

PROJECT TITLE: Winter Wheat Variety Trials (1983)

PERSONNEL:

Leader: Vern R. Stewart
 Cooperators: G. A. Taylor, P&SS, MSU
 J. A. Hoffman, USDA-ARS, Logan, UT
 Technician: Todd K. Keener
 Cooperating Agencies:
 Montana Wheat Research Committee
 Montana Wheat Research & Marketing Comm.
 Montana Cooperative Extension Service

SUMMARY:

Winridge continues to perform well. It surpassed all other named hard red varieties in yield, test weight and disease resistance. MT77066 also performed well in comparison to other hard red winter wheat, but was more susceptible to lodging.

Luke continues to out-yield most of the white wheats in drier locations of northwestern Montana. In higher moisture areas Luke loses yield potential because of lodging. Daws, Crew and Lewjain which have stronger straw, yield more than Luke under higher moisture conditions. Dwarf smut evaluations were limited because there was not continuous snow cover during the winter. The open winter did provide an opportunity to determine the winter hardiness of varieties tested.

In the western Montana off station nurseries Winridge was the hard red winter wheat variety which performed best. Tyee, Luke, Lewjain and Stephens soft white varieties were high yielding lines. Lewjain and Luke were about equal for yield but Lewjain had a higher test weight. Winridge was higher in both yield and test weight when compared to Crest.

INTRODUCTION:

To determine the adaptability of new and introduced winter wheat varieties for Montana, the Western Regional Winter Wheat Nurseries are grown in several locations throughout the state. These nurseries are cooperative trials with the USDA-ARS in the Pacific Northwest. The main thrust of these variety trials is to find lines that are resistant to dwarf smut (Tilletia controversa Kuhn) and stripe rust (Puccinia striiformis West).

Off station variety testing provides evaluation of varieties against the varied growing conditions that exist in western Montana. Two nurseries were grown in the 1982-83 season consisting of 10 soft white and 6 hard red winter wheat varieties.

1983 Winter Wheat Nurseries:

Western Regional Hard Red Winter Wheat Nursery
 (1) Kalispell
 (2) Stillwater

1983 Winter Wheat Nurseries (con't):

Western Regional White Winter Wheat Nursery

- (1) Kalispell
- (2) Stillwater

Off Station Winter Wheat Trials

- (1) Sanders County
- (2) Lake County

RESULTS:Western Regional Hard Red Winter Wheat Nursery - Kalispell

Yields were a little lower than the 1982 season. These high yields reflect a mild winter, good seasonal moisture, and the low incidence of plant diseases throughout the trial. The check variety, Crest yielded well below the mean at 76.1 bu/a. Seventeen varieties that were tested yielded significantly greater than Crest (Table 1).

Test weights were low in comparison to previous years. Only one variety had a test weight significantly less than Crest.

Although TCK Smut infection was very slight in the winter wheat studies this year all but five varieties showed some symptoms of the disease. The five lines demonstrating resistance to TCK were UT132569, UT132712, ID0217, ID0260 and ID0216.

Weather conditions at maturity were conducive to lodging. All but 11 of the varieties showed some degree of lodging. Severely lodged plots were lower in yield.

Western Regional Hard Red Winter Wheat Nursery - Stillwater

Yields for the Stillwater location were also less than the previous year, yet normal for this area. Four varieties yielded significantly more than the check variety, Crest. These were ID245 (81.95 bu/a), Winridge (80.41 bu/a), OR792 (79.41 bu/a) and UT132569 (79.34 bu/a).

Test weights averaged 57.14 lbs/bu with four varieties being significantly lower than the check. Test weights on the whole were less than those of previous years.

Winter kill was observed in several varieties but stand loss did not exceed 5% except for ID261.

Five varieties were significantly higher in lodging than Crest.

TCK smut was observed in only six varieties and did not occur above the .5% infection level.

The incidence of leaf rust (Puccinia recondita) was high and

Results (con't):

all varieties showed some infection. Those varieties showing some resistance were ID3518, Weston and UT125327. The rust infection came late in the season and therefore yields were not greatly effected. Table 2.

Western Regional White Winter Wheat Nursery - Kalispell

Five varieties yielding significantly more than Luke, the check, were ORCW8113 (128.89 bu/a), WA6698 (124.24 bu/a), OR8188 (123.21 bu/a), OR68007 (121.62 bu/a) and WA6912 (118.30 bu/a). The average yield for the nursery was 104.08 bu/a.

