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Winter Grain Variety Trials in South Dakota 1954-1958

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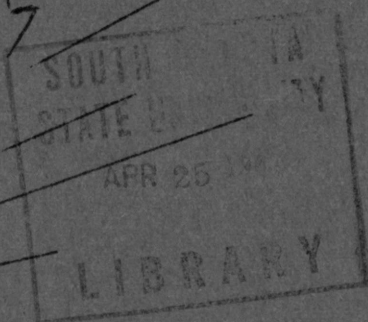
South Dakota Agricultural Experiment Station, "Winter Grain Variety Trials in South Dakota 1954-1958" (1958). *Agricultural Experiment Station Agronomy Pamphlets*. 35.
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Agronomy Department

Pamphlet 44
September 1958

WINTER GRAIN'S VARIETY TRIALS



In South Dakota
1954-1958

Agricultural Experiment Station
South Dakota State College
Brookings, South Dakota

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Winter Grain Variety Trials in South Dakota
1954-1958

A Progress Report
by

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(not for publication without permission)

Separate publication of the results of the yield trials with winter wheat, rye, and winter barley is justified by the increasing importance of these crops in South Dakota, and increasing farmer interest in them. In the past, this report was part of the annual small grain variety testing pamphlet put out from the Agronomy Department of the Agricultural Experiment Station at State College. This year a later pamphlet will report on spring sown crop varieties in performance trials in the state.

The information in this pamphlet goes primarily to county agents and extension specialists, who furnish it directly to the farmers of the state.

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- 8/ Station Supt., Range Field Station, Cottonwood.

There is need for caution in the expansion of winter grain production in this state. The last two years have had remarkable crops, inasmuch as the winters were mild enough to permit excellent survival of varieties and types which have had a history of extreme winter killing in this state. Table 9, contrasting survival at Brookings in 1955-56 as compared to 1957-58, should illustrate this point. Winter barley, too, must be considered a high-hazard crop. It is well for the grower and the county agent to keep this in mind.

In this pamphlet, the winter wheats have been grouped into classes based on their past performance and type. In general, northern types are less hardy than adapted rye varieties, central types are at the northern limit of their range and southern types and winter barleys involve high risk levels, and frequent replanting.

Five year yield averages are furnished where available. The winter grain program at this station has expanded so rapidly that these are available only for limited numbers of varieties and stations and so the exercise of "horse sense" and good judgement will be valuable in interpreting short term results.

Size and Location of Tests

Most of the data is taken from rod row nurseries, replicated three, four, or more times. Large, 1/60 acre plots are used at Cottonwood, Eureka and Newell.

Winter grain studies in 1957-58 were run at Brookings, Highmore, Cottonwood, Eureka, Menno, Presho and Newell. The results reported here are from the variety testing aspects of those studies.

Management

Summer fallow is used for winter grain seedings. This provides adequate moisture and good tilth for fall emergence. Deep furrow planting has been used for all rod row tests. Fertility is maintained at economic levels at all stations.

Factors Influencing 1958 Yields

Some of the very obvious factors affecting the yield of the 1958 winter grain crop could be noted:

A. Yield Favoring Factors:

1. Abundant fall moisture in 1957, favoring rapid emergence of seedings and excellent fall stands and growth.
2. A relatively mild winter, permitting the complete survival of varieties normally considered too tender for this area.
3. Adequate moisture in June, 1958, along with cool weather during maturation of the grain.
4. Use of deep furrow planting and adequate summer fallow.

B. Yield Reducing Factors:

1. Soil blowing at Presho and Cottonwood reduced stands on many plots.
2. Drought injury during an abnormally dry April and May, especially at Brookings.
3. Widespread and severe leaf rust infection on most wheat and all rye varieties.
4. Hail at Newell completely destroyed the winter wheat crop, June 7.
5. Widespread infestation of aphids in May and June.
6. Presence of streak mosaic injury at Presho.

