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Spring Wheat Yield Trials
South Dakota, 1956-1960

by
V. A. Dirks

Agricultural Experiment Station
South Dakota State College
Brookings, South Dakota

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The 1960 Spring Wheat crop in South Dakota did not quite achieve the promise of a very favorable May and June. Hot, dry weather in early July, which was sustained into August, caused premature ripening of much of the crop, with an attendant reduction of yield and quality. The effect of high temperatures on test weight was very considerable, thus causing a major reduction in market value of much of the crop.

The following have assisted in collecting these data:

- Q. Kingsley, Assistant Agronomist, Agricultural Experiment Station
- H. Geise, Assistant Agronomist, Agricultural Experiment Station
- H. Lund, Agronomy Field Foreman, Main Experiment Station, Brookings
- A. Dittman, Station Superintendent, North Central Substation, Eureka
- W. Pringle, Station Superintendent, Central Substation, Highmore
- J. Bonnemann, U. S. Dryland and Irrigation Field Station, Newell
- J. Nesvold, Station Superintendent, Range Field Station, Cottonwood

Although the full expectations of June were not realized, the 1960 spring wheat crop must still rank as better than average, and very much better than the near failure of 1959.

Yields and other pertinent information were obtained from all eight experimental locations in the state and are reported here for those varieties of hard red spring wheat and durum wheat which are of major interest to growers in the state. A much larger range of material is actually tested than the varieties here reported; this includes special purpose check varieties, numerous unnamed selections which are potential varieties, and varieties which may occupy only minor acreages but which may be of interest to limited groups and under special circumstances.

Specific comments on the environment as affecting the 1960 spring wheat crop should include the following:

1. A favorable spring moisture situation at planting time, followed by excellent growing conditions through June. This tended to favor very heavy tillering and production of heavy stands of long spikes at heading time.
2. Extremely hot, dry weather in July which, imposed on the thick stands of wheat, caused shrivelling of kernels and premature ripening.
3. Frequent wet periods in April delayed planting beyond optimum dates at most locations.
4. Local drouth conditions prevailing in northwest South Dakota reduced yields on dryland at Newell and at Eureka.
5. Stem rust, apparently of "older" races affected Ceres and Marquis at the eastern locations in the state.
6. Fairly severe leaf rust occurred at the eastern and central stations.
7. Scab was quite apparent at Brookings and Menno.

Principal observations in 1960:

1. Early maturity was favored throughout the state. Late maturing varieties, like Conley, were severely hurt by heat.
2. The excellent yielding ability of Selkirk was demonstrated once again, even if it had low test weights.
3. The variety Pembina appears extremely similar to Selkirk in appearance and performance, and its production as an improved quality replacement for Selkirk appears justified.
4. The two new durum wheats, Wells and Lakota, were satisfactory in 1960.

The data are reported by stations, and include the 1960 yields and test weights of the varieties. In addition, the percent yield of each variety in terms of the average yield of all varieties and strains of its class at that station is given, both for 1960 and the five-year period, 1956-1960.

The station average represents the potential pool of available or nearly available varieties to the grower. A variety rating above the mean (having a score of 100 or over) would represent a good choice; one well below the average, a poor choice, which might call for a reconsideration.

Of course, this is a yield rating only. The other aspects, such as market quality, limit the use of less desirable, even if high yielding, alternative varieties. Then poor yield performance of the varieties grown in relation to those that could be grown (if they had quality) indicates the magnitude of the task still ahead of the research worker. For two varieties to have yield differences that are highly reliable, they must differ by at least the L.S.D. This is given where it applies.

Recommended Varieties for 1961 Planting

Bread Wheat:

Selkirk - throughout the eastern and central areas of the state

Pembina - the same area as Selkirk

Lee - central and western South Dakota

Rushmore- central and western South Dakota

Canthatch - northwestern South Dakota

Durum Wheat:

Langdon - northeastern South Dakota

Ramsey - northeastern South Dakota

Wells - eastern and central South Dakota

Lakota - eastern and central South Dakota

Table 1. Spring Wheat Variety Test at Main Station, Brookings,
1956-60

<u>Variety</u>	<u>Yield bu/acre</u>	<u>1960</u>		<u>Wt/bu lbs.</u>	<u>1956-60</u>	
		<u>Yield</u>	<u>Pct. sta. av.</u>		<u>Yield</u>	<u>Pct. sta. av.</u>
Bread Wheat	33.6					
Selkirk	39.1	117		54		109
Pembina	40.1	119		56		107*
Thatcher	29.2	87		55		98
Canthatch	31.3	93		56		102*
Conley	27.2	81		53		94
Rushmore	37.9	113		57		106
Lee	37.3	111		56		104
Mida	34.9	104		57		102
Spinkota	32.7	97		59		102
Ceres	20.4	61		52		89
Marquis	13.0	39		46		71
Durum	38.7					
Yuma	29.7	77		55		79
Langdon	40.6	106		57		109
Ramsey	33.2	86		57		96
Wells	38.9	101		55		104*
Lakota	40.7	106		54		107*
L.S.D.	3.3					

Five year station yield average:

Bread Wheat, 25.9 b/a; durum wheat 24.5 b/a.

