Third Annual Progress Report

December 1963

SOUTHEAST SOUTH DAKOTA EXPERIMENT FARM

NEAR CENTERVILLE, SOUTH DAKOTA

Aerial view of Southeast South Dakota Experiment Farm, showing farmstead and research plots.

Agricultural Experiment Station
South Dakota State College
Brookings

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This is a progress report and therefore 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.

There are other fields of research which are not covered by this pamphlet, in plant breeding and genetic studies. These areas of research are corn, by D.B. Shank and D. W. Beatty; grasses by J. G. Rose; legumes by M. D. Rumbaugh; sorghum and soybeans by C. J. Franzke; and cattle grub control by P.H. Kohler.

This report was prepared by staff members of South Dakota State College as indicated in each section, and assembled by J. F. Fredriksen, superintendent, and F. E. Shubeck, Agronomy Department.

All experiments and work on the SESD Experimental Farm were conducted with the aid of Superintendent J. F. Fredrikson and his employees.

Introduction

Land utilization for the period of this report followed the pattern of developing agronomic research on the south quarter of this half section research station, while the north quarter was utilized for the production of feed for the livestock experiments. This distribution of land should not be construed as a determining policy. The entire acreage is available for the primary purpose of basic research as the need for expension develops.

This year approximately 20 acres were utilized by Foundation Seed Stock for the purpose of increasing seed of two varieties of oats and two varieties of soybeans.

Complete official Weather Observer records for the immediate area are available for the eleven year period 1953 through 1963. Although an eleven year period is not sufficient to establish an absolute normal, it does furnish a basis for evaluating current temperature changes and precipitation amounts as they occur.

The 1963 monthly distribution of precipitation is partially deceiving in that it does not point out two critical periods of very limited rainfall which had a limiting effect on the yields of corn and other late maturing crops. One of these periods extended from late June until late July and the other extended through the first three weeks of August.

Temperatures through the growing period were generally favorable for crop production with one important exception. On May 22, a low of 26° was recorded and the resulting frost damaged most crops. Small grains and alfalfa showed damage but recovered well. Soybeans were severely damaged and were replanted. Corn that was up was damaged. The resulting weakness of roots and plants, together with the aggravated weed problem, had a depressing effect on corn that was not replanted.

Surplus grain from the agronomy plots as well as the filler areas on the south quarter are utilized in the livestock feeding program.

Production from the 1963 crop year yielded the following feed and forage: (Determined by sampling and field measurements)

Corn silage	235 tons
Ground ear corn silage	4400 bushels
Ear corn	1800 bushels
Oats	1200 bushels
Alfalfa hay	132 tons

Fertility application on the north quarter crop land was as follows:

Corn--Alfalfa sod, 75 lbs. of 18-46-0 starter per acre. Continuous corn, 50 lbs. nitrogen and 25 lbs. P_2O_5 plowed down in fall, plus 75 lbs. 18-46-0 starter per acre.

Oats - as a nurse crop for alfalfa--15 lbs. nitrogen and 60 lbs phosphate per acre, drilled with the seed.

Plans for 1964 cropping program on the north quarter call for 50 acres of alfalfa, 102 acres of corn, and 3 acres of temporary hog pasture.

Table 1 1963 Precipitation and Temperature

Month	Rainfall in Inches	Departure from 11 yr. Average 1953-1963		Average Temperature (F)	Departure from 11 yr. Average 1953-1963	
		11 yr Average	Departure		11 yr Average	Departure
Jan.	.39	.44	- .05	11.6	17.5	-5.9
Feb.	.28	1.54	-1.26	23.3	26.7	-3.4
March	1.02	1.51	- .49	42.0	33.4	+8.6
April	2.28	2.73	- .45	52.6	49.4	+ 3.2
May	3.09	3.57	- .48	60.8	61.8	-1.0
June	3.53	3.90	- .37	73.6	71.8	+1.8
July	3.79	2.69	+1.10	76.7	76.5	+ .2
Aug.	1.91	3.01	-1.10	72.5	75.5	-3.0
Sept.	4.20	2.54	+1.66	66.8	64.7	+2.1
Oct.	1.27	1.19	+ .08	61.2	56.5	+4.7
Nov.	.10	1.25	-1.15	39.9	37.5	+2.4
Dec.	.05	.69	- .64	14.6	23.9	-9.3
Total	21.91	25.06	-3.15	49.6	49.6	
Frost Free Days: May 22 to October 28 -- 159 Days						

FERTILITY AND CULTURAL PRACTICE EXPERIMENTS

By - F. E. Shubeck

Experiment No. 1 -- Minimum Tillage for Corn

Objectives of Experiment:

1. How much tillage is actually necessary for satisfactory corn production?
2. Can the yield from minimum tillage methods be maintained or improved over that from conventional methods?
3. Evaluate various methods of seedbed preparation, planting and cultivation.

Table 2 Minimum Tillage of Corn

Treatment	Fertility*	Bu/Acre
1. Hard ground listing	80-28-0	82
2. Wheel track planting	80-28-0	79
3. Conventional plant, spring plow	0-0-0	89
4. Stubble mulch, Noble blade	80-28-0	73
5. Spring list after fall subsoiling	80-28-0	84
6. Plow - plant	80-28-0	86
7. Loose ground listing, fall plow	80-28-0	87
8. Conventional plant, fall plow	80-28-0	88
9. Roto tiller, conventional plant	80-28-0	80
10. Conventional plant, spring plow	80-28-0	92

*The 80-28-0 is total fertility applied. This included 60 lbs. of 18-46-0 applied in a band as starter and 70 lbs. of liquid nitrogen as side dress.

Loose ground listing appeared to yield a little more than the hard ground listing, but this difference was not statistically significant at 5%. The subsoiling treatment in the fall in listed plots did not increase yields appreciably. An interesting observation involving all listed plots was made following the late spring freeze in this area. Corn in listed plots survived the freeze

with no apparent damage, but corn in surface planted plots required extensive replanting to bring the stand back up to 12,000 plants per acre.

In those plots that were fertilized and planted with a conventional planter, spring plowing appeared to be slightly more advantageous than fall plowing. This is a reversal from results of 1962.

In this experiment, response to fertilizer was not as great as in 1962.

Yields from stubble mulch plots were lowest of the ten treatments. This is due in part to difficulties in controlling weeds while maintaining the straw mulch cover.

Table 3. Crop Yields from Rotation Experiment

Sequence No.	Cropping sequence and fertilizer[1]	1961 Corn	1961 Oats	1961 Beans	1961 Sorg.	1962 Corn	1962 Oats	1962 Beans	1962 Sorg.	1963 Corn	1963 Oats	1963 Beans	1963 Sorg.
	0-0-0												
1	Continuous corn	75	--	--	--	93	--	--	--	71	--	--	--
	50-20-0 broadcast												
1A	Continuous corn	81	--	--	--	93	--	--	--	77	--	--	--
	0-0-0 0-0-0												
2	Corn - oats	70	44	--	--	90	54	--	--	72	52	--	--
	50-20-0 broadcast 30-15-0												
2A	Corn - oats	79	68	--	--	98	68	--	--	77	69	--	--
	0-0-0 0-0-0												
3	Oats + sweet clover - corn	69	29	--	--	97	54	--	--	79	50	--	--
	30-15-0 75# 18-46-0												
3A	Oats + sweet clover - corn	80	48	--	--	102	63	--	--	73	62	--	--
	0-0-0 0-0-0 0-0-0												
4	Corn - beans - oats	74	37	27	--	98	49	36	--	80	54	24	--
	50-20-0 broad- 75# 18-46-0 20-20-0												
4A	Corn cast - beans oats	81	53	29	--	104	65	37	--	87	73	28	--
	0-0-0 0-0-0 0-0-0												
5	Corn - oats - beans	69	38	27	--	82	56	35	--	82	52	24	--
	75# 18-46-0 30-15-0 75# 18-46-0												
5A	Corn/+ 40# N/ - oats - beans	79	52	29	--	105	65	37	--	87	65	24	--
	0-0-0												
6	Continuous sorghum	--	--	--	70	--	--	--	68	--	--	--	50
	50-20-0 broadcast												
6A	Continuous sorghum	--	--	--	78	--	--	--	96	--	--	--	67

[1]Fertilizer applications are listed above the crops for which they were applied in lbs. per acre of N, P_2O_5, and K_2O.

