ANNUAL PROGRESS REPORT 2000

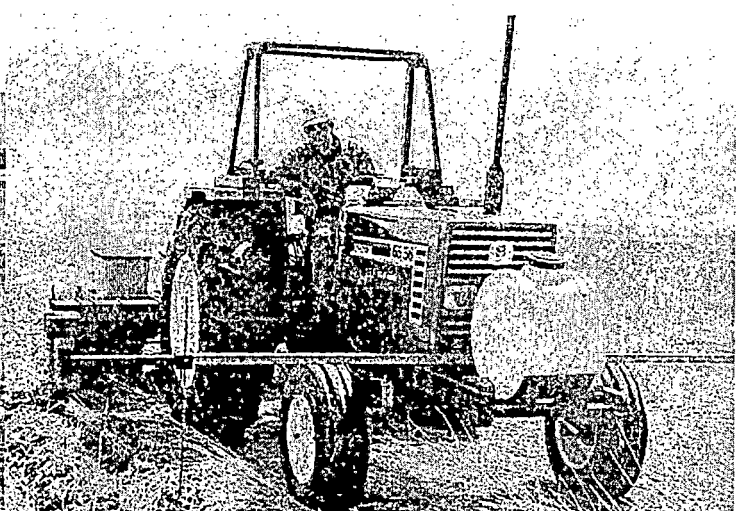
SOUTH DAKOTA STATE UNIVERSITY

WEST RIVER AG CENTER

CROPS AND SOILS RESEARCH

PLANT SCIENCE PAMPHLET #2

JANUARY 2001



South Dakota State University

SDSU

INTRODUCTION

This is an annual progress report of the West River Crops and Soils Research Projects, South Dakota Agricultural Experiment Station. The equipment storage and processing facilities are located approximately one mile southwest of Box Elder, SD at 21 County Road 212. The office facilities are located at 1905 Plaza Boulevard; Rapid City, SD 57702. Telephone (605)394-2236, e-mail: Stymiest.Clair@ces.sdstate.edu or Rickertsen.John@ces.sdstate.edu or Swan.Bruce@ces.sdstate.edu

Internet web page: www.abs.sdstate.edu/wrac/

The Research Projects serve the western part of South Dakota. They are unique in that all experimental plots are cooperatively located with farmers. All the experimental plots are located on farmer fields rather than at a particular experiment station. This allows for more mobility and localized data collection. This system is very dependent upon farmer cooperators and local extension agronomy educators.

This research tests the adaptability of new crops, varieties and farming methods. This report does not include results of work conducted by SDSU projects headquartered on campus at Brookings, South Dakota.

FIELD PLOT COOPERATORS

Name	Address	County
Larry Novotny	Martin 57551	Bennett
Bill Goeringer	Newell 57760	Butte
Dave Reaser	Oelrichs 57763	Fall River
Roger Rosenow	Ralph 57650	Harding
Henry Roghair	Murdo 57559	Jones
Merle Aamot	Kennebec 57544	Lyman
Kip Matkins	Sturgis 57785	Meade
Don Brown	Scenic 57780	Pennington
Gregg Krebsbach	New Underwood 57761	Pennington
Crown Partnership	Wall 57790	Pennington
Gary Wunder	Bison 57620	Perkins
Rex Haskins	Hayes 57537	Stanley
Mark Stiegelmeier	Selby 57472	Walworth

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

250 copies printed at an estimated cost of $3.38 each. January 20001

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

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ACKNOWLEDGMENTS

The following County Extension Agents assisted in locating cooperators and conducting the research: Sandra Huber-Martin, Ed Bowker-Hot Springs, Ken Nelson-Buffalo, Robert Fanning-Kennebec, Valerie Mitchell-Murdo, Vincent J. Gunn-Bison, and Jim Kanable-Mound City.

The results reported in this pamphlet were funded under Plant Science Projects SD 00956, Research Substation and SD 00276, Cropping Systems in Western South Dakota. Additional financial support was received from The South Dakota Crop Improvement Association, The South Dakota Wheat Commission, South Dakota Foundation Seed Stocks Division-SDSU, South Dakota Oilseed Council, Monsanto Agricultural Company, Gustafson Corporation, and Warne Chemical Co.

Research was conducted by C.E. Stymiest-Associate Professor, J.R. Rickertsen-Research Associate, B.A. Swan-Senior Ag Research Technician, and in conjunction with K. D. Kephart-Director Ag Experiment Station, D.J. Galenburg-Dept. Head Plant Science, R.G. Hall, R.J. Pollman, J. Ingemansen, A. Ibrahim and J.C. Rudd.

A special thank you is extended to Clay Volmer and Brandon Zelfer for their help during the summer of 2000.

This publication was written and edited by Clair E. Stymiest, John R. Rickertsen and Bruce A. Swan.

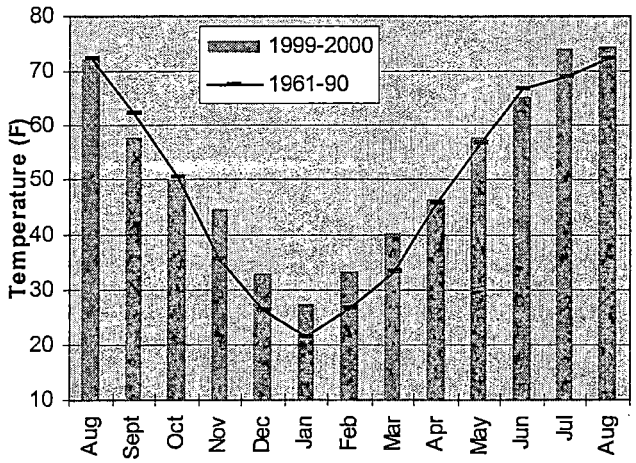
WEATHER SUMMARY

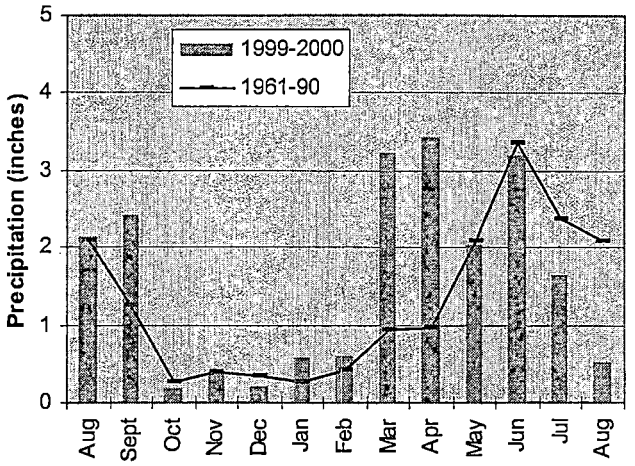
The data in the weather summaries presented in the following charts and Tables 1 and 2 were obtained from the National Oceanic and Atmospheric Administration (NOAA) publication, Climatological Data - South Dakota; from Al Bender, State Climatologist at South Dakota State University; and from the South Dakota Crop-Weather Summary published by the South Dakota Statistical Reporting Service-USDA.

The 1999-2000 growing season was a story of extremes for Western South Dakota. September was cooler that normal, with normal to above normal rainfall. October temperatures were near normal with dry conditions in the southwest and west central regions. Very mild temperatures and dry conditions marked the months of November through March. Temperatures were 6-10 degrees above normal throughout the region during this time with normal to below normal precipitation. The month of April was slightly cooler than normal with abundant rainfall, with the southwest and central regions receiving 3-6 inches of precipitation. May and June were near the average for temperatures with average to below average rainfall. The rest of the summer turned hot and dry with August being 2-3 degrees hotter than normal and most locations receiving less than a ½ inch of rain.

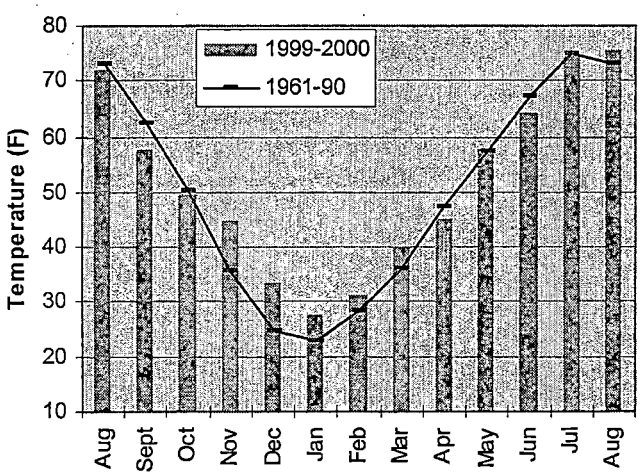
Overall it was a good year for small grains. The mild winter allowed the winter wheat to survive well and the wet spring allowed for good yields. The spring planted cool season crops did average in 2000, but were affected by the hot conditions in July. The warm season crops like corn and millet were adversely affected by the hot, dry and windy conditions in July and August. But drought tolerant crops like safflower and sunflower did well because of their extensive root systems.

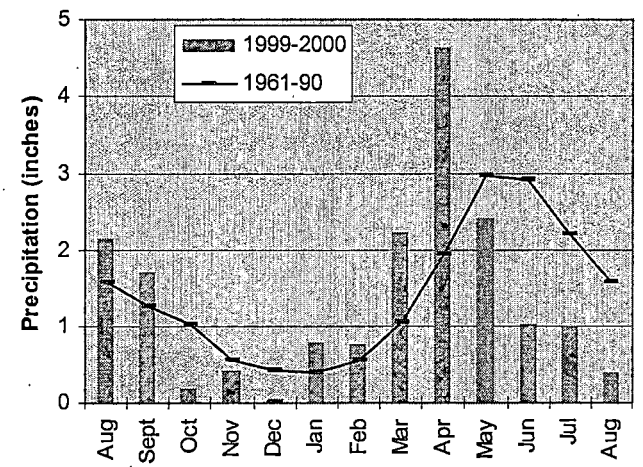
Temperature and Precipitation Charts for Martin (Bennett County Reporting Station).



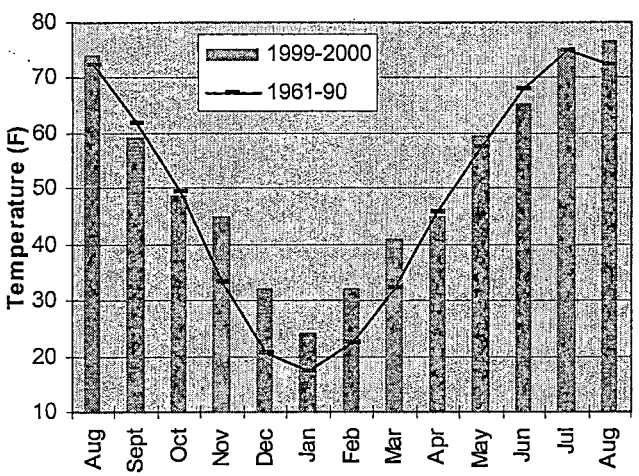


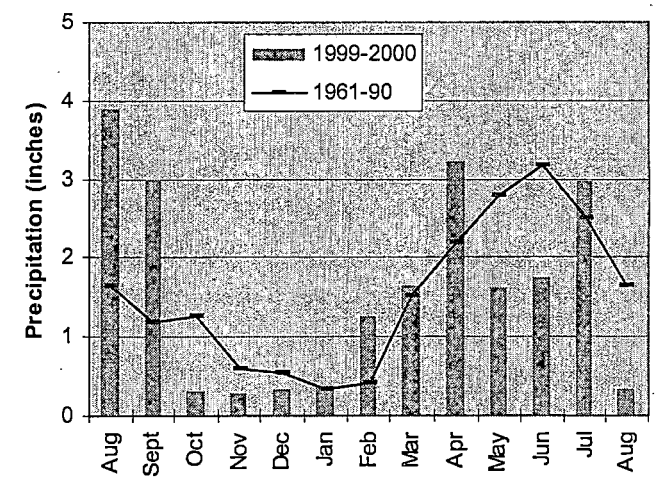
Temperature and Precipitation Charts for Oelrichs (Fall River County Reporting Station).





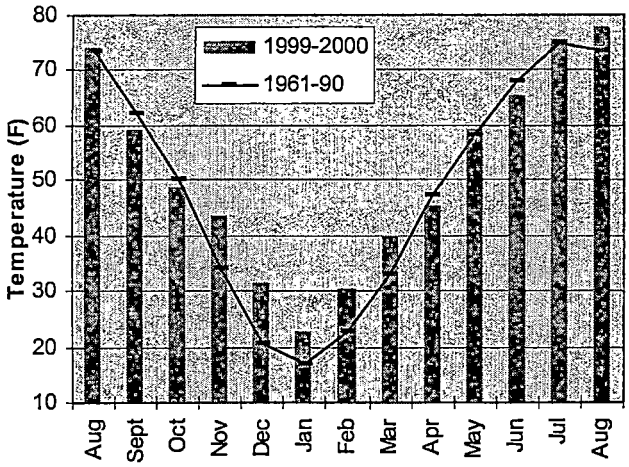
Temperature and Precipitation Charts for Murdo (Jones County Reporting Station).

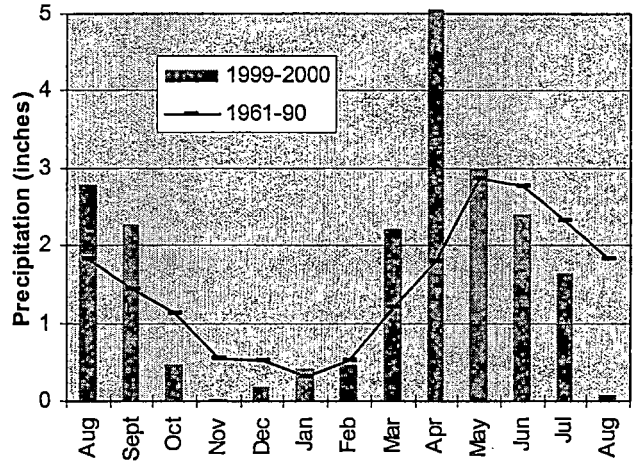




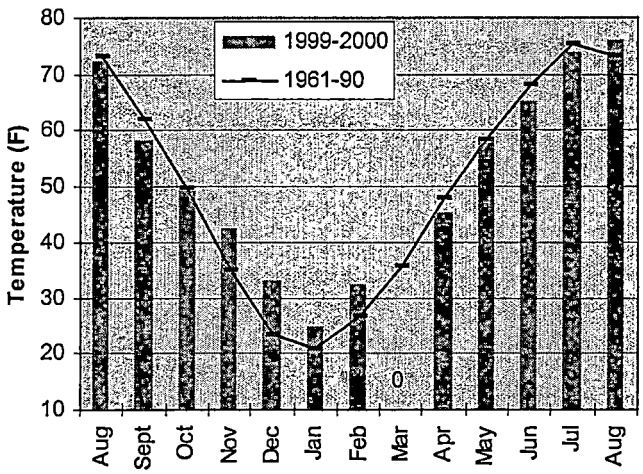
Average temperatures and precipitation obtained from NOAA Climatological Data and from Al Bender, State Climatologist at South Dakota State University. Weather data is collected from the reporting station nearest the experimental sites.

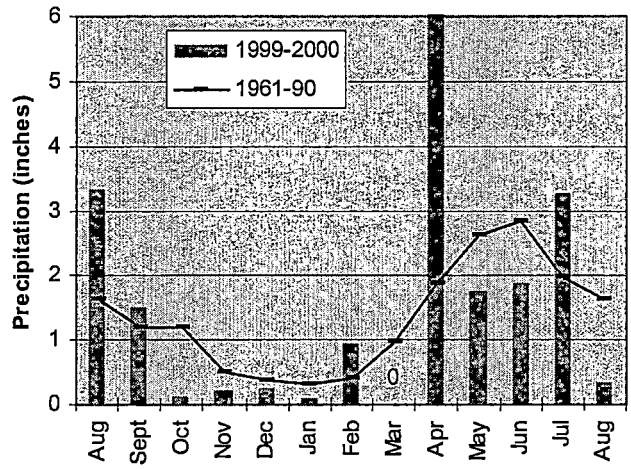
Temperature and Precipitation Charts for Kirley (Haakon County Reporting Station).





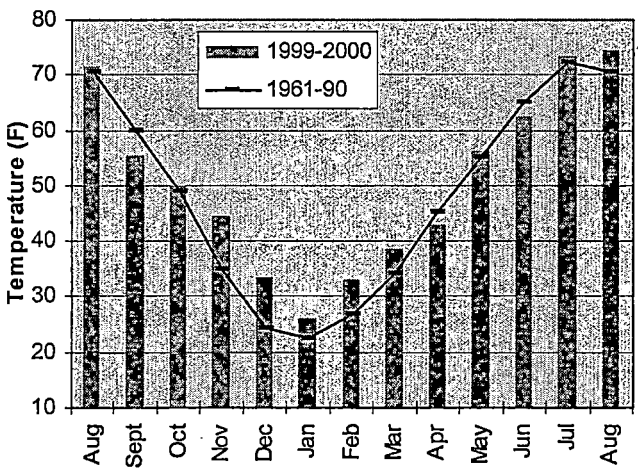
Temperature and Precipitation Charts for Wasta (Pennington County Reporting Station).

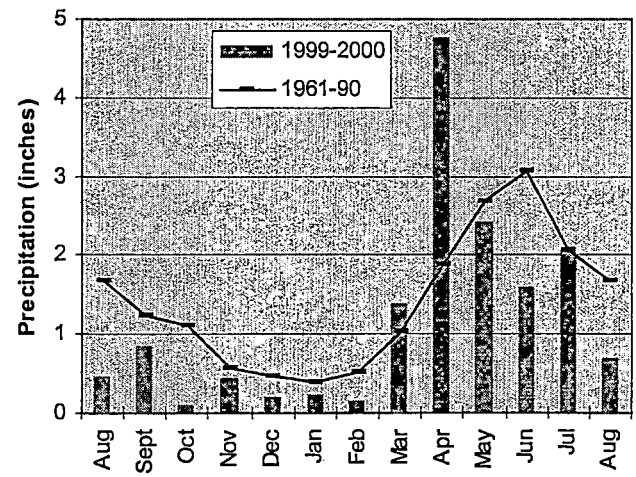




0 = No data was reported for March at Wasta.

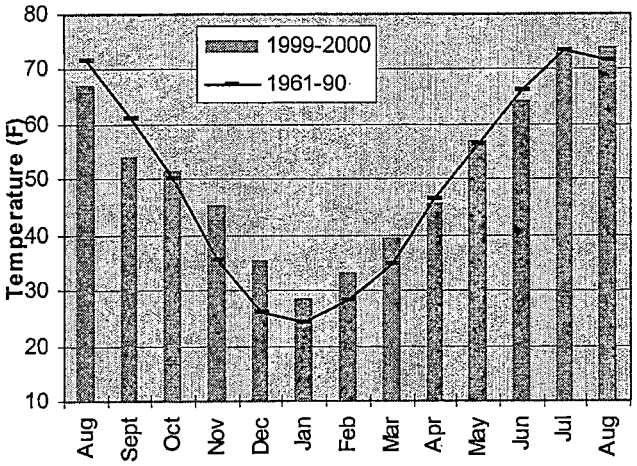
Temperature and Precipitation Charts for Rapid City Airport (Pennington County Reporting Station).

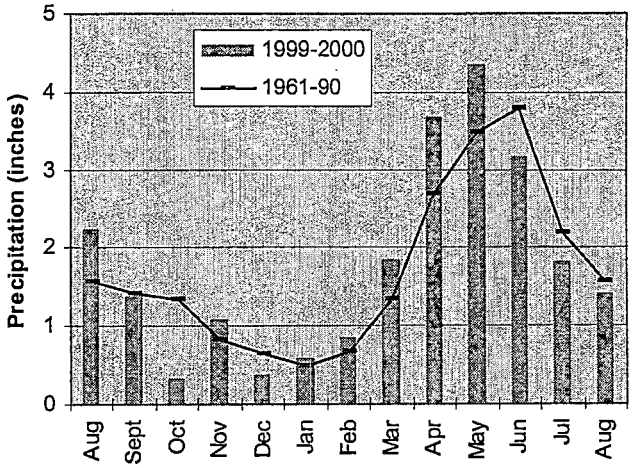




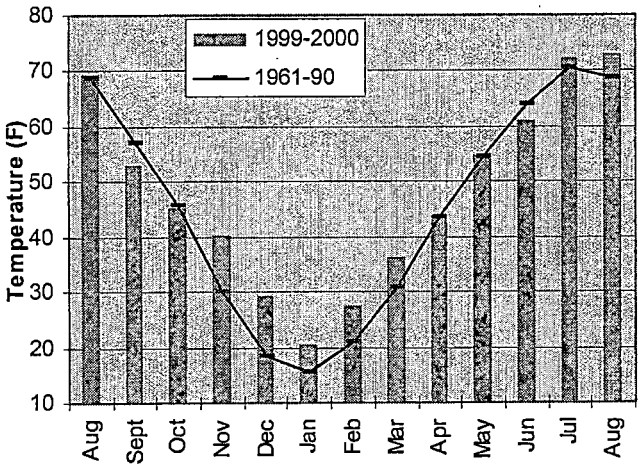
Average temperatures and precipitation obtained from NOAA Climatological Data and from Al Bender, State Climatologist at South Dakota State University. Weather data is collected from the reporting station nearest the experimental sites.

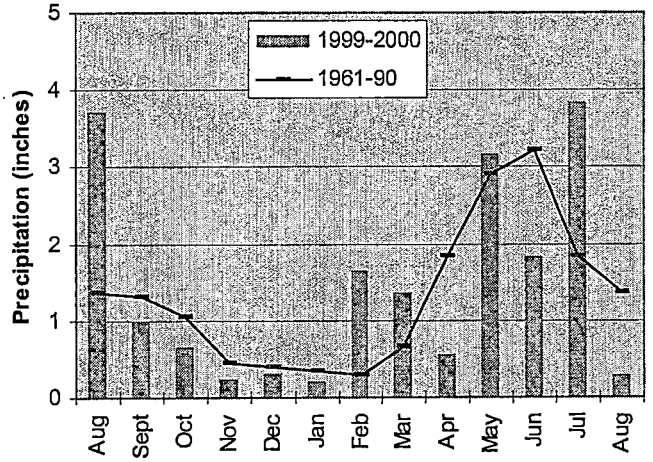
Temperature and Precipitation Charts for Ft. Meade (Meade County Reporting Station).



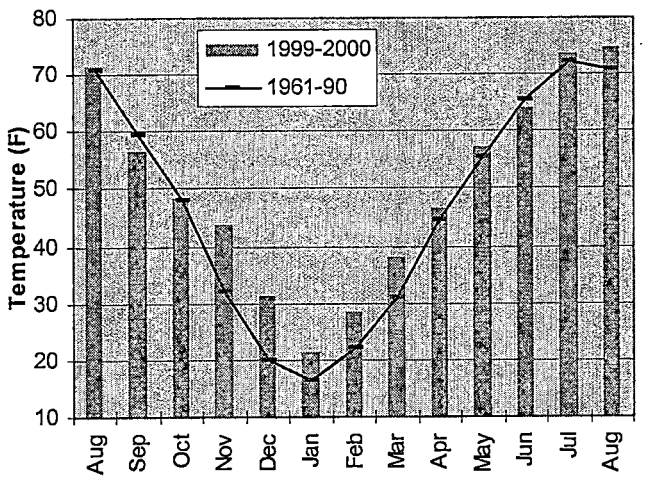


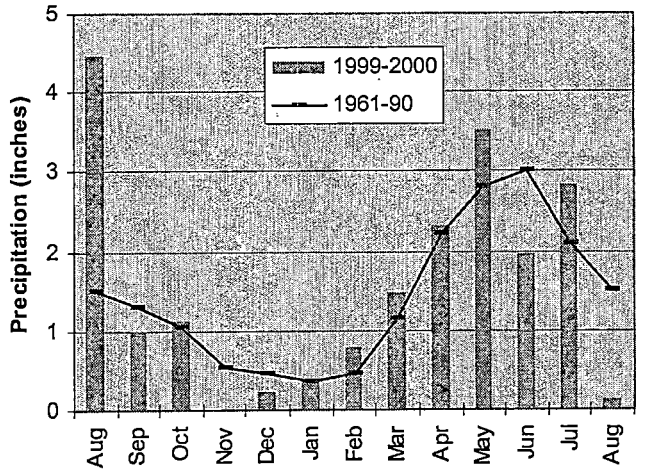
Temperature and Precipitation Charts for Ralph (Harding County Reporting Station).





Temperature and Precipitation Charts for Bison (Perkins County Reporting Station).

