Agronomy Pamphlet #73

December, 1962

ANNUAL PROGRESS REPORT

NORTHEAST RESEARCH FARM

Watertown, South Dakota

INTRODUCTION

The Northeast Research Farm is utilized for testing varieties and selections of several crops grown in the Northeast part of the state. Because soil and climatic conditions at the station approximate those of the Northeastern area of South Dakota, it is the only station at which crops adapted to that area can be extensively and adequately tested.

Recorded rainfall covering the period of April 1 through October 31 was the highest in the history of this station. A total of 25.6 inches fell during this period, which is 8.35 inches above normal. This above normal rainfall caused some soil erosion, and also necessitated replanting of some of the crops. The small grain crops suffered much damage, and in some cases had to be replanted. The replanted material did not produce as well as the early plantings.

A 5% increase in subsoil moisture has raised the content above the 1961 level, and prospects look favorable for a good crop season in 1963.

The temperatures averaged below normal for every month except October, which averaged 2.3 degrees above. Having low temperatures and high precipitation did not increase grain yields over 1961 but did help in the production of high hay tonnages.

A summer field day, July 12th, was attended by approximately 150 people and the interesting areas of the farm were discussed. There is no field day scheduled for 1963, but the farm is always open for observations and visitors.

NORTHEAST EXPERIMENTAL FARM COMMITTEE

Member	County	Address
W.H. Schwanke (Chairman)	Codington	Watertown- Route 4
F. Morris (Secretary)	Codington	Watertown
Harold Hurlbut	Clark	Raymond
W. Peterson	Day	Lily
Alfred Skovly	Deuel	Astoria
Lyle Kriesel	Grant	Summit
Oliver Heitsmeyer	Hamlin	Estelline
Donald Naddy	Marshall	Britton
Elmer Greseth	Roberts	Sisseton

This report was prepared by the staff members of South Dakota State College as indicated in each section, and assembled by Q. S. Kingsley, Agronomy Department.

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FERTILITY AND CULTURAL PRACTICE EXPERIMENTS

Q. S. Kingsley and F.E. Shubeck

Table 1. Comparison of Legumes, Commercial Nitrogen and Fallow for Increasing Yields of Spring Wheat.

	Preceding Crop or Treatment	Pounds of Fertilizer Applied per acre to Wheat N	P_2O_5	K_2O	Spring Wheat Bu/A.
1	Oats	0	40	0	24.0
2	Oats	30	40	0	23.0
3	Alfalfa for hay	0	40	0	29.1
4	Red Clover for hay	0	40	0	29.3
5	Sweet Clover for seed	0	40	0	29.5
6	Sweet Clover fallow	0	40	0	27.6
L.S.D. at 5%					2.8

For experiment objectives, cropping sequence and other details, see Agronomy Pamphlet #53.

The data in Table 1 are the results of 6 separate rotations, all of which have wheat in the cropping sequence. The table was set up in such a way that attention would be focused on how the yield of the cash crop wheat was influenced by the preceding treatments and legumes.

Treatment number 1 is considered the check plot to measure nitrogen responses, therefore no commercial nitrogen or legumes were used in this rotation. Forty lbs. of P_2O_5 were applied to all plots so that possible soil deficiencies of phosphorus would not be a limiting factor.

In this year of above average rainfall, the sweet clover fallow treatment increased the yield of wheat about the same as the legume rotations without the fallow. In this wet year, all of the different legumes were effective for increasing the yield of the following wheat crop and there were no significant differences in favor of any one legume.

Table 2. Inches of Available Moisture Under Spring Wheat and Alfalfa

1961 Crop and Fertilizer Treatment	1962 Crop and Fertilizer Treatment	Inches of Available water to a depth of 5 feet * 4/19/62	Inches of available water to a depth of 5 feet * 8/15/62
Oats 30-40-0	Wheat 30-40-0	3.6	8.7
Alf hay 0-40-0	Wheat 0-40-0	1.9	6.0
Sweet Clover fallow 0-40-0	Wheat 0-40-0	4.4	7.9
Flax Alf 0-40-0	Alf. hay 0-40-0	3.1	3.9

*In calculating inches of available water, the bulk density and wilting points were taken from a Kranzburg loam similar to that occurring at Watertown.

The data in table 2 show again how a legume in the rotation will deplete the subsoil of moisture. Notice the low available moisture content on April 19, 1962 under wheat that followed alfalfa. The above average seasonal rainfall in 1962 conpensated for this initial handicap and the wheat yields in this plot were 29.1 bu/acre (see table 1).

