

WEST RIVER AGRICULTURAL RESEARCH AND EXTENSION CENTER
CROPS AND SOILS RESEARCH

Rapid City, South Dakota

INTRODUCTION

This is an annual progress report of the West River Crops and Soils Research Project, South Dakota Agricultural Experiment Station. The equipment storage and processing facilities are located approximately 1 mile west of the village of Box Elder. The office facilities are located on the Central States Fairgrounds at 801 San Francisco Street, Rapid City. Telephone 605/394-2236.

The Research Project serves the western part of the state. It is unique in that all experimental plots are cooperatively located with farmers, ranchers, crop improvement associations, and county agents.

The research conducted is not restricted to a specific area, crop, or soil, but by necessity of workload investigates only those problems which are pertinent to general areas. This report contains results of selected research. It does not include results of incomplete work nor work conducted by projects headquartered from the campus at Brookings.

FIELD PLOT COOPERATORS

<u>Name</u>	<u>Address</u>	<u>County</u>
County Crop Impr. Ass'n	Martin 57551	Bennett
Neil Krinke	Ralph 57650	Harding
Clifford Halverson	Kennebec 57544	Lyman
Charles Hawks	Plainview 57771	Meade
Tim Komes	Sturgis 57785	Meade
Lavon Shearer	Wall 57790	Pennington
Joe Wunder	Bison 57620	Perkins
County Crop Impr. Ass'n	Winner 57580	Tripp

This is annual report and results published herein are therefore neither complete nor conclusive. 500 copies printed at an estimated cost of 92¢ each.

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Weather Summary

The weather summaries presented in tables 1 and 2 were obtained from the National Oceanic and Atmospheric Administration publication, Climatological Data-South Dakota.

Some of the information which is identified by footnotes, was obtained from private cooperators, and the South Dakota Department of Natural Resources, because data from the primary source was missing.

Air temperatures during the late summer of 1981 were slightly below normal in August and October, but several degrees above normal in September and November. December was normal, but January was more than 10 degrees below normal. February was normal, March was warmer, April cooler, May warmer, and June cooler than normal. The month of July was below normal in the central part of the state but above normal in the Northern and Southern areas.

The precipitation patterns in South Dakota have been quite erratic in recent times. The previous year in the northern part of the state conditions had been excessively dry, so rain that came in August provided moisture necessary for fall seeded crops. The central and southern areas were dry during the fall. The west half of the state had below normal to normal precipitation until the end of April when heavy rain fell in the entire state. Rainfall during May was nearly triple the longtime averages, while June was near normal, and July slightly below or near normal.

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**
<u>Martin</u> (Bennett County Reporting Station)				
Aug. 1981	70.8	--	2.78	--
Sept. 1981	64.0	--	0.50	--
Oct. 1981	50.4	--	1.64	--
Nov. 1981	40.4	--	0.25	--
Dec. 1981	27.3	--	1.07	--
Jan. 1982	13.6	--	0.66	--
Feb. 1982	26.8	--	0.30	--
Mar. 1982	35.7	--	1.78	--
Apr. 1982	44.6	--	0.76	--
May 1982	56.9	--	8.53	--
June 1982	62.4	--	3.42	--
July 1982	73.8	--	1.74	--
<u>Ralph</u> (Harding County Reporting Station)				
Aug. 1981	69.6	1.9	1.23	-0.39
Sept. 1981	60.1	4.2	1.59	0.43
Oct. 1981	44.6	-0.5	0.38	-0.33
Nov. 1981	34.2	4.6	0.48	0.12
Dec. 1981	19.8	0.2	0.46	0.22
Jan. 1982	3.5	-10.7	0.65	0.37
Feb. 1982	18.8	-0.1	0.32	0.05
Mar. 1982	28.7	2.0	2.57	2.11
Apr. 1982	40.4	-1.3	0.99	--
May 1982	52.7	0.1	5.88	3.56
June 1982	60.3	-0.9	2.03	-1.85
July 1982	69.6	0.5	2.18	0.26
<u>Kennebec</u> (Lyman County Reporting Station)				
Aug. 1981	72.9	-1.0	1.96	-0.38
Sept. 1981	65.7	2.9	0.24	-1.28
Oct. 1981	50.8	-0.4	2.26	1.23
Nov. 1981	40.0	5.3	0.78	0.15
Dec. 1981	20.9	-1.4	0.31	-0.06
Jan. 1982	6.5	-10.4	0.53	0.20
Feb. 1982	22.3	0.0	tr	-0.55
Mar. 1982	33.7	2.7	1.21	0.38
Apr. 1982	45.3	-2.0	0.54	-1.38
May 1982	60.5	2.4	7.69	5.00
June 1982	64.3	-3.2	2.67	-0.86
July 1982	75.8	0.9	3.63	1.58

* Average temperatures and precipitation obtained from NOAA Climatological Data from 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 1941-1970.

Table 1. Continued

Month & Year	Average Temperature*	Departure from Normal**	Total Precipitation*	Departure from Normal**
<u>Bear Butte Valley (Ft Meade-Meade County Reporting Point)</u>				
Aug. 1981	71.3	--	0.23	--
Sept. 1981	63.9	--	2.37	--
Oct. 1981	48.3	--	1.52	--
Nov. 1981	40.5	--	0.47	--
Dec. 1981	27.5	--	0.33	--
Jan. 1982	15.0	--	0.68	--
Feb. 1982	27.2	--	0.71	--
Mar. 1982	33.8	--	2.59	--
Apr. 1982	43.7	--	1.20	--
May 1982	53.6	--	8.73	--
June 1982	61.0	--	2.03	--
July 1982	72.5	--	1.98	--
<u>Plainview (Meade County Reporting Point)***</u>				
Aug. 1981	72.4	--	1.70	--
Sept. 1981	63.7	--	0.66	--
Oct. 1981	45.9	--	1.99	--
Nov. 1981	38.9	--	0.38	--
Dec. 1981	22.0	--	0.05	--
Jan. 1982	5.6	--	0.46	--
Feb. 1982	18.3	--	0.30	--
Mar. 1982	M	--	M	--
Apr. 1982	41.4	--	0.45	--
May 1982	M	--	M	--
June 1982	M	--	M	--
July 1982	M	--	M	--
<u>Rapid City (Pennington County Reporting Station)</u>				
Aug. 1981	70.0	-1.6	1.74	0.27
Sept. 1981	63.5	3.0	0.16	-1.06
Oct. 1981	47.7	-2.3	1.81	0.95
Nov. 1981	40.4	5.0	0.23	-0.25
Dec. 1981	25.8	-0.7	0.35	-0.04
Jan. 1982	12.2	-9.7	0.39	-0.08
Feb. 1982	24.2	-1.6	0.37	-0.20
Mar. 1982	33.0	1.8	1.35	0.36
Apr. 1982	42.1	-2.5	0.69	-1.40
May 1982	53.3	-1.9	6.50	3.69
June 1982	59.7	-4.5	2.89	-0.78
July 1982	70.7	-1.9	1.81	-0.29

* Average temperatures and precipitation obtained from NOAA Climatological Data from 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 1941-1970.

***Data obtained from an alternate source.

Table 1. Continued.

Month & Year	Average Temperature*	Departure from Normal**	Total Precipitation*	Departure from Normal**
<u>Wall (Wasta-Pennington County Reporting Station)</u>				
Aug. 1981	72.7	--	0.54	--
Sept. 1981	64.5	--	1.16	--
Oct. 1981	49.6	--	1.36	--
Nov. 1981	39.1	--	0.53	--
Dec. 1981	26.0	--	0.41	--
Jan. 1982	12.4	--	0.52	--
Feb. 1982	24.7	--	0.26	--
Mar. 1982	34.9	--	2.04	--
Apr. 1982	45.0	--	0.55	--
May 1982	57.9	--	9.85	--
June 1982	64.6	--	1.31	--
July 1982	73.9	--	2.82	--
<u>Meadow (Bison-Perkins County Reporting Station)</u>				
Aug. 1981	69.8	--	3.97	2.16
Sept. 1981	60.5	--	2.08	0.78
Oct. 1981	45.1	--	0.58	-0.25
Nov. 1981	37.0	--	0.56	0.02
Dec. 1981	19.9	--	0.38	0.11
Jan. 1982	3.6	--	0.48	--
Feb. 1982	17.7	--	0.11	-0.30
Mar. 1982	26.9	--	2.60	1.87
Apr. 1982	38.7	--	2.19	0.59
May 1982	53.1	--	7.27	4.74
June 1982	61.5	--	1.41	-2.54
July 1982	71.2	--	1.49	-0.56
<u>Winner (Tripp County Reporting Station)</u>				
Aug. 1981	73.4	-1.2	2.75	0.02
Sept. 1981	67.1	3.3	0.65	-1.17
Oct. 1981	52.4	-0.3	2.50	1.28
Nov. 1981	43.2	6.0	1.25	0.52
Dec. 1981	24.7	-1.4	1.06	0.58
Jan. 1982	10.9	-10.6	1.01	0.56
Feb. 1982	27.4	0.9	0.10	-0.48
Mar. 1982	36.4	3.4	1.70	0.58
Apr. 1982	46.8	-1.7	1.55	-0.81
May 1982	60.6	1.3	7.77	4.76
June 1982	66.0	-2.5	4.67	0.43
July 1982	76.3	0.4	5.25	2.69

* Average temperatures and precipitation obtained from NOAA Climatological Data from 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 1941-1970.

Table 2. Weather Data - Date of Critical Temperatures and Total Usable-Precipitation in Counties with Experimental Plots, (1981-1982).

Location	Date of Temperature*		Total Usable Moisture**	
	Fall-First	Spring-Last	Aug 81-July 82	April 82-July 82
Bennett County (Martin)	Sep 16 (26)	Apr 30 (25)	23.43	14.45
Harding County (Ralph)	Sep 1 (28)	May 6 (28)	18.76	11.08
Jones County (Murdo)	Oct 21 (27)	Apr 22 (26)	24.44	14.71
Lyman County (Kennebec)	Sep 17 (27)	Apr 30 (28)	21.82	14.53
Meade County#				
(Ft Meade)	Oct 21 (25)	Apr 19 (26)	22.84	13.94
(Plainview)	Oct 12 (24)	Apr 21 (27)		
Pennington County				
(Wasta)	Oct 21 (28)	May 6 (28)	21.35	14.53
(Rapid City)	Oct 6 (28)	Apr 22 (27)	18.95	12.55
Perkins County (Bison)	Oct 14 (25)	May 6 (26)	23.12	12.36
Tripp County (Winner)	Oct 22 (24)	Apr 22 (26)	27.7	16.68

* First 28° temperature in Fall or last 28° temperature in Spring.

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

Ft Meade was used as the reporting point for Bear Butte Valley, while an average of data from two reporting points for the Department of Natural Resources was used for the Plainview research site.

SMALL GRAIN VARIETY TRIALS

Objective: To observe and compare standard small grain varieties and experimental lines for winterhardness, grain yield, grain quality, disease resistance, insect resistance, and other characteristics for area adaptability.

Hard Red Winter Wheat

Trials were located in Bennett, Lyman, Meade-(2 locations), Pennington, and Perkins counties. All plots were seeded in non-fertilized fallow with a deep furrow drill. The seeding rate averaged 60 pounds per acre.

The plots were harvested with a HEGE Model 125B self-propelled plot combine. Machine harvested plots contained a minimum of 100 square feet per sample. All plots contained six rows with a 12 inch space.

Table 3. Hard Red Winter Wheat Variety Trial - Bennett County(Martin), 1981-82.

Variety	Percent	Height	Date of	Percent	Test Wt	Grain Yield-Bu/Acre		
	Stand	(Inches)	Heading	Protein*	(Lbs/Bu)	1981	1982	(2 yr av)
SD 76694	88	37	June 14	12.8	60.6	--	59.1	--
NE 78415	90	35	13	12.9	61.9	--	58.9	--
Brule**	85	34	13	12.1	60.5	53.5	58.6	56.0
Rita**	87	32	14	12.7	59.2	50.2	57.6	53.9
SD 74221	90	38	14	13.8	62.8	43.8	57.1	50.4
SD 76598	90	43	June 15	12.9	60.6	49.7	57.0	53.4
Rocky	88	39	14	12.1	61.6	54.3	56.2	55.2
CO 786741	90	35	11	13.5	62.6	--	55.7	--
Dawn**	85	32	13	11.6	62.5	49.9	55.3	52.6
Rose**	91	37	14	12.2	60.8	55.2	54.4	54.8
Sage	86	36	June 11	13.0	61.6	53.0	54.2	53.6
NE 78668	91	39	14	12.7	61.8	--	53.8	--
SD 76705	90	35	14	13.1	61.0	44.0	53.4	48.7
SD 75284	94	35	11	13.3	62.2	48.3	53.3	50.8
Centurk 78	86	38	13	12.1	61.6	45.1	53.3	49.2
Larned	86	35	June 11	12.0	62.0	48.8	53.2	51.0
Archer	83	31	14	11.6	60.0	46.1	52.9	49.5
NE 78465	93	40	14	12.5	61.5	--	52.8	--
TAM 105	89	28	10	11.7	61.4	49.0	51.6	50.3
SD 76709	88	37	14	13.5	61.5	47.5	50.8	49.2
Bronze	84	40	June 13	13.1	62.0	45.1	50.5	47.8
Rall	86	34	11	13.0	62.0	50.1	50.2	50.2
Newton	83	31	11	12.8	60.6	46.3	49.8	48.0
Gent	84	36	12	13.2	62.0	48.1	48.3	48.2
Scout 66	89	37	10	13.1	61.5	50.1	48.0	49.0
Buckskin	74	38	June 14	12.6	61.6	54.2	48.0	51.1
Lancer	88	40	14	12.9	61.5	43.5	47.9	45.7
Nell**	91	38	12	12.4	60.8	47.2	47.1	47.2
Agate	90	41	13	11.5	61.5	59.3	47.1	53.2
Wall	90	39	13	12.7	61.9	51.5	46.4	49.0
Bennett	82	32	June 11	12.8	60.6	45.8	46.1	46.0
Roughrider	91	45	--	13.1	61.8	47.4	45.9	46.6
Nebred	89	42	13	12.1	61.6	49.0	45.9	47.4
Eagle	86	34	11	12.9	60.8	40.6	45.8	43.2
Vona	80	26	13	12.4	61.4	53.6	38.7	46.2
Winoka	93	46	--	12.5	61.6	45.0	36.2	40.6
ISD(05) - 9.2 Bu/A						C.V. - 12.9%		
						Mean - 51.1		
						49.6		

* Percent protein determined with a Technicon 300 InfraAnalyzer.

**Newly released varieties.

Note: Data presented within the table are an average of four replications. Seeded on September 15, 1981 and harvested on August 2, 1982.

The winter wheat variety trial in Bennett county received a half inch of rainfall within a week after seeding. That moisture plus additional rainfall received in

October permitted immediate germination and the development of healthy, vigorous seedlings. Snow cover and precipitation were light during the winter. In mid-March wet snow was received. The above normal rains in May, and good growing conditions of May and June resulted in yields of 144% of the average of the last ten years.

Table 4. Hard Red Winter Wheat Variety Trial - Lyman County(Kennebec), 1982.

