YEAR: 1964

TITLE: Small Grain Investigations (Winter Wheat) 5023

LOCATION: Northwestern Montana Branch Station, Field No. E-2 and several off-station locations.

DURATION: Indefinite

OBJECTIVES:

1. To obtain the information necessary for making varietal recommendation 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 the effect of seeding date, seeding depth and variety on the incidence of dwarf smut.

EXPERIMENTAL DESIGN AND PROCEDURE:

Standard nursery procedures were used in the variety testing program. In general station studies were four row plots, replicated four times. The design - complete randomized block. Discription of a particular study and the procedures of each will be included in the results and discussion section.

RESULTS AND DISCUSSION:

Each nursery will be discussed separately in this report.

Intrastate Hard Red

Several commercial varieties and five Bunt x P.I. 178383 selections were included in this nursery. All the entries were superior to Westmont in yield. The Burt x P.I.178383 selections were quite late in maturity. The entire nursery with the exception of Gaines was lodged severly.

Stripe rust infections were quite sever in the susceptible varieties. Dwarf smut readings were not made but was evident in all entries except, C62-4 and C62-44. See Table 1, for complete results of this study.

Western Regional Hard Red

The hard red regional nursery was grown in two locations in 1963-1964. One in the dwarf bunt area Northwest of Kalispell on the Claridge farm and the other on the station. These nurseries contained thirty entries.

In the nursery on the Claridge farm, dwarf bunt was very sever with many of the susceptible varieties being over 50% smutted. Four of the five Burt x P.I.178383 selections were apparently immuned to dwarf bunt. These were also the highest yielding lines in the nursery. See Table 2 for complete data on this study.

Winter Wheat (con't)

The station nursery was grown in single row plots. It appeared from this nursery that Gaines could not stand the competition from the closely growing hard red entries. In the area of higher yield levels the Burt x P.I. 178383 selections did not preform as well. Delmar is second in yield in this study which is used as a check. Sever lodging was present throughout the nursery. No attempt was made to record plant diseases. See Table 3 for agronomic data.

Western Regional White

Gaines was the out-standing variety in the western regional white wheat nursery. Lodging was quite sever in the nursery except the Semi dwarf selections. Stripe rust, dwarf bunt and mildew were all abundant in this study. There was very little real resistant material to stripe rust in this nursery. However, Gaines does show moderate resistance as a mature plant. See Table 4 for complete results.

Off-Station

Growing conditions, results and other information about each nursery will be discussed under the individual county heading. A total of six nurseries were seeded in the fall of 1963. Each nursery contained fourteen entries.

Missoula County - Excellent growing conditions existed for this study. Stripe rust was heavy, but it did not reduce yields because of the stage of growth when infection took place, namely after the wheat had headed. Thus Westmont is the highest yielding variety in the nursery, and being significantly higher than 12 other entries. Yields were above average for this area in 1964. See Table 5 for complete data.

Ravalli County - Growing conditions in this area were excellent and a fairly high yield level was obtained. Tripplet and Westmont are top yielders. When analyzed statistically these data were found to be non-significant. Table 6.

Sanders County - Emergence was poor in this nursery. This was due to poor moisture conditions at seeding time. Thus only two replications were harvested. Data from this study are found in Table 7.

Mineral County - This nursery was "stubble in". Emergence was fair in the fall. Stands at harvest time were above 60 percent in all varieties. Considerable dwarf smut was found in Warrior and Winalta. Omar and Gaines are the highest yield, a trend never before noted in this area in the soft white wheats. See Table 8 for complete data.

Lake County - Emergence was good, however, heavy snow cover resulted in snow mold. This caused poor stands and the study was abandoned.

Protein determinations were made of all entries of the off-station nurseries. These data are made a part of this report. Table 9.

The summary of off-station work including Creston is found in Table 10. Cheyenne is the highest yielding hard red entry and 14 x 53 Sel. 101, is the highest yielding soft wheat entry. Table 10.