The available soil moisture under alfalfa hay on Aug. 15, 1962 was considerably less than under wheat. Therefore, even in a relatively wet year it appears that if wheat follows alfalfa it will have a handicap of low subsoil moisture-unless the seasonal rainfall is again sufficient to restore this deficiency. Here again we are trading soil moisture for legume nitrogen. When we have plenty of soil moisture to trade with, this can be quite profitable. But when soil moisture is scarce, this can be a costly trade. (see progress report for 1959, Agronomy Pamphlet #53).

Table 3. Residual Effect of Legumes and Annual Applications of Commercial Nitrogen on Yield of Corn

1960 Crop	1961 Crop	1962 Crop	Lbs. of Fertilizer Applied per acre each year N	P_2O_5	K_2O	Yield of Corn in 1962 Bu/acre
1 Oats (check plot)	Wheat	Corn	0	40	0	45.4
2 Oats	Wheat	Corn	30	40	0	46.5
3 Alfalfa for hay	Wheat	Corn	0	40	0	47.6
4 Red Clover for hay	Wheat	Corn	0	40	0	48.2
5 S. Clover for seed	Wheat	Corn	0	40	0	49.3
6 S. Clover fallow	Wheat	Corn	0	40	0	48.7

This table was presented to show the residual value of including a legume in a rotation. Although the corn yield increases in the legume rotations were not statistically significant at the 5% point, the trend was apparent.

Table 4. Effect of Methods of Fertilizer Application and Weed Control on Yield of Flax

Lbs. per acre N	P_2O_5	K_2O	Method of Fert. application	Weed Control*	Yield of flax in Bu/acre
0	0	0	None applied	none	10.0
0	0	0	None applied	Weed Control	7.5
40	30	0	Drilled with seed	none	8.1
40	30	0	Drilled with seed	Weed Control	9.0
40	30	0	Disked in	none	8.3
40	30	0	Disked in	Weed Control	9.2
40	30	0	Plowed under	none	9.3
40	30	0	Plowed under	Weed Control	9.5
20	15	0	Drilled with seed	none	9.2
20	15	0	Drilled with seed	Weed Control	6.1

* Weed control consisted of 1 lb/acre of Dalapon to control grassy weeds and 1/4 lb/acre of MCP for broadleaved weeds.

For this year, there were not flax yields above that of the check plot which

received no fertilizer and no weed control spray. The 1 pound rate of dalapon is to be reduced to 3/4 pound in 1963.

Table 5. Effect of Time of Plowing Legumes on Yields of Flax and Corn

1959 Crop 40 lb. P_2O_5/A	1960 Crop 60 lb. P_2O_5/A	Crop	Time of Plowing	1962 Crop in bu/acre
1. Flax + Alfalfa	Alfalfa hay	Alfalfa hay	June 1961-after first hay crop	12.1 flax
2. Flax + Alfalfa	Alfalfa hay	Alfalfa hay	July 1961-after second hay crop	12.7 flax
3. Flax + Alfalfa	Alfalfa hay	Alfalfa hay	Early the following spring-1962	16.1 flax
4. Flax + Alfalfa	Alfalfa hay	Alfalfa hay	Spray to kill after 1st hay crop, plow in spring, 1962	12.6 flax
5. Flax + Alfalfa	Alfalfa hay	Alfalfa hay	July 1961, after 2nd. hay crop	33.3 corn

This experiment was designed to solve the problem of how to get the land back into production after alfalfa without taking a serious yield reduction in the first cash crop. When there is above average moisture this is not a serious problem and the moisture conserving practices in the experiment had only minor effects on yield. However, with the climate of 1961 and 1962, treatment 3 appeared to give a little more flax but this was not statistically significant at the 5% level.

An interesting comparison can be made regarding the best crop to follow alfalfa-a short season crop like flax or a long season crop like corn. At the present prices (Dec. 18, 1962) 12 bushels of flax is about equal in value to 33 bu. of corn.

Table 6. Residual Effect of Legume on Grain Yield

Preceding Crops*	Fertilizer Applied in 1961 and 1962	1961 Crop	1962 Crop	Wheat bu/acre
1. Alfalfa for 5 years	0-40-0	flax	wheat	27.6
2. Alfalfa for 4 years	0-40-0	flax	wheat	27.4
3. Alfalfa for 3 years	0-40-0	flax	wheat	27.8
4. Alfalfa for 2 years	0-40-0	flax	wheat	29.2
5. Flax + Alfalfa for 1 year	0-40-0	flax	wheat	21.2
6. Corn	0-40-0	flax	wheat	28.5
7. Corn	40-40-0	flax	wheat	30.5
L.S.D. at 5% level.				3.2

* For alfalfa, the year planted was counted as one year, Example: plots with Alfalfa for 5 years would have Flax and alfalfa the first year and alfalfa hay for the next 4 years.