Variety	Winter Hardiness	Percent Protein*	Test Weight (lbs/Bu)	Grain Yield (bu/Acre)
Dekalb 554	--	12.3	61.0	77.8
TAM 105	Fair	12.4	59.9	75.9
Dawn**	Fair-Good	12.6	60.5	69.0
Bennett	Good	12.4	59.2	68.3
Sage	Good	13.2	62.0	68.1
Salad	--	--	59.8	66.9
Rita**	Good	13.5	56.1	66.3
Eagle	Fair	13.3	62.0	66.1
Centurk 78	Good	13.1	60.0	66.1
Gent	Good	13.0	61.5	66.0
Dekalb H85B	--	12.6	60.6	66.0
Archer	--	12.0	57.4	65.8
Rose**	Good-Exc.	13.0	61.1	65.3
Larned	Fair	12.4	61.1	65.2
Rall	Fair	12.5	60.8	64.6
Nell**	Good	12.1	60.1	63.6
Wall	--	13.3	61.5	62.6
Rocky	Good	12.9	59.9	61.6
Lancer	Good	12.3	60.6	61.5
Agate	Good	12.4	60.6	58.4
Weathermaster 106	--	12.8	61.4	58.0
Dekalb 1150	--	12.6	59.4	57.8
Buckskin	Good	12.2	58.8	57.7
Scout 66	Fair	13.2	60.8	55.6
Bronze	Excellent	12.4	60.6	53.7
Roughrider	Excellent	13.9	60.5	48.1
Winoka	Excellent	13.1	60.4	46.9

LSD(05) - 4.2 Bu/A

C.V. - 4.8%

Mean - 63.1

* Percent protein determined with a Technicon 300 InfraAnalyzer.

**Newly released varieties.

Note: Data presented within the table are an average of four yield samples.

Lyman county was considered as under drought conditions at seeding time in 1981. Fall rains in October and November brought the rainfall situation to a normal level. During the winter and early spring precipitation averaged near normal with some months above and some below. In May, exceptionally heavy rainfall was experienced.

Temperatures followed the same pattern as rainfall with below normal temperatures and low precipitation, or above normal temperatures and high precipitation. The combination of those conditions resulted in tall plants that produced an abundance of good quality grain. However, because of the tall heavy growth, lodging was serious in some areas.

Table 5. Hard Red Winter Wheat Variety Trial - Meade County(Bear Butte Valley), 1981-82.

Variety	Percent Stand*	Height (Inches)	Date of Heading	Percent Protein**	Test Wt (Lbs/Bu)	Grain Yield-Bu/Acre		
						1981	1982	(2 yr av)
TAM 105	100	35	June 8	13.2	61.0	45.0	64.5	54.8
Nell***	100	45	10	13.5	62.0	--	63.2	--
Brule***	82	38	12	12.6	59.3	--	61.5	--
Sage	100	43	9	13.6	63.2	46.5	61.2	53.8
Norstar	100	43	10	13.0	62.0	47.2	61.2	54.2
Rall	70	41	June 9	13.1	62.3	--	59.8	--
Archer	100	37	12	12.4	57.2	--	59.7	--
Buckskin	100	46	13	13.1	59.5	46.5	59.3	52.9
Scout 66	90	45	9	12.8	62.5	51.6	58.6	55.1
Gent	100	44	11	13.5	62.5	42.4	58.5	50.4
Bennett	100	40	June 9	13.3	61.3	41.1	58.5	49.8
Eagle	90	39	9	14.6	62.0	--	58.3	--
Baca	90	45	8	13.2	62.7	--	57.6	--
Wings	64	39	12	13.3	60.8	37.3	56.5	46.9
Centurk 78	100	43	13	13.0	59.5	46.2	55.8	51.0
Rose***	100	45	June 14	14.1	58.7	--	54.6	--
Dawn***	82	38	12	13.5	59.8	40.2	54.4	47.3
Agate	93	47	13	12.6	61.3	43.6	54.4	49.0
Rita***	90	39	15	14.0	55.3	51.6	52.9	52.2
Lancer	100	47	13	13.6	61.0	--	52.9	--
Wall	80	47	June 11	13.7	60.7	36.1	51.9	44.0
Rocky	100	42	14	13.1	59.5	51.8	50.8	51.3
Winoka	80	50	16	13.3	61.5	40.4	48.7	44.6
Roughrider	94	50	15	14.4	60.3	46.0	48.6	47.3
Bronze	100	47	12	13.6	59.8	42.6	46.6	44.6
YTO-117	100	55	17	14.5	59.8	--	43.7	--

LSD(05) - 6.1 Bu/A

C.V. - 6.7%

Mean - 55.9

* Percent stand visually determined from ground cover in April 1982.

** Percent protein determined with Technicon 300 InfraAnalyzer.

***New variety.

Note: Yield data presented in table are an average of 3 replications. Seeded September 17, 1981 and harvested July 23, 1982.

The winter wheat variety trial near Bear Butte Village received showers both before and after seeding. Germination was immediate and emergence good, resulting in healthy vigorous seedlings. During October several showers fell providing adequate fall moisture. Temperatures during the winter were mild except during January when they averaged ten degrees below normal for western South Dakota. The area had adequate precipitation during the spring and far above normal during May. Growing conditions during the remainder of the season were very good. The average yield for the trial was nearly 56 bushels per acre, which was 20 bushels higher than the 1974-82 average.

Table 6. Hard Red Winter Wheat Variety Trial - Meade County(Plainview), 1981-82.

Variety	Percent	Height	Date of	Percent	Test Wt	Grain Yield-Bu/Acre		
	Stand*	(Inches)	Harvesting	Protein**	(Lbs/Bu)	1981	1982	(2 yr av)
Sage	95	39	June 10	13.6	60.2	30.0	61.2	45.6
Scout 66	95	40	9	12.8	61.0	27.1	59.6	43.4
Bennett	95	36	10	13.3	59.8	31.5	59.0	45.2
Wings	92	34	11	13.3	59.7	31.0	56.9	44.0
TAM 105	95	30	8	13.2	59.2	40.7	56.5	48.6
Archer	95	34	June 13	12.4	56.8	--	56.5	--
Rose***	95	41	14	14.1	58.5	--	56.3	--
Wall	95	43	12	13.7	59.7	33.6	56.1	44.8
Nell***	95	39	10	13.5	59.7	--	56.0	--
Centurk 78	93	39	13	13.0	58.3	36.8	55.8	46.3
Rocky	93	40	June 14	13.1	59.0	35.1	55.6	45.4
Brule***	92	35	14	12.6	57.5	--	55.4	--
Baca	93	39	10	13.2	60.5	--	55.2	--
Norstar	95	38	12	13.0	60.5	24.7	54.8	39.8
Agate	95	43	14	12.6	60.2	33.9	54.8	44.4
Dawn***	93	35	June 13	13.5	59.5	41.6	54.4	48.0
Gent	90	37	12	13.5	59.7	34.4	53.8	44.1
Buckskin	92	40	14	13.1	59.5	41.1	53.4	47.2
Rita***	95	35	14	14.0	55.0	32.4	53.0	42.7
Rall	92	36	11	13.1	59.7	--	52.8	--
Eagle	92	34	June 12	14.6	60.0	--	52.8	--
Winoka	95	48	15	13.3	61.0	35.3	51.7	43.5
Lancer	93	42	14	13.6	60.0	--	51.5	--
Roughrider	95	43	16	14.4	59.7	33.9	50.7	42.3
YT0-117	95	56	17	14.5	58.8	--	50.3	--
Bronze	95	42	13	13.6	57.5	26.1	48.2	37.2

LSD(05) - 5.5 Bu/A

C.V. - 6.1%

Mean - 54.7

* Percent stand visually determined from ground cover in April 1982.

** Percent protein determined with Technicon 300 InfraAnalyzer.

***New variety.

Note: Data presented within the table are an average of three replications.

Seeded September 16, 1981 and harvested July 28, 1982.

The winter wheat trial at Plainview received rain both prior to and shortly after the plots were seeded. The conditions were favorable for immediate germination and emergence. The area also received good showers at weekly intervals during October. The seedlings were vigorous and healthy, and had excellent winter survival. Precipitation was minimal during the winter months, but was sufficient during the spring. Heavy showers during May resulted in tall plants with heavy growth. Yields in 1982 were almost double the average for the six (1977-82) year average.

Pennington County

The winter wheat variety trial in Pennington county was seeded in dry to slightly moist soil on September 17. A week later an inch of rain fell which provided excellent conditions for germination and emergence. Below normal temperatures in October restricted growth. However, adequate ground cover was produced. Lack of winter snow cover was followed by cool dry weather through April. The restricted fall growth and unfavorable conditions in the spring were exhibited by stunted plants which had poor color and a general lack of vigor. Rainfall in May provided better growing conditions so that by maturity the plants were normal height with heavy foliage. Winter survival was normal, but yield and grain quality were not. The above normal rain in May resulted in heavy growth which placed the plants under moisture stress at the time the kernels were filling. Test weights and yield were below those of 1981. The data for the trial are shown in table 7.

Perkins County

The trial in Perkins county was seeded in fallow on September 17. The moisture supply was extremely short because of drought conditions in previous years. Even though the soil moisture was limited good stands were obtained. Extremely cold temperatures were experienced in January resulting in severe winterkill. Weather conditions during the spring were not favorable for growth, however, above normal rainfall in May permitted more normal growth and by maturity some varieties had above standard test weights with yields ranging from above to far below the three year (1980-1982) average. Yields and other data are reported in table 8.

Table 7. Hard Red Winter Wheat Variety Trial - Pennington County(Wall), 1981-82.

Variety	Percent Stand*	Height (Inches)	Date of Heading	Percent Protein**	Test Wt (Lbs/Bu)	Grain Yield-Bu/Acre		
						1981	1982	(2 yr av)
TAM 105	86	31	June 14	12.0	58.8	57.0	47.0	52.0
SD 75284	90	32	16	12.8	59.0	52.2	44.6	48.4
Rose***	90	34	17	12.8	59.0	55.5	43.4	49.4
Agate	90	40	19	12.3	59.6	58.6	43.0	50.8
NE 78668	90	33	18	13.5	58.3	--	42.5	--
Brule***	86	32	June 22	12.3	56.1	49.2	41.7	45.4
Larned	84	34	17	12.1	59.4	57.4	40.5	49.0
NE 78415	87	32	19	13.8	57.6	--	40.4	--
Lancer	89	40	21	13.2	59.1	54.4	38.9	46.6
Winoka	89	45	22	13.2	60.0	51.9	38.7	45.3
NE 78465	86	35	June 19	13.5	57.0	--	38.4	--
SD 74221	80	34	21	13.5	58.4	45.0	38.4	41.7
Bennett	81	33	15	13.4	58.6	54.8	38.4	46.6
Dawn***	82	30	20	12.0	58.3	57.7	38.3	48.0
Wall	90	38	17	14.0	58.6	47.4	38.1	42.8
Roughrider	90	42	June 21	13.0	58.3	51.2	37.7	44.4
Nell***	89	35	16	11.9	59.0	50.3	37.5	43.9
Buckskin	80	41	20	13.6	57.5	57.2	37.5	47.4
SD 76694	82	32	21	14.2	56.3	--	37.4	--
Scout 66	85	36	16	13.3	59.1	54.9	37.2	46.0
Rita***	81	31	June 20	13.7	54.9	59.0	37.1	48.0
Nebred	84	41	18	13.2	58.0	53.4	36.3	44.8
Sage	84	33	18	13.2	59.0	54.1	35.5	44.8
SD 76598	86	36	20	13.1	57.7	52.8	35.1	44.0
Rocky	77	35	20	12.6	55.9	58.8	34.8	46.8
SD 76705	84	32	June 20	13.6	55.7	45.9	34.0	40.0
Archer	70	28	20	12.9	55.4	59.2	33.9	46.6
Bronze	87	36	17	13.5	57.6	45.9	33.7	39.8
Newton	70	26	18	12.5	57.5	51.8	33.4	42.6
Rall	76	34	17	12.3	58.9	55.7	33.4	44.6
Centurk 78	86	33	June 20	13.3	57.1	61.0	33.3	47.2
Co 786741	72	30	18	12.8	58.4	--	32.5	--
Eagle	75	34	17	13.7	59.0	55.4	32.2	43.8
Gent	84	35	19	13.4	58.3	55.5	31.6	43.6
SD 76709	88	34	22	14.6	55.0	42.4	31.5	37.0
Vona	26	26	17	13.1	55.7	57.2	21.8	39.5

LSD(05) - 7.0 Bu/A

Mean - 36.9 45.2

* Percent stand obtained by visual estimate of ground cover on April 14, 1982.

** Percent protein determined with a Technicon 300 InfraAnalyzer.

***Newly released variety

Note: Yield data presented within the table are averages of four replications. Seeded on September 17, 1981 and harvested August 3, 1982. Seeding rate was 60 pounds per acre.

Table 8. Hard Red Winter Wheat Trials - Perkins County(Meadow), 1982.

Variety	Height (Inches)	% Winter Survival	Date of Heading	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield-Bu/A 1982 (3 yr av)**	
Rose	28	89	June 30	14.4	62.0	37.0	--
Winoka	33	93	22	15.0	62.7	36.5	35.3
Roughrider	32	91	21	14.2	61.2	35.8	36.6
SD 76705	24	79	20	13.4	60.4	30.7	--
Nebred	31	74	20	14.5	61.0	28.1	31.8
NE 78415	26	59	June 19	13.5	59.2	26.9	--
NE 78668	29	74	19	14.5	59.5	26.7	--
SD 76709	23	60	22	14.4	57.9	26.5	--
Bronze	28	68	20	14.8	60.0	25.6	--
SD 74221	26	64	22	13.6	59.7	25.2	--
Brule	20	46	June 21	13.8	56.5	24.9	--
Agate	29	59	21	14.4	57.6	24.2	30.5
Nell	27	76	20	14.2	58.7	23.0	--
NE 78465	27	46	20	14.8	58.1	22.7	--
SD 76598	21	59	20	14.1	59.2	22.7	--
Rita	26	56	21	14.2	57.7	22.7	--
SD 75284	25	44	June 19	13.8	57.2	20.0	--
Bennett	26	60	17	14.1	57.6	19.4	24.3
Dawn	21	24	21	14.2	57.5	19.2	--
CO 786741	23	59	18	14.8	58.4	19.1	--
TAM 105	21	56	17	14.0	57.6	19.1	--
Sage	25	36	20	14.3	57.3	18.9	24.5
Lancer	26	26	June 22	14.6	56.2	18.2	27.0
Rall	27	36	18	14.1	57.6	18.0	27.9
SD 76694	23	61	22	13.6	57.6	16.7	--
Buckskin	26	10	22	14.7	55.5	15.4	26.4
Wall	24	23	22	15.0	52.7	14.0	--
Centurk 78	22	28	June 22	13.9	55.5	14.0	23.6
Gent	24	22	19	14.8	55.2	13.8	20.8
Archer	20	26	21	13.6	54.3	13.8	--
Scout 66	24	20	20	14.2	56.0	13.2	25.2
Larned	23	10	19	--	54.7	9.3	21.4

LSD(05) - 8.4 Bu/A

C.V. - 27.4%

Mean - 21.9

* Percent protein determined with a Technicon 300 InfraAnalyzer.

**Three year averages listed are for years 1979, 1981, and 1982.

Note: Trial contained 4 replications. Seeded on September 17, 1981 and harvested on August 6, 1982.

Hard Red Spring Wheat

Plots were seeded at six locations in 1982. All trials were seeded on fallow with a six row plot seeder having an 8 inch row spacing.

Seeding rate was controlled by prepackaging all seed. Fertilizer requirements were predetermined by soil test. Harvesting was accomplished with a self-propelled plot combine. Grain yields and other data are reported in tables 9 thru 20.

