

ANNUAL PROGRESS REPORT 1994

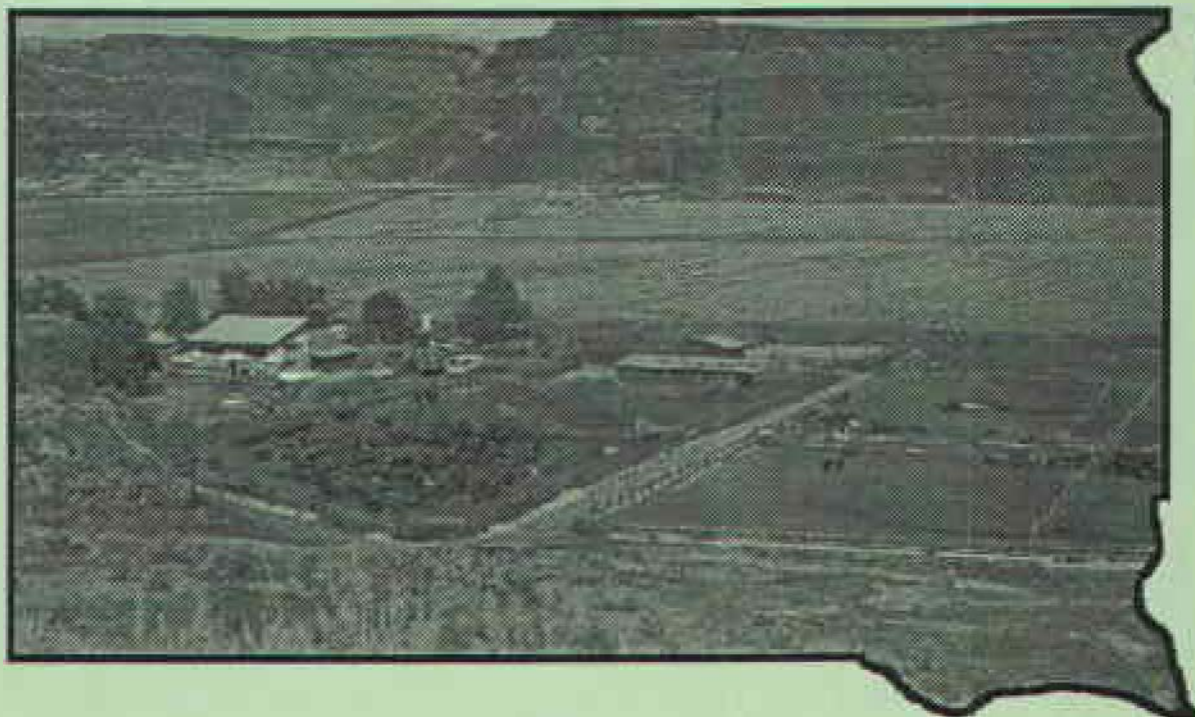
SOUTH DAKOTA STATE UNIVERSITY

**WEST RIVER AGRICULTURAL RESEARCH AND EXTENSION
CENTER**

CROPS AND SOILS RESEARCH

PLANT SCIENCE PAMPHLET #80

JANUARY 1995



INTRODUCTION

This is an annual progress report of the West River Crops and Soils Research Projects, South Dakota Agricultural Experiment Station. The equipment storage and processing facilities are located approximately 1 mile southwest of the town of Box Elder at 21 County Road 212. The office facilities are located on the Central States Fairgrounds at 801 San Francisco Street, Rapid City, SD 57701-3057. Telephone 605/394-2236.

The Research Projects serve the western part of the state. They are unique in that all experimental plots are cooperatively located with Farmers, Ranchers, or Crop Improvement Associations, through Extension Agents.

The research is conducted on farmers fields under their conditions. The research tests the adaptability of new crops, varieties and farming methods. This report does not include results of work conducted by projects headquartered from the campus at Brookings, South Dakota.

FIELD PLOT COOPERATORS

Name	Address	County
County Crop Impr. Assc.	Martin 57551	Bennett
Bryant Herman	Nisland 57762	Butte
William Miller	Oelrichs 57763	Fall River
Dewey Trent	Oelrichs 57763	Fall River
Roger Rosenow	Ralph 57650	Harding
Kevin Meyers	Draper 57531	Jones
Paul Patterson	Draper 57531	Jones
Clifford Halverson	Presho 57568	Lyman
Tim Komes	Sturgis 57785	Meade
Crown Partnership	Wall 57790	Pennington
Rodney Renner	Wall 57790	Pennington
Jim Madson	New Underwood 57761	Pennington
Kent Kjerstad	Quinn 57775	Pennington
David Finneman	Rapid City 57701	Pennington
Gary Winder	Bison 57620	Perkins
Sivage Farms	Hayes 57537	Stanley
Leon & Rex Haskins	Hayes 57537	Stanley

This is an annual report, some trials are ongoing and will require additional testing before final conclusions can be made.

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South Dakota State University, South Dakota Counties, and U.S. Department of Agriculture Cooperating

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A special thank you is extended to Bryan Dirk and Leon Ellis for their help during the summer of 1994.

This publication was written and edited by Clair Stymiest-Associate Professor, John Rickertsen-Research Associate, and Bruce A. Swan-Senior Ag Research Technician.

Weather Summary

The data in the weather summaries presented in Tables 1 through 3 were obtained from the National Oceanic and Atmospheric Administration publication, Climatological Data - South Dakota; from Al Bender, State Climatologist at South Dakota State University; and from the South Dakota Crop-Weather Summary published by the South Dakota Statistical Reporting Service-USDA.

Average air temperatures were from 5-7 degrees below normal from August through November at all locations. December was 1-4 degrees warmer in Southwestern South Dakota and 6-7 degrees warmer in the West Central and Northwest. January was 2-4 degrees cooler in the West Central and Southwest and 6 degrees below normal in the Northwest. February was very cold with all locations 7-11 degrees below normal. March went the other direction with temperatures 4-6 degrees warmer than normal. April was near normal and May 3-5 degrees above normal across western South Dakota. June was near normal to slightly above normal and July was 4-5 degrees cooler in the Southwest, 3-4 degrees cooler in the Northwest and 1-6 degrees cooler in the West Central part of the state.

Martin had consistently more moisture than normal throughout the August to July crop season. Ralph was below normal during August through October and March through May, and near normal for the other months. The other locations had near normal precipitation from August through February, then drier in March and April. The western locations typically had below normal rainfall from April through July and the Central sites were near normal during this time. Overall, temperatures were favorable at all locations but precipitation was highly variable with many locations having a dry late Spring to early Summer.

Total usable moisture (Table 3) for the August through July crop season were between 5.5 to 9 inches at most locations with Rapid City being very dry with only 3.3 inches and Martin having plentiful moisture with 15 inches. The spring season usable moisture was highly variable ranging from .87 inch at Rapid City to 9.5 inches at Martin.

TABLE 1. Weather Data - Average Temperatures and Total Precipitation by Months, with Departures from Normal.

Month & Year	Average Temperature*	Departure from Normal**	Total Precipitation*	Departure from Normal**
Martin (Bennett County Reporting Station)				
Aug. 1993	67.5	- 4.6	2.38	.29
Sept. 1993	54.6	- 7.6	2.80	1.54
Oct. 1993	46.3	- 4.4	1.08	.19
Nov. 1993	26.8	- 9.5	.40	.02
Dec. 1993	27.0	.7	1.64	1.59
Jan. 1994	19.6	- 1.8	.71	.45
Feb. 1994	17.4	- 9.0	1.38	.96
Mar. 1994	38.3	5.2	.88	.05
Apr. 1994	45.9	.2	1.53	.57
May 1994	59.8	3.1	3.15	.20
June 1994	66.7	.1	3.74	.37
July 1994	68.4	- 5.4	4.63	2.27
Oelrichs (Fall River County Reporting Station)				
Aug. 1993	68.5	- 4.5	1.29	.30
Sept. 1993	55.9	- 6.6	1.57	.31
Oct. 1993	45.0	- 5.3	1.44	.41
Nov. 1993	27.5	- 8.0	.88	.33
Dec. 1993	28.6	3.8	.44	.03
Jan. 1994	20.7	- 2.0	.48	.08
Feb. 1994	18.8	- 9.4	.27	.21
Mar. 1994	39.8	3.6	.33	.71
Apr. 1994	45.4	- 1.9	.57	1.38
May 1994	60.6	3.4	1.03	1.95
June 1994	68.8	2.0	2.20	.71
July 1994	70.8	- 3.7	1.74	.47
Ralph (Harding County Reporting Station)				
Aug. 1993	64.4	- 4.2	.53	.84
Sept. 1993	53.3	- 3.6	.32	1.00
Oct. 1993	44.7	- 1.2	.29	.76
Nov. 1993	26.7	- 3.5	.75	.30
Dec. 1993	24.8	6.5	.74	.34
Jan. 1994	11.0	- 4.4	.80	.45
Feb. 1994	10.1	- 10.9	.65	.36
Mar. 1994	35.0	4.3	.47	.19
Apr. 1994	43.9	.4	1.27	.57
May 1994	58.0	3.5	.76	2.15
June 1994	64.6	1.9	3.41	.18
Julv 1994	66.9	2.7	3.33	1.49

* Average temperatures and precipitation obtained from NOAA Climatological Data and from Al Bender, State Climatologist at South Dakota State University. Weather data is collected from the reporting station nearest the experimental sites. Temperatures are reported in degrees Fahrenheit and precipitation in inches.

**Departures from normal are based on records for the period 1961-1990(30vrs).

TABLE 1. Weather Data - Average Temperatures and Total Precipitation by Months, with Departures from Normal.

Month & Year	Average Temperature*	Departure from Normal**	Total Precipitation*	Departure from Normal**
Murdo (Jones County Reporting Station)				
Aug. 1993	69.6	- 2.7	.88	- .76
Sept. 1993	56.3	- 5.3	1.30	.11
Oct. 1993	47.8	- 1.5	.50	- .77
Nov. 1993	28.4	- 4.9	1.29	.71
Dec. 1993	27.5	6.9	.72	.17
Jan. 1994	13.3	- 4.1	.93	.60
Feb. 1994	14.2	- 8.3	.68	.26
Mar. 1994	37.2	5.1	.25	- 1.26
Apr. 1994	45.8	.2	2.15	- .03
May 1994	61.2	3.7	2.80	.01
June 1994	68.4	.4	2.50	- .67
July 1994	69.8	- 5.2	3.65	1.15
Aug. 1994	71.1	- 2.5	1.65	.01
Bear Butte Valley (Ft. Meade-Meade County Reporting Station)				
Aug. 1993	67.2	- 4.5	1.67	.09
Sept. 1993	56.2	- 4.8	1.91	.49
Oct. 1993	47.7	- 2.5	.78	- .57
Nov. 1993	31.7	- 3.8	.79	- .04
Dec. 1993	32.3	6.2	1.12	.48
Jan. 1994	22.0	- 2.1	1.53	1.05
Feb. 1994	19.7	- 8.4	.99	.32
Mar. 1994	39.6	4.7	.68	- .67
Apr. 1994	47.0	.7	2.66	- .01
May 1994	60.9	4.4	1.15	- 2.34
June 1994	69.4	3.6	.52	- 3.27
July 1994	71.2	- 1.8	2.04	- .15
Rapid City WSO Airport(Pennington County Reporting Station)				
Aug. 1993	68.6	- 2.0	1.18	- .49
Sept. 1993	56.6	- 3.4	1.46	.23
Oct. 1993	48.2	- .5	.90	- .20
Nov. 1993	32.4	- 2.4	.70	.14
Dec. 1993	31.5	7.3	.53	.06
Jan. 1994	22.4	.1	.45	.06
Feb. 1994	19.8	- 6.9	.66	.14
Mar. 1994	40.5	6.4	.37	- .66
Apr. 1994	46.0	.9	1.20	- .69
May 1994	60.2	5.0	1.47	- 1.21
June 1994	68.5	.2	.67	- 2.39
July 1994	70.1	- 6.0	.64	- 1.40

* Average temperatures and precipitation obtained from NOAA Climatological Data and from Al Bender, State Climatologist at South Dakota State University. Weather data is collected from the reporting station nearest the experimental sites. Temperatures are reported in degree Fahrenheit and precipitation in inches.

**Departures from normal are based on records for the period 1961-1990(30yrs).

TABLE 1. Weather Data - Average Temperatures and Total Precipitation by Months, with Departures from Normal.

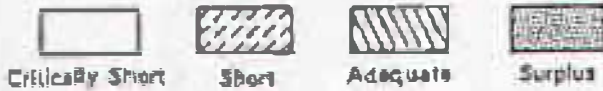
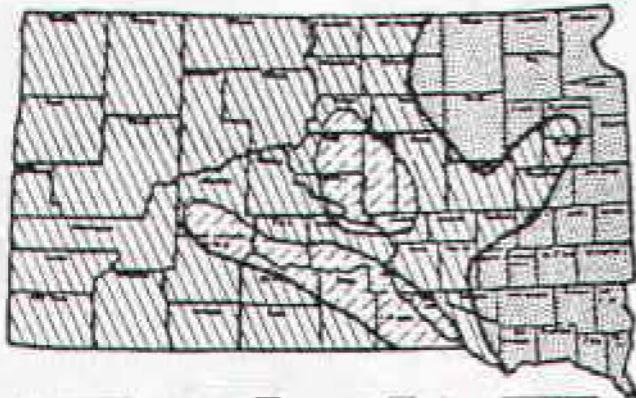
Month & Year	Average Temperature*	Departure from Normal**	Total Precipitation*	Departure from Normal**
Wasta (Pennington County Reporting Station)				
Aug. 1993	69.4	- 3.8	1.07	.54
Sept. 1993	56.4	- 5.5	1.65	.46
Oct. 1993	46.8	- 3.0	.74	.44
Nov. 1993	29.9	- 5.1	.50	.01
Dec. 1993	28.9	5.7	.50	.11
Jan. 1994	17.4	- 3.6	.64	.33
Feb. 1994	17.0	- 9.6	.16	.24
Mar. 1994	39.4	3.9	.39	.57
Apr. 1994	46.5	- 1.3	3.45	1.57
May 1994	61.9	3.6	.43	- 2.18
June 1994	68.9	1.2	2.27	.56
July 1994	70.7	- 4.2	1.12	.84
Aug. 1994	73.0	.3	1.95	.34
Bison (Perkins County Reporting Station)				
Aug. 1993	66.9	- 3.9	.71	.79
Sept. 1993	55.9	- 3.4	.54	.77
Oct. 1993	47.3	.6	traces	- 1.04
Nov. 1993	29.2	- 2.9	.25	.29
Dec. 1993	25.7	5.9	1.12	.65
Jan. 1994	10.4	- 6.1	1.03	.67
Feb. 1994	10.7	- 11.3	.36	.10
Mar. 1994	36.4	5.4	.59	.55
Apr. 1994	45.7	1.2	2.13	.09
May 1994	60.1	4.5	.09	- 2.71
June 1994	66.3	.5	2.82	.19
July 1994	69.3	- 3.7	2.80	.70
Midland (Haakon County Reporting Station)				
Aug. 1993	68.8	- 5.3	1.44	.28
Sept. 1993	55.9	- 6.6	1.56	.29
Oct. 1993	46.7	- 3.3	.76	.27
Nov. 1993	29.0	- 5.3	.12	.30
Dec. 1993	27.8	5.8	.00	.36
Jan. 1994	14.9	- 4.4	.50	.20
Feb. 1994	15.4	- 9.5	.80	.39
Mar. 1994	38.4	3.8	.00	- 1.25
Apr. 1994	46.1	- 1.9	1.97	.07
May 1994	62.1	2.9	1.85	.80
June 1994	69.1	2.0	1.80	- 1.09
July 1994	69.8	- 4.8	3.04	.97

* Average temperatures and precipitation obtained from NOAA Climatological Data and from Al Bender, State Climatologist at South Dakota State University. Weather data is collected from the reporting station nearest the experimental sites. Temperatures are reported in degrees Fahrenheit and precipitation in inches.

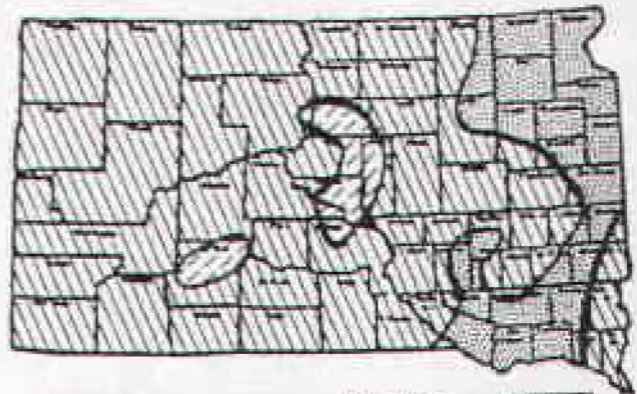
**Departures from normal are based on records for the period 1961-1990(30yrs).

Table 2. Topsoil Moisture Conditions During 1994 Growing Season.
 (Crop and Livestock Reporting Service - USDA)

As of Friday, April 15, 1994



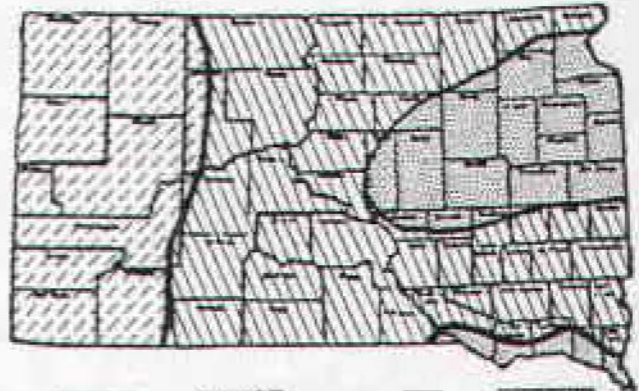
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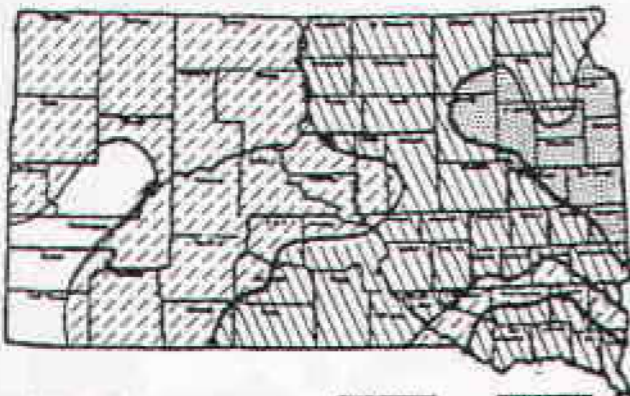
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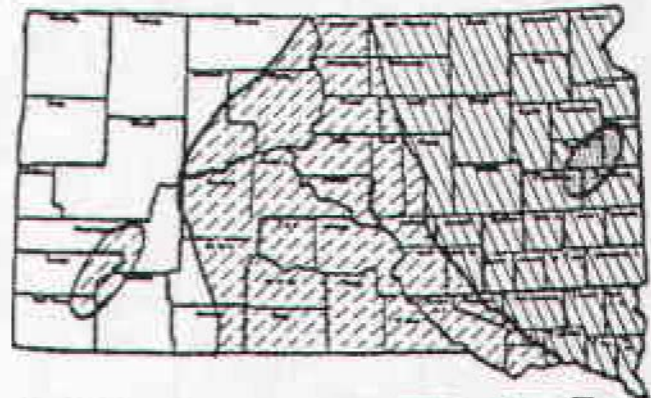
As of Friday, July 15, 1994



As of Friday, August 12, 1994



As of Friday, Sept. 16, 1994



**TABLE 3. Weather Data - Date of Critical Temperatures and Total Useable
Precipitation in Counties with Experimental Plots (1993-94)**

Location	Date of Temperature*		Total Useable Moisture**	
	Fall-First	Spring-Last	Aug 93-July 94	April 94-July 94
Bennett County (Martin)	Sept.14 (24°)	Apr.29 (21°)	14.97	9.59
Fall River County (Oelrichs)	Sept.14 (25°)	Apr.29 (27°)	5.51	2.73
Harding County (Ralph)	Sept.14 (16°)	May 7 (26°)	6.51	5.48
Jones County (Murdo)	Sept.14 (27°)	Apr.30 (23°)	9.35	7.31
Meade County (Ft. Meade)	Oct. 8 (26°)	May 1 (27°)	8.06	4.02
Pennington County (Rapid City AP)	Sept.14 (24°)	May 1 (27°)	3.32	.87
Pennington County (Wasta)	Sept.14 (24°)	Apr.29 (26°)	6.84	4.90
Perkins County (Bison)	Sept.14 (25°)	Apr.29 (18°)	5.70	4.68
Haakon County (Midland)	Sept.14 (28°)	Apr.29 (22°)	7.05	5.31

*First 28 degree temperature in Fall or last 28 degree temperature in Spring, reported in degrees Fahrenheit.

**Sum of all precipitation where amounts were greater than 0.25 inch or totaled 0.25 inches in two contiguous days.

WINTER WHEAT VARIETY TRIALS

Objective: To evaluate standard and experimental hard red winter wheat varieties for yield, agronomic characteristics and adaption to western South Dakota.

Procedure: Plots were seeded at seven locations in September 1993 with a John Deere 750 plot drill with ten inch spacing. Hayes was in millet the previous year, the rest of the locations were planted into fallow. A seeding rate of 950,000 seeds per acre (60 Lb/A) was used and liquid starter fertilizer (10-34-0 6.3 gal/A) applied at 7.4-25-0 pounds per acre. Herbicides were applied either in the fall or spring and varied according to weeds present. Visual stand ratings were taken in May 1994 and plots were trimmed to 5' x 25' after heading. The wheat was harvested in July and August with a Wintersteiger Nurserymaster Elite plot combine. Height, shatter and lodging notes were taken at the time of harvest. Protein content was determined with a Near Infrared Spectrophotometer.