In this experiment, it appears that neither the legumes nor the commercial fertilizer increased the yield over the check plots where no legume or Commercial nitrogen was used. The yield of flax in 1961 was rather low so evidently, not much fertility was removed from the check plots that year.

Notice the low yield for treatment 5. This is considerably less than the check plot. The reason for this is rather surprising and it nulifies, to a certain

extent, the measurement of the legume nitrogen recovery by the 1962 wheat crop. Treatment 5 had flax + alfalfa in 1960, flax in 1961 and wheat in 1962. This is the only treatment that had flax for 2 consecutive years. As a result the wild oats became a severe problem and reduced the yields. These were the only plots in this experiment that had wild oats and it occurred in all 4 replications. This was very noticeable at the field day tour and everyone there could easily pick out those particular plots from a considerable distance.

ALFALFA VARIETY TRIALS

M.D. Rumbaugh

Two alfalfa forage yield trials are currently being conducted at the Watertown station. Both tests were seeded in 1960 and differential stand losses have not yet occurred in either trial.

Table 7 reports the results obtained with varieties developed by a number of agricultural experiment stations. The recommended hay varieties, Ladak, Ranger, and Vernal have exceeded the average yield level of the test but are not significantly different from several other varieties. On the basis of previous tests, it is anticipated that the superiority of the recommended varieties will be demonstrated in future years as winter kill and disease reduce the stand and forage potential of many of the test entries.

Table 8. includes the yields of eight commercially developed strains and the check variety Vernal. Vernal has produced significantly more hay than five of the other entries.

Table 7 Alfalfa Variety Trial

Variety	Percent Stand 5/4/62	Yield (Dry Tons/Acre) 1961 2 cuts	1962 1st Cut	1962 2nd Cut	1962 3rd Cut	1962 Total	Average Total
Atlantic	99	2.18	1.83	1.83	1.07	4.72	3.45
Buffalo	100	1.91	1.58	1.79	1.07	4.43	3.17
CK	92	1.64	2.12	1.90	.40	4.42	3.03
Cody	99	1.68	1.64	1.68	1.01	4.33	3.00
Cossack	99	2.19	1.84	2.01	1.06	4.92	3.55
Culver	100	2.04	2.14	2.13	1.02	5.28	3.66
DuPuits	100	2.15	1.64	1.90	.95	4.49	3.32
Grimm	100	2.01	1.89	1.95	.98	4.82	3.42
Ladak	100	2.20	2.14	2.23	1.07	5.44	3.82
Lahontan	94	1.17	1.13	1.60	.86	3.59	2.38
Narragansett	100	2.28	1.88	2.23	.99	5.10	3.69
Nomad	99	1.72	1.88	1.86	.88	4.62	3.17
Ranger	100	2.02	1.79	1.96	1.16	4.90	3.46
Rambler	100	2.40	2.13	2.14	.69	4.95	3.67
Rhizoma	100	2.14	2.18	2.33	.97	5.48	3.81
Semipalatinsk	99	2.42	2.36	2.10	.66	5.12	3.77
Teton	98	2.00	2.11	2.26	.76	5.14	3.57
Vernal	99	2.24	2.10	2.14	1.05	5.30	3.77
Average	99	2.02	1.91	2.00	.92	4.84	3.43
L.S.D. (0.05)		N.S.	.29	.25	.17	.57	.36
(0.01)		N.S.	.38	.33	.23	.76	.48

Table 8 Alfalfa Variety Trail

Variety	Percent Stand 5/4/62	Yield (Dry Tons/Acre) 1961 2 Cuts	1962 1st Cut	1962 2nd Cut	1962 3rd Cut	1962 Total	Average Total
W.L. 200	100	1.76	1.95	2.05	.96	4.96	3.36
W.L. 300	99	1.88	1.91	1.87	.94	4.72	3.30
W.L. 400	94	1.52	1.51	1.82	.88	4.22	2.87
W.L. HLK	100	2.14	2.27	2.15	1.00	5.42	3.78
N9-504	98	2.10	2.18	2.10	1.03	5.30	3.70
N9-503	99	1.92	2.28	2.30	1.08	5.67	3.80
N9-502	100	1.87	1.94	2.10	1.00	5.04	3.46
F.D. 100	100	1.89	1.88	2.07	1.05	5.00	3.44
Vernal	98	2.03	2.35	2.23	1.07	5.65	3.84
Averages	99	1.90	2.03	2.08	1.00	5.11	3.50
L.S.D. (0.05)		.25	.26	.20	N.S.	.45	.32
(0.01)		N.S.	.35	.28	N.S.	.60	.44

