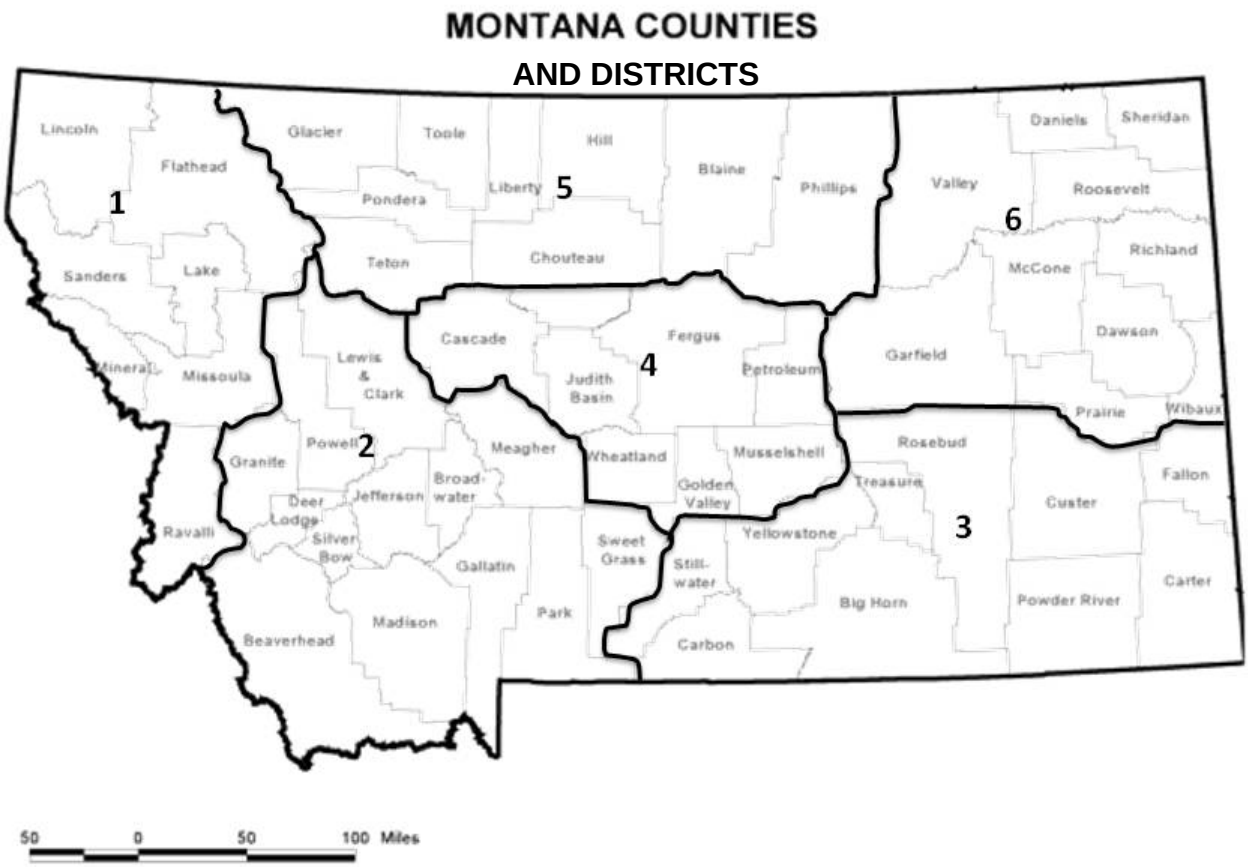
2009
WINTER WHEAT VARIETIES

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

Revised February 2009

2009 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
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
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

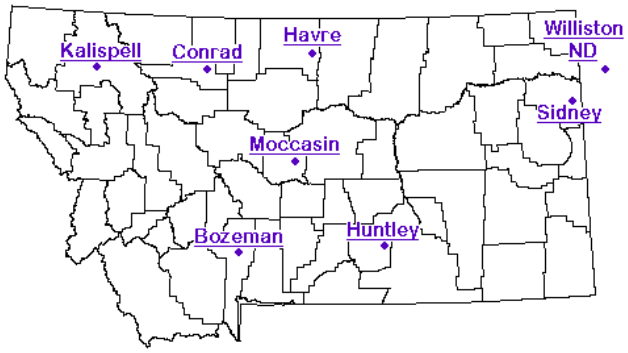

Fig. 1. Test Locations for Montana winter wheat performance tests in 2008.

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. The Kalispell test was dropped for the 2008 crop year.

Entries

Names of commercially available entries evaluated in 2008 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-eight hard wheats are included in this summary comprising 30 varieties (18 public and 12 private) and 18 experimental lines (11 public and 1 private). Numbered entries preceded by a state designation [e.g. MT0495 (Montana), WA8023 (Washington)] are experimental lines provided by the breeder of the originating state. Private experimental lines [e.g. BZ9W02-2051 (WestBred)] are submitted for testing on a fee basis. The soft white evaluation contains 12 varieties [10 soft white, 1 private, and one hard wheat check (Neeley).]

Experimental Design and Seeding Methods

The Intrastate Winter Wheat Test consisted of a 49 entry test (1 variety was dropped from the analysis because the wrong seed was planted) with 3 replicates. It was planted in the form of 7x7 lattice at all locations except Kalispell, where it was in a randomized complete block design. 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 2008. Fall nitrogen (N), phosphorus (P_20_5) and potassium (K_2O) were preplant applied and incorporated.

Location	2007 Crop	2006 Crop	2007 Planting Date	Fertilizer N Fall	Fertilizer N Spring	Fertilizer P_2O_5	Fertilizer K_2O	2008 Harvest Date
				--------- Pounds per acre ---------				
Kalispell	**fallow**	**barley**	**Sep 13**	**30**	**60**	**30**	**30**	**Aug 12**
Bozeman	**fallow**	**spring wheat**	**Sep 10**	**92**	**-**	**0**	**0**	**Hail out**
Huntley	**chem. fallow**	**fallow**	**Sep 26**	**30**	**-**	**30**	**0**	**July 29**
Moccasin	**chem. fallow**	**barley**	**Sep 18**	**10**	**60**	**10**	**10**	**Aug 12**
Conrad	**fallow**	**barley**	**Sep 17**	**71**	**-**	**52**	**0**	**Aug 12**
Havre	**fallow**	**barley**	**Sep 21**	**70**	**-**	**40**	**25**	**Aug 6**
Sidney	**fallow**	**safflower**	**Sep 18**	**36**	**-**	**92**	**0**	**Aug 1**
Williston, ND	**fallow**	**safflower**	**Sep 12**	**51**	**-**	**25**	**9**	**July 31**

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 2008, data is provided for two (2007-2008), three (2006-2008) and four (2005-2008) 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 Julian days (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 2008, Sidney and Williston had significant stand loss due to winter kill.

Table 11 contains information on % winter survival and associated yield in winter-kill environments from 2003 to 2008. The data summarizes 13 tests in which significant winter-kill occurred (test average for winter survival was less than 90%). Eleven 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', 'Rampart' and were released in 1995 and 1996, respectively. These 2 varieties were planted on 9% of the winter wheat acreage in the 2008 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 two years. In 2008, Genou was planted on 20% 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 9 testing locations where sawfly pressure was present during the years 2003-2008. The data is from Havre and a site 25 miles north of Havre. 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 quantitave polyphenol oxidase (PPO) was determined for varieties in the 2006 and 2007 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 2008 data for hard winter wheat collected at all harvested experiment station sites. Tables 16 - 17 contain 2007 data for the soft white wheats. 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.

2008 Test Conditions

Statewide winter wheat yields were moderate and projected by the Montana Agricultural Statistics Service at 39 bu/a for 2008 compared to 38 bu/a for the 2007 harvest year. The harvested acreage in 2008 was 2.42 million acres (total production = 94.4 million bu) compared to 2.19 million acres in 2007 (83.2 million bu). Rainfall for the 2007-2008 winter wheat season was generally adequate at all locations except Sidney and Williston. Test weight averaged 60.5 lb/bu across all locations (Havre, Sidney, Williston, and Moccasin were below 60 lb/bu). Winterkill at Williston (9% survival across varieties, range 0-70%) and Sidney (27% survival

across varieties, range 6-52%) reduced yields of all varieties.

Stripe rust was present in plots at Bozeman, but at a lesser level than in previous years. Stripe rust was not a factor at Kalispell for 2008. There was sawfly cutting at the Havre Experiment Station averaging 23% of stems cut across varieties (range = 4 – 48%). Stem cutting was also observed at Conrad.

Protein content averaged near 13% across all locations (location range = 11.5 – 14.9%) tested. Huntley and Conrad were below 12%. The range of genotype means across all locations was 12.0-14.1%.

Leading winter wheat varieties planted for 2008 were Genou (19.7%), CDC Falcon (13.4%), Yellowstone (8.4%), Rampart (7.3%), Ledger (5.9%) and Jagalene (5.4%).

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.

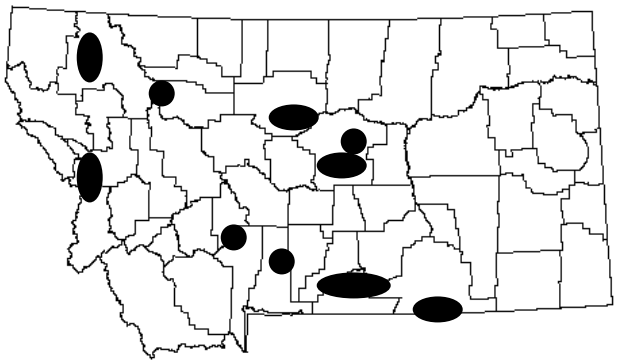

Fig. 2. Known areas of dwarf smut (TCK) infestations.