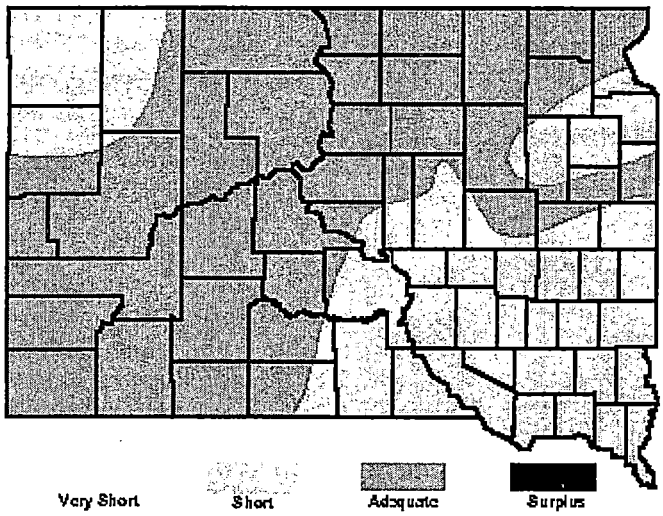




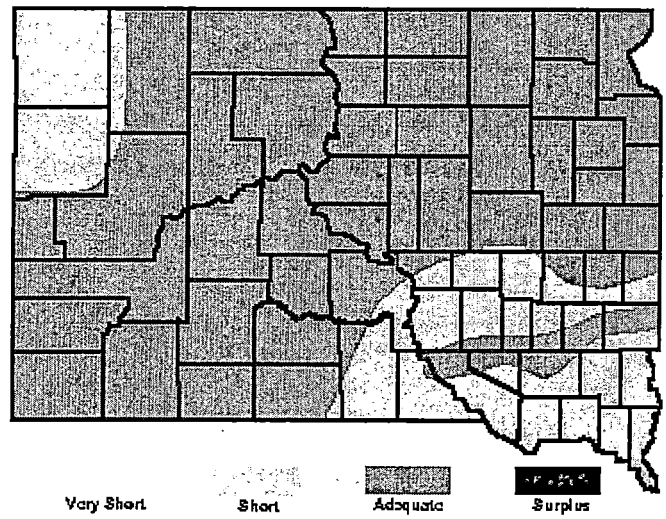
Average temperatures and precipitation obtained from NOAA Climatological Data and from Al Bender, State Climatologist at South Dakota State University. Weather data is collected from the reporting station nearest the experimental sites.

Figure 1. Topsoil Moisture Conditions During 2000 Growing Season.
(Crop and Livestock Reporting Service - USDA)

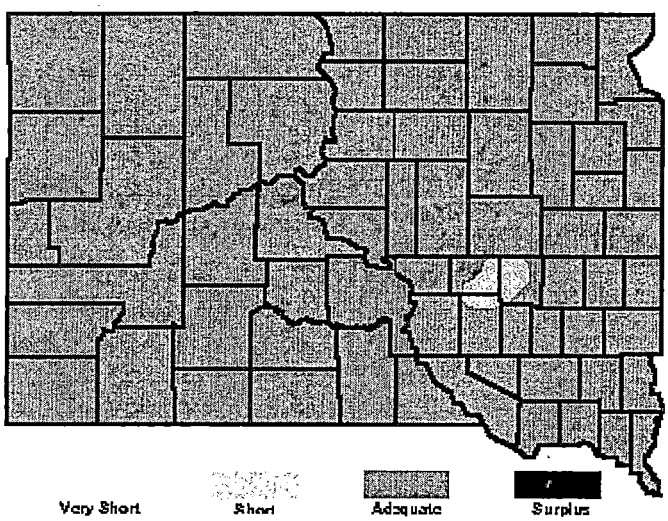
TOPSOIL MOISTURE
As of Sunday, April 9, 2000



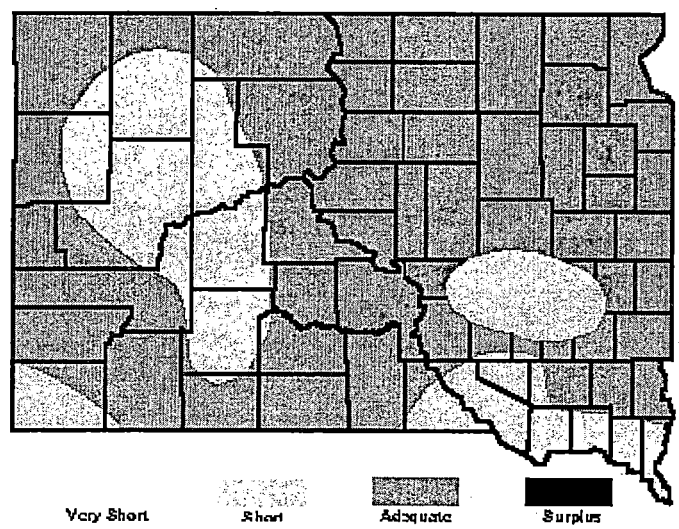
TOPSOIL MOISTURE
As of Sunday, May 7, 2000



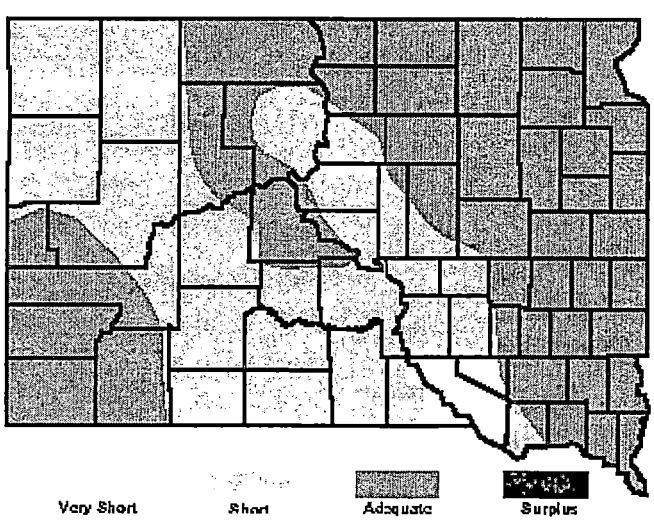
TOPSOIL MOISTURE
As of Sunday, June 11, 2000



TOPSOIL MOISTURE
As of Sunday, July 9, 2000



TOPSOIL MOISTURE
As of Sunday, August 13, 2000



TOPSOIL MOISTURE
As of Sunday, September 10, 2000

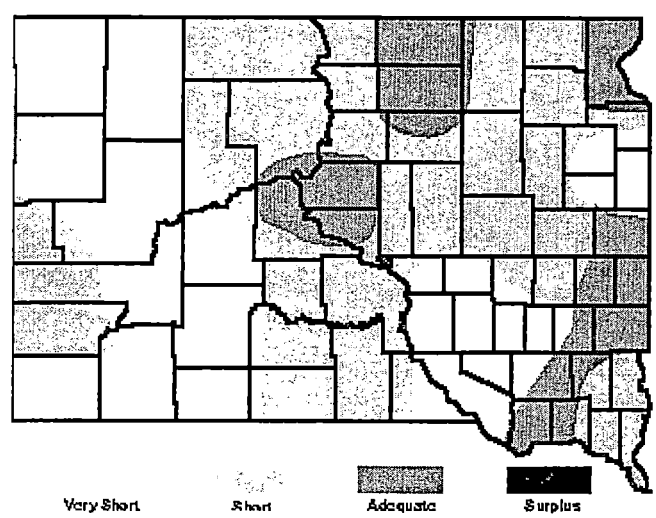


Table 1. Weather Data - Date of Critical Temperatures and Total Useable Precipitation in Counties with Experimental Plots (1999-2000).

Location	Date of Temperature*		Total	Total Useable Moisture**	
	First	Last	Moisture	Aug. 99-July 00	April 00-July 00
Bennett County (Martin)	Sept.29, 1999 28 °F	May 13, 2000 27 °F	20.05"	12.43"	6.44"
Fall River County (Oelrichs)	Sept.27, 1999 26 °F	May 13, 2000 28 °F	17.43"	10.86"	6.19"
Harding County (Ralph)	Sept.15, 1999 26 °F	May 13, 2000 24 °F	18.56"	10.98"	5.75"
Jones County (Murdo)	Oct. 2, 1999 24 °F	Apr. 17, 2000 26 °F	20.67"	13.62"	5.58"
Meade County (Ft. Meade)	Oct. 17, 1999 28 °F	Apr.20, 2000 27 °F	21.77"	13.15"	8.33"
Pennington County (Rapid City AP)	Sept. 28,1999 28 °F	May 13, 2000 27 °F	13.83"	7.30"	5.91"
Pennington County (Wasta)	Sept.29, 1999 24 °F	May 13, 2000 27 °F	23.43"	16.24"	8.88"
Perkins County (Bison)	Oct. 1, 1999 28 °F	May 13, 2000 27 °F	20.09"	12.35"	6.57"
Haakon County (Kirley)	Oct. 4, 1999 28 °F	Apr. 17, 2000 22 °F	20.98"	14.53"	8.48"
Butte County (Newell)	Oct. 4, 1999 27 °F	May 13, 2000 28 °F	13.86"	7.44"	5.05"
Lyman County (Kennebec)	Oct. 2, 1999 20 °F	Apr. 16, 2000 27 °F	18.96"	12.09"	4.33"

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

** Sum of all precipitation where amounts are in excess of .25 inch or totaled over .25 inch in two contiguous days.

WINTER WHEAT VARIETY TRIALS

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

Procedure: Plots were seeded at seven locations in September 1999 with a John Deere 610 or John Deere 750 plot drills with 10 inch spacing. The experimental design was a randomized complete block with four replications. The seeding rate was 950,000 seeds per acre (60 Lb/A). The plots received 7.4 lbs N and 25 lbs P_2O_5 per acre as 10-34-0 with the seed. Herbicides were applied in either the fall or spring and varied according to weeds present. Visual stand ratings were taken in October 1999 and April 2000. The plots were trimmed to 5' x 25' after heading. The wheat was harvested in July with a small plot combine. Height, shatter, and lodging notes were taken at the time of harvest. Protein content was determined with a Near Infrared Spectrophotometer (Technicon Infranlyzer 400).

Location Summaries

Plots not harvested

Location	Reason
Meade County - Sturgis	Hail

Fall River County - Oelrichs

Planted: September 21, 1999 Herbicide: Glean $^1/_3$ oz/A
Harvested: July 12, 2000 Additional Nitrogen: 100 Lb/A
Previous crop: Conventional fallow

Once again Oelrichs had favorable conditions and produced an excellent crop. The yields averaged 77 Bu/A with a 60.1 Lb/Bu average test weight. The top yield group included Quantum 7588, Quantum 7406 and Alliance, other varieties that did well were Platte, Wesley, Vista and Arapahoe. Over the past three years Alliance, 2137, Wesley, Jagger, Tam 107 and Arapahoe have had the best yield averages. Results are shown in Table 2.

Bennett County – Martin

Planted: September 22, 1999 Herbicide: None
Harvested: July 22, 2000 Additional Nitrogen: 100 Lb/A
Previous crop: Millet, planted no-till

The Martin trial was variable this year as indicated by the high Coefficient of Variation (CV) of 17.4. Because the CV was above 13 it is not recommended to make yield comparisons from the 2000 data. The three year data was usable and the varieties with the best three year averages were Alliance, Arapahoe, TAM 107, Siouxland, Wesley, Vista, 2137 and Crimson. Results are shown in Table 3.

Table 2. Hard Winter Wheat Variety Trial – Fall River County (Oelrichs), 1998-2000.

Variety	Height	Lodging	Moisture	Test Wt.	Yield Bu/A		Protein
	Inches	1-9*	Percent	Lb/Bu	2000	3-Year	Percent
Hard Red							
2137	34	1	17.2	58.7	78	**83**	10.8
ALLIANCE	36	1	12.9	62.0	**91**	**88**	9.5
ARAPAHOE	38	1	15.9	59.9	81	**79**	10.1
COUGAR	41	1	18.1	58.6	65	--	12.2
CRIMSON	42	1	24.5	58.2	68	71	13.2
CULVER	37	1	17.8	59.4	75	**78**	10.1
HARDING	41	1	23.9	57.7	70	68	11.3
HONDO	37	1	15.8	59.5	76	--	11.1
JAGGER	34	1	12.6	63.1	80	**82**	10.0
MILLENNIUM	38	1	19.3	58.2	75	--	10.8
NEKOTA	36	1	13.8	60.4	77	--	9.9
RANSOM	40	1	14.9	58.4	67	64	11.4
ROSE	43	1	21.8	56.4	64	71	11.9
ROUGHRIDER	44	1	20.1	57.8	58	58	12.6
SCOUT 66	46	1.8	13.3	62.9	74	62	10.5
SEWARD	43	1	23.4	55.5	58	66	12.3
SIOUXLAND	43	1	19.3	59.0	77	74	10.8
TAM 107	36	1	13.4	61.1	80	**81**	10.2
TANDEM	41	1	21.3	57.8	72	70	11.6
VISTA	33	1	14.6	61.2	81	**76**	11.2
WESLEY	33	1	11.8	61.6	83	**83**	10.9
WINDSTAR	37	1	16.3	59.5	78	**74**	10.1
SD92107-1	42	1	14.8	61.2	81		10.5
SD92107-3	40	1	14.9	59.6	77		11.2
SD92107-5	40	1	23.0	57.1	72		11.6
SD93267	45	1	17.0	61.8	76		11.9
SD94149	35	1	17.8	61.2	81		10.4
SD95203	41	1	20.1	59.7	78		10.4
SD95218	40	1	14.4	61.0	75		11.2
SD97457	35	1	13.4	61.8	85		10.2
NE93613	39	1	14.6	60.6	81		10.4
NE94654	37	1	15.0	59.3	83		8.9
NE95473	34	1	15.0	61.4	83		10.9
Hard Red Hybrids							
QUANTUM 7406	36	1	14.8	61.1	**89**		10.1
QUANTUM 7463	36	1	17.0	59.9	88		10.7
QUANTUM 7588	37	1	14.0	60.0	**96**		8.8
QUANTUM 9806	35	1	15.7	60.8	84		9.4
Hard White							
BETTY	36	1	18.4	58.9	74		12.4
HEYNE	34	1	13.2	60.9	72		11.4
NUPLAINS	35	1	17.2	61.8	77		10.3
PLATTE	33	1	14.3	64.1	83		9.7
TREGO	36	1	17.3	60.7	78		11.6
KS96HW115	36	1	14.9	61.8	88		10.1
SD97W604	33	1	14.1	62.2	79		10.7
SD97W609	34	1	15.8	60.9	75		11.6
SD97W624	36	1	14.3	60.2	75		10.6
Average	38	1.0	16.6	60.1	77	74	10.8
LSD (P=.05)	1.8	0.2	--	1.6	7	13	--
CV	3.5	13.9	--	1.9	6.3	7	--

* 1=No lodging, 9 = 100% lodged.

Table 3. Hard Winter Wheat Variety Trial - Bennett County (Martin), 2000.

Variety	Height	Lodging	Test Wt.	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3-Year
Hard Red					
2137	35	1	61.2	66	**67**
ALLIANCE	33	1	60.9	71	**74**
ARAPAHOE	37	1	61.0	74	**70**
COUGAR	38	1	62.4	60	--
CRIMSON	39	1	62.4	67	**67**
CULVER	33	1	61.0	61	**67**
HARDING	36	1	60.2	53	56
HONDO	35	1	62.1	74	--
JAGGER	31	1	62.0	49	64
MILLENNIUM	36	1	61.4	64	--
NEKOTA	34	1	60.8	60	62
RANSOM	36	1	60.5	54	57
ROSE	36	1	61.6	45	58
ROUGHRIDER	42	1	62.5	59	55
SCOUT 66	40	1	63.2	53	55
SEWARD	37	1	60.8	52	58
SIOUXLAND	43	1	60.5	70	**68**
TAM 107	35	1	60.6	70	**70**
TANDEM	40	1	60.7	62	65
VISTA	32	1	60.6	66	**66**
WESLEY	31	1	61.0	69	**68**
WINDSTAR	34	1	59.2	57	65
SD92107-1	39	1	61.0	62	
SD92107-3	39	1	61.4	62	
SD92107-5	36	1	61.0	60	
SD93267	42	1	62.0	61	
SD94149	35	1	62.4	68	
SD95203	38	1	62.6	77	
SD95218	39	1	61.8	71	
SD97457	36	1	62.2	71	
NE93613	37	1	59.8	67	
NE94654	31	1	61.0	56	
NE95473	34	1	61.4	70	
Hard Red Hybrids					
QUANTUM 7406	35	1	62.0	85	
QUANTUM 7463	33	1	62.0	65	
QUANTUM 7588	35	1	61.1	75	
QUANTUM 9806	32	1	62.6	75	
Hard White					
BETTY	34	1	61.5	54	
HEYNE	32	1	60.8	55	
NUPLAINS	34	1	64.0	69	
PLATTE	30	1	63.6	63	
TREGO	29	1	63.5	56	
KS96HW115	34	1	60.7	67	
SD97W604	32	1	61.9	69	
SD97W609	33	1	61.3	62	
SD97W624	33	1	61.3	58	
Average	35	1	61.5	64	64
LSD (P=.05)	4.1	0.0	1.5	16	9
CV	8.3	0.0	1.8	**17.4**	12

* 1=No lodging, 9 = 100% lodged.

Pennington County - Wall

Planted: September 28, 1999 Herbicide: Glean $^1/_3$ oz/A
Harvested: July 25, 2000 Additional Nitrogen: 80 Lb/A
Previous crop: Conventional fallow

Growing conditions at Wall were excellent for winter wheat in 2000. Yields averaged 67 Bu/A with good test weights averaging 63 Lb/Bu. The top yield group included the Quantum hybrids and the varieties Vista, Wesley and Alliance, other varieties that did well were TAM 107, 2137, Arapahoe and Hondo. The results are presented in Table 4.

Stanley County - Hayes

Planted: September 13, 1999 Herbicide: None
Harvested: July 11, 2000 Additional Nitrogen: none
Previous crop: Conventional fallow

Hayes had good growing conditions in 2000, the wheat averaged 61 Bu/A with 62.1 Lb/Bu average test weights. The top yield group in 2000 consisted of the Quantum hybrids, Vista Rose, Millennium, Trego, Tandem, TAM 107 and Siouxland. The varieties with the best three year averages were 2137, Vista, Alliance, Arapahoe and Jagger. The results are presented in Table 5.

Butte County – Newell

Planted: September 15, 1999 Herbicide: $^3/_{10}$ oz/A Harmony Extra
Harvested: July 25, 2000 Additional Nitrogen: None
Previous crop: Conventional fallow

The trial at Newell was somewhat variable, due to problems with stem rust and moderate hail damage. The trial averaged 43 Bu/A with test weights averaging 61.9 Lb/Bu. The Quantum hybrids and the varieties Alliance, TAM 107, Trego, Nekota, Platte and Harding had the best yields in 2000. Results are shown in Table 6.

Perkins County – Bison

Planted: September 15, 1999 Herbicide: Glean $^1/_3$ oz/A
Harvested: July 27, 2000 Additional Nitrogen: 80 Lb/A
Previous crop: Barley, No-till planted

Bison had excellent yields on recrop with a 64 Bu/A average, but test weights were lower than expected at 59.9 Lb/Bu. The top yield group consisted of Trego and Quantum 7588, other varieties that did well were Vista, TAM 107, Wesley and 2137. Over the past three years there were not significant differences among varieties. Because of the need for winter hardy wheats for this northern location the varieties Harding, Crimson and Rose would be recommended. The results are presented in Table 7.

Table 4. Hard Winter Wheat Variety Trial - Pennington County (Wall), 2000.

Variety	Test Wt Lb/Bu	Yield Bu/A
Hard Red		
2137	62.7	69
ALLIANCE	62.4	**73**
ARAPAHOE	62.5	68
COUGAR	63.7	65
CRIMSON	65.6	67
CULVER	63.2	63
HARDING	63.0	66
HONDO	64.2	68
JAGGER	63.3	61
MILLENNIUM	63.0	63
NEKOTA	62.1	61
RANSOM	61.3	67
ROSE	65.3	65
ROUGHRIDER	63.9	58
SCOUT66	63.7	64
SEWARD	61.9	64
SIOUXLAND	60.0	58
TAM107	62.6	**71**
TANDEM	62.3	59
VISTA	63.0	**78**
WESLEY	62.7	**77**
WINDSTAR	62.1	67
SD92107-1	62.5	67
SD92107-3	62.4	**73**
SD92107-5	62.8	72
SD93267	64.1	61
SD94149	62.9	**74**
SD95203	61.9	70
SD95218	62.8	**74**
SD97457	64.1	62
NE93613	62.8	66
NE94654	62.1	**72**
NE95473	62.6	69
Hard Red Hybrids		
QAUNTUM 7463	63.2	**77**
QUANTUM 7406	63.6	**79**
QUANTUM 7588	62.3	**77**
QUANTUM 9806	63.5	**80**
Hard White		
BETTY	62.6	60
HEYNE	63.3	60
NUPLAINS	65.1	66
TREGO	64.7	68
KS96HW115	63.6	**73**
SD97W604	64.0	60
SD97W609	62.9	55
SD97W624	62.6	66
Average		67
LSD(P=.05)		9
CV		10

Table 5. Hard Winter Wheat Variety Trial - Stanley County (Hayes), 1998-2000.

Variety	Height Inches	Lodging 1-9*	Test Wt. Lb/Bu	Yield Bu/A 2000	Yield Bu/A 3-Year	Protein Percent
Hard Red						
2137	31	1	63.0	59	**65**	9.3
ALLIANCE	33	1	62.2	64	**68**	8.3
ARAPAHOE	37	1	60.9	64	**66**	8.8
COUGAR	35	1	62.6	53	--	9.9
CRIMSON	36	1	63.8	57	60	9.5
CULVER	34	1	61.6	61	**64**	9.3
HARDING	36	1	62.3	63	**64**	8.9
HONDO	33	1	61.1	54	--	10.4
JAGGER	30	1	62.7	63	**65**	9.5
MILLENNIUM	36	1	62.1	**66**	--	9.0
NEKOTA	33	1	62.7	55	62	9.9
RANSOM	38	1	61.2	59	59	9.8
ROSE	40	1	60.9	**70**	**63**	10.1
ROUGHRIDER	39	1	61.8	45	47	10.1
SCOUT 66	42	1.3	62.5	58	58	11.0
SEWARD	40	1	61.4	57	59	9.3
SIOUXLAND	38	1	60.6	**65**	62	9.0
TAM 107	32	1	61.5	63	**63**	9.4
TANDEM	37	1	61.8	**65**	**64**	9.5
VISTA	31	1	61.9	**73**	**70**	9.7
WESLEY	31	1	61.5	56	**64**	9.5
WINDSTAR	34	1	61.9	63	**64**	10.4
SD92107-1	37	1	61.5	58		10.5
SD92107-3	35	1	61.9	65		9.5
SD92107-5	36	1	61.8	65		10.6
SD93267	40	1	63.3	58		10.0
SD94149	32	1	63.5	57		9.1
SD95203	36	1	60.7	64		8.9
SD95218	36	1	62.8	57		10.0
SD97457	32	1	61.9	58		9.6
NE93613	35	1	60.1	61		9.3
NE94654	35	1	60.6	**68**		8.3
NE95473	32	1	60.4	57		10.1
Hard Red Hybrids						
QUANTUM 7406	33	1	61.8	**74**		9.6
QUANTUM 7463	33	1	61.7	**67**		8.8
QUANTUM 7588	34	1	61.0	**74**		8.4
QUANTUM 9806	32	1	62.6	**70**		9.1
Hard White						
BETTY	31	1	63.0	52		10.1
HEYNE	29	1	63.6	45		9.8
NUPLAINS	30	1	62.9	55		10.1
PLATTE	31	1	64.3	61		.
TREGO	32	1	63.8	**65**		9.3
KS96HW115	34	1	62.4	**67**		8.8
SD97W604	30	1	62.4	57		9.4
SD97W609	31	1	62.7	63		9.5
SD97W624	35	1	62.0	58		9.2
Average	34	1.0	62.1	61	62	9.5
LSD (P=.05)	2.9	0.1	1.9	10	7	--
CV	6.0	7.3	2.2	11.3	9	--

*1=No lodging, 9 = 100% lodged.

Table 6. Hard Winter Wheat Variety Trial - Butte County (Newell), 2000.

Variety	Test Wt. Lb/Bu	Yield Bu/A	Protein Percent
Hard Red			
2137	63.3	37	9.9
ALLIANCE	60.6	**53**	10.8
ARAPAHOE	61.2	43	10.9
COUGAR	62.6	34	11.1
CRIMSON	62.9	41	11.4
CULVER	61.1	43	10.1
HARDING	61.7	**46**	10.5
HONDO	63.1	36	11.9
JAGGER	60.9	37	10.7
MILLENNIUM	63.1	43	10.9
NEKOTA	62.8	**48**	9.8
RANSOM	60.2	43	10.5
ROSE	62.0	45	13.2
ROUGHRIDER	62.3	35	10.6
SCOUT 66	62.2	38	10.5
SEWARD	61.0	40	.
SIOUXLAND	60.4	45	10.7
TAM 107	60.5	**50**	9.9
TANDEM	63.0	45	10.7
VISTA	62.2	44	10.8
WESLEY	60.1	44	10.3
WINDSTAR	60.1	35	10.7
SD92107-1	60.0	36	10.9
SD92107-3	62.5	**49**	11.1
SD92107-5	61.5	45	10.6
SD93267	61.2	30	11.1
SD94149	63.3	44	10.1
SD95203	63.9	53	10.4
SD95218	61.6	39	10.6
SD97457	61.4	**52**	10.3
NE93613	61.3	42	11.2
NE94654	60.5	**52**	9.7
NE95473	62.2	43	10.8
Hard Red Hybrids			
QUANTUM 7406	63.0	**54**	9.3
QUANTUM 7463	63.2	**54**	9.1
QUANTUM 7588	61.7	**54**	10.6
QUANTUM 9806	62.0	**53**	10.7
Hard White			
BETTY	62.5	36	13.3
HEYNE	60.1	28	11.4
NUPLAINS	63.5	42	11.3
PLATTE	64.6	**47**	11.4
TREGO	64.7	**49**	10.0
KS96HW115	62.6	39	10.5
SD97W604	62.0	42	11.4
SD97W609	61.1	41	10.4
SD97W624	61.4	**46**	12.4
Average	61.9	43	10.8
LSD (P=.05)	1.9	9	--
CV	2.2	14.3	--

* 1=No lodging, 9 = 100% lodged.

