

TITLE: Small Grain Investigations

PROJECT NUMBER: 5023 (Winter Wheat)

PERSONNEL: Leader - Vern R. Stewart  
Cooperators - E. R. Hehn, J. A. Hoffman\*, E. L. Kendrick\*,  
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FUNDS: State - \$3509.00

LOCATION: Northwestern Montana Branch Station, Field No. E-3, R-rotation  
and several off-station locations.

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 smut and stripe rust. Other agronomic characteristics such as straw strength, winter hardiness, etc., will be evaluated in this program.
3. To determine the effect of seeding date, seeding depth and variety on the incidence of dwarf smut.
4. To determine the effectiveness of fungicides in the control of stripe rust.
5. To maintain a pure genetic varietal seed source of recommended winter wheat.

EXPERIMENTAL DATA:

INTRODUCTION

Research in 1962-1963 has been directed to finding a solution or solutions to two major problems in winter wheat production in western Montana. The problems are dwarf bunt and stripe rust. Of the two, stripe rust is causing more yield losses throughout the area.

The winter wheat research program in 1962-1963 consisted of; variety testing a breeding program, cultural studies, and a cooperative program with the Regional Disease Control Laboratory in Pullman, Washington.

MATERIALS AND METHODS

A complete description of procedures and designs are found on page seventy of the 1961 Annual Research Report of the Northwestern Montana Branch Station.

Three nurseries were seeded in the fall of 1962, two located on the station and one off-station in the dwarf bunt area, northwest of Kalispell. Six off-station nurseries were seeded in September of 1961 with one each being located in Missoula, Ravalli, Lake, Sanders, Mineral and Lincoln Counties.

Thirty entries were included in the intrastate hard red winter wheat nursery and it was grown in field E-3. The western regional white wheat nursery contained 25 entries and was also grown in field E-3. In the dwarf bunt area, Northwest of Kalispell, the regional hard red winter wheat nursery was grown on the Lance Claridge farm. The foregoing nurseries were grown in four row plots and replicated four times.

The six off-station nurseries contained 14 entries and were grown in single row plots, replicated four times. The location and grower are found in the tabulated data from each of the studies.

The breeding plots were located on the Lance Claridge farm and a duplicate planting on the station in field number E-3. A description of materials in the breeding program is found under Results and Discussion.

Pathology studies were carried on by the Regional Disease Control Laboratory. Report of this work will be made in the annual report of the Disease Control Laboratory.

Fungicide studies for control of stripe rust were conducted on a field basis and plot basis. Fungicides in the field plots were applied with an air craft. Two applications were made during the growing season. An eighteen acre field was used in the study. Two varieties were used, namely Westmont and Gaines. The field was divided into three equal parts. Yields from this study were obtained by harvesting the entire treated area. The small plots were located on the Leonard Marshall farm, in the variety, Westmont. The fungicide was applied using a small research type "spray rig". Plots were 60 feet long and ten feet wide. Four random samples were obtained from each treatment. Two treatments were made 16 days apart.

## RESULTS AND DISCUSSION

Each nursery will be discussed separately in this report.

### Intrastate Hard Red

The majority of the entries in this nursery were from selections made from Burt x P.I. 178383 material. The yields on most of these selections were superior to Westmont but many of them were late in maturity and lodged severely. Gaines was the highest yielding entry in the nursery.

Stripe rust infections were very high in the susceptible lines. Four of the Burt x P.I. 178383 entries had immuned reactions to stripe rust. No dwarf bunt was found in this nursery. Table XXXIV, shows complete results of this study.

### Western Regional White

Gaines is used as a check in this nursery and only one entry is higher in yield but not significantly. Stripe rust infestation was quite high in this nursery. The mean of the nursery was 57.0 bushels per acre, 7.4 per acre less than the hard red nursery which was adjacent to this nursery. Table XXXV, shows complete data for this nursery.

Table XXXV. Agronomic data from Western Regional White Winter Wheat Nursery at Creston, Montana in 1963. Four row plots, four replications.

Date Planted: 9/21/62

Date Harvested: 8/8/63

Size of Plot: 16 square feet

Variety or Cross	C. I. or N. No.	Head- ing Date	Lodg- ing %	Stripe Rust			Grams per Plot				Total Grams	Yield Bushel 1 Acre	Bushel Weight in Lbs.
				0-4	%	Coeffi- cient	I	II	III	IV			
Omar x 1834 Sel-12	13646	6-13	25	1	10	2	644	885	809	805	3143	78.6	59.0
Gaines	13448	6-11	-	1.2	40	24	694	775	805	709	2983	74.6	60.5
[-(Elgin19xElmar)-111] x 18113 Sel 4	13645	6-12	10	3	30	24	675	681	735	735	2826	70.7	57.3
Burt Mutant (27-15 x Rio-Rex, 53) x Elgin 11	13728	6-11	5	2	60	24	700	715	694	700	2809	70.2	61.2
(27-15 x Rio-Rex, 53) x Elgin-4	13725	6-10	10	-	25	2.5	670	605	735	742	2752	68.8	61.4
Brevor	12385	6-12	98	2	10	4	578	550	681	660	2469	61.7**	61.1
Burt	12696	6-10	20	2.3	40	24	610	549	605	583	2347	58.7**	61.0
Hussar-Hohenheimer x Triplet <sup>5</sup>	13649	6-11	93	3.4	80	48	640	550	570	530	2290	57.2**	62.1
White Coin (Emil Luft)	13729	6-10	100	1	5	1	615	476	679	480	2250	56.3**	58.5
Kharkof	1442	6-10	100	2	10	4	558	482	490	475	2005	50.1**	59.8
Triplet	5408	6-9	90	3	70	56	430	540	525	496	1991	49.8**	62.5
Omar Mutant	13737	6-13	73	4	100	100	499	614	465	399	1977	49.4**	58.5
Burt x Kenya F.57-70136 (Fed.41M x Golden4)x(Rio x Golden4)Sel.B-59	13641	6-4	85	2.3	20	18	473	503	605	340	1921	48.0**	60.0
Golden	10063	6-12	100	3	50	40	495	421	460	365	1741	43.5**	59.6
Elgin	11755	6-12	88	4	100	100	494	425	418	325	1662	41.6**	57.5
Omar	13072	6-11	98	4	90	90	360	400	355	325	1440	36.0**	57.5

Note: Gaines is used as a check in this nursery

\*\* Varieties yielding significantly less than the check (1%)

Analysis of Variance

Source	D.F.	Mean Square	F
Replications	3	14528.48333	3.18*
Varieties	17	63573.3617	13.91**
Error	51	4571.48627	
Total	71		

$\bar{x}$ .....	57.0
S.E. $\bar{x}$ .....	3.38064
L.S.D.(.05)..	9.6
L.S.D.(.01)..	12.8
C.V. %.....	5.92