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

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PROJECT TITLE:

Dryland and Irrigated Durum Performance Trials near Bridger, Hysham, Molt and Ryegate, Montana. (Exps. 029894, 029895, 029896 and 029897).

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OBJECTIVES:

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

METHODS:

Off-station durum trials were established under dryland conditions near Molt and Ryegate, and under irrigated conditions near Bridger and Hysham, Montana (Fig. 1). Fifteen durum entries plus 'McNeal' hard red spring wheat (HRSW) were planted at each location.

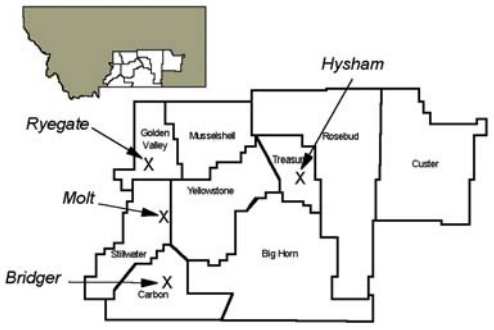

Figure 1. 2002 off-station durum trial locations in south central Montana.

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 durum off-station trials were planted in the spring of 2002, but only three of the sites, Bridger, Hysham and Molt, were harvested. 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.

Durum yields under dryland conditions in Molt were very low (Table 1). Most entries experienced some sawfly damage, but cut stems were most evident in 'Laker' and 'Plaza' durums. Average grain yield was 8.0 bu/ac and ranged from 10.4 bu/ac for 'McNeal' to 5.6 bu/ac for 'Plaza'. 'AC Avonlea', 'Maier', 'Mountrail', 'Renville', 'Scepter', 'Vic' and 'Ward' produced yields equal with that of McNeal.

Substantial lodging was observed among the durum entries grown at the Hysham site in 2002, which likely reduced yields and grain test weight (Table 2). Durum average yield under irrigated condition in Hysham was 96.5 bu/ac and ranged from 112.5 bu/ac for 'Lebsock' to 75.1 bu/ac for 'Kyle'. AC Avonlea, 'Ben', Maier, 'Monroe', Mountrail, 'Munich', Renville and Vic produced yields equal with that of Lebsock. Test weights averaged 59.3 lb/bu, with 5 out of 16 entries having test weights equal to or greater than 60 lb/bu.

The irrigated off-station durum trial grown at Bridger during 2002 had higher average yield compared to the previous year (Table 3). The average yield in 2002 was 57.4 bu/ac, with a range of 68.5 bu/ac for McNeal and 47.4 bu/ac for 'Kyle'. Only Maier and Mountrail produced yields equal with that of McNeal. Test weights averaged 60.9 lb/bu. All of the entries had test weights equal to or greater than 60 lb/bu. Two-year average yield for durum varieties tested during 2001 and 2002 in Bridger averaged 53.7 bu/ac with McNeal producing the highest average seed yield at 71.9 bu/ac. Three-year average yield for durum varieties tested during 2000 to 2002 averaged 69.7 bu/ac with McNeal producing the highest average seed yield at 88.1 bu/ac. None of the remaining entries produced yields equal with the highest yield.

SUMMARY:

Based on three-year averages analyzed for the Bridger site and two-year averages analyzed for the Bridger location, the McNeal spring wheat check has been the highest yielding entry grown in off-station durum trials for south central Montana (Table 3). The durum cultivars Maier and Mountrail have equaled the yields of McNeal under irrigated conditions in 2002. No durum tested in the past three years has equaled the yield of McNeal under irrigation.

FUTURE PLANS:

Access to durum markets has been limited and no substantial acreage has developed for durum in this region of the state. Off-station durum performance evaluations in south central Montana will be discontinued in 2003.

Table 1. Performance of 16 spring durum cultivars compared to McNeal hard red spring wheat tested under dryland conditions near Molt, Montana during 2002. Cultivars listed alphabetically. (Exp. 029894).

Cultivar	1/ Grain Yield	Test Weight	Grain Moisture	2/ Grain Protein	Plant Height	Sawfly Index
	bu/ac	lb/bu	%	%	inches	0-9
AC Avonlea	**10.3***	56.5	9.9	18.7	23.1	0.3
Ben	6.7	58.0	9.6	18.2	20.3	0.0
Kyle	7.1	58.9	9.8	18.8	20.1	0.0
Laker	6.1	58.7	10.1	16.7	17.0	1.3
Lebsock	7.3	58.1	10.0	18.0	18.8	0.0
Maier	**8.7***	57.7	9.9	18.2	19.4	0.0
McNeal (HRSW)	**10.4****	55.2	9.9	18.0	20.1	0.0
Medora	6.3	56.7	9.4	18.5	18.8	0.0
Monroe	7.1	54.6	9.5	18.6	21.9	0.3
Mountrail	**7.9***	55.3	9.9	18.7	18.5	0.0
Munich	7.1	54.4	9.2	20.8	17.5	0.3
Plaza	5.6	58.6	10.0	17.7	16.7	1.7
Renville	**9.2***	56.4	9.4	19.5	21.2	0.0
Sceptre	**8.5***	55.9	9.6	18.5	19.1	0.7
Vic	**10.2***	57.6	9.7	17.9	22.9	0.0
Ward	**9.7***	57.1	9.7	18.4	21.9	0.0
Average	8.0	56.9	9.7	18.4	19.8	0.3
LSD (p=0.05)	3.0	-.-	-.-	-.-	2.2	0.7
CV%	22.3	-.-	-.-	-.-	6.7	152.8