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 and Vanguard, which are not competitive in the absence of wheat stem sawfly, are recommended in Districts 3, 4 and 5 for sawfly areas only. Only five 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
Alice (HWW)	**SD97W609**	South Dakota	**2006**	Abilene/Karl
Bill Brown	**CO01385-A1**	Colorado	**2007**	Yumar/Arlin
Bond CL	**CO00D007**	Colorado	**2004**	Yumar//TXGH12588-120*4/FS2
Darrell	**SD98102**	South Dakota	**2006**	2076-W12-11/Karl 92/7/(NE89526, Lancota sel/Siouxland/6/ (TX79A2729, TAM W-103/5/ (KS73167, Pitic 62/Chris sib// 2*Sonora 64 /3/Klein Rendidor/4/ Scout)))
Genou	**MTS0031**	Montana	**2004**	(Lew/Tiber//Redwin, MTS92015)/3/Vanguard/ Norstar
Jerry	**ND9257**	North Dakota	**2001**	Roughrider//(ND7571, Winoka/NB66425)/3/ Arapahoe
Neeley	**IDO158**	Idaho	**1980**	Heglar/3/Norin 10/Staring//2*Cheyenne
NuSky	**MTW9441**	Montana	**2001**	NuWest/Tiber
Peregrine	**DH99-37-100**	Saskatchewan	**2008**	McClintock/S86-808
Promontory	**UT1567-51**	Utah	**1990**	Manning/Bezostaya-1
Rampart	**MTS92042**	Montana	**1996**	Lew/Tiber//Redwin
Ripper	**CO0016**	Colorado	**2006**	((PI 220127/Plainsman V//TAM 200/ KS87H66), KS94WGRC29 sib, CO940606)/3/(TAM 107 R2, Prarie Red
Tiber	**MT8003**	Montana	**1988**	Redwin pure line selection
Vanguard	**MTSF2238**	Montana	**1995**	Lew/Tiber//Redwin
Wahoo	**NE94654**	Nebraska, Wyoming	**2000**	Arapahoe*2/Abilene
Wendy (HWW)	**SD97W604**	South Dakota	**2004**	(Gent/Siouxland, SD89333)//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)
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
Hawken	**98x0435-15**	AgriPro	**2007**	(Heyne sib/3//(W87-085, ((Vona/ W76-1141, W81-133)// Thunderbird W95-091)/5/(W96-427, Arlin/4/ (WI90-431, (F2SPS-102/TAM W-101, 84PY1003-106)/3/(84PD007-16-1, RPB/Mustang/W80-425))
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
NuWest (HWW)	**MT7811**	Montana, General Mills	**1994**	Froid/Winoka/7/((Sinvalocho/Wichita//Hope/ Cheyenne/3/ Wichita/4/ Seu Seun 27, TX55-391-56-D8)/5/Westmont, MT6928)/6/Trader
Pryor	**BZ9W96-919**	WestBred LLC	**2002**	Hatten/Abilene
Rocky	**NA 1316**	AgriPro	**1978**	Centurk pure line selection

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

	Cultivar/Line	Grain Yield (bushels/acre)				2008 Data					
						Test	Heading Date		Plant	Lodging	Protein
		2008	2007-2008	2006-2008	2005-2008	weight	Julian	Calendar	height		
			2 yr	3 yr	4 yr	lb/bu			in	%	%
	Accipiter	**142.4***				65.2	169.3	17-Jun	39.7	25	11.0
	Alice (HWW)+	124.5	**110.4***			63.8	160.3	8-Jun	35.1	0	13.1
	AP 503 CL2 (P, CL)+	116.7				64.6	166.8	15-Jun	35.5	1	12.4
	Bill Brown ++	**140.6***				64.9	161.5	10-Jun	36.0	15	10.8
	Bond CL (CL)+	126.8	**110.4***	**95.5***	86.5	63.4	158.4	6-Jun	39.0	50	12.0
	Bynum (P, CL)+	115.2	98.4	85.2	90.9	65.2	163.4	11-Jun	41.4	38	13.7
	BZ9W02-2051 (P)	133.4	**110.3***			65.8	168.6	17-Jun	37.6	27	11.0
	Carter (P)++	126.4	**112.8***	95.2	88.5	65.0	166.1	14-Jun	34.7	4	12.2
	CDC Falcon (P)	**138.8***	**121.5***	**99.9***	**92.5***	64.2	167.3	15-Jun	35.4	2	11.4
	Darrell +	106.9	103.3			64.0	162.5	11-Jun	37.7	6	13.7
	Genou +	127.1	107.0	93.7	87.4	65.0	167.5	16-Jun	41.3	72	12.8
	Hawken (P)+	128.9	108.8			64.6	157.5	6-Jun	33.5	4	12.3
	Hyalite (P, CL, HWW)+	**134.8***	**111.2***	91.2	84.8	63.9	164.4	12-Jun	39.7	15	13.0
R	**Jagalene (P)+**	**145.5***	**123.5***	**101.9***	**106.9***	65.5	165.8	14-Jun	37.0	2	12.6
	Jerry	105.8	97.2	83.9	83.3	63.1	168.0	16-Jun	42.3	80	13.8
	Ledger (P)+	**138.6***	**118.9***	**100.1***	**97.6***	64.9	164.5	13-Jun	37.6	6	11.9
	MT0495	**141.7***	**126.0****	**109.3****		65.3	167.2	15-Jun	38.1	3	11.2
	MT0552	**138.2***	**117.2***			65.6	165.3	13-Jun	38.1	5	11.7
	MT06102	**136.7***				64.3	164.3	12-Jun	41.8	4	12.9
	MT06103	**140.9***				64.7	164.7	13-Jun	40.6	1	13.4
	MT0641	111.4				65.0	164.2	12-Jun	38.9	33	11.3
	MT0686	109.0				64.0	167.8	16-Jun	44.2	61	12.1
	MT0688	111.3				63.7	167.9	16-Jun	39.8	61	11.6
	MTS04114 (HWW)	**140.7***	**120.4***	**98.1***		64.7	167.7	16-Jun	39.2	13	11.9
	MTS04120	**140.2***	**117.0***	**98.1***		65.6	167.9	16-Jun	41.9	8	11.4
	MTS0531 (HWW)	**134.9***	**117.5***			63.6	167.5	16-Jun	37.7	21	12.3
	MTS0532 (HWW)	**141.5***	**120.5***			64.6	166.9	15-Jun	37.3	12	12.0
	MTS0608	106.4				63.7	166.0	14-Jun	40.0	86	14.0
	MTS0633	118.0				63.9	168.3	16-Jun	41.6	63	14.4
	MTS0705	109.6				64.7	169.9	18-Jun	42.6	85	13.4
	MTS0713	**146.0***				65.2	167.8	16-Jun	37.3	10	11.1
	MTW06118 (HWW)	**146.8****				66.1	167.8	16-Jun	41.0	3	10.9
	Neeley	119.4	102.1	88.5	73.2	64.1	169.8	18-Jun	40.4	57	11.3
	Norris (P, CL)+	122.9	105.5	88.3	86.6	65.4	166.5	15-Jun	41.7	39	12.6
	NuSky (HWW)	119.7	96.4	76.5	63.7	63.8	169.6	18-Jun	41.7	43	10.6
	NuWest (P, HWW)+	110.5	95.4	75.9	63.1	64.3	169.3	17-Jun	42.8	77	11.8
	Peregrine	126.6				65.1	169.0	17-Jun	46.3	22	11.3
R	**Promontory** [1/]	**142.1***	**122.3***	**105.2***	**111.6***	66.0	167.8	16-Jun	40.7	31	11.0
	Pryor (P)+	**143.3***	**115.8***	**100.9***	89.4	64.3	168.3	16-Jun	35.1	0	10.6
	Rampart	102.4	92.0	86.0	87.8	63.9	167.9	16-Jun	41.2	74	14.1
	Ripper +	**141.7***	**114.1***			63.9	157.7	6-Jun	34.4	0	12.7
	Rocky (P)	102.8	99.0	86.5	81.4	64.5	167.9	16-Jun	43.2	91	12.2
	Tiber	123.2	107.5	93.0	88.5	64.6	170.2	18-Jun	45.7	60	12.1
	Vanguard	111.6	97.2	81.5	83.7	64.2	168.1	16-Jun	43.1	72	14.8
	WA8023	123.9				63.8	170.5	19-Jun	42.3	4	11.2
	Wahoo +	132.7	**116.5***	**99.3***	**91.6***	63.9	162.9	11-Jun	37.7	23	11.7
	Wendy (HWW)+	117.9	**112.0***	92.5		64.7	159.0	7-Jun	34.0	3	12.7
R	**Yellowstone +**	**141.0***	**121.8***	**107.1***	**111.8****	63.5	168.8	17-Jun	40.3	5	11.9
	Average	**127.2**	**110.6**	**93.3**	**88.1**	**64.5**	**166.2**	**14-Jun**	**39.5**	**30.2**	**12.2**
	LSD (0.05)	**12.6**	**17.0**	**13.8**	**20.9**		**1.1**		**2.1**	**26.1**	
	C.V.	**5.9**	**7.5**	**9.0**	**16.7**		**0.4**		**3.2**	**51**	

