

TITLE: Small Grain Investigations

PROJECT NUMBER: 5023 (Winter Wheat)

PERSONNEL: Leader - Vern R. Stewart
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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 XXXIV. Agronomic data from the intrastate winter wheat nursery grown at Creston, Montana in 1962-1963. Four row plots, four replications. Field No. E-3.

Date Planted: 9/21/62 Date Harvested: 8/8/63 Size of Plot: 16 square feet

Variety or Cross	C.I.No.	Head- ing Date	Lodg- ing %	Stripe Rust			Grams per Plot				Total Grams	Yield Bushel per A.	Bushel Weight in Lbs.
				0-4	%	Coef- icient	I	II	III	IV			
Gaines	13448	6-11	0	3.0	12	9.3	925	889	905	950	3669	91.7**	62.0
Vogel-11 (61-Bulk)	C61-11	6-9	100	.3	4	.6	795	950	960	665	3370	84.3**	60.6
Vogel-9 (61-Bulk)	C61-9	6-7	85	0	3	.3	755	840	722	745	3062	76.6**	60.6
Vogel-91 (62-Bulk)	C62-13	6-11	100	0	12	1.2	730	830	670	690	2920	73.0**	60.5
Vogel-3 (61-Bulk)	C61-3	6-6	75	2.7	35	27.0	710	865	735	605	2915	72.8**	58.3
Neb. Sel.No.391-56-D8		6-3	5	1.7	4	1.4	758	720	705	730	2913	72.8**	61.4
Vogel-92 (62-Bulk)	C62-14	6-10	100	0	3	.3	698	755	720	715	2888	72.2**	60.0
Delmar	13442	6-10	60	3.7	58	44.0	646	610	810	805	2871	71.8**	61.0
Vogel-113(62-Bulk)	C62-22	6-11	67.5	1	0	0	685	870	664	610	2829	70.7**	59.5
Vogel-24 (61-Bulk)	C61-24	6-10	100	1	0	0	654	695	900	565	2814	70.4**	60.1
Vogel-98 (62-Bulk)	C62-17	6-10	100	1	0	0	755	725	685	560	2725	68.1**	59.7
Vogel-110(62-Bulk)	C62-20	6-7	100	1	0	0	661	744	625	680	2710	67.8**	61.0
Vogel-60 (62-Bulk)	C62-6	6-8	100	.3	4	1.0	607	785	608	685	2685	67.1**	60.5
Vogel-90 (62-Bulk)	C62-12	6-5	100	1.3	10	6.0	760	660	610	649	2679	67.0**	57.0
Vogel-26 (61-Bulk)	C61-26	6-8	100	4.0	90	90.0	642	723	640	595	2600	65.0**	59.0
Rex X Rio X Cheyenne ² x Turkey ²		6-6	100	1.7	37	14.3	606	582	575	745	2508	62.7**	59.5
Tendoy	13426	6-7	97.5	3.0	32	21.2	670	615	606	595	2486	62.2**	61.0
Cheyenne	8885	6-8	85	2.3	15	9.0	590	635	692	560	2477	61.9**	61.6
Vogel-22 (61-Bulk)	C61-22	6-6	100	4.0	75	81.7	525	649	635	651	2460	61.5**	58.5
Rego	13181	6-6	100	1.0	25	6.3	636	670	520	580	2406	60.2*	58.5
Vogel-85 (62-Bulk)	C62-11	6-5	100	4.0	25	22.3	650	575	600	570	2395	59.9*	58.9
P80 X Comanche ³ (Pope)		6-7	100	1	0	0	524	565	544	615	2248	56.2	61.0
Vogel-2 (61-Bulk)	C61-1	6-7	55	.7	7	1.7	686	463	627	460	2236	55.9	59.9
Vogel-93 (62-Bulk)	C61-2	6-11	100	2.7	70	48	520	525	670	481	2196	54.9	58.6
Itana	12933	6-7	72.5	4.0	100	100	550	559	484	585	2178	54.5	59.0
Vogel-109(62-Bulk)	C62-15	6-6	100	0	5	.2	481	565	665	430	2141	53.5	57.6
Vogel-78 (62-Bulk)	C62-19	6-5	100	3.0	78	62.7	520	415	569	590	2094	52.4	57.5
(Alicel-Rex,P80) x Cheyenne ² , Sel.4		6-12	100	1.3	20	7.6	431	532	670	405	2038	51.0	61.5
Rex x Rio X Cheyenne ⁵		6-11	100	1.0	6	2.8	470	506	425	510	1911	47.8	59.7
Westmont	12930	6-4	85	4.0	100	100	415	635	450	324	1824	45.6	56.5

Table XXXIV. (con't)

NOTE: Westmont is the check variety used in this nursery.
 * Varieties yielding significantly less than the check (.05)
 ** Varieties yielding significantly less than the check (.01)

\bar{x} 64.4
 S.E. \bar{x} 3.95251
 L.S.D.(.05)..... 11.1
 L.S.D.(.01)..... 14.8
 C.V.%..... 6.14

Analysis of Variance			
<u>Source</u>	<u>D. F.</u>	<u>Mean Square</u>	<u>F.</u>
Replications	3	20452.59	3.27*
Varieties	29	44126.4644	7.06**
Error	87	6248.94517	
Total	119		