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ANNUAL PROGRESS REPORT

SOUTH EAST SOUTH DAKOTA EXPERIMENT FARM
Beresford, South Dakota

BRIEF HISTORY

In 1955, and I am sure for several years prior to that, farmers in the Southeastern part of South Dakota have been interested in setting up a research farm in that portion of the state. They worked actively with the Directors of the Experiment Station and the Extension Service in discussing the type of projects that could be studied advantageously for this area. To make this farm a reality, a group of progressive farmers in the area banded together and formed the Southeast South Dakota Experiment Farm Association, an association which has been duly incorporated under the laws of the State of South Dakota.

The bylaws indicate this is a non-profit corporation formed for the purpose of promoting research in Southeastern South Dakota. The organization is authorized to sell $25 memberships in this corporation and certificates of interest for the purpose of raising money to promote the work. Constant, diligent work by the members concluded in 1960 after sufficient funds were raised to purchase the Strubble farm. Memberships are still available to those desiring them.

Appropriations by the 1961 Legislature to South Dakota State College started the wheels rolling at the new South East South Dakota Experiment Farm. Work started immediately, equipment was moved from the research farm at Menno, land layout, soil sampling and planting of crops followed in proper sequence.

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Jake Fredrikson, Superintendent, SESD Experiment Farm.

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.

INTRODUCTION

The purpose of this area of the farm is to provide facilities for research to obtain solutions of local problems in crop production and soil management. Experiments involving fertilizers, plant disease control, Crop management, soil fertility and crop variety testing have been started.

The agronomic phases of experimentation at this new farm are located on the south quarter of land in areas most suited for experimental work. Two fertility experiments were put into full operation in 1961, plus preparatory work for others which needed a previous cropping to initiate proper sequence of either crop or residue. Much caution is necessary in starting new experiments, and any misjudgement at this time is costly both in time lost and loss of land due to fertility treatment.

Areas being utilized for plant breeding studies are located east of the farm buildings. This piece of land is separated into areas of approximately 4.2 acres each. A modified rotation is used here where oats is planted following the plant breeding program. Any surplus from these crops will be used in the cattle feeding programs in the future.

The season covered by this pamphlet is from April 1 through October 31. A total of 18.1 inches of rain fell during this period, and the most of it fell at intervals when moisture was needed by the crops. The temperatures during July and August were high during the daytime, but cooled sufficiently at night for plants to rejuvenate.

Small grain and corn responded well to these conditions, and the yields were good. Some disease was noticed in the small grain, but generally the grain was bright and the test weights were above average. Corn yields averaged about 80 bushel and the moisture per cent was close to 25 per cent in early October when it was harvested.

Approximately 2½ - 3 acres are devoted each year to experimental work on corn. This involves the testing of single cross, three way cross and double cross hybrids. The work is directed toward the development of new adapted hybrids for the area. This work is being carried out by D. B. Shank and D. W. Beatty.

NOTE: This is a progress report and therfore the results presented are not necessarily complete nor conclusive. Any interpretation given is strictly tentative because additional data resulting from continuation of these experiments may result in conclusions different than those of any one year.

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FERTILITY AND CULTURAL PRACTICE EXPERIMENTS

Q. S. Kingsley

Experiment #1

Objectives of Experiment

1. How much will fertilizer increase net profit?
2. Which rotation brings in the greatest net cash return?

Table 1. Crop Income for 1961 SESD Experiment Farm.

Crop	Bu/A.	Price per bu.(2)	Value of Grain	Cost of Machine Operation	Cost of Seed	Cost of fertilizer	Total Cost*	Net Return/A.*
Corn 0-0-0	72.1	$ .87(1)	$62.73	$20.31	$2.55		$22.86	$39.87
50-20-0	79.9		69.59	20.91	2.55	$8.05	31.51	38.08
Oats 0-0-0	36.8	.62	22.82	7.44	2.80		10.24	12.58
30-15-0	54.2		33.62	8.38	2.80	5.10	11.18	17.34
Soybeans 0-0-0	22.9	2.28	52.21	14.26	3.45		17.71	34.50
75# 18-46-0	29.2		66.58	14.98	3.45	4.60	23.03	43.55
Sorghum 0-0-0	69.5	.80	55.60	14.74	1.20		15.94	39.66
50-20-0	78.2		62.56	15.51	1.20	8.05	24.76	37.80

(1) Number 2 corn at 15.5% moisture
(2) December 15, 1961, Farmers Coop Elevator, Brookings, S. Dak.
* Does not include cost of land use.

