RESULTS OF AGRONOMIC AND WEED SCIENCE RESEARCH CONDUCTED IN SOUTH CENTRAL MONTANA - 2002

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PROJECT TITLE:

Dryland and Irrigated Spring Wheat Performance Trials near Bridger, Hysham, Molt and Ryegate, Montana. (Exps. 029994, 029995, 029996 and 029997).

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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 spring wheat varieties. This information should help spring wheat producers in south central Montana select varieties best suited to their particular area and growing conditions.

METHODS:

Off-station spring wheat trials were established under dryland conditions near Molt and Ryegate, and under irrigated conditions near Bridger and Hysham, Montana (Fig. 1). The 2002 off-station spring wheat trials each possessed 20 entries.

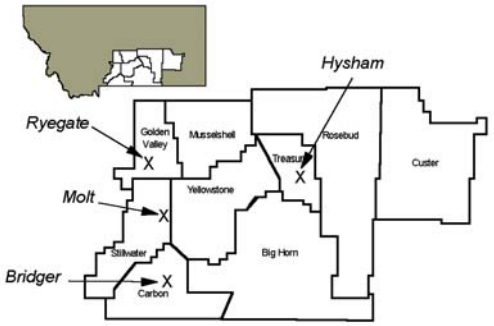

Figure 1. 2002 off-station spring wheat trial locations in south central Montana.

All studies were 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. Irrigated test plots consisted of a 15-foot, 7-row plot with 6-inch row spacing. All rows of each test plot were trimmed 36 inches and harvested using an experimental-plot combine. Recorded grain yields were adjusted to 13% grain moisture content, and are reported in bushels per acre based on a 60 pound

standard bushel weight. 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 for each entry bulked across replications. Grain protein values were adjusted to 12% grain moisture content. Plant height was measured in inches from the soil surface to the top of the head, excluding the awns if present. Reported plant height values have been rounded to the nearest inch. Lodging of some entries was noted at the irrigated locations. Lodging severity was recorded on a 0 to 9 scale at Hysham and Bridger, representing no lodging to all stems lying flat on the ground, respectively. At Molt, sawfly damage was scored from 0 to 9 representing less than 10 percent to greater than 90 percent cut stems, respectively.

RESULTS:

All four off-station spring wheat trials were planted in the spring of 2002, but only three of the sites, Bridger, Hysham and Molt were harvested. Drought and sawfly damage was evident at the Molt location prior to harvest. The Ryegate trial suffered from extreme drought conditions throughout the growing season and experienced substantial feeding damage from grasshoppers. The Ryegate site was not harvested in 2002.

Yields of spring wheat entries tested under dryland condition in Molt were very low due to severe drought stress conditions and sawfly injury (Table 1). Most entries experienced some sawfly damage, but cut stems were most evident in 'Hank', 'MTHW9420' and 'Westbred Express' spring wheats. The average grain yield was 7.3 bu/ac. There was no significant difference in yield observed among the 20 spring wheat entries tested at Molt. Average test weight was 55.5 pounds per bushel. Only 'Conan' and 'Scholar' produced test weights greater than or equal to 58 pounds per bushel.

Substantial lodging was observed among the spring wheat entries grown at the Hysham site in 2002, which likely reduced yields and grain test weight (Table 2). Average spring wheat yield under irrigated conditions in Hysham during 2002 was 95 bu/ac. The highest yielding spring wheat cultivar was Westbred Express, averaging 125.7 bu/ac. 'Ernest', 'Outlook' and 'Westbred 936' produced yields from 109.6 to 110.4 which was equal with that of the highest yield. Average test weight was 58.4 lb/bu, with only 5 out of 20 entries having test weights greater than 60 lb/bu.

The irrigated off-station spring wheat trial grown at Bridger during 2002 did not yield as good as spring wheat studies grown at this location during previous years. The average yield in 2002 was 58.7 bu/ac and ranged from 67.3 bu/ac for 'Rambo' to 42.0 bu/ac for MTHW9420. 'Amidon', Hank, 'Hi-Line', Outlook, 'MT9929' and 'Reeder' produced yields from 60.9 to 66.4 bu/ac, which was equal with that of the highest yield. Average test weight was 61.0 lb/bu, with 14 out of 20 entries having test weights greater than 60 lb/bu. Two year average yield for spring wheat varieties tested during 2001 and 2002 in Bridger averaged 61.5 bu/ac. There was no significant difference in yield among entries. Three-year average yield for spring wheat varieties tested during 2000 to 2002 averaged 72.6 bu/ac with McNeal producing the highest average seed yield at 84.2 bu/ac. Amidon, Hi-Line, 'Lew', 'Newana', Rambo, Reeder and 'Scholar' produced yields from 74.4 to 80.3 bu/ac which was equal with the highest yield.