Table 7. Hard Winter Wheat Variety Trial - Perkins County (Bison), 1998-2000.

Variety	Height	Lodging	Test Wt.	Yield Bu/A		Protein
	Inches	1-9*	Lb/Bu	2000	3-Year	Percent
2137	32	1	59.8	72	65	10.0
ALLIANCE	32	1	59.2	67	64	8.6
ARAPAHOE	35	1	59.6	62	65	10.2
COUGAR	36	1	61.3	53	--	11.9
CRIMSON	37	1	61.4	54	56	10.2
CULVER	34	1	58.4	60	58	10.4
HARDING	38	1	59.8	62	65	10.7
HONDO	34	1	60.9	60	--	11.0
JAGGER	32	1	58.5	60	56	11.4
MILLENNIUM	36	1	60.5	70	--	10.1
NEKOTA	33	1	59.7	64	60	10.0
RANSOM	38	1	58.2	59	59	10.4
ROSE	37	1	60.6	54	57	10.7
ROUGHRIDER	42	1	62.0	49	51	11.4
SCOUT 66	41	2	60.9	58	61	10.2
SEWARD	40	1	59.7	57	59	10.8
SIOUXLAND	39	1	58.9	53	61	10.9
TAM 107	32	1	59.8	73	62	10.7
TANDEM	38	1	60.0	61	64	9.9
VISTA	31	1	59.3	74	67	10.5
WESLEY	32	1	58.1	72	62	9.8
WINDSTAR	34	1	58.1	66	65	11.0
SD92107-1	39	1	59.3	64		10.5
SD92107-3	37	1	58.0	67		11.0
SD92107-5	39	1	60.0	71		10.6
SD93267	42	1	61.3	58		10.6
SD94149	32	1	60.5	68		12.8
SD95203	37	1	59.5	69		9.5
SD95218	36	1	58.5	54		10.2
SD97457	34	1	59.8	75		9.8
NE93613	36	1	58.3	66		10.8
NE94654	34	1	58.7	71		9.1
NE95473	33	1	59.6	61		9.8
QUANTUM 7406	34	1	59.2	73		11.7
QUANTUM 7463	31	1	60.4	71		11.2
QUANTUM 7588	35	1	58.5	**78**		8.8
QUANTUM 9806	32	1	61.2	71		9.7
BETTY	34	1	60.4	57		11.1
HEYNE	32	1	59.8	55		10.8
NUPLAINS	32	1	63.6	68		10.2
PLATTE	31	1	62.4	71		10.0
TREGO	34	1	61.5	**83**		11.2
KS96HW115	33	1	60.0	67		9.7
SD97W604	28	1	60.3	60		10.8
SD97W609	32	1	60.0	67		10.8
SD97W624	34	1	59.0	65		10.1
Average	34.8	1.0	59.9	64.5	61	10.5
LSD (P=.05)	2.3	0.2	1.5	8	NS	.
CV	4.6	11.8	1.8	8.4	10	.

* 1=No lodging, 9 = 100% lodged.

Lyman County – Kennebec

The winter wheat variety strips near Kennebec were planted on September 28, 1999 with a John Deere 750 plot drill. The varieties were seeded in five-foot strips 100 feet long, with a check strip of the variety Arapahoe after every fourth entry. The strips were harvested on July 17, 2000 with a small plot combine and the information is given in Table 8. This was a single rep trial so the information is not statistically analyzed. Due to a pattern of variation in the check strips the yields of adjacent plots were adjusted to account for the variation.

Table 8. Hard Winter Wheat Variety Strip – Lyman County (Kennebec), 1998-2000.

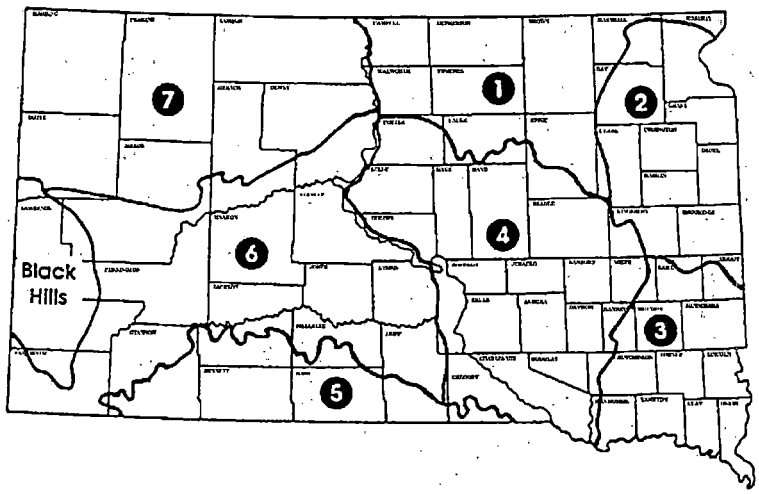
Variety	Height Inches	Lodging 1-9*	Protein Percent	Moisture Percent	Yield Bu/A	Yield 3Yr Ave.	Test Wt. Lb/Bu
Check	35	1		16.4	69		60.4
Alliance	32	1	12.6	16.1	67	66	60.6
Nekota	32	1	12.6	16.1	64	67	59.2
Arapahoe	35	1	14.2	16.0	67	65	60.6
Tandem	38	3	14.9	16.0	65	65	61.4
Check	37	1		15.8	67		61.0
Harding	38	1	15.1	15.8	57	60	61.1
Siouxland	35	1	14.0	16.1	66	65	60.0
Culver	34	1	13.2	15.7	63		57.3
Qauntum 7406	30	1	13.3	15.8	73		58.3
Check	35	1		15.2	64		61.6
Quantum 7588	33	2	13.4	15.5	76		58.7
2137	31	1	13.1	15.8	63	72	58.6
Jaggger	31	1	14.3	15.9	63	73	59.2
Wesley	30	1	14.6	15.4	72		57.9
Check	33	1		15.7	69		61.1
Hondo	31	1	14.5	15.1	52		58.7
Nuplains	32	1	14.5	15.9	65		61.3
Heyne	32	1	14.2	15.1	57		60.7
Betty	32	1	15.3	15.1	55		60.7
Check	34	1		15.4	68		59.9
Trego	31	1	13.3	15.2	68		62.1
Vista	29	1	14.4	15.7	64		59.6
TAM 107	31	1	13.7	15.3	63	72	61.0
Dawn	32	1	13.9	15.5	59	64	58.5
Check	32	1		15.2	62		60.4
Windstar	34	1	14.1	14.9	60	62	56.3
Crimson	38	1	15.8	14.9	57	57	62.1
Rose	37	1	15.1	15.1	47	51	61.6
Seward	34	1	14.2	15.1	51	59	59.6
Check	34	1		14.8	64		60.9
Roughrider	38	1	16.0	15.1	42	45	62.1
Ransom	35	1	15.0	15.1	53		58.0
Scout 66	40	5	14.0	15.5	50	52	62.3
SD 93267	40	1	15.4	15.1	57	60	62.0
Check	35	1	14.0	15.1	62		59.2
Check Average	34.4	1.0	14.0	15.5	66		60.6
Plot Average	33.4	1.3	14.1	15.6	63		60.0

* 1=No lodging, 9 = 100% lodged.

WHEAT VARIETY RECOMMENDATIONS FOR 2001

Crop Adaptation Areas for South Dakota

(Revised 1992)



WINTER WHEAT

Recommended:

Variety	*Crop Adaptation Area*
Alliance [PVP]	3,4[pc],5,6
Arapahoe [PVP]	1,3,4[pc],5,6,7
Nekota	1[pc],3,4[pc],5,6,7[pc]
Wesley	1[pc],3,4[pc],5,6,7[pc]
Tandem [PVP]	1[pc],3,4[pc],5,6,7[pc]
Crimson [PVP]	1[pc],2[pc],3[N],4[pc],6,7
Harding [PVP]	1[pc],2[pc],4[pc],7

Acceptable/Promising:

Variety	*Crop Adaptation Area*
TAM 107 [PVP]	4[pc],5,6
Millennium [PVP]	1[pc],4[pc],5,6,7[pc]
2137 [PVP]	1[pc],3,4[pc],5,6,7[pc]
Windstar [PVP]	1[pc],3,4[pc],5,6,7[pc]
Rose	1[pc],2[pc],3[N],4[pc],6,7

SPRING WHEAT

Recommended:

Variety	*Crop Adaptation Area*
Russ [PVP]	Statewide
Oxen [PVP]	Statewide
Forge [PVP]	Statewide
Ingot [PVP]	Statewide
Hamer [PVP]	Statewide
Reeder [PVP]	Statewide

Acceptable/Promising:

Variety	*Crop Adaptation Area*
Butte 86	Statewide
Ember [PVP]	Statewide
Sharp	Statewide
Ivan [PVP]	Statewide
Parshall [PVP]	Statewide

DURUM WHEAT

Recommended:

Variety	*Crop Adaptation Area*
Munich [PVP]	All durum areas
Ben [PVP]	All durum areas
Mountrail [PVP]	All durum areas
Munich [PVP]	All durum areas

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

[pc] Plant into protective cover.

[N] Northern half of crop adaptation area.

Source - Small Grains 2001 Variety Recommendations, EC774

SPRING WHEAT VARIETY TRIALS

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

Procedure: Plots were seeded at three locations in April 2000 with a John Deere 750 plot drill with 10 inch spacing. The experimental design was a randomized complete block with four replications. The seeding rate was 1,390,000 seeds per acre (90 Lb/A). The plots received 7.4 lbs N and 25 lbs P_2O_5 per acre as 10-34-0 with the seed. Herbicides were applied in May and varied according to weeds present. Plots were trimmed to 5' x 25' after heading. The wheat was harvested in July and August with a small plot combine. Height, shatter, and lodging notes were taken at the time of harvest.

Location Summaries

Pennington County – Wall

Planted: April 4, 2000 Herbicide: Ally ($^1/_{10}$ oz/A) + 2,4-D (5.3 oz/A LV-6), May 24,2000.
Harvested: July 31, 2000 Additional Nitrogen: 60 Lb/A
Previous crop: Conventional fallow

The growing conditions were favorable for spring wheat at Wall in 2000. The plot averaged 41 Bu/A and test weights averaged 59.5 Lb/Bu. The best yielders in 2000 were Ember, Saxon, Oxen, Forge, Parshall, Reeder and Russ. Varieties with good three-year averages were Ember, Saxon, Oxen, Forge, Parshall, Reeder, Ivan and Russ. Results are shown in Table 9.

Perkins County – Bison

Planted: April 13, 2000 Herbicide: Ally ($^1/_{10}$ oz/A) + 2,4-D (5.3 oz/A LV-6) + Assert (1 pint/A), May 19, 2000.
Harvested: Aug 2, 2000 Additional Nitrogen: 80 Lb/A
Previous crop: Barley, No-till planted

Yields at Bison averaged 35 Bu/A with 60.7 Lb/Bu average test weight. Top yielders were Ivan, Norpro, Saxon and Oxen. The best varieties over three-years were Ivan, Russ, Oxen, Forge, Ember, Hamer, Saxon, HJ98 and Ingot. The results are presented in Table 10.

Harding County - Ralph

Planted: April 13, 2000 Herbicide: Ally ($^1/_{10}$ oz/A) + 2,4-D (5.3 oz/A LV-6) + Assert (1 pint/A), May 19, 2000.
Harvested: August 3, 2000 Additional Nitrogen: None
Previous crop: Conventional fallow

Ralph spring wheat yields averaged 38 Bu/A with good test weights averaging 61.8 Lb/Bu. The top yield group for 2000 included Ember, HJ98, McVey, Ivan, Norpro and Oxen. The three year data shows Ivan, Ember, Oxen, HJ98, Forge and Russ with the best yields. The results are shown in Table 11.

Table 9. Hard Red Spring Wheat Variety Trial – Pennington County (Wall), 1998-2000.

Variety	Height	Lodging	Test Wt	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
ALSEN	29	1	60.9	42	
ARGENT(white)	28	1	59.5	37	37
BUTTE 86	27	1	58.8	37	39
CATEAU	29	1	55.3	33	
CHRIS	30	1	56.1	34	32
EMBER	29	1	61.8	**48**	**46**
FORGE	28	1	61.3	**44**	**44**
HAMER	26	1	58.5	38	40
HJ98	27	1	56.2	40	40
INGOT	29	1	62.4	43	40
IVAN	25	1	59.2	42	**45**
McVEY	28	1	56.6	42	
NORPRO	26	1	60.1	41	
OXEN	25	1	59.9	**45**	**43**
PARSHALL	28	1	61.8	**44**	**44**
REEDER	25	1	59.8	**44**	**46**
RUSS	28	1	59.3	**44**	**44**
SAXON	26	1	58.4	**46**	**42**
SHARP	27	1	60.8	42	40
2375	26	1	59.5	39	39
SD 3348	29	1	60.1	42	
SD 3367	26	1	60.5	40	
SD 3496	27	1	61.0	42	
SD 3506	29	1	61.3	**44**	
SD 3522	27	1	59.4	40	
SD 3411	27	1	58.0	38	
SD 3475	28	1	60.8	39	
SD 3518	26	1	58.7	41	
ND 709-9	29	1	59.4	37	
GM 40001	25	1	55.9	31	
GM 40002	24	1	60.3	43	
GM 40003	28	1	60.5	43	
N96-0144	26	1	59.8	42	
Average	27	1.0	59.5	41	42
LSD (P=.05)	3.2	--	1.6	5	4
CV	8.4	--	1.9	8.6	7

* 1=No lodging, 9 = 100% lodged.

Table 10. Hard Red Spring Wheat Variety Trial – Perkins County (Bison), 1998-2000.

Variety	Height	Lodging	Test Wt.	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
ALSEN	30	1	61.3	35	
ARGENT(white)	32	1	59.4	32	39
BUTTE 86	31	1	59.5	33	41
CATEAU	35	1	57.2	29	
CHRIS	36	1	57.8	23	30
EMBER	32	1	62.7	36	**48**
FORGE	33	1	62.8	35	**50**
HAMER	29	1	60.8	36	**48**
HJ98	29	1	60.0	36	**46**
INGOT	35	1	63.0	33	**46**
IVAN	28	1	60.3	**45**	**51**
McVEY	31	1	59.1	35	
NORPRO	29	1	59.6	**41**	
OXEN	30	1	61.1	**40**	**50**
PARSHALL	36	1	61.4	35	44
REEDER	30	1	59.0	38	43
RUSS	34	1	59.7	38	**50**
SAXON	31	1	60.5	**41**	**48**
SHARP	35	1	61.8	35	45
2375	30	1	59.7	32	43
SD 3348	31	1	60.9	38	
SD 3367	30	1	61.5	36	
SD 3496	33	1	61.7	33	
SD 3506	34	1	60.9	30	
SD 3522	34	1	61.7	32	
SD 3411	30	1	59.5	34	
SD 3475	34	1	62.1	30	
SD 3518	32	1	61.5	37	
ND 709-9	31	1	60.0	32	
GM 40001	28	1	59.7	37	
GM 40002	29	1	59.7	30	
GM 40003	30	1	62.0	37	
N96-0144	30	1	62.5	**40**	
Average	32	1.0	60.7	35	45
LSD (P=.05)	3.1	--	1.4	6	5
CV	6.9	--	1.7	12.5	9

* 1=No lodging, 9 = 100% lodged.

Table 11. Hard Red Spring Wheat Variety Trial - Harding County (Ralph), 1998-2000.

Variety	Height	Lodging	Test Wt.	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
ALSEN	29	1	61.7	35	
ARGENT(white)	35	1	61.6	37	42
BUTTE 86	36	1	61.4	39	42
CATEAU	40	1	58.6	30	
CHRIS	40	1	60.0	32	33
EMBER	34	1	62.9	**45**	**49**
FORGE	34	1	63.8	38	**46**
HAMER	28	1	62.1	36	43
HJ98	31	1	62.4	**44**	**47**
INGOT	37	1	62.8	34	42
IVAN	30	1	62.6	**43**	**49**
McVEY	34	1	60.7	**44**	
NORPRO	31	1	60.4	**43**	
OXEN	31	1	62.0	**43**	**48**
PARSHALL	39	1	62.0	38	43
REEDER	33	1	61.2	39	44
RUSS	37	1	61.5	40	**46**
SAXON	31	1	60.8	39	44
SHARP	36	1	62.4	35	40
2375	33	1	62.0	35	39
SD 3348	34	1	61.6	39	
SD 3367	35	1	61.7	39	
SD 3496	36	1	62.7	**41**	
SD 3506	38	1	62.3	38	
SD 3522	37	1	62.0	34	
SD 3411	34	1	62.1	37	
SD 3475	39	1	63.0	37	
SD 3518	34	1	61.8	33	
ND 709-9	32	1	61.3	31	
GM 40001	31	1	61.2	38	
GM 40002	30	1	61.5	37	
GM 40003	30	1	63.5	**45**	
N96-0144	33	1	62.1	39	
Average	34	1.0	61.8	38	44
LSD (P=.05)	2.0	--	1.1	5	4
CV	4.2	--	1.2	9.1	10

* 1=No lodging, 9 = 100% lodged.

DURUM WHEAT VARIETY TRIALS

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

Procedure: Plots were seeded at three locations in April 2000 with a John Deere 750 plot drill with 10 inch spacing. The experimental design was a randomized complete block with four replications. The seeding rate was 1,390,000 seeds per acre (90 Lb/A). The plots received 7.4 lbs N and 25 lbs P_2O_5 per acre as 10-34-0 with the seed. Herbicides were applied in early June and varied according to weeds present. Plots were trimmed to 5' x 25' after heading. The wheat was harvested in July and August with a small plot combine. Height, shatter, and lodging notes were taken at the time of harvest.

Location Summaries

Pennington County – Wall

Planted: April 4, 2000 Herbicide: Bronate (16 oz/A), May 24, 2000.
Harvested: July 31, 2000 Additional Nitrogen: 60 Lb/A
Previous crop: Conventional fallow

The yields at Wall were affected by the hot weather in late June and early July which caused low test weights of 58 Lb/Bu. Yields averaged 35 Bu/A with the top yield group in consisting of Mountrail and Maier. Results are shown in Table 12.

Perkins County – Bison

Planted: April 13, 2000 Herbicide: Ally ($^1/_{10}$ oz/A) + 2,4-D (5.3 oz/A LV-6) + Assert (1 pint/A), May 19, 2000.
Harvested: Aug 2, 2000 Additional Nitrogen: 80 Lb/A
Previous crop: Barley, No-till planted

Yields at Bison averaged 41 Bu/A in 2000 with 59.3 Lb/Bu average test weights. The top yielders in 2000 included Belzer, Mountrail and Maier. There was no significant difference in yields of varieties tested over the past three years. Results are shown in Table 13.

Harding County - Ralph

Planted: April 13, 2000 Herbicide: Ally ($^1/_{10}$ oz/A) + 2,4-D (5.3 oz/A LV-6) + Assert (1 pint/A), May 19, 2000.
Harvested: August 3, 2000 Additional Nitrogen: None
Previous crop: Conventional fallow

Ralph yields were only 32 Bu/A in 2000, mainly due to hot droughty conditions. The trial was fairly variable as indicated by the CV(Coeffienct of Variation) of 17.7 so yield comparisons should not be made from this data. Results are shown in Table 14.

Table 12. Durum Wheat Variety Trial - Pennington County (Wall), 1998-2000.

Variety	Height	Lodging	Test Wt	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
BELZER	33	1	57.9	37	
BEN	32	1	58.3	35	37
LEBSOCK	31	1	58.7	35	
MAIER	31	1	58.9	**40**	**40**
MONROE	32	1	58.0	35	
MOUNTRAIL	32	1	58.9	**42**	**44**
MUNICH	29	1	58.4	37	39
PLAZA	28	1	58.2	35	
SCEPTRE	30	1	56.6	32	
GM 90001	25	1	58.3	**42**	
GM 90002	27	1	57.1	28	
GM 90003	22	1	57.0	23	
Average	29.2	1.0	58.0	34.9	40
LSD (P=.05)	1.7	--	1.2	5	4
CV	4.1	--	1.5	9.7	6

Table 13. Durum Wheat Variety Trial - Perkins County (Bison), 1998-2000.

Variety	Height	Lodging	Test Wt	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
BELZER	37	1	55.6	**48**	
BEN	35	1	58.7	39	**48**
LEBSOCK	34	1	61.1	40	
MAIER	34	1	59.7	43	**48**
MONROE	39	1	61.0	35	
MOUNTRAIL	36	1	59.5	45	**53**
MUNICH	34	1	60.6	41	**49**
PLAZA	30	1	58.8	41	
SCEPTRE	35	1	59.1	38	
GM 90001	28	1	59.8	**49**	
GM 90002	29	1	59.5	35	
GM 90003	27	1	58.2	33	
Average	33.1	1.0	59.3	41	50
LSD (P=.05)	2.2	--	1.1	3	NS
CV	4.5	--	1.3	5.1	5

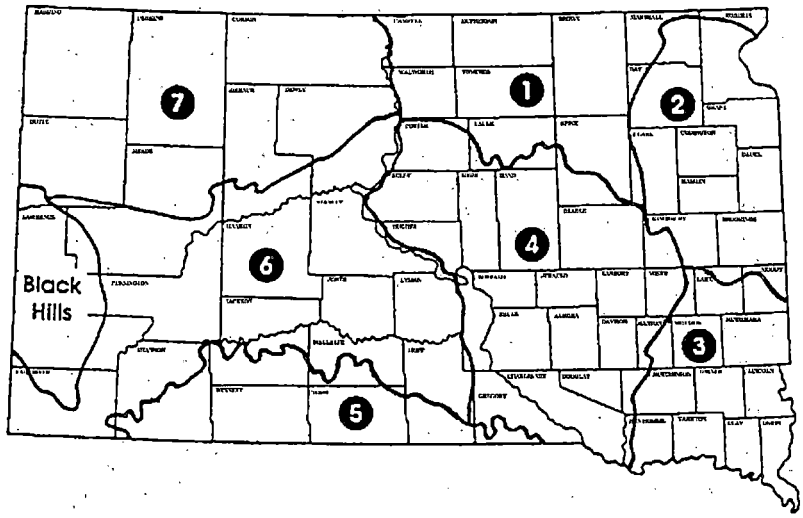
Table 14. Durum Wheat Variety Trial – Harding County (Ralph), 2000.

Variety	Height Inches	Lodging 1-9*	Test Wt Lb/Bu	Yield Bu/A
BELZER	37	1	61.1	39
BEN	38	1	62.3	36
LEBSOCK	33	1	62.6	32
MAIER	33	1	63.2	33
MONROE	34	1	61.8	30
MOUNTRAIL	34	1	61.6	35
MUNICH	31	1	62.3	31
PLAZA	30	1	62.7	36
SCEPTRE	32	1	61.3	32
GM 90001	25	1	61.1	36
GM 90002	25	1	62.0	24
GM 90003	23	1	61.6	23
Average	31.2	1.0	62.0	32
LSD (P=.05)	2.7	--	1.0	8
CV	6.1	--	1.1	**17.7**

OAT AND BARLEY VARIETY RECOMMENDATIONS FOR 2001

Crop Adaptation Areas for South Dakota

(Revised 1992)



OATS

Recommended:

Variety	*Crop Adaptation Area*
Jerry [PVP]	Statewide
Don	1,4 [N],5,6,7
Loyal	1,2,4 [N],6,7
Troy	1,2,4 [N],6,7

Acceptable/Promising:

Variety	*Crop Adaptation Area*
Riser [PVP]	2,3
Settler	Statewide

SPRING BARLEY

Recommended:

Variety	*Crop Adaptation Area*
6 Row	
Excel [PVP]	1,2,4,6,7
Robust [PVP]	1,2,4,6,7
Stander [PVP]	Statewide
Foster [PVP]	Statewide
2 Row	
Logan [PVP]	1,4[N],6,7

Acceptable/Promising:

Variety	*Crop Adaptation Area*
6 Row	
Lacey [PVP]	Statewide
2 Row	
Conlon [PVP]	1,4[N],6,7

Conlon, Excel, Foster, Robust and Stander are approved American Malting Barley Association varieties.

