Wesley sib, N95L159)/3/Millenium sib//(Above sib, TXGH125888-120*4/FS2) [CLEARFIELD]
Wahoo	**NE94654**	Nebraska, Wyoming	**2000**	Arapahoe*2/Abilene
Yellowstone	**MT00159**	Montana	**2005**	F2 composite of Promontory/Judith and Judith-dwarf/Promontory
Private Varieties				
AP503 CL2	**CL03040-5-2**	AgriPro	**2007**	iW98-362A1 (Als3-653)/AP502 CL (Als1-653) [CLEARFIELD] (Note: W98-362 = Jagalene)
Art	**98x0338-13**	AgriPro, Syngenta	**2007**	Jagger/4/(W94-244-132, (TAM 200/ Mesa sib, WI89-088)/3/(WI88-052, (C78-244/Archer, 82F2042#2)// Mesa sib))
Boomer	**CA9W07-819**	WestBred (Monsanto)	**2009**	CDC Falcon/Jerry
Bynum (CL)	**MTCL0318**	WestBred LLC, Montana	**2005**	Rampart/FS2//CDC Kestrel, FS2 = mutagenized Fidel
Carter	**BZ9W02-2060**	WestBred LLC	**2006**	Jagger/Rampart
CDC Falcon	**S94-4**	WestBred LLC Saskatchewan	**1999**	Norstar*2/Vona//Abilene
Hyalite (CL, HWW)	**MTCL0306**	WestBred LLC, Montana	**2005**	composite of crosses consisting of 98X78 ((Norwin//Froid/ SD1287 /3/NuWest, MTW9727)/4/FS2/5/NuWest), 98X88 (Redwin/Rio Blanco//NuWest, MTW9722) /3/NuWest// (TX12588-120, TAM 110 sib)*4/ FS2), 98X93 (NuSky//TAM 110*4/FS2/3/(N95S004, KS87809-10/Arapahoe)
Jagalene	**W98-362**	AgriPro Seeds	**2002**	Jagger/Abilene
Ledger	**BZ9W96-788-d**	WestBred LLC	**2004**	(Hatten/SS-14, BZ9W92-709)/3/(MTSF1142, Lew/Tiber//Redwin)
Norris (CL)	**MTCL0316 (IMI)**	WestBred LLC, Montana	**2005**	Big Sky//(TXGH 12588-26, TAM-110 sib)*4/FS2
Pryor	**BZ9W96-919**	WestBred LLC	**2002**	Hatten/Abilene
Radiant	**W337**	Alberta, Meridian Seeds	**2002**	Norstar*6/Cmc1//Norwin/UT125512, WSMV resistant
Rocky	**NA 1316**	AgriPro	**1978**	Centurk pure line selection
Striker	**CA9W07-818**	WestBred LLC (Monsanto)	**2009**	CDC Falcon/Jerry
WB-Matlock	**CA9W07-817**	WestBred LLC (Monsanto)	**2010**	CDC Falcon/Jerry

Table 3. HARD WINTER : District 1-- Kalispell - Dryland (High Rainfall)

Cultivar/Line	Grain Yield (bushels/acre)				2010 Data					
					Test	Heading Date		Plant	Stripe	Protein
	2010	2009-2010	2008-2010	2007-2010	weight	Ordinal	Calendar	height	rust	
		2 yr	3 yr	4 yr	lb/bu	from Jan1		in	%	%
Accipiter	138.1	114.6	**123.9***		61.3	168.4	17-Jun	43.0	11	11.7
AP503 CL2 (P, CL)+	144.4	112.6	114.0		62.7	164.2	13-Jun	39.3	1	12.5
Art (P)+	145.8				61.8	159.9	9-Jun	39.3	10	12.0
Boomer (P)++	128.2				59.9	165.9	15-Jun	40.9	23	11.7
Broadview	132.6				61.1	164.8	14-Jun	41.3	33	11.6
Bynum (P, CL)+	136.9	104.0	107.7	101.2	61.8	163.3	12-Jun	44.8	5	14.2
BZ9W05-2039 (P)	133.4				61.5	161.8	11-Jun	41.6	46	12.6
BZ9W05-2043 (P)	**161.8***				62.3	166.3	15-Jun	41.4	4	12.1
Carter (P)+	135.5	109.3	115.0	111.0	61.1	164.8	14-Jun	36.7	13	11.9
CDC Falcon (P)	139.5	115.3	**123.1***	**118.4***	61.9	164.8	14-Jun	39.6	4	11.6
Curlew [1/]	**158.4***	129.8			61.7	164.2	13-Jun	45.5	0	12.5
Decade ++	127.7	107.8	117.9	112.5	58.9	162.0	11-Jun	39.9	74	12.1
Genou +	139.5	109.6	115.4	108.3	62.7	165.7	15-Jun	43.9	30	12.5
Hyalite (P, CL, HWW)+	143.3	114.9	**121.5***	113.0	63.1	163.1	12-Jun	42.8	8	12.3
R **Jagalene (P)+**	**153.4***	125.0	**131.8***	**124.2***	63.1	162.5	12-Jun	40.2	20	12.4
Jerry	116.7	101.2	102.7	99.2	61.0	166.9	16-Jun	47.6	40	11.9
Ledger (P)+	139.8	114.0	**122.2***	**116.4***	61.6	163.1	12-Jun	40.9	23	11.4
MT06103	**149.1***	119.5	**126.6***		63.3	162.5	12-Jun	41.4	1	13.5
MT0861	**161.1***	125.5			63.1	164.6	14-Jun	43.3	0	12.7
MT0866	136.5				**64.3****	165.4	14-Jun	43.8	14	12.7
MT0871	**162.4****				61.8	165.6	15-Jun	42.5	6	12.1
MT0890	**161.1***				62.3	164.9	14-Jun	42.4	1	12.6
MTS04114 (HWW)	145.8				62.4	163.8	13-Jun	40.2	3	12.8
MTS04114L	141.9				62.5	165.2	14-Jun	42.0	1	13.0
MTS0532 (HWW)	133.1	108.9	**119.7***	**114.7***	61.6	165.1	14-Jun	40.7	4	12.6
MTS0532L	142.5				62.3	164.3	13-Jun	39.0	2	12.7
MTS0705	133.4	108.4	108.8		62.3	168.5	18-Jun	44.1	8	13.2
MTS0713++	**147.8***	116.0	**126.0***		62.6	164.7	14-Jun	39.0	3	12.7
MTS0721++	**151.3***	114.3			62.3	164.9	14-Jun	40.6	11	12.5
MTS0808	**153.1***				62.3	166.0	15-Jun	41.8	0	12.6
MTS0819	**155.0***				62.2	163.1	12-Jun	37.6	1	12.5
MTS0826	145.3				61.5	169.3	18-Jun	45.2	5	13.2
MTS0827	146.8				61.8	169.7	19-Jun	44.0	13	12.8
MTS0832	129.4				59.8	169.5	19-Jun	45.3	67	11.2
Neeley	127.7	110.8	113.7	106.5	61.4	166.1	15-Jun	46.3	36	11.3
Norris (P, CL)+	138.0	112.7	116.1	109.1	**63.7***	162.6	12-Jun	45.0	65	12.3
Overland +	143.9	115.1			62.0	162.8	12-Jun	42.7	35	12.2
Peregrine	**155.1***	123.6	**124.6***		62.9	165.3	14-Jun	51.9	4	12.0
R **Promontory** [1/]	**155.7***	119.0	**126.7***	**120.6***	**63.7***	163.9	13-Jun	39.9	1	11.4
Pryor (P)+	113.2	102.2	115.9	109.0	57.2	165.5	15-Jun	39.6	67	12.4
Radiant (P)	146.6	113.0			61.9	166.4	15-Jun	44.0	2	11.8
Rampart	135.2	106.3	105.0	99.1	62.0	164.2	13-Jun	45.1	6	13.9
Robidoux (NI04421)	**150.2***	118.9			62.2	160.4	9-Jun	42.7	0	11.8
Rocky (P)	140.5	114.9	110.9	106.9	62.4	162.9	12-Jun	46.3	62	11.7
Settler CL (CL)+	**148.1***	117.4			63.0	161.5	11-Jun	39.3	29	12.2
Striker (P)++	119.2				61.3	165.4	14-Jun	37.9	43	11.9
Wahoo +	135.2	111.1	118.3	113.8	59.9	161.2	10-Jun	40.6	33	11.7
WB Matlock (P)++	129.0				61.8	166.8	16-Jun	43.8	46	12.0
R **Yellowstone +**	**162.2***	130.9	**134.2****	**126.3****	61.2	166.3	15-Jun	41.4	2	11.7
Average	**142.3**	**114.4**	**118.4**	**111.7**	**61.9**	**164.7**	**14-Jun**	**42.2**	**18.7**	**12.3**
LSD (0.05)	**14.8**	**ns**	**15.5**	**12.1**	**0.9**	**1.5**		**2.3**	**16.3**	
C.V.	**6.2**	**7.4**	**8.0**	**7.6**	**0.8**	**0.5**		**3.1**	**52.0**	

** = indicates highest yielding variety within a column CL = CLEARFIELD wheat tolerant to imidazolinone (IMI) herbicides

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

R = Recommended Variety; (P) = Private Variety; + = Protected Variety; ++ = PVP Pending

[1/] = Dwarf Smut Resistant; (HWW) = Hard White Winter Wheat

Table 4. HARD WINTER : District 2-- Bozeman - Dryland (Moderate Rainfall)

***** No harvest in 2008 and 2010 due to severe hail *****

Cultivar/Line	Grain Yield (bushels/acre)				2009 and 2010[2/] Data						
					Test	Heading Date[2/]		Hail	Plant	Stripe	Protein
	2010	2009	2008	2007//2010	weight	Ordinal	Calendar	damage[2/]	height[2/]	rust	
				2 yr	lb/bu	from Jan1		%	in	%	%
Accipiter		90.9			62.8	179.0	28-Jun	37	38.2	7	12.0
AP503 CL2 (P, CL)+		89.5			**64.1***	175.7	25-Jun	27	34.0	1	13.2
Art (P)+						174.7	24-Jun	28	36.0		
Boomer (P)++						178.0	27-Jun	12	38.5		
Broadview						175.7	25-Jun	27	37.3		
Bynum (P, CL)+		79.7		89.1	62.1	175.7	25-Jun	23	42.4	2	15.0
BZ9W05-2039 (P)						177.3	26-Jun	12	38.4		
BZ9W05-2043 (P)						179.0	28-Jun	8	38.8		
R Carter (P)+		106.2		**106.4***	61.0	176.3	25-Jun	7	34.9	29	12.7
R CDC Falcon (P)		87.4		99.5	62.6	176.7	26-Jun	25	35.5	5	13.0
Curlew [1/]		103.7			63.2	177.7	27-Jun	28	40.3	1	12.9
Decade ++		96.2		**104.6***	62.6	176.3	25-Jun	17	36.0	3	13.8
Genou +		96.7		96.7	62.7	179.0	28-Jun	15	41.9	5	13.3
R Hyalite (P, CL, HWW)+		86.4		94.9	62.6	177.0	26-Jun	20	39.7	14	13.6
R Jagalene (P)+		88.9		101.0	**63.9***	175.3	24-Jun	35	35.8	6	13.6
Jerry		92.6		**102.4***	61.9	178.7	28-Jun	35	43.9	4	14.1
R Ledger (P)+		90.8		99.6	62.7	176.0	25-Jun	20	36.8	11	12.9
MT06103		92.3			63.5	176.3	25-Jun	38	39.3	0	14.3
MT0861		103.3			**64.1***	176.7	26-Jun	15	39.9	0	13.6
MT0866						178.0	27-Jun	37	40.7		
MT0871						178.0	27-Jun	23	37.3		
MT0890						176.7	26-Jun	13	38.8		
MTS04114 (HWW)						176.7	26-Jun	15	36.8		
MTS04114L						177.3	26-Jun	23	36.2		
MTS0532 (HWW)		94.5		**105.4***	61.7	176.7	26-Jun	25	36.1	0	13.9
MTS0532L						178.0	27-Jun	13	37.0		
MTS0705		102.3			62.9	180.7	30-Jun	32	44.1	2	13.4
MTS0713++		103.9			63.3	177.0	26-Jun	18	37.2	1	12.7
MTS0721++		93.3			61.9	176.7	26-Jun	25	38.0	16	13.9
MTS0808						178.0	27-Jun	12	39.0		
MTS0819						178.3	27-Jun	10	36.3		
MTS0826						180.7	30-Jun	15	40.7		
MTS0827						180.3	29-Jun	10	40.4		
MTS0832						180.0	29-Jun	8	43.0		
R Neeley		102.2		98.1	63.1	179.3	28-Jun	38	41.5	14	12.5
R Norris (P, CL)+		93.2		99.4	63.6	175.7	25-Jun	53	42.5	5	13.5
Overland +		85.5			61.1	174.0	23-Jun	47	38.8	3	14.2
Peregrine		88.5			63.3	179.7	29-Jun	57	45.7	1	13.0
R Promontory [1/]		105.2		**113.4***	**64.2****	176.0	25-Jun	22	38.8	2	11.6
R Pryor (P)+		102.2		98.4	61.4	178.7	28-Jun	10	36.5	22	12.0
Radiant (P)		89.1			62.8	179.3	28-Jun	15	41.9	3	12.6
Rampart		89.5		93.3	62.4	178.3	27-Jun	30	42.8	12	14.5
Robidoux (NI04421)		98.0			63.6	175.0	24-Jun	23	37.3	0	13.3
Rocky (P)		85.7		96.8	63.5	176.7	26-Jun	63	41.1	0	13.8
Settler CL (CL)+		96.3			62.8	173.7	23-Jun	27	34.5	7	13.2
Striker (P)++						176.3	25-Jun	18	36.6		
Wahoo +		104.5		**111.6***	61.5	174.7	24-Jun	32	32.0	6	13.0
WB Matlock (P)++						178.7	28-Jun	25	40.0		
R Yellowstone +		**116.8****		**117.1****	63.2	178.7	28-Jun	15	39.0	1	12.2
Average		**95.0**		**100.5**	**62.6**	**177.3**	**26-Jun**	**24.1**	**38.7**	**8.4**	**13.3**
LSD (0.05)		**7.0**		**15.0**	**0.5**	**0.9**		**11.2**	**2.3**	**10.2**	
C.V.		**4.2**		**7.3**	**0.5**	**0.3**		**28.7**	**3.7**	**72**	

