Progress Report

1982 RESEARCH RESULTS

James Valley Agricultural Research & Extension Ctr.
Redfield, SD 57469

Agricultural Experiment Station • South Dakota State University • Brookings, South Dakota 57007

MARCH, 1983

1982 REDFIELD PROGRESS REPORTS

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We the employees at the James Valley Research and Extension Center, Redfield, wish to thank the Project Leaders and Graduate Students for their cooperation, time and effort in making 1982 a very successful year.

THANK YOU,

Albert Dittman, Manager
Hazel Cartner, Adm Sec I
Michael Esser, Ag Res Tech II
Miron Fisk, Ag Res Tech I
Tracy Robinson, Summer Help
Lynette Esser, Summer Help
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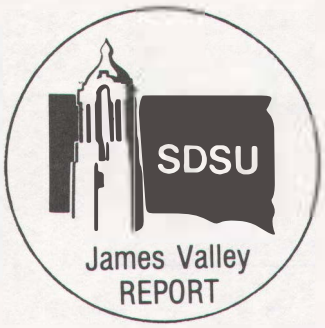

BRIEF HISTORY

The James Valley Agricultural Research and Extension Center was established by the United States Department of Interior, Bureau of Reclamation in 1948. It was first known as the Redfield Development Farm. The prime function was to study and demonstrate gravity flow irrigation potential on lake plain soils of the Oahe Project Area. The Bureau of Reclamation operated the farm through 1952. The farm was then operated by an individual farmer with some areas for research under the supervision of South Dakota State University. South Dakota State University began operating the farm in 1959. The farms name was changed in 1972 from the Redfield Development Farm to the James Valley Agricultural Research and Extension Center.

Water for irrigation purposes is pumped from the James River, with additional water being pumped from a surface well located on the farm. The river pump is one-half mile north of the farm and the well is located on the north edge of the farm. The river pump is capable of providing approximately 1000 to 1300 gallons per minute and the well provides approximately 300 gallons per minute. This year we installed an automatic relief valve at the river, which allows excess water to return to the river, this enables us to use sprinkler irrigation (without having to use gravity flow) earlier in the year and to provide water for small areas and test plots.

Gravity irrigation systems in use on the farm at the present time include gated pipe and open cement ditch. Sprinkler irrigation is provided by two small pivots, a lateral, towline and solid set pipe.

Research work conducted at the center pertains to crop production techniques, soil management practices and irrigation management. Various crop varieties are tested under dryland and irrigated conditions. Herbicides are tested for their effectiveness in weed control.

Studies are being conducted on insect control in sunflowers through chemical and tillage treatments. There is research performed on feed rations for breeding heifers whereas in the past research has been conducted on slaughter steers and heifers.

Many aspects of agriculture are being researched at the Center. We welcome you to stop and observe the research being conducted at the Center and if you have any questions we will be happy to answer them.

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REDFIELD WEATHER 1982

Redfield, South Dakota

The weather at the James Valley Research and Extension Center, Redfield for the 1982 season was moderately favorable for crop production. Recorded precipitation during the growing season (April-September) was approximately one half of an inch below normal, while temperatures were one degree below normal. Early small grains may have suffered because of below normal precipitation in April, but rebounded with above normal precipitation in May. The cool temperatures in June were also beneficial to the small grain. Some reductions in yields may have resulted from 100 degree temperatures coupled with strong southerly winds during the 4th of July weekend.

The above normal rainfall in May made the planting of row crops difficult for area farmers. Emergence of early planted row crops was adversely affected by the cool temperatures and a hard rain on June 6 that caused severe crusting problems. Farmers also experiences difficulty harvesting row crops due to above average rainfall in October.

Temperatures

The temperatures for the year were 1.9°F below normal. January was extremely cold with temperatures 13.3°F below normal. The only months with above normal temperatures were May, July and December, while August temperatures in June slowed corn maturity, which was evident in the high moisture content of the grain at harvest time. The average date of last frost in the spring is May 14 and the average date of first frost in the fall is September 24. In 1982 the last frost in the spring was May 7 and the first frost in the fall was September 21.

Evaporation + Growing Degree Days

An open evaporation pan is utilized at the Center to determine the maximum or potential for water loss experienced by soils and crops. The average annual open pan evaporation is approximately 49 inches of which 40 inches evaporates from May through October. Evaporation on lakes in the Redfield area averages approximately 35 inches annualy. Actual water loss from the soil through evaporation is usually less than the open pan due to the moisture limitations. For 1982 evaporation from May through September was 36.89 inches with the greatest amount, 9.65 inches occurring in July.

Growing Degree Days (GDD) are heat units, required by plants to reach physiological maturity. GDD are calculated by adding the maximum and minimum temperatures (for a given day), dividing this number by two, then subtracting a base temperature (the lowest temperature at which a plant will grow), the results are the number of GDD occurring for that day. The base temperature used in this report is for corn, which is 50°F. In 1982 the Redfield area

experienced below normal GDD as can be noted in the GDD table in this report.

Snowfall and Wind

Normal snowfall for the Center is 24.9 inches but may vary from 5 inches to 95 inches. Snowfall usually occurs in the months from October through May with February averaging the greatest amount at 5.8 inches. The snowfall from October 1981 through May 1982 was 42.5 inches, which was 17.6 inches above the average. Strong winds often accompany snowfall causing large drifts in farm yards and other sheltered areas. This above average snowfall made travel difficult and caused many problems for farmers with livestock.

Wind speed averages 11 to 12 miles per hour (mph) with the prevailing direction from the northwest during the winter and from the south southeast during the summer. Strong winds of 50 mph or more are a possible occurrence in any month of the year, but are most likely to occur with summertime thunderstorms. Strong winds in other months usually accompany the passage of a cold front or an intense low pressure area. There is a possibility of a tornado touching down in the Redfield area but is an extremely rare event.

1982 Temperatures (°F)

Month	1982 Average Maximum	1982 Average Minimum	1982 Average Mean	Long Term Avg Max	Long Term Avg Min	Long Term Avg Mean	Deviation from Mean
January	9.0	-10.4	-.7	23.7	1.4	12.6	-13.3
February	23.1	5.2	14.2	27.6	5.3	16.5	-2.3
March	36.1	22.5	29.3	41.4	18.5	30.0	-.7
April	55.6	31.6	43.6	58.9	32.5	45.7	-2.1
May	69.0	48.8	58.9	70.8	44.0	57.4	+1.5
June	74.3	50.0	62.2	80.1	54.3	67.2	-5.0
July	87.2	61.0	74.1	87.8	59.2	73.5	+.6
August	85.6	57.6	71.6	86.0	57.2	71.6	.0
September	72.6	48.2	60.4	75.8	47.0	61.4	-1.0
October	56.8	37.8	47.3	62.9	35.0	48.9	-1.6
November	38.0	19.0	28.5	43.8	20.7	32.3	-3.8
December	33.8	14.4	24.1	29.3	8.1	18.7	+5.4
Annual Total	53.4	32.1	42.8	57.3	31.9	44.7	-1.9

Growing Season Open Pan Evaporation

Month	79 Monthly Total	79 Daily Average	80 Monthly Total	80 Daily Average	81 Monthly Total	81 Daily Average	82 Monthly Total	82 Daily Average
April	1.04[a]	.13	4.44[b]	.32	7.52	.25	4.34[c]	.23
May	5.86	.19	8.30	.27	6.65	.21	6.72	.22
June	7.03	.23	4.88	.16	7.62	.25	7.47	.25
July	5.12	.17	5.94	.19	9.59	.31	9.65	.31
August	4.91	.16	5.84	.18	7.36	.24	8.04	.26
September	5.93	.20	5.92	.20	6.10	.20	5.01	.17
Annual Total[d]	28.85		30.52		37.32		36.89	

a 1979 Evaporation for last 8 days of April
b 1980 Evaporation for last 17 days of April
c 1982 Evaporation for last 19 days of April
d Total from May through September

1982 Precipitation in Inches

Month	1982 Precip	Long Term Average	Deviation Average
January	.67	.44	+.23
February	.41	.56	-.15
March	1.28	.83	+.45
April	.48	1.93	-1.45
May	4.54	2.67	+1.87
June	1.72	3.49	-1.77
July	3.44	2.45	+.99
August	1.40	2.29	-.89
September	2.30	1.62	+.68
October	4.74	1.29	+3.45
November	.59	.59	.00
December	.01	.46	-.45
Annual Totals	21.58	18.62	+2.96

