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TITLE: Spring Wheat

PROJECT: Small Grains Investigations MS 756

YEAR: 1972

PERSONNEL: Leader - Vern R. Stewart  
Cooperator - F. H. McNeal and M. A. Berg

LOCATION: Northwestern Agricultural Research Center, Field No. Y-2  
Off station locations are as listed in the manuscript

DURATION: Indefinite

OBJECTIVES:

1. To determine the adaptability of new introduced spring wheat varieties and selections by comparisons with recommended varieties.
2. Study the semi-dwarf strains of spring wheat for us under irrigated conditions.
3. To aid in basic genetics research in spring wheat and the overall breeding program.

SIGNIFICANT FINDINGS:

In the Advanced Yield Nursery the semi-dwarfs continue to outperform the taller wheats. There are several of the new semi-dwarfs entered in the nursery this year that show considerable promise for use in western Montana.

The following lines exceed Twin in yield based on a two year average, ID 44, ID 46, ID 45, ID 43, Fremont and MN 206264.

The variety Twin was the outstanding spring wheat variety, a soft white, in western Montana in 1972. The outstanding hard red is Era followed closely by Shortana, a recommended variety for western Montana.

FUTURE PLANS: To continue to evaluate spring wheat varieties and to aid in the total breeding program in Montana. The off-station spring wheat program will be reduced.

MATERIALS AND METHODS:

Standard nursery procedures were used in the variety testing program. Nurseries were grown in four row plots, four replications. A randomized block design was used for all nurseries. All station nurseries this season were located in field No. Y-2 at the Northwestern Agricultural Research Center. Yield nurseries grown were: Advanced Yield Nursery, containing 30 entries; the Western Regional Spring Wheat Nursery, containing 24 entries; a Private Variety Nursery, with checks containing 15 entries; four Off Station Yield Nurseries containing 14 entries. All studies were harvested with a small power harvester and threshed with a nursery type thresher. (Vogel)

Advanced Yield Nursery

The mean for this nursery was 74.8 bu/a. Test weights were somewhat light with a mean of 58.9. Differential lodging was recorded in the nursery as was stripe rust infections. The highest yielding variety in the nursery was Era, 96.6 bu/a. The semi-dwarf type continued to give us the highest yields. MT 7157, MT 7153 and MT 6903 were high yielding entries. Twin, a soft white, yielded 93.36 bu/a. Using Shortana as a check variety, no other entries were significantly higher in yield, however the yield of Shortana was only 87.43 bu/a. Sheridan is the lowest yielding entry in the nursery with 43.96 bu/a. The high yielding lines discussed above do not in all

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cases have the degree of stripe rust resistance that they should have for good production in this western Montana valley. Shortana does not have as good resistance to stripe rust as was found in MT 7153. The stripe rust type found in Shortana and MT 7153 is the same, however the severity is greater on Shortana, 18.75%. Table 1

In table 2 is a summary of the dryland hard red spring wheat yields from the Advanced Spring Wheat Nursery grown at the Northwestern Agricultural Research Center from 1963 to 1972. Thatcher is used as a base for comparison. Because of the stripe rust incidence in western Montana varieties that used to out yield Thatcher now have dropped to less than 100% of Thatcher in the past 3 or 4 years. Fortuna is 106% of Thatcher, Shortana exceeds Thatcher by 17%, MT 6830 is 26% above Thatcher based on a 4 year average. Era out yields Thatcher by 38% based on 4 years. MT 6903 is 35% above Thatcher based on a 3 year average. Most of the semi-dwarf lines are higher in yield than Thatcher.

### Western Regional Spring Wheat Nursery

A large number of these varieties are soft white wheats plus several of the hard red spring. The highest yielding entry in the nursery was WA 5938 which is a soft white. It was significantly higher in yield than Twin which is used as the check variety, with a yield of 86.4 bu/a. Most of the entries are somewhat later in heading date and maturity than we would like. The earliest heading variety in the nursery was ID 45. This line also has excellent stripe rust resistance. WA 5938 was susceptible to stripe rust. Some stripe rust was noted on Twin this year, however in the Advanced Yield Nursery we saw no evidence of stripe rust. The semi-dwarf types are giving the best performance and have good lodging resistance. It should be noted that the WA 5938 was 41 inches tall and had excellent lodging resistance. Table 3 gives complete details.

