TITLE: Winter Wheat

PROJECT: Small Grains Investigations MS 756

YEAR: 1975

PERSONNEL: Leader - Vern R. Stewart
Research Technician - Nancy Campbell
Cooperator - G. A. Taylor
Cooperating Agencies - Montana Agricultural Experiment Station
Montana Wheat Research and Marketing Committee

OBJECTIVES:

1. To obtain the information necessary for making varietal recommendations and evaluating new varieties and selections.
2. To cooperate in a breeding program in Northwestern Montana designed to produce high yielding varieties with particular emphasis on quality, disease resistance - dwarf smut and stripe rust. Other agronomic characteristics such as straw strength, winter hardiness etc. will be evaluated in this program.

1975 EXPERIMENTS:

1. Western Regional Hard Red Winter Nursery
2. Off Station Nurseries
3. Western Regional White Winter Nursery
4. Crest Line Row Yield Nursery
5. Breeding Material

SUMMARY OF 1975 RESULTS:

Western Regional Hard Red Winter Nursery -

Kalispell - The nursery's yields and test weights were lower than that of last year. This was probably brought about by the hot, dry weather in July. Four entries' yields were significantly greater than the check, Crest. One entry had a yield significantly less than Crest.

Lodging was less severe than last year. There was a lodging severity of 7.88 last year compared to 3.19 this year.

There were six entries that had a significantly greater amount of dwarf smut than Crest. ID 92, one of the high yielding entries had no dwarf smut. Nine other entries also had no dwarf smut. Because of the low level of dwarf smut in susceptible varieties, those entries with low readings could, in fact, be escapes and one could not conclude that they are resistant lines from these data. Table 1.

Stillwater - The nursery at Stillwater had to be abandoned this year because of an extremely poor stand. Most entries failed to come up due to dry soil conditions.

Off Station Nurseries - Four off station nurseries were planted in the fall of 1974. Two were harvested and are reported below. The nursery in Sanders County had to be abandoned because of hail damage.

The nursery in Missoula County was abandoned because of its irregular growth. It is thought that this irregularity was caused by a herbicide injury.

Summary of 1975 Results (con't)

Lake County - Yield data was found to be non-significant. Yields and test weights ran low this year. McDermid was the highest yielding entry at 31.4 bu/a and the lowest was Paha at 13.3 bu/a. Five test weights were unobtainable because of insufficient amounts of grain. Table 2.

Ravalli County - Yields and test weights tend to be low this year. Nugaines was the only entry with a yield significantly less than the check, Crest. No yields were significantly greater than Crest. Five test weights were unobtainable because of insufficient amounts of grain. Sprague and Luke were the only two entries who's lodging severity was significantly greater than Crest. Table 3.

Western Regional White Winter Nursery - The hot, dry weather in July contributed greatly to the nursery's over all low yields, a mean of 49.73 bu/a and low test weights, a mean of 54.63 lb/bu this year. No entries were found to have yields or test weights significantly greater than the check, Nugaines. Five entries had yields significantly less than Nugaines.

Dwarf smut was not observed in three entries this year. The entries were Moro, WA 5826 and WA 6145. Stripe rust readings were not obtained this year. Table 4.

Using Nugaines as a check variety for several years, nine varieties have shown yields superior to Nugaines. WA 6145 exceeded Nugaines in yield and has good dwarf smut resistance. McDermid, OR 67205, and OR 7147 exceeded Nugaines in yield and have shown some resistance to dwarf smut. The other high yielding entries haven't shown substantial amounts of resistance to dwarf smut. Table 5.

Crest Line Row Yield Nursery - Table 6, gives yield data from several selections from the variety Crest. The F test for the lines was non-significant for yield. Significant differences were noted for heading date, plant height and lodging readings.

Breeding Material - Allan Taylor selected dwarf smut free plants and our staff harvested and threshed the seed. This was sent to Taylor for his use in the breeding program.

