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- TITLE: Winter Wheat
- PROJECT: Small Grains Investigations MS 756
- YEAR: 1971
- PERSONNEL: Leader - Vern R. Stewart  
Cooperator - G. A. Taylor
- LOCATION: Northwestern Agricultural Research Center and several off station locations throughout western Montana which will be identified in the manuscript.
- DURATION: Indefinite
- 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 Northwest Montana designed to produce high yielding varieties with particular emphasis on the acceptable quality and resistance for dwarf bunt and stripe rust. Other agronomic characteristics such as straw strength, winter hardiness etc., will be evaluated in this program.
- SIGNIFICANT FINDINGS:
1. Semi-dwarf lines used provide good straw strength, but are not satisfactory for dwarf smut resistance.
  2. Lines with PI 178383 parentage provide good dwarf smut resistance.
  3. Cheyenne or Cheyenne types are best suited for Ravalli County wheat growing area.
- FUTURE PLANS: Plans for 1971-72 include regular yield nurseries and assistance in the overall state breeding program.

MATERIALS AND METHODS:

Standard nursery procedures were used in all of the variety testing programs. A randomized block design was used having four to six replications. Data obtained were: yield; plant height; test weight; disease and lodging. Nurseries grown were: Intrastate Winter Wheat Nursery at the Northwestern Agricultural Research Center in Field E-3; Western Regional Hard Red Winter Wheat Nursery grown on the L. B. Claridge farm, Northwest of Kalispell in a dwarf bunt area; Uniform White Wheat Nursery grown at the Northwestern Agricultural Research Center in Field E-3. The off station nurseries were planted in Ravalli, Missoula, Lake, Sanders and Mineral Counties.

Plots were harvested with a power harvester.

RESULTS AND DISCUSSIONS:Intrastate Hard Red Winter Wheat Nursery

Four semi-dwarf lines were significantly higher in yield than Crest the check variety, and had exceedingly good straw strength. In all four varieties there was a high incidence of dwarf smut. Table 1. The mean of the nursery 52.3 bu/a is about average for the area in which it was grown. Lodging was very severe throughout the nursery except for the semi-dwarf lines already discussed.

In this area only short strawed or very strong strawed varieties should be considered for future testing.

Nine varieties are included in the ten year summary as seen in Table 2. Cheyenne is used as the long term check and is the only variety grown for the last consecutive ten years. Wanser, McCall and Crest are the only varieties that are equal to or exceed Cheyenne in yield. Only Crest is resistant to the prevalent race of dwarf smut.

Western Regional Hard Red Winter Nursery

The C.V. is rather high in this nursery because of unevenness in stands in replication number three. The dwarf smut level was not high, but of a high enough level to secure good differential reading. McCall and Wanser, both high yielding varieties, are very susceptible to dwarf smut. A trace amount of dwarf smut was noted in the variety Crest this season.

There were no yields significantly higher than Crest (the check) in this nursery, however twelve entries were found to be significantly lower. The mean of 36.6 bu/a is about average for this area of the valley.

Uniform White Wheat Nursery

Dwarf smut levels in this nursery were sufficient to make good differential reading between entries. Those lines with P.I. 178383 in their parentage had a high level of resistance. Luke and Nugaines were about equal in yield. Straw strength in Luke is some less than Nugaines. There were no other entries in the nursery that would be of potential value in this area, because of their susceptibility to dwarf smut. Luke is about four days later in heading than Nugaines and two to three inches taller. See Table 4 for complete details.

Seven varieties have been tested for nine years in this nursery (Table 5). Some of these will be dropped in the 1972 growing season as long time checks. Based on two years data at this location plus additional data from Washington and Oregon, Luke is to be added to the recommended list for 1972. A seed increase is being grown this season.

Off Station Nurseries

These nurseries were composed of 16 entries.

A severe infestation of blue mustard in the nursery located on the Jack Marrian farm in Sanders County, made harvest impossible and the nursery was abandoned. Very poor wheat stands in Mineral County was the reason for dropping this nursery. This study was located on the Elmer Hankenson farm near Tarkio, Montana.

Missoula County

Yield data obtained from this location was found to be statistically non-significant, however Crest was the highest yielding entry. These rather poor results can be attributed to low tillering, quite dry growing conditions and low fertility. Table 6.

Ravalli County

Cheyenne or Cheyenne type wheats continue to perform the best in this area of Western Montana. Crest was somewhat lower in yield, but was not statistically significant. Stands were good with no significant differences found between varieties. White wheats in this area have not been consistent in their performance over the years, however Omar was one of the higher yielding entries in 1971. Table 7.

Lake County

Soil variations were variable in this location, with replication one being in a very favorable location and number four in a rather dry sandy soil type. When analyzed statistically yield data was found to be non-significant. The mean yield in the nursery was quite high at 62.2 bu/a.

Table 9, is a summary of off station locations in 1971. McCall is the highest yielding entry of the hard red entries. Crest is No. 3 in rank.

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Table 1. Agronomic data from the intrastate hard red winter wheat nursery grown on the Northwestern Agricultural Research Center at Kalispell, Montana in 1971. Experimental design - random block, 6 replications.

Planting date: September 16, 1970  
 Harvest date: August 10, 1971  
 Size of plot: 16 sq. ft.