Varietal Performance

Varietal performance is generally dependant on the impact of the yield influencing factors on the fixed genotypes of the varieties. 1958 was no exception. Early drouth severely limited the yields of Southern winter wheat types. Later (Northern) types benefited from June moisture and cool weather until leaf rust killed them. Thus Nebred, Cheyenne and the Minter-Minturki group yielded well in 1958. At Highmore where drouth never became too severe,

phenomenal yields of rye, winter wheat, and winter barley were recorded.

In rye, little difference in yield between the three recommended varieties was indicated.

In winter barley, Dictoo and Kearney performed best.

Using the Data

It will be noted from the tables that all yields are given in bushels per acre and test weight in pounds per bushel. Whenever possible, five year yield averages are included. Rust notes are reported in percent of infection. Notes on other agronomic reactions are given in a scale of 0-9. In this scale "0" is read as the desired reaction while "9" is the most severe possible.

Measuring Differences

Average yields are not exact, even when taken over five years' time. The differences in yield between varieties should exceed the least significant difference (L.S.D.) given at the bottom of the column, before the difference is considered due to variety, rather than to handling or soil variations.

Where the abbreviation N.S. occurs at the bottom of the column, it means that differences between the variety yield figures are not reliable, and that a variety might, by chance, have any yield in the range of yields reported. Thus, if Caribou yields 15.0 bushels and Pierre 13.0, and the difference is not significant, Pierre might just as readily yield 15.0 and Caribou 13.0. It would be well to assume that while the yields are what they are, they are really alike, except for soil and harvesting variations.

Table 1. Average Temperatures by Months and the Departure from the Long-Term Average at each of the Stations where Test Plots were located.*

Average Monthly Temperature in Degrees Fahrenheit						
	Bkgs.	Highmore	Eureka	C'w'd.	Newell	Menno
Sept.	56.9	58.3	56.5	60.3	57.7	59.6
Oct.	47.0	48.2	46.5	50.3	46.2	48.4
April	45.3	45.8	44.7	45.4	43.4	48.2
May	60.6	59.8	59.4	62.3	60.1	63.6
June	61.8	62.4	59.1	64.0	60.6	65.7
July	68.1	67.9	65.4	69.1	68.6	70.6
Mean	56.6	57.1	55.3	58.6	56.1	59.3
Departure from Long-Term Averages						
Sept.	-4.7	-4.5	-3.7	-2.7	-2.9	-5.4
Oct.	-2.6	-1.9	-1.1	0	-2.3	-4.2
April	-0.1	0	0.8	-1.4	-1.2	-1.0
May	3.0	2.6	3.1	5.0	4.7	3.6
June	-5.6	-4.3	-6.0	-2.8	-3.6	-4.4
July	-5.6	-7.0	-7.0	-6.8	-4.9	-6.1
Mean	-2.6	-2.5	-2.3	-1.4	-1.7	-2.9
						-1.5

* Data courtesy U.S. Weather Bureau, Huron, South Dakota.

** Since Prescho data are not available, Kennebec is substituted.

Table 2. Total Rainfall by Months and the Departure from the Long-Term
Average at each of the Stations where the Test Plots were located.*

	Bkgs.	Highmore	Eureka	C'w'd.	Newell	Menno	Ken.**
Sept.	1.35	2.07	2.75	0.99	1.18	1.92	1.64
Oct.	1.21	3.17	1.56	1.80	1.03	1.56	1.45
April	1.99	2.70	1.36	2.56	2.18	3.26	1.62
May	0.10	1.34	2.46	1.72	0.55	1.30	0.65
June	3.45	2.27	3.90	4.68	6.12	1.67	2.25
July	2.83	2.23	3.15	3.59	2.78	2.71	1.62
Total snow	8.3	21.1	33.5	14.5	10.2	27.7	25.0
Total	10.93	13.78	15.18	15.34	13.84	12.42	9.23
<u>Departure from Long-Term Average</u>							
Sept.	-0.75	0.86	1.45	0	0.05	-0.06	0.26
Oct.	-0.03	2.04	0.57	0.91	0.16	0.30	0.41
April	0.18	0.99	-0.02	0.94	0.43	1.11	0.97
May	-2.56	-0.84	0.06	-0.85	-2.03	-1.94	-1.71
June	-0.54	-1.44	-0.12	1.78	2.89	-2.61	-1.03
July	0.77	0.43	0.78	2.20	1.03	0.33	-1.08
Total	-2.93	2.04	2.72	4.98	2.53	-2.87	-2.18

* Data courtesy U.S. Weather Bureau, Huron, South Dakota.