SWEETCLOVER VARIETY TRIALS

M.D. Rumbaugh

Weather conditions at Watertown during the growing season of 1962 were exceptionally favorable for the development of forages. Table 9 reports the yields of sweetclover plots planted May 1, 1962, and harvested August 16, 1962. Only rarely can an average yield level of 3.59 oven-dry tons per acre be attained for first year growth. The performance of Goldtop and Madrid was quite satisfactory. These two varieties are recommended for South Dakota use on the basis of agronomic performance at a number of test locations. Comparative data for forage yields in the second year of growth at Watertown are included in table 10.

An evaluation of the seed producing potential of sweetclover varieties at Watertown was initiated in 1961. Four-row plots were established with a row spacing of 1 foot. The center two rows of each plot were harvested and threshed by hand to minimize losses due to shattering. Pounds of seed per acre for each of the ten varieties harvested in 1962 are shown in table 11. Any two varieties not joined by a common line are significantly different in yield capacity.

Goldtop and Madrid produced satisfactory, but not outstanding, seed yields. Denta was clearly superior to both of the yellow-flowered varieties. However, Denta was 38 days later in maturity than Madrid. The frost free period at Watertown in 1962 was unusually long. In a normal season Denta would likely be killed prior to full development of the seed crop. It is believed that Madrid and Goldtop are better adapted for seed production in the vicinity of Watertown than is Denta.

Table 9. First year forage yields of sweetclover varieties at Watertown, South Dakota. Seeded May 1, 1962. Harvested August 16, 1962.

Variety		Yield (Dry Tons/Acre)
Artic		2.94
Common White		3.86
Common Yellow		3.94
Cumino		2.08
Denta		3.66
Evergreen		3.69
Goldtop		4.22
Madrid		3.76
M. officinalis		3.08
Spanish		4.65
	Average	3.59
	d' (0,05)	.68
	(0.01)	.84
	C.V.	9.0%

Table 10. Second year forage yields of sweetclover varieties at Watertown, South Dakota.

Variety	Yield (Dry tons/acre) 1960	1961	Average
Common White	1.62	1.52	1.57
Common Yellow	1.88	1.72	1.80
Denta	1.28	.91 1/	1.10
Evergreen	1.77	1.48	1.62
Goldtop	2.04	1.44	1.74
Madrid	1.80	1.69	1.74
M. officinalis	1.84	1.34	1.59
Spanish	1.77	1.43	1.60
TEST AVERAGE 2/	1.75	1.34	1.54
L.S.D.(0.05)	N.S.	.21	.43
(0.01)	N.S.	.29	.57

1/ Almost completely defoliated by blister beetles/

2/ Not all varieties known.

South Dakota Agricultural Experiment Station

Sweetclover Seed Yield Trial

Location: Watertown, South Dakota
Design: Randomized Block
Method of Seeding: V-belt drill
Soil Type: Kranzburg

Plot Size : 4' x 20'
Planting Date: May, 1961
Replications: 4
Years: 1962

Variety	Pounds of Seed per acre	Date of Harvest	Days earlier (-) or later (+) than Madrid
Evergreen	718	Sept. 26	+41
Denta	455	Sept. 23	+38
Common Yellow	303	Aug. 16	0
M. Officinalis	295	July 26	-21
Spanish	245	Aug. 28	+12
Common White	236	Aug. 28	+12
Madrid	209	Aug. 16	0
Goldtop	185	Sept. 1	+16
Cumino	111	Sept. 5	+20
Artic	74	Aug. 19	+ 3
Average	283		

GRASS TESTING

J. G. Ross

Tests of varieties of smooth bromegrass, intermediate wheatgrass and crested wheatgrass were established in 1957. These have been harvested for 5 years but since smooth bromegrass has recently encroached on many of the crested wheatgrass plots, crested wheatgrass yields are not reported for 1962. New tests of these grasses were established in the fall of 1962. Yields of the different varieties are shown in Table 12.

Yields of the 3 species have not dfffered a great deal, but crested wheatgrass hay is not as desirable since it tends to be somewhat coarser than bromegrass and intermediate wheatgrass. The early spring growth of crested wheatgrass makes it desirable as an early pasture.

Among the bromegrass varieties, Canadian Common yielded the least. No variety showed a decided superiority.

Greenar, A 12496 and Idaho #3 yielded less than other intermediate wheatgrasses. Mandan 759, Ree, Nebraska 50 and Idaho #4 were the better yielding varieties, in that order.