** = indicates highest yielding variety within a column CL = CLEARFIELD wheat tolerant to imidazolinone (IMI) herbicides

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

R = Recommended Variety; (P) = Private Variety; + = Protected Variety; ++ = PVP Pending

[1/] = Dwarf Smut Resistant; (HWW) = Hard White Winter Wheat [2/] = 2010 data

Table 5. HARD WINTER : District 3-- Huntley - Dryland

Cultivar/Line	Grain Yield (bushels/acre)				2010 Data				
					Test	Heading Date		Plant	Protein
	2010	2009-2010	2008-2010	2007-2010	weight	Ordinal	Calendar	height	
		2 yr	3 yr	4 yr	lb/bu	from Jan1		in	%
Accipiter	78.3	**85.8***	**85.9***		60.3	164.7	14-Jun	38.4	12.1
AP503 CL2 (P, CL)+	86.9	**86.7***	79.4		**62.4***	159.0	8-Jun	34.2	12.5
Art (P)+	85.7				**61.9***	157.3	6-Jun	35.0	13.0
Boomer (P)++	71.8				58.6	165.3	14-Jun	35.6	12.3
Broadview	77.7				59.2	165.3	14-Jun	36.0	12.8
Bynum (P, CL)+	89.2	76.6	70.9	78.0	61.1	160.3	9-Jun	42.1	14.1
BZ9W05-2039 (P)	82.6				61.1	159.7	9-Jun	36.2	13.2
BZ9W05-2043 (P)	73.2				58.2	165.0	14-Jun	36.5	14.0
R Carter (P)+	72.6	76.0	75.4	78.5	61.0	165.0	14-Jun	31.9	12.2
R CDC Falcon (P)	84.6	**91.6***	**88.6***	**90.2***	60.0	163.3	12-Jun	34.3	12.0
Curlew [1/]	**97.2***	**93.8***			60.2	161.7	11-Jun	42.2	12.3
R Decade ++	92.1	**89.8***	**89.0***	**90.3***	60.8	161.0	10-Jun	39.1	13.4
R Genou +	75.7	70.6	72.6	76.2	60.8	162.7	12-Jun	40.3	12.6
R Hyalite (P, CL, HWW)+	96.8*	**98.1****	**88.5***	**90.2***	61.5	159.3	8-Jun	39.3	12.8
R Jagalene (P)+	84.4	**95.5***	**93.9***	**94.3***	**63.1****	158.3	7-Jun	38.0	12.5
Jerry	76.1	77.4	79.5	80.9	60.4	164.0	13-Jun	44.4	12.6
Ledger (P)+	93.5	**88.8***	**84.4***	**86.5***	**61.6***	161.7	11-Jun	35.7	12.5
MT06103	89.1	**90.7***	**89.9***		**61.6***	160.0	9-Jun	39.2	14.3
MT0861	88.0	**84.8***			**62.2***	165.3	14-Jun	38.7	12.6
MT0866	83.0				**62.0***	165.7	15-Jun	38.2	12.3
MT0871	85.3				59.0	164.7	14-Jun	37.6	12.6
MT0890	**101.0***				61.4	162.0	11-Jun	38.9	13.2
MTS04114 (HWW)	80.9				60.8	161.7	11-Jun	35.0	12.9
MTS04114L	83.9				60.7	164.7	14-Jun	38.8	13.1
MTS0532 (HWW)	86.0	**85.5***	**87.1***	**88.5***	61.3	161.0	10-Jun	37.1	13.2
MTS0532L	84.0				60.9	162.3	11-Jun	35.4	13.4
MTS0705	78.2	81.2	**84.0***		**61.6***	165.3	14-Jun	42.3	13.9
MTS0713++	87.4	**86.4***	**86.1***		60.7	164.3	13-Jun	36.8	12.4
MTS0721++	89.3	**85.8***			60.7	164.7	14-Jun	36.3	12.6
MTS0808	79.9				58.7	166.0	15-Jun	36.6	13.3
MTS0819	87.0				58.3	160.7	10-Jun	36.1	13.6
MTS0826	84.7				**61.6***	164.7	14-Jun	40.2	13.5
MTS0827	84.9				**61.9***	166.7	16-Jun	40.3	12.8
MTS0832	79.3				59.7	164.3	13-Jun	40.6	13.3
R Neeley	79.1	**85.2***	**87.1***	**87.8***	60.7	166.3	15-Jun	42.3	13.7
R Norris (P, CL)+	92.5	**95.4***	**92.0***	**92.3***	**62.2***	158.0	7-Jun	39.4	13.2
Overland +	90.5	**92.6***			**62.4***	159.3	8-Jun	37.3	12.5
Peregrine	76.6	80.6	81.1		61.0	164.0	13-Jun	44.8	11.5
R Promontory [1/]	83.8	**86.0***	80.0	82.8	**61.7***	161.0	10-Jun	38.9	12.2
R Pryor (P)+	78.5	**88.5***	**87.2***	**86.8***	59.3	163.7	13-Jun	35.3	12.5
Radiant (P)	78.5	**83.2***			60.2	163.0	12-Jun	39.3	13.1
R Rampart	70.7	73.9	70.3	73.5	60.1	165.0	14-Jun	40.2	13.1
Robidoux (NI04421)	88.6	**96.9***			61.5	156.3	5-Jun	37.3	11.9
R Rocky (P)	84.1	78.7	80.4	83.2	60.6	159.7	9-Jun	41.6	12.3
Settler CL (CL)+	**102.5****	**97.2***			**63.1***	158.7	8-Jun	34.9	12.3
Striker (P)++	76.4				60.8	164.0	13-Jun	35.1	13.2
R Wahoo +	**96.1***	**94.2***	**95.3****	**95.1****	60.1	160.7	10-Jun	38.7	12.0
WB Matlock (P)++	82.5				61.2	162.3	11-Jun	39.9	13.6
R Yellowstone +	88.6	**97.6***	**92.5***	**92.2***	59.0	164.0	13-Jun	40.0	12.8
Average	**84.5**	**86.9**	**84.2**	**86.0**	**60.8**	**162.5**	**12-Jun**	**38.2**	**12.9**
LSD (0.05)	**9.6**	**15.5**	**13.2**	**11.1**	**1.5**	**1.5**		**3.0**	
C.V.	**6.5**	**8.7**	**9.5**	**9.1**	**1.4**	**0.6**		**4.7**	

** = indicates highest yielding variety within a column CL = CLEARFIELD wheat tolerant to imidazolinone (IMI) herbicides

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

R = Recommended Variety; (P) = Private Variety; + = Protected Variety; ++ = PVP Pending

[1/] = Dwarf Smut Resistant; (HWW) = Hard White Winter Wheat

Table 6. HARD WINTER : District 4-- Moccasin - Dryland

Cultivar/Line	Grain Yield (bushels/acre)				2010 Data				
					Test	Heading Date		Plant	Protein
	2010	2009-2010	2008-2010	2007-2010	weight	Ordinal	Calendar	height	
		2 yr	3 yr	4 yr	lb/bu	from Jan1		in	%
Accipiter	52.3	48.9	47.7		60.9	179.7	19-Jun	35.8	10.6
AP503 CL2 (P, CL)+	53.6	48.4	45.4		60.5	175.7	15-Jun	32.2	11.2
Art (P)+	**67.7***				61.1	174.0	13-Jun	35.2	11.6
Boomer (P)++	53.6				60.1	177.0	16-Jun	34.1	11.3
Broadview	60.8				60.1	176.7	16-Jun	35.7	12.1
R Bynum (P, CL)+	44.7	40.3	38.5	45.6	61.2	175.3	14-Jun	39.1	13.0
BZ9W05-2039 (P)	61.6				**61.5***	175.0	14-Jun	37.4	11.2
BZ9W05-2043 (P)	50.0				60.5	178.3	17-Jun	33.0	11.3
R Carter (P)+	62.5	53.4	49.0	55.6	60.6	175.3	14-Jun	32.6	11.5
R CDC Falcon (P)	58.2	51.8	50.8	56.8	59.0	177.7	17-Jun	33.1	11.5
Curlew [1/]	56.4	50.2			60.0	176.3	15-Jun	37.5	11.4
R Decade ++	60.6	**53.6***	51.8	58.4	**61.4***	174.7	14-Jun	33.8	11.4
R Genou +	55.9	49.1	46.6	53.1	61.2	176.7	16-Jun	40.7	10.9
R Hyalite (P, CL, HWW)+	59.4	51.9	50.4	57.0	61.1	176.0	15-Jun	36.5	11.4
R Jagalene (P)+	63.1	52.7	50.8	58.1	**61.9****	175.0	14-Jun	35.3	11.3
Jerry	61.1	52.8	52.6	57.6	59.7	177.0	16-Jun	40.6	11.7
R Ledger (P)+	51.5	46.1	46.2	53.4	60.0	176.0	15-Jun	34.0	10.9
MT06103	56.4	51.3	50.3		60.6	175.0	14-Jun	37.2	11.7
MT0861	62.5	52.8			60.9	176.0	15-Jun	37.3	11.7
MT0866	59.8				61.3	177.0	16-Jun	37.6	10.9
MT0871	61.3				60.1	177.7	17-Jun	36.3	10.5
MT0890	56.8				60.0	176.7	16-Jun	35.3	12.6
MTS04114 (HWW)	42.6				61.3	176.7	16-Jun	33.0	10.8
MTS04114L	41.2				60.4	176.3	15-Jun	33.9	11.3
MTS0532 (HWW)	49.7	45.6	44.0	52.2	60.7	177.0	16-Jun	34.0	10.9
MTS0532L	48.3				60.6	176.3	15-Jun	32.9	11.5
MTS0705	50.6	46.1	44.6		61.2	179.0	18-Jun	39.9	12.2
MTS0713++	54.0	46.2	44.5		60.7	176.7	16-Jun	34.5	10.9
MTS0721++	58.1	49.9			60.7	176.0	15-Jun	34.0	12.5
MTS0808	58.6				60.9	177.7	17-Jun	33.1	11.1
MTS0819	60.2				59.1	179.0	18-Jun	32.7	10.5
MTS0826	43.8				60.9	179.0	18-Jun	35.6	12.0
MTS0827	46.5				60.5	180.0	19-Jun	37.6	13.0
MTS0832	52.8				60.3	178.7	18-Jun	35.5	11.2
R Neeley	54.0	48.4	48.3	54.2	61.2	177.7	17-Jun	38.8	9.5
R Norris (P, CL)+	56.3	50.1	49.2	55.7	60.2	175.3	14-Jun	38.9	12.3
Overland +	**67.7***	**55.1***			61.2	174.0	13-Jun	36.7	11.0
Peregrine	49.9	45.4	43.8		60.3	177.0	16-Jun	41.1	11.3
R Promontory [1/]	59.5	52.7	51.3	58.3	60.0	177.0	16-Jun	35.5	10.3
R Pryor (P)+	62.4	**55.0***	54.5	59.4	61.1	178.7	18-Jun	31.8	10.9
Radiant (P)	39.5	38.1			59.9	179.0	18-Jun	35.5	10.3
R Rampart	48.6	44.5	42.2	46.8	59.8	177.0	16-Jun	39.1	12.8
Robidoux (NI04421)	63.6	**55.9***			60.7	174.0	13-Jun	34.2	10.1
R Rocky (P)	54.2	51.6	50.5	56.9	59.8	175.3	14-Jun	41.4	12.6
Settler CL (CL)+	61.3	51.0			61.3	174.3	13-Jun	33.2	10.6
Striker (P)++	58.7				59.0	175.7	15-Jun	33.4	12.2
R Wahoo +	57.6	50.6	48.3	57.2	59.4	173.7	13-Jun	35.2	10.6
WB Matlock (P)++	54.6				**61.9****	178.3	17-Jun	36.5	11.3
R Yellowstone +	**70.1****	**60.6****	**59.6****	**64.9****	58.9	178.0	17-Jun	36.2	11.4
Average	**55.8**	**50.0**	**48.4**	**55.6**	**60.5**	**176.7**	**16-Jun**	**35.8**	**11.4**
LSD (0.05)	**6.4**	**7.2**	**4.3**	**4.5**	**1.3**	**1.0**		**2.2**	
C.V.	**6.4**	**7.0**	**5.4**	**5.7**	**1.1**	**0.4**		**3.7**	

