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TITLE: Winter Wheat

PROJECT: Small Grains Investigations 756

PERSONNEL: Leader - Vern R. Stewart
Cooperator - G. A. Taylor
Cooperating Agencies - Montana Agricultural Experiment Station
Montana Wheat Research and Marketing Committee

OBJECTIVES:

1. To obtain the information necessary for making varietal recommendations and evaluating new varieties and selections.
2. To cooperate in a breeding program in Northwestern Montana designed to produce high yielding varieties with particular emphasis on quality, disease resistance, dwarf smut and stripe rust. Other agronomic characteristics such as straw strength, winter hardiness etc. will be evaluated in this program.

1973 EXPERIMENTS:

1. Western Regional Hard Red Nursery
2. Western Regional White Nursery
3. Intrastate Nursery
4. Elite Stripe Rust Nursery
5. Off Station Nurseries

SUMMARY OF 1973 RESULTS:Western Regional Hard Red Nursery -

Kalispell - ID70401 was the highest yielding entry in the nursery. Mean for all varieties was 45.6 bu/a. Real differences were found in winter survival of entries. ID33 has a survival reading of 29%, WA5985 and UT80702 had survival readings of 66% and 65% respectively. All other entries exceeded 80%. No dwarf smut was found in this nursery. Table 1.

Stillwater - Stand loss was very high and dwarf bunt infestation low in this nursery due to the extremely low temperatures and no snow cover. No percentage estimates were made on smut. Itana, a very susceptible variety, was smut free in this location. Table 2.

Summary of the data from these two nurseries is found in Table 3. UT755090 is the highest yielding entry, no evidence of dwarf smut, good test weight, fair straw, and somewhat later than Itana, but a little taller.

Western Regional Soft White Nursery:

In 1973 WA5987 and Paha were slightly higher, but not significantly higher, in yield than Nugaines, the check variety, however they are 2 to 3 days later in heading. Three entries were found to be significantly lower in yield. Test weights averaged 60.9 lbs/bu with Nugaines having a test weight of 63.2 lbs/bu, which was the highest in the nursery. WA5987 and Paha had less dwarf smut than Nugaines, however light smut has been found in Paha other seasons. Paha was 5 inches taller than Nugaines in this study. Table 4.

Using Nugaines as a check variety over a ten year period, eight varieties were found to exceed the check. Of these varieties only Luke has satisfactory dwarf smut and stripe rust resistance. Table 5.

Results (con't)

Intrastate Nursery -

The highest yielding entry in this nursery was McCall, however it was not significantly higher than Crest, the check variety. McCall, Wanser and Centurk are usually higher in yield but all 3 are susceptible to dwarf smut in this location. Table 6.

A summary of selected winter wheat varieties grown at the Northwestern Agricultural Research Center 1962-1973 are found in Table 7.

Elite Stripe Rust Nursery -

In this nursery lines from the breeding lines in advance stages are evaluated. Many lines were not harvested this year because of milling quality evaluation received after seeding indicated no need to continue their evaluation. The data obtained from this nursery are recorded in the wheat research committee report.

Off Station -

Three nurseries were seeded in the fall of 1972 in Lake, Sanders, Ravalli and Missoula Counties. The nursery in Missoula county was not harvested because of poor stands and high weed population.

Lake County - Because of the very dry conditions yields were low in this location. Yields were not statistically significant, however Hyslop was the highest yielding entry. Table 8.

Sanders County - Stands and yields were average in this location. McCall is the highest yielding variety in the nursery and is significantly higher in yield than Crest. Table 9.

Table 1. Agronomic data from the western regional hard red winter wheat nursery grown at the Northwestern Agricultural Research Center, Kalispell, Montana, 1973 in Field R-8a.

Date Seeded: September 20, 1972 Date Harvested: August 10, 1973 Size of Plot: 16 sq. ft.