Bennett County

Hard Red Spring Wheat plots at Martin were seeded on April 28 in soil fallowed in 1981. Soil moisture, although adequate for germination, was not abundant. Plants grew and tillered well, but conditions during filling and maturation resulted in grain of low weight per bushel. Protein content was above normal. The plots were harvested on August 17 with data being reported in table 9.

Table 9. Hard Red Spring Wheat Variety Trial - Bennett County(Martin), 1981-82.

Variety	Height (Inches)	Date of Harvesting	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
					1982	(2 yr av)
Butte	39	July 3	15.6	55.0	43.4	32.4
Guard (SD 8015)**	32	3	15.8	56.0	32.2	--
SD 2861**	30	3	16.6	54.3	39.2	31.4
Oslo**	30	4	15.2	52.0	38.8	31.2
Centa	39	3	14.8	57.4	38.3	29.0
Aim**	29	July 5	14.1	54.0	37.8	28.7
WPB 906R	31	4	15.0	53.4	37.2	28.5
Alex	39	6	17.3	57.3	37.2	27.4
SD 2903	40	3	15.7	56.6	36.7	--
James	36	3	15.5	53.7	36.7	28.2
SD 2854	37	July 4	16.2	52.6	36.3	27.7
Len**	33	6	16.3	53.7	36.3	28.8
SD 2881	38	3	15.3	56.6	34.8	--
Pioneer 2369**	31	4	15.7	54.9	34.8	--
Olaf**	39	6	16.0	54.6	34.8	27.3
Eureka	39	July 7	16.2	54.4	33.9	26.4
Marshall**	29	9	15.6	53.1	33.8	26.2
Angus**	35	9	16.8	56.4	33.0	26.6
Solar**	30	9	15.5	52.1	31.8	26.2
Probrand 711**	31	6	15.4	54.6	31.8	27.2
Coteau	37	July 8	17.1	54.1	31.8	25.4
Pioneer 2360**	30	6	15.8	54.0	31.0	--
Chris	40	4	17.0	54.9	29.4	24.6
Probrand 715**	32	8	16.2	52.5	28.9	25.7
Era**	30	9	15.4	53.9	28.5	25.2
Lew	38	July 8	16.3	55.4	27.8	23.1
Pondera	33	4	16.6	55.3	27.6	24.4
Walera**	29	9	15.6	52.6	23.4	21.4

LSD(05) - 6.1 Bu/A C.V. - 12.7% Mean - 34.2 27.1

* Percent protein determined with a Technicon 300 InfraAnalyzer.

**Semidwarf variety.

Note: Data presented within the table are an average of four replications, Seeded on April 28 and harvested August 17, 1982.

Harding County

A spring wheat trial was seeded near Ralph on May 6. Soil moisture was excellent resulting in immediate germination and emergence. Favorable conditions carried on through the growing season. Grain quality was excellent with protein content ranging from 14.0% to 16.4%. Test weights were near standard weight, but were reduced by 2-3 pounds per bushel by rain which fell after the grain was mature but before it could be harvested. Harvesting was completed on August 24. Trial results are reported in table 10.

Table 10. Hard Red Spring Wheat Variety Trial - Harding County(Ralph), 1982.

Variety	Height (Inches)	Date of Heading	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield (Bu/Acre)
Guard (SD 8015)**	31	July 8	15.0	59.4	69.7
Alex	38	10	15.7	59.2	69.3
Olaf**	31	10	15.3	59.5	66.1
SD 2854	35	9	16.0	56.9	64.8
Marshall**	28	10	14.2	57.0	64.6
SD 2903	34	July 6	15.1	60.5	64.1
Centa	35	5	14.9	59.8	63.9
Butte	35	6	15.2	61.0	63.7
SD 2861**	32	6	15.5	58.8	62.2
Len**	31	9	15.6	59.2	62.2
Coteau	36	July 10	16.0	57.9	60.8
James	33	7	14.4	58.6	60.6
Angus**	30	10	15.9	58.4	60.4
Aim**	32	9	13.6	58.9	60.1
Oslo**	29	5	14.2	57.8	58.4
WPB 906R**	30	July 5	14.7	58.1	58.1
Pioneer 2360**	31	9	14.4	57.8	56.8
Eureka	38	9	16.2	57.5	56.4
Pioneer 2369**	31	9	14.0	58.2	56.3
Era**	29	10	14.2	57.0	53.5
Walera**	29	July 10	14.3	55.1	52.8
SD 2881	36	8	16.4	59.0	52.8
Probrand 715**	31	10	14.6	57.2	50.6
Probrand 711**	32	9	14.6	57.0	50.5
Chris	37	9	16.2	57.8	48.6
Solar**	28	July 10	14.3	55.9	48.3
Lew	37	10	15.5	59.8	47.6
Pondera	33	8	15.1	57.1	47.2

LSD(05) - 7.6 Bu/A

C.V. - 9.4%

Mean - 58.2

* Percent protein determined with a Technicon 300 InfraAnalyzer.

**Semidwarf variety.

Note: Data presented within the table are an average of four replications. Seeded May 6 and harvested August 24, 1982.

Meade County
(Bear Butte Valley)

The spring wheat variety trial was seeded in Bear Butte Valley on April 27. Soil moisture conditions were only fair because of a lack of winter snow. However, conditions improved in May with heavy showers, and conditions looked favorable for a good harvest. High temperatures during the period July 20-24 damaged the developing heads resulting in good yields, but poor quality grain. Weights per bushel were 10-15 pounds below standard. The kernels were shrivelled and contained high levels of protein. The data are reported in table 11.

Table 11. Hard Red Spring Wheat Variety Trial - Meade County(Bear Butte Valley), 1981-82.

Variety	Height (Inches)	Date of Heading	Percent Protein*	Test Wt (Lb./Bu)	Grain Yield-Bu/A	
					1982	(2 yr av)
WPB 906R**	23	June 27	17.2	48.3	37.2	28.5
WS 1809**	22	27	15.1	47.3	35.6	27.3
Oslo**	23	28	14.5	46.6	35.4	--
Protor**	21	28	15.4	49.6	34.3	27.3
Eureka	30	July 2	17.6	47.3	33.6	23.2
SD 8021	29	July 1	16.3	55.0	32.3	--
Butte	29	July 29	16.0	49.4	32.3	24.9
Probrand 715**	25	July 6	16.1	47.7	32.1	--
Centa	29	June 27	16.2	49.4	32.1	--
Fortuna	28	July 3	16.5	51.6	31.2	22.9
Waldron	29	July 2	14.3	48.3	31.2	--
Olaf**	24	2	17.0	47.0	30.5	22.7
James	26	June 29	16.7	46.7	30.5	23.9
Probrand 711**	24	July 2	15.7	47.3	30.1	25.7
Pondera	25	2	15.6	50.1	30.1	23.4
Marshall**	21	July 5	16.2	45.0	29.0	--
Alex	30	4	18.4	50.3	28.7	--
Angus**	25	3	16.8	46.7	28.1	22.4
Aim**	24	3	17.1	43.1	27.6	20.6
Coteau	29	5	17.6	47.0	27.2	20.4
Len**	22	July 3	17.1	45.4	26.9	22.7
Lew	27	5	18.3	51.0	26.5	19.3
Era**	23	4	16.5	45.0	26.3	22.0

LSD(05) - 3.4 Bu/A C.V. - 7.8% Mean - 30.8 23.6

* Percent protein determined with a Technicon 300 InfraAnalyzer.

**Semidwarf variety.

Note: Data contained within the table are an average of four replications.
Seeded on April 27 and harvested August 11, 1982.

Meade County
(Plainview)

A spring wheat variety trial was seeded at Plainview on May 5. The soil had been fallowed in 1981. Snow and rain received in March provided sufficient

moisture for germination. Cool temperatures and small showers delayed seeding until early May. This was followed by frequent showers and cool temperatures which lasted until mid-June. The soil became saturated causing seed to rot, poor emergence, and poor stands. Plants were stunted, quite variable, and did not mature uniformly. The grain produced was high in protein, low in weight per bushel, and shrivelled. The data from the trial are reported in table 12.

Table 12. Hard Red Spring Wheat Variety Trial - Meade County(Plainview), 1981-82.

Variety	Height (Inches)	Maturity Rating	Percent Protein*	Test Wt (lb./Bu)	Grain Yield-Bu/A 1982 (2 yr av)	
Butte	26	Early	15.3	54.0	29.3	20.2
Centa	26	Early	15.8	54.8	24.9	--
Alex	26	Med. Late	17.5	56.0	24.7	--
Fortuna	24	Medium	17.1	52.8	20.1	15.5
Pondera	22	Med. Early	16.0	55.0	18.6	15.0
Oslo**	18	Med. Early	15.5	49.5	18.4	--
Olaf**	20	Med. Late	--	52.8	17.9	15.3
Lew	26	Med. Late	17.2	54.2	17.9	14.1
Waldron	27	Medium	17.5	51.2	16.9	--
James	23	Medium	15.8	54.0	16.7	14.5
Coteau	25	Late	17.9	49.5	16.7	12.5
Angus**	22	Late	17.2	53.0	16.7	13.8
Aim**	19	Medium	15.7	51.8	16.7	13.3
Eureka	25	Medium	--	51.5	16.5	14.2
Era**	21	Late	16.1	52.0	16.5	13.2
Len**	20	Med. Late	17.1	52.8	15.2	13.6
WPB 906R**	17	Med. Early	16.8	52.5	15.2	15.4
Marshall**	21	late	16.1	51.8	14.0	--
Probrand 715**	22	Late	16.7	50.2	12.1	--
WS 1809**	20	Very Early	15.5	49.3	10.6	12.3
SD 8021	22	Early	17.0	54.8	9.4	--
Protor**	18	Med. Early	17.0	50.0	9.0	9.5

LSD(05) - 7.5 Bu/A C.V. - 27.2% Mean - 17.0 12.8

* Percent protein determined with Technicon 300 InfraAnalyzer.

**Semidwarf variety.

Note: Data presented within the table are an average of three replications. Seeded May 5 and harvested August 10, 1982. Water saturated soil resulted in stand loss of some varieties.

Pennington County

The spring wheat variety trial at Wall was seeded in fallow soil on April 30. Soil moisture conditions were favorable for germination and emergence, but cool temperatures in May resulted in thin stands. The growth of the plants was slow because of cool temperatures and prolonged rainy periods during the latter part of May and early June. Some of the variety plots were destroyed by water saturated soil. Limited rainfall in late June and July placed the

plants under moisture stress during the critical time between heading and maturity. The data presented in table 13 shows high protein content and low test weight which are indicators of moisture stress. Grain yields are near the two year average showing little difference from the previous years yield.

Table 13. Hard Red Spring Wheat Variety Trial - Pennington County(Wall), 1981-82.

Variety	Height (Inches)	Date of Heading	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
					1981	(2 yr av)
Guard (SD8015)**	29	July 4	16.1	56.0	33.2	--
Centa	35	3	15.9	56.4	33.0	--
Butte	34	4	16.5	55.7	32.5	26.7
WPB 906R**	27	4	16.0	54.1	30.5	25.1
SD 2903	35	4	15.3	55.7	30.1	--
SD 2861**	29	July 5	16.3	52.9	30.0	26.3
SD 2881	34	5	17.5	55.7	28.9	--
James	32	4	16.4	54.3	28.9	26.6
Marshall**	31	7	16.5	51.3	28.3	25.7
Olaf**	31	6	16.7	54.5	26.9	25.9
Oslo**	25	July 5	15.7	50.7	26.7	27.1
Alex	35	6	16.9	56.0	26.7	25.3
Aim**	29	6	15.7	53.4	26.7	25.4
Pioneer 2360**	29	7	16.2	52.4	26.0	--
SD 2854	33	4	16.8	53.3	25.8	25.7
Probrand 711**	30	July 6	15.8	53.9	25.6	24.9
Len**	31	7	16.4	54.5	25.6	23.3
Pioneer 2369**	29	6	16.8	53.6	25.4	--
Chris	34	4	16.5	54.0	25.2	25.1
Angus**	31	6	16.8	54.4	24.0	22.5
Walera**	30	July 10	16.4	45.9	23.4	24.6
Coteau	35	8	17.7	54.3	23.2	23.5
Eureka	35	6	17.3	53.5	23.0	23.5
Probrand 715**	31	8	17.0	53.6	22.5	23.1
Pondera	31	6	16.9	54.3	22.5	23.9
Era**	29	July 8	16.1	53.1	21.0	23.9
Solar**	29	9	16.5	52.3	20.9	22.5
Lew	35	8	17.1	54.5	17.1	22.1

LSD(05) - 3.8 Bu/A C.V - 10.4% Mean - 26.2 24.7

* Percent protein determined with Technicon 300 InfraAnalyzer.

**Semidwarf variety.

Note: Data presented within the table are an average of 4 replications. Seeded on April 30 and harvested August 12, 1982.

Perkins County

The Spring Wheat Variety and Advanced Yield Trials at Meadow were seeded on April 30. The seedbed was dry but contained sufficient moisture for germ-

ination and emergence. Rain showers began ten days later and continued sporadically until the end of May. The precipitation total for the month of May was over 4 inches above normal. During this period growth was slow and some plots were lost to standing water. As June approached the situation changed and for the next two months moisture was limited. The grain quality reflects the plant stress by containing high protein and having low test weight. The grain yields of the variety trial were similar to those of 1981, and are slightly higher than the historic average. The Advanced Yield Trial which is made up of experimental lines and the newer released varieties had considerably higher yields, although both tests were treated the same and were adjacent to each other in the field.

Table 14. Hard Red Spring Wheat Variety Trial - Perkins County(Meadow), 1981-82.

Variety	Height (Inches)	Date of Heading	Percent Protein*	Test Wt (lbs/bu)	Grain Yield-Bu/A	
					1982	(2 yr av)
WPB 906R**	24	July 4	16.0	61.6	33.6	23.9
Coteau	28	9	16.9	59.3	33.2	22.4
SD 2861**	23	4	16.6	59.5	33.0	24.6
Probrand 715**	25	9	15.7	60.6	32.8	21.8
Marshall**	23	8	15.6	60.3	32.8	23.3
Aim**	23	July 6	15.3	61.1	32.7	21.0
Pioneer 2360**	23	8	16.1	61.0	32.3	--
SD 2854	27	4	17.2	59.7	31.9	22.8
Era**	23	8	14.7	61.9	31.9	22.6
Walera**	23	9	14.9	60.1	31.4	22.4
Guard (SD8015)**	24	July 6	15.6	60.1	31.4	--
Len**	25	8	16.0	62.0	31.2	22.2
Alex	26	7	16.7	61.0	31.2	21.6
Solar**	23	9	14.7	61.0	31.0	21.6
Lew	28	8	15.4	62.4	31.0	22.8
Angus**	24	July 6	16.4	61.4	30.7	21.7
Probrand 711**	25	5	14.9	60.5	30.3	22.8
Oslo**	23	5	15.0	60.7	30.0	23.4
Pondera	25	6	15.7	61.7	29.2	22.8
Pioneer 2369**	23	8	16.1	60.5	28.9	--
Olaf**	24	July 8	15.9	59.3	28.5	19.5
Centa	27	4	15.6	62.9	28.5	21.4
Butte	28	4	15.7	61.3	28.0	20.4
SD 2903	26	4	16.4	62.9	27.6	--
Eureka	29	6	16.8	58.3	27.4	20.3
Chris	29	July 6	16.1	59.9	27.4	20.0
SD 2881	28	4	17.6	60.3	25.0	--
James	27	4	15.8	60.1	25.0	19.1

LSD(05) - 4.2 Bu/A C.V. - 10.0% Mean - 30.3 21.9

* Percent protein determined with a Technicon 300 InfrAnalyzer.