The only variety exceeding 60 lbs/bu for test weight was WA6996. Several of the varieties having significantly less test weights than Luke also had yields less than Luke.

Smut levels were not observed above 1% except in the case of Elgin at 1.38%. Ten varieties showed no signs of smut at all.

Lodging was not prevalent throughout the nursery, yet was severe in seven varieties. Table 3.

Western White Regional Winter Wheat - Stillwater

Luke was one of the highest yielding varieties this year at Stillwater. The average yield was 20 bushels less than last year and 10 bushels less than 1981. Sixteen varieties yielded significantly less than the check variety, Luke.

Fourteen varieties had test weights significantly greater than Luke yet none were above 60 lbs/bu. Table 4.

Winter kill was higher in the white winter wheats when compared to the hard reds. Most lines showed stand reductions because of winter injury. Stands varied from 52.5% to 99.7% survival.

WA6915, Kharkof and OR7996 were severely lodged.

Leaf rust was observed in all varieties and was very severe (above 75% infection) in seven of the varieties. ID7956 showed the greatest resistance to leaf rust having only 5% infection. Yields were not greatly effected by the disease because it occurred late in the season.

Off Station - Sanders County

Excellent yields were harvested from this nursery with yields ranging from 82.5 bu/a to 110.1 bu/a. The top four yielding varieties were white wheats with Tyee being the highest at 110.1 bu/a. Five out of the six hard red winter wheat varieties tested yielded significantly less than Luke.

Test weights averaged about 57.7 lbs/bu with only one variety exceeding 60 lbs/bu (Weston at 60.42 lbs/bu). Table 5.

Off Station - Lake County

The hard red winter wheat variety Winridge was highest in yield at this location. Next in yields were five soft white winter varieties which ranged in yield from 69 bu/a to 73 bu/a. Luke at this location was fourth in yield as it was in Sanders County. Table 6.

There were 11 varieties having test weights significantly less than Luke while Lewjain at 60.52 lbs/bu was significantly higher than Luke. Table 6.

Table 3. Agronomic data from the Western Regional White Winter Wheat Nursery grown at the Northwestern Agricultural Research Center, Kalispell, MT, in 1983. Random block design with four replications. Field No. E-2, plot size 32 sq.ft.

Date planted: September 21, 1982 Date harvested: August 23, 1983

	VARIETY	YIELD BU/A	TEST WT LB/BU	HEADING DATE	MATURE DATE	HEIGHT INCHES	% 2/ SMUT	% LOGG. PREV.	LOGG. PREV.
ORCWB113	SPN//53189-66-71/BEZ	128.89a	57.50	159.50b	225.00	33.37	.37	.00	.00
WA 6698	SW92/6*0/3/1.5P/CTL/	124.24a	56.58	162.75	223.00	38.09	.00	.00	.00
OR 8188	HYS/NORCO//CAMA//SM	123.21a	57.60	160.50b	224.00	32.87	.12	.00	.00
OR 88007	HILL 81	121.62a	58.00	161.75b	223.00	37.89	.12	.00	.00
WA 6912	BVR/CI115923/HGS,VH07	118.30a	57.63	161.75b	225.00	34.06	.37	.00	.00
OR 7794	REW/LUKE sel.305	117.39	59.90a	160.50b	222.00	41.24a	.25	3.75	2.25a
WA 6696	DAWS/WA5829,VH079141	116.49	60.45a	161.75b	224.00	25.05b	.12	.00	.00
WA 7047	NORCO/VH72297,VH0807	115.75	55.40b	160.25b	222.00	33.66	.50a	.00	.00
CI 17149	DAWS	114.30	58.37a	162.75	225.00	35.53	.12	.00	.00
WA 6914	SCT/101//3469/PI1783	112.12	58.62a	160.75b	226.00	35.24	.12	.00	.00
OR 797	CI14482/NORO sel.E10	109.62	57.15	159.75b	217.00	34.84	.00	.00	.00
OR 7996	HYS/YAYLA//WA4995/3/	109.51	57.37	164.25	227.00	35.73	.00	24.75	1.00
CI 17596	STEPHENS	109.18	57.18	159.00b	223.00	32.87	.37	.00	.00
WA 6910	MARIS HUNTSMAN/VH745	109.09	57.45	162.75	224.00	35.53	.12	.00	.00
CI 17590	FARD	108.65	52.20b	159.75b	216.00	33.76	.12	.00	.00
IB745318	WA4765//BURT/PI17838	106.29	57.25	160.50b	223.00	35.14	.00	.00	.00
CI 17951	CREW	106.15	53.85b	162.50b	217.00	36.32	.00	.00	.00
CI 17909	LEWJAIN	105.99	57.77	164.50	228.00	32.48	.00	.00	.00
CI 13968	NUGAINES	105.95	58.65a	161.00b	224.00	32.97	.00	.00	.00
OR 835	1523BRC/RBS	105.06	57.60	164.00	226.00	35.43	.50a	.00	.00
WA 6915	SPRAGUE/LUKE//498,B7	103.44	55.87	161.50b	228.00	34.55	.00	6.25	.75
CI 14586	LUKE 1/	103.39	56.93	164.00	225.00	36.22	.00	22.50	.50
WA 6613	LUKE/VH76375	102.50	58.53a	162.00b	227.00	40.94a	.25	2.50	1.00
CI 17773	TYEE	98.82	51.85b	163.00	224.00	37.11	.00	.00	.00
OR CP04	1523BRC/RBS	96.72	57.30	164.75	225.00	34.25	.25	.00	.00
WA 6911	WA8240/NORCO,VJ08012	95.65	57.58	162.00b	232.00	32.28	.12	.00	.00
UC WW33	PHOENIX,WW33	94.51	57.20	153.00b	223.00	28.44b	.50a	.00	.00
ORCWB110	1523BRCdwt/YMH	88.18b	54.62b	163.00	222.00	34.25	.62a	.00	.00

