RESULTS OF AGRONOMIC AND WEED SCIENCE RESEARCH CONDUCTED IN SOUTH CENTRAL MONTANA - 2003

The Annual Report of the Investigations at and Administration of the Southern Agricultural Research Center, Huntley, Montana

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PROJECT TITLE: Dryland and Irrigated Winter Wheat Variety Performance Trials near Forsyth, Huntley, Indian Creek, Lodge Grass and Rapelje, Montana. (Exps. 033880, 033881, 033882, 033883 and 033884).

PROJECT LEADERS:
Kenneth D. Kephart, Agronomist, SARC, Huntley
Geraldine B. Opena, Research Associate, SARC, Huntley

PROJECT PERSONNEL:
Phil L. Bruckner, Winter Wheat Breeder, PSPP, Bozeman
James E. Berg, Winter Wheat Research Associate, PSPP, Bozeman
Tom A. Fischer, Research Specialist and Farm Foreman, SARC, Huntley
Paul Dixon, Yellowstone County Extension, Billings
Lee Schmelzer, Stillwater County Extension, Columbus
Kirk Barnette, Big Horn County Extension, Hardin

COOPERATORS:
Don Holland, Farmer Cooperator, Forsyth
Mike Hammond, Farmer Cooperator, Indian Creek
Carter Miklovich, Farmer Cooperator, Lodge Grass
Gary Broyles, Farmer Cooperator, Rapelje

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

METHODS: The 2003 off-station winter wheat trials were established under dryland conditions near Forsyth, Indian Creek, Lodge Grass and Rapelje, and under irrigation at Huntley (Fig. 1). Each trial possessed 24 hard red and hard white winter wheat entries (17 cultivars, 7 experimental lines), and was planted using a randomized complete block design with three replications. Dryland test plots consisted of a 15-foot, 4-row plot with 12-inch row spacing. The irrigated test plots consisted of a 15-foot, 7-row plot with 6-inch row spacing.

All rows of each harvested test plot were trimmed 36 inches and harvested using an experimental plot combine. Recorded grain yields were adjusted to 13% grain moisture content, and are reported in bushels per acre based on a 60 pound standard bushel weight. Two year (2002-2003) and three year (2001-2003) yield averages are provided for cultivars tested during previous years. Test weight (pounds per bushel) and percent grain moisture content were obtained for each plot using a Dickey-john™ GAC 2100 grain analyzer. Grain protein was determined by near-infrared reflectance by the MSU Cereal Quality Lab for each entry bulked across replications. Reported grain protein values have been adjusted to a 12% grain moisture content. Plant height was measured in inches from the soil surface to the top of the head, excluding the awns if present. Lodging of some cultivars was noted at the Huntley location during 2003, and recorded on a 0 to 9 scale representing no lodging to all stems lying flat on the ground, respectively.

RESULTS: Marginal soil moisture resulted in poor germination and spotty emergence at the Indian Creek and Rapelje sites, but the Indian Creek site eventually developed fairly uniform plant stands. Extremely dry conditions prevailed all

season at Rapelje, resulting in poor stands and crop growth across the entire test site. Over-wintering temperatures were unusually mild during December, January and most of February. Unusually cold temperatures were experienced from late February throughout most of March, but little or no winter injury was observed at the five locations. Surface soil moisture conditions in the spring of 2003 were more favorable for winter wheat growth compared to the previous year at 3 of the 4 dryland sites. Most of the dryland trials had significant yield improvements compared to the previous year. Soil moisture conditions at the Rapelje site never did improve and all entries produced depressed yields from the drought stress. The Rapelje trial also experienced extensive feeding damage from grasshoppers. All locations experienced unusual hot, dry conditions during late June and throughout July, which hastened crop maturity.

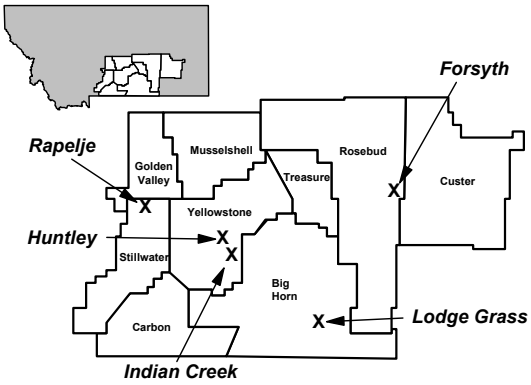

Figure 1. 2003 off-station winter wheat trial locations in south central Montana.

