

TITLE: Winter Wheat

PROJECT: Small Grains Investigations MS 756

YEAR: 1969

PERSONNEL: Leader- Vern R. Stewart  
Cooperator - G. A. Taylor

LOCATION: Northwestern Montana Branch Station and several off station locations throughout western Montana which will be identified in the manuscript.

DURATION: Indefinite

OBJECTIVES:

1. To obtain the information necessary for making varietal recommendations and evaluating new varieties and selections.
2. To conduct a breeding program in northwest Montana designed to produce high yielding varieties with particular emphasis on the acceptable quality and resistance for dwarf bunt and stripe rust. Other agronomic characteristics such as straw strength, winter hardiness etc., will be evaluated in this program.

SIGNIFICANT FINDINGS:

1. Burt x P.I. 178383 lines are highly resistant to dwarf smut and stripe rust.
2. Moro and Omar x P.I. 178383 are white wheats which have a high degree of resistance to stripe rust and dwarf smut.
3. Nugaines and Moro were the highest yielding varieties in all studies in western Montana. Wanser was the highest yielding hard red entry, but very susceptible to dwarf smut.

FUTURE PLANS: Plans for 1969-70 include regular yield nurseries and assistance in the overall state breeding program.

MATERIALS AND METHODS:

Standard nursery procedures were used in all of the variety testing programs. A randomized block design was used having four to six replications. Data obtained were: yield; plant height; test weight; disease and lodging. Nurseries grown were: Intrastate Winter Wheat Nursery at the Northwestern Montana Branch Station in Field E-3; Western Regional Hard Red Winter Wheat Nursery grown on the L. B. Claridge farm, northwest of Kalispell in a dwarf bunt area; Uniform White Wheat Nursery grown at the Northwestern Montana Branch Station in Field E-3. The off station nurseries were located in Ravalli, Missoula, Lake, Sanders and Mineral Counties.

Herbicide applications were made for weed control in all winter wheat studies early in the spring. Bromoxynil was used at the rate of 3/8 lb ai/a.

Plots were harvested with a power harvester.

RESULTS AND DISCUSSIONS:Intrastate Hard Red Winter Wheat Nursery

The yield data from this nursery were non-significant when analyzed statistically. The high coefficient of variability is due in part to bird damage, uneven soil conditions and variation of stripe rust between replications which is a direct relationship to the soil variation.

Dwarf smut readings were high in the varieties of Lancer, McCall, Winalta, Westmont, Wanser, MT 6832, Rego, Cheyenne, MT 6830 and MT 6641. Some of the fore named varieties also had a high incidence of stripe rust. The Burt x P.I. 178383 lines were the top yielding entries, had excellent dwarf bunt resistance and generally good stripe rust resistance. Table 1, gives complete detail of this test.

In table 2 a summary of data is given for varieties grown in the above named nursery. Two varieties, Cheyenne and Westmont have been grown for ten years. Using Westmont as a standard, Cheyenne is 20% higher in yield over the 10 years 1960-69. Of the named varieties, four year averages, Wanser (64.5 bu/a) is high in yield followed by Delmar (61.8 bu/a), McCall (56.4), and Crest 55.6 bu/a). McCall and Wanser both have a high susceptibility to dwarf smut in this location.

Western Regional Hard Red Winter Nursery

A seeding date of October 1, 1969 resulted in loss of stand and low tillering in this nursery. Only three of the four replications was harvested because of almost total loss of the fourth replication. To obtain optimum stand in this area, seeding should be completed by not later than September 20, with September 15 being the best seeding date for highest yields.

Yields were non-significant, however UT 646001 was the highest yielding entry. This variety also had the highest stand count at harvest time. The mean for the nursery was 41.3 bu/a.

Dwarf smut was very light this season on the Claridge farm. This in contrast to what we usually expect in this area with a late date of planting. (Oct. 1, 1969) Readings were not obtained for entries because of an error in recording at the time the notes were taken. Table 4. all

Uniform White Wheat Nursery

Soil and moisture conditions were the same for this nursery as described above for the Intrastate hard red winter wheat nursery. Yield data were non-significant. Significant differences were found in stripe rust and dwarf bunt levels in the nursery. Nugaines, the check variety, had a high level of both stripe rust and dwarf bunt. Moro and a sister selection showed good resistance to both diseases in this nursery. Table 5 gives complete tabulation of all data obtained in 1969.

