Agronomy Pamphlet #83

December, 1966

ANNUAL PROGRESS REPORT

NORTHEAST RESEARCH FARMS
Garden City and Watertown, South Dakota

INTRODUCTION

The State Legislature appropriated money in 1955 for new research crops, soils, and crop diseases in northeastern South Dakota. A 20-acre site was originally selected. It is located on the Otto Korth farm, 15 miles north of Watertown at the junction of Highways 81 and 20. A second site was added in 1965 at Garden City. It is located on the Everett Fletcher farm, 2 miles north and a half mile west of the Garden City junction on Highway 25. There are 45 acres in this farm for crop and soil management and 15 acres for weed control studies.

These farms provide research facilities to obtain solutions for local problems in crop production and soil management. Soil and crop management experiments include tillage methods and the use of fertilizers and the soil fertility. Crop oriented experiments are conducted on disease control, weed control, and the testing of potentially adaptable varieties.

Evaluation of plant materials by plant breeders in the Agronomy Department are carried on at these farms. Local weather conditions aid in the selection of plants adapted to the area.

There will be no field day at the Northeast Research Farm this year, but tours may be scheduled by the County Extension Agents.

NORTHEAST EXPERIMENTAL FARM COMMITTEE

Member	County	Address
W. H. Schwanke (Chairman)	Codington	Watertown-Rt.#4
Fred Morris (Secretary)	Codington	Watertown
Grant Kellog	Codington	Watertown-Rt.#2
Harold Hurlbut	Clark	Raymond
William Peterson	Day	Lily
Alfred Skovly	Devel	Astoria
Lyle Kriesel	Grant	Summit
Oliver Heitsmeyer	Hamlin	Estelline
Donald Maddy	Marshall	Britton
Elmer Greseth	Roberts	Sisseton

Farm Personnel		
Quentin Kingsley	SDSU Agronomy Dept.	Brookings
Donald W. Nelson	SDSU Employee	Garden City Unit
Edwin O. Noeldner	SDSU Employee	Watertown Unit

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

BRIEF HISTORY

All experiments or cultural practices, which formerly were at Watertown, are now being continued at Garden City. During the coming 1967 season at Garden City, the following general work will be initiated: winter wheat hardiness and yield trials; effectiveness of organic and inorganic soil mulches; to determine and control the local diseases and insects of potatoes; influence of sorghum row spacing and population on yield; the relationship of soil moisture to temperature; and plots to increase the seed supply of some experimental barleys. All experiments are on the contour with roadways located in the grassed drainways for access to the experiments.

The Watertown Unit is utilized for adaptation studies with corn, small grain, sorghum, soybeans, grasses, and for plant disease observations. These studies will be continued on this farm due to its environment and soil condition.

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1966 CROP SEASON

Table 1. Total Rainfall and Average Temperature by Months with Their Departure from Long-Time Average at Northeast Research Farms*

Watertown and Garden City Units

	April	May	June	July	Aug.	Sept.	Oct.	Total
RAINFALL*								
Total in Inches								
Watertown	1.49	0.77	1.88	2.19	4.59	1.53	1.52	13.97
Garden City	1.76	0.64	1.81	5.49	5.83	1.29	1.80	18.62
Depature from Long-time Avg.								
Watertown	-0.57	-2.10	-1.82	-0.48	+1.81	-0.32	+0.36	-3.12
Garden City	-0.43	-2.21	-2.19	+2.61	+2.87	-0.98	+0.28	-0.05
TEMPERATURE								
Average Monthly in degrees F.								
Watertown	37.0	49.5	64.3	73.4	64.9	58.2	46.7	----
Garden City	36.6	52.3	65.3	74.7	65.3	58.4	45.6	----
Departure from Long-Time Avg.								
Watertown	-6.2	-6.5	+0.4	+1.1	-4.1	-1.7	-1.0	----
Garden City	-7.7	-4.5	-0.7	+1.9	-5.7	-2.3	-3.0	----
Frost free days								
Watertown	May 20 to Oct. 5 = 138 days							
Garden City	May 11 to Oct. 4 = 146 days							

* Longtime rainfall average for 12 months

Watertown Airport	20.85
Clark	22.46

The past crop season had below normal rainfall and temperatures through the main developing stage of the crops. There was sufficient moisture for germinations and emergence but growth was poor for small grain during the normal rapid growth stage. The early poor growth and the high temperatures in July reduced small grain yields. Corn was not affected to the same degree as small grain. Adequate moisture which was received at the Garden City Unit in mid-July and August, increased the growth of the corn so the yield was larger than that in 1965.

*The above rainfalls and temperatures were taken and recorded at the Northeast Research Farms. The departure from long-time average was obtained by comparing data taken at the farm to the long-time average at the Watertown and Clark Weather Stations, courtesy U.S. Weather Bureau, Huron, South Dakota.

The frost free periods at the Watertown Unit are reported in Table 2, and shows the length of the growing season for the past 10 years.

Table 2. Periods of Frost-Free Days Recorded at the Northeast Research farm, Watertown Unit.

Year	Last Frost	First Frost	Frost-Free Days
1956	May 4	Sept. 6	125
1957	May 20	Sept. 16	119
1958	May 23	Sept. 16	116
1959	May 22	Sept. 10	110
1960	May 11	Sept. 19	123
1961	May 10	Sept. 25	138
1962	April 30	Sept. 20	143
1963	May 23	Oct. 28	158
1964	June 11	Sept. 10	92
1965	May 28	Sept. 9	104
1966	May 20	Oct. 5	138
		Average Frost Free Days	124

FERTILITY AND CULTURAL PRACTICE EXPERIMENT

Garden City Unit

Q. S. Kingsley

TITLE: The Long Term Effect of Row Versus Broadcast Method of Fertilizer Application on Soil Fertility and Crop Rotation.

OBJECTIVES OF EXPERIMENT:

1. To compare the effect on crop yields of fertilizer applied in a row with that broadcast and then plowed under or disk-in.

2. To determine the relative management efficiency of the three methods in terms of economic returns for labor, equipment, and other inputs for the typical South Dakota farms.

3. To determine the effect of the three methods on soil tests and the effect of residual carryover on the succeeding crop yield.

NEED TO STUDY:

1. Should the farmer buy equipment for the row application of most of the phosphate required for small grain and row crops? Additional labor would be needed during busy planting time for this application in comparison to the other methods.

2. Should he eliminate the additional labor by having higher rates of phosphate broadcast with nitrogen and plowed under?

3. What is the long term effect on yield and soil fertility of (1) a small amount of fertilizer applied to a small part of the surface soil as compared to (2) a large amount of fertilizer mixed throughout the surface soil?

EXPERIMENTAL PLAN:

The plots receiving nitrogen are to receive the same amount, but the two crops will receive different amounts. Corn would receive 50 pounds of nitrogen and wheat, 30 pounds of nitrogen per acre. The phosphate applications vary according to the following summary. In this summary the rates are expressed as elemental phosphorus and nitrogen in pounds per acre. Phosphorus may be convented to phosphorus pentoxide by multiplying the elemental P shown in formula by 2.3. To reverse this procedure multiply 0.44 times P_2O_5 to get the elemental P quality.