** = indicates highest yielding variety within a column CL = CLEARFIELD wheat tolerant to imidazolinone (IMI) herbicides

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

R = Recommended Variety; (P) = Private Variety; + = Protected Variety; ++ = PVP Pending

[1/] = Dwarf Smut Resistant; (HWW) = Hard White Winter Wheat

Table 7. HARD WINTER : District 5-- Conrad - Dryland

	Cultivar/Line	Grain Yield (bushels/acre)				2010 Data					
						Test	Heading Date		Plant	Lodg-	Protein
		2010	2009-2010	2008-2010	2007-2010	weight	Ordinal	Calendar	height	ing	
			2 yr	3 yr	4 yr	lb/bu	from Jan1		in	%	%
	Accipiter	**103.8***	**88.1***	**78.6***		60.7	178	17-Jun	37	1	11.3
	AP503 CL2 (P, CL)+	84.1	81.5	70.1		60.6	177	16-Jun	31	0	13.0
	Art (P)+	81.5				60.1	172	11-Jun	32	2	13.0
	Boomer (P)++	100.5				59.9	177	16-Jun	36	3	12.3
	Broadview	**112.6***				60.3	176	15-Jun	36	4	11.7
R	**Bynum (P, CL)+**	89.3	77.6	65.9	61.3	60.1	175	14-Jun	38	4	13.3
	BZ9W05-2039 (P)	90.4				58.7	173	12-Jun	34	1	12.6
	BZ9W05-2043 (P)	95.3				59.9	179	18-Jun	35	0	12.2
R	**Carter (P)+**	86.1	78.2	71.3	68.7	59.1	174	13-Jun	31	1	12.0
R	**CDC Falcon (P)**	**106.8***	**95.7***	**80.8***	**75.9***	60.6	175	14-Jun	32	0	11.4
	Curlew [1/]	100.0	**91.8***			57.8	177	16-Jun	37	12	12.8
R	**Decade ++**	98.7	**88.9***	**78.0***	**74.0***	58.7	175	14-Jun	36	1	12.0
R	**Genou +**	95.2	**86.7***	**74.9***	70.4	59.6	177	16-Jun	39	24	12.0
R	**Hyalite (P, CL, HWW)+**	99.9	84.9	72.7	67.3	59.5	175	14-Jun	37	2	12.6
R	**Jagalene (P)+**	94.6	84.8	73.3	69.0	60.4	174	13-Jun	33	1	12.1
	Jerry	86.1	80.0	69.1	65.2	59.9	176	15-Jun	40	6	13.0
R	**Ledger (P)+**	96.1	85.6	72.4	69.2	59.6	176	15-Jun	33	1	11.5
	MT06103	98.8	**90.1***	**77.5***		59.6	173	12-Jun	35	1	13.2
	MT0861	**103.6***	**91.1***			60.2	176	15-Jun	36	1	11.5
	MT0866	**103.2***				**62.0****	175	14-Jun	37	1	13.1
	MT0871	**109.9***				59.4	176	15-Jun	36	5	11.6
	MT0890	**101.8***				60.0	175	14-Jun	36	2	12.8
	MTS04114 (HWW)	86.0				58.7	177	16-Jun	33	1	13.3
	MTS04114L	92.1				58.1	177	16-Jun	33	2	13.2
	MTS0532 (HWW)	100.7	**91.5***	**80.5***	**76.9***	59.1	176	15-Jun	35	1	11.9
	MTS0532L	89.3				58.6	177	16-Jun	31	0	12.6
	MTS0705	96.0	**89.6***	**79.7***		**61.6***	177	16-Jun	41	35	12.8
	MTS0713++	96.0	84.9	**75.4***		60.0	174	13-Jun	33	0	11.3
	MTS0721++	100.6	85.6			60.0	176	15-Jun	34	1	12.0
	MTS0808	**103.1***				60.1	177	16-Jun	34	0	12.5
	MTS0819	**114.0****				**60.8***	176	15-Jun	34	0	11.8
	MTS0826	**105.7***				**60.9***	179	18-Jun	40	4	12.0
	MTS0827	97.7				60.4	178	17-Jun	39	11	12.2
	MTS0832	99.3				59.1	179	18-Jun	39	4	11.5
R	**Neeley**	93.9	**87.2***	73.9	68.4	58.5	177	16-Jun	39	21	11.6
	Norris (P, CL)+	95.5	83.4	73.8	70.3	58.9	174	13-Jun	38	2	12.4
	Overland +	**112.5***	**95.0***			59.8	173	12-Jun	36	2	11.4
	Peregrine	93.3	**88.7***	**75.3***		**61.3***	175	14-Jun	43	10	11.7
	Promontory [1/]	**102.8***	**89.8***	**75.8***	69.2	60.1	176	15-Jun	35	1	11.4
R	**Pryor (P)+**	**102.0***	**92.8***	**82.0***	**77.8****	59.4	177	16-Jun	33	1	10.3
	Radiant (P)	98.5	**88.3***			58.8	175	14-Jun	38	1	12.4
R	**Rampart**	82.6	77.7	67.2	62.8	60.2	177	16-Jun	39	27	13.4
	Robidoux (NI04421)	100.2	**95.7***			60.2	173	12-Jun	33	3	11.7
R	**Rocky (P)**	90.9	83.8	74.2	70.7	60.5	173	12-Jun	40	7	11.9
	Settler CL (CL)+	99.8	**90.1***			59.1	172	11-Jun	31	3	12.1
	Striker (P)++	95.9				60.5	175	14-Jun	32	0	12.7
	Wahoo +	97.5	**90.2***	**79.1***	**74.7***	55.3	172	11-Jun	34	2	11.3
	WB Matlock (P)++	99.0				60.3	177	16-Jun	36	0	13.3
R	**Yellowstone +**	**108.9***	**96.0****	**82.1****	**76.3***	60.0	176	15-Jun	36	0	11.6
	Average	**97.8**	**87.6**	**75.2**	**70.4**	**59.7**	**175.6**	**15-Jun**	**35.6**	**4.2**	**12.2**
	LSD (0.05)	**12.2**	**10.2**	**7.4**	**5.7**	**1.3**			**2.2**	**15.6**	
	C.V.	**7.2**	**5.7**	**6.0**	**5.7**	**1.3**			**3.5**	**227.0**	

** = indicates highest yielding variety within a column CL = CLEARFIELD wheat tolerant to imidazolinone (IMI) herbicides

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

R = Recommended Variety; (P) = Private Variety; + = Protected Variety; ++ = PVP Pending