50-20-0 = 150 lbs. of 33.5% ammonium nitrate + 44 lbs. of 0-46-0 broadcast per acre.

Table 4. Crop Income from Rotation Experiment for 3 Years

Rotation No. (from Table 2)	Total Value (1) of Grain on 1 acre (2) for 3 yrs	Cost of Machine Operation. Custom Rates (4) for 3 yrs	Seed Cost for 3 yrs	Fertilizer Cost for 3 yrs N - 12¢/lb P_2O_5-10¢/lb	Total Cost (3) for 3 yrs	Net Return per acre for 3 yrs	Average Returns above Cash Costs per year
1	$231.83	60.93	7.65	--	68.58	163.25	54.42
1A	243.47	62.73	7.65	24.00	94.38	149.09	49.70
2	157.52	41.61	8.04	--	49.65	107.87	35.96
2A	184.69	43.92	8.04	19.65	71.61	113.08	37.69
3	158.73	42.36	9.30	--	51.66	107.07	35.69
3A	175.58	44.68	9.30	15.27	69.25	106.33	35.44
4	184.30	42.00	8.79	--	50.79	133.51	44.50
4A	206.99	44.13	8.79	17.49	70.41	136.58	45.53
5	178.50	42.00	8.79	--	50.79	127.71	42.57
5A	201.42	44.13	8.79	20.04	72.96	128.46	42.82
6	154.16	44.22	3.60	--	47.82	106.34	35.45
6A	197.62	46.02	3.60	24.00	73.62	124.00	41.33

(1) Prices used for all 3 years were those quoted Dec. 19, 1963, at Farmers Coop., Brookings: No. 2 Corn - $.97; Oats - $.60; Soybeans - $2.58; Grain Sorghum - $.82/bu.

(2) In a sequence with 2 crops, for example--corn and oats, the crop value per acre was determined by adding the value of 1/2 acre of corn to 1/2 acre of oats. This relationship would be similar to a quarter section farm with 80 acres of corn and 80 acres of oats.

(3) This does not include cost of land use.

(4) Custom rates are more representative of costs of farm operators with small acreages.

Experiment #2 -- Most Profitable Rotation

Objectives of Experiment:

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

Discussion and interpretation of results.

Results in tables 3 and 4 summarize the first 3 years of the experiment. This represents only one cycle in the 3 year cropping sequences. Results from the 4 year rotation, including alfalfa, were not included because it has not made a complete cycle.

Cost of machine operations appears high because prevailing custom rates were used as a basis. Individual farmers with large acreages would have lower costs than custom rates because they can spread their overhead costs over more acres.

Only high quality seed was purchased and this represents actual cash cost for this item.

Value of all crops was determined from 1963 prices. This may give soybeans a comparative financial advantage.

When oats were included in a cropping sequence with corn, the return above cash costs were reduced. (Table 4) However, in the corn and oats sequence note that oats gave a profitable response to fertilizer in all 3 years. (Table 4)

Returns for above cash costs for continuous sorghum were not as high as with continuous corn but sorghum gave a consistent and economically profitable return for use of fertilizer.

Continuous corn responded to commercial fertilizer in 2 of 3 years but not enough to pay for the fertilizer over the 3 year period. If weather conditions permit yields to stay in the 75-90 bushel range, lower yields for unfertilized continuous corn would be expected in the next 3 year period.

From table 3 we can see that the inclusion of a sweet clover catch crop in an unfertilized corn oats sequence increased the yield of corn about 7 bushels in 1962 and 1963. (Compare sequence number 2 to 3). With the same cropping system but with commercial fertilizer added, (compare 2A to 3A) the sweet clover catch crop had a beneficial effect on corn in 1962. However in a year with a midseason drought (1963) yield of fertilized corn dropped from 77 to 73 bu/acre when preceded by a sweet clover catch crop.

Many other comparisons can be made from the yield data in table 3 but it may be risky to base ones plans on short time results that may not continue in the future under different climatic conditions.

Experiment #3 -- Corn Plant Populations
(Performed in Cooperation with A.R.S. from Morris, Minnesota)

Objectives of Experiment:

1. What corn plant population is the best for this soil and climate?
2. With greater plant populations, what fertilizer rates and ratios should be used?
3. In an area subject to periodic droughts, does ear size provide an accurate basis for determining the optimum number of plants per acre?

Table 5 Effect of Corn Plant Populations and Fertilizer on Yield of Corn

Plants per acre	Fertilizer treatment N - P_2O_5 - K_2O	Bu/acre No. 2 corn
10,000	0 - 0 - 0	53.0
10,000	40 - 0 - 0	52.4
10,000	40 -40 - 0	52.4
10,000	80 -40 - 0	47.9
14,000	0 - 0 - 0	49.0
14,000	40 - 0 - 0	54.0
14,000	40 -40 - 0	47.0
14,000	80 -40 -0	56.1
18,000	0 - 0 - 0	44.0
18,000	40 - 0 - 0	44.0
18,000	40 -40 - 0	48.4
18,000	80 -40 - 0	45.0

In this experiment phosphate was broadcast and disked in prior to planting. Nitrogen was side dressed when corn was knee-high. This location was higher in elevation than most of the farm and soil moisture supplies were not quite so favorable as for some of the other experiments. Commercial fertilizer had little influence on the yield.

The effect of plant populations on corn yield is shown in Figure 1.