Location Summaries

Fall River County - Oelrichs

This trial was seeded on September 15, 1993 into moist soil. Plot stands were excellent and were sprayed with Glean (1/3 oz/A) + X-77 (9 ml/gal) on October 20. The growing season was warmer than normal and received only 2.7 inches of usable moisture from April through July. This contributed to a high average test weight of 62.3 lb/bu and average yields of 41.7 bu/A. Protein content was very low averaging only nine percent. The wheat was harvested on July 11, 1994 and the data is presented in Table 4. One thing to note is that Quantum 566 yielded eight bushel better than any other entry. Dawn and TAM 107 had the best three year averages.

Bennett County - Martin

Martin was planted on September 27, 1993 into good soil and moisture conditions. Stands were fair to good and seemed to vary according to winter hardiness. Ally (1/10 oz/A) plus 2,4-D (8 oz/A LV-4) were applied on May 11 to control weeds. It was harvested on July 18 with the results presented in Table 5. Rainfall was plentiful with 15 inches of usable moisture received from August to July and temperatures were normal. Yields at Martin averaged 40.8 bu/A and test weights 61.2 lb/bu. Quantum 566, Quantum 549, Karl 92 and Seward were the top yielding in 1994. Quantum 549, Arapahoe and Rose looked good when averaged over the last three years.

Pennington County - Wall

Planted on September 17, the Wall location suffered from crusting problems and winterkill, so stands were very poor. It was sprayed with Glean (1/3 oz/A), X-77 (9 ml/gal) on October 21. The plot was harvested on July 21 with the results shown in Table 6. Due to the poor stands, the data was highly variable, therefore variety yield comparisons should not be made. The stand did seem to strongly correlate with winter hardiness, therefore the more winter hardy varieties yielded the best.

Table 4. Hard Red Winter Wheat Variety Trial - Fall River County (Oelrichs), 1992-94.

Variety	Stand Percent	Height Inches	Protein Percent	Test Wt Lbs/Bu	Yield Bu/A	
					1994	1992-4
Abilene	94	23.3	9.6	64.1	41.2	53.3
Alliance	86	23.8	7.9	60.7	44.1	****
Arapahoe	90	26.0	8.5	61.4	41.2	57.8
Arlin	84	24.3	9.1	63.1	37.9	****
Dawn	90	25.5	8.4	63.2	39.2	62.3
Ike	90	25.0	10.2	63.0	37.2	****
Jules	94	25.8	8.0	62.8	43.2	****
Karl 92	91	23.8	10.1	63.4	42.0	****
Laredo	95	23.8	9.3	62.6	39.9	****
Longhorn	93	27.3	9.1	62.9	42.1	****
Quantum 549	91	25.8	8.9	60.9	42.9	58.7
Quantum 566	95	28.8	8.0	62.4	52.5	****
Redland	94	27.3	7.8	59.2	41.5	55.2
Rose	89	28.0	9.2	65.0	40.0	57.1
Roughrider	90	29.5	10.2	63.6	39.6	50.3
Sage	95	27.3	8.9	61.5	40.8	53.8
Scout 66	93	27.3	8.2	63.0	43.3	55.1
Seward	91	28.0	9.8	61.2	44.7	56.7
Siouxland	91	29.3	9.6	60.7	44.2	54.2
TAM 107	91	23.8	8.0	62.0	42.6	62.7
Thunderbird	93	26.5	9.1	63.1	40.9	55.9
Tomahawk	95	23.8	8.7	61.5	40.6	****
Vista	90	22.0	8.9	61.6	41.9	48.2
NE 87612	69	25.3	8.3	60.4	36.9	****
NE 88427	93	25.5	10.5	63.3	43.7	****
NE 89522	91	28.0	8.7	61.6	43.4	****
NE 89526	88	26.5	8.7	61.5	39.7	****
SD 89119	93	26.0	9.0	62.8	42.1	58.0
SD 89153	93	28.6	8.8	64.5	42.2	****
SD 89180	94	28.3	9.2	62.5	43.4	****
SD 89186	93	27.0	8.5	61.7	39.1	****
SD 89205	93	27.8	9.1	62.2	39.8	****
SD 89333	93	26.8	8.4	62.0	43.9	60.5
HBC197F	88	25.3	9.6	62.7	41.9	****
Test Mean	91	26.2	9.0	62.3	41.7	56.2
LSD (5%)	5	1.6	NA	1.9	6.8	NS
C.V.	4	8.2	NA	2.1	11.2	20.7

Good trial, summary on page 7.

Table 5. Hard Red Winter Wheat Variety Trial - Bennett County (Martin), 1992-94.

Variety	Stand %	Height Inches	Lodging 1-5 [*]	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A	
							1994	1992-4
Abilene	79	26.5	1.0	14.0	12.8	62.6	44.0	40.2
Alliance	78	28.5	1.3	12.7	12.6	60.1	39.9	****
Arapahoe	85	30.8	1.3	12.8	12.8	61.7	44.8	46.0
Arlin	43	22.8	1.0	13.5	13.4	58.1	18.0	****
Dawn	74	30.3	1.3	13.3	14.2	62.0	40.4	44.7
Ike	69	28.5	1.0	****	11.9	61.5	40.2	****
Jules	75	28.0	1.0	12.2	14.0	60.6	47.7	****
Karl 92	73	25.5	1.0	15.2	14.3	62.4	36.2	****
Laredo	75	27.0	1.0	14.1	13.6	61.6	41.4	****
Longhorn	79	31.5	1.0	15.2	17.0	60.5	39.2	****
Quantum 549	90	32.0	1.8	14.1	13.0	61.4	50.6	49.7
Quantum 566	94	32.0	1.5	13.6	15.7	61.6	52.0	****
Redland	71	31.8	1.0	12.3	24.4	60.9	37.0	43.3
Rose	83	34.0	1.0	14.7	17.7	60.8	43.9	45.6
Roughrider	89	37.3	1.8	14.3	17.0	62.4	40.8	41.9
Sage	88	33.8	1.8	14.6	12.8	62.9	39.9	40.2
Scout 66	75	35.3	2.0	13.5	16.3	62.9	34.4	40.5
Seward	90	39.3	1.8	13.3	16.7	60.4	47.6	44.9
Siouxland	73	33.8	1.5	14.4	19.7	60.7	33.0	40.0
TAM 107	73	26.3	1.0	13.7	12.4	61.0	37.4	38.2
Thunderbird	73	29.5	1.3	14.5	17.8	62.2	36.0	38.3
Tomahawk	78	25.3	1.0	13.8	13.9	60.8	37.7	****
Vista	73	26.3	1.0	13.9	19.7	60.5	40.7	44.2
NE 876 12	53	30.0	1.0	14.2	14.3	56.6	32.9	****
NE 88427	73	28.5	1.0	14.0	13.9	62.3	40.9	****
NE 89522	74	30.5	1.0	13.3	16.1	59.8	39.7	****
NE 89526	65	29.8	1.0	13.6	19.0	60.9	38.2	****
SD 89119	76	32.3	1.5	14.6	16.7	60.5	39.3	****
SD 89153	91	33.3	1.5	14.7	15.7	62.4	43.7	****
SD 89180	80	33.5	1.5	14.3	18.0	61.7	37.4	****
SD 89186	79	32.5	1.8	14.3	16.5	62.2	38.4	****
SD 89205	78	32.3	1.3	14.2	19.3	63.0	35.3	****
SD 89333	81	32.3	2.0	12.8	13.3	62.9	43.7	****
HBC197F	63	29.8	1.0	13.8	18.0	61.6	34.0	****
Test Mean	76	30.6	1.3	13.9	15.7	61.2	40.8	42.4
LSD (5%)	11	2.3	0.5	NA	NA	2.3	5.7	NS
C.V.	10	8.1	26.4	NA	NA	2.6	9.9	9.9

* 1 = no lodging, 5 = > 80% lodged.

Good growing conditions, summary on page 7.

Table 6. Hard Red Winter Wheat Variety Trial - Pennington County (Wall), 1992-94.

Variety	Stand Percent	Height Inches	Protein Percent	Test Wt Lbs/Bu	Yield	
					1994	1992-4
Abilene	25	22.3	14.2	63.6	30.8	48.8
Alliance	35	24.5	11.5	61.3	41.7	****
Arapahoe	44	25.8	13.8	61.0	42.8	48.6
Arlin	10	19.8	14.3	61.3	8.6	****
Dawn	34	27.0	13.7	62.8	37.9	47.0
Ike	25	22.5	16.6	61.3	24.4	****
Jules	41	24.3	11.5	61.3	43.1	****
Karl 92	44	23.3	16.2	61.1	31.2	****
Laredo	33	21.5	13.5	61.7	30.8	****
Longhorn	40	25.8	13.7	63.2	36.7	****
Quantum 549	44	26.3	11.2	63.0	48.5	55.6
Quantum 566	53	28.3	11.7	61.5	58.4	****
Redland	29	27.5	11.8	60.6	32.4	46.4
Rose	44	28.0	14.3	62.9	43.1	52.3
Roughrider	59	31.8	13.2	62.9	47.6	48.2
Sage	46	26.5	13.7	62.4	41.0	47.1
Scout 66	41	29.3	13.9	63.0	37.4	48.2
Seward	54	29.8	11.8	61.2	51.8	53.2
Siouxland	20	27.8	14.7	61.3	23.7	44.3
TAM 107	33	21.3	13.0	61.8	31.5	48.1
Thunderbird	33	24.3	14.2	63.4	34.8	46.4
Tomahawk	38	23.0	14.7	62.1	36.3	****
Vista	21	21.5	13.7	61.7	32.9	47.5
NE 87612	9	23.8	14.6	60.4	16.7	****
NE 88427	34	22.8	14.7	61.3	36.2	****
NE 89522	18	25.8	13.3	60.0	31.3	****
NE 89526	19	24.0	15.1	61.2	27.9	****
SD 89119	45	25.3	13.6	64.4	41.4	54.0
SD 89153	53	28.0	12.9	63.2	48.0	****
SD 89180	49	28.5	13.9	63.0	42.1	****
SD 89186	48	25.8	11.4	62.9	41.7	****
SD 89205	41	26.8	13.2	63.5	39.2	****
SD 89333	44	26.0	13.1	62.0	43.6	50.1
HBC197F	34	24.5	13.8	63.1	35.6	****
Test Mean	36	25.4	13.5	62.1	36.7	48.8
LSD (5%)	11	1.6	NA	1.4	6.1	NS
C.V.	30	6.3	NA	1.6	16.5	15.3

Poor stands from winterkill, summary on page 7.

Stanley County - Hayes

The minimum and no-tillage trials were planted on September 21, 1993. The ground was in millet the year before with the minimum tillage trial being worked with a chisel plow one week prior to planting. The no-till trial was planted directly into the millet stubble. Ally (1/10 oz/ac) + 2,4-D (5.3 oz/ac LV-6) were applied on May, 8 for weed control. The plots suffered hail damage two weeks prior to harvest on July 19. The results shown in Table 7 and 8, show that some varieties had a large amount of shatter due to the hail. Weed pressure caused a large amount of variation in yield even within a variety so this data should not be used to make yield comparisons. The comparison of varieties that were in both trials showed little difference. The no-till trial had a better stand, was slightly shorter and suffered more shatter than the minimum tillage trial. The increased shatter was probably due to the apparent earlier maturity of the no-till trial. Due to the hail no valid yield comparisons can be made between the two tillage practices.

Meade County - Bear Butte

Bear Butte was planted on September 15, 1993 and sprayed with Glean (1/3 oz/A) + Lexone (300 ml/A for downy brome) on October 18. Spring stands were fair to good but plots were heavily infested with downy brome. This combined with warm and droughty conditions caused high variation in the data. Therefore little useful yield information was obtained when the plots were harvested on July 12. Vista, Dawn, Abilene, Arapahoe and Quantum 549 look good at this location during the last three years. The results of this trial can be found in Table 9.

Perkins County - Bison

The winter wheat at Bison was planted on September 15, 1993 into fair soil moisture conditions. Emergence was fair to good but some plots were lost to grasshopper feeding. Ally (1/10 oz/A) + 2,4-D (LV-4 8 oz/A) on May 12 for weed control. The normal temperatures and dry spring led to average yields of 39 bu/A and excellent test weights averaging 64.2 lb/bu. Top yielders for 1994 were Jules, Quantum 549, Rose, Quantum 566 and Seward. The varieties with the best three year averages are Quantum 549, Seward, Rose and Roughrider. Results from the harvest on July 28 are given in Table 10.

Harding County - Ralph

The top 3-4 inches at Ralph was very dry when planted on September 14, 1993 and substantial rainfall did not occur until March. When the plots were observed on October 14 they had not yet germinated. The wheat did not emerge until spring and stands were very poor averaging only 31 percent. Because of the poor stands and the fact that the wheat did not vernalize properly no variety comparisons should be made. The data from harvest on August 4 are given in Table 11.

Table 7. Hard Red Winter Wheat Variety Trial - Stanley County (Hayes), 1992-94.

Variety	Stand Percent	Height Inches	Shatter 1-5*	Protein Percent	Test Wt Lbs/Bu	Yield Bu/A	
						1994	1992-4
Abilene	71	17.7	3.0	14.1	62.3	14.5	38.3
Alliance	63	24.0	3.0	11.2	61.4	24.6	****
Arapahoe	64	22.5	2.8	15.0	60.5	18.1	49.3
Arlin	58	20.5	2.5	13.1	60.3	16.2	****
Dawn	66	21.5	2.5	13.8	62.1	23.7	39.8
Ike	65	21.0	2.8	13.6	61.8	19.9	****
Jules	69	21.3	2.8	12.7	60.9	30.5	****
Karl 92	65	19.0	3.0	14.3	61.0	15.6	****
Laredo	73	23.8	3.0	12.9	61.8	27.5	****
Longhorn	79	22.3	2.5	13.8	62.6	22.8	****
Quantum 549	74	24.3	3.0	12.8	61.2	29.4	****
Quantum 566	79	24.5	2.8	14.4	62.3	24.7	****
Redland	65	23.3	2.8	13.2	60.7	19.6	46.8
Rose	68	22.8	2.3	13.3	61.9	27.1	46.5
Roughrider	65	27.8	2.8	14.3	62.3	22.7	44.9
Sage	76	24.3	3.0	12.5	62.0	21.9	35.0
Scout 66	58	26.3	2.8	14.0	62.2	23.1	38.7
Seward	63	27.0	2.8	12.4	60.8	32.0	50.7
Siouxland	50	25.3	3.0	13.9	62.4	20.7	37.0
TAM 107	73	21.3	2.5	12.4	60.6	29.3	38.6
Thunderbird	66	23.8	3.0	14.0	62.3	15.0	43.5
Tomahawk	78	22.0	3.0	14.1	60.7	18.9	****
Vista	60	22.0	2.8	13.9	61.0	27.5	****
NE 87612	46	25.3	2.8	12.3	60.4	22.6	****
NE 88427	65	20.0	3.0	13.5	61.9	25.6	****
NE 89522	59	24.5	2.3	12.5	61.3	27.8	****
NE 89526	63	22.0	3.0	14.5	61.7	24.5	****
SD 89119	71	23.0	3.0	13.2	62.8	28.9	****
SD 89153	69	23.5	2.8	13.7	62.9	30.6	****
SD 89180	74	22.5	3.0	13.6	61.4	29.7	****
SD 89186	63	23.3	3.0	12.7	62.2	23.2	****
SD 89205	64	23.3	2.8	13.8	61.7	27.4	****
SD 89333	63	24.8	2.8	13.4	62.2	26.3	****
HBC197F	63	22.3	2.8	13.6	61.8	22.1	****
Test Mean	66	23.0	2.8	13.5	61.6	23.9	42.4
LSD (5%)	11	4.2	0.5	NA	1.9	8.4	NA
C.V.	11	12.8	13.3	NA	2.2	24.2	NA

* 1 = no shatter, 5 = mostly shattered.

Location was hailed on, summary on page 11.

Table 8. No-Till Hard Red Winter Wheat Variety Trial - Stanley County (Hayes), 1992-94.

Variety	Stand Percent	Height Inches	Shatter 1-5*	Test Wt Lbs/Bu	Yield Bu/A	
					1994	1992-4
Abilene	70	16.3	3.5	63.5	12.1	30.0
Agassiz	48	26.0	2.5	61.3	17.9	****
Alliance	74	18.5	3.0	60.2	17.4	****
Arapahoe	75	21.8	3.0	61.0	20.3	47.7
Dawn	68	20.3	3.0	62.9	23.0	40.7
Laredo	76	18.8	3.0	61.2	17.8	****
Longhorn	74	20.8	3.0	62.7	18.4	36.1
Ogallala	70	18.3	3.0	63.3	14.5	****
Quantum 549	76	20.3	3.0	61.4	19.9	****
Quantum 562	74	20.8	2.8	61.6	21.2	****
Redland	65	22.0	3.5	61.1	16.5	47.6
Rose	70	23.0	2.0	63.4	28.3	47.2
Roughrider	76	22.0	3.3	62.5	16.8	39.9
Sage	78	23.0	3.0	62.1	21.0	35.0
Scout 66	66	22.8	2.8	63.0	23.5	39.4
Seward	71	22.0	2.8	60.6	23.9	43.4
Siouxland	70	22.3	3.3	61.6	16.9	37.9
TAM 107	70	19.3	2.5	60.5	20.6	36.3
TAM 200	61	19.3	3.0	61.4	23.1	37.9
Thunderbird	65	21.0	4.0	61.7	11.4	33.1
Tomahawk	68	18.0	3.5	61.2	14.4	****
Vista	69	18.8	2.8	61.3	27.4	****
Test Mean	74	20.6	3.0	61.8	19.3	39.4
LSD (5%)	7	2.7	0.6	1.1	3.5	NA
C.V.	7	9.0	12.8	1.3	12.5	NA

* 1 = no shatter, 5 = mostly shattered.

Location was hailed on, summary on page 11.

Table 9. Hard Red Winter Wheat Variety Trial - Meade County (Bear Butte), 1992-94.

Variety	Stand	Height	Protein	Test Wt	Yield	
	Percent	Inches	Percent	Lbs/Bu	1994	1992-4
Abilene	76	21.8	13.3	58.0	20.0	47.4
Alliance	71	24.5	11.0	58.0	20.4	****
Arapahoe	79	21.5	14.2	58.6	19.3	43.9
Arlin	50	20.8	****	54.6	6.3	****
Dawn	79	23.8	14.3	58.7	17.3	45.6
Ike	78	23.5	12.7	58.3	22.6	****
Jules	76	22.0	13.0	57.3	18.1	****
Karl 92	80	23.5	12.2	59.1	23.6	****
Laredo	79	22.8	12.0	57.2	22.4	****
Longhorn	59	26.5	13.1	58.4	13.2	****
Quantum 549	83	26.3	12.5	58.9	27.5	44.3
Quantum 566	76	26.0	13.0	58.4	24.7	****
Redland	71	25.0	12.8	55.2	16.2	43.8
Rose	84	24.3	13.7	60.0	24.9	37.2
Roughrider	84	28.3	14.3	60.5	21.8	30.0
Sage	68	27.3	11.7	58.5	19.4	38.1
Scout 66	73	29.0	13.0	60.2	18.3	37.7
Seward	81	28.5	12.9	59.7	25.5	38.1
Siouxland	80	26.5	11.9	59.1	22.1	44.2
TAM 107	79	23.5	14.5	56.8	20.5	48.8
Thunderbird	56	24.8	14.1	56.4	10.6	41.3
Tomahawk	72	22.5	13.1	55.3	16.2	****
Vista	71	20.5	16.2	52.4	16.4	48.2
NE 87612	61	24.3	12.7	56.8	20.1	****
NE 88427	80	23.8	12.2	58.0	22.7	****
NE 89522	68	25.8	11.3	57.6	16.7	****
NE 89526	79	23.8	13.5	60.7	24.9	****
SD 89119	75	25.5	13.3	61.2	21.4	44.4
SD 89153	85	26.3	14.2	60.6	23.6	****
SD 89180	85	26.5	15.8	60.1	27.1	****
SD 89186	79	27.0	****	59.5	21.5	****
SD 89205	79	26.5	15.7	58.7	23.2	****
SD 89333	81	27.8	12.7	58.2	26.0	****
HBC197F	71	24.8	14.2	58.5	96.6	44.7
Test Mean	75	24.8	13.5	58.2	20.6	42.4
LSD (5%)	9	3.0	NA	3.5	6.3	9.0
C.V.	8	8.4	NA	4.1	21.3	15.3

Heavy weed pressure, summary on page 11.

Table 10. Hard Red Winter Wheat Variety Trial - Perkins County (Bison), 1992-94.

Variety	Stand Percent	Height Inches	Protein Percent	Test Wt Lbs/Bu	Yield Bu/A	
					1994	1992-4
Abilene	80	22.0	12.2	64.9	36.7	38.2
Alliance	78	24.3	11.6	64.6	42.7	****
Arapahoe	77	25.7	15.3	63.9	35.0	38.3
Arlin	48	18.0	14.3	64.5	25.7	****
Dawn	73	25.0	13.0	65.2	40.1	35.9
Ike	71	23.3	15.5	64.0	37.0	****
Jules	80	23.8	11.5	64.6	45.9	****
Karl 92	70	20.8	13.7	63.5	36.7	****
Laredo	67	22.7	13.5	64.3	37.1	****
Longhorn	80	26.5	13.5	64.3	38.8	****
Quantum 549	84	26.8	12.5	64.5	45.7	48.5
Quantum 566	83	27.3	13.1	64.1	44.0	****
Redland	80	26.0	12.4	63.5	37.4	38.9
Rose	77	27.7	13.6	64.5	45.0	45.7
Roughrider	75	31.0	13.1	63.7	40.3	44.7
Sage	80	25.5	13.0	63.8	38.3	37.5
Scout 66	76	29.5	13.6	64.6	38.3	38.0
Seward	78	34.5	11.0	63.4	43.3	48.2
Siouxland	80	28.5	11.9	63.4	36.4	37.7
TAM 107	74	19.8	13.0	64.2	38.8	34.3
Thunderbird	76	25.3	13.5	65.6	40.6	39.9
Tomahawk	79	21.0	14.4	64.0	36.0	****
Vista	74	21.5	13.8	63.9	39.4	38.8
NE 87612	63	26.0	12.9	63.8	33.9	****
NE 88427	75	21.3	12.7	64.6	38.8	****
NE 89522	70	26.3	12.3	63.3	40.0	****
NE 89526	66	24.3	14.6	63.5	35.5	****
SD 89119	73	25.8	13.1	64.4	44.9	43.1
SD 89153	75	26.5	13.2	64.8	42.6	****
SD 89180	75	28.7	12.5	65.2	42.4	****
SD 89186	70	28.0	12.1	64.6	43.0	****
SD 89205	72	28.0	11.7	65.1	41.5	****
SD 89333	73	24.5	13.2	64.8	46.3	41.8
HBC197F	70	24.3	13.4	64.3	42.0	****
Test Mean	75	25.3	13.1	64.2	39.1	40.6
LSD (5%)	7	4.0	NA	0.8	5.2	6.9
C.V.	10	11.8	NA	0.9	9.7	12.4

Some grasshopper damage, summary on page 11.