Corn - 6 treatments		Wheat - 6 treatments	
N-P-K	N-P_2O_5-K_2O	N-P-K	N-P_2O_5-K_2O
0-0-0	0-0-0	0-0-0	0-0-0
0-0-0	0-0-0	30-0-0	30-0-0
50-0-0	50-0-0	30-7-0	30-16-0
50-7-0	50-35-0	30-15-0	30-35-0
50-15-0	50-35-0	30-15-0	30-35-0
50-30-0	50-70-0	30-30-0	30-70-0

The three initial corrective treatments were included in each experimental block, as is shown below. These ratios are also in terms of the elements N,P, and K. A maintance treatment will be applied to each of these plots starting with the first crop season. No K is added in the maintenance fertilizer. The fertilizer treatment for corn is to be:

Corrective	Maintenance*
100-0-0	50-0-0
100-60-0	50-7-0
100-60-100	50-7-0
for wheat	
100-0-0	30-0-0
100-60-0	30-7-0
100-60-100	30-7-0

*The fertilizer will be broadcast in the fall and spring plowed.

There are 8 replications of the plots for each crop-year block and treatment, except for the corrective treatments which was applied to 3 plots in each of the 16 blocks. These three plots are on one end or another of each block. A randomized block design was used and the plots will remain as whole plots until the last year of the experiment (1969) at which time all plots are to be divided. Half of each plot will receive fertilizer and the other half none. Residual effects are to be determined at this time. The residual fertility is the fertilizer which was not used by corn but is used the following year by wheat or vice versa.

N and P contents will be determined for the grain, the corn stover, wheat straw and for the soil at the beginning and end of the experiment. Air and soil temperature, wind velocity, and rainfall are to be recorded as equipment becomes availab.e

Fertilizer will be applied at three different times:

1. Fall application, with plowing the following spring.
2. Spring application after plowing, then disk in.
3. Drill-with-the-seed application.

Weed control will be maintained at the discretion of the farm manager.

RESULTS:

Table 3. Time, Rate, and Placement of Fertilizer for Wheat

Treatment	Time of Method of Fertilizer Application Yield in Bushel per acre						
	Broadcast Fall		Broadcast Spring		Drill with Seed		
	1966	65-66	1966	65-66	1966	65-66	Av. 66
0-0-0	15.5	16.7	16.3	17.4	15.3	15.9	15.7
30-0-0	16.2	18.4	19.5	19.8	17.7	18.2	17.8
30-7-0	18.1	19.1	19.7	18.5	18.9	20.0	18.9
30-15-0*	17.8	----	20.0	----	20.0	----	19.3
30-15-0**	18.8	----	18.7	----	18.4	----	18.6
30-30-0	17.8	19.8	19.8	19.5	20.4	21.6	19.3

*30-15-0 Preceded by corn 1965 with 50-15-0 treatment
**30-15-0 Preceded by corn 1965 with 0-0-0 treatment

DISCUSSION AND INTERPRETATION OF RESULTS:

For this year, the largest increase over the untreated wheat yield was with the 30-0-0 treatment. Spring broadcasting and plowing under of fertilizer was the best method in 1966, but this is only one years results and definite conclusions cannot be made.

Table 4. Time, Rate and Placement of Fertilizer for Corn

Treatment	Time and Method of Fertilizer Application Yield in Bushels per acre						
	Broadcast Fall		Broadcast Spring		Starter In Row		
	1966	65-66	1966	65-66	1966	65-66	Av. 66
0-0-0*	43.6	38.9	51.4	43.6	48.4	43.7	47.8
0-0-0	45.6	40.6	49.9	43.2	45.0	42.9	46.8
50-0-0	71.2	55.3	75.8	58.9	67.0	53.4	71.3
50-7-0	75.8	59.8	77.1	58.7	65.1	53.0	72.7
50-15-0	73.5	56.4	80.3	61.9	64.9	54.3	72.9
50-30-0	73.3	58.5	74.0	58.3	62.6	53.9	70.0
Average of N + P treatment	73.4	57.5	76.8	59.5	64.9	53.7	71.7

* This treatment received 30-15-0 for wheat in 1965.

DISCUSSION AND INTERPRETATION:

The starter fertilizer produced large rapid growing corn plants in the early part of the season when conditions were cool and dry. In comparison, corn in the fall and spring-broadcast tteatments grew slower initially but responded more to rain in mid-July and August. The starter fertilized corn seemed to lose its vigor and possibly the fertilizer was used early in the season. This loss in vigor reduced the yield 8 to 12 bushels per acre when compared to the other treatments for this year. The nitrogen treatment, when compared to the untreated corn, produced the largest yield increase per acre.

Three plots of each replication received high applications of fertilizer for wheat and corn in 1965. Subsequent to this large application, a maintenance amount is to be applied each year as indicated in tables 5 and 6.

Table 5. Large Initial Application of Fertilizer Plus Maintenance Fertilizer Yield of Wheat

Rate 1965	Rate 1966	Yield Bu/A	Av. 65-66
100-0-0	30-0-0	16.4	18.1
100-30-0	30-7-0	18.2	21.8
100-30-100*	30-7-0	19.4	21.1

*Potassium was applied in 1965 only.

As a brief resume, corn was planted on the heavy fertility plots in 1965. The maintenance amount was broadcast in the fall and plowed under in the spring of 1966. The yields in 1966 are compared to those of fall broadcast and spring plow under in table 3. The yield increase from the large application did not exceed the smaller amounts applied yearly.

Table 6. Large Initial Application of Fertilizer Plus Maintenance Fertilizer for Yield of Corn

Rate 1965	Rate 1966	Yield Bu/A	Ave. 65-66
100-0-0	50-0-0	74.9	59.9
100-60-0	50-7-0	79.2	63.4
100-60-100*	50-7-0	84.1	64.5

*Potassium was applied in 1965 only.

Wheat was planted following these heavy applications in 1965 and the management was the same as for fertilized corn. By comparing table 6 to the fall broadcast treatment in table 4 the effect of residual fertilizer becomes more apparent. Increases in yield vary from 3.7 bushels for the 50-0-0 treatment to 3.4 bushels for 50-7-0 treatment and any increase in yield above this point may be due to the potassium in the initial application.

CORN AND SORGHUM FORAGE STUDIES

Q. S. Kingsley

OBJECTIVES OF EXPERIMENT:

1. Determine Yield of crop in 20 and 40 inch row spacings.
2. Compare yields of forage sorghum varieties and of a corn variety under similar condition.

ENVIRONMENT:

Fertilizer - 60-16-0 elemental
Population and seeding rates:
Corn: 40" rows - 12,000 per acre
20" rows - 22,000 per acre

Sorghum and Sudan:
40" rows - 6# seed per acre
20" rows -12# seed per acre

Planting date:	Watertown	Garden City
	May 23	May 20
Harvest date:	Aug. 29	Aug. 30

Approximate sorghum seeds per pound: 22-25,000

DISCUSSION AND INTERPRETATION OF RESULTS:

The weather conditions during the early part of the growing season were cool and dry. Weed control chemicals (Atrazine and Lorix) did not receive moisture at the right time to properly activate them. Some weed control was derived by working the materials into the soil. The 20 inch row spaced crops produced 32 percent more silage, on an average, per acre than the 40 inch row spaced at the Watertown Unit. At the Garden City Unit, the 20 inch row spaced material produced 15 percent more silage than the 40 inch row spacing.