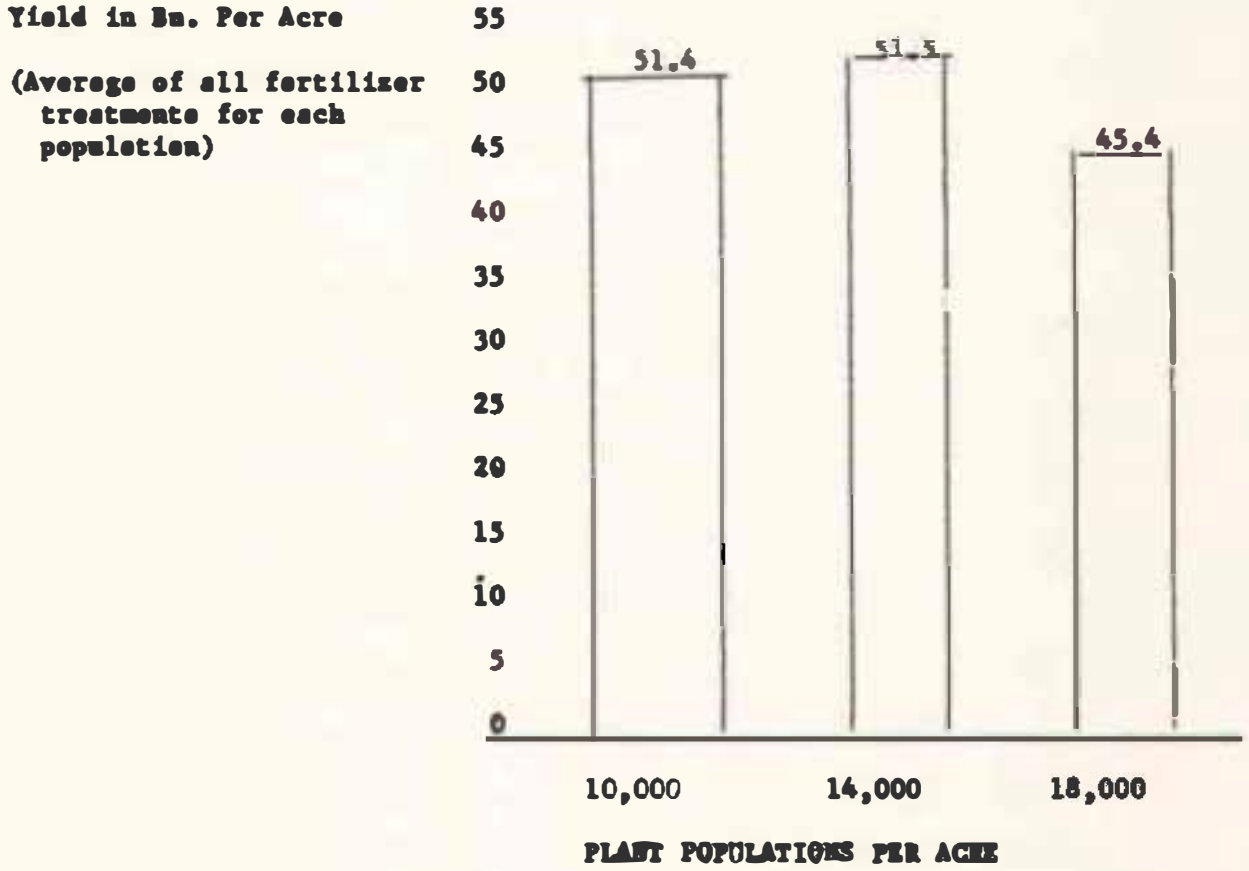

Figure 1. Influence of Plant Populations on Yield of Corn

When plant density was increased, corn yields were not increased. This is nearly a complete reversal from 1962 results.

Ear size was generally quite small.(Figure 2) Ears from all three populations were less than ½ lb. per ear. To sum it up, we had both smaller ears and lower yield with 18,000 plants per acre in a year with a mid-season drought.

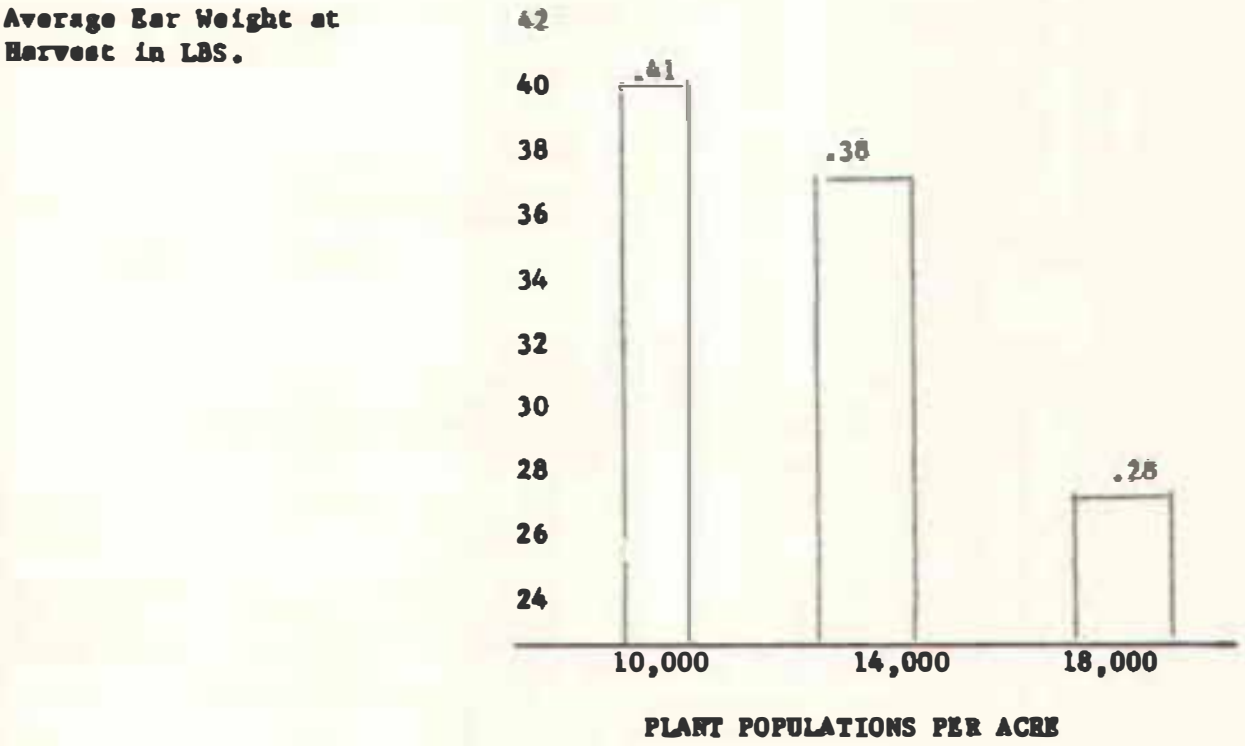

Figure 2. Effect of Plant Populations on Ear Size

Experiment #4 -- Fertilizer Rates and Ratios

Objectives of Experiment

1. What are the optimum fertilizer rates and ratios for corn and oats?
2. Will these optimum rates and ratios for broadcasting fertilizer be the same as for drilling fertilizer with the seed for small grain?
3. Is it best to fertilize corn and recover the residue with oats or to fertilize the oats and recover the residue with corn?

Table 6 Effect of Fertilizer Rates, Ratios and Methods of Application on Oats Yield

Fertility Rate	Fertilizer Broadcast Bu/acre	Fertilizer Drilled with Seed Bu/acre	Increase for drilling over Broadcast
0 - 0 - 0	34.1	34.1	---
20 - 0 - 0	43.8	46.3	2.5
40 - 0 - 0	43.2	46.0	2.8
40 -20 - 0	49.5	47.9	-1.6
40 -40 - 0	47.3	54.8	7.5
60 -40 - 0	52.0	58.0	6.0

Twenty pounds of nitrogen per acre gave a very profitable yield increase of oats over the check plot (about $2.00 back for each $1.00 invested). The largest yield increases occurred with nitrogen-phosphorus combinations and at higher rates of application.

Drilling fertilizer with the seed was usually more efficient than broadcasting it. Drilling 60 lbs N and 40 lbs P_2O_5 per acre with the seed did not reduce yield in 1963.

Table 7 Effect of Fertilizer Rates and Ratios on Yield of Corn

Fertility Rate	Bu of #2 Corn/Acre
0 - 0 - 0	75.9
40 - 0 - 0	71.6
40 -60 - 0	75.6
80 - 0 - 0	78.7
80 -60 - 0	69.7
120 -60 - 0	81.8

Yield increases were not enough to pay for the cost of fertilizer in this experiment.

