

TITLE: Small Grain Investigations

PROJECT NUMBER: 5023 (Winter Wheat)

PERSONNEL: Leader - Vern R. Stewart
Cooperators - E. R. Hehn, J. A. Hoffmann*, E. L. Kendrick*,
and H. Purdy* (* USDA)

FUNDS: State - \$ 2956.67

LOCATION: Northwestern Montana Branch Station in field number E R-3, and off-station locations in several Northwestern Montana counties.

PROBABLE DURATION: Indefinite

OBJECTIVES:

1. To obtain the information necessary for making varietal recommendations and for evaluating new varieties and selections.
2. To conduct a breeding program in Northwestern Montana designed to produce high yielding varieties with particular emphasis on acceptable quality and resistance to dwarf bunt and stripe rust. Other agronomic characteristics such as straw strength, winter hardiness, etc. will be evaluated in this program.
3. To determine cultural practices that will return the highest yields per acre and the highest quality wheat.
4. To maintain a pure genetic varietal seed source of recommended winter wheat.

EXPERIMENTAL DATA:

INTRODUCTION

Dwarf bunt and stripe rust are the two major disease problems in winter wheat production in western Montana, and no doubt, the major factor affecting wheat production in this area. Quality, the lack of it, can also be added as one of the major problems.

Variety testing, a breeding program, cultural studies, and a cooperative program with the Regional Smut Control Laboratory in Pullman, Washington combine to make the winter wheat project at the Northwestern Montana Branch Station.

Growing of foundation and certified seed is included in the project report, however, it is not a research problem.

Irrigation versus dryland wheat production study was conducted on the Station this year in a field type study.

MATERIALS AND METHODS

A complete description of procedure and design are found on page seventy of the 1961 Annual Report of the Northwestern Montana Branch Station of technique used in variety testing and seed production.

Four nurseries were seeded in the fall of 1964 on the Station and in the dwarf smut area northwest of Kalispell, Montana. Six offstation nurseries were seeded in the fall of 1964, one each in Missoula, Ravalli, Lake, Sanders, Mineral, and Lincoln Counties. The Intrastate hard red winter wheat nursery contained twenty-five entries and was grown on the Station in field number E-1. The Western Regional Nursery containing thirty entries was seeded on the Howard Braaten farm northwest of Kalispell nine miles in a dwarf smut area. Sixteen entries were placed in the short straw nursery and grown on the Station in field number E-1. The Western Regional white wheat nursery contained nineteen entries and was grown in field number E-1 on the Station. The off-station nurseries grown in single row plots and replicated four times consisted of sixteen entries. The location, grower, and address are found in the tabulated data included later in this report.

The breeding plots were located on the Howard Braaten farm nine miles northwest of Kalispell. 544 rows of bulk, head rows, and plant rows were seeded and observed during the growing season for dwarf bunt, stripe rust, and other agronomic characteristics. Mr. Bruce McCallum grew several selections for winter hardiness at the North Montana Branch Station at Havre.

RESULTS AND DISCUSSIONS

Each nursery as presented above will be discussed separately in this report.

Intrastate Hard Red Winter

Material in this nursery is grown throughout the state of Montana in cooperation with other Agronomists of the Experiment Station system. This nursery was located in field number E-1.

Table XXXIII presents the data from this nursery. Rodco was the lowest yielding entry and had the highest level of dwarf bunt (Tilletia contraversa) infection. Stripe rust (Puccinia striiformis) was not a factor in the nursery this season. The taller variety, generally, lodged considerably more than the shorter strawed varieties. Westmont was used as a check in this nursery and in no case was there any variety significantly higher in yield. Yields were about average for this rotation.

Western Regional Hard Red Winter

This nursery is grown throughout the western states. In 1961 this nursery was seeded on the Howard Braaten farm in an area known to be infected with dwarf bunt (Race D-3). The nursery was located in an area in the field so that there was low areas in the center of the nursery. This caused a poor stand and uneven growth. Because of this no yield data was secured from the study. However, good smut data was obtained from the nursery and are shown in Table XXXIV. Only six entries of the thirty entries had smut readings under fifty percent. California 6097 showed only a trace of smut. Those entries with Wasatch parentage tended to have lower readings, that is, below fifty percent as did Wasatch. Two Utah lines, G.I. 13673 and 13676, were also below fifty percent. Delmar, a variety showing resistance in other areas, had an infection rating of sixty percent.