RESULTS

Table 7. Corn and Sorghum Forage Tests 1966 Tons/Acre

	40" Rows				20" Rows			
	Watertown		Garden City		Watertown		Garden City	
	Silage	Air Dry	Silage	Air Dry	Silage	Air Dry	Silage	Air Dry
Crop	wt.	wt.	wt.	wt.	wt.	wt.	wt.	wt.
Trudan I	8.6	4.8	7.8	3.5	9.6	4.6	9.1	3.5
DeKalb SX II	11.3	6.2	12.0	5.4	13.2	7.0	12.5	5.4
Excel Chow Maker	12.6	5.9	15.2	5.8	16.1	8.3	17.4	7.3
Hi Dan 37	10.6	5.4	11.2	4.6	14.6	6.5	13.5	4.9
Piper Sudan	6.8	2.7	7.3	2.3	7.4	3.3	6.5	2.3
Rox Orange	14.6	6.8	13.8	5.2	20.2	10.2	19.5	8.0
Sweet Sioux	11.4	5.5	11.8	4.6	13.8	6.5	13.8	5.2
Hi Dan 35	10.7	4.9	14.3	5.3	12.9	5.7	16.1	5.8
Volkman S100	10.5	5.4	11.1	4.7	13.4	6.3	14.3	5.4
Rancher	9.1	4.7	11.7	4.9	16.5	6.9	15.1	5.1
Frontier S210	13.3	6.9	18.5	7.8	19.0	9.8	17.4	7.3
252 F	11.0	5.6	12.5	5.1	14.1	6.8	14.3	5.6
SD Corn Blend	10.5	5.5	10.9	4.7	14.3	6.9	12.2	4.8
Average Yield	10.8	5.4	12.2	4.9	14.2	6.8	14.0	5.4

No fertilizer was applied to the forage crop at Garden City but the Watertown study had 60-16-0 broadcast and plowed in.

PERFORMANCE TRIALS, NORTHEAST RESEARCH FARMS, WATERTOWN UNIT, 1966

J. J. Bonnemann

OBJECTIVE OF TRIALS:

Testing only at Brookings would be an insufficient guide to varietal performance of the major crops grown across the state. Hence, testing is conducted at sub-stations and with farmer cooperators so those interested can be better informed on the relative performance of varieties grown under similar environmental conditions.

DISCUSSION AND INTERPRETATION OF RESULTS:

The weather conditions during the early part of the growing season were cool and dry. Weed control chemicals (Atrazine and Lorix) did not receive moisture at the right time to properly activate them. Some weed control was derived by working the materials into the soil. The 20 inch row spaced crops produced 32 percent more silage, on an average, per acre than the 40 inch row spaced at the Watertown Unit. At the Garden City Unit, the 20 inch row spaced material produced 15 percent more silage than the 40 inch row spacing.

RESULTS

Table 7. Corn and Sorghum Forage Tests 1966 Tons/Acre

	40" Rows				20" Rows			
	Watertown		Garden City		Watertown		Garden City	
	Silage	Air Dry	Silage	Air Dry	Silage	Air Dry	Silage	Air Dry
Crop	wt.	wt.	wt.	wt.	wt.	wt.	wt.	wt.
Trudan I	8.6	4.8	7.8	3.5	9.6	4.6	9.1	3.5
DeKalb SX II	11.3	6.2	12.0	5.4	13.2	7.0	12.5	5.4
Excel Chow Maker	12.6	5.9	15.2	5.8	16.1	8.3	17.4	7.3
Hi Dan 37	10.6	5.4	11.2	4.6	14.6	6.5	13.5	4.9
Piper Sudan	6.8	2.7	7.3	2.3	7.4	3.3	6.5	2.3
Rox Orange	14.6	6.8	13.8	5.2	20.2	10.2	19.5	8.0
Sweet Sioux	11.4	5.5	11.8	4.6	13.8	6.5	13.8	5.2
Hi Dan 35	10.7	4.9	14.3	5.3	12.9	5.7	16.1	5.8
Volkman S100	10.5	5.4	11.1	4.7	13.4	6.3	14.3	5.4
Rancher	9.1	4.7	11.7	4.9	16.5	6.9	15.1	5.1
Frontier S210	13.3	6.9	18.5	7.8	19.0	9.8	17.4	7.3
252 F	11.0	5.6	12.5	5.1	14.1	6.8	14.3	5.6
SD Corn Blend	10.5	5.5	10.9	4.7	14.3	6.9	12.2	4.8
Average Yield	10.8	5.4	12.2	4.9	14.2	6.8	14.0	5.4

No fertilizer was applied to the forage crop at Garden City but the Watertown study had 60-16-0 broadcast and plowed in.

PERFORMANCE TRIALS, NORTHEAST RESEARCH FARMS, WATERTOWN UNIT, 1966

J. J. Bonnemann

OBJECTIVE OF TRIALS:

Testing only at Brookings would be an insufficient guide to varietal performance of the major crops grown across the state. Hence, testing is conducted at substations and with farmer cooperators so those interested can be better informed on the relative performance of varieties grown under similar environmental conditions.

STANDARD VARIETY SMALL GRAIN TRIALS

The small grain trials were seeded on April 15 and harvested from July 26 through early August. Seedbed moisture was good at planting time, but germination and growth were slow as temperatures were cool and precipitation limited. Percipitation was limited during much of the growing season and yields of oats and barley are down from previous years. The barley trials lodged quite badly after a heavy rain and sever windstorm shortly after heading had begun. The spring wheat and flax trials matured slowly and were able to benefit from the rains of late July and August. The quality of the 1966 small grain was rather poor.

Because of sever lodging, the malting-type barleys did not perform as well as the feed types in 1966. The two malting-type barleys, Larker and Traill, have the best 5-year averages. Several new entries were grown but conclusions cannot safely be drawn from one years' data.

The durum wheats were highest yielding in the 1966 trial and have the highest five-year averages. The newly recommended durum, Leeds, performed quite satisfactorily. The recently released spring wheat, Manitou, produced satisfactory yields for the two years it has been included in these trials.

The oat yield ranged from 60.3 down to 40.0 bushels per acre. The quality was rather poor. Clintland 64 has the highest 3-year average and broader disease resistance than Clintland 60. Brave, Dodge, Minhafer and Portage have the better yield averages of the varieties recommended for the area.

Of the recommended rust-resistant flax varieties, Summit and Windom have the highest 5-year averages.

Further information on the 1966 small grain trials can be found in Circular 179, 1966 Small Grain Variety Trials.

GRAIN SORGHUM PERFORMANCE TRIALS

The trials have been conducted at the Watertown unit for five years. The choice of entries is that of the participating producers.

Twenty entries were included in the 1966 trial. Seeding of the trials was on June 1 and harvesting was on September 27.

Seedbed conditions were excellent at planting time. However, cooler temperatures and an absence of precipitation retarded growth until late in the season. Moisture in the grain was determined on September 20. Many entries had over 35 percent moisture in the grain. However, several of the entries had apparently reached physiological maturity as test weights of the harvested grain indicate good quality for those entries.

Further information on the 1966 trial can be found in Circular 181, 1966 Grain Sorghum Performance Trials.

CORN PERFORMANCE TRIALS

Thirty-seven entries were included in the 1966 corn performance trials. The trials were seeded on May 20, The trial at Watertown was abandoned due to herbicide damage of the corn brought on by weather conditions and time of application.

