

WINTER WHEAT

INTRODUCTION:

Winter wheat work was conducted in Western Montana with a primary purpose of introducing varieties that are adapted to the area. Standard nursery techniques are used in the testing program. Varieties that are found to be of high potential for yield and other agronomic and milling and baking characteristics are used in off station testing. In addition to these lines, varieties from neighboring states are included in off station testing if they show promise in the western region.

RESULTS AND DISCUSSION:

Intra-state Hard Red - There were eighteen entries in the intra-state hard red winter wheat nursery. This nursery consisted of thirteen commercial lines that are being grown throughout the pacific northwest and in Montana. The other entries in the nursery consisted of a Burt x P.I. 178383 cross and five lines of Westmont² x P.I. 178383.

Delmar was the variety used as a check on yield in the nursery and only one variety, Gaines, was superior. Crest, a new line released by Montana Agricultural Experiment Station, was not significantly less in yield than Delmar, but some two bushels less in yield. Four of the entries in the nursery were free of Dwarf Smut and these were; MT 6646, MT 6642, MT 6634 and the variety Crest. All other entries had some dwarf smut ranging from a mean of 33% found in McCall to 0% in the varieties already mentioned.

One of the high yielding entries MT 6646 has a late heading date, June 17. Crest is one of the earliest heading, it and Westmont heading the 7th day of June. Test weights were good on all of the entries. Only MT 6643 was found completely free of stripe rust. Westmont had the highest infestation of all the entries. Table 1.

Western Regional Hard Red - The western regional hard red winter wheat nursery grown on the L. B. Claridge farm, contained 29 varieties. Dwarf smut and stripe rust were found to be prevalent in this nursery as was snow mold. Only two entries were found to be entirely free of dwarf smut and these were MT 6634 and MT 6619 or Crest. Columbia, one of the most susceptible entries in the nursery had 63% dwarf smut. Stand loss in the nursery was contributed mainly to the snow mold, in that, a perfect stand was obtained in the fall of 1966. The entries showing the most resistance were those crosses of Westmont 2 x P.I. 178383. Two entries ID 0001 and ID 5001 also having a common parent of Turkey, were quite resistant to snow mold. The entries showing the most stripe rust resistance were again the crosses of Westmont 2 x P.I. 178383. The mean yield for the nursery was 43.9 bushels per acre. The test weights were good for all entries. No lodging was noted in this nursery. See Table 2 for complete details.

Winter Wheat Results and Discussion (con't)

Western Uniform White Wheat Nursery - This nursery was grown on the station in Field E-2 and consisted of 15 entries. Yields were about average, with the high being 66.5 bushels per acre for WA 4765. Test weights averaged about 60 pounds. Stripe rust was quite severe on several of the entries with Omar, Elgin and Golden being very severe. Little yield difference was found between Moro and Gaines this season. Moro was one of the entries that had complete stripe rust resistance, and also good dwarf bunt resistance. The dwarf bunt level was not particularly high in the susceptible varieties. Kharkof, a susceptible variety had 21.25% smut. Gaines and Nugaines were also fairly equal in yield in this study. See Table 3.

Elite Stripe Rust Dwarf Bunt Nursery - This nursery consisted of 23 entries, six replications in single row plots. The nursery consisted of five check varieties, remaining entries were lines of Westmont 2 x P.I. 178383 lines, plus one Itana x P.I. 178383 line. These were measured for yield, test weight and dwarf smut. The highest yielding entry in the nursery was the check variety Delmar with 61.53 bushels per acre. Test weights were high in all of the lines, running from 61 to 63 pounds per bushel. The smut level was not exceedingly high, however Westmont which is the most susceptible had a level of 19%. One entry did exceed this, namely MT 6736, an Itana x P.I. 178383 cross. Itana also exceeded Westmont as far as bunt infestation was concerned. There was some material that headed early in this test which may have possibilities in that they had good dwarf bunt resistance. Two entries were found to be completely dwarf bunt resistant, they were 8-6-8 and 8-8-1, however they should be tested further to be assured they were not escapes rather than resistance. Table 4

Off-station - Growing conditions and results about each of the nurseries will be discussed under each individual county heading. A total of four nurseries were seeded in the fall of 1966. Each nursery contained fifteen entries of both hard red and soft white winter wheats.

