

TITLE: Small Grain Investigations

PROJECT NUMBER: 5023

PERSONNEL: Leader - Vern R. Stewart

Coordinators -

1. Winter Wheat - E. R. Hehn
2. Spring Wheat - F. H. McNeal
3. Spring Barley - E. A. Hockett and R. F. Eslick
4. Winter Barley - R. F. Eslick
5. Oats - S. A. Thies

FUNDS: State -- \$5508.31

LOCATION: Northwestern Montana Branch Station and off-station locations in seven Northwestern Montana counties.

PROBABLE DURATION: Indefinite

EXPERIMENTAL DATA:

INTRODUCTION

The small grain investigations project includes winter wheat, spring wheat, winter barley, spring barley, and oats. The trials are conducted in cooperation with personnel at the Main Station in Bozeman. Personnel concerned are listed above. Plans for work on these projects are formulated and designed in a planning meeting at the Main Station in February of each year.

Handling of foundation seed production is included in this project, however, it is not a research problem.

MATERIALS AND METHODS

Station nurseries are grown in four-row plots, ten feet long in general, with either a randomized block or triple lattice design. Off-station plots, generally, were single row plots with four replications.

Planting was done with a four-row belt seeder mounted on a Farmall Cub tractor. Seeding depth depended on moisture and soil conditions, usually one to one and a half inches.

Weeds were controlled by cultivation with a small garden tractor and sprayed with 2,4-D. The irrigated nurseries were irrigated once during the growing season, using two inches of water. Irrigation date was July 10, 1960.

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Materials and Methods (continued)

Plots were harvested by hand, using a small hand scythe. Threshing was done in the field or at the plot immediately following harvest, except oats which were bound and allowed to dry. A portable Vogel threshing machine was used in threshing the plots.

Foundation seed production was done with large general farm machinery, most usually used in production of commercial grain. One planting was made in 35 inch rows to allow for cultivation.

RESULTS AND DISCUSSION

The results and discussion of this project will be considered individually for each crop listed in the introduction.

Winter Wheat

Nurseries grown this year were (1) Western Regional Hard Red Winter (2) Interstate Hard Red Winter and (3) three off-station nurseries. Breeding material consisted of (1) material being screened for Dwarf Bunt control; (2) head row selections of Rego; and (3) head row selections of (Yogo x Wasatch) x Cheyenne (four sister selections). Foundation seed production of Westmont, production studies of wheat on corn ground versus wheat on fallow, and Federal Smut Laboratory projects were other winter wheat research problems this season.

Western Regional Hard Red Winter

This nursery is grown at many stations throughout the western region of the United States.

The nursery consisted of thirty entries in three-row plots, 18 feet long. Four replications were used.

To test these entries for Dwarf Bunt, the nursery was grown on the Conrad Gilbertson farm northwest of Kalispell. This area is known to be infected with Race D-3 of Dwarf Bunt.

All entries were checked for the presence of Dwarf Bunt in the forepart of August and none were found to have escaped infection.

Stands were poor in many plots, because of ice, which killed out the stand completely in low places. No harvest yield data was secured, however, what material was there was harvested and each entry was sent in for quality analysis. These data on quality analysis have not been returned at the writing of this report. Table II shows varieties included in this nursery.

Interstate Hard Red Winter

Material in this nursery is grown throughout the State of Montana in cooperation with other Agronomists in the Experiment Station system. Twenty-five entries were included in this year's nursery and was located on the Station in field No. E-3.

Hail on August 3 did considerable damage in this plot. Stripe rust, Puccinia glumarum, was found on all entries. Some of the Yogo x (Turkey x Oro-221) indicated some resistance.

The mean yield is somewhat lower than we find in this rotation, however, this can be accounted for by moisture limitations and hail damage. Yield differences are not great enough to be significantly different, and this is borne out in the analysis of variance. See Table III for details.

Off-station Nurseries

These nurseries are grown in western Montana counties and contain entries from the Station nursery, which have a yield potential or other factors which warrant testing off-station.

Three nurseries were seeded in the fall of 1959. Each will be listed and discussion of each thereafter.

