TITLE: Spring Wheat

PROJECT: Small Grains Investigations MS 756

YEAR: 1970

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

LOCATION: Northwestern Montana Branch Station - Field No. Y-8. Off station locations 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 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. In general, semi-dwarf types were higher in yield than standard varieties.
2. CA 6903, a semi-dwarf, was outstanding in the Western Regional Nursery.
3. CI 13736 was the highest yielding variety grown in Western Montana in 1970, but is very late in maturity which is a definite draw back.

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-8 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 Isogenic Height Level Nursery, 5 entries (four located off station) the Yield Component Yield Nursery, 27 entries and the Protein Yield Nursery, 18 entries. Tiller counts, kernels/head, 500 kernel weights were secured on the protein yield nursery and the yield component study. Tillers were counted in 16 linear feet of row and 25 heads selected at random were used to determine seeds per head. Four off station nurseries consisting of 16 entries were seeded in Lake, Missoula, Sanders and Ravalli Counties.

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

RESULTS AND DISCUSSION:

Advance Yield Nursery

Twenty entries in this nursery were significantly higher in yield than Sheridan which was used as the check. The semi-dwarf types were for the most part the highest yielding lines and lodging resistance was excellent in most of the semi-dwarf lines except Pitic 62, MT 6539 and Bonanza. Nine entries all semi-dwarf exceeded 80 bushels per acre in this study. Severe early lodging in Fortuna and Sheridan no doubt accounts for the low yields in these two varieties. Based on agronomic data MT 6903, MT 6902, MT 6865, MT 6868 and MT 6723 are entries that should be given additional consideration. None of the commercial entries were outstanding in performance, however Bonanza a DeKalb entry was the highest yielding of this group. Table 1.

A summary of 10 years data of the Advance Yield nursery is given in Table 2. The semi-dwarf are far superior to Sheridan and Thatcher for the most part. Fortuna is 119 percent of Sheridan, 109 of Thatcher, based on 6 years data. For the three year period MT 6723 is 130 percent of Sheridan and 118% of Thatcher, Era for a 2 year period is 140% of Thatcher and 149% of Sheridan. These two varieties have real possibility for use in Western Montana.

Western Regional White Wheat Nursery

CA 6903 is the high yielding entry in this nursery and has a maturity date similar to Idaed 59, and is highly resistant to lodging. Springfield(ID 0019)and ID 0015 were lower in yield than last year. ID 0015 was very late and had a very low test weight. Springfield (ID 0019)has fair test weight, but did not out yield Idaed in this years nursery. Lodging and stripe rust were severe, however rust rates were not recorded. Table 3.

In Table 4 is found data for ten years on wheats grown in the Western Regional Nursery. Varieties are compared with Lemhi and also with Idaed 59. There are several entries that are far superior to the checks in yield. Maturity of varieties is a critical factor in many of the entries, however these data are not included in Table 4.

Off Station

Of the four nurseries planted only two were harvested. The nursery in Missoula County was dropped because of a high infestation of Canada thistle. The nursery in Sanders County was not harvested because of uneven stands and growth. This was due in part to a soil condition and inadequate irrigation.

Ravalli County

In this location ID 0015 was the leading entry for yield, but had a very low test weight due to the lateness in maturity. This nursery was harvested a little on the green side, however Sheridan had a good test weight. Table 5.

Results and Discussion (con't)

Lake County

ID 0015 was high in this location as it was in Ravalli County. Test weights were low in both ID 0015 and ID 0019, but ID 0019 is a slight bit higher. Five entries were significantly higher in yield than the variety Sheridan. Table 6.

In 1970 the top three yielding varieties were CI 14555, CI 13736 and Pitic 62. All three were low in test weight and quite late in maturity. CI 13736 was very late as was Pitic 62. Table 7.

Isogenic Height Nurseries

Significant results were obtained in two of the four nurseries. At the station the medium types were significantly higher in yield than Centana and in Ravalli County the medium types were highest in yield but only one bushel higher than Centana. The nurseries in Sanders and Lake Counties were not significantly different in yield.

Plant heights were all found to vary significantly at all locations as would be expected with this material.

Kernel weights were significantly different in all locations. Medium is the heaviest of the entries. Complete data for these studies are seen in Table 8 thru 11. Table 12 gives a summary of these data.

Table 3. Agronomic data from the western regional spring wheat nursery grown at Northwestern Montana Branch Station, Route 4, Kalispell Montana in 1970. Field No. Y-8 Experimental design - random block, four replications.

Planting date: May 6, 1970
Harvest date: September 10, 1970
Size of plot: 16 sq. ft.

