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December 1971

SOUTH CENTRAL RESEARCH FARM
Presho, South Dakota

INTRODUCTION

This is the fourteenth annual report of the South Central Research Farm. The experimental area, located on the Glen Hutchinson farm, is approximately ten and one-half miles south of Presho, South Dakota. The soil, a fine clay, derived from Pierre shale is identified as Promise clay. It contains 3.0% organic matter, is medium in available phosphorus, and is high in potassium.

Rainfall in 1971 was below normal for almost the entire year. However, soil moisture was sufficient to produce good yields of winter small grain. High winds in late March and early April caused severe wind erosion in late-fall seeded plots. The resulting loss of stand required overseeding with spring wheat. This factor accounts for the low yields in some of the experiments.

Spring seeded small grain, although severely retarded by drought and heat produced fair yields of grain.

Grain sorghum yields varied with the previous treatment of the soil. If the sorghum was grown in soil which was in fallow in 1970, the grain yield was high, wheres if there was a previous spring grain crop, the subsoil moisture was low and subsequently the yields were reduced.

The annual field day was held June 30 with seventy-five people in attendance. A small sorghum tour was held on September 8 and was devoted to group discussion of problems in growing sorghum for grain.

The Field Tour for 1972 is scheduled to be held on June 28, at 6:00 p.m. It will be devoted to discussion of winter wheat production problems.

SOUTH CENTRAL RESEARCH FARM ADVISORY COMMITTEE

Officers	Address	County
Ralph Reimers	Pukwana 57372	Brule
George Fish, Jr.	Platte 57369	Charles Mix
Ed Bailey	Lucas 57549	Gregory
Lyn Lyman	Murdo 57559	Jones
John Quillan	Kennebec 57544	Lyman
Jerry Bruning	Wood 57585	Mellette
Lyle Hedman	Hayes 57537	Stanley
Dan Heinert	Parmelee 57566	Todd
Don Jorgensen	Ideal 57541	Tripp

This report was prepared by members of the South Dakota Agricultural Experiment Station. It is an annual report and results published herein are therefore neither complete nor conclusive.

TABLE OF CONTENTS

Table 1. Weather Data - South Central Research Farm, 1971.

Month	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Rainfall in Inches*	0.01	0.65	0.08	2.56	1.85	0.60	1.55	1.78	2.07	2.14	0.42	0.24	13.95
Longtime Average**	0.47	0.57	1.02	1.79	2.38	3.11	1.66	2.08	1.45	0.98	0.67	0.39	16.57
Departure from Longtime Average	-0.46	0.08	-0.94	0.99	-0.53	-2.51	-0.11	-0.30	0.62	1.16	-0.25	-0.15	- 2.62
Average Temperature*	--	--	--	48.6	57.8	73.6	72.9	77.1	63.2	53.2	--	--	
Longtime Average**	18.6	21.9	31.8	47.6	58.9	68.7	76.8	75.0	74.5	51.4	34.8	23.9	
Departure from Longtime Average	--	--	--	0.6	-1.2	4.9	-4.4	2.0	-1.6	0.8	--	--	
Av. Monthly Maximum - 1971*	--	--	--	58.8	68.7	86.7	87.2	91.5	75.1	63.2	--	--	
Av. Monthly Minimum - 1971*	--	--	--	38.3	47.0	60.4	58.7	62.6	51.2	41.4	--	--	
Inches of Water Evaporated from Free Surface	--	--	--	--	--	--	8.95	6.68	5.72	2.29	--	--	

Note: The maximum recorded air temperature for the year was 106° and occurred on August 23.
Last killing frost - April 13; First frost - September 19; First killing frost - October 29; Growing eason - 200 days.

*Data taken and Recorded at South Central Research Farm.
**Longtime averages were recorded at Kennebec, South Dakota, based on 30 year period 1931 - 1960 inclusive.

SMALL GRAIN VARIETY TESTING

H. A. Geise, D. G. Wells, P. B. Price, D. L. Reeves, and J. J. Bonnemann

Objective: To observe and compare small grain varieties and experimental strains for winterhardiness, grain yield, disease resistance, and other characteristics of area adaptability.

RYE

The plots were seeded by using a deep furrow drill. The seeding rate was 5 pecks or 70 pounds per acre. The soil was fertilized by applying 15 pounds of elemental phosphorus with the seed. The results of the trial are presented in table 2.

Table 2. Rye Variety Performance Trial - South Central Research Farm, 1971

Variety	Date of Heading	Height Inches	Percent* Protein	Test Weight Lbs/Bu	Grain Yield Bu/Acre
Pearl	June 3	44	14.6	54	59.1
Cougar	3	43	14.3	54	58.6
Frontier	2	47	14.6	56	49.1
Von Lochow**	June 4	44	13.7	56	47.2
Coloma	2	48	14.4	54	47.1

Mean - 52.2

* Percent protein was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

** Von Lochow data is reported on one replication only, all others are an average of four replications.

Note: Date of Planting: September 23, 1970
Date of Harvest: July 19, 1971

WINTER WHEAT

Winter wheat varieties were evaluated in large drill-sized plots. They were fertilized by broadcasting 30 pounds of nitrogen per acre and applying 15 pounds of elemental phosphorus with the seed by using a drill box attachment. The information is published in tables 3 and 4.

Table 3. Winter Wheat Variety Performance Trial (Late Seeded) - South Cental Research Farm, 1971

Variety	Date of Heading	Height Inches	Rust Reaction* Leaf	Rust Reaction* Stem	Percent** Protein	Test Weight Lbs/Bu	Grain Yield Bu/Acre
NB66403	June 18	33			15.4	58.8	40.2
Scoutland	17	33	S	R	16.5	61.0	38.8
Lancer	18	34	S	R	15.0	59.6	38.4
Scout 66	17	34	S	R	15.7	59.0	37.7
Weathmaster 106	17	36	MR	R	15.7	59.8	37.6
Winoka	June 18	34	S	R	14.4	59.5	36.0
Centurk	18	32	MR	R	14.1	57.2	35.8
Eagle	18	32	S	R	15.8	58.6	34.7
Minter	19	36	S	R	16.3	58.5	33.8
Trader	19	33	S	R	16.0	55.2	33.0
Hume	June 18	34	S	R	16.0	59.8	32.8
Omaha	18	33	S	S	16.4	58.8	32.8
Gage	19	34	MR	R	16.1	59.1	31.9
Trapper	19	31	S	R	16.8	56.2	31.4
Froid	18	34	MR	R	16.7	56.1	30.8
SD 6753 Bronze	June 18	31	MR	R	16.5	54.5	30.8
Guide	18	32	S	R	16.2	60.2	27.6
Sturdy	18	24	R	S	16.6	56.9	26.8
Satanta	18	28	S	S	16.8	58.4	7.8
LSD (OS) - 6.5 Bu/A		C.V. - 25.4%				Mean	32.6

Note: Values presented within the table are averages of four replications.
Date of Planting: September 23, 1970; Date of Harvest: July 19, 1971.