WINTER WHEAT VARIETIES

WINTER WHEAT VARIETIES RECOMMENDED FOR WESTERN MONTANA

Hard Red Varieties

1. Crest
2. Winalta
3. Cheyenne

Soft White Varieties

1. Nugaines
2. Luke

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 and dwarf smut
   i. Susceptible to stem rust and sawfly infestation
   j. Not extremely winter hardy
   k. Adequate baking and milling 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 resistance to stem rust

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

Recommended Varieties (con't)

Soft White Varieties

1. Nugaines
   a. Bearded variety
   b. Good yielding ability
   c. Semi-dwarf type
   d. Maturity - mid-season
   e. Good test weight
   f. Very strong straw strength
   g. Resistant to shattering
   h. Resistant to stripe rust
   i. Susceptible to dwarf smut
   j. Good baking and milling quality for cake flours

2. Luke
   a. Bearded variety
   b. Good yielding ability
   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 at Kalispell, MT in 1975. Random block design, four replications.

Date seeded: September 19, 1974 Date harvested: August 12, 1975 Size of plot: 16 sq. ft.

C. I. or State No.	Variety	Yield Bu/A	Test Wt Lbs/Bu	Heading Date	Plant Height	Lodging Prev.	Lodging Sev.	Dwarf Smut
ID 92	Minn2601255/C114106//MC	53.67a	57.40	172.00a	37.25	20.00b	2.50b	.00
CI 13844	Wanser	51.89a	58.00	167.50a	43.00a	43.75b	2.50b	.92
ID 745101	ID 5011/ID 5006	51.74a	57.00	172.75a	32.50b	80.50	1.25b	.05
MT 6715	3Yogo/CNN 2-3-13-6	50.72a	58.50	165.25	42.75a	16.25b	3.25b	1.75a
WA 7003	PI173467/IT//Wanser	48.64	58.20	172.25a	40.00a	40.00b	3.50b	1.50a
CI 12933	Itana	48.59	59.00	169.25a	46.00a	17.50b	3.00b	.45
ID 101	A68229WA185	47.84	56.50	168.75a	40.25a	41.25b	7.00a	.00
ID 102	A68230WD311	47.57	58.70	170.00a	44.00a	37.50b	3.50b	.00
ID 745102	BEZ//Burt/178383/3/ARK	47.22	58.50	168.50a	46.25a	33.75b	3.25b	.00
ID 72	CNN*2/PI 178383	47.17	60.00	171.50a	43.50a	76.25	4.25	.00
UT 819164	DM/CLM//Burt/PI178383	46.59	62.00	170.75a	47.00a	99.00	1.00b	.00
UT 84557	DM/173438//CLM/3/DM/4/CO	46.52	59.10	169.25a	44.25a	61.25	3.50b	.00
CI 17296	Hansel	46.27	59.60	169.25a	44.75a	74.75	5.50	.00
ID 745103	Pope//BEZ/3/Burt/178383	45.11	59.30	176.00a	44.25a	12.50b	2.50b	1.12a
ID 103	II-60-157/Wanser//McCall	44.86	55.20	166.25	32.50b	99.00	1.00b	2.05a
CI 13880	Crest 1/	44.84	57.00	166.00	37.75	81.00	4.75	.00
MT 6828	Burt/PI 178383 13-1201	43.61	54.20	166.75	41.00a	77.00	4.00	.37
ID 745104	Pope//BEZ/3/Burt/178383	43.41	58.50	171.00a	43.50a	27.50b	3.00b	.50
UT 819116	DM/CLM//Burt/PI 178383	42.74	57.50	170.75a	41.50a	76.75	1.25b	.00
MT 6930	NB176/Y18181//YTO1174-3	41.19	60.40	170.00a	44.50a	45.00b	3.00b	1.00a
CI 1442	Kharkof	39.14	57.70	172.00a	44.50a	38.50b	3.00b	1.37a
CI 17295	Cardon	33.36b	58.50	170.25a	43.50a	59.50	3.75	.22
	$\bar{x}$	46.03	58.22	169.82	42.02	52.66	3.19	.51
	F 2/	5.00**	.00	40.31**	36.30**	4.80**	16.57**	4.14**
	S. E.$\bar{x}$	2.02	.00	.40	.66	12.32	.35	.33
	L.S.D. (.05)	5.71	.00	1.13	1.86	34.85	1.00	.93
	C.V. %	4.39	.00	.24	1.57	23.40	11.05	63.68

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

Table 2. Agronomic data from the off station winter wheat nursery grown in Lake County on the Jaye Johnson farm, Ronan, MT in 1975. Random block design, four replications.