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

[N] Northern half of crop adaptation area.

Source - Small Grains Variety Recommendations, EC774.

OAT VARIETY TRAILS

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

Procedure: Plots were seeded at two locations in April 2000 with a John Deere 750 plot drill with 10 inch spacing. The experimental design was a randomized complete block with four replications. The seeding rate was 1,390,000 seeds per acre (64 Lb/A). The plots received 7.4 lbs N and 25 lbs P_2O_5 per acre as 10-34-0 with the seed. Herbicides were applied in May and varied according to weeds present. Plots were trimmed to 5' x 25' after heading. The oats were harvested in July and August with a small plot combine. Height, shatter, and lodging notes were taken at the time of harvest.

Location Summaries

Pennington County - Wall

Planted: April 4, 2000 Herbicide: Bronate (16 oz/A), May 24, 2000.
Harvested: July 31, 2000 Additional Nitrogen: 60 Lb/A
Previous crop: Conventional fallow

Wall had an average yield of 79 Bu/A with test weights averaging 40.3 Lb/Bu. The varieties Ebeltoft, Loyal and Troy did well in 2000. Troy, Loyal, Jerry, Don and Settler had the best three-year average yields. Results are presented in Table 15.

Perkins County - Bison

Planted: April 13, 2000 Herbicide: Bronate (16 oz/A), May 19, 2000.
Harvested: August 3, 2000 Additional Nitrogen: 80 Lb/A
Previous crop: Barley, no-till planted

Bison had good oat yields again in 2000. The yields averaged 77 Bu/A with test weights averaging 37.9 Lb/Bu. The top yielder in 2000 was Ebeltoft; it should be noted that Ebeltoft had one of the lowest test weights in the trial. Other varieties that did well were Richard, Loyal, Killdeer and Jerry. The top yield group for the three-year averages was Loyal, Jerry, Don, Troy and Settler. Results are shown in Table 16.

Table 15. Oat Variety Trial - Pennington County (Wall), 1998-2000.

Variety	Height	Lodging	Test Wt	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
DON	29	1	39.3	80	**83**
EBELTOFT	31	1	35.8	**92**	
HYTEST	37	1	41.5	69	65
JERRY	36	1	40.8	84	**85**
KILLDEER	28	1	36.8	84	
LOYAL	36	1	39.5	**93**	**90**
RICHARD	36	1	37.7	82	
RISER	32	1	39.8	73	71
SETTLER	33	1	44.8	75	**83**
TROY	36	1	38.3	**93**	**92**
YOUNGS	37	1	36.2	80	
SD 94004	32	1	40.3	78	
SD 96024	34	1	39.5	**91**	
SD 97264	38	1	39.0	**92**	
SD 97525	35	1	38.1	81	
PAUL (hulless)	36	1	45.4	62	
SD 97839 (hulless)	30	1	45.0	57	
SD 97914 (hulless)	34	1	42.7	72	
SD 95963 (hulless)	34	1	45.6	58	
Average	33.9	1.0	40.3	79	80
LSD (P=.05)	2.5	--	2.7	8	12
CV	5.3	--	4.7	7.1	9

* 1 = No Lodging, 9 = 100% lodged.

Table 16. Oat Variety Trial - Perkins County (Bison), 1998-2000.

Variety	Height	Lodging	Test Wt	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
DON	29	1	36.4	73	**109**
EBELTOFT	30	1	36.2	**103**	
HYTEST	36	1	38.3	56	87
JERRY	34	1	37.6	83	**113**
KILLDEER	30	1	37.0	89	
LOYAL	35	1	36.7	92	**114**
RICHARD	36	1	35.1	**93**	
RISER	30	1	36.0	57	86
SETTLER	33	1	38.3	76	**107**
TROY	36	1	36.6	86	**110**
YOUNGS	37	1	35.2	82	
SD 94004	31	1	38.5	71	
SD 96024	36	1	36.9	86	
SD 97264	36	1	37.0	87	
SD 97525	36	1	34.1	66	
PAUL (hulless)	35	1	44.5	68	
SD 97839 (hulless)	31	1	42.2	68	
SD 97914 (hulless)	34	1	40.9	64	
SD 95963 (hulless)	35	1	43.6	60	
Average	33.8	1.0	37.9	77	102
LSD (P=.05)	2.2	--	1.4	10	9
CV	4.6	--	2.6	9.1	7

* 1 = No Lodging, 9 = 100% lodged.

SPRING BARLEY VARIETY TRIALS

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

Procedure: Plots were seeded at three locations in April 2000 with a John Deere 750 plot drill with 10 inch spacing. The experimental design was a randomized complete block with four replications. The seeding rate was 1,210,000 seeds per acre (117 Lb/A for two row, 83 Lb/A for six-row). The plots received 7.4 lbs N and 25 lbs P_2O_5 per acre as 10-34-0 with the seed. Herbicides were applied in May and varied according to weeds present. Plots were trimmed to 5' x 25' after heading. The barley was harvested in July and August with a small plot combine. Height, shatter, and lodging notes were taken at the time of harvest.

Location Summaries

Pennington County - Wall

Planted: April 4, 2000
Harvested: July 31, 2000
Previous crop: Conventional fallow

Herbicide: Bronate (16 oz/A), May 24, 2000.
Additional Nitrogen: 60 Lb/A

At Wall, yields averaged 43 Bu/A and test weights averaged 48.2 Lb/Bu. The varieties Logan, Excel, Lacy and Foster had the best yields in 2000. The varieties with the best three-year averages were Foster, Excel and Logan. Results are shown in Table 17.

Perkins County - Bison

Planted: April 13, 2000
Harvested: July 27, 2000
Previous crop: Barley, No-till planted

Herbicide: Ally ($^1/_{10}$ oz/A) + 2,4-D (5.3 oz/A LV-6), May 19.
+ Assert (1 pint/A), May 19, 2000.
Additional Nitrogen: 80 Lb/A

Bison had good recrop barley yields in 2000 averaging 44 Bu/A with a 45.1 Lb/Bu average test weights. There were no significant yield differences in 2000 with all the varieties yielding within nine bushels of each other. The three-year averages were close also with an eleven bushel range between varieties. The results are presented in Table 18.

Harding County - Ralph

Planted: April 13, 2000
Harvested: August 3, 2000
Previous crop: Conventional fallow

Herbicide: Ally ($^1/_{10}$ oz/A) + 2,4-D (5.3 oz/A LV-6)
+ Assert (1 pint/A), May 19, 2000.
Additional Nitrogen: None

Growing conditions for barley were normal at Ralph in 2000. The average yield was 41 Bu/A with test weights averaging 47.8 Lb/Bu. The varieties with the best yields in 2000 were Stander and Lacy. Excel, Foster, Stander and Logan had the best three-year averages. Results are presented in Table 19.

Table 17. Spring Barley Variety Trial - Pennington County (Wall), 1998-2000.

Variety	Height	Lodging	Test Wt	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
TWO ROW					
CONLON	27	1	49.3	43	54
LOGAN	28	1	51.3	**53**	**59**
2ND16461	27	1	50.4	41	
SIX ROW					
DRUMMOND	28	1	46.4	37	
EXCEL	28	1	46.3	**46**	**61**
FOSTER	29	1	46.5	**46**	**56**
MNBRITE	29	1	47.5	40	51
ROBUST	31	1	48.7	44	52
STANDER	28	1	47.0	34	50
LACEY	27	1	48.6	**48**	
Average	27.9	1.0	48.2	43.3	55
LSD (P=.05)	3.6	--	2.3	8	7
CV	5.7	--	3.2	12.2	9

* 1 = no lodging, 9 = 100% lodged.

Table 18. Spring Barley Variety Trial - Perkins County (Bison), 1998-2000.

Variety	Height	Lodging	Test Wt	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
TWO ROW					
CONLON	32	1	47.8	42	67
LOGAN	30	1	46.4	48	74
2ND16461	31	1	48.0	47	
SIX ROW					
DRUMMOND	32	1	44.8	41	
EXCEL	30	1	41.4	39	70
FOSTER	32	1	42.9	42	74
MNBRITE	32	1	45.9	41	68
ROBUST	35	1	45.9	43	71
STANDER	31	1	43.6	45	78
LACEY	31	1	44.8	48	
Average	31.4	1.0	45.1	43.7	72
LSD (P=.05)	1.5	--	2.2	**NS**	**NS**
CV	3.2	--	3.4	12.0	10

* 1 = no lodging, 9 = 100% lodged.

Table 19. Spring Barley Variety Trial - Harding County (Ralph), 1998-2000.

Variety	Height	Lodging	Test Wt	Yield	Bu/A
	Inches	1-9*	Lb/Bu	2000	3 Year
TWO ROW					
CONLON	32	1	50.6	35	50
LOGAN	30	1	50.7	37	**57**
2ND16461	31	1	49.8	**	
SIX ROW					
DRUMMOND	32	1	47.5	35	
EXCEL	30	1	45.8	43	**60**
FOSTER	32	1	45.4	40	**56**
MNBRITE	32	1	47.1	41	53
ROBUST	35	1	46.9	41	53
STANDER	31	1	47.0	**48**	**59**
LACEY	31	1	47.7	**47**	
Average	31.4	1.0	47.8	40.8	55
LSD (P=.05)	1.5	--	1.4	3	7
CV	3.2	--	2.0	5.1	9

* 1 = no lodging, 9 = 100% lodged.
** The variety 2ND16461 was destroyed by deer.

SPRING TRITICALE VARIETY TRIALS

Objective: This trial was initiated to evaluate standard and experimental spring triticale varieties for yield, agronomic characteristics and adaptation to western South Dakota.

Procedure: Spring triticale varieties obtained from Resource Seeds and one spring wheat check (Forge) were planted near Wall and Bison South Dakota. The experimental design was a randomized complete block with four replications. A seeding rate of 1,390,000 seeds per acre was used and liquid starter fertilizer (10-34-0 at 6.3 gal/A) applied at 7.4-25-0 pounds per acre. Plots were trimmed to 5' x 25' after heading. The plot was harvested in July with a small plot combine. Height, shatter, and lodging notes were taken at the time of harvest.

Summary

Pennington County – Wall

Planted: April 4, 2000
Harvested: July 31, 2000
Previous crop: Conventional fallow

Herbicide: Bronate (16 oz/A), May 24, 2000.
Additional Nitrogen: 60 Lb/A

The plot averaged 2785 Lb/A and triticale test weights averaged 52.2 Lb/Bu. The triticale varieties are late in maturity, but seem adapted to the area and yielded similar to Forge spring wheat. The newer varieties are much shorter, have better seed quality and test weight than the older varieties that have been tested in the past. Results are shown in the table below.

Table 20. Spring Triticale Variety Trial – Pennington County (Wall), 1999-2000.

Variety	Height	Lodging	Test Wt	Yield	Lb/A
	Inches	1-9*	Lb/Bu	2000	2 year
Trical 303	32	1	53.7	2419	2706
Trical 310	33	1	52.7	**2748**	3044
94T20635	28	1	53.6	**2894**	3145
95T40611	26	1	48.8	1851	2265
Forge (sp. wheat)	29	1	62.2	**2758**	2767
Average	29.2	1.0	54.2	2534	2785
LSD (P=.05)	1.8	--	1.0	256.8	--
CV	2.2	--	1.2	6.6	--

* 1=No lodging, 9 = 100% lodged.

SAFFLOWER VARIETY TRIAL

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

Procedure: Eleven varieties were planted at 210,000 seeds/A (~25 Lb/A) in a randomized complete block experiment with four replications near Wall and Oelrichs, South Dakota. The previous year was fallow. The plots were planted in April with a John Deere 610 drill set to 10-inch row spacing. The plots were harvested with a small plot combine.

Pennington County - Wall

Planted: April 18, 2000
Not harvested, very poor stands due to crusting.

Fall River County - Oelrichs

Planted: May 3, 2000
Harvested: September 18, 2000

Herbicide: Treflan liquid 1LB/A active ingredient May 3, 2000.
Additional Nitrogen: 40 Lb/A

Discussion: Finally in 2000 we had decent safflower yields with good quality. The dry conditions in late summer allowed the safflower to mature without disease problems. This led to a crop with good color and test weights averaging 40.2 Lb/Bu. The yields at Oelrichs averaged a respectable 1520 Lb/A with the varieties S-518, Montola 2000, Finch, Montola 2004 and S-541 doing well in 2000. The best three-year average yielders were S-518, Montola 2000, Finch, C/W 88-OL and S-541. Results are shown in Table 21.

Table 21. Safflower Variety Trial – Fall River County (Oelrichs) 1998-2000.

Variety	Height	Lodging	Test Wt.	Yield	Lb/A
	Inches	1-9*	Lb/Bu	2000	3 year
Linoleic types					
Centennial	28	1	39.8	1569	1326
Finch	25	1	41.6	**2036**	1640
Morlin	28	1	37.3	1575	1213
SeedTec S-208	26	1	40.3	1853	
SeedTec S-541	27	1	40.8	**2094**	1514
SeedTec 7118exp	25	1	43.8	**2031**	
SeedTec 8117exp	29	1	37.3	1674	
SeedTec 9154exp	27	1	41.1	**1994**	
Oleic types					
CalWest C/W 88-OL	28	1	39.0	1890	1591
Montola 2000	26	1	41.8	**2247**	1708
Montola 2001	26	1	39.5	1889	1483
Montola 2003	25	1	40.2	**2203**	
SeedTec S-345	28	1	40.4	**2012**	1388
SeedTec S-518	28	1	39.4	**2529**	1819
Average	26.5	1.0	40.2	1971	1520
LSD (P=.05)	4.9	--	3.1	544	--
CV	8.5	--	5.5	19.3	--

SOYBEAN VARIETY TRIAL

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

Procedure: Nine varieties were planted at 180,000 seeds/A in a randomized complete block experiment with four replications near Wall and Oelrichs, South Dakota. The previous year was fallow. The plots were planted in May with a John Deere 750 drill set to 10-inch row spacing with soybean inoculum (*Bradyrhizobium japonicum*) added to the seed at planting time. The plots were harvested with a small plot combine. Results are shown in tables 23.

Pennington County - Wall

Planted: May 22, 2000
Harvested: September 28, 2000

Herbicide: Treflan liquid 1LB/A ai April 6, 2000.
Additional Nitrogen: none

Discussion: 2000 was a more typical year for soybeans in western South Dakota. The hot dry weather in July and August stressed the soybeans during the critical time of flowering and pod fill. This lead to an average yield of 12 Bu/A and 55.3 Lb/Bu test weights. The normal weather patterns from July 15th through Sept 1st usually tends toward hot and dry conditions when soybeans are most susceptible to drought stress. This makes soybeans a riskier crop choice for this part of the state.

Table 22. Soybean Variety Trial – Pennington County (Wall) 2000.

Variety	Maturity Group	Height Inches	Lodging 1-9*	Test Wt Lb/Bu	Yield Bu/A
Conventional					
Stride	1.4	18	1	57.3	14
Surge	0.7	15	1	55.4	13
Roundup Ready					
NK S14-B2	1.5	16	1	56.0	10
NK S14-M7	1.5	17	1	54.6	10
NK S14-G3 (X9913R)	1.5	16	1	56.3	11
Stine 0900-4	0.9	18	1	52.7	13
Stine 1006-4	1.0	17	1	56.2	9
Cargill B164RR	1.6	16	1	53.8	**15**
Asgrow 2301	2.3	14	1	55.3	**16**
Average	--	16.0	1.0	55.3	12.3
LSD (P=.05)	--	2.3	--	0.8	2
CV	--	6.3	--	1.0	11.5

FIELD PEA VARIETY TRIALS

Objective: To evaluate field pea varieties for yield and adaptation to western South Dakota.

Procedure: Field peas were planted in a randomized complete block experiment with four replications near Selby, Wall and Bison, South Dakota. The Wall and Selby trial had eighteen entries; the Bison trial had eight entries. The seeding rate was 300,000 seeds/A (90 - 220 Lb/A). The peas were inoculated with a granular pea inoculum (*Rhizobium leguminosarium* biovar *viceae)* just prior to planting. A John Deere 750 or 610 drill with 10-inch spacing was used to plant the trials in April 2000. The peas were harvested for grain in July and August with a Wintersteiger small plot combine equipped with vine lifters and a pickup reel. The results are given in Tables 24 and 25. Table 23 shows variety characteristics.

Location Information:

	Selby	**Wall**	**Bison**
Planted:	4/11	4/6	4/13
Harvested:	7/23	Not harvested	8/2
Herbicide:	Pursuit	Treflan	Poast
	3 oz/A	2 pint/A	20 oz/A

Summary: The Wall plot suffered from variable stands due to heavy crusting so this location was not harvested. .

At Selby, yields were below average. The plot did suffer from hail damage. This probably contributed to the lodging problem there, which made the trial difficult to harvest. The average yield was 36 Bu/A with 60.7 Lb/Bu average test weights. The top yield group in 2000 included Highlight and Carneval. Other varieties that did well were M-98, Delta and Millennium.

At Bison, yields averaged 35Bu/A which is very consistent with past yields here. There was no significant difference among yields in 2000. Grain varieties recommended for this area would be Grande, Carneval and Highlight. Arvika and 40-10 Magda would be excellent choices for forage with their normal leaf type and vigorous growth.

Table 23. Field Pea Characteristics.

Variety	Maturity	Leaf type	Vine Length	Seed Size
Yellow cotyledon				
Grande	Med-Late	Normal	Long	Medium
Carneval	Medium	Semi-Leafless	Short-Med	Med-Small
Crusader		Semi-Leafless	Short	Medium
Delta	Early	Semi-Leafless	Short	Medium
Highlight	Early-Med	Semi-Leafless	Short-Med	Small-Med
Integra	Early	Semi-Leafless	Short-Med	Large
Profi	Early-Med	Semi-Leafless	Short	Medium
Green cotyledon				
Atomic	Early	Semi-Leafless	Short-Med	V. Large
Majoret	Early	Semi-Leafless	Short-Med	Med-Large
Millennium	Early	Semi-Leafless	Short	Large
M-98	Early	Semi-Leafless	Short	Large
Toledo	Early	Semi-Leafless	Short	Large
Forage				
Arvika	Late	Normal	Long	Small
40-10 Magda	Late	Normal	Long	Small

Table 24. Field Pea Variety Trial – Perkins County (Bison), 2000.

Variety	Height Inches	Lodging 1-9*	Test Wt. Lb/Bu	Yield Bu/A
Forage				
40-10 Magda	40	9	60.3	29
Arvika	41	9	59.5	**30**
Yellow				
Grande	30	3	63.8	**35**
Carneval	24	1	59.6	**35**
Crusader	22	1	62.3	**37**
Highlight	24	1	62.6	**38**
Green				
Atomic	23	1	61.2	**39**
Majoret	24	1	60.7	**36**
Average	28.5	3.3	61.3	34.7
LSD (P=.05)	2.9	1.1	2.5	9
CV	5.7	18.8	2.3	14.4

*1=No lodging, 9= 100% lodged.

Table 25. Field Pea Variety Trial - Walworth County (Selby), 2000.

Variety	Lodging 1-5*	Test Wt. Lb/Bu	Yield Bu/A
Forage			
Arvika	4.8	59.8	19
40-10 Magda	5.0	59.3	20
Yellow			
Grande	5.0	61.2	24
Carneval	3.8	60.9	**45**
Crusader	5.0	61.5	32
Delta	5.0	60.3	39
Highlight	5.0	61.2	**49**
Integra	4.8	60.1	35
Profi	4.5	61.7	31
Green			
Atomic	3.5	60.9	36
Majoret	4.3	60.7	34
Millennium	4.3	60.2	37
M-98	4.8	59.8	41
Toledo	4.5	59.7	36
Experimentals			
CEB 1158	5.0	61.5	**49**
CEB 1484	5.0	61.9	**44**
PS510718	5.0	60.2	42
PS510737	5.0	62.0	31
Average	4.7	60.7	35.7
LSD (P=.05)	0.7	1.6	6
CV	10.1	1.9	11.1

*1=No lodging, 5= 100% lodged.

CHICKPEA VARIETY TRIAL

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

Procedure: Chickpea varieties were planted in a randomized complete block experiment with four replications near Oelrichs and Wall, South Dakota. Seven of the varieties are large kabuli types, which are grown for the large seeded garbanzo bean salad bar market. One of the varieties (B-90) is a smaller sized kabuli for the export market and the other variety (Myles) is a desi type, which accounts for 90% of the market outside the United States and is grown as a protein source for humans and livestock. Kabuli types used a planting rate of 150 Lb/A (~3 seeds ft^2) Desi types 90 Lb/A (~4 seeds ft^2). The plots were planted in April and May with a John Deere 610 drill set to 10-inch row spacing. The plots were harvested in October with a small plot combine. Results are shown in Tables 26 and 27.

Pennington County - Wall

Planted: April 6, 2000
Harvested: August 29, 2000

Herbicide: Treflan 2 pint/A, double pass incorporated.
Additional Nitrogen: None

Fall River County - Oelrichs

Planted: May 3, 2000
Harvested: October 12, 2000

Herbicide: Treflan 2 pint/A, double pass incorporated.
Additional Nitrogen: 40Lb/A

Discussion: Chickpeas did fairly well in 2000. The drier weather in the later part of the growing season allowed the plants to mature evenly and produce good quality seed. The best Kabuli type was Dwelly, it had decent yield and good seed size. It would be the one to consider for the human consumption market, where good color and seed size below 56 seeds per ounce is preferred. The variety B-90 also did well in its first year of testing and is another option as marketing contracts are available. The desi chickpea type typically has good yields in South Dakota, but would have a very limited market in the United States. Chickpeas are well adapted to the dry semi-arid climate of South Dakota and can be a profitable crop if quality characteristics are met.

Table 26. Chickpea Variety Trail - Pennington County (Wall), 1997-2000.

Variety	Height	Lodging	Seed Size	Test Wt	Yield Lb/A	
	Inches	1-9*	Seeds/oz	Lb/Bu	2000	4 Year
Kabuli						
Dwelly	16	1	56	59.3	**1320**	1297
Evans	16	1	62	59.9	**1273**	1178
Sanford	17	1	63	60.0	**1328**	1287
CDC Xena	14	1	60	60.5	**1506**	
B-90	12	1	100	61.1	**1362**	
CA9783007W	14	1	44	55.5	1147	
CA9783152	14	1	48	57.7	**1421**	
CA9783165C	14	1	47	55.4	1227	
Desi						
Myles	12	1	161	58.4	819	1190
Average	14.2	1.0	71	58.7	1267	1238
LSD (P=.05)	1.9	--	--	1.8	239	--
CV	5.8	--	--	2.1	12.9	--

Table 27. Chickpea Variety Trail – Fall River County (Oelrichs), 2000.

Variety	Height	Lodging	Seed Size	Test Wt	Yield
	inches	1-9*	Seeds/oz	Lb/Bu	Lb/A
Kabuli					
Dwelly	15	1	55	58.3	**1201**
Evans	17	1	62	59.0	912
Sanford	16	1	61	60.0	884
B-90	16	1	106	58.8	**1050**
Desi					
Myles	15	1	148	54.9	813
Average	15.5	1.0	86	58.2	972
LSD (P=.05)	2.2	--	--	1.5	229
CV	5.2	--	--	1.6	15.3

PROSO MILLET VARIETY TRIAL

Objective: To evaluate standard and experimental proso millet varieties for yield, agronomic characteristics and adaptation to western South Dakota.

Procedure: This test was done in cooperation with Dr. David Baltensperger (millet breeder) and Glen Frickel from the University of Nebraska. The experiment was planted in a randomized complete block design with four replications near Martin and Wall, South Dakota. The millet was planted into 5' x 25' plots with a John Deere 750 plot drill with ten-inch spacing. The ground was sprayed with Roundup prior to planting. Nebraska personnel harvested the Martin trial with a small plot swather. The results are presented in the Table 27.

Discussion: The cooperation between the two Universities made this test possible. By SDSU personnel planting and University of Nebraska people harvesting, resources could be better utilized. It gave us a chance to look at new varieties and the Nebraska millet breeding program a trial in an area in South Dakota where millet is grown.

Bennett County – Martin

Planted: June 13, 2000 Herbicide: Roundup burndown.
Harvested: Sept. 8, 2000 Additional Nitrogen: 50Lb/A
Previous crop: Sunflowers

The Martin location had poor yields caused by the very dry and hot weather. There was limited rainfall throughout July and August at Martin and therefore yields were limited to 590 Lb/A.

Pennington County – Wall

Planted: June 12, 2000 Herbicide: Roundup burndown.
Harvested: Not harvested Additional Nitrogen: 60 Lb/A
Previous crop: Conventional fallow

The Wall location was not harvested due to the dry conditions and damage by livestock.

Table 28. Proso Millet Variety Trial - Bennett County (Martin), 2000.