** = 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 due to severe hail on July 22, 2008 *****

Cultivar/Line	Grain Yield (bushels/acre)				2007[2/] and 2008[3/] Data					
					Test[2/]	Heading Date[3/]		Plant[2/]	Stripe[3/]	Protein[2/]
	2008	2007	2006-2007	2005-2007	weight	Julian	Calendar	height	rust %	
			2 yr	3 yr	lb/bu			in	6-Jul	%
Accipiter						182.1	30-Jun	38.2	26	
Alice (HWW)+		106.1			62.8	175.7	24-Jun	34.4	5	12.9
AP 503 CL2 (P, CL)+						179.0	27-Jun	37.0	1	
Bill Brown ++						176.3	24-Jun	34.7	33	
Bond CL (CL)+		114.7	94.2	**100.9***	62.1	174.6	36/23	38.8	15	11.4
Bynum (P, CL)+		98.5	86.7	89.8	62.2	178.0	26-Jun	43.6	0	14.0
BZ9W02-2051 (P)		114.5			62.6	181.4	29-Jun	38.9	23	11.8
R Carter (P)++		106.5	90.1	96.0	61.6	179.0	27-Jun	34.2	33	12.6
R CDC Falcon (P)		111.6	94.6	95.9	61.7	180.3	28-Jun	34.7	16	11.6
Darrell +		99.6			61.9	176.7	25-Jun	38.6	12	12.8
Genou +		96.7	83.9	87.2	61.3	180.3	28-Jun	43.5	6	13.2
Hawken (P)+		104.4			63.1	174.7	23-Jun	33.8	0	13.1
R Hyalite (P, CL, HWW)+		103.4	87.0	95.5	61.5	179.0	27-Jun	39.1	14	13.3
R Jagalene (P)+		113.0	96.0	**100.9***	**63.9***	179.0	27-Jun	37.7	2	13.2
Jerry		112.2	**100.4***	99.3	60.3	181.0	29-Jun	45.5	3	12.9
R Ledger (P)+		108.3	89.3	96.5	62.7	177.7	26-Jun	37.8	3	12.2
MT0495		**127.0****	**106.2***		60.5	180.7	29-Jun	38.1	0	12.6
MT0552		113.0			61.6	179.7	28-Jun	36.2	0	13.2
MT06102						177.0	25-Jun	42.7	3	
MT06103						178.0	26-Jun	42.3	0	
MT0641						178.7	27-Jun	37.8	0	
MT0686						179.7	28-Jun	44.1	2	
MT0688						179.0	27-Jun	41.3	1	
MTS04114 (HWW)		**117.5***	**103.3***		62.1	179.0	27-Jun	38.0	0	12.9
MTS04120		96.5	88.9		61.0	181.0	29-Jun	42.4	2	13.1
MTS0531 (HWW)		**117.5***			61.9	179.0	27-Jun	36.8	1	12.7
MTS0532 (HWW)		**116.2***			61.9	179.0	27-Jun	38.8	0	12.4
MTS0608						181.0	29-Jun	44.9	3	
MTS0633						181.0	29-Jun	44.5	0	
MTS0705						181.0	29-Jun	43.3	2	
MTS0713						179.3	27-Jun	38.0	3	
MTW06118 (HWW)						181.0	29-Jun	38.5	38	
R Neeley		94.0	82.0	89.0	60.2	181.7	30-Jun	43.4	18	12.5
R Norris (P, CL)+		105.6	91.5	96.7	62.4	179.3	27-Jun	44.7	3	12.9
NuSky (HWW)		80.6	73.2	80.6	59.9	181.8	30-Jun	41.5	33	12.3
NuWest (P, HWW)+		93.0	78.7	85.1	60.3	181.3	29-Jun	40.9	24	11.9
Peregrine						182.1	30-Jun	45.8	2	
R Promontory [1/]		**121.6***	**107.2***	**107.4***	**64.4****	180.9	29-Jun	40.0	0	11.4
R Pryor (P)+		94.5	87.0	90.2	59.5	182.0	30-Jun	35.2	10	12.4
Rampart		97.0	88.7	91.2	61.4	180.3	28-Jun	44.6	1	14.3
Ripper +		112.4			61.9	174.0	22-Jun	34.1	34	12.2
Rocky (P)		107.9	**96.8***	99.4	62.1	179.0	27-Jun	45.1	0	12.7
Tiber		99.8	91.8	92.7	61.9	181.7	30-Jun	46.3	2	13.9
Vanguard		95.5	85.3	88.6	61.9	180.4	28-Jun	45.8	2	13.7
WA8023						183.3	1-Jul	41.2	0	
Wahoo +		**118.7***	**105.0***	**107.7***	60.3	177.4	25-Jun	40.1	5	12.3
Wendy (HWW)+		108.6	94.0		62.8	176.0	24-Jun	34.9	3	13.6
R Yellowstone +		**117.3***	**108.3****	**109.9****	60.6	181.6	30-Jun	39.3	0	12.4
Average		**106.8**	**92.4**	**95.3**	**61.7**	**179.4**	**27-Jun**	**40**	**7.8**	**12.7**
LSD (0.05)		**11.0**	**11.7**	**10.0**	**0.9**	**0.9**		**1.7**	**20.7**	
C.V.		**6.1**	**6.1**	**6.3**	**0.8**	**0.3**		**2.5**	**155**	

** = 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 5. HARD WINTER : District 3-- Huntley - Dryland

Cultivar/Line	Grain Yield (bushels/acre)				2008 Data				
					Test	Heading Date		Plant	Protein
	2008	2007-2008	2006-2008	2005-2008	weight	Julian	Calendar	height	
		2 yr	3 yr	4 yr	lb/bu			in	%
Accipiter	**86.0***				62.1	170.2	18-Jun	35.2	11.4
Alice (HWW)+	71.3	78.0			62.9	164.3	12-Jun	29.3	12.7
AP 503 CL2 (P, CL)+	64.8				**64.9****	167.2	15-Jun	29.3	12.1
Bill Brown ++	75.3				**63.7***	165.3	13-Jun	30.6	10.5
Bond CL (CL)+	77.5	83.0	84.5	80.7	**63.4***	162.0	10-Jun	34.7	11.2
Bynum (P, CL)+	59.5	79.5	80.4	74.3	**63.3***	168.0	16-Jun	34.6	12.4
BZ9W02-2051 (P)	**88.2***	87.1			62.4	169.3	17-Jun	35.6	11.2
R Carter (P)++	74.3	81.1	79.2	76.7	62.7	167.9	16-Jun	30.4	12.1
R CDC Falcon (P)	82.6	88.7	86.5	**83.0***	62.2	169.0	17-Jun	31.6	11.6
Darrell +	**88.9***	71.1			62.3	165.1	13-Jun	34.2	12.2
R Genou +	76.8	81.9	83.0	77.3	63.0	169.0	17-Jun	39.2	11.9
Hawken (P)+	67.7	75.6			**63.6***	158.7	7-Jun	29.6	12.1
R Hyalite (P, CL, HWW)+	69.4	82.3	83.6	79.5	62.9	164.3	12-Jun	34.7	11.3
R Jagalene (P)+	**90.7***	93.1	92.4	**87.7***	**64.5***	166.0	14-Jun	35.2	12.1
Jerry	**83.7***	84.4	81.6	77.4	61.9	169.7	18-Jun	38.3	12.2
Ledger (P)+	75.6	84.2	83.4	79.1	63.0	168.9	17-Jun	32.7	11.2
MT0495	**94.5***	101.0	95.4		62.7	168.8	17-Jun	33.8	11.4
MT0552	**87.4***	90.8			63.2	166.0	14-Jun	33.5	12.7
MT06102	**95.1***				**63.6***	167.1	15-Jun	37.9	12.8
MT06103	**88.3***				**63.6***	166.2	14-Jun	36.8	11.7
MT0641	70.2				62.9	167.5	16-Jun	32.6	10.9
MT0686	**90.3***				62.7	169.3	17-Jun	38.1	11.7
MT0688	82.6				**63.5***	167.9	16-Jun	36.0	10.6
MTS04114 (HWW)	**85.0***	86.8	86.4		63.1	166.6	15-Jun	33.8	11.1
MTS04120	62.4	77.9	78.2		62.9	169.4	17-Jun	36.6	10.5
MTS0531 (HWW)	**94.0***	98.9			**63.5***	165.9	14-Jun	33.9	11.3
MTS0532 (HWW)	**90.5***	91.5			**63.3***	166.7	15-Jun	35.1	11.4
MTS0608	80.1				63.0	167.6	16-Jun	39.0	12.2
MTS0633	65.2				62.4	169.7	18-Jun	35.4	12.0
MTS0705	**89.5***				**64.0***	169.6	18-Jun	39.2	11.8
MTS0713	**85.6***				**63.6***	168.7	17-Jun	32.4	12.1
MTW06118 (HWW)	**89.4***				**63.3***	168.2	16-Jan	35.3	10.5
R Neeley	**90.9***	90.5	84.3	80.2	58.9	170.6	19-Jun	38.9	11.9
R Norris (P, CL)+	**85.1***	89.1	86.4	**81.5***	**63.5***	165.7	14-Jun	35.8	12.1
NuSky (HWW)	**87.9***	87.6	82.0	76.9	62.7	168.4	16-Jun	37.4	11.1
NuWest (P, HWW)+	**93.4***	88.7	84.8	79.7	61.2	167.5	16-Jun	38.2	11.6
Peregrine	82.2				62.5	169.2	17-Jun	40.5	10.7
R Promontory [1/]	68.1	79.6	81.2	78.9	**64.2***	167.9	16-Jun	32.7	11.0
R Pryor (P)+	**84.6***	85.1	82.6	**81.4***	61.8	169.8	18-Jun	31.8	10.4
R Rampart	63.3	73.2	74.7	70.4	63.1	169.8	18-Jun	34.4	12.5
Ripper +	82.0	91.1			62.9	160.3	8-Jun	30.0	12.0
R Rocky (P)	**83.8***	87.8	84.2	79.4	**63.8***	166.7	15-Jun	38.8	10.6
Tiber	79.7	84.2	82.5	76.6	59.6	170.2	18-Jun	41.5	12.3
Vanguard	67.2	77.4	77.6	73.5	63.0	168.9	17-Jun	36.4	12.4
WA8023	68.7				58.2	171.1	19-Jun	32.6	11.6
R Wahoo +	**97.4****	96.1	94.5	**89.8****	62.0	165.0	13-Jun	33.8	11.3
Wendy (HWW)+	65.9	76.0	79.0		**64.0***	164.5	13-Jun	27.8	12.9
R Yellowstone +	82.3	86.8	88.3	**84.8***	61.0	168.2	16-Jun	35.0	11.3
Average	**80.7**	**85.1**	**83.9**	**79.5**	**62.8**	**167.4**	**15-Jun**	**34.9**	**11.6**
LSD (0.05)	**13.9**	**ns**	**ns**	**8.7**	**1.6**	**1.1**		**2.2**	
C.V.	**10.0**	**11.0**	**8.5**	**7.8**	**1.5**	**0.4**		**3.6**	

