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 3. Agronomic data from the western regional white winter wheat nursery grown at the Northwestern Agricultural Research Center, Kalispell, MT in 1979. Field No. 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	% Surv.	Smut[3/] Count	Leaf Rust %	Leaf Rust Sev.	Powdery Mildew %	Powdery Mildew Sev.
WA 6155	CI13431/CI7805//CI13447	114.58a	59.22	167.00a	33.27	68.00	2.25	.00	.00	86.25a	4.50a
CI 14586	Luke	114.20a	57.97	169.00a	32.58	78.50	.25	.00	.00	10.00	1.25
WA 6363	Luke/WA 5829	104.75a	58.35	169.00a	32.28	82.25	.50	.00	.00	25.00a	1.50
ID 775323	WA4765//Burt/PI178383	103.82a	57.87	165.75a	33.66	71.25	.75	.00	.00	3.75	.25
WA 6581	VD 67217/VB 67297	103.21a	59.85	168.50a	31.50	84.75	2.25	17.50	1.00	60.00a	3.50a
WA 6472	Semidwarf Multiline Club	102.87a	59.60	167.00a	32.68	79.50	1.75	30.00	2.25	55.00a	3.75a
WA 6850	CI 14484/K 691533	101.90a	59.77	166.25a	32.58	75.25	1.50	17.50	1.25	31.25	2.50a
OR 74131	Pendleton Sel. No. I-372	101.88a	59.43	165.25	37.01a	70.75	.75	5.00	.50	41.25a	3.25a
WA 6242	Luke/(VH66387, Itana	101.71a	60.63	164.75	33.96	63.75	.50	.00	.00	50.00a	2.75a
WA 6470	Luke/Norco, VH74333	100.25	56.00b	168.25a	31.30	82.75	.00	..00	.00	11.25	.75
OR 65116	Stephens	100.16	59.30	162.25b	35.24a	77.75	.75	17.50	1.00	17.50	2.00a
ID 745318	WA4765//Burt/PI178383	99.38	57.07	164.75	33.76	72.25	.25	.00	.00	.00	.00
OR 7142	Suwon 92/3 Omar//Moro	98.38	60.12	164.25	34.65	72.00	1.00	.00	.00	26.25a	1.75a
OR 7493	Pendleton Sel. No. I-607	98.17	56.55	166.00a	28.54b	61.25	.25	20.00	1.00	35.00a	2.25a
CI 14564	Hyslop	98.09	59.10	164.75	32.28	65.00	.75	5.00	.50	10.00	1.00
OR 680073	Yamhill/Hyslop	96.43	58.35	166.25a	35.93a	73.25	.25	8.75	.50	.00	.00
OR 67237	CD/Sel.101//55-1744/3/DC	96.32	59.38	165.00	35.33a	66.25	1.25	3.75	.25	11.25	1.00
CI 13740	Moro	96.32	60.62	165.50	40.94a	77.50	1.25	15.00	1.75	10.00	1.50
OR 739401	Oregon Sel. R73-9401	95.37	58.80	164.75	32.38	54.25b	1.25	16.25	1.00	25.00a	2.50a
ID 755314	WA4765/Burt/PI178383	95.22	61.32a	165.75a	43.70a	82.50	.75	.00	.00	.00	.00
OR 68007	Yamhill/Hyslop	94.36	58.68	167.00a	35.53a	67.50	.00	11.25	.75	.00	.00
OR 7147	Faro	94.22	58.77	165.00	33.17	58.75	.50	.00	.00	27.50a	2.25a
CI 11755	Elgin	94.08	61.20a	166.75a	44.29a	78.25	2.50	.00	.00	55.00a	3.25a
CI 13968	Nugaines	93.69	61.88a	164.50	31.99	67.50	2.25	12.50	1.00	22.50	1.25
ID 755312	WA4765/Burt/PI178383	91.76	58.15	166.25a	34.55	61.75	2.00	.00	.00	3.75	.25
CI 14565	McDermid[1/]	88.05	58.45	164.00	32.78	77.00	1.00	20.00	1.25	.00	.00
WA 6471	CI15923//Nord Desperz/2	87.48	59.57	166.25a	30.12b	51.25b	.50	2.50	.25	.00	.00
CI 1442	Kharkof	78.08	61.40a	163.25	47.44a	80.00	4.25a	10.00	1.25	20.00	2.25a
	$\bar{x}$	98.03	59.19	165.82	34.77	71.46	1.12	7.59	.55	22.77	1.62
	F[2/]	2.42**	2.92**	9.05**	25.59**	1.66*	2.46**	1.50NS	1.54NS	7.30**	6.09**
	S.E. $\bar{x}$	4.72	.84	.54	.86	6.91	.61	7.06	.51	8.27	.54
	L.S.D.(.05)	13.27	2.36	1.53	2.42	19.45	1.72	19.86	1.43	23.26	1.51
	C.V. %	4.81	1.42	.33	2.47	9.68	54.64	93.01	91.65	36.32	33.15

