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TITLE: Spring Wheat

PROJECT: Small Grains Investigations MS 756

YEAR: 1969

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

LOCATION: Northwestern Montana Branch Station - Field No. Y-6. Off station locations as listed in the manuscript.

DURATION: Indefinite

OBJECTIVE:

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

SIGNIFICANT FINDINGS:

1. Fortuna is the best hard red variety for yield and performance, being 120% of Sheridan, the check variety. It was also the outstanding hard red variety in 1969 in an overall average in western Montana.
2. ID 0015 and ID 0006, white varieties, were outstanding in yield throughout western Montana in 1969 and are potential replacements for Idaed 59.

FUTURE PLANS: To continue to evaluate spring wheat varieties. To aid in the total breeding program in Montana. To study semi-dwarf strains of spring wheat for irrigated conditions.

MATERIALS AND METHODS:

Standard nursery procedures were used in a 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 Y-6 at the Northwestern Montana Branch Station. The nurseries grown were: Advanced Yield Nursery containing 30 entries; the Western Regional White Spring Wheat Nursery containing 27 entries; the Pubescent Glume Yield Nursery containing 19 entries; the Isogenic Height Level Nursery, 5 entries (four located off station) and a Semi-dwarf Observation Nursery. Three off station nurseries consisting of 16 entries were seeded in Lake, Missoula and Ravalli Counties.

All studies were harvested with a small power harvester and threshed with a nursery type thresher (Vogel).

RESULTS AND DISCUSSION:

June precipitation was 2 inches above the mean, with July and August being about half of the mean. These moisture conditions helped to produce high yields of dryland spring wheat.

Advanced Yield Nursery: Six entries in this nursery were significantly higher in yield than Sheridan, which is the check variety. They were Petic 62, MN 6261, ND 6579, Fortuna, MT 6830, MT 6834 and MT 6833. Test weights on these entries were very good except Petic 62, which was green at harvest time. Petic 62 is a high yielding variety, but is late in maturity and has very poor quality. MT 6830 has excellent straw strength and is highly resistant to stripe rust. Based on agronomic characteristics MT 6830 is promising material if quality evaluations are equal to Centana. Table 1.

Over a six year period Fortuna is 120% of Sheridan as seen in table 2. The semi-dwarf types are for the most part superior in yield to the recommended variety Sheridan.

Western Regional White Nursery: Yields were quite high in this nursery with a mean of 80.5 bu/a. The high yielding entry was UT 256002 at 113.0 bu/a. Aberdeen selections, ID 0015 and ID 0020 were outstanding in yield this season. They have excellent stripe rust resistance and good straw strength. These two selections are about five days later than Idaed 59, but about the same as Lemhi which has a satisfactory maturity range for Northwestern Montana. ID 0015 and ID 0020 were susceptible to leaf rust this season as were many other entries in this nursery. See table 3.

In table 4, is a summary of the Western Regional White Wheat Nursery since 1959. Over a two year period ID 0015 is 126% of Idaed. UT 256002 is 124% of Idaed for a 3 year period. UT 256002 could be a possible replacement for Idaed. It has good straw strength, stripe and leaf rust resistance, is light in test weight and some 8 days later in heading date than Idaed 59.

Pubescent Glume Yield Nursery: In addition to the usual agronomic data, tiller counts, spikelets per head and 200 kernel weights were obtained in this nursery. Low CV's were calculated for all measurements made. The yield range was 48.3 bu/a to 83.9 bu/a. A gain in all characteristic or measurements are found in the PI 24500 x B 52-91 cross except test weight where a slight loss is noted.

In the Pugsley x B 52-91 a rather large yield gain is noted, which is no doubt due to the yield component of tillering. The three inch increase in height is listed as a loss by the author.

The yield loss of 4.9 bu/a in the Centana x PI 176217 cross cannot be easily explained because there is a fair increase in tiller numbers. See tables 5 and 6 for complete tabulation of data.

Results and Discussion (con't)

Isogenic Height Level Nurseries: Five nurseries were seeded in various locations in Western Montana. Four of the five were harvested. The nursery located in Ravalli County was severely damaged by birds, and for this reason it was abandoned. Tables 7, 8, 9 and 10 are the individual tabulations and analysis for each location. Only in one location, Northwestern Montana Branch Station, were yields found statistically significant. Plant height was significant at all four locations. The short type Centana headed considerably later than the other isogenic lines. Straw weights for the short type were significantly less than other types. There were no others with this magnitude of difference. Tiller counts and spikelets per head were not significant in the two locations where these measurements were made. Test weights were a bit lower for the short type on an average for the four locations. The short type was the lowest in grain yield for the four locations. Table 11 gives a complete summary of data for measurements made at the four locations.

