TITLE: Winter Wheat

PROJECT: Small Grain Investigation MS 756

YEAR: 1979

PERSONNEL: Leader - Vern R. Stewart
Technician - Todd K. Keener
Cooperator - G. A. Taylor
Cooperating Agencies - Montana Agricultural Experiment Station, MSU
Montana Wheat Research & Marketing Committee

LOCATION: Northwestern Agricultural Research Center and L. B. Claridge farm, Kalispell, MT.

OBJECTIVES:

1) To obtain information necessary to make varietal recommendations and evaluate new varieties and selections.

2) To obtain from a cooperative program with the USDA-SEA-AR in the Pacific northwest wheat germ plasm or varieties that have resistance to TCK smut (dwarf smut) and stripe rust.

3. To find a fungicide that will aid in the control of TCK smut.

1979 EXPERIMENTS:

1. Western Regional Hard Red Winter Wheat Nursery
   (a) Kalispell
   (b) Stillwater
2. Western Regional White Winter Wheat Nursery
   (a) Kalispell
   (b) Stillwater
3. Elite Yellow Rust Nursery
   (a) Kalispell
   (b) Stillwater
4. Fungicide study - paired plots in the western regional white winter wheat nursery
   (a) Stillwater

1979 RESULTS:

Western Regional Hard Red Winter Wheat Nursery - Kalisepll

Favorable moisture, low incidence of snow mold, and a long growing season were instrumental in higher than normal yields from the hard red winter winter wheat nursery this year. The yields ranged from 52.42 bu/a to 108.37 bu/a with ten entries yielding significantly lower than the check, Wanser. Test weights differed from the check significantly, however four were significantly less.

The occurrence of high percent survivals would testify to the low incidence of snow mold this year (see Table 1). Lodging was heavy in six entries, one of which was Kharkof. There was a moderate level of leaf rust throughout this study and some varieties such as ID 154, UT 890152 and ID 178 exhibited moderate susceptibility to it. Powdery mildew was heavy throughout the study with only one variety, Weston, showing a high level of resistance. There was no dwarf smut found in the susceptible varieties in this test, thus this season we do not have an evaluation of the resistance of the varieties grown in 1979. Table 1.

1979 Results (con't)

Western Regional Hard Red Winter Wheat Nursery - Stillwater

Yields from the Stillwater nurseries were slightly above average and ranged from 35.26 bu/a to 52.05 bu/a. Kharkof and ten other varietius had test weights significantly less than Wanser, the check. Snow mold was not a factor in survival in 1979. The stand of UT930082 was the lowest in the study at 80 %. TCK smut was not found in the susceptible varieties, thus we do not have an evaluation of the resistance of the varieties tested in 1979. Table 2.

Western Regional White Winter Wheat Nursery - Kalispell

Yields were higher than average. Nine varieties significantly out yielded McDermid which was used as the check. Luke was second in yield at 114.2 bu/a. Only four entries ID755314, Nugaines, Elgin and Kharkof had test weights above or equal to the wheat standard. Stands throughout the test were reduced by snow mold. WA 6471 and OR739401 were reduced in stands up to 49%. WA6470, WA6363, WA6581 and ID 755314 exceeded an 80% stand. TCK smut was present in the susceptible varieties at a low level, with Kharkof being the highest. It is difficult to tell from this test if the zero readings are escapes or real. OR68007 and WA6470 did not contain any smut. Powdery mildew was found at high levels throughout the nurseries. The following varieties were found to be relatively free of the disease, ID45318, OR680073, ID755314, Or68007 and McDermid. Table 3.

Western Regional White Winter Wheat Nursery - Stillwater

Yields were higher than average for white winter wheat grown at Stillwater. Four varieties, yielded significantly lower than the check and among these were Moro and Nugaines. Test weights were slightly less than normal with four varieties varying significantly from the check, McDermid. Tiller counts per foot of row showed that approximately 50% of the entries had significantly lower tiller counts than McDermid, the check.

Very little winter kill due to snow mold was observed. There was not any TCK smut in this test, so we are unable to evaluate these lines for resistance. Table 4.

Elite Yellow Rust Dwarf Smut Winter Wheat Nursery - Kalispell

Several entries in this nursery provided excellent yields, four of which were significantly greater than the check variety, Crest. Test weights were normal except for three varieties that were significantly lower than the check (see Table 5). All but two entries headed significantly later than Crest, Crest being an early maturing variety. Winter kill due to snow mold did not exceed 10% except in the case of MT77069 which had a 16% plant reduction due to the disease. Stem lodging was moderate throughout the test but was severe in the varieties Cardon, Hansel and Jeff. The incidence of leaf rust (Puccinia sp) was moderate for the test on the average but was severe in Jeff and MT77077. Several other varieties were moderately susceptible, but not significantly different from the check. Powdery mildew (Erysiphe graminis) was severe in the variety Cardon, which had a significantly higher rate of infection than Crest. Several other varieties were moderately or at least slightly susceptible to the mildew organism. Table 5.