**Semidwarf variety.

Note: Data presented within the table are an average of four replications.
Trial seeded May 6 and harvested August 19, 1982.

Table 15. Hard Red Spring Wheat Advanced Yield Trial - Perkins County(Meadow), 1982.

Variety	Height (Inches)	Date of Heading	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield (Bu/Acre)
VEERY=4	22	July 9	15.1	60.8	47.0
SD 2941	26	7	16.0	59.3	45.8
SD 2949	26	8	13.6	61.2	45.3
Wheaton(MN73168)**	23	8	15.0	59.2	44.3
Marshall**	22	July 9	15.3	60.2	43.6
Probrand 711**	26	6	15.0	61.3	43.6
SD 2854	29	5	16.8	58.5	43.4
SD 2922	26	8	16.0	59.5	42.6
SD 2953	25	7	16.0	61.5	42.4
SD 2948	27	July 5	15.6	60.5	41.2
SD 2956	26	7	15.1	60.2	40.4
Len**	27	9	16.3	60.0	40.2
SD 2861**	24	5	15.9	59.0	39.5
Era**	24	9	14.5	61.2	39.2
SD 2926	28	July 6	16.3	61.8	39.2
Guard(SD8015)**	24	4	15.9	60.7	39.0
SD 2951	30	6	16.3	59.5	39.0
SD 2912	26	6	15.8	60.8	38.5
SD 2940	28	5	16.6	58.5	38.5
SD 2935	24	July 7	16.0	58.7	37.5
SD 2903	30	3	16.6	61.3	37.3
SD 2946	27	4	15.9	59.3	37.1
Probrand 715**	26	9	15.2	59.7	36.8
SD 2952	23	7	16.5	61.0	36.6
Pondera	26	July 7	16.0	62.0	36.3
SD 2955	26	4	15.7	59.3	36.1
Alex	27	7	16.9	61.0	35.8
SD 8021	28	5	16.8	61.5	35.6
Eureka	29	8	16.6	59.0	35.1
SD 2954	25	July 8	15.5	60.7	35.1
Olaf**	27	7	16.4	60.7	34.9
SD 2937	30	5	16.5	61.2	34.6
SD 8039	25	5	15.6	61.2	34.6
SD 8026	28	4	16.7	59.3	34.4
SD 2945	25	July 6	17.4	60.2	34.4
SD 8036	24	5	16.3	60.3	33.9
SD 2911	24	8	16.3	58.8	33.7
SD 2942	29	7	16.0	58.7	33.4
SD 2943	27	4	15.7	60.5	32.7
SD 2944	24	July 7	17.0	59.5	32.7
James	27	4	16.2	59.2	32.2
Oslo**	23	4	15.2	58.8	31.7
SD 2947	28	5	16.9	60.8	31.0
SD 2950	27	5	17.1	61.0	31.0
Butte	29	July 4	16.2	60.0	31.0
SD 2881	27	4	17.4	60.8	30.5
SD 8038	31	9	15.5	56.0	28.8
SD 2925	27	5	16.8	58.5	28.3
Centa	26	5	16.0	60.8	27.1

LSD(05) - 7.5 Bu/A

C.V. - 13.3%

Mean - 36.8

* Percent protein determined with a Technicon 300 InfraAnalyzer.

**Semidwarf variety.

Note: Data presented within the table are an average of three replications. Seeded May 6 and harvested August 19, 1982.

Durum Wheat

Durum wheat variety trials were seeded at six locations in 1982. However, the trial at Plainview was destroyed because of flooding and stand loss. The remarks and discussions pertinent to these trials were included in the Hard Red Spring Wheat section and appear just ahead of the table for each location. The yields and other data are listed in tables 16 thru 20.

Table 16. Durum Wheat Variety Trial - Bennett County(Martin), 1981-82.

Variety	Height (Inches)	Date of Heading	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
				1982	(2 yr av)
Ward	33	July 4	55.4	20.7	16.1
Vic	33	4	56.9	17.6	17.1
Rugby	29	4	55.3	17.4	12.3
Crosby	32	5	54.9	17.2	15.0
Cando*	27	July 4	54.3	16.9	15.7
Edmore	33	4	56.5	15.4	16.5
Lloyd (D771)*	26	7	54.1	14.0	--
LSD(05) - 7.0 Bu/A		C.V. - 27.5%		Mean - 17.0	15.4

*Semidwarf variety.

Note: Data presented within the table are an average of four replications. Plots were seeded April 28 and harvested on August 17, 1982.

Table 17. Durum Wheat Variety Trial - Harding County(Ralph), 1982.

Variety	Height (Inches)	Date of Heading	Test Wt (Lbs/Bu)	Grain Yield	
				(Bu/Acre)	
Rugby	38	July 9	59.6	66.8	
Calvin*	28	July 9	58.8	66.4	
Lloyd (D771)*	30	July 9	56.3	63.3	
Cando*	29	July 10	58.1	62.4	
Crosby	37	July 8	59.6	62.4	
Ward	37	July 9	59.1	62.2	
Vic	38	July 9	59.0	59.7	
Rolette	36	July 7	59.5	55.3	
Botno	37	July 7	58.9	53.8	
Edmore	39	July 8	58.3	52.9	
LSD(05) - 6.6 Bu/A		C.V. - 7.6%		Mean - 60.5	

*Semidwarf variety.

Note: Data presented within the table are an average of four replications. Plots were seeded May 6 and harvested August 24, 1982.

Table 18. Durum Wheat Variety Trial - Meade County(Bear Butte Valley), 1981-82.

Variety	Height (Inches)	Date of Heading	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
				1982	(2 yr av)
Botno	31	June 30	54.5	36.1	25.5
Rugby	29	July 1	53.6	35.2	25.1
Rolette	30	June 29	55.3	34.3	25.5
Crosby	30	July 1	53.1	32.8	24.5
Vic	31	July 2	55.4	32.7	22.7
Ward	27	July 2	54.4	31.2	23.1
Edmore	27	July 2	53.9	31.2	22.1
Lloyd (D771)*	21	July 2	48.0	31.0	--
Cando*	21	July 2	48.7	30.1	22.5
Calvin*	20	July 2	51.4	30.1	23.1
Sheba	--	--	49.6	21.4	--

LSD(05) - 3.8 Bu/A C.V. - 8.4% Mean - 31.5 21.4

*Semidwarf variety.

Note: Data presented within the table are an average of four replications.
Plots were seeded April 27 and harvested August 11, 1982.

Table 19. Durum Wheat Variety Trial - Pennington County(Wall), 1981-82.

Variety	Height (Inches)	Date of Heading	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
				1982	(2 yr av)
Lloyd (D771)*	25	July 6	55.0	20.2	--
Cando*	28	6	55.0	17.6	17.3
Ward	30	5	56.1	17.4	19.2
Rugby	29	6	55.6	14.9	17.1
Vic	31	July 6	56.0	14.3	14.9
Edmore	30	6	56.0	13.8	15.5
Crosby	26	6	54.7	11.6	17.9

LSD(05) - 4.8 Bu/A C.V. - 20.6% Mean - 15.7 17.0

*Semidwarf variety

Note: Data presented within the table are an average of three replications.
Plots were seeded April 30 and harvested August 12, 1982.

Table 20. Durum Wheat Variety Trial - Perkins County(Meadow), 1981-82.

Variety	Height (Inches)	Test Weight (Lbs/Bu)	Grain Yield-Bu/A	
			1982	(2 yr av)
Lloyd (D771)*	24	57.7	42.6	--
Cando*	23	60.9	38.5	26.1
Vic	27	59.0	32.3	22.8
Ward	29	58.6	31.6	23.7
Rugby	27	58.4	30.7	20.7
Edmore	30	58.1	30.3	24.4
Crosby	28	59.5	29.2	20.8

LSD(05) - 7.0 Bu/A C.V. - 14.0% Mean - 33.6 23.1

*Semidwarf variety.

Note: Data presented within the table are an average of four replications.
Plots were seeded May 6 and harvested August 19, 1982.

Oat Variety Trials

Oat variety trials were conducted on a cooperative basis at six locations in 1982. Seeding dates ranged from April 27 to May 6. All trials were seeded on fallow with a six row plot seeder having an 8 inch row spacing. Seeding rates were controlled by prepackaging all seed. Fertilizer requirements were predetermined by soil test. Harvesting was accomplished with a self-propelled plot combine. Grain yields and other data are reported in tables 21 thru 26.

Table 21. Oat Variety Performance Trial - Bennett County(Martin), 1981-82.

Variety	Height (Inches)	Date of Heading	Percent Oil*	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
						1982	(2 yr av)
Moore	37	July 6	9.8	22.6	30.0	71.5	60.8
Lancer	32	6	6.3	17.4	34.5	71.5	60.6
Larry	30	4	7.4	24.5	31.7	70.1	55.9
Otee	31	6	7.4	18.8	35.3	68.7	56.9
Noble	30	5	6.3	16.7	36.0	68.4	54.3
Lang	30	July 3	7.0	21.5	30.9	68.1	62.0
Porter	28	7	6.9	18.9	33.5	67.4	--
Ogle	31	5	5.6	16.6	32.0	67.4	66.1
Otana	34	8	6.1	17.7	34.1	66.7	58.9
SD 773358-10	34	5	8.3	18.6	35.6	64.3	53.9
Burnett	33	July 6	5.5	16.4	34.6	64.0	51.5
Nodaway 70	33	4	5.9	18.9	37.1	63.6	48.9
Preston	32	5	8.9	20.9	33.6	63.3	52.1
Chief	33	4	6.1	20.9	35.1	63.3	52.5
Benson	37	7	6.5	18.7	31.9	62.6	50.6
Bates	29	July 3	8.6	18.3	34.4	62.6	56.4
SD 78-0304	32	8	7.8	19.8	31.7	62.3	--
Dal	30	9	8.5	19.7	31.6	61.6	50.3
Wright	36	7	8.3	17.6	34.1	61.3	51.1
Arrowhead 135E**	29	6	6.8	17.9	36.5	60.9	--
SD 78-0393	37	July 7	7.3	27.5	32.7	60.2	--
SD 78-0352	35	7	7.9	21.9	32.1	59.9	--
Lyon	35	6	7.1	19.1	33.1	56.2	54.5
Arrowhead 335M**	30	6	5.9	16.7	35.6	54.4	--
SD 773358-06	34	4	7.3	19.1	36.5	53.4	42.0
Marathon	34	July 9	8.2	24.3	29.0	52.4	47.7
SD 773358-12	37	9	6.7	19.7	33.0	51.0	48.3
Froker	30	9	5.4	16.0	34.9	47.3	44.7

LSD(05) - 11.9 Bu/A C.V. - 13.7% Mean - 62.3 53.6

*Percentages of oil and protein are reported on dehulled kernels or groats only, and were determined with a Technicon 300 InfraAnalyzer.

**Blend of varieties.

Note: Data presented within the table are an average of four replications. Plots were seeded April 28 and harvested August 17, 1982.

Bennett County

Oat plots at Martin were seeded April 28. The seedbed was dry but contained adequate moisture for germination and emergence. A rainy period began in mid-May in which over eight inches of rain fell during the remainder of the month. The abundant moisture helped to develop numerous tillers and provided the plants with necessary moisture during June. In the month of July rainfall was below normal which resulted in only fair grain yields. Weights per bushel were low with most varieties only producing near standard weight grain. The data are reported in table 21.

Table 22. Oat Variety Performance Trial - Harding County(Ralph), 1982.

Variety	Height (Inches)	Date of Heading	Percent Oil*	Percent Protein*	Test Wt (lbs/Bu)	Grain Yield (Bu/Acre)
Porter	35	July 9	7.4	18.9	39.9	151.3
Ogle	32	6	6.2	18.7	37.8	146.2
Lang	32	4	6.4	16.8	38.5	132.3
Benson	37	8	6.3	19.3	39.5	128.9
Moore	36	9	8.2	20.2	38.9	126.5
Bates	32	July 3	6.2	17.1	39.9	125.5
Otana	34	10	5.4	20.3	38.1	124.8
Larry	30	6	7.7	19.8	39.1	123.1
Burnett	37	8	5.0	19.0	38.8	123.1
SD 78-0393	36	8	7.5	19.6	38.0	122.1
Wright	36	July 8	8.0	21.9	39.3	120.7
Noble	31	7	6.4	20.6	39.5	120.0
SD 773358-12	40	9	7.1	20.5	40.4	117.6
SD 773358-10	35	7	7.7	20.6	39.6	117.3
SD 78-0352	40	9	8.1	22.5	37.1	115.9
Arrowhead 135E**	36	July 6	6.3	19.4	41.1	115.9
Dal	34	10	8.6	25.4	38.8	114.6
SD 78-0304	35	9	7.8	20.3	38.9	112.9
SD 773358-06	34	5	6.8	21.4	41.9	111.9
Nodaway 70	34	4	5.9	20.6	41.1	110.5
Arrowhead 335M**	34	July 7	6.0	20.5	38.5	109.1
Otee	33	7	7.0	21.8	40.9	104.0
Froker	35	10	5.7	19.2	39.8	102.0
Marathon	38	9	8.5	24.9	34.4	101.3
Lyon	36	8	8.0	21.7	38.8	100.3
Lancer	32	July 6	6.8	22.9	38.9	94.2
Preston	32	5	8.1	23.5	40.8	91.8
Chief	35	5	6.2	20.7	39.4	84.7

LSD(05) - 13.1 Bu/Acre

C V. - 8.1%

Mean - 116.0

* Percentages of oil and protein are reported on dehulled kernels or groats only, and were determined with a Technicon 300 InfraAnalyzer.

**Blend of varieties.

Note: Plots were seeded May 6 and harvested August 24, 1982.

Harding County

An Oat trial was seeded near Ralph on May 6. Soil moisture was excellent resulting in immediate germination and emergence. Favorable conditions carried on through the growing season. Grain quality was excellent with protein content ranging from 16.8% to 25.4%. Test weights were high and averaged 39.2 pounds per bushel. Harvesting was completed on August 24. Trial results are reported in table 22.

Table 23. Oat Variety Trial - Meade County(Bear Butte Valley), 1981-82.

Variety	Height (Inches)	Date of Heading	Test Weight (Lbs/Bu)	Grain Yield-Bu/A	
				1982	(2 yr av)
Benson	27	July 3	31.2	92.6	67.6
Lang	26	July 29	30.7	88.9	69.1
Spear	26	June 30	32.2	87.6	64.7
Noble	26	July 1	29.7	87.6	66.0
Ogle	25	June 30	30.0	87.1	68.5
Porter	24	July 6	31.0	85.8	--
Burnett	25	July 1	32.7	83.9	64.1
Nodaway 70	29	June 26	34.5	82.1	62.3
Arrowhead 335M*	25	July 1	32.0	82.1	--
Larry	23	June 30	30.0	79.0	61.9
Chief	28	June 30	31.7	78.5	61.7
Lyon	28	July 2	30.5	78.0	58.1
Marathon	29	July 3	28.2	78.0	57.3
SD 78-0393	28	July 2	29.3	77.1	--
Lancer	25	July 1	31.7	77.1	60.3
SD 773358-10	26	June 30	33.5	76.7	--
Arrowhead 135E*	29	June 28	32.8	76.7	--
Moore	29	July 3	30.3	76.2	57.8
Wright	28	July 2	32.7	75.3	58.3
SD 78-0304	25	July 3	29.0	74.9	--
Dal	27	July 3	32.3	74.9	--
SD 78-0352	27	July 2	29.0	84.0	--
Preston	25	June 30	31.5	74.0	--
SD 773358-06	30	June 28	35.3	73.5	--
Otee	23	July 1	30.7	73.0	57.9
Arrowhead Haylander*	27	July 2	30.5	69.0	--
SD 773358-12	26	July 4	33.0	68.1	--
Diana	25	June 30	33.0	63.1	47.7

LSD(05) - 13.8 Bu/A

C.V - 10.8%

Mean - 78.4

61.4

* Blend of varieties.