Of the crested wheatgrass varieties, Nordan, Fairway, Nebraska 3576 and Summit appear to be the best adapted.

Table 12. Forage Yields, Bromegrass, Intermediate Wheatgrass and Crested Wheatgrass. 1962.

Variety	Average Yield Tons/acre 1962	1958-1962
BROMEGRASS		
Saratoga	2.86	1.77
Southland	2.96	1.78
Lancaster	3.40	1.86
Wisc. 55	2.94	1.80
Canada Common	2.75	1.42
Achenbach	3.19	1.74
Lincoln	3.08	1.74
Manchar	2.93	1.70
Wisc. 63	3.26	1.78
Homesteader	3.13	1.73
LSD	N.S.	

Table 12 cont.

Variety	Average Yield Tons/acre 1962	1958-1962
INTERMEDIATE WHEATGRASS		
Idaho #4	2.80	1.74
Ree	3.24	1.78
Amur	3.23	1.72
Greenar	2.42	1.60
A 12496	2.79	1.61
Neb. 50	2.79	1.77
Idaho #3	2.71	1.57
Mandan 759	3.38	1.90
L.S.D.	N.S.	
		1958-1961
CRESTED WHEATGRASS		
Commercial		1.21
Neb. 3576		1.55
Nordan		1.44
Summit		1.42
Mandan 2359		1.18
Comm. Fairway		1.45
Utah 42-1		1.28
Neb. 10		1.25
L.S.D.		

SMALL GRAIN TESTING

Standard Variety Trials of Small Grain, NE Farm, 1962

J.J. Bonnemann

Cool, moist weather conditions and adequate fertility levels at the Northeast Farm prompted production of some good small grain yields. Yields could have been much higher but rains and winds caused lodging of the rank growth, reducing yield and test weight, especially of the oats and barley.

The flax trials were severly lodged early in the growing season and became impossible to keep the crop free of weeds. At harvest time, the seed set was low and very thin. No data were taken from this test in 1962.

The later maturing, recommended oat varieties, generally of greater height, suffered from lodging and some diseases in 1962. The yields were thus reduced and test weights were light.

Newer varieties showing promise for the area in 1962 were Garland, Portage, Dodge and CI 7473. Minhafer, Rodney, Burnett and Garry all have good yield records over the five-year average.

These oat yields were achieved under good management practices at adequate fertility levels. Poor soil management can not be overcome with improved varieties.

The two new malting barley releases, Larker and Trophy produced satisfactory yields in 1962. Both of these varieties are slightly superior to Traill when all standard agronomic characters are considered. On the basis of their performance and recent complete approval by the malting barley industry, it is suggested that growers discontinue production of malting types previously used.

Selkirk and Pembina produced satisfactory yields of spring wheat in 1962. Yields were comparable and Pembina possesses some more desireable quality features than Selkirk. Some of the other entries, though higher in yield, are not acceptable to the milling industry.

Wells, Langdon and Lakota durum produced satisfactory yields in 1962 as well as over the past 5-year period. Langdon may be a high risk crop to race 15B of stem rust in 1963.

Table 13. Small Grain Variety Testing, NE Farm, 1962

Variety	Maturity	Yield Bu/A 1962	Yield Bu/A 1958-62	Test wt.
OATS				
Minhafer	E	93.6	78.7	30
Garland	L	91.0		29
Nehawka	E	90.0		29
Portage	L	88.8		30
Dodge	L	88.2		33
Clintland 60	ME	88.1		30
CI 7473	L	76.9		28
Dupree	E	76.5		26
Mo. 0-205	M	73.1	66.8	26
Nodaway	M	72.0		29
Tonka	E	70.4		32
Rodney	L	70.0	77.6	29
Burnett	ML	65.9	73.3	27
CI7399	ML	65.9		24
Ransom	E	64.2	67.6	26
Branch	L	61.1		24
Andrew	E	61.0		24
Garry	L	60.0	72.8	22
Marion	M	57.7		26
Waubay	M	56.3		26
L.S.D. -.05		17.2		
BARLEY				
Larker	M	51.8		41
Traill	M	48.8	41.9	37
Trophy	M	47.2		38
Parkland	E	44.0	38.3	37
Betzes	L	43.7		41
Freebar	E	41.9		38
Otis	E	41.3		43
Spartan	M	38.9		42
Liberty	E	38.2	39.3	35
Plains	E	38.1		36
Custer	E	36.4		33
Kindred	M	31.1	32.1	35
L.S.D.-.05		7.7		
WHEAT				
Spring				
Lathrop	M	36.6		55
CI13162	E	35.7		57
Spinkcota	M	23.4	26.6	59
CI13242	ME	23.1		53
Selkirk	M	22.4	23.9	52
Pembina	M	21.4		51
Rushmore	E	20.7	20.1	54
Lee	E	18.8	25.3	55
Justin	M	18.8		55
Mida	L	18.7	22.4	54
CI13465	M	18.0		55
Carthatch	M	16.4	18.4	56
Ceres	L	15.8	14.7	50
Thatcher	E	14.1	13.4	54
Conley	M	10.7	13.9	44
Durum				
Lakota	E	41.2	28.8	53
CI13340	M	40.5		55
Wells	E	38.3	33.3	57
Langdon	M	36.6	31.4	58
Ramsey	M	23.9	24.1	56
L.S.D.-.05		4.9		