Flathead County: The top yielding entries at this location were the soft white types followed by two hard red types. These entries were significantly higher in yield than Sheridan which is used as a check. They were ID 0016, ID 0015, ID 0006 (white), MT 6722 and Fortuna (red). Test weights were low on ID 0006 and ID 0015. Table 12.

Missoula County: Three white entries ID 0015, ID 0006 and ID 0016 were significantly higher in yield than the check. A durum variety, Wells was also in this group. The mean on this nursery is low because of a rather severe quackgrass infestation in part of the nursery. Test weights tend to be low for the white wheats at this yield level. Table 13.

Lake County: Three white entries in the Lake County location were significantly higher in yield than Sheridan which is used as a check. They were ID 0015, ID 0016 and Idaed 59. A complete tabulation of data are found in table 14.

Ravalli County: Bird damage was very severe in this location. Because of this damage the nursery was not harvested for yield, nor were any other agronomic measurements made.

A summary of spring (16) varieties grown in western Montana in 1969 are given in table 15. Fortuna ranks number one for the hard red entries and ID 0015 for the soft white entries. The test weights of the hard red entries are very good based on the 60 pound standard, however the white entries tend to be slightly lower in this measurement.

Semi-dwarf Observation Nursery: Twenty-five semi-dwarf lines were grown in four row plots, one replication, for observation. Yields were obtained as was plant height. When there was sufficient seed bushel weight measurements were made. Sn 64A//Tzpp/Na1 60 was the highest yielding entry with 94.7 bu/a, but several lines did approach this yield level. Table 16.

Male Sterile Ergot Study: The purpose of this study was to determine the affect ergot would have on male sterile wheats. The ergot level was quite low in the area in 1969 and only two varieties showed any ergot. Table 17.

Table 3. Agronomic data from the western regional white spring wheat nursery grown at Northwestern Montana Branch Station in 1969. Field No. Y-6. Experimental design- random block, four replications.

Planting date: May 6, 1969 Harvest date: September 16, 1969 Size of plot: 16 square feet

CI or State No.	Variety	Yield Bu/A	Test Wt. Lbs/Bu.	Days Jan.1 to Heading	Plant Height	Lodging ^{1/}		Stripe Rust ^{2/}		4/ Leaf Rust
						% Prev.	Sev. 0-9	Type 0-9	% Sev.	
UT 256002	Svn/4/Lee/3/NLO/Bvr//Ut	113.0*	52.4	195	38.8	0.0	0.0	0.0	0.0	
CI 13736	Burt x Kf, 58-2025	102.9*	57.8	197	42.0	0.0	0.0	2.8	7.8	
ID 0015	Aberdeen Selection	95.5*	56.8	193	38.0	21.3	1.5	0.0	0.0	M
ID 0020	Aberdeen Selection	93.2*	58.0	192	38.0	20.0	0.5	0.0	0.0	M
ID 0016	Nainari 60 x2 Lemhi 53	91.5	58.5	190	42.3	27.5	2.8	3.5	13.8	H
ID 0019	Aberdeen Selection	90.0	54.0	191	35.8	12.5	0.5	0.0	0.0	H
UT 256006	Svn/4/Lee/3/NLO/Bvr//Ut	85.1	58.3	188	36.3	18.8	2.0	0.0	0.0	M
CA 6902	Tobari 66	85.1	61.4	186	34.3	0.0	0.0	0.0	0.0	L
MT 6723	Nrn10/Bvr14//6*Cnt	85.1	58.8	191	36.0	57.3	3.0	5.8	60.0	
ID 0021	Aberdeen Selection	84.5	55.6	192	38.0	20.0	1.3	1.0	3.8	H
ID 0006	Aberdeen Selection	84.3	55.1	194	38.5	36.3	1.8	0.0	0.0	M
UT 256005	Svn/4/Lee/3/NLO/Bvr//Ut	83.1	58.5	188	37.0	37.3	4.0	0.0	0.0	M
OR 672	Idaed x Burt, 19-1	82.0	60.0	189	36.3	63.5	3.8	0.0	0.0	H
CA 6903	Axteca F67	79.8	61.2	185	33.3	0.0	0.0	0.0	0.0	
MT 677	Nrn10/Bvr14//6*Cnt	78.8	60.3	190	36.8	51.3	3.0	4.3	56.3	
CA 6901	Inia 66	78.3	61.6	184	32.0	0.0	0.0	3.8	45.0	
CI 13631	Idaed 59 ^{3/}	78.2	57.6	187	43.3	99.0	7.3	1.3	0.3	M
WA 5387	1750 x Tst 2x Aiv, 14	77.8	58.2	193	47.3	62.0	5.3	5.8	72.5	
CI 13722	Adams	77.0	58.3	190	43.5	99.0	8.0	0.0	0.0	H
CI 13732	Federation 67	76.0	59.9	191	44.3	33.3	6.3	7.0	67.5	
ID 0028	Nrn10/Bvr//Tk/3/2*Cnt	72.6	58.3	187	41.0	89.8	4.5	6.5	91.3	
CI 10003	Thatcher	70.5	60.0	189	44.5	94.5	5.5	0.0	0.0	H
WA 5488	K337/AO//Koelz7941S66-9	69.0	53.8	192	44.3	99.0	8.8	0.0	0.0	VH
CI 11919	Marfed	67.3	56.8	196	43.3	89.5	6.8	5.0	20.0	H
CI 1697	Baart	62.1	58.0	192	50.8	96.8	8.3	9.0	99.0	
CI 11415	Lemhi	57.0	56.3	193	46.5	86.8	5.0	9.0	99.0	
CI 4734	Federation	55.2	52.8	198	47.3	81.8	6.8	9.0	85.3	