Date seeded: September 27, 1974 Date harvested: September 5, 1975
Size of plot: 16 sq. ft.

C.I. or State No	Variety	Yield Bu/A	Test Wt. Lbs/Bu.	Plant Height	Lodging Prev.	Lodging Sev.
MT 6829		13.8		19.0	31.0	2.3
CI 17295	Cardon (UT 755090)	21.2	55.6	23.0	17.5	2.5
CI 8885	Cheyenne	27.6	56.5	27.5a	22.5	3.0
CI 15327	Sundance	28.3	56.4	27.3a	42.5	5.3a
CI 15317	Franklin	24.1	56.9	28.0a	28.8	4.3
MT 6828	Burt/PI 178383	16.1		21.0	32.3	2.8
ID 0037	Jeff	30.9	56.9	29.8a	40.0	4.0
CI 17296	Hansel (UT 755204)	26.9	55.9	26.5a	32.5	3.3
CI 17298	Peck (ID 71041)	19.1		23.0	32.3	1.8
CI 13968	Nugaines	19.0		21.0	7.5	2.3
CI 14586	Luke	30.4	54.5	21.8	16.3	3.0
CI 14564	Hyslop	28.1	52.9	22.5	11.3	2.0
CI 14565	McDermid	31.4	52.5	20.8	16.3	2.5
CI 14485	Paha	13.3		24.0	33.5	2.0
CI 13880	Crest 1/	22.3	54.5	20.3	15.0	3.0
CI 15376	Sprague	27.3	53.6	23.5	37.5	5.0a
	$\bar{x}$	23.7	55.1	23.7	26.0	3.0
	F 2/	N.S.	0.0	3.5**	N.S.	5.3**
	S.E.$\bar{x}$	5.4	0.0	1.7	14.3	0.6
	L.S.D. (.05)	15.4	0.0	4.9	40.7	1.3
	C.V. %	22.8	0.0	7.2	55.0	15.0

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

Table 3. Agronomic data from the off station winter wheat nursery grown in Ravalli County on the Ross McIntre farm, Stevensville, MT in 1975. Random block design, four replications.

Date seeded: September 26, 1974 Date harvested: September 9, 1975
Size of plot: 16 sq. ft.

C.I. or State No	Variety	Yield Bu/A	Test Wt. Lbs/Bu.	Plant Height	Lodging Prev.	Lodging Sev.
MT 6829		17.7		22.3	32.3	1.8
CI 17295	Cardon (UT 755090)	27.0	57.1	24.5	32.3	1.8
CI 8885	Cheyenne	23.5	56.1	21.8	54.5	1.5
CI 15327	Sundance	24.3	53.4	21.3	12.5	2.0
CI 15317	Franklin	17.2		22.5	32.3	1.8
MT 6828	Burt/PI 178383	16.6		21.0	10.0	2.0
ID 0037	Jeff	24.0	56.7	24.3	34.8	2.0
CI 17296	Hansel (UT 755204)	26.6	56.7	24.3	12.5	2.3
CI 17298	Peck (ID 71041)	16.1		19.8b	76.8	1.3
CI 13968	Nugaines	15.3b		17.0b	17.5	2.0
CI 14586	Luke	22.4	51.1	19.3b	50.0	8.0a
CI 14564	Hyslop	25.4	48.2	18.5b	32.5	1.8
CI 14565	McDermid	22.4	48.5	19.3b	22.5	2.0
CI 14485	Paha	19.5	47.6	17.3b	76.8	1.3
CI 13880	Crest 1/	22.9	53.0	22.8	32.5	1.8
CI 15376	Sprague	27.4	54.9	20.0	45.0	7.8a
	$\bar{x}$	21.8	48.6	21.0	35.9	2.5
	F 2/	2.5**	0.0	5.6**	N.S.	86.1**
	S.E.$\bar{x}$	2.6	0.0	1.0	17.5	0.2
	L.S.D. (.05)	7.3	0.0	2.9	49.8	0.6
	C.V. %	11.9	0.0	4.8	48.8	8.9

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