* Letter indicates reaction to rust: S-susceptible R-resistant MR-moderately resistant
** Protein content was calcualted from Kjeldahl analysis and is reported on an oven-dry basis.

Table 4. Winter Wheat Variety Performance Trial (Early Seeded) - South Central Research Farm, 1971

Variety	Height Inches	Rust Reaction* Leaf	Rust Reaction* Stem	Percent** Moisture	Percent*** Protein	Test Weight Lbs/Bu	Grain Yield Bu/Acre
Lancer	40	S	R	9.0	16.6	61.1	39.5
Trapper	38	S	R	8.7	17.2	59.9	39.2
Scout 66	34	S	R	9.0	16.8	60.2	37.5
Trader	44	S	R	9.4	17.6	59.9	37.2
Gage	38	MR	R	9.0	17.2	59.4	36.1
Winoka	35	S	R	8.8	15.4	61.2	35.8
Froid	40	MR	R	8.8	16.7	58.4	35.6
Hume	38	S	R	8.2	18.2	59.5	33.6
Guide	36	S	R	9.4	16.5	60.8	33.4
Sturdy	33	R	S	8.3	--	59.9	30.1
Omaha	36	S	S	9.4	17.7	59.5	30.0
SD66169	36	S	R	9.4	17.5	58.9	23.8
LSD(05) - 4.1 Bu/A		C.V. - 14.9%				Mean	34.3

Note: Values presented within the table are averages of four replications.
Date of Planting: September 3, 1970 Date of Harvest: July 16, 1971

*Letter indicates reaction to rust: S-susceptible R-resistant MR-moderately resistant
**Percent Moisture in grain at harvest was measured by using a Steinlite moisture tester.
***Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

OATS

All varieties listed in tables 5 and 6 were seeded on fallow. The soil was fertilized by broadcasting nitrogen at the rate of 30 pounds per acre, while phosphorus was applied with the seed at the rate of 15 pounds of the element per acre. The plots were seeded in mid-April, and harvested with a self-propelled combine in late July.

Table 5. Oat Variety Trial - South Central Research Farm, 1971

Variety	Date of Heading	Test Wt. Lbs/Bu	Grain Yield Bu/Acre
Cayuse	6-21	28.6	70.8
Dupree	6-21	26.8	63.5
Burnett	6-21	33.8	63.0
Otter	6-19	30.9	60.7
Kelsey	6-18	34.1	59.8
Pettis	6-20	37.2	57.6
Kota	6-21	33.9	57.6
Chief	6-20	30.5	56.9
Diana	6-20	34.8	56.5
Portal	6-19	34.4	55.0
Garland	6-19	38.5	54.7
Holden	6-19	36.8	54.4
Froker	6-19	36.6	53.2
Lodi	6-20	34.9	53.0
Nodaway 70	6-21	40.0	50.7
Ortley	6-23	34.5	48.1
Mammoth	6-21	37.4	44.5
Clintland 64	6-22	37.2	44.5
Rodney	6-21	30.5	39.7
LSD(05) - 4.5 Bu/A	C.V. - 1.40%	Mean -	55.0

Table 6. Oat Variety Trial (Forage Type) - South Central Research Farm, 1971

Variety	Date of Heading	Test Wt. Lbs/Bu	Grain Yield Bu/Acre	Forage Yield Percent Protein*	Forage Yield Tons/A**
Rodney	6-21	30	40	8.6	2.3
Cayuse	6-21	29	71	8.3	2.2
Lodi	6-20	35	53	8.8	2.3
Froker	6-19	37	53	7.4	2.4
Kelsey	6-18	34	60	7.5	2.6
Ortley	6-23	34	48	8.3	2.4

*Protein content was calcualted from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

**Forage Yields are reported on a 12% moisture content.

SPRING WHEAT AND TRITICALES

All varieties reported in tables 7 and 8 were seeded in fallow. The soil was fertilized by broadcasting 30 pounds of nitrogen per acre, and applying 15 pounds of phosphorus per acre with the seed when planted. The plots were seeded in early April and harvested with a self-propelled combine in late July.

Table 7. Spring Wheat Variety Trial - South Central Research Farm, 1971

Variety	Date of Heading	Percent Moisture	Percent Protein	Test Wt. Lbs/Bu	Seed Yield Bu/Acre
HARD RED SPRING					
Waldron	6-22	9.6	18.4	56.0	29.8
Fletcher	6-22	10.8	17.8	58.6	29.4
Sheridan	6-21	11.0	18.1	59.8	28.0
Neepawa	6-23	9.4	19.8	55.8	27.9
Polk	6-22	10.6	18.4	60.2	26.3
BH 631	6-23	10.4	18.4	57.5	24.8
Chris	6-22	9.9	18.6	57.1	24.7
Manitou	6-22	10.5	18.7	55.5	24.5
Fortuna	6-22	10.0	18.0	58.9	22.4
SEMI-DWARFS					
Cargill-Bounty 208	6-21	10.3	17.4	57.9	32.0
Era (feed wheat)	6-23	10.6	17.4	59.4	31.1
W.S. 1809	6-23	9.7	17.6	57.1	28.2
DeKalb-Bonanza	6-23	9.6	17.7	56.0	28.2
DURUM					
Hercules	6-21	10.0	17.7	58.9	29.2
Wells	6-21	10.3	19.9	59.8	28.0
Leeds	6-21	11.3	19.4	60.8	26.0

LSD(05) - 3.6 Bu/A C.V. - 12.8% Mean - 27.5

Table 8. Triticales Variety Trial - South Central Research Farm, 1971

Variety	Date of Heading	Percent Moisture	Percent Protein	Test Wt. Lbs/Bu	Seed Yield Lbs/Acre
Fas-Gro 204	6-21	8.5	20.6	46.0	1089
Fas-Gro 203	6-22	8.5	20.3	47.2	1039
Rosner	6-22	8.6	17.9	46.2	990
Graze-Grain 70A	6-22	8.6	18.6	50.2	940
				Mean	1014

SPRING BARLEY

The plots were seeded in fallow and received 30 pounds of nitrogen fertilizer. Phosphorus fertilizer was applied at the rate of 15 pounds of elemental phosphorus per acre with the seed at planting time. The yields and other data are presented in table 9.