Table 3 . (con't)

1/ Check variety
2/ F - value for value 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
3/ Number smutty heads/12 feet of row, approximately 300 to 400 head per 12 feet of row.

Table 4. Agronomic data from the Western Regional White 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.	Tiller per Ft.	% Survival
WA 6363	Luke/WA 5829	54.78	54.35	36.19b	100.00
CI 14565	McDermid 1/	54.68	52.17	44.88	100.00
CI 14564	Hyslop	54.36	52.13	40.06	100.00
OR 67237	CD/Sel.101//55-1744	53.68	54.00	35.63b	100.00
OR 74131	Pendleton Sel. No.I-372	53.57	53.25	35.44b	100.00
OR 7493	Pendleton Sel. No.I-607	52.88	51.85	37.13	100.00
OR 739401	Oregon Sel. R73-9401	52.72	52.13	39.56	100.00
OR 7147	Faro	52.69	51.77	40.25	100.00
OR 65116	Stephens	52.59	52.47	37.94	100.00
OR 7142	Suwon 92/30Mar//Moro	52.53	53.00	39.75	100.00
ID 775323	WA4765//Burt/PI 178383	52.35	49.35	34.44b	100.00
WA 6155	CI13431/CI7805//CI13447	52.30	51.57	36.94b	100.00
ID 745318	WA 4765//Burt/PI 178383	51.78	48.27b	41.81	100.00
CI 1442	Kharkof	51.29	57.15a	36.94b	100.00
WA 6850	CI 14484/K 691533	51.08	52.00	34.94b	100.00
WA 6472	Semidwarf Multiline Club	50.79	50.67	34.31b	100.00
ID 755312	WA4765/Burt/PI178383	50.79	52.17	31.88b	100.00
CI 14586	Luke	50.38	53.02	40.69	100.00
ID 755314	WA4765/Burt/PI178383	49.87	55.32a	35.31b	100.00
OR 680073	Yamhill/Hyslop	48.68	50.40	34.44b	100.00
WA 6581	VD 67217/VB 67297	48.45	53.90	34.19b	100.00
OR 68007	Yamhill/Hyslop	48.45	49.90	37.38	100.00
WA 6242	Luke/(VH66387,Itana	48.45	53.65	35.63b	100.00
CI 11755	Elgin	48.39	54.82	38.31	100.00
WA 6471	CI15923//Nord Desprez	48.04b	52.72	35.38b	100.00
CI 13968	Nugaines	48.00b	55.63a	39.63	93.75b
CI 13740	Moro	43.41b	51.70	35.50b	100.00
WA 6470	Luke/Norco, VH74333	42.48b	50.00	42.63	100.00
	$\bar{x}$	50.70	52.48	37.40	99.78
	F 2/	1.74*	3.75**	1.18NS	2.78**
	S.E.$\bar{x}$	2.31	1.03	2.76	.71
	L.S.D. (.05)	6.49	2.89	7.76	1.99
	C.V. %	4.55	1.96	7.37	.71

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