Summary of selected varieties grown in Northwestern Montana is found in

Table 2. Agronomic data obtained from dryland western regional hard red winter wheat nursery grown on the Lance Claridge farm, Northwest of Kalispell in 1963-1964. Three row plots, three replications.

Date Seeded: September 17, 1963 Date Harvested: August 20, 1964 Size of Plot: 16 square feet

Variety or Cross	C.I.No.	Heading Date	Height in Inches	Grams Per Plot I	II	III	Total Grams	Yield Bu/ A	Bushel Weight	% Dwarf Bunt
Burt x P.I. 178383	C62-44	6-28	29	411	289	140	840	28.0	57.6	0
Burt x P.I. 178383	C61--9	6-25	29	302	235	264	801	26.7	57.5	0
Burt x P.I. 178383	C62-31	6-25	29	320	280	170	770	25.7	58.0	0
Burt x P.I. 178383	C62- 4	6-23	28	248	255	235	738	24.6	58.2	0
Burt x P.I. 178383	C62- 7	6-23	29	315	190	224	729	24.3	58.5	T
Delmar	13442	6-24	33	274	285	151	710	23.7	59.4	28
Burt x Itana,Sel.42	13845	6-24	31	255	251	200	706	23.5	58.5	52
Rego	13181	6-23	34	270	284	150	704	23.5	58.4	8
Nrn10-Brevor 14XBurt^5, Sel.-11	13739	6-24	24	260	245	169	674	22.5	58.4	12
Yogo x Rescue)Marmin-1065	13544	6-25	37	314	185	165	664	22.0	59.4	22
Burt x Itana, Sel. 34	13844	6-24	32	240	225	170	635	21.1	58.6	23
Burt x Itana, Sel.215 W.C.	13841	6-25	30	245	220	139	604	20.1	58.5	30
Gaines	13448	6-25	29	295	200	108	603	20.0	58.9	18
Rex-Rio x Chey^5(Tendoy-61)	13675	6-23	32	301	151	140	592	19.8	59.0	37
Burt x Itana, Sel.125 W.C.	13842	6-24	29	135	215	70	420	19.5	58.6	43
Kharkof	1442	6-23	34	260	200	120	580	19.3	58.9	40
Itana x Kharkof 17, Sel. 1-26-1	13692	6-24	32	229	226	115	570	19.0	59.6	32
Burt x Itana Sel. 50	13843	6-25	31	176	226	160	562	18.7	59.0	37
Wasatch x Kharkof-17 Sel. 8-5	13691	6-25	37	210	220	125	555	18.5	60.5	23
Colorow	12865	6-23	35	230	174	135	539	18.0	58.5	42
Tendoy	13426	6-19	31	280	120	135	535	17.8	59.1	23
Cheyenne	8885	6-24	29	235	170	130	535	17.8	58.2	47
Col. x Utah 75A-53, Sel. 275-40-2-2	13840	6-24	29	115	174	240	529	17.6	58.9	43
Columbia	12928	6-23	31	225	125	170	520	17.3	60.2	52

Table 2 . (con't)

Variety or Cross	C.I.No.	Heading Date	Height in Inches	Grams per Plot I	II	III	Total Grams	Yield Bu/ A	Bushel Weight	% Dwarf Bunt
Rio	10061	6-24	32	259	95	105	459	15.3*	59.2	42
Itana Sel. W 1	13846	6-25	30	135	210	105	450	15.0*	59.6	63
Burt x Itana, Sel.7	13693	6-25	30	204	154	85	443	14.8*	58.4	63
Columbia x Utah 75-A-53, Sel. 275-40-3-1	13839	6-24	29	130	155	130	415	13.8*	58.2	52
Burt x Itana, Sel.160	13694	6-25	31	118	130	140	388	12.9*	58.5	62
Itana	12933	6-24	32	100	125	120	345	11.5**	58.9	35

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

$\bar{x}$..... 19.6
S.E.$\bar{x}$..... 2.8169
L.S.D.(.05).. 8.0
L.S.D.(.01).. 10.6
C.V.%..... 14.39