* Three or four year ratings

Table 2. Spring Wheat Variety Test at the Northeast Research Farm,
Watertown, 1956-60

Variety	1960			1956-60
	Yield bu/acre	Yield Pct. sta. av.	Wt/bu lbs.	Yield Pct. sta. av.
Bread Wheat	22.5			
Selkirk	25.7	114	53	110
Pembina	20.7	92	54	101*
Thatcher	13.1	58	54	75
Canthatch	21.4	95	55	89*
Conley	16.7	74	53	79
Rushmore	22.4	99	56	92
Lee	31.3	139	55	114
Mida	26.2	116	57	105
Spinkota	26.8	119	59	122
Ceres	12.6	56	47	78
Marquis	11.3	50	51	63
Durum	27.9			
Yuma	19.1	69	56	85
Langdon	25.9	93	58	105
Ramsey	25.3	91	60	91
Wells	30.0	108	55	116*
Lakota	27.3	98	56	106*
L.S.D.	5.7			

Five year station yield average:

Bread Wheat, 17.9 b/a; durum wheat, 21.3 b/a.

* Three or four year ratings

Table 3. Spring Wheat Variety Test at the Southeast Research Farm,
Menno, 1956-1960

Variety	1960		Wt./bu lbs.	1956-60
	Yield bu/acre	Yield Pct. sta. av.		Yield Pct. sta. av.
Bread Wheat	26.2			
Selkirk	28.8	109	54	111
Pembina	35.1	133	56	--
Thatcher	25.0	95	54	103
Canthatch	25.1	95	54	100*
Conley	18.9	72	52	79
Rushmore	28.2	107	55	106
Lee	22.9	87	54	97
Mida	22.0	84	57	102
Spinkota	25.5	97	56	98
Durum	34.5			
Yuma	29.3	85	55	88
Langdon	39.5	115	59	107
Ramsey	28.4	82	56	92
Wells	39.4	114	56	112*
Lakota	35.9	104	53	115*
L.S.D.	6.9			

Five year station yield average:

Bread Wheat, 18.1 b/a; durum wheat, 19.4 b/a.

* Three or four year ratings

Table 4. Spring Wheat Variety Test at the South Central Research Farm,
Presho, 1958-60

<u>Variety</u>	<u>1960</u>		<u>Wt./bu</u> <u>lbs.</u>	<u>1958-60</u>
	<u>Yield</u> <u>bu/acre</u>	<u>Yield</u> <u>Pct. sta. av.</u>		<u>Yield</u> <u>Pct. sta. av.</u>
Bread Wheat	8.9			
Selkirk	14.2	160*	48	136
Pembina	9.4	106	44	102
Canthatch	6.9	78	45	81
Conley	2.5	28	42	49
Rushmore	9.4	106	48	111
Lee	10.7	120	48	133
Mida	5.0	56	44	--
Ceres	3.4	38	46	--
Durum	5.8			
Langdon	4.3	74	39	106
Ramsey	9.4	161*	46	--
Wells	4.3	74	43	--
Lakota	5.2	89	39	--
L.S.D.	2.5			

*Seeded a few days earlier than other varieties

Three year station yield average:

Bread Wheat, 7.0 b/a; durum wheats, 8.7 b/a.

Table 5. Spring Wheat Variety Test at the Central Station, Highmore,
1956-60

Variety	1960		Wt./bu lbs.	1956-60
	Yield bu/acre	Yield Pct. sta. av.		Yield Pct. sta. av.
Bread Wheat	21.5			
Selkirk	23.1	108	50	105
Pembina	24.5	114	52	104*
Thatcher	20.5	96	52	92
Canthatch	22.6	105	52	97*
Conley	14.8	69	51	85
Rushmore	23.4	109	54	99
Lee	24.6	115	55	107
Mida	23.4	109	55	107
Spinkota	24.8	116	59	105
Ceres	19.3	90	54	88
Marquis	19.1	89	53	84
Durum	19.7			
Yuma	9.9	50	53	80
Langdon	20.9	106	56	105
Ramsey	20.8	106	58	96
Wells	21.5	109	55	117*
Lakota	21.9	111	53	108*
L.S.D.	3.0			

Five year station yield average:

Bread Wheat, 17.6 b/a; durum wheat, 19.8 b/a.