Table 1. Agronomic data from the western regional hard red winter wheat nursery grown at the Northwestern Agricultural Research Center, Kalispell, MT in 1979. Field E-2. Random block design, four replications.

Date seeded: September 25, 1978 Date harvested: August 10, 1979 Size of plot: 32 sq. ft.

C.I. or State No.	Variety	Yield Bu/A	Test Wt. Lbs/Bu.	Heading Date	Height Inches	% Survival	Lodging %	Lodging Sev.	Leaf Rust %	Leaf Rust Sev.	Mildew %	Mildew Sev.
UT 89099	DM/178383//CLM/4/DM/3/UT	108.27	61.75	163.50	40.94b	94.75	7.50	1.75	25.00	3.00a	86.25	4.75
UT 930082	DM/178383//CLM/3/SCT/4/B	107.35	61.90	165.25a	48.33	94.25	.00	.00	2.50	.25	56.25	3.75
WA 6365	Koelz7941/2*McCall	100.47	61.45	167.25a	50.98	96.50	32.50	3.00	10.00	.75	63.75	3.75
WA 6582	Suwon92/6*Burt//Falco/2*	99.23	58.35b	166.50a	34.84b	95.75	.00	.00	.00	.00	57.50	3.75
ID 158	Heglar/ID5006	98.82	62.07	166.00a	45.87b	97.00	18.75	1.50	5.00	.50	76.25	4.50
WA 6364	Koelz7941/2*McCall	98.77	63.17	166.75a	47.24	96.75	12.50	1.75	.00	.00	83.75	3.75
CI 13844	Wanser 1/	97.99	62.97	164.00	48.82	97.75	.00	.00	22.50	1.25	67.50	3.50
WA 6473	14484/3/Bezo-1/Bnk1205//	94.92	57.07b	167.50a	34.74b	94.50	.00	.00	2.50	.25	37.50	3.00
ID 745520	Weston	94.39	62.67	162.00b	48.03	87.25b	20.00	3.50a	10.00	1.00	2.50b	.75b
WA 6367	Suwon92/Burt//Wanser	93.14	60.45	163.75	36.52b	96.75	.00	.00	.00	.00	94.75	7.25a
ID 178	SNR64/II-60-155//Heglar/	89.24	60.70	163.25	47.74	96.25	73.75a	5.75a	32.50	3.00a	16.25b	1.50
ID 180	Turkey/Burt//Bezostaja	88.33	61.27	166.75a	45.08b	97.25	20.00	1.75	2.50	.50	82.50	4.25
ID 176	II-60-155/CI14106//McCal	81.41	61.77	167.25a	49.61	95.75	36.25	4.50a	12.50	.50	25.00b	1.75
ID 156	RNG/5/UT/UT/4/SN/3/7*Lee	79.49	62.15	164.50	47.34	88.50b	60.00a	5.75a	.00	.00	72.50	4.25
UT 890152	DM/178383//CLM/4/DM/3/UT	78.84	56.00b	167.25a	44.49b	96.50	41.25a	4.25a	32.50	1.50	76.25	5.25
UT 927124	178383/IT//DM/3/WN/4/BUR	78.55b	61.97	165.25a	50.39	99.25	45.00a	4.25a	6.25	.50	62.50	4.50
ID 51022	Bezo//Burt/178383/3/ARK	77.41b	61.40	161.25b	50.00	99.00	20.00	1.25	.00	.00	68.75	5.75a
ID 179	A667W-46/Ranger	76.68b	61.72	167.00a	48.03	98,00	88.75a	7.25a	.00	.00	67.50	4.00
UT 927140	178383/IT//DM/3/WN/4/BUR	76.30b	62.32	164.50	50.49	97.25	36.25	3.50a	.00	.00	45.00	3.00
ID 51031	Bezo//Burt/178383/ID5011	76.04b	59.22b	164.50	50.79	98.50	40.00a	4.25a	3.75	.50	27.50b	2.50
ID 154	BSN//KO/178383/3/II-60-1	75.82b	60.32	166.75a	44.69b	97.00	54.75a	4.75a	40.00	2.00	21.25b	1.75
ID 51021	Bezo//Burt/178383/3/ARK	74.95b	61.60	161.50b	45.67b	97.75	21.25	3.00	10.00	.50	56.25	4.00
ID 157	CI14106/MC13/WRR//KO/178	71.41b	60.67	165.00	48.23	97.00	59.75a	6.00a	15.00	1.00	71.25	4.25
CI 1442	Kharkof	58.34b	59.65b	168.75a	52.07	96.25	66.25a	5.50a	7.50	.50	35.00b	2.00
ID 51032	ID5011/WA4765//ID5011	52.42b	54.90b	171.75a	50.89	96.25	78.50a	7.75a	22.50	1.25	25.00b	2.75
	$\bar{x}$	85.14	60.70	165.51	46.47	96.07	33.32	3.24	10.50	.75	55.14	3.61
	F 2/	3.97**	4.29**	33.05**	40.89**	2.55**	3.94**	3.95**	2.19**	3.39**	5.32**	3.57**
	S.E.$\bar{x}$	7.14	1.03	.41	.77	1.73	13.61	1.19	8.08	.47	10.84	.76
	L.S.D.(.05)	20.15	2.89	1.16	2.16	4.88	38.38	3.37	22.77	1.32	30.58	2.15
	C.V. %	8.39	1.69	.25	1.65	1.80	40.85	36.86	76.91	62.28	19.67	21.14