Note: Data presented within the table are an average of four replications. Plots were seeded April 27 and harvested August 11, 1982.

Meade County
(Bear Butte Valley)

The Oat variety trial was seeded in Bear Butte Valley on April 27. Soil moisture conditions were only fair because of a lack of winter snow. However, conditions improved in May with heavy showers, and conditions looked favorable for a good harvest. High temperatures and lack of moisture from July 20-24 damaged the developing heads. The results were good yields but poor quality grain. The data are reported in table 23.

Table 24. Oat Variety Trial - Meade County(Plainview), 1981-82.

Variety	Height (Inches)	Date of Heading	Test Weight (Lbs/Bu)	Grain Yield-Bu/A	
				1982	(2 yr av)
Porter	21	July 8	35.0	83.0	--
Moore	26	5	35.2	80.8	49.9
Ogle	24	3	32.5	76.2	50.1
SD 78-0304	24	5	33.8	75.8	--
Nodaway 70	23	June 30	37.8	73.5	48.3
Larry	21	July 2	35.0	73.5	51.7
Arrowhead Haylander*	28	5	33.0	73.5	--
SD 78-0393	26	4	34.0	72.6	--
Lang	18	1	35.5	71.7	47.8
Burnett	25	3	36.8	70.3	47.6
Spear	21	July 2	35.7	69.9	47.4
SD 78-0352	24	3	34.0	69.0	--
Lancer	20	4	36.0	69.0	46.0
Lyon	25	4	33.0	67.6	46.0
Otee	23	3	37.3	67.2	46.6
Benson	25	July 5	35.2	67.2	43.8
Arrowhead 135E*	24	June 30	36.3	67.2	--
Wright	27	July 2	36.3	66.7	44.2
SD 773358-06	23	1	37.3	66.7	--
SD 773358-10	24	2	36.7	65.8	--
Dal	23	July 5	34.3	65.8	--
Arrowhead 335M*	23	2	36.8	65.3	--
Marathon	26	5	31.5	61.7	38.4
Chief	23	3	36.2	59.9	44.9
Preston	23	1	34.5	58.5	--
SD 773358-12	23	July 6	35.8	57.2	--
Noble	21	2	34.7	55.4	41.1
Diana	20	2	38.2	31.3	24.5
LSD(05) - 14.6 Bu/A		C.V. - 13.3%		Mean - 67.2	44.9

* Blend of varieties.

Note: Data presented within the table are an average of three replications. Plots were seeded May 5 and harvested August 10, 1982.

Meade County
(Plainview)

The Oat variety trial at Plainview was seeded in fallow soil. Snow and rain received in March provided sufficient moisture for germination. However, cool temperatures and small showers delayed seeding until early May. This was followed by frequent showers and cool temperatures which lasted until mid-June. The soil became saturated causing some seed to rot, poor emergence, and poor stands. Plants were quite variable, and did not mature uniformly. The grain produced was high in test weight. The data from the trial are reported in table 24.

Table 25. Oat Variety Performance Trial - Pennington County(Wall), 1981-82.

Variety	Height (Inches)	Date of Heading	Percent Oil*	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield-Bu/A 1982	(2 yr av)
Bates	29	July 5	7.7	20.3	33.7	67.7	76.6
Porter	28	8	6.9	21.1	32.6	67.4	--
SD 78-0393	34	9	7.1	20.8	34.4	61.6	--
Arrowhead 135E**	30	6	5.8	19.5	36.5	60.2	--
SD 78-0352	32	8	7.2	22.9	30.1	58.2	--
Otana	33	July 9	5.4	18.0	33.1	58.2	75.0
Wright	35	8	8.0	22.0	35.0	56.8	68.3
SD 773358-06	33	5	6.9	21.3	36.6	56.5	62.5
Ogle	31	7	5.2	16.8	32.4	56.2	68.9
Larry	28	6	7.2	21.0	31.9	54.8	62.7
Benson	32	July 6	7.1	21.2	32.7	54.1	67.3
Noble	29	7	6.9	23.0	34.4	53.8	60.7
SD 78-0304	33	10	7.4	21.9	30.7	53.4	--
Lang	29	5	6.4	18.7	33.7	53.4	69.3
SD 773358-12	35	10	6.8	22.3	34.1	52.8	56.3
Marathon	37	July 10	7.6	21.7	31.3	51.7	57.6
Chief	31	6	6.3	21.3	33.4	50.0	58.7
Lyon	33	8	7.3	22.0	32.3	49.4	64.4
Otee	31	6	6.9	21.8	34.0	48.0	58.4
Lancer	31	7	6.2	22.5	32.1	47.3	66.5
Nodaway 70	29	July 6	5.5	20.2	36.7	47.3	57.9
Preston	31	6	8.6	23.1	34.7	46.3	59.5
SD 773358-10	34	8	7.3	21.0	32.7	45.9	62.9
Moore	33	8	7.8	22.3	31.3	45.3	64.7
Arrowhead 335M**	31	8	5.6	21.6	34.7	42.9	--
Dal	31	July 9	7.8	22.7	31.0	42.2	53.2
Burnett	35	5	5.4	19.1	33.0	41.2	58.5
Proker	32	9	6.0	20.1	35.0	39.8	51.7

LSD(05) - 20.8 Bu/A C.V. 28.5% Mean - 52.2 62.8

* Percentages of oil and protein are reported on dehulled kernels or groats only, and were determined with a Technicon 300 InfraAnalyzer.

**Blend of varieties.

Note: Data presented within the table are an average of four replications. Plots were seeded April 30 and harvested August 12, 1982.

Pennington County

The Oat variety trial at Wall was seeded in fallow soil on April 30. Soil moisture conditions were favorable for germination and emergence, but cool temperatures in May resulted in poor germination and thin stands. The growth of the plants continued to be slow because of the cool temperatures and prolonged rainy periods during the latter part of May and early June. Limited rainfall in late June and July placed the plants under moisture stress during the critical time between heading and maturity. The data presented in table 25 show high protein content and low test weight which are indicators of moisture stress.

Table 26. Oat Variety Performance Trial - Perkins County(Meadow), 1981-82.

Variety	Height Inches	Percent Oil*	Percent Protein*	Test Wt (lbs/Bu)	Grain Yield-Bu/A	
					1982	(2 yr av)
SD 78-0304	29	7.9	20.4	36.9	79.0	--
Otana	31	5.5	18.9	40.6	77.9	50.7
SD 78-0352	29	7.7	21.0	38.7	73.2	--
Marathon	31	8.1	22.3	35.7	72.5	47.4
Wright	29	8.3	22.7	37.1	70.8	46.4
Ogle	27	6.2	18.3	36.1	70.1	52.4
SD 773358-12	30	7.0	21.2	39.9	68.7	47.0
Moore	29	8.3	19.6	38.7	68.4	45.2
Burnett	28	5.1	19.2	39.1	67.0	42.5
Lyon	31	8.2	21.5	37.4	66.7	45.6
Dal	28	8.2	22.7	38.1	66.4	45.0
SD 78-0393	31	7.0	20.5	39.3	65.7	--
Porter	25	7.6	20.6	37.1	65.0	--
Froker	27	--	--	39.7	65.0	43.7
Arrowhead 335M**	28	6.0	20.7	39.4	64.7	--
Benson	30	6.5	21.2	38.4	64.0	40.8
SD 773358-10	28	7.6	20.7	37.7	61.5	43.7
Bates	22	7.9	20.2	37.4	61.6	44.4
Lancer	27	6.1	21.8	39.3	60.6	41.2
Lang	25	6.9	17.9	35.7	58.2	45.1
SD 773358-06	29	6.6	20.7	40.1	55.5	46.0
Preston	27	8.8	23.2	36.3	55.5	48.1
Arrowhead 135E**	28	6.6	21.7	38.7	55.5	--
Noble	27	6.7	21.3	35.4	52.8	37.8
Nodaway 70	26	5.6	18.2	38.0	50.7	38.8
Larry	20	7.8	19.4	36.4	50.7	38.6
Otee	25	7.5	23.8	38.7	49.7	35.4
Chief	28	6.0	21.9	37.4	48.0	38.4

LSD(05) - 13.7 Bu/A

C.V. - 15.6%

Mean - 63.0

43.8

* Percentages of oil and protein are reported on dehulled kernels or groats only, and were determined with a Technicon 300 InfraAnalyzer.

**Blend of varieties.

Note: Data presented within the table are an average of four replications. Plots were seeded May 6 and harvested August 19, 1982.

Perkins County

The Oat Trial at Meadow was seeded on April 30. The seedbed was dry but contained sufficient moisture for germination and emergence. Rain showers began ten days later and continued sporadically until the end of May. The precipitation total for the month of May was over 4 inches above normal. As June approached the situation changed and for the next two months moisture was limited. The grain yields of the variety trial were much higher than those of 1981 with the average 2½ times greater than that of the previous year. The data are listed in table 26.

Spring Barley Trials

Barley variety trials were conducted on a cooperative basis at six locations in 1982. Seeding dates ranged from April 27 to May 6. Soil moisture was adequate for germination and emergence at all sites. Further growth was slow because of cool temperatures and cloudy days. Above normal rainfall during the latter part of May followed by below normal rainfall from late June through July placed the plants under severe stress. Grain quality varied with sites.

Bennett County

Spring barley plots at Martin were seeded April 28. The seedbed was dry but contained adequate moisture for germination and emergence. A rainy period began in mid-May in which over eight inches of rain fell during the remainder of the month. The cool temperatures and moisture helped to develop tillers and also provided the plants with necessary moisture during June. In the month of July rainfall was below normal which resulted in average grain yields. Weights per bushel were slight-below standard weight. The data are reported in table 27.

Table 27. Spring Barley Variety Trial - Bennett County(Martin), 1981-82.

Variety	Height (Inches)	Date of Heading	Percent Plump**	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
					1982	(2 yr av)
Azure**	29	July 6	98.5	47.2	43.3	--
Bumper	27	6	99.0	46.0	40.4	37.2
Morex**	28	3	98.0	45.0	37.7	38.5
Clark	27	7	98.7	45.1	35.8	45.9
Robust (M-36)	26	7	98.8	48.2	35.2	--
Glenn**	28	July 3	99.0	45.0	34.9	21.0
Larker**	28	3	99.0	47.6	33.8	34.6
Primus II	28	2	98.4	48.2	33.4	30.0
Firbeck's III	28	9	98.7	46.9	26.3	33.6
Klages**	23	9	98.1	46.0	25.0	31.4

LSO(05) - 11.7 Bu/A

Mean - 34.6 34.0

* Percentages of kernels not passing through 6/64 inch round hole screen, must be 65% to meet malting standards.

**Approved malting variety.

Note: Data presented within the table are an average of four replications. Plots were seeded April 28 and harvested August 17, 1982.

Harding County

A Spring Barley Trial was seeded near Ralph on May 6. Soil moisture was excellent resulting in immediate germination and emergence. Favorable conditions carried on through the growing season. Grain quality was excellent with percent kernel plumpness above 97%. Test weights were high and averaged over 50 pounds per bushel. Harvesting was completed on August 24. Trial results are reported in table 22.

Table 28. Spring Barley Variety Performance Trial - Harding County(Ralph), 1982.

Variety	Head Type	Height (Inches)	Date of Heading	Percent Plump*	Test Weight (Lbs/Bu)	Grain Yield (Bu/Acre)
Bumper	6-row	36	July 8	98.6	49.6	84.4
Robust (M-36)	6-row	31	7	98.5	51.3	81.6
Larker**	6-row	33	6	98.4	51.5	79.8
Unitan	6-row	31	7	97.7	48.1	78.0
Clark	2-row	31	9	98.3	50.9	75.3
Pirolina**	2-row	33	July 8	98.0	51.1	75.0
Azure**	6-row	32	7	99.0	50.1	75.0
Steptoe	6-row	30	7	97.8	46.8	74.6
Hector	2-row	32	9	98.2	51.5	74.6
Morex**	6-row	31	6	98.8	49.4	74.6
Ingrid	2-row	27	July 8	98.4	51.4	73.0
Shabet**	2-row	31	10	97.9	50.1	72.8
Klages**	2-row	31	10	98.6	50.5	71.9
Glenn**	6-row	30	4	98.5	50.3	70.8
Primus II	6-row	31	4	97.9	50.3	70.3
Compana	2-row	31	July 8	98.5	50.3	68.5
Firlbeck's III	2-row	31	10	98.5	50.9	67.6
Ershabet	2-row	28	6	98.4	51.6	65.8
Menuet	2-row	28	10	97.9	49.8	65.5
Onda**	4-row	30	4	97.7	46.3	60.1

LSD(05) - 10.7 Bu/A

C.V. - 10.4%

Mean - 73.0

* Percentage of kernels not passing through 6/64 inch round hole screen, must be 65% to meet malting standards.

**Approved malting variety.

Note: Data presented within the table are an average of four replications. Plots were seeded May 6 and harvested August 24, 1982.

Meade County (Bear Butte Valley)

The Barley Variety Trial was seeded in Bear Butte Valley on April 27. Soil moisture conditions were only fair because of a lack of winter snow. However, conditions improved in May with heavy showers. From mid-June through July rainfall was below normal. The lack of moisture during that period damaged the developing heads. The results were good yields of poor quality grain. The data are reported in table 29.

Table 29. Spring Barley Variety Trial - Meade County(Bear Butte Valley), 1981-82.

Variety	Percent	Height	Date of	Test Weight	Grain Yield-Bu/A	
	Lodging	(Inches)	Heading	(Lbs/Bu)	1982	(2 yr av)
Glenn*	91	25	June 26	41.6	73.7	50.2
Unitan	92	27	27	41.4	71.9	--
Primus II	70	28	25	46.2	70.6	50.9
SD 79-282	88	27	28	42.5	69.6	--
Morex*	82	27	27	42.1	68.5	50.8
Azure*	54	26	June 28	42.2	68.3	--
SD 79-435	78	28	30	40.9	67.4	--
Larker*	95	26	27	43.5	66.5	46.6
Ershabet	70	26	28	45.9	65.6	--
Steptoe	38	22	29	40.0	64.9	49.2
WE HV #14	32	25	June 27	48.2	61.0	--
Pirolina*	23	26	July 1	44.5	60.0	--
Clark	25	23	2	43.0	60.1	--
SD 79-434	59	26	June 29	45.2	59.7	--
Compana	80	24	30	44.4	59.4	--
Bumper	25	27	July 1	38.9	58.8	41.0
WE HV #9	88	24	June 26	40.9	58.5	--
Onda*	97	23	27	40.4	57.8	--
Hector	41	23	July 2	43.6	56.7	--
Shabet*	25	23	3	41.6	52.4	--
Firlbeck's III	10	23	July 3	42.1	50.6	--
Klages*	10	22	3	41.4	50.1	33.5
Menuet	10	21	2	41.4	49.9	--
Ingrid	--	21	3	43.1	46.3	--
LSD(05) - 8.6 Bu/A		C.V. - 10.0%		Mean - 61.2		46.0

* Approved malting variety.

Note: Data presented within the table are an average of four replications. Plots were seeded April 27 and harvested August 11, 1982. High wind in early August caused severe lodging.