Flax trial lodged and overrun with weeds, abandoned.

SORGHUM TESTING

Grain Sorghum Performance Trials, Area D2, 1962

Performance trials measuring the potential of commercial grain sorghum hybrids and selected Experiment Station entries were conducted by Statewide Services in 1962. The entries included were the choice of cooperating producers and checks developed by Experiment Stations. Previous results are not included in this report as this is the first year trials were conducted on a fee basis.

Fourteen entries were grown in the 1962 performance trial. Adverse weather conditions delayed planting of the trial until June 2, The late planting and cool, wet growing season delayed progress of the plants toward maturity. A killing frost, 24°F., occurred on September 20. None of the entries had reached full maturity as evidenced by the low test weights. The trial was harvested on October 4, 1962.

Yields were low, ranging from 17.8 to 4.3 cwt. per acre calculated on a dry-matter basis. Moisture in the grain averaged 19.9 percent at harvest.

The results should be examined with the thought in mind that results from only one year should not be considered conclusive.

Table 14. Grain Sorghum Performance Trial, Area D_2, NE Farm

Variety	Yield @ Cwt./A.	Percent moisture	Test wt. lbs	Height Inches	Statistical Significance
Steckley's Ex 3490	17.8	16.8	47.0	45	
SD441	17.4	13.8	45.5	48	
SD502	15.7	19.2	39.0	51	
SD503	14.1	23.9	37.5	54	
RS501	13.5	22.4	42.5	57	
SD451	13.2	21.1	44.0	48	
Northrup King 125	12.2	20.7	38.0	48	
Reliance	11.4	13.0	46.5	40	
SD102	9.5	14.5	44.0	40	
Northrup King 120	8.8	22.1	28.5	49	
Frontier 388	7.0	17.8	31.5	43	
Norghum	6.7	20.8	42.0	44	
Steckley's R-103	5.6	26.1	22.0	47	
Frontier 4008	4.3	27.1	22.5	49	
Mean	11.2	19.9			

Yield differences of less than 5.5 cwt. per acre are not considered significant.

a- Dry-matter basis.

b- Using Duncan's Multiple Range Test at the 5 percent level.

CORN TESTING

1962 Corn Performance Trials, Area D2

J.J. Bonneman

Corn Performance Trials at the NE Farm were under the supervision of Statewide Services again in 1962. Entries were chosen by producers who desired to enter hybrids for testing. The trials are conducted on a fee basis, and there were 20 entries, including checks, in 1962.

The corn was planted on May 26, and harvested October 5. Moisture contents were very high at harvest. Late planting and cool, very wet conditions early in the season delayed progress of the corn. The first frost, September 20, occurred when some entries were in the late milk stage.

Yields ranged from 54.1 to 41.4 bushels per acre with moisture in the ear corn from 38.4 to 51.9 percent. The average yield for all entries was 47.2 bushels per acre. The corn averaged 45.2 percent moisture in the ear corn for all entries and lodging was very slight.

Table 15. Corn Performance Trial, Area D2, NE Farm 1962.

Variety	Yield Bu./A.	Performance rating	Percent moisture at harvest	Stalk lodging	1961-1962 Average yield	1961-1962 Ave. % moisture
SDExptl.39	54.1	1	40.0	0		
Cargill 590	53.3	2	42.9	2		
Pioneer 385	52.9	4	48.2	0		
SD 250	48.3	8	44.7	0	54.9	43.5
SDExptl. 26	48.2	7	44.5	1	58.6	43.2
Pioneer 388	48.2	5	42.0	1	53.4	40.7
DeKalb 56	48.2	10	45.3	0		
Pioneer 3862	47.8	9	45.8	1		
Pioneer 384	47.4	14	46.3	1	56.7	43.9
SD 220	47.0	3	36.8	1	54.8	37.1
Pioneer 377A	46.9	18	51.9	1	50.5	48.7
SD 240	46.4	13	44.2	3	52.3	42.7
Disco 101-A	45.6	19	49.8	2		
DeKalb 46	45.3	12	41.8	0		
Sokota 255	45.1	17	47.4	1		
SD 210	45.0	6	38.4	1	54.2	37.6
Pioneer 391	44.8	11	39.7	2	54.3	37.9
DeKalb 62	44.7	16	45.6	0		
DeKalb 50	44.1	15	44.0	0		
DeKalb 58	41.4	20	45.0	1		
Average	47.2		45.2			
L.S.D.-.05	4.1					