** = 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)				2008 Data				
						Test	Heading Date		Plant	Protein
		2008	2007-2008	2006-2008	2005-2008	weight	Julian	Calendar	height	
			2 yr	3 yr	4 yr	lb/bu			in	%
	Accipiter	45.3				54.3	177.7	26-Jun	29.3	12.2
	Alice (HWW)+	38.1	56.9			59.3	172.3	20-Jun	26.4	13.9
	AP 503 CL2 (P, CL)+	39.4				59.4	172.0	20-Jun	25.5	12.9
	Bill Brown ++	41.5				59.6	173.0	21-Jun	26.8	11.8
	Bond CL (CL)+	45.7	**63.7***	**63.0***	**58.7***	59.5	160.3	8-Jun	28.9	11.8
R	**Bynum (P, CL)+**	35.0	50.9	48.4	44.3	57.3	173.3	21-Jun	29.6	12.8
	BZ9W02-2051 (P)	**53.4***	**70.0****			56.0	175.0	23-Jun	27.6	11.5
R	**Carter (P)++**	40.3	57.8	54.9	50.8	59.3	174.0	22-Jun	25.6	13.1
R	**CDC Falcon (P)**	48.9	**61.8***	59.1	54.1	56.0	175.0	23-Jun	27.1	11.9
	Darrell +	42.8	57.5			59.9	174.0	22-Jun	28.2	12.4
R	**Genou +**	41.7	57.1	55.3	50.0	56.8	174.0	22-Jun	31.6	13.4
	Hawken (P)+	39.4	58.8			56.5	163.7	12-Jun	25.9	12.2
R	**Hyalite (P, CL, HWW)+**	47.4	**62.1***	57.0	53.2	56.6	173.7	22-Jun	30.2	11.0
R	**Jagalene (P)+**	47.1	**63.5***	58.7	55.0	58.5	172.7	21-Jun	28.7	11.6
	Jerry	**52.4***	**62.4***	59.5	54.3	57.7	175.7	24-Jun	34.8	12.7
R	**Ledger (P)+**	46.3	60.8	58.3	53.8	59.5	174.3	22-Jun	28.7	12.6
	MT0495	**50.9***	**65.3***	**64.1***		58.6	174.3	22-Jun	28.8	10.9
	MT0552	48.4	**63.3***			60.5	173.7	22-Jun	27.9	11.3
	MT06102	50.2				60.0	174.0	22-Jun	31.5	12.2
	MT06103	48.5				61.1	173.0	21-Jun	32.4	11.1
	MT0641	44.6				55.2	174.0	22-Jun	26.6	12.4
	MT0686	46.3				56.9	173.7	22-Jun	33.4	11.8
	MT0688	48.0				59.6	174.7	23-Jun	32.1	11.0
	MTS04114 (HWW)	38.3	53.4	52.2		60.1	173.7	22-Jun	29.4	11.6
	MTS04120	40.2	54.7	53.3		57.0	176.0	24-Jun	31.2	12.4
	MTS0531 (HWW)	39.9	61.2			60.1	174.3	22-Jun	27.5	11.5
	MTS0532 (HWW)	40.8	58.9			58.1	174.3	22-Jun	27.8	11.3
	MTS0608	40.6				58.9	175.3	23-Jun	33.8	12.7
	MTS0633	34.6				53.4	174.3	22-Jun	30.4	13.9
	MTS0705	41.7				57.5	175.7	24-Jun	32.2	13.2
	MTS0713	41.1				58.4	174.7	23-Jun	27.4	12.3
	MTW06118 (HWW)	49.2				56.8	174.0	22-Jun	29.5	11.4
R	**Neeley**	48.2	60.1	**61.5***	54.9	58.2	174.0	22-Jun	33.3	11.9
R	**Norris (P, CL)+**	47.3	61.3	58.3	53.9	59.0	172.7	21-Jun	31.4	12.5
	NuSky (HWW)	47.4	59.2	58.7	53.5	60.4	175.7	24-Jun	33.0	10.0
	NuWest (P, HWW)+	48.9	61.1	59.2	54.1	58.6	174.7	23-Jun	31.7	10.6
	Peregrine	40.7				56.3	174.7	23-Jun	33.6	12.3
R	**Promontory** [1/]	48.6	**63.8***	**60.9***	**56.4***	60.9	175.7	24-Jun	30.2	11.1
R	**Pryor (P)+**	**53.6***	**63.9***	**63.1***	**57.9***	55.6	176.3	24-Jun	27.6	11.6
R	**Rampart**	37.8	49.1	47.7	44.5	57.5	176.0	24-Jun	31.7	13.5
	Ripper +	43.3	59.6			59.5	160.0	8-Jun	25.4	13.4
R	**Rocky (P)**	48.4	**62.2***	59.4	54.0	60.8	174.7	23-Jun	33.5	11.5
	Tiber	41.0	51.3	52.7	48.3	58.7	175.3	23-Jun	32.1	11.9
	Vanguard	38.7	54.0	52.1	47.1	56.8	175.0	23-Jun	31.6	13.3
	WA8023	46.7				55.5	179.3	27-Jun	31.2	10.8
R	**Wahoo +**	43.9	**63.9***	59.0	54.8	57.3	169.0	17-Jun	28.9	12.8
	Wendy (HWW)+	38.2	51.1	48.8		61.4	163.3	11-Jun	25.4	13.5
R	**Yellowstone +**	**57.7****	**69.2***	**66.1****	**61.2****	58.0	175.3	23-Jun	32.0	11.1
	Average	**44.6**	**59.7**	**57.3**	**53.1**	**58.2**	**173.4**	**21-Jun**	**29.8**	**12.1**
	LSD (0.05)	**7.5**	**8.3**	**6.2**	**5.1**	**ns**	**3.1**		**2.8**	
	C.V.	**9.6**	**6.8**	**6.6**	**6.8**	**3.6**	**1.1**		**5.7**	

** = 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)				2008 Data				
					Test	Heading Date		Plant	Protein
	2008	2007-2008	2006-2008	2005-2008	weight	Julian	Calendar	height	
		2 yr	3 yr	4 yr	lb/bu			in	%
Accipiter	**59.6***				61.5	175	23-Jun	31	11.1
Alice (HWW)+	51.6	**56.1***			62.7	169	17-Jun	25	12.1
AP 503 CL2 (P, CL)+	47.4				63.0	172	20-Jun	26	11.7
Bill Brown ++	42.3				62.5	169	17-Jun	26	11.3
Bond CL (CL)+	50.6	55.6	**66.5***	**71.8***	61.3	168	16-Jun	31	10.6
R Bynum (P, CL)+	42.6	45.1	53.7	58.8	62.0	173	21-Jun	31	12.6
BZ9W02-2051 (P)	**52.3***	**56.1***			62.1	175	23-Jun	29	10.8
R Carter (P)++	**57.4***	**59.2***	62.6	67.4	62.9	171	19-Jun	26	11.8
R CDC Falcon (P)	51.2	**56.1***	**64.2***	69.2	61.7	174	22-Jun	27	11.3
Darrell +	**54.7***	**58.5***			61.9	168	16-Jun	29	11.3
R Genou +	51.4	54.1	61.7	67.8	62.1	173	21-Jun	33	12.0
Hawken (P)+	39.0	47.8			62.7	168	16-Jun	25	12.1
R Hyalite (P, CL, HWW)+	48.5	49.8	60.7	66.9	61.5	169	17-Jun	28	12.1
R Jagalene (P)+	50.3	53.2	58.9	64.8	63.5	172	20-Jun	28	11.1
Jerry	47.2	50.3	51.6	58.1	61.3	174	22-Jun	32	11.6
R Ledger (P)+	46.0	52.9	61.3	67.0	62.9	173	21-Jun	27	11.0
MT0495	50.5	55.4	**65.4***		61.8	172	20-Jun	30	11.1
MT0552	**56.2***	**59.1***			62.4	170	18-Jun	26	12.0
MT06102	**53.7***				62.8	170	18-Jun	30	12.3
MT06103	**52.3***				63.0	171	19-Jun	33	11.6
MT0641	45.5				61.9	172	20-Jun	30	11.8
MT0686	**54.1***				61.6	172	20-Jun	35	11.6
MT0688	49.9				62.2	172	20-Jun	32	10.5
MTS04114 (HWW)	**57.0***	**58.9***	**63.6***		62.3	173	21-Jun	28	10.9
MTS04120	**55.9***	54.1	62.0		62.4	173	21-Jun	32	11.5
MTS0531 (HWW)	**59.8***	**59.9***			62.0	174	22-Jun	31	11.0
MTS0532 (HWW)	**58.4***	**62.2***			61.8	172	20-Jun	27	11.7
MTS0608	50.5				62.2	174	22-Jun	31	11.7
MTS0633	**52.4***				61.3	175	23-Jun	30	12.4
MTS0705	**60.1***				63.0	173	21-Jun	33	10.9
MTS0713	**56.5***				63.2	172	20-Jun	27	11.4
MTW06118 (HWW)	51.5				63.0	172	20-Jun	31	11.2
R Neeley	47.5	49.7	58.6	64.6	61.8	174	22-Jun	35	11.2
Norris (P, CL)+	**54.6***	**57.2***	**66.1***	**72.3***	62.2	170	18-Jun	32	11.8
NuSky (HWW)	49.2	49.2	54.7	62.2	61.0	174	22-Jun	31	11.7
NuWest (P, HWW)+	45.9	49.0	54.5	61.8	61.9	173	21-Jun	31	10.7
Peregrine	48.7				61.6	173	21-Jun	35	11.5
Promontory [1/]	47.9	48.6	57.8	66.3	63.4	174	22-Jun	31	11.0
R Pryor (P)+	**60.5****	**62.8****	**70.1****	**76.8****	62.5	173	21-Jun	28	10.0
R Rampart	46.2	47.9	55.6	59.2	61.8	174	22-Jun	28	12.8
Ripper +	47.7	**57.6***			62.3	169	17-Jun	27	11.4
R Rocky (P)	**55.1***	**57.6***	**63.9***	69.1	63.3	171	19-Jun	33	10.9
Tiber	**53.1***	52.7	58.2	63.5	61.9	173	21-Jun	36	11.8
Vanguard	49.9	51.1	56.7	60.6	61.6	173	21-Jun	28	12.6
WA8023	42.0				58.6	176	24-Jun	32	11.2
Wahoo +	**56.8***	**59.2***	**66.2***	**71.9***	60.6	168	16-Jun	27	11.1
Wendy (HWW)+	49.6	53.1	59.0		63.3	168	16-Jun	24	11.8
R Yellowstone +	**54.5***	**56.7***	**65.7***	**72.4***	61.1	175	23-Jun	32	11.4
Average	**51.3**	**54.4**	**60.8**	**66.3**	**62.1**	**172.1**	**20-Jun**	**29.9**	**11.5**
LSD (0.05)	**8.8**	**6.9**	**7.2**	**6.0**					
C.V.	**10.3**	**6.2**	**7.2**	**6.4**					