Table 8 Residual Effect of Fertilizer on Yield of 1963 Oats (Fertilizer Applied on Corn in 1962)

Fertilizer applied on Corn in 1962	Bu of Corn per acre 1962	Bu of oats per acre 1963 (Residual effect)
0 - 0 - 0	83.6	47.3
40 - 0 - 0	105.6	45.4
40 -60 - 0	106.6	47.0
80 - 0 - 0	94.5	45.4
80 -60 - 0	104.3	50.1
120 -60 - 0	114.3	41.6

Table 9. Residual Effect of Fertilizer on Yield of 1963 Corn (Fertilizer Applied on Oats in 1962)

Fertilizer Applied on Oats in 1962	Bu of Oats per acre 1962 (average of drilled vs broadcast)	Bu of Corn per acre - 1963 (Residual effect)
0 - 0 - 0	45.9	71.2
20 - 0 - 0	52.1	74.4
40 - 0 - 0	55.3	77.6
40 -20 - 0	61.9	69.3
40 -40 - 0	62.6	74.8
60 -40 - 0	67.0	79.6

Compare tables 8 and 9 to answer the objective: is it best to fertilize corn and recover residue with oats, or to fertilize oats and recover residue with corn.

Notice that corn received a higher rate of fertilizer than oats in the year of application. Residual effect on 1963 oats that followed fertilized corn was not very great. The 100+bushel crop of corn used much of the fertility that was applied.

When fertilizer was applied for oats in 1962, there was some carry-over for corn in 1963.

Experiment #5 -- Starter Fertilizer for Corn

Objectives of Experiment:

1. Evaluate use of starter fertilizer and side-dressed nitrogen on corn.
2. Is the practice worthwhile of including a small amount of potassium in the starter "for insurance" against possible potassium deficiencies in borderline response areas?

Table 10 Effect of Starter Fertilizer with Potash and Side-dressed Nitrogen on Yield of Corn.

Fertilizer treatments		Bu of #2 corn/acre	% water in ears at harvest	Tons of starter/acre air dried
110# starter/acre of each of the ratios listed below	side-dress nitrogen			
0 - 0 - 0	none	94.2	31.1	2.5
11 -48 - 0	none	84.5	30.1	2.5
11 -48 -20	none	87.9	29.8	2.6
11 -48 - 0	70# N/A	88.4	31.0	2.6
11 -48 -20	70# N/A	86.5	30.3	2.6
0 - 0 - 0	70# N/A	96.7	31.4	2.6

There was practically no yield increase for any of the fertilizer treatments. Per cent water in corn was affected very slightly by starter fertilizer.

FORAGE STUDY

By - Jake Fredrickson

Objectives:

1. Compare several different varieties and hybrids for yields of forage.
2. Compare effect of different row spacings on forage yield.

Table 11 Effect of Row Spacings on Forage Yield of Several Different Varieties and Hybrids

	Crop	Tons/acre 70% moisture silage 40 inch rows	Tons/acre 70% moisture silage 20 inch rows
1.	Rancher sorghum	10.3	11.2
2.	Piper sudan	9.4	8.9
3.	Hybrid sudan (Green M)	24.7	12.4
4.	S. D. 252 forage sorghum	11.4	13.0
5.	Volkman S-100	13.8	9.4
6.	Dekalb SX-100 (Sudax)	11.5	13.0
7.	Rox Orange	13.1	8.3
8.	Frontier FS-210	6.5	9.1
9.	Hydan 38	12.5	14.5
10.	Pioneer 3445 (Corn)	10.3	11.8

All varieties were fertilized with 60 lbs. of N and 40 lbs. of P_2O_5 per acre. Fertilizer was broadcast and plowed under. Corn plant populations were 22,000 plants per acre in 40 inch rows and 42,000 in 20 inch rows. Sorghums and sudans were seeded at 6# per acre in 40 inch rows and 12 # per acre in 20 inch rows.

Some of the sudans and sudan hybrids gave very good yields of forage. About half of the crops did better with 40 inch row spacing than with 20 inch rows. In 1962, a year of higher rainfall, most of the crops yielded more forage with the 20 inch row spacing.

SOIL POTASSIUM OF THE SOUTHEAST FARM

By - Dwight Hovland

During the 1961 growing season some agrologists observed what they considered potassium deficiency symptoms in corn plants that were growing on some of the soils of the Southeast Farm. Corn was planted on these soils again in 1962 and 1963. The soils were divided into plots and potassium fertilizer was added to the soils on some plots while on other plots no potassium fertilizer was used. Thus, comparison of corn produced on these soil fertility plots should aid in determining if availability of soil potassium was limiting corn growth.

Analysis of variance showed no significant differences in the 1962 corn grain yield on these soil fertility plots, however, in 1963 on the well drained site the yield increased with potassium fertilizer treatment.

A summary of the yields is presented in table 12.

Table 12 Influence of Potassium Fertilizer on 1962 and 1963 Corn Grain Yield of Some Well-drained Soils and Some Poorly-drained Soils of the Southeast Farm.

Soils	Treatments *		
	a	b	c
		(bu/ac)	
		1962	
Poorly-drained	51	52	56
Well-drained	90	92	88
		1963	
Poorly-drained	54	49	52
Well-drained	50	58	58

*Treatment Key (All plots received adequate nitrogen and phosphorus fertilizers.)
- a - no potassium fertilizer in 1962 or in 1963
- b - 125 pounds of K(250 lb. 0-0-60) broadcasted per acre in 1962 and 400 pounds of K(800 lb. 0-0-60) broadcasted per acre in 1963.
- c - 12.5 pounds of K(25 lb. 0-0-60) hilldropped per acre in 1962 and in 1963.

WEED CONTROL IN CORN

By L. C. Warner

Objectives:

To determine weed control, crop injury and corn grain yields as influenced by cultivation and various herbicide treatments.

Description of Experiment:

The plots were located on the South East Research Farm. A randomized block design was used with three replications. Corn (Var. Farmers 427) was planted May 15, 1963 and preemergence treatments made the same day using a small tractor plot sprayer (2.0 mph 22 gpa). Postemergence applications were made when the corn whorl was 14-16" tall (June 26, 1963). The treatments were directed at a 14" band in the row and at the lower 7" of the corn plant (2.0 mph 60 gpa). Visual evaluations of crop injury and weed control were made July 24, 1963. The plots were harvested October 11, 1963.

Results: Preemergence:

The yields of all herbicide treatments were increased by cultivation. Three cultivations increasing yields over two cultivations. A 3 lb/A over-all application of atrazine without cultivation was approximately equal to three cultivations alone. None of the other herbicides used provided adequate control without supplemental tillage.

Postemergence:

Of the directed herbicide treatments, atrazine 3 lb/A plus uran 100 lb/A and Linuron WK 4 lb/A gave increased yields over the check plot which had two cultivations.