Average winter wheat yield under irrigated condition in Huntley was 121.4 bu/ac (Table 1). Yields ranged from 82.6 bu/ac for 'Norstar' to 149.5 bu/ac for 'MT9989' during 2003. 'CDC Falcon', 'Judith', 'MT00159', 'Paul', 'Promontory', and 'Pryor', produced yields between 130.6 bu/ac to 143.1 bu/ac, which were statistically equal with the highest yielding entry. 'BigSky' hard red winter wheat produced the heaviest test weight during 2003, averaging 64.8 lb/bu, with all of the 24 entries producing test weights heavier than 60 lb/bu. Grain protein averaged 12.7 percent and ranged from 11.1 to 14.3 percent. Two-year average yield for winter wheat varieties tested during 2002 and 2003 averaged 124.1 bu/ac with Promontory producing the highest average seed yield at 139.2 bu/ac. Ten other entries produced yields equal to the highest yield. Three-year average yield for winter wheat varieties tested during 2001 to 2003 averaged 123.7 bu/ac with Promontory producing the highest average grain yield at 135.6 bu/ac. Nine other entries produced yields equal to the yields of Promontory at this site for the past three years.

The Rapelje location demonstrated the highest level of drought stress among the four dryland off-station sites harvested in 2003. The trial also experienced extensive feeding damage from grasshopper infestations. Average yield under dryland condition at Rapelje in 2003 was 12.8 bu/ac (Table 2). Yields ranged from 18.0 bu/ac for MT00159 to 7.5 bu/ac for 'Rampart'. Eight entries produced equal yields with that of MT00159. Average test weight was 53.8 lb/bu. Grain protein averaged 17.5 percent and ranged from 16.6 to 18.2 percent.

Average yield under dryland condition at Forsyth in 2003 was 53.9 bu/ac, up 130 percent from the previous year (Table 3). Grain yields ranged from 63.4 bu/ac for Promontory to 46 bu/ac for 'Nuwest'. MT00159, 'Neeley', 'NuSky' and

Pryor produced yields equal with that of Promontory. Average test weight was 61.8 lb/bu, with 23 out of 24 entries producing test weights heavier than 60 lb/bu. Grain protein averaged 7.4 percent and ranged from 6.2 to 8.1 percent. Two-year average yield for winter wheat varieties tested during 2002 and 2003 averaged 38.6 bu/ac with Promontory producing the highest average seed yield at 42.6 bu/ac. Twelve other entries produced yields equal with the highest yield. Three-year average yield for winter wheat varieties tested during 2001 to 2003 averaged 34.6 bu/ac with Promontory producing the highest average seed yield at 37.1 bu/ac. Ten other entries produced yields equal with the highest yield.

Agronomic performance of the winter wheat cultivars and experimental lines tested under dryland conditions near Lodge Grass during 2003 is presented in Table 4. Average grain yield was 55.1bu/ac, up 11% from the previous year. Highest yield was produced by Promontory at 70.8 bu/ac. MT0097, Neeley, Paul and Pryor produced yields equal with the highest yield. Average test weight was 63.3 bu/ac, with all of the 24 entries producing test weights heavier than 60 lb/bu. Two-year average yield for winter wheat varieties tested during 2002 and 2003 averaged 51.9 bu/ac. Three-year average yield for winter wheat varieties tested during 2001 to 2003 in Lodge Grass averaged 48.5 bu/ac. For the two-year and three-year trials, Promontory had the highest yield and none of the entries had equal yields with that of Promontory.

Stands were slow to develop in the fall of 2002 in the dryland trial at the Indian Creek site, but all entries responded dramatically to late winter/early spring precipitation. Winter wheat yields at Indian Creek averaged 52 bu/ac in 2003 (Table 5), which is a 187% yield improvement compared to the average yield produced at this site in 2002. A compacted area, resulting from an abandoned access road or livestock path, affected crop growth in a strip that affected portions of all three replications. There was no significant difference in yield between the entries at this site in 2003. Average test weight was 63.9 lb/bu. All of the entries produced test weights heavier than 60 lb/bu. Two-year average yield for winter wheat varieties tested during 2002 and 2003 averaged 35 bu/a. Three-year average yield for winter wheat varieties tested during 2001 to 2003 averaged 46.2 bu/ac. There was no significant difference in yield among entries for the two-year and three-year trials.