Table 11. Hard Red Winter Wheat Variety Trial - Harding County (Ralph), 1994.

Variety	Stand Percent	Height Inches	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A
Abilene	24	21.8	13.0	23.7	61.2	23.1
Alliance	26	22.8	10.5	23.6	61.5	32.7
Arapahoe	44	25.3	11.6	19.5	62.5	36.8
Arlin	30	22.3	12.9	20.1	62.5	18.7
Dawn	35	24.5	10.7	15.0	63.6	30.5
Ike	29	23.5	14.3	16.5	61.5	25.1
Jules	46	24.0	9.8	15.3	61.6	35.8
Karl 92	34	21.8	12.2	16.6	62.7	27.2
Laredo	39	20.0	13.0	14.6	61.5	22.5
Longhorn	45	25.0	12.7	19.3	61.7	25.6
Quantum 549	36	24.0	12.2	19.4	62.8	30.4
Quantum 566	38	25.3	11.4	18.6	60.2	39.8
Redland	29	25.3	9.9	18.7	59.3	37.0
Rose	29	25.8	12.3	20.9	57.9	31.1
Roughrider	35	27.5	12.6	32.6	58.2	29.2
Sage	40	26.3	12.2	16.4	60.8	30.0
Scout 66	29	25.8	10.7	19.5	60.8	28.5
Seward	33	27.3	10.4	23.7	58.1	31.4
Siouxland	30	28.0	11.7	24.3	58.8	32.4
TAM 107	25	20.8	11.3	15.6	60.1	21.0
Thunderbird	35	23.8	11.8	15.4	62.7	29.9
Tomahawk	31	21.8	12.6	14.8	61.2	24.5
Vista	24	22.0	11.1	16.0	61.3	31.5
NE 87612	18	24.0	13.0	20.7	59.7	21.5
NE 88427	26	22.8	12.0	23.6	61.1	26.8
NE 89522	21	26.0	10.8	18.7	58.9	33.2
NE 89526	30	24.8	11.9	15.0	61.6	29.0
SD 89119	29	24.8	12.1	19.3	61.6	35.8
SD 89153	30	26.3	12.3	23.2	52.5	32.7
SD 89180	29	26.0	12.2	17.8	60.4	29.2
SD 89186	33	25.0	11.5	16.4	61.7	30.9
SD 89205	31	26.5	11.1	18.3	61.1	32.3
SD 89333	30	23.8	11.0	14.5	62.7	30.4
HBC197F	28	24.5	12.4	18.9	61.9	27.5
Test Mean	31	24.4	11.8	19.0	60.7	31.4
LSD (5%)	11	1.7	NA	NA	4.0	4.9
C.V.	11	4.8	NA	NA	4.6	11.4

Very poor emergence and very dry conditions, summary on page 11.

Lyman County - Kennebec

The winter wheat variety strips near Kennebec were planted in early September with a farm sized deep furrow drill. The varieties were seeded in five foot strips 400 feet long, with a check strip of the variety Arapahoe after every fifth entry. Warm temperatures and near normal rainfall contributed to excellent yields. A 100 foot strip was harvested on July 13 with a small plot combine and the information is given in Table 12. This was a single rep trial so the information is not statistically analyzed. The yields from the Arapahoe check strips were very consistent, indicating a uniform field. Therefore careful variety comparisons can be made.

Table 12. Hard Red Winter Wheat Variety Strip - Lyman County (Kennebec), 1994.

Variety	Height Inches	Shatter 1-5*	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A
Arapahoe check	26	1	14.6	62.9	47.4
Rio Blanco	23	1	15.6	63.8	46.1
Arlin	25	2	15.6	64.9	54.3
Arapahoe check	26	1	14.6	61.2	51.2
Tomahawk	27	1	13.8	62.2	55.3
TAM 107	26	1	13.7	63.2	59.8
Rose	34	1	16.9	63.2	56.1
Ogalala	25	2	15.5	63.6	57.2
Arapahoe check	28	1	14.1	62.8	56.0
Longhorn	28	1	14.4	63.1	46.1
Arapahoe	32	1	14.1	61.8	60.7
Vista	26	1	14.4	63.6	59.4
Arapahoe check	28	1	13.7	62.8	54.0
Thunderbird	30	2	15.6	63.6	56.0
Scout 66	32	1	14.3	64.1	60.3
Alliance	31	1	13.4	61.0	71.3
SD 89119	33	1	15.5	63.6	62.4
Arapahoe check	30	1	13.3	63.4	55.3
SD 89333	31	1	13.8	62.5	67.1
Seward	36	1	15.7	61.2	53.7
Arapahoe check	27	1	13.5	62.9	56.0
Siouxland	30	1	13.6	63.4	51.1
Roughrider	32	1	16.1	63.1	46.4
Sage	33	1	13.5	64.3	55.2
Dawn	29	1	13.8	62.5	60.2
Arapahoe check	27	1	13.1	63.2	56.2
WM 140A	30	1	13.8	62.5	60.2
Agate	30	1	13.6	64.9	56.3
Redland	27	1	13.1	60.8	57.1
Laredo	26	1	13.1	63.9	63.0
Arapahoe check	26	1	12.9	63.9	56.7
Quantum 549	26	1	14.0	63.2	60.9
Check Mean	27	1	13.6	62.9	54.5
Test Mean	29	1.1	14.4	63.1	57.3

*1 = No lodging, 5 = >80% lodged.

WHEAT VARIETY RECOMMENDATIONS FOR 1995

Crop Adaptation Areas for South Dakota (Revised 1992)



WINTER WHEAT

Recommended:	Variety Area
Arapahoe [®]	1*,3,4*,5,6,7
Dawn	4*,5,6
Quantum 549 [®]	1*,3,4*,5,6,7*
Redland [®]	1*,3,4*,5,6,7*
Rose	1*,2*,3†,4*,6,7
Seward	1*,2*,4*,6,7
Vista	3,4*,5,6

Acceptable/Promising: Variety Area

Abilene	1*,3,4*,5,6
Alliance	3,4*,5,6
Roughrider	1*,2*,4,7
Sage	4*,5,6
Siouxland [®]	3,4*,5,6
TAM 107 [®]	4*,5,6

DURUM WHEAT

Recommended:	Variety Area
Fjord [®]	All durum areas
Monroe	All durum areas
Renville	All durum areas
Vic	All durum areas
Ward	All durum areas

SPRING WHEAT

Recommended:	Variety Area
Butte 86	Statewide
Prospect	Statewide
Sharp	Statewide
2375 [®] ‡	Statewide

Acceptable/Promising: Variety Area

Amidon	1,4†,6,7
Bergen [®]	1,2,4†,6,7
Gaurd [®]	Statewide
Krona	1‡,4‡,6,7
Nordic [®]	Statewide
Sonja	1‡,4‡,6,7
Stoa	Statewide
2371 [®] ‡	1‡,4‡,6,7

[®] U.S. Plant Variety Protection applied for and/or issued; seed sales of these varieties are restricted to classes of certified seed.

* Plant into protective cover.

‡ 2375 and 2371 are owned by the North Dakota State University Research Foundation (NDSURF). Seed is available for increase and sale as a class of certified seed through an agreement between NDSURF and South Dakota Foundation Seed Stock Division of SDSU.

† Northern half of crop adaptation area.

‡ Western half of crop adaptation area.

Source - Small Grains 1995 Variety Recommendations, EC744.

SPRING WHEAT VARIETY TRIALS

Objective: To evaluate standard and experimental hard red spring wheat varieties for yield, agronomic characteristics and adaption to western South Dakota.

Procedure: Plots were seeded into fallow ground at three locations in April 1994 with a John Deere 750 plot drill with ten inch spacing. There were 28 varieties with four replications at each location. A seeding rate of 1,390,000 (90 Lb/A) seeds per acre was used and starter fertilizer (10-34-0 6.3 gal/A) applied at 7.4-25-0 pounds/acre. Herbicides were applied in early June and varied according to weeds present. Plots were trimmed to 5' x 25' after heading. The wheat was harvested in July and August with a Wintersteiger Nurserymaster Elite plot combine. Height, shatter and lodging notes were taken at the time of harvest. Protein content was determined using a Near Infrared Spectrophotometer.

Location Summaries

Pennington County - Wall

The spring wheat trial near Wall was planted on April 10, 1994. The wheat was sprayed on May 20 with Ally (1/10 oz/A) + 2,4-D (5.3 oz/A LV-6) for weed control. Warm temperatures and a very dry May lead to an average yield of 38 bushels per acre. The test weights at this location were excellent averaging 64.1 pounds per bushel. The grain was harvested on July 29 and the results are given in Table 13. Krona, Sonja, Vance and 2375 did well in 1994. The varieties with good three year averages are Krona, Sonja, Bergen, Butte 86 and 2375. Krona and Nordic had low percent proteins in this trial.

Perkins County - Bison

Bison was planted on April 21, 1994 into good moisture. It was sprayed with Ally (1/10 oz/A) + 2,4-D (5.3 oz/A LV-6) on June 2. Temperatures were normal and rainfall below normal in April and May, and near normal in June and July. The average yield was 39 bushels per acre and test weights averaged 61.2 pounds per bushel. This location was harvested on August 16 with the varieties Nordic, Krona, Norm and Prospect yielding well. For the 1992-94 time period Krona, Sonja, Nordic and Prospect yielded the best. Nordic had the lowest protein content and Prospect one of the highest. The results are given in Table 14.

Harding County - Ralph

The top two inches of soil were very dry when Ralph was planted on April 20, 1994. Ally (1/10 az/A) + 2,4-D (5.3 oz/A LV-6) + Hoelon (40 oz/A for wild oat) were applied on June 2. Very dry conditions persisted from the previous year through June of 1994. This location had excellent weed control but the lack of moisture limited yields to an average of 24 bushels per acre. Test weights were excellent at 64.9 pounds per bushel. Harvest took place on August 4 with results presented in Table 15. Amidon, Nordic, Krona and Stoa yielded well in 1994, with Nordic, Krona and Prospect showing good yields the past three years. Nordic and Krona had much lower protein content than any other variety in this trial

Table 13. Hard Red Spring Wheat Variety Trial - Pennington County (Wall), 1992-94.

Variety	Height Inches	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A	
					1994	1992-94
Amidon	33.0	13.3	10.8	62.7	33.3	45.6
Bergen	25.5	14.2	10.6	63.5	36.9	51.9
Butte 86	31.3	13.7	10.5	64.6	37.8	51.4
Chris	34.5	14.4	10.2	63.1	30.6	38.5
Dalen	26.8	13.1	11.1	65.9	38.2	49.6
Grandin	31.3	12.8	11.5	64.2	38.7	48.4
Gaurd	26.0	14.5	10.6	63.9	34.5	46.6
Krona	25.5	12.2	10.7	63.1	42.7	54.5
Kulm	26.5	13.4	11.2	65.7	38.0	****
Nordic	26.5	12.8	11.0	65.0	37.1	50.7
Norm	29.0	14.0	10.8	64.9	39.0	45.6
Prospect	29.5	13.6	11.4	64.9	34.9	50.2
Sharp	29.0	13.6	11.1	66.4	38.3	50.0
Stoa	33.5	12.8	10.4	62.9	36.9	49.0
Sonja	26.3	13.6	10.5	64.5	43.0	52.9
Vance	31.5	13.6	10.1	63.1	40.8	48.8
2371	26.8	14.5	10.7	63.3	38.7	49.5
2375	26.5	13.6	10.3	64.3	39.3	51.3
MN 0437	29.0	13.8	10.7	64.2	40.5	****
ND 673	33.0	14.3	10.5	63.1	33.9	****
ND 677	32.5	14.4	10.6	64.8	35.5	****
ND XW398	29.0	15.5	10.8	63.8	39.8	****
SD 0007	27.0	12.8	10.8	63.9	39.4	****
SD 0010	27.3	14.0	11.2	63.9	41.7	****
SD 0014	27.5	14.5	11.1	63.3	41.1	****
SD 3151	29.0	13.9	10.9	64.5	42.1	****
SD 3156	30.0	13.2	11.1	65.6	42.9	****
SD 8073	30.3	13.0	10.5	63.3	35.8	53.0
Test Mean	29.2	13.7	10.8	64.1	38.2	49.3
LSD (5%)	2.7	NA	NA	1.7	4.3	6.5
C.V.	6.5	NA	NA	1.9	8.0	11.0

Good growing conditions, summary on page 19.

Table 14. Hard Red Spring Wheat Variety Trial - Perkins County (Bison), 1992-94.

Variety	Height Inches	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A	
					1994	1992-4
Amidon	28.3	13.4	9.7	60.0	32.5	32.9
Bergen	23.0	12.7	10.1	60.3	37.2	33.8
Butte 86	27.0	13.1	9.8	62.2	35.4	36.2
Chris	30.0	15.2	9.1	60.5	31.9	32.2
Dalen	24.0	13.3	9.9	62.3	36.9	36.1
Grandin	28.3	13.0	9.6	62.3	38.7	36.6
Gaurd	24.3	12.9	9.9	62.0	39.7	34.9
Krona	23.0	12.5	9.8	60.6	42.3	47.3
Kulm	27.8	13.8	9.8	62.6	33.8	****
Nordic	26.3	12.0	10.7	63.7	43.6	42.9
Norm	25.3	13.6	9.3	60.8	41.4	40.4
Prospect	25.3	14.1	9.6	61.2	41.1	41.0
Sharp	27.3	13.4	10.5	63.0	37.5	35.9
Stoa	26.8	13.3	9.6	61.8	29.7	33.7
Sonja	23.3	13.0	8.9	59.7	40.1	47.7
Vance	25.5	13.8	9.2	60.3	36.9	37.6
2371	23.5	14.3	8.9	59.5	36.8	38.7
2375	26.3	13.0	9.3	61.1	36.9	38.5
MN 0437	23.8	13.3	9.7	61.6	39.4	****
ND 673	28.8	13.5	10.1	61.2	33.9	****
ND 677	28.5	13.1	9.6	60.6	34.2	****
ND XW398	25.3	13.5	10.1	61.3	36.5	****
SD 0007	24.0	12.6	9.9	61.1	38.0	****
SD 0010	23.5	14.1	9.1	59.6	34.5	****
SD 0014	23.0	13.9	9.4	60.8	33.9	****
SD 3151	27.0	14.6	9.8	61.5	36.0	****
SD 3156	26.0	14.1	10.9	61.8	36.6	****
SD 8073	26.5	14.1	10.1	61.8	37.2	40.6
Test Mean	25.8	13.5	9.7	61.2	36.8	38.2
LSD (5%)	1.8	NA	NA	1.2	6.0	NS
C.V.	4.7	NA	NA	1.4	11.5	14.4

Somewhat dry conditions, summary on page 19.

Table 15. Hard Red Spring Wheat Variety Trial - Harding County (Ralph), 1992-94.

Variety	Height Inches	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A	
					1994	1992-4
Amidon	26.8	12.8	17.2	61.6	28.8	46.7
Bergen	23.0	13.0	12.1	64.9	23.8	44.5
Butte 86	26.3	12.7	12.8	65.3	24.0	43.3
Chris	28.0	14.2	13.3	63.7	21.4	37.0
Dalen	23.3	12.8	12.2	65.9	24.2	42.8
Grandin	25.8	12.6	13.2	65.2	24.6	43.8
Gaurd	23.8	13.0	12.7	65.9	24.4	41.6
Krona	21.8	11.8	13.8	65.4	27.0	51.9
Kulm	25.3	13.2	12.9	66.2	23.0	****
Nordic	24.5	11.7	14.5	65.1	28.2	52.1
Norm	23.8	13.3	12.7	65.9	21.2	44.1
Prospect	23.3	13.2	14.7	65.7	25.0	49.4
Sharp	26.5	13.2	12.9	66.4	22.9	35.9
Stoa	25.3	12.5	14.4	63.9	25.7	45.2
Sonja	23.3	12.7	13.0	65.3	24.8	46.7
Vance	24.5	13.3	12.8	64.2	24.4	44.9
2371	22.5	13.6	13.9	64.2	23.8	43.9
2375	23.0	12.7	12.0	64.9	21.6	43.7
MN 0437	24.5	12.9	13.8	64.6	24.2	****
ND 673	26.8	13.0	13.8	64.1	25.3	****
ND 677	26.3	13.2	13.0	65.6	23.5	****
ND XW398	23.0	13.7	14.1	64.7	26.0	****
SD 0007	23.3	12.3	12.5	64.7	22.8	****
SD 0010	22.5	13.6	13.7	65.1	23.9	****
SD 0014	23.8	13.5	14.5	64.2	23.5	****
SD 3151	25.0	13.4	12.4	65.6	22.9	****
SD 3156	25.8	13.0	13.3	65.9	26.4	****
SD 8073	24.5	12.7	13.6	64.5	23.3	43.8
Test Mean	24.5	13.0	13.4	64.9	24.2	44.7
LSD (5%)	1.7	NA	NA	1.1	3.6	5.6
C.V.	4.9	NA	NA	1.2	10.6	9.8

Very dry year, summary on page 19.

DURUM WHEAT VARIETY TRIALS

Objective: To evaluate standard and experimental durum wheat varieties for yield, agronomic characteristics and adaption to western South Dakota.

Procedure: Plots were seeded into fallow ground at three locations in April 1994 with a John Deere 750 plot drill with ten inch spacing. There were 7 varieties with four replications at each location. A seeding rate of 1,390,000 (90 Lb/A) seeds per acre was used and starter fertilizer (10-34-0 at 6.3 gal/A) applied at 7.4-25-0 pounds/acre. Herbicides were applied in early June and varied according to weeds present. Plots were trimmed to 5' x 25' after heading. The wheat was harvested in July and August with a Wintersteiger Nurserymaster Elite plot combine. Height, shatter and lodging notes were taken at the time of harvest. Protein content was determined using a Near Infrared Spectrophotometer.

Summary: Durum wheat and hard red spring wheat trials were at the same three locations in 1994. Information on cultural practices and growing conditions can be found on page 19. The results are shown in Tables 16 through 18. Yield averages were as follows, Wall 36 bu/A, Bison 32 bu/A, Ralph 28 bu/A. Test weights were excellent averaging 63.7 lb/bu at Wall, 62.5 lb/bu at Bison and 64.3 lb/bu at Ralph. There was little difference in yield performance between varieties, with three year averages showing no significant difference in yield. The averages for 1992 -94 were in a three bushels range at Wall and Bison, and six bushels at Ralph.

Table 16. Durum Wheat Variety Trial - Pennington County (Wall), 1992-94.

Variety	Height Inches	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A	
					1994	1992-94
Monroe	30.3	13.7	10.8	62.8	36.3	47.0
Vic	32.3	13.5	10.8	63.9	35.2	46.4
Ward	32.8	13.3	10.7	63.8	38.9	48.2
Fjord	30.8	12.8	10.9	64.6	36.1	45.2
Renville	30.8	13.6	10.1	63.0	34.4	46.3
ND 8460	30.0	14.3	9.4	61.9	31.1	****
Voss	25.0	12.4	10.7	64.2	37.1	****
Test Mean	30.2	13.4	10.4	63.5	35.9	46.6
LSD (5%)	1.7	NA	NA	1.3	3.7	NS
C.V.	3.9	NA	NA	1.4	7.1	10.1

Table 17. Durum Wheat Variety Trial - Perkins County (Bison), 1992-94.

Variety	Height Inches	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield	
					1994	Bu/A 1992-94
Monroe	27.0	13.0	9.3	60.3	32.1	30.9
Vic	27.0	13.3	9.7	62.7	30.2	30.3
Ward	28.3	13.5	9.7	62.7	29.0	31.7
Fjord	27.8	12.9	10.1	63.7	32.9	31.3
Renville	27.5	12.2	10.1	62.7	35.9	33.9
ND 8460	25.8	12.7	10.0	61.4	29.5	****
Voss	22.3	12.6	10.0	63.0	34.3	****
Test Mean	26.5	12.9	9.8	62.4	31.7	31.6
LSD (5%)	2.0	NA	NA	1.5	6.5	NS
C.V.	5.4	NA	NA	1.6	13.9	16.7

Warm and dry weather.

Table 18. Durum Wheat Variety Trial - Harding County (Ralph), 1992-94.

Variety	Height Inches	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield	
					1994	Bu/A 1992-94
Monroe	25.8	11.9	13.4	64.1	24.9	40.0
Vic	25.3	11.5	15.8	64.6	27.2	41.1
Ward	24.5	10.1	15.2	65.0	26.8	43.4
Fjord	25.5	10.2	15.9	64.5	25.7	40.5
Renville	24.0	10.1	15.9	63.4	28.4	46.1
ND 8460	23.0	10.2	14.0	63.5	22.8	****
Voss	21.3	10.1	16.3	64.7	28.0	****
Test Mean	24.2	10.6	15.2	64.3	25.9	42.2
LSD (5%)	1.7	NA	NA	1.0	2.9	NS
C.V.	4.8	NA	NA	1.1	7.7	6.0

Very dry growing season.