1982 Growing Season Growing Degree Days

Month	1982	Monthly Average	Deviation
April	85.5	133.8	-48.3
May	264.0	346.8	-82.8
June	354.5	510.0	-155.5
July	684.0	674.6	+9.4
August	617.0	656.6	-39.6
September	371.5	385.3	-13.8
Total	2376.5	2707.1	-330.6

Snowfall October 1981 - May 1982

Month	Snowfall 1981-1982	Snowfall Average
October	.0	.6
November	T	2.8
December	10.5	3.7
January	16.5	4.9
February	2.0	5.8
March	11.0	5.3
April	2.5	1.7
May	.0	0.1
TOTALS	42.5	24.9

James Valley REPORT

CHEMICAL CONTROL OF STALK-BORING INSECTS IN SUNFLOWERS

Dr. David Walgenback, Terril Heilman and Joe Gednalske
Plant Science Department

During the 1982 growing season, field surveys indicated that stalk-boring insects and associated stalk-rot diseases caused significant lodging of sunflowers after ray-petal drop. Effected areas appeared to be concentrated in the traditional growing areas between Highway 14 and the North Dakota border and west of a line from DeSmet to Britton, South Dakota. All of the following species were found: two stem weevils, Apion occidentale and Cylindrocopterus adspersus; one long horned beetle, Dectes texanus; and one tumbling flower beetle, Mordellistena sp.

In 1981 field test plots, applications of Furadan 10G and Counter 15G at planting time and at first cultivation significantly reduced the percent of stems infested by C. adspersus and D. texanus. The same treatments also significantly reduced the severity of stalk-rots. However, no evidence of yield differences were found at the one location where yield data was taken.

In 1982, field test plots were treated with Furadan 15G and Counter 15G at planting time and at first cultivation. Field tests were planted at Watertown, Hayti, Redfield and Ipswich. All tests included treatments of Furadan and Counter at rates of 1, 1½ and 2 lbs. per acre in each of three placements: (1) seed furrow, (2) subseed and (3) cultivation. A band placement of Counter at 2 lbs. was also included. Weed control at each location included 1½ pints of Treflan and 3 quarts of Amiben pre-plant incorporated (except Ipswich where Roundup had been applied in late fall and again one month before planting). Cultivations were made at the time plants averaged 9 inches and again at 18 inches.

The effect of treatments was determined by hand-splitting of ten stems randomly selected from each replication at a location or test. The species of insects and severity of stalk-rots present were recorded for each stem. Rateings of stalk-rot severity were as follows: 0 for stems with no infection, 1 for stems with a light infection in the pith only, 2 for stems with a complete infection throughout the pith in at least one area of the stem and 3 for stems with a complete destruction of the pith and partial destruction of the vascular tissue in one or more areas. All stems were split after ray-petal drop and before the heads and stems turned brown.

Field plots were harvested for yield data at Watertown and Redfield, where sufficient insect populations and stalk-rots were believed to cause yield reductions.

The following table summarizes the results from 1982 chemical treatment test. Yields were poor due to a combination of factors, including drought stress and lodging. Although significant differences were found between chemical treatments in yield, it was impossible to determine if insects and/or

stalk-rot control was associated with these differences. However, it is worth noting that some control of stalk-rots and insects was obtained, particularly with subseed and cultivation placements of both Counter and Furadan. In addition, higher yields tended to be associated with chemical treatments showing significant control of stalk-rots and Cylindrocopterus. More research is needed to determine what rates and chemicals will improve yield.

INSECTICIDE TREATMENT EFFECTS AT REDFIELD (1st and 2nd Tests Combined)
Variety: Sigco 894A Planted 5/4 and 5/19 Respectively
Replications: 8

Treatment	Rate	Placement	Yield (lbs/ac)	Number of Lodged Stalks/Plot	Stalk-Rot Rating	% of Stalks Infested by Species			
						Apion	Cylindrocopterus	Dectes	Mordellistena
Counter 15G	2 lb	Band	779 a	30	2.19	100	88	60	20*
Counter 15G	2 lb	Cultivation	731 ab	19	1.90*	96	76*	54*	13*
Counter 15G	2 lb	Furrow	696 abc	17*	2.01*	93	78*	66	14*
Furadan 15G	1.5 lb	Cultivation	639 abcd	25	1.99*	95	81	78	25*
Counter 15G	1.5 lb	Furrow	638 abcd	24	1.88*	91	79*	59	15*
Counter 15G	1.0 lb	Cultivation	627 abcd	24	2.00*	81*	69*	58*	11*
Counter 15G	1.5 lb	Subseed	605 abcde	17*	1.56*	85*	71*	51*	18*
Counter 15G	1.0 lb	Furrow	604 abcde	24	2.20	96	84	64	11*
Untreated			581 abcde	34	2.58	98	98	74	44
Furadan 15G	1.5 lb	Subseed	560 abcde	34	2.01*	88	91	75	18*
Counter 15G	1.0 lb	Subseed	547 bcde	24	2.03*	93	83	70	24*
Counter 15G	2.0 lb	Subseed	521 bcde	22	1.81*	90	83	59	13*
Furadan 15G	2.0 lb	Furrow	521 bcde	37	2.30	94	98	80	29*
Furadan 15G	1.0 lb	Furrow	492 cde	25	2.15	95	94	74	23*
Furadan 15G	2.0 lb	Cultivation	491 cde	27	1.89*	80*	76*	63	16*
Furadan 15G	1.5 lb	Furrow	474 cde	34	2.21	90	96	84	26*
Furadan 15G	1.0 lb	Cultivation	468 de	26	2.25	94	95	81	30*
Furadan 15G	2.0 lb	Subseed	463 de	38	1.70*	96	75*	65	24*
Furadan 15G	1.0 lb	Subseed	390 e	41	2.36	95	95	73	33*
Counter 15G	1.5 lb	Cultivation	386 e	38	2.40	89	87	68	21*

*Means followed by an asterisk were significantly different from the untreated mean in the same column of the table at the .10 probability level.

Means in a column superscribed by the same letter are not significantly different at the .10 probability level using Duncan's Multiple Range Test.

James Valley REPORT

SUNFLOWER INSECT RESEARCH

D.D. Walgenbach, J.V. Gednalske and T.J. Heilman
Plant Science Department

Date of Planting Study

Sunflower seed weevils are the number one pest of cultivated sunflowers in South Dakota. In 1981 studies at Redfield indicated that early planted sunflowers may escape major infestations because the bloom period would occur before the majority of adult seed weevils emerged from the soil.

To test this theory, a date of planting study was initiated at Redfield and other locations.

Two hybrids were planted on three dates. The hybrids Sigco 432 and Sigco 894 were planted in four row plots 100 ft long and replicated six times. Plots were planted on May 1, May 15 and June 1.

Effectiveness of each planting was determined by calculating the percent of seeds infested by seed weevils. No other insects had a significant effect on the plantings in 1982.

Table 1 summarizes the results. They indicate that by planting an early maturing hybrid such as 432 or by planting from May 1 to May 10, weevil infestations can be limited.

Insecticide Screening for Sunflower Seed Weevil Control

The primary insecticides presently used to control seed weevils in South Dakota are methyl and ethyl parathion. While these two chemicals give good control, both are highly toxic to mammals and have a short residual period. An insecticide with a lower toxicity would be safer for applicators and more sound ecologically. Also, a longer residual period would provide more protection for sunflowers which are susceptible to weevil infestation for a long period of time.

Our purpose in this study was to look for insecticides which would offer good control and meet the criteria of lower mammalian toxicity and longer residuals.

In 1982 we tested nine chemicals at several rates and at two stages of sunflower bloom.

Results are not complete for 1982 at this time. However, a similar study in 1981 indicated several synthetic pyrethroids which have a low mammalian toxicity giving good control. Furadan 4L and Lorsban, both longer residual chemicals, also showed promising results.

Date of Emergence Study

Sunflower seed weevils overwinter in the soil in South Dakota in the larval stage. In late June and early July they pupate and adults emerge from July through August. The timing of adult emergence can be critical to producers in planning control programs.

Little work has been done on emergence patterns for seed weevils. A study was initiated at Redfield in 1981 along with a tillage control study, and this work was continued in 1982.