[1/] = Dwarf Smut Resistant; (HWW) = Hard White Winter Wheat

Table 8. HARD WINTER : District 5-- Havre - Dryland

	Cultivar/Line	Grain Yield (bushels/acre)				2010 Data					
						Test	Heading Date		Plant	Sawfly	Protein
		2010	2009-2010	2008-2010	2007-2010	weight	Ordinal	Calendar	height	cutting	
			2 yr	3 yr	4 yr	lb/bu	from Jan1		in	%	%
	Accipiter	**73.6***	58.6	60.6		61.3	171.5	21-Jun	36.5	10	10.6
	AP503 CL2 (P, CL)+	**74.7***	53.1	56.4		62.2	168.3	17-Jun	34.2	9	12.7
	Art (P)+	**81.1***				62.4	167.7	17-Jun	34.2	9	12.4
	Boomer (P)++	69.8				59.8	170.7	20-Jun	38.3	16	12.0
	Broadview	**73.5***				61.7	169.4	18-Jun	35.8	10	11.4
R	**Bynum (P, CL)+**	62.6	51.1	54.0	54.0	**62.8***	169.2	18-Jun	37.9	10	13.0
	BZ9W05-2039 (P)	71.4				62.0	167.2	16-Jun	36.1	12	12.4
	BZ9W05-2043 (P)	70.5				62.0	171.5	21-Jun	35.6	2	11.0
R	**Carter (P)+**	**74.6***	56.2	59.1	58.5	62.6	170.5	20-Jun	33.4	3	11.5
R	**CDC Falcon (P)**	**72.3***	56.5	60.5	60.4	61.2	169.3	18-Jun	32.4	7	11.1
	Curlew [1/]	62.0	48.6			61.1	170.0	19-Jun	38.6	33	12.3
R	**Decade ++**	72.1	53.8	59.5	60.8	62.4	167.3	16-Jun	36.0	5	11.5
R	**Genou +**	61.7	53.4	55.9	56.1	60.7	170.5	20-Jun	38.8	16	12.4
R	**Hyalite (P, CL, HWW)+**	**72.9***	54.8	58.2	57.4	**63.0***	167.3	16-Jun	38.4	18	10.9
R	**Jagalene (P)+**	**77.8***	55.5	59.4	58.5	**64.0****	168.7	18-Jun	34.7	11	11.6
	Jerry	68.6	52.3	55.9	55.4	61.1	171.0	20-Jun	40.7	28	11.6
R	**Ledger (P)+**	69.9	55.0	56.2	57.5	61.7	169.6	19-Jun	35.0	17	11.5
	MT06103	68.4	52.3	57.7		62.3	167.5	17-Jun	37.3	8	12.3
	MT0861	68.1	53.2			**62.9***	171.3	20-Jun	38.3	29	12.3
	MT0866	**80.6***				**63.0***	169.8	19-Jun	37.6	9	11.7
	MT0871	**76.8***				60.6	171.3	20-Jun	37.3	11	11.9
	MT0890	**72.3***				62.2	170.0	19-Jun	38.8	10	12.0
	MTS04114 (HWW)	69.6				62.6	169.2	18-Jun	34.7	6	11.3
	MTS04114L	65.6				62.5	169.0	18-Jun	35.0	5	13.0
	MTS0532 (HWW)	**76.8***	57.8	62.6	62.3	61.5	169.9	19-Jun	35.4	8	11.7
	MTS0532L	70.2				61.6	170.4	19-Jun	33.9	9	12.1
	MTS0705	69.8	56.0	58.6		60.3	171.3	20-Jun	39.1	10	12.9
	MTS0713++	**72.4***	57.8	60.9		61.3	170.6	20-Jun	34.3	5	12.5
	MTS0721++	68.0	52.8			61.2	170.1	19-Jun	35.2	2	11.6
	MTS0808	71.6				61.4	170.4	19-Jun	35.8	1	11.7
	MTS0819	**77.2***				61.5	170.8	20-Jun	34.9	3	11.9
	MTS0826	63.5				61.5	172.2	21-Jun	37.2	1	10.6
	MTS0827	65.6				61.1	173.4	22-Jun	37.8	2	12.0
	MTS0832	70.2				61.0	173.4	22-Jun	38.8	0	11.2
R	**Neeley**	66.5	52.5	55.7	54.6	61.4	171.9	21-Jun	39.4	13	11.0
	Norris (P, CL)+	65.7	52.1	56.4	56.3	60.3	169.1	18-Jun	40.0	24	12.6
	Overland +	**81.8****	61.6			**63.4***	167.3	16-Jun	36.0	13	11.5
	Peregrine	67.6	52.2	53.1		60.1	171.1	20-Jun	43.5	24	12.0
	Promontory [1/]	**78.3***	57.4	60.1	57.8	**63.4***	170.5	20-Jun	34.9	22	11.0
R	**Pryor (P)+**	**73.5***	56.9	60.7	57.7	61.3	171.6	21-Jun	34.9	5	12.0
	Radiant (P)	64.6	51.9			61.4	171.6	21-Jun	38.9	8	10.7
R	**Rampart**	58.7	49.1	50.6	51.7	60.4	171.4	20-Jun	39.7	6	12.9
	Robidoux (NI04421)	71.2	53.4			61.2	167.6	17-Jun	35.0	14	11.5
R	**Rocky (P)**	66.6	53.4	57.7	55.9	**62.7***	168.4	17-Jun	40.8	18	11.9
	Settler CL (CL)+	**79.6***	56.2			62.3	168.1	17-Jun	33.3	23	11.2
	Striker (P)++	67.5				**62.9***	169.4	18-Jun	34.2	2	11.3
	Wahoo +	**74.6***	57.5	62.8	60.8	61.5	167.2	16-Jun	36.1	12	11.4
	WB Matlock (P)++	65.7				62.4	171.1	20-Jun	39.4	36	11.7
R	**Yellowstone +**	**73.3***	57.0	61.0	60.1	61.5	171.7	21-Jun	38.3	9	11.8
	Average	**70.9**	**54.5**	**58.1**	**57.5**	**61.8**	**170.0**	**19-Jun**	**36.8**	**11.5**	**11.8**
	LSD (0.05)	**9.7**	**ns**	**ns**	**ns**	**1.4**	**1.5**		**2.2**	**9.5**	
	C.V.	**7.9**	**9.0**	**7.0**	**7.2**	**1.3**	**0.5**		**3.4**	**48.3**	

** = indicates highest yielding variety within a column CL = CLEARFIELD wheat tolerant to imidazolinone (IMI) herbicides

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

R = Recommended Variety; (P) = Private Variety; + = Protected Variety; ++ = PVP Pending

[1/] = Dwarf Smut Resistant; (HWW) = Hard White Winter Wheat

Table 9. HARD WINTER : District 6-- Sidney - Dryland

***** No harvest in 2009 due to severe winter-kill *****

Cultivar/Line	Grain Yield (bushels/acre)				2010 Data: Test weight	Winter survival	Heading Date		Plant height	Protein
	2010	2009	2008//2010	2007//2010			Ordinal	Calendar		
			2 yr	3 yr	lb/bu	%	from Jan1		in	%
Accipiter	**70.3****		**50.4****		59.4	72	166.6	16-Jun	30.3	9.9
AP503 CL2 (P, CL)+	46.6		31.3		**61.2***	43	162.1	11-Jun	26.4	11.3
Art (P)+	47.8				59.8	37	161.2	10-Jun	28.7	10.9
Boomer (P)++	59.2				58.1	57	164.6	14-Jun	30.4	9.5
Broadview	**67.6***				59.4	72	163.3	12-Jun	31.4	10.7
Bynum (P, CL)+	42.6		25.4	35.3	60.1	35	166.1	15-Jun	30.2	10.7
BZ9W05-2039 (P)	51.2				**60.3***	48	162.6	12-Jun	30.6	11.5
BZ9W05-2043 (P)	49.6				59.0	50	166.4	15-Jun	30.1	10.2
R **Carter (P)+**	49.4		33.2	45.9	59.8	40	163.6	13-Jun	28.6	11.1
R **CDC Falcon (P)**	60.9		**45.2***	**53.8***	59.4	66	162.9	12-Jun	29.4	9.3
Curlew [1/]	49.9				58.1	44	166.5	16-Jun	32.9	10.9
R **Decade ++**	60.2		**44.8***	**53.6***	59.0	55	163.2	12-Jun	30.6	11.4
Genou +	48.9		32.4	39.9	59.3	48	167.0	16-Jun	32.0	11.1
Hyalite (P, CL, HWW)+	58.8		38.1	44.4	59.3	55	162.1	11-Jun	32.9	10.6
Jagalene (P)+	48.2		35.4	43.8	**61.0***	41	162.1	11-Jun	31.2	10.4
R **Jerry**	**64.3***		**49.0***	**56.5****	58.6	69	165.4	14-Jun	34.5	12.3
Ledger (P)+	47.3		31.7	42.6	59.3	43	163.1	12-Jun	29.4	10.2
MT06103	37.8		27.9		**61.0***	23	165.6	15-Jun	29.6	11.7
MT0861	53.0				59.9	51	164.2	13-Jun	31.5	9.2
MT0866	**63.9***				**60.7***	46	165.6	15-Jun	33.3	11.3
MT0871	**63.0***				57.2	53	166.8	16-Jun	32.2	11.9
MT0890	50.2				60.0	42	166.3	15-Jun	30.7	9.8
MTS04114 (HWW)	50.1				**60.9***	43	164.9	14-Jun	30.3	10.1
MTS04114L	51.6				**60.5***	46	164.3	13-Jun	31.1	10.7
MTS0532 (HWW)	57.5		35.8	46.2	**60.1***	46	165.2	14-Jun	30.2	11.8
MTS0532L	49.7				59.6	44	164.8	14-Jun	30.7	11.3
MTS0705	55.7		34.4		**60.6***	44	166.2	15-Jun	33.8	11.9
MTS0713++	52.0		34.5		58.3	55	164.2	13-Jun	30.9	11.6
MTS0721++	49.4				59.0	47	163.6	13-Jun	26.8	9.3
MTS0808	55.1				58.9	44	165.8	15-Jun	30.6	10.6
MTS0819	59.2				59.2	54	165.6	15-Jun	29.9	11.4
MTS0826	55.9				59.3	48	167.3	16-Jun	33.4	10.9
MTS0827	49.0				58.8	51	167.4	16-Jun	32.2	10.9
MTS0832	50.0				57.0	66	166.6	16-Jun	33.8	10.2
Neeley	52.3		**39.9***	45.0	59.2	48	165.6	15-Jun	33.0	9.8
Norris (P, CL)+	56.1		35.7	44.0	**61.4****	53	160.9	10-Jun	31.4	9.9
Overland +	**65.3***				**60.6***	53	162.3	11-Jun	31.0	11.0
Peregrine	56.0		**43.7***		59.5	78	165.1	14-Jun	35.9	10.7
Promontory [1/]	58.1		36.6	44.1	60.1	44	162.8	12-Jun	31.7	11.0
R **Pryor (P)+**	45.7		**39.0***	45.9	57.0	43	167.0	16-Jun	31.7	10.4
Radiant (P)	56.4				59.1	62	165.6	15-Jun	34.8	10.0
Rampart	40.9		25.1	34.6	59.3	32	167.4	16-Jun	30.7	10.7
Robidoux (NI04421)	54.3				58.7	45	160.9	10-Jun	30.3	10.7
Rocky (P)	60.3		**41.6***	47.4	**60.1***	52	162.4	11-Jun	33.0	10.6
Settler CL (CL)+	53.0				**60.3***	44	161.1	10-Jun	28.1	11.1
Striker (P)++	**63.5***				**60.2***	61	162.0	11-Jun	27.7	10.8
Wahoo +	**69.5***		**46.1***	**53.1***	57.6	59	161.2	10-Jun	32.1	10.4
WB Matlock (P)++	**64.7***				59.3	55	164.2	13-Jun	31.9	11.7
Yellowstone +	**62.1***		**43.1***	**51.8***	58.3	51	165.7	15-Jun	30.4	10.3
Average	**54.8**		**37.5**	**46.0**	**59.4**	**50.1**	**164.4**	**13-Jun**	**31.1**	**10.7**
LSD (0.05)	**9.4**		**11.8**	**8.6**	**1.3**	**10.5**	**1.7**		**2.9**	
C.V.	**10.1**		**15.2**	**11.2**	**1.3**	**12.1**	**0.6**		**5.5**	

** = indicates highest yielding variety within a column CL = CLEARFIELD wheat tolerant to imidazolinone (IMI) herbicides

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

R = Recommended Variety; (P) = Private Variety; + = Protected Variety; ++ = PVP Pending