C.I. or State No.	Variety	Yield Bu/A	Test Wt. Lbs/Bu.	Heading Date	Plant Height	Lodging		% Stand	Smut at Stillwater
						% Prev	Sev.		
ID 71040	Moscow 71040	53.87a	57.80	168.25a	32.00	.00b	.00b	97.50	
ID 725055	ID 5011/ID 5006	53.17a	61.20	167.50a	32.50	.00b	.00b	100.00a	
UT 819116	DM/CLM//Burt/PI 178383	52.92a	61.40	163.75	40.25a	.00b	.00b	91.25	
WA 5835	Bez-1//Bnk1205/CI13438	52.84a	60.60	169.00a	32.25	.00b	.00b	97.50	
ID 725058	ID 5011/WA 4765, Sel. 3	51.94a	60.60	171.00a	40.25a	.00b	.00b	97.50	x
UT 755090	DM/178383/CLM	51.02a	61.40	165.00a	37.00a	24.75b	.25b	93.75	
ID 725056	ID 5011/WA 4765, Sel, 1	50.97a	58.50	171.25a	31.75	.00b	.00b	100.00a	
CI 13844	Wanser	50.47a	62.50	163.50	36.25a	.00b	.00b	97.50	x
UT 755204	DM/178383/Clm	49.89a	62.90	164.75a	40.25a	99.00	1.00	96.25	x
ID 37	IT//KO/PI 178383	49.54a	63.40	164.75a	38.75a	99.00	2.50	96.25	
CI 15317	Franklin	48.97a	60.80	167.50a	40.50a	49.50b	.50b	96.25	x
UT 84557	DM/173438//CLM/3/DM/4/CO	48.52a	60.80	166.00a	40.25a	99.00	2.50	96.25	
MT 6829	Burt/PI 178383 101-1200	47.09	60.40	163.75	34.75a	24.75b	.25b	97.50	
UT 821252	Warrior//Burt/PI 178383	47.02	59.10	166.50a	37.00a	24.75b	.25b	97.50	
WA 5836	Bez-1//CI 13438/Burt	46.92	61.40	163.50	25.25b	.00b	.00b	100.00a	
ID 72	Cnn*2/PI 187383	46.52	61.20	166.00a	40.50a	74.25	1.00	100.00a	x
WA 5984	BNK 1205/Burt//14/53-1	46.42	59.00	164.25a	31.50	24.75b	.25b	86.25	
CI 15286	Ark	45.54	62.60	164.50a	38.25a	49.50b	.50b	98.75a	
CI 15316	Ranger	44.94	62.50	160.75	36.00a	99.00	1.00	97.50	x
CI 1442	Kharkof	42.94	59.50	168.75a	42.25a	99.00	1.50	100.00a	
ID 75	CI 14106/CLM//McCall	40.86	61.90	166.75a	35.75a	74.25b	2.25	92.50	x
MT 6827	Burt/PI 178383 14-1202	40.76	58.70	168.50a	33.75a	.00b	.00b	91.25	
MT 6828	Burt/PI 178383 13-1201	39.74	59.10	166.00a	34.00a	.00b	.00b	90.00	
CI 12933	Itana ^{1/}	37.29	60.90	162.25	31.50	99.00	1.75	82.50	
WA 5985	BNK 1205/Burt//14/53-1	36.76	58.50	166.50a	31.00	.00b	.00b	66.25b	
UT 80702	DM/173438//CLM/3/DM	32.74	62.60	165.00a	38.00a	24.75b	1.00	65.00b	x
ID 33	MN60157/McCall//Moran	22.21b	58.40	166.75a	35.75a	24.75b	.50b	28.75b	

\bar{x}	45.6	60.7	166.0	35.8	36.7	.6	90.9
$F^2/$	3.90**	.0	8.44**	26.75**	6.50**	4.35**	7.72**
S.E. \bar{x}	3.67	.0	.86	.78	15.78	.39	5.53
L.S.D.(.05)	10.31	.0	2.41	2.19	44.38	1.10	15.56
C.V.%	8.04	.0	.52	2.17	43.03	61.85	6.09

1/ Check variety

2/ Value for variety comparison

a/ Values significantly greater than the check .05 level
b/ Values significantly less than the check .05 level

** Indicates statistical significance at .01 level

Table 2. Agronomic data from the western regional hard red winter wheat nursery grown on the Lance Claridge farm, Kalispell, Montana in 1973. Random block design, four replications.