This experiment is set up to operate as a rotation, but until the experiment has made one complete cycle it will be reported on yearly basis. The cost of machine operation is based on average custom rates throughtout the state, which would include labor, fuel, breakdown and so on.

It may be well to point out, do not reach a definite conclusion on one year's data. The above table brings to light a few interesting things which a rotation whould help prove or disprove. Which crop should receive the fertilizer, and which should be used to take out the residual fertility? The data indicates fertilization of the oats and take out the residual with corn or sorghum.

Experiment #2

Objective of Experiment

1. If drilling the fertilizer with the oats is better than broadcasting it?
2. What are the optimum fertilizer rates and ratios for corn and oats?
3. Study residual effect of corn fertilizer on oats and oats fertilizer on corn.

Table 2. Fertilizer Rates and Ratios on Corn.

Fertility Rate	Bu/acre	Corn % Protein
0-0-0	64.1	8.44
40-0-0	76.5	10.46
40-60-0	81.6	10.72
80-0-0	81.1	10.88
80-60-0	77.6	10.87
120-60-0	86.0	10.90

The leveling off of yields at 40-60-0 indicates a yearly application of lower amount are more economical. Yield increases above this rate do not off set the cost of the fertilizer. The oats to be planted on this land in 1962 will be used to pick up the residual fertility left by the corn crop.

Table 3. Fertilizer Rates and Ratios on Oats. Fertilizer Broadcast Versus Fertilizer Drilled with Seed.

Fertility Rate	Broadcast Bu/acre	Drilled with Seed Bu/acre
0-0-0	29.6	
20-0-0	33.2	44.0
20-20-0	41.1	37.8
40-20-0	41.5	44.8
40-40-0	36.8	51.4
60-40-0	46.2	46.7

Differences between methods of fertilizer application are rather striking. The 20-20-0 broadcast application increased yields over the drilled application, but the other rates favor the drilling of fertilizer with the seed.

This experiment is placed on a somewhat poorly drained soil, and that in conjunction with evidence of burned straw pile bottom will necessitate completion of the experiment before a definite analysis can be made. The amount of moisture received was adequate, but Red Leaf infection occuring on the oats reduced yields considerably. This experiment rotates onto a new site each year.

Table 4. Effect of Commercial Fertilizer on Yield of Oats, S.E. Research Farm, 1961.

F. E. Shubeck

Pounds per acre of: N	P_2O_5	K_2O	Yield in Bu/acre
0	40	0	72.7
9	40	0	55.0
9	40	20	67.9
34	0	0	48.3
34	17	0	71.0
34	34	0	68.1
0	0	0	53.1

The fertilizers, Table 4, were applied in the following forms: nitrogen as ammonium nitrate, P_2O_5 as treble superphosphate and K_2O as muriate of potash. The fertilizer was broadcast in the spring after the seed bed was prepared. Corn preceded the oats experiment.

A sizeable increase in oats yield was obtained over the check plots by the application of 40 lb. of P_2O_5 per acre. At this location on the farm, nitrogen alone did not increase the yield. At another location on the farm, farther away from the buildings, the greatest increases in oats yields were due to combinations of nitrogen and phosphorus (see Table 1).

CORN PERFORMANCE TRIAL - 1961

J. J. Bonnemann

Performance trials measuring the potential of commercial hybrids and selected Experiment Station hybrids were conducted by Statewide Services in 1961. Varieties tested were those entered by the cooperating producers and checks produced by the Experiment Station. As this was the first year the trials were conducted on a fee basis and the farm has been relocated, comparisons from other years are not included.

This trial was located in Area E, one of the thirteen crop adaptation areas of the state. These areas have been established on the basis of elevation, temperature, rainfall, soil type and other related factors.

Twenty-two entries were tested at this location in 1961. The trial was planted May 19 and harvested October 25, 1961. Yields ranged from 90.0 to 65.3 bushels per acre. Lodging was negligible for most varieties. Moisture in the ear corn averaged 25.2 per cent for all varieties. The range was from 21.1 up to 32.1 per cent moisture.