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.
3/ Test weight, grain moisture and grain protein determined from samples bulked across replications.
** Indicates highest yielding cultivar within a column.
* Indicates cultivars yielding equal to highest yielding cultivar within a column based on Fisher's protected LSD (p=0.05).

Molt Dryland Durum Wheat (Exp. 029894)

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 16 spring durum cultivars compared to McNeal hard red spring wheat tested under irrigated conditions near Hysham, Montana during 2002. Cultivars listed alphabetically. (Exp. 029896).

Cultivar	1/ Grain Yield	Test Weight	Grain Moisture	2/ Grain Protein	Plant Height	3/ Lodging
	bu/ac	lb/bu	%	%	inches	0-9
AC Avonlea	**103.3***	59.0	8.8	16.3	43.0	5.7
Ben	**109.5***	61.4	9.6	15.1	42.1	6.0
Kyle	75.1	59.1	9.5	16.0	46.2	7.3
Laker	83.9	57.7	8.9	14.7	38.4	6.3
Lebsock	**112.5****	61.4	9.5	14.9	39.9	6.0
Maier	**96.4***	59.4	9.4	16.1	40.4	6.0
McNeal (HRSW)	88.8	60.0	9.2	15.6	38.3	3.3
Medora	88.0	59.6	9.3	16.0	44.3	7.7
Monroe	**99.7***	58.9	9.1	15.4	43.2	6.3
Mountrail	**110.7***	60.3	9.3	15.3	41.6	6.0
Munich	**102.2***	59.4	9.0	15.4	40.6	5.0
Plaza	87.1	57.6	8.7	15.1	35.9	5.3
Renville	**101.8***	60.1	9.4	15.5	45.2	6.7
Sceptre	83.9	56.4	8.9	15.4	41.5	8.7
Vic	**107.0***	59.2	9.4	15.7	45.7	6.3
Ward	93.8	59.8	9.2	15.8	43.1	7.3
Average	96.5	59.3	9.2	15.5	41.8	6.3
LSD (p=0.05)	16.5	2.2	ns	-.-	3.6	1.7
CV%	10.3	2.2	4.2	-.-	5.1	16.1

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).

Hysham Irrigated Durum Wheat (Exp. 029896)

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 16 spring durum cultivars compared to McNeal hard red spring wheat tested under irrigated conditions near Bridger, Montana during 2002. Cultivars listed alphabetically. (Exp. 029897).

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
AC Avonlea	58.5			61.3	9.2	15.2	33.3	1.0
Ben	56.7	49.7	66.4	61.0	9.2	16.3	34.9	1.0
Kyle	47.4	44.2	63.7	60.9	9.6	16.0	37.1	2.7
Laker	55.5	53.2	70.3	61.4	9.4	14.9	27.4	0.3
Lebsock	50.5	49.0	67.5	61.4	9.3	15.5	32.0	1.3
Maier	**63.0***	52.7	71.1	61.1	9.3	16.8	34.4	0.3
McNeal (HRSW)	**68.5****	**71.9****	**88.1****	60.0	8.8	15.4	30.8	0.0
Medora	59.0	55.4	68.3	61.4	9.2	15.8	38.6	0.7
Monroe	54.9	46.4	58.2	60.0	9.2	15.6	37.1	1.7
Mountrail	**67.2***	55.6	74.3	60.9	9.4	15.8	33.9	0.7
Munich	54.1	55.6	70.0	60.7	9.0	16.0	30.4	1.3
Plaza	56.3	57.6	75.6	61.0	9.5	14.1	26.1	0.0
Renville	59.6	57.4	72.2	60.7	9.3	16.5	37.1	0.3
Sceptre	57.3	50.6	68.5	60.3	9.1	15.8	33.2	1.0
Vic	55.3	51.9	65.2	61.5	9.4	15.4	37.2	0.7
Ward	55.3	54.6	66.4	60.9	9.2	15.9	36.6	1.7
Average	57.4	53.7	69.7	60.9	9.3	15.7	33.8	0.9
LSD (p=0.05)	8.9	9.7	7.2	ns	0.3	-.-	2.4	1.0
CV%	9.3	15.5	11.1	1.1	1.9	-.-	4.2	64.7

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/ 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 Durum Wheat (Exp. 029897)

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