OAT AND BARLEY VARIETY RECOMMENDATIONS FOR 1995

Crop Adaptation Areas for South Dakota (Revised 1992)



OATS

Recommended: Variety Area

Don	1,4†,5,6,7
Troy	1,2,4†,6,7
Valley	1,2,4†

Acceptable/Promising: Variety Area

Hazel	Statewide
Hytex #	1‡,4‡,5,6,7
Jerry	Statewide
Newdak	1,2,7
Settler	Statewide

SPRING BARLEY

Recommended: Variety Area

B1602 ©	1,2,4,6,7
Gallatin	1,4†,6,7
Excel ©	1,2,4,6,7
Robust ©	1,2,4,6,7
Stark	Statewide

Acceptable/Promising: Variety Area

Bowman	Statewide
Morex	1,2,4,6,7
Stander ©	Statewide

Excel, Morex, and Robust are approved American Malting Barley Association varieties. Stander is presently under evaluation for malting quality.

© U.S. Plant Variety Protection applied for and/or issued; seed sales of these varieties are restricted to classes of certified seed.

Hytex is susceptible to Barley Yellow Dwarf virus (red leaf).

† Northern half of crop adaptation area.

‡ Western half of crop adaptation area.

Source - Small Grains 1995 Variety Recommendations, EC744.

OAT VARIETY TRIALS

Objective: To evaluate standard and experimental oat varieties for yield, agronomic characteristics and adaption to western South Dakota.

Procedure: Plots were seeded into fallow ground at two locations in April 1994 with a John Deere 750 plot drill with ten inch spacing. There were 27 varieties with four replications at each location. A seeding rate of 1,950,000 seeds per acre (64 Lb/A) was used and starter fertilizer (10-34-0 at 6.3 gal/A) applied at 7.4-25-0 pounds/acre. Herbicides were applied in early June and varied according to weeds present. Plots were trimmed to 5' x 25' after heading. The grain was harvested in July and August with a Wintersteiger Nurserymaster Elite plot combine. Height, shatter and lodging notes were taken at the time of harvest.

Location Summaries

Pennington County - Wall

The oat trial was planted north of Wall on April 10, 1994 into good soil moisture. Weeds were controlled with Bronate (16 oz/A) applied on May 20. Warm and dry growing conditions led to below average yields, plus high winds just prior to harvest caused substantial lodging. Harvest was accomplished on July 29, with the results shown in Table 19. The trial averaged 55 bushels per acre, but the yield variation caused by the lodging make comparisons of 1994 data difficult. Monida, Troy, Newdak, Valley, Hazel and Settler did the best when averaged over the last three years. Troy and Valley had test weights 4-5 Lb/Bu better than Monida.

Perkins County - Bison

Bison was planted on April 21, 1994 into a good seedbed which produced excellent stands. Bronate (16 oz/A) was applied on June 2 to control weeds. The plot was harvested on August 3 and averaged 83 bushels per acre. There were large variety differences in yield with Monida and Newdak being the best in 1994. Over the 1992-94 time period, Monida, Newdak, Troy and Valley had the best yields. Results are shown in Table 20.

Table 19. Oat Variety Trial - Pennington County (Wall), 1992-94.

Variety	Height Inches	Lodging 1-5*	Oil Percent	Protein Percent	Test Wt Lbs/Bu	Yield Bu/A	
						1994	1992-94
Burnett	28.3	2.5	4.7	17.6	39.1	46.7	95.9
Dane	24.0	2.0	6.0	17.6	36.1	51.9	104.3
Don	24.0	1.8	7.1	18.8	39.4	40.0	107.4
Hazel	23.0	1.3	8.2	20.3	38.7	65.0	113.7
Hypro	25.5	1.0	7.6	20.6	39.3	49.0	****
Hytest	29.8	2.5	6.9	21.4	42.0	54.1	101.0
Hyyielder	26.3	1.3	8.3	21.6	38.9	53.2	****
Milton	27.5	3.5	7.0	18.2	37.4	61.1	****
Monida	30.3	2.8	7.2	17.2	35.0	79.2	127.6
Newdak	30.0	2.8	6.9	19.4	37.3	64.3	124.6
Pal	22.3	1.8	7.7	23.1	37.2	48.5	****
Premier	28.3	2.8	6.6	18.7	41.5	54.0	105.0
Settler	29.8	3.0	5.1	19.8	40.5	66.2	111.6
Troy	30.8	2.3	6.3	16.7	39.3	59.7	127.3
Valley	24.5	1.5	6.6	19.9	40.3	66.1	121.0
SD 90128	22.3	2.5	7.6	21.4	42.0	43.5	****
SD 90134	21.0	2.3	3.9	20.2	40.9	37.6	****
SD 90198	26.5	3.0	7.7	20.0	42.8	27.0	****
SD 89210	30.5	2.8	8.0	18.0	38.6	44.8	****
SD 89504	29.3	2.3	7.5	18.9	39.5	49.5	****
Troy-7	28.5	3.0	6.6	17.1	37.4	58.1	****
Troy-12	31.8	2.8	6.7	19.0	37.2	58.4	****
Troy-59	30.5	3.0	6.7	18.3	39.5	54.8	****
Troy-81	31.0	3.0	7.2	20.0	37.4	54.8	****
ND 870952	28.5	2.5	5.7	18.4	40.5	51.4	****
IL 86-1995	28.5	1.5	5.3	17.4	36.4	63.7	****
WI X5673-2	27.8	1.3	6.4	16.5	39.5	56.6	****
Test Mean	22.4	2.3	6.7	19.1	39.2	54.7	112.7
LSD (5%)	3.7	0.9	NA	NA	1.4	8.7	18.6
C.V.	9.4	25.9	NA	NA	2.4	16.2	12.1

* 1 = No lodging, 5 = Mostly lodged
 High C.V., mostly due to lodging from high winds.

Table 20. Oat Variety Trial - Perkins County (Bison), 1992-94.

Variety	Height	Oil	Protein	Test Wt	Yield	
	Inches	Percent	Percent	Lbs/Bu	1994	1992-94
Burnett	26.5	4.2	13.8	44.8	74.5	90.4
Dane	26.5	6.1	15.9	41.2	82.5	104.3
Don	23.0	7.0	13.5	42.8	69.0	93.0
Hazel	22.5	7.5	18.3	42.1	73.6	95.7
Hypro	22.3	7.3	18.6	42.9	69.7	****
Hytest	30.0	6.0	17.8	46.4	82.3	94.2
Hyyielder	23.3	7.8	17.9	43.6	77.6	****
Milton	25.8	5.2	15.9	43.8	78.8	****
Monida	28.8	6.8	11.7	44.1	119.0	139.0
Newdak	27.0	5.6	13.1	41.3	111.3	131.7
Pal	21.0	7.2	18.1	40.7	76.0	****
Premier	24.3	6.1	17.5	46.6	66.8	91.2
Settler	24.0	5.1	17.5	44.4	82.8	109.0
Troy	27.8	6.0	15.2	43.8	99.1	123.9
Valley	24.5	6.6	16.3	47.0	87.9	118.3
SD 90128	22.8	8.0	18.5	45.7	74.4	****
SD 90134	22.5	4.0	19.8	44.1	63.1	****
SD 90198	24.8	7.0	18.9	45.5	61.7	****
SD 89210	30.5	7.6	17.3	43.1	83.1	****
SD 89504	25.8	6.8	17.0	43.0	77.7	****
Troy-7	26.5	5.7	17.4	44.7	84.3	****
Troy-12	28.8	7.1	17.4	45.2	84.5	****
Troy-59	26.5	6.4	16.2	44.0	95.0	****
Troy-81	29.8	5.8	14.4	44.3	99.2	****
ND 870952	26.8	6.6	16.7	44.2	87.1	****
IL 86-1995	25.0	5.7	16.8	41.6	87.6	****
WI X5673-2	26.3	6.0	14.3	42.6	91.8	****
Test Mean	25.5	6.3	16.5	42.1	83.4	108.2
LSD (5%)	2.0	NA	NA	2.3	12.5	21.3
C.V.	5.5	NA	NA	3.7	10.4	10.2

Good trial, summary on page 26.

SPRING BARLEY VARIETY TRIALS

Objective: To evaluate standard and experimental spring barley varieties for yield, agronomic characteristics and adaption to western South Dakota.

Procedure: Plots were seeded into summer fallow at two locations in April 1994 with a John Deere 750 plot drill with ten inch spacing. There were 15 varieties with four replications at each location. Seeding rate was 1,210,000 seeds per acre (117 Lb/A for two-row, 83 Lb/A for six-row). Starter fertilizer (10-34-0 at 6.3 gal/A) was applied at 7.4-25-0 pounds/acre. Herbicides were applied in late May to early June and varied according to weeds present. Plots were trimmed to 5' x 25' after heading. The barley was harvested in July and August with a Wintersteiger Nurserymaster Elite plot combine. Height, shatter and lodging notes were taken at the time of harvest. Protein content was determined using a Near Infrared Spectrophotometer.

Location Summaries

Pennington County - Wall

The Wall location was planted on April 10, 1994 and sprayed with Ally (1/10 oz/A) + 2,4-D (5.3 oz/A LV-6) on May 20. The plot had good stands with normal temperatures and dry conditions producing an average yield of 44 bushels per acre. The results from harvest on July 21 are presented in Table 21. Gallatin and Bowman were the best two-row barleys in 1994 and Excel was best among the six-row barleys. Both of these varieties had the best averages over the past three years. Overall the two-row varieties yielded the best and had two to four pound better test weights than the six-row types. The two-row varieties are generally superior as feed barley.

Perkins County - Bison

Bison was planted on April 21, 1994 and sprayed on June 2 with Ally (1/10 oz/A) + 2,4-D (5.3 oz/A LV-6). The grain was harvested on August 3 and averaged 50 bushels per acre. The test had a fairly high Coefficient of Variation (C.V.), so few differences in variety yield were found. There were no significant yield differences for varieties at this location for the past three years. The varieties Bowman and Stark seemed to suffer from some sterility problems which reduced their yields from what they are normally. This may have been due to the hot, dry and windy that occurred in May. Results are presented in Table 22.

Table 21. Spring Barley Variety Trial - Pennington County (Wall), 1992-94.

Variety	Type	Height Inches	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A	
						1994	1992-94
Bowman	2 row	22.8	11.6	9.3	54.3	50.6	77.2
Buck	hulless	28.8	9.8	10.9	60.0	38.6	****
Excel	6 row	23.3	10.9	7.2	51.2	50.1	82.9
Gallatin	2 row	24.3	10.8	9.5	53.8	58.0	86.4
Morex	6 row	26.8	11.4	7.4	52.5	42.9	69.2
Richard	hulless	24.3	9.4	11.4	61.3	48.8	****
Robust	6 row	26.5	10.8	7.8	53.3	42.0	76.4
Royal		21.8	11.2	7.1	51.6	36.7	****
Stander	6 row	24.8	9.4	7.6	52.2	44.9	76.3
Stark	2 row	25.3	11.4	8.6	54.3	42.0	73.6
B-1602	6 row	24.8	11.4	7.8	51.8	37.8	74.2
B-2912		28.0	10.7	7.7	51.9	42.0	****
M-66		25.0	10.3	7.6	52.7	41.2	****
ND-11055	6 row	25.3	9.7	7.6	52.0	38.6	73.4
ND-11231-11	2 row	25.3	11.3	9.1	54.7	51.1	****
Test Mean		25.1	10.7	8.4	53.8	44.3	76.6
LSD (5%)		2.5	NA	NA	1.4	5.4	7.8
C.V.		6.8	NA	NA	1.7	8.4	8.1

Good Trial, summary on page 29.

Table 22. Spring Barley Variety Trial - Perkins County (Bison), 1992-94.

Variety	Type	Height Inches	Protein Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A	
						1994	1992-94
Bowman	2 row	20.8	10.9	7.6	50.7	48.7	61.8
Buck	hulless	22.8	10.2	12.0	58.4	51.7	****
Excel	6 row	22.8	9.1	7.8	50.1	48.6	79.3
Gallatin	2 row	23.3	10.8	7.7	49.6	51.8	68.9
Morex	6 row	23.8	10.5	7.6	51.0	45.7	61.6
Richard	hulless	21.8	10.9	15.6	60.4	48.1	****
Robust	6 row	23.8	10.5	9.6	53.0	53.2	78.2
Royal		21.0	10.4	****	49.8	46.0	****
Stander	6 row	22.0	10.3	10.7	51.6	49.2	70.8
Stark	2 row	22.0	9.5	8.8	53.2	40.8	62.9
B-1602	6 row	24.5	9.9	7.3	50.0	52.5	74.6
B-2912		23.0	10.4	9.4	50.9	49.9	****
M-66		23.0	10.2	8.5	52.4	56.2	****
ND-11055	6 row	23.3	9.1	8.5	51.6	51.3	72.9
ND-11231-11	2 row	22.3	10.7	10.1	54.2	58.0	****
Test Mean		22.7	10.2	9.4	52.4	50.0	70.1
LSD (5%)		2.1	NA	NA	1.9	10.8	NS
C.V.		6.5	NA	NA	2.5	14.9	15.9

Trial somewhat variable, summary on page 29.

SAFFLOWER VARIETY TRIAL

Objective: To evaluate safflower varieties and hybrids for yield and adaptation to western South Dakota.

Procedure: Three hybrids and two varieties were planted at 10 and 15 Lb/A in a randomized complete block experiment with three replications near Wall, South Dakota. The previous crop was winter wheat and Sonalan was incorporated at 1 Lb active ingredient/Acre before planting. It was planted on April 22, 1994 with a John Deere 750 small plot drill with 20 inch row spacing. The trial was harvested on September 7, 1994 with a Wintersteiger small plot combine. The results are given in Table 23.

Table 23. Safflower Variety Trial - Pennington County (Wall) 1994.

Variety	Type	Seeding Rate	Test Wt.	Yield
	*	Lb/A	Lb/Bu	Lb/A
Sigco SH-3013	hyb	10	44.9	1303
Sigco SH-3013		15	44.6	1230
Sigco SH-3004	hyb	10	44.3	1228
Sigco SH-3004		15	44.7	1310
Sigco SH-3037	hyb	10	44.6	1330
Sigco SH-3037		15	43.6	1554
S-541	var	10	41.5	1041
S-541		15	41.0	1252
Morlin	var	10	39.0	579
Morlin		15	38.9	701
Average			42.7	1170
LSD 5%			0.8	230
C.V.			1.1	11.5

* var = variety, hyb = hybrid.

Discussion: The only significant difference in seeding rate was with Morlin yielding better at 15 Lb/A. The others show no difference between the two planting populations, but S-541 and SH-3037 were close to being significantly better at the 15 Lb/A seeding rate. Morlin had the lowest yield partially due to its poor stand. The hybrids averaged 1326 Lb/A, yielding as good as or better than variety S-541 which averaged 1147 Lb/A. All the hybrids had significantly better test weight (44.5 Lb/Bu) than S-541 (41.3) and Morlin (38.8). From this study and past research it can be concluded that there is an advantage to using certain hybrids versus conventional varieties.

MILLET VARIETY TRIAL

Objective: To evaluate millet varieties for grain yield and agronomic characteristics.

Procedure: Thirteen varieties were planted in a randomized complete block experiment with four replications near Wall, South Dakota. The ground was fallow the previous year and was sprayed with a burndown treatment of 16 oz/A Roundup + additives + 16oz/A Buctril + 1/2 Lb/A atrazine before planting. The millet was planted on May 18, with a John Deere 750 small plot drill. The millet was harvested for grain on August 22, with a Wintersteiger small plot combine. Height and lodging notes were taken at the time of harvest. The data is given in Table 24.

Table 24. Millet Variety Trial - Pennington County (Wall), 1994.

Variety	Seed Color	Height Inches	Moisture Percent	Test Wt. Lb/Bu	Yield Lb/A
Proso Millet					
Cerise	red	24	9.0	58.3	507
New Dawn	white	21	8.4	57.0	907
Minco	white	23	8.4	55.9	616
Misum	white	27	9.4	55.3	721
Rise	white	25	8.1	54.9	664
Sunup	white	30	8.7	56.3	699
Foxtail Millet					
German	golden	23	30.0	51.2	541
Manta	orange	26	9.1	56.8	1285
Siberian	orange	25	9.2	57.5	1386
86005-3		28	9.3	56.2	1052
870041		23	8.5	54.5	1212
880063		31	10.3	56.2	988
88001-7		30	8.4	55.5	1206
Average		26	9.2	55.8	1060
LSD 5%		NA	NA	1.3	224
C.V.		NA	NA	1.3	19.6

Discussion: The Coefficient of Variation was too high in this experiment to make any valid variety comparisons. This was mainly due to the high winds before harvest that caused a fair amount of shatter in the proso millet. It can be noted that the variety German is too late to be used for grain in South Dakota, as it was still very green at harvest time. This was a very low input crop with just the cost of the herbicides and planting.

SOYBEAN VARIETY STRIP TEST

Objective: To evaluate yield potential and adaptation of various soybean varieties to gravity irrigation in western South Dakota.

Procedure: Nine soybean varieties were planted in unreplicated strips near Nisland, South Dakota on May 24, 1994. Pursuit Plus was preplant incorporated at 2.5 pints per acre for weed control. The soybeans were treated with liquid inoculant just prior to planting. The plots were four or eight 38 inch rows wide by 1000 feet long and were seeded at approximately 140,000 seeds per acre with a John Deere MaxEmerge planter. The plot was irrigated as needed and harvested on October 22 with a small plot combine. Two rows by 200 feet were harvested from each strip, with the results presented in Table 25.

Table 25. Soybean Strip Trial - Butte County (Nisland) 1994.

Variety	Maturity Group	Moisture Percent	Yield Bu/A
Dekalb CX121	1	11.8	25.6
Dekalb CX096	0	11.6	28.1
Dekalb CX117	1	11.0	28.2
Pioneer 9041	0	11.4	17.8
Pioneer 9061	0	11.2	22.4
Cenex L0704	0	11.6	22.9
Simpson	0	11.0	27.8
Lambert	0	12.4	28.5
Dawson	0	12.8	33.3
Average		11.6	26.1

Discussion: This was an unreplicated trial so it can not be statistically analyzed. The yields were not as good as expected but the area that was harvested was rocky and probably not the best soil in the area. Two strips taken from a field nearby averaged 43 bushels per acre versus this plots 26 bushels. The beans looked good and seem adapted to the area, if they are irrigated. Another factor that may help increase yields is the use of narrower rows. Many studies have shown the benefit of ten to fifteen inch rows to soybean yields. The problem is that you still need some type of ridge so the field can be properly gravity irrigated, so some planter modification would be required.

FORAGE TRIAL

Objective: To compare oat and winter triticale forage yields, and compare oat forage and grain yields.

Procedure: Four winter triticale and seven oat varieties were planted in an experiment with four replications, near Sturgis, South Dakota. The winter triticales were seeded on September 15, 1993 and the oat forage and oat grain tests were seeded on April 12, 1994. The forage trial was harvested on June 29, 1994 with a sickle bar mower. A small subsample was taken and dried to determine moisture content of the forage. Visual stand ratings were taken after harvest. The oat grain trial was harvested on July, 12 1994 with a small plot combine. Height, shatter and lodging notes were taken at the time of harvest.

Table 26. Winter Triticale and Oat Forage Trial - Meade County.

Variety	Forage Trial				Grain Trial		
	Stand Percent	Height Inches	Dry Matter Percent	Yield Ton/A	Moisture Percent	Test Wt. Lb/Bu	Yield Bu/A
Oats							
Valley	90	27	39.8	1.51	10.6	38.0	66.0
Premier	91	29	38.7	1.44	10.5	39.6	53.3
Monida	90	30	38.4	1.55	18.0	29.9	75.8
Moore	90	33	33.5	1.38	19.5	32.5	57.8
Troy	91	30	37.7	1.78	18.5	34.4	72.2
Hyttest	90	34	40.0	1.52	11.7	40.1	53.9
Burnett	90	32	39.4	1.42	16.6	37.3	50.8
Triticale							
Newcale	19	33	50.5	1.09	-	-	-
Jenkins	90	43	57.4	2.87	-	-	-
Winteri	91	48	59.7	2.59	-	-	-
18249	90	41	59.9	2.26	-	-	-
Average	84	35	45.0	1.76	15.1	35.9	61.4
LSD 5%	2	2.8	2.9	0.20	NA	2.1	7.8
C.V.	2	8.6	3.6	7.89	NA	4.0	8.6

Discussion: The winter triticales with good stands were all significantly better yielding than the oats, with the variety Jenkins being the best. Newcale suffered from poor stands and was the lowest yielding of all the varieties. Among the oat varieties, Troy was the only one with a significantly better forage yield. The other oat varieties were very similar in forage yield.

In the oat grain trial, Monida was the top yielder. Troy and Valley had similar yields and the others were not significantly different from each other in yield. This study shows that winter triticale can outyield oats in some years, but requires you to plant them in the fall. With oats, Troy gives top forage and grain yields leaving options open for which way to harvest depending on the year.

SAFFLOWER SEEDING RATE AND ROW SPACING

Objective: Previous work has indicated that increased row spacing in safflowers can lead to increased yield. This study was initiated to further investigate the effect of seeding rate and row spacing on safflower.

Procedure: This experiment was planted at two locations near Wall and Sturgis, South Dakota in 1994. At Sturgis the ground was fallow and Wall was winter wheat the previous year. Three safflower varieties were planted at rates of 10, 15 and 20 Lb/A in 20 inch rows and at 15 Lb/A in 10 inch rows. Treflan was incorporated at 1 Lb ai/A prior to planting at Sturgis and Sonalan incorporated at 1 Lb ai/A at Wall. Plots were planted on April 12 (Sturgis) and April 22 (Wall). Planting was done with a John Deere 750 small plot drill and harvest accomplished in early September with a Wintersteiger small plot combine. Data are presented in Tables 27 and 28.