Table 5. 1961 Corn Performance Test, Area E, Centerville

Variety	Acre Yield Bu/acre	Performance Rating	Moisture at Harvest %	Lodging %
Pioneer 345	90.0	2	22.1	3
S.D. Expt. 27	89.8	1	21.6	4
Pioneer 329	88.0	6	25.9	2
S.D. 622	87.3	9	25.4	3
Pioneer 362	87.2	3	22.1	3
Tristate 89	86.5	4	23.5	1
Pioneer 328	86.4	12	27.0	1
S.D. 604	86.2	5	23.3	5
Gurney's 118A	85.6	7	22.7	2
Disco 112A	84.7	8	21.8	3
Pioneer 354	84.5	11	24.2	1
GreenAcres 004	83.6	13	27.2	1
Iowealth AF11	83.5	10	21.1	1
GreenAcres 446	82.6	16	29.2	0
Curry C-68	81.1	15	27.1	1
GreenAcres 395	79.3	17	25.7	2
Gurney's107	78.8	14	23.3	1
Curry C-62	78.3	18	26.1	1
Gurney's 118B	77.8	19	26.2	1
Iowealth AQ	75.9	21	32.1	1
GreenAcres 002	73.3	20	26.5	1
GreenAcres 674	65.3	22	29.6	0
Average	82.5		25.2	

Yield differences of less than 7.9 bushels per acre are not significant.

SORGHUM AND SOYBEAN VARIETY TESTING

C. J. Franzke

Table 6. Height, Maturity and Yield of Commercial Sorghum Varieties.

Variety	Height	Maturity	Bu/A.
S.D. 102	40	Ripe	101.4
Reliance	46	"	78.3
Norghum	45	"	99.0
S.D. 441	52	"	96.3
S.D. 451	51	"	106.0
R.S. 610	52	"	115.3
R.S. 608	49	"	113.5
R.S. 501	63	"	111.5
Lindsey 722	47	"	104.0
Stickley R103	52	"	96.2
" R99	62	"	94.1
" R106	49	"	90.4
Pfister 305S	59	"	84.1
" 430S	50	"	78.3
DeKalb 50A	60	"	93.1
" C44A	47	"	98.8
" C45	43	"	69.8
" X49	46	"	96.1
" E56A	51	"	106.4
Pioneer 9409	45	"	88.5
Northrup K125	48	"	85.6
" 3026	43	"	66.7
" 210	54	"	96.3
" 140	53	"	75.8
" 135	59	"	72.9
" 120	49	"	69.1
Frontier 400C	53	"	58.6
" 400B	48	"	95.5

The effects of adequate moisture and moderage temperatures are evident in the yields this year. Top growth, being a factor in combining sorghum for grain, should be given much consideration. Many of these tall growing varieties do not lend themselves too well. A tall crop tends to bend away from the machine, and also put more material through the machine, increasing the load on the sieves.

Table 7. Height, Maturity and Yield of Soybeans.

Variety (Group 2)	Height	Maturity	Bu/A.
Adams	45	+3	16.6
Harosoy	42	-1	19.4
Hawkeye	44	0	19.2
Lindarin	40	-2	18.4
Blackhawk	37	-2	19.0
Ford	42	-1	21.2

Hawkeye matured Sept. 23.

The soybean varieties used here, Table 7, are in Group 2, which are adapted to the general area of highway #16 on the north to the state line on the south.

Hawkeye is used as the guide crop, and all maturity ratings are expressed with reference to it. This soybean variety is fairly well adapted to the area, and anything with minus days, matures that many days before Hawkeye. Anything with plus days matures after Hawkeye does.

SMALL GRAIN VARIETY TESTING

Table 8. Small Grain Variety Testing.