Table 8. STANDARD VARIETY OAT TRIAL, NORTHEAST RESEARCH FARM, WATERTOWN UNIT, 1966

Variety	Test wt. lb/bu.	Average yields, B/A	
		1966	1964-66
Burnett	33.7	60.3	79.6
Clintford	36.0	58.8	78.1
Holden	33.0	54.5	86.3
CI 8072	32.0	54.5	----
Portal	33.2	54.2	----
Ortley	32.7	53.3	78.0
Portage	30.0	53.1	77.8
Santee	31.0	53.0	81.6
Garland	32.2	52.5	81.6
CI 8273	33.0	52.1	----
Lodi	30.7	52.0	72.3
Sioux	29.0	51.4	----
Orbit	27.7	51.4	----
Andrew	31.5	50.4	72.9
Minhafer	32.2	50.0	77.4
Clintland 64	32.0	49.4	83.8
Wyndmere	28.7	48.7	----
CI 8174	32.2	48.6	----
CI 8178	30.0	48.6	----
Tippecanoe	33.7	48.2	74.0
Peterson 100	31.2	48.1	----
Dupree	29.7	48.1	79.2
Dodge	33.7	47.9	76.9
Rodney	32.0	47.3	68.0
Mo. 0-205	30.2	47.1	78.1
Jaycee	30.0	47.1	----
Brave	29.0	47.1	80.4
Garry	30.5	46.6	72.1
Stormont	32.0	44.1	----
Tyler	30.7	43.5	77.3
Dawn	31.0	41.9	----
Coachman	32.5	40.9	73.7
Harmon	31.5	40.0	----
		Mean yield	49.5
		L s[illegible] (.05)	6.1

Table 9. STANDARD VARIETY BARLEY TRIAL, NORTHEAST RESEARCH FARM, WATERTOWN UNIT, 1966

Variety	Test wt. lb/bu	Average yields/ B/A 1966	1962-66
Spartan	43.0	37.3	41.2
Plains	37.5	37.1	43.1
Liberty	37.0	31.4	46.5
Betzes	39.0	28.9	44.3
Conquest	35.5	25.8	----
Primus	38.0	25.4	----
Larker	36.0	24.2	45.1
Galt	33.5	23.1	----
CI 13110	33.0	21.0	----
CI 11863	34.5	20.9	----
Trophy	35.0	20.1	43.4
CI 11864	32.0	18.7	----
Traill	32.5	16.4	40.8
Dickson	33.0	14.7	----
	Mean yield	24.6	
	L SD (.05)	3.7	

Table 10. STANDARD VARIETY SPRING WHEAT AND DURUM TRIAL, NORTHEAST RESEARCH FARM, WATERTOWN UNIT, 1966

Variety	Test wt. lb/bu	Average yields, B/A 1966	1962-66
Wells	60.0	30.1	29.8
Stewart 63	61.5	29.7	----
CI 13773	58.0	29.4	----
CI 13949	54.5	29.1	----
Leeds	61.5	29.0	----
Lakota	60.0	28.7	30.2
Thatcher	53.5	25.1	17.6
CI 13947	52.5	24.1	----
Justin	55.5	23.8	20.3
Manitou	53.0	23.4	----
Chris	55.0	23.3	----
CI 13826	53.0	22.9	----
Rushmore	53.0	22.8	20.9
Selkirk	48.5	21.3	20.7
Crim	52.0	21.0	20.6
Pembina	51.0	20.2	21.5
Fortuna	54.0	19.7	----
Sheridan	56.0	18.2	----
	Mean yield	24.5	
	L SD (.05)	2.5	

Table 11. STANDARD VARIETY FLAX TRIAL, NORTHEAST RESEARCH FARM, WATERTOWN UNIT, 1966

Variety	Test wt. lb/bu	Average yields, B/A	
		1966	1961-66
CI 2292	55.0	18.1	----
Summit	55.0	17.2	22.3
Redwood 65	56.0	16.8	----
Windom	55.3	16.6	21.7
Redwood	55.0	16.3	20.1
Caldwell	56.0	15.7	----
Bolley	55.0	15.7	----
Noralta	55.0	15.1	----
CI 2290	55.0	15.0	----
B-5128	55.0	14.8	18.7
Norland	55.0	13.8	18.0
Drillman	55.0	13.8	----
CI 1910	55.0	11.9	----
Mean Yield		15.4	
L SD (.05)		2.6	

Table 12. 1966 GRAIN SORGHUM PERFORMANCE TRIAL, AREA D2, NORTHEAST RESEARCH FARM, WATERTOWN UNIT

Variety	Height, inches	Percent moisture 9/20/66	Test wt. lb/bu	Yield, 100#/A.	
				1966	1965-66
T-E Exp 22128	46	35.1+	54.0	34.1	----
SD 451	45	35.1+	55.0	33.8	25.8
T-E Exp 07128	46	35.1+	57.0	33.0	----
NK 120	41	34.5	54.0	32.3	27.5
Pawnee	44	34.7	57.0	31.4	25.5
T-E 44C	43	35.1+	55.0	31.1	----
NK 133	41	35.1+	54.0	30.8	25.7
T-E Exp 22120	40	35.1+	55.0	30.8	----
Excel 202A	42	35.1+	54.0	30.5	----
Nebr. 504	44	35.1+	55.0	30.0	23.5
DeKalb B32	42	35.1+	55.0	30.0	24.7
SD 441	48	31.9	55.0	29.7	25.4
NK 115	42	33.1	54.0	29.6	27.5
T-E Exp 07120	42	35.1+	56.0	29.5	----
SD 503	47	35.1+	54.0	29.3	26.2
NK 125	44	35.1+	52.0	29.2	25.8
Colo. 585	47	35.1+	56.0	28.0	22.8
PAG 304	35	35.1+	54.0	27.2	22.2
PAG 400	44	35.1+	54.0	26.9	----
Pioneer 885	40	35.1+	52.0	23.2	15.8
Mean yield				30.0	
L SD (.05)				4.6	

COMPARATIVE TESTS OF NEW WHEAT, OATS AND FLAX STRAINS AND COMMERCIAL VARIETIES

OAT BREEDING

R. S. Albretchsen

The Uniform Midseason Oat Performance Nursery, Rod Row Oat Nursery, and a Preliminary Rod Row Oat Nursery were grown at the Watertown Unit in 1966, as a part of the Oat Breeding and Testing Program.

The Uniform Nursery is made up of superior strains entered by states throughout the North Central Region of the United States and Canada. These strains are in the final stages of evaluation and from these tests, decisions will be made concerning their releases as new varieties.

Data on selected high yielding experimental strains, recently released varieties, and long-time check varieties in the Uniform Midseason Oat Performance Nursery are shown in Table 13. Entries in this Nursery are primarily of the midseason to late maturity class, being as late as, or later than, the Clintland type oats. Most of these strains are of a maturity range suitable for growing in Northeastern South Dakota.

Data are not included for the Rod Row Oat Nursery and the Preliminary Rod Row Oat Nursery. Experimental strains in these nurseries are in the preliminary stages of testing and many will be discarded at this point in the breeding program. Strains exhibiting potential as new varieties will be advanced to testing in the Uniform Nursery.

Table 13. PERFORMANCE OF SELECTED EXPERIMENTAL OAT STRAINS AND CHECK VARIETIES IN THE WATERTOWN UNIFORM MIDSEASON OAT PERFORMANCE NURSERY.

C.I. Number	Variety or Selection	Bushel weight		Yield	
		1966	'65-66	1966	'65-66
		lbs/bushel		bushels/acre	
8168	62-3824	35.2	35.3	56.0	82.4
7978	Holden (new)	34.8	36.3	55.8	83,6
8171	I.H.5880-3-3	33.5	32.2	53.5	80.6
7982	C-2-2-58	33.0	32.9	53.5	79.3
8172	R.L. 2796	31.7	31.0	51.2	79.0
8040	Portal (new)	34.8	36.1	50.6	82.4
8178	B-60-2-149	31.9	34.2	50.4	80.2
4170	Andrew	34.3	34.8	51.9	77.8
7463	Clintford	38.2	38.1	53.3	73.1
7679	Tyler	32.4	33.6	52.4	78.1
7639	Clintland 64	34.0	36.4	49.1	69.1
6662	Garry	33.3	31.4	47.9	75.0

FLAX BREEDING

R. S. Albrechtsen

The Uniform Regional Flax Nurseries (early and late seeded), State Row Flax Nursery, Rod Row Flax Nursery, Preliminary Rod Row Flax Nursery, a Flax F_1 Yield Test Nursery, Flax Rust Differentials, and approximately 1500 plant rows were grown at the Watertown Unit in 1966 as part of the South Dakota Flax Breeding and Testing Program.