Analysis of Variance

Source	D.F.	Mean Square	F.
Replications	2	56019.4800	23.53**
Varieties	29	54561.8586	22.92**
Error	58	2380.47775	
Total	89		

Table 3. Agronomic data obtained from the western regional hard red winter wheat nursery grown at Creston, Montana in 1963-1964. Single row plots, four replications. Field No. F-2

Date Seeded: Sept. 30, 1963 Date Harvested: Sept. 9, 1964
Size of Plot: 16 square feet

Variety or Cross	C.I.No.	Height in Ins.	Grams per Plot I	II	III	IV	Total Grams	Yield Bu/ A	Bushel Weight
Burt x Itana, Sel. 125 W.C.	13842	45	835	739	765	630	2969	74.2	54.8
Delmar (Yogo Rescue)	13442	49	585	735	860	770	2950	73.8	53.4
Marmin-1065	13544	51	750	729	685	691	2855	71.4	57.0
Itana x Kharkof 17, Sel. 1-26-1	13692	51	619	690	860	679	2848	71.2	55.5
Burt x Itana Sel.34	13844	48	860	680	665	615	2820	70.5	52.5
Rego	13181	51	670	654	725	755	2804	70.1	55.6
Columbia x Utah 75A-53,Sel.275-40-3-1	13839	55	694	567	881	561	2703	67.6	54.6
Burt x P.I.178383	C62-4	46	539	592	725	820	2676	66.9	51.5
Colorow	12865	50	795	635	655	515	2600	65.0	55.4
Cheyenne	8885	52	510	740	560	740	2550	63.8	54.7
Itana Sel. W-1	13846	49	659	506	615	685	2465	61.6	55.5
Kharkof	1442	54	461	565	640	775	2441	61.0	55.5
Burt x Itana Sel. 50	13843	48	655	639	640	465	2399	60.0	54.5
Burt x Itana Sel. 215 W.C.	13841	46	505	655	650	585	2395	59.9	54.7
Burt x P.I.178383	C62-44	51	784	601	543	421	2349	58.7*	52.9
Rio	10061	53	511	589	615	624	2339	58.5*	54.5
Rex-Rio x Chey^5 (Tendoy-61)	13675	52	505	560	674	600	2339	58.5*	55.5
Burt x Itana Sel.42	13845	48	575	535	519	649	2278	57.0*	52.8
Tendoy	13426	50	489	465	595	725	2274	56.9*	55.0
Col x Utah 75A-53, Sel.275-40-2-2	13840	47	585	472	655	505	2217	55.4**	55.5
Wasatch x Kharkof-17, Sel. 8-5	13691	52	516	656	490	451	2113	52.8**	55.4
Burt x P.I.178383	C61-9	50	635	427	611	430	2103	52.6**	52.9
Burt Itana Sel.7	13693	47	445	690	499	422	2056	51.4**	49.6
Burt x P.I.178383	C62-31	50	521	521	578	405	2025	50.6**	50.9
Burt x P.I.178383	C62-7	45	523	496	424	399	1842	46.1**	49.9
Burt Itana Sel.160	13694	46	360	419	388	534	1701	42.5**	50.7
Nrnl0-Brevor 14 x Burt^5, Sel. 11	13739	30	565	518	300	290	1673	41.8**	47.9
Itana	12933	52	340	379	376	391	1486	37.2**	49.2
Columbia	12928	48	230	390	395	514	1529	38.2**	50.6
Gaines	13448	33	576	422	493	325	1816	25.4**	51.9

NOTE: Delmar used as a check in this nursery
* Varieties yielding significantly less than the check (.05)
** Varieties yielding significantly less than the check (.01)

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Table 3. (con't)

Analysis of Variance

Source	D.F.	Mean Square	F.
Replication	3	7514.34333	
Varieties	29	44722.7010	4.44**
Error	87	10071.20885	
Total	119		

$\bar{x}$.....	58.0
S.E.x.....	5.01777
L.S.D.(.05)	14.1
L.S.D.(.01)	18.7
C.V.%.....	8.65