SUMMARY:

Very low yields and poor crop quality were experienced under dryland conditions at the Molt location in 2002. Substantial difference in yield between the two irrigated sites, Hysham and Bridger, was observed during 2002. Entries including Amidon, Ernest, Hank, Hi-Line, MT9929, Rambo, Reeder, Westbred 936 and Westbred Express produced high yields at one or the other of the two irrigated sites, but only Outlook produced yields in the top yield group at both locations. Based on three-year averages analyzed for Bridger harvested in 2002, 'McNeal' has been the highest yielding spring wheat cultivar grown in south central Montana since 2000 (Table 3).

FUTURE PLANS: Off-station spring wheat variety performance trials will continue in 2003 at the Bridger, Hysham, Molt and Ryegate locations.

Table 1. Performance of 20 hard red and hard white spring wheat cultivars and experimental lines tested under dryland conditions near Molt, Montana during 2002. Cultivars listed alphabetically. (Exp. 029994).

Cultivar	1/ Grain Yield	Test Weight	2/ Grain Moisture	Grain Protein	Plant Height	3/ Sawfly Index
	bu/ac	lb/bu	%	%	inches	0-9
Amidon	7.4	52.1	9.0	18.7	17.6	0.7
Conan	7.4	58.0	9.8	17.3	19.1	0.0
Ernest	7.2	54.8	9.1	18.8	18.0	0.0
Explorer	7.4	54.5	9.5	18.9	17.6	0.7
Fortuna	7.2	57.1	9.5	17.6	17.8	0.0
Hank	7.4	50.8	9.3	18.3	18.2	1.3
Hi-Line	7.2	54.6	9.3	17.4	17.2	0.7
Lew	7.2	57.3	9.5	17.9	18.6	0.3
MT9806	7.4	56.3	9.4	17.4	19.4	0.0
Choteau (MT9929)	7.3	55.4	9.4	18.4	14.9	0.0
MTHW9420	7.2	56.5	9.4	16.7	16.2	1.7
McNeal	7.3	56.6	9.5	17.9	17.8	0.3
Newana	7.4	57.5	10.0	16.0	16.9	0.7
Outlook (MT9874)	7.5	54.0	9.8	17.6	20.1	0.7
Rambo	7.2	55.4	9.5	18.7	15.0	0.0
Reeder	7.3	55.2	9.4	17.2	17.5	0.3
Scholar	7.3	58.1	9.5	16.8	20.0	0.7
Westbred 926	7.4	53.7	9.6	19.2	16.2	0.7
Westbred 936	7.1	55.3	9.4	18.2	18.3	0.0
Westbred Express	7.1	56.9	9.6	17.2	17.3	2.7
Average	7.3	55.5	9.5	17.8	17.7	0.6
LSD (p=0.05)	ns	3.4	ns	-.-	2.8	0.9
CV%	2.8	3.7	3.4	-.-	9.7	99.7

1/ Yields are based on 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12 percent grain moisture content.
3/ Sawfly index scores of 0 to 9 represent less than 10 percent to greater than 90 percent cut stems, respectively.
ns Indicates no significant difference between cultivars within a column based on Fisher's protected LSD (p=0.05).

Molt Dryland Spring Wheat (Exp. 029994)

Planted:	May 16, 2002
Harvested:	August 16, 2002
Fertility:	11-52-00, 120 lb/a in-furrow, May 16, 2002
Herbicide:	n/a
Insecticide:	none
Previous Crop:	summer fallow
Precipitation:	n/a

Table 2. Performance of 20 hard red and hard white spring wheat cultivars and experimental lines tested under irrigation near Hysham, Montana during 2002. Cultivars listed alphabetically. (Exp. 029996).