1/ Check variety

2/ F - value for variety comparison

* Indicates statistical significance at the .05 level.

a/ Values significantly greater than the check at the .05 level

b/ Values significantly less than the check at the .05 level

** Indicates statistical significance at the .01 level

Table 2. Agronomic data from the western regional hard red winter wheat nursery grown on the Lance Claridge farm, Kalispell, MT in 1979. Random block design, four replications.

Date seeded: September 28, 1978 Date harvested: August 16, 1979
Size of plot: 32 sq. ft.

C.I. or State No.	Variety	Yield Bu/A	Test Wt. Lbs/Bu.	Height Inches	% Survival	Lodging %	Lodging Sev.
UT 89099	DM/178383//CLM/4/DM/3/UT	52.05	54.20b	34.25b	100.00	.00	.00
ID 158	Heglar/Id5006	50.00	56.60	27.07b	96.25	.00	.00
WA 6364	Koelz7941/2*McCall	49.87	58.50	35.53b	100.00	.00	.00
ID 745520	Weston	48.94	56.88	34.84b	100.00	2.50	2.00
UT 890152	DM/178383//CLM/4/DM/3/UT	47.87	52.25b	34.45b	100.00	.00	.00
ID 180	Turkey/Burt//Bezostaja	47.72	57.00	25.00b	97.50	.00	.00
WA 6367	Suwon 92/Burt//Wanser	47.64	53.42b	25.00b	100.00	.00	.00
WA 6582	Suwon 92/6*Burt//Falco/2*	47.30	53.85b	22.64b	96.25	.00	.00
ID 156	RNG/5/UT/UT/4/SN/3/7*Lee	47.20	56.82	34.35b	100.00	.00	.00
CI 13844	Wanser 1/	46.70	57.32	38.09	100.00	.00	.00
UT 927140	178383/IT//DM/3/WN/4/Bur	46.03	55.30	40.94a	100.00	.00	.00
WA 6473	14484/3/Bezo.1/BNK1205//	45.95	53.25b	22.44b	100.00	.00	.00
ID 178	SNR64/II-60-155//Heglar/	45.89	53.20b	25.59b	100.00	12.50	2.50
ID 154	BSN//KO/178383/3/II-60-1	45.84	55.80	22.74b	100.00	.00	.00
ID 51022	Bezo//Burt/178383/3/ARK	44.73	57.65	40.65a	100.00	12.50	2.25
ID 51021	Bezo//Burt/178383/3/ARK	44.71	57.15	39.86a	100.00	2.50	2.00
WA 6365	KOELZ7941/2*McCall	43.64	55.20	34.65b	100.00	10.00	1.50
ID 157	CI14106/MC13/WRR//KO/178	43.05	55.77	35.83b	100.00	.00	.00
ID 51031	Bezo//Burt/178383/ID5011	41.63	53.50b	38.29	100.00	.00	.00
ID 179	A667W-46/Ranger	41.25	56.07	24.11b	100.00	.00	.00
UT 927124	178383/IT//DM/3/WN/4/BUR	40.26	54.57b	40.94a	100.00	6.25	1.75
ID 176	II-60-155/CI14106//McCal	39.80	56.70	36.22b	100.00	.00	.00
UT 930082	DM/178383//CLM/3/SCT/4/B	39.71	52.77b	40.65a	80.00	.00	.00
CI 1442	Kharkof	36.16b	52.95b	40.35a	100.00	.00	.00
ID 51032	ID5011/WA4765//ID5011	35.26b	52.17b	40.16a	100.00	.00	.00
	$\bar{x}$	44.77	55.16	33.39	98.80	1.85	.48
	F 2/	2.64**	5.57**	774.52**	.95NS	1.23NS	1.25NS
	S.E.$\bar{x}$	2.62	.80	.24	4.18	3.59	.79
	L.S.D.(.05)	7.38	2.25	.69	11.79	10.12	2.24
	C.V. %	5.85	1.45	.73	4.23	193.90	165.42

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