Table 27. Safflower Seeding Rate and Row Spacing - Pennington County (Wall) 1994.

Variety	Seeding Rate	Row Spacing	Test Wt.	Yield
	Lb/A	Inches	Lb/Bu	Lb/A
S-541	10	20	40.9	707
S-541	15	20	41.5	716
S-541	15	10	40.6	743
S-541	20	20	41.7	611
S-208	10	20	41.6	556
S-208	15	20	41.2	638
S-208	15	10	41.3	690
S-208	20	20	41.4	756
Morlin	10	20	38.9	418
Morlin	15	20	38.3	501
Morlin	15	10	38.4	492
Morlin	20	20	38.5	531
Average			40.4	613
LSD 5%			0.9	101
C.V.			1.5	11.4

Planted: April 22, 1994. Harvested: September 7, 1994.
Plot Size: 5' x 75', three replications.

Table 28. Safflower Seeding Rate and Row Spacing - Meade County (Sturgis) 1994.

Variety	Seeding Rate	Row Spacing	Test Wt.	Yield
	Lb/A	Inches	Lb/Bu	Lb/A
S-541	10	20	40.6	779
S-541	15	20	41.0	974
S-541	15	10	40.4	811
S-541	20	20	40.4	851
S-208	10	20	40.2	668
S-208	15	20	40.8	936
S-208	15	10	40.3	689
S-208	20	20	40.6	1033
Morlin	10	20	38.9	583
Morlin	15	20	39.1	750
Morlin	15	10	39.1	661
Morlin	20	20	38.9	701
Average			40.0	786
LSD 5%			1.1	168
C.V.			2.0	14.8

Planted: April 12, 1994. Harvested: September 6, 1994.
 Plot Size: 5' x 25', four replications.

Discussion: At Wall the 20 Lb/A seeding rate was significantly better for Morlin and S-208 while the 15 Lb/A rate was best for S-541. This location showed no significant advantage of the 10 inch rows over the 20 inch rows at the 15 Lb/A rate.

At Sturgis the 20 Lb/A rate was best for S-208 and the 15 Lb/A rate seemed best for S-541 and Morlin. The 20 inch rows only showed a significant advantage for the variety S-208, but there seems to be a trend over all the varieties for a yield increase with the wider rows at Sturgis.

Overall it appears the best seeding rate is 15 to 20 Lb/A, but this year did show some variety interaction to population. The differences in row spacing were not as pronounced as last year, but 1994 was drier than 1993. One of the advantages of wider rows is less disease pressure in a wet year due to more airflow between the rows. The 20 inch rows would be recommended since there was no decrease in yield with wider rows and there seems to be a trend towards better yields with them. This being due to less disease and also better emergence because the seeds are closer together in the row.

WINTER WHEAT STARTER FERTILIZER

Objective: Evaluate the effect of starter fertilizer on hard red winter wheat.

Procedure: Plots were seeded at seven locations in September 1993 with a John Deere 750 plot drill with ten inch spacing. Hayes was millet the previous year and the other locations were planted in summer fallow. Four fertilizer treatments and one check without fertilizer were planted in a four replication experiment. The granular fertilizer treatments were applied directly with the seed. The variety Arapahoe was planted at rate of 60 pounds per acre. Herbicides were applied in the fall or spring and varied according to weeds present. Visual stand ratings were taken in May and plots were trimmed to 5' x 25' after heading. The wheat was harvested in July and August with a Wintersteiger Nurserymaster Elite plot combine. Height, shatter and lodging notes were taken at the time of harvest. Protein content was determined using a Near Infrared Spectrophotometer.

Summary: This experiment was planted beside the winter wheat variety trials at all CPT locations. Summaries of cultural practices and growing conditions can be found on pages 7 and 11. Responses at all locations were non-significant in 1994, but in some years starter fertilizer can give a significant yield advantage. Bison was completely lost to grasshoppers, Martin had missing plots from standing water and Bear Butte was heavily infested with cheatgrass. Ralph suffered from poor emergence and Hayes was hailed on just before harvest. It should be noted that the soil samples were taken to a depth of six inches, which is adequate for phosphorus testing. Results are given in Tables 29 - 34.

Many factors contributed to non-significant reactions to starter in 1994. As mentioned above, many locations had problems that probably masked any treatment effects. Also it should be noted that most locations had high or very high phosphorus levels and much of the advantage of starter comes from the phosphorus. The fertilized plots do seem to mature a little earlier than the unfertilized plots. They may have started grain fill prior to summer rains and therefore show no yield advantage in 1994.

Table 29. Winter Wheat Starter Fertilizer - Fall River County (Oelrichs) 1994.

Treatment	Height Inches	Stand Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A
0-0-0 (check)	26.8	91	8.6	60.5	44.0
12-0-0	28.0	91	9.0	60.1	43.0
12-30-0	27.3	90	8.8	60.3	42.6
12-30-20	26.5	94	9.0	59.7	43.8
0-0-20	26.5	88	8.8	60.8	41.4
Test Mean	27.0	91	8.8	60.3	43.0
LSD (5%)	NS	NS	NA	NS	3.5
C.V.	5.8	7	NA	1.1	5.2
Soil Analysis (0-6 inch sample)	Ph	Organic Matter	Nitrogen Lb/A	Phosphorus Lb/A	Potassium Lb/A
In Soil	7.9	1.9	20	8	610
Recommended for 40 Bu/A	*	*	96	40	275

Very uniform trial, below normal precipitation throughout growing season.

Table 30. Winter Wheat Starter Fertilizer - Bennett County (Martin) 1994.

Treatment	Height Inches	Stand Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A
0-0-0 (check)	30.0	83	****	57.8	53.6
12-0-0	29.5	80	14.5	60.1	50.8
12-30-0	30.5	85	15.0	59.9	47.9
12-30-20	30.0	75	15.0	58.4	49.1
0-0-20	30.5	83	15.1	57.8	49.3
Test Mean	30.1	81	14.9	58.8	50.1
LSD (5%)	NS	NS	NA	NS	NS
C.V.	6.1	6	NA	3.4	8.4
Soil Analysis (0-6" sample)	pH	Organic Matter	Nitrogen Lb/A	Phosphorus Lb/A	Potassium Lb/A
In Soil	6.6	2.2	27	36	1998
Recommended for 50 Bu/A	*	*	120	50	275

Some plots were lost to standing water.

Table 31. Winter Wheat Starter Fertilizer - Stanley County (Hayes) 1994.

Treatment	Height Inches	Stand Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A
0-0-0 (check)	23.0	78	11.0	60.6	23.9
12-0-0	22.3	80	10.8	60.7	20.8
12-30-0	22.5	74	10.8	60.3	22.5
12-30-20	22.0	74	12.1	60.4	21.6
0-0-20	22.3	74	12.2	60.7	22.7
Test Mean	22.4	76	11.4	60.5	22.3
LSD (5%)	NS	NS	NA	NS	NS
C.V.	5.2	12	NA	1.2	12.7
Soil Analysis (0-6" sample)	pH	Organic Matter	Nitrogen Lb/A	Phosphorus Lb/A	Potassium Lb/A
In Soil	7.2	3.5	14	34	2000
Recommended for 40 Bu/A	*	*	96	40	275

Hayes suffered hail damage just prior to harvest.

Table 32. Winter Wheat Starter Fertilizer - Pennington County (Wall) 1994.

Treatment	Height Inches	Stand Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A
0-0-0 (check)	24.8	38	11.9	62.0	31.3
12-0-0	26.3	40	11.9	60.7	33.1
12-30-0	24.0	34	11.9	60.8	33.5
12-30-20	25.3	36	12.2	60.5	34.9
0-0-20	25.3	35	12.0	61.6	31.3
Test Mean	25.4	37	12.0	61.1	32.8
LSD (5%)	NS	NS	NA	NS	NS
C.V.	5.5	23	NA	1.5	14.5
Soil Analysis (0-6" sample)	pH	Organic Matter	Nitrogen Lb/A	Phosphorus Lb/A	Potassium Lb/A
In Soil	6.1	2.1	37	60	956
Recommended for 40 Bu/A	*	*	96	40	275

Plot suffered from poor stands, averaging 36 percent.

Table 33. Winter Wheat Starter Fertilizer - Meade County (Bear Butte) 1994.

Treatment	Height Inches	Stand Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A
0-0-0 (check)	25.3	81	8.6	58.9	21.1
12-0-0	25.3	86	9.6	59.4	20.5
12-30-0	25.3	81	8.1	58.5	17.1
12-30-20	25.0	85	9.2	59.6	22.0
0-0-20	24.8	76	8.1	59.2	18.5
Test Mean	25.1	82	8.7	59.1	19.8
LSD (5%)	NS	NS	NA	NS	NS
C.V.	5.2	9	NA	3.4	18.2
Soil Analysis (0-6" sample)	pH	Organic Matter	Nitrogen Lb/A	Phosphorus Lb/A	Potassium Lb/A
In Soil	7.0	2.3	30	48	1034
Recommended for 40 Bu/A	*	*	96	40	275

Bear Butte was heavily infested with downy brome.

Table 34. Winter Wheat Starter Fertilizer - Perkins County (Ralph) 1994.

Treatment	Height Inches	Stand Percent	Moisture Percent	Test Wt Lbs/Bu	Yield Bu/A
0-0-0 (check)	25.3	36	20.3	63.0	40.9
12-0-0	25.5	30	23.3	62.5	37.0
12-30-0	25.5	36	18.5	61.7	38.8
12-30-20	25.0	40	19.4	62.2	37.9
0-0-20	25.5	36	21.3	62.1	37.0
Test Mean	25.4	38	8.7	62.3	38.3
LSD (5%)	NS	NS	NA	NS	NS
C.V.	3.1	22	NA	3.4	11.7

Soil sample was not taken from Ralph.

SDSU REDUCED TILLAGE CROP ROTATION STUDY
HAYES, SOUTH DAKOTA 1994

Objectives: 1) To maintain at least 30% residue cover on the soil surface at all times. 2) Evaluate the net income from each rotation each year. 3) Evaluate changes in soil tilth, weeds present and disease occurrence.

Experimental Design: The crop rotations include 5 cropping sequences which vary from 2 to 5 years in duration. The cropping sequences have been maintained from 1987 to the present. The rotations are replicated 4 times in a randomized complete block design.

Funding: The South Dakota Wheat Commission, SDSU Agricultural Experiment Station and SDSU Cooperative Extension Service.

Cooperator: Bonnie Sivage of Hayes, South Dakota.

Rotations:

A. Winter Wheat → Summer Fallow

A combination of herbicides and tillage are being used to maintain a 30% soil residue cover.

B. Winter Wheat → Millet

A continuous cropping rotation planted no-till. This rotation maintains excellent soil protection. Herbicides are used to control weeds.

C. Winter Wheat → Milo → Millet → Barley

A continuous cropping system that includes 1 year of row crop and 3 years of small grains.

D. Winter Wheat → Milo → Oats → Winter Wheat → Summer Fallow

The longest rotation that includes no-tillage methods of growing small grains and a row crop as well as a reduced tillage summer fallow period.

E. Winter Wheat → Milo → Summer Fallow

The standard Ecofallow rotation crops 2 out of 3 seasons. The rotation helps clean up cheatgrass infested fields.

Comments on the 1994 growing season: The net income for all rotations was down in 1994 compared to 1992 and 1993. Rotations B and C lost money, while rotations D and E had a break even net income. Rotation A had the best income in 1994 of \$1.78 per acre. The fall was very dry and the winter wheat planted on oats and barley stubble had a thin stand that was moisture stressed in the fall. The winter wheat planted on oats and barley stubble winter killed and had to be replanted to spring wheat. The winter wheat planted into millet stubble had a thin stand in the spring of 1994 but did not need to be replanted. The plots received a hail storm after the small grains were headed and caused significant losses.

1994 YIELDS

Rotation	Crop	Yield Bu/A.	Crop	Yield Bu/A.	Crop	Yield Bu/A.	Crop	Yield Bu/A.	Crop	Yield Bu/A.
A	W.Wheat	43.9	Fallow							
B	W.Wheat	28.2	Millet(*)							
C	W.Wheat	35.7	Milo	48.9	Millet	21.5	Barley	18.3		
D	W.Wheat	43.4	Milo	45.7	Oats	40.0	W.Wheat	32.2	Fallow	
E	W.Wheat	42.8	Milo	48.6	Fallow					

* No-till fallow due to heavy green foxtail infestation.

Rotation A

WINTER WHEAT / SUMMER FALLOW

Cost / A.	1994 Winter Wheat
5.80	-Spray w/LV6 at 1# ai/A (21.3 oz prod/A), (8 gal/A rate) - Aug 31, 93
20.89	-Plant to Arapahoe 1 bu/A plus 10-34-0 at 6 gal/A w/Double-disk drill 12" row spacing - Sept 22, 93
10.60	-Spray on 30#N/Acre using liquid 28-0-0 (10 gal/A rate) - April 20
13.93	-Spray w/.1 oz Ally+LV6 at 5.3 oz prod/A plus 10 gal liquid 28-0-0/A (30#N/A) as a carrier - May 9
16.78	-Harvest 43.9 bu Winter wheat - July 20
.40	-Soil Sampling & Analysis - Oct 26
<u>17.00</u>	-Land Charges 1994
85.40	Total Cost of Winter Wheat Production

Rotation A

WINTER WHEAT / SUMMER FALLOW

<u>Cost / A.</u>	<u>1994 Summer Fallow</u>
5.40	-Spray w/ 3/4# ai Atrazine (20 gal/A rate) - Nov 2,93
6.91	-Spray w/12 oz Roundup plus additives (Ammonium Sulfate 50 ml/gal, X-77 at 15 ml/gal) (8 gal/A rate) - May 9
9.91	-Spray w/12 oz Roundup + additives (Ammonium Sulfate 50 ml/gal, X-77 at 15 ml/gal) plus 5 oz Banvel/A (8 gal/A rate) - June 9
4.00	-Worked w/under-cutter sweeps - June 27
.40	-Soil Testing & Analysis - Oct 26
<u>17.00</u>	-Land Charges 1994
43.62	Total Cost of Summer Fallow

Rotation A SUMMARY 1994

<u>Income</u>	<u>Expenses</u>	
20.57	Deficiency Payment	85.40
<u>155.85</u>	Sale of Winter Wheat	<u>43.62</u>
176.42	Total Income	129.02
		Cost of Wheat Crop
		Cost of Fallow
		Total Cost of Prod.
	\$23.70 (1994) Income per acre	
	\$41.58 (3yr. ave.) Income per acre	

Discussion of Rotation A: The winter wheat yields were lower in 1994 due to a dry fall and May of 1994. The crop also had a hail storm after the crop was headed. The rotation did have a good stand of wheat in the fall and had very little winter injury. This rotation provides one of the most stable incomes of all the rotations. More frequent cropping does however increase the net income in moist seasons. This rotation is used as a standard to compare other rotations to.

Rotation B

WINTER WHEAT / MILLET

<u>Cost / A.</u>	<u>1994 Winter Wheat</u>
9.39	-Spray Roundup-12 oz/A + additives (Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal) plus 3/4# LV6 ai/A (8 gal/A rate) -Aug 31
20.89	-Plant Arapahoe (60#/A) plus 6 gal/A. (10-34-0) Starter Fertilizer JD 750 Drill - Sept 21
10.60	-Apply 10 gal/A liquid 28-0-0 (30#N/Acre) - April 20
13.93	-Spray w/.1 oz Ally+LV6 at 5.3 oz prod/A plus 10 gal liquid 28-0-0/A (30#N/A) as a carrier - May 9
13.64	-Harvest 28.2 bu Winter wheat - July 20
.40	-Soil Testing & Analysis - Oct 26
<u>17.00</u>	-Land Charges 1994
85.85	Total Cost of Winter Wheat Production

Rotation B

WINTER WHEAT / MILLET

Cost / A.	1994 Millet
8.87	-Spray w/ 3/4# ai IVE/A plus 12 oz Roundup + additives (Liquid Ammonium Sulfate 30ml/gal), (8 gal/A rate) - Aug 11
5.40	-Spray w/ 3/4# ai Aatrex (20 gal/A rate) - Nov 2, 93
14.65	-Apply liquid 28-0-0 w/750 drill knifed in (45#N/Acre) - April 15
6.91	-Spray w/12 oz Roundup plus additives (50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77) (8 gal/A rate) - May 9
6.91	-Spray w/12 oz Roundup plus additives (50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77), (8 gal/A rate) - June 14
.40	-Soil Testing & Analysis - Oct 26
<u>17.00</u>	-Land Charges 1994
60.14	Total Cost of Millet Production

Rotation B SUMMARY 1994

Income		Expenses	
20.57	Deficiency Payment	85.85	Cost of Wheat Crop
100.11	Sale of Winter Wheat	<u>60.14</u>	Cost of Millet Crop
<u>0.00</u>	* Sale of Millet		
120.68	Total Income	145.99	Total Cost of Prod.
		\$-12.66	(1994) Income per acre
		\$ 53.62	(3 yr. ave.) Income per acre

* No-till fallow due to heavy green foxtail infestation.

Discussion of Rotation B: Rotation B had a net loss in 1994 because of the decision to fallow the millet plot rather than allow the millet crop to grow infested with green foxtail. The 3 year average however is better than all other rotations. The excellent showing for rotations B is due to above normal millet prices and excellent winter wheat yields in 1992 and 1993. The yields of winter wheat grown after millet have reached 80 percent of those grown on fallow in this study. This rotation is a very good alternative to the winter wheat/fallow rotation. It appears that after 4 or more years of the continuous cropping it will be essential to fallow the field or rotate to a different crop for a season. This would be done to aid in the control of spring annual weeds. The millet plot was not tilled during the summer fallow period in 1994. There were very few weeds present after the first spraying with Roundup. After five seasons of no-till continuous cropping there is a lot of crop residue on the soil surface.

Rotation C

Winter Wheat / Milo / Millet / Barley

Cost / A.	1994 Winter Wheat
9.39	-Spray w/ 3/4# ai LV6/A plus 12 oz Roundup + additives (Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal), (8 gal/A rate) - Aug 11
20.89	-Plant Arapahoe (60#/A) plus 6 gal/A. (10-34-0) Starter Fertilizer JD 750 Drill - Sept 21
18.65	-Plant 1 1/2 bu/A Sharp Spring Wheat w/JD 750 drill, 10" row spacing, no starter fertilizer - April 2
21.94	-Apply 24 gal/A liquid 28-0-0 w/750 drill knifed in between rows (72#N/Acre) Sharp <u>not</u> emerged yet- April 15
13.93	-Spray w/.1 oz Ally+LV6 at 5.3 oz prod/A plus 10 gal liquid 28-0-0/A (30#N/A) as a carrier - May 9
15.14	-Harvest 35.7 bu Spring Wheat - July 20
.40	-Soil Sampling & Analysis - Oct 26
17.00	-Land Charges 1994
117.34	Total Cost of Wheat Production

Rotation C

Winter Wheat / Milo / Millet / Barley

Cost / A.	1994 Milo
5.80	-Spray w/LV6 at 1# ai/A, (21.3 oz/A product) 8 gal/A rate - Aug 31, 93
12.17	-Spray w/ 2 1/2# ai Aatrex (20 gal/A rate) - Nov 2, 93
39.70	-Plant Pio 3921 corn 30"row spacing (85 day maturity) with Buffalo planter, 18,800 seeds/A plus 8 gal/A 10-34-0 S. Fertilizer-May 12
6.91	-Spray out poor stand of corn before milo emerged with 12 oz Roundup plus additives (50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77) (8 gal/A rate) - June 2
10.65	-Plant Pio 894 milo 30"row spacing with Buffalo planter, 2.8#/A of seed, 5" spacing between seeds, <u>no</u> starter fertilizer - June 2
17.58	-Harvest 48.9 bu/A milo - Oct 24
.40	-Soil Sampling & Analysis - Oct 26
17.00	-Land Charges 1994
110.21	Total Cost of Milo Production

Rotation C

Winter Wheat / Milo / Millet / Barley

Cost / A.	1994 Millet
8.98	-Apply 8 gal/A liquid 28-0-0, knifed in w/JD750 drill (24#N/Acre) - April 15
6.91	-Spray w/12 oz Roundup plus additives (50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77) (8 gal/A rate) - May 9
15.05	-Planted Sunup Millet (20#/A) w/JD 750 drill (10" row spacing) <u>no</u> starter fertilizer applied (Soil temp 68 deg F) (Air temp 90 deg F) - May 17
4.30	-Spray w / 1 oz Barvel/A (8 gal/A rate) - June 9
14.30	-Harvest 21.5 bu/A (1075#/A) millet - August 18
.40	-Soil Sampling & Analysis - Oct 26
17.00	-Land Charges 1994
66.94	Total Cost of Millet Production

Rotation C

Winter Wheat / Milo / Millet / Barley

Cost / A.	1994 Barley
21.39	-Plant to Bowman Barley with JD 750 drill, 10" rows, 2 bu/A seeding rate, 6 gal/A 10-34-0 starter fertilizer - April 2
28.42	-Apply 32 gal/A liquid 28-0-0 w/750 drill knifed in between rows of non-emerged barley (96#N/Acre) - April 15
9.25	-Spray w/14 oz/A Bronate (10 gal/A rate) - May 10
12.00	-Harvest 18.3 bu/A barley - July 30
.40	-Soil Sampling & Analysis - Oct 26
17.00	-Land Charges 1994
88.46	Total Cost of Barley Production

Rotation C SUMMARY 1994

Income	Expenses
20.57	Deficiency Payment 117.34 Cost of Wheat Crop
132.09	Sale of Winter Wheat 110.21 Cost of Milo Crop
78.24	Sale of Milo 66.94 Cost of Millet Crop
80.63	Sale of Millet 88.46 Cost of Barley Crop
34.77	Sale of Barley
346.30	Total Income 382.95 Total Cost of Prod.
	\$-9.16 (1994) Income per acre
	\$37.59 (3 yr. ave.) Income per acre

Discussion of Rotation C: Rotation C is a very intensive no-till crop rotation. 1994 was not a good year for rotation C. The dry weather in the fall of 1993 caused the winter kill of wheat planted into barley stubble and it had to be replanted to spring wheat at an additional cost of \$18.65 per acre. Corn was planted in place of milo. During 1993 the corn yields were 75 to 80 bushels per acre in this rotation. The corn stand was poor and cut worms caused more loss of stand. In early June, the corn was reseeded to milo. It cost \$39.70 to seed the corn and \$6.91 to spray it out with Roundup. The barley crop had a very low yield of 18 bushels per acre due to sterility caused by dry winds during May and hail after the crop was headed.