Treatments included four tillage practices and two cropping systems. Tillage treatments included mold-board plowing, discing, chisel plowing and untilled. The cropping systems included wheat and sunflower.

Traps were placed over the plots to capture emerging adult weevils. The number of weevils captured at date of emergence was recorded.

In 1982 there were no differences between tillage treatments or cropping systems for time of emergence. Figure 1 shows the pattern of emergence for weevils in 1982. It is hoped that over a period of years a correlation can be made between time of emergence and soil temperature, as this would be a useful tool in predicting when producers should start scouting for weevil infestations.

Table 1. Effect of Date of Planting on Seed Weevil Infestation Levels.

Hybrid	Date Planted	Percent of Seeds Infested
Sigco 432	May 1	1.3
	May 15	14.1
	June 1	56.1
Sigco 894	May 1	9.0
	May 15	48.5
	June 1	52.9

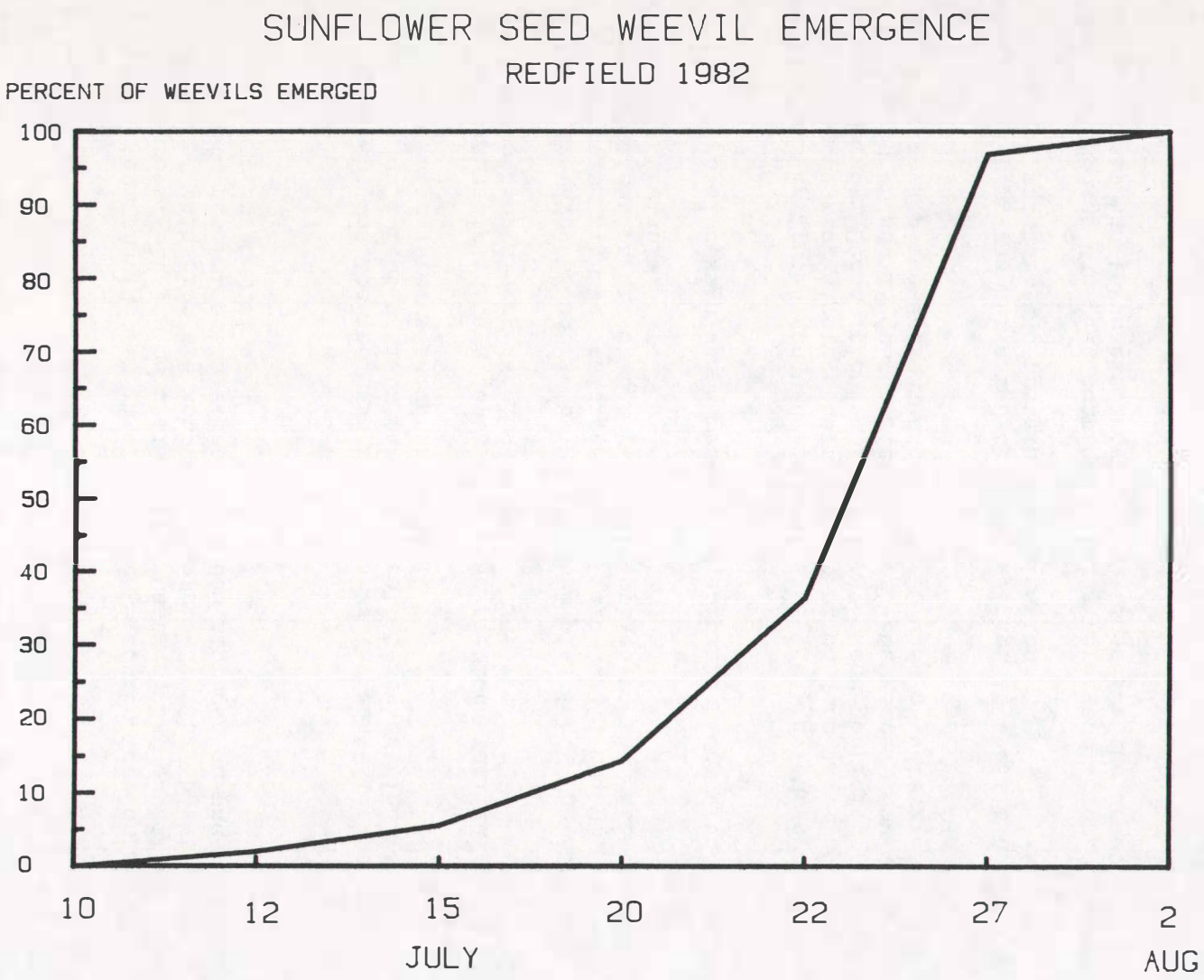
SUNFLOWER SEED WEEVIL EMERGENCE
REDFIELD 1982
PERCENT OF WEEVILS EMERGED
100
90
80
70
60
50
40
30
20
10
0
10
12
15
20
22
27
2
JULY
AUG

Figure 1

SDSU James Valley REPORT

NITROGEN FERTILIZATION OF FORAGE SORGHUM

R. Gelderman and P. Fixen

Department of Plant Science

Forage sorghum provides an important forage source for South Dakota livestock producers. It can be utilized for pasture, hay or silage. The nitrogen needs of this crop are not well understood. The objective of this experiment was to determine the effect of added nitrogen on the yield and quality of forage sorghum silage.

Methods

1. The experiment was located on a site towards the east side of the Redfield Irrigation farm on a Beotia silt loam. The soil tests obtained from samples taken before planting are as shown in Table 1.

The site had been sampled to a depth of 4' the previous fall and had shown only small amounts of nitrogen below 2 feet.

2. The fertilizer was broadcast by hand before planting. The nitrogen source was ammonium nitrate. Nitrogen rates were 0, 30, 60, 90, 120 and 150 lb/A N. An application of 40 lb/A P_2O_5 was applied to the site to eliminate phosphorus as a variable.

3. The experimental design was a randomized complete block with four replications.

4. The site was irrigated and had sunflowers as the previous crop. Tillage consisted of two spring discings before planting on June 18. The variety was Sokota 300-F Sorghum-Sudan, planted at 13 lb/A. Weed control consisted of 3 quarts of Ramrod 4L and 1½ quarts Bladex 4L pre-emergence. Row width was 36". One irrigation took place approximately July 20 when 6" water was applied in the rows.

An area of each plot was harvested by hand, weighed in the field and a silage sample taken for moisture and protein determination.

The stand was good as was weed control. Yields were good to excellent, reflecting in part the favorable growing conditions for the season.

Results

The yields of 60% moisture silage are given in Table 2. The yields average between 12 and 13 ton/acre. No significant yield difference due to nitrogen treatment are seen at this site.

The nitrate level would be considered medium to high for a yield goal of

12 ton silage. It appears that this amount of soil nitrogen was adequate to meet the crops nitrogen demand. No nitrogen deficiency symptoms were noted during the season.

The protein content of the forage and total nitrogen uptake figure are also given in Table 2. Protein levels and nitrogen uptake reach a maximum at the 90 pound rate of fertilization. Protein content of the silage increases 1.2% over the check at the 90 pound nitrogen rate. This is not enough added protein to economically pay for the nitrogen.

The pounds of nitrogen uptake per ton of dry matter is equal to 27 pounds. This is very close to the 25 pound figure presently used by the SDSU Soil Testing Laboratory to calculate nitrogen recommendations for forage sorghum.

In summary, no nitrogen response from forage sorghum was found at this site. The protein content of the forage did respond to additional nitrogen and reach a maximum at the 90 pound nitrogen rate. These plots and other similar experiments will be used to refine the nitrogen recommendations made by the Soil Testing Laboratory.

Table 1. Soils information on forage sorghum site.

Soil	NO_3-N lb/A-2'	O.M. %	P lb/A	K lb/A	pH
Beotia	100	2.5	32	1000+	7.5
	high	medium	high	very high	slightly alkaline

Table 2. Forage sorghum yields, protein content and nitrogen as influenced due to added nitrogen, Redfield, 1982.

Treatment lb/A/N	Yield lb/A 60% moisture	Protein %	N Uptake lb/A
0	25,505	7.31	119
30	26,435	7.88	133
60	25,095	8.06	129
90	24,642	8.50	134
120	25,212	8.31	134
150	26,158	8.38	140
Sig. of F	0.92	0.055	---
C.V.	10.3	6.5	---

SDSU
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REPORT

SPRING WHEAT BREEDING

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Department of Plant Science

The experiments were seeded on April 29, 1982 in good soil moisture resulting in excellent germination and stand establishment. Soil tests indicated adequate levels of N, P and K and 100 lbs/A of 20-10-10 was banded with the seed. Growing conditions were very good producing high yields for all nurseries. The crop was delayed in maturity, with the average number of days from planting to heading 4½ days later than in 1981. Selection and harvest were completed on August 4, 1982.

