

TITLE: Winter Wheat

PROJECT: Small Grain Investigations MS 756

YEAR: 1980

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

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 dwarf smut (Tilletia controversa Kuehn) and stripe rust (Puccinia striiformis West).

- 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. Intrastate Hard Red Winter Wheat Nursery
 - (a) Stillwater
 4. Preliminary Evaluation Hard Red Winter Wheat Nursery
 - (a) Stillwater

1980 RESULTS:

Western Regional Hard Red Winter Wheat Nursery - Kalispell

Very little winter kill from snow mold and associated diseases was observed in the winter wheat nurseries at Kalispell. Although yields were very good this year, and were up from both 1977 and 1978, they were not equal to 1979 yields. Yields were reduced some because of hail storms.

High yields were obtained from the varieties of WA6695, MT77002, and Weston (ID745520). Weston had a high yield in 1979 and was the top yielding variety in 1978. The mean yield for the hard red winter wheat nursery was 74.46 bu/a.. Test weights were down from last year because of the frequent rains at harvest time. The high yielding varieties of Weston and MT 77002 also had good test weights (Table 1). The mean heading date was seven to eight days earlier than the average for the last five years. This is due in part to the favorable temperatures and moisture level in early spring.

Lodging was moderate to severe throughout the nursery, however eight varieties showed good resistance to lodging. WA6695, a high yielding line, had excellent lodging resistance.

Moisture conditions in mid-season favored infestations of both powdery mildew (Erysiphe graminis DC) and leaf rust (Puccinia recondita Rob ex Desm), Dwarf smut was not observed at the Kalispell location.

1980 Results (con't)

Western Regional Hard Red Winter Wheat Nursery - Stillwater

The winter wheat nursery yields at Stillwater were the best ever. Very little winter kill was observed throughout the location. The mean yield was 95.46 bu/a which tops any yields from the nurseries at this location. The three highest yielding entries were from Utah with yields exceeding 113 bu/a (Table 2). Test weights were about normal when compared to previous years. The only significantly high test weight was from the high yielding variety ID745520, which also did well at the Kalispell location. Plant height was above average for this location. Lodging was moderate throughout the study although several varieties demonstrated excellent lodging resistance. Dwarf smut infections were evaluated and several resistant lines were noted (Table 2).

Western Regional White Winter Wheat Nursery - Kalispell

Yields from the white winter wheat nursery at Kalispell were excellent with the mean yield higher than the five year mean. Thirteen varieties yielded significantly more than Nugaines, the check (Table 3). The varieties OR680073, WA6470 and WA6363, all exceeded last season's yields. The test weight mean was less than last year's. This is due in part to heavy rain that occurred at harvest time. Early heading dates are a consequence of favorable temperature and moisture conditions in the spring. Plant height this year exceeded last year's heights. Moro and Kharkof were the only varieties lodging in this nursery. Leaf rust was severe only in a few varieties but was evident throughout the study. Powdery mildew was a significant factor within the study and was moderate to heavy on all varieties except WA6470, WA6363, ID745318 and CI17730. A ten year summary of white winter wheat is given in Table 4.

Western Regional White Winter Wheat - Stillwater

Excellent yields were obtained from the Stillwater location. The mean yield surpasses any yield ever obtained from nurseries in this location. OR7794 and WA6471 were significantly higher in yield than the check. WA6471 was the highest yielding variety in 1978, but did not perform as well in 1979. Test weight and plant height means were both about average when compared to the past five years. The high yielding variety of OR7794 was significantly higher than the check in both test weight and height (Table 5). Lodging was of no consequence in this test except in the variety Kharkof. Dwarf smut was found in the test, but these data were not accurately recorded and thus are not a part of this report.

Intrastate Hard Red Winter Wheat - Stillwater

Several first year entries were grown this year at the Stillwater location. Good yields of up to 100 bu/a were obtained from the 50 entries. One entry, which is being considered for state registration, is MT77077. This variety yielded 92 bu/a. Test weights were average and did not vary significantly. Plant height was above normal with the tallest variety, Winoka being 49 inches. Lodging was moderate to severe throughout the study yet many varieties exhibited no lodging symptoms. Dwarf smut was observed throughout the study. Readings are found in Table 4.

1980 Results (con't)

Preliminary Evaluation Hard Red Winter Wheat Nursery - Stillwater

The purpose of this nursery grown at the Stillwater location was to investigate the potential of several Montana winter wheat varieties. Yields ranged from 59 bu/a to 92 bu/a with the mean yield being 75.96 bu/a. The test weights were high, compared to accompanying tests, as the mean value of 59.21 lbs/bu will indicate. Lodging which was a problem in this study, interfered with data collection and complicated harvest procedures. Several varieties showed good potential against lodging tendencies (Table 7). Dwarf smut also existed at unacceptable levels throughout this study and ran as high as 20% infestation in some plots.

Table 3 . Agronomic data from the Western Regional White Winter Wheat Nursery grown at the Northwestern Agricultural Research Center, Kalispell, MT in 1980. Field No. E-2. Random block design, four replications.

Date seeded: September 19, 1979 Date harvested: August 22, 1980 Size of Plot: 32 sq. ft.