Table 13. THE EFFECT OF HERBICIDES AND CULTIVATION ON WEED CONTROL, CROP INJURY AND CORN GRAIN YIELDS

Herbicide	Rate lb/A	Visual Evaluation % Crop Injury	Visual Evaluation % Weed Control	Yields Bu/A No Cultivation	Yields Bu/A Two Cultivations Missed the 1st Cult.
HERBICIDE APPLIED PREEMERGENCE (overall)					
Atrazine	3	0	70	50.2	53.8
CDAA-T	4	0	30	27.7	43.9
Linuron	4	2	56	33.7	49.2
R-1910 + 2,4-D	4*	5	57	21.5	33.7
Amiben + 2,4-D	2+1	13	40	24.8	38.9
Check (weedy)		0	0	6.6	----
Check (Cult. 2 x missed 1st Cult.)		0	--	----	42.0
Check (Cult. 3x)		0	--	----	49.0
HERBICIDE APPLIED POSTEMERGENCE TO A 14" BAND DIRECTED OVER THE ROW					
Atrazine	3	0	57	19.8	38.0
Atrazine + Uran	3+100	0	63	32.7	51.5
Uran	100	0	12	21.5	37.3
Dalapon + Uran + 2,4-D	2+100+3/4	3	58	17.2	36.6
Dalapon + 2,4-D	2+3/4	7	65	17.5	41.9
Dalapon	2	3	77	12.5	30.7
Linuron + WK	4+1/2%	7	98	24.1	48.2
Check (weedy)		0	0	6.6	----
Check (Cult. 2 x missed 1st cult.)		0	--	----	42.0
Check (Cult. 3x)		0	--	----	49.0

*Incorporated immediately following application.

HERBICIDE RESIDUE STUDY

By - L. C. Warner

Objectives:

To determine the dissipation rate of herbicides used on South Dakota soils.

Description of Experiment:

The plots were located at the Southeast Research Farm near Centerville, South Dakota. A randomized block design was used with 10' x 10' plots. The treatments were applied with a hand sprayer over a stand of oats approximately 4" high. The treatments were made May 25, 1962. The plots were evaluated on June 28, 1962, and September 24, 1962. The area was raked clean of old growth during the early spring of 1963. To determine the degree of toxicity remaining in the soil one year after the herbicide application, soybeans and oats were drilled separately in rows across the plots on May 23, 1963. Stand counts were made of both oats and soybeans on July 10, 1963. All evaluations are reported as the percent stand compared to the check. The experiment will be continued in 1964 with oats and soybeans again used as the bio-assay crops.

Results:

A comparison of the herbicide dissipation rate is made from the date of treatment, May 25, 1962, to July 10, 1963, fourteen months later (table 14).

It is evident that large differences in the dissipative rates of the various herbicides exist. However, a full summary of the comparitive results will not be attempted until the study has continued at least one more year, and their respective dissipative patterns are more complete.

Table 14. HERBICIDE RESIDUE IN THE SOIL

Treatment	Rate lb/A	Approx. cost	Crop % stand 6-28-62	All Vegetation % stand 9-24-62	Oats % stand 7-10-63	Soybeans % stand 7-10-63
Ammate	500	180.00	22	48	100	77
Ammate	1000	360.00	0	11	100	100
Ametryne	10	*	0	1	100	77
Ametryne	50	*	0	0	17	45
Atrazine	10	35.00	0	0	0	59
Atrazine	50	175.00	0	0	0	18
Benzabor	200	116.00	96	90	100	100
Benzabor	500	290.00	88	87	67	64
Borascu (conc)	1000	70.00	83	47	99	45
Urox	200	140.00	89	45	7	27
Dalapon	20	24.00	0	55	100	100
Dalapon	100	117.00	0	58	100	86
Dicamba	10	*	7	45	100	73
Dicamba	50	*	0	6	100	41
Diuron	10	38.00	31	10	57	50
Diuron	50	188.00	0	1	17	23
Erbon	50	60.00	2	3	93	91
Erbon	200	240.00	0	3	100	100
Fenac	10	70.00	56	50	40	50
Fenac	50	350.00	41	5	13	0
Fenuron	50	50.00	0	0	0	51
Fenuron	200	200.00	0	0	0	18
Linuron	10	28.50	0	3	93	100
Linuron	50	142.50	0	3	10	54
Monuron	10	35.00	0	1	37	45
Monuron	50	188.00	0	0	0	45
Polybor Chlorate	500	70.00	60	57	100	64
Polybor Chlorate	2000	240.00	44	2	100	14
Prometryne	10	*	0	7	76	54
Prometryne	50	*	0	5	1	41
Propazine	10	35.00	0	40	0	27
Propazine	50	175.00	0	27	0	2
Sodium Chlorate	500	90.00	28	45	76	54
Sodium Chlorate	2000	260.00	0	5	43	18
Simazine	10	35.00	0	10	0	64
Simazine	50	175.00	0	5	0	4
T.B.A.(2,3,6) Lith	10	50.00	83	45	100	100
T.B.A.(2,3,6) Lith	50	252.00	73	25	17	0
TCA	50	28.00	92	95	100	100
TCA	200	112.00	38	75	100	100
Amitrol-T	20	52.00	0	92	100	64
Amitrol-T	100	260.00	0	87	80	40
MCPA	400	208.00	0	3	100	100
CDAA-T	50	144.00	27	47	80	45

*Price not available

STANDARD VARIETY TRIALS OF SMALL GRAIN, SOUTHEAST FARM, 1963

By - J. J. Bonnemann

Standard variety trials harvested at the Southeast Farm in 1963 included oats, barley rye, spring durum and winter wheat. Data reported include current year yields and test weight and five-year averages where available. Data included in the five-year averages include that from the plots grown at Menno.

Germination was uneven for spring planted grains as only light showers occurred for some time following planting. A serious infestation of corn borer larva working in small grain stems, necessitated harvesting some of the trials, especially the oats, about a week earlier than it would normally have occurred. Rather than have the entire plots overtaken, some test weight was sacrificed to save the grain and obtain fairly reliable yields.

Andrew, Mo. O-205 and Minhafer have performed most satisfactorily for the past five years.

Liberty barley produced the highest yields in 1963 and has also been most satisfactory yieldwise for the past five years.

Selkirk has produced the most satisfactory yield of spring wheat for the past five years. Others have performed equally well but are not as resistant to present races of rust.

Yields are not exceptional in the 1963 trials. The retarded germination and subsequent late freeze reduced the stand and vigor of the plants during the year.

Table 15 Standard Variety Trials of Small Grain, Southeast Farm, 1963

Variety	Yield, bu/acre		Test weight
	1963	1959-63 (a)	lb/bu
OATS			
Andrew	56.8	52.6	35.0
Dupree	56.7		33.5
Osage	54.4		33.0
Ajax	53.9		31.0
Dodge	53.4		34.5
CI 7399	53.2		33.0
Portage	53.1		33.5
Mo. 0-205	52.4	50.2	34.0
Ortley	51.2		34.0
Burnett	50.2	45.7	35.5
Minhafer	50.2	50.1	33.5
Ransom	50.2	43.4	33.0
Coachman	50.0		34.5
Marion	49.9	48.3	33.5
Goodfield	49.9		37.0
Nodaway	49.6		36.0
Clintland 60	49.0	44.8	36.5
Waubay	48.7	43.6	36.5
Minton	47.1		30.5
Cherokee	45.6		33.5
Tonka	45.1		38.0
Garland	45.1		34.5
Rodney	44.7		33.5
Neal	43.6		33.5
Newton	43.3		35.0
AuSable	42.1		35.0
Nehawka	41.1	47.1	34.0
Bonkee	40.7		34.0
Lodi	38.3		29.5
Garry	38.0	44.7	30.5
LSD .05	7.9		

(a) 1959-60 data from Menno Station

Table 15 (continued) Standard Variety Trials of Small Grain, Southeast Farm, 1963