SOYBEANS

C.J. Franzke

Grant is the maturity check for group O and Chippewa is the maturity check for group I. These two groups have to be tested because the Northeast Research Farm is in the transitional area between groups O & I. All of the beans produced from all varieties were small due to the drier growing season. All varieties of group I were immature when frozen by the September 20th killing frost. They produced a poorer quality of beans than group O as the beans contained an immature green color. These immatured beans produce a greenish colored oil which requires an extra distillation of the processed oil to make it clear.

Table 16. 1962 Summary of the Soybeans at NE Farm

Variety	Group	Height In.	Maturity ± Days	Lodging	Bu/acre
Grant	O	23	0	2	12.2
Merit	O	24	-3	2	13.2
Norchief	O	23	-3	2	13.9
Flambeau	O	24	-4	1	13.1
Grant matured Sept 29 - Maturity check for Group O					
Blackhawk	I	28	+ 1	2	13.9
Chippewa	I	25	0	2	13.7
Ottawa	I	28	-1	1	13.0
Chippewa matured Oct 3 - Maturity check for Group I					

CROP DISEASES AND THEIR CONTROL

Corn Diseases

C. M. Nagel
Plant Pathology Department

Root rot and lodging due to stalk rot are seriousdisease problems of hybrid corn in the eastern area of the state. Both of these diseases are caused by fungi (molds) which are capable of infecting corn plants in the field in midseason and result in important yield losses and lodging.

The disease performance experiments with hybrid corn were continued in 1962. About one hundred ninety experimental hybrids were produced in 1961 and grown the past season to incorporate these newly developed disease resistant inbred lines of corn in hybrid combinations so they could be tested as hybrids for their disease resistance and yield performances under the climate and soil conditions prevalent in the area of the Northeast Research Farm.

In 1962, experimental hybrids which contained the new disease resistant parents again performed well in the four experiments conducted at the Northeast Research Farm as the data will indicate in Table .

Certain of these experimental disease resistant hybrids have rated at the top during each of the four years in which they have been under test.

These experiments were conducted on the basis of three replications, grown in randomized blocks and all results analyzed statistically according to accepted procedures.

The experimental plots were planted on May 31 and harvested on October 25, 1962.

The first half of the 1962 growing season was abnormally wet due to the heavy amounts of precipitation, which created a saturated soil moisture condition where these experiments were grown. Because of the unfavorable growing conditions due to the excessive soil moisture plus the late date of planting because of unfavorable planting conditions appeared to limit the higher yields which might have been expected in a season such as 1962, of ample rainfall.

One of the parents of S. D. 240 (released about 2 years ago) resulted from the disease resistance program conducted under this particular project.

Table 17. Performance of 45 out of 190 experimental hybrids having varying degrees of resistance to root and stalk rot, grown in 4 different experiments at the Northeast Research Farm and compared with several commercial hybrids in 1962.

Rank of Hybrids	Yield* Bu/A.	Ear Moisture at Harvest %	Performance Rating
EXP. I:			
1	47.96	31.4	1
2 P 388	46.69	29.2	2
3	44.92	27.2	4
4	44.43	27.9	6
5	44.30	30.7	7
6	44.29	31.5	8
7 SD 210	44.26	24.0	3
8 Dek 46	44.24	26.9	5
9	43.61	31.3	10
10	42.87	30.7	12
11 SD 220	42.40	26.2	9
12	41.46	25.6	11
13	40.76	33.4	13
14	38.32	31.1	15
15	38.20	30.6	14

* Differences less than 6.55 Bu/A. not significant

Rank of Hybrids	Yield* Bu/A.	Ear Moisture at Harvest %	Performance Rating
EXP. II:			
1	51.34	27.4	1
2	50.63	30.3	2
3	47.51	30.0	3
4	47.44	30.3	5
5	47.17	29.4	4
6	47.02	30.0	6
7	46.83	30.2	7
8 SD 210	46.12	28.9	8
9	45.99	30.8	10
10	45.06	31.2	13
11 Dek 46	44.99	29.6	11
12 P 388	44.75	33.8	17
13	44.69	25.8	9
14 SD 220	44.59	29.6	12
15 SD 240	43.63	31.4	19