SUMMARY:

Significant differences in yield averaged among entries under both dryland and irrigated scenarios were obtained in 2003 (Table 6). Promontory had the highest yield of 69.2 bu/ac, averaged across all five test locations harvested in 2003. MT00159, MT9989 and Pryor produced yields equal with that of Promontory across all locations, but only MT00159 equaled the yield of Promontory under dryland conditions. Since 2001, experiments representing 13 location-years of testing have uniformly tested 14 cultivars at several dryland and irrigated sites in south central Montana (Table 7). Under both dryland and irrigated conditions, averaged across three years, Promontory hard red winter wheat has been the highest yielding cultivar, averaging 65.8 bu/ac. No other cultivar entered in these trials has yielded as well as Promontory at all sites tested the past three years (Table 7). Promontory also has been the highest yielding cultivar tested, at 44.9 bu/ac, when comparing only dryland environments (Table 8). None of the cultivars tested under dryland conditions produced yields equal to the yield of Promontory from 2001 to 2003.

FUTURE PLANS:

All five off-station winter wheat cultivar evaluations were planted during the fall of 2003 for continuation of the program through 2004. A change in cooperators has moved the Indian Creek trial to the Fly Creek area of north-western Big Horn County.

Table 1. Performance of 24 hard red and hard white winter wheat cultivars and experimental lines tested under irrigated conditions near Huntley, Montana during 2003. Cultivars listed alphabetically. (Exp. 033880).

Cultivar	Grain Yield 1/ 2003	Grain Yield 1/ 2002-03	Grain Yield 1/ 2001-03	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height	Lodging 3/	Heading Date Julian	Heading Date Calendar
	------ bushels per acre ----			lb/bu	%	%	inches	0-9		
Bighorn	121.1	**129.0***	**125.7***	62.9	10.6	12.4	40.0	2.7	157.7	Jun 5
BigSky	120.1	**126.3***	**123.0***	64.8	10.3	12.8	49.8	3.0	157.3	Jun 5
CDC Falcon	**130.6***	**127.2***		63.8	9.7	12.6	40.0	2.0	156.3	Jun 4
Genou (MTS0031)	110.6	119.3		64.1	9.9	13.5	45.4	1.0	159.7	Jun 7
Jerry	113.9			62.3	10.2	13.7	49.6	0.0	158.7	Jun 6
Judith	**135.1***	**135.4***	**130.4***	62.3	9.8	11.6	46.8	0.0	156.3	Jun 4
Morgan	121.9	**125.6***	**129.9***	62.4	10.0	11.9	47.3	0.0	159.0	Jun 7
MT00159	**143.1***			61.6	13.9	12.3	44.9	0.0	159.7	Jun 7
MT0097	118.1			62.4	11.8	13.7	42.8	0.3	159.7	Jun 7
MT9982	124.7	**125.3***	**127.9***	61.7	12.2	13.1	43.4	0.0	159.7	Jun 7
MT9989	**149.5****			62.6	9.9	12.5	46.4	0.0	156.3	Jun 4
MTCL01158	124.9			63.9	9.9	13.2	41.3	0.0	155.0	Jun 3
MTR9997	118.8	**124.3***		63.7	11.0	12.9	43.1	1.0	158.3	Jun 6
Neeley	126.1	**130.0***	**129.7***	64.5	11.3	12.6	46.4	0.0	159.0	Jun 7
Norstar	82.6	95.7	103.4	62.8	11.3	13.6	53.8	8.0	163.0	Jun 11
NuSky	99.8	117.0	116.9	60.7	11.6	12.6	45.3	6.7	158.7	Jun 6
NuWest	115.9	**127.3***	120.1	61.9	11.8	12.8	45.5	5.7	158.0	Jun 6
Paul	**133.2***	**131.4***	**128.9***	63.0	10.5	11.6	39.7	3.7	159.0	Jun 7
Promontory	**137.6***	**139.2****	**135.6****	64.6	10.5	11.1	42.6	0.3	156.0	Jun 4
Pryor	**139.6***			61.3	11.9	11.4	41.8	0.0	160.0	Jun 8
Rampart	100.0			64.1	9.8	14.3	44.5	7.3	158.7	Jun 6
Rocky	119.2	123.3	**125.8***	63.8	10.3	12.8	46.2	4.0	155.0	Jun 3
Tiber	115.9	121.3	**124.1***	64.4	10.5	11.8	50.0	0.0	159.3	Jun 7
Vanguard	111.5	118.9	115.7	64.5	10.2	13.7	46.1	0.7	157.0	Jun 5
Average	121.4	124.1	123.7	63.1	10.8	12.7	45.1	1.9	158.2	Jun 6
LSD (p=0.05)	21.4	15.2	12.9	1.6	1.6	-.-	2.4	2.7	1.5	
CV %	10.7	10.6	11.1	1.6	8.8	-.-	3.3	84.8	0.6	