In the advanced yield trial (AYT) Table 1, the mean yield was 54.7 bu/A, which was the highest mean yield of the 9 sites where this trial was grown in 1982. The LSD of 5.86 bus. indicates that any two varieties that differ by more than 5.86 bus. were significantly different. The top yielding named variety was James and other named varieties near the top were Len, Alex and Marshall.

In addition to the AYT breeding nurseries, 2500 plots were grown for observation and selection. Selected lines were harvested and evaluated for yield, test weight and quality analysis. The level of leaf rust in this year's nurseries was heavy and many lines in the breeding nursery as well as some in the AYT were discarded because of susceptibility to this disease.

Table 1. Spring Wheat Advanced Yield Trial. 1982. Redfield.

Entry No.	Variety	Pedigree	Grain Yield Bu/A 1982	Grain Yield Bu/A 1981	Test Weight lbs/bu	Maturity Days to Heading	Height inches	Leaf Rust[1]
1	Butte		53.4	31.6	60	56	44	40MS
2	Eureka		49.0	33.3	59	59	44	50MS
3	Olaf		48.5	38.1		60	36	50MS
4	Len		58.1	33.5	59	60	37	5MR
5	Era		49.1	34.8	57	63	34	5MR
6	Centa		45.9	32.4	62	56	43	30MS
7	James		59.9	30.6	59	56	39	40MS
8	Alex		47.8	38.5		60	44	TMR
9	Oslo		53.2			58	33	10MR
10	Marshall		57.6			61	34	5MR
11	Pro 711		54.3			60	33	10MR
12	Pro 715		40.2			64	35	80S
13	Pondera		50.1			59	36	20M
14	Verry-4		51.5			67	32	TR
15	SD 2854	James/SD 2049	54.5	32.8	58	59	44	5MR
16	SD 2861	Eureka/Prodax	53.7	36.7	59	57	36	10MR
17	SD 2881	Protor/RL 6010	51.8	31.5	60	57	43	10MR
18	SD 2903	SXW Composite	55.7	32.7		56	43	50S
19	SD 2911	Prt/RL 6010//Marshall	57.8	35.3	60	60	39	10MR
20	SD 2912	Prt/RL 6010//Marshall	66.4	33.7	59	56	40	TR
21	SD 2922	Mn 69124/3/LV//Era/Tob	54.1	29.6		62	38	TMR
22	SD 2925	Butte/James	56.6	33.3	59	57	39	5MR
23	SD 2926	ND 528/1117/IAS 20/3/Butte	42.7	30.0		60	43	80S
24	SD 2935	Agt/3/ND 411/Wld/BB	55.4	33.7		60	34	5MR
25	SD 2937	Hand/2*1809//On/Tob//Tpr	55.2	30.6	61	58	45	TMR
26	SD 8026	Coteau/Dawn	59.1	33.1	60	56	44	5MR
27	SD 8021	James/Dawn	51.4	33.1		60	45	TMR
28	SD 8015	Eureka/Dawn	57.3	33.8	60	58	37	5MR
29	SD 8036	Butte*2/Arthur 71	58.7		61	56	42	TR
30	SD 8038	Pro 711//EE/Parker	51.7			62	45	5MR
31	SD 8039	Pro 711/Butte/Art	54.4		58	57	35	60S
32	SD 2940	SD 2854-42 James/2049	60.0		58	59	45	5MR
33	SD 2941	SD 2861-4 EE/PRD	59.1			59	37	5MR
34	SD 2942	SD 2835-6 Butte/EE	56.4		60	57	46	20MR
35	SD 2943	SD 2837-2 Butte/EE	53.8		60	56	45	60S
36	SD 2944	WS 25/Butte	48.3			60	36	10MR
37	SD 2945	WS 28/James	50.9		60	59	40	TR
38	SD 2946	Butte/SD 2271//Mn 70181	63.2		60	56	38	5MR
39	SD 2947	Glenlee/Butte	54.1			56	43	50S
40	SD 2948	Prt/RL6010//James	59.3		59	59	40	20MR
41	SD 2949	PTM 70/SD 75409//Marshall	59.9		59	60	37	10R
42	SD 2950	WS 1809//Butte/SD 74219	47.8			57	41	30S
43	SD 2951	SD 2837/5/Bgs*2/· · ·	56.4		60	56	43	40M
44	SD 2952	Prt/RL 6010//Marshall	61.8		60	60	36	10MR
45	SD 2953	SD 2911-Selection	58.4		58	60	38	5MR
46	SD 2954	SD 2863/Olaf	55.2			60	38	5MR
47	SD 2955	SD 21671/Mn 70181//SD 2853	53.8		58	56	37	5MR
48	SD 2956	Butte/Co 53427//WS 1809	61.6		59	60	37	TR
49	Mn 73168	Crim/Era 2*//Bai-Gallo	56.8			60	34	TMR
Mean			54.7					
CV			6.7					
LSD .05			5.86					

[1] % leaf infested; reaction T = trace, R = resistant, MR = moderate resistant, MS = moderate susceptible, M = moderate resistant/susceptible and S = susceptible.

James Valley REPORT

GLEAN RECROPPING STUDY

M.A. Peterson and W.E. Arnold

Department of Plant Science

Split plot experiments were established at the Northeast Research Station, Watertown and the James Valley Research Farm, Redfield to examine the effects of Glean[tm] carryover on flax, sunflowers, corn, soybeans and grain sorghum. In the spring of 1982, four rates of Glean (0.0, 0.015, 0.03 and 0.06 lb. active ingredient per acre) were applied postemergence to oats at the Watertown location and wheat at the Redfield location. The test crops were planted in these treated areas in 1982 and crop injury measurements taken.

Injury ratings for the two locations are given in Table 1.

Differences in the amount of carryover and consequent crop injury between the two locations appeared to be related to soil pH and organic matter, with the Watertown location having a pH of 6.4 and organic matter content of 4%, and the Redfield location having a pH of 7.5 and organic matter content of 3%.

Table 1:

Crop (1982)	Glean Rate (1981)	Percent Crop Injury	
		Watertown	Redfield
Flax	0.0 lb/A	0	0
	0.015	0	38
	0.03	0	54
	0.06	5	72
Sunflowers	0.0	0	0
	0.015	0	21
	0.03	0	38
	0.06	8	77
Corn	0.0	0	0
	0.015	0	34
	0.03	5	59
	0.06	8	77
Soybeans	0.0	0	0
	0.015	0	37
	0.03	0	62
	0.06	0	89
Sorghum	0.0	0	0
	0.015	0	44
	0.03	0	78
	0.06	5	93

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James Valley
REPORT

ALFALFA VARIETAL SEEDING RATE TRIAL

A. Boe and R. Wynia
Department of Plant Science

Two seeding rate trials comprised of 6 and 12 pounds/acre planting rates for 26 varieties were planted adjacent to each other on May 13, 1981. Percent stand in May 1982 was generally 70% or better for most of the varieties, but several plots in the 6 pound/acre experiment exhibited very weak stands and were not havested for forage yield. Plots were harvested for forage yield on June 10 and July 28, 1982, average yields of the sum of the two cuts are presented for each variety in Table 1. No statistically significant differences were detected among varieties within planting rates.

Although the average yield of the two planting rates cannot be accurately compared statistically, the 12 pound/acre seeding rate does not appear to have a forage yield advantage over the 6 pounds/acre seeding rate one year after establishment.