** Since Presho data are not available, Kennebec is substituted.

Table 3. Winter Wheat Variety Test at the Main Station, Brookings, 1955-58*.

Variety	Av. Yield, Bu./A		Test wt. 1958	Survival 1958
	1958	1955-58		

Northern Types:

Minter	43.7	32.9	63	95
Minturki	47.5	33.1	61	98
Marmin	27.8	28.9	61	93
Yogo	48.4	31.0	63	90
Kharkof MC22	37.1	26.5	62	98

Central Types:

Nebred	37.7	30.7	62	92
Cheyenne	30.4	24.2	62	95
Chey. Sel 432	35.6	-	61	96
Kharkof	34.8	27.2	62	95
PawxNeb 13015	22.6	23.9	61	92
PawxChey 13190	24.7	-	60	90
C.I. 13279	36.7	-	62	88

Southern Types:

Wichita	24.9	23.8	63	85
Pawnee	25.5	20.5	62	90
Bison	37.3	-	62	90
Concho	34.3	17.0	62	92

L.S.D. N.S. 7.4

*No crop in 1954 due to dry fall.

Table 4. Winter Wheat Variety Test at the Central Station, Highmore, 1955-58.

Variety	Av. Yield Bu./A		Test wt. 1958	Survival 1958
	1958	1955-58		
Northern Types:				
Minter	47.6	36.4	61	100
Minturki	50.2	35.7	60	98
Marmin	45.9	---	60	95
Yogo	47.6	33.6	61	95
Kharkof MC22	45.2	32.3	57	100
Central Types:				
Nebred	48.0	30.5	61	95
Cheyenne	54.9		62	100
Chey. Sel 432	52.0		62	98
Kharkof	53.5		61	90
PawxNeb 13015	43.5		61	92
PawxChey 13190	49.0		60	90
C.I. 13279	53.1		62	88
Southern Types:				
Wichita	48.7	36.0	62	85
Pawnee	45.5	35.0	61	90
Bison	48.1		62	92
Concho	50.7		62	90
L.S.D.	9.0	3.4		

Table 5. Winter Wheat Variety Test at the South Central Station, Presho, 1958.

Variety	Av. Yield Bu./acre 1958	Test wt. 1958	Stand 1958	Leaf rust
Northern Types:				
Minter	30.7	61	64	28
Minturki	25.6	59	60	45
Marmin	27.2	60	75	50
Yogo	22.1	58	44	50
Kharkof MC22	20.5	57	44	50
Central Types:				
Nebred	25.0	60	50	60
Cheyenne	31.2	61	82	65
Chey-Sel 432	33.1	60	61	65
Kharkof	24.4	60	58	50
PawxNeb. 13015	23.6	60	49	65
PawxChey. 13190	24.9	59	59	55
C.I. 13279	27.3	61	58	30
Southern Types:				
Wichita	25.2	62	55	60
Pawnee	29.9	60	72	50
Bison	24.5	60	56	65
Concho	26.9	60	64	60
L.S.B.	9.1			

Table 6. Winter Wheat Variety Test at the South East Station, Menno, 1958.