[1/] = Dwarf Smut Resistant; (HWW) = Hard White Winter Wheat

Table 10. HARD WINTER : District 6-- Williston, North Dakota - Dryland

***** No harvest in 2010 due to severe winterkill *****

Cultivar/Line	Grain Yield (bushels/acre)				2009 Data					
					Test	Heading Date		Plant	1000	Protein
	2010	2009	2008-09	2007-09	weight	Ordinal	Calendar	height	kernel wt	
		1y	2y	3y	lb/bu	from Jan1		in	g	%
Accipiter		**45.2***	44.2		63.1	164.7	14-Jun	25.6	29.2	14.3
AP503 CL2 (P, CL)+		39.2	25.1		64.1	159.0	8-Jun	24.9	30.9	14.3
Art (P)+										
Boomer (P)++										
Broadview										
Bynum (P, CL)+		38.0	21.4	30.7	62.3	160.0	9-Jun	27.7	31.0	16.2
BZ9W05-2039 (P)										
BZ9W05-2043 (P)										
R **Carter (P)+**		**45.4***	33.4	44.3	62.8	162.0	11-Jun	24.3	27.9	16.0
R **CDC Falcon (P)**		**48.4***	43.7	**54.1***	61.1	162.7	12-Jun	24.7	26.1	14.6
Curlew [1/]		40.7			63.8	163.3	12-Jun	28.1	36.8	15.6
R **Decade ++**		39.6	37.3	**50.7***	64.0	161.7	11-Jun	26.3	32.7	15.9
Genou +		41.8	27.3	37.3	61.7	163.0	12-Jun	27.3	27.5	15.1
Hyalite (P, CL, HWW)+		**45.1***	28.3	40.4	62.8	159.3	8-Jun	27.0	29.8	16.1
Jagalene (P)+		41.9	32.4	41.8	64.0	159.7	9-Jun	26.3	33.8	15.4
R **Jerry**		**48.9***	43.7	**54.5****	62.7	164.0	13-Jun	29.2	34.6	14.5
Ledger (P)+		**44.8***	27.5	37.9	63.1	162.3	11-Jun	26.8	35.2	14.2
MT06103		**46.9***	28.7		63.7	161.7	11-Jun	28.1	37.7	14.9
MT0861		**47.8***			63.8	161.3	10-Jun	27.1	30.8	15.0
MT0866										
MT0871										
MT0890										
MTS04114 (HWW)										
MTS04114L										
MTS0532 (HWW)		**45.4***	29.3	44.4	62.1	161.7	10-Jun	28.2	32.3	15.1
MTS0532L										
MTS0705		**45.1***	25.0		63.2	164.3	13-Jun	28.2	31.6	15.8
MTS0713++		39.7	24.7		63.9	162.7	12-Jun	27.3	37.2	16.2
MTS0721++		36.1			61.9	163.3	12-Jun	24.1	30.0	15.7
MTS0808										
MTS0819										
MTS0826										
MTS0827										
MTS0832										
Neeley		**50.4***	35.8	45.0	62.7	164.3	13-Jun	27.2	32.7	14.1
Norris (P, CL)+		**49.5***	39.2	**47.9***	63.4	161.7	11-Jun	28.7	33.8	14.3
Overland +		40.9			63.5	158.7	8-Jun	27.7	33.7	14.8
Peregrine		**48.4***	42.0		62.8	165.0	14-Jun	29.5	29.7	13.4
Promontory [1/]		**46.9***	31.4	41.1	**65.0****	160.7	10-Jun	28.7	36.5	14.2
R **Pryor (P)+**		**43.1***	33.3	43.8	63.1	164.3	13-Jun	23.9	28.2	14.0
Radiant (P)		**50.4***			62.6	164.3	13-Jun	28.5	32.7	14.4
Rampart		40.6	24.7	33.5	62.4	163.3	12-Jun	26.9	31.2	15.7
Robidoux (NI04421)		36.9			**64.2***	159.7	9-Jun	24.9	33.5	14.1
Rocky (P)		39.1	26.0	40.2	63.8	163.7	13-Jun	27.9	28.5	14.3
Settler CL (CL)+		36.9			63.1	160.7	10-Jun	26.8	37.6	14.3
Striker (P)++		**45.9***	33.1	**45.5***	62.4					14.1
Wahoo +						158.0	7-Jun	28.1	33.3	
WB Matlock (P)++										
Yellowstone +		**50.9****	38.8	**49.6***	62.7	164.0	13-Jun	28.7	33.8	14.7
Average		**43.7**	**31.9**	**43.4**	**62.9**	**161.9**	**11-Jun**	**26.8**	**32.5**	**15.0**
LSD (0.05)		**8.0**	**ns**	**9.5**	**0.8**	**2.5**		**2.0**	**3.4**	**0.6**
C.V.		**11.2**	**21.8**	**13.3**	**0.6**	**2.4**		**4.7**	**5.3**	**1.9**

** = indicates highest yielding variety within a column CL = CLEARFIELD wheat tolerant to imidazolinone (IMI) herbicides

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

R = Recommended Variety; (P) = Private Variety; + = Protected Variety; ++ = PVP Pending

[1/] = Dwarf Smut Resistant; (HWW) = Hard White Winter Wheat

Table 11. 2003//2010 Intrastate Winter Wheat Test (Exp. 3501): Combined Locations Winter Survival and associated Yield (Locations: Williston (2003-2008), Sidney (2003-2006, 2008, 2010), Conrad and Moccasin in 2004 =14 locations

***** No recordable Winterkill in 2009 *****

	Winter Survival (%)							Yield under Winterkill						
	2010	2008-10	2007-10	2006-10	2005-10	2004-10	2003-10	2010	2008-10	2007-10	2006-10	2005-10	2004-10	2003-10
location-years	1	3	4	6	8	12	14	1	3	4	6	8	12	14
Accipiter	**71.8***	**63.2****						**70.3****	**48.0****					
AP503 CL2 (P, CL)+	43.4	23.1						46.6	24.5					
Art (P)+	36.6							47.8						
Boomer (P)++	56.7							59.2						
Broadview	**71.5***							**67.6***						
Bynum (P, CL)+	35.1	16.1	20.9	26.9	34.1			42.6	18.5	26.2	28.9	31.8		
BZ9W05-2039 (P)	48.0							51.2						
BZ9W05-2043 (P)	50.0							49.6						
Carter (P)+	39.8	22.8	32.5	36.7	47.7			49.4	29.2	38.5	37.7	42.1		
CDC Falcon (P)	**66.1***	42.0	**50.3***	**54.5***	**62.5***	**59.4***	**60.1***	60.9	**43.1***	**51.1***	**50.4***	**52.5***	**53.4***	**54.8***
Curlew 1/	44.0							49.9						
Decade ++	55.3	45.7	**53.4***					60.2	**41.5***	**50.6***				
Genou +	48.3	23.0	31.8	37.6	47.2	46.9	47.5	48.9	25.8	33.7	35.6	38.7	42.7	45.2
Hyalite (P, CL, HWW)+	55.2	33.0	39.3	44.4	52.7			58.8	29.2	38.1	40.0	42.8		
Jagalene (P)+	40.6	23.3	30.4	39.0	48.5	47.8	47.6	48.2	31.2	38.6	39.7	43.3	44.4	46.4
Jerry	**69.1***	46.8	**56.8****	**60.4****	**67.9****	**63.2****	**64.1****	**64.3***	**45.4***	**53.1****	**52.3****	**55.1****	**56.0****	**57.1****
Ledger (P)+	43.2	22.5	29.4	34.6	43.2	44.1	43.7	47.3	24.5	33.1	35.1	38.0	42.3	43.6
MT06103	23.2	15.0						37.8	22.1					
MT0861	51.1							53.0						
MT0866	46.0							**63.9***						
MT0871	52.8							**63.0***						
MT0890	42.3							50.2						
MTS04114 (HWW)	43.0							50.1						
MTS04114L	45.7							51.6						
MTS0532 (HWW)	45.9	23.3	35.8					57.5	28.2	39.8				
MTS0532L	43.8							49.7						
MTS0705	43.9	22.5						55.7	24.5					
MTS0713++	54.5	26.5						52.0	26.2					
MTS0721++	47.3							49.4						
MTS0808	44.3							55.1						
MTS0819	53.9							59.2						
MTS0826	47.5							55.9						
MTS0827	50.5							49.0						
MTS0832	**66.2***							50.0						
Neeley	48.0	37.5	44.0	44.9	51.6	51.0	52.2	52.3	33.6	41.1	41.6	44.3	48.2	51.2
Norris (P, CL)+	53.1	29.4	36.2	43.5	51.7			56.1	33.4	41.4	42.1	44.6		
Overland +	52.9							**65.3***						
Peregrine	**78.1****	47.3						56.0	**41.0***					
Promontory 1/	43.7	24.4	29.5	36.9	42.5	42.3	44.7	58.1	29.6	37.4	38.9	40.6	43.9	47.4
Pryor (P)+	43.3	30.1	40.1	44.4	54.1	52.6	51.9	45.7	33.8	41.5	42.7	47.0	50.8	52.9
Radiant (P)	61.8							56.4						
Rampart	31.7	15.1	21.3	26.7	36.0	38.3	37.9	40.9	19.6	27.5	30.0	34.1	37.5	39.2
Robidoux (NI04421)	45.4							54.3						
Rocky (P)	51.5	25.0	34.6	43.0	53.1	52.3	53.6	60.3	32.0	41.2	42.6	45.4	48.0	50.2
Settler CL (CL)+	44.3							53.0						
Striker (P)++	61.1							**63.5***						
Wahoo +	58.6	30.9	38.6	47.8	56.5	56.1	56.8	**69.5***	37.4	45.7	46.7	50.0	51.1	52.9
WB Matlock (P)++	54.7							**64.7***						
Yellowstone +	50.5	30.7	38.1	45.4	55.1	52.9	54.9	**62.1***	37.6	46.0	46.5	49.9	**53.2***	**56.4***
Average	**50.1**	**30.0**	**36.8**	**41.7**	**50.3**	**50.6**	**51.3**	**54.8**	**31.7**	**40.2**	**40.7**	**43.8**	**47.6**	**49.8**
LSD (0.05)	**10.5**	**13.4**	**9.3**	**7.1**	**6.7**	**5.3**	**4.9**	**9.4**	**9.4**	**7.0**	**5.0**	**4.0**	**3.9**	**3.6**
C.V.	**12.1**	**27.1**	**17.7**	**14.8**	**13.4**	**12.8**	**12.9**	**10.1**	**18.1**	**12.3**	**10.6**	**9.1**	**10.0**	**9.8**

+ = new for 2010, # = paid entry, r = return from 2006-08

** = indicates highest value within a column

* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05)

Table 12. HARD WINTER WHEAT: Yield Performance under Sawfly Pressure and % Sawfly Cutting (2003-2010)
Cutting (Note: Sawfly cutting in each location-year >10%)

Cultivar/Line	Grain Yield (bu/a)							Sawfly Cutting (%)						
	2010	2009-10	2008-10	2007-10	2006-10	2005-10	2003//10	2010	2009-10	2008-10	2007-10	2006-10	2005-10	2003//10
Location-years	2	4	6	8	10	12	13	2	4	6	8	10	12	13
Accipiter	60.2	52.6						54.0	44.3					
Bynum (P, CL)+	56.5	47.5	48.3	49.4	47.2	46.4		36.7	34.8	30.2	25.9	22.1	23.5	
Carter (P)+	**67.0***	**54.4***	54.3					49.6	37.4	31.7				
CDC Falcon (P)	**64.2***	**53.7***	53.7	54.5	53.2	**52.2***	**52.4***	53.4	46.6	43.3	42.2	41.8	38.8	39.1
Decade ++	**66.8***	**54.4***	55.3					50.6	39.7	38.3				
Genou +	56.7	50.3	51.9	53.9	52.7	**52.2***	**52.4***	33.7	29.6	26.2	23.2	19.7	22.0	20.9
Hyalite (P, CL, HWW)-	59.7	50.4	52.5	52.6	50.3	49.2		59.0	55.1	51.0	49.4	45.9	43.1	
Jagalene (P)+	**67.4***	**54.4***	55.5	55.3	52.3	51.2		55.5	50.9	48.5	48.8	44.5	41.6	
Jerry	55.3	46.9	48.9	50.3	48.5	47.5	48.5	62.2	59.6	50.7	52.3	47.7	47.4	48.5
Ledger (P)+	**66.1***	**54.8***	54.1	55.6	53.0			58.7	41.8	38.0	38.6	37.1		
MT06103	61.6	50.5						47.3	48.9					
MTS0532 (HWW)	**71.5***	**57.3***	**58.8***					45.4	30.9	**25.9***				
MTS0705	61.9							10.9						
MTS0713++	**63.8***	**54.0***						29.1	**23.6***					
MTS0721++	61.4							5.1						
MTS0826	59.9							2.9						
MTS0832	**64.7***							3.4						
Neeley	61.3	50.9	50.1	50.2	49.0	47.7	48.6	54.5	55.1	49.1	51.8	49.7	52.3	49.3
Norris (P, CL)+	59.3	49.6	51.8	52.4	51.6	51.0		58.3	56.9	52.4	48.2	43.3	44.5	
Promontory 1/	**68.5***	**55.4***	54.2	54.4	51.8	50.1	50.6	61.1	66.1	61.0	62.7	57.0	58.0	59.8
Pryor (P)+	**62.7***	52.7	53.5	53.1	51.7	51.0	50.8	37.6	29.0	26.3	28.9	28.4	28.1	30.4
Rampart	55.7	48.0	47.9	49.5	48.0	47.9	48.5	8.2	**8.3****	**11.2****	**9.9****	**8.6****	**8.3****	**7.9****
Wahoo +	**71.6****	**59.6****	**60.4****	**60.0****	**57.7****	**55.3****		55.0	52.9	48.9	48.0	43.1	42.2	
Yellowstone +	**70.0***	**56.3***	**56.9***	**56.5***	**55.6***	**54.2***	**54.6****	54.2	53.5	46.9	50.5	50.0	51.1	50.5
Average	**63.0**	**52.7**	**53.4**	**53.4**	**51.6**	**50.5**	**55.2**	**41.1**	**43.2**	**40.0**	**41.4**	**38.5**	**38.5**	**38.3**
LSD (0.05)	**9.5**	**6.1**	**4.8**	**4.2**	**3.7**	**3.5**	**3.0**	**ns**	**19.1**	**14.8**	**12.6**	**11.0**	**10.2**	**10.9**
C.V. (%)	**7.3**	**8.2**	**8.0**	**7.9**	**8.2**	**8.5**	**8.8**	**56.8**	**31.1**	**32.2**	**30.5**	**32.1**	**32.9**	**36.6**