Variety	Yield, bu/acre		Test weight
	1963	1958-63 (a)	lb/bu
BARLEY			
Liberty	34.8	33.7	48.5
Traill	32.3		46.5
Larker	23.9		48.5
Plains	21.3	23.7	47.0
Feebar	20.7		42.5
Trophy	20.5		45.5
Betzes	18.9		45.5
Spartan	18.0	19.9	46.5
Kindred	17.2		45.5
Parkland	17.1		47.5
Otis	17.0	22.6	44.5
Custer	11.9		40.5
LSD .05	5.1		

(a) Four-year average - 1960 lost to windstorm

SPRING WHEAT & DURUM			
		(b)	
Lakota	19.6	22.2	54.5
CI 13654	19.1		58.0
Wells	17.3	21.5	57.0
CI 13751	16.8		57.5
CI 13586	16.8		56.0
Spinkcota	13.9	17.5	57.0
Langdon	12.9	20.3	54.0
Crim	12.0		55.0
Rushmore	11.8	17.2	54.0
Pembina	11.4		51.5
Selkirk	10.5	16.6	49.0
Canthatch	10.4	15.9	51.0
Thatcher	10.3	16.0	51.5
Lee	8.7	14.6	53.0
Justin	8.7		51.5
Ceres	4.0		43.5
LSD .05	2.7		

(b) Four-year average, 1959 not available

Table 15 (continued) Standard Variety Trials of Small Grain, Southeast Farm, 1963

Variety	Yield, bu/acre		Test weight
	1963	1962-63	lb/bu
WINTER WHEAT			
Lancer	18.3	12.1	58.0
SD 56-53	17.9	14.2	58.0
Minter	16.8	12.9	56.5
Ottawa	13.0	9.5	58.5
Rodco	12.6	9.5	54.0
Omaha	10.5	8.4	53.0
Nebred	9.3	6.1	49.5
SD 56-197	9.1	9.9	52.5
Wichita	8.9	7.6	53.5
Warrior	7.2	6.2	46.0
Cheyenne	6.6	4.6	47.5
Kaw	6.5	6.1	53.5
Pawnee	5.2	5.6	50.0
Bison	4.6	4.7	45.5
Aztec	3.7		48.5
LSD .05	3.9		
RYE	1963	1960-63 (a)	
Caribou	27.9	22.8	54.5
Antelope	27.0	24.4	55.5
Pierre	24.6	20.4	57.5
Elk (b)	4.6	14.8	48.0
LSD .05	17.4		

(a) 3 year average - no fall crop planted at Southeast Farm 1960
(b) Poor stand in 1963; seed had very low germination

GRAIN SORGHUM PERFORMANCE TRIALS, AREA E, 1963

By - J. J. Bonnemann

Grein sorghum performance trials have been conducted on a fee basis for two yeers et the Southeast Farm. The hybrids entered, excluding checks, are the choice of the entering producer.

Twenty-six entries were included in the 1963 trial. The grain sorghum was planted May 22 and harvested on October 9. A killing frost did not occur until October 28.

Yields are reported in hundred-weight (cwt) per acre. Yields ranged from 55.4 down to 21.9 cwt per acre. Moisture in the grain at harveat ranged from 15.7 to 22.0 percent.

Table 16 Grain Sorghum Performance Trial, Area E, 1963

Variety	Percent Moisture	Test weight lbs.	Yield, cwt/acre 1963	Yield, cwt/acre 1962-63	date headed	height, inches
Pioneer 861	22.0	58.5	55.4		7/25	44
Dekalb X1510	21.3	55.5	49.2		7/26	46
N 80	19.5	59.0	47.3		7/27	42
Dekalb C44b	19.5	55.0	47.2		7/24	44
NK 227	16.9	56.5	46.4	49.7	7/22	43
RS 610	18.7	55.5	46.2	52.6	7/22	43
RS 501	17.6	59.5	46.2	51.1	7/18	46
Nebr. 504	19.0	59.0	45.8		7/20	42
Frontier 400C	20.1	56.5	45.5	50.3	7/22	43
NK 210	18.6	57.5	45.4	50.7	7/22	43
Frontier 401	19.5	58.5	45.3		7/25	45
Frontier 388	18.1	58.5	44.8	44.9	7/22	44
SD 503	18.6	56.5	44.6	49.8	7/20	46
RS 608	15.7	57.5	43.9	48.0	7/25	45
N 79	18.4	59.0	43.3		7/23	42
Steckley's R-103	17.0	58.5	42.2	46.1	7/22	45
NK 222	17.2	58.5	42.0	47.5	7/22	43
N 78	18.9	57.5	41.6		7/23	45
Nebr. 505	16.9	58.5	41.6		7/20	43
Steckley's R-3495	16.8	59.0	40.7		7/21	44
Rudy-Patrick 110	19.5	58.0	40.3		7/25	45
SD 441	18.4	54.0	39.0	40.5	7/15	48
SD 451	17.3	55.5	38.0	43.5	7/18	45
Rocket A	16.8	57.0	37.6		7/23	44
SD 102	18.8	54.5	28.5	28.8	7/16	45
Reliance	19.6	55.0	21.9	27.5	7/18	46
		Mean	42.7			
	LSD	.05	6.0			

CORN PERFORMANCE TRIALS, AREA E, 1963

By - J. J. Bonnemann

Corn Performance Trials have been conducted on the Southeast Farm for three years. Hybrids tested were those entered by commercial producers of seed corn and checks developed by Experiment Stations. Forty-six entries were included in the trials. A fee is charged for each hybrid entered, excluding checks.

The corn was planted May 15 and harvested on October 24. Yields ranged from 123.5 to 85.1 bushels per acre. Irregular small patches of root lodging occurred, presumeably caused by the western corn rootworm. The same varieties in other areas of the field revealed no lodging. Moisture in the ear corn at harvest averaged 21.3 percent.

Table 17 Corn Performance Trial, Area E Southeast Farm, 1963

Variety	Yield bu/ac	Performance rating	Moisture at harvest	1961-1963 Averages Yield 1961-63	Yield 1962-63	Moisture 1961-63	Moisture 1962-63
Pioneer 3558	123.5	1	18.1				
United-Hagie 158	120.9	2	24.9				
Pioneer 321	117.5	4	25.4				
Pioneer 3304	116.4	3	23.9				
Dekalb 3x1	112.2	5	22.3		121.8		25.2
Green Acres 446	110.4	14	26.1	103.7	114.2	28.3	27.8
Funks G-93	109.8	8	22.7				
Pioneer 328	109.5	11	23.6	104.1	113.0	26.4	26.1
Dekalb 3x2	109.2	9	22.5		112.7		26.5
Sokota 645	109.0	10	22.6		113.2		25.2
Disco 112-A	107.8	6	17.8	104.2	114.0	21.5	21.4
Pioneer 318-A	106.4	17	24.7		117.0		26.5
Dekalb 441	106.3	7	18.3				
Iowa 5063	105.8	12	19.6		112.6		21.9
Dekalb 661	104.2	22	24.5		112.3		26.3
Sokota 619	103.6	13	17.9		110.5		21.6
SD Expt'l 27	102.4	16	19.3	100.2	105.3	23.0	23.5
Pioneer 329	102.4	15	18.1	102.7	110.1	23.0	23.7
Disco 1090	102.0	18	20.1				
United-Hagie 52B	101.9	31	26.1				
Funks G-72	101.3	21	20.3				
SD 620	100.5	24	21.6		101.0		26.5
SD Expt'l 38	100.5	20	19.2		106.6		21.6
SD Expt'l 42	99.0	25	19.9				
Master F-102	99.0	19	17.2				
Tri-State 89	99.0	23	19.7		92.8*		21.6*
Tri-State 80B	98.9	30	22.1				
Funks G-75A	98.6	27	21.2				
SD 622	98.5	26	21.0	98.5	103.8	24.9	24.7
Funks G-83	98.3	34	23.0				
Sokota 625	97.4	28	19.9		98.9		24.8
Tri-State 88	96.8	32	20.8				
Cargill 270	96.5	33	20.7		104.7		24.9
Cargill 259	96.1	29	18.8		107.4		22.8
Green Acres 698	95.1	37	23.6				
Green Acres 004	94.7	39	23.4	96.2	102.5	27.3	27.4
Green Acres 003	94.2	38	22.8				
Green Acres 674	94.1	43	27.7		79.7*		28.7*
Master F-80	93.0	35	17.2				
Royal 617	92.3	36	20.1				
Master F-106A	90.2	40	19.0				
Nebr. 202	88.7	42	20.3		100.5		24.1
Master F-90	87.9	41	17.0				
United-Hagie 3H40	86.4	45	22.2				
SD 604	85.5	44	19.8	92.7	96.0	23.9	24.2
Green Acres 395	85.1	46	24.1		92.2*		24.9*
Mean	101.0		21.3				
LSD .05	11.1						