Meade County (Plainview)

The Barley Variety Trial at Plainview was seeded in fallowed soil on May 5. Snow and rain received in March provided sufficient moisture for germination. However, cool temperatures and small showers delayed seeding until early May. This was followed by frequent showers and cool temperatures which lasted until mid-June. The soil became saturated causing some seed to rot, and poor stands. Plants were quite variable, and did not mature uniformly. The grain produced was low in test weight but the kernels were plump. The data from the trial are reported in table 30.

Table 30. Spring Barley Variety Trial - Meade County(Plainview), 1981-82.

Variety	Height (Inches)	Date of Heading	Percent Plump*	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
					1982	(2 yr avg)
Steptoe	18	July 3	98.6	45.3	39.6	27.5
Morex**	21	2	98.7	45.0	35.1	23.9
Primus II	19	1	98.9	46.3	33.6	25.4
Glenn**	18	1	98.9	44.8	32.4	23.3
Larker**	19	3	98.8	44.5	30.2	23.6
Klages**	18	July 7	98.8	44.5	29.0	15.4
Azure**	22	2	98.9	44.7	28.7	--
Bumper	21	5	97.9	43.2	26.6	17.8
Clark	19	6	97.7	44.3	24.5	--
Mean -					31.1	22.4

* Percentage of kernels not passing through 6/64 inch round hole screen, must be 65% to meet malting standards.

**Approved malting variety.

Note: Data presented within the table are an average of three replications. Plots were seeded May 5 and harvested August 10, 1982. Water saturated soil resulted in stand reductions of 32% because of seed rot.

Pennington County

The Spring Barley Variety Trial at Wall was seeded in fallow soil on April 30. Soil moisture conditions were favorable for germination and emergence, but cool temperatures in May resulted in thin stands. The growth of the plants was slow because of cool temperatures and prolonged rainy periods during the latter part of May and early June. Some of the variety plots were destroyed by water saturated soil. Limited rainfall in late June and July placed the plants under moisture stress during the critical time between heading and maturity. The data presented in table 31 show a high percentage of plump kernels and low test weight. Grain yields were very low with the average about half that of 1981.

Perkins County

The Spring Barley Variety Trial at Meadow was seeded on April 30. The seedbed was dry but contained sufficient moisture for germination and emergence. Rain showers began ten days later and continued sporadically until the end of May. The precipitation total for the month of May was over 4 inches above normal. During this period, growth was slow, and some plots were lost to standing water. As June approached the situation changed and for the next two months moisture was limited. The grain quality was good with a high percentage of plump kernels and above normal test weights. The grain yields of the variety trial were similar to those of 1981, but were slightly higher.

Table 31. Spring Barley Variety Trial - Pennington County(Wall), 1981-82.

Variety	Height (Inches)	Date of Heading	Percent Plump*	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
					1982	(2 yr av)
Bumper	27	July 6	98.6	43.2	25.1	44.6
Glenn**	25	6	98.5	44.8	24.2	42.0
Primus II	28	5	98.5	45.5	22.1	38.0
Larker**	27	6	98.1	45.3	21.8	35.0
Robust (M-36)	25	7	98.6	45.5	21.2	--
Azure**	29	July 6	97.9	45.0	20.3	--
Morex**	26	6	97.8	44.5	17.2	38.3
Firlbeck's III	24	9	97.6	45.0	17.2	36.6
Clark	24	9	97.9	45.7	13.9	32.7
Klages**	24	10	--	45.0	10.9	31.2

LSD(05) - 9.6 Bu/A

Mean - 19.4 37.3

* Percentage of kernels not passing through 6/64 inch round hole screen, must be 65% to meet malting standards.

**Approved malting variety.

Note: Data presented within the table are an average of three replications. Plots were seeded April 30 and harvested August 12, 1982. Standing water reduced stands by 23% to 52%.

Table 32. Spring Barley Variety Trial - Perkins County(Meadow), 1981-82.

Variety	Height (Inches)	Date of Heading	Percent Plump*	Test Wt (Lbs/Bu)	Grain Yield-Bu/A	
					1982	(2 yr av)
Clark	22	July 9	99.2	50.8	54.9	47.0
Steptoe	25	6	98.4	45.2	53.5	--
Ingrid	24	9	99.2	51.8	53.5	--
Shabet**	25	9	98.7	51.0	53.1	--
Hector	25	9	98.6	51.9	52.4	--
Unitan	25	July 6	98.7	46.5	52.0	--
Pirolina**	25	7	98.5	50.6	49.5	--
Menuet	23	9	98.7	50.2	48.6	--
Bumper	26	7	99.4	47.4	48.3	40.4
Klages**	22	9	99.2	48.4	47.4	39.8
Compana	23	July 9	99.0	50.4	46.5	--
Glenn**	24	5	98.4	47.4	45.2	48.6
Firlbeck's III	24	9	98.3	50.1	44.5	38.4
Ershabet	24	7	98.6	51.4	43.6	--
Robust (M-36)	25	5	98.8	50.3	43.6	--
Primus II	24	July 4	98.9	47.2	42.0	47.0
Morex**	27	5	99.3	47.4	41.7	46.5
Azure**	25	6	99.0	47.4	39.9	--
Larker**	26	5	98.7	50.0	39.9	40.0
Onda**	24	5	97.9	44.8	38.3	41.0

LSD(05) - 7.7 Bu/A

C.V. - 11.6%

Mean - 46.9 43.2

* Percentage of kernels not passing through 6/64 inch round hole screen, must be 65% to meet malting standards.

** Approved malting variety.

Note: Data presented within the table are an average of four replications. Plots were seeded May 6 and harvested August 19, 1982.

SORGHUM VARIETY TESTING

Grain Sorghum

Objective: To compare the performance of grain sorghum hybrids and varieties for yield and other agronomic characteristics.

Grain sorghum variety trials were seeded in Tripp and Pennington counties in 1982. Included were public and commercial varieties which varied in maturity from short season, or very early, to medium, or mid-season.

The stands varied from excellent to good. Moisture shortage during normal heading period was evident in the Pennington county trial from the number of plants that failed to produce mature seed.

The grain sorghum variety trials grown in 1982 had good soil moisture at seeding time. Rainfall at Winner during July was timely and adequate to support good plant growth. Grain yields were excellent with the average yield above 50 bushels per acre. The trial data are reported in table 33.

The trial at Wall received little moisture during mid-July but had 1.27 inches near the end of the month. The dry period in mid-July resulted in some varieties going dormant, and consequently heading late. The late heading resulted in much of the seed being in the milk stage in October at harvest time. The immaturity is exhibited by both the variety rating and the extremely low test weight. The yield data are reported in table 34.

Table 33. Grain Sorghum Variety Trial - Tripp County(Winner), 1982.

Brand and Variety	Maturity Rating	Test Weight (Lbs/Bu)	Grain Yield (Bu/Acre)
Pioneer 894	Very Early	50.3	65.7
Keltgen KG-60T	Early	48.0	64.5
Pfizer M518G	Early	47.0	60.8
Sokota 466T	Early	49.5	60.8
Sokota 480T	Early	43.3	60.8
Cenex 228T	Med. Early	47.7	59.6
Dekalb A28+	Early	50.7	55.9
Paymaster R930	Early	47.5	55.3
Cenex 224T	Early	49.5	52.2
Keltgen KG-57T	Early	47.5	51.6
Cargill 20	Early	46.3	47.9
Northrup King 2018	Med. Early	46.3	47.3
Northrup King 2030	Med. Early	41.5	41.8
Sokota 488Y	Medium	44.0	41.8
Funk's G251	Very Early	49.7	38.7
			Mean - 53.6

Sorghum Forage Trials

Objective: To compare the various Forage Sorghums, Sorghum-Sudangrass crosses, and sudangrasses as to their adaptability, their forage production, and their forage quality.

Table 34, Grain Sorghum Variety Trial - Pennington County(Wall), 1982.

Brand and Variety	Height (Inches)	Maturity (1-5)*	Test Weight (Lbs/Bu)	Grain Yield (Bu/Acre)
Northrup King MM54BR	43	1	47.3	57.1
Northrup King 121A	43	3	45.0	50.4
Northrup King 1210	42	3	44.7	49.7
Growers Seed Ass'n SG10	47	2	45.3	49.7
Paymaster R920	50	2	46.1	47.4
Pioneer 894	39	2	43.6	46.7
Cenex 224T	39	3	43.6	45.3
Pioneer 8901	44	3	39.2	42.7
Cargill 20	41	2	38.9	41.3
Asgrow Dorado E	46	3	38.7	40.6
Disco 385B	43	3	40.7	39.4
Pride P151-GB	43	2	40.0	39.0
Pride P508-GB	47	2	41.6	38.5
Dekalb A28+	46	3	39.6	37.6
Reliance	49	2	50.1	36.2
Sokota 488Y	48	3	38.3	36.0
Disco 200R	52	3	41.7	35.5
Western WS-201	50	2	46.0	35.5
SD 106	41	2	44.3	34.7
SD 102	42	2	48.7	34.7
Mallard GS1010	46	3	39.0	33.9
SD 104	41	2	46.1	33.4
Mallard GS1010A	51	2	45.0	30.3
Western WS-203	45	3	37.9	28.4
Paymaster R1014	46	3	33.9	25.9
SIGCO 54YG	48	3	36.7	24.1
SIGCO 52YG	48	3	34.7	22.7
Mallard GS1044	48	3	36.9	21.7
Asgrow Corral	48	3	33.8	21.7
Dekalb B38+	45	3	36.9	20.9
Disco 289R	50	3	34.0	20.9
Cenex 228T	48	3	35.2	19.7
Northrup King 1580	45	3	33.7	18.4
Sokota 480	49	3	38.7	17.8
Paymaster R980	43	3	37.7	17.6
Cenex 310T	51	3	32.1	17.4
Northrup King X7911	45	3	33.8	17.4
Hegari	60	3	34.7	14.2
Growers Seed Ass'n 17GBR	44	3	31.0	13.6
Disco 204R	48	3	31.3	12.9
Pride P812GB	48	3	--	10.2
Sokota 330F	65	4	--	9.0
Funk's G623-GBR	42	4	--	7.5
Cenex 700T	57	4	--	7.0
Disco Duo	54	4	--	6.6

LSD(05) - 16.5 Bu/A

Mean - 29.1

*(See footnotes on page 38)

Table 35. Forage Sorghum Variety Trial - Pennington County(Wall), 1982.

Brand & Variety	Height (Inches)	Leaf Number	Maturity (1-5)*	% Sugar in Sap**	HCN*** (ppm)	Plant Type****	Percent Dry Matter	Forage Yield-T/A @ 12% moisture
Northrup King 367	96	17	5	10.4	380	2	32.3	17.4
Paymaster FS 531	96	17	5	9.6	610	2	26.8	13.2
Newell Rose Sugar Drip	85	15	5	11.3	492	2	28.3	12.6
Pioneer 931	109	16	4	9.7	164	3	33.3	12.4
Dekalb FS-25a+	86	15	3	12.8	327	3	28.5	12.1
SIGCO Sooner-Sue	97	13	3	10.6	42	3	33.0	11.6
Pride PF 38	87	17	2	12.1	828	3	30.1	11.6
Disco S 210	92	15	2	12.6	401	3	29.5	11.5
Northrup King X8042F	99	15	4	10.0	310	3	27.8	11.4
Newell Rose Sumac 6550	85	14	3	12.8	548	3	30.7	11.4
Newell Rose Atlas Sorgo	97	16	4	14.1	344	3	32.0	11.3
Paymaster FS 461	86	15	3	14.9	324	3	34.5	11.2
Disco Duo	73	16	4	13.7	290	3	36.2	11.0
Newell Rose Sweet-N-Red	91	13	2	12.5	370	3	31.4	11.0
Waconia	94	13	3	13.5	1039	3	32.3	10.6
Pride PF 70	104	17	4	9.9	323	3	26.0	10.6
Newell Rose Rox Orange	89	15	3	11.5	164	3	29.5	10.5
Dekalb FS-4	93	15	3	12.1	304	3	32.8	10.4
Robinson Regro H20B	99	14	4	13.5	83	3	34.7	10.4
Sokota 330F	85	15	4	13.2	468	3	31.3	10.2
Western WS-58	77	15	4	11.7	324	3	31.6	10.2
Newell Rose Early Sumac	87	13	3	13.8	618	3	31.9	10.2
Growers SSF 55	87	16	4	11.9	295	2	28.0	10.1
Pioneer 956	91	15	4	13.7	226	3	32.2	9.9
Paymaster FS 451	74	15	4	14.7	458	3	33.0	9.8
Disco Wintergraze	97	14	4	13.1	420	3	29.1	9.8
Cenex 700T	76	15	4	14.4	645	3	33.7	9.4
Newell Rose Leoti Red	94	13	2	12.2	510	3	33.7	9.4
Pfizer F 40A	98	15	3	11.8	574	3	28.9	9.3
Newell Rose Hegari	62	13	2	14.1	658	8	32.9	9.2

(continued)

(Table 35. continued)

Western WS-60	92	14	4	12.3	356	3	30.8	9.1
Northrup King X7984F	91	13	2	12.9	400	4	31.2	9.1
Newell Rose Ellis Sorgo	92	13	3	13.6	211	3	30.9	9.1
Northrup King 326	90	15	2	12.9	255	3	30.1	8.9
Newell Rose Kansas Orange	85	15	4	13.7	662	3	31.7	8.7
SIGCO Sooner-Sweet	95	13	2	11.9	102	3	33.2	8.6
Mallard Rine AAA	78/55	14/13	3	12.1	481	3	28.9	8.4
Paymaster FS 351	58	13	4	13.5	814	8	32.6	8.0
SIGCO 54YG	50	13	3	11.3	160	8	31.2	7.1
Rancher	77	8	1	10.3	184	4	35.8	6.9
FMC Dual	65	9	1	4.7	138	9	25.3	6.0

LSD(05) - 3.4 T/A

C V - 23.6%

Mean - 10.2

* Legend for Maturity: 1-Mature Grain; 2-Hard Dough Stage; 3-Milk Stage; 4-Pollination Stage; 5-Not Headed.

** Percent sugar was determined with a high contrast refractometer.

*** HCN or Prussic Acid levels above 600 PPM should be considered as potentially toxic. Reported on an oven dry basis.

****Legend for Plant Type:

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

Note: Plots were seeded June 16. The soil had been in Spring Wheat in 1981 and had been fallowed from late summer on. The population was approximately 174 thousand plants per acre. Harvesting was completed on October 14, 1982.

Replicated plots of forage sorghum, sorghum-sudangrass, and sudangrasses were seeded in Harding and Pennington counties. The trial in Pennington county was seeded into soil which had produced a spring wheat crop in 1981, while the trial at Ralph in Harding county was seeded into Oat stubble.

The trials were seeded in mid-June. They consisted of single row plots with 36 inch spaced rows. Weeds were controlled by applying Ramrod herbicide and by cultivation. Stands were uniform, and growth was normal until late July. At that time moisture became limiting at Wall. Most of the varieties headed from mid- to late-August. However, some dormancy was noted at Wall with pollination still visible in mid-October. The plots were harvested in September at Ralph and on October 14 at Wall. Sugar content was determined from the stem tissue at the time of harvest. The data are reported in tables 35 through 38.

Table 36. Sorghum-Sudangrass Variety Trial - Pennington County(Wall), 1982.