** = 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)				2008 Data					
					Test	Heading Date		Plant	Sawfly	Protein
	2008	2007-2008	2006-2008	2005-2008	weight	Julian	Calendar	height	cutting	
		2 yr	3 yr	4 yr	lb/bu			in	%	%
Accipiter	64.7				58.6	170.6	19-Jun	32.6	27	14.1
Alice (HWW)+	68.3	62.3			**62.5****	161.3	9-Jun	29.4	27	14.1
AP 503 CL2 (P, CL)+	62.9				**61.4***	164.0	12-Jun	31.4	23	15.2
Bill Brown ++	66.3				61.0	161.4	9-Jun	31.1	28	13.6
Bond CL (CL)+	65.5	60.4	59.8	**63.4****	60.2	159.8	8-Jun	32.8	31	13.4
R **Bynum (P, CL)+**	59.7	56.8	54.0	53.2	60.2	166.5	15-Jun	36.7	12	14.6
BZ9W02-2051 (P)	66.7	**64.5***			59.3	169.2	17-Jun	34.7	41	15.3
R **Carter (P)++**	64.9	60.8	56.1	**57.3***	59.7	167.9	16-Jun	31.8	10	15.7
R **CDC Falcon (P)**	68.7	**64.4***	63.2	**63.4***	59.3	166.8	15-Jun	31.1	33	14.2
Darrell +	67.4	63.4			60.6	164.4	12-Jun	33.6	36	14.6
R **Genou +**	60.9	58.8	57.8	**59.1***	58.6	168.7	17-Jun	37.3	9	15.8
Hawken (P)+	65.8	60.3			60.8	160.7	9-Jun	30.3	28	15.0
R **Hyalite (P, CL, HWW)+**	65.1	60.0	56.9	55.9	59.2	162.9	11-Jun	35.3	29	14.2
R **Jagalene (P)+**	67.2	61.6	57.7	**58.1***	**62.1***	164.6	13-Jun	31.8	37	14.4
Jerry	63.2	58.5	57.5	55.6	58.4	169.1	17-Jun	39.5	23	15.8
R **Ledger (P)+**	58.7	59.9	57.3	**59.1***	60.6	166.8	15-Jun	31.8	48	13.9
MT0495	**75.8****	**70.0***	64.8		57.4	167.3	15-Jun	34.5	34	15.0
MT0552	**71.0***	**67.9***			60.3	163.1	11-Jun	32.6	36	15.0
MT06102	69.5				60.3	164.5	13-Jun	34.3	17	14.6
MT06103	68.5				60.1	164.8	13-Jun	35.2	18	14.8
MT0641	59.8				57.1	167.3	15-Jun	34.3	27	15.1
MT0686	64.1				58.0	168.2	16-Jun	37.6	21	15.3
MT0688	62.4				58.1	167.9	16-Jun	35.0	41	15.0
MTS04114 (HWW)	**74.7***	**65.0***	60.6		61.0	166.8	15-Jun	32.9	16	14.7
MTS04120	62.0	58.7	56.4		59.3	167.4	15-Jun	34.6	6	15.1
MTS0531 (HWW)	**75.4***	**73.2****			60.6	166.0	14-Jun	32.2	13	13.9
MTS0532 (HWW)	**72.2***	**66.9***			60.0	166.4	14-Jun	32.3	12	14.4
MTS0608	62.2				59.3	168.4	16-Jun	38.5	8	15.3
MTS0633	55.2				59.1	170.0	18-Jun	36.6	5	15.3
MTS0705	63.8				58.3	169.5	18-Jun	38.0	4	15.0
MTS0713	67.2				57.9	166.7	15-Jun	31.7	8	16.0
MTW06118 (HWW)	68.2				60.3	167.8	16-Jun	35.6	35	13.9
R **Neeley**	62.2	56.7	55.9	54.7	58.0	169.3	17-Jun	37.7	26	15.6
Norris (P, CL)+	64.9	60.6	59.2	**59.3***	60.4	162.9	11-Jun	34.5	24	14.5
NuSky (HWW)	57.2	55.4	55.5	54.0	57.8	170.0	18-Jun	35.9	33	15.3
NuWest (P, HWW)+	63.1	55.2	55.9	56.2	58.8	168.1	16-Jun	37.0	28	15.4
Peregrine	54.9				57.7	169.6	18-Jun	40.8	25	15.9
Promontory [1/]	65.5	58.2	56.7	54.0	60.6	168.0	16-Jun	34.2	29	13.5
R **Pryor (P)+**	68.3	58.6	58.6	**60.0***	58.5	169.2	17-Jun	34.9	10	14.4
R **Rampart**	53.8	54.4	52.8	54.4	59.1	168.1	16-Jun	35.9	13	15.7
Ripper +	68.1	**71.3***			60.1	160.1	8-Jun	29.0	40	14.7
R **Rocky (P)**	66.2	58.4	59.8	**59.8***	60.6	165.3	13-Jun	37.7	14	14.5
Tiber	58.8	54.8	55.5	53.6	59.7	168.8	17-Jun	38.4	27	15.3
Vanguard	52.9	55.3	54.3	56.3	59.4	169.7	18-Jun	38.3	14	17.0
WA8023	58.8				55.5	171.8	20-Jun	34.0	10	14.9
Wahoo +	**73.5***	64.1	65.0	**62.7***	59.2	162.0	10-Jun	34.2	39	14.8
Wendy (HWW)+	**72.5***	**67.5***	62.6		**61.7***	160.2	8-Jun	29.8	38	14.3
R **Yellowstone +**	69.1	63.3	63.4	**62.4***	57.5	169.2	17-Jun	35.9	18	15.4
Average	**63.4**	**61.4**	**58.3**	**57.7**	**59.4**	**166.8**	**15-Jun**	**34.9**	**23.2**	**14.9**
LSD (0.05)	**6.9**	**9.0**	**ns**	**6.8**	**1.4**	**1.6**		**2.6**	**14.0**	
C.V.	**6.1**	**7.2**	**7.9**	**8.3**	**1.3**	**0.5**		**4.3**	**34.4**	

** = 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

	Cultivar/Line	Grain Yield (bushels/acre)				2008 Data					
						Test	Winter	Heading Date		Plant	Protein
		2008	2007-2008	2006-2008	2005-2008	weight	survival	Julian	Calendar	height	
			2 yr	3 yr	4 yr	lb/bu	%			in	%
	Accipiter	**30.4***				56.0	**47.9***	166.7	15-Jun	25.2	12.5
	Alice (HWW)+	13.1	41.6			**60.0***	22.9	163.3	11-Jun	19.9	14.1
	AP 503 CL2 (P, CL)+	16.0				**60.6***	23.6	167.3	15-Jun	22.3	13.9
	Bill Brown ++	1.8				**60.0***	9.2	163.3	11-Jun	20.1	15.2
	Bond CL (CL)+	2.9	28.8	35.1	36.4	**60.2***	6.6	167.0	15-Jun	21.4	13.5
	Bynum (P, CL)+	8.1	31.6	35.5	34.2	59.0	12.6	168.0	16-Jun	24.7	15.4
	BZ9W02-2051 (P)	21.3	43.1			57.9	31.1	168.4	16-Jun	25.4	14.0
R	**Carter (P)++**	16.9	44.1	43.7	44.9	**59.8***	21.9	166.0	14-Jun	21.7	13.7
R	**CDC Falcon (P)**	**29.5***	50.3	**54.1***	**53.5***	56.7	**36.7***	165.0	13-Jun	24.6	13.9
	Darrell +	**24.9***	44.4			59.3	31.7	164.3	12-Jun	24.9	13.0
	Genou +	15.8	35.5	41.1	41.1	58.6	18.3	169.3	17-Jun	24.6	14.5
	Hawken (P)+	6.6	36.3			**60.3***	9.7	160.4	8-Jun	20.4	15.5
	Hyalite (P, CL, HWW)+	17.3	37.2	42.5	42.8	59.7	**41.7***	162.0	10-Jun	26.5	14.1
	Jagalene (P)+	22.5	41.6	43.7	44.5	**60.9***	23.9	165.7	14-Jun	23.2	13.6
R	**Jerry**	**33.6***	52.6	**54.3****	**54.7****	58.5	**40.5***	168.3	16-Jun	26.5	13.3
	Ledger (P)+	16.1	40.3	42.9	41.9	**59.9***	20.6	168.4	16-Jun	22.9	13.6
	MT0495	**33.9****	50.1	**52.3***		56.6	**43.2***	167.4	15-Jun	26.8	14.0
	MT0552	**29.4***	50.4			**60.1***	**51.7****	163.7	12-Jun	24.1	14.3
	MT06102	16.8				59.2	15.7	167.7	16-Jun	25.2	13.2
	MT06103	18.0				**59.9***	19.8	164.7	13-Jun	24.8	15.0
	MT0641	20.1				57.4	30.8	165.0	13-Jun	24.2	14.1
	MT0686	20.5				58.1	32.6	167.0	15-Jun	24.2	14.6
	MT0688	20.9				57.9	27.2	167.7	16-Jun	25.6	13.6
	MTS04114 (HWW)	**25.9***	43.5	45.7		58.7	31.8	166.7	15-Jun	24.3	13.2
	MTS04120	18.1	40.0	42.6		59.1	22.5	167.7	16-Jun	25.3	13.9
	MTS0531 (HWW)	21.6	43.5			58.2	21.2	167.0	15-Jun	24.5	13.9
	MTS0532 (HWW)	14.0	40.5			57.8	21.2	167.7	16-Jun	23.5	13.9
	MTS0608	14.8				59.0	20.1	169.0	17-Jun	24.6	14.0
	MTS0633	16.7				58.1	19.5	169.0	17-Jun	26.3	14.0
	MTS0705	13.0				59.2	21.6	169.0	17-Jun	27.5	13.3
	MTS0713	16.9				58.9	24.0	167.9	16-Jun	23.9	14.3
	MTW06118 (HWW)	**25.6***				59.2	29.7	164.7	13-Jun	26.0	15.0
	Neeley	**27.4***	41.3	46.1	46.3	58.3	**43.3***	168.0	16-Jun	27.6	13.1
	Norris (P, CL)+	15.3	38.0	42.7	43.1	59.6	18.8	163.6	12-Jun	24.4	13.5
	NuSky (HWW)	**33.1***	41.8	**46.9***	**48.0***	58.7	**43.1***	167.0	15-Jun	28.9	13.9
	NuWest (P, HWW)+	**31.7***	42.7	**46.1***	47.1	58.5	**46.1***	166.3	14-Jun	27.1	13.5
	Peregrine	**31.4***				58.4	32.0	168.7	17-Jun	29.6	12.8
	Promontory [1/]	15.0	37.1	41.9	41.3	**61.0****	25.1	167.0	15-Jun	24.0	13.1
R	**Pryor (P)+**	**32.2***	46.0	**49.9***	**51.7***	58.4	**41.8***	166.7	15-Jun	24.6	13.1
	Rampart	9.3	31.4	36.0	37.0	59.4	10.2	169.7	18-Jun	23.8	13.2
	Ripper +	7.0	38.9			**59.8***	14.5	162.6	11-Jun	20.2	14.5
	Rocky (P)	22.8	41.0	44.4	45.1	59.4	22.3	165.7	14-Jun	26.2	13.4
	Tiber	22.6	38.8	42.3	40.9	**59.8***	30.3	169.4	17-Jun	28.0	13.5
	Vanguard	14.0	35.1	39.6	38.8	59.2	20.3	168.3	16-Jun	24.5	14.0
	WA8023	3.2				56.7	5.7	172.1	20-Jun	21.1	13.7
	Wahoo +	22.6	44.9	**49.3***	**50.5***	57.3	28.9	164.1	12-Jun	23.2	13.3
	Wendy (HWW)+	21.0	43.2	44.5		**60.4***	19.8	159.7	8-Jun	22.1	14.1
	Yellowstone +	**24.0***	46.7	**50.1***	**50.7***	58.3	33.4	168.3	16-Jun	25.8	13.2
	Average	**19.7**	**41.3**	**44.5**	**44.5**	**58.9**	**26.9**	**166.5**	**15-Jun**	**24.6**	**13.8**
	LSD (0.05)	**10.6**	**ns**	**8.5**	**6.8**	**1.2**	**15.1**	**2.9**		**2.3**	
	C.V.	**32.0**	**17.2**	**11.7**	**10.8**	**1.3**	**32.3**	**1.0**		**5.4**	