Table 3.1. (cont'd)

			YIELD BU/A	TEST WT LB/BU	HEADING DATE	MATURE DATE	HEIGHT INCHES	% 2/ SMUT	% LOGG.	LOGG. PREV.
OR	7792	FAHA/OR6857 sel.204	87.61b	55.30b	161.50b	223.00	43.60a	.00	48.75a	4.50a
WA	7050	PI173467/GNS, sel.292	87.20b	51.17b	162.50b	218.00	32.58	.50a	.00	.00
CI	1442	KARKOF	86.15b	57.98	162.75	224.00	47.83a	.37	95.75a	7.75a
CI	11755	ELGIN	84.37b	55.30b	162.00b	216.00	44.68a	1.38a	50.00a	3.00a
WA	6819	CJFELUE/SPRAGUE3/	83.34b	53.02b	162.50b	222.00	35.04	.12	82.00a	7.50a
CI	13740	MORO	82.05b	54.20b	161.00b	222.00	43.01a	.00	31.00	2.00
OR	7956	BFC/68-23, JWW68109-1	81.00b	53.37b	164.25	228.00	34.74	.00	.00	.00
		X	104.08	56.48	161.71	.00	35.76	.21	10.49	.86
		F 3/	6.81**	19.00**	17.32**	.00	7.27**	2.91**	6.76**	12.87**
		S.E.X.	5.05	.51	.51	.00	1.64	.16	9.10	.55
		L.S.D. (.05)	14.16	1.44	1.44	.00	4.59	.46	25.53	1.54
		C.V. %	4.85	.91	.32	.00	4.57	77.21	86.75	63.37

1/ Check variety

2/ % Smut = % TCK (Tilletia controversa Kohn) smut per plot by ocular ratings

3/ F value for variety comparison

** Indicates statistical significance at the .01 level

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

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

Headings and maturity dates are number of days from January 1.

Table 3a. Ten year summary of yields for the Western Regional White Winter Wheat Nursery grown at the Northwestern Agricultural Research Center, Kalispell, MT 1974-1983.