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12 percent grain moisture content.
3/ Lodging severity scores of 0 to 9 represent no lodging to all stems flat on the ground, respectively.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).

Huntley Irrigated Winter Wheat (Exp. 033880)

Planted:	September 30, 2002
Harvested:	July 28, 2003
Fertility	none applied
Herbicide:	Harmony Extra, 0.3 oz/a; Bronate, 1 pt/a; R-11, 1 pt/a, May 22, 2003
Insecticide:	none applied
Previous crop:	alfalfa
Precipitation:	9.49 inches

Table 2. Performance of 24 hard red and hard white winter wheat cultivars and experimental lines tested under dryland conditions near Rapelje, Montana during 2003. Cultivars listed alphabetically. (Exp. 033881).

Cultivar	1/ Grain Yield	Test Weight	Grain Moisture	2/ Grain Protein	Plant Height
	bu/ac	lb/bu	%	%	inches
Bighorn	10.1	53.7	10.2	17.6	21.7
BigSky	12.7	54.6	10.1	18.0	26.4
CDC Falcon	**17.5***	52.9	10.5	17.4	22.6
Genou (MTS0031)	11.0	54.4	10.1	17.9	24.0
Jerry	**13.7***	52.4	10.5	17.4	24.2
Judith	11.3	49.4	10.0	17.4	25.5
Morgan	**13.1***	54.2	10.3	16.6	22.5
MT00159	**18.0****	55.3	10.3	17.0	24.8
MT0097	12.7	53.4	10.2	17.5	24.6
MT9982	**13.9***	53.1	10.1	17.1	23.9
MT9989	**14.3***	50.9	10.0	17.3	25.1
MTCL01158	11.8	55.4	9.8	17.9	23.9
MTR9997	10.0	51.2	10.3	18.2	25.1
Neeley	11.9	55.1	10.3	17.3	21.4
Norstar	8.4	53.1	10.2	16.9	26.0
NuSky	12.5	54.8	10.1	17.2	24.0
NuWest	12.3	53.5	10.1	17.7	25.2
Paul	9.5	49.7	10.4	17.7	21.5
Promontory	**14.9***	56.6	10.6	17.1	24.2
Pryor	12.7	54.3	10.1	17.4	22.6
Rampart	7.5	55.6	10.4	17.9	21.3
Rocky	**16.5***	55.4	10.3	17.0	26.6
Tiber	**16.9***	56.1	10.5	17.5	24.1
Vanguard	12.8	55.6	10.4	17.8	22.1
Average	12.8	53.8	10.2	17.5	23.9
LSD (p=0.05)	5.0	-.-	-.-	-.-	ns
CV %	23.9	-.-	-.-	-.-	10.2

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12 percent grain moisture content.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Rapelje Dryland Winter Wheat (Exp. 033881)

Planted:	October 1, 2002
Harvested:	July 25, 2003
Fertility:	11-52-00, 100 lb/a, at planting
Herbicide:	n/a
Insecticide:	Di-Syston 8E, 8.0 oz/a; in-furrow, October 1, 2002
Previous Crop:	summer fallow
Precipitation:	n/a

Table 3. Performance of 24 hard red and hard white winter wheat cultivars and experimental lines tested under dryland conditions near Forsyth, Montana during 2003. Cultivars listed alphabetically. (Exp. 033882).