** = 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

Cultivar/Line	Grain Yield (bushels/acre)				2008 Data					
					Test	Winter	Heading Date		Plant	Protein
	2008	2007-2008	2006-2008	2005-2008	weight	survival	Julian	Calendar	height	
		2 yr	3 yr	4 yr	lb/bu	%			in	%
Accipiter	**43.2****				**59.9***	**70.0****	163.5	12-Jun	23.4	13.3
Alice (HWW)+	16.8	42.7			**60.9***	7.7	159.0	7-Jun	18.5	12.8
AP 503 CL2 (P, CL)+	10.9				**58.2***	2.3	170.5	19-Jun	22.1	13.7
Bill Brown ++	4.9				**60.0***	1.0	162.0	10-Jun	21.3	12.7
Bond CL (CL)+	5.5	26.8	27.5	34.3	49.9	0.7	167.0	15-Jun	25.0	12.8
Bynum (P, CL)+	4.7	27.1	26.5	32.5	52.7	0.7	168.5	17-Jun	24.4	**14.7***
BZ9W02-2051 (P)	12.7	42.8			56.3	4.0	168.5	17-Jun	24.6	13.9
R Carter (P)++	21.4	43.8	38.9	44.7	**59.0***	6.7	169.5	18-Jun	22.7	14.5
R CDC Falcon (P)	**38.9***	**56.9***	**50.1***	**54.0***	56.9	23.3	165.5	14-Jun	23.8	14.3
Darrell +	24.4	**51.4***			**60.4***	10.3	162.0	10-Jun	24.2	13.7
Genou +	12.8	35.1	32.1	37.9	**57.5***	2.3	169.0	17-Jun	26.6	**14.7***
Hawken (P)+	3.5	33.9			54.2	0.7	164.0	12-Jun	21.5	14.1
Hyalite (P, CL, HWW)+	11.5	38.1	36.9	42.4	**57.8***	2.0	165.0	13-Jun	25.2	13.7
Jagalene (P)+	22.9	41.8	39.8	45.2	**60.6***	5.3	163.5	12-Jun	23.2	13.8
R Jerry	**38.4***	**57.3****	**52.7****	**57.3****	**59.3***	30.7	165.0	13-Jun	28.4	13.9
Ledger (P)+	10.2	34.5	33.1	38.5	**59.8***	3.7	164.0	12-Jun	23.6	13.9
MT0495	24.1	**50.7***	**47.5***		52.8	8.3	169.0	17-Jun	24.4	**15.3***
MT0552	**34.9***	**56.3***			**61.2***	30.0	161.0	9-Jun	23.4	14.4
MT06102	13.7				**59.5***	4.3	168.5	17-Jun	25.6	14.3
MT06103	10.4				**58.7***	2.0	165.5	14-Jun	23.0	14.3
MT0641	4.1				51.3	0.7	172.0	20-Jun	23.2	**14.9***
MT0686	18.6				56.5	5.0	166.5	25-Jun	25.8	13.8
MT0688	4.8				56.1	0.7	170.0	18-Jun	24.8	13.6
MTS04114 (HWW)	21.0	44.6	41.4		**59.4***	7.0	168.0	16-Jun	25.8	13.7
MTS04120	7.0	35.1	33.7		**57.8***	2.0	169.5	18-Jun	23.0	14.2
MTS0531 (HWW)	16.3	42.9			**58.6***	4.3	168.5	17-Jun	22.8	13.9
MTS0532 (HWW)	13.2	43.9			**57.7***	2.7	168.5	17-Jun	24.4	13.8
MTS0608	10.1				56.1	2.0	170.5	19-Jun	26.8	**14.7***
MTS0633	2.0				49.5	0.7	171.0	19-Jun	22.9	**14.8***
MTS0705	4.9				56.4	2.0	170.0	18-Jun	28.0	**14.8***
MTS0713	9.6				57.0	1.0	168.5	17-Jun	24.0	**14.6***
MTW06118 (HWW)	9.9				**57.6***	2.0	168.5	17-Jun	23.7	13.6
Neeley	21.2	42.3	38.1	43.0	56.1	21.3	168.0	16-Jun	25.2	14.2
Norris (P, CL)+	28.8	**47.2***	43.1	47.2	**59.8***	16.3	161.0	9-Jun	23.8	13.3
NuSky (HWW)	20.4	43.1	42.1	45.3	**58.6***	7.0	169.0	17-Jun	30.1	13.8
NuWest (P, HWW)+	23.2	45.9	43.0	47.2	**57.7***	4.3	169.5	18-Jun	28.6	13.9
Peregrine	**35.5***				**59.0***	31.7	168.0	16-Jun	29.0	13.1
Promontory [1/]	15.8	38.3	36.3	40.2	**58.3***	4.3	163.0	11-Jun	23.8	13.5
R Pryor (P)+	23.5	44.1	40.2	45.8	**57.8***	5.3	170.0	18-Jun	23.0	13.7
Rampart	8.7	29.9	28.2	34.5	**58.2***	3.3	164.0	12-Jun	25.2	**15.4****
Ripper +	4.4	25.7			**57.7***	0.7	167.0	15-Jun	20.3	13.3
Rocky (P)	12.8	40.8	40.4	45.4	**57.5***	1.3	169.5	18-Jun	25.8	13.1
Tiber	22.0	42.0	39.5	43.7	**59.1***	15.3	169.0	17-Jun	27.6	14.2
Vanguard	11.6	34.2	32.0	37.8	56.8	2.3	169.5	18-Jun	25.2	**14.9***
WA8023	0.0				-	0.0	-		-	-
Wahoo +	20.2	45.3	43.3	48.9	56.9	5.3	162.0	10-Jun	22.6	13.6
Wendy (HWW)+	**34.0***	**54.4***	**48.9***		**61.7****	29.0	157.5	16-Jun	21.7	14.1
Yellowstone +	26.7	**49.0***	45.3	51.0	**58.2***	8.3	164.5	13-Jun	24.8	13.5
Average	**16.9**	**42.0**	**39.2**	**43.6**	**57.5**	**8.6**	**166.6**	**15-Jun**	**24.4**	**13.9**
LSD (0.05)	**11.2**	**10.1**	**6.7**	**5.3**	**4.2**	**15.4**	**4.5**		**3.7**	**0.8**
C.V.	**40.9**	**11.8**	**10.5**	**8.6**	**3.7**	**110.1**	**1.4**		**7.5**	**2.8**

** = 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. Yield in Winter-Kill Environments, 2003-2008: Combined Locations Winter Survival and associated Yield Locations: Williston (2003-2008), Sidney (2003-2006, 2008), Conrad and Moccasin in 2004 = 13 locations

Cultivar/Line	Winter Survival (%)						Yield under Winterkill					
	2008	2007-08	2006-08	2005-08	2004-08	2003-08	2008	2007-08	2006-08	2005-08	2004-08	2003-08
location-years	2	3	5	7	11	13	2	3	5	7	11	13
Accipiter	**59.0****						**36.8****					
Alice (HWW)+	15.3	27.4					15.0	24.6				
AP 503 CL2 (P, CL)+	13.0						13.5					
Bill Brown ++	5.1						3.4					
Bond CL (CL)+	3.7	11.9	23.8	36.0			4.2	14.1	26.6	32.6		
Bynum (P, CL)+	6.7	16.1	25.2	34.0			6.4	15.6	26.2	30.2		
BZ9W02-2051 (P)	17.6	33.9					17.0	26.7				
Carter (P)++	14.3	30.1	36.1	48.8			19.2	26.1	35.3	41.0		
CDC Falcon (P)	30.0	**45.0***	**52.2***	**62.0***	**58.7***	**55.4***	**34.2***	**35.8***	**48.3***	**51.3***	**52.7***	**50.5***
Darrell +	21.0	38.4					24.7	**31.9***				
Genou +	10.3	26.3	35.4	47.1	46.8	44.1	14.3	21.5	32.9	37.2	42.1	41.7
Hawken (P)+	5.2	22.9					5.1	18.6				
Hyalite (P, CL, HWW)+	21.9	34.0	42.3	52.3			14.4	23.4	36.2	40.5		
Jagalene (P)+	14.6	27.0	38.7	49.6	48.5	44.7	22.7	26.5	38.0	42.6	44.1	43.0
Jerry	35.6	**52.6***	**58.6****	**67.7****	**62.7****	**59.2****	**36.0***	**37.0****	**49.9****	**53.8****	**55.2****	**52.5****
Ledger (P)+	12.2	24.8	32.8	43.2	44.2	40.6	13.2	21.3	32.7	36.7	41.8	40.2
MT0495	25.8	**43.3***	**50.8***				**29.0***	**33.8***	**46.6***			
MT0552	40.9	**52.8****					**32.2***	**35.5***				
MT06102	10.0						15.3					
MT06103	10.9						14.2					
MT0641	15.8						12.1					
MT0686	18.8						19.6					
MT0688	14.0						12.9					
MTS04114 (HWW)	19.4	36.3	43.3				23.5	28.8	40.0			
MTS04120	12.3	25.9	32.9				12.6	22.1	33.4			
MTS0531 (HWW)	12.8	30.7					19.0	26.8				
MTS0532 (HWW)	12.0	32.4					13.6	25.5				
MTS0608	11.1						12.5					
MTS0633	10.1						9.4					
MTS0705	11.8						9.0					
MTS0713	12.5						13.3					
MTW06118 (HWW)	15.9						17.8					
Neeley	32.3	**42.6***	44.3	52.1	51.3	48.8	24.3	28.0	39.5	43.2	47.8	47.4
Norris (P, CL)+	17.6	30.6	41.6	51.5			22.1	27.4	39.3	42.9		
NuSky (HWW)	25.1	**43.9***	**51.7***	**62.1***	56.4	53.7	**26.8***	29.8	43.3	46.1	48.5	47.6
NuWest (P, HWW)+	25.2	**42.4***	47.1	59.6	54.9	52.2	**27.5***	30.9	42.7	46.3	48.6	46.9
Peregrine	31.9						**33.5***					
Promontory [1/]	14.7	24.8	35.6	42.3	42.2	41.6	15.4	22.9	35.1	38.1	42.6	43.3
Pryor (P)+	23.6	39.0	44.6	55.6	53.4	48.8	**27.9***	30.1	42.1	47.2	51.3	**49.6***
Rampart	6.8	17.8	25.7	36.6	38.9	35.6	9.0	17.3	27.8	33.2	37.2	36.2
Ripper +	7.6	11.2					5.7	14.6				
Rocky (P)	11.8	29.0	41.3	53.3	52.4	49.9	17.8	26.1	39.0	43.2	46.9	45.9
Tiber	22.8	38.5	45.9	54.4	52.8	50.6	22.3	26.7	38.1	40.5	44.9	43.9
Vanguard	11.3	23.6	32.1	42.6	43.6	40.2	12.8	20.6	31.7	35.7	39.5	38.7
WA8023	2.9						1.6					
Wahoo +	17.1	32.0	45.7	56.2	55.9	52.7	21.4	28.3	42.1	47.2	49.4	47.9
Wendy (HWW)+	24.4	**39.6***	48.3				**27.5***	**32.4***	42.9			
Yellowstone +	20.9	33.9	44.4	55.8	53.1	51.3	25.4	30.5	43.3	48.2	**52.4***	**52.0***
Average	**17.4**	**32.1**	**40.8**	**50.6**	**51.0**	**51.8**	**18.0**	**34.7**	**38.1**	**41.8**	**46.6**	**48.5**
LSD (0.05)	**16.6**	**13.3**	**8.8**	**7.5**	**5.7**	**5.2**	**10.3**	**7.8**	**5.4**	**4.1**	**3.7**	**3.5**
C.V.	**47.6**	**25.3**	**17.1**	**14.1**	**13.2**	**13.1**	**28.4**	**13.7**	**11.2**	**9.3**	**9.5**	**9.2**