Brand & Variety	Height (Inches)	% Sugar in Sap*	HCN** (ppm)	% Dry Matter	Forage Yield-T/A at 12% moisture
Robinson SIGCO H1	92	12.1	395	28.2	10.0
Newell Rose Sunny Sue	105	10.2	33	28.7	10.0
Pride Su-ghum 60	98	11.1	69	28.9	9.8
Pioneer 988	98	13.6	177	29.4	9.2
Mallard SSG	103	11.5	144	30.0	9.2
Western WS-15	96	11.1	39	26.4	9.0
Disco 3530	106	11.6	249	31.2	8.8
Sokota 310F	103	12.0	38	29.6	8.8
Cargill SS100	97	11.3	37	27.3	8.8
GSA 1757	98	11.1	37	28.0	8.6
Newell Rose Sweet Sunny Sue	105	12.5	33	31.7	8.6
Cenex Sweet Suso	92	12.2	38	25.5	8.6
Northrup King Sordan 79	107	10.9	178	25.7	8.4
Cenex Highland Sweet	103	11.1	108	31.7	8.2
Newell Rose Sunny Sweet	95	10.3	33	27.7	8.2
Western WS-20	95	11.9	38	30.0	8.2
Dekalb ST-6+	112	11.6	45	23.4	8.0
GSA SS75	95	11.5	33	24.9	7.8
Paymaster S99	100	11.9	42	27.3	7.6
Paymaster Sweet Sioux IV	99	11.9	32	23.4	7.4
Sokota 300F	99	10.3	110	24.3	6.9
Disco Hidan 35	103	10.7	35	26.2	6.8
Pfizer S33	100	9.1	33	21.2	6.6
Sexauer SX(Redlan x Greenleaf)	96	11.1	37	25.9	6.6
Cenex Highland Sweet Two	86	12.0	33	25.0	5.3
GSA SG62	87	12.7	44	33.3	5.2

LSD(05) - 2.7 T/A

C.V. - 23.3%

Mean - 8.1

* Percent sugar was determined with a high contrast refractometer.

**HCN of Prussic acid levels above 600 ppm should be considered as potentially toxic. Data reported in table are on an oven dry basis.

Note: Plots were seeded on June 16. The soil had been in Spring Wheat in 1981 and had been fallowed from late summer on. Harvesting was completed October 14, 1982.

Table 37. Sorghum Forage Trial - Harding County(Ralph), 1982.

Brand & Variety		Percent Sugar in Plant Sap*	Percent Dry Matter	Forage Yield-T/A @ 12% moisture
<u>Sorghum x Sudangrass Hybrids</u>				
	Wonder Green SX 66	14.8	31.5	5.4
Cenex	Highland Sweet	15.8	32.6	4.8
Northrup King	Sucro Sorgo	9.5	24.7	4.8
Sexauer	SX Brand	13.0	29.5	4.2
Pioneer	988	14.3	27.9	3.9
Weathermaster	FS522 Superdan	15.0	29.2	3.7
	Sweet Chow	15.3	27.7	3.6
	Buffalo Brand	13.3	29.5	3.6
Cenex	Highland Suso	15.9	22.1	3.3
Northrup King	Sordan 79	14.1	23.5	2.5
<u>Sudangrass Hybrids & Varieties</u>				
Northrup King	Trudan 8	15.9	28.1	4.2
	Piper	11.4	36.2	3.4
Cal/West	Monarch	11.5	30.4	3.2
<u>Mixtures</u>				
Trudan 8 + Sweet Chow + Wondergreen			26.5	5.0
Highland Sweet + Sucro Sorgo + Piper			28.2	4.7
Monarch + Superdan + 988			29.5	4.2

Mean - 4.0

* Percent sugar was determined with a high contrast refractometer at harvest.

Table 38. Sudangrass Variety Trial - Pennington County(Wall), 1982.

Brand & Variety	Height (Inches)	% Sugar in Sap*	HCN** (ppm)	% Dry Matter	Forage Yield-T/A @ 12% moisture
Northrup King Trudan 8	99	12.0	45	32.1	7.8
Disco 3030	93	11.5	47	29.3	6.4
GSA FFR 74A	90	9.8	39	34.7	6.0
Cal/West Monarch	95	12.8	40	35.1	6.0
Northrup King Truadn 6	92	10.9	43	31.2	5.5
Acco HS-33	92	11.5	35	37.1	5.0
Piper	95	13.2	38	38.7	4.4

LSD(05) ~ 1.8 T/A

C.V. ~ 21.5%

Mean - 5.9

* Percent sugar was determined with a high contrast refractometer.

**HCN or Prussic Acid levels above 600 ppm should be considered as potentially toxic. Data reported in table are on an oven dry basis.

Note: Plots were seeded June 16 and harvested October 14, 1982. The soil had been in spring wheat in 1981 and had been fallowed from late summer until seed-ing time.

MANAGEMENT, TILLAGE, AND CULTURAL PRACTICES

Seeding Dates of Hard Red Winter Wheat

Objective: To observe and compare growth characteristics, seed quality, and seed production of winter wheat when seeded at different calendar dates.

In 1980, two early maturing winter wheat varieties were seeded at ten day intervals. The soil moisture conditions were good for early seeding in August, but were poor in mid- and late-September. The early seeded plots headed earlier, had higher protein content, but lower yield. The results are reported in table 39.

Table 39. Effects of Seeding Dates on Yield, Grain Quality, and Plant Response of Two Varieties of Hard Red Winter Wheat - Pennington County(Wall), 1981.

Variety	Date of Planting	Height (Inches)	% Headed (May 26)	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield (Bu/Acre)
Scout 66	Aug 28	27	99	14.4	60.8	40.9
	Sept 5	31	94	14.5	60.8	43.0
	Sept 14	32	79	14.1	61.0	45.0
	Sept 24	32	34	13.6	60.9	52.6
Bronze	Aug 28	27	91	15.6	58.2	36.0
	Sept 5	30	81	15.0	59.5	39.3
	Sept 14	28	22	15.3	59.9	46.7
	Sept 24	30	3	14.2	59.1	47.5

Mean - 43.9

* Percent protein determined with Technicon 300 InfraAnalyzer.

Note: Plots were seeded into fallow soil with a deep furrow drill. Seeding rate was 60 pounds per acre. Drill row spacing was 12 inches.

An experiment containing six winter wheat varieties of varying winter hardiness (table 40), was seeded at two dates a month apart. The early maturing varieties headed 4 to 7 days before the medium-maturing varieties regardless of seeding date. Test weights for the early-seeded early-maturing varieties were slightly higher than the early-seeded medium-maturing varieties. The later seeding did not indicate a clear pattern difference for test weight. Grain yields were highest for the later planting and plants were taller. That reflects better soil moisture conditions during the spring because of less moisture utilized in the fall.

Table 40. Effects of Planting Date on Yield and Other Characteristics of Hard Red Winter Wheat - Pennington County(Wall), 1981.

Date of Seeding	Variety	Winter Hardiness	Height (Inches)	% Headed May 26	Test Wt (Lbs/Bu)	Grain Yield (Bu/Acre)
Aug 28	Roughrider	Excellent	28	2	59.5	45.3
	Homestead	Good	27	80	60.5	49.1
	Winoka	Excellent	27	1	59.5	44.1
	Newton	Poor	29	80	60.5	42.1
	Eagle	Fair	26	100	60.5	42.7
	Rall	Fair	28	100	61.5	50.4
						Mean - 45.6
Sept 24	Roughrider	Excellent	32	0	60.5	54.7
	Homestead	Good	32	30	60.0	45.0
	Winoka	Excellent	35	2	61.0	50.1
	Newton	Poor	30	90	61.0	48.7
	Eagle	Fair	29	90	61.5	49.0
	Rall	Fair	31	75	62.0	50.7
						Mean - 49.7

In 1981, three varieties of Hard Red Winter Wheat were seeded at four ten day intervals. The varieties differed in maturity and winterhardiness. The results listed in table 41 indicate a significant increase in yield was obtained by planting the early-maturing varieties in mid-September. The medium-maturing variety, Roughrider, produced the highest yield from September 4 seeding. The soil moisture conditions were poor for the August seeding and did not improve until after the last planting.

Table 41. Date of Seeding of Hard Red Winter Wheat - Pennington County(Wall), 1982.

Variety	Date of Seeding	Percent Moisture*	Percent Protein**	Test Wt (Lbs/Bu)	Grain Yield (Bu/Acre)
Bronze	Aug 28	12.2	14.1	57.5	48.6
	Sept 4	11.6	13.2	57.0	52.0
	Sept 14	11.5	12.9	57.8	59.2
	Sept 24	11.6	13.3	57.2	53.4
Scout 66	Aug 28	12.5	13.3	59.2	52.0
	Sept 4	12.6	12.5	59.5	57.8
	Sept 14	12.7	13.1	59.6	59.6
	Sept 24	12.6	13.0	59.0	53.2
Roughrider	Aug 28	12.9	12.6	58.8	53.1
	Sept 4	12.6	13.5	58.4	56.2
	Sept 14	13.0	14.4	58.5	53.1
	Sept 24	12.7	14.1	58.6	54.6

LSD(05) - 5.6 Bu/A

C.V. - 7.2%

Mean - 54.2

* Percent moisture in grain at harvest.

**Percent protein determined with Technicon 300 InfraAnalyzer.

Note: Yield data presented within the table are averages of four replications. Plot size was 6' x 50' with 12 inch spaced rows. Harvested July 29, 1982.

Seeding Rates of Hard Red Winter Wheat

Objective: To observe and compare growth characteristics, seed quality, and seed production of winter wheat when seeded at progressive rates from 1/4 bushel per acre up to 1 bushel per acre.

Two varieties of Hard Red Winter Wheat were seeded in replicated plots at progressive rates of 1/4 bushel per acre up to 1 bushel per acre. Grain quality was compared by measuring protein content and weight per bushel. Grain yield was the final measurement. The data are reported in tables 42, 43, and 44.

Table 42. Rate of Seeding of Hard Red Winter Wheat - Bennett County(Martin),1982.

Variety	Rate of Seeding (Bushel/Acre)	Percent Stand*	Percent Protein**	Test Wt (Lbs/Bu)	Grain Yield (Bu/Acre)
Buckskin	1.00	92	12.5	62.9	50.9
	0.75	86	12.2	61.8	49.6
	0.50	75	12.6	62.4	46.9
	0.25	50	12.5	61.5	40.3
TAM 105	1.00	91	12.4	61.9	45.6
	0.75	85	12.4	62.5	37.3
	0.50	78	12.7	61.5	44.0
	0.25	52	12.2	61.6	33.6

LSD(05) - 12.4 Bu/A

C.V. - 19.4%

Mean - 43.5

* Percent stand was determined visually in April 1982 and reflects ground cover.

**Percent protein determined with Technicon 300 InfraAnalyzer.

Note: Yield data presented within the table are averages of four replications.

Plot size was 6' x 25' with 12 inch spaced rows. Seeded September 17, 1981 and harvested August 3, 1982.

Table 43. Rate of Seeding of Hard Red Winter Wheat - Pennington County(Wall), 1982.

Variety	Rate of Seeding (Bushel/Acre)	Percent Stand*	Percent Protein**	Test Wt (Lbs/Bu)	Grain Yield (Bu/Acre)
Buckskin	1.00	91	13.4	56.4	39.3
	0.75	79	13.0	55.0	39.6
	0.50	69	12.9	53.6	34.9
	0.25	31	13.8	49.8	26.5
TAM 105	1.00	94	11.9	57.6	39.6
	0.75	79	12.4	56.9	34.5
	0.50	62	12.6	53.4	31.2
	0.25	43	13.0	52.8	25.4

LSD(05) - 5.2 Bu/A

C.V. - 10.4%

Mean - 33.9

* Percent stand was determined visually in April 1982 and reflects ground cover.

**Percent protein determined with Technicon 300 InfraAnalyzer.

Note: Yield data presented within the table are averages of four replications.

Plot size was 6' x 25' with 12 inch spaced rows. Seeded September 17, 1981 and harvested August 3, 1982.

Table 44. Rate of Seeding of Hard Red Winter Wheat - Perkins County(Meadow),1982.

Variety	Rate of Seeding (Bushel/Acre)	Percent Survival*	Percent Protein**	Test Wt (Lbs/Bu)	Grain Yield (Bu/Acre)
Buckskin	1.00	18	14.7	59.5	19.4
	0.75	8	14.6	57.5	18.2
	0.50	12	14.2	57.0	15.7
	0.25	4	--	--	---***
TAM 105	1.00	42	14.0	58.0	18.2
	0.75	30	13.9	56.7	16.9
	0.50	22	13.4	56.5	18.8
	0.25	8	--	56.0	9.1

Mean - 16.6

* Percent winter survival determined in April 1982. Normal stand based on ground cover as affected by seeding rate approximately 98, 90, 75, and 50%.

** Percent protein determined with a Technicon 300 InfraAnalyzer.

***Treatment lost to winterkill.

Note: Yield data presented within the table are an average of four replications. Plot size was 6' x 25' with 12 inch spaced rows. Seeded September 17, 1981 and harvested August 3, 1982.

The winter wheat seeding rate experiment was placed at three locations in western South Dakota. The experimental sites were located in Bennett county, on the states southern border; in eastern Pennington county at Wall, a central location; and in Perkins county, near the northern border of the state. Seeding for all sites was completed within three days.

Winter survival of TAM 105 was much better than Buckskin, even though Buckskin has a better rating than TAM 105. The plants were under moisture stress from the time they were planted until May of 1982. Considering the moisture stress, death of the plants were probably due more to dessication than cold injury. Protein contents were higher for the variety Buckskin than for TAM 105. However, the differences were small and not significant.

Weights per bushel were lower when seeding rates were reduced. This would indicate a later maturity which resulted from less competition for soil moisture but ultimately was more damaging because the larger plants eventually ran out of moisture when the kernels were maturing. This is suggested by the higher protein content in the lower seeding rates.

Grain yield trends were not different for the two varieties. Both tended to have lower yields when seeded at lower rates. Previous research utilizing different varieties resulted in yield patterns similar to those listed here, where a positive correlation existed for yield and seeding rate.

Alternate Cropping Sequence

Objective: To compare a series of six crop rotations and determine the relative operational costs and economic returns, as well as monitor changes in weed populations, pathogens, and soil moisture.

The series of rotations used in this study are shown in table 45, and includes a continuous cropping, and alternating crop-fallow system, as well as mono-culture, biculture, and triculture systems. The economic returns based on four years results are listed in table 46.

Table 45. Rotation Study - Pennington County(Wall).

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Rot 1	HRW*	HRW	HRW	HRW	HRW	HRW
Rot 2	Barley	HRW	Safflower	Barley	HRW	Safflower
Rot 3	HRS**	HRW	Fallow	HRS	HRW	Fallow
Rot 4	Fallow	HRW	Fallow	HRW	Fallow	HRW
Rot 5	HRS	HRW	Proso	HRS	HRW	Proso
Rot 6	HRW	HRW	Fallow	HRW	HRW	Fallow

* Hard Red Winter Wheat

**Hard Red Spring Wheat

The six rotations under study show considerable differences for crop responses, weed problems, and ease of handling. The base rotation (1) is continuous winter wheat. The difficulties arising in this operation are tillage and seedbed preparation. A careful selection of, and operation of, the tillage implement is necessary. If the soil is too dry it will form large clods which are undesirable for a seedbed. Associated with continuous cropping is the annual brome grass infestation. The weed stand can become so thick that the wheat cannot compete. Consequently, wheat plants are few, stunted, and produce little grain.