Cultivar	Grain Yield 1/ 2003	Grain Yield 1/ 2002-2003	Grain Yield 1/ 2001-2003	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height
	----------bu/ac----------			lb/bu	%	%	inches
Bighorn	56.0	**41.2***	**36.5***	60.8	8.8	7.2	28.0
BigSky	55.9	**38.1***	**34.5***	63.6	9.1	8.1	33.2
CDC Falcon	53.9	**38.7***		61.2	8.9	7.1	29.4
Genou (MTS0031)	54.9	**38.2***		63.0	9.0	7.1	32.1
Jerry	52.8			59.6	8.9	7.8	32.6
Judith	53.5	**39.8***	**35.6***	60.6	9.0	7.7	33.7
Morgan	51.4	36.9	**34.0***	62.4	8.8	7.3	35.7
MT00159	**58.9***			61.1	8.8	7.6	34.2
MT0097	52.0			61.4	9.0	7.4	29.6
MT9982	53.6	37.7	**35.9***	61.5	9.1	7.9	33.2
MT9989	55.3			60.7	9.0	7.5	33.0
MTCL01158	49.5			62.4	8.7	8.1	31.3
MTR9997	50.0	**38.2***		62.3	9.0	7.6	30.8
Neeley	**56.4***	**40.1***	**36.4***	62.7	9.2	7.0	32.7
Norstar	47.4	34.1	32.6	61.8	9.0	7.6	41.1
NuSky	**58.0***	**40.0***	**36.9***	61.9	9.3	7.3	34.0
NuWest	46.0	34.6	33.5	61.2	9.2	6.7	31.8
Paul	55.7	**39.7***	**34.6***	61.4	9.1	6.7	29.7
Promontory	**63.4****	**42.6****	**37.1****	63.4	8.9	7.8	32.8
Pryor	**58.9***			61.7	8.9	6.2	30.7
Rampart	50.4			62.5	8.8	7.8	31.0
Rocky	50.8	**40.6***	**34.7***	61.4	9.1	6.4	34.0
Tiber	54.2	**39.7***	**35.4***	62.5	9.0	7.5	35.0
Vanguard	54.7	**38.6***	31.5	62.6	8.8	8.1	33.0
Average	53.9	38.6	34.6	61.8	9.0	7.4	32.6
LSD (p=0.05)	7.2	4.9	3.4	0.7	0.2	-.-	2.0
CV %	8.1	10.9	10.6	0.7	1.1	-.-	3.8

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12 percent grain moisture content.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).

Forsyth Dryland Winter Wheat (Exp. 033882)

Planted:	September 16, 2002
Harvested:	July 16, 2003
Fertility:	11-52-00, 100 lb/a, at planting
Herbicide:	n/a
Insecticide:	Di-Syston 8E, 12.0 oz/a; in-furrow, September 16, 2002
Previous crop:	summer fallow
Precipitation:	n/a

Table 4. Performance of 24 hard red and hard white winter wheat cultivars and experimental lines tested under dryland conditions near Lodge Grass, Montana during 2003. Cultivars listed alphabetically. (Exp. 033883).

Cultivar	Grain Yield 1/ 2003	Grain Yield 1/ 2002-2003	Grain Yield 1/ 2001-2003	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height
	----------	bushels/acre	----------	lb/bu	%	%	inches
Bighorn	59.3	54.5	50.6	63.4	9.5	9.3	29.4
BigSky	50.8	48.8	45.2	64.8	9.7	9.8	36.4
CDC Falcon	53.9	51.7		63.3	9.7	9.1	28.6
Genou (MTS0031)	49.5	48.2		64.2	9.8	8.9	33.6
Jerry	50.9			62.6	9.9	9.8	33.3
Judith	57.6	52.5	47.1	61.6	9.7	10.0	31.8
Morgan	44.1	44.2	41.6	63.1	9.4	9.7	32.8
MT00159	57.4			62.7	9.7	9.6	31.2
MT0097	**59.8***			63.1	9.8	9.7	31.6
MT9982	45.0	48.1	47.0	63.2	9.9	10.2	31.6
MT9989	57.5			62.2	9.8	9.6	34.2
MTCL01158	52.5			64.5	9.2	11.4	31.7
MTR9997	55.2	54.1		63.8	9.6	9.8	32.8
Neeley	**60.6***	56.0	50.3	63.7	9.8	9.5	34.2
Norstar	53.6	48.9	46.6	62.3	9.9	9.3	43.0
NuSky	58.3	53.2	48.8	62.8	10.0	8.7	34.3
NuWest	48.3	48.2	45.4	63.1	10.0	9.2	33.1
Paul	**59.6***	54.4	51.7	63.3	10.0	8.7	31.3
Promontory	**70.8****	**62.4****	**56.6****	64.8	9.8	9.8	33.3
Pryor	**64.7***			63.0	9.7	8.3	28.3
Rampart	48.4			63.6	9.5	10.3	33.8
Rocky	54.7	54.1	50.6	63.5	10.1	8.5	35.3
Tiber	53.1	50.7	48.5	63.3	9.7	9.6	37.4
Vanguard	57.3	54.8	49.1	63.8	9.6	9.7	35.8
Average	55.1	51.9	48.5	63.3	9.7	9.5	33.3
LSD (p=0.05)	11.3	5.9	4.9	0.8	0.2	-.-	1.8
CV %	12.5	9.9	10.7	0.8	1.4	-.-	3.2