** = indicates highest yielding variety within a column sf = solid-stemmed sawfly resistant variety

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

(P) = Private Variety; + = Protected Variety; ++ = PVP Pending

1/ = Dwarf Smut Resistant; (HWW) = Hard White Winter Wheat

Table 13. Precipitation (top, in inches) and Average Monthly Temperature (bottom, °F) for Crop Year 2009-2010

Agricultural Research Center	Sept. 2009	Oct. 2009	Nov. 2009	Dec. 2009	Jan. 2010	Feb. 2010	Mar. 2010	Apr. 2010	May 2010	June 2010	July 2010	Aug 2010	Total Average
Western Triangle, Conrad	**0.41**	**0.77**	**0.00**	**0.41**	**0.53**	**0.14**	**0.14**	**2.03**	**3.03**	**3.79**	**2.29**	**1.98**	**15.52**
					1984-2010 Average = 11.35								
	62.6	36.2	36.9	12.6	20.4	22.9	37.5	40.5	44.3	55.7	62.4	62.1	41.2
Northern, Havre	**0.39**	**1.25**	**0.00**	**0.69**	**0.72**	**0.28**	**0.31**	**2.39**	**3.36**	**2.54**	**1.40**	**1.28**	**14.61**
					1916-2010 Average = 11.92								
	64.1	38.8	38.8	7.0	13.1	12.2	32.7	44.7	49.4	60.3	66.7	66.7	41.2
Northwestern, Kalispell	**0.04**	**1.72**	**0.37**	**2.66**	**1.42**	**0.66**	**0.72**	**3.47**	**2.45**	**5.03**	**1.25**	**1.35**	**21.14**
					1980-2010 Average = 20.16								
	60.1	38.9	35.3	18.0	26.4	31.4	37.9	41.2	47.1	56.0	61.9	61.4	43.0
Central, Moccasin	**0.81**	**2.91**	**0.19**	**0.34**	**0.42**	**0.48**	**0.18**	**1.10**	**3.36**	**2.61**	**1.47**	**3.78**	**17.65**
					1909-2010 Average = 15.29								
	63.2	35.2	39.1	15.7	26.6	25.4	40.6	41.6	45.7	56.5	63.6	64.6	43.2
Southern, Huntley	**0.28**	**1.93**	**0.16**	**0.46**	**0.77**	**0.69**	**0.36**	**0.85**	**2.66**	**3.15**	**2.08**	**2.80**	**16.19**
					1911-2010 Average = 13.31								
	63.0	39.0	37.0	14.3	19.6	21.2	42.1	46.2	51.6	63.5	70.2	70.6	44.9
Northeastern, Sidney	**0.71**	**2.14**	**0.02**	**0.82**	**0.78**	**0.35**	**0.29**	**1.13**	**6.44**	**2.94**	**2.54**	**2.27**	**20.43**
					1958-2010 Average = 13.91								
	57.8	40.5	38.5	8.8	13.9	11.5	35.5	48.8	53.4	64.8	70.7	70.9	43.0
Williston, N. Dakota	**0.38**	**1.58**	**0.02**	**0.24**	**0.25**	**0.07**	**0.19**	**0.92**	**4.65**	**2.10**	**2.41**	**3.14**	**15.95**
					1957-2010 Average = 14.32								
	67.2	39.9	39.1	8.6	13.5	12.2	34.5	48.2	53.0	64.8	71.0	70.9	43.6
Post Farm, Bozeman	**0.51**	**1.81**	**1.18**	**0.29**	**0.53**	**0.30**	**0.99**	**1.49**	**3.38**	**4.69**	**0.40**	**1.78**	**17.35**
					1958-2010 Average = 16.05								
	63.7	38.7	33.4	15.4	24.2	26.9	37.2	43.2	46.9	56.9	65.3	64.3	43.0

Table 14. Selected agronomic characters, cereal quality evaluations and disease reactions of hard winter wheat varieties.

	Agronomic Chararacters						Cereal Quality			Disease Reactions[8/]			
Variety	Maturity[1/]	Chaff Color	Winter Survival[2/]	Straw Strength[3/]	Stem solid[4/]	Coleoptile length[5/]	Milling[6/]	Baking[6/]	PPO[7/]	Dwarf Smut	Stripe Rust	Stem Rust	Leaf Spot Complex
Accipiter	M-L	White	5	MS		M	2	3	H	S	S	MR	-
AP 503 CL2	M	White	2	S		M	3	4	H	S	R	MR	-
Art	E	White	2	S		S	-	-	-	S	MR	-	-
Bearpaw	M	White	2	M	22	M	4	3	H	S	S	R	-
Boomer	M	White	4	S		S	-	-	-	S	S	-	-
Broadview	M	White	5	S		S	-	-	-	S	S	-	-
Bynum	M	Brown	2	M	19	L	5	4	M	S	R	MS	R
Carter	M	White	3	S	15	S	4	5	M	S	MR	MS	R
CDC Falcon	M	White	4	S	7	S	3	3	H	S	VS	MR	R
Curlew	M	Brown	2	S		M	4	3	L	R	R	VS	-
Decade	M	White	4	S		M	3	4	H	S	S	R	-
Genou	M	White	2	M	18	M	4	4	H	S	VS	S	S
Hyalite	E	White	3	S		S	3	3	L	S	VS	R	S
Jagalene	E	White	2	S		M	4	3	H	S	R	MR	MR
Jerry	M	White	5	M		M	3	3	H	S	MR	R	R
Judee	M	White	2	S	20	M	3	4	H	S	R	S	-
Ledger	M	White	2	S	11	M	5	3	M-H	S	MR	S	VS
Neeley	M-L	White	3	M	7	M	2	3	M	S	VS	S	MR
Norris	E	White	3	S		M	3	3	M	S	S	S	MR
Overland	E	White	3	S		M	3	2	M	S	R	R	-
Peregrine	M-L	White	5	MS		M	3	3	M	S	R	MR	-
Promontory	M	Brown	2	MS		S	4	3	L	R	R	VS	VS
Pryor	M	White	3	S		S	3	2	H	S	S	S	MR
Radiant	M-L	White	4	S		S	3	3	H	S	R	VS	-
Rampart	M	Brown	2	MW	21	L	4	5	M	S	R	MR	S
Robidoux	E	White	2	S		S	3	3	H	S	R	-	-
Rocky	E-M	White	3	MW		M	3	3	-	S	S	R	S
Settler CL	E	White	2	S		M	3	2	H	S	MR	R	-
Striker	M	White	4	S		S	-	-	-	S	S	-	-
Wahoo	E	White	4	S		S	2	2	H	S	S	R	MR
WB-Matlock	M-L	White	3	S		S	-	-	-	S	S	-	-
Yellowstone	M	White	4	S		S	3	4	M	S	R	MS	S

1/ VE = Very Early, E = Early, M = Medium, L = Late, VL = Very Late

2/ 5 = Best Winter survival (over several years at Sidney, Williston and Moccasin)

3/ W = Weak
MW = Medium Weak
M = Medium
MS = Medium Strong
S = Strong

5/ L = long
M = medium
S = short
- = no info.

6/ 5 = Superior
4
3
2
1 = Inferior

7/ PPO = Polyphenol Oxidase
(low is better for noodles)
L = low
M = medium
H = high

4/ scored 5-25, 25 = most solid
Combined Bozeman, Conrad, Havre, Moccasin, and Sidney data; 2007-2010
varieties with no number were not evaluated

8/ R = Resistant
MR = Moderately Resistant
M = Moderate
MS = Moderately Susceptible
S = Susceptible
VS = Very Susceptible
- = no information

Table 15. List of soft white winter wheat varieties.

Cultivar/ Line	Experimental Designation	Origin	Release Year	Pedigree
Public Varieties				
Eltan	**WA7431**	Washington	**1990**	Luke/8/(BR-70443-3, PI167822)/7/(CItr13438, (Norin 10/Brevor, Sel. 14, CItr13253)/6/(Sel. 53, CItr12597, (Turkey Red/Florence// Fortyfold /Federation/4/Oro//Turkey Red/ Florence/3/Oro //Fortyfold/Federation, Sel. 27-15, CItr12250) /5/Rio/Rex)
Finch	**WA7853**	Washington	**2002**	Dusty*2/3/(WA7164, VPM 1/Moisson 951// Yamhill/Hyslop)
Hubbard	**ID86-10420A**	Idaho	**2000**	Hill 81/Augusta
Lambert	**ID85-153**	ID, OR, WA	**1994**	Stephens/Sprague
Lewjain	**WA6363**	WA, OR, ID	**1982**	Luke/9/Super Helvia/8/Suweon 92/7/(Vogel 4, CItr13645, (Oro//Turkey Red/Florence/3/3* Elgin, Elgin Sel. 19)/4/Elmar/5/Illinois No. 1/6/ Vogel 1813)
MacVicar	**ORFW75336**	Oregon	**1992**	Yamhill/McDermid//Triticum spelta var. Alba /3/Suweon 92/Roedel/6/(Warrior//Atlas 66/ Comanche/3/Comanche/Ottawa, NE68513) /4/Hyslop/5/Backa
Masami	**WA7916**	Washington, Idaho	**2004**	MacVicar/3/(PI561031, WA7625, VPM/Moisson 951//2*Hill 81)
Rod	**WA7662**	Washington	**1992**	Luke/Daws//Hill 81
Simon	**ID91-34302A**	Idaho	**2003**	Haven/Lambert//Madsen
Stephens	**OR 65-116**	Oregon	**1977**	Nord Deprez/7/(Sel. 101, CItr13438, (Norin 10 /Brevor, Sel. 14, CItr13253)/6/(Sel. 53, (Turkey Red/Florence// Fortyfold/Federation/4/ Oro//Turkey Red/Florence/3/ Oro//Fortyfold/ Federation, Sel. 27-15, CItr12250)/5/ Rio/Rex)
Xerpha	**WA7937**	Washington	**2007**	Eltan/Estica
Private Varieties				
MAC-1	**PB1-85-WW-1**	Plant Breeders 1, Inc., Moscow, ID	**1992**	slection from a bulk of Daws/ CIMMYT/Pacific Northwest wheats
Mohler	**BU6W93-477, WPB00477**	Western Plant Breeders, Bozeman, MT	**2002**	Stephens/Madsen

Table 16. SOFT WHITE WINTER WHEAT: District 2 -- Bozeman - Dryland (Moderate Rainfall)

	Cultivar/Line	Grain Yield (bushels/acre)				2009 Data					
						Test	Heading Date		% Hail	Plant	Protein
		2009	2007//2009	2006//2009	2005//2009	weight	Julian	Calendar	damage	height	%
			2 yr	3 yr	4 yr	lb/bu			2-Jul		
R	**Eltan**	**124.6****	124.6	116.0	**114.1****	60.8	174.0	23-Jun	8.3	34.6	11.4
	Finch	**119.4***	113.0	105.4	103.1	61.5	176.3	25-Jun	13.3	34.3	11.5
	Hubbard +	**121.6***	115.4	105.5	104.7	60.3	174.0	23-Jun	8.3	39.1	11.6
	Lambert	110.9	110.3	104.3	104.6	60.3	171.0	20-Jun	6.7	36.0	11.4
	Lewjain	110.1	115.2	110.8	**106.2***	61.5	176.0	25-Jun	18.3	31.9	11.4
	MAC-1 (P)+	109.9	118.0	109.7	**107.7***	61.6	171.0	20-Jun	11.7	36.1	12.0
	MacVicar	106.9	108.1	99.4	98.8	60.2	171.7	21-Jun	8.3	33.2	11.0
	Masami +	**117.5***	114.4	104.7	101.7	59.2	176.7	26-Jun	18.3	33.2	10.9
	Mohler (P)+	109.6				60.1	172.3	21-Jun	8.3	35.0	11.4
	Neeley (HRW)	**115.5***	114.7	99.2	100.2	**62.2****	173.0	22-Jun	20.0	39.9	12.1
	Rod	113.0	113.7	104.7	105.1	59.4	174.7	24-Jun	11.7	32.4	11.4
	Simon +	**120.6***	122.1	113.2	**111.9***	60.9	171.0	20-Jun	8.3	34.4	11.4
	Stephens	95.4				61.5	174.0	23-Jun	50.0	32.3	11.5
	Xerpha	**123.4***	123.3			61.1	173.7	23-Jun	18.3	33.3	11.8
	Average	**114.2**	**116.1**	**106.6**	**105.3**	**60.8**	**173.5**	**23-Jun**	**15.0**	**34.7**	**11.5**
	LSD (0.05)	**9.6**	**ns**	**ns**	**8.9**	**0.5**	**1.0**		**6.4**	**1.1**	
	C.V.	**5.0**	**5.0**	**6.0**	**5.9**	**0.5**	**0.3**		**25.3**	**1.9**	

** = indicates highest yielding variety within a column

* = indicates varieties yielding equal to highest yielding variety within a column based on Fisher's protected LSD (p=0.05)

R = Recommended Variety; (P) = Private Variety; + = Protected Variety; ++ = PVP Pending

Table 17. Selected agronomic characters and disease reactions of soft white winter wheats.