Entries in the Uniform Regional Nursery are in the most advanced stage of testing and are the only ones for which data are included in this report. Strains in this nursery will serve asathe source of new variety releases of the near future in the North Central Region of the U.S. The growing of these nurseries throughout North Central U.S. and Canada provides information for decision on the release of new varieties and in determining their areas of adaptation.

Table 14 gives performance data for entries in the early seeded Uniform Regional Flax Nursery. Data on the same entries seeded at a later date are shown in Table 15. Overall mean yield was reduced from 16.6 bushels per acre at the May 5 seeding date to 11.5 bushels per acre when the nursery was seeded on May 27. Entries responded differently to changes in date of seeding.

Performance data are not included for the three Rod Row Nurseries. Because of the preliminary nature of these tests, many entries will be discarded at this stage of the breeding program. The most promising strains will be carried on to a more advanced stage of testing.

The Flax F_1 Yield Test Nursery was grown to evaluate the potential of hybrid flax production. F_1 progeny of all possible single cross combinations among 11 varieties (121 combinations, including reciprocals) and parent varieties were grown in a hall planting to determine desirable F_1 combinations and to compare the performance of hybrid combinations with that of the parent varieties. Analyses of data from this test are imcomplete at the time of writing this report.

The Flax Rust Differentials were grown to serve as indicators of the prevalent races of flax rust in the area. No rust was observed at Watertown in 1966 because of poor environmental conditions for the development of the organism.

Phenotypic selections were made from the Flax Plant Row Material. Most promising lines will be grown in preliminary yield tests in 1967.

Table 14. RESULTS OF THE 1966 UNIFORM REGIONAL FLAX NURSERY; WATERTOWN, EARLY SEEDED. (W66 URNF-E).

1966 Entry No.	C.I. No.	Variety	Maturity Date Aug.	Ht. In.	Test wt. Lbs.	Seed per Lbs.	Yield more Bu.	Yield rank
1	389	Bison	7	20	55.0	892	15.9	14
2	1130	Redwood	9	17	55.0	884	15.8	15
3	1478	Bolley	7	20	55.0	969	17.3	4
4	1823	Windom	6	18	55.5	1021	18.3	3
5	1914	Summit	7	17	54.5	939	16.8	7
6	2430	Noralta	6	18	55.0	832	14.9	16
7	2444		11	18	53.5	929	16.6	10
8	2445		6	18	53.0	955	17.1	5
9	2446		7	17	54.5	1025	18.3	1
10	2447		8	20	54.0	911	16.3	13
11	2480		6	19	53.0	798	14.3	18
12	2481		7	19	53.5	923	16.5	12
13	2482		9	19	54.5	933	16.7	9
14	2483		7	18	54.0	939	16.8	8
15	980	B-5128	11	20	54.5	955	17.1	6
16	1908	Caldwell	5	15	54.5	824	14.7	17
17	2290		8	18	54.0	929	16.6	11
18	2292		9	19	55.0	1023	18.3	2

Seeded May 5, 1966
Overall mean = 927 lbs.; 16.6 Bu.
C.V. = 10.45%
L.S.D. = 137 lbs.; 2.46 Bu.

Number of reps = 4

Table 15. RESULTS OF THE 1966 UNIFORM REGIONAL FLAX NURSERY; WATERTOWN, LATE SEEDED (W66 URFN-L).

1966 Entry No.	C.I. No.	Variety	Maturity date Aug.	Ht. In.	Test wt. lbs.	Seed per lbs.	Yield acre Bu.	Yield rank
1	389	Bison	27	23	53.5	650	11.6	9
2	1130	Redwood	29	23	54.5	678	12.1	6
3	1478	Bolley	22	21	53.0	670	12.0	7
4	1823	Windom	24	20	53.5	696	12.4	4
5	1914	Summit	27	20	52.5	754	13.5	1
6	2430	Noralta	25	23	54.0	626	11.2	12
7	2444		27	20	54.5	728	13.0	2
8	2445		23	20	54.5	728	13.0	3
9	2446		24	22	53.0	642	11.5	10
10	2447		30	23	52.0	602	10.8	14
11	2480		28	21	49.0	568	10.2	15
12	2481		25	22	52.0	684	12.2	5
13	2482		29	23	51.0	550	9.8	18
14	2483		21	19	52.5	632	11.3	11
15	980	B-5128	31	23	51.0	566	10.1	16
16	1908	Caldwell	27	17	52.0	564	10.1	17
17	2290		28	24	54.0	654	11.7	8
18	2292		29	24	52.0	622	11.1	13

Seeded May 27, 1966
Overall mean = 645 lbs.; 11.5 Bu.
C.V. = 10.54%
L.S.D. = 96 lbs.; 1.72 Bu.

Number of reps = 4

WHEAT BREEDING

D.G. Wells

Tests of the hardiness of 2486 lines and varieties of winter wheat were disappointing because too much winter killing occured to be helpful in our program of gradual improvement of hardiness.

Hard red spring wheat and durum varieties and new strains were tested cooperatively with other states. Some of the results are shown in this report.

A seeding rates test for spring wheat was made for the second year. This will be done again in 1967 and the results summarized.

Table 16. PARTIAL SUMMARY OF ENTRIES IN THE UNIFORM REGIONAL DURUM WHEAT TESTS, 1966.

Entries	Cereal Index No.	Watertown Test weights	Watertown Yields per acre	Eureka Test weights	Eureka Yields per acre
		lbs.	bu.	lbs.	bu.
Mindum	5296	62	23.8	59	20.4
Wells	13333	60	29.2	56	17.4
Lakota	13335	58	25.4	52	13.0
Stewart 63	13371	62	26.7	59	17.4
Leeds	13768	62	29.4	61	20.1
61-48	13942	62	31.4	58	17.8
62-29	---	59	26.3	57	20.7
184	---	59	21.9	58	17.6
188	---	62	31.6	59	20.1

Table 17. PARTIAL SUMMARY OF ENTRIES IN THE UNIFORM REGIONAL HARD RED SPRING WHEAT TESTS, 1966.

Entries	Cereal Index No.	Watertown Test weights	Watertown Yields Per acre	Highmore Test weights	Highmore Yields Per acre
		lbs.	bu.	lbs.	bu.
Marquis	3641	59	21.3	53	11.9
Thatcher	10003	55	24.8	57	10.1
Selkirk	13100	52	21.4	52	12.9
Justin	13462	57	26.0	58	14.7
Chris	13751	57	26.4	57	15.6
Manitou	13775	56	30.7	55	16.8
55016	---	61	29.8	59	10.6
SD626	13949	55	28.4	56	14.4
456	13956	58	27.8	59	15.4
363	13828	55	26.9	58	17.6

SORGHUM BREEDING AND TESTING

A. O. LUNDEN

Grain sorghum yields ranged to 34 hundredweight or 61 bushels per acre in 1966. Testing of hybrids included observation testing of a large number of newly developed hybrids and replicated tests of twenty hybrids which were first produced in 1965.

A short early entry and a slightly taller later hybrid will be advanced to final testing in 1967 for potential release in 1968. Regional observation tests over a 12 state area are also scheduled for 1967. An extra leafy forage type sorghum will be tested in 1967.

SOYBEAN BREEDING AND TESTING

A. O. Lunden

Soybean yields were above the four year average which included the poor years of 1964 and 1965. Moisture conditions were favorable with an excellent stand, timely cultivation for good weed control and good growth through the season in spite of below normal temperature duting August and September.