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12 percent grain moisture content.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).

Lodge Grass Dryland Winter Wheat (Exp. 033883)

Planted:	October 8, 2002
Harvested:	July 29, 2003
Fertility:	11-52-00, 100 lb/a, at planting
Herbicide:	n/a
Insecticide:	Di-Syston 8E, 12.0 oz/a; in-furrow, October 8, 2002
Previous crop:	summer fallow
Precipitation:	n/a

Table 5. Performance of 24 hard red and hard white winter wheat cultivars and experimental lines tested under dryland conditions at the Indian Creek location near Huntley, Montana during 2003. Cultivars listed alphabetically. (Exp. 033884).

Cultivar	Grain Yield 1/ 2003	Grain Yield 1/ 2002-2003	Grain Yield 1/ 2001-2003	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height
	---------- bushels/acre ----------			lb/bu	%	%	inches
BigSky	47.4	30.8	42.6	65.1	8.6	8.1	35.1
Bighorn	59.2	39.1	49.1	64.2	8.5	8.1	30.6
CDC Falcon	49.8	35.6		64.0	8.6	8.0	27.9
Genou (MTS0031)	54.6	37.2		65.3	8.8	7.5	33.3
Jerry	44.7			63.3	8.6	8.1	33.8
Judith	47.9	32.1	44.4	62.2	8.5	7.5	34.8
Morgan	53.0	35.9	48.2	64.3	8.3	9.1	34.3
MT00159	62.4			63.4	8.3	9.2	33.7
MT0097	42.2			63.7	8.5	7.9	28.4
MT9982	46.9	33.9	47.6	63.8	8.5	8.4	32.4
MT9989	49.2			62.8	8.5	8.3	32.5
MTCL01158	56.9			63.8	8.3	9.8	35.1
MTR9997	53.9	37.2		64.1	8.4	8.1	33.2
Neeley	51.5	34.7	43.4	64.5	8.7	8.0	33.6
Norstar	47.7	31.6	41.5	63.5	8.5	9.4	41.7
NuSky	53.6	33.7	45.9	63.7	8.7	7.8	34.3
NuWest	51.8	33.4	46.9	63.6	8.5	7.8	34.0
Paul	50.1	31.2	43.9	63.5	8.7	8.4	30.5
Promontory	59.4	38.8	50.9	64.8	8.5	9.9	33.6
Pryor	49.2			63.8	8.4	6.5	28.8
Rampart	53.5			64.5	8.5	9.2	34.6
Rocky	56.5	37.0	49.1	63.3	8.6	6.5	34.4
Tiber	55.5	36.5	47.4	64.7	8.4	8.9	37.6
Vanguard	50.3	35.1	45.6	64.9	8.6	8.7	34.3
Average	52.0	35.0	46.2	63.9	8.5	8.3	33.4
LSD (p=0.05)	ns	ns	ns	0.6	0.2	-.-	3.0
CV %	15.9	18.1	13.3	0.6	1.2	-.-	5.4

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12 percent grain moisture content.
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Indian Creek Dryland Winter Wheat (Exp. 033884)

Planted:	October 1, 2002
Harvested:	July 25, 2003
Fertility:	11-52-00, 100 lb/a, at planting
Herbicide:	n/a
Insecticide:	Di-Syston 8E, 8.0 oz/a; in-furrow, October 1, 2002
Previous crop:	summer fallow
Precipitation:	n/a

Table 6. Grain yield[1/] of 24 hard red and hard white winter wheats tested at five locations in south central Montana during 2003. Varieties listed by declining four-location average yield.