Variety	Agronomic Characters			Diseases[3/]			
	Maturity[1/]	Winter Survival[2/]	Lodging[3/]	Dwarf Smut	Snow Mold	Stem Rust	Stripe Rust
Eltan	**L**	**2**	**MS**	**MR**	**MR**	**MS**	**R**
Finch	**M-L**	**2**	**MR**	**-**	**-**	**S**	**R**
Hubbard +	**M**	**2**	**MR**	**S**	**-**	**-**	**MR**
Lambert	**E-M**	**1**	**M**	**S**	**MS**	**-**	**R**
Lewjain	**L**	**1**	**M**	**MR**	**MS**	**MS**	**MR**
MAC-1 (P) +	**E-M**	**2**	**MR**	**-**	**-**	**-**	**R**
MacVicar	**E-M**	**1**	**MR**	**S**	**S**	**MS**	**R**
Masami +	**M-L**	**-**	**-**	**-**	**-**	**-**	**MR**
Mohler (P)+	**E-M**	**-**	**-**	**-**	**-**	**-**	**-**
Rod	**M-L**	**1**	**MR**	**S**	**S**	**MS**	**R**
Simon +	**E**	**2**	**MR**	**-**	**-**	**-**	**R**
Stephens	**M**	**1**	**R**	**S**	**S**	**MS**	**R**
Xerpha	**M-L**	**-**	**-**	**-**	**-**	**-**	**R**

(P) = Private Variety; + = Protected Variety; ++ = PVP Pending

1/ E = Early; M = Medium, L = Late

2/ 5 = Best Winter survival (over several years at Moccasin)

3/ VR = Very Resistant
R = Resistant
MR = Moderately Resistant
M = Moderate
MS = Moderately Susceptible
S = Susceptible
- = no information

Additional Descriptive Information for Winter Wheat Varieties

Hard Winter Wheat

New for the 2011 Bulletin:

Art – hard red winter wheat developed by Syngenta (AgriPro) Seeds in 2007. Art is an early maturing, short statured wheat, with white chaff. Art has average yield, above average test weight and protein, and below average winter hardiness. Art is moderately resistant to stripe rust. PVP, Title V has been issued (Certificate #200700349).

Bearpaw (MTS0721) – hard red winter wheat developed by the Montana Agricultural Experiment Station in 2011. Bearpaw is a white-glumed, solid-stem, semi-dwarf (*Rht1*) wheat with medium maturity. Bearpaw has average yield, test weight, and protein, and below average winter hardiness. Bearpaw is resistant to prevalent races of stem rust but susceptible to stripe and leaf rust. Stem-solidness of Bearpaw is most similar to Rampart. Bearpaw is a high PPO variety with above average milling and average baking properties. PVP, Title V will be applied for.

Boomer– hard red winter wheat developed by WestBred (Monsanto) in 2009. Boomer is a medium maturing, medium statured wheat, with white chaff. Boomer has average yield and protein, below average test weight, and above average winter hardiness. Boomer is susceptible to stripe rust. PVP, Title V will is pending (Certificate #201100050).

Broadview– hard red winter wheat developed by the Lethbridge, Alberta winter wheat breeding program in 2009. Broadview is a medium maturing, medium statured wheat, with white chaff. Broadview has above average yield, average test weight and protein, and excellent winter hardiness. Broadview is susceptible to stripe rust.

Judee (MTS0713) – hard red winter wheat developed by the Montana Agricultural Experiment Station in 2011. Judee is a white-glumed, solid-stem, semi-dwarf (*Rht1*) wheat with medium maturity. Judee has average yield, test weight, and protein, and below average winter hardiness. Judee is susceptible to prevalent races of stem and leaf rust but resistant to stripe rust. Stem-solidness of Judee is most similar to Genou. Judee is a high PPO variety with average mill and above average bake properties. PVP, Title V will be applied for.

Robidoux – hard red winter wheat developed by Nebraska in 2010. Robidoux is an early maturing, medium statured wheat, with white chaff. Robidoux has above average yield, average test weight, and below average protein, and winter hardiness. Robidoux is resistant to stripe rust. Robidoux is a high PPO variety with average mill and bake qualities. PVP, Title V will be applied for.

Striker – hard red winter wheat developed by WestBred (Monsanto) in 2009. Striker is a medium maturing, short statured wheat, with white chaff. Striker has below average yield, average test weight and protein, and above average winter hardiness. Striker is susceptible to stripe rust. PVP, Title V will is pending (Certificate #201100049).

WB-Matlock – hard red winter wheat developed by WestBred (Monsanto) in 2010. WB-Matlock is a medium to late maturing, medium tall statured wheat, with white chaff. WB-Matlock has average yield, above average test weight and protein, and average winter hardiness. WB-Matlock is susceptible to stripe rust. PVP, Title V will be applied for.

Varieties previously in bulletin:

Accipiter – hard red winter wheat developed by the Crop Development Center, Saskatoon, Saskatchewan and registered in 2008. Accipiter is a medium to late maturing average height wheat with white chaff. Accipiter has above average yield, below average test weight and protein, and excellent winter hardiness. Accipiter is susceptible to stripe rust and moderately resistant to stem rust. Accipiter has below average milling and average baking quality.

AP503 CL2 – a 2-gene CLEARFIELD hard red winter wheat released by AgriPro in 2007. AP503 CL2 is a medium maturing short wheat with white chaff. AP503 CL2 has below average yield, above average test weight, average protein, and below average winter hardiness. AP503 CL2 appears resistant to stripe rust and moderately resistant to stem rust. AP503 CL2 has average milling and above average baking quality. PVP, Title V has been issued (Certificate #200800322). Additionally, the CLEARFIELD gene is patented.

Bynum – a CLEARFIELD (CL) wheat with imidazolinone tolerance, developed by the Montana Agricultural Experiment Station in 2005 and licensed to WestBred LLC. Bynum is a solid stem "Rampart-type" CLEARFIELD hard red winter cultivar similar in most characteristics to Rampart. It is lower yielding than Norris and similar in yield to MT1159CL. Bynum has a solid stem, high grain protein, and excellent bread baking quality. Bynum is resistant to stripe rust and has some resistance to stem rust. PVP, Title V has been issued (Certificate #200600285). Additionally, the CLEARFIELD gene is patented.

Carter – a semi-solid stem hard red winter wheat released by WestBred LLC in 2007. Carter is a medium maturity semidwarf wheat. It has average yield, test weight, and winterhardines and good protein. Carter is moderately susceptible to stem rust and moderately resistant to stripe rust. Carter has above average milling and baking quality. PVP, Title V has been issued (Certificate #200800383).

CDC Falcon – hard red winter wheat developed by the Crop Development Center, Saskatoon, Saskatchewan and registered in 1998. Licensed to WestBred LLC. Superior stem and leaf rust resistance over all current winter wheat varieties in western Canada. High yield, good winter-hardiness, semidwarf, short strong straw, especially good for direct seeding and straight cut harvest. CDC Falcon is moderately resistant to stem rust and susceptible to stripe rust. It is rated as having acceptable milling and baking quality. CDC Falcon is protected under the Plant Variety Protection Act, but not the Title V option (Certificate #200800322).

Curlew – hard red winter wheat released by Utah in 2009. Curlew is an early to medium maturing tall wheat with brown chaff. In the initial year of testing in Montana, Curlew had above average yield and test weight and average protein. Curlew appears resistant to stripe rust but very susceptible to stem rust. Curlew is resistant to dwarf bunt. Curlew has above average milling and average baking properties. It is a low PPO variety.

Decade – hard red winter wheat developed by the Montana Agricultural Experiment Station and released jointly with North Dakota (pending at publication) in 2010. Decade is an early to medium maturing reduced height wheat with white chaff. Decade is a high yielding wheat with good winter hardiness and medium to high test weight and protein. Decade is resistant to prevalent races of stem and stripe rust. Decade has excellent milling and baking quality. Seed available fall 2010. PVP, Title V will is pending (Certificate #201100096).

Genou – a solid-stem hard red winter wheat with improved yield potential and cold tolerance relative to Rampart. Stem solidness is relatively good, although not as good as Rampart. Test weight, maturity, plant height, grain protein, and end-use qualities are similar to those of Rampart and Vanguard. Genou is susceptible to both stem and stripe rust. Foundation seed was made available in fall of 2004. Genou (French for knee) is named after a school house in The Knees area of Chouteau County. PVP with Title V option has been issued (Certificate #200500334).

Hyalite – a CLEARFIELD (CL) wheat with imidazolinone tolerance, developed by the Montana Agricultural Experiment Station in 2005 and licensed to WestBred LLC. Hyalite is a good yielding hard **white** winter CLEARFIELD cultivar. Hyalite is significantly higher in yield than other CLEARFIELD checks, similar in yield to Neeley, and better yielding than NuSky and NuWest. Hyalite has average test weight, good crop tolerance to herbicide, and is relatively early in heading compared to Montana varieties. Hyalite is resistant to stem rust and very susceptible to stripe rust. Grain protein of Hyalite is above average and milling and baking characteristics are acceptable. It has low PPO and could be used as a dual-purpose (bread and noodles) variety. PVP, Title V has been issued (Certificate #200600291). Additionally, the CLEARFIELD gene is patented.

Jagalene – Developed from the cross "Abilene/Jagger" and released by AgriPro in 2003. Jagalene is a hollow-stemmed hard red winter variety. It has been tested in Montana Intrastate Trials and Off-Station trials during the 2003 through 2005 seasons. It has exhibited consistently high yields in Crop Reporting Districts 1 through 5. Jagalene has excellent test weight ranking higher than all checks. It is a semi-dwarf with height shorter than all checks except CDC Falcon. Lodging resistance is very good. It has early heading, nearly 6 days earlier than Neeley and earlier than all checks. Winterhardiness levels would be considered average to below average. It has excellent general disease resistance, including the entire soil virus complex, stem rust, stripe rust, tan spot and septoria. Protein is average compared to the checks. Jagalene has excellent milling and very good baking characteristics. This variety is protected under the Plant Variety (Certificate #200200160) Protection Act and can only be sold or advertised by variety name as a class of certified seed.

Jerry – hard red winter wheat released by North Dakota State University in 2001. It is white-chaffed and awned and similar in maturity to Roughrider. Jerry has good winter hardiness and is a top yielder in areas where winterkill can occur. Jerry has average test weight and protein under Montana conditions. It has good resistance to prevalent races of stem and leaf rust and is moderately resistant to stripe rust. Mixing properties and baking performance are equal to Roughrider.

Ledger – hard red winter wheat developed by WestBred LLC and released in 2004. Ledger is an early maturing wheat, semidwarf wheat with average winter hardiness. The Montana Intrastate Winter Wheat Program testing shows this variety to be of average yield and protein with above average test weight. Ledger is moderately resistant to stripe rust and susceptible to stem rust. Milling and baking characteristics are acceptable. Ledger is protected under the Plant Variety Protection Act, but not the Title V option (Certificate #200600063).