Variety	Height Inches	Yield Lb/A
CERISE-red	32	454
COPE	36	487
DAWN	22	410
EARLYBIRD	27	543
HUNTSMAN	30	**796**
SUNRISE	29	**720**
SUNUP	27	**782**
9210	26	**720**
9213	31	**742**
9217	26	**841**
9239-red	29	454
9241-red	35	277
9304	28	642
9307	28	642
9308	29	698
9668-1	24	399
9668-10	28	531
9668-16	29	**786**
9668-17	25	**709**
9668-18	28	**808**
9668-5	29	642
9668-6	27	675
436623-w	27	515
436625-w	38	266
436626-w	38	321
Average	29	590
LSD(P=.05)	5	140

SDSU REDUCED TILLAGE CROP ROTATION STUDY
WALL, SOUTH DAKOTA 2000

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

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

Cooperator: Crown Partnership of Wall, South Dakota.

Procedures: The study with the 11 different rotations was established in the spring of 1994. The rotations are 2 to 6 years in duration and we have completed at least one full cycle in all of the rotation sequences. All the crops in each rotation are grown each year and the rotations are replicated 4 times at this location. Reduced and no-till production practices are used to grow the crops in the rotations. The continuous crop millet, peas, spring wheat and winter wheat were planted with a JD 750 no-till drill at 10 inch row spacing. The fallow winter wheat was planted with a JD610 drill with 12 inch row spacing. The safflower, corn and sunflower were planted with a JD 7100 corn planter in 20 inch rows. The safflower, sunflower and field pea plots had granular Treflan applied in the fall with no incorporation. The crop yields were taken from each plot and used to compute the average yields for each rotation. The crop yields are beginning to reflect the effects of the rotations and the data is becoming more meaningful each season. Detailed field notes are recorded for each rotation and used in calculating the cost of production. An economic return is calculated for each season as well as long term averages.

	Rotations and Crop Yields:	**Dollars Return / A.**
1	Winter Wheat / Fallow 58.3 bu	$ 4.79
2a	Winter Wheat-A / Sunflower / Millet / Winter Wheat-B / Corn / Fallow 66.9 bu 2602 lbs 1300 lbs 46.0 bu 65.8 bu	$ 28.19
3	Winter Wheat / Safflower / Millet 45.4 bu 1391 lbs 1266 lbs	$14.59
4	Winter Wheat / Millet 32.6 bu 1370 lbs	$ - .01
5a	Winter Wheat / Corn / Sunflower / Spring Wheat 47.6 bu 50.2 bu 1958 lbs 31.8 bu	$ -4.40
6a	Winter Wheat-B / Sunflower / Fallow / Winter Wheat-A 48.9 bu 2468 lbs 60.8 bu	$19.34
9a	Winter Wheat-B / Safflower / Fallow / Winter Wheat-A 43.0 bu 1546 lbs 57.1 bu	$ 7.52
10	Winter Wheat / Peas / Millet 48.9 bu 1074 lbs 1524 lbs	$ - 1.54 or $ -9.84
11	Winter Wheat / Corn / Millet 37.8 bu 60.2 bu 1300 lbs	$ - 7.35

Rotation 1
WINTER WHEAT / SUMMER FALLOW

Cost / A.	2000 Winter Wheat
23.22	-Plant to Tandem 950,000 seeds/acre. Planted w/JD610 drill at 12" rows + 6 gal/A liquid 10-34-0. on Sept. 13, 1999
29.40	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 120#N / Acre rate. - March 23, 2000
0.00	-Wheat was weed-free so did not spray. – May 16, 2000
23.60	-Harvest 58.3 bu / acre winter wheat – July 13,2000 Test weight – 61.6# / bu (Protein content-13.5%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$105.12	Total Cost of Winter Wheat Production

Rotation 1
WINTER WHEAT / *SUMMER FALLOW*

Cost / A.	2000 Summer Fallow
12.35	-Spray w/1 1/4 lbs ai Aatrex 90df + 16 oz Roundup Ultra + liquid Ammonium Sulfate 10 gpA spray rate. on September 23, 1999.
5.25	-Work plots w//24" sweeps. – June 14, 2000
5.25	-Work w / off-set disk - July 17, 2000
10.00	-Spray w / 16 oz/acre Roundup Ultra + 12 oz/acre LV6 + 50 ml/gal liquid ammonium sulfate @ 8 gp Acre spray rate – August 1, 2000
28.50	-Land Charges 2000
$61.35	Cost of Summer Fallow

Rotation 1 SUMMARY 2000

Crop	Income		Expenses		Net Income Per Acre
Winter Wheat	$176.06	-	$105.12	=	$ 70.94
Fallow	$ 0.00	-	$ 61.35	=	$- 61.35
	$176.06	-	$166.47	=	$ 9.59 / 2 = $ 4.79

$ 4.79 Average Income / acre for Rotation 1 - 2000

Rot. 1 Discussion: The winter wheat grown on fallow had average yields this season of 58 Bu./A.. The weather in late June and early July was very dry and the plots did not have yields like they did in 1999. The net returns were down due to the lower yields and lower grain prices. The protein content of the grain was much better this year at 13.5 percent because of lower yields and higher nitrogen fertilizer application. The net return was lower this year at $4.79 compared to $15.46 last year and a three year average of $12.29 per acre. This net return includes the expenses from both the crop year and the fallow season. The cropping system is of lower intensity and does not always use all the moisture received. This rotation requires much less machinery and the work-load fits well with livestock producers.

Rotation 2a

WINTER WHEAT-A / SUNFLOWER / MILLET / WINTER WHEAT-B / CORN / FALLOW

Cost / A.	2000 Winter Wheat-A
23.22	-Plant to Tandem 950,000 seeds/acre. Planted w/JD610 drill at 12" rows + 6 gal/A liquid 10-34-0. on Sept. 13, 1999
29.40	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 120#N / Acre rate. - March 23, 2000
0.00	-Did not spray for weed control. Weed free. – May 16, 2000
25.64	-Harvest 66.9 bu / acre winter wheat-A – on July 13,2000 Test weight – 62.9# / bushel (Protein content-13.7%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$107.16	Total Cost of Winter Wheat -A Production

Rotation 2a

WINTER WHEAT-A / *SUNFLOWER* / MILLET / WINTER WHEAT -B / CORN / FALLOW

Cost / A.	2000 Sunflowers
10.60	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon + 16 oz LV6/acre at 8 gallons/acre spray rate.-August 11, 1999
8.20	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon. 8 gallons/acre spray rate. -September 20, 1999
28.50	-Injected 32-0-0 at 24 gal/A + 10-34-0 at 6 gal/A (87#N/acre plus 25# P2O5 per acre). - November 2, 1999
13.50	-Apply 1 1/4# ai Treflan TR-10 granules (no incorporation) – November 3, 1999
13.47	-Spray w/ .4 oz/A Harmony Extra + 16 oz Roundup Ultra + 50 ml/gal liquid ammonium sulfate + 18 ml/gal Penetrate II. 8 gpA spray rate. – May 19, 2000
24.76	-Plant to Pioneer 63M80 (Nusun) size 3, treated w / Lindane for wireworm control. 19,600 seeds/acre (box treated w/ Lindane) 16" plant spacing on a 20" row. May 23, 2000.
31.48	-Harvest 2602# / Acre Sunflowers – October 11, 2000. Test weight – 28.5# / bushel
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$159.41	Total Cost of Sunflower Production

Rotation 2a

WINTER WHEAT-A / SUNFLOWER / *MILLET* /WINTER WHEAT-B / CORN / FALLOW

Cost / A.	2000 Millet
12.35	-Spray w/ 1 1/4# ai Aatrex 90df + 16 oz Roundup Ultra + 50 ml/gal of Liquid Ammonium Sulfate. 10 gpA rate. - November 3. 1999
16.20	-Spray on 28-0-0 liquid Nitrogen fertilizer at 60#N / Acre rate. - March 23, 2000
9.52	-Spray w / .4 oz / acre Harmony Extra + LV6 @ 5 oz product / acre + Penetrate II @ 18 ml/gal. 8 gpA spray rate. -May 9, 2000
8.20	Spray w/ 16 oz Roundup Ultra + 50 ml/gal Ammonium Sulfate. 8 gpA spray rate. - June 8, 2000
21.62	-Planted to Sunrise proso millet w/JD750 drill. w/ starter fertilizer(10-34-0) at 6 gal/Acre. Row spacing was at 10". Seeding rate was at 20#/A. – June 12, 2000
15.84	-Harvest 1300 # / acre Millet – September 6, 2000
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$112.63	Total Cost of Millet Production

Rotation 2a

WINTER WHEAT-A / SUNFLOWER / MILLET / *WINTER WHEAT-B* / CORN / FALLOW

Cost / A.	2000 Winter Wheat -B
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml/gal liq amm. sulfate. 8 gpA spray rate. -September 20, 1999
25.47	-Plant to Wesley (90#/A rate) w/JD750 drill at 10" rows + 6 gal/A liquid 10-34-0. - Sept.29, 1999
24.78	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 100#N / Acre rate. - March 23, 2000
7.16	-Spray w/ .1 oz Ally / acre + LV6 @ 5 oz product/acre + Penetrate II @ 18 ml/gal. 8 gpA spray rate. – May 9, 2000
20.64	-Harvest 46.0 bu / acre winter wheat-B – July 13, 2000 Test weight –63.1# / bushel (Protein content – 11.9%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$115.15	Total Cost of Winter Wheat-B Production

Rotation 2a

WINTER WHEAT-A / SUNFLOWER / MILLET / WINTER WHEAT-B / *CORN* / FALLOW

Cost / A.	2000 Corn
10.60	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon + 16 oz LV6/acre at 8 gallons/acre spray rate.-August 11, 1999
32.82	-Injected 32-0-0 at 30 gal/Acre (100#N/acre) + 10-34-0 at 6 gal/Acre. (107#N/acre + 25# P2O5 / acre) - November 2, 1999
12.90	-Spray w/ 2 1/2# ai Aatrex 90df + crop oil concentrate @ 1 quart per acre. 10 gpA spray rate - November 3, 1999.
39.50	-Plant to Asgrow RX445 RR w/ JD 7100 corn planter w/ corn fingers (plateless) 19,600 seeds/acre. 98 day maturity. 20" row spacing, seed spacing of 16" to achieve 18,620 plant population per acre. -May 15, 2000.
0.00	-Corn was weed-free so did not spray. – June, 2000.
25.38	-Harvest 65.8 bushels / acre corn - September 28, 2000 Test weight – 54.1# / bushel
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$150.10	-Total Cost of Corn Production

Rotation 2a

WINTER WHEAT-A / SUNFLOWER / MILLET /WINTER WHEAT-B / CORN / *FALLOW*

Cost / A.	2000 Summer Fallow
13.47	-Spray w/ .4 oz/A Harmony Extra + 16 oz Roundup Ultra + 50 ml/gal liquid ammonium sulfate + 18 ml/gal Penetrate II. 8 gpA spray rate. – May 19, 2000.
5.25	-worked w / 24" sweeps. – June 14, 2000
5.25	-worked w / off-set disk. – July 17, 2000
28.50	-Land Charges 2000
$52.47	Total Cost of Summer Fallow

Rotation 2a SUMMARY 2000

Crop	Income		Expenses	Net Income Per Acre
Winter Wheat-A	$202.70		$149.14	$ 53.56
Sunflower	$244.06		$169.90	$ 74.16
Millet	$117.00		$112.63	$ 4.37
Winter Wheat-B	$134.32		$115.15	$ 19.17
Corn	$125.02		$150.10	$ -25.08
Fallow	$ 0.00		$ 0.00*	$ 00.00*
	$823.10	-	$653.97	= $ 169.13 / 6 = $28.19

*The expense of the fallow ($52.47) was split 80% to the Winter Wheat-A and 20 % to the sunflowers.

$28.19 Average Income / acre for Rotation 2a - 2000

Rot. 2a Discussion: This rotation provides a high level of diversity and intensity of crop production. The idea was to develop a 6 year rotation with as much diversity as possible to reduce effects from diseases and moisture use. The corn had a big loss in 2000 (-$25.08 per acre) in 1999 the corn made $36.30 per acre. The corn is the most weather dependent crop in the rotation. The price of millet has not always made it a profitable crop but it provides a good transition from sunflower to winter wheat.

This rotation does provide some excellent weed control and disease protection for the crop grown. The plots were very weed free and we observed no diseases on the crops. This diversity also spreads the work-load out for the producer. The big disadvantage would be the need for different types of equipment to produce the row crops and the small grains.

Rotation 3

WINTER WHEAT / SAFFLOWER / MILLET

Cost / A.	2000 Winter Wheat
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml/gal liq amm. sulfate. 8 gpA spray rate. -September 20, 1999
25.47	-Plant to Wesley (90#/A rate) w/JD750 drill at 10" rows + 6 gal/A liquid 10-34-0. - Sept.29, 1999
24.78	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 100#N / Acre rate. - March 23, 2000
7.16	-Spray w/ .1 oz Ally / acre + LV6 @ 5 oz product/acre + Penetrate II @ 18 ml/gal. 8 gpA spray rate. - May 9, 2000
20.48	-Harvest 45.4 bu / acre winter wheat-B – July 13, 2000 Test weight –63.3# / bushel (Protein content –11.4%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$114.99	Total Cost of Winter Wheat Production

Rotation 3

WINTER WHEAT / *SAFFLOWER* / MILLET

Cost / A.	2000 Safflower
10.60	-Spray w/ 16 oz Roundup Ultra + 50 ml / gal Am Sul + 16 oz LV6/acre. – Aug. 11, 1999.
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml / gal Am Sulfate. – September 20, 1999.
21.30	-Injected 32-0-0 at 14 gal/Acre (46#N/acre) + 10-34-0 at 6 gal/Acre. (54#N/acre + 25# P2O5 / acre) - November 2, 1999
13.50	-Apply 1 1/4# ai Treflan TR-10 granules (no incorporation) – Nov 3, 1999.
22.05	-Plant to S-541 w / JD 7100 planter at 210,000 seeds/acre (25 lbs/acre) Seed box treated w/ Lindane for wire worm control. – April 18, 2000.
17.56	-Spray w/ 1.5 pints (24 oz) / acre Poast + crop oil @ 1 quart/acre. 10 gpA spray rate. – May 16, 2000
8.97	-Spray w/ .4 oz Harmony GT + Penetrate II @ 20 ml/gal. (Mare's tail control).
17.92	-Harvest 1391# / Acre Safflowers - Sept. 7 ,2000 Test weight – 41.6# / bushel
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$149.00	Total Cost of Safflower Production

Rotation 3

WINTER WHEAT / SAFFLOWER / *MILLET*

Cost / A.	2000 Millet
12.35	-Spray w/ 1 1/4# ai Aatrex 90df + 16 oz Roundup Ultra + 50 ml/gal of Liquid Ammonium Sulfate. 10 gpA rate. - November 3. 1999
16.20	-Spray on 28-0-0 liquid Nitrogen fertilizer at 60#N / Acre rate. - March 23, 2000
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml/gal Ammonium Sulfate. 8 gpA spray rate. - June 8, 2000
21.62	-Planted to Sunrise proso millet w/JD750 drill. w/ starter fertilizer(10-34-0) at 6 gal/Acre. Row spacing was at 10". Seeding rate was at 20#/A. – June 12, 2000
15.66	-Harvest 1266# / acre Millet - September 6, 2000.
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$102.93	Total Cost of Millet Production

Rotation 3 SUMMARY 2000

Crop	Income	Expenses	Net Income Per Acre
Winter Wheat	$129.84	$114.99	$ 14.85
Safflower	$166.92	$149.00	$ 17.92
Millet	$113.94	$102.93	$ 11.01
	$410.70	- $366.92 =	$ 43.78 / 3 = $14.59

$14.59 Average Income / acre for Rotation 3 - 2000

Rot. 3 Discussion: This rotation has a consistent net income between crops for the 2000 growing season. The safflower has a greater chance of being infected by leaf spotting diseases when the weather is humid during the middle of the day in July and August. The weather this summer was dry and more windy than normal which reduced disease occurrence. The stands of safflower were excellent and the yields were good at 1391 pounds per acre. This is an intensive, diverse, and short rotation. During dry seasons, a producer may consider fallow in place of millet.

Rotation 4
WINTER WHEAT / MILLET

Cost / A.	2000 Winter Wheat
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml/gal liq amm. sulfate. 8 gpA spray rate. -September 20, 1999
25.47	-Plant to Wesley (90#/A rate) w/JD750 drill at 10" rows + 6 gal/A liquid 10-34-0. - Sept.29, 1999
20.60	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 80#N / Acre rate. - March 23, 2000
7.16	-Spray w/ .1 oz Ally / acre + LV6 @ 5 oz product/acre + Penetrate II @ 18 ml/gal. 8 gpA spray rate. - May 9, 2000
17.42	-Harvest 32.6 bu / acre Wesley winter wheat – on July 13, 2000 Test weight – 63.9# / bushel (Protein content-13.5%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$107.75	Total Cost of Winter Wheat Production

Rotation 4
WINTER WHEAT / *MILLET*

Cost / A.	2000 Millet
10.60	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon + 16 oz LV6/acre at 8 gallons/acre spray rate.-August 11, 1999
12.35	-Spray w/ 1 1/4# ai Aatrex 90df + 16 oz Roundup Ultra + 50 ml/gal of Liquid Ammonium Sulfate. 10 gpA rate. - November 3, 1999
16.20	-Spray on 28-0-0 liquid Nitrogen fertilizer at 60#N / Acre rate. - March 23, 2000
8.20	Spray w/ 16 oz Roundup Ultra + 50 ml/gal Ammonium Sulfate. 8 gpA spray rate. - June 8, 2000
21.62	-Planted to Sunrise proso millet w/JD750 drill. w/ starter fertilizer(10-34-0) at 6 gal/Acre. Row spacing was at 10". Seeding rate was at 20#/A. – June 12, 2000
16.16	-Harvest 1370 # / acre Millet – September 6, 2000
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$114.03	Total Cost of Millet Production

Rotation 4 SUMMARY 2000

Crop	Income	Expenses	Net Income Per Acre
Winter Wheat	$ 98.45	$107.75	$-9.30
Millet	$123.30	$114.03	$ 9.27
	$221.75 -	$221.78 =	$ -.03 / 2 = $ -.01

$- .01 Average Income / acre for Rotation 4 - 2000

Rot. 4 Discussion: The continuous winter wheat / millet crop rotation has developed some crown rot disease and the yields of the winter wheat have been lower by about ten bushels per acre when compared to other rotations where winter wheat was planted after millet. The use of millet is a good alternative to summer fallow when the price of millet is greater than 5 cents per pound. The millet provides excellent protection for the winter wheat and the stubble does a good job of catching snow during the winter. This rotation works well as an alternative but continued use of winter wheat / millet builds up residue on the soil surface and increases the potential for crown rot diseases.

Rotation 5a

WINTER WHEAT / CORN / SUNFLOWER / SPRING WHEAT

Cost / A.	2000 Winter Wheat
10.60	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon + 16 oz LV6/acre at 8 gallons/acre spray rate.-August 11, 1999
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml/gal liq amm. sulfate. 8 gpA spray rate. -September 20, 1999
25.47	-Plant to Wesley (90#/A rate) w/JD750 drill at 10" rows + 6 gal/A liquid 10-34-0. - Sept.29, 1999
24.78	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 100#N / Acre rate. - March 23, 2000
7.16	-Spray w/ .1 oz Ally / acre + LV6 @ 5 oz product/acre + Penetrate II @ 18 ml/gal. 8 gpA spray rate. -May 9, 2000
21.02	-Harvest 47.6 bu / acre winter wheat – on July 13, 2000 Test weight – 63.8# / bushel (Protein-10.9%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$126.13	Total Cost of Winter Wheat Production

Rotation 5a

WINTER WHEAT / *CORN* / SUNFLOWER / SPRING WHEAT

Cost/A.	2000 Corn
10.60	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon + 16 oz LV6/acre at 8 gallons/acre spray rate.-August 11, 1999.
12.35	-Spray w/ 1 1/4# ai Aatrex 90df + 16 oz Roundup Ultra + 50 ml/gal liquid ammonium sulfate. 10 gpA spray rate. - September 23, 1999.
32.82	-Injected 32-0-0 at 30 gal/Acre(100#N) + 10-34-0 at 6 gal/Acre. (107#N/acre + 25# P2O5 / acre) - November 2, 1999.
39.50	-Plant to Asgrow RX445 RR w/ JD 7100 corn planter w/ corn fingers (plateless) 19,600 seeds/acre. 98 day maturity. 20" row spacing, seed spacing of 16" to achieve 18,620 plant population per acre. -May 15, 2000.
0.00	-Corn was weed-free so did not spray. – June, 2000.
21.64	-Harvest 50.2 bushels / acre corn on September 28, 2000 Test weight – 52.4# / bushel
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$145.81	Total Cost of Corn Production

Rotation 5a

WINTER WHEAT / CORN / *SUNFLOWER* / SPRING WHEAT

Cost / A.	2000 Sunflower
28.50	-Injected 32-0-0 at 24 gal/A (80#N) + 10-34-0 at 6 gal/A (87#N/acre plus 25# P2O5 per acre). - November 2, 1999.
13.50	-Apply 1 1/4# ai Treflan TR-10 granules (no incorporation) – November 3, 1999.
13.47	-Spray w/ .4 oz/A Harmony Extra + 16 oz Roundup Ultra + 50 ml/gal liquid ammonium sulfate + 18 ml/gal Penetrate II. 8 gpA spray rate. – May 19, 2000.
24.76	-Plant to Pioneer 63M80 (Nusun) size 3, treated w / Lindane for wireworm control. 19,600 seeds/acre (box treated w/ Lindane) 16" plant spacing on a 20" row. May 23, 2000.
26.36	-Harvest 1958# / Acre Sunflowers – October 11, 2000. Test weight – 28.0# / bushel
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$135.49	Total Cost of Sunflower Production

Rotation 5a

WINTER WHEAT / CORN / SUNFLOWER / *SPRING WHEAT*

Cost / A.	2000 Spring Wheat
24.78	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 100#N / Acre rate. - March 23, 2000
8.20	-Spray w / 16 oz / acre Roundup Ultra + 50ml/gal liquid ammonium sulfate. 8 gpA rate. - March 28, 2000.
30.03	-Plant to Forge spring wheat @ 120 lbs/acre + 10-34-0 @ 6 gpA rate. Seed treated with Vitavax,thiram,RTU - March 28, 2000.
7.16	-Spray w / .1 oz Ally + 5.3 oz product LV6 + 18 ml / gal Penetrate II. 8 gpA spray rate. – May 9, 2000.
17.24	-Harvest 31.9 bu/a spring wheat – July 26, 2000 Test weight – 62.0 # / bushel(Protein –13.2%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$116.31	Total Cost of Spring Wheat Production

Rotation 5a SUMMARY 2000

Crop	Income		Expenses		Net Income Per Acre
Winter Wheat	$129.47		$126.13		$ 3.34
Corn	$ 95.38		$145.81		$-50.43
Sunflower	$183.66		$135.49		$ 48.17
Spring Wheat	$ 97.61		$116.31		$-18.70
	$506.12	-	$523.74	=	$-17.62 / 4 = $ -4.40

$ - 4.40 Average Income / acre for Rotation 5a - 2000

Rot. 5a Discussion: The sunflowers in this rotation had good yields even though they were grown after a high moisture use crop like corn. The sunflowers were about the only money makers in this rotation. The rotation may be too high in moisture use for western South Dakota. The use of fallow or millet would help to replenish the soil moisture.