Table 1. 1981 Redfield Alfalfa Varietal Seeding Rate Trial

Location:	Redfield, SD	Plot Size:	4' x 21'
Design:	RCB	Planting Date:	May 13, 1981
Method of Seeding:	V-Belt Drill	Replications:	2
Soil Type:	Beasia Silt Loam	Years:	1982

	Seeding Rate	
	6 lbs acre	12 lbs acre
	Oven Dry Tons Per Acre Two Cuts	
Variety		
Duke	3.12	2.38
N-545	3.56	2.59
C/W 8042	2.92	2.59
Hy-PHY	2.74	2.65
SX-208	2.68	2.35
DF 44	2.91	2.90
C/W 61	3.21	2.62
524	3.23	2.74
526	3.70	2.80
KN33	3.07	2.40
DeKalb 117	2.89	2.84
Spectrum	3.33	2.48
DeKalb 120	3.23	2.74
532	2.99	2.86
Spredor II	3.07	2.65
Super 721	2.99	2.54
Thor	2.76	3.06
C/W 8032	--	3.13
SX-418	2.79†	3.17
919	--	2.45
SX-10	--	2.89
Baker	3.18†	2.98
Agate	2.62†	2.56
DeKalb 131	3.11†	2.75
DeKalb 130	3.34†	3.22
DeKalb 123	3.17†	2.65
Average	3.08	2.73

† Data from one replication only

James Valley REPORT

1982 PERFORMANCE TRIALS OF CORN, GRAIN SORGHUM, SOYBEANS AND WINTER WHEAT

Joseph J. Bonnemann
Department of Plant Science

Performance trials with corn, grain sorghum, soybeans and winter wheat were seeded at the Research Center for 1982 harvest. The winter wheat trials failed to survive the winter and jackrabbits severely damaged the soybeans again forcing abandonment of both trials.

The corn trials were seeded on May 20 on both irrigated and dryland fields of the Center. The dryland field was firm and good soil moisture was present for germination. The irrigated field was somewhat lumpy but good soil moisture was present for germination; seeding was completed just prior to a beneficial shower. An Oyjord small-batch type feeder with 6-row divider was used for seeding the corn. This unit was mounted above commercial flexi-planter units with double-disc openers on 36-inch spacing for 2-row plots. Recommended granular insecticides and herbicides were spread over the row at seeding.

The grain sorghum and soybeans were seeded on June 4 in 36- and 30-inch rows, respectively. A custom built 31-cell cone seeder over a flexi-planter unit was used for seeding each row. Seedbeds were good for both trials. The soybeans emerged earlier than the surrounding field and jackrabbits concentrated on the small area causing serious stand loss or reduction in eventual plant size. Recommended herbicides were applied either prior to or at seeding. A granular seed inoculant was put down with the soybean seed. All trials received adequate fertility applications when field preparations were underway.

Plant populations were not quite the levels intended for the irrigated corn trials and slightly exceeded the intended level for dryland. Populations desired were 10,500 plants per acre for dryland and 24- and 28,000 for the irrigated trials. Final populations were 10,832 for the dryland and 22,375 and 25,827 for the irrigated trials, respectively.

The grain sorghum trials averaged 4-5 plants per foot of row and 9-10 kernels were seeded per foot of row for the soybeans. No statistical difference was found for either population in the corn trials. The corn trial yields are the average of four replications; the grain sorghum yields the average of three replications.

The grain sorghum trial was harvested on October 18. The irrigated corn was harvested on November 8 and the dryland corn on November 16.

The 1982 grain sorghum yields ranged from 5595 down to 2920 pounds per acre; the mean yield for all entries was 4265 pounds per acre. The seed quality was good for most entries considering the cooler temperatures throughout the season that delayed flowering and maturity. Kernel moisture for all entries was above 35% the day following the first frost, September 22. Had a killing frost come at that time many of the entries would have produced

shriveled, lightweight seed. Continued growth to mid-October permitted the plants to reach physiological maturity and the test weight averaged 55 lb/Bu for all entries.

The corn yields were good in both trials, but moisture content high, especially for some of the irrigated hybrids. Dryland yields ranged from 103 down to 65 B/A. Irrigated trials yields were much better ranging from 176 down to 119 B/A. The moisture averaged 25% in the dryland trials and 26.3 in the irrigated plots. Slow drydown in the trials was typical of much of the crop in the area and around the state. Stalk breakage was not a serious problem for most entries.

Current years data are presented for the corn trials. Current plus several years data are presented for the grain sorghum trials. Additional data on these and other trials will be found in Performance Trial publications available from your County Extension office.

1982 Grain Sorghum Performance Trial, Area C1 (irrigated), James Valley Research Center, Redfield, Spink County, South Dakota

Brand and Hybrid	Date Headed	Height Inches	Test Wt. lb/B	Yield, Pounds per Acre 1982	1980-82	1981-82
Cenex 228T	8/15	48	57	5595	5145	5195
SeedTec 624G	8/15	58	58	5490		5265
DeKalb Exp 223	8/8	45	57	5425		
DeKalb DK-38	8/13	54	55	5390		5070
Warner W-564T	8/14	50	57	4945		
Pride P508GB	8/13	44	55	4940	4890	4930
Northrup King X7911	8/15	46	56	4935		
Paymaster 930	8/15	46	57	4710		
Triumph Two 54YG	8/19	51	55	4575	4800	4860
Warner WX9183	8/17	49	54	4555		
Warner W-655T	8/16	52	54	4555	4830	4840
Triumph Two 50YG	8/15	48	58	4525		
SeedTec 651DR	8/20	55	53	4465		4475
Northrup King NK2244	8/22	41	40	4445		
PAG Exp 91008	8/20	48	55	4380		4295
Warner W-545T	8/15	40	56	4345	4730	4705
SeedTec 1002	8/14	39	56	4255		
Northrup King NK2018	8/12	46	56	4245	4475	4470
Cenex 224T	8/15	39	57	4235	4400	4445
SeedTec 652G	8/18	54	54	4220		4660
Western WS-203	8/18	46	54	4175		4430
PAG 2250	8/13	41	56	4150		
Asgrow Dorado E	8/16	46	55	4135	4925	4255
Asgrow Corral	8/18	51	54	4095	4875	4655
Funk's G-1350	8/16	47	55	3990		
Cargill 22	8/16	42	56	3960		
Pride P812GB	8/23	50	53	3945		
Cargill 40	8/22	47	55	3840		
Warner WX9181	8/20	44	54	3740		
Northrup King NK2030	8/19	42	54	3690	4205	4250
Paymaster R920	8/11	49	56	3640		
Warner W-684DR	8/22	48	54	3610		
Funk's G-251	8/10	37	57	3605		
Paymaster R980	8/19	43	54	3585		
Funk's G-201	8/16	44	55	3525		
Paymaster GR1018	8/21	45	53	2985		
Cargill 30	8/22	48	54	2920	4115	3750
Means		47	55	4265		

LSD (.05) 895 C.V. - % = 13.0

Moisture samples taken on September 22, 1982, the morning following the first frost, indicated all entries were still in excess of 35% moisture.

1982 Corn Performance Trials, Area C1(dryland), Redfield, SD

Brand and Variety	Maturity and Cross	Yield, B/A	Percent Stalk Lodged	Percent Moisture	Performance Score Rating
Pioneer 3732	M 2X	102.8	3.6	24.2	2
Pioneer 3747	M 2X	101.5	1.5	22.8	1
Northrup King PX9353	M 2X	100.1	0.8	22.8	3
Trojan T1000	M 2X	97.1	1.4	26.4	5
Asgrow RX40	E 2X	95.4	6.3	21.5	4
Paymaster 2990	M 2X	94.2	2.1	28.4	9
Paymaster 4660	M 2X	93.9	2.3	30.7	15
Top Farm SX104	M 2X	92.7	4.9	23.0	6
Curry SC-1424	M 2X	91.9	1.6	31.5	23
Pioneer 3901	E 2X	91.4	2.9	22.7	7
Funk's G-4342	M 2X	90.7	8.0	26.8	19
Stauffer S3306	M 2X	90.7	3.8	21.9	8
Keltgen KS101	E 2X	89.9	1.5	23.5	11
Pride 5523	M 2X	89.8	3.8	27.0	20
Asgrow RX511	M 2X	89.6	7.6	26.9	25
Sigco 3106	M 3X	89.0	17.1	22.8	24
Top Farm SX1105	M 2X	88.8	3.7	22.4	12
DeKalb XL-32A	M 2X	88.5	6.1	30.0	34
Keltgen KS104	M 2X	88.4	0.8	26.7	21
Western KX-55	M 2X	88.4	1.6	27.8	26
SDAES Check 4	M 2X	88.3	2.9	23.5	16
Pioneer 3906	E 2X	87.8	0.7	21.0	10
Curtis 439	M 2X	87.5	6.3	25.7	27
SDAES Check 10	M 2X	87.5	3.8	21.2	14
DeKalb EX2324	M 2X	87.2	2.2	24.1	18
Pride 4422	M 2X	87.1	0.8	23.4	17
Funk's G-4315	M 2X	85.9	3.0	24.9	28
Farm Bureau FB94	M 2X	85.8	9.0	17.1	13
SeedTec 7007	M 2X	84.9	7.8	22.1	30
Keltgen KS1020	M 2X	84.8	3.1	28.8	40
SeedTec CX8154	L 2X	84.7	1.6	26.0	31
PAG SX181	E 2X	84.5	4.5	22.6	29
Stauffer S3242	M 2X	84.1	1.4	21.4	22
Keltgen KS95	E 2X	82.6	5.0	22.3	32
Cargill 426	E 2X	82.1	9.6	22.7	39
Cenex 2106	M 2X	81.8	2.2	23.1	36
Cenex 2108	M 2X	81.8	2.4	27.9	43
DeKalb XL-36	M 2X	81.8	3.0	30.4	47
Cargill 834	E 2X	81.5	2.1	22.1	33
Disco DS5605	E 2X	80.3	6.7	23.8	42
Pride 3322	E 2X	80.2	2.2	21.5	37
Northrup King PX9288	E 2X	80.2	8.1	21.8	41