CI or State No.	Variety	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	- X	Sta. Yrs.	% Nussaine
CI 1442	Kharkof	27.7	37.4	61.1	50.7	16.9	78.1	55.5	40.7	59.7	86.2	51.4	10	66
CI 11755	Elsin	59.2	42.3	67.6	57.8	21.3	94.1	68.5	42.5	63.2	84.4	60.1	10	77
CI 13740	Moro	60.3	44.0	69.8	57.0	27.8	96.3	67.4	62.5	84.8	81.1	65.1	10	84
CI 13968	Nussaine	77.9	51.8	80.2	66.0	18.9	93.7	75.3	79.1	130.9	106.0	78.0	10	100
CI 17596	Stephens	81.2	52.3	82.1	60.6	23.4	100.2	99.3	79.8	119.0	109.2	80.7	10	104
CI 17590	Faro	85.4	53.5	74.9	65.2	25.4	94.2	80.6	66.5	124.9	108.7	77.9	10	100
CI 17419	Daws	89.0	56.3	92.8	68.7	22.9	--	--	90.9	130.8	114.3	83.2	8	109
OR 68007	Hill 81			92.1	75.5	25.1	94.4	100.4	84.0	133.3	121.6	90.8	8	112
CI 17909	LewJain				70.2	34.2	104.8	109.7	85.3	130.5	106.0	91.5	7	112
ID 745318	WA4765//Burt/PI178383					25.3	99.4	105.9	75.9	132.2	106.3	90.8	6	106
CI 17951	Crew					30.1	102.9	93.1	72.6	118.2	106.2	87.2	6	104
CI 14586	Luke					30.0	114.2	--	83.1	140.5	103.4	94.2	5	91
CI 17773	Tsee						114.6	82.2	91.1	124.1	98.8	79.8	5	105
WA 6698	Allan Sel. A7815							107.7	54.0	122.3	124.2	102.1	4	103
OR 797	CI14482/Moro, Sel. E109							100.3	82.6	107.2	109.6	99.9	4	101
WA 6696	Daws/WA5829/VH078141							96.3	81.4	132.6	116.5	106.7	4	108
OR 7794	Rew/Luke/Sel., 305							91.9	79.8	112.0	117.4	100.3	4	101
WA 6913	Luke/VH76375								84.7	108.5	102.5	98.6	3	94
OR 7792	Faha/OR6857, Sel. 204								77.9	98.7	87.6	88.1	3	84
OR CW8113	SPN//63169-66-71/BEZ									138.5	128.9	133.7	2	113
WA 6912	BUR/CI15923/NGS,VH074									137.4	118.3	127.9	2	106
OR 7996	HYS/YAYLA/WA4995/3/									131.7	109.5	120.6	2	102
WA 6914	SCT/101//3469/178383									127.2	112.1	119.7	2	101
OR 7956	DCR/68,OWW68109-IM6,R									125.4	81.0	103.0	2	87
WA 6911	WA6240/NORCO,VJ08012									124.9	95.7	110.3	2	93
WA 6915	Sprague/Luke//498,B77									124.9	103.4	114.2	2	96
OR 835	1523 DRC/RBS									119.5	105.1	112.3	2	95
WA 6910	Maris Huntman/VH74521									118.9	109.1	114.0	2	96
OR CP04	1523 DRC/RBS									117.9	96.7	107.3	2	91
OR CW8110	1523 DRC DWT/YMH									99.5	88.2	93.9	2	79
WA 6819	CJ Club/Sprague									93.8	83.3	88.6	2	75
OR 8168	HYS/NORCO//CAMA//SM										123.2	123.2	1	116
WA 7047	NORCO/VH72297,VH0807										115.8	115.8	1	109
UC WW33	Phoenix, WW33										94.5	94.5	1	89
WA 7050	FI 173467/GNS, Sel 292										87.2	87.2	1	82

Table 4. Agronomic data from the Western Regional White Winter Wheat Nursery grown on the Lance Claridge farm at Kalispell, MT in 1983. Random block design, four replications. Plot size: 32 sq. ft.