Table 9. Spring Barley Variety Trial - South Central Research Farm, 1971

Variety	Date of Heading	Height Inches	Percent Protein	Test Wt. Lbs/Bu	Grain Yield Bu/Acre
Primus II	6-17	27	15.6	45.6	39.2
Liberty	6-20	26	17.7	45.2	33.6
Conquest	6-19	28	16.8	44.5	31.5
Paragon	6-20	26	16.2	44.8	31.2
Larker	6-20	27	16.9	46.2	30.6
Prilar	6-19	29	18.1	45.8	30.4
Nordic	6-19	27	17.6	45.0	30.3
M-11	6-20	24	18.6	41.8	29.1
Dickson	6-20	24	17.5	44.8	28.9

LSD(05) - 3.8 Bu/Acre C.V. - 1.53% Mean - 31.6

SPECIALTY CROP TESTING

H. A. Geise

Objectives: To observe and compare various specialty crop varieties and selections for grain yield, disease resistance, new management practices, and other characteristics for area adaptability.

SUNFLOWER YIELD TRIAL

Sunflowers are grown as a crop for several purposes. The large-seed types are grown for whole-seed-uses in the confectionery trade. They are also preferred by some bird feeders because the large seed is less likely to attract sparrows and is less likely to be lost on the ground.

The small seeded varieties have a much thinner hull resulting in a proportionally larger meat. These thin hulled types are used primarily for their oil. Certain varieties contain over 50% high quality oil in the seed.

At present there is only one chemical herbicide cleared for use in South Dakota. This is the preplant chemical "Treflan". Treflan is decomposed by light and therefore must be thoroughly incorporated into the soil immediately after application.

Table 10. Sunflower Variety Trial - South Central Research Farm, 1971

Variety	Date of Flowering	Percent Lodging	Height Inches	Test Wt. Lbs/Bu	Seed Yield Lbs/A
OILSEED TYPE					
P21ms x HA 60	7-18	7	52	26	930
(P21VR1 x P21VR2)xHA60	7-21	15	51	24	811
P21 VR2 x HA 60	7-20	7	53	24	1081
P21ms x HA 61	7- 7	7	53	32	709
Romania-52	7-21	11	51	23	860
Romania-53	7-22	7	53	24	1200
Peredovik (66)	7-20	8	54	24	581
VNIIMK 8931 (66)	7-22	11	56	24	814
Majak	7-18	9	50	25	660
Record	7-21	7	55	23	378
GOR 101	7-20	11	56	24	718
Krasnodarets	7- 9	8	50	26	1116
P21 VR1 x HA 60	7-18	22	50	24	1026
GOR 104	7-19	13	54	24	820
EDIBLE OR BIRDFEED TYPE					
P21ms x Menn RR-18-1	7-16	9	53	26	683
P21 VR2 x Menn RR-18-1	7-15	18	50	25	826
Menn RR-B-03-6ms x Mingren	7-19	8	51	22	811
Mingren	7-16	11	51	21	773
Arrowhead	7-11	8	50	28	878
Greystripe	8- 7	5	62	24	369
Commander	7-16	6	52	21	703
SD 68001	7- 9	13	52	26	1122
SD 68002	7-12	18	55	26	962
SD 68003	7-13	5	48	26	1076
SD 69001	7-16	4	54	25	1212
SD 69002	7- 3	9	47	32	826

LSD(05) - 183 lbs/acre C.V. - 5.43% Mean - 843

SORGHUM PERFORMANCE TESTING

Sorghum Breeding

A. O. Lunden

Sorghum-test entries included State, Regional, and Experimental grain and forage sorghum lines and hybrids. Yields were considerably below average because of high temperature and low rainfall in June. Severe drought

injury was evident on many entries. Grain yields ranged from 25 bushels per acre for early varieties to 50 bushels per acre for midseason hybrids. The new early-hybrid RS506 has the best average yield of the open-pedigree hybrids listed in table 11, and is recommended for the South Central area. This hybrid has had a high 6-year average yield in the sorghum growing area of South Dakota.

Table 12 gives yield test results of 5 potential hybrids and 3 pure lines, or varieties. The 1971 yields of the hybrids ranged from 10% to 30% higher than RS610 (table 11). The pure lines were much lower in yield, but are designed for narrow row planting and/or late planting and would not be expected to yield as much as the hybrids in 36 inch rows. Field stands were lower than desired for the pure lines because of poor seed quality. They will be planted in 1972 for more extensive evaluation.

Yields of an experimental extra leafy forage sorghum (SDR873F) are reported elsewhere in this report (table 14). This hybrid appears to have considerable potential for winter grazing because it is short, resistant to lodging, and retains its leaves.

Table 11. Yields of Grain Sorghum Hybrids - 1971

Entry	Days to Heading	Height Inches	Test Wt. Lbs/Bu	Yield - Lbs/Acre 1967-70	Yield - Lbs/Acre 1971	6 Year Average Lbs/A	6 Year Average Bu/A
SD441	67	47	58	3098	1650	2860	51.0
SD451	69	43	59	3324	1840	3080	54.9
SD503	71	44	60	3822	2220	3560	63.5
NB505	70	40	61	3100	2070	2830	50.5
RS506	70	44	60	3872	2110	3660	65.4
RS610	79	36	60	3628	2280	3400	60.8
				LSD(.05) -	743		

Table 12. Yields of Experimental Lines and Hybrids - 1971

Entry	Percent Stand	Days to Heading	Plant Height	Test Wt. Lbs/Bu	Grain Yield Lbs/A	Grain Yield Bu/A
LINES						
SD102	89	64	38	57	1240	22.1
SD690363	98	66	34	58	1860	33.2
SD104	85	62	40	59	1390	24.8
HYBRIDS						
SD70166	75	65	42	59	2790	49.8
SD70312	73	66	44	59	2570	45.9
SD70321	78	69	43	60	2520	45.0
SD70058	90	70	44	61	2960	52.9
NB684241	94	80	36	62	2820	50.4

GRAIN SORGHUM PERFORMANCE TESTING

J. J. Bonnemann

Objective: To compare the performance of grain sorghum hybrid varieties as to yield and other agronomic characteristics.