Date Seeded: September 20, 1972
Date Harvested: August 14, 1973
Size of Plot: 16 sq. ft.

C.I. or State No.	Variety	Yield Bu/A.	Test Wt. Lbs/Bu.	Plant Height	% Stand	Smut
WA 5836	Bez-1//CI13438/Burt	24.98	58.10	20.00	65.00	x
WA 5984	Bnk 1205/Burt//14/53-1	23.78	52.50	26.25a	65.00	
UT 755090	DM/178383/Clm	23.61	59.00	27.00a	55.00	
UT 755204	DM/178383/Clm	23.21	.00	31.00	50.00	
WA 5985	BNK 1205/Burt//14/53-1	23.06	56.00	23.75	52.50	x
ID 37	IT//KO/PI178383	22.93	59.40	28.25a	42.50	x
ID 725056	ID 5011/WA 4765, Sel.1	22.81	53.10	25.25	67.50a	x
CI 15316	Ranger	22.61	56.00	27.00a	65.00	
CI 1442	Kharkof	21.43	53.20	32.25a	75.00a	x
ID 725058	ID 5011/WA 4765, Sel. 3	21.38	55.20	30.00a	55.00	
ID 72	CNN*2/PI 178383	21.16	56.00	29.75a	60.00	
ID 75	CI 14106/Clm//McCall	20.81	.00	28.00a	37.50	
UT 84557	DM/173438//Clm/3/DM/4/CO	20.66	57.00	29.75a	42.50	
ID 71040	Moscow 71040	19.23	52.70	26.25a	57.50	
ID 725055	ID 5011/ID 5006	19.18	.00	24.50	47.50	
CI 15286	Ark	18.98	.00	29.25a	60.00	x
UT 819116	DM/Clm//Burt/PI 178383	18.66	.00	30.25a	50.00	
CI 15317	Franklin	18.66	.00	29.75a	42.50	
CI 13844	Wanser	18.21	.00	26.75a	57.50	x
MT 6829	Burt/PI 178383 101-1200	17.56	57.30	27.25a	52.50	
WA 5835	Bez-1 ₁ //Bnk1205/CI 13438	16.73	.00	23.75	32.50	x
CI 12933	Itana ₁	16.43	.00	22.25	42.50	
UT 80702	DM/173438//Clm/3/DM	16.21	.00	28.50a	7.50	
MT 6828	Burt/PI 178383 13-1201	15.15	.00	24.00	45.00	x
ID 33	MN60157/McCall//Moran	15.00	.00	24.00	22.50	x
UT 821252	Warror//Burt/PI 178383	14.45	.00	26.50a	43.75	
MT 6827	Burt/PI 178383 14-1202	12.85	.00	23.50	45.00	
	\bar{x}	19.6	26.9	26.8	49.6	
	$F^2/$	1.19NS	.0	6.31**	2.66**	
	S.E. \bar{x}	3.01	.0	1.18	8.77	
	L.S.D.(.05)	8.48	.0	3.32	24.67	
	C.V.%	15.37	.0	4.40	17.69	

1/ Check variety
2/ Value for variety comparison
a/ Values significantly greater than the check .05
b/ Values significantly less than the check .05
* Indicates statistical significance .05 level
** Indicates statistical significance .01 level

Table 3. Summary of agronomic data from the western regional hard red winter wheat nursery, grown at Northwestern Agricultural Research Center and Stillwater in 1973.