** = 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 12. HARD WINTER WHEAT: Yield Performance under Sawfly Pressure and % Sawfly Cutting (2003-2008)
(Note: Sawfly cutting in each location-year >10% average for test)

Cultivar/Line	Grain Yield (bu/a)					Sawfly Cutting (%)				
	2008	2007-08	2006-08	2005-08	2003//08	2008	2007-08	2006-08	2005-08	2003//08
Location-years	2	4	6	8	9	2	4	6	8	9
sf **Bynum (P, CL)+**	49.9	51.3	47.1	45.9		**21.1***	**17.0***	**13.7***	**17.8***	
sf **Carter (P)++**	54.1					**20.2***				
CDC Falcon (P)+	53.8	55.3	**52.8***	**51.5***	**51.8***	**36.6***	37.9	38.6	34.9	35.8
sf **Genou +**	55.0	**57.5***	**54.3***	**53.2***	**53.4***	**19.5***	**16.7***	**13.2***	**18.1***	**17.0***
Hyalite (P, CL, HWW)+	**56.7***	54.7	50.2	48.6		42.8	43.7	39.7	37.1	
Jagalene (P)+	**57.8***	56.2	50.9	**49.7***		43.7	46.6	40.3	36.9	
Jerry	53.0	53.8	49.7	47.8	49.3	**33.0***	45.0	39.7	41.2	43.5
Ledger (P)+	52.8	56.3	**51.8***			**30.6***	35.4	34.0		
MT0495	**62.1***	**61.8***				43.4	47.2			
MT0552	**57.0***					**35.6***				
sf **MTS04114 (HWW)**	**64.6****	**62.3****				**27.3***	**23.6***			
sf **MTS04120**	50.4	54.3				**17.8***	**15.0***			
sf **MTS0531 (HWW)**	**63.9***					**15.4****				
sf **MTS0532 (HWW)**	**61.6***					**15.9***				
Neeley	48.5	49.6	47.8	46.1	47.6	**37.0***	48.5	46.0	50.9	46.7
Norris (P, CL)+	**56.4***	55.3	**53.0***	**51.7***		43.6	39.6	34.2	38.3	
NuSky (HWW)	50.6	51.8	50.4	47.8	48.7	41.6	52.6	51.2	53.5	57.5
Promontory	51.8	53.4	49.5	47.5	48.5	50.9	59.3	50.9	53.9	57.0
Pryor (P)+	55.3	53.5	51.0	**50.2***	**50.0***	**21.0***	28.9	28.0	27.7	31.1
sf **Rampart**	47.8	51.1	48.0	47.9	48.7	**17.2***	**11.5****	**8.8****	**8.4****	**7.8****
Rocky (P)	**56.3***	54.3	**52.6***	**51.4***	**51.4***	**23.5***	31.7	25.6	27.2	26.8
Tiber	53.8	52.7	50.3	48.0	47.7	39.4	49.8	42.9	44.8	43.3
Wahoo +	**61.9***	**60.3***	**56.3****	**53.2***		41.0	43.1	36.6	36.9	
Yellowstone +	**58.2***	**56.8***	**55.2***	**53.2****	**53.8****	**33.8***	47.4	47.6	49.9	49.2
Average	**55.5**	**55.1**	**51.2**	**49.6**	**50.1**	**31.3**	**37.0**	**34.8**	**36.1**	**37.8**
LSD (0.05)	**8.4**	**5.6**	**4.5**	**3.9**	**3.9**	**22.4**	**16.4**	**12.9**	**12.0**	**12.2**
C.V. (%)	**7.3**	**7.2**	**7.7**	**8.0**	**8.3**	**34.6**	**31.3**	**32.4**	**33.5**	**34.4**

** = 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 2007-2008

Agricultural Research Center	Sept. 2007	Oct. 2007	Nov. 2007	Dec. 2007	Jan. 2008	Feb. 2008	Mar. 2008	Apr. 2008	May 2008	June 2008	July 2008	Aug 2008	Total Average
Western Triangle, Conrad	**2.51**	**0.56**	**0.00**	**0.06**	**0.19**	**0.14**	**0.19**	**0.35**	**4.11**	**2.43**	**0.90**	**0.45**	**11.89**
						1986-2008 Average = 11.32							
	54.4	45.9	33.8	23.1	19.3	25.5	33.6	37.2	50.8	57.8	66.9	66.3	42.9
Northern, Havre	**1.76**	**0.26**	**0.07**	**0.31**	**0.17**	**0.69**	**0.12**	**0.35**	**3.01**	**3.57**	**1.16**	**0.74**	**12.21**
						1916-2008 Average = 11.89							
	57.3	48.0	33.6	21.1	18.2	20.6	34.6	39.7	53.1	60.4	69.8	68.6	43.7
Northwestern, Kalispell	**1.28**	**1.11**	**1.02**	**1.13**	**1.31**	**0.76**	**0.61**	**0.90**	**2.33**	**3.65**	**3.80**	**1.15**	**19.05**
						1980-2008 Average = 20.19							
	53.6	40.3	32.6	26.2	19.4	30.2	32.9	37.8	47.0	55.6	65.1	63.6	42.0
Central, Moccasin	**1.11**	**0.93**	**0.91**	**0.02**	**0.19**	**0.21**	**0.11**	**0.44**	**4.32**	**2.94**	**0.45**	**0.89**	**12.52**
						1909-2008 Average = 12.52							
	56.4	47.6	34.5	26.1	22.0	28.6	32.9	37.1	49.6	56.5	66.7	67.0	43.8
Southern, Huntley	**1.40**	**2.06**	**0.55**	**0.14**	**0.33**	**0.10**	**0.21**	**0.22**	**5.44**	**0.43**	**1.32**	**0.45**	**12.65**
						1911-2008 Average = 13.22							
	57.3	43.9	33.2	29.4	25.4	25.0	43.6	43.6	56.6	64.1	76.3	69.7	47.3
Northeastern, Sidney	**0.94**	**1.15**	**0.07**	**0.06**	**0.18**	**0.10**	**0.19**	**0.20**	**1.24**	**1.30**	**0.70**	**1.11**	**7.24**
						1958-2008 Average = 13.77							
	59.3	49.3	34.1	20.0	16.0	20.2	34.5	45.1	57.4	63.7	73.3	72.5	45.5
Williston, N. Dakota	**0.85**	**1.18**	**0.18**	**0.04**	**0.14**	**0.09**	**0.29**	**0.28**	**1.40**	**2.31**	**0.84**	**1.40**	**9.00**
						1957-2008 Average = 14.03							
	62.0	49.5	33.2	18.4	15.3	16.9	33.3	44.2	55.9	63.2	74.1	73.1	44.9
Post Farm, Bozeman	**1.49**	**2.35**	**0.85**	**2.39**	**0.72**	**0.40**	**0.70**	**1.67**	**3.30**	**2.66**	**1.28**	**0.70**	**18.51**
						1958-2008 Average = 16.05							
	56.5	45.0	33.0	28.0	20.6	30.2	32.2	38.5	50.7	58.0	67.4	66.7	43.9

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		S	2	3	H	S	VS	MS	-
Alice	E	White	2	S		S	3	3	H	S	MR	MS	R
AP 503 CL2	M	White	2	S		M	3	4	H	S	R	MS	-
Bill Brown	E	White	2	S		S	-	-	-	S	VS	S	-
Bond CL	E	White	2	S		MS	2	2	M	S	VS	S	S
Bynum	M	Brown	2	M	20	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
Darrell	M-E	White	3	S		M	4	3	M	S	MS	R	MR
Genou	M	White	2	M	19	M	4	4	H	S	VS	S	S
Hawken	VE	White	2	S		S	3	3	H	S	R	MR	MR
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
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
NuSky	M	White	4	S		S	3	3	L	S	VS	R	R
NuWest	M	White	4	M		S	3	3	-	S	VS	R	S
Peregrine	M-L	White	4	MS		M	3	3	M	S	R	MS	-
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
Rampart	M	Brown	2	MW	22	L	4	5	M	S	R	MR	S
Ripper	E	White	1	S		M	4	3	H	S	VS	S	R
Rocky	M-E	White	3	MW		M	3	3	-	S	S	R	S
Tiber	M	Brown	3	M		M	3	3	-	S	VS	VS	MR
Vanguard	M	White	2	M	19	L	4	4	-	S	MR	MS	S
Wahoo	E	White	4	S		S	2	2	H	S	S	R	MR
Wendy	VE	White	3	S		S	3	3	M	S	R	MR	MR
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, and Moccasin data, 2007-2008
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
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

Table 16. SOFT WHITE WINTER WHEAT: District 1 -- Kalispell - Dryland (High Rainfall)