Rotation 6a

WINTER WHEAT-B / SUNFLOWER / Pea-FALLOW / WINTER WHEAT-A

Cost / A.	2000 Winter Wheat -B
10.60	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon + 16 oz LV6/acre at 8 gallons/acre spray rate.-August 11, 1999
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml/gal liq amm. sulfate. 8 gpA spray rate. -September 20, 1999
25.47	-Plant to Wesley (90#/A rate) w/JD750 drill at 10" rows + 6 gal/A liquid 10-34-0. - Sept.29, 1999
24.78	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 100#N / Acre rate. - March 23, 2000
7.16	-Spray w/ .4 oz Harmony Extra / acre + LV6 @ 5 oz product/acre + Penetrate II @ 18 ml/gal. 8 gpA spray rate. –May 9, 2000
21.32	-Harvest 48.9 bu / acre winter wheat-B – on July 13, 2000 Test weight – 61.4# / bushel (Protein content-10.9%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$126.43	Total Cost of Winter Wheat –B Production

Rotation 6a

WINTER WHEAT-B / *SUNFLOWER* / Pea-FALLOW / WINTER WHEAT-A

Cost / A.	2000 Sunflower
10.60	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon + 16 oz LV6/acre at 8 gallons/acre spray rate.-August 11, 1999
8.20	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon. 8 gallons/acre spray rate. -September 20, 2000.
28.50	-Injected 32-0-0 at 24 gal/A (80#N) + 10-34-0 at 6 gal/A (87#N/acre plus 25# P2O5 per acre). - November 2, 1999.
13.50	-Apply 1 1/4# ai Treflan TR-10 granules (no incorporation) – November 3, 1999
13.47	-Spray w/ .4 oz/A Harmony Extra + 16 oz Roundup Ultra + 50 ml/gal liquid ammonium sulfate + 18 ml/gal Penetrate II. 8 gpA spray rate. – May 19, 2000
24.76	-Plant to Pioneer 63M80 (Nusun) size 3, treated w / Lindane for wireworm control. 19,600 seeds/acre (box treated w/ Lindane) 16" plant spacing on a 20" row. May 23, 2000.
30.44	-Harvest 2468# / Acre Sunflowers – October 11, 2000. Test weight – 28.4# / bushel
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$158.37	Total Cost of Sunflower Production

Rotation 6a

WINTER WHEAT-B / SUNFLOWER / *Pea-FALLOW* / WINTER WHEAT-A

Cost / A.	2000 Pea-Fallow
8.20	-Spray w / 16 oz / acre Roundup Ultra + 50ml/gal liquid ammonium sulfate. 8 gpA rate. -March 28, 2000.
23.42	-Plant to Arvika peas @ 300,000 seeds per acre (90#/A) + 6 1/2#/acre granular innoculum w/ JD 750 drill. -March 28, 2000.
11.16	-Spray to terminate peas w/ 4 oz Banvel 4L + 16 oz Roundup Ultra + 50 ml/gal Ammonium Sulfate. 8 gpA spray rate.
5.25	-Work pea/fallow w/ off-set disk. - July 17, 2000.
28.50	-Land Charges 2000
$76.53	Total Cost of Pea-Fallow

Rotation 6a

WINTER WHEAT-B / SUNFLOWER / Pea-FALLOW / *WINTER WHEAT-A*

Cost / A.	2000 Winter Wheat -A
6.50	-Spray w/ 20 oz LV6. 8 gallons / acre spray rate.- August 11, 1999.
23.22	-Plant to Tandem @ 950,000 seeds/acre plus 10-34-0 @ 6 gpA rate.) w/JD610 drill at 12" rows. - Sept. 13, 1999.
24.78	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 100#N / Acre rate. - March 23, 2000.
24.18	-Harvest 60.8 bu / acre winter wheat-A – on July 13,2000 Test weight – 62.4# / bushel (Protein content-12.9%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$107.58	Total Cost of Winter Wheat-A Production

Rotation 6a SUMMARY 2000

Crop	Income		Expenses		Net Income Per Acre
Winter Wheat -B	$133.00		$141.74		$ -8.74
Sunflower	$231.49		$158.37		$ 73.12
Pea-Fallow	$ 0.00		$ 0.00*		$ 0.00*
Winter Wheat -A	$181.79		$168.80		$ 12.99
	$546.28	-	$468.91	=	$ 77.37 / 4 = $19.34

*The expense of the fallow ($76.53) was split 80% to the Winter Wheat-A and 20% to the Winter Wheat-B.

$19.34 Average Income / acre for Rotation 6a - 2000

Rot. 6a Discussion: the pea/fallow in this rotation is a new concept and is not fully tested yet. The peas were planted to be grown in the fallow plots only until early bloom stage of growth. At this stage, they were killed by a herbicide spray. The peas have by this time produced most of the organic nitrogen they will assimilate during the growing season. It is yet to be determined if the use of early season moisture during the fallow period will reduce yields of the following wheat crop.
The sunflower yields were excellent with loan price of $9.38 per hundred. The crop was very profitable with a net return of $73.12 per acre. The sunflower yields in the test plots may be better than producers are getting in fields because the heads were harvested by hand and there was no harvest loss.
The cost of the fallow has included in it the cost of growing the peas and the crops have not been able to benefit from the release of organic nitrogen yet. This rotation is less intense and includes the pea/fallow which could reduce the problem of how to fallow the land after sunflowers.

Rotation #8

The plots from this rotation were added to Rotations 5, 6 and 9 to make longer 4 year rotations.

Rotation 9a

WINTER WHEAT -B / SAFFLOWER / PEA-FALLOW / WINTER WHEAT-A

Cost / A.	2000 Winter Wheat -B
10.60	-Spray w/ 16 oz Roundup Ultra + Liquid Ammonium Sulfate at 50 ml/gallon + 16 oz LV6/acre at 8 gallons/acre spray rate.-August 11, 1999
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml/gal liq amm. sulfate. 8 gpA spray rate. -September 20, 1999
25.47	-Plant to Wesley (90#/A rate) w/JD750 drill at 10" rows + 6 gal/A liquid 10-34-0. - Sept.29, 1999
20.60	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 80#N / Acre rate. - March 23, 2000
7.16	-Spray w/ .4 oz Harmony Extra / acre + LV6 @ 5 oz product/acre + Penetrate II @ 18 ml/gal. 8 gpA spray rate. –May 9, 2000
19.92	-Harvest 43.0 bu / acre winter wheat-B – on July 13, 2000 Test weight – 62.6# / bushel (Protein content-12.3%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$120.85	Total Cost of Winter Wheat–B Production

Rotation 9a

WINTER WHEAT-B / *SAFFLOWER* / PEA-FALLOW / WINTER WHEAT-A

Cost / A.	2000 Safflower
10.60	-Spray w/ 16 oz Roundup Ultra + 50 ml / gal Am Sul + 16 oz LV6/acre + 50 ml/gal liquid ammonium sulfate. 8 gpA rate. – Aug. 11, 1999.
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml / gal Am Sulfate. – September 20, 1999.
21.30	-Injected 32-0-0 at 14 gal/Acre (46#N/acre) + 10-34-0 at 6 gal/Acre. (53#N/acre + 25# P2O5 / acre) - November 2, 1999.
13.50	-Apply 1 1/4# ai Treflan TR-10 granules (no incorporation) – Nov 3, 1999.
22.05	-Plant to S-541 w / JD 7100 planter at 210,000 seeds/acre (25 lbs/acre) Seed box treated w/ Lindane for wire worm control. – April 18, 2000.
17.56	-Spray w/ 1.5 pints (24 oz) / acre Poast + crop oil @ 1 quart/acre. 10 gpA spray rate. – May 16, 2000
8.97	-Spray w/ .4 oz Harmony GT + Penetrate II @ 20 ml/gal. (Mare's tail control).
18.86	-Harvest 1546# / Acre Safflowers - Sept. 7 ,2000 Test weight – 42.1# / bushel
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$149.94	Total Cost of Safflower Production

Rotation 9a

WINTER WHEAT-B / SAFFLOWER / PEA-*FALLOW* / WINTER WHEAT-A

Cost / A.	2000 Fallow
8.20	-Spray w / 16 oz / acre Roundup Ultra + 50ml/gal liquid ammonium sulfate. 8 gpA rate. - March 28, 2000.
23.42	-Plant to Arvika peas @ 300,000 seeds per acre (90#/A) + 6 1/2#/acre granular innoculum w/ JD 750 drill. -March 28, 2000.
11.16	-Spray to terminate peas w/ 4 oz Banvel 4L + 16 oz Roundup Ultra + 50 ml/gal Ammonium Sulfate. 8 gpA spray rate.
5.25	-Work pea/fallow w/ off-set disk. - July 17, 2000.
28.50	-Land Charges 2000
$76.53	Total Cost of Pea-Fallow

Rotation 9a

WINTER WHEAT-B / SAFFLOWER / PEA-FALLOW / *WINTER WHEAT-A*

Cost / A.	2000 Winter Wheat-A
6.50	-Spray w/ 20 oz LV6. 8 gallons / acre spray rate.- August 11, 1999.
23.22	-Plant to Tandem @ 950,000 seeds/acre plus 10-34-0 @ 6 gpA rate.) w/JD610 drill at 12" rows. - Sept. 13, 1999.
24.78	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 100#N / Acre rate. - March 23, 2000
0.00	-Wheat was weed-free so did not spray. – May 16, 2000
23.30	-Harvest 57.1 bu / acre winter wheat-A – on July 13,2000 Test weight – 62.4# / bushel (Protein content-13.0%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$106.70	Total Cost of Winter Wheat-A Production

Rotation 9a SUMMARY 2000

Crop	Income		Expenses		Net Income Per Acre
Winter Wheat-B	$127.28		$136.16		$ -8.88
Safflower	$185.52		$149.94		$ 35.58
Pea-Fallow	$ 0.00		$ 0.00*		$ 0.00*
Winter Wheat-A	$171.30		$167.92		$ 3.38
	$484.10	-	$454.02	=	$ 30.08 / 4 = $7.52

*The expense of the fallow ($76.53) was split 80% to the Winter Wheat-A and 20% to the Winter Wheat-B.

$ 7.52 Average Income / acre for Rotation 9a - 2000

Rot. 9a Discussion: Rotation 9a is similar to rotation 6a except the sunflower has been replaced by safflower. The safflower could be an easier oil seed crop to grow in the drier regions of western South Dakota. The first wheat crop after fallow had an excellent yield. The second year of winter wheat planted no-till into winter wheat stubble had an average yield of 43 bushels per acre. The second year wheat had the cheat-grass controlled in the fall of 1999 with two sprayings. This increased the cost of production but reduced the cheat-grass.
The over-all return from this rotation was not too bad and could have been much better if wheat prices were higher. The rotation will have a better economic return during drier seasons because the safflower is susceptible to leaf spotting diseases in humid conditions.

Rotation 10

WINTER WHEAT / YELLOW DRY PEAS / MILLET

Cost / A.	2000 Winter Wheat
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml/gal liquid ammonium sulfate. 8 gpA spray rate. -September 20, 1999
25.47	-Plant to Wesley (90#/A rate) w/JD750 drill at 10" rows + 6 gal/A liquid 10-34-0. - Sept.29, 1999.
24.78	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 100#N / Acre rate. - March 23, 2000.
9.52	-Spray w/ .4 oz Harmony Extra / acre + LV6 @ 5 oz product/acre + Penetrate II @ 18 ml/gal. 8 gpA spray rate. –May 9, 2000
21.32	-Harvest 48.9 bu / acre winter wheat-B – on July 13, 2000 Test weight – 63.8# / bushel (Protein content-11.2%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$118.19	Total Cost of Winter Wheat Production

Rotation 10

WINTER WHEAT / *YELLOW DRY PEAS* / MILLET

Cost / A.	2000 Yellow Dry Peas
10.60	-Spray w/ 16 oz Roundup Ultra + 50 ml / gal Am Sul + 16 oz LV6/acre. – Aug. 11, 1999.
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml / gal Am Sulfate. – September 20, 1999.
13.50	-Apply 1# ai Treflan TR-10 granules (no incorporation) – Nov 3, 1999.
31.95	-Plant to Grande peas @ 300,000 seeds per acre (160#/acre) + granular innoculum @ 6 1/2#/acre w/ JD 750 drill. -March 28, 2000.
17.56	-Spray w/ 1.5 pints (24 oz) / acre Poast + crop oil @ 1 quart/acre. 10 gpA spray rate. – May 16, 2000
14.13	-Harvest 1068# / Acre Grande peas - July 26, 2000 Test weight – 65.9# / bushel
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$124.84	Total Cost of Pea Production

Rotation 10

WINTER WHEAT / YELLOW DRY PEAS / *MILLET*

Cost / A.	2000 Millet
12.35	-Spray w/ 1 1/4# ai Aatrex 90df + 16 oz Roundup Ultra + 50 ml/gal of Liquid Ammonium Sulfate. 10 gpA rate. - September 23, 1999
8.50	-Spray on 28-0-0 liquid Nitrogen fertilizer at 25#N / Acre rate. - March 23, 2000.
11.16	-Spray w / 16 oz Roundup Ultra + 50 ml/gal Am Sulfate + 4 oz Banvel 4L. 8 gpA spray rate. - June 8, 2000.
21.62	-Planted to Sunrise proso millet w/JD750 drill. w/ starter fertilizer(10-34-0) at 6 gal/Acre. Row spacing was at 10". Seeding rate was at 20#/A. – June 12, 2000
16.90	-Harvest 1524# / acre Millet – September 6, 2000
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$99.43	Total Cost of Millet Production

Rotation 10 SUMMARY w/ human edible peas price 2000

Crop	Income		Expenses		Net Income Per Acre
Winter Wheat	$138.38		$118.19		$ 20.19
Yellow Dry Peas (as Human edible)	$ 62.30		$124.84		$-62.54
Millet	$137.16		$ 99.43		$ 37.73
	$337.84	-	$342.46	=	$ -4.62 / 3 = $ -1.54

$ -1.54 Average Income / acre for Rotation 10 - 2000

Rotation 10 SUMMARY w / o human edible peas price 2000

Crop	Income		Expenses		Net Income Per Acre
Winter Wheat	$138.38		$118.19		$ 20.19
Yellow Dry Peas (as feed)	$ 37.38		$124.84		$-87.46
Millet	$137.16		$ 99.43		$ 37.73
	$312.92	-	$342.46	=	$-29.54 / 3 = $ -9.84

$ -9.84 Average Income / acre for Rotation 10 - 2000

Rot. 10 Discussion: Rotation 10 has had field peas grown for grain from 1996 through 2000. The yields have varied from 17 bushels per acre in the dry 2000 season to 52 bushels per acre in the wet cool seasons. The 2000 crop was planted as a human edible variety Grande. The Grande variety does not grow as vigorously during the early spring as the arvika forage variety grown in our fallow plots.

The total nitrogen requirement of the rotation is less because during the pea year no nitrogen is applied. However, soil tests indicate an increase in available nitrogen to the following crops. There appears to be a rotational benefit to using peas in the rotation and this is why we started using peas in the early part of our fallow season in rotations 6a and 9a.

It has been difficult for this rotation to show a profit because the peas are expensive to plant and the millet and wheat prices have been low except for the 2000 millet crop. It is a rotation that looks very good agronomically but it may be difficult to show a profit. There is going to be a significant increase in pea production in Canada in 2001 due to increased nitrogen prices.

Rotation 11
WINTER WHEAT / CORN / MILLET

Cost / A.	2000 Winter Wheat
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml/gal liq amm. sulfate. 8 gpA spray rate. -September 20, 1999
25.47	-Plant to Wesley (90#/A rate) w/JD750 drill at 10" rows + 6 gal/A liquid 10-34-0. - Sept.29, 1999.
24.78	-Spray on 28-0-0 liquid Nitrogen fertilizer on dormant winter wheat at 100#N / Acre rate. - March 23, 2000.
7.16	-Spray w / .1 oz Ally + 5 oz product LV6 + 18 ml / gal Penetrate II. 8 gpA spray rate. – May 9, 2000.
18.66	-Harvest 37.8 bu/acre winter wheat – on July 13, 2000 Test weight – 62.9# / bushel(Protein content – 12.2%)
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$113.17	Total Cost of Winter Wheat Production

Rotation 11
WINTER WHEAT / *CORN* / MILLET

Cost / A.	2000 Corn
10.60	-Spray w/16 oz/A Roundup Ultra + 16 oz/A LV6 + 50 ml/gal liquid ammonium sulfate. 8 gpA spray rate. - August 11, 1999.
12.90	-Spray with 2 1/2 # ai Aatrex 90 df + 1 quart crop oil 10 gpA spray rate. -September 23, 1999.
32.82	-Injected 32-0-0 at 30 gal/Acre (100#N/acre) + 10-34-0 at 6 gal/Acre. (117#N/acre + 24# P2O5/acre) - November 2, 1999.
39.50	-Plant to Asgrow RX445 RR w/ JD 7100 corn planter w/ corn fingers (plateless) 19,600 seeds/acre. 98 day maturity. 20" row spacing, seed spacing of 16" to achieve 18,620 plant population per acre. -May 15, 2000.
0.00	-Corn was weed-free so did not spray. – June, 2000.
24.04	-Harvest 60.2 bushels / acre corn on September 28, 2000 Test weight – 52.6# / bushel
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$148.76	Total Cost of Corn Production

Rotation 11
WINTER WHEAT / CORN / *MILLET*

Cost / A.	2000 Millet
16.20	-Spray on 28-0-0 liquid Nitrogen fertilizer at 60#N / Acre rate. - March 23, 2000.
12.64	-Spray w / 16 oz / acre Roundup Ultra + 50ml/gal liquid ammonium sulfate + 6 oz Banvel 4L 8 gpA rate. -May 9, 2000.
8.20	-Spray w/ 16 oz Roundup Ultra + 50 ml / gal Am Sulfate. 8 gpA spray rate.– June 8, 2000.
21.62	-Planted to Sunrise millet w / JD 750 drill. w/ starter fertilizer(10-34-0) at 6 gal/Acre. Row spacing was at 10". Seeding rate was at 20#/A. – June 12, 2000.
15.84	-Harvest 1300 # / acre Millet – September 6, 2000.
.40	-Soil Sampling / acre
28.50	-Land Charges 2000
$103.40	Total Cost of Millet Production

Rotation 11 SUMMARY 2000

Crop	Income	Expenses	Net Income Per Acre
Winter Wheat	$111.88	$113.17	$ -1.29
Corn	$114.38	$148.76	$ -34.38
Millet	$117.00	$103.40	$ 13.60
	$343.26 -	$365.33 =	$ -22.07 / 3 = $ -7.35

$ - 7.35 Average Income / acre for Rotation 11 - 2000

Rot. 11 Discussion: This is an intensive continuous cropping system and in dry years summer fallow should be substituted for the millet crop. The corn yields were good the previous three years with an average yield of 88.6 bushels per acre. The corn yields in 2000 were much lower due to dry and windy conditions in July and August. The use of injection of our nitrogen and phosphorus fertilizer and the new Roundup Ready Corn I feel has increased our average yield potentials.
The injection of fertilizer in the fall allows us to plant the corn into a tilled strip that is 2 to 4 degrees warmer than the non-tilled area between the rows. The plant population has been 18,900 seeds and the stands have been about 16,000 to 17,000 plants per acre in 20 inch rows. The 20 inch rows allows for almost equal plant spacing between the rows and down the rows. The 16,000 plants per acre is adequate to produce over 100 bushels per acre and this is at the top end of the potential yields for dry-land production in western South Dakota. This is the first year of the single wheel residue manager. They seem to be working well.
The yields of the winter wheat have been good but there is more potential in this rotation to develop crown rot because of the continuous no-till grassy crops being grown. Therefore, it is important to select a winter wheat variety that has more crown rot resistance.

Wall Rotation Rain-Fall Data (2000)

Total Precip.(inches)		Total Precip.(inches)	
April	3.27	August	0.13
May	1.19	September	0.25
June	1.96	October	1.22
July	1.65	November	0.80

(Accumulative total precipitation from Apr.1 to Nov.30, 2000 is 10.47")

Cost of Inputs - 2000

SEED

Tandem Winter Wheat..... $ 4.50/Bu
Wesley Winter Wheat..... $ 4.50/Bu
Forge Spring Wheat..... $ 4.75/Bu
Earlybird Millet..... $ .145 / lb
S-541..... $23.00 / 50 lbs
Grande Field Peas..... $ 7.50 / Bu (60 lbs)
Asgrow RX445RR Corn..... $118.40 / 80,000 kernels
Pioneer 63M80 Sunflowers..... $145.00 per 200,000 seeds
Arvika Peas..... $ 8.00 / bu (60 lbs)

LIQUID FERTILIZERS

10-34-0..... $234 / Ton ($1.37/gal)
28-0-0..... $123 / Ton ($.66/gal)
32-0-0..... $130 / Ton ($.72/gal)

HERBICIDES

Roundup Ultra..... $33.26/gal
Penetrate II $17.50/gal
Ammonium Sulfate..... $ 5.50/gal
Atrazine 90df..... $ 2.91/lb
Crop Oil..... $ 5.36/gal
Harmony GT..... $11.93/oz
Harmony Extra..... $11.63/oz
Ally..... $22.92/oz
Treflan 10% granules..... $ .84/lb
LV6 (2,4D Ester)..... $19.94/gal
Poast..... $68.67/gal
Clarity (dicamba)..... $95.30/gal
Tilt..... $340 / gal
Fallow Master..... $18.75/gal
Spartan 75df..... $41.32/lb

INSECTICIDES

Enhance plus (lindane)..... $14.70/lb

NO-TILL PLANTING CHARGES

$10.50/Acre

LAND CHARGES

$350/acre x .07 = $24.50 + $4 land tax= $28.50/Acre

SPRAY APPLICATION FEE

Herbicides @ $3.50/acre. Fertilizer @ $3.00/acre.
Treflan application @ $3.00/acre.

HARVEST CHARGES

Base is $12 per acre plus $ .12 for each bushel over 20 bushel, and $ .12 per bushel for transportation.

GRAIN SALE VALUES

Spring Wheat @ 13.2%protein... $ 3.06/bu
Winter Wheat ..... See chart **on page 58.**
Safflowers (oil-type)..... $12.00/cwt
Corn #2 yellow..... $ 1.90/bu
Proso Millet..... $ 9.00/cwt
Yellow Dry Peas (human edible) $ 3.50/bu (feed) $2.10/bu
Sunflowers (oil-type)..... $ 9.38/cwt

SOIL SAMPLING & ANALYSIS

$ .40 per acre

SEED TREATMENTS

Vitavax/Thiram/RTU..... $33.41/gal (5 oz/100# seed)
Seed treatment fee..... $ .25/Acre
Field Pea innoculum.(peat base) $ .45/bu

MECHANICAL TILLAGE CHARGE

$5.25 / Acre

Wheat Value Per Bushel with Protein Adjustment and LDP

up to 10.9%....$2.30 + $.42 LDP = $2.72
11.0 .....$2.38 + $.42 LDP = $2.80
11.2.....$2.41 + $.42 LDP = $2.83
11.4.....$2.44 + $.42 LDP = $2.86
11.6.....$2.47 + $.42 LDP = $2.89
11.8.....$2.50 + $.42 LDP = $2.92
12.0.....$2.53 + $.42 LDP = $2.95
12.2.....$2.54 + $.42 LDP = $2.96
12.4.....$2.55 + $.42 LDP = $2.97
12.6.....$2.56 + $.42 LDP = $2.98
12.8.....$2.57 + $.42 LDP = $2.99
13.0.....$2.58 + $.42 LDP = $3.00
13.2.....$2.59 + $.42 LDP = $3.01
13.4.....$2.60 + $.42 LDP = $3.02
13.6.....$2.61 + $.42 LDP = $3.03
13.8.....$2.62 + $.42 LDP = $3.04
14.0.....$2.63 + $.42 LDP = $3.05

Protein Premium Quotes from Dakota Mill and Grain, Rapid City, SD. As of December 21, 2000.

2000 Wall Rotation Yields, Expense/Acre, Break-Even Costs & Break-Even Yields

Rotation & Net return/A	Crop	(A) Yield	(B) Expense of Crop/Acre	(C) Cost of Production	(D) Yield to Break-Even	(E) Sale Value $/Bu
1	W Wheat	58.3 bu	$166.47	$2.86/bu	55.1 bu	$3.02
($4.79)	Fallow at $61.35/acre.					
2a	W Wheat-A	66.9 bu	$149.14	$2.23/bu	49.2 bu	3.03
($28.19)	Sunflower	2602#	$169.90	$.065/#	1811#	
	Millet	1300#	$112.63	$.087/#	1251#	
	W Wheat-B	46.0 bu	$115.15	$2.50/bu	39.4 bu	2.92
	Corn	65.8 bu	$150.10	$2.28/bu	79.0 bu	
	Fallow at $52.47/acre.		($41.98 + $10.49)*			
3	W Wheat	45.4 bu	$114.99	$2.53/bu	40.2 bu	2.86
($14.59)	Safflower	1391#	$149.00	$.107/#	1242#	
	Millet	1266#	$102.93	$.081/#	1144#	
4	W Wheat	32.6 bu	$107.75	$3.31/bu	35.7 bu	3.02
($-.01)	Millet	1370#	$114.03	$.083/#	1267#	
5a	W Wheat	47.6 bu	$126.13	$2.65/bu	46.4bu	2.72
($-4.40)	Corn	50.2 bu	$145.81	$2.90/bu	76.7 bu	
	Sunflower	1958#	$135.49	$.069/#	1444#	
	S Wheat	31.8 bu	$116.31	$3.66/bu	37.9 bu	3.07
6a	W Wheat-B	48.9 bu	$141.74	$2.90/bu	52.1 bu	2.72
($19.34)	Sunflower	2468#	$158.37	$.064/#	1688#	
	Fallow at $76.53/acre.		($61.22 + $15.31)*			
	W Wheat-A	60.8 bu	$168.80	$2.78/bu	56.5 bu	2.99
9a	W Wheat-B	43.0 bu	$136.16	$3.17/bu	46.0 bu	2.96
($7.52)	Safflower	1546#	$149.94	$.097/#	1250#	
	Fallow at $76.53/acre.		($61.22 + $15.31)*			
	W Wheat-A	57.1 bu	$167.92	$2.94/bu	56.0 bu	3.00
10	W Wheat	48.9 bu	$118.19	$2.42/bu	41.8 bu	2.83
($-1.54)	Peas	17.9 bu	$124.84	$6.97/bu	35.7 bu	
	Millet	1524#	$ 99.43	$.065/#	1105#	
11	W Wheat	37.8 bu	$113.17	$2.99/bu	38.2 bu	2.96
($-7.35)	Corn	60.2 bu	$148.76	$2.47/bu	78.3 bu	
	Millet	1300#	$103.40	$.080/#	1149#	

Grain Values for determining Yield to Break-Even Point (E)

Winter Wheat	See Chart Above (E)	Corn	$1.90/bu
Peas	$3.50/bu	Millet	$.09/lb
Sunflower	$.0938/lb	Safflower	$.12/lb

C = B / A **D = B / E**

*The fallow expense was separated at 80% for the first crop year and 20% to the second crop year.