A summary of the Uniform White Wheat Nursery is given in Table 6. This shows five varieties being greater in yield than Gaines which is used as a standard. Some of the comparisons are for only one year thus one should not make a firm judgement on this limited amount of data. WA 4966 and WA 4995 have good yield level, but the dwarf smut level is too high to be acceptable as a commercial variety in this area.

Table 1. Agronomic data from the intrastate winter wheat nursery grown on the Northwestern Montana Branch Station, in 1969. Field No. E-3. Experimental design - random block, three replications.

Planting date: September 25, 1969      Harvest date: August 20, 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 | Stripe Rust |         | Dwarf Smut |
|-----------------|--------------------------|------------|------------------|------------------------|--------------|-------------|---------|------------|
|                 |                          |            |                  |                        |              | Type        | Prev. % |            |
| MT 6829         | Burt/PI 178383 101-1200  | 77.1       | 62.6             | 156                    | 36.0         | 0.5         | 0.5     | 0.0        |
| MT 6646         | Burt x 83 C63-11         | 68.3       | 56.8             | 169                    | 37.0         | 3.0         | 4.3     | 0.0        |
| MT 6828         | Burt/PI 178383 13-1201   | 67.7       | 61.4             | 157                    | 35.3         | 0.0         | 0.0     | 0.0        |
| MT 6826         | Burt/PI 178383 4-1192    | 61.4       | 61.7             | 157                    | 36.0         | 0.0         | 2.5     | 0.0        |
| MT 6827         | Burt/PI 178383 14-1202   | 61.3       | 60.2             | 156                    | 35.7         | 0.3         | 1.3     | 0.0        |
| MT 6729         | Wmt/PI 178383 14-11-3    | 59.6       | 61.5             | 157                    | 40.0         | 2.8         | 1.8     | 2.0        |
| CI 13442        | Delmar                   | 59.3       | 61.0             | 162                    | 41.0         | 6.8         | 47.5    | 6.7        |
| MT 6833         | Wmt/178383 21-1-6        | 59.0       | 61.8             | 156                    | 35.0         | 0.3         | 1.3     | 0.0        |
| MT 6641         | PI 178383 x2 Wmt, 16-1-8 | 58.0       | 61.2             | 159                    | 41.3         | 0.0         | 0.0     | 20.0       |
| MT 6830         | Uniform Mildew 48        | 57.1       | 62.5             | 158                    | 38.0         | 2.8         | 2.8     | 21.7       |
| CI 8885         | Cheyenne                 | 57.0       | 61.6             | 158                    | 43.3         | 5.0         | 60.0    | 16.7       |
| MT 6732         | Wmt/PI 178383 8-8-1      | 56.4       | 62.5             | 157                    | 35.3         | 3.8         | 6.3     | 0.0        |
| CI 13844        | Wanser                   | 56.0       | 62.0             | 157                    | 35.7         | 7.5         | 72.5    | 18.3       |
| MT 6831         | Wmt/178383 20-3-14       | 54.1       | 62.9             | 156                    | 34.7         | 3.0         | 7.5     | 1.7        |
| MT 6634         | Wmt-2 x 83 7-14-4        | 51.8       | 62.0             | 155                    | 35.3         | 2.0         | 16.3    | 0.0        |
| MT 6721         | Wmt/PI 178383 7-10-3     | 51.5       | 61.6             | 156                    | 37.3         | 3.0         | 2.3     | 0.0        |
| CI 13181        | Rego                     | 51.3       | 59.0             | 158                    | 43.0         | 4.3         | 15.0    | 13.3       |
| MT 6726         | Wmt/PI 178383 8-10-6     | 50.3       | 61.1             | 156                    | 35.0         | 2.3         | 5.0     | 0.0        |
| MT 6832         | Wmt/178383 11-4-5        | 49.1       | 61.0             | 155                    | 35.0         | 0.8         | 0.3     | 16.7       |
| MT 6734         | Wmt/PI 178383 12-6-3     | 46.8       | 60.7             | 157                    | 37.0         | 4.0         | 22.8    | 0.0        |
| CI 12930        | Westmont                 | 46.7       | 61.0             | 156                    | 36.0         | 9.0         | 95.5    | 33.3       |
| CI 13670        | Winalta                  | 45.7       | 60.9             | 157                    | 39.3         | 7.0         | 38.8    | 23.3       |
| CI 13880        | Crest                    | 43.8       | 62.4             | 156                    | 36.7         | 0.0         | 0.0     | 0.0        |
| CI 13842        | McCall                   | 40.5       | 61.1             | 158                    | 32.3         | 7.8         | 71.3    | 30.0       |
| CI 13547        | Lancer                   | 38.3       | 60.9             | 156                    | 36.7         | 4.8         | 28.8    | 31.7       |