Neeley yield severely affected by stripe rust infestation at Kalispell in 2005

	Cultivar/Line	Grain Yield (bushels/acre)				2007 Data				
						Test	Heading Date		Plant	Protein
		2007	2006-2007	2005-2007	2004-2007	weight	Julian	Calendar	height	%
			2 yr	3 yr	4 yr	lb/bu			in	
R	**Eltan**	88.1	78.6	93.1	103.6	54.5	159.0	8-Jun	36.1	13.1
	Finch	81.4	85.2	103.2	112.4	53.4	162.7	12-Jun	36.7	14.4
	Hubbard +	96.7	85.7	91.6	104.3	56.9	158.3	7-Jun	41.3	12.0
	Lambert	90.9	85.7	101.4	109.5	54.5	156.7	6-Jun	37.5	13.1
R	**Lewjain**	**100.8***	90.1	96.9	105.2	55.4	163.0	12-Jun	37.8	12.0
	MAC-1 (P)+	87.1	79.2	98.3	106.4	56.6	156.3	5-Jun	38.3	13.3
	MacVicar	81.3	78.6	92.8	104.2	50.6	157.0	6-Jun	34.8	14.5
	Masami +	85.6	80.6	97.4		53.1	161.3	10-Jun	35.6	12.7
	Neeley (HRW)	94.6	74.2	53.9	69.5	60.0	157.0	6-Jun	43.6	12.1
	Rod	92.1	88.8	105.8	114.3	52.9	161.0	10-Jun	33.6	12.9
	Simon +	95.0	87.5	105.9	113.7	55.6	157.0	6-Jun	35.7	12.6
	Xerpha	**99.4***				53.4	161.3	10-Jun	36.6	13.7
	Average	**92.6**	**83.3**	**94.6**	**104.3**	**54.8**	**158.5**	**8-Jun**	**37.1**	**13.0**
	LSD (0.05)	**9.1**	**ns**	**ns**	**ns**	**ns**	**2.9**		**1.5**	
	C.V.	**5.9**	**11.8**	**20.5**	**16.8**	**2.6**	**1.1**		**2.4**	

** = 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. SOFT WHITE WINTER WHEAT: District 2 -- Bozeman - Dryland (Moderate Rainfall)

	Cultivar/Line	Grain Yield (bushels/acre)				2007 Data: Test weight	Heading Date		Plant height	Protein
		2007	2006-2007	2005-2007	2004-2007		Julian	Calendar		
			2 yr	3 yr	4 yr	lb/bu			in	
R	**Eltan**	124.5	111.7	110.6	112.8	57.4	167.7	17-Jun	38.2	11.9
	Finch	106.6	98.5	97.6	101.7	56.9	172.7	22-Jun	37.5	13.2
	Hubbard +	109.2	97.5	99.1	104.8	58.4	168.7	18-Jun	42.3	12.7
	Lambert	109.7	101.0	102.5	106.3	57.3	163.7	13-Jun	39.1	12.7
	Lewjain	120.3	111.2	104.9	104.6	55.6	170.3	19-Jun	40.0	12.9
	MAC-1 (P)+	**126.0***	109.6	107.0	108.5	**59.6***	163.7	13-Jun	40.9	12.7
	MacVicar	109.3	95.7	96.1	99.0	54.6	166.0	15-Jun	35.6	12.6
	Masami +	111.3	98.4	96.4		54.4	170.7	20-Jun	36.6	12.3
	Neeley (HRW)	113.9	91.1	95.0	102.1	**60.6****	165.0	14-Jun	42.1	12.4
	Rod	114.4	100.6	102.5	107.2	54.0	168.7	18-Jun	36.0	12.9
	Simon +	123.6	109.5	109.0	111.5	58.6	164.0	13-Jun	36.5	12.1
	Xerpha	123.2				57.4	167.7	17-Jun	37.3	12.6
	Average	**117.6**	**103.3**	**102.1**	**105.3**	**57.2**	**166.6**	**16-Jun**	**38.1**	**12.5**
	LSD (0.05)	**8.2**	**ns**	**ns**	**ns**	**1.5**	**1.6**		**1.6**	
	C.V.	**4.2**	**6.5**	**6.3**	**6.3**	**1.5**	**0.6**		**2.6**	

** = 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 18. 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**
Rod	**M-L**	**1**	**MR**	**S**	**S**	**MS**	**R**
Simon +	**E**	**2**	**MR**	**-**	**-**	**-**	**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 2009 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. In the initial year of testing in Montana, Accipiter had above average yield, below average test weight and protein, and excellent winter hardiness. Accipiter appears very susceptible to stripe rust and susceptible 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. In the initial year of testing in Montana, AP503 CL2 had below average yield, above average test weight, average protein, and below average winter hardiness. AP503 CL2 appears resistant to stripe rust and moderately susceptible to stem rust. AP503 CL2 has average milling and abpve average baking quality. PVP, Title V has been applied for (Certificate #200800322). Additionally, the CLEARFIELD gene is patented.

Bill Brown – hard red winter wheat released by Colorado in 2007. Bill Brown is an early maturing short wheat with white chaff. In the initial year of testing in Montana, Bill Brown had below average yield and protein, above average test weight, and poor winter hardiness. Bill Brown appears very susceptible to stripe rust and susceptible to stem rust.PVP, Title V has been applied for (Certificate #200800327).

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. In the initial year of testing in Montana, Peregrine had above average yield, average test weight, below average protein, and good winter hardiness. Peregrine appears resistant to stripe rust and moderately susceptible to stem rust. Peregrine has average milling and baking quality.

Varieties previously in bulletin:

Alice – hard **white** winter wheat released by South Dakota in 2006. Alice is an early maturing, white chaffed, short semidwarf wheat. Alice has average yield and protein, above average test weight, and below average winter hardiness. Alice appears moderately resistant to stripe rust and moderately susceptible to stem rust. Alice has average milling and baking quality. PVP, Title V has been issued (Certificate #200700337).

Bond CL – hard red winter wheat was developed by the Colorado Agricultural Experiment Station and released to seed producers in 2004. Bond CL was released based on its resistance to Biotype 1 of the Russian wheat aphid, its tolerance of imizamox (IMI) herbicide, and its adaptation to dryland production in Eastern Colorado and the west-central Great Plains, and improved bread and baking qualities relative to available IMI-tolerant cultivars. Bond CL is a medium-early maturing semidwarf. It is susceptible to stem rust, leaf rust, and very susceptible to stripe rust. It is moderately susceptible to wheat streak mosaic virus. PVP with Title V option has been issued (Certificate #200500339). 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 applied for (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).

Darrell – hard red winter wheat released by South Dakota in 2006. Darrell is an early maturing, white chaffed, medium height semidwarf wheat. Darrell has above average winter hardiness and average yield, test weight, and protein. Darrell is moderately susceptible to stripe rust and resistant to stem rust. Darrell has above average milling and average baking characteristics. PVP, Title V has been issued (Certificate #200700338).

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).

Hawken – hard red winter wheat released by AgriPro in 2007. Hawken is an early maturing, white chaffed, short semidwarf wheat. Hawken has above average test weight and below average yield, average protein, and below average winter hardiness. Hawken is resistant to stripe rust and moderately resistant to stem rust. Hawken has average milling and baking quality. PVP, Title V has been issued (Certificate #200700350).

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.

NuSky – hard **white** winter wheat to be released by the Montana Agricultural Experiment Station as a public release in the fall of 2001. High yielding, medium maturity, good winterhardiness, intermediate height, good straw strength, average grain protein, and good milling, bread-baking, and Asian noodle characteristics. Like NuWest, NuSky is resistant to stem rust and very susceptible to stripe rust. Field performance and end-use quality characteristics are very similar to NuWest. It has low PPO and could be used as a dual-purpose (bread and noodles) variety..

NuWest – Developed by the Montana Agricultural Experiment Station. It was released in 1994 and is currently licensed to General Mills. NuWest is a hard **white** winter wheat of intermediate height. The spike is awned, white chaffed and erect at maturity. The kernels are hard, white and elliptical. The germ is large, with a mid-long brush, cheeks are rounded with a narrow straight crease. There is approximately one red kernel per 1500 white kernels. NuWest is resistant to prevalent races of stem rust found in Montana. It is susceptible to leaf rust, wheat streak mosaic virus and dwarf bunt. It is resistant to stem rust, very susceptible to stripe rust, and moderately susceptible to Cephalosporium stripe. It is susceptible to Russian wheat aphid and the wheat stem sawfly. It has low PPO and could be used as a dual-purpose (bread and noodles) variety. 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 #9600342).

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).

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.

Ripper – hard red winter wheat released by Colorado in 2006. Ripper is an early maturing, white chaffed, short semidwarf wheat. In the initial year of testing in Montana, Ripper has average yield, test weight, and protein, but poor winter hardiness. Ripper is very susceptible to stripe rust and susceptible to stem rust. Ripper has above average milling and average baking characteristics. PVP, Title V has been issued (Certificate #200700302).

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.

Tiber – A standard height hard red winter wheat variety released by the Montana Agricultural Experiment Station in 1987. Tiber was selected from a Redwin population based on its tolerance to the leaf spot disease complex. Tiber is a bearded, brown chaffed, stiff-strawed variety. It has a high yield potential, good shatter resistance and good winter-hardiness (similar to Redwin). Tiber's resistance to lodging and shattering is equal to Redwin; shorter in straw height than Winalta. Tiber has moderate resistance to the leaf spot complex, but is susceptible to dwarf smut, stem rust, and stripe rust. Tiber has average milling and baking quality.

Vanguard – Developed by the Montana Agricultural Experiment Station and released in 1995. Vanguard is the first sawfly-tolerant winter wheat released in Montana since 1965. It is resistant to the wheat stem sawfly. It was released as an emergency measure to reduce yield losses due to the sawfly. Vanguard has awned spikes, with white chaff and the straw is white. Vanguard is moderately resistant to stripe rust, has some resistance to stem rust, leaf rust and susceptible to dwarf smut.

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).

Wendy – hard **white** wheat released by South Dakota in 2006. It is a white chaffed, early maturing, short semidwarf cultivar. In limited testing (1 year) in the Montana Intrastate Winter Wheat Test, Wendy has average yield and above average test weight and protein. It has average winterhardiness. Wendy is resistant to stripe rust and moderately resistant to stem rust. It has acceptable milling and baking characteristics. PVP with Title V option has been issued (Certificate #200500102).

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).

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. In the initial year of testing in Montana, Xerpha had above average yield and average test weight and protein. Xerpha appears resistant to stripe rust.

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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