Note: Winter Wheat values have been adjusted for protein content in column (E).

Wall Rotation Study Soil Analysis for the 2001 Season

Plot No.	2001 Crop and estimated yield goal	Soil Texture	Soil pH	Sol. Salts	Organic Matter %	NO3-N # / acre 0-6" top	NO3-N # / acre 0-24" total	P ppm	K ppm	Add SO4-S #/A	Add Zn #/A	Add N #/A	Add P205 #/A	Add K2O #/A	2000 Yield (Bushels/A or Lbs / acre)
101-1	Fallow	Medium	6.6	0.5	1.5	14	29	11	445	--	--	--	--	--	58.3 bu HRW
102-1	HRW-60bu	Medium	6.2	0.5	1.5	42	86	11	510	--	--	65	20	0	Fallow
117-2a	Sunf 2000#	Medium	6.3	0.5	1.5	44	70	13	434	--	--	65	10	0	66.9 bu HRW-a
118-2a	Millet 2000#	Medium	6.2	0.3	1.6	17	29	9	459	--	--	40	15	0	2602# Sunflower
119-2a	HRW-b45bu	Medium	6.5	0.4	1.4	15	27	13	516	--	--	85	10	0	1300# Millet
103-2a	Corn-80bu	Medium	6.7	0.5	1.5	21	34	12	542	--	--	60	15	0	46.0 bu HRW-b
104-2a	Fallow	Medium	6.6	0.4	1.7	16	33	13	479	--	--	--	--	--	65.8 bu Corn
105-2a	HRW-a60bu	Medium	6.1	0.4	1.5	36	66	16	467	--	--	85	0	0	Fallow
106-3	Saff 2000#	Medium	6.5	0.4	1.5	20	31	12	414	--	--	70	15	0	45.4 bu HRW
107-3	Millet 2000#	Medium	6.7	0.4	1.5	5	12	7	494	--	--	60	20	0	1391# Safflower
108-3	HRW-45bu	Medium	6.7	0.4	1.5	13	25	11	462	--	--	90	15	0	1266# Millet
109-4	Millet 2000#	Medium	6.5	0.4	1.6	24	40	13	477	--	--	30	5	0	32.6 bu HRW
110-4	HRW-45bu	Medium	6.6	0.6	1.6	14	30	23	457	--	--	80	0	0	1370# Millet
111-5a	HRW-45bu	Medium	6.4	0.5	1.5	27	42	16	510	--	--	70	0	0	31.8 bu HRS
122-5a	Corn-80bu	Medium	6.3	0.4	1.6	16	28	10	474	Trial25	5	70	20	0	47.6 bu HRW
112-5a	Sunf 2000#	Medium	6.8	0.5	1.5	11	20	9	451	Trial25	0	80	20	0	50.2 bu Corn
113-5a	HRS-40bu	Medium	6.8	0.5	1.6	9	21	11	412	--	--	80	15	0	1958# Sunflower
114-6a	HRW-b45bu	Medium	7.2	0.6	1.4	17	41	6	385	--	--	70	30	0	60.8 bu HRW-a
115-6a	Sunf 2000#	Medium	6.8	0.4	1.5	21	37	8	442	Trial25	0	65	25	0	48.9 bu HRW-b
121-6a	Pea/Fallow	Medium	6.3	0.4	1.6	8	17	13	488	--	--	--	--	--	2468# Sunflower
116-6a	HRW-a60bu	Medium	6.3	0.4	1.6	30	49	14	488	--	--	100	10	0	Pea/Fallow
123-9a	HRW-b45bu	Medium	6.6	0.5	1.5	22	40	15	502	--	--	70	5	0	57.1 bu HRW-a
124-9a	Saff 2000#	Medium	6.5	0.4	1.5	16	36	12	428	--	--	65	15	0	43.0 bu HRW-a
125-9a	Pea/Fallow	Medium	6.5	0.4	1.6	8	19	8	491	--	--	--	--	--	1546# Safflower
120-9a	HRW-a60bu	Medium	6.3	0.4	1.6	34	55	15	517	--	--	95	5	0	Pea/Fallow
126-10	Peas 1500#	Medium	6.5	0.5	1.5	15	26	13	456	--	--	0	5	0	48.9 bu HRW
127-10	Millet 2000#	Medium	6.5	0.4	1.5	15	27	13	441	--	--	45	5	0	1074# peas
128-10	HRW-45bu	Medium	6.4	0.4	1.5	10	18	13	497	--	--	95	10	0	1524# Millet
129-11	Corn 80bu	Medium	6.2	0.4	1.5	20	33	16	454	Trial25	10	65	0	0	37.8 bu HRW
130-11	Millet 2000#	Medium	6.6	0.5	1.5	17	34	16	419	--	--	35	0	0	60.2 bu Corn
131-11	HRW-45bu	Medium	6.4	0.4	1.6	14	24	17	493	--	--	90	0	0	1300# Millet

Note: to convert P & K values to #/A take ppm value x 2.
Example: 500 ppm is equal to 1000#/Acre

NO-TILL WINTER WHEAT DATE OF PLANTING STUDY
(1997-2000)

Objectives:

1.) To evaluate yield reductions due to delayed planting of winter wheat.
2.) To determine if seeding rates were more important when planting was delayed.
3.) To evaluate the grain yields of 7 popular varieties for no-till delayed planting.

Procedures:

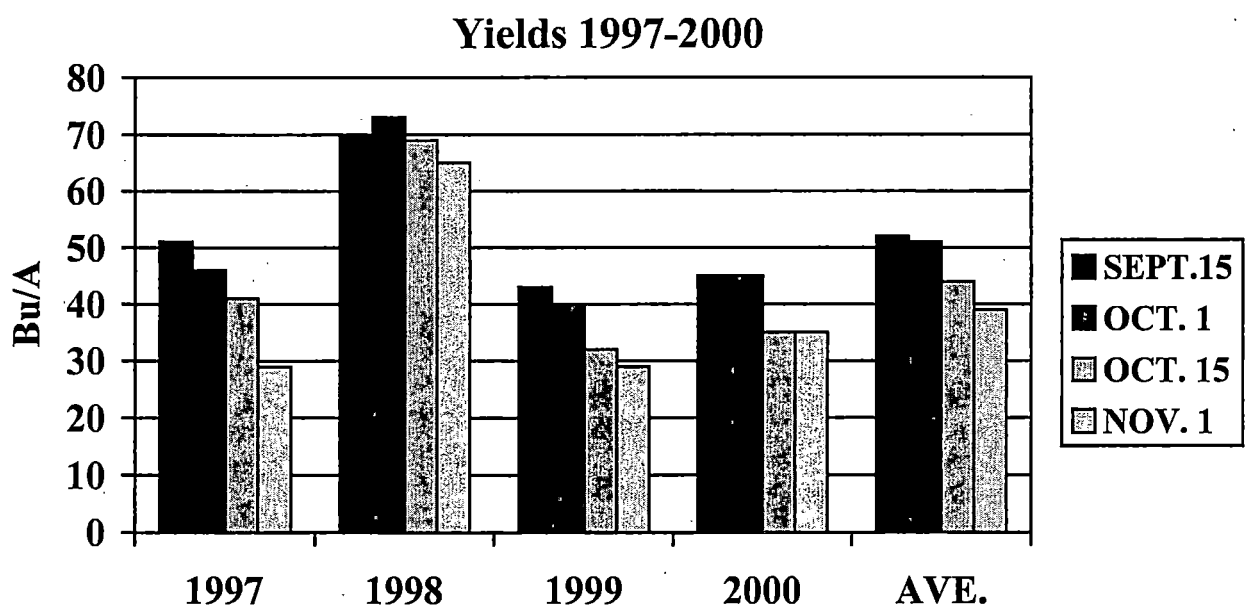
The study was established because of a need for data to document the effect no-till delayed planting into stubble had on the danger of winter-kill. The studies were funded over the past 5 years by the South Dakota Wheat Commission with producer check-off dollars.

The study has been planted no-till into 2 types of stubble, spring wheat and millet. The locations have been in the New Underwood and Scenic areas in western South Dakota. The dates of planting have been September 15, October 1, October 15 and November each year. Four seeding rates have been tested at all planting dates. Seven popular varieties of winter wheat have been tested to determine if they are more adapted to no-till delayed planting. The seed size was considered and all the plots were planted to the same number of seeds per acre. A starter fertilizer of 6 gallons per acre of (10-34-0) was applied with seed and nitrogen was top dressed according to soil test recommendations for 50 bushel per acre yields of winter wheat.

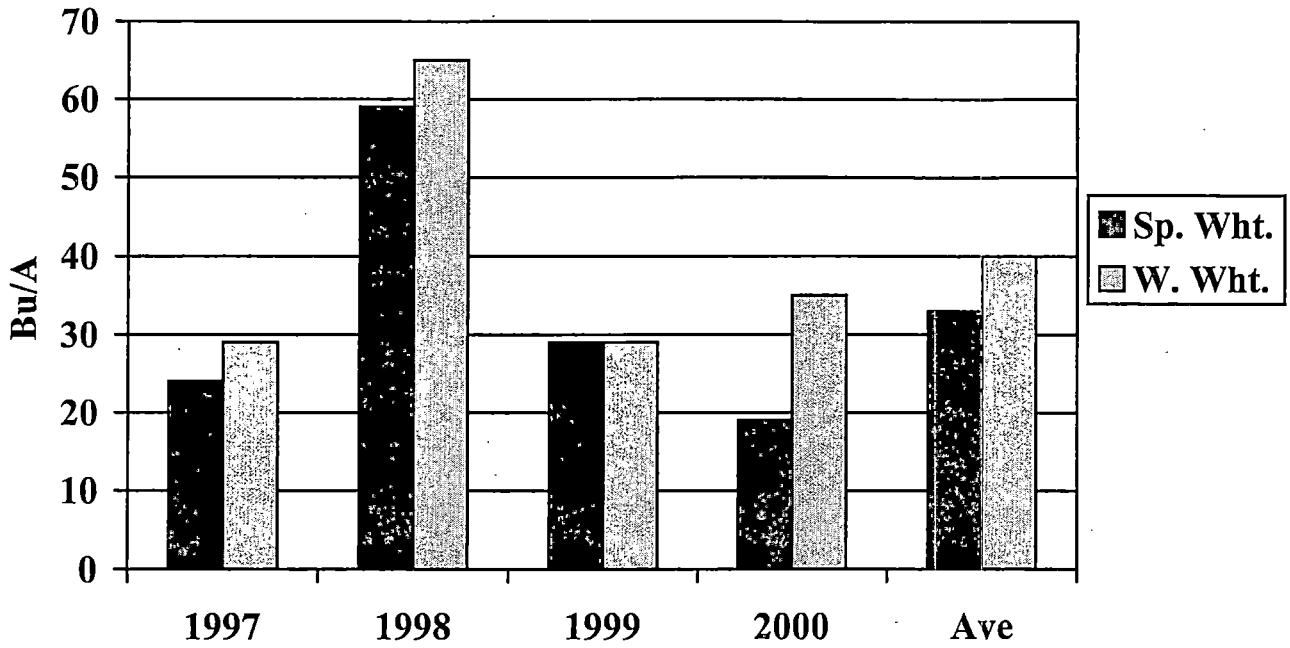
The plots were managed and sprayed for weeds during the early summer. Grain yields were taken all years at both locations and in 2000 the New Underwood plots were also evaluated for presence of common root rot. The common root rot was very uniform in appearance during the 2000 growing season at the New Underwood location.

Results:

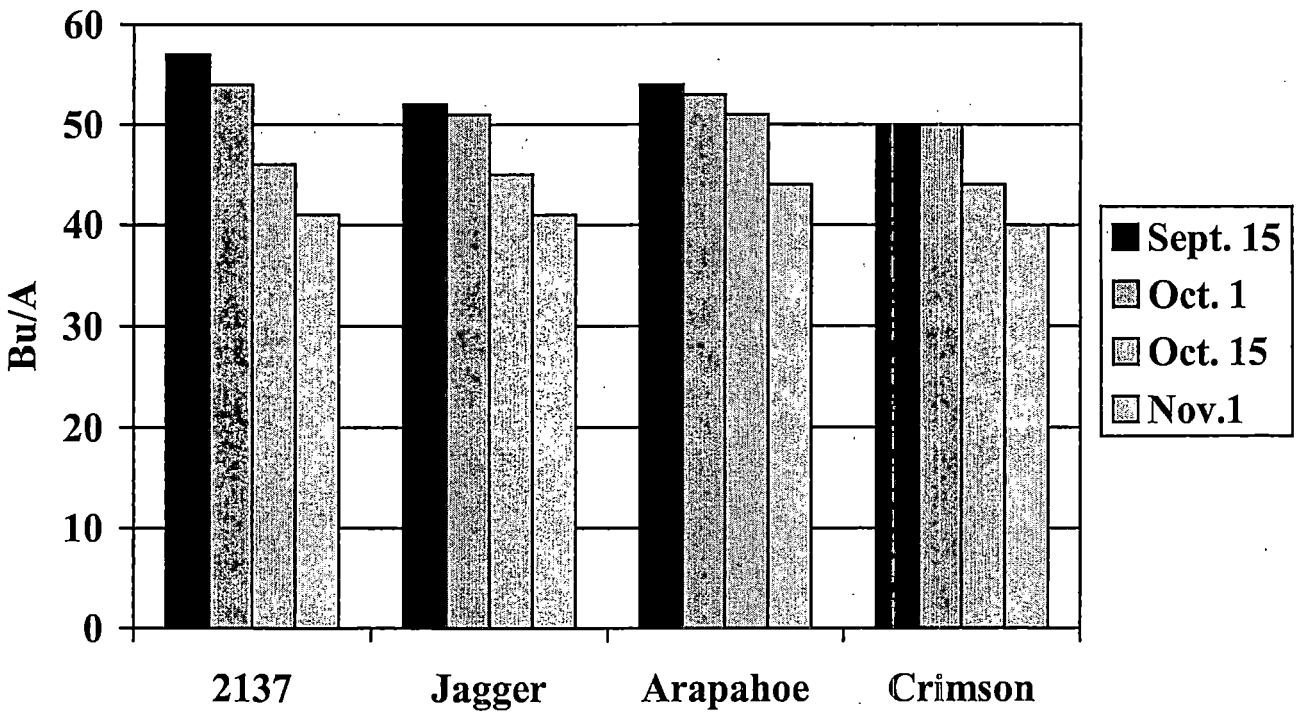
Response of Winter Wheat To Planting Date



Dormant Planting of Spring Wheat vs Winter Wheat
(November 1st seeding date)



Varietal Response to Seeding Date
(1997-2000)



Discussion:

The planting date of winter wheat in the fall has a significant effect on the spring growth and yield of the crop the next season. The later planted wheat has less fall growth and in the case of the November planting, no fall growth. The lack of fall growth results in slower development of the crop in the early spring and delays the grain fill period in mid summer. The rainfall patterns in western South Dakota tend to favor the early development of the winter wheat in most years. The yield differences were not as great in 1998 because June had 2.5 inches more rainfall than normal and the average air temperatures were 6 degrees below normal.

The average grain yields for the first two plantings dates (September 15 and October 1) were consistently higher. The last two planting dates (October 15 and November 1) consistently had lower grain yields. The October 15 planting date had very limited fall growth, generally 1-2 leaves with limited crown development. The November planting was a dormant planting and the wheat had no growth in the fall. The first two planting dates were able to start growth quickly in the spring and make use of the moisture and cool growing season in the early spring. The last two planting dates had no growth in the early spring and you had to wait until mid April to evaluate the stand. The last two planting dates developed good stands by late April but were behind in amount of growth.

The spring wheat was planted at all dates just to determine its ability to survive. The first two planting dates had good fall growth and the spring wheat died during the winter. The November planting date had no fall growth and the crop generally had an adequate stand in the spring. The spring wheat planted in November headed before the winter wheat planted in November. The dormant planted winter wheat had higher grain yields than the dormant planted spring wheat except in 1999 when the grain yields were the same. The seven winter wheat varieties dormant planted averaged 7 bushels per acre more yield than the spring wheat dormant planted.

The seeding rates appeared to be less important at the early planting dates. The higher rates of seeding appeared to increase grain yields at the later two planting dates. The rate of seeding was not as important in determining grain yields as the date of planting. You can not increase the seeding rate on a later planted winter wheat and expect to get similar yields to an earlier planted winter wheat.

The seven varieties of winter wheat tested were Arapahoe, Tandem, Crimson, Jagger, 2137, and Nekota. Wesley winter wheat was added to the trial the last two years and appeared to do very well at all planting dates during the 2000 growing season. The spring wheat Oxen was used for the first 3 years and Forge for the last two years. When planting at the first two planting dates, the best grain yield was obtained from 2137. When planting at the last two planting dates, the best grain yield was obtained from Arapahoe winter wheat.

The early planting dates offered more crop competition against downy brome-grass. Downy brome-grass was not a problem in the experiment although in the year 1998, there was more downy brome-grass in the later two planting dates.

Supporting Data

Table 29. 1997 Yields for September 15th Planting Date.

Treatment	New Underwood		Scenic	
	Test Wt Lb/Bu	Yield Bu/A	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	49.6	50	52.9	30
Jagger	49.3	32	54.6	22
2137	51.6	59	53.3	26
Ogallala	50.9	46	55.7	22
Crimson	51.8	52	55.5	41
Elkhorn	51.0	53	51.6	35
Nekota 60#	51.7	54	53.8	33
Nekota 75#	50.3	53	53.5	32
Nekota 90#	50.1	54	53.8	33
Nekota 120#	51.5	60	54.0	32
Oxen (spring wheat)	44.0	9	N/A	2
LSD (P=.05)	1.79	6	.82	5
CV	2.47	8.78	1.06	11.88
Average(winter wheat)	50.78	51.3	53.87	30.6

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 30. 1997 Yields for October 1st Planting Date.

Treatment	New Underwood		Scenic	
	Test Wt Lb/Bu	Yield Bu/A	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	50.0	47	52.9	29
Jagger	48.9	38	53.7	25
2137	49.9	49	54.3	29
Ogallala	48.9	34	55.4	26
Crimson	49.9	45	55.3	32
Elkhorn	50.5	49	51.3	33
Nekota 60#	50.0	44	54.0	30
Nekota 75#	51.0	50	53.9	27
Nekota 90#	50.4	51	53.7	30
Nekota 120#	50.5	56	54.1	30
Oxen (spring wheat)	--	3	--	2
LSD (P=.05)	1.69	9	.61	4
CV	2.33	14.81	.78	10.63
Average(winter wheat)	50.0	46.3	53.86	29.1

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 31. 1997 Yields for October 15th Planting Date.

Treatment	New Underwood		Scenic	
	Test Wt Lb/Bu	Yield Bu/A	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	50.0	46	51.8	24
Jagger	50.4	34	53.4	17
2137	50.5	41	52.0	24
Ogallala	49.6	29	53.9	18
Crimson	51.5	43	54.0	30
Elkhorn	51.0	45	51.1	24
Nekota 60#	50.8	38	51.3	24
Nekota 75#	51.3	41	51.8	38
Nekota 90#	51.1	45	51.9	25
Nekota 120#	51.2	48	52.4	27
Oxen (spring wheat)	47.2	24	50.1	6
LSD (P=.05)	1.31	6	1.95	10
CV	1.80	9.85	2.58	28.6
Average(winte rwheat)	60.78	41.0	52.36	25.1

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 32. 1997 Yields for November 1st Planting Date.

Treatment	New Underwood		Scenic	
	Test Wt Lb/Bu	Yield Bu/A	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	47.2	34	52.6	21
Jagger	45.2	23	51.9	11
2137	48.4	27	52.4	9
Ogallala	48.3	25	53.4	13
Crimson	50.6	34	54.3	21
Elkhorn	45.5	31	52.1	20
Nekota 60#	46.9	26	51.0	12
Nekota 75#	49.2	27	52.4	17
Nekota 90#	48.6	32	52.2	18
Nekota 120#	48.3	33	52.8	18
Oxen (spring wheat)	46.5	24	49.8	6
LSD (P=.05)	2.06	5	1.54	4
CV	2.99	11.7	2.04	19.3
Average(winter wheat)	47.82	29.2	52.51	16.0

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 33. 1998 Yields for September 15th Planting Date.

Treatment	New Underwood			Scenic		
	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	15.1	61.6	65	11.1	62.3	45
Jagger	16.2	62.5	74	11.9	61.6	46
2137	12.3	62.6	73	9.3	62.3	48
Q-566	14.5	63.0	77	10.4	61.5	46
Crimson	14.8	63.0	73	11.1	64.9	44
Elkhorn	14.0	62.5	60	10.0	62.1	37
Nekota 60#	14.4	62.0	68	11.2	63.8	41
Nekota 75#	14.7	62.9	70	11.3	61.8	41
Nekota 90#	14.5	62.6	70	11.7	62.4	44
Nekota 120#	14.0	62.2	65	10.9	62.1	39
Oxen (spring wheat)	16.5	--	24	--	--	4
LSD (P=.05)	--	1.17	6	--	2.22	9
CV	--	1.29	5.43	--	2.45	14.38
Average(winter wheat)	14.5	62.47	71	10.9	62.47	43

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 34. 1998 Yields for October 1st Planting Date.

Treatment	New Underwood			Scenic		
	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	14.0	60.8	72	11.4	62.0	45
Jagger	14.9	62.0	75	11.6	64.0	49
2137	13.0	62.0	78	10.0	64.3	54
Q-566	14.6	61.6	80	10.3	63.2	56
Crimson	14.4	59.3	77	11.4	65.4	50
Elkhorn	14.4	60.1	65	10.6	62.9	44
Nekota 60#	14.0	61.8	70	10.7	64.6	50
Nekota 75#	14.2	62.0	70	11.0	64.4	49
Nekota 90#	14.0	61.8	73	11.2	64.2	49
Nekota 120#	14.4	61.4	71	11.3	65.1	53
Oxen (spring wheat)	16.5	N/A	31	14.1	58.4	23
LSD (P=.05)	--	1.48	6	--	1.75	6
CV	--	1.66	5.64	--	1.88	7.72
Average(winter wheat)	14.2	61.29	73	11.0	64.0	50

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 35. 1998 Yields for October 15th Planting Date.

Treatment	New Underwood			Scenic		
	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	13.5	57.2	67	11.3	63.3	44
Jagger	13.9	58.3	71	11.5	63.8	43
2137	12.9	57.3	71	10.2	63.6	47
Q-566	13.2	57.3	65	11.1	62.8	46
Crimson	14.5	60.2	68	11.0	64.8	45
Elkhorn	14.3	56.6	54	10.6	61.0	42
Nekota 60#	13.7	56.3	72	10.5	62.7	45
Nekota 75#	14.2	58.5	72	10.5	63.6	45
Nekota 90#	13.2	57.1	72	11.5	63.9	44
Nekota 120#	13.8	57.5	75	10.7	63.6	44
Oxen (spring wheat)	16.3	54.3	54	13.5	60.4	34
LSD (P=.05)	--	1.35	5	--	1.25	3
CV	--	1.61	4.79	--	1.36	4.19
Average(winter wheat)	13.7	57.64	69	10.9	63.3	45

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 36. 1998 Yields for November 1st Planting Date.

Treatment	New Underwood			Scenic		
	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	13.6	55.4	65	10.3	58.0	47
Jagger	13.8	57.3	74	11.4	58.7	50
2137	12.5	56.2	68	11.1	57.8	50
Q-566	13.5	55.0	61	10.8	58.8	50
Crimson	13.6	59.3	65	10.8	61.2	45
Elkhorn	14.5	53.6	43	10.2	57.2	40
Nekota 60#	13.4	55.5	66	10.5	58.4	46
Nekota 75#	13.1	56.4	68	10.6	57.6	46
Nekota 90#	13.4	57.0	71	10.5	58.1	46
Nekota 120#	13.4	57.2	71	10.6	58.3	45
Oxen (spring wheat)	16.0	53.9	59	13.9	57.1	44
LSD (P=.05)	--	1.72	4	--	0.93	3
CV	--	2.10	4.72	--	1.09	4.11
Average(winter wheat)	13.5	56.29	65	10.7	58.42	47

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 37. 1999 Yields for September 15th Planting Date.

Treatment	New Underwood			Scenic		
	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	11.5	58.9	42	9.6	57.8	58
Tandem	11.4	59.4	39	10.8	58.0	51
Crimson	11.5	58.8	44	10.4	60.9	60
Quantum 566	11.6	59.8	43	10.2	58.7	60
Jagger	11.0	58.0	40	9.9	58.5	56
2137	11.0	61.0	47	9.4	58.6	59
Nekota 60#	11.0	58.2	42	10.1	58.9	54
Nekota 75#	11.1	57.4	41	10.4	59.2	52
Nekota 90#	11.3	59.5	42	10.1	59.0	56
Nekota 120#	11.9	57.4	46	10.0	59.1	58
Oxen (spring wheat)	--	--	--	--	--	--
LSD (P=.05)	--	2.40	7	--	1.58	6
CV	--	2.82	10.9	--	1.84	7.46
Average(winter wheat)	11.3	58.83	42.52	10.1	58.87	56.20

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 38. 1999 Yields for October 1st Planting Date.