Cultivar	Forsyth Dryland	Lodge Grass Dryland	Indian Creek Dryland	Rapelje Dryland	Dryland Average	Huntley Irrigated	Five Location Average
	bushels per acre						
Promontory	**63.4****	**70.8****	59.4	**14.9***	**52.1****	**137.6***	**69.2****
MT00159	**58.9***	57.4	62.4	**18.0****	**49.2***	**143.1***	**68.0***
MT9989	55.3	57.5	49.2	**14.3***	44.1	**149.5****	**65.2***
Pryor	**58.9***	**64.7***	49.2	12.7	46.4	**139.6***	**65.0***
Paul	55.7	**59.6***	50.1	9.5	43.7	**133.2***	61.6
Neeley	**56.4***	**60.6***	51.5	11.9	45.1	126.1	61.3
CDC Falcon	53.9	53.9	49.8	**17.5***	43.8	**130.6***	61.2
Bighorn	56.0	59.3	59.2	10.1	46.2	121.1	61.1
Judith	53.5	57.6	47.9	11.3	42.6	**135.1***	61.1
Rocky	50.8	54.7	56.5	**16.5***	44.6	119.2	59.5
MTCL01158	49.5	52.5	56.9	11.8	42.7	124.9	59.1
Tiber	54.2	53.1	55.5	**16.9***	44.9	115.9	59.1
MTR9997	50.0	55.2	53.9	10.0	42.3	118.8	57.6
BigSky	55.9	50.8	47.4	12.7	41.7	120.1	57.4
Vanguard	54.7	57.3	50.3	12.8	43.8	111.5	57.3
MT0097	52.0	**59.8***	42.2	12.7	41.7	118.1	57.0
MT9982	53.6	45.0	46.9	**13.9***	39.9	124.7	56.8
Morgan	51.4	44.1	53.0	**13.1***	40.4	121.9	56.7
NuSky	**58.0***	58.3	53.6	12.5	45.6	99.8	56.5
Genou (MTS0031)	54.9	49.5	54.6	11.0	42.5	110.6	56.1
Jerry	52.8	50.9	44.7	**13.7***	40.6	113.9	55.2
NuWest	46.0	48.3	51.8	12.3	39.6	115.9	54.9
Rampart	50.4	48.4	53.5	7.5	39.9	100.0	51.9
Norstar	47.4	53.6	47.7	8.4	39.3	82.6	47.9
Average	53.9	55.1	52.0	12.8	43.4	121.4	59.0
LSD (p=0.05)	7.2	11.3	ns	5.0	4.8	21.4	5.7
CV%	8.1	12.5	15.9	23.9	13.8	10.7	13.4

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.

** Indicates highest yielding cultivar within a column.

* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).

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

Table 7. Performance of 24 hard red and hard white winter wheat cultivars and experimental lines tested under dryland and irrigated conditions at 5 locations in south central Montana during 2003. Cultivars listed alphabetically.