CI or State #	Variety	Yield Bu/A	Test Wt Lbs/Bu.	Days Jan 1 to Heading	Plant Height	Lodging % Prev.	Lodging Sev. 0-9
CA 6903	Azteca F67	87.95*	57.9	181b	34.3b	0.0b	0.0b
CA 6901	Inia 66	79.30*	58.3	181b	33.3b	0.0b	0.0b
CI 13736	Burt x Kf, 58-2025	77.13*	54.5	193a	42.3	41.3b	3.5b
MT 6723	Nrnl0/Bvrl4//6*Cnt	75.37	57.8	187a	37.5b	2.5b	.5b
CA 6902	Tobari 66	73.27	56.0	183a	34.8b	25.0b	2.0b
CI 14587	TZpp/Sonora 64	70.37	56.3	185a	38.0b	52.5b	4.5
ID 0035	Tzpp/Sonora 64	67.92	56.7	186a	38.5b	50.0b	5.3
UT256006	Svn/4/Lee/3/N10/Bvr//Ut	67.05	57.0	184a	35.8b	71.0	5.5
ID 0028	Nrnl0/Bvr//Tk/3/2*Cnt	66.60	57.4	183b	40.8	80.8	2.8b
OR 6713	Idaed/Burt//Idaed 59	64.90	57.0	185a	42.0	52.0b	1.3b
CI 14588	Aberdeen Selection	64.32	51.4	190a	37.5b	32.5b	4.0
CI 13631	Idaed 59 1/	59.82	55.5	182	42.0	99.0	6.8
CA 6907	Opal	59.42	52.3	191a	45.5	87.3	6.3
OR 672	Idaed x Burt, 19-1	57.09	54.6	185a	39.0b	85.8	3.8
WA 5652	Henry/Burt, Sel 65-2	56.69	56.5	189a	49.0	98.0	6.0
CI 10003	Thatcher	56.67	56.0	186a	44.3	99.0	4.3
CI 14589	Aberdeen Selection	54.32	59.3	187a	36.3b	51.0b	5.0
UT256002	Svn/4/Lee/3/N10/Bvr//Ut	53.09	50.7	193a	36.0b	78.3	8.0
ID 0020	Aberdeen Selection	48.94	59.7	187a	37.0b	77.5	8.0
CI 1697	Baart	40.31 2/	54.6	188a	45.3	99.0	9.0
WA 5651	Marfed Mutant 6278	38.19 2/	59.5	190a	42.8	99.0	9.0
ID 0036	Gaines/Lemhi 53	36.11 2/	43.5	187a	36.3b	73.3	6.0
WA 5658	Marfed Mutant x 6135-1	33.34 2/	51.4	190a	45.3	99.0	7.5
WA 5488	K337/Ao//Koelz7941S66-9	29.61 2/	47.1	188a	42.5	99.0	7.0
CI 11415	Lemhi	29.41 2/	48.5	189a	44.3	95.5	8.5
CI 11919	Marfed	26.46 2/	50.3	189a	43.8	99.0	8.5
CI 4734	Federation	18.43 2/	43.2	191a	44.8	96.8	7.8

1/ Check variety
* Varieties yielding significantly more than the check
2/ Varieties yielding significantly less than the check
a Values significantly more than the check
b Values significantly less than the check

$\bar{x}$	55.3	54.2	186.9	40.3	68.3	5.2
F-Value for variety comparison	10.26**	0.0	77.36**	20.98**	5.83**	5.88**
S.E.$\bar{x}$	5.69	0.0	.37	.92	13.78	1.15
L.S.D.(.05)	16.03	0.0	1.05	2.59	38.78	3.24
C.V.%	10.30	0.0	.20	2.28	20.18	22.10

Table 4. Summary of regional spring wheat variety yields grown at the Northwestern Montana Branch Station, Route 4, Kalispell, Montana from 1960-69.

CI or State No.	Variety	1960	1961	1962	1963	1964	1966	1967	1968	1969	1970	Sta. Yrs.	% Lemhi	% Idaed 59
1697	Baart	29.1	25.5	41.8	21.8	35.0	32.4	60.9	52.5	62.1	40.3	10	126.1	77.1 1/
4734	Federation	30.6	24.9	44.1	21.2	29.5	36.6	43.7	54.1	55.2	18.4	10	112.6	68.3 1/
10003	Thatcher	25.5	30.0	50.3	35.2	50.1	72.6	57.4	54.7	70.5	56.7	10	158.2	97.0 1/
11415	Lemhi	17.8	18.3	52.4	6.2	14.7	15.7	37.2	69.7	57.0	29.4	10	100.0	61.4 1/
13631	Idaed 59	31.8		52.1	29.1	55.7	66.7	59.6	54.8	78.2	59.8	9	162.8	100.0
UT 256002	Svn/4/Lee/3/N10/Bvr//UT							63.3	61.6	113.0	53.1	4	150.7	115.3
13736	Burt x KF, 58-2025								70.2	103.0	77.1	3	160.4	129.9
11919	Marfed								53.0	67.3	26.5	3	94.0	76.1
14588	Aberdeen Selection 0015								71.9	95.5	64.3	3	148.4	123.0
ID 0020	Aberdeen Selection									93.2	48.9	2	162.7	102.9
UT 256006	Svn/4/Lee/3/N10/Bvr//Ut									85.1	67.1	2	151.2	110.3
CA 6902	Tobari 66									85.1	73.3	2	181.2	114.8
MT 6723	Nrn10/Bvr14//16*Cnt									85.1	75.4	2	183.5	116.0
OR 672	Idaed x Burt 19-1									82.0	57.1	2	159.3	100.1
CA 6903	Azteca F67									79.8	88.0	2	192.0	121.6
CA 6901	Inia 66									78.3	79.3	2	180.3	114.2
ID 0028	Nrn10/Bvr//Tk/3/2*Cnt									72.6	66.6	2	159.3	100.8
WA 5488	K337/AB//Koelz 7941S 66-9									69.0	29.6	2	112.8	71.4
14589	Aberdeen Selection 0019									90.0	54.3	2	167.0	104.6
14587	TZPP/Sonora 64										70.4	1	239.5	117.7
ID 0035	TZPP/Sonora 64										67.9	1	231.0	113.5
OR 6713	Idaed/Burt//Idaed 59										64.9	1	220.7	108.5
CA 6907	Opal										59.4	1	202.0	99.3
WA 5652	Henry/Burt, Sel 65-2										56.7	1	192.9	94.8
WA 5651	Marfed Mutant 6278										38.2	1	129.9	64.0
ID 0036	Gaines/Lemhi 53										36.1	1	122.8	60.5
WA 5658	Marfed Mutant x 6135-1										33.3	1	113.3	55.7

1/ 9 year average