C. I. or State No.	Variety	Yield Bu/A	Test Wt Lbs/Bu.	Heading Date	Height Inches	% Lodging	% Leaf Rust	% Mildew
OR 680073	Yamhill /Hyslop 3M6	125.12a	45.77a	161.75a	42.22a	.00	2.75	11.25
WA 6470	Luke/Norco, VH74333	112.04a	55.65a	162.50a	37.40	.00	2.00	6.50b
WA 6363	Luke/WA5829	109.70a	54.38a	163.00a	37.01	.00	1.00	7.75
WA 6698	Allan Sel. A7815	107.65a	56.32a	162.00a	43.01a	.00	5.50	35.00
ID 745318	WA4765//Burt/PI178383	105.86a	51.88	160.50	40.65a	.00	2.00	4.00b
CI 17730	WA4765//Burt/PI178383	101.62a	53.92a	160.00	41.54a	.00	3.25	5.50b
OR 68007	Yamhill/Hyslop 2M6	100.43a	54.70a	161.50a	41.44a	12.50	2.00	16.75
OR 797	CI14482/Moro, Sel.E109	100.33a	54.25a	158.50b	39.07a	.00	3.00	12.50
CI 17596	Stephens	99.32a	53.82a	156.75b	36.32	.00	2.00	12.50
WA 6697	Hyslop/Brueh 170-254-6	99.12a	51.42	161.50a	37.30	.00	3.00	38.75
WA 6580	CI14484/K691533	97.88a	52.10	161.25a	38.19	.00	3.75	21.50
WA 6696	Daws/WA5829 VH078141	96.32a	54.88a	160.75	40.75a	.00	4.25	12.75
WA 6472	Semidwarf Multiline Club	93.08a	51.05	162.00a	41.44a	.00	10.25	26.25
OR 7794	Rew/Luke, Sel.305	91.89	56.52a	159.25	43.21a	.00	10.00	18.75
OR 7142	Suwon92/3*Omar//Moro 142	82.25	51.80	157.00b	42.32a	.00	9.00	30.00
WA 6155	CI13431/CI7805//CI13447/	82.15	49.90	161.75a	39.96a	.00	2.00	37.50
CI 17590	Faro	80.61	49.07b	158.75	40.26a	.00	5.25	36.25
WA 6471	CI15923//Nord Desprez/2**	79.78	52.07	161.50a	36.71	.00	2.00	25.00
WA 6581	VD67217/VB67297	78.05	51.10	161.75a	35.93	.00	1.00	32.50
CI 13968	Nugaines (Sel-7)-1/	75.31	51.40	159.75	37.11	.00	4.25	23.75
CI 11755	Elgin	68.54	55.13a	162.25a	48.13a	15.00a	8.00	33.75
CI 13740	Moro	67.36	49.98	160.75	45.57a	70.00a	9.25	12.50
CI 1442	Kharkof	55.54b	55.20a	161.75a	52.95a	88.50a	4.00	18.75
	\bar{x}_2	91.74	53.10	160.72	40.80	8.09	4.33	20.86
	F ₂	7.41**	13.63**	21.21**	47.71**	25.28**	1.32NS	3.78**
	S.E. \bar{x}	6.10	.59	.37	.59	4.57	2.57	5.77
	L.S.D.(.05)	17.26	1.68	1.03	1.67	12.92	7.27	16.31
	C.V. %	6.65	1.12	.23	1.44	56.50	59.41	27.64

1/ Check variety

2/ F value for variety comparison

** Indicates statistical significance at the .01 level.

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

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

Table 4 . Ten year summary for the Western Regional White Wheat Nursery grown at the Northwestern Agricultural Research Center, Kalispell, MT 1971-1980.

C.I. or State No.	Variety	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	Ave.	Sta. Yrs.	% Nugaines
CI 1442	Kharkof	62.1	59.7	45.3	27.7	37.4	61.1	50.7	16.9	78.1	55.5	49.5	10	70
CI 11755	Elgin	73.0	70.8	50.9	59.2	42.3	67.6	57.8	21.3	94.1	68.5	60.6	10	86
CI 13740	Moro	68.3	68.5	65.6	60.3	44.0	69.8	57.0	27.8	96.3	67.4	62.5	10	88
CI 13968	Nugaines	102.8	73.0	68.5	77.9	51.8	80.2	66.0	18.9	93.7	75.3	70.8	10	100
CI 17596	Stephens			61.6	81.2	52.3	82.1	60.6	23.4	100.2	99.3	70.1	8	105
CI 17590	Faro				85.4	53.5	74.9	65.2	25.4	94.2	80.6	68.5	7	103
OF 7142	Suwon 92/3*Omar//Moro 142					51.4	74.1	66.9	28.3	98.4	82.3	66.9	6	104
OF 68007	Yamhill/Hyslop						92.1	75.5	25.1	94.4	100.4	77.5	5	116
WA 6363	Luke/WA5829							70.2	34.2	104.8	109.7	79.7	4	126
ID 745318	WA4765//Burt/PI 178383								25.3	99.4	105.9	76.9	3	123
WA 6470	Luke/Norco, VH 74333								29.8	100.3	112.0	80.7	3	129
WA 6471	CI 15923//Nord Desprez/2*								19.5	87.5	79.8	62.3	3	99
WA 6472	Semidwarf Multiline Club								30.1	102.9	93.1	75.4	3	120
OF 680073	Yamhill/Hyslop								29.1	96.4	125.1	83.5	3	133
WA 6155	CI 13431/CI 7805//CI 13447									114.6	82.2	98.4	2	116
WA 6580	CI 14484/K691523									101.9	97.9	99.9	2	118
WA 6581	VD 67217/VB 67297									103.2	78.1	90.7	2	107
WA 6698	Allan Sel. A7815										107.7	107.7	1	143
CI 17730	WA4765//Burt/PI178383										101.6	101.6	1	135
OP 797	CI 14482/Moro, Sel. E109										100.3	100.3	1	133
WA 6697	Hyslop/Brueh 170-254-6										99.1	99.1	1	132
WA 6696	Daws/WA5829 VHO 78141										96.3	96.3	1	128
OF 7794	Rew/Luke, Sel. 305										91.9	91.9	1	122

-8-