

-1-

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 1. Agronomic data from the advanced yield 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 |          | Stripe Rust |        |
|-----------------|--------------------------|------------|------------------|-----------------------|--------------|---------|----------|-------------|--------|
|                 |                          |            |                  |                       |              | % Prev. | Sev. 0-9 | Type 0-9    | % Sev. |
| CI 13927        | Pitic 62                 | 101.1*     | 51.0             | 196                   | 38.8         | 76.0    | 6.3      | 0.0         | 0.0    |
| MN 6261         | Minnesota II-62-61       | 93.1*      | 62.0             | 192                   | 36.3         | 52.5    | 3.3      | 1.5         | 2.8    |
| ND 6579         | Fta/61-107,S6579         | 90.9*      | 61.6             | 188                   | 42.3         | 60.0    | 3.3      | 5.5         | 8.8    |
| CI 13596        | Fortuna                  | 88.9*      | 61.5             | 189                   | 47.5         | 96.8    | 8.5      | 0.5         | 0.3    |
| MT 6830         | SI/3/Nrn10/Bvr14//5*Cnt  | 87.0*      | 60.5             | 187                   | 37.5         | 0.0     | 0.0      | 0.0         | 0.0    |
| MT 6834         | SI/3/Nrn10/Bvr14//5*Cnt  | 86.7*      | 60.5             | 189                   | 40.3         | 72.0    | 5.5      | 3.8         | 6.3    |
| MT 6833         | SI/3/Nrn10/Bvr14//5*Cnt  | 85.3*      | 60.1             | 189                   | 43.5         | 94.3    | 8.3      | 2.8         | 0.8    |
| MT 6722         | Nrn10/Bvr14//6*Cnt       | 82.6       | 60.0             | 189                   | 37.8         | 61.0    | 4.0      | 1.8         | 1.5    |
| MT 676          | Nrn10/Bvr14//6*Cnt       | 81.7       | 60.2             | 190                   | 39.3         | 23.8    | 0.8      | 2.8         | 15.3   |
| MT 6839         | Ftr/3/Nrn10/Bvr14//5*Cnt | 80.9       | 58.5             | 191                   | 42.0         | 67.5    | 2.0      | 4.0         | 1.8    |
| MT 6831         | SI/3/Nrn10/Bvr14//5*Cnt  | 78.6       | 60.8             | 186                   | 39.3         | 15.0    | 0.8      | 4.3         | 19.0   |
| MT 6829         | SI/3/Nrn10/Bvr14//5*Cnt  | 78.6       | 61.0             | 186                   | 38.0         | 38.8    | 4.0      | 0.0         | 0.0    |
| MT 677          | Nrn10/Bvr14//6*Cnt       | 75.6       | 60.0             | 190                   | 37.8         | 48.5    | 1.8      | 2.5         | 7.5    |
| MT 6626         | B52-91//K338/Lee         | 74.9       | 60.5             | 185                   | 47.0         | 85.8    | 6.8      | 0.5         | 0.3    |
| RL 4200         | RL 4125 x RL 4008        | 74.2       | 61.0             | 187                   | 50.0         | 95.8    | 5.5      | 6.3         | 25.3   |
| MT 6836         | Crim/3/n10/Bvr14//4*Cnt  | 73.5       | 59.5             | 185                   | 35.8         | 57.5    | 3.0      | 1.5         | 1.3    |
| MT 6723         | Nrn10/Bvr14//6*Cnt       | 71.9       | 59.9             | 191                   | 38.5         | 31.3    | 1.8      | 2.8         | 10.3   |
| CI 13586        | Sheridan                 | 71.8       | 58.6             | 190                   | 47.5         | 99.0    | 8.8      | 3.8         | 1.8    |
| MT 6616         | K338 x Lee               | 71.7       | 59.0             | 185                   | 45.5         | 93.5    | 7.5      | 0.0         | 0.0    |
| MT 6634         | Kf/Cnt//B52-91           | 70.9       | 61.5             | 183                   | 46.8         | 94.8    | 4.5      | 0.5         | 0.3    |
| CI 14193        | Red River 68             | 70.7       | 62.5             | 185                   | 37.5         | 72.3    | 4.0      | 0.0         | 0.0    |
| CI 13775        | Manitou, R.L. 4159       | 70.7       | 59.9             | 188                   | 45.3         | 88.3    | 6.5      | 0.0         | 0.0    |
| CI 10003        | Thatcher                 | 69.5       | 59.5             | 188                   | 47.5         | 96.8    | 7.8      | 0.0         | 0.0    |
| MT 6617         | B52-91//Kf/Cnt           | 67.7       | 60.4             | 185                   | 46.8         | 83.5    | 5.0      | 0.0         | 0.0    |
| CI 13333        | Wells                    | 64.8       | 61.0             | 190                   | 51.0         | 82.3    | 3.8      | 0.0         | 0.0    |
| CI 13773        | Polk                     | 64.3       | 60.6             | 190                   | 46.8         | 99.0    | 9.0      | 0.8         | 2.5    |
| CI 13958        | Waldron                  | 62.0       | 59.4             | 187                   | 44.8         | 63.5    | 2.3      | 0.0         | 0.0    |
| CI 12974        | Centana                  | 62.0       | 59.8             | 189                   | 50.3         | 97.0    | 7.3      | 3.5         | 1.8    |
| MT 6842         | N10/BL4//5*Cnt/3/58-29-4 | 60.0       | 60.0             | 190                   | 38.5         | 0.0     | 0.0      | 1.3         | 1.3    |
| CI 13768        | Leeds                    | 49.4       | 60.5             | 189                   | 48.5         | 49.8    | 1.8      | 1.5         | 1.5    |