* Three or four year ratings

Table 6. Spring Wheat Variety Test at the North Central Station,
Eureka, -1956-60

<u>Variety</u>	<u>Yield bu/acre</u>	<u>1960</u>		<u>1956-60 Yield Pct. sta. av.</u>
		<u>Yield Pct. sta. av.</u>	<u>Wt./bu lbs.</u>	
Bread Wheat	13.3			
Selkirk	13.5	102	48	98
Pembina	14.1	106	52	93*
Thatcher	14.3	108	54	94
Canthatch	15.2	115	54	94*
Conley	10.5	79	54	90
Rushmore	15.0	113	54	94
Lee	14.2	107	54	106
Mida	12.6	95	56	97
Spinkota	14.0	106	59	107
Ceres	13.0	98	57	98
Marquis	14.5	109	56	86
Durum	13.4			
Yuma	11.1	83	57	81
Langdon	14.3	107	56	108
Ramsey	13.8	104	58	102
Wells	12.4	93	56	105*
Lakota	16.8	126	55	110*

Five year station yield average:

Bread Wheat, 19.7 b/a; durum wheat, 19.2 b/a.

* Three or four year ratings

Table 7. Spring Wheat Variety Test at the Range Field Station,
Cottonwood, 1956-60

<u>Variety</u>	<u>1960</u>			<u>1956-60</u>
	<u>Yield</u> <u>bu/acre</u>	<u>Yield</u> <u>Pct. sta. av.</u>	<u>Wt./bu</u> <u>lbs.</u>	<u>Yield</u> <u>Pct. sta. av.</u>
Bread Wheat	29.4			
Selkirk	30.0	102	56	103
Pembina	26.1	89	57	--
Thatcher	32.3	110	58	96
Canthatch	32.2	109	60	105*
Conley	28.7	98	59	91
Rushmore	28.9	98	60	98
Lee	35.7	121	59	109
Mida	25.2	86	59	92
Spinkota	31.0	105	62	111
Ceres	38.7	132	61	109
Marquis	30.6	104	59	93
Durum	34.9			
Yuma	32.7	95	60	90
Langdon	39.8	115	62	107
Ramsey	39.5	115	63	103
Wells	30.4	88	62	102*
Lakota	32.7	95	59	103*

Five year station yield average:

Bread wheat, 23.6 b/a; durum wheat, 24.7 b/a.

* Three or four year ratings

Table 8. Spring Wheat Variety Test on Dryland at the Newell Station,
1956-60

<u>Variety</u>	<u>Yield bu/acre</u>	<u>1960</u>		<u>Wt./bu lbs.</u>	<u>1956-60* Yield Pct. sta. av.</u>
		<u>Yield</u>	<u>Pct. sta. av.</u>		
Bread Wheat	12.4				
Selkirk	12.9	104		54	111
Pembina	12.4	100		59	100**
Thatcher	12.6	102		56	108
Canthatch	10.9	88		54	91**
Conley	12.0	97		56	90
Rushmore	13.3	108		57	100
Lee	11.8	96		58	101
Mida	12.2	99		57	99
Ceres	11.6	94		58	95
Marquis	11.3	92		57	93

Four year station yield average: *
Bread Wheat, 8.9 b/a.

* 1958 crop hailed out, not included

** Shorter period approximation

Table 9. Spring Wheat Variety Test on Irrigation at the Newell Station, 1956-60

Variety	1960			1956-60*
	Yield bu/acre	Yield Pct. sta. av.	Wt./bu lbs.	Yield Pct. sta. av.
Bread Wheat	40.8			
Selkirk	41.4	101	59	104
Pembina	40.1	98	62	97**
Thatcher	41.2	101	60	99
Canthatch	41.6	102	62	105**
Conley	36.8	90	60	95
Rushmore	40.2	98	61	100
Lee	41.2	101	61	95
Mida	38.7	95	62	104
Ceres	41.7	102	63	108
Marquis	40.6	99	62	93

Four year station yield average: *
Bread Wheat, 32.2 b/a.

* 1958 crop hailed out, not included

** Shorter period approximation

Table 10. Selected 1960 Performance Notes on Spring Wheat Varieties

<u>Variety</u>	<u>Brookings</u>			<u>Scab rating</u>	<u>Eureka Straw breaking</u>	<u>Menno Lodging score</u>
	<u>Date headed</u>	<u>Stem rust</u>	<u>Leaf rust</u>			
Bread Wheat						
Selkirk	6-28	0	30	3	0	0.0
Pembina	-25	0	35	2	0	1.5
Thatcher	-22	6	75	5	0	0.5
Canthatch	-22	2	70	4	0	0.5
Conley	7-1	0	32	6	24	2.3
Rushmore	6-25	0	60	5	0	0.3
Lee	-24	0	40	9	28	2.3
Mida	-27	4	55	7	4	--
Spinkota	-28	0	75	3	3	3.3
Ceres	-26	35	65	4	1	--
Marquis	-30	50	55	6	8	--
Durum						
Yuma	6-27	0	0	5	0	1.0
Langdon	-26	0	4	4	0	1.7
Ramsey	-28	0	8	6	0	0.8
Wells	-24	0	0	7	0	1.7
Lakota	-22	0	0	9	0	0.7

Stem rust and leaf rust and straw breaking readings expressed as per cent of maximum possible **reading**. Scab and lodging ratings are on a 0-10 scale of increasing severity.