PROJECT TITLE: Winter Wheat Variety Trials (1983)

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SUMMARY:

Winrdige 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 looses 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.

WINTER WHEAT VARIETIES

WINTER WHEAT VARIETIES RECOMMENDED FOR WESTERN MONTANA

Hard Red Varieties

1. Crest - dryland
2. Winalta - dryland
3. Cheyenne - dryland
4. Winridge - dryland

Soft White Varieties

1. Luke - Dryland or irrigated

CHARACTERISTICS OF RECOMMENDED VARIETIES

1. Crest
   a. Bearded variety, developed in Montana
   b. High yielding potential in dwarf smut and stripe rust areas
   c. Tall type
   d. Maturity - early to mid-season
   e. Good test weight
   f. Weak straw strength
   g. Moderate shattering resistance
   h. Resistant to stripe rust
   i. Moderate resistance to dwarf smut
   j. Susceptible to stem rust and sawfly infestation
   k. Not extremely winter hardy
   l. Adequate milling and baking quality

2. Winalta
   a. Bearded variety
   b. Fair yielding
   c. Tall type
   d. Maturity - early to mid season
   e. Good test weight
   f. Weak straw strength
   g. Good shattering resistance
   h. Susceptible to dwarf smut and sawfly infestations
   i. Resistant to stripe rust
   j. Moderate rsistance to stem rust

Recommended Winter Wheat Varieties (cont'd)

3. Cheyenne

a. Bearded variety
b. Good yielding
c. Tall type
d. Maturity - early to mid season
e. Good test weight
f. Weak straw strength
g. Susceptible to shattering
h. Moderate resistant to stripe rust
i. Susceptible to dwarf smut, stem rust and sawfly infestation
j. Good milling and baking qualities

4. Winridge

a. High yielding ability
b. Tall type
c. Good test weight
d. Resistant to shattering
e. Resistant to lodging
f. Resistant to dwarf smut, stripe rust and cephalosporium stripe
g. Winter hardy
h. Acceptable protein, milling and baking qualities

Soft White Variety

1. Luke

a. Bearded variety
b. Good yielding
c. Semi-dwarf type
d. Maturity - mid season
e. Fair test weight
f. Poor to fair straw strength
g. Resistant to shattering
h. Resistant to dwarf smut and stripe rust
i. Foot rot tolerant
j. Good baking and milling quality for cake flours

Table 1. Agronomic data from the Western Regional Hard Red Winter Wheat Nursery grown on the Northwestern Agricultural Research Center at Kalispell, MT. in 1983. Random block design, four replications. Field no. E-2.

Date seeded: September 21,1982 Date harvested: August 22,1983 Plot size: 32 sq.ft.