Yield potential of the new Group 1 variety, Hark, is comparable to Chippewa at Watertown. Hark is about five days later and slightly taller than Chippewa but pod height and plant type are similar. It is recommended north to Deuel and Codington counties but will not yield appreciably above the other varieties, in the northern part of this area as it will in the counties to the south. A new new group 00 variety, Portage, which was released in North Dakota and Minnesota is not recommended because of severe potential shattering losses. The 1963-66 yield, relative maturity, plant height and lodging index for several soybean varieties and experimental strains at the NE farm are presented in Table 18.

Table 18. 1966 SOYBEAN YIELDS AND AGRONOMIC DATA AT THE N.E. FARM

Variety	Days to Maturity*	1966 Yield	1963-66 Average	Plant Ht. in 1966	Lodging Index**
Group 00 (Very Early)	-7	10.2	----	19	1
Portage					
Group0 (Early)					
Grant	0	26.2	20.3	23	2
Traverse	1	23.3	19.2	22	1.5
Group I (Midseason)					
Chippewa	3	24.1	21.5	25	2
A-100	7	23.5	19.0	26	2.5
Hark	8	26.8	21.3	31	2
Experimental					
SD 64182	5	29.0	----	24	2
SD 64177	8	29.5	----	26	2

*Days to maturity relative to Grant

**Lodging based on scale of 1 to 5 where 1 is upright and 5 is severely lodged.

WEED RESEARCH

W.G. Wright

Wild Buckwheat Control-Wheat-Watertown

Objective:

To determine minimum rates for effective wild buckwheat control of several promising herbicides.

To determine crop tolerance to these herbicides at their effective rates.

Description of Experiment:

Justin spring wheat was treated post emergence when the wheat was in the 4-5-leaf stage and the wild buckwheat was 2-3-leaf stage. A uniform stand of 20-25 wild buckwheat plants per square foot was present over the entire plot area.

Results:

Treatment	Rate oz/A	% control 6-23-66 wild buckwheat	% control 6-23-66 wild mustard	% control 7-19-66 wild buckwheat	Yield bu/A
Bromoxynil	4	89	99	88	24.6
Bromoxynil	6	97	99	98	23.5
Bromoxynil + MCPA	4+4	90	99	86	25.0
Bromoxynil + 2,4-D	4+4	92	99	88	25.5
Picloram + 2,4-D	1/4+4	90	98	95	23.4
Picloram + 2,4-D	3/8+6	93	99	99	20.9
Dicamba + MCPA	.5+4	50	98	32	24.1
Dicamba + MCPA	1+4	92	99	80	24.0
Dicamba + MCPA	1.5+4	93	99	80	23.4
Dicamba + MCPA	2+4	95	99	93	20.6
Dicamba + 2,4-D	.5+4	68	99	35	23.4
Dicamba + 2,4-D	1+4	93	99	76	22.3
Dicamba + 2,4-D	1.5+4	93	99	78	23.1
Dicamba + 2,4-D	2+4	95	99	94	25.1
Endothal 273+2,4-D	4+4	65	95	45	20.4
Endothal 273+2,4-D	8+4	92	98	87	23.9
2,4-D ester	8	80	98	37	23.6
Ansar 529	2 1/4#	40	95	32	20.8
Ansar 290D	1.45+312#	83	99	68	23.4
Check	----	--	--	--	14.1

DISCUSSION AND INTERPRETATION OF RESULTS:

The area was very dry throughout the growing season. All treatments increased yield over the severely weed infested untreated area. All treatments effectively controlled wild mustard. Bromoxynil under better moisture conditions controlled buckwheat at 4 ounces per acre. Under more adverse conditions 6 ounces was needed for effective control. The addition of 2,4-D or MCPA did not enhance control. Picloram at 1/4-3/8 ounces per acre plus 4-6 ounces of 2,4-D effectively controlled wild buckwheat with no injury to the wheat. Dicamba + MCPA or s,4-D at 2+4 ounces per acre was the best control rate for this chemical. No wheat injury was observed. The 1/2 ounce rate did not give satisfactory control. Rates of 1 and 1.5 ounces per acre although not as good as the 2 ounce rate controlled 80 percent of the wild buckwheat.

Endothal 273+2,4-D at 8+4 ounces per acre shows promise for wild buckwheat control in wheat. No apparent injury to wheat was observed for this chemical. 2,4-D ester controlled wild mustard and set back the wild buckwheat but it recovered and poor season long control resulted.

Ansar 529 and 290D did not injure the wheat or give good wild buckwheat control.

Wild Buckwheat-Barley-Watertown

Objective:

To determine minimum rates for effective wild buckwheat control of several promising herbicides.

To determine crop tolerance to these herbicides at their effective rates.

Description of Experiment:

Larker barley was treated post emergence when the barley was in the 4-5 leaf stage and the wild buckwheat was in the 2-3-leaf stage. A uniform stand of 20-25 wild buckwheat plants per square foot was present over the entire plot area.

Results:

Treatment	Rate oz/A	% control 6-23-66 wild buckwheat	% control 6-23-66 wild mustard	% control 7-19-66 wild buckwheat	Yield bu/A
Bromoxynil	4	89	99	70	33.6
Bromoxynil	6	96	99	86	27.2
Bromoxynil + MCPA	2+4	50	99	48	33.0
Bromoxynil + MCPA	4+4	90	99	73	35.7
Bromoxynil + 2,4-D	2+4	70	99	45	24.3
Bromoxynil + 2,4-D	4+4	88	98	68	29.0
Picloram + 2,4-D	1/4+4	95	99	91	32.8
Picloram + 2,4-D	3/8+6	95	99	97	26.9
Dicamba + MCPA	1+4	88	99	83	29.9
Dicamba + MCPA	1.5+4	93	99	87	26.3
Dicamba + 2,4-D	1+4	93	99	87	29.1
Dicamba + 2,4-D	1.5+4	92	99	92	26.5
2,4-D ester	8	85	99	53	32.9
Ansar 529	2 1/4#	70	99	48	22.4
Endothal 273+2,4-D	4+4	82	96	58	30.0
Endothal 273+2,4-D	8+4	96	99	88	30.7
Ansar 529	4.5#	93	99	50	15.4
Ansar 290D	1.45+.312#	65	99	35	26.7
Ansar 290D	2.9+.624#	92	99	83	25.0
Check	----	--	--	--	29.7

DISCUSSION AND INTERPRETATION OF RESULTS:

The area was very dry throughout the growing season. All treatments effectively controlled wild mustard. Bromoxynil required 6 ounces per acre for effective wild buckwheat control. Combinations of bromoxynil plus 2,4-D or MCPA did not give as good control as bromoxynil alone.

Picloram plus 2,4-D at 1/4-3/8+4 ounces per acre and dicamba plus 2,4-D or MCPA at 1-1.5 ounces per acre showed excellent wild buckwheat control. Both chemicals showed at light yield reduction tendency at the higher rates. Endothal 273+ 2,4-D at 8+4 ounces per acre showed good promise as a wild buckwheat herbicide with no apparent injury to the barley.

Ansar 529 and 290D show some barley injury at all rates, and only Ansar 290D at the higher rate showed fair to good wild buckwheat control.

WILD BUCKWHEAT-OATS-WATERTOWN

Objective:

To determine minimum rates for effective buckwheat control of several promising herbicides.

To determine crop tolerance to these herbicides at their effective rates.

Description of Experiment:

Clintland 64 oats was treated post emergence when the oats were in the 3-5-leaf stage and the wild buckwheat was in the 2-3-leaf stage. A uniform stand of 20-25 wild buckwheat plants per square foot was present over the entire plot area.