Dryland Corn Trial, Redield, SD, 1982(cont)

SeedTec 7971	E 2X	80.0	5.4	21.1	38
DeKalb XL-28	M 2X	79.6	0.0	28.2	46
Interstate 784	E 2X	79.1	0.8	19.8	35
Tall Corn SX109	M 2X	78.6	3.1	37.0	61
Trojan T1056	M 2X	78.1	8.1	32.9	59
Top Farm SX104A	M 2X	77.7	2.1	28.0	51
PAG Exp291511	E 2X	77.5	6.9	23.1	45
DeKalb XL-314	E 3X	77.2	17.0	22.5	52
Curry SC-1455	M 2X	76.1	3.5	38.9	62
DeKalb XL-18	E 2X	75.5	1.5	26.9	53
Cargill 862	E 2X	75.4	3.5	27.6	55
Tall Corn SX110	M 2X	75.2	0.8	31.9	60
Kletgen KX102	M 2X	75.1	0.0	28.1	54
Cenex 2098	E 2X	74.3	1.5	22.6	49
Interstate 842	E 2X	73.9	9.7	19.9	50
SDAES Check 11	E 2X	73.8	0.8	18.9	44
Sigco 0902	E 2X	73.3	2.4	19.8	48
SeedTec CX8152	E 2X	71.2	4.3	22.1	56
Western KX-49	M 2X	70.6	5.7	23.1	57
SeedTec 7006	E 3X	67.1	3.6	20.4	58
Sigco 2107	M 2X	64.9	10.2	31.8	63
Means		83.8	4.1	24.9	
LSD (.05)		13.6	C.V. - % = 11.6		

1982 Corn Performance Trials, Area C1(irrigated), Redfield, SD

Brand and Variety	Maturity and Cross	Yield, B/A	Percent Stalk Lodged	Percent Moisture	Performance Score Rating
Circle Seed CS-4988	M 2X	175.6	0.4	34.3	9
Tall Corn SX108	M 2X	171.3	0.9	36.4	27
McCurdy 81-54	M 2X	170.1	0.4	29.4	7
Curry SC-1455	M 2X	169.1	0.4	37.6	41
Paymaster 2990	M 2X	167.7	0.0	26.7	5
Pioneer 3732	M 2X	167.6	1.7	25.4	3
Cagrill 861	E 2X	165.8	0.8	25.6	6
Curry SC-1425	M 2X	165.0	0.9	28.8	19
Curry SC-1420	M 2X	164.8	0.4	28.6	17
Asgrow RX 511	M 2X	164.5	2.7	23.0	4
Circle Seed CS-207	M 2X	164.5	0.0	32.2	30
Stauffer S5602	L 2X	163.6	2.0	27.2	16
Northrup King PX39	M 2X	163.3	3.3	29.9	26
Pioneer 3901	E 2X	163.3	0.8	22.0	1
Keltgen KS107	M 2X	162.9	0.8	27.3	18
O's Gold 2321	E 2X	161.3	0.4	21.3	2
Paymaster 4660	M 2X	161.0	0.0	27.7	22
Top Farm SX1105	M 2X	160.1	0.8	23.5	10
Top Farm SX104	M 2X	160.0	0.4	24.9	14
Funk's G-4342	M 2X	159.9	0.4	29.0	31
O's Gold 2330	M 2X	159.6	0.4	23.1	8
Northrup King PX9353	M 2X	159.6	1.3	23.6	12
Keltgen KS95	E 2X	159.5	1.7	24.3	15
SeedTec CX8154	LM2X	159.5	0.4	28.2	25
DeKalb XL-36	M 2X	159.3	0.0	28.4	28
Asgrow RX 40	E 2X	159.2	0.4	23.4	11
Keltgen KS101	E 2X	157.3	1.3	23.8	20
Keltgen KS1020	M 2X	157.0	0.4	27.6	33
Cenex 2106	M 2X	156.9	0.0	22.8	13
Keltgen KS104	M 2X	156.0	2.1	27.3	39
O's Gold 6880	M 2X	155.6	0.4	27.0	34
Tall Corn SX113	L 2X	155.1	1.3	35.8	65
Western KX-59	M 2X	154.9	0.4	26.6	36
Pride 5523	M 2X	154.7	0.4	27.7	42
Circle Seed CS-201	E 2X	154.6	1.3	22.5	21
Sigco 1103	M 2X	154.0	0.0	27.9	43
Curry SC-1424	M 2X	153.7	0.0	30.9	55
Disco DS5519	M 2X	153.6	0.8	25.6	35
DeKalb EX1212	E 2X	153.1	3.8	21.9	24
Sigco 2105	M 2X	152.8	18.2	25.5	59
Trojan T950	E 2X	152.8	1.3	21.8	23
Pioneer 3747	M 2X	152.4	0.0	23.8	29
McCurdy 4855	M 2X	152.2	0.4	28.0	50
Cenex 2108	M 2X	151.9	1.3	26.6	46
McCurdy 81-3	M 2X	151.4	3.7	26.4	51
PAG Exp 291511	E 2X	150.0	1.3	23.4	38
SDAES Check 10	M 2X	149.7	1.8	21.7	32
Trojan T1000	M 2X	149.5	0.5	27.2	53

1982 Irrigated Corn Trial, Redfield, SD (cont)

DeKalb XL-28	M 2X	148.1	0.4	29.8	63
PAG SX397	M 2X	148.1	2.2	33.3	69
Tall Corn SX109	M 2X	147.8	0.0	31.2	66
Pride 6611	L 2X	147.3	5.7	33.7	73
Cargill 426	E 3X	146.7	1.6	23.8	49
SeedTec CX8152	E 2X	146.4	1.5	22.7	45
Circle Seed CS-2155	E 2X	146.3	1.3	20.8	37
Keltgen KS102	M 2X	146.1	1.3	31.0	68
Stauffer S3306	M 2X	146.0	1.0	21.2	40
Funk's G-4315	MM2X	145.9	0.4	26.4	58
DeKalb EX1615	E 2X	145.7	2.3	22.7	48
Cargill 834	E 2X	145.3	0.9	21.8	44
Pride 4422	M 2X	145.3	0.0	24.5	54
Cargill 862	E 2X	144.2	0.0	29.1	67
Cargill 872	M 2X	143.2	0.0	32.1	72
McCurdy 4664	E 2X	142.9	1.6	23.6	57
DeKalb XL-8	E 2X	142.1	0.4	20.3	47
Pioneer 3906	E 2X	142.0	0.0	22.0	52
McCurdy 80-71	E 2X	140.9	0.0	23.3	60
Western KX-420	E 3X	140.3	1.3	21.7	56
Circle Seed CS-210	M 2X	140.2	0.5	37.9	80
Top Farm SX104A	M 2X	140.1	0.9	30.4	74
DeKalb XL-25A	M 2X	139.9	1.7	27.8	70
Disco DS5605	E 2X	138.6	1.3	24.0	64
SeedTec 7971	E 2X	138.1	0.5	22.2	62
McCurdy 4956	M 2X	137.4	1.3	29.7	78
Stauffer S3242	M 2X	136.6	1.3	20.4	61
Northrup King PX9288	E 2X	132.8	3.5	22.7	71
SeedTec 7007	M 2X	132.0	6.3	23.8	76
Circle Seed CS-2355	M 2X	130.6	0.8	24.4	75
Cenex 2110A	M 2X	129.8	13.5	28.0	81
Asgrow RX 355	E 3X	126.8	0.0	22.3	77
SeedTec 7006	E 3X	119.2	1.5	21.1	79
	Mean	151.6	1.5	26.3	

LSD(.05) 13.1 C.V. - % = 16.9

James Valley REPORT

AN EVALUATION OF THREE FEEDING SCHEMES TO WINTER REPLACEMENT HEIFERS

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Summary

Three feeding schemes for wintering replacement heifers were evaluated in terms of cost and animal performance. Ninety-three Simmental-Angus crossbred heifers were divided into three groups of 31 head and fed the following diets: (1) .28 Mcal of net energy for gain per pound of feed, fed free choice: (2) .28Mcal of net energy for gain per pound of feed limit fed to 13 lb dry matter per head per day and (3) .36 Mcal of net energy for gain per pound of feed limit fed to 13 lb of dry feed per head per day. The third diet (higher energy) was the best scheme. It resulted in the best gains and the lowest feed costs per pound of gain.