C.I. or State #	Vareity	Yield Bu/A	Test Wt Lbs/Bu	Heading Date	Plant Height	Lodging		Dwarf <sup>2/</sup> Smut <sup>2/</sup>
						Prev %	Sev. 0-9	
DK 184		81.68*	61.0	159.83a	44.33	81.00	1.33b	25
DK 142		79.91*	62.5	157.67	44.17	82.50	1.00b	15
MT 6928	NB55-391-56-D8/Wmt11-4-3	79.88*	61.5	157.83	42.17	16.50b	.17b	15
DK 176		74.76*	59.5	159.83a	43.50	83.67	4.00b	20
CI13844	Wanser	59.57	62.5	160.17a	50.67a	98.33	7.17b	x
CI13842	McCall	58.47	62.0	163.33a	48.83a	95.17	6.17b	x
MT 691	Yogo/Rsc//Marmin/3/Td	56.39	60.5	162.67a	45.83	99.00	8.50	x
CI13181	Rego	56.32	59.5	161.50a	47.67a	99.00	8.50	x
CI13670	Winalta	55.94	62.0	161.17a	49.33a	93.50	7.50b	x <sup>3/</sup>
CI13880	Crest <sup>1/</sup>	54.08	60.5	157.17	44.33	99.00	8.83	x <sup>3/</sup>
CI12933	Itana	53.25	60.5	162.00a	53.17a	99.00	8.67	x
MT 6910	Wsc/Yogo//Rsc/3/Td 231	52.70	59.0	160.00a	46.00	99.00	8.33	x
MT 6615	Rego x Yto 457	52.65	59.5	165.67a	47.00a	99.00	8.67	x
CI14580	Bridger	51.00	62.5	162.00a	49.67a	96.83	7.33b	x <sup>3/</sup>
MT 698	Wsc/Yogo//Rsc/3/Wrr 189	49.30	59.0	160.17a	47.17a	99.00	8.33	x <sup>3/</sup>
CI 8033	Yogo	48.62	59.5	164.00a	51.17a	99.00	8.50	x
CI 8885	Cheyenne	48.57	60.5	163.00a	48.67a	99.00	8.33	x
CI13190	Warrior	48.32	60.5	159.67a	48.00a	99.00	8.17	x
MT 6535	Rego/Cnn 39-7-4	47.40	61.0	164.17a	49.50a	99.00	7.83	x
MT 694	MM/Yogo//Rsc/3/Yogo/Tk/0	46.92	60.0	160.33a	49.67a	99.00	8.33	x
CI13544	Sawmont	46.80	61.0	163.33a	47.33a	99.00	8.33	x
MT 6532	Rego x Cnn 37-12-4	46.78	59.5	162.83a	48.17a	99.00	8.50	x
NB66425		46.78	60.5	159.00a	47.67a	99.00	8.33	x
MT 692	MM/Yogo//Rsc/3/Td 123	46.72	60.5	162.67a	46.83a	99.00	8.50	x
CI14000	Winoka	46.32	61.5	163.00a	47.67a	95.83	7.83	x
MT 654	Sel Bulk 7-58	44.91	60.0	163.83a	50.50a	99.00	8.33	x
MT 693	Winalta 41	44.73	60.5	162.00a	49.00a	99.00	8.17	x
CI13999	Trapper	44.58	59.0	162.17a	47.83a	99.00	8.67	x
CI13872	Froid	43.81	61.0	163.67a	51.00a	99.00	8.50	x
CI13547	Lancer	42.65	62.0	157.50	47.83a	90.83	8.33	x
MT 6616	Sel Bulk 6-142-6	40.68	60.5	164.33a	50.17a	99.00	8.00	x
CI13998	Trader	38.80	60.5	161.50a	48.33a	99.00	8.33	x
CI 6938	Kharkof Mc22	36.18	59.0	168.00a	48.17a	99.00	9.00	x
$\bar{x}$		52.3	60.6	161.7	47.9	94.3	7.4	
F-value for variety comparison		15.50**	0.0	19.96**	7.32**	8.0**	48.09**	
S.E. $\bar{x}$		2.91	0.0	.55	.89	5.23	.33	
L.S.D. (.05)		8.08	0.0	1.52	2.46	14.49	.92	
C.V. %		6.78	0.0	1.28	2.06	12.16	.77	

<sup>1/</sup> Check variety

<sup>2/</sup> x indicates presence of smut, where variety was standing % of smut was recorded.

<sup>3/</sup> found in trace amounts.

\* varieties yielding significantly more than the check .05.

a/ values significantly more than the check .05.

b/ values significantly less than the check .05.

Table 2. Summary of selected winter wheat data from the intrastate yield nurseries grown at the Northwestern Agricultural Research Center, Kalispell, Montana from 1962 - 1971.

Variety Number	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	Sta. Yrs.	% of Cheyenne	$\bar{x}$	2	3	4	10
														Yrs.	Yrs.	Yrs.	Yrs.
Cheyenne 8885	55.5	61.9	57.5	48.7	59.3	46.4	57.2	57.0	63.7	48.6	10	100	55.6	56.2	56.4	56.6	55.6
Rego 13181	60.6	60.2	49.9	42.5	62.4	43.6		51.3	58.7	56.3	9	97	53.9	57.5	55.4	52.5	
Winalta 13670			54.4	31.4	67.4	44.9	55.8	45.7	57.9	55.9	8	94	51.7	56.9	53.2	53.8	
Itana 12933	50.3	54.5	46.8	38.3	58.2				61.1	53.3	7	95	51.8	57.2	57.5	52.7	
Crest 13880				40.8	73.4	53.5	51.5	43.8	69.0	54.1	7	101	55.2	61.6	55.6	54.6	
McCall 13842					56.4	51.9	76.8	40.5	63.3	58.5	6	105	57.9	60.9	54.1	59.8	
Lancer 13547					57.0	41.7	44.0	38.3	58.7	42.7	6	85	47.1	50.7	46.6	45.9	
Wanser 13844					73.9	51.7	76.5	56.0	65.5	59.6	6	115	63.9	62.6	60.4	64.4	
Warrior 13190			45.8	37.1	59.5	43.5			60.8	48.3	6	89	49.2	54.6	50.9	53.0	