Rotation D

Winter Wheat / Milo / Oats / Winter Wheat / Fallow

Cost / A.	1994 Winter Wheat
20.89	-Plant to Arapahoe 1 bu/A plus 10-34-0 at 6 gal/A w/Double-disk drill 12" row spacing - Sept 22, 93
10.60	-Spray on 30#N/Acre using liquid 28-0-0 (10 gal/A rate) - April 20
13.93	-Spray w/.1 oz Ally+LV6 at 5.3 oz prod/A plus 10 gal liquid 28-0-0/A (30#N/A) as a carrier - May 9
16.68	-Harvest 43.4 bu/A Winter wheat
.40	-Soil Sampling & Analysis - Oct 26
17.00	-Land Charges 1994
79.50	Total Cost of Wheat Production

Rotation D

Winter Wheat / Milo / Oats / Winter Wheat / Fallow

Cost / A.	1994 Milo
5.80	-Spray w/LV6 at 1# ai/A (21.3 oz prod/A), (8 gal/A rate) - Aug 31,93
8.31	-Spray w/ 1 1/2# ai Aatrex (20 gal/A rate) - Nov 2, 93
8.98	-Apply 8 gal/A liquid 28-8-0 knifed in w/750 drill (240N/Acre) - Apr 15
39.70	-Plant Pio 392: corn 30" row spacing (85 day maturity) with Buffalo planter, 18,800 seeds/A plus 8 gal/A 10-34-0 S. Fertilizer - May 12
10.65	-Plant Pio 894 milo 30" row spacing with Buffalo planter, 2.8#/A of seed, 5" spacing between seeds, no starter fertilizer (Soil Temp 66 deg F) (Air Temp 60 deg F) - June 2
6.91	-Spray out poor stand of corn before milo emerged with 12 oz Roundup plus additives (50ml/gal liquid Ammonium Sulfate, 1.5 ml/gal X-77) (8 gal/A rate) - June 2
17.14	-Harvest 45.7 bu/A milo - Oct 24
.40	-Soil Sampling & Analysis - Oct 26
<u>17.00</u>	-Land Charges 1994
114.89	Total Cost of Milo Production

Rotation D

Winter Wheat / Milo / Oats / Winter Wheat / Fallow

Cost / A.	1994 Oats
11.98	-Plant to Troy Oats with JD 750 drill, 10" rows, 1 1/2 bu/A seeding rate, No starter fertilizer - April 2
21.94	-Apply 24 gal/A liquid 28-0-0 w/750 drill (72#N/A) knifed in between rows of non-emerged oats. - April 15
9.25	-Spray w/18 oz/A Bronate (10 gal/A rate) - May 20
16.00	-Harvest 40.0 bu/A oats - July 27
.40	-Soil Sampling & Analysis - Oct 26
<u>17.00</u>	-Land Charges 1994
76.57	Total Cost of Oats Production

Rotation D

Winter Wheat / Milo / Oats / Winter Wheat / Fallow

Cost / A.	1994 Winter Wheat
5.80	-Spray w/LV6 at 1# ai/A (21.3 oz prod/A), (8 gal/A rate) - Aug 31,93
20.89	-Plant Arapahoe (60#/A) plus 6 gal/A. (10-34-0) Starter Fertilizer w / JD 750 Drill - Sept 21
18.65	-Plant 1 1/2 bu/A Sharp Spring wheat w/JD 750 drill, 10" row spacing, no starter fertilizer - April 2
21.94	-Apply 24 gal/A liquid 28-0-0 w/750 drill knifed in between rows (72#N/Acre) Sharp not emerged yet- April 15
13.93	-Spray w/.1 oz Ally+LV6 at 5.3 oz prod/A plus 10 gal/A (30#N/A) as a carrier - May 9
14.44	-Harvest 32.2 bu/A Spring Wheat - July 20
.40	-Soil Sampling & Analysis - Oct 26
<u>17.00</u>	-Land Charges 1994
113.05	Total Cost of Wheat Production

Rotation D

Winter Wheat / Milo / Oats / Winter Wheat / Fallow

Cost / A.	1994 Fallow
5.80	-Spray w/LV6 at 18 ai/A (21.3 oz Product/A), (8 gal/A rate) - Aug 11, 93
5.40	-Spray w/ 3/48 ai Atrax (20 gal/A rate) - Nov 2, 93
6.91	-Spray w/12 oz Roundup plus additives (50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77) (8 gal/A rate) - May 9
9.91	-Spray w/12 oz Roundup plus additives (50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77) plus 5 oz Barvel/A (8 gal/A rate) - June 5
4.00	-Worked w/under-cutter sweeps - June 27
.40	-Soil Sampling & Analysis - Oct 26
17.00	-Land Charges 1994
49.42	Total Cost of Summer Fallow

Rotation D SUMMARY 1994

Income	Expenses		
20.57	Deficiency Payment	79.50	Cost of Wheat Crop
154.07	Sale of Winter Wheat	114.89	Cost of Milo Crop
73.12	Sale of Milo	76.57	Cost of Oats Crop
56.00	Sale of Oats	113.05	Cost of Wheat Crop
20.57	Deficiency Payment	49.42	Cost of Fallow
119.14	Sale of Spring Wheat		
443.47	Total Income	433.43	Total Cost of Prod.

\$ 2.01 (1994) Income per acre
 \$32.67 (3 yr. ave.) Income per acre

Discussion of Rotation D: Rotation D is 5 years in duration with limited tillage during the fallow year only. This rotation had many of the same problems rotation C had in 1994. The corn had to be replanted to milo and the winter wheat planted into oats stubble winter killed. This rotation has consistently produced the best winter wheat yields planted after summer fallow of all the rotations. The rotation has had excellent weed control through alternation of the different crops.

Rotation E

WINTER WHEAT / MILO / FALLOW

Cost / A.	1994 Winter Wheat
20.89	-Plant to Arapahoe 1 bu/A plus 10-34-0 at 6 gal/A w/Double-disk drill 12" row spacing - Sept 22, 93
10.60	-Spray on 10 gal/A liquid 28-0-0 (10#N/A) - April 20
13.93	-Spray w/.1 oz Ally+LV6 at 5.3 oz prod/A plus 10 gal liquid 28-0-0/A (30#N/A) as a carrier - May 9
16.56	-Harvest 42.8 bu/A Winter wheat - July 20
.40	-Soil Sampling & Analysis - Oct 26
17.00	-Land Charges 1994
79.38	Total Cost of Wheat Production

Rotation E

WINTER WHEAT / MILO / FALLOW

Cost / A.	1994 MILO
5.80	-Spray w/LV6 at 1# ai/A, (21.3 oz/A product) 8 gal/A rate - Aug 31,93
12.17	-Spray w/ 2 1/2# ai Aatrex (20 gal/A rate) - Nov 2, 93
8.98	-Apply 8 gal/A liquid 28-0-0 knifed in w/JD750 drill(24#N/A)-Apr15
39.70	-Plant Pio 3921 corn 30"row spacing (85 day maturity) with Buffalo planter, 18,800 seeds/A plus 8 gal/A 10-34-0 Starter fertilizer (Soil temp 63 deg F, Air temp 80 deg F) - May 12
6.91	-Spray out poor stand of corn with 12 oz Roundup plus additives (50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77) (8 gal/A rate) - June 2
10.65	-Plant Pio 894 milo 30"row spacing with Buffalo planter, 2.8#/A of seed, 5" spacing between seeds, <u>no</u> starter fertilizer - June 2
17.72	-Harvest 48.6 bu/A milo - Oct 24
.40	-Soil Sampling & Analysis - Oct 26
<u>17.00</u>	-Land Charges 1994
119.33	Total Cost of Milo Production

Rotation E

WINTER WHEAT / MILO / FALLOW

Cost / A.	1994 Summer Fallow
6.91	-Spray Roundup 12 oz/A + additives (Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal) (8 gal/A rate) - May 9
8.87	-Sprayed w/Roundup-12 oz/A plus additives (Liquid Ammonium sulfate 50ml/gal) plus 3/4# LV6 ai/A (16 oz prod/A) (8 gal/A rate) - May 25
9.91	-Sprayed w/Roundup-12 oz/A plus additives (Liquid Ammonium sulfate 50ml/gal, X-77 at 15 ml/gal)plus Banvel-5 oz/A(8 gal/A rate)-June 9
4.00	-Worked w/under-cutter sweeps - June 27
.40	-Soil Testing and Analysis - Oct 26
<u>17.00</u>	-Land Charges 1994
47.09	Total Cost of Summer Fallow

Rotation E SUMMARY 1994

Income	Expenses		
20.57	Deficiency Payment	79.38	Cost of Wheat Crop
151.94	Sale of Winter Wheat	119.33	Cost of Corn Crop
<u>77.76</u>	Sale of Milo	<u>47.09</u>	Cost of Fallow
250.27	Total Income	245.80	Total Cost of Prod.

\$ 1.49 (1994) Income per acre
\$34.35 (3yr. ave.) Income per acre

Discussion of Rotation E: This is the "Ecofallow" rotation which uses a no-till row crop planted after winter wheat. It has potential of cleaning up weed problems and reducing soil erosion. This rotation also had problems with the corn stand in 1994 and had to be replanted to milo. The summer fallow in this rotation stays so clean it requires very little tillage or spraying to control annual weeds.

Cost of Inputs - 1994

SEED

Arapahoe Winter Wheat..\$5.00/bu
 Sunup Millet..... .36/#
 Pio 3921 Corn.....89.90/Bu (80,000 kernels)
 Pio 894 Milo.....1.00/#
 Bowman Barley.....2.75/bu
 Troy Oats.....2.75/bu
 Sharp Spring Wheat.....7.20/bu

NO-TILL PLANTING CHARGES

\$7.85/Acre

LAND CHARGES

\$17.00/Acre

LIQUID FERTILIZERS

10-34-0.....\$228.80/Ton (\$1.34/gal)
 28-0-0.....151.20/Ton (\$.81/gal)

SPRAY APPLICATION FEE

\$2.50/Acre

HERBICIDES

Roundup RT.....\$36.63/gal
 Ammonium Sulfate(Liquid)..3.90/gal
 X-77 (Surfactant).....16.50/gal
 Atrazine 90W.....3.48/lb
 Banvel76.35/gal
 Bronate.....53.97/gal
 Ally.....25.12/oz
 LV6 (2,4D Ester).....19.82/gal

HARVEST CHARGES

Base is \$12/A @ 20 bushels.
 \$.20/bu for yields above 20 bushels

GRAIN SALE VALUES

(From Hubbard Mill at Rapid City Nov 1, 94)
 Winter Wheat-13½ pro...\$3.55/bu
 Spring Wheat-14½ pro...\$3.70/bu
 Proso Millet.....7.50/cwt
 Milo.....1.60/bu
 Barley.....1.90/bu
 Oats.....1.40/bu

MECHANICAL TILLAGE CHARGE

\$4.00/Acre

WHEAT DEFICIENCY PAYMENT

Stanley Co average yield 24.2 bu/A
 $\times .85 / \text{bu}$
 \$20.57/Acre

ECONOMIC COMPARISONS OF ROTATIONS DOLLARS PER ACRE

<u>Rotations</u>	<u>1994</u>	<u>3YR.AVE.</u>	<u>4YR.AVE.</u>
A	23.70	41.58	37.85
B	- 12.66	53.62	46.35
C	- 9.16	37.59	31.29
D	2.01	32.67	32.77
E	1.49	34.35	29.70

**SDSU REDUCED TILLAGE CROP ROTATION STUDY
WALL, SOUTH DAKOTA 1994**

Objectives: To evaluate the economic returns from the total crop rotation each year.

Funding: The South Dakota Oil Seeds Council and the South Dakota Wheat Commission have shared the funding on this crop rotation study.

Cooperator: Crown Partnership of Wall, South Dakota.

Procedures: The land was leased from Crown Partnership in the spring of 1994. The land had been in wheat in 1993 and the stubble was still standing. The eleven different crop rotations were established in the spring of 1994. All crops in the rotation are planted each year and the study is replicated 4 times in a randomized complete block lay out. Reduced and no-till crop production practices were used to grow the crops in the rotations. The corn, millet, flax and the recropped wheat were planted no-till. The fallow had 2 tillage operations and 2 sprayings. The sunflower and safflower plots had 2 tillage operations to incorporate the spring applied herbicide. The crop yields were taken from each plot this season and recorded. The crop yields in the future will reflect the effects of the crop rotations.

Rotations and Crop Yields:

1	Spring Wheat* 19.6 bu	→	Fallow	
2	Spring Wheat* 19.3 bu	→	Sunflower 1124 lbs	→ Millet 1250 lbs
3	Spring Wheat* 19.8 bu	→	Safflower 1061 lbs	→ Millet 1360 lbs
4	Spring Wheat* 19.7	→	Millet 1275 lbs	
5	Spring Wheat* 20.4	→	Sunflower 1370 lbs	→ Spring Wheat 19.9 bu
6	Spring Wheat* 19.5 bu	→	Safflower 1065 lbs	→ Spring Wheat 20.3 bu
7	Spring Wheat* 21.0 bu	→	Corn 52.9 bu	→ Fallow
8	Spring Wheat* 20.7 bu	→	Sunflower 1125 lbs	→ Clover Fallow
9	Spring Wheat* 19.5 bu	→	Safflower 960 lbs	→ Clover Fallow
10	Spring Wheat* 20.1	→	Flax 11.6 bu	→ Millet 1275 lbs
11	Spring Wheat* 19.8 bu	→	Corn 51.6 bu	→ Millet 1260 lbs

* Spring wheat was planted in the plots where winter wheat will normally be planted in the rotations.

Rotation 1

WINTER WHEAT / SUMMER FALLOW

<u>Cost / A.</u>	<u>1994 Spring Wheat</u>
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring Wheat (90#/A) plus 6 Gal/A. (10-34-0) Starter Fertilizer (w/750 drill) - April 13
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-15 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.00	-Harvest 19.6 bu Spring wheat - July 22
<u>23.00</u>	-Land Charges 1994
98.67	Total Cost of Spring Wheat Production

Rotation 1

WINTER WHEAT / ~~SUMMER FALLOW~~

<u>Cost / A.</u>	<u>1994 Summer Fallow</u>
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
4.00	-Worked with under-cutter sweeps - May 24
4.00	-Worked with under-cutter sweeps - June 27
8.78	-Sprayed w/Roundup-12 oz/A plus Ammonium Sulfate-50ml/gal, LV6-16 oz prod/A (8 gal/A rate) - July 21
<u>23.00</u>	-Land Charges 1994
66.19	Total Cost of Summer Fallow

Rotation 1 SUMMARY 1994

<u>Income</u>		<u>Expenses</u>	
25.24	Deficiency Payment	98.67	Cost of Wheat Crop
<u>72.52</u>	Sale of Spring Wheat	*	Cost of Fallow
97.76	Total Income	98.67	Total Cost of Prod.

-\$.91 Income per acre in 1994

(*)Note: Fallow expenses are not included this year. Spring wheat was recropped on Winter wheat stubble to initiate the rotation study.

Rotation 2

Winter Wheat / Sunflower / Millet

Cost / A.	1994 Spring Wheat
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring Wheat(90#/A) plus 6 Gal/A. (10-34-0) Starter Fertilizer - April 13
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.00	-Harvest 19.3 bu Spring wheat - July 22
<u>23.00</u>	-Land Charges 1994
98.67	Total Cost of Spring Wheat Production

Rotation 2

WINTER WHEAT / SUNFLOWER / MILLET

Cost / A.	1994 SUNFLOWERS
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
12.40	-Apply Sonalan granules at 3/4# ai/Acre & undercut with sweeps at 3-5" deep to incorporate - April 18
4.00	-Disked at 4" deep to final incorporate Sonalan granules - April 22
24.22	-Plant Sunflowers (S-658) 18,000 seeds/A, 30" rows, 11" spacing, Starter Fertilizer 10-34-0 at 6 gal/A - May 26
18.20	-Harvest 1124# / Acre Sunflowers - Oct 24
<u>23.00</u>	-Land Charges 1994
100.52	Total Cost of Sunflower Production

Rotation 2

WINTER WHEAT / SUNFLOWER / MILLET

Cost / A.	1994 Millet
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
15.05	-Planted Sunup Millet (20#/A) w/JD 750 drill No Starter Fertilizer applied - May 18
15.72	-Spray w/12 oz Roundup plus 50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77 plus Bucril 16 oz/A plus Aatrex 90W at 1/2# ai/A (8 gal/A rate) - May 20
13.00	-Harvest 1250 # Millet - August 18
<u>23.00</u>	-Land Charges 1994
93.18	Total Cost of Millet Production

Rotation 2 SUMMARY 1994

Income	Expenses	
25.24	Deficiency Payment	98.67
71.41	Sale of Spring Wheat	100.52
106.78	Sale of Sunflowers	<u>93.18</u>
<u>23.75</u>	Sale of Millet	
297.18	Total Income	292.37
		Total Cost of Prod.
	<u>\$2.60</u> Income per acre in 1994	

Rotation 3

WINTER WHEAT / SAFFLOWER / MILLET

Cost / A.	1994 Spring Wheat
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring Wheat (90#/A) plus 6 gal/A. (10-34-0) Starter Fertilizer - April 13
7.71	-Spray Roundup-16 oz/A + Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.00	-Harvest 19.8 bu Spring wheat - July 22
<u>23.00</u>	-Land Charges 1994
98.67	Total Cost of Spring Wheat Production

Rotation 3

WINTER WHEAT / SAFFLOWER / MILLET

Cost / A.	1994 SAFFLOWERS
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
12.40	-Apply Sonalan granules at 3/4# ai/Acre & undercut with sweeps at 3-5" deep to incorporate - April 18
4.00	-Disked at 4" deep to final incorporate Sonalan granules - April 22
16.85	-Plant Safflowers (S-541) 20#/A, 20" rows, No Starter Fertilizer - April 22
12.72	-Harvest 1061# / Acre Safflowers - Sept 7
<u>23.00</u>	-Land Charges 1994
87.67	Total Cost of Safflower Production

Rotation 3

WINTER WHEAT / SAFFLOWER / MILLET

Cost / A.	1994 Millet
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
7.71	-Spray Roundup 16 oz/A - Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
15.05	-Planted Sunup Millet (20#/A) w/JD 750 drill No Starter Fertilizer applied - May 18
15.72	-Spray w/12 oz Roundup plus 50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77 plus Buctril 16 oz/A plus Atrax 90N at 1/2# ai/A (8 gal/A rate) - May 30
13.44	-Harvest 1360# Millet - August 18
<u>23.00</u>	-Land Charges 1994
93.62	Total Cost of Millet Production

Rotation 3 SUMMARY 1994

Income	Expenses
25.24	Deficiency Payment 98.67
73.26	Sale of Spring Wheat 87.67
122.02	Sale of Safflowers 93.62
<u>102.00</u>	Sale of Millet
322.52	Total Income 279.96
	Total Cost of Prod.
	<u>34.19</u> Income per acre - 1994

Rotation 4

WINTER WHEAT / MILLET

Cost / A.	1994 Spring Wheat
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring Wheat (50#/A) plus 5 Gal/A. (10-14-0) Starter Fertilizer - April 13
7.71	-Spray Roundup-16 oz/A + Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.00	-Harvest 19.7 bu Spring wheat - July 22
<u>23.00</u>	-Land Charges 1994
98.67	Total Cost of Spring Wheat Production

Rotation 4

WINTER WHEAT / MILLET

<u>Cost / A.</u>	<u>1994 Millet</u>
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
15.05	-Planted Sunup Millet (20#/A) w/JD 750 drill No Scarter Fertilizer applied - May 18
15.72	-Spray w/12 oz Roundup plus 50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77 plus Buctril 16 oz/A plus Aatrex 90W at 1/2# ai/A (8 gal/A rate) - May 20
13.10	-Harvest 1275 # Millet - August 18
<u>23.00</u>	-Land Charges 1994
93.28	Total Cost of Millet Production

Rotation 4 SUMMARY 1994

<u>Income</u>		<u>Expenses</u>	
25.24	Deficiency Payment	98.67	Cost of Wheat Crop
72.89	Sale of Spring Wheat	<u>93.28</u>	Cost of Millet Crop
<u>95.63</u>	Sale of Millet		
193.76	Total Income	191.95	Total Cost of Prod.
	<u>\$.91</u>		Income per acre - 1994

Rotation 5

WINTER WHEAT / SUNFLOWER / SPRING WHEAT

<u>Cost / A.</u>	<u>1994 Spring Wheat</u>
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring Wheat (90#/A) plus 6 Gal/A. (10-34-0) Starter Fertilizer - April 13
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.08	-Harvest 20.4 bu Spring wheat - July 22
<u>23.00</u>	-Land Charges 1994
98.75	Total Cost of Spring Wheat Production

Rotation 5

WINTER WHEAT / SUNFLOWER / SPRING WHEAT

Cost / A.	1994 SUNFLOWERS
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
12.40	-Apply Sonalan granules at 3/4# ai/Acre & undercut with sweeps at 3-5" deep to incorporate - April 18
4.00	-Diaked at 4" deep to final incorporate Sonalan granules - April 22
24.22	-Plant Sunflowers (S-658) 18,000 seeds/A, 30" rows, 11" spacing, Starter Fertilizer 10-34-0 at 6 gal/A - May 26
20.46	-Harvest 1370# / Acre Sunflowers - Oct 24
<u>23.00</u>	-Land Charges 1994
102.78	Total Cost of Sunflower Production

Rotation 5

WINTER WHEAT / SUNFLOWER / SPRING WHEAT

Cost / A.	1994 Spring Wheat
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring Wheat (90#/A) plus 6 Gal/A. (10-34-0) Starter Fertilizer - April 13
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.00	-Harvest 19.9 bu Spring wheat - July 22
<u>23.00</u>	-Land Charges 1994
98.67	Total Cost of Spring Wheat Production

Rotation 5 SUMMARY 1994

Income	Expenses	
25.24	Deficiency Payment	98.75
75.48	Sale of Spring Wheat	102.78
130.15	Sale of Sunflowers	<u>98.67</u>
<u>73.63</u>	Sale of Spring Wheat	
304.50	Total Income	300.20
		Total Cost of Prod.