Results:

Treatment	Rate oz/A	% control 6-23-66 wild buckwheat	% control 6-23-66 wild mustard	% control 7-19-66 wild buckwheat	Yield bu/A
Bromozynil	4	90	99	75	50.7
Bromoxynil	6	97	99	97	54.8
Bromoxynil + MCPA	4+4	88	99	62	48.0
Ansar 529	4.5	93	99	13	0
Picloram + 2,4-D	1/4+4	90	99	97	48.2
Picloram + 2,4-D	3/8+6	94	99	99	52.0
Dicamba + MCPA	1+4	83	99	78	51.2
Dicamba + MCPA	1.5+4	92	99	85	44.4
Dicamba + MCPA	2+4	96	99	93	42.5
Dicamba + 2,4-D	1+4	92	99	77	46.9
Dicamba + 2,4-D	1.5+4	95	99	87	42.2
Dicamba + 2,4-D	2+4	95	99	96	49.7
2,4-D ester	8	87	99	30	39.9
Ansar 529	2 1/4#	45	94	10	0
Endothal 273+2,4-D	4+4	82	96	35	53.3
Endothal 273+2,4-D	8+4	90	99	60	54.6
Picloram + MCPA	1/4 +4	78	99	84	47.5
Picloram + MCPA	3/8 +6	87	99	96	52.9
Ansar 290D	1.45+.312#	88	99	52	37.4
Check	----	--	--	--	----

DISCUSSION AND INTERPRETATION OF RESULTS:

This area was very dry throughout the growing season. All treatments effectively controlled wild mustard. It required 6 ounce per acre of bromoxynil for effective wild buckwheat control. Combinations with MCPA were not as effective as bromoxynil alone. Bromoxynil caused no injury to oats. Picloram + 2,4-D or MCPA at 1/4-3/8 +4-6 ounces per acre effectively controlled buckwheat with no injury to the oats.

Dicamba + MCPA or 2,4-D at 1-2 + 4 ounces per acre gave increased buckwheat control from the lower to higher rates of dicamba with little to no injury to the oats.

Endothal 273 + 2,4-D at 8+4 ounces per acre did not injure the oats. Wild buckwheat control was not as good as in wheat and barley but it does show promise as a wild buckwheat herbicide.

Ansar 529 completely killed the oats at all rates. Ansar 290 D, though not so severe, showed considerable oat injury.

FLAX-POST-WATERTOWN

Objective:

To evaluate several herbicides for wild buckwheat control in flax.

Description of Experiment:

Summit flax was planted April 25 and treated post June 3, 1966 when the flax was 3 inches tall and the wild buckwheat was in the 2-3 leaf stage.

Results:

Treatment	Rate oz/A	% control 6-23-66 wild mustard	% control 6-23-66 wild buckwheat	% control 7-19-66 wild buckwheat	% crop injury	Yield bu/A
Endothal 273+MCPA	4+4	89	40	15	20	2.8
Endothal 273+MCPA	8+4	90	83	93	40	2.4
Daxtron	1	70	35	0	0	5.2
Daxtron	2	43	10	0	0	4.1
Daxtron + Picloram	1+ 1/4	35	23	90	10	2.5
Dicamba + MCPA	1+4	99	33	53	0	5.0
Dicamba + MCPA	1.5+4	97	62	47	0	4.0
Dicamba + 2,4-D	1+4	99	63	65	0	3.5
Dicamba + 2,4-D*	1.5+4	97	88	78	0	5.0
Check	-----	0	0	0	0	3.5
Picloram + 2,4-D	1/4 +4	96	83	95	0	4.6
Picloram + MCPA	1/4 +4	89	50	88	0	4.5
Picloram + MCPA	3/8 +6	98	87	95	0	4.4
Picloram + MCPA*	1/2 +8	98	83	97	0	5.4
Ansar 529	2 1/4#	89	43	0	95	0.6
TD-6078	8	13	0	0	95	0.7
TD-6078	16	52	0	0	95	0.5
Bromoxynil	4	96	88	83	0	7.5

* 1-2 inch height reduction of flax

DISCUSSION AND INTERPRETATION OF RESULTS:

The area was extremely dry and flax yields were low. Several herbicides severely injured the flax. Picloram plus 2,4-D or MCPA showed the best control of wild buckwheat followed by bromoxynil and dicamba plus 2,4-D. None of these herbicides showed serious flax injury.

FLAX-PRE-WATERTOWN

Objective:

To evaluate several preemergence herbicides for weed control in flax.

Description of Experiment:

Summit flax was planted and treated pre April 24, 1966. Poor control of most weeds was obtained so entire area was treated with 1/2 pound of bromoxynil June 19 when the mustard was just flowering and the wild buckwheat was 1 foot tall.

Results:

Treatment	Rate #/A	Percent control 6-19-66 Wild Mustard	Wild Buckwheat	Yield Bu/A
Dacthal	6	0	0	4.5
Patoran	2	53	0	6.2
Patoran	4	81	37	7.7
GS-17891	1	10	0	5.0
GS-17891	2	30	0	6.8
BV-201	3	20	0	5.0
Dacthal	8	27	0	4.6
Daxtron	2 oz.	30	0	6.7
Daxtron	4 oz.	60	23	7.7
OCS-21799	2	99	8	4.1
GS-16065	1	0	0	4.4
GS-16065	2.	8	10	6.8
GS-16065	4	85	37	6.4
GS-13633	1	0	0	5.7
BH-584	1	13	7	4.9
BH-584	2	7	0	5.3
Tupersan	6	0	0	5.0
Check	6	0	0	3.9

DISCUSSION AND INTERPRETATION OF RESULTS:

The area was under considerable drought stress most of the season. None of the treatments controlled both wild mustard and wild buckwheat, the two predominant weeds. Some flax injury was noted for OCS-21799. The late rescue treatment of 1/2 pound of bromoxynil gave 100 percent control of wild buckwheat and wild mustard with no apparent injury to flax.

FLAX-GARDEN CITY

Objective:

To evaluate the potential of both pre and post emergence herbicides for weed control in flax.

Description of Experiment:

Summit flax was planted May 5, treated pre May 6 and post June 16 when the flax was 6" tall with a tractor plot sprayer delivering 18.2 gpa.

Predominant weeds were green and yellow foxtail, wild buckwheat, lamb's quarters and wild mustard.

Rainfall received after treatment was as follows: May 10 (.33), 22 (.13), June 1 (.27), 4 (.52), 22 (.73).

Results:

Treatment	Rate lb/A	% control 6-30-66 wild grass	wild buckwheat	other broadleaf	% crop kill	height inches reduction	Yield bu/A
			PRE EMERGENCE				
BV-201	4	0	0	0	0	0	7.1
BV-201	6	0	0	27	0	0	7.5
Patoran	4	10	0	0	0	0	6.1
C-6313	4	17	0	0	0	0	7.6
Daxtron	3 oz.	17	0	0	0	0	6.4
Daxtron	6 oz.	25	25	23	0	0	8.5
DCPA	4	10	0	0	0	0	7.5
Tupersan	4	17	0	0	0	0	6.5
BH-584	1.5	7	0	0	0	0	4.1
	oz/A		POST EMERGENCE				
Endothal 273+MCPA	6+4	92	94	96	75	4	3.7
Daxtron	1	47	58	75	0	0	7.2
Daxtron	2	88	81	95	0	2	6.2
Dicamba + MCPA	1+4	0	98	99	0	6	5.0
Dicamba + MCPA	1.5+4	0	98	98	0	7	4.6
Piclorem + MCPA	1/4+4	0	96	96	0	2	7.9
Picloram + MCPA	3/8+6	0	96	95	0	2	6.0
Bromoxynil	4	0	94	98	0	0	7.0
Bromoxynil	6	0	98	99	0	0	6.8
TD-6078	12	93	40	77	97	-	0.3
Check	-	0	0	0	0	0	8.4

DISCUSSION AND INTERPRETATION OF RESULTS:

The area was extremely dry. Both crops and weeds were under considerable drought stress. More herbicial injury to flax for all post treatments under these conditions was evident. The higher rate of dicambe + 2,4-D curled 85 percent of the flax leaves and was evident to a lesser extent at the lower rate.