Table XXXIII Agronomic data from dryland intrastate winter wheat nursery grown at Creston, Montana in 1961-62. Four row plots, four replications, field no. E-1.
Date Seeded: September 20, 1961 Date Harvested: August 13, 1962 Size of Plot: 32 sq. ft.

Variety	C.I.No.	Head- ing Date	Smut %	Height in Inches	Lodge- ing %	Grams per plot				Total Grams	Ave. Bu/ Acre	Bu. Wt.
						I	II	III	IV			
Cheyenne	8885	6-15	28.8	41	23.3	1228	900	1005	1303	4436	55.5	60.0
Karmont	6700	6-14	23.8	44	48.3	1005	925	1011	1089	4030	50.4	60.0
Rogo	13181	6-13	3.0	44	50.0	1246	1231	1220	1150	4847	60.6	58.5
Newturk	6935	6-14	31.3	42	56.7	754	786	1040	1210	3790	47.4	59.2
Itana	12933	6-15	43.8	41	—	789	1049	1095	1089	4022	50.3	60.5
Westmont	12930	6-10	35.0	37	1.7	860	1075	1165	1479	4579	57.2	61.3
Tendoy	13426	6-14	27.5	43	13.3	920	995	1175	1245	4335	54.2	59.8
Triplet	5408	6-12	31.3	41	8.3	915	1179	1114	1260	4468	55.9	59.4
Rodeo	—	6-9	56.3	40	36.7	702	730	605	1045	3082	38.5*	59.9
Wasatch	11925	6-14	7.8	45	25.0	1065	1073	984	925	4047	50.6	59.7
Yogo x (Turkey/Oro-221)-117	13542	6-16	20.0	43	50.0	874	935	939	1150	3898	48.7	60.4
Yogo/Wasatch-3 x Cheyenne 56-10-1	13633	6-13	8.8	45	11.7	910	980	1180	970	4040	50.5	60.0
Yogo/Wasatch-3 x Cheyenne 56-6-5	—	6-12	9.8	41	1.7	1085	1085	1000	924	4094	51.2	61.4
Yogo/Wasatch-3 x Cheyenne 56-5-3	—	6-14	7.5	44	25.0	870	815	1225	1000	3910	48.9	59.6
(Itana #6 x K-17-7-3)-1-26-1	—	6-13	17.5	45	1.7	880	939	1089	1459	4367	54.6	60.2
(Itana #6 x K-17-7-3)-1-26-2	—	6-15	38.8	44	1.0	840	865	976	1309	3990	49.9	60.0
(Itana #6 x K-17-7-3)-1-26-4	—	6-15	33.3	40	—	826	710	1070	1045	3651	45.6*	59.6
(Itana #6 x K-17-7-3)-1-26-5	—	6-14	41.3	42	.7	802	910	1070	1410	4192	52.4	61.0
(K-17-7-4 x Was.-6)-1-10-5	—	6-16	4.0	47	30.0	884	1181	905	1095	4065	50.8	60.1
(Was. 2 x K-17-7-2)-1-8-5	—	6-16	.8	43	40.0	999	985	975	615	3574	44.7*	60.5
(Was. 3 x Itana-6)-2-10-5	—	6-17	21.3	48	5.0	1126	1158	966	1106	4356	54.5	61.0
Delmar	13442	6-16	16.3	40	—	1171	1050	1145	1060	4426	55.3	59.5
Wasatch x (Yogo x Rescue-21)-11	—	6-12	11.3	40	61.7	1040	1089	1115	1184	4428	55.4	59.5
(Yogo x Rescue-21) x Marmin-1065	—	6-16	21.3	46	50.0	910	1150	1105	1149	4314	53.9	60.9
Wasatch x (Yogo x Rescue-21)-12	—	6-15	13.8	43	30.0	1155	1250	1100	1060	4565	57.1	60.9

Note: Westmont is used as a check in this nursery.

* Varieties yielding significantly less than the check (5%).

Analysis of Variance

Source	D.F.	Mean Square	F
Replications	3	146085.1667	7.18**
Varieties	24	35312.94167	1.74*
Error	72	20351.3819	
Total	99		

\bar{X}	51.7
S.E. \bar{X}	3.56717
L.S.D. (.05)	10.0
C.V.	6.89%