Table 1. continued

|   | Yield<br>Bu/A | Test Wt.<br>Lbs/Bu. | Days Jan.1<br>to Heading | Plant<br>Height | Lodging    |             | Stripe Rust |           |
|---|---------------|---------------------|--------------------------|-----------------|------------|-------------|-------------|-----------|
|   |               |                     |                          |                 | %<br>Prev. | Sev.<br>0-9 | Type<br>0-9 | %<br>Sev. |
| <u>1/</u> Check variety   |               |                     |                          |                 |            |             |             |           |
| * Varieties yielding significantly more than the check (P.=.05) |               |                     |                          |                 |            |             |             |           |
| $\bar{x}$   | 75.4          | 60.0                | 188                      | 42.9            | 66.5       | 4.4         | 1.7         | 3.7       |
| F - Value for variety comparison                                | 6.44**        | 0.0                 | 21.48**                  | 8.96**          | 3.70**     | 5.25**      | 5.03**      | 2.33**    |
| S.E. $\bar{x}$  | 4.4           | 0.0                 | 0.6                      | 1.6             | 15.5       | 1.2         | 0.8         | 4.1       |
| L.S.D.(P.=.05)  | 12.39         | 0.0                 | 1.64                     | 4.50            | 43.67      | 3.38        | 2.29        | 11.55     |
| C.V.%   | 5.84          | 0.0                 | .31                      | 3.72            | 23.34      | 27.02       | 47.49       | 112.27    |

Table 2. Summary of dryland hard red spring wheat yields for the advanced yield nursery grown at the Northwestern Montana Branch Station, Route 4, Kalispell, Montana from 1960-1969.