|                                  |       |      |         |        |         |         |       |
|----------------------------------|-------|------|---------|--------|---------|---------|-------|
| $\bar{x}$                        | 54.7  | 61.3 | 157.3   | 37.1   | 3.2     | 20.1    | 9.4   |
| F - Value for variety comparison | 1.47  | 0.0  | 101.9** | 3.79** | 10.35** | 13.27** | 6.8** |
| S.E. $\bar{x}$                   | 7.4   | 0.0  | .3      | 1.4    | .9      | 7.7     | 4.5   |
| L.S.D. (P. = .05)                | N.S.  | 0.0  | .77     | 3.98   | 2.42    | 21.65   | 12.72 |
| C.V.%                            | 13.46 | 0.0  | .17     | 3.79   | 26.68   | 37.98   | 47.77 |

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Table 2. Summary of winter wheat data from the intrastate yield nurseries grown at the Northwestern Montana Branch Station, Kalispell, Montana from 1960-1969.

| Variety         | Number | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | Sta- | %     | $\bar{x}$ | 2    | 3               | 4    | 10   |  |
|-----------------|--------|------|------|------|------|------|------|------|------|------|------|------|-------|-----------|------|-----------------|------|------|--|
|                 |        |      |      |      |      |      |      |      |      |      |      | tion | West- |           | Yrs. | Yrs.            | Yrs. | Yrs. |  |
|                 |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      | Average bu/acre |      |      |  |
| Cheyenne        | 8885   | 41.4 | 49.5 | 55.5 | 61.9 | 57.5 | 48.7 | 59.3 | 46.4 | 57.2 | 57.0 | 10   | 120   | 53.4      | 57.1 | 53.5            | 55.0 | 53.4 |  |
| Westmont        | 12930  | 34.3 | 51.1 | 57.2 | 45.6 | 41.5 | 42.4 | 30.2 | 50.4 | 46.9 | 46.7 | 10   | 100   | 44.6      | 46.8 | 48.0            | 43.5 | 44.6 |  |
| Rego            | 13181  | 35.5 | 46.7 | 60.6 | 60.2 | 49.9 | 42.5 | 62.4 | 43.6 |      | 51.3 | 9    | 113   | 50.3      |      |                 |      |      |  |
| Delmar          | 13442  |      |      | 55.3 | 71.8 | 51.4 | 47.3 | 64.2 | 55.9 | 68.0 | 59.3 | 8    | 131   | 59.2      | 63.6 | 61.1            | 61.8 |      |  |
| Winalta         | 13670  |      |      |      |      | 54.4 | 31.4 | 67.4 | 44.9 | 55.8 | 45.7 | 6    | 116   | 49.9      | 50.7 | 48.8            | 54.3 |      |  |
| Burtx83063-11   | 6646   |      |      |      |      |      | 50.1 | 81.8 | 58.4 | 64.4 | 68.3 | 5    | 149   | 64.6      | 66.4 | 63.7            | 68.2 |      |  |
| Crest           | 13880  |      |      |      |      |      | 40.8 | 73.4 | 53.5 | 51.5 | 43.8 | 5    | 121   | 52.6      | 47.6 | 49.6            | 55.6 |      |  |
| McCall          | 13842  |      |      |      |      |      |      | 56.4 | 51.9 | 76.8 | 40.5 | 4    | 130   | 56.4      | 58.7 | 42.3            | 56.4 |      |  |
| Lancer          | 13547  |      |      |      |      |      |      | 57.0 | 41.7 | 44.0 | 38.3 | 4    | 104   | 45.3      | 41.1 | 41.3            | 45.3 |      |  |
| Wanser          | 13844  |      |      |      |      |      |      | 73.9 | 51.7 | 76.5 | 56.0 | 4    | 148   | 64.5      | 66.2 | 61.4            | 64.5 |      |  |
| PI 178383 x 2   |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      |                 |      |      |  |
| Wmt 16          | 6641   |      |      |      |      |      |      |      | 54.8 | 48.8 | 58.0 | 3    | 112   | 53.9      | 53.4 | 53.9            |      |      |  |