Neeley – Developed and released in 1980 by USDA-ARS and the Idaho Agricultural Research Station. It is a hard red wheat. It is a semidwarf variety with intermediate maturity. Neeley is susceptible to stem rust and very susceptible to stripe rust. Neeley has average protein and winter-hardiness.

Norris - a CLEARFIELD (CL) wheat with imidazolinone tolerance, developed by the Montana Agricultural Experiment Station in 2005 and licensed to WestBred LLC. Norris is a high yielding hard red winter CLEARFIELD cultivar that could replace MT1159CL once seed becomes available. Norris is significantly higher in yield than other CLEARFIELD checks and similar in yield to Neeley. Norris has high test weight, good crop tolerance to herbicide, and is relatively early in heading compared to Montana varieties. Grain protein of Norris is relatively low, but milling and baking characteristics are acceptable. Norris is susceptible to both stem and stripe rust. PVP, Title V has been issued (Certificate #200600286). Additionally, the CLEARFIELD gene is patented.

Overland – hard red winter wheat developed in Nebraska and released jointly with South Dakota in 2007. Overland is an early maturing average height wheat with white chaff. In the initial year of testing in Montana, Overland had average yield, test weight, and protein. Overland appears resistant to both stripe and stem rust. Overland has average milling and below average baking quality. PVP, Title V has been issued (Certificate #200700333).

Peregrine – hard red winter wheat developed by the Crop Development Center, Saskatoon, Saskatchewan and registered in 2008. Peregrine is a medium to late maturing tall wheat with white chaff. Peregrine has average yield, above average test weight, below average protein, and good winter hardiness. Peregrine appears resistant to stripe rust and moderately resistant to stem rust. Peregrine has average milling and baking quality.

Promontory – Released by the Utah Agricultural Experiment Station in 1991. It is a hard red winter wheat of medium height with awns and bronze chaff. Promontory is a high yielding line with excellent test weight. It has poor winterhardiness. Promontory is resistant to dwarf bunt and stripe rust and susceptible to stem rust. Promontory has average milling and above average baking characteristics. It has low PPO and could be used as a dual-purpose (bread and noodles) variety.

Pryor – hard red winter wheat released by Western Plant Breeders in 2002. Pryor is a white chaffed, awned variety with short stature and medium winter hardiness. Pryor is a high yielding variety with average test weight and below average protein. It is susceptible to stem rust and stripe rust and moderately resistant to leaf spot complex. Pryor has average milling and below average baking characteristics. This variety is protected under the Plant Variety Protection Act without the Title V option (Certificate #200400072).

Radiant – hard red winter wheat released by Alberta in 2002 and marketed by Meridian Seeds. Radiant is a medium to late maturing, medium tall wheat with white chaff. Radiant has good winter hardiness in North Dakota tests. In the initial year of testing in Montana, Radiant had average yield, average test weight, and below average protein. Radiant appears resistant to stripe rust and very susceptible to stem rust. Radiant has average milling and baking quality.

Rampart – Released by the Montana Agricultural Experiment Station in 1996. It is an awned, red chaffed, solid-stemmed hard red winter wheat variety. The kernel is long with a sloping back and a heavy brush. The cheeks are rounded to angular with an open crease. Rampart is resistant to the wheat stem sawfly. It is moderately resistant to prevalent races of stem rust. Rampart is resistant to stripe rust. It is susceptible to leaf rust, dwarf smut and the Russian wheat aphid. Rampart has excellent milling and baking properties and is a sister line to Vanguard.

Rocky – A pure line selection from Centurk developed and released by Nickerson American Plant Breeders (now Agripro Seed Company) in 1978. Rocky is a hard red winter wheat that has white glumes and awns. It is similar in most characteristics to Centurk but differs in glume shape and beak length and has better resistance to soil born mosaic. Rocky is resistant to stem rust, but susceptible to stripe rust. Rocky tends to be about three to four days later in heading than Centurk but dries down for harvest as early as Centurk. Rocky is adapted to the same areas as Centurk, but has superior yields under most conditions. Rocky has average milling and baking qualities when compared to Redwin.

Settler CL – a single gene CLEARFIELD (CL) hard red winter wheat developed in Nebraska and released jointly with South Dakota and Wyoming in 2008. Settler CL is an early maturing reduced height wheat with white chaff. In the initial year of testing in Montana, Settler CL had average yield, test weight, and protein. Settler appears to be moderately resistant to stripe rust and resistant to stem rust. Settler CL has average milling and below average baking quality. PVP, Title V has been issued (Certificate #200900104). Additionally, the CLEARFIELD gene is patented.

Wahoo – hard red winter wheat released jointly by Nebraska and Wyoming in 2000. Wahoo is a semidwarf, early maturing white chaffed variety. It has above average yield, below average test weight, and average protein under Montana conditions. Wahoo is resistant to stem rust and leaf rust, but susceptible to stripe rust, wheat streak, and barley yellow dwarf viruses. Milling and baking characteristics are below average. This variety is protected under the Plant Variety Protection Act and can only be sold or advertised by variety name as a class of certified seed (Certificate #200100237).

Yellowstone – hard red winter wheat developed by the Montana Agricultural Experiment Station and released to seed growers in 2005. Yellowstone is a very high yielding winter hardy variety with medium test weight, maturity, height, and grain protein. Yellowstone has excellent baking and good Asian noodle quality. It is moderately resistant to TCK smut and resistant to stripe rust, but susceptible to stem rust. Yellowstone potentially could occupy acreage currently planted to Neeley, Tiber CDC Falcon, Paul, Promontory, and Morgan. PVP, Title V has been issued (Certificate #200600284).

Soft White Winter Wheat

Eltan – Developed cooperatively by USDA-ARS and the Washington Agricultural Experiment Station and released jointly by the Washington, Oregon and Idaho AES in 1990. Eltan is a semidwarf, soft white winter wheat. The spike is awned and white chaffed. It is resistant to dwarf bunt (TCK), snow mold and common bunt. Eltan is moderately susceptible to prevalent races of stripe rust, but susceptible to stem rust and leaf rust.

Finch – Developed by the Washington AES and released in 2002. Finch is an awned, white chaffed medium-late maturing soft white winter wheat. It has resistance to strawbreaker foot rot, stripe rust and powdery mildew. Yield potential similar to Eltan, test weight better than Eltan in limited Montana testing.

Hubbard – Tall semidwarf with good straw strength developed by the Idaho AES and released in 2000. Good resistance to stripe rust; susceptible to cephalosporium stripe, strawbreaker foot rot, Septoria tritci blotch, common bunt and dwarf bunt. Yield potential and test weight better than Eltan in limited Montana testing. This variety is protected under the Plant Variety Protection Act and can only be sold or advertised by variety name as a class of certified seed (Certificate #200300007).

Lambert – Developed by the Idaho AES and jointly released in 1995 by the Idaho, Oregon and Washington Agricultural Experiment Stations. Lambert is an awned, semidwarf, soft white winter wheat, The kernels are soft, white and ovate, with a mid-deep crease and a mid-sized germ. It is resistant to stripe rust, more tolerant than Stephens to both Cephalosporium stripe and snow mold. Lambert is susceptible to strawbreaker foot rot and dwarf bunt. Lambert's quality characteristics have been accepted by industry.

Lewjain – developed and jointly released by the Washington AES and the USDA-ARS in 1982. It is a semidwarf, soft white winter wheat. It is white chaffed, awned, with a common head type. Lewjain is resistant to some races of common smut and dwarf smut. In the adult stage it is resistant to stripe rust and moderately resistant to *Cephalosporium gramineum*. It is susceptible to leaf rust, stem rust, flag smut and foot rot.

MAC-1 – soft white winter developed by Plant Breeders 1, Moscow, ID in 1992. Currently licensed to Lake Seeds in Ronan, MT. Above

average yield and test weight in first year of testing at Bozeman and Kalispell. High protein for soft white winter wheat. This variety is protected under the Plant Variety Protection Act and can only be sold or advertised by variety name as a class of certified seed (Certificate #9100217).

MacVicar – Jointly released in 1980 by the Washington AES and the USDA-ARS. The spike is awned, white chaffed, fusiform and lax. Kernels are white, mid-long, ovate to elliptical, the crease is narrow and shallow. The brush is mid-long and cheeks are rounded. The glumes are glabrous, mid-long, mid-wide with narrow acuminate beaks and shoulders are wanting.

Masami - developed by Washington State University and released, jointly with Idaho, in 2004. Masami is an awned, white-chaffed semidwarf soft white winter wheat. It is targeted to replace Eltan and Madsen in all precipitation zones of eastern Washington as it consistently produces higher grain yields, especially in those areas where foot rot is a problem for Eltan and cold hardiness is a problem for Madsen. When compared to Eltan, Madsen, and Rod, extensive data indicate that Masami is equal or superior in grain yield, cold-hardiness, end-use quality, and resistance to stripe rust and foot rot. PVP has been applied for without Title V option (Certificate #200600244).

Mohler – soft white winter wheat developed by WestBred and released in 2002. Mohler is an early to medium maturing average height wheat with white chaff. In the initial year of testing in Montana, Mohler had below average yield, below average test weight, and average protein. Overland appears resistant to stripe rust. PVP, Title V has been issued (Certificate #200400304).

Rod – Developed by Washington State University in cooperation with USDA-ARS. Released jointly by the Washington, Oregon and Idaho AES. Rod has some winter-hardiness (similar to Stephens), moderately weak straw and medium-late heading. Resistant to local races of stripe rust and common bunt, but susceptible to dwarf bunt, stem rust, leaf rust and snow mold.

Simon – Early maturing semidwarf developed by the Idaho AES and released in 2003. Yield potential similar to Eltan, test weight better than Eltan in limited Montana testing This variety is protected under the Plant Variety Protection Act and can only be sold or advertised by variety name as a class of certified seed (Certificate #200500001).

Xerpha – soft white winter wheat released by Washington in 2007. Xerpha is a medium to late maturing, white chaffed semidwarf wheat. Xerpha had above average yield, above average test weight, and average protein. Xerpha appears resistant to stripe rust. PVP, Title V has been issued (Certificate #200900289).

Plant Variety Protection

The Plant Variety Act, signed into law in 1970, offers legal protection to developers of new varieties of plants which reproduce sexually – that is, through seeds. The law provides for a Plant Variety Protection Office in the U.S. Department of Agriculture. The office receives and processes applications and when "novelty" is established, issues a certificate granting protection rights specified by the applicant.

The owner (or developer) holding a "certificate of protection" has complete control over the variety for 20 years. The law provides two types of protection:

1. Without Seed Certification
The owner of the protected variety may exclude others from reproducing the variety, selling it, offering it for sale, importing or exporting it, or use it in the commercial production of a hybrid or a different variety without permission. In this sense, the owner of a protected variety may bring civil damage action against anyone who infringes upon his rights.

2. Certified Seed Option
The owner may specify that the seed of his variety "…be sold or advertised only as a class of Certified Seed". Production and sale of such seed by variety name, when not certified, constitute a violation of the Federal Seed Act. This means of protection may be used extensively for publicly as well as privately developed varieties.

Amendments to the Plant Variety Protection Act (PVPA) have passed both houses of Congress and been signed into law by the President. These amendments went into effect in 1995. The farmers exemption has been changed for new varieties. Seed for varieties issued a certificate after April 4, 1995, may only be purchased from the owner or his agent. A farmer can only save seed of these varieties for use on his own farm and cannot sell seed of the protected variety to his neighbor.

A variety protected under the certification option does not permit a farmer producing seed to sell or offer for sale or advertise by variety name unless it is certified. Sale of such seed by variety name as uncertified seed will constitute a violation of the Federal Seed Act. Interstate movement of seed is subject to inspection by Federal Seed Control officials. Seed within the state is subject to inspection by State Department of Agriculture inspectors.

Owners of protected varieties will give public notice that their variety is protected by affixing to the label or container the words: “Unauthorized Propagation Prohibited” or the words, “Unauthorized Seed Multiplication Prohibited”. Producers must check the label (tag) or the container for the above wording.

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