Performance trials with grain sorghum hybrids have been conducted on a fee basis at the South Central Research Farm since 1962. Table 13 presents the 1971 yields and agronomic data. Long term averages and other information can be found in Circular 205, 1971 Grain Sorghum Performance Trials, South Dakota Agricultural Experiment Station.

Sorghum Forage Testing

H. A. Geise

Objective: To compare the various forage sorghums and sudangrasses, or their hybrids as to their adaptability, their forage production, and their forage quality.

Sorghum forage testing at the South Central Research Farm is continued because of voluntary contribution of seed by commercial companies. With the exception of certain preselected "Check" varieties, which will remain unidentified, all other seed is donated.

The researcher will not make interpretations or verbal comparisons of the trials, because of what may be misconstrued as "Brand' favoritism.

When studying the tables, the reader should consider the extremely droughty conditions which occurred during August. The lack of available moisture prevented normal heading and maturity, and thus altered such measurements as maturity, and plant type.

The data from these trials are presented in tables 14, 15, and 16. The plots were planted on May 28, on October 5 the plant notes were taken, and the sugar content, moisture content, and forage yields were not measured until mid-October.

Table 13. 1971 Grain Sorghum Performance Trials, South Central Research Farm, 1971

Brand and Variety	Date of Heading	% Moisture* 9/23/71	Test Wt. Lbs/Bu	Grain Yield Lbs/Acre
Frontier Super 400A	8/6	28.9	52	2870
Pride P550 BR	7/31	16.4	55	2720
RS 610	8/4	29.4	55	2675
DeKalb C-42a	8/2	27.8	55	2670
SD 25702	8/5	29.4	57	2665
ACCO R 1019	8/8	31.0	57	2640
ACCO R 1010	7/26	20.0	59	2605
Weathermaster GS-35	8/3	23.6	56	2605
Pioneer 866	8/4	33.1	55	2580
Frontier 400C	8/4	23.4	55	2570
Northrup-King NK 121	7/26	16.9	56	2565
SD 503	7/27	17.8	57	2535
Pride P-500A	7/24	14.1	56	2530
Western WS 206	8/3	20.4	54	2520
Pioneer 878	7/31	21.3	56	2490
Pioneer 883	8/3	14.8	48	2490
RS 506	7/29	17.9	57	2480
Pioneer 894	7/24	13.6	56	2410
Northrup-King	8/4	21.1	54	2400
DeKalb B-36	7/28	19.1	56	2395
Weathermaster GS-31Y	7/31	16.0	56	2375
Weathermaster GS-30A	7/26	15.1	57	2360
Northrup-King MM 54BR	7/27	16.9	52	2325
Excel's 202B	7/28	16.4	55	2310
ACCO R 920	7/26	14.9	55	2300
Coop SG-20	7/31	18.6	55	2275
DeKalb A-25	7/25	15.2	53	2245
Weathermaster GS-30B	7/26	16.0	57	2190
Northrup-King X4027	7/16	14.5	56	2175
DeKalb B-32A	7/28	15.2	56	2140
Frontier GK 410	8/4	23.5	54	2135
RS 633	8/9	35.+	58	2120
Western WS102	7/22	14.8	54	2100
Frontier Grassy Grain I	7/26	15.3	48	2025
Frontier 389	8/4	23.9	57	2010
SD 451	7/25	14.1	54	2005
Pride P-200	7/17	17.0	55	1990
ACCO Exp X-7250	8/4	19.9	57	1980
P-A-G Ex 3849	7/23	14.1	57	1975
Excel's 101	7/25	14.8	54	1940
Northrup-King MM 50A	7/15	14.3	56	1710

C.V. - 12.0% Mean - 2345

*Moisture content was determined by an electronic moisture tester, a "+" sign indicates the content to be above the upper limit of the tester. Seeded - May 20; Harvested - Sept. 27; Row spacing - 36"; the area harvested was 60 sq. ft., and yields reported are an average of three replications.

Table 14. Performance Trial of Forage Sorghum Varieties - South Central Research Farm, 1971

Brand & Variety	Date of Heading	Lodging (1-5)	Maturity* (1-5)	Height Inches	% Sugar in Sap	Plant** Type	Percent*** Protein	Forage Yield**** Tons/Acre
Asgrow Duet	8-14	1	1	51	12.9	5	8.4	6.8
Rudy-Patrick 55F	8-20	1	4	68	13.6	2	7.2	6.6
Pioneer 931	8-27	2	4	75	15.5	2	7.8	6.5
Acco X7804	8-23	1	2	49	15.3	7	8.6	6.4
Funk 93F	8-22	1	3	62	21.3	3	7.4	6.0
Niagara Hi-Chew		1	4	72	13.7	1	6.9	6.0
Asgrow Beefbuilder T	8-22	1	5	71	13.9	1	6.7	6.0
Funk 78F	8-25	1	4	73	19.5	3	7.2	5.9
Disco S212	8-27	1	4	65	19.9	3	8.2	5.8
Northrup-King 300	8-21	1	3	43	13.5	7	8.2	5.8
Disco S210	8-22	1	4	55	18.5	5	8.1	5.8
Acco FS531R		1	5	70	16.6	1	8.1	5.8
Acco FS401R	8-24	1	3	48	14.4	6	7.7	5.7
Acco FS403R	8-24	1	3	51	19.8	4	7.2	5.6
Advance 1071F	8-20	1	2	62	21.0	3	6.4	5.6
DeKalb FS1A	8-22	1	2	44	13.3	7	8.6	5.5
Rudy-Patrick Sumax	8-17	1	2	59	21.9	4	7.1	5.5
Disco S209	8- 6	2	1	68	13.4	4	9.8	5.4
Excel Hay-King S50	8-23	1	4	63	18.1	3	7.6	5.4
Excel Hay-King 22	8-14	1	3	60	20.0	3	7.1	5.3
Excel Silo-King 33		1	4	51	18.5	7	8.8	5.2
Advance 1085F		1	5	64	17.9	1	7.5	5.2
Waconia	8- 8	2	1	66	19.2	4	6.1	5.2
Rudy-Patrick 22F	8- 5	1	1	53	18.3	3	7.1	5.1
DeKalb FS4	8-20	1	4	62	19.9	3	6.8	5.1
Northrup-King 325	8-13	1	4	60	18.8	3	8.2	4.9
SD R873	8-19	1	3	38	23.5	7	7.6	4.9
Disco S205	8- 1	3	1	67	15.4	4	8.3	4.8
Pioneer 944		1	5	62	16.7	3	7.7	4.8
Acco X8815	8-23	1	4	52	20.1	5	9.0	4.6
Asgrow Dairy D	8-23	2	5	61	19.7	2	7.0	4.5
Pioneer 927	8-27	1	4	46	16.8	7	9.1	4.3
Niagara Protector	8-15	1	3	57	21.6	5	7.4	4.0
Northrup-King 145	8- 2	1	1	62	11.3	4	7.2	3.6
Rancher	8-28	1	1	58	19.6	4	5.8	2.5

Note: Footnote explanations can be found on pages 15 and 16.