\$1.43 Income per acre - 1994

Rotation 6

WINTER WHEAT / SAFFLOWER / SPRING WHEAT

Cost / A.	1994 Spring Wheat
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring Wheat (90#/A) plus 5 Gal/A. (16-34-0) Starter Fertilizer - April 13
7.71	-Spray Roundup 16 oz/A - Liquid Ammonium Sulfate 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.00	-Harvest 19.5 bu Spring wheat - July 22
23.00	-Land Charges 1994
98.67	Total Cost of Spring Wheat Production

Rotation 6

WINTER WHEAT / SAFFLOWER / SPRING WHEAT

Cost / A.	1994 SAFFLOWERS
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
12.40	-Apply Sonalan granules at 3/4# ai/Acre & undercut with sweeps at 3-5" deep to incorporate - April 18
4.00	-Disked at 4" deep to final incorporate Sonalan granules - April 22
16.85	-Plant Safflowers (S-541) 20#/A, 20" rows, No Starter Fertilizer - April 22
12.73	-Harvest 1065# / Acre Safflowers - Sept 7
23.00	-Land Charges 1994
87.68	Total Cost of Safflower Production

Rotation 6

WINTER WHEAT / SAFFLOWER / SPRING WHEAT

Cost / A.	1994 Spring Wheat
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring Wheat (90#/A) plus 5 Gal/A. (16-34-0) Starter Fertilizer - April 13
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate at 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.06	-Harvest 20.3 bu Spring wheat - July 22
23.00	-Land Charges 1994
98.73	Total Cost of Spring Wheat Production

Rotation 6 SUMMARY 1994

<u>Income</u>		<u>Expenses</u>	
25.24	Deficiency Payment	98.67	Cost of Wheat Crop
72.15	Sale of Spring Wheat	87.68	Cost of Safflower Crop
122.48	Sale of Safflowers	<u>28.71</u>	Cost of Wheat Crop
<u>13.11</u>	Sale of Spring Wheat		
294.98	Total Income	285.08	Total Cost of Prod.
	<u>\$3.30</u> Income per acre - 1994		

Rotation 7

WINTER WHEAT / CORN / FALLOW

<u>Cost / A.</u>	<u>1994 Spring Wheat</u>
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring wheat (90#/A) plus 6 Gal/A. (10-14-0) Starter Fertilizer (w/750 drill)- April 13
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate at 50ml/gal. X-77 at 15ml/gal. (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.00	-Harvest 19.6 bu Spring wheat - July 22
<u>11.01</u>	-Land Charges 1994
98.67	Total Cost of Spring Wheat Production

Rotation 7

WINTER WHEAT / CORN / FALLOW

<u>Cost / A.</u>	<u>1994 CORN</u>
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate at 50ml/gal. X-77 at 15ml/gal. (5 gal/A rate) - April 19
39.70	-Planted Corn at 18,800 seeds/A Pio 3921(85 day), 11" seed spacing, 30" rows plus Starter Fertilizer (10-14-0) at 8 gal/A rate-May 12.
30.45	-Spray w/Facitril 16 oz/A. Aatrex 1/2# ai/Acre plus 2/3 oz Accent, 1 quart Crop Oil /A (8 gal/A rate) - May 20
18.58	-Harvest 52.9 bu Corn / Acre - October 24
<u>23.09</u>	-Land Charges 1994
138.14	Total Cost of Corn Production

Rotation 9

WINTER WHEAT / SAFFLOWER / CLOVER FALLOW

Cost / A.	1994 Spring Wheat
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring wheat (90#/A) plus 5 Gal./A. (16-34-0) Starter Fertilizer - April 11
7.71	-Spray Roundup 15 oz/A + Liquid Ammonium Sulfate at 50ml/gal. X-77 at 15ml/gal. (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A. Barvel-2 oz/A. (10 gal/A rate) - May 12
12.00	-Harvest 19.5 bu Spring wheat - July 22
<u>33.00</u>	-Land Charges 1994
98.67	Total Cost of Spring Wheat Production

Rotation 9

WINTER WHEAT / SAFFLOWER / CLOVER FALLOW

Cost / A.	1994 SAFFLOWERS
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
18.00	-Apply Sonalan granules at 1 1/4# ai/Acre & undercut with sweeps at 3-5" deep to incorporate - April 18
4.00	-Disked at 4" deep to final incorporate Sonalan granules - April 22
16.85	-Plant Safflowers (S-541) 20#/A, 20" rows, No Starter Fertilizer - April 22
4.36	-Broadcast Sweetclover seed at 6#/A - June 21
12.27	-Harvest 960# / Acre Safflowers - Sept 7
<u>23.00</u>	-Land Charges 1994
97.18	Total Cost of Safflower Production

Rotation 9

WINTER WHEAT / SAFFLOWER / CLOVER FALLOW

Cost / A.	1994 Clover Fallow
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
7.71	-Spray Roundup 15 oz/A + Liquid Ammonium Sulfate at 50ml/gal. X-77 at 15ml/gal. (5 gal/A rate) - April 19
4.00	-Worked with under-cutter sweeps - May 24
4.00	-Worked with under-cutter sweeps - June 27
8.78	-Sprayed w/Roundup-12 oz/A plus Ammonium Sulfate (50 ml/gal). LV6-16 oz prod/A (8 gal/A rate) - July 21
<u>23.00</u>	-Land Charges 1994
66.19	Total Cost of Clover Fallow

Rotation 9 SUMMARY 1994

<u>Income</u>		<u>Exoenses</u>	
25.24	Deficiency Payment	98.67	Cost of Wheat Crop
72.15	Sale of Spring Wheat	97.18	Cost of Safflower Crop
<u>119.49</u>	Sale of Safflowers	*	Cost of Clover Fallow
207.79	Total Income	195.85	Total Cost of Prod.

\$5.97 Income per acre - 1994

(*) Note: Fallow expenses are not included this year. Spring wheat was recropped on Winter wheat stubble to initiate the rotation study.

Rotation 10

WINTER WHEAT / FLAX / MILLET

<u>Cost / A.</u>	<u>1994 Spring Wheat</u>	
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10	
26.69	-Plant Prospect Spring Wheat(90#/A) plus 6 Gal/A. (10-34-0) Starter Fertilizer - April 13	
7.71	-Spray Roundup-16 oz/A + Liquid Ammonium Sulfate at 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19	
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12	
12.02	-Harvest 20.1 bu Spring wheat - July 22	
<u>23.00</u>	-Land Charges 1994	
98.69	Total Cost of Spring Wheat Production	

Rotation 10

WINTER WHEAT / FLAX / MILLET

<u>Cost / A.</u>	<u>1994 FLAX</u>	
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10	
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate at 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19	
22.25	-Plant Flax 90#/Acre w/JD 750 drill No Starter fertilizer - April 14	
12.00	-Harvest 11.6 bu / Acre Flax - August 9	
<u>23.00</u>	-Land Charges 1994	
83.66	Total Cost of Flax Production	

Rotation 10

WINTER WHEAT / FLAX / MILLET

Cost / A.	1994 Millet
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
7.71	-Spray Roundup-16 oz/A + Liquid Ammonium Sulfate at 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
15.05	-Planted Sunup Millet (100#/A) w/JD 758 drill No Starter Fertilizer applied - May 19
15.72	-Spray w/12 oz Roundup plus 50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77 plus Sencoril 16 oz/A plus Axtrex 90W at 1/20 ml/A (2 gal/A rate) - May 20
13.10	-Harvest 1275# Millet - August 18
<u>21.00</u>	-Land Charges 1994
93.28	Total Cost of Millet Production

Rotation 10 SUMMARY 1994

Income	Expenses
25.24	Deficiency Payment 98.69 Cost of Wheat Crop
74.37	Sale of Spring Wheat 83.66 Cost of Flax Crop
46.40	Sale of Flax <u>21.28</u> Cost of Millet Crop
<u>95.61</u>	Sale of Millet
241.64	Total Income 275.63 Total Cost of Prod.
	<u>-\$11.33</u> Income per acre - 1994

Rotation 11

WINTER WHEAT / CORN / MILLET

Cost / A.	1994 Spring Wheat
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
26.69	-Plant Prospect Spring Wheat (90#/A) plus 6 Gal/A. (10-34-0) Starter Fertilizer - April 13
7.71	-Spray Roundup-16 oz/A + Liquid Ammonium Sulfate at 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
10.57	-Spray w/Dakota-16 oz/A, Banvel-2 oz/A, (10 gal/A rate) - May 12
12.00	-Harvest 19.8 bu Spring wheat - July 22
<u>21.00</u>	-Land Charges 1994
98.67	Total Cost of Spring Wheat Production

Rotation 11

WINTER WHEAT / CORN / MILLET

Cost / A.	1994 CORN
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
7.71	-Spray Roundup 16 oz/A + Liquid Ammonium Sulfate at 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
39.70	-Planted Corn 18,800 seeds/A Pio 3921 (85 day), 11" seed spacing, 30" row spacing plus Starter Fertilizer (10-34-0) at 8 gal/A rate - May 12
30.45	-Spray w/Buctril 16 oz/A, Aatrex 1/2# ai/A plus 2/3 oz Accent, 1 quart Crop Oil /A (8 gal/A rate) - May 20
18.32	-Harvest 51.6 bu Corn / Acre - Oct 24
<u>23.00</u>	-Land Charges 1994
137.88	Total Cost of Corn Production

Rotation 11

WINTER WHEAT / CORN / MILLET

Cost / A.	1994 Millet
18.70	-Apply liquid 28-0-0 (60#N/Acre) - April 10
7.71	-Spray Roundup-16 oz/A + Liquid Ammonium Sulfate at 50ml/gal, X-77 at 15ml/gal, (5 gal/A rate) - April 19
15.05	-Planted Sunup Millet (20#/A) w/JD 750 drill No Starter Fertilizer applied - May 18
15.72	-Spray w/1/2 oz Roundup RT plus 50ml/gal Liquid Ammonium Sulfate, 15 ml/gal X-77 plus Buctril 16 oz/A plus Aatrex 90W at 1/2# ai/A (8 gal/A rate) - May 20
13.04	-Harvest 1260 # Millet - August 18
<u>23.00</u>	-Land Charges 1994
93.22	Total Cost of Millet Production

Rotation 11 SUMMARY 1994

Income		Expenses	
25.24	Deficiency Payment	98.67	Cost of Wheat Crop
73.26	Sale of Spring Wheat	137.88	Cost of Corn Crop
103.20	Sale of Corn	<u>93.22</u>	Cost of Millet Crop
<u>94.50</u>	Sale of Millet		
296.20	Total Income	329.77	Total Cost of Prod.

-\$11.19 Income per acre - 1994

Discussion: It may be too early to have a summary of income because the effects of the rotations have not yet become evident. The addition of the oil seeds to crop rotations hopefully will increase the net income.

Cost of Inputs - 1994

SEED

Prospect Spring Wheat..\$7.20/Bu
 Sunup Millet..... .36/#
 Rahab Flax..... 9.00/Bu
 Pio 3921 Corn.....89.90/Bu (80,000 kernels)
 S-658 Sunflowers.....185.00/50#
 S-541 Safflowers..... 22.50/50#
 Sweetclover..... .31/#

NO-TILL PLANTING CHARGES

\$7.85/Acre

LBSO CHARGES

\$23.00/Acre

LIQUID FERTILIZERS

10-34-0.....\$228.80/Ton (\$1.34/gal)
 28-0-0.....151.20/Ton (\$.81/gal)

SPRAY APPLICATION FEE

\$2.50/Acre

HERBICIDES

Roundedup RT,.....\$36.63/gal
 X-77 (Surfactant)..... 16.50/gal
 Ammonium Sulfate.....3.90/gal
 Atrazine 30W.....3.48/lb
 Crop Oil.....4.90/gal
 Buttril.....55.00/gal
 Accent.....26.66/oz
 Ally.....25.12/oz
 LV6 (2,4D Ester).....19.82/gal
 Cyclone.....82.75/gal
 Dakota.....55.00/gal
 MCPA ester.....17.95/gal
 Bronate.....53.97/gal
 Sonalan 10% granules... 1.12/lb
 Barvel.....76.35/gal

HARVEST CHARGES

Base is \$12/A @ 20 bushels.
 \$.20/Bu for yields above 20 bushels

GRAIN SALE VALUES

(From Hubbard Mill at Rapid City Nov 1, 94)
 Spring Wheat-14% pro...\$3.70/bu
 Corn #2 yellow.....2.00/bu
 Proso Millet.....7.50/cwt
 Flax.....4.00/bu
 Sunflowers (oil-type)...9.50/cwt
 Safflowers (oil-type)..11.50/cwt

MECHANICAL TILLAGE CHARGE

\$4.00/Acre

WHEAT DEFICIENCY PAYMENT

Pennington Co average yield 29.7 bu/A
 $\times .85 / \text{bu}$
 \$25.24/Acre

NOTES

Winter Wheat Date of Planting & Gustafson Seed Treatment Study, 1994-95

Cooperators: Paul Patterson (Draper, SD) & Rex Haskins (Hayes, SD)

Objectives: To document percent of ground cover achieved when planting at 4 separate planting dates. To evaluate insect problems associated with early planting dates. To test seed applied systemic insecticides for control of insects.

Procedure: Arapahoe and Vista were seeded on 4 planting dates. The trials were seeded with a John Deere 610 Series Hoe drill with starter fertilizer (10-34-0) applied at 6.3 gallons/Acre. Row spacing was 12 inches. The plots were evaluated for percent cover produced by the growing winter wheat and aphids/sample. Evaluations were made for percent ground cover at both locations on October 19, 94. The sampling for aphids were taken October 19 at Draper and November 1 at Hayes. Results are listed below in Tables 38 and 39.

Seeding rates were adjusted from one date to the next to maintain a uniform number of tillers. Seeding rates of 45# seed/A were used on the first planting date. 60#/A on the second date, 75#/A on the third date, and 90#/A on the fourth date.

A winter wheat boarder network was seeded on the first planting date, August 25 at Draper and August 26 at Hayes. The intent was to attract various species of insects that vector viral diseases to the winter wheat in the trial. All controls and systemic insecticide treatments were replicated 4 times in each trial at each seeding date. The 0/0 rate (Control) has no insecticide. The (1/4) refers to .5 oz ai/100 lbs seed. The (1/2) refers to 1.0 oz ai/100 lbs seed. The (1/1) refers to full rate of 2 oz ai/100 lbs of seed.

Results:

TABLE 38 % Cover, Aphids/Sample as of October 19, 94 at Draper

Variety	Insecticide Rate	Aug 25 (45#/A)		Sept 8 (60#/A)		Sept 22 (75#/A)		Oct 11 (90#/A)	
		% Cover	Aphids/Sample	% Cover	Aphids/Sample	% Cover	Aphids/Sample	% Cover	Aphids/Sample
Arapahoe	0/0	80	32.5	44	4.8	16	2.0	NA	NA
Arapahoe	1/4	84	17.8	48	.5	18	.0	NA	NA
Arapahoe	1/2	78	7.8	50	1.0	18	.5	NA	NA
Arapahoe	1/1	88	10.8	46	6.3	18	.3	NA	NA
Vista	0/0	84	24.3	46	.8	16	5.8	NA	NA
Vista	1/4	84	13.8	42	1.0	18	.3	NA	NA
Vista	1/2	88	10.8	48	1.5	16	.0	NA	NA
Vista	1/1	90	4.8	48	2.0	18	.3	NA	NA
LSD(0.05)=		10	15.3	6	7.0	4	3.1	NA	NA
C.V.=		8	68.0	9	213.4	15	190.1	NA	NA

TABLE 39 % Cover on October 19, Aphids/Sample as of November 1, 94 at Hayes

Variety	Insecticide Rate	Aug 26 (45#/A)		Sept 8 (60#/A)		Sept 22 (75#/A)		Oct 11 (90#/A)	
		% Cover	Aphids/ Sample	% Cover	Aphids/ Sample	% Cover	Aphids/ Sample	% Cover	Aphids/ Sample
Arapahoe	0/0	38	46.0	30	18.0	14	3.0	NA	NA
Arapahoe	1/4	48	48.8	28	2.8	16	.5	NA	NA
Arapahoe	1/2	50	16.3	28	1.0	16	.3	NA	NA
Arapahoe	1/1	48	5.5	42	1.5	12	.0	NA	NA
Vista	0/0	36	27.5	28	19.5	14	1.0	NA	NA
Vista	1/4	42	25.8	26	6.8	12	.0	NA	NA
Vista	1/2	48	13.3	30	1.0	14	.3	NA	NA
Vista	1/1	50	13.5	32	.3	14	.0	NA	NA
LSD(0.05)=		4	34.2	8	11.2	4	1.7	NA	NA
C.V.=		7	94.6	16	119.5	17	184.8	NA	NA

Discussion: The percent of ground cover was reduced by later planting dates. The October 11 planting date had just emerged by October 19 but was providing no ground cover.

The aphids per sample were also reduced by later planting dates. Because of the early seeded border, there were a few aphids found in the later planted plots. However, if the whole field had been planted later, the aphids would not have been a problem. The aphids were controlled at the early planting dates by the systemic insecticide seed treatments. The 1 and 3 ounces per hundred pounds of seed appeared to be the most effective in controlling aphids. The experiments will be evaluated for virus diseases, yield, and test weight next summer.

Comparisons of various Sulfonylurea Compounds on Winter Wheat

Cooperator: Dave Finneman of Box Elder, SD

Objectives: 1) To evaluate control of kochia and wild buckwheat in winter wheat when various combinations of sulfonylurea compounds are used. 2) To evaluate amount of crop injury when these compounds are used.

Procedure: A winter wheat field was located that had weed pressure from kochia and wild buckwheat. The site was flagged and sprayed on May 10, 94. The soil was moist. Air temp was at 75 degrees and soil temp was at 60 degrees F. The experiment was sprayed with a Suzuki Research sprayer. Boom width was 10 foot. 8002 XR nozzles were used at a 30 inch spacing. Boom pressure was at 30 psi and spray speed was at 3.5 mph. Spray rate was at 10 gallons/acre. The plots were 10' wide x 40' long. All spray treatments were supplemented with a non-ionic surfactant at .25% or 9 ml/gal of spray solution. The trial was evaluated for percent weed control and degree of crop injury on May 27 and June 9, 94. On Crop Injury, 1 = least injury, 10 = most injury. Results are shown in Table 40.

Discussion: The plots had a very heavy stand of kochia. The herbicides by themselves did not give satisfactory control of kochia. The addition of Banvel or Buctril improved the control of kochia and wild buckwheat. The crop injury rating to the winter wheat was a result of spraying after the wheat was jointed. The injury was not severe but there was some stunting.

TABLE 40

Treatment	Product Oz/Acre	May 27, 1994 ratings			June 9, 1994 ratings		
		% Cont Kochia	% Cont W. Bkwh	Injury 1-10	% Cont Kochia	% Cont W. Bkwh	Injury 1-10
Exceed	.25	15	78	1	38	40	1
Exceed	.50	46	86	1	38	53	1
Control (Not Sprayed)		1	1	1	1	1	1
Exceed Banvel(4L)	.25 2.00	86	89	1	89	91	2
Exceed Banvel(4L)	.50 2.00	84	88	1	91	90	3
Exceed Banvel(4L)	.25 4.00	88	88	1	95	91	3
Exceed Buctril(2L)	.25 8.00	90	90	1	95	94	1
Exceed 2,4-D es(4L)	.25 8.00	60	85	1	79	73	1
Exceed Amber	.25 .14	44	86	1	61	60	2
Amber Banvel(4L)	.19 4.00	80	89	1	94	93	3
Amber	.19	31	70	1	50	66	1
Amber Buctril(2L)	.19 8.00	68	80	1	53	61	1
Ally	.10	44	68	1	60	46	1
Ally 2,4-D es(4L)	.10 8.00	64	85	1	69	68	1
	LSD=	19	9	0	11	12	1
	CV =	24	8	13	11	13	38

Winter Wheat Sensitivity to Frontier Herbicide

Cooperator: Jim Madson of New Underwood, SD

Objectives: To determine sensitivity of Frontier herbicide when applied at various early growth stages of Winter Wheat.

Procedure: Arapahoe was planted on a field basis on September 22, 94. There was marginal sub-surface moisture so there was variability in seed germination. The soil surface was dry and crumbly. The soil texture was of a clay loam type.

All 4 spray date applications were performed with a Suzuki Research sprayer using 8002 XR nozzles. The trial was flagged and the first spraying was applied on Sept 26. Spraying was done at 3.5 mph and at 20 psi at the boom to achieve 8 gal/Acre rate. Plot size was 10' x 50'. Soil temp at 3" depth was 62 degrees F and Air temp was at 75-80 degrees F. Coleoptile length was at 3/4 to 1" long and was 1 1/2" from emergence.

On Sept 28 (Delayed Pre-emerge) the coleoptile length was short of emergence by 1/2" to emerged to 1/2" tall. The soil was still dry and some seed was not fully germinated. Soil Temp at 3" was 68 degrees F and air temp was at 84 degrees F.