A summary of the Western Regional Spring Wheat Nursery is found in table 4. Twin is used as the basis for comparison. There are 7 lines that exceed Twin in the 2 to 5 year average. ID 0044 is 131%, ID 46 is 117%, ID 45 is 118% and ID 43 is 117% greater in yield than Twin.

### Private Variety Nursery

This nursery is made up of lines from various seed companies throughout the United States and checks. Highest yielding entry was Era 91.8 bu/a, followed by a Northrup King line with 86 bu/a. Shortana is used as a check in the nursery. There were no entries found significantly higher in yield, however there were three significantly lower in yield which included Triticales, Fortuna and World Seeds 1809. The mean for the nursery was 70.3 bu/a which is not as high as the mean for the Advanced Yield Nursery that was grown adjacent to it. Most of the entries had excellent lodging resistance except the taller varieties that were included. No stripe rust notes were obtained on this study.

### Off Station Nurseries

Missoula County - This was in a very excellent location. Seed bed was well prepared and excellent stands were obtained. Bronate at 3/8 lb/a was applied for weed control early in the growing season when weeds were quite small. Following the application the cooperator reported considerable yellowing of the wheat plants. During the last two weeks in May and the first part of June there was considerable hot weather. These factors no doubt contributed to the reduced tillering in spring wheat. The

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highest yielding entry in the nursery was Twin with 64 bu/a, and the lowest was Funk Bros. entry at 22.93 bu/a. The mean was 46.1 bu/a. Shortana is used as the check and is second in yield in the nursery, 54.9 bu/a. Table 6.

Ravalli County - This was a fair seed bed at planting time, but during the growing season we were unable to control the weeds adequately. There was infestation of quack-grass and other broadleaved weeds. The broadleaves were controlled fairly adequately with spraying when the wheat was in the 3 to 5 leaf stage. During the last 2 weeks in May and the first two weeks in June rather hot weather prevailed and had an adverse effect on the tillering. It is possible as stated above that there was some injury from herbicides, but this was not observed by the author. Highest yielding entry in this nursery was Twin. Shortana is used as a check variety. Twin was found to be significantly higher in yield than the check. Funk Bros. was the lowest yielding entry in the nursery. Table 7.

Lake County - There was an excellent seed bed in this location following potatoes. There was apparently no herbicide damage in this location. The soil is quite sandy and wasn't irrigated at the opportune time for maximum yield accounting for the rather low yields in this location. The highest yielding entry was Twin, the lowest was Funk Bros. 406. The yield range was from 18 to 33 bu/a, however statistically these data were found non-significant. The rather high C.V. in this study 13.39%, is rather surprising because of the apparent uniform soil conditions.

Sanders County - This nursery was located in a field that was prepared for seeding of legumes. The seed bed was just fair. Irrigations were not made at the opportune time which probably accounts in part for the rather low yields. The highest yielding entry in the nursery was MT 6830, 47 bu/a ranging down to 15 bu/a for Funk Bros. 406. It is interesting to note that in all locations this is the lowest entry in each nursery. Test weights were quite low in this location, 56 lbs/bu. Twin and Era rate highly in this nursery as does Shortana. However, Shortana was significantly lower in yield than MT 6830. Table 9.

In table 10 is a summary of the agronomic data obtained from 14 spring wheat varieties grown throughout western Montana under high moisture situations. The highest yielding variety was Twin, a soft white wheat. Highest yielding hard red spring was Era, followed closely with Shortana which is third ranked in the nursery. The private varieties such as Bounty and World Seeds 1651 and Funk Bros. 406 rank rather low. WO 1651 ranked 6th out of 14, Funk Bros. 406 is 14 and Bounty ranks 10th in the study. Twin, the leading variety in yield is 11th in test weight 56.8 lbs/bu. Bounty has the highest test weight of the 14 entries tested. Heights were tabulated for the 14 entries. They are ranked 1 thru 14 from the tallest to the shortest. Funk Bros. 406 was the shortest and also the lowest yielding. The tallest one is Sheridan. Shortana has an acceptable height and ranks 11th out of the 14, and Twin ranks 7th which is about mid-way in height. Shortana was 28.8 inches and the height for Twin is 29.7 inches, Funk Bros. 406 is 21.6.

Table 1. Agronomic data from the Advanced Yield Nursery grown at the Northwestern Agricultural Research Center in 1972. Field Y-2. Experimental design - random block, four replications.

Planting date: April 25, 1972 Harvest date: September 7, 1972 Size of plot: 16 sq. ft.

