

TITLE: Small Grains Investigations (Winter Wheat) 756

LOCATION: Northwestern Montana Branch Station, Field E-1 and several off station locations.

DURATION: Indefinite

OBJECTIVES:

1. To obtain the information necessary for making vital recommendations and evaluating new varieties and selections.
2. To conduct a breeding program in North West 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.

EXPERIMENTAL DESIGN AND PROCEDURE:

Standard nursery procedures were used in the variety testing program. In general station studies were four row plots replicated four times. The design, complete randomized block. The description of a particular study and procedures of each will be included in the results and discussion.

RESULTS AND DISCUSSION:

Attached

FUTURE PLANS:

Plans for 1966-67 will include intra-state nurseries, Western Regional nurseries, and an increase in the amount of breeding material.

SUMMARY:

Yields were average or slightly above in 1966. Harvest conditions were excellent throughout the harvest period. The highest yielding entry in the Intra-state Nursery was Montana #647 or listed as C 63-9, a complex cross named by Dr. Konsak, which yielded 82.6 bushels per acre. Several entries in the nursery were significantly better in yield than Delmar.

Wanser was the highest yielding entry in the Western Regional Nursery with 64.1 bushel per acre, stands were excellent, but it did have a high percent of dwarf smut.

Moro was the highest yielding entry in the White Wheat Nursery with 85.9 bushels per acre. It had good resistance to both dwarf smut, stripe rust and good resistance to lodging. This variety could have a potential in Western Montana.

Only two of the off-station nurseries of the five put out were harvested. A summary of the data shows that Montana #647 C 63-9 is the highest yielding entry of the off-station nurseries in 1966.

Several lines were evaluated in the elite stripe rust nursery for stripe rust and dwarf bunt resistance. Out of the 25 entries included only 5 of the Westmont x P.I. 178383 crosses were left after evaluation.

Summary (con't)

A summary of all data in Western Montana indicates that Westmont² x P. I. 178383 8-10-8 is superior in yield to both Cheyenne and Delmar when grown in Western Montana.

RESULTS AND DISCUSSION:

Intra-state Hard Red. There were twenty entries in the intra-state hard red wheat nursery. Eleven commercial varieties, three Burt x P.I. 178383 crosses, two crosses from a complex cross made by Dr. Konzak at Washington State, which are listed as C63-9 and C63-16 and four lines from the Westmont x P.I. 178383 backcross were included in this study. Delmar is used as a check in this nursery. There are eight entries in the nursery that are significantly better in yield than Delmar. Among those is Montana #6619 which is Westmont² x P.I. 178383 8-10-8. The highest yielding entry in the nursery is Montana #647, this is also listed as C63-9, one of the lines developed by Dr. Konzak at Washington State University. Westmont was not included in this nursery due to an error in seed packaging. Itana, the most susceptible variety to stripe rust in the nursery had an infection type of 8 with 99 percent severity. Those varieties showing resistance in the study are some of the higher yielding ones, Gaines showed 63 percent rust 8-10-8 had a severity of 2.5 and a pustule type of 0. A high reading of 15 percent or more of smut was found in McCall and several lines of the Westmont² x P.I. 178383 were quite resistant to dwarf smut in this study. Test weights were low on the Burt x P.I. 178383 crosses. Maturity of Burt x P.I. 178383 was somewhat later than some of the other commercial lines in the nursery. Generally test weights were good to excellent in this study. Complete data of this nursery is found in Table 1.

Western Regional Hard Red. There were twenty-seven entries in the western regional hard red winter wheat nursery. It was grown in the dwarf smut infested area, Northwest of Kalispell, on the Lance Claridge farm. Susceptible varieties had a high percentage of dwarf smut as can be seen in Table 2. Stand counts were made of all varieties. Stand loss could be attributed to snow mold. This was prevalent throughout the entire nursery. There are differences in stands between varieties as seen in Table 2. Wanser was the highest yielding entry in the nursery. Wanser contained 34 percent smut. Stands were excellent in this variety of some 86 percent. Delmar, the variety used as a check in the nursery, had a yield of 45.8 bushels per acre compared with Westmont² x P.I. 178383 8-10-8 which had a yield of 44.8 bushels per acre. The mean for the entire nursery was 39.1 bushels per acre. Two entries were found to be completely free of smut, these were Westmont² x P.I. 178383 lines 21-3 and 15-5-17. There was a trace of 1 percent smut in Westmont² x P.I. 178383 8-10-8.

Western Regional White Wheat. The western regional white wheat nursery contained sixteen entries. Stands were excellent, also yields were excellent with a mean of 66.6 bushels per acre. This study was located in Field E-3 on the station, where there are excellent growing conditions for winter wheat. The highest yielding entry in the nursery was Moro with 85.9 bushels per acre, and this was significantly higher than Gaines which is used as a check in this nursery. Moro also had a .3 percent smut reading, compared to Triplet, a susceptible variety, which had 11 percent smut. Actually the smut level is not adequately measured in this test because of the low level of smut in the susceptible varieties. Moro also had good stripe rust resistance giving a 0 type reaction and severity being 0 in this particular study. Susceptible varieties such as Triplet and Omar had a severity of 98 percent and a type of 9.

Table 3. Agronomic data from the uniform white regional winter wheat nursery grown at the Northwestern Montana Branch Station in 1965-1966. Field No. E-3. Four row plots, four replications. Randomized block.

Date Seeded: September 20, 1965 Date Harvested: August 11, 1966 Size of Plot: 16 sq. ft.

Variety	Number	Yield Bu/A	Test Wt Lbs/Bu	Ht In	Heading Date	Stripe Rust		Smut Sever	Lodging	
						Sever	Type		Prev	Sever
P.I. 178383 x Omar 2-172	13740	85.9*	59.3	42	6/13	0.0	0	3	3	2
(14-53 x Odin) x 13431	4765	82.3	57.7	31	6/17	0.0	0	10	0	0
(14 x 50-3) x Burt, Sel 7	13968	79.7	60.6	33	6/13	33.7	2	9	0	0
Suwon 92 x Omar, BC-3	4771	78.7	59.5	38	6/14	0.0	0	3	0	2
Brevor	12385	71.0	60.2	40	6/12	45.0	2	3	0	0
Suwon 92 x Omar, BC-3	4780	70.4	59.4	37	6/12	0.0	0	3	0	0
Gaines	13448	68.4	60.1	31	6/12	32.5	3	7	0	0
Suwon 92 x Omar, BC-3	4762	68.2	58.8	30	6/9	0.0	0	6	0	0
HH-EG2 x Omar	9129	64.8	59.9	44	6/16	68.7	8	6	0	0
Burt	12696	62.2	58.4	38	6/11	51.2	4	2	0	0
Triplet	5408	59.5	60.5	48	6/10	98.0	9	11	24	2
Omar	13072	58.7	58.5	44	6/15	99.0	9	3	15	1
Golden	11063	55.0	57.9	48	6/14	99.0	9	2	24	3
Elgin	11755	52.3	58.6	43	6/13	99.0	9	8	0	0
Kharkof	1442	52.1	60.1	53	6/13	23.7	4	11	91	8
Omar x 1834-1	13750	51.4	57.0	34	6/7	60.0	3	2	0	0

NOTE: Gaines used as a check in this nursery
 * Variety yielding significantly more than check (.05)

Source	Analysis of Variance		
	D.F.	Mean Square	F.
Replications	3	46.8	.40
Varieties	15	504.4	4.36
Error	45	115.5	
Total	63		

\bar{x} 66.3
 S.E. \bar{x} 5.3
 L.S.D.(.05).. 15.4
 C.V.%..... 8.1