Introduction

This section of the annual report includes all work done on small grains as it pertains to testing and selecting for a new variety. The objectives of the small grain variety project is to (1) determine the adaptation of new and introduced varieties; (2) to evaluate new selections and crosses developed in the breeding program of the Montana Agricultural Experiment Station; and (3) to select for disease resistance. (Drawf bunt in winter wheat).

This work was done on both dryland and irrigated conditions on the station and in several locations in the seven western counties in Montana. Spring grain nurseries, which include wheat, oats and barley were located in the following counties: Sanders, Mineral, Missoula and Lincoln. The nursery in Mineral county was dryland where as the others were grown under irrigated conditions. Winter wheat nurseries were grown in all seven of the western counties served by the N. W. Montana Branch Station. Each of these nurseries will be discussed by crop later in this report.

All of this work is done in cooperation with the personnel in Montana State College, Extension Service, and the Agricultural Research Service, United States Department of Agriculture.

Spring Wheat

The spring wheat variety nurseries grown in 1957, were, advance yield, (dry and irrigated) durum, uniform western regional white wheat, four off-station nurseries, milling and baking plots, and barley streak mosaic on spring wheat varieties.

Advance Yield Nurseries

The advanced yield nursery was grown under both dryland and irrigated conditions. These nurseries consisted of 24 entries made up of recommended varieties and other promising selections. The dryland nursery was grown on Conrad Gilbertson farm northwest of Kalispell in a very low rain fall area. The irrigated nursery was grown on the station. Three replications were used for the dryland test and five for irrigation. Both nurseries were sprayed for weed control with 2, 4-D, and the dryland nursery was also cultivated. Seeding dates are included in the table of results of each nursery. Three inches of water were applied to the irrigated nursery, July 10, 1957.

Results and Discussion

In the dryland nursery, only one variety was found to be significantly lower in yield than Thatcher, which is used as a check, namely Rescue. Yields were low for this region of Flathead county, due to low rain fall during the growing season.

The mean for this nursery was 12.0 bushels per acre. Table I.

The mean yield of the irrigated nursery was 52.3 bushels per acre. C.I. 13242, a selection that is showing promise as a new variety, was significantly better in yield than Pilot. Leaf rust was severe in the nursery this year. Lodging, rust, and smut notes for this nursery can be seen in table II.

Durum Wheat

The government wheat programs have brought about an increased acreage of durum wheat in Montana. Some durum has been grown west of the continental divide. Because of this a testing program was undertaken on durum wheat. Studies have been conducted for two years.

Results and Discussions

In the past two years, the hard red spring wheat has out yielded the durum entries in the nursery. The data thus far gathered has been non-significant when analyzed statistically. In 1957 a C.V. of 24.41% was obtained. The author finds this difficult to explain. Stands were fair, however conditions were very dry, this could in part account for the high C.V. Data obtained to date does not encourage the growing of durm in some areas of Flathead county. Table III.

Off-Station Nurseries

The off-station nurseries will be discussed as a unit, a unit including wheat, oats and barley. This discussion will be only as to seeding methods, observations, weed control and other factors that pertain to all three crops. Specific results as to yield and other agronomic factors will be discussed in the division pertaining to that particular crop.

The off-station variety nurseries were seeded in single plots, rows eighteen feet long replicated four times. There were ten entries each of wheat, oats and barley. Seeding date and harvest dates for each are in the individual tables for each nursery.

Inspections of off-station plots were made twice during the growing season. Weed control methods were employed during the first observation. Following is information on observations, by county, location and date.

County	Name of farmer	Address	Date	Remarks
Sanders	Jim Hauser	Lonepine	6-12-57	Nursery in good shape. Cultivated but not sprayed.
			7-15-57	Good Shape, weed free
Mineral	Charles Fry	Tarkio	6-12-57	Cultivated and sprayed
			7-15-57	Centana outstanding in appearance, equal to Pilot.
Missoula	Don Roth	Clinton	6-11-57	Cultivated and sprayed, some quackgrass.
			7-11-57	Uniform irrigation apparent. Quackgrass throughout the plot.
Lincoln	Wilerd Johnson	Eureka	6-13-57	Cultivated and sprayed. Infestation of quackgrass and Canada thistle.
			7-2-57	Cattle had eaten off plot and was abandon because of this.