* Not entered in 1962 trial

SOYBEANS

By - C. J. Franzke

Hawkeye is the maturity check for group II. The varieties in this group are adapted to an area in general from highway #16 on the north to the state line on the south. All varieties and selections grown in this test were well advanced in maturity. There was no killing frost during maturity. Good pod set, high yields and a good quality of beans were produced despite periods of limited rainfall.

Table 18 Summary of Soybean Work at Southeast Farm

Variety	Height (inches)	Lodging	Seed quality	Shattering	Bu/acre
Harosay	34 inches	0	2	3	36.0
Harosay 63	35 "	0	2	3	37.7
Hawkeye	36 "	0	1	2	38.9
Hawkeye 63	35 "	0	1	2	38.2
Lindarin	30 "	0	3	2	33.3
Lindarin 63	31 "	0	2	2	36.2
Blackhawk	32 "	0	2	2	33.2
Ford	34 "	0	1	2	44.0

Note: Seed quality : 1 - very good, 2 - good, 3 - fair

Shattering: 1 - none, 2 - 1 to 10%, 3 - 11 to 25%

CROP DISEASES

C. M. Nagel, Plant Pathology Department

"Stunt" - A New Virus Disease of Corn

A number of growers in the area of the Research Farm have inquired about this comparatively new disease of corn. Insofar as is known, it is not present in South Dakota or any of the adjoining states. There was a serious outbreak in the Ohio Valley on about 10,000 acres of corn in 1963.

This is a serious disease. It is caused by a virus and results in a serious dwarfing effect of the plant. Yields likewise may be nearly a failure. It is not known at present if the disease will become established in the western edge of the corn belt. Too little is known about the disease at this time to make any predictions.

Root Rot Disease Control in Hybrid Corn

Root rot diseases of corn are caused by fungi (molds) which live in the soil. These microscopic-sized organisms exist in the soil indefinitely; however, their population may vary from year to year depending on the type of crop rotation that is practiced on a particular farm, because some crop plants are not as susceptible to such organisms as is corn.

Seed treatment is helpful in controlling the seedling disease phase but not the destructive mid-season damage when root rot becomes most serious. Root rot can cause lodging, stalk rot and light kernels and poor ear tip fill. It is a soil-borne disease present in all areas of the corn belt. Symptoms of the disease during the growing period may not be very noticeable; however, premature stalk dying is a common symptom in late August.

Research in progress is directed at developing a strain of corn which is resistant to the diseases. Over the past years, strains of corn have been developed by the Plant Pathology Department at the Main Experiment Station at Brookings; and although it appears that many of these lines are adapted more to the north central part of the state, it was thought desirable to evaluate these hybrids at the Research Farm in hopes that certain of these lines when in hybrid combination might be adapted to the southeast area.

Approximately 300 three-way hybrids involving one root rot resistant parent in each of the three-way hybrids were grown at the Research Farm in 1963. Results were obtained on the over-all performance including resistance to disease, lodging, moisture and yields. The most promising hybrids will be grown again in 1964.

SWINE RESEARCH

By - Robert W. Seerley

Because of the area interest in Specific Pathogen Free (S.P.F.) hogs, an S.P.F. herd has been established. In mid July, 18 bred gilts and one boar were transferred to this location from the established herd at North Central Substation at Eureka. These are second generation S.P.F. gilts produced from parent stock selected from the three way cross (Hampshire-Duroc-Yorkshire) breeding program which has been in progress at that station for a number of years.

These gilts were placed on temporary pasture and farrowed in a temporary shelter during the month of September. The future breeding and farrowing schedule will be determined after the completion of the proposed Swine Research Unit.

A concentrated effort will be made to maintain this herd under regulations outlined by the South Dakota S.P.F. Swine Certification Program.

On December 16, 1963, 80 pigs were selected from the September farrowing and placed on trial in the two insulated temporary buildings erected in the spring of 1962. This trial is a continuation of the study described in the 1962 progress report.

CATTLE FEEDING TRIAL

By - F. W. Whetzel

Table 19

Lot No.	1	2	3	4
Ration	Hi Moisture Corn	Corn Silage	Corn Silage-154 Days Hi M. Corn-183 Days	15 lbs Corn Silage Plus Hi M. Corn
No. Steers	25	23	25	25
Initial shrunk wt.	401.0	402.4	401.2	401.0
Final shrunk wt.	1107.6	1075.1	1137.4	1119.4
Days on feed	310	337	337	310
Total Steer days	7750	7751	8425	7750
Total gain	17666	15472	18405	17961
Average gain	706.6	672.7	736.2	718.4
Average daily gain	2.28	2.0	2.18	2.32
Average daily ration:				
Corn silage	--	42.7	16.7	14.8
Hi Moisture corn	18.5	--	12.2	14.8
Soybean meal	2.0	2.0	2.0	2.0
Feed per cwt gain:				
Corn silage	--	2138	764	638
Hi Moisture corn	813	--	560	639
Soybean meal	87	101	92	86
Feed cost per cwt gain:				
Corn silage	--	8.55	3.06	2.55
Hi Moisture corn	11.38	--	7.84	8.95
Soybean meal	3.48	4.04	3.68	3.44
Total	14.86	12.59	14.58	14.94
Average initial plus Feed cost	235.32	215.47	237.73	237.65
Average sale value	242.57	207.54	232.48	245.96
Average net return	7.25	-7.93	-5.25	8.31

a. Lots 1 and 4 were sold on November 21.
Lots 2 and 3 were sold on December 18.

b. Prices received for lots 2 and 3 were about $2.00 per cwt less than for lots 1 and 4, due to drop in market.

c. Steers were implanted with either 24 or 30 mg. of stilbestrol at start of trial and re-implanted with 36 mg. after 157 days.

d. Vitamin A was added to soybean meal at level of 5000 I.U. per lb. for first 71 days, then increased to 10,000 I.U. per lb.

e. Initial cost of calves: $32.50 per cwt.

f. Feed prices used: corn silage - $8.00 per ton; hi moisture ground ear corn - $28.00 per ton; soybean meal - $80.00 per ton.

g. Hi moisture ear corn was ground and stored in a conventional silo. Average moisture content of hi moisture corn was 24.5%. Average moisture content of corn silage was 67.9%.

h. Corn yielded about 16 tons of 68% moisture silage per acre, or 83 bushels of 15% moisture grain per acre.