*Legend for Plant Type - Tables 14-16.

Score	Description	Score	Description
1	Tall-Extra Leafy-No Grain	6	Short-Extra Leafy-No Grain
2	Tall-Leafy-Some Grain	7	Short-Leafy-Some Grain
3	Tall-Leafy-Grain (50-50)	8	Short-Leafy-Grain (50-50)
4	Tall-Few Leaves-Some Grain	9	Short-Few Leaves-Some Grain
5	Tall-Few Leaves- No Grain	10	Short-Few Leaves-No Grain

Table 15. Performance Trial of Sorghum-Sudangrass Crosses - South Central Research Farm, 1971

Brand & Variety	Date of Heading	Lodging (1-5)	Maturity* (1-5)	Height Inches	% Sugar in Sap	Plant** Type	Percent*** Protein	Forage Yield**** Tons/Acre
DeKalb ST6	8-19	1	4	77	16.8	4	5.9	5.4
Funk's HW8123	8-18	1	4	81	18.2	4	8.1	4.5
Disco Hidan 39	8-22	1	4	75	17.0	4	7.4	4.5
Asgrow Grazer N	8-19	1	4	69	17.2	4	6.8	4.3
Northrup-King Sordan	8-20	1	4	71	17.8	3	7.7	4.2
Acco Sweet Sioux II	8- 6	1	4	75	17.8	4	6.9	4.1
DeKalb X1714	8-16	1	4	73	19.1	4	9.3	4.1
Funk's 262S	8-24	1	4	73	17.8	5	8.7	4.0
Pioneer 988	8- 7	1	3	66	18.3	3	7.5	4.0
Acco Sweet Sioux	8- 8	1	4	77	19.0	4	7.2	4.0
Doreman Sure-Graze	8-23	1	4	75	18.0	3	8.1	4.0
Disco Hidan 37	8-10	1	4	72	17.5	3	7.9	3.9
Superdan FS554	8-17	1	4	74	17.8	4	8.2	3.7
DeKalb SX5	8- 5	1	4	72	17.6	4	7.2	3.7
Rudy-Patrick Su4	8- 1	1	3	70	15.9	3	7.2	3.2
Asgrow Astro	8- 2	1	2	70	13.7	3	7.6	3.0
Disco Hidan 35	8- 2	1	1	70	13.8	3	7.4	1.0

* See legend on page 16.

** See legend at top of page 15.

*** Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

**** Forage yields are reported on the basis of 12% moisture content.

Table 16. Performance Trial of Miscellaneous Annual Forages - South Central Research Farm, 1971

Brand & Variety	Date of Heading	Lodging (1-5)	Maturity* (1-5)	Height Inches	% Sugar in Sap	Plant** Type	Percent*** Protein	Forage Yield**** Tons/Acre
SILAGE CORN								
Pioneer Blend C	8- 4	2	1	64	20.4	3	9.0	2.7
Pioneer 3681	8- 2	1	1	65	19.5	4	7.9	2.5
Pioneer Blend B	8- 2	2	1	66	16.6	4	8.8	2.4
Pioneer Blend A	7-31	2	1	62	14.1	4	9.7	2.1
SUDANGRASS								
Northrup-King Trudar 4	8- 7	1	4	69	17.3	4	6.4	3.7
Acco HS-33	8- 2	1	1	73	15.0	4	7.0	3.6
Northrup-King Trudar 2	8- 2	2	4	72	21.6	4	6.2	3.4
Rudy-Patrick Trudy	8- 1	1	1	60	15.2	4	7.6	3.0
Cal/West Monarch	8- 2	1	1	64	15.6	4	6.7	3.0
Piper	8- 2	1	1	69	14.2	2	6.6	2.6
SORGHUM BLENDS								
Acco FB-44	8-10	2	1-4	35-85	18.6	3	7.6	6.0
Acco 3 Little Indians	8- 8	1	1-4	32-70	16.6	3	7.6	5.7
SOUTH DAKOTA FORAGE HYBRIDS								
K-882F	8- 2	1	4	48	15.4	6	8.7	4.2
R-873F	8- 2	1	1	45	18.9	8	7.7	3.7
K-873F	8- 2	1	4	48	14.8	6	9.0	3.5
205-882F	7-23	1	2	45	16.5	8	6.9	3.1
GRAIN SORGHUM CHECK								
SD 503	7-31	2	1	48	16.3	4	8.6	4.0

*Legend for maturity: 1- mature grain; 2- Hard dough stage; 3- Milk stage; 4- Pollinating stage; 5- Not headed

**See legend at top of page 15.

***Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

****Forage yields are reported on the basis of 12% moisture content.

GRASS TESTING

Grass Variety Trials

H. A. Geise

Objective: To determine which species and varieties of introduced grasses are best adapted to the South Central Area on the basis of their forage production.

All varieties of Smooth Bromegrass (table 17) and Russian Wildrye (table 18) were fertilized with 40 pounds of nitrogen per acre per year.

Table 17. Smooth Bromegrass Forage Yield Trial - South Central Research Farm (Seeded August 1968)

Variety	Forage Yield - Tons/Acre* 1971	11-Year Average
Wisconsin 55	1.00	1.17
Southland	0.96	1.33
Lancaster	1.01	1.32
South Dakota 5	0.98	1.18
Lincoln	0.80	1.29
Canadian Common	0.77	0.92
Homesteader	1.05	1.08

*Reported as hay with 12% moisture.

Table 18. Wildrye Variety Forage Yield Trial - South Central Research Farm (Seeded August 1958)

Variety	Forage Yield - Tons/Acre* 1971	Av. 1960-1971
Vinall Russian Wildrye	0.43	0.83
Common Russian Wildrye	0.40	0.74

*Reported as hay with 12% moisture.