On Oct 3 (2-leaf stage) the seedlings were 3-5" tall. Soil temp was at 51 degrees F and air temp was at 44 degrees F. It was lightly misting that morning but quit.

On Oct 19 (4-leaf stage) the wheat was at 3-4 leaf stage plus 1 tiller. The soil was damp on top at spraying time. Soil temp was at 49 degrees F and air temp was at 65 degrees F. Stand counts were taken on November 9 and are listed in Table 41 below.

TABLE 41

Treatment	Oz prod /Acre	Timing of Application	Date of Application	Stand Plants/4'
Control	(Not Sprayed)	N/A	N/A	47.3
Frontier	8.5	Pre	Sept 26	36.7
Frontier	17.0	Pre	Sept 26	26.7
Frontier	34.0	Pre	Sept 26	20.7
Frontier	8.5	D-Pre	Sept 28	29.3
Frontier	17.0	D-Pre	Sept 28	29.3
Frontier	34.0	D-Pre	Sept 28	22.0
Frontier	8.5	2-leaf	Oct 3	38.7
Frontier	17.0	2-leaf	Oct 3	43.3
Frontier	34.0	2-leaf	Oct 3	31.3
Frontier	8.5	4-leaf	Oct 19	48.7
Frontier	17.0	4-leaf	Oct 19	46.3
Frontier	34.0	4-leaf	Oct 19	41.3
			LSD	6.9
			CV	11.5

Discussion: Both the pre-emergence and the delayed pre-emergence applications reduced the November 9 stand counts. Both of the post-emergence treatments had very little effect on the November 9 stand counts. The plots will be carried through to yield to determine if the injury is detrimental to grain yield and test weight.

Kochia Control in Wheat Stubble Fallow

Cooperator: Kent Kjerstad of Quinn, SD

Objectives: To evaluate control of kochia in post-harvest wheat stubble fallow using various rates and formulations (dry & liquid) of glyphosate with a surfactant (R-11). To compare glyphosates with and without use of additional broad-leaf herbicides.

Procedure: A post-harvest winter wheat stubble field was located that was uniformly infested with kochia. There was limited surface moisture. It had rained 1/2 to 3/4 inch a week before spraying so the kochia was actively growing. Kochia was at 6-8" tall. The wheat stubble was 12-16" tall. An area was flagged and sprayed on August 23, 94. The Landmaster treatments were sprayed on August 30, 94. It rained .3 inch the day before the Landmaster was applied. Each spray plot measured 10' wide x 50' long. The experiment was of a Randomized Complete Block Design. All plots were sprayed with a Suzuki research sprayer with a 10 foot boom. The plots were sprayed using 8002 XR nozzles at 20 psi and at a speed of 3.5 mph (8 gal/Acre rate). Winds were at 3-5 mph from the north. The sprayed plots were evaluated for percent control on September 9, 94. Results are listed on the following pages in Table 42.

Discussion: Kochia is a difficult weed to control post-harvest when the conditions are dry and the weeds are not actively growing. This experiment evaluated different formulations of Roundup (glyphosate). One formulation was a dry granule that dissolved in water. This may be the way many pesticides are packaged in the future to reduce the problems with empty container disposal. The dry formulation appeared to have similar performance to the liquid formulations. Banvel increased control of the kochia in the mixtures more than 2,4-D ester.

TABLE 42

Treatment	Oz prod /Acre	% Control Kochia
Roundup RT R-11	12.0 5.1	50.0
Roundup RT R-11	16.0 5.1	61.3
Roundup RT R-11	20.0 5.1	80.0
MON65005 R-11	12.0 5.1	55.0
MON65005 R-11	16.0 5.1	57.5
MON65005 R-11	20.0 5.1	81.3
Roundup RT R-11 2,4-D es (LV4)	12.0 5.1 16.0	66.3
Roundup RT R-11 2,4-D es (LV4)	16.0 5.1 16.0	82.5
Roundup RT R-11 2,4-D es (LV4)	20.0 5.1 16.0	87.5
MON65005 R-11 2,4-D es (LV4)	12.0 5.1 16.0	67.5
MON65005 R-11 2,4-D es (LV4)	16.0 5.1 16.0	77.5
MON65005 R-11 2,4-D es (LV4)	20.0 5.1 16.0	87.5
Roundup RT R-11 Banvel	12.0 5.1 8.0	81.3
Roundup RT R-11 Banvel	16.0 5.1 8.0	86.3
Roundup RT R-11 Banvel	20.0 5.1 8.0	92.5

Table 42 continued on next page.

TABLE 42 continued

Treatment	Oz prod /Acre	% Control Kochia
MON65005	12.0	77.5
R-11	5.1	
Banvel	8.0	
MON65005	16.0	91.3
R-11	5.1	
Banvel	8.0	
MON65005	20.0	96.0
R-11	5.1	
Banvel	8.0	
MON60696 (dry)	6.7	62.5
R-11	5.1	
2,4-D es (LV4)	16.0	
MON60696 (dry)	9.3	62.5
R-11	5.1	
2,4-D es (LV4)	16.0	
MON60696 (dry)	11.3	85.0
R-11	5.1	
2,4-D es (LV4)	16.0	
MON60696 (dry)	6.7	75.0
R-11	5.1	
Banvel	8.0	
MON60696 (dry)	9.3	85.0
R-11	5.1	
Banvel	8.0	
MON60696 (dry)	11.3	92.5
R-11	5.1	
Banvel	8.0	
Landmaster	40.0	47.5
Landmaster	54.0	55.0
Control	(Not Sprayed)	1.0
MON60696 (dry)	12.0	41.3
R-11	5.1	
MON60696 (dry)	16.0	53.8
R-11	5.1	
MON60696 (dry)	20.0	62.5
R-11	5.1	

LSD = 15.7
CV = 15.5

Comparisons of Various Glyphosates on Fallow

Cooperator: Dave Finneman of Box Elder, SD

Objectives: To evaluate control of volunteer wheat, kochia, and wild buckwheat when using various rates and formulations (dry & liquid) of glyphosate with and without use of a surfactant (R-11) and ammonium sulfate. To compare glyphosates with and without use of additional broad-leaf herbicides.

Procedure: A fallow field was located that had weed pressure from volunteer wheat, kochia, and wild buckwheat. Soil conditions had been moist in early May so we waited a week to do the spraying. The trial was set up in a randomized complete block design with 4 replications. The individual plots were 10' wide x 50' long. The site was flagged on May 10 and sprayed on May 24, 94. The trial was sprayed with a Suzuki research sprayer. The boom was 10 foot wide. Nozzles were 8001 XR at 30 inch spacing. Boom pressure was at 30 psi and speed was at 3.5 mph. Spray rate was at 5 gal/Acre. Winds were calm and spray coverage was excellent. The weeds were actively growing. The volunteer wheat was thin but uniform, the kochia was at the wooly stage and 1 inch tall.

The sky was over-cast and rain started to fall 5 minutes after completion of spraying. Within 15 minutes, 3/8 inch of rain had fallen. Results are shown below in Table 43.

TABLE 43

Treatment	Oz prod /Acre	% Control Vol. Wheat	% Control kochia	% Control W. Buckwheat
Roundup RT(liq)	6.0	70	35	34
Roundup RT(liq)	12.0	81	38	28
Roundup RT(liq)	16.0	91	45	38
MON65005 (liq)	6.0	74	28	18
MON65005 (liq)	12.0	89	40	30
MON65005 (liq)	16.0	95	55	38
Roundup RT(liq) R-11 (.5%)	6.0	74	25	18
Roundup RT(liq) R-11 (.5%)	12.0	91	47	30
Roundup RT(liq) R-11 (.5%)	16.0	95	45	33
MON65005 (**) R-11 (.5%)	6.0	1	1	1

Table 43 continued on next page.

TABLE 43 continued

Treatment	Oz prod /Acre	% Control Vol. Wheat	% Control kochia	% Control W. Buckwheat
MON65005(liq) R-11 (.5%)	12.0	93	53	37
MON65005(liq) R-11 (.5%)	16.0	90	40	25
Roundup RT(liq) R-11 (.5%) Am Sulf (2.0%)	6.0	86	35	25
Roundup RT(liq) R-11 (.5%) Am Sulf (2.0%)	12.0	93	60	40
Roundup RT(liq) R-11 (.5%) Am Sulf (2.0%)	16.0	98	53	38
MON60696 (dry) R-11 (.5%)	3.36	45	25	18
MON60696 (dry) R-11 (.5%)	6.88	88	43	25
MON60696 (dry) R-11 (.5%)	9.28	90	50	33
Control (Not Sprayed)		1	1	1
Roundup Banvel SGF (2L) Am Sulf (2.0%) R-11 (.5%)	12.0 8.0	93	85	90
	LSD=	9	14	14
	CV =	8	24	33

(**) = Was not sprayed due to lack of product.

Discussion: Roundup formulations are generally easily washed off the plant leaf and are lost. In this experiment, the treatments were absorbed quickly by the volunteer wheat plants. The control was adequate. The dry formulations of Roundup had similar control to the Roundup RT formulations. The kochia plants were small and difficult to control with Roundup alone. The addition of Banvel increased the control significantly.

CRP Conversion to Cropland

Cooperator: Dave Finneman of Box Elder, SD

Objectives: To determine efficient and economical methods to convert CRP land to cropland.

Procedure: An area of uniform CRP land was flagged out on March 30, 94. The total area was 200 feet from east to west and 800 feet long north to south. The area was flagged into 4 equal segments that were 50' wide x 800' long. The east strip was left standing and undisturbed. The middle 2 strips were mowed off with a 7' rotary mower. The west strip was burned on April 12, 94. The area was then flagged and sprayed east & west across the undisturbed, mowed and burned strips. Spray treatments were laid out in 4 ranges starting at the north and ending at the far south end. The growing vegetation was sprayed at 3 various time frames, 1) early (May 19); 2) mid (June 16); and/or 3) late (September 20, 94).

Spray conditions on May 19 (early) included: air temp of 68 and soil temp of 63 on the mowed strip, 64 degrees on the undisturbed strip and 68 degrees on the burned strip. Weed pressure varied among the strips. The burned strip had few dandelions, very few prickly lettuce and a good stand of western wheatgrass. The mowed strip had a heavy stand of prickly lettuce. Soil moisture was 18-20 inches deep on the burned strip and 24-26 inches deep on the mowed strip.

Winds were calm on May 19 when the first spraying was done. The treatments were applied with a Suzuki research sprayer with a 10' boom. 8001 XR spray nozzles with 100 mesh screens were used at 30" spacing and at 30 psi on the boom to deliver the 5 gallons/acre spray rate. A 5 foot unsprayed border was left between the 20 foot plots to aid in weed control evaluation. The soil was moist on the surface. Weeds present included: prickly lettuce and western wheatgrass (4-6" tall). Warm season grasses included sideoats grama (dormant or just breaking dormancy). Visual ratings of the (early) treatment were taken on May 28, 94 and are listed below in Table 44.

Treatments were applied on June 16 (mid) in an attempt to control sideoats grama. The western wheatgrass was still under control from the early treatment. Visual ratings of the (mid) treatment were taken on July 19, 94. The percent control of the vegetation are listed in Table 45.

The late treatment was applied on September 20, 94 and will be rated for percent of control in the spring of 1995.

Results of the May 19 spraying as of May 28, 1994

TABLE 44

No. & rate of Treatment	Qc prod /Acre	Timing of Spraying	BURIED STRIP		MOWED STRIP		NO DISTURBANCE STRIP	
			Grass & Control	P. Lettuce & Control	Grass & Control	P. Lettuce & Control	Grass & Control	P. Lettuce & Control
(1) Roundup(3L)* Barnett(4L)	64 R	early early	78	99	66	92	58	89
(2) Roundup(3L)* Barnett(4L)	32 R	early early	58	99	53	94	43	84
(3) Roundup(3L)* Barnett(4L)	32 R	early early	60	98	55	94	43	85
Roundup(3L)*	16	mid						
(4) Roundup(3L)* Barnett(4L)	32 R	early early	63	99	65	93	48	83
Roundup(3L)*	16	mid						
Roundup(3L)*	16	late						
(5) Roundup(3L)* Barnett(4L)	16 R	early early	43	99	40	91	30	81
Roundup(3L)*	16	mid						
Roundup(3L)*	16	late						
(6) Roundup(3L)* Barnett(4L)	16 R	early early	33	98	33	94	28	87
Roundup(3L)*	12	mid						
Roundup(3L)*	8	late						
(7) Control	(not sprayed)		1	83	1	1	1	1
(8) Paraquat	32	early	1	88	1	1	1	1
			LSD = 8	3	8	4	6	5
			CV = 28	5	31	8	29	12

* - Ammonium Sulfate at 2.0% and R-11 at .25% of the spray solution were added with the Roundup to improve its efficiency.

Results of the June 16 spraying as of July 19, 1994

TABLE 45

No. & rate of Treatment	Oz prod /Acre	Timing of Spraying	BURNED STRIP		MOWED STRIP		NO DISTURBANCE STRIP	
			Grass & Control	P. Lettuce & Control	Grass & Control	P. Lettuce & Control	Grass & Control	P. Lettuce & Control
#1) Roundup(3L)* Banvel(4L)	64 8	early early	96	61	88	64	82	60
#2) Roundup(3L)* Banvel(4L)	32 8	early early	86	45	79	38	69	33
#3) Roundup(3L)* Banvel(4L)	32 8	early early	88	45	75	40	61	33
Roundup(3L)*	16	mid						
#4) Roundup(3L)* Banvel(4L)	32 8	early early	84	43	75	44	65	30
Roundup(3L)*	16	mid						
Roundup(3L)*	16	late						
#5) Roundup(3L)* Banvel(4L)	16 8	early early	78	35	68	38	60	35
Roundup(3L)*	16	mid						
Roundup(3L)*	16	late						
#6) Roundup(3L)* Banvel(4L)	16 8	early early	63	38	61	38	54	30
Roundup(3L)*	12	mid						
Roundup(3L)*	8	late						
#7) Control		(not sprayed)	1	1	1	1	1	1
#8) Paraquat	32	early	1	1	1	1	1	1
			LSD = 5	6	5	13	9	8
			CV = 13	26	15	58	28	44

* - Ammonium Sulfate at 2.0% and R-11 at 25% of the spray solution were added with the Roundup to improve its efficiency

Discussion: Treatments 1-3 had only one spraying of Roundup at the rates indicated. Treatments 4-6 had early, mid, and late summer sequences of Roundup spraying.

Table 44 contains the results from the first spraying only. Table 45 contains the results of the early and mid-summer spraying. The notes for the late summer spraying results will be taken in the spring of 1995. The data indicates that Roundup is effective at controlling the cool-season grasses. However, the warm-season grass, sideoats grama; was not controlled by any of the treatments and most likely would be a problem to control without tillage. The sideoats grama produced seed heads after being sprayed with Roundup. The seeds were tested for germination. The germination percentage varied from 19-38%.

NUTRIENT RECOMMENDATIONS OF CROPS GROWN IN SOUTH DAKOTA
Soil Testing Laboratory - South Dakota State University
Revised September 1994

Nutrient Requirements/Bushel

Crop	N #/Bu	P205 #/Bu	K2O #/Bu	Commonly accepted Test Weight (#/Bu)	Seeding Rate Pounds/Acre
Barley(feed)	1 7xYG-STN	785xYG- 390xSTPxYG	1 286xYG- 0085xSTKxYG	48	72
Barley(malting)	1.5xYG-STN	785xYG- 390xSTPxYG	1 286xYG- 0085xSTKxYG	48	72
Buckwheat	2.2xYG-STN	1 320xYG- 066xSTPxYG	1 860xYG- 0166xSTKxYG50	50	50
Corn(grain)	1.2xYG-STN	700xYG- 035xSTPxYG	1 166xYG- 0073xSTKxYG	56	12
Flax	3.0xYG-STN	1 170xYG- 058xSTPxYG	2 200xYG- 0140xSTKxYG	56	56
Oats	1 3xYG-STN	644xYG- 032xSTPxYG	1 277xYG- 0086xSTKxYG	38	76
Rye	2 5xYG-STN	1 071xYG- 054xSTPxYG	2 71xYG- 017xSTKxYG	56	56
Sorghum(milo)	1 1xYG-STN	666xYG- 033xSTPxYG	0 875xYG- 0058xSTKxYG	56	3-6
Soybean	none	1 550xYG- 100xSTPxYG	2 200xYG- 0183xSTKxYG	60	60
Wheat(spring)	2.5xYG-STN	1 071xYG- 054xSTPxYG	2 71xYG- 017xSTKxYG	60	90
Wheat(winter)	2.5xYG-STN	1 071xYG- 054xSTPxYG	2 71xYG- 017xSTKxYG	60	60

Nutrient Requirements/Ton

Crop	N #/Ton	P205 #/Ton	K2O #/Ton	Commonly accepted Test Weight (#/Bu)	Seeding Rate Pounds/Acre
Alfalfa (established)	none	18 57xYG- 93xSTPxYG	55 71xYG- 38xSTKxYG	--	--
Alfalfa-Grass (established)	none	18 57xYG- 93xSTPxYG	55 71xYG- 38xSTKxYG	--	--
Alfalfa (new seeding)	none	18 57xYG- 93xSTPxYG	55 71xYG- 38xSTKxYG	60	6
Corn(silage)	10 4xYG-STN	5 62xYG- 28xSTPxYG	9 5xYG- 06xSTKxYG	--	--
Grass (established)	25xYG	45 0-2 5xSTP	80 0- 53xSTK	--	--
Sudangrass	25xYG-STN	11 0xYG- 533xSTPxYG	43 0xYG- 3xSTKxYG	40	8-12(dried)
Grass (new seeding)	25xYG	45 0-2 5STP	9 5xYG- 06xSTKxYG	--	--

Nutrient Requirements/Pound

Crop	N #/Lb	P205 #/Lb	K2O #/Lb	Commonly accepted Test Weight (#/Bu)	Seeding Rate Pounds/Acre
Edible Beans	05xYG-STN	0231xYG- 0011xSTPxYG	03460xYG- 00042xSTKxYG	60	60
Millet	035xYG-STN	0171xYG- 00085xSTPxYG	03xYG- 00018xSTKxYG	50	20
Safflower	050xYG-STN	027xYG- 0014xSTPxYG	048xYG- 00033xSTKxYG	45	20
Sunflower	050xYG-STN	0225xYG- 0011xSTPxYG	041xYG- 00027xSTKxYG	22	2-3

Nutrient Requirements/Cwt

Crop	N #/Cwt	P205 #/Cwt	K2O #/Cwt	Commonly accepted Test Weight (#/Bu)	Seeding Rate Pounds/Acre
Canola	6 5xYG-STN	3 6xYG- 17xSTPxYG	5 40xYG- 034xSTKxYG	50	5-7
Potatoes	0 4xYG-STN	0 5xYG- 026xSTPxYG	0 85xYG- 0057xSTKxYG	--	--

Nutrient Requirements/Acre

Crop	N #/Acre	P205 #/Acre	K2O #/Acre	Commonly accepted Test Weight (#/Bu)	Seeding Rate Pounds/Acre
Edible low	none	none	none	--	--
Garden	3 5- 03xSTN	3 6- 18xSTP	5 4- 03xSTK	--	--
Lawn (established)	4 0- 04xSTN	2 5- 125xSTP	5 0- 0286xSTK	--	--
Lawn(Kent Blue) (new seeding)	2 0-0 025xSTN	5 0- 25xSTP	5 0- 0286xSTK	14	20

Abbreviations: YG = yield goal; STN = soil test nitrogen (0-2") lbs/acre;
 STP = soil test Bray #1 Phosphorus 0-6" (ppm); STK = soil test potassium 0-6" (ppm)

Note: A sampling date adjustment and previous crop N credit should be subtracted from the N recommendation when appropriate.

For Soil Sampling bags and any further soil sampling instructions contact the Extension Agent in your county

1994-1995 PREVIEW

The following experiments are currently in process or soon will be. Data will be collected through the following year and presented in next years Annual Report.

Cheatgrass control in Winter Wheat

This trial utilizes varying rates and timing of Frontier herbicide to control Cheatgrass in seedling winter wheat when applied in the fall.

Aphid Control in Winter Wheat (2 locations)

A systemic insecticide on winter wheat seed is being utilized at various rates to evaluate control of aphids that vector virus diseases.

Methods of Converting CRP back to Crop Land

This trial was initiated in the spring of 1994. It looks at conversion of CRP (Crop Reserve Program) Land back to farm land by use of Conventional, Minimum, and No-tillage methods. These plots are currently seeded to Vista winter wheat. Agronomic differences and yield will be evaluated throughout the coming year.

SDSU Reduced Tillage Crop Rotation Study at Hayes, SD

This 4 acre trial was initiated in the fall of 1987. This trial has 5 various cropping sequences of winter wheat and other cereal grains. This trial has emphasis on maintaining 30% crop residue at all times. These rotations are evaluated annually for economics, changes in soil tilth, and weed and disease occurrences. The effects of specific cropping sequences at this rotation study are becoming more evident.

SDSU Wheat and Oilseed Crop Rotation Study at Wall, SD

This 10 acre trial was initiated in the spring of 1994. There are 11 cropping sequences that are currently being evaluated. This rotation study looks at the economics, sustainability, and conservation compliance of wheat when grown in combination with minor oil seed crops (safflower, sunflower, flax).

CPT Testing of Winter Wheat and Spring Grains (7 locations)

There are currently 7 Crop Performance Testing (CPT) sites for evaluation of winter wheat. This year has 35 varieties of winter wheat at each location. There are trials at: Bison, Ralph, Bear Butte, Hayes, Wall, Oelrichs, and Martin. Spring grains such as oats, barley, spring wheat, durum, and millet will have on-going evaluation at various test sites this spring.

CPT Testing of Oilseed and Specialty Crops

Safflower variety trials, field peas, and other specialty/alternative crops will be evaluated throughout the 1995 growing season.