Variety	Av. Yield Bu./Acre 1958	Test wt. 1958	Sur- vival 1958	Ht. In.
Northern Types:				
Minter	40.3	63	87	35
Minturki	36.5	62	72	35
Central Types:				
Nebred	34.8	63	70	28
Cheyenne	46.2	63	90	31
Turkey	35.5	62	77	34
Kharkof	38.9	62	72	32
Paw.xNeb. 13015	30.6	62	68	29
Paw.xChey. 13190	38.3	62	60	29
C.I. 13279	34.3	63	60	30
Southern Types:				
Wichita	36.3	63	57	30
Pawnee	35.8	63	67	28
L.S.D.	7.3			

Table 7. Winter Wheat Variety Test at the Range Field Station, Cottonwood, 1954-58.

Variety	Av. Yield, Bu./Acre		Test wt. 1958	Sur-
	1958	1954-58		vival 1958
Northern Types:				
Minter	24.2	23.7	59	65
Minturki	17.6	20.8	62	58
Yogo	19.1		60	50
Kharkof MC22	18.8		57	70
Central Types:				
Nebred	21.7	25.5	62	
Cheyenne	23.2		60	72
Southern Types:				
Wichita	23.5	21.3	63	45
Pawnee	26.3	23.8	62	60
L.S.D.	5.2	3.1		

Table 8. Winter Wheat Variety Test at the North Central Station, Eureka, 1957-58.

Variety	Av. Yield, Bu./Acre		Test wt. 1958	Survival
	1958	1957-58		
Northern Types:				
Minter	18.9	21.0	65	65
Marmin	18.1	16.4	64	60
Minturki	19.5	18.5	64	55
L.S.D.	N.S.	3.1		

Table 9. Winter Wheat Performance Notes at the Main Station, Brookings, 1955-58.

Variety	Av. survival <u>percent</u>		Drouth <u>injury</u>	Maturity <u>class</u>
	1955-56	1957-58	1958	1958
Northern Types:				
Minter	49	91	1	5
Minturki	67	94	1	6
Marmin	64	89	3	5
Yogo	51	90	1	6
Kharkof MC22	66	96	1	7
Central Types:				
Nebred	36	80	1	3
Cheyenne	27	80	2	3
Chey. Sel 432	29*	82	2	3
Kharkof	37	81	2	4
PawxNeb 13015	44	79	5	2
PawxChey 13190	43*	83	3	2
C.I. 13279	25*	69	2	3
Southern Types:				
Wichita	18	67	3	3
Pawnee	18	71	3	2
Bison	8*	70	2	2
Concho	4	61	2	1

* Data from hardiness tests

Table 10. Rate of Planting Winter Wheat, 1958.

Variety	Seeding Rate Bu./A	Yield in bushels per acre			
		Bkgs.	Highmore	Presho	Av.
Minter	1	50.5	50.2	36.1	45.6
	1/2	49.8	51.0	34.2	45.0
Cheyenne	1	47.5	64.1	36.9	49.5
	1/2	45.6	54.2	38.9	46.2
Nebred	1	40.1	46.8	42.7	43.2
	1/2	31.8	48.1	32.6	37.5
Wichita	1	37.8	36.4	36.3	36.8
	1/2	41.1	43.4	39.4	41.3
Average	1	44.0	49.4	38.0	43.8
	1/2	42.1	49.2	36.3	42.5

Table 11. Minter-Nebred Mixture Study, 1958.

Seed	Yield in bushels per acre			
	Bkgs.	Highmore	Presho	Av.
Minter	28.1	49.0	25.1	34.1
3/4 Minter	25.8	47.7	24.1	32.5
1/4 Nebred				
1/2 Minter	30.0	43.4	26.1	33.2
1/2 Nebred				
1/4 Minter	30.8	41.6	25.4	32.6
3/4 Nebred				
Nebred	29.0	47.1	27.1	34.4
L.S.D.	N.S.	7.5	N.S.	N.S.

Table 12. Rye Variety Test at the Main Station,
Brookings, 1955-58.