C.I. or State No.	Variety	Yield ^{1/} Bu/A	Test Wt. Lbs/Bu.	Heading Date ^{2/}	Lodging ^{2/}		Plant ^{1/} Height	% ^{1/} Stand	Dwarf ^{3/} Smut
					% Prev.	Sev.			
ID 71040	Moscow 71040	36.55	55.25 ^{1/}	168.25a	.00	.00	29.13	77.50	
ID 725055	ID5011/ID5006	36.18	61.20 ^{2/}	167.50a	.00	.00	28.50	73.75	
UT 819116	DM/Clm//Burt/PI178383	35.79	61.40 ^{2/}	163.75a	.00	.00	35.25	70.63	
WA 5835	Bez-1//Bnk1205/CI13438	34.79	60.60 ^{2/}	169.00a	.00	.00	28.00	65.00	x
ID 725058	ID5011/Wa4765, Sel. 3	36.66	57.90 ^{1/}	171.00a	.00	.00	35.13	76.25	
UT 755090	DM/178383/Clm	37.32	60.20 ^{1/}	165.00a	24.75	.25	30.00	74.38	
ID 725056	ID5011/Wa4765, Sel. 1	36.89	55.80 ^{1/}	171.25a	.00	.00	28.50	83.75	x
CI 13844	Wanser	34.34	62.50 ^{2/}	163.50	.00	.00	31.50	77.50	x
UT 755204	DM/178383/Clm	36.55	62.90 ^{2/}	164.75a	99.00	1.00	35.63	73.13	
ID 37	IT//KO/PI 178383	36.24	61.40 ^{1/}	164.75a	99.00	2.50	33.50	69.38	x
CI 15317	Franklin	33.82	60.80 ^{2/}	167.50a	49.50	.50	35.13	69.38	
UT 84557	DM/173438//Clm/3/DM/4/CO	34.59	58.90 ^{1/}	166.00a	99.00	2.50	35.00	69.38	
MT 6829	Burt/PI178383 101-1200	32.33	58.85 ^{1/}	163.75	24.75	.25	31.00	75.00	
UT 821252	Warrior//Burt/PI178383	30.74	59.10 ^{2/}	166.50a	24.75	.25	31.75	70.63	
WA 5836	Bez-1//CI13438/Burt	35.95	59.75 ^{1/}	163.50	.00	.00	22.63	82.50	x
ID 72	CNN*2/PI 178383	33.84	58.60 ^{1/}	166.00a	74.25	1.00	35.13	80.00	
WA 5984	BNK1205/Burt//14/53-1	35.10	55.75 ^{1/}	164.25a	24.75	.25	28.88	75.63	
CI 15286	Ark	32.26	62.60 ^{2/}	164.50a	49.50	.50	33.75	79.38	x
CI 15316	Ranger	33.78	59.25 ^{1/}	160.75	99.00	1.00	31.50	81.25	
CI 1442	Kharkof	32.19	56.35 ^{1/}	168.75a	99.00	1.50	37.25	87.50	x
ID 75	CI14106/Clm//McCall	30.84	61.90 ^{2/}	166.75a	74.25	2.25	31.88	65.00	
MT 6827	Burt/PI178383 14-1202	26.81	58.70 ^{2/}	168.50a	.00	.00	28.63	68.13	
MT 6828	Burt/PI178383 13-1201	27.45	59.10 ^{2/}	166.00a	.00	.00	29.00	67.50	
CI 12933	Itana ^{4/}	26.86	60.90 ^{2/}	162.25	99.00	1.75	26.88	62.50	
WA 5985	BNK 1205/Burt//14/53-1	29.91	57.25 ^{1/}	166.50a	.00	.00	27.38	59.38	x
UT 80702	DM/173438//Clm/3/DM	24.48	62.60 ^{2/}	165.00a	24.75	1.00	33.25	36.25	
ID 33	MN 60157/McCall//Moran	18.61	58.40 ^{2/}	166.75a	24.75	.50	29.88	25.63	

1/ \bar{x} for Northwestern Agricultural Research Center and Stillwater

2/ \bar{x} for Northwestern Agricultural Research Center only

3/ x indicates presence of dwarf smut, no percentage estimates were taken

4/ Check variety

a/ Values significantly greater than the check (.05)