Results and Discussion

Only one of the irrigated spring wheat nurseries was harvested. Cattle distroyed the nursery in Lincoln county and birds the one in Sanders county. Results from the nursery at Roths in Missoula county was not found to be significant when analysed statistically. The high C.V. is due in part to the heavy growth of quackgrass in replications three and four of the nursery. Marfed x Merit-28, C.I. 13058 was the highest yielding variety. This entry is a white wheat. Of the hard red springs, Centana was the leading variety in the yield column. The mean for the nursery was 30.3 bushels per acre. Table V.

Uniform Western Regional White Wheat

One uniform nursery of this type is grown. The past year it was located on the station under non-irrigated conditions, however, where moisture conditions are usually quite favorable. (See weather data in this report). The nursery contained 16 entries. Three hard red spring varieties were included as checks. This nursery is grown in cooperation with ARS USDA.

Results and Discussion

Leaf rust was very prevalent this year and considerable was found on many of the varieties in this test. Stem rust was noted on eight varieties. It was most severe on the variety, Lemhi. There was not any statistical difference found in the nursery when analysed. The highest yielding variety was C.I. No. 13268. The mean for the test was 55.4 bushels per acre. See table VI for complete results.

Table VI. Agronomic data from dryland western regional spring wheat nursery, Creston, Montana 1957. Four row plots three replications.

Planted. April 27, 1957 Harvested. August 26, 1957 Size of Plot. 16 Sq. Ft.

Variety or Cross	C. I. or N No.	Heading Date	Heading Height IN Ins.	Leaf Rust %	Stem Rust %	Lodging %	Grams Per Plot I	II	III	Total Grams	Average Bushel Per Acre	Bushel Wt. in Pounds
Onas	6221	6-30	42	70	T	-	280	510	632	1422	47.4	58.9
Kenya x Lemhi^3 No.23	13271	6-27	47	65	1	5	521	520	675	1716	57.2	59.0
Idaed	11706	6-20	39	23	-	13	530	568	451	1549	51.6	61.1
Kenya x Lemhi^2 No.16	13269	6-27	42	7	-	2	562	585	600	1747	58.2	59.2
Henry	12365	6-23	42	12	-	9	445	631	628	1704	56.8	61.7
Kenya x Lemhi^2 No.18	13270	6-25	41	33	-	2	525	555	485	1565	52.2	59.4
Marfed	11919	7-1	41	93	3	-	621	450	701	1772	59.1	-
Kenya x Lemhi^2 No.15	13268	6-28	41	5	-	-	645	660	670	1975	65.8	59.2
Thatcher	10003	6-25	41	67	-	3	541	485	578	1604	53.5	60.3
Lemhi	11415	6-25	45	95	10	3	485	680	515	1680	56.0	59.6
2236 x Lee (B52-107)	13305	6-22	43	T	-	13	610	675	613	1898	63.3	-
Onas 53	13257	6-30	43	95	T	-	540	600	637	1777	59.2	60.0
Federation	4734	7-5	43	95	7	-	435	390	401	1226	40.9	57.6
Baart	1697	6-30	47	87	1	18	619	505	662	1786	59.5	62.4
Lemhi x Hope-Fed.	13053	6-29	38	93	T	5	524	510	340	1374	45.8	58.0
Lemhi 53 (K x L^6).	13258	6-27	44	88	-	-	505	599	670	1774	59.1	60.0

Analysis of Variance

Source	D.F.	Mean Square	F
Replications	2	12,035	1.76
Varieties	15	12,784.133	1.87
Error	30	6,827.666	
Total	47		

Mean Yield.....55.4
S. E. $\bar{x}$.....4.7706
L.S.D. .....N. S.
C. V. 8.61%