Date seeded: October 1, 1982

Date harvested: September 15, 1983

VARIETY	YIELD BU/A	TEST WT LBS/BU	% 2/ SURVIVAL	HEIGHT INCHES	LODGING %	LODGING SEVER.	% 3/ SKUT	LEAF RS4/ SEVER.
WA 7047 NORCO/VH72297, VH0807	96.32	55.70a	99.7	27.76	.00	.00	.25	40.00
OR 8188 HYS/NORCO//CAMA//SM	92.86	55.58a	96.3	27.95	.00	.00	.00	60.00
OR 68007 HILL 81	92.17	55.27	96.5	32.28a	.00	.00	.00	15.00
CI 14586 LUKE	85.30	54.30	95.5	29.72	5.00	.25	.00	45.00
WA 7050 PI173467/GNS, sel.292	84.67	54.25	99.3	24.31b	.00	.00	.00	85.00a
OR 7794 REW/LUKE sel.305	84.30	57.18a	91.0	33.37a	13.75	2.00a	.00	45.00
ORCWB113 SPN//63189-66-71/BEZ	83.86	56.08a	92.7	28.84	.00	.00	.00	40.00
CI 17909 LEWJAIN	83.62	54.40	87.3	28.44	3.75	.50	.00	57.50
WA 6819 CJPFLUB/SPRAGUE3/	83.26	54.05	98.0	29.92	2.50	1.50a	.00	45.00
CI 17951 CREW	81.60	54.62	96.7	28.05	.00	.00	.00	37.50
CI 17596 STEPHENS	80.39	55.58a	96.3	26.38b	.00	.00	.00	32.50
WA 6910 MARIS HUNTSMAN/VH745	80.12	54.15	85.2	28.44	2.50	.75	.00	10.00
OR 7792 PAHA/OR6857 sel.204	79.82	55.33a	94.7	32.09	.00	.00	.00	55.00
WA 6698 SW92/6*0/3/T.SP/CTL/	78.05	56.55a	91.2	29.82	.00	.00	.00	15.00
OR 797 CI14482/MORO sel.E10	75.09	55.18	89.5	30.31	.00	.00	.00	75.00
OR 835 1523DRC/RBS	73.40	53.45	69.2b	30.81	.00	.00	.00	22.50
OR 7956 DRC/68-23, OWW68109-1	72.85	50.83b	71.2b	30.71	.00	.00	.00	5.00
CI 13740 MORO	71.81	53.60	96.7	30.91	.00	.00	.00	72.50
IL745318 WA4765//BURT/PI17838	71.80	55.30a	80.5	29.33	.00	.00	.00	12.50
CI 11755 ELGIN	70.66b	54.43	90.7	31.79	.00	.00	.75	75.00
WA 6914 SCT/101//3469/PI1783	68.24b	55.40a	89.5	27.76	.00	.00	.00	52.50
CI 13968 NUGAINES	68.19b	55.38a	83.0	27.76	.00	.00	.00	60.00
CI 17149 DAWS	66.55b	55.97a	87.0	27.85	.00	.00	.00	37.50
CI 17590 FARO	66.51b	53.02b	92.3	25.49b	.00	.00	.00	82.50a
OR 7996 HYS/YAYLA//WA4995/3/	66.50b	54.05	52.5b	31.40	40.00a	3.00a	.00	35.00
CI 1442 KARKOF	65.85b	56.48a	96.5	46.36a	97.00a	6.75a	.25	10.00
WA 6696 DAWS/WA5829, VH079141	62.75b	56.65a	83.7	26.57b	.00	.00	.00	75.00
WA 6813 LUKE/VH76375	61.25b	54.85	87.5	33.66a	1.25	.25	.00	47.50
OR CP04 1523DRC/RBS	61.09b	52.70b	52.5b	28.44	.00	.00	.00	15.00

Table 4. (con't)

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VARIETY	YIELD BU/A	TEST WT LBS/BU	2/		LODGING %	LODGING SEVER.	3/		LEAF RS SEVER.
			% SURVIVAL	HEIGHT INCHES			% SMUT	4/	
WA 6912 BUR/CI15923/NGS,VH07	57.92b	51.87b	66.2b	27.95	.00	.00	.00	31.50	
WA 6911 WA6240/NORCO,VJ08012	52.84b	53.70	45.0b	29.23	.00	.00	.00	65.00	
ORCW8110 1523DRCdwf/YMH	50.94b	52.83b	63.0b	27.95	12.50	.75	.00	22.50	
CI 17773 TYEE	50.02b	53.27b	73.7b	27.85	7.50	.50	.00	92.50a	
WA 6915 SPRAGUE/LUKE//498,B7	47.19b	52.27b	41.2b	27.17b	37.50a	3.25a	.00	47.50	
UC WW33 PHOENIX,WW33	46.81b	56.42a	87.2	24.61b	.00	.00	.00	80.00a	
	X	71.85	54.59	83.44	29.47	6.38	.56	.23	45.69
	F 5/	6.68**	17.56**	7.97**	16.83**	17.12**	10.50**	1.00	5.44**
	S.E.X.	5.09	.35	5.71	.90	4.43	.42	1.27	10.53
	L.S.D. (.05)	14.27	.99	16.02	2.53	12.44	1.17	3.64	30.28
	C.V. %	7.08	.65	34.49	3.06	69.52	74.97	54.14	23.06

1/ Check variety

2/ % of plot survival from winter kill

3/ % smut = % TCK (*Tilletia controversa* Kuhn) smut per plot by ocular ratings4/ Leaf rust (*Puccinia recondita*) severity, average area of leaf surface infected per plot

5/ F value for variety comparisons

** 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