Introduction

Many different feeding practices have been used to grow out replacement heifers. The goal for replacement heifers is to over-winter at gains sufficiently high enough that they will be at 60% of mature body weight at breeding. This should be done as efficiently as possible and to meet all nutrient requirements.

This study was designed to evaluate three methods of growing replacements as to dollar efficiency and animal performance.

Methods

Ninety-three Simmental-Angus crossbred heifers were purchased at weaning and placed on trial at the James Valley Research and Extension Center at Redfield, SD. The heifers were divided into two groups, light and heavy (average of 510 and 600 lbs, respectively). Each group was divided randomly into three groups, each receiving one of the following rations: (1) .28 Mcal of net energy for gain per pound of dry feed, fed free choice (low energy ration, free choice); (2) the same diet as in one but with intake limited to 13 lbs of dry feed per head per day or (3) .36 Mcal of net energy for gain per pound of dry feed (high energy ration) intake limited to 13 lbs of dry matter per head per day. Composition of the diets is shown in Table 1. The cattle were weighed and treatments initiated February 4, 1982. The heifers were artificially inseminated in early June and dietary treatments were terminated resulting in a 144-day feeding period. Cattle were weighed every 28 days and feed measured on a pen basis each day. Subsequently, cattle were placed on pasture at Cottonwood, South Dakota.

Analyses of data included calculation of weight gain, average daily gain, feed consumption and feed cost per treatment group. The reproductive performance of the heifers will be monitored in future years.

Results

Data representing total weight gain, average daily gain, total feed consumption, pounds of feed per pound of gain and feed cost are presented in Table 2. The average daily gains and feed efficiencies were lower than what might be expected in all pens because of a month of severe weather compounded by recurring water problems. The most satisfactory overall performance was achieved by the high energy limit-fed group. They gained the most with the lowest feed cost per pound of gain. The animals in the low energy free-choice group consumed the highest amount of feed and had the poorest feed efficiency. They also had the highest total feed cost as well as feed cost per pound of gain. The low energy limit-fed group was more efficient than the free choice group but had the lowest gain rate. The limit-fed high energy group performed the best in total weight gain, average daily gain and feed conversion. They also were the most economical in feed cost per pound of gain. Limit feeding seems to decrease feed costs, but the energy level in the ration must be relatively high to sustain adequate gains.

TABLE 1. RATION COMPOSITION[a], ENERGY LEVEL AND DAILY INTAKE LEVEL FOR EACH OF THE DIETS

	Low energy Free Choice	Low energy Limit-fed	High energy Limit-fed
Composition,%[b]			
Corn, shelled	65	65	77
Prairie hay	34	34	22
Protein supplement	1	1	1
Energy, NEg Mcal/lb	.28	.28	.36
Lb intake per head/day	14.5	12.5	12.7

[a] All rations included free access to mineralized salt.

[b] All numbers are on a dry matter basis.

TABLE 2. FEEDLOT PERFORMANCE[a] AS MEASURED BY WEIGHT GAIN, AVERAGE DAILY GAIN, FEED CONSUMPTION, FEED EFFICIENCY AND FEED COST OF SIMMENTAL-ANGUS CROSSBRED REPLACEMENT HEIFERS FED 144 DAYS

Item	Low energy Free choice	Low energy Limit-fed	High energy Limit-fed
Total wt. gained (lb)	189	171	195
ADG, lb/day	1.31 ± .12	1.22 ± .04	1.39 ± .03
Total lb feed consumed[b]	2099	1810	1839
Feed efficiency (lb feed, DMB/lb gain)	11.24 ± 1.22	10.64 ± .77	9.43 ± .07
Total feed cost/hd ($)[c]	73	63	65
Feed cost, $/lb gain	.39	.37	.33

[a] Values are averages on an individual basis.

[b] Dry basis.

[c] Based on corn at $2.40/bushel and prairie hay at $68/ton.

James Valley REPORT

ROOT ZONE DEPTH OF SOYBEANS ON GREAT BEND SILT LOAM

R. Kohl and V. Rasiah

Department of Plant Science

Weber soybeans were planted in 30 inch rows across the plot area. A single sprinkler line with sprinklers every 20 feet was placed through the center of the plot. This arrangement provided for a gradiation in irrigation water applied from a maximum near the sprinkler line down to zero additional water at the outer edge of the plot.

Root distributions were measured across the treatments three times through the season on 9 July, 23 August and 23 October. Soil water content was measured every 7 to 10 days and irrigations applied to maintain the maximum water treatments at an optimum soil water content.

Research farm personnel provided excellent support resulting in a good stand of weed free soybeans. Irrigations under low wind conditions provided a very good gradiation in soil water contents. Soybean growth during the season provided a visual display of the water treatment.

Soybean yields varied uniformly from 45 bu. per acre along the sprinkler line to 22 bu. per acre under dryland conditions.

Rooting density through the major portion of the profile was between 0.2 and 0.4 cm root per cm^3 of soil. The effective root zone depth was found to contain more than 0.1 cm root per cm^3 of soil. With an abundance of water producing the maximum yield the root zone depth was only 75 cm. The remainder of the water treatments resulted in root zone depths of about 110 cm. The relative openness of this silt loam soil (Great Bend) would argue against rooting depths being limited by soil aeration even with optimum water being supplied. At present one could guess that maximum rooting depth could be a plant response to need in this case.

The success of this experiment could not have been achieved without the excellent work of Michael Esser and Albert Dittman in establishing the plots and of Miron Fisk in providing irrigation and water management skills.

James Valley REPORT

PERFORMANCE OF HERBICIDES IN CORN, SOYBEANS AND SUNFLOWERS

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Department of Plant Science

Herbicide demonstration plots provide side-by-side comparison of herbicide treatments. Treatments include herbicides presently labeled and those which may be approved in the near future. Demonstration plots are the final step in the herbicide evaluation program. Rates and application methods for each are based on results obtained in previous years screening tests.

Methods

Preplant and preemergence treatments were applied May 19. A plot sprayer delivering 20 gpa water and 40 psi pressure was used. Preplant incorporated treatments were incorporated immediately with two tandem diskings set to cut 5-6 inches deep. Shallow preplant incorporated treatments were incorporated with one pass of the disk set at 3 inches deep. The disk was a light-weight, finishing model with small blades.

The corn, soybean and sunflower crops were planted May 19. Preemergence treatments were applied immediately after planting.

Total rainfall the first seven days after application was 1.20 inches and 1.37 inches during the second week. Weed pressure was moderate to heavy. Green foxtail was the predominant grass specie. Redfoot pigweed, Russian thistle and lambsquarters were the predominant broadleaves.

Results

The performance of the treatments is presented in the following tables. Evaluations are based on two visual ratings per plot on July 21. A two year average for early season weed control for corn and a three year average for sunflowers is included for those treatments in the test each year.