CI or State No.	Variety	Yield Bu/A	Test Wt. Lbs/Bu.	Heading Date	Plant Height	Lodging		Stripe Rust	
						%	Sev.	Type	%
CI 13986	Era	96.06	60.00	183.75	37.50	7.50	1.50	3.00	1.00 b
MT 7157	SI/3/Nrn10/Bvr14//5*Cnt	96.03	60.50	182.50 b	35.50	5.00	.75	4.00 a	15.00
MT 7153	SI/3/Nrn10/Bvr14//4*Cnt	95.33	59.50	183.50 b	41.00 a	.00	.00	3.00	5.25 b
MT 6903	SI/3/Nrn10/Bvr14//5*Cnt	94.36	59.50	181.50 b	36.25	.00	.00	3.50	11.50 b
CI 14588	Twin - ID0015	93.36	55.00	186.00	37.75	10.00	2.00 a	.00b	.00 b
MT 7042	SI/3/Nrn10/Bvr14//5*Cnt	87.55	58.50	182.50 b	37.25	.00	.00	3.00	4.25 b
CI 15233	Shortana <sup>1</sup> / <sub>1</sub>	87.43	57.00	184.75	37.25	.00	.00	3.00	18.75
MT 7019	Stn/4/N-B14//Cnt/3/2*Rsc	87.08	58.50	182.00 b	37.25	76.75 a	3.00 a	3.00	3.25 b
MT 7150	JT/3/Nrn10/Bvr14//4*Cnt	86.65	59.50	180.50 b	38.25	.00	.00	.00b	.00 b
MT 6830	SI/3/Nrn10/Bvr14//5*Cnt	85.25	58.50	180.75 b	37.00	.00	.00	2.25	1.75 b
MT 7119	Stn/3/Nrn10/Bvr14//4*Cnt	84.28	58.50	186.75 a	44.75 a	67.00 a	3.00 a	3.00	6.50 b
MT 7156	SI/3/Nrn10/Bvr14//5*Cnt	83.90	59.00	183.50	34.75 b	.00	.00	3.00	1.00 b
CI 13985	Fletcher	83.85	57.00	184.25	37.75	12.50	1.25	3.25	11.25 b
MT 7149	SK/3/Nrn10/Bvr14//5*Cnt	81.93	57.50	181.75 b	37.75	.00	.00	3.00	1.00 b
MT 7031	Jt/3/Nrn10/Bvr14//4*Cnt	80.05	58.50	179.25 b	37.00	.00	.00	3.00	1.00 b
MT 711	Fortuna/62-85	71.90 *	59.50	184.50	41.75 a	82.00 a	5.50 a	3.00	5.25 b
ND 686	Fortuna/62-85	67.12 *	60.50	183.00 b	43.50 a	60.75 a	5.50 a	3.25	18.75
MT 7110	Fta/ND 363	66.50 *	58.50	181.00 b	43.25 a	72.25 a	6.25 a	3.75 a	13.75
CI 10003	Thatcher	64.70 *	59.50	180.75 b	44.50 a	99.00 a	1.75	1.50b	.50b
MT 661718	B52-91//Kf/Cnt	63.60 *	59.50	178.75 b	43.75 a	6.25	1.50	.75b	.25b
ND 6851	Fortuna/ND 363	63.57 *	59.00	181.25 b	42.25 a	52.25 a	4.00 a	3.00	3.00b
CI 13768	Leeds	63.12 *	59.50	181.00 b	46.75 a	76.75 a	1.50	4.25 a	25.00
ND 6677	Fta/62-85,S6677	62.77 *	59.00	182.00 b	41.75 a	99.00 a	7.25 a	4.00 a	16.25b
ND 6662	Fta/62-85,S6662	62.72 *	60.50	183.25 b	42.25 a	61.00 a	5.00 a	5.00 a	45.00 a
CI 13958	Waldron	62.45 *	59.00	178.75 b	42.00 a	7.50	2.00 a	.75b	.25b
CI 13775	Manitou, R.L. 4159	61.45 *	59.00	181.00 b	42.50 a	69.50 a	3.50 a	2.25	.75b
CI 12974	Centana	56.99 *	59.50	185.25	48.75 a	93.00 a	5.25 a	4.25 a	27.50 a
CI 13596	Fortuna	56.22 *	59.50	180.75 b	41.25 a	96.75 a	6.00 a	3.00	5.50 b
CI 13333	Wells	54.12 *	58.00	181.75 b	47.50 a	73.25 a	3.25 a	4.00 a	26.25 a
CI 13586	Sheridan	43.96 *	59.50	182.25 b	47.50 a	99.00 a	7.75 a	3.00	5.25 b