Rotation two is a three crop sequence with two years of winter wheat followed by a safflower crop in the third year, and a barley crop in the fourth year. Grassy weeds are controlled by use of Treflan during the year when safflower is grown and broad leaf weeds controlled by chemical during the three years of winter wheat and barley. The most difficult part of this rotation is establishing the safflower plants.

Rotation three is a three year sequence consisting of spring wheat followed by winter wheat, with fallow in the third year. The combination is ideal to control winter annual weeds. However, the spring wheat yields are so low in relation to winter wheat that the return per acre is similar to continuous winter wheat.

Rotation 4 is an alternating crop-fallow sequence in which annual weeds and soil moisture problems are not critical. The wheat is vigorous, tall, tillers profusely, has large heads, and produces good yields. Only a few annual brome grass plants grow on the plot edges.

Rotation five is similar to rotation three except the fallow is replaced by Proso millet. This sequence yielded about the same winter and spring wheat as in rotation three. However, the dollar return is considerably higher because the return from the millet is equal to the sum of both wheat crops. The total return for this rotation is the highest of the six being studied. This sequence also provides excellent control both for annual and perennial weeds.

Rotation six which had two winter wheat crops and third year fallow provides some control for the annual brome. This permits the weed cycle to be broken resulting in some increase in soil moisture during the fallow year, as well as

more nitrogen from the decaying mulch, to be available to the growing wheat. The first year after fallow, the grain yields are double that of the second crop year. In this sequence the annual brome grass is found mostly in the edges of the winter wheat plot. Both crops of winter wheat had better stands and much more vigor than continuous wheat.

Table 46. Economic Returns from Six Cropping Sequences - Pennington County (Wall), 1978-82.

Rotation	Sequence Year			Ave. Annual \$ Return	Cycle \$ Return	Six Year \$ Return
	1	2	3			
1						
Crop*	HRW					
Test Wt	56.8					
Yield-Bu/A	9.4					
Return/Acre	\$26.29			\$ 26.29	\$ 26.29	\$157.73
2						
Crop*	HRW	SAF	BAR			
Test Wt	56.3	35.4	43.1			
Yield-Bu/A	19.1	739#	9.6			
Return/Acre	\$59.37	\$35.24	\$23.08	\$ 39.23	\$117.69	\$235.38
3						
Crop*	HRW	FAL	HRS			
Test Wt	56.5	---	55.0			
Yield-Bu/A	18.6	---	8.3			
Return/Acre	\$57.50	---	\$26.96	\$ 28.15	\$ 84.46	\$168.92
4						
Crop*	HRW	FAL				
Test Wt	55.9	---				
Yield-Bu/A	28.6	---				
Return/Acre	\$94.54	---		\$ 47.27	\$ 94.54	\$283.62
5						
Crop*	HRW	PROSO	HRS			
Test Wt	56.6	54.3	54.6			
Yield-Bu/A	18.0	694#	6.9			
Return/Acre	\$55.78	\$88.79	\$23.62	\$56.06	\$168.19	\$336.06
6						
Crop*	HRW	HRW	FAL			
Test Wt	57.0	56.4	---			
Yield-Bu/A	22.4	16.1	---			
Return/Acre	\$72.95	\$50.78	---	\$41.24	\$123.73	\$247.46

Note: Dollar return per acre is calculated on market price on January 1.

* HRW-Hard Red Winter Wheat, HRS-Hard Red Spring Wheat, BAR-Spring Barley, SAF-Safflower, PROSO-Proso Millet.

Fallow Alternatives and Seeding Methods

Objectives: (1) To compare the three fallow alternatives of zerotill, subsurface or mulch tillage, and black fallow, by measuring grain yield and quality. Soil changes are to be monitored by soil sampling.

(2) To compare the long term effects of nitrogen and phosphorus fertilizer when applied in combinations with fallow alternatives.

(3) To compare drill openers and press wheel combinations when used under different fallow procedures.

(4) To compare the effects of fallow technics on soil tilth, organic accumulation, plant pathogens, nematodes, and weed populations.

PROCEDURE:

An experiment was established in which a winter wheat-fallow system was utilized to study the residue management of three fallow procedures. The systems consisted of (1) a black fallow, (2) a stubble mulch fallow, and (3) a zerotill or chemical fallow.

The fallowed areas were subdivided into five subtreatments in order to study the effect of different drill openers-press wheel combinations when used in three different fallow procedures.

The fallowed areas were further subdivided and a fertility factor in which nitrogen, phosphorus, and the combination of nitrogen plus phosphorus were incorporated. The plots were seeded to Hard Red Winter Wheat (var. Buckskin) in September 1981.

RESULTS:

Table 47. Effects of Fallow Methods on Grain Yield and Other Agronomic Characteristics of Hard Red Winter Wheat (var.-Buckskin), Pennington County(Wall) 1981-82.

Fallow Method	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield-Bu/Acre	
			1982	(2 yr av)
Mulch (Subsurface)	13.51	55.8	40.9	52.0
Black	13.61	56.0	36.7	51.4
Chemical	12.65	57.4	37.3	46.9
Mean -			38.3	50.1

*Percent protein determined with a Technicon 300 InfraAnalyzer.

A review of the wheat yields (table 47) indicate in 1982 the highest grain yield was produced under the mulch system. In 1981, when moisture was available throughout May, June, and July, the highest yield was produced under the black fallow. Protein content was lower and test weight higher under the chemical, or No-till fallow system, and indicates less moisture stress during the period when the grain was filling.

Fertilizer applied to the soil had little effect on yield in 1982 (table 48). A small yield increase was received where nitrogen was applied to the mulch fallow. This would be expected because the organic matter had not decomposed and released its nitrogen into the soil. Under the black fallow system where the straw had been

Table 48. Influence of Fallow Methods and Fertilizer Variables on Grain Yield of Hard Red Winter Wheat(var.-Buckskin), Pennington County(Wall), 1981-82.

Fallow Method	Fertilizer Treatment	Height (Inches)	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield-Bu/Acre	
					1982	(2 yr av)
Mulch	Check	38	13.40	57.1	40.1	49.9
	30# Nitrogen	39	13.61	53.4	41.9	50.1
	40# Phosphorus	38	13.29	57.0	40.1	55.0
	30# N + 40# P	40	13.75	55.7	41.6	53.1
Black	Check	37	13.48	56.6	37.8	51.3
	30# Nitrogen	38	13.64	55.8	34.6	47.0
	40# Phosphorus	38	13.54	56.2	38.9	55.6
	30# N + 40# P	38	13.77	55.5	35.6	51.9
Chemical	Check	37	12.20	58.2	36.8	45.3
	30# Nitrogen	38	12.89	56.8	36.9	44.9
	40# Phosphorus	38	12.44	58.2	38.0	49.9
	30# N + 40# P	39	13.07	56.4	37.5	47.5
Mean -					38.3	50.1

*Percent protein determined with Technicon 300 InfraAnalyzer.

Table 49. Influence of Drill Opener and Fallow Method on Grain Yield and Other Agronomic Characteristics of Hard Red Winter Wheat - Pennington County (Wall), 1982.

Drill Openers	Press Wheel	Method of Fallow	Percent Protein*	Test Wt (Lbs/Bu)	Grain Yield (Bu/Acre)
Spear Point	Steel "V"	Mulch	13.50	57.3	39.8
		Black	13.85	57.0	34.3
		Chemical	12.84	57.7	35.0
Double Disc	2" Rubber	Mulch	13.46	56.6	41.9
		Black	13.53	55.9	38.8
		Chemical	12.38	58.0	30.7
HZ (Slot)	Steel "V"	Mulch	13.55	56.3	41.9
		Black	13.45	55.2	35.6
		Chemical	12.94	56.8	32.3
Shoe 4"	2" Rubber	Mulch	13.45	56.4	44.7
		Black	13.45	56.1	38.2
		Chemical	12.38	57.4	38.4
Double Disc	Steel "V"	Mulch	13.60	56.1	36.4
		Black	13.76	56.0	36.6
		Chemical	12.73	57.3	40.8

LSD(05) - 10.4 Bu/A

C.V. - 19.4%

Mean - 38.3

*Percent protein determined with Technicon 300 InfraAnalyzer.

Table 50. Yield of Hard Red Winter Wheat Seeded with a Combination of Drill Openers and Press Wheels in Soil Fallowed by Three Different Technics. Pennington County(Wall), 1982.

Drill Openers	Press Wheel	Fert.	Method of Fallow			Mean
			Black	Subsurface	Chemical	
Spear Point	Steel "V"	O	35.8	38.9	34.8	36.5
		N	30.1	41.4	33.2	34.9
		P	40.7	36.7	38.1	38.5
		NP	30.7	42.0	34.1	35.6
Double Disc	2" Rubber	O	35.6	40.1	37.4	37.7
		N	34.7	39.3	39.6	37.9
		P	44.1	42.9	40.3	42.4
		NP	41.0	45.3	42.9	43.1
HZ (Slot)	Steel "V"	O	35.3	39.2	33.4	36.0
		N	34.7	43.8	31.6	36.7
		P	35.9	43.8	33.8	37.8
		NP	36.4	40.7	30.6	35.9
4" Shoe	2" Rubber	O	39.6	48.9	39.4	42.6
		N	38.6	47.3	40.7	42.2
		P	37.5	39.9	35.6	37.7
		NP	37.3	42.7	37.8	39.3
Double Disc	Steel "V"	O	42.7	33.2	38.8	38.2
		N	34.9	37.9	39.6	37.5
		P	36.3	37.3	42.3	38.6
		NP	32.7	37.1	42.3	37.4

incorporated into the soil, nitrogen fertilizer had no effect, but there was a small increase due to phosphorus fertilizer. However, all of the yields under the black fallow method were below the mulch method. Under the chemical or zero-till method only a response to phosphorus was obtained. However, yields were still several bushels below the mulch method and were equal to the black fallow method.

The type of drill opener had little effect (table 49) on yield. The highest was obtained from the conventional wide shoe. The double disc openers produced about the same yield regardless of the press wheel used. Lowest yields were obtained when the slot (spear and HZ) openers were used.

The statistical analysis of the study in 1982 indicated small but real differences existed between openers. Certain openers create more desirable effects under different fallow procedures. Those differences are discernible in tables 49 and 50.

REDUCED TILLAGE STUDIES

Recropped Winter Wheat
Early Preplant
Wasta, South Dakota

Objectives: To evaluate the efficacy of BLADEx 90DF and 80W for controlling weeds in spring and winter wheat when applications are made 40 to 45 days before planting winter wheat or in late fall before planting spring wheat.

(2) To evaluate the effect of BIADEX herbicide so applied on wheat yields.

Soil Types: Clay loam. OM - 1.8%
Phosphorus V. high - Potassium V. high - pH 6.1

Plot Size: 20 x 30 foot plots replicated 4 times.

Application: Flood jet nozzles at 20 gallon/A.

Treatments	Formulation	Rates Lbs/A	Replications-Bushels/Acre				Ave.
			I	II	III	IV	
Bladex	80W	1.6	47.7	36.5	38.6	37.1	40.0
Bladex	80W	2.4	46.5	36.1	43.6	38.4	41.2
Bladex	90DF	1.6	44.4	43.2	37.4	37.4	40.6
Bladex	90DF	2.4	32.2	44.2	45.4	37.6	40.0
Check			34.9	33.4	37.6	37.4	35.8

Fall Notes:

Plots were sprayed August 3, 1981.

Soil condition was wet.

Volunteer wheat was 3" to 4" tall.

The plots were oversprayed after application with 6 ounces Roundup.

The stand in the no-till plots were poorer than in the farmer's field around the plots. This could have been due to the fact that the surface of the untilled plots dried out and the drill did not get the seed into moisture.

Spring Notes:

The plots that had not been tilled in the fall were 6" taller in late May and had a darker green color. The stand appeared to be adequate. There was stubble still standing between the rows.

Winter Wheat-Grain Sorghum-Fallow Rotation

Introduction

Ecofallow is a term used to describe a cropping rotation of small grain-row crops-summer fallow. This rotation has some or all of the mechanical tillage replaced by herbicides. This concept was tested in research plots at Winner, South Dakota.

Conventional tillage plots had sweep type tillage in the fall and disked in the spring to control weeds and to establish a uniform seedbed. After planting the row crop with a buffalo till planter the plots were sprayed with pre-emergence herbicide to control annual weeds. The plots were cultivated twice during the early part of the season.

Minimum tillage plots were sprayed with Atrazine in the winter wheat stubble after harvest of the crop. The plots were undercut by a blade in the spring prior to planting the row crop with a buffalo till planter. After planting, the plots were sprayed with a preemergence herbicide to control annual weeds. The plots were cultivated once during the early part of the growing season.

No tillage plots were sprayed with Atrazine in the stubble after harvest of the winter wheat crop. There was no tillage prior to the planting of the row crop with a buffalo till planter. The plots were not cultivated during the growing season and much of the winter stubble remained standing between the rows.

Grain Sorghum Yields Bu/A

Treatment	1980	1981	1982	Average
No-Tillage	71	44	82	66
Minimum-Tillage	84	39	75	66
Conventional-Tillage	63	19	54	45
C.V. =	5.3%	25.1%	9.9%	
LSD 5% =	6.7 Bu/A	14.8 Bu/A	12.0 Bu/A	

The no-tillage and minimum-tillage treatments consistently had a higher yield than the conventionally tilled plots.

Winter Wheat Rotations Winner, South Dakota

Sorghum-Fallow-Winter Wheat

The winter wheat crop in this rotation was planted on fallowed land. There were three levels of tillage used during the fallow period. The no-tillage treatment used herbicides to replace all tillage. The minimum tillage treatment had a non-residual herbicide used to replace early tillage in the spring and sweep type tillage was started during June to prepare a seedbed for the fall seeding of

winter wheat. The conventionally tilled treatment had normal tillage used to control weeds during the fallow period.

Winter Wheat-Fallow-Winter Wheat

The winter wheat in the rotation was always planted on fallowed land. There were three levels of tillage used during the fallow period. The no-tillage treatment had three pound Bladex 80W plus one pound Atrazine 80W applied in late July after wheat harvest. The no-tillage treatment used two sprayings of non-residual herbicides during the late fallow period to control weeds.

The minimum tillage treatment had three pounds Bladex 80W plus one pound Atrazine 80W applied in late July after wheat harvest. Tillage was begun in late June in the minimum tillage treatment to control weeds. The minimum tillage plots require two to three tillage operations to control weeds during the fallow period.

The conventional tillage treatment used sweep type tillage to control weeds during the fallow period. The soil surface had very little crop residue left on it by planting time.

Continuous Winter Wheat

The no-tillage treatment was sprayed two times with non-residual herbicides to control volunteer wheat and weeds prior to planting in mid-September. The minimum tillage treatment was bladed post harvest and sprayed once prior to seeding in mid-September. The conventionally tilled treatment used a disk and sweep type tillage to control weeds prior to seeding in mid-September.

Treatment	Bushels per Acre		Continuous Winter Wheat		
	Winter Wheat - Fallow				
	1980 Sorghum - Winter Wheat				
	1981 Fallow - Fallow				
	1982 Winter Wheat - Winter Wheat		1980	1982	1980-1982
No-Tillage	48	46	22	27	25
Min-Tillage	54	51	27	31	29
Conv.-Tillage	50	50	21	23	22
% C.V.	=	10.6	10.5	14.4	14.0
Bu/A LSD 5%	=	9.3	8.9	5.7	6.6

There were no significant yield differences due to the method of tillage during the fallow period. The continuously cropped plots show a significant yield advantage for the minimum-tillage treatment. However, the reduced-tillage plots were more severely infested with Downy brome grass after three years of reduced tillage.