Table 20. Carcass Grade and Prices

Grade and Carcass Weight	Lot 1. Steers in Each Grade	Price per cwt of Carcass	Lot 4. Steers in Each Grade	Lot 2. Steers in Each Grade	Price per cwt of Carcass	Lot 3. Steers in Each Grade
Prime 6/800 lb	1	$36.50	1			
Choice 6/800 lb	16	36.00	18	6	$34.00	18
Choice 8/900 lb	1	35.00	2			
Good 6/800 lb	6	35.00	4	12	33.00	6
Low Good	1	34.00		4	32.00	1
Standard				1	29.50	

BEEF RESEARCH UNIT FEEDING SYSTEM

Harvey G. Young and Harold Winterfeld

The beef feeding facilities at the S.E.S.D. Experimental Farm have been in operation for one year and the feeding system has functioned satisfactorily. Automatic feeding controls were installed during the months of June and July which automatically operate the feeding system. The function of the controls has been to meter, blend and distribute the correct ration to each of four lots of steers.

Minor difficulties have developed in the feed metering system in the silos. The metering principle involved in feeding from the silos was to lower the

silo at a predetermined, constant rate, thus removing the feed from the silo at a predictable volume per unit time. During the first few minutes of silo unloader operation, the discharge rate was higher than the predicted rate which was determined by previous tests. After five or six minutes of operation, the discharge volume would decrease to the expected volume and would remain fairly accurate for the remainder of the feeding period.

The variation has been predictable to the extent that an adjustment of the feeding time in the first lot would adequately compensate for the fluctuation. Frequent measurements of the discharge rate were made to determine the amount of adjustment in feeding time that was required.

A different method of lowering the silo unloader is being developed and will be tested and evaluated during the present feeding period. The amount of electric power required to operate the system will be metered and recorded to determine operating costs.

ELECTRIC HOUSE HEATING

Harold Winterfeld and Harvey Young

The studies on electric house heating were continued during the 1962-63 heating period and the summary of these studies is included on the following pages. The amount of installed electric heating was the same as during the 1961-62 season and the same total area of floor space was heated. The difference in the study being that a polyethylene sheet was installed around the base of the dwelling sealing this area against infiltration.

A comparison of the 1962-63 data with that reported in the 1961-62 annual report shows an increase in electrical energy for heating of 3,507 KW for a heating season that was 276 degree days less than the preceding year.

The study will be continued with some possible changes being made in the insulation in some areas of the house.

ELECTRIC HOUSE HEATING
SOUTHEAST EXPERIMENT FARM
CENTERVILLE, SOUTH DAKOTA

RESEARCH BY:
HARVEY YOUNG
HAROLD WINTERFELD
AGRICULTURAL ENGR. DEPT
S.D.S.C., BROOKINGS, S. DAK.

1962 - 1963 HEATING SEASON

FIRST FLOOR ROOMS

Meter Number	Room	Square Feet Per Room	Sept. Oct. November Degree Days 1123	December D.D. 1320	January D.D. 1712	February D.D. 1160	March D. D. 720	April D.D. 379	Total Kilowatt Hours Per Room For Season
			KILOWATT HOURS USED						
5	Living	248	14	771	728	257	82		2100
10	Front Hall	120	71	182	201	33	27		634
11	Downstairs Bath	46	216	167	264	229	163		1085
13	Dining	195	702	1012	1376	912	348		4545
14	Utility	81	8	10	40	-	-		139
16	Kitchen	208	2758	599	787	493	504		5349
17	Entry	30	190	299	366	288	122		1295
18	Hall	100	167	366	416	142	23		1214
19	Basement	196	19	80	226	354	8		687
20	Family	212	1421	1015	1194	1028	786		5656
Total Kilowatt Hours Used Per Month		1240	5566	4501	5598	3736	2063		22,704

ELECTRIC HOUSE HEATING
SOUTHEAST RESEARCH FARM
CENTERVILLE, SOUTH DAKOTA

1962 - 1963 HEATING SEASON

SECOND FLOOR ROOMS

Meter Number	Room	Square Feet Per Room	Sept. Oct. November Degree Days 1123	December D.D. 1320	January D.D. 1712	February D.D. 1160	March D.D. 720	April D.D. 379	Total Kilowatt Hours Per Room For Season
			KILOWATT HOURS USED						
1	#6 Bedroom	176	113	322	476	346	218		1651
2	#5 Bedroom	120	63	172	270	109	58		792
3	Upstairs Hall	257	38	395	678	276	234		1878
4	Upstairs Bath	62	144	340	370	329	159		1404
6	#1 Bedroom	116	77	296	438	358	132		1417
7	#2 Bedroom	125	15	34	26				200
8	#3 Bedroom	166	369	372	546	381	253		2063
9	#4 Bedroom	120	450	350	245	453	245		2063
Total Kilowatt Hours		1140	1249	2481	3049	2252	1299		11,470

APPLIANCE KILOWATT HOUR USAGE
SOUTHEAST EXPERIMENT FARM
CENTERVILLE, SOUTH DAKOTA

FOR MONTHS OF:
SEPT., OCT., NOV., DEC. - 1962
JAN., FEBRUARY, MARCH - 1963

Meter Number	Appliance	Sept. Oct. November	December	January	February	March	April	Total Kilowatt Hours Per Appliance
		KILOWATT HOURS USED						For Month Shown
21	Deep Freeze	580	29	--	203	238		1050
22	Refrigerator	452	169	165	149	168		1103
23	Range	414	157	158	130	152		1011
24	Dish Washer	96	45	38	35	38		252
26	Pump	20	9	11	8	10		58
27	Clothes Dryer	367	113	152	121	160		913
28	Water Heater	1589	610	696	588	605		4088
Total Kilowatt Hours Used		3518	1132	1220	1234	1371		8475

ELECTRIC HOUSE HEATING
SOUTHEAST RESEARCH FARM
CENTERVILLE, SOUTH DAKOTA

1962-1963 HEATING SEASON

1.	Square feet area of first floor	1238
2.	Square feet area of second floor	1138
	Total square feet	2376
3.	Ceiling height first floor	9 feet
4.	Ceiling height second floor	8 feet
	Total cubic feet	20,256
5.	Degree days for months shown (Taken at Research Farm)	6414
6.	Total kilowatt hours used for heating	34,174
7.	Cost of heating	$512.00

Remodeled outside walls of kitchen and utility rooms were insulated with 2 inch blanket. Attic has 4" fill insulation over second floor ceiling. Rest of house is back plastered, no insulation.

A plastic covering was used on the outside of the house at the foundation for the 1962-1963 heating season.

NOTES

NOTES

THE SOUTHEAST SOUTH DAKOTA EXPERIMENT FARM CORPORATION

Board of Directors

Members	County	Address
Ervin Cleland, President	Clay	Vermillion
John Walker, Vice President	Turner	Parker
Bernard Uthe, Secretary	Lincoln	Canton
Lawrence Swanson, Treasurer	Lincoln	Canton
Ercil Bowled	Lincoln	Centerville
Eric Thormodegaard	Lincoln	Hudson
Carl Wright	Clay	Volin
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Leonard Daily	Union	Jefferson
Wesley Larson	Union	Beresford
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