	Maturity	Test wt.	Yield Bu/A.	Rank
Spring Wheat				
Selkirk	M	52.5	15.1	7
Pembina	M	53.0	17.4	6
Canthatch	M	54.0	13.5	9
Thatcher	E	53.0	13.9	8
Rushmore	E	55.5	18.3	5
Lee	E	54.5	21.3	3
Willet	-	55.0	21.8	2
RH 1935	E	56.5	20.2	4
Minn. 404	M	55.0	22.0	1
Durum wheat				
LD 408	-	56.5	26.2	1
Langdon	M	59.0	21.9	3
Ramsey	M	60.0	14.7	5
Wells	E	58.5	23.9	2
Lakota	E	57.0	19.0	4
Oats				
Andrew	E	34.0	65.5	1
Marion	M	30.0	60.5	2
Nehawka	E	33.0	58.1	3
Mo-0-205	M	34,0	56.5	4
Minhafer	E	34.0	56.2	5
Garry	L	33.0	55.2	6
Portage	L	38.0	54.0	8
Minton	ML	31.0	48.6	10
Ransom	E	34.0	46.8	11
Burnett	ML	34.0	45.5	12
Nodaway	M	40.0	45.1	13
Cherokee	E	34.0	44.4	14
Goodfield	E	36.0	43.8	15
Waubay	M	33.0	40.2	17
Tonka	E	41.0	38.1	18
Clintland 60	ME	32.0	37.8	19
Newton	E	38.5	54.2	7
Dodge	ML	36.0	43.3	16
CI 7473	L	38.0	52.7	9
Barley				
Betzes	L	45.0	23.0	5
Erie	L	46.0	21.5	6
Liberty	M	47.0	35.5	1
Otis	ML	48.0	23.1	4
Plains	E	47.0	34.8	2
Spartan	ML	46.5	24.4	3
Dekap	ML	45.5	13.9	7

Crop	Planting Date	Harvesting Date	Maturity
Spring wheat	April 20	July 29	E=Early
Durum wheat	April 20	July 29	M=Medium
Oats	April 20	July 25	ME=Medium Early
Barley	April 21	July 25	ML=Medium Late
			L=Late

SMALL GRAIN VARIETY TESTING

D. D. Harpstead, P. B. Price, V. A. Dirks

The past crop season was favorable for the production of good small grain yields. Some disease effected the crops especially the virus disease which causes Red Leaf on oats and Yellow Dwarf on barley. Clintland 60 was severely infected with Red Leaf this year and the yields were lowered. The more resistant lines yielded well and produced straw of top quality. None of the barley varieties were resistant to the Yellow Dwarf virus.

Pembina, a new variety of wheat, can be grown in areas where Selkirk is now grown. It has about the same characteristics as Selkirk. Some rust was noticed on the spring wheat and durum wheat, but the severity did not reduce yields appreciably.

A winter grain planting was made using the more common varieties of winter wheat, barley and rye. The planting was accomplished using a deep furrow drill with rows on 12-inch spacing. The fall emergence occured early enough to establish good root and top growth.

GRASS AND LEGUME TESTING

M. D. Rumbaugh is supervising an alfalfa isolation for seed increase to permit further testing of the clonal cross H2-5 by Minnesota 247. This particular cross proved to be superior in a 64 entry test at Brookings. The two parental clones are outstanding with respect to winter hardiness and foliage disease resistance.

A grass test was planted this summer consisting of six varieties of Intermediate wheatgrass, ten varieties of bromegrass, four varieties of tall wheatgrass, two varieties of Russian wildrye and two single varieties for observational purposes. This work is being conducted by J. G. Ross.

CROP DISEASE CONTROL

Sugar Beets

K. D. Fisher
Plant Pathology Department

Investigations on control of sugar beet diseases were initiated at the Southeast South Dakota Experiment Farm in 1961. While facilities for irrigation were not available, other soil and climatic conditions were similar to the sugar beet producing areas in southeastern South Dakota.

Seed treatment trials with five fungicides were carried out. Fungicides included were Thiram (75%), Captan (75%), Ceresan M, Dichlone (50%) and Captan (60%) + Dieldrin (15%). Applications were made at recommended rates. Three weeks after planting no significant differences in stands were obtained

between treated plots and the untreated check plots.

Subsequent disease development in all plots was limited. While crown rot appeared in many fields in the Hurley area at harvest, this disease was not observed in the trials.

VEGETABLES

K. D. Fisher (Plant Pathology) and P. Prashar (Horticulture)

Vegetable crops were grown at the Southeastern Research Farm in 1961 to determine the feasibility of utilizing this substation for more extensive work with various vegetable crops. Cantaloupe, cauliflower, field bean, pepper, potato, squash, sweet corn, and tomatoes were grown in replicated plots.

Further work on several aspects of production of horticultural crops in southeastern South Dakota is planned for 1962.