Intermediate and Tall Wheatgrasses have consistently produced the highest forage yields of the wheatgrasses. Oahe, an intermediate wheatgrass, has the highest average of the groups seeded in 1958 and 1960 (table 19). The recommended intermediate wheatgrass varieties are Oahe, Amur, and Greenar. Tall wheatgrass yields nearly as well as intermediate but it is not as palatable. Nordan crested wheatgrass, the highest forage producer of the crested wehatgrass varieties is also the most desirable from other agronomic standpoints.

Table 19. Wheatgrass Forage Yield Trial* - South Central Research Farm

Variety	Forage Yield - Tons/Acre**			
	Seeded August 1968		Seeded August 1960	
	1971	11 Yr. Avg.	1971	9 Yr. Avg.
Crested Wheatgrass				
Common	0.47	0.83	--	--
Common Fairway	0.53	0.70	0.66	0.96
Mandan 2359	0.56	0.84	0.71	1.04
Nebraska 10	0.53	0.85	--	--
Nebraska 20	--	--	0.76	0.96
Nebraska 3576 Fairway	0.68	0.82	0.68	1.03
Nordan	0.58	0.87	0.68	1.06
Summit	0.49	0.85	--	--
Tall Wheatgrass				
Alkar	--	--	0.79	1.21
A12465	--	--	0.79	1.18
Mandan 1422	0.40	1.06	0.82	1.21
Nebraska Tall	0.56	0.94	--	--
S-64	0.67	0.78	0.84	1.13
Intermediate Wheatgrass				
Amur	0.44	1.13	0.76	1.15
Greenar	0.62	1.15	0.85	1.22
Idaho #3	0.54	0.98	0.86	1.20
Idaho #4	0.58	1.18	--	--
Mandan	--	--	1.10	1.26
Nebraska 50	0.58	1.14	0.85	1.10
Oahe	0.44	1.21	0.81	1.27
Ree	0.58	1.02	0.74	1.23
Miscellaneous Wheatgrass				
P-27 (A. sibericum)	0.61	0.90	0.70	0.99
Topar Pubsecent (A. trichophorum)	0.70	0.89	0.88	0.99
Whitmar (A. inerme)	0.60	0.73	--	--

*Variety trials were fertilized with 40# of Nitrogen/Acre each year.
**Absence of a yield indicates variety was not included in trial seeded that year.

GRASS FORAGE PRODUCTION WITH VARIOUS FERTILIZERS AND ROW SPACINGS

H. A. Geise

Objective: To determine optimum rates and ratios of fertilizers to be used in the production of grass forage. The effects of wide and narrow row spacings are also included.

The results of this study are reported in table 20.

Table 20. Influence of Row Space and Fertilizer on Forage Yield of Smooth Bromegrass and Intermediate Wheatgrass

Species	Row Space	Fertilizer* Applied	Percent** Protein	Forage Yield-Tons/A 1971	Forage Yield-Tons/A Av. 1960-71
Smooth Bromegrass	6"	0-0-0	5.25	0.54	0.70
		20-0-0	5.75	0.84	1.00
		40-0-0	7.94	0.82	1.09
		40-9-0	5.38	1.07	1.22
		40-9-0+Zn	4.50	1.02	1.15***
	42"	0-0-0	5.62	0.35	0.97
		20-0-0	7.00	0.56	1.12
		40-0-0	9.56	0.58	1.15
		40-9-0	9.44	0.78	1.20
		40-9-0+Zn	8.06	0.63	1.00***
Intermediate Wheatgrass	6"	0-0-0	5.69	0.58	0.97
		20-0-0	7.44	0.59	1.38
		40-0-0	9.62	0.82	1.22
		40-9-0	6.25	0.93	1.26
		40-9-0+Zn	6.50	1.10	1.02***
	42"	0-0-0	4.06	0.79	1.12
		20-0-0	5.54	0.75	1.24
		40-0-0	6.94	0.78	1.30
		40-9-0	6.94	0.75	1.32
		40-9-0+Zn	5.38	0.64	1.06***

*Nitrogen and Phosphorus fertilizers were applied as pounds of element at the rate indicated. Zinc was applied at 10 pounds per acre as zinc sulphate.

**Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

***Average yield for this treatment is for the period 1966-1971 only.

MANAGEMENT, TILLAGE AND CULTURAL PRACTICES

H. A. Geise

Comparison of Different Techniques in Growing Winter Wheat

Objective: To compare yields of winter wheat grown, (1) continuously with and without commercial nitrogen, (2) in rotation with conventional fallow or sweet clover fallow, and (3) in rotation with corn or sorghum harvested as an ensilage crop.

The results of this study are reported in tables 21 and 22.

Table 21. Yields of Winter Wheat From Plots Having Eight Different Management Practices - South Central Research Farm

Management Practices	Fertilizer*	Height Inches	Protein Protein	Test Wt. Lbs/Bu	Grain Yield Bu/A - 1971
Continuous Wheat	0-0-0	21	18	56	10.1
	0-15-0	23	19	55	11.9
Continuous Wheat	40-0-0	22	18	56	11.0
	40-15-0	26	18	55	14.5
Continuous Wheat	80-0-0	20	18	55	10.6
	80-15-0	24	18	56	14.8
Continuous Wheat	120-0-0	19	19	55	10.1
	120-15-0	22	19	55	12.1
Wheat - Fallow	0-0-0	23	18	56	16.8
	0-15-0	28	17	56	20.3
Wheat - Sw Cl Fallow	0-0-0	17	21	55	6.2
	0-15-0	20	21	54	10.6
Wheat - Corn (Silage)	0-0-0	18	19	57	9.2
	0-15-0	18	20	56	12.6
Wheat - Sorghum (Silage)	0-0-0	14	20	56	3.3
	0-15-0	14	21	56	4.3

*Phosphorus fertilizer was applied with the seed at the rate of 15 pounds of element per acre, while nitrogen was broadcast on the surface at the rate indicated.

Table 22. Yields of Forage Obtained From Corn and Sorghum, 1971

Crop	Fertilizer* Treatment	Percent Dry Matter	Percent** Protein	Forage Yield-Tons/Acre Wet	Dry***	Av.1964-71
Silage Corn (Pioneer 3579)	0	34.5	9.69	15.6	6.1	3.6
	P			16.4	6.5	
Forage Sorghum (Pioneer 931)	0	30.6	11.94	13.8	5.4	3.8
	P			17.2	6.7	

*15 pounds of elemental phosphorus is applied with the seed of the alternating winter wheat crop.

**Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

***Dry forage yields are reported on a 12% moisture content.

Several factors should be considered when reviewing the results of the management study on winter wheat. First, there is the soil moisture content to consider. The fallowed soil usually contains a good supply of stored moisture, whereas the continuous cropped plots usually are relatively lower. This condition affects the wheat in two ways, (a) the seed bed is unsatisfactory because the hard and cloddy soil does not pack and make contact with the seed so that soil water moves into the seed causing germination, and (b) the low moisture availability limits the growth of the plants so that ground cover is sparse, the plants are weak, and winter survival is low. These conditions ultimately result in a weed problem the following year because of a lack of competition.

Secondly, commercial nitrogen fertilizer has been applied only to continuous wheat plots where moisture has limited the yield and therefore has not been able to show beneficial results. However, in other studies, (table 27, Plant Science Pamphlet #2, 1969) small amounts of nitrogen fertilizer applied to fallowed soil have increased yields.

In the case of phosphorus fertilizer, all applications (table 21) have increased the grain yield of the wheat. However, only small applications, such as 15 pounds per acre (table 39, Plant Science Pamphlet #2) have resulted in yield increases where dollar returns are greater than the cost of fertilizer.

MANAGEMENT, METHODS OF SEEDING SORGHUM, AND FERTILIZER EFFECTS ON A SORGHUM-SPRING WHEAT ROTATION

H. A. GEISE

Objectives: To determine the effect of nitrogen and phosphorus fertilizers, planting dates, and varieties of grain sorghum on grain yield, and effects of these practices on the yield of spring wheat the next year.

Grain yields in the sorghum-spring wheat rotations have varied among years because of weather conditions. Although the yields have been above the county averages, they are below the yields in other studies at the research farm. Continuous cropping since 1957 may have depleted the subsoil moisture to cause the lower yields.

The spring wheat in this study has not yielded more even though nitrogen was applied. However, there has been a visual difference in the appearance of the fertilized and unfertilized plots. The nitrogen fertilized plots have had thicker stands, taller plants, and larger leaves per plant. While the test weights of the grain have been lower, the protein content has always been higher. These are characteristics of grain produced under moisture stress.

Table 22. Effects of Planting Date and Fertilizer Application of Previous Crop of Grain Sorghum on Spring Wheat Yields, 1971

Date of Planting Sorghum	Type of Grain Sorghum	Fertilizer*	Height Inches	Percent** Protein	Test Wt. Lbs/Bu	Grain Yield Bu/Acre
June 1	Short-Season	0	21	21.1	54.3	8.3
		N	20	22.2	54.9	6.9
		P	20	20.9	55.5	9.0
		NP	20	21.9	54.6	8.4
	Mid-Season	0	20	20.8	55.1	6.7
		N	22	20.4	55.1	7.3
		P	20	20.7	55.3	9.3
		NP	20	21.2	54.6	10.0
	Long-Season	0	22	20.0	56.5	9.6
		N	23	20.5	56.1	12.6
		P	23	19.3	56.1	11.3
		NP	24	21.3	55.8	14.0
June 15	Short-Season	0	21	20.5	55.6	7.6
		N	22	21.3	54.8	8.9
		P	22	20.8	54.4	9.3
		NP	22	21.8	54.1	10.8
	Mid-Season	0	20	20.5	55.3	7.8
		N	19	21.4	55.4	9.0
		P	21	20.7	54.6	9.6
		NP	23	21.6	54.3	11.8
	Long-Season	0	19	20.6	55.4	8.3
		N	20	21.4	55.3	9.0
		P	22	20.3	54.1	9.6
		NP	23	22.2	54.8	11.2
June 30	Short-Season	0	21	18.9	56.6	12.4
		N	22	20.7	56.0	13.0
		P	24	19.3	55.8	14.5
		NP	23	20.8	55.4	13.6
	Mid-Season	0	20	20.9	54.3	8.3
		N	21	21.3	55.5	9.2
		P	22	21.3	54.0	8.4
		NP	23	22.5	54.8	12.2
	Long-Season	0	23	19.4	58.1	14.0
		N	23	19.9	57.3	13.8
		P	23	18.5	57.8	15.0
		NP	21	20.4	55.5	15.2

* "0" indicates fertilizer was not applied, "P" indicates 15# of Phosphorus per acre was applied, "N" indicates 40# of Nitrogen per acre was applied, "NP" indicates that both fertilizers were applied at the rate stated.

** Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

Table 23. Effects of Planting Date and Fertilizer Application on Yield of Grain Sorghum Varieties of Varying Maturity

Date of Planting	Brand and Variety	Fertilizer*	Lodging (1-5)	Height Inches	Test Wt. Lbs/Bu	Grain Yield Lbs/Acre
June 1	NK-MM54BR	0	1	22	57.5	293
		N	1	22	57.3	293
		P	1	24	58.2	293
		NP	1	22	57.1	293
	NK-120	0	4	27	53.8	854
		N	4	27	54.0	1049
		P	4	28	54.5	854
		NP	4	28	54.4	952
	NK-127	0	2	24	55.6	293
		N	2	24	55.8	244
		P	2	24	55.8	146
		NP	2	24	56.3	171
June 15	NK-MM54BR	0	1	24	56.0	244
		N	1	22	57.3	464
		P	1	23	57.5	390
		NP	1	23	56.9	512
	NK-120	0	3	27	53.0	659
		N	2	29	52.4	732
		P	3	29	53.4	634
		NP	3	29	52.9	634
	NK-127	0	1	24	56.4	537
		N	2	25	54.6	488
		P	1	25	55.8	488
		NP	1	25	55.9	634
June 30	NK-MM54BR	0	1	24	53.8	1220
		N	1	26	53.5	1440
		P	1	27	53.8	1366
		NP	1	28	52.9	1464
	NK-120	0	1	30	55.5	1366
		N	1	31	54.8	1220
		P	1	29	55.3	1318
		NP	1	30	54.6	1171
	NK-127	0	1	25	50.0	878
		N	1	25	47.4	610
		P	1	26	47.9	659
		NP	1	27	46.8	634

* "O" indicates fertilizer was not applied, "P" indicates 15# of Phosphorus per acre was applied, "N" indicates 40# of Nitrogen per acre was applied, "NP" indicates that both fertilizers were applied at the rate stated.