Missoula County - Good fall moisture resulted in excellent stands in this nursery on the Al Goodan farm. Early spring moisture was adequate, fertilizer was applied as a top dress in the spring to insure a high level of fertility. The white wheats were the higher yielding entries in the nursery, Gaines being high followed very closely by Moro. They were significantly higher than Delmar, the check, which was equal in yield with Crest. Protein levels were very low, being about the same for the hard reds as they were for the white wheats. This is a traditional history for this area, where proteins seldom get above 9%. Considerable common smut was found in this nursery in 1967, and this is attributed to the fact that the seed had not been treated prior to seeding. Table 5 gives the complete data on this nursery.

Ravalli County - Moisture and late seeding was a contributing factor to low yields on the Gerald Neil farm, in the winter wheat belt, southeast of Stevensville. The highest yielding entry in the nursery was Wanser, no significant difference was found in any of the yields when tested statistically. Protein levels were extremely high, running as high as 18.9% for the variety Omar, which is a soft white wheat. In Table 6 is shown yields, plant height and protein.

Winter Wheat (con't)

SUMMARY AND CONCLUSION:

1. Intrastate nursery - Delmar exceeded in yield only by Gaines. Crest with-
in two bushels of Delmar, not significantly less.
2. Western regional hard red - Snow mold was a factor in stands and yields.
MT 6634 and Crest were found to be entirely free of dwarf smut.
3. Western regional white - Moro and Gaines about equal in yield. Moro was
resistant to stripe rust and dwarf smut.
4. Elite stripe rust nursery - Twenty-three entries of P.I. 178383 x West-
mont² and five check varieties were included in this nursery. Delmar, a check, was
highest yielding entry in the nursery.
5. Off-station nurseries - Crest is the highest yielding entry grown (see
summary). Protein levels vary greatly at each location.
6. Breeding nurseries - One hundred and thirty-four lines tested, forty were
harvested for yield. All were evaluated for snow mold and dwarf smut.

Table 2. (con't) Statistical Analysis

Source	Analysis of Variance			\bar{x}	43.9
	D.F.	Mean Square	F.		
Replications	3	970.6	9.04*	S.E. \bar{x}	5.1
Varieties	28	282.2	2.63*	L.S.D.....	14.56
Error	84	107.2		C.V.%.....	11.79
Total	115				

Table 3. Agronomic data from the western regional uniform white winter wheat nursery. Field E-2 at the Northwestern Montana Branch Station. Random block design, four replications.

Date Seeded: September 21, 1966 Date Harvested: August 10, 1967 Size of Plot: 16 sq. ft.

Variety	C.I. Number	Yield Bu/A.	Test Wt. Lbs/Bu.	Heading Date	Plant Height	Lodging		Stripe Rust		% Smut
						Prev	Sever	Sever	Type	
(14-53 x Odin) x 13431	4765	66.55	60.2	6/15	29	0.0	0.0	0.0	0.0	10.0
Suwon 92 x Omar, BC-3	4762	61.40	61.4	6/ 8	28	0.0	0.0	0.0	0.0	8.8
Gaines	13448	60.25	62.5	6/12	27	0.0	0.0	11.3	2.8	7.5
PI 178383/4 Omar	88	60.07	60.9	6/12	40	.8	3.8	0.0	0.0	0.0
Brevor	12385	59.97	60.7	6/13	37	0.0	0.0	86.2	6.0	4.0
Suwon 92/Omar, BC4	4962	58.80	61.6	6/12	32	0.0	0.0	0.0	0.0	1.5
Nugaines	13968	58.65	63.6	6/12	28	23.8	.8	1.0	1.5	10.0
HH/2 Elgin 2/2 Omar	5002	57.50	60.8	6/13	37	0.0	0.0	98.0	9.0	.5
Moro	13740	57.20	60.4	6/12	36	4.5	3.8	0.0	0.0	.3
Omar	13072	51.40	60.6	6/14	36	0.0	0.0	98.0	7.8	3.0
Elgin	11755	49.55*	60.4	6/14	38	0.0	0.0	98.0	7.8	7.5
Triplet	5408	47.37*	62.1	6/ 9	44	11.3	3.0	93.5	8.5	12.5
Kharkof	1442	47.35*	61.9	6/11	45	71.3	2.5	61.3	5.3	21.3
Golden	10063	46.30*	60.2	6/13	40	1.3	.3	98.0	7.8	10.0
Burt	12696	46.00*	61.6	6/ 9	34	0.0	0.0	58.8	5.5	8.8

NOTE: Gaines is used as the check

* Varieties yielding significantly less than the check (.05)

Source	Analysis of Variance			\bar{x}	55.2
	D.F.	Mean Square	F.		
Replications	3	169.4	3.26*	S.E. \bar{x}	3.6
Varieties	14	173.2	3.33*	L.S.D.....	10.29
Error	42	51.8		C.V.%.....	6.52
Total	59				