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Table 1 . (con't)

CI or State No.	Variety	Yield	Test Wt.	Heading	Plant	Lodging		Stripe Rust	
		Bu/A	Lbs/Bu.	Date	Height	%	Sev.	Type	%

- 1/ Check Variety  
 \* Varieties yielding significantly less than the check  
 a Values significantly more than the check  
 b Values significantly less than the check

$\bar{x}$	74.8	58.9	182.3	40.9	40.9	2.6	2.9	9.2
F-value for variety comparison	6.05**	0.0	19.09**	26.61**	12.28**	10.17**	13.99**	12.98**
S.E. $\bar{x}$	6.04	0.0	.46	.76	11.39	.78	.32	3.01
L.S.D. (.05)	14.19	0.0	1.08	1.79	26.77	1.82	.76	7.08
C.V.%	8.07	0.0	.25	1.86	27.85	30.01	11.25	32.91

Table 2 . Summary of dryland, hard red spring wheat yields for the Advanced Yield Nursery grown at the Northwestern Agricultural Research Center, Route 4, Kalispell, Montana, 1963 thru 1972.

C.I. or State #	Variety	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	Ave.	Sta. Yrs.	% of Thatcher
10003	Thatcher	34.7	46.7	65.4	62.2	60.6	63.4	69.5	55.5	72.5	64.7	59.5	10	100
13333	Wells	33.7	57.1	58.4	67.9	62.8	63.1	64.8	53.7	66.8	54.1	58.2	10	98
13586	Sheridan	36.9	50.6	76.8	50.9	54.5	54.4	71.7	45.7	73.3	44.0	55.9	10	94
12974	Centana	34.3	47.8	61.1	50.4	54.5	66.1	61.9	52.8	71.1	57.0	55.7	10	94
13775	Manitou		50.8	62.2	67.5	57.5	57.6	70.7	66.9	67.1	61.5	62.4	9	100
13596	Fortuna		62.9		66.2	56.4	74.7	88.9	41.9	76.8	56.2	65.5	8	106
13768	Leeds				55.8	58.1	58.2	49.4	64.0	61.4	63.1	58.6	7	91
15233	Shortana						71.8	71.9	80.2	70.6	87.4	76.4	5	117
13958	Waldron							62.0	67.1	66.6	62.5	64.6	4	99
MT 6830	Si/3/Nrn10/Bvr14//5*Cnt							87.0	74.0	85.0	85.3	82.8	4	126
13986	Era							93.1	82.2	90.0	96.1	90.4	4	138
MT 6903	Si/3/Nrn10/Bvr14//5*Cnt								87.7	78.5	94.4	86.9	3	135
13985	Fletcher								78.0	80.5	83.9	80.8	3	126
MT 7042	Si/3/Nrn10/Bvr14//5*Cnt									90.8	87.6	89.2	2	130
MT 7157	Si/3/Nrn10/Bvr14//5*Cnt										96.0	96.0	1	148
MT 7153	Si/3/Nrn10/Bvr14//4*Cnt										95.3	95.3	1	147
CI 14588	Twin - Id0015										93.4	93.4	1	144
MT 7019	Stn/4/N-B14//Cnt/3/2*RSC										87.1	87.1	1	135
MT 7150	UT/3/Nrn10/Bvr14//4*Cnt										86.7	86.7	1	134
MT 7119	Stn/3/Nrn10/Bvr14//4*Cnt										84.3	84.3	1	130
MT 7156	Si/3/Nrn10/Bvr14//5*Cnt										83.9	83.9	1	130
MT 7149	Sk/3/Nrn10/Bvr14//5*Cnt										81.9	81.9	1	127
MT 7031	UT/3/Nrn10/Bvr14//4*Cnt										80.1	80.1	1	124
MT 711	Fortuna/62-85										71.9	71.9	1	111
ND 686	Fortuna/62-85										67.1	67.1	1	104
MT 7110	Fta/ND 363										66.5	66.5	1	103
MT 661718	B52-91//KF/Cnt										63.6	63.6	1	98
ND 6851	Fortuna/ND363										63.6	63.6	1	98
ND 6677	Fta/62-85,S6677										62.8	62.8	1	97
ND 6662	Fta/62-85,S6662										62.7	62.7	1	97