		YIELD BU/A	TEST WT LB/BU	HEADING DATE	MATURE DATE	HEIGTH INCHES	% 2/ SMUT	% LODG.	LODG. PREV.
WA 7049	LIND sel.B	108.59a	58.22a	160.00a	221.00	37.89	.25	.00b	.00b
WA 6820	GWB/127/GWB236//GWB2	104.22a	57.40a	154.50	216.00	33.96	.12	.00b	.00b
OR 792	TRIUMPH/LANCER,sel.1	101.66a	58.43a	158.25a	221.00	38.58	.12	13.75b	2.50b
CI 17902	WINDRIDGE	101.57a	59.77a	160.75a	224.00	43.01a	.12	1.25b	1.25b
ID 0261	BURT/CI13929//DLM/4/	101.16a	58.47a	161.50a	222.00	38.09	.62	.00b	.00b
ORCR8107	ALBA/GNS//FN/SONORA6	98.17a	59.23a	157.00a	223.00	44.98a	1.00a	18.75b	.50b
MT 77066	C61-9/WLT//CRT	97.30a	59.62a	160.75a	223.00	40.26	.12	23.75b	1.25b
CI 13844	WANSER	94.17a	57.93a	156.25a	218.00	41.44	.62	.00b	.00b
OR 7923	CLARIPEN/WA5836,sel.	93.06a	54.98	157.00a	216.00	28.44b	.37	24.75b	1.25b
CI 17727	WESTON	92.99a	60.45a	156.00a	221.00	43.80a	.12	25.00b	3.25b
UT125327	DLM/PI173438//CLM/3/	92.69a	57.55a	157.00a	221.00	35.43	.12	.00b	.00b
ID 3518	WA4765/3/BEZ//BURT/1	92.42a	55.75	164.75a	226.00	33.86b	.25	12.50b	1.25b
WA 7048	LIND sel.A	92.31a	57.02	158.50a	221.00	43.21a	.37	.00b	.00b
OR 7921	BEZ/SPRAGUE,sel.18-2	92.15a	57.08	157.50a	221.00	31.99b	.37	.00b	.00b
MT 77002	FRD/BEZ	92.14a	58.77a	155.00	218.00	40.65	.37	.00b	.00b
WA 6816	ID5012/WA5866	89.85a	55.52	160.25a	222.00	36.52	.50	.00b	.00b
UT132569	WRR/CI13837//PI17343	88.39a	56.15	161.00a	223.00	45.18a	.00	91.00	7.25
ID 0259	JEFF///II-60-155/CI1	85.72	58.25a	157.25a	216.00	43.60a	.12	72.00	4.75b
UT132712	KR/SVE//RDT///IT/4/F	85.67	57.23a	159.50a	222.00	42.91a	.00	72.00	5.75
ID 51022	BEZ//BURT/178383/3/A	83.27	57.27a	154.50	217.00	44.98a	.25	.00b	.00b
ID 51021	BEZ//BURT/178383/3/A	82.62	59.10a	154.00	221.00	42.62a	.25	.00b	.00b
ID 0242	SM4/TD//3*IT/PI17838	79.99	59.27a	159.25a	221.00	45.77a	.37	58.50b	5.50b
ID 0245	II.60-155/CI14106//W	78.87	57.40a	157.50a	216.00	39.37	.12	46.00b	4.75b
CI 13880	CREST 1/	76.10	55.35	154.50	222.00	37.89	.12	97.00	8.50
ID 0217	A667W-46/RANGER	74.11	59.10a	159.25a	221.00	42.81a	.00	66.25	4.00b
ID 0260	DLM/PI173438//CLM///	73.22	56.68	159.75a	222.00	48.23a	.00	99.00	8.00
CI 1442	KHARKOF	72.94	58.33a	161.25a	221.00	46.75a	1.62a	95.75	6.75
ID 0216	SM4/TD//3*IT/PI17838	69.05	53.35b	160.75a	223.00	46.16a	.00	99.00	8.50

Table 11. (con't)

	YIELD BU/A	TEST WT LB/BU	HEADING DATE	MATURE DATE	HEIGTH INCHES	% SMUT	% LODG.	LODG. PREV.
X	89.02	57.63	158.34	.00	40.66	.30	37.72	2.68
F 3/	6.82**	6.87**	29.48**	.00	12.04**	2.36**	8.12**	9.33**
S.E.X.	4.02	.63	.49	.00	1.40	.23	13.39	1.00
L.S.D. (.05)	11.30	1.76	1.37	.00	3.95	.64	37.67	2.82
C.V. %	4.51	1.09	.31	.00	3.46	75.70	40.91	37.45

1/ Check variety
2/ % Smut = % TCK (Tilletia controversa Kohn) smut per plot by ocular ratins
3/ 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

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

Table 2. Agronomic data from the Western Regional Hard Red Winter Wheat Nursery grown on the Lance Claridge farm at Kalispell, MT in 1983. Random block design, four replications. Size of plot: 32 sq. ft.