Ravalli County -- The nursery in Ravalli County was grown in the winter wheat area near Stevensville on the L. B. McFadgen farm. Dry, hot weather at heading time reduced yields in this nursery more than 50% as compared to previous years. The mean yield was 16.7 bushels per acre with no significant difference found between entries. See Table IV.

Sanders County -- This plot was located in the Camas Prairie Valley in above county. Because of severe soil erosion and very dry conditions, this nursery was abandoned.

Mineral County -- This nursery was grown on the Charles Frey ranch at Tarkio, Montana. Yields were about normal, with a mean of 28.1 and test weight was fair in most entries. Statistically, there was no significance found in this nursery. See Table V.

Breeding Material

The breeding material was grown in the same area as the Western Regional Hard Red Winter Wheat nursery, thus assuring some degree of natural infection.

This material was subjected primarily to Dwarf Bunt infection. Seed was planted with a belt seeder and then a suspension of Dwarf Bunt spores were sprayed on the soil surface to insure inoculation of seedlings. Breeding materials were provided by E. R. Hehn, plant

Table III. Agronomic data from the Interstate Hard Red Winter Wheat nursery, Creston, Montana in 1960. Three row plots, four replications.

Planted: September 23, 1959 Harvested: August 11, 1960 Size of Plot: 16 sq. ft.

Variety or Cross	C.I. Number	Heading Date	Heading Height	Plot I	Yield II	Yield III	Yield IV	Total Grams	Ave. Bu/A	Bu Wt in lbs
Columbia	12928	6-16	36	300	365	330	355	1350	33.8	62.0
Westmont	12930	6-16	37	315	380	380	295	1370	34.3	62.5
Rego	13181	6-18	42	335	365	365	365	1430	35.5	59.7
Itana	12933	6-19	44	315 ¹	375	290	325	1305	32.6	62.0
Burt	12696	6-19	39	310	330	335	355	1330	33.3	59.8
Wasatch	11925	6-19	46	330	230	335	315	1210	30.3	61.2
Yogo	8033	6-20	45	345	300	380	375	1400	35.0	62.0
Cheyenne	8885	6-19	46	405	445	340	465	1655	41.4	62.0
Tendoy	13426	6-19	44	425	430	330	360	1545	38.6	62.0
Newturk	6935	6-19	41	295	355	305	310	1265	31.6	61.3
Karmont	6700	6-20	44	355	325	400	420	1500	37.5	61.5
Triplet	5408	6-20	41	395	350	225	390	1360	34.0	62.0
Omar	13702	6-21	40	250	290	245	380	1165	29.1	59.0
Yogo x (Turkey x Oro-221) - 9	13632	6-20	46	345	410	415	440	1610	40.3	62.0
Yogo x (Turkey x Oro-221) - 10		6-20	46	380	220	305	480	1385	34.6	61.5
Yogo x (Turkey x Oro-221) - 14		6-21	47	345	370	395	380	1490	37.3	60.8
Yogo x (Turkey x Oro-221) - 27		6-22	48	350	270	355	480	1455	36.4	61.5
Yogo x (Turkey x Oro-221) - 29		6-24	48	360	250	425	310	1345	33.6	61.0
Yogo x (Turkey x Oro-221) - 46		6-21	44	370	355	380	280	1385	34.6	60.5
Yogo x (Turkey x Oro-221) - 60		6-22	41	290	310	320	380	1300	32.5	61.5
Yogo x (Turkey x Oro-221) - 66	13427	6-22	45	305	420	340	435	1500	37.5	61.4
Yogo x (Turkey x Oro-221) - 117	13633	6-21	45	325	465	280	265	1335	33.4	61.0
Itana (Montana selection)		6-20	44	305	360	350	315	1330	33.3	62.0
(Yogo x Wasatch-3) x Cheyenne	M56-5-3	6-19	43	285	300	340	200	1125	28.1	60.9
C.I. 12936 x (Mgo-Oro x Oro-Tk-Flor)	K58307	6-16	36	245	310	260	275	1090	27.3	61.6

¹ Calculated missing plot

Analysis of Variance

Source	D.F.	Mean Square	F
Replications	3	3321.5833	1.10
Varieties	24	4807.9792	1.60
Error	71	3015.0211	
Total	98		

Mean Yield.....	34.2
S. E. \bar{x}	2.7455
L. S. D. (5%).....	NS
C. V.	8.02%