Cultivar	1/ Grain Yield	Test Weight	2/ Grain Moisture	Grain Protein	Plant Height	3/ Lodging
	bu/ac	lb/bu	%	%	inches	0-9
Amidon	104.0	60.4	9.9	15.7	44.7	3.3
Conan	88.8	59.2	10.0	15.5	35.4	3.7
Ernest	**110.4***	60.3	9.9	17.0	44.0	3.3
Explorer	67.1	54.6	9.0	16.8	34.3	7.0
Fortuna	86.5	60.2	10.3	16.1	42.0	6.0
Hank	99.3	56.0	9.4	16.4	34.6	4.0
Hi-Line	88.1	58.6	9.8	15.8	37.5	4.3
Lew	67.9	59.7	10.0	16.6	43.7	8.0
McNeal	104.1	58.8	9.9	15.8	37.2	2.7
MT9806	101.8	58.8	9.6	15.9	38.0	3.3
Choteau (MT9929)	98.3	57.9	9.6	16.4	36.0	3.7
MTHW9420	79.5	54.0	9.0	15.8	36.1	7.0
Newana	73.6	57.7	9.7	15.2	34.4	3.0
Outlook (MT9874)	**109.6***	58.9	9.6	15.4	39.7	2.3
Rambo	85.0	58.3	9.7	15.2	34.0	5.7
Reeder	104.2	61.0	10.1	16.7	40.5	2.7
Scholar	90.4	59.9	9.9	16.5	43.0	5.7
Westbred 926	105.1	57.2	9.2	16.2	35.2	3.3
Westbred 936	**109.8***	56.8	9.5	16.2	32.0	3.0
Westbred Express	**125.7****	60.5	10.2	15.0	32.1	1.0
Average	95.0	58.4	9.7	16.0	37.7	4.2
LSD (p=0.05)	16.2	1.3	0.3	-.-	2.1	2.4
CV%	10.3	1.4	2.1	-.-	3.3	34.4

1/ Yields are based on 60 pound standard bushel weight and adjusted to 13.0 percent moisture content.
2/ Grain protein values adjusted to 12 percent grain moisture content.
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).

Hysham Irrigated Spring Wheat (Exp. 029996)

Planted:	April 5, 2002
Harvested:	August 14, 2002
Fertility:	11-52-00, 120 lb/a in-furrow, April 5, 2002
Herbicide:	n/a
Insecticide:	none
Previous Crop:	sugar beets
Irrigation:	n/a
Precipitation:	n/a

Table 3. Performance of 20 hard red and hard white spring wheat cultivars and experimental lines tested under irrigation near Bridger, Montana during 2002. Cultivars listed alphabetically. (Exp. 029997).

Cultivar	Grain Yield 1/ 2002	Grain Yield 1/ 2001-2002	Grain Yield 1/ 2000-2002	Test Weight	Grain Moisture	Grain Protein 2/	Plant Height	Lodging 3/
	bu/ac			lb/bu	%	%	inches	0-9
Amidon	**60.9***	64.6	**74.4***	61.2	10.3	15.2	38.6	0.0
Conan	59.7	57.8	66.3	61.3	11.6	15.9	29.4	0.0
Ernest	57.0	61.3	73.0	61.3	10.2	17.1	36.7	0.0
Explorer	50.0	60.0	72.5	59.9	9.9	15.8	29.2	0.0
Fortuna	51.3	54.9	68.2	61.5	10.3	15.6	38.1	2.3
Hank	**66.0***			59.8	10.7	15.5	29.5	0.0
Hi-Line	**62.1***	71.5	**76.9***	60.3	9.9	16.0	27.9	0.0
Lew	54.0	59.7	**74.5***	63.0	10.8	15.3	37.4	2.7
McNeal	**65.6***	69.1	**84.2****	59.7	10.0	16.6	32.8	0.0
MT9806	60.0			61.6	10.4	15.4	31.8	0.0
Choteau (MT9929)	**66.5***	61.2		62.0	10.4	15.4	29.4	0.0
MTHW9420	42.0	58.3	67.6	59.9	10.2	15.1	28.6	0.0
Newana	57.5	54.4	**75.9***	61.2	10.2	15.8	28.5	0.0
Outlook (MT9874)	**62.9***	66.0		60.8	10.6	--	30.7	0.0
Rambo	**67.3****	61.4	**74.8***	61.7	11.5	15.4	29.6	0.0
Reeder	**66.4***	71.4	**78.6***	62.0	10.5	15.7	30.5	0.0
Scholar	58.6	69.8	**80.3***	62.3	10.4	14.7	35.9	0.0
Westbred 926	52.4	57.7	65.0	59.9	10.1	16.5	28.4	0.0
Westbred 936	57.3	53.4	59.0	59.8	10.2	16.4	25.7	0.0
Westbred Express	57.2	55.2	70.2	61.0	10.4	16.4	26.4	0.0
Average	58.7	61.5	72.6	61.0	10.4	15.8	31.3	0.3
LSD (p=0.05)	6.4	ns	10.3	0.8	0.5	-.-	2.3	ns
CV%	6.6	19.3	15.1	0.8	2.9	-.-	4.5	398.1

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

Bridger Irrigated Spring Wheat (Exp. 029996)

Planted:	May 3, 2002
Harvested:	August 16, 2002
Fertility:	11-52-00, 120 lb/a in-furrow, May 3, 2001
Herbicide:	Harmony Extra, 0.5 oz/a; Bronate, 1 pt/a; R-11, 1 pt/a, June 4, 2002
Insecticide:	none
Previous Crop:	summer fallow
Irrigation:	n/a
Precipitation:	n/a