Date seeded: October 1, 1982 Date harvested: September 15,1983

	VARIETY		YIELD BU/A	TEST WT LB./BU	% 2/ SURVIVAL	HEIGTH INCHES	LODGING %	LODGING SEVER.	% 3/ SMUT	LEAF RS SEVER.4/
ID 0245	II.60-155/CI14106//M		81.95a	57.45a	99.3	32.38	17.50	1.75	.00	45.00
CI 17902	WINDRIDGE		80.41a	57.63a	100.0	36.52a	2.00	.75	.00	15.00
OR 792	TRIUMPH/LANCER,sel.1		79.41a	57.65a	97.0	36.22a	8.75	2.75	.00	20.00
UT132569	WRR/CI13837//PI17343		79.34a	57.02	95.5	36.32a	70.75a	2.75	.00	47.50
ID 0291	DURI/CI12929//DLM/4/		76.99	56.30	95.0	30.41	5.00	1.50	.00	32.50
ID 3818	WA4765/3/BEZ//BURT/1		76.35	54.37b	100.0	32.09	2.50	.75	.25	5.00
ID 0260	DLM/PI173438//CLM///		73.81	58.95a	98.7	41.63a	99.00a	5.50	.00	62.50
WA 6816	ID5912/WA5866		72.75	55.90b	99.7	30.41	5.00	.50	.25	12.50
ORCR8107	ALBA/GNS//FN/BONORA6		72.25	57.93a	98.0	37.89a	2.50	.75	.00	42.50
ID 0259	JEFF///II-60-155/CI1		71.71	57.95a	99.7	30.31	51.75	3.50	.00	45.00
MT 77002	FRD/BEZ		71.42	57.73a	99.7	35.33a	7.50	1.00	.00	17.50
MT 77066	C81-9/WLT//CRT		70.36	57.75a	100.0	36.42a	17.50	2.50	.50	10.00
WA 7043	LIND sel.n		69.94	56.52	99.3	31.89	.00	.00	.00	62.50
WA 6820	GWB/127/GWB236//GWB2		67.76	57.45a	100.0	37.36	.00	.00	.00	27.50
UT132712	KR/GVE//RDT///IT/4/P		67.56	57.83a	100.0	36.12a	61.00a	3.25	.00	37.50
CI 17727	WESTON		67.55	58.98a	99.7	34.25a	3.25	.75	.00	5.00
ID 0242	SMA/TD//3*IT/PI17838		67.12	56.73	100.0	37.70a	37.50	4.00	.00	32.50
OR 7921	BEZ/SPRAGUE,sel.18-2		66.47	57.08	95.5	27.17	.00	.00	.00	5.00
WA 7047	LIND sel.e		66.10	56.63	98.7	30.71	.00	.00	.25	35.00
UT125327	DLM/PI173438//CLM/3/		65.16	56.50	100.0	33.66a	.00	.00	.00	5.00
OR 7925	CLARIFEN/WA5836,sel.		65.10	56.00b	98.0	25.00	.00	.00	.00	75.00
CI 13880	CREST	1/	64.15	56.73	99.7	27.85	27.50	1.50	.00	50.00
ID 0217	Ae87W-46/RANGER		63.91	58.05a	98.7	37.01a	53.50	3.50	.00	37.50
ID 0216	SMA/TD//3*IT/PI17838		62.36	55.87b	98.7	37.99a	80.25a	5.50	.00	17.50
CI 13844	WANSER		61.51	57.10	100.0	33.37a	2.00	.50	.00	30.00
CI 1442	KHARKOF		59.20	57.22	95.5	43.21a	93.25a	5.25	.25	12.50
ID 51021	BEZ//BURT/178303/3/A		54.09	58.15a	100.0	32.18	.00	.00	.00	60.00
ID 51022	BEZ//BURT/178303/3/A		53.50	56.58	100.0	37.11a	.00	.00	.25	30.00

Table 2 (con't)

VARIETY	YIELD BU/A	TEST WT LB./BU	% 2/ SURVIVAL	HEIGTH INCHES	LODGING %	LODGING SEVER.	% 3/ SMUT	LEAF RS SEVER.4
X	68.87	57.14	99.24	33.88	23.25	1.72	.06	31.34
F 5/	2.43**	14.68**	1.16	5.42**	10.02**	6.74**	.89	3.17**
S.E.X.	4.41	.26	1.05	1.87	10.09	.70	.14	11.13
L.S.D. (.05)	13.25	.72	2.94	5.25	28.39	1.96	.40	32.30
C.V. %	6.84	.45	137.87	5.51	43.40	40.51	219.19	35.52

1/ Check variety
2/ % plot surviving winter kill
3/ % smut = % TCK (Tilletia controversa Kohn) smut per plot by ocular ratins
4/ Average leaf rust infected area per plot. Leaf rust (Puccinia recondita)
5/ 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