Variety	Av. Yield, Bu./A		Test wt. 1958	Survival 1958
	1958	1955-58		
Pierre	39.4	40.3	56	100
Antelope	44.3	42.8	57	100
Caribou	47.3	43.7	56	100
Tetra Petkus	27.3	21.6	54	100
Emerald	41.6	42.3	55	100
Balboa	34.6		55	100
L.S.D.	5.3	2.2		

Table 13. Rye Variety Test at the Central Station,
Highmore, 1954-58.

Variety	Av. Yield, Bu./A		Test wt. 1958	Survival 1958
	1958	1954-58		
Pierre	62.0	32.0	58	100
Antelope	75.8	35.5	58	100
Caribou	75.5	36.8	59	100
Tetra Petkus	38.6	16.8	55	100
Emerald	59.2	36.1	57	100
Balboa	54.8		57	100
L.S.D.	10.1	2.8		

Table 14. Rye Variety Test at the South Central Station, Presho, 1958.

Variety	Av. Yield, Bu./acre 1958	Test wt. 1958	Percent Stand 1958
Pierre	30.4	58	96
Antelope	37.4	58	97
Caribou	34.7	58	97
Tetra Petkus	17.8	52	65
Emerald	30.2	56	57
Balboa	27.7	56	85
L.S.D.	6.6		

Table 15. Rye Variety Test at the South East Station, Menno, 1958.

Variety	Av. Yield, Bu./acre 1958	Test wt. 1958	Percent Stand 1958
Pierre	38.3	60	100
Antelope	49.8	60	100
Caribou	40.1	60	100
Tetra Petkus	28.5	56	90
Emerald	41.4	59	89
Balboa	31.3	58	100
L.S.D.	5.1		

Table 16. Rye Variety Test at the Range Field Station, Cottonwood, 1954-58.

Variety	Av. Yield, Bu./acre		Test wt. 1958	Survival 1958
	1958	1954-58		
Pierre	25.2	20.3	58	100
Antelope	25.7	19.4	57	100
Caribou	26.2	25.7	58	98
Tetra Petkus	21.2	14.7	52	60
L.S.D.	N.S.	4.6		

Table 17. Rye Variety Test at the North Central Station, Eureka, 1954-58.

Variety	Av. Yield, Bu./acre		Test wt. 1958	Survival 1958
	1958	1954-58		
Pierre	13.5	21.8	55	50
Antelope	15.4	17.0	58	33
Caribou	15.2	20.9	58	60
Tetra Petkus	9.4	7.4	56	32
L.S.D.	3.3	4.3		

Table 18. Winter Barley Test at the Central Station, Highmore, 1958.

Variety	Av. Yield, Bu./A 1958	Test wt. 1958	Survival percent 1958
Dicktoo	63.6	52	100
Kearney	63.7	52	100
Reno	53.6	50	65
Mo. B 969	59.8	52	85
Siberian	53.4	51	70
L.S.D.	8.4		

Table 19. Winter Barley Test at the South Central Station, Presho, 1958.

Variety	Av. Yield, Bu./A 1958	Test wt. 1958	Survival percent 1958
Dicktoo	40.9	53	96
Kearney	46.3	52	95
Reno	42.1	51	87
Mo. B 969	39.0	50	93
L.S.D.	N.S.		

Table 20. Winter Barley Test at the South East Station, Menno, 1958.

Variety	Av. Yield, Bu./Acre 1958	Test wt. 1958	Survival percent 1958
Dicktoo	17.0	50	62
Kearney	31.2	50	81
Reno	20.9	50	72
L.S.D.	2.6		

Table 21. Suggested Varietal Choices in
Winter Grain Crops for South Dakota, 1958-59.

Rye

Pierre, Antelope, or Caribou anywhere in the state. All are sufficiently hardy and high yielding.

Winter Wheat

1. Southwest - Cheyenne or Nebred

2. Southeast - Minter

Use of deep furrow press drill is recommended for winter wheat culture. Seed rows at right angles to slope and prevailing winds.

Winter Barley

Dicktoo or Kearney where winter barley is tried. Grower risk is much higher than with recommended rye or winter wheat varieties.