Treatment	New Underwood			Scenic		
	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	11.7	58.8	37	10.8	60.4	54
Tandem	12.5	59.3	40	11.2	61.7	54
Crimson	11.9	62.2	44	10.7	63.2	55
Quantum 566	12.1	60.1	41	12.1	60.9	56
Jagger	11.8	59.2	39	10.7	59.1	59
2137	11.4	61.7	42	9.7	60.7	63
Nekota 60#	11.1	61.0	39	10.1	59.8	49
Nekota 75#	11.3	60.2	41	10.5	60.0	58
Nekota 90#	11.1	60.0	39	10.5	60.0	52
Nekota 120#	11.7	58.8	41	9.7	60.0	54
Oxen (spring wheat)	13.4	51.1	20	12.1	--	20
LSD (P=.05)	--	2.73	6	--	2.36	16
CV	--	2.64	9.72	--	1.73	12.50
Average(winter wheat)	11.7	60.13	40.36	10.6	60.59	55.40

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 39. 1999 Yields for October 15th Planting Date.

Treatment	New Underwood			Scenic		
	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	12.4	57.3	29	11.2	60.4	56
Tandem	12.1	55.7	32	11.6	62.3	57
Crimson	11.8	56.5	35	12.6	63.9	65
Quantum 566	12.6	58.6	29	12.0	61.7	61
Jagger	12.0	58.4	32	12.1	59.2	61
2137	11.9	60.0	35	10.2	61.4	65
Nekota 60#	11.5	59.6	29	12.3	60.2	56
Nekota 75#	11.5	59.8	33	11.1	61.2	58
Nekota 90#	11.5	60.6	34	10.5	61.7	63
Nekota 120#	11.5	60.0	34	11.7	61.3	59
Oxen (spring wheat)	12.5	52.2	25	13.2	57.6	41
LSD (P=.05)	--	2.74	5	--	3.06	9
CV	--	2.73	11.62	--	2.21	6.94
Average(winter wheat)	11.9	58.66	32.00	11.5	61.33	59.89

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 40. 1999 Yields for November 1st Planting Date.

Treatment	New Underwood			Scenic		
	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	12.3	54.6	29	10.7	59.3	47
Tandem	12.7	54.5	28	11.3	60.9	46
Crimson	12.1	58.1	29	11.1	60.9	51
Quantum 566	13.4	56.5	26	11.5	59.5	48
Jagger	12.0	57.1	27	11.0	58.6	46
2137	12.0	56.6	32	10.4	61.2	57
Nekota 60#	11.3	54.1	25	11.1	59.2	46
Nekota 75#	11.5	59.0	29	10.9	59.8	45
Nekota 90#	11.4	57.1	32	10.7	59.6	46
Nekota 120#	11.3	56.8	31	10.7	60.7	50
Oxen (spring wheat)	12.5	55.3	29	11.8	59.4	48
LSD (P=.05)	--	5.29	5	--	1.87	5
CV	--	5.39	11.54	--	2.15	7.24
Average(winter wheat)	12.0	56.44	28.83	10.9	59.98	48.18

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 41. 2000 Yields for September 15th Planting Date.

Treatment	New Underwood				Scenic		
	Root Rot Damage (% damaged heads) June 30, 2000	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	25	14.3	55.6	42	--	54.1	14
Tandem	31	14.6	57.6	31	--	55.6	20
Crimson	13	15.6	58.8	32	--	53.0	15
Nekota	13	13.4	58.0	46	--	54.1	13
Jagger	3	--	57.8	41	--	55.1	9
2137	7	13.8	57.5	47	--	56.8	18
Wesley 60#	2	14.2	56.1	54	--	54.6	11
Wesley 75#	2	14.5	56.8	52	--	54.3	11
Wesley 90#	3	14.9	56.2	52	--	54.0	11
Wesley 120#	3	13.7	57.1	54	--	53.6	11
Forge (spring wheat)	--	--	--	--	--	54.3	6
LSD (P=.05)	11	--	3.21	5	--	1.56	4
CV	80.82	--	4.29	8.23	--	1.95	19.54
Average(winter wheat)	--	14.3	57.2	45.1	--	54.5	13.3

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 42. 2000 Yields for October 1st Planting Date.

Treatment	New Underwood				Scenic		
	Root Rot Damage (% damaged heads) June 30, 2000	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	15	14.9	58.3	41	--	56.1	19
Tandem	37	15.4	59.6	32	--	58.4	21
Crimson	4	15.5	61.7	34	--	59.5	20
Nekota	17	13.3	60.2	46	--	57.1	20
Jagger	5	14.6	60.3	42	--	57.7	14
2137	3	13.6	58.4	48	--	57.6	19
Wesley 60#	4	13.8	59.4	49	--	56.7	17
Wesley 75#	4	13.7	59.8	52	--	56.6	17
Wesley 90#	4	13.3	60.5	49	--	56.6	18
Wesley 120#	4	13.4	59.9	53	--	56.8	17
Forge (spring wheat)	33	16.3	57.3	15	--	57.6	15
LSD (P=.05)	7	--	1.59	4	--	1.09	3
CV	42.28	--	1.84	6.57	--	1.31	1.90
Average(winter wheat)	--	14.2	59.8	44.6	--	57.3	18.2

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 43. 2000 Yields for October 15th Planting Date.

Treatment	New Underwood				Scenic		
	Root Rot Damage (% damaged heads) as of June 30, 2000	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	9	16.0	56.3	34	--	56.9	19
Tandem	16	16.6	59.5	29	--	57.5	20
Crimson	2	16.7	58.3	29	--	59.8	19
Nekota	15	14.9	57.8	37	--	58.1	18
Jagger	3	16.1	56.5	35	--	58.2	14
2137	2	13.8	55.9	37	--	57.7	18
Wesley 60#	2	15.5	56.9	36	--	57.1	18
Wesley 75#	3	15.3	56.6	39	--	57.3	15
Wesley 90#	3	16.0	55.8	37	--	57.1	17
Wesley 120#	5	15.1	57.1	41	--	57.2	19
Forge (spring wheat)	41	17.0	55.4	18	--	57.7	15
LSD (P=.05)	5	--	2.03	4	--	1.14	4
CV	35.97	--	2.47	7.81	--	1.37	15.4
Average(winter wheat)	--	15.6	57.1	35.4	--	57.7	17.7

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 44. 2000 Yields for November 1st Planting Date.

Treatment	New Underwood			Scenic		
	Protein Percent	Test Wt Lb/Bu	Yield Bu/A	Protein Percent	Test Wt Lb/Bu	Yield Bu/A
Arapahoe	16.9	57.6	29	--	55.0	15
Tandem	16.7	60.0	31	--	56.1	20
Crimson	16.7	60.8	30	--	58.3	14
Nekota	15.3	60.0	36	--	56.6	16
Jagger	16.6	58.9	32	--	56.0	11
2137	14.5	59.1	38	--	56.3	15
Wesley 60#	16.1	58.3	36	--	55.1	13
Wesley 75#	16.4	58.6	38	--	54.4	16
Wesley 90#	15.2	57.9	37	--	55.3	16
Wesley 120#	15.3	58.0	41	--	55.1	17
Forge (spring wheat)	16.7	55.4	19	--	56.0	16
LSD (P=.05)	--	1.79	3	--	2.79	4
CV	--	2.11	5.32	--	3.46	18.12
Average(winter wheat)	16.0	58.9	34.8	--	55.8	15.3

Note: Spring wheat is not included in statistical analysis for test weight or yield.

PEA FALLOW STUDY
Gregg Krebsbach Farm
New Underwood, SD

Objectives:

1.) To determine if growing a pea forage crop during the early portion of the summer fallow period could provide cover and nitrogen for the following crops.

2.) To evaluate transitional crops to be grown after sunflowers and safflowers.

Procedure: Sunflowers were grown and harvested on this land in 1998. The experimental block (field lay-out) was approximately 200 feet by 200 feet. Arvika peas were planted on March 26, 1999. They were seeded at the rate of 300,000 seeds per acre with a JD 610 drill. The seed was inoculated with a peat base inoculum at seeding time. The peas were allowed to grow until late bloom to early pod set. The peas were terminated at that time (July 7, 1999) with 16 oz Roundup Ultra plus 8 oz Banvel 4L at 10 gpA spray rate. The peas were left to melt down in the soil until fall. Winter wheat was planted on September 13, 1999. Three different drills were used. The JD 610 and JD 750 were used to no-till plant the 2 west blocks. The east 1/3 was disked prior to planting winter wheat with a Concord drill. Liquid Nitrogen fertilizer as 28-0-0 was sprayed on the entire north 1/2 only of the three different drill strips on April 12, 2000 at the rate of 26.6 gallons (80 lbs N) per acre. Results of wheat yields with and without added liquid nitrogen and comparison of 3 drills are listed below in table 45.

Table 45. Pea Fallow Study

Type of Drill	Lbs. of Nitrogen Fertilizer added & date	Date Planted	Moisture Content (%) & Harvest date	Protein Content (%)	Test Wt (Lb/Bu)	Yield (Bu/A)
John Deere 610 Deep furrow drill	80 (4-12-00)	9-13-99	13.5 (7-15-00)	14.4	57.8	33.1
John Deere 610 Deep furrow drill	0	9-13-99	14.1 (7-15-00)	13.9	57.5	41.5
John Deere 750 no-till drill	80 (4-12-00)	9-15-99	13.6 (7-15-00)	13.2	57.8	41.20
John Deere 750 no-till drill	0	9-15-99	13.6 (7-15-00)	12.7	57.2	38.02
Concord drill *	80 (4-12-00)	9-18-99	13.7 (7-15-00)	12.7	56.9	50.00
Concord drill *	0	9-18-99	14.1 (7-15-00)	12.1	56.4	48.6
Rotation 1 * w/fal	120# N (3-23-00)	9-13-99	11.3 (7-13-00)	13.5	61.6	58.3
Rotation2a * w/su/m/w/c/fal	120# N (3-23-00)	9-13-99	11.0 (7-13-00)	13.7	62.9	66.9
Rotation 6a w/w/su/pfal	100# N (3-23-00)	9-13-99	11.9 (7-13-00)	12.9	62.4	60.8
Rotation 9a w/w/sa/pfal	100# N (3-23-00)	9-13-99	11.7 (7-13-00)	13.0	62.4	57.1

* = disked before planting.

Discussion:
The use of the peas as a green fallow crop is a new concept. The thinking was that we could use some of the early season moisture in the soil to produce the pea crop that could increase the plant available nitrogen for the following crop. We have also use this method of summer fallow in our crop rotation study located at Wall, SD. The results have been somewhat difficult to explain. The yield of the plots planted with the concord drill after disking were better at the Krebsbach farm. I feel the concord hoe drill was able to place the seed deeper in the soil and get the fall crop off to a better start. The soil in the no-till portion of this experiment was hard due to dry soil conditions at planting time.

The use of the pea fallow in our crop rotation study at Wall did not increase or decrease crop yields when compared to the reduced tillage fallow that was planted with a drill that was able to place the seed into more moisture in the fall. The use of the green fallow still has merit in controlling soil erosion and providing organic nitrogen but may require tillage prior to seeding to make it work more effectively.

1999 Spring and Summer field layout (Arvika Peas)

The entire block was solid seeded on March 26, 1999 with a JD 610 drill with 10" row spacing and at 300,000 seeds per acre. The entire block had innoculated seed and was allowed to grow until late bloom to early pod set at which time it was terminated with Roundup Ultra at 16 oz / acre plus Banvel 4L at 8 oz/acre and at a spray rate of 10 gallons per acre.

Fall of 1999 and Spring 2000 field layout (Arapahoe)

Seeded w/ JD 610 drill + 80# N/acre - 12" row spacing	Seeded w/ JD 750 drill + 80# N / acre - 10" row spacing	Disked and seeded w/ Concord drill + 80# N/acre 10" row spacing
Seeded w/ JD 610 drill - no nitrogen fertilizer added-12" row spacing	Seeded w/ JD 750 drill no nitrogen fertilizer added-10" row spacing	Disked and seeded w/ Concord drill no nitrogen fertilizer added 10" row spacing

WINTER WHEAT ROOT ROT STUDY

Gregg Krebsbach Farm
New Underwood, SD

Objectives:

1) Determine if there were differences in resistance of Winter Wheat to common root rot organisms (Fusarium graminearai).
2) Determine if seed treatment on the seed prior to planting would reduce the occurrence of common root rot in winter wheat.

Procedure:

This study was funded by the South Dakota Wheat Commission and producer check –off dollars. The site selected for the study was on a field that had been planted to spring wheat the year before and the stubble was left standing. The location had some volunteer winter wheat and downy brome-grass growing prior to the planting of the first date the field was sprayed to control these weeds.

The planting dates were September 15, October 1, October 15 and November 1. The date of planting study had a rate of seeding study at each planting date and the seeding rate for each variety was increased at each planting date. The study evaluating the ability of seed treatments to protect the seedling from common root rot was planted on October 1,1999. The seed treatment study had (Fusarium graminearai) infected oats planted in the same trench as the winter wheat seed.

The experiment was sprayed for weeds during the 2000 growing season. The plots were rated for visual presence of common root rot showing up as premature ripening of the winter wheat heads on June 30, 2000 . SDSU Plant Pathologist Yue Jin and his assistant conducted the ratings.

The seed treatments were applied to Nekota winter wheat. The seed treatments and 6 other untreated varieties were evaluated in the seed treatment plots. Results are listed in table 46.

The ratings from the 4 replications at three of the planting dates for the seven varieties tested were averaged and expressed in tables 47-49.

Table 46. Seed Treatment Study - 2000 Yields for October 1st Planting Date.

Treatment	New Underwood		
	Root Rot Damage (% damaged heads) as of June 30, 2000	Test Wt (Lb/Bu)	Yield (Bu/A)
Nekota + Raxil XT MD	13	58.0	41
Nekota + Raxil + LS 176	13	58.5	42
Nekota + Raxil + Kodiak	16	59.0	45
Nekota + LS 314	15	59.2	42
Nekota check	16	57.8	44
Arapahoe	18	57.6	42
2137	2	59.4	47
Wesley	2	58.1	50
Alliance	23	58.2	37
Crimson	1	60.5	35
LSD (P=.05)	10	2.53	5
CV	58.73	2.96	7.61

Table 47. Root Rot Resistance Study - 2000 Yields for September 15th Planting Date.

Treatment	New Underwood			
	Root Rot Damage (% damaged heads) as of June 30, 2000	Protein Percent	Test Wt (Lb/Bu)	Yield (Bu/A)
Arapahoe	25	14.3	55.6	42
Tandem	31	14.6	57.6	31
Crimson	13	15.6	58.8	32
Nekota	13	13.4	58.0	46
Jagger	3	--	57.8	41
2137	7	13.8	57.5	47
Wesley 60#	2	14.2	56.1	54
Wesley 75#	2	14.5	56.8	52
Wesley 90#	3	14.9	56.2	52
Wesley 120#	3	13.7	57.1	54
Forge (spring wheat)	--	--	--	--
LSD (P=.05)	11	--	3.21	5
CV	80.82	--	4.29	8.23
Average(winter wheat)	--	14.3	57.2	45.1

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 48. Root Rot Resistance Study - 2000 Yields for October 1st Planting Date.

Treatment	New Underwood			
	Root Rot Damage (% damaged heads) as of June 30, 2000	Protein Content (Percent)	Test Wt (Lb/Bu)	Yield (Bu/A)
Arapahoe	15	14.9	58.3	41
Tandem	37	15.4	59.6	32
Crimson	4	15.5	61.7	34
Nekota	17	13.3	60.2	46
Jagger	5	14.6	60.3	42
2137	3	13.6	58.4	48
Wesley 60#	4	13.8	59.4	49
Wesley 75#	4	13.7	59.8	52
Wesley 90#	4	13.3	60.5	49
Wesley 120#	4	13.4	59.9	53
Forge (spring wheat)	33	16.3	57.3	15
LSD (P=.05)	7	--	1.59	4
CV	42.28	--	1.84	6.57
Average(winter wheat)	--	14.2	59.8	44.6

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Table 49. Root Rot Resistance Study - 2000 Yields for October 15th Planting Date.

Treatment	New Underwood			
	Root Rot Damage (% damaged heads) as of June 30, 2000	Protein Content (Percent)	Test Wt (Lb/Bu)	Yield (Bu/A)
Arapahoe	9	16.0	56.3	34
Tandem	16	16.6	59.5	29
Crimson	2	16.7	58.3	29
Nekota	15	14.9	57.8	37
Jagger	3	16.1	56.5	35
2137	2	13.8	55.9	37
Wesley 60#	2	15.5	56.9	36
Wesley 75#	3	15.3	56.6	39
Wesley 90#	3	16.0	55.8	37
Wesley 120#	5	15.1	57.1	41
Forge (spring wheat)	41	17.0	55.4	18
LSD (P=.05)	5	--	2.03	4
CV	35.97	--	2.47	7.81
Average(winter wheat)	--	15.6	57.1	35.4

Note: Spring wheat is not included in statistical analysis for test weight or yield.

Discussion:

The seed treatments did not appear to give any degree of protection to the winter wheat during this experiment. This could have been due to the long fall in 1999 and the seed treatment material could have been decomposed prior to the infection. Data from other states have indicated some level of protection. The infection was very uniform and more common than usually found in a producers fields. Planting into heavy standing spring wheat stubble with a no-till disk drill may have contributed to the infection. I have however looked at producers fields where the losses were just as great where the field had been fallowed the previous season and had an abundance of downy brome-grass residue on the surface.

There did appear to be a significant reduction in infection with Wesley, Jagger, 2137, and Crimson when compared to Arapahoe, Tandem, and Nekota. Common root rot is occurring in winter wheat fields and many times is not diagnosed. The variety response could also be affecting the yield results from crop performance testing locations. Further testing is needed to determine a consistent response of all varieties grown. Producers would be well advised to select a variety with good tolerance when planting no-till into spring wheat stubble.

Maverick Herbicide Planting Restriction Study
Gregg Krebsbach Farm
New Underwood SD

Objectives:

1.) To measure the loss of stand due to herbicide carry over on sensitive crops.
2.) To measure plant height reductions due to herbicide rates over the seasons after application.
3.) To measure grain yield reductions if any due to herbicide carryover.
4.) The crops to be evaluated were Grain Sorghum, Corn, Sunflowers, Soybeans and Millet as rotational crops after Maverick.

Procedures: The plot area was a no-till field prior to the starting of the experiments and the plots will be maintained by no-till farming methods during the experiment.

1998: The six blocks of land 80 ft. by 160 ft. were planted no-till to winter wheat in the fall of 1998. The blocks were sub-divided into four treatments per replication and four replications per each of the 6 blocks. Maverick treatments of 1X, 2X, 4X and the untreated control were applied to each of the six blocks which were randomized separately. The treatments were applied to plots consisting of 20 ft. by 40 ft. in the fall after the winter wheat was fully tillered on October 14, 1998. The herbicide treatments were applied with a research plot sprayer, applying 10 gallons of spray solution per acre. The fall was rainy and the plots received 3.4 inches of rainfall that fall prior to freeze up. The cross alleyways were planted to crested wheat-grass to better define the blocks in the spring of 1999.

1999: The plots received several snows over the winter that filled short stubble. The snow melted and the moisture went into the soil. The spring and summer were very wet with 7.9 inches of precipitation being received in 13 rainfall events from March through July 8, 1999. Each of the 96 plots was harvested separately to evaluate the effect Maverick had on winter wheat grain yield. The data is presented in table 50. On November 10 th, 1999, 12.5 pounds per acre of Treflan 10-G granules were applied to the block to be planted to sunflowers in 2000.

2000: On April 10, 2000; liquid fertilizer was applied for yield potentials of 100 bushels of corn, 3000 pounds of millet, 2000 pounds sunflowers and 50 bushels of soybeans per acre. On May 4 the block to be planted to corn was sprayed with 16 ounces of Roundup + 16 ounces of Buctril per acre. On May 10,th Asgrow RX445RR corn was planted at 20,880 seeds per acre in 20 inch rows. Soybeans (NK-RR S14B2) were planted on May 23rd at a rate of 182,500 seeds per acre in 20 inch rows. Also on May 23 grain sorghum (NK251) was planted at 67,750 seeds per acre in 20 inch rows. The block that was planted to grain sorghum was sprayed with 32 ounces of Roundup, 16 ounces of Buctril, 40 ounces per acre Dual and 1.25 pounds of 90 df atrazine. Roundup Ready Soybeans were planted on May 23rd. The block already planted to soybeans was sprayed on May 24th with 32 ounces of Roundup and 16 ounces of Buctril per acre after planting.

On June 7th, the corn block was sprayed with 32 ounces of Roundup and 1.25 pounds per acre of 90 df atrazine. On June 10th, the Roundup Ready soybeans were sprayed with 32 ounces per acre of Roundup. The sunflowers were first planted on May 23rd and the stand was not good so they were replanted to Pioneer hybrid 63M80 sunflowers on June 29th. The stand of sunflowers was excellent this time. Stand evaluations could be made after emergence.

Soil samples were taken from each treatment of the grain sorghum block and shipped to a Monsanto laboratory for residue analysis during the first week of June. Stand counts and height notes were taken on July 13th and August 8 on the sorghum, soybeans and sunflowers plots. The corn and millet crops were not measured because they were not showing any differences in height or stand of plants.

The millet plots were harvested on September 6th and the grain sorghum plots were harvested on September 13th. The corn was picked on October 5th and the soybeans were harvest with a plot combine on October 10th. The sunflower heads were picked on October 10th and were dried and thrashed by a plot combine later.

Discussion:

The results of this year's data would indicate that sunflowers and grain sorghum are sensitive crops to carryover of Maverick herbicide. The millet in these plots as well as others in South Dakota indicates a good tolerance to Maverick herbicide carryover with no stunting or yield reductions. The soybeans did not show any significant stunting or yield reductions. The soybeans in the 4 X rate plots did appear to drop their leaves later than the control plots, which could indicate a delayed maturity. The corn grown in these plots did not show any stunting or yield reductions, however other plots in South Dakota and Montana have had some indication of Maverick injury from carryover.

Maverick has been a very effective herbicide for the control of downy brome-grass when fall applied. The danger is that the winter wheat crop could be lost and a decision would have to be made on what crop to plant back into this field. The Monsanto Company will have a label with the crop rotations allowed after Maverick has been applied and a producer should review these prior to planting sensitive crops. Supporting data are shown in tables 50-55.

1999 layout

Wheat Block #2	Wheat Block #1
Wheat Block #4	Wheat Block #3
Wheat Block #6	Wheat Block #5

The yield data for 1999 and 2000 is shown in the tables below.

Results:

Table 50. 1999 Crop-Winter Wheat Yields

Treatment	Oz prod /Acre	Block #1 Yield bushels /acre	Block #2 Yield bushels /acre	Block #3 Yield bushels /acre	Block #4 Yield bushels /acre	Block #5 Yield bushels /acre	Block #6 Yield bushels /acre	Ave Yield bu /acre
Check	--	47.8	40.1	51.8	35.1	44.5	32.5	42.0
Maverick	.66	62.0	45.8	47.7	44.5	43.1	39.2	47.0
Maverick	1.32	55.8	46.8	50.8	38.9	42.3	36.1	45.1
Maverick	2.64	58.3	37.8	55.6	38.5	41.9	31.7	44.0

2000 layout

Milo Block #2	Millet Block #1
Corn Block #4	Millet Block #3
Sunflower Block #6	Soybean Block #5

Table 51. 2000 Crop-Millet-Block #1

Treatment	Oz prod /Acre	Height (inches) 7-13-00	Stand (Plants/4') 7-13-00	Yield (pounds /acre) 9-6-00
Check	N/A	6.3"	18.0	1710.8#
Maverick	.66	6.5"	18.0	1715.0#
Maverick	1.32	6.3"	19.8	1795.3#
Maverick	2.64	4.5"	18.3	1665.0#
LSD =		.96	2.20	162
CV =		10.23	7.43	5.87

Table 52. 2000 Crop-Milo-Block #2

Treatment	Oz prod /Acre	Stand (Plants/4') July 13	Height (inches) July 13	Stand (Plants/4') Aug 8	Height (inches) Aug 8	Harvest Mois.% Oct 20	TestWt (#/bu) Oct 20	Yield (lbs/A) Oct 20
Check	N/A	9.8	16.8"	10.3	25.5"	11.8%	52.35	3069.0 #
Maverick	.66	8.8	9.0"	8.8	23.8"	10.9%	52.68	1326.8 #
Maverick	1.32	5.5	5.3"	5.3	17.3"	9.23%	50.60	768.0#
Maverick	2.64	2.5	3.5"	2.8	10.5"	N/A	N/A	N/A
	LSD=	1.53	4.40	2.38	7.60	1.68	2.676	819.28
	CV =	14.45	31.93	22.08	24.67	12.76	4.27	39.67