The grain sorghum study has been revised over the years as data has been collected and interpreted. The best implement for seeding sorghum was either a conventional corn planter or a grain drill. These implements placed the seed at a depth satisfactory for rapid seedling emergence. They also do not leave furrows which collect water from heavy rains. Standing water in the furrows usually causes a puddled soil surface and a hard crust when the soil dries.

Soil temperature was also studied in relation to date of planting for grain sorghum. The optimum temperature for rapid germination and emergence is usually reached in mid-June. This planting date also had other advantages in that it permits the early growing weeds to be destroyed before the sorghum is planted.

The next variable which was studied was row width. The most satisfactory width of those studied was found to be 24 inches. This width produced the highest grain yields with the least weed problems.

The last variable which has been studied is the length of growing season required for varieties. The results of earlier studies indicate that the short-season variety produced a higher yield when planted later, the medium-maturing variety produced best when planted in mid-June, and the long-season variety produced the highest yields when planted early.

The results of the 1971 study presented in table 23 do not agree with earlier data. Under the limited moisture conditions during July and August the sorghum either headed, but was unable to pollinate and set seed, or was forced into dormancy until late August when moisture was again available. In either situation, the seed produced was of low quality.

INFLUENCE OF FERTILIZERS ON YIELD OF WINTER WHEAT

H. A. Geise

Objective: To study winter wheat responses which are influenced by addition of fertilizers.

This experiment was initiated to study the effects of fertilizing winter wheat in a Promise clay soil. The fertilizers used contained the plant nutrient elements: Nitrogen, Phosphorus, Potassium, and Sulphur. The fertilizers were placed with the seed by using a drill attachment.

The experiment was placed on fallow land and consisted of various rates and ratios of plant food. The results of this trial (table 24) indicated the light rate of phosphorus (0-15-0), and a combination of nitrogen and phosphorus (15-15-0) to be the only ratios of those tested to provide a return large enough to be practical.

The use of systemic insecticides increases the yield of winter wheat but as yet the reason for the increase has not been determined.

Table 24. Influence of Fertilizer on Winter Wheat in Fallow - South Central Research Farm, 1971

Fertilizer Treatment* Pounds of Element/A	Height Inches	Percent Survival	Percent** Protein	Test Wt. Lbs/Bu.	Grain Yield Bu/A
0-0-0	24	80	15.0	60.5	14.7
15-0-0	22	78	15.4	59.3	16.4
30-0-0	20	58	15.2	58.3	14.1
60-0-0	20	70	14.9	60.3	14.2
0-15-0	29	92	14.5	62.3	19.7
15-15-0	29	85	14.9	62.3	21.1
30-15-0	28	85	--	61.8	19.2
60-15-0	25	62	15.4	61.2	15.6
0-30-0	28	85	15.2	62.3	19.6
15-30-0	26	80	14.3	62.0	18/5
30-30-0	25	58	14.7	61.5	17.7
60-30-0	28	87	14.1	62.7	18.3
0-0-30	21	73	14.9	60.0	9.9
0-0-60	21	58	14.8	58.8	12.0
30-15-30	25	82	14.9	62.8	18.0
30-15-60	23	70	15.3	60.3	13.3
30-15-122	20	42	15.6	57.5	5.5
$CuSO_4$ (Cu-15#/A, S-7#/A)	24	88	15.6	61.3	18.0
Furadan	23	73	15.4	60.2	19.2
Thimet	21	52	15.2	60.2	15.6
Di-Syston	24	87	14.9	61.3	15.1
Furadan + 30-15-0	23	72	14.5	60.3	23.4
Thimet + 30-15-0	29	72	14.5	59.7	21.1
Di-Syston + 30-15-0	29	90	14.6	61.8	18.2
				Mean	16.4

*Rate indicated is actual pounds of element applied per acre (N-P-K).
**Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

CROP DISEASE CONTROL

Management of Stubble, Fallow, and Seed Bed Preparation for Mosaic Control in Winter Wheat

W. S. Gardner and H. A. Geise

The wheat streak mosiac virus, which infects winter wheat, can be controlled through the management of wheat stubble by proper fallow practices and seed bed preparation. The virus is spread by the wheat curl mite which reproduces on annual and perennial grasses as well as in wheat. Thus volunteer wheat and annual or perennial grasses may harbor the mite and the mosiac virus so that they can spread into the wheat fields.

Tentative recommendations are that wheat stubble should be tilled before August 15 to kill volunteer wheat and grassy weeds so the mites and virus will be destroyed. The wheat stubble should be left exposed on the soil surface so the soil will be protected from erosion. Summer fallowing should destroy all volunteer wheat and grassy weeds but leave the soil surface protected by a stubble mulch. All volunteer wheat and grassy weeds should be destroyed 7 to 10 days before the wheat is planted. Otherwise these plants can act as a reservoir for mites and virus to infect the wheat planted after mid-September.

The incidence of wheat streak mosaic can also be controlled by regulating the date of planting of winter wheat. The results of the 1971 demonstration are shown in table 25.

Table 25. Winter Wheat Date of Planting Study - South Central Research Farm, 1971

Date of Planting	Insecticide Treatment	Date of Heading	Height Inches	Percent* Moisture	Percent** Protein	Test Weight Lbs/Bu	Grain Yield Bu/Acre
August 15	Check	June 15	35	9.4	16.1	60.3	37.5
	Furadan	9	39	8.8	15.7	60.3	43.6
August 25	Check	June 10	41	8.0	16.1	60.7	46.6
	Furadan	9	41	8.8	15.9	60.8	47.1
September 4	Check	June 10	39	9.2	15.9	60.7	46.5
	Furadan	10	40	8.9	16.0	60.5	45.0
September 14	Check	June 15	40	9.2	16.0	60.5	39.5
	Furadan	16	39	8.9	15.6	60.5	39.9
September 24	Check	June 15	37	9.4	15.3	60.5	34.8
	Furadan	11	32	9.2	15.3	61.0	36.9
October 4	Check	June 17	36	10.4	15.4	60.7	33.9
	Furadan	15	32	10.4	14.9	60.8	32.5

LSD(05) - 4.8 Bu/A C.V. - 21.4%

Note: Furadan is a systemic insecticide which was applied with a drill box attachement. The recommended rate is 1#/Acre.
Variety: Lancer

*Percent moisture in grain at harvest was measured by using a Steinlite moisture tester.

**Percent protein was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.