1982
CORN HERBICIDE DEMONSTRATION
James Valley Research Center

Treatment	lb/A act.	Percent Weed Control 1982 Gr	1982 Bdlf	2 Year Avg. Gr	2 Year Avg. Bdlf
PREPLANT INCORPORATED					
Check	--	0	0	0	0
Eradicane	4	98	72	94	71
Eradicane+atrazine	4+1	99	97	96	94
Eradicane+Bladex	4+1½	99	96	94	92
Sutan+	4	98	30	90	42
Sutan+ +atrazine	4+1	98	96	92	94
Sutan+ +Bladex	4+1½	95	95	93	91
Sutan+ +Bladex+atrazine	4+1½+½	97	98	96	98
SHALLOW PREPLANT INCORPORATED					
atrazine	2½	67	97	76	82
Lasso	3	70	65	81	55
Dual	2½	85	25	85	26
PREEMERGENCE					
atrazine	2½	87	98	78	96
Bladex	3	58	73	70	83
Lasso	3	83	73	88	65
Dual	2½	93	15	92	30
Prowl	2	50	75	68	68
propachlor	5	48	30	72	28
Mon-097	2½	96	91	96	67
Lasso+atrazine	2+1	97	99	95	96
Lasso+Bladex	2+1½	94	96	93	93
Dual+atrazine	2+1	98	99	94	94
Dual+Bladex	2+1½	98	96	93	96
propachlor+atrazine	4+1	89	93	92	89
Lasso+Bladex+atrazine	2+1½+½	98	99	94	96
Lasso+Bladex+Sencor	2+1½+¼	98	99	96	98
Lasso+atrazine+Sencor	2+1+¼	98	99	--	--
EARLY POSTEMERGENCE					
Prowl+atrazine (2 lf)	1½+1	92	97	90	86
Prowl+Bladex (2 lf)	1½+1½	84	97	86	88
atrazine+oil	1½+1 gal	72	96	77	82
Bladex 80W+WA	1½+½%	70	85	76	80
PREEMERGENCE & POSTEMERGENCE					
propachlor&Banvel	4&¼	50	89	71	86
propachlor&2,4-D amine	4&½	43	82	66	71

1982
SOYBEAN HERBICIDE DEMONSTRATION
James Valley Research Center

Treatment	lb/A act	Percent Weed Control Gr	Bdlf
PREPLANT INCORPORATED			
Check	--	0	0
Treflan	3/4	98	83
Basalin	1	98	84
Prowl	1¼	98	65
Vernam	2½	98	45
Treflan+Sen/Lex	3/4+3/8	98	92
Treflan+Amiben+Sen/Lex	3/4+2+¼	98	95
SHALLOW PREPLANT INCORPORATED			
Lasso	3	98	23
Dual	2½	98	10
Prowl	1¼	98	25
PREPLANT INCORPORATED & PREEMERGENCE			
Treflan&Sen/Lex	3/4&½	99	99
PREEMERGENCE			
Treflan+Surflan	½+½	98	38
Amiben	3	96	58
Lasso	3	98	28
Dual	2½	98	10
Lasso+Sen/Lex	2+½	98	98
Dual+Sen/Lex	2+½	98	96
Lasso+Amiben	2+2	98	87
Lasso+Modown	2+1½	98	93
Lasso+Lorox	2+1	98	76
Dual+Lorox	2+1	98	71
PREEMERGENCE & POSTEMERGENCE			
Lasso&Basagran	2&1	98	82
Lasso&Blazer	2&½	98	94
Lasso&Tackle	2&½	98	87
Check	--	0	0

1982
HERBICIDE DEMONSTRATION - SUNFLOWERS
James Valley Research Center

Treatment	lb/A act.	Percent Weed Control 1982 Gr	1982 Bdlf	3 Year Avg. Gr	3 Year Avg. Bdlf
PREPLANT INCORPORATED					
Check	--	0	0	0	0
Eptam	3	94	35	90	53
Treflan	3/4	92	91	86	84
Prowl	1¼	95	95	91	79
Basalin	1	93	92	--	--
Eptam+Prowl	3+3/4	92	55	--	--
Eptam+Lasso	3+2	94	45	--	--
Treflan+Amiben	3/4+2	91	90	91	89
Treflan+Eptam	½+1½	94	87	--	--
SHALLOW PREPLANT INCORPORATED					
Lasso	3	88	30	88	49
Dual	2½	89	10	90	32
PREEMERGENCE					
Lasso	2½	83	45	--	--
Amiben	3	65	82	--	--
Dual	2½	93	40	--	--
Prowl	1¼	63	77	--	--
PREPLANT INCORPORATED & PREEMERGENCE					
Treflan&Amiben	3/4&2	99	99	95	94
Prowl&Amiben	1¼&2	99	98	--	--

James Valley REPORT

AGRONOMIC TRAIT RESPONSES OF INBRED LINES TO LINE SOURCE SPRINKLER IRRIGATION

Z.W. Wicks, A.R. Bettendorf, D.L. Robbins
Department of Ag Engineering

The object of our irrigation experiments are to develop lines which are drought resistant by means of recurrent selection. The experiment at the Redfield location consisted of 25 inbred lines replicated two times. A line source irrigation system 150' long was used.

Water was applied when soil moisture readings, from irrometers placed in the field were at approximately -.5 bars. The dates of water application were July 20 and 30, August 6, 13 and 27th. The amount of moisture applied to the plots was measured by rain guages placed evenly throughout the plot. Amount of moisture applied was recorded after each application. The plots were harvested for yield estimates on October 18.

Results in this experiment from replication I were very inconsistent. We feel this inconsistency is due mainly to a border effect, as replication I was bordered by a roadway. More valuable results were obtained from replication II. There were several inbred lines which had statistically significant yield response due to the water gradient. Lines selected from this study will be recombined in 1983 to form a recurrent population.

SDSU
James Valley
REPORT

SUNFLOWER VARIETY TRIALS

C.L. Lay
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The hybrid sunflower trial was planted on June 11 and harvested on October 6, 1982. The plant population at harvest ranged from 15,000 to 16,500 plants per acre. Data is reported for only those hybrids not affected by rabbit feeding. Results are presented in the following table.

Results of the 1982 Hybrid Sunflower Trial at Redfield, SD.

Hybrid Identification	Seed Yield (lbs/A)	Plant Height (inches)	Percent Oil (10% moisture)	Rust[1]
Cargill 207	3464	81	36.4	S-tr
Northrup King 246	3452	61	42.0	S-20
Northrup King 265	3402	53	39.9	S-10
Gro Agri 380-A	3296	65	39.2	S-20
Sokota 4000	3294	62	38.2	S-10
Gro Agri 382	3294	67	39.3	S-5
Arrowhead 747	3291	67	41.8	S-5
Sigco 448	3272	65	40.8	S-20
Cargill 205	3240	67	40.0	S-20
Hybrid 894 ck	3215	62	37.6	S-30
Stauffer S 303	3215	70	38.2	S-5
Dahlgren DO 705	3213	69	40.6	S-5
Seedtec 316	3149	77	39.6	S-10
Seedtec 307	3146	70	37.3	S-30
Sexauer 811	3135	72	37.3	S-20
Dekalb DKS-37	3110	72	38.5	S-20
O's Gold 614	3110	62	38.0	S-30
TNT 534	3092	64	39.6	S-5
Interstate 897	3089	73	37.7	S-30
Pride 2011	3065	67	37.0	S-20
Interstate 7111	3021	68	39.5	S-5
89-A x 124-B x RHA 274 ck	3011	79	36.7	S-20
Stauffer S 3101	3004	57	33.0	S-10
Cal West 67P	2987	67	37.6	S-20
Keltgen DO 704 XL	2984	64	37.9	S-10
Sokota 2057	2963	65	37.9	S-20
Northrup King 254	2938	77	37.8	S-10
Northrup King 275	2915	71	35.0	S-10
Sokota 81-930	2902	64	36.8	S-20
Dekalb 2049	2897	71	35.0	S-30
Dekalb 2214	2879	65	39.2	S-30
Cal West 54k	2879	64	37.8	S-20
Stauffer S 1888	2851	60	39.1	S-20
Jacques J 311	2846	70	37.5	S-30
Sokota 81-307	2834	60	36.4	S-30
Sexauer S-305A	2805	61	37.5	S-20
Seedtec 315	2737	75	35.7	S-30
Sheyenne Golden Glo	2706	71	36.1	S-20
Interstate 775-S	2672	69	36.3	S-40
Test Average	3061	67	38.0	
LSD .05	431	--	1.9	
Coefficient of Variation	9	--	3	

[1] S = susceptible reaction
10 = percent of leaf covered
tr = less than 1% of leaf covered