| Wmt-2x83 7-14-4 | 6634   |      |      |      |      |      |      |      | 45.8 | 36.1 | 51.8 | 3    | 93    | 44.6      | 44.0 | 44.6            |      |      |  |
| 2 Wmt/PI 178383 |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      |                 |      |      |  |
| 14-11-3         | 6729   |      |      |      |      |      |      |      |      | 60.0 | 59.6 | 2    | 128   | 59.8      | 59.8 |                 |      |      |  |
| 2 Wmt/PI 178383 |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      |                 |      |      |  |
| 8-10-6          | 6726   |      |      |      |      |      |      |      |      | 54.7 | 50.3 | 2    | 112   | 52.5      | 52.5 |                 |      |      |  |
| 2 Wmt/PI 178383 |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      |                 |      |      |  |
| 12-6-3          | 6734   |      |      |      |      |      |      |      |      | 52.2 | 46.8 | 2    | 106   | 49.5      | 49.5 |                 |      |      |  |
| 2 Wmt/PI 178383 |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      |                 |      |      |  |
| 8-8-1           | 6732   |      |      |      |      |      |      |      |      | 52.1 | 56.4 | 2    | 116   | 54.3      | 54.3 |                 |      |      |  |
| 2 Wmt/PI 178383 |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      |                 |      |      |  |
| 7-10-3          | 6721   |      |      |      |      |      |      |      |      | 41.9 | 51.5 | 2    | 98    | 46.7      | 46.7 |                 |      |      |  |
| Burt/PI 178383  |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      |                 |      |      |  |
| 101-1           | 6829   |      |      |      |      |      |      |      |      |      | 77.1 | 1    | 173   | 77.1      |      |                 |      |      |  |
| " " 13-1201     | 6828   |      |      |      |      |      |      |      |      |      | 67.7 | 1    | 152   | 67.7      |      |                 |      |      |  |
| " " 4-1192      | 6826   |      |      |      |      |      |      |      |      |      | 61.4 | 1    | 138   | 61.4      |      |                 |      |      |  |
| " " 14-1202     | 6827   |      |      |      |      |      |      |      |      |      | 61.3 | 1    | 137   | 61.3      |      |                 |      |      |  |
| 3Wmt/178383     |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      |                 |      |      |  |
| 21-1-6          | 6833   |      |      |      |      |      |      |      |      |      | 59.0 | 1    | 132   | 59.0      |      |                 |      |      |  |
| Uniform Mildew  | 6830   |      |      |      |      |      |      |      |      |      | 57.1 | 1    | 128   | 57.1      |      |                 |      |      |  |
| 3Wmt/178383     |        |      |      |      |      |      |      |      |      |      |      |      |       |           |      |                 |      |      |  |
| 20-3-14         | 6831   |      |      |      |      |      |      |      |      |      | 54.1 | 1    | 121   | 54.1      |      |                 |      |      |  |
| " " 11-4-5      | 6832   |      |      |      |      |      |      |      |      |      | 49.1 | 1    | 110   | 49.1      |      |                 |      |      |  |