Picloram and bromoxynil showed some flax injury.

Daxtron, either pre or post showed marked whitening of flax tops. This delayed maturity somewhat but the flax recovered.

All preemergence herbicides failed to control weeds under these adverse conditions.

CORN-GARDEN CITY

Objective:

To evaluate the potential of several herbicides for weed control in corn.

Description of Experiment:

SD 220 corn was planted May 17 and treated preemergence May 20, 1966. Predominant weeds were green and yellow foxtail, wild buckwheat and lamb's quarters. Treatments applied broadcast with tractor plot sprayer delivering 18.2 gpa. Rainfall received after application was as follows: May 22 (.13), June 1 (.27), 4 (.52), 22 (.73).

Results:

Treatment	Rate lb/A	Percent Control 6-16-66 Grass	Broadleaf
Ramrod	4	68	0
Atrazine	2 1/2	23	65
Atrazine + Lunuron	1+1	17	53
Atrazine + Promotryne	1+1	8	0
Atrazine + Ramrod	1+2	65	13
CP-50144	2	30	0
GS-13529	2 1/2	17	38
Dicamba	1	23	10
C-8250	2 1/2	0	0
Fenaben Ester	1 + 1/2	0	0
Atrazine + CP-50144	1+1	27	0
Check	---	0	0

DISCUSSION AND INTERPRETATION OF RESULTS:

The area was very dry throughout the growing season. The only herbicide showing activity under limited moisture after application was ramrod or a ramrod mixture. Due to the design of the experiment there was no early cultivation done. Since herbicides gave early weed control the experiment was lost to weed competition and drought and was abandoned after the first control readings were taken.

POTATOES- GARDEN CITY

Objective:

To evaluate the potential of several herbicides for weed control in potatoes.

Description of experiment:

Pre plant incorporated herbicides were applied May 5, 1966. LaSoda potatoes were planted May 17 and the other preemergence treatments were applied May 19. All treatments were made with a tractor plot sprayer delivering 18.2 gpa. Plots were 6 rows by 30 feet and were divided into 2 row plots which received 0, 1, and 2 cultivation. Predominant weeds were green and yellow foxtail. Rainfall received after application was as follows: May 10 (.33), 22 (.13), June 1 (.27), 4 (.53), 22 (.73).

Results:

Treatment	Rate lb/A	control 6-30-66	10-4-66			yield lb/A		
			0 cult	1 cult	2 cult	0 cult	1 cult	2 cult
EPTC (ppi)	3	92	66	75	92	10,952	15,039	18,959
DCPA	8	0	23	70	85	8,360	13.732	15,599
Balan (ppi)	1	90	47	68	89	8,505	13,690	14,935
Linuron	3	43	7	42	85	6,638	10,060	15,101
Lunuron-Caperol	1+1	38	20	53	75	5,061	12,156	11,907
Check	-	0	0	55	82	5,849	10,828	12,985
Ramrod	4	53	55	65	83	7,436	11,471	12,988
C-5313	5	33	23	50	82	5,912	11,492	15,039
GS-14260	2.5	13	13	35	73	5,289	8,525	14,748
GP-50144	2	67	50	65	87	5,248	11,553	13,027

DISCUSSION AND INTERPRETATION OF RESULTS:

The area was extremely dry and all treatments except those pre plant incorporated did not receive enough moisture for activation. EPTC and balan, pre plant incorporated, both showed good early control and highest yields with or without cultivation. Balan did not show as good season long control as EPTC. Under these conditions, EPTC shows the most promise as an effective weed control herbicide in potatoes with 2 cultivations.

Table 19. Yield and moisture content of 69, 3-way experimental hybrids containing inbred lines possessing varying degrees of disease resistance to stalk and root rot. N.E.R.F. 1966.

Exp'tl hybrid or com'l check	Yield Bu/A	Ear Moisture at Harvest	Exp'tl hybrid or com'l check	Yield Bu/A	Ear Moisture at harvest
1	68.3	34.0	35	51.3	34.0
2	66.2	28.0	36	51.3	33.0
3	66.2	27.0	37	51.3	36.0
4	56.3	33.0	38	51.3	34.0
5	64.3	35.0	39	51.2	30.0
6	63.2	26.0	40	50.3	35.0
7	62.3	33.0	41	49.3	30.0
8	62.3	34.0	42	49.3	34.0
9	61.3	37.0	43	49.3	32.0
SD220	60.8	29.2	44	49.3	34.0
SD240	60.3	34.8	45	49.3	35.0
10	60.3	32.0	46	49.3	33.0
11	60.3	33.0	47	49.2	28.0
12	60.3	37.0	48	48.3	34.0
13	59.3	31.0	49	48.3	35.0
14	58.3	33.7	50	47.3	35.5
15	58.3	35.0	51	47.2	26.0
Dek46	58.2	28.7	52	46.3	33.0
16	57.3	30.5	53	46.3	35.0
17	57.3	30.0	54	44.3	32.0
18	57.3	33.0	55	44.3	32.0
19	57.3	36.0	56	43.3	34.5
20	57.2	29.0	57	43.3	35.0
SD210	56.9	27.7	58	42.3	32.0
21	56.3	31.0	59	42.3	32.0
22	56.3	35.0	60	42.3	34.0
23	55.3	33.5	61	42.3	34.0
24	55.3	37.5	62	41.3	31.5
25	54.3	34.5	63	40.3	30.0
26	54.3	39.0	64.	40.2	27.0
27	53.3	35.0	65	39.3	36.0
28	53.3	35.0	66	37.3	34.0
29	53.3	38.0	67	35.3	32.0
30	53.2	29.0	68	34.3	35.0
P388	52.3	31.3	69	33.3	32.0
31	52.3	35.0			
32	52.3	37.0			
33	52.2	29.0			
34	51.3	30.0			

NEW EFFECTIVE CHEMICAL CONTROL FOR LOOSE SMUT OF BARLEY

V. D. Pederson

A new systemic seed treatment chemical called Vitavax* was tested for its effectiveness for loose smut control in barley. Two seed lots of Larker barley were treated with 75% wettable powder formulation of Vitavax at rates of 1 and 2 oz/bu. One of the seed lots contained 24%, the other less than 1% loose smut infected seed. The results of the test appear in Table 20.

Table 20. Percent smutted heads present in Larker barley treated with Vitavax seed treatment at two dosages.

Percent smut infected seed based on embryo test.	Check	Vitavax 1 oz/bu	Vitavax 2 oz/bu
	Percent	Smutted	Heads
24	23.6	0	0

The new chemical is unique in that it controls smut infection without harming the seed. Other chemical seed treatments have not been effective because the loose smut fungus is present in the embryo rather than on the seed coat. Preliminary results indicate the chemical is compatible with organic mercury fungicides. This is important because Vitavax is not effective against certain seed rotting organisms. Thus a combination of Vitavax and organic mercury fungicides can be used to control both loose smut, seed rot and seedling blight of barley.

*United States Rubber Company registered trademark.