| Number | Variety                   | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969  | Sta. Years | % Thatcher | % Sheridan        |
|--------|---------------------------|------|------|------|------|------|------|------|------|------|-------|------------|------------|-------------------|
| 12974  | Centana                   | 33.5 | 28.3 | 59.1 | 34.3 | 47.8 | 61.1 | 50.4 | 54.5 | 66.1 | 62.0  | 10         | 98         | 95 <sup>1/2</sup> |
| 10003  | Thatcher                  | 29.0 | 27.4 | 49.7 | 34.7 | 46.7 | 65.4 | 62.2 | 60.6 | 63.4 | 69.5  | 10         | 100        | 98 <sup>1/2</sup> |
| 13586  | Sheridan                  |      | 38.5 | 59.4 | 36.9 | 50.6 | 72.8 | 50.9 | 54.5 | 54.4 | 71.8  | 9          | 102        | 100               |
| 13333  | Wells                     |      |      | 52.6 | 33.7 | 57.0 | 58.4 | 67.9 | 62.8 | 63.1 | 64.8  | 8          | 102        | 102               |
| 13596  | Fortuna                   |      |      |      |      | 62.9 | 76.8 | 66.2 | 56.4 | 74.7 | 88.9  | 6          | 116        | 120               |
| 13775  | Manitou R.L. 4159         |      |      |      |      | 50.8 | 62.2 | 67.5 | 57.5 | 57.6 | 70.7  | 6          | 100        | 103               |
| 13773  | Polk                      |      |      |      |      |      |      | 51.4 | 52.3 | 57.2 | 64.3  | 4          | 88         | 97                |
| 6617   | B52-91//Kf/Cnt            |      |      |      |      |      |      |      | 62.3 | 71.2 | 67.6  | 3          | 104        | 111               |
| 13768  | Leeds                     |      |      |      |      |      |      |      | 58.1 | 58.2 | 49.4  | 3          | 85         | 92                |
| 6634   | Bkf/Cnt//B52-91           |      |      |      |      |      |      |      | 54.1 | 65.4 | 70.9  | 3          | 98         | 105               |
| 6722   | Nrn10/Bvrl4//6 * Cnt      |      |      |      |      |      |      |      |      | 85.8 | 82.6  | 2          | 127        | 133               |
| 676    | Nrn10/Bvrl4//16* Cnt      |      |      |      |      |      |      |      |      | 85.8 | 81.7  | 2          | 126        | 133               |
| 677    | Nrn10/Bvrl4//16* Cnt      |      |      |      |      |      |      |      |      | 83.5 | 75.6  | 2          | 120        | 126               |
| 6723   | Nrn10/Bvrl4//16* Cnt      |      |      |      |      |      |      |      |      | 71.8 | 71.9  | 2          | 108        | 114               |
| 13927  | Pitic 62                  |      |      |      |      |      |      |      |      |      | 101.1 | 1          | 145        | 141               |
| 6261   | Minnesota 11-62-61        |      |      |      |      |      |      |      |      |      | 93.1  | 1          | 134        | 130               |
| 6579   | Fta/61-107,S6579          |      |      |      |      |      |      |      |      |      | 90.9  | 1          | 131        | 127               |
| 6830   | Si/3/Nrn10/Bvrl4//5 * Cnt |      |      |      |      |      |      |      |      |      | 87.0  | 1          | 125        | 121               |
| 6834   | Si/3/Nrn10/Bvrl4//5 * Cnt |      |      |      |      |      |      |      |      |      | 86.7  | 1          | 125        | 121               |
| 6833   | Si/3/Nrn10/Bvrl4//5 * Cnt |      |      |      |      |      |      |      |      |      | 85.3  | 1          | 123        | 119               |
| 6839   | Ftr/3/Nrn10/Bvrl4//5* Cnt |      |      |      |      |      |      |      |      |      | 80.9  | 1          | 116        | 113               |
| 6831   | Si/3/Nrn10/Bvrl4//15* Cnt |      |      |      |      |      |      |      |      |      | 78.6  | 1          | 113        | 109               |
| 6829   | Si/3/Nrn10/Bvrl4//5* Cnt  |      |      |      |      |      |      |      |      |      | 78.6  | 1          | 113        | 109               |
| 6626   | B52-91//K338/Lee          |      |      |      |      |      |      |      |      |      | 74.9  | 1          | 108        | 104               |
| 4200   | RL 4125 x RL 4008         |      |      |      |      |      |      |      |      |      | 74.2  | 1          | 107        | 103               |
| 6836   | Crim/3/N10/Bvrl4//4* Cnt  |      |      |      |      |      |      |      |      |      | 73.5  | 1          | 106        | 102               |
| 6616   | K338 x Lee                |      |      |      |      |      |      |      |      |      | 71.7  | 1          | 103        | 100               |
| 14193  | Red River 68              |      |      |      |      |      |      |      |      | 81.8 | 70.7  | 2          | 115        | 121               |
| 13958  | Waldron                   |      |      |      |      |      |      |      |      |      | 62.0  | 1          | 89         | 86                |
| 6842   | N10/Bl4//5*Cnt/3/58-29-4  |      |      |      |      |      |      |      |      |      | 59.8  | 1          | 86         | 83                |

1/ Nine years