*Differences less than 6.14 Bu/A not significant

Rank of Hybrids	Yield* Bu/A.	Ear Moisture at Harvest %	Performance Rating
EXP.III:			
1 SD 240	48.86	30.9	1
2	48.40	34.8	4
3	48.25	33.1	3
4	48.13	32.5	2
5	46.40	34.1	12
6	46.18	29.1	5
7 P 388	45.67	31.7	11
8	45.51	28.3	6
9	45.00	28.5	8
10	44.96	34.1	16
11	44.83	28.5	9
12	44.32	30.1	13
13 SD 210	44.29	27.9	10
21 SD 220	42.75	27.2	14
29 Dek 46	40.85	.6	24

* Differences less than 4.75 Bu/A. not significant

Rank of Hybrids	Yield* Bu/A.	Ear Moisture at Harvest %	Performance Rating
EXP. IV:			
1	51.56	29.2	2
2	51.04	27.9	1
3	50.66	32.9	7
4	50.42	32.3	6
5	49.95	30.8	5
6	49.61	33.4	15
7	49.55	28.1	3
8 101A	49.32	34.9	18
9	49.00	29.5	8
10	48.96	29.7	9
13 P 388	48.58	30.7	14
14 SD 210	47.87	27.5	10
19 Dek 46	47.02	28.9	16
25 SD 220	44.68	27.4	21
47 95W	23.38	35.2	48

* Differences less than 5.25 Bu/A not significant

POTATOES

K.D. Fisher

Plant Pathology Department

Potato production is one of the important farm operations in Northeastern South Dakota. In recent years a large number of varieties have been developed throughout the United States. A number of these varieties were evaluated for yield, disease reaction and chipping quality at the Northeast Research Farm in 1962. Results of these trials are presented in the following table. It would appear that several varieties not currently produced here may be adapted to South Dakota growing conditions. Several of the new varieties have potential both for certified seed and potato chip production.

Table 18. Potato variety performance.

Variety	Total Yield (Cwt/A)	US#1 Yield (Cwt/A)	US#1 (%)	Scab 1/ Area	Scab 1/ Type	Specific Gravity	Chip 2/ Color
Red Pontiac	91	83	91	1	2	1.065	10
Red LaSoda	91	85	93	T	1	1.067	9
Norland	117	101	86	2	1	1.073	4
LaRouge	89	80	90	1	1	1.081	5
Redskin 3/	164	156	95	1	3	1.080	8
Bounty 3/	144	137	95	Russet		1.089	6
Early Ohio	82	63	77	T	1	1.086	4
Dazoc	115	93	81	T	1	1.088	4
Red Warba	118	98	83	2	1	1.084	6
Russet Rural	109	90	83	Russet		1.096	5
Haig	81	65	80	Russet		1.084	3
Kennebec	139	129	93	T	1	1.088	4
Sebago	86	80	93	T	1	1.080	5
Katadhin	93	90	97	1	1	1.088	5
Pungo 3/	133	125	94	T	1	1.092	6
Ontario	96	85	89	1	1	1.085	6
Nordak	78	71	91	T	1	1.084	5
Norgleam	103	91	88	Russet		1.088	3
LaChipper	104	94	90	2	1	1.092	4
Merrimack	80	74	92	1	1	1.090	6
Teton	100	91	91	T	1	1.090	5
Fundy	83	76	92	T	1	1.090	7

Table 18 cont.

Variety	Total Yield (Cwt/A)	US#1 Yield (Cwt/A)	US#1 (%)	Scab Area [1]	Scab Type [1]	Specific Gravity	Chip Color [2]
White Cloud	112	92	82	T	1	1.087	4
Saranac	78	55	71		Russet	1.084	9
Blanca	79	65	82		Russet	1.096	6
Navajo	75	66	88		Russet	1.093	4
Snowflake 3/	119	105	88	1	2	1.093	6

1 Scab rated as follows:

Area	Type of lesions
T - less than 1% of tuber surface scabby	
1 - 1-20% " " " "	1 -small, superficial
2 - 21-40% " " " "	2 -large, superficial
3 - 41-60% " " " "	3 -large, raised, rough
4 - 61-100% " " " "	4 -pit type scab

2 Based on a scale of 1-10; 1-5 acceptible, 6-10 too dark to be acceptable. Chipped 22 days after harvest, no cold storage.

3 Matured very late.