^{1/} Prev. = % involved; Sev. = Scale 0-9, 0 = No lodging 9 = flat

^{2/} Type 0-9, Sev. % of plants involved

^{3/} Check variety

* Varieties yielding significantly more than the check

^{4/} VH = very heavy; H = heavy; M = medium; L = light.

Table 3. continued

	Yield Bu/A	Test Wt. Lbs/Bu.	Days Jan.1 to Heading	Plant Height	Lodging ^{1/}		Stripe Rust ^{2/}	
					% Prev.	Sev. 0-9	Type 0-9	% Sev.
\bar{x}	80.5	57.7	191	40.3	50.3	3.6	2.7	26.7
F - value for variety comparison	9.07**	0.0	62.84**	24.93**	9.24**	7.59**	19.51**	24.71**
S.E. \bar{x}	4.3	0.0	0.4	1.0	12.5	1.1	0.7	7.4
L.S.D.(P. = .05)	12.02	0.0	1.25	2.71	35.14	2.96	2.09	20.82
C.V.%	5.31	0.0	.23	2.39	24.86	29.51	27.28	27.70

Table 4. Summary of white spring wheat yields grown at the Northwestern Montana Branch Station, Route 4, Kalispell, Montana from 1959-1969.

Number	Variety	1959	1960	1961	1962	1963	1964	1966	1967	1968	1969	Sta. Years	% Lemhi	% Idaed 59
1697	Baart	41.8	29.1	25.5	41.8	21.8	35.0	32.4	60.9	52.5	62.1	10	123	78 ^{1/2}
4734	Federation	43.2	30.6	24.9	44.1	21.2	29.5	36.6	43.7	54.1	55.2	10	117	74 ^{1/2}
10003	Thatcher	45.2	25.5	30.0	50.3	35.2	50.1	72.6	57.4	54.7	70.5	10	150	97 ^{1/2}
11415	Lemhi	38.7	17.8	18.3	52.4	6.2	14.7	15.7	37.2	69.7	57.0	10	100	63 ^{1/2}
13631	Idaed 59		31.8		52.1	29.1	55.7	66.7	59.6	54.8	78.2	8	158	100
13732	Federation 67					32.3	42.7	60.4	54.2	55.2	76.0	6	160	93
0006	Aberdeen Selection								77.7	66.3	84.3	3	139	119
256002	Svn/4/Lee/3/NLO/Bvr//Ut								63.3	61.6	113.0	3	145	124
0015	Aberdeen Selection									71.9	95.5	2	132	126
13736	Burt x Kf, 58-2025									70.2	103.0	2	137	130
0016	Nainari 60 x 2 Lemhi 53									70.1	91.5	2	128	122
13722	Adams									61.0	77.0	2	109	104
5387	1750 x Tst2xAiv, 14									57.0	77.8	2	106	101
11919	Marfed									53.0	67.3	2	95	90
0020	Aberdeen Selection										93.2	1	164	119
0019	Aberdeen Selection										90.0	1	158	115
256006	Svn/4/Lee/3/NLO/Bvr//Ut										85.1	1	149	109
6902	Tobari 66										85.1	1	149	109
6723	Nrn10/Bvr14//16* Cnt										85.1	1	149	109
0021	Aberdeen Selection										84.5	1	148	108
256005	Svn/4/Lee/3/NLO/Bvr//Ut										83.1	1	146	106
672	Idaed x Burt 19-1										82.0	1	144	105
6903	Azteca F 67										79.8	1	140	102
677	Nrn10/Bvr14//6* Cnt										78.8	1	138	101
6901	Inia 66										78.3	1	137	100
0028	Nrn10/Bvr//Tk/3/2* Cnt										72.6	1	127	93
5488	K337/AB//Koelz 794LS 66-9										69.0	1	121	88

1/ Eight years