Cultivar	Grain Yield 1/ 2003	Grain Yield 1/ 2002-2003	Grain Yield 1/ 2001-2003	Test Weight	Grain Moisture	Grain Protein	Plant Height
	bushels/acre			lb/bu	%	%	inches
Bighorn	61.1	59.7	61.2	61.0	9.5	10.9	29.9
BigSky	57.4	55.6	57.6	62.6	9.6	11.4	36.2
CDC Falcon	61.2	58.2		61.1	9.5	10.8	29.7
Genou (MTS0031)	56.1	55.2		62.2	9.5	11.0	33.7
Jerry	55.2			60.0	9.6	11.4	34.7
Judith	61.1	59.0	60.3	59.2	9.4	10.8	34.5
Morgan	56.7	55.4	59.6	61.3	9.4	10.9	34.5
MT00159	**68.0***			60.8	10.2	11.1	33.7
MT0097	57.0			60.8	9.8	11.2	31.4
MT9982	56.8	56.0	60.7	60.6	9.9	11.3	32.9
MT9989	**65.2***			59.8	9.4	11.0	34.3
MTCL01158	59.1			62.0	9.2	12.1	32.7
MTR9997	57.6	57.5		61.0	9.6	11.3	33.0
Neeley	61.3	59.2	60.9	62.1	9.9	10.9	33.6
Norstar	47.9	47.7	52.4	60.7	9.8	11.4	41.1
NuSky	56.5	55.6	58.3	60.8	9.9	10.7	34.4
NuWest	54.9	55.5	57.7	60.7	9.9	10.8	33.9
Paul	61.6	58.1	60.5	60.2	9.7	10.6	30.6
Promontory	**69.2****	**64.5****	**65.8****	62.8	9.6	11.1	33.3
Pryor	**65.0***			60.8	9.8	10.0	30.5
Rampart	51.9			62.1	9.4	11.9	33.0
Rocky	59.5	58.5	61.3	61.5	9.7	10.2	35.3
Tiber	59.1	57.0	60.2	62.2	9.6	11.1	36.8
Vanguard	57.3	56.4	56.8	62.3	9.5	11.6	34.3
Average	59.0	56.9	59.3	61.2	9.6	11.1	33.7
LSD (p=0.05)	5.7	4.1	3.5	0.4	0.3	0.4	1.2
CV %	13.4	13.4	13.3	0.9	4.5	4.6	5.0
Location years	5	9	13	5	5	5	5

1/ Yields are based on a 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.

** Indicates highest yielding cultivar within a column.

* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).

Table 8. Performance of 24 hard red and hard white winter wheat cultivars and experimental lines tested under dryland conditions only in south central Montana during 2003. Cultivars listed alphabetically.

Cultivar	Grain Yield 1/ 2003	Grain Yield 1/ 2002-2003	Grain Yield 1/ 2001-2003	Test Weight	Grain Moisture	Grain Protein	Plant Height
	bushels/acre			lb/bu	%	%	inches
Bighorn	46.2	40.0	41.9	60.5	9.5	11.4	26.4
BigSky	41.7	35.4	38.0	62.0	9.6	12.0	32.0
CDC Falcon	43.8	38.5		60.4	9.7	11.2	26.8
Genou (MTS0031)	42.5	36.9		61.7	9.6	11.3	29.9
Jerry	40.6			59.5	9.8	11.7	30.0
Judith	42.6	37.2	39.3	58.4	9.6	11.7	30.3
Morgan	40.4	35.3	38.5	61.0	9.5	11.2	30.3
MT00159	**49.2***			60.6	9.6	11.4	30.0
MT0097	41.7			60.4	9.7	11.5	28.6
MT9982	39.9	36.2	40.5	60.4	9.7	11.7	29.6
MT9989	44.1			59.2	9.6	11.5	30.8
MTCL01158	42.7			61.5	9.2	12.5	29.0
MTR9997	42.3	38.4		60.3	9.6	11.9	29.6
Neeley	45.1	39.0	40.2	61.5	9.8	11.3	29.4
Norstar	39.3	33.9	37.1	60.2	9.7	11.3	36.7
NuSky	45.6	38.0	40.8	60.8	9.8	11.1	30.7
NuWest	39.6	34.9	39.0	60.3	9.7	11.2	30.1
Paul	43.7	37.1	40.0	59.5	9.8	11.0	27.5
Promontory	**52.1****	**43.2****	**44.9****	62.4	9.7	11.6	30.1
Pryor	46.4			60.7	9.5	10.6	27.2
Rampart	39.9			61.5	9.6	12.0	28.7
Rocky	44.6	40.0	42.0	60.9	9.8	10.6	32.0
Tiber	44.9	38.7	41.1	61.6	9.7	11.5	32.2
Vanguard	43.8	38.5	39.2	61.7	9.6	11.9	30.3
Average	43.4	37.6	40.0	60.7	9.6	11.5	29.9
LSD (p=0.05)	4.8	3.1	2.5	0.3	0.1	0.3	1.6
CV%	13.8	13.3	12.3	0.6	1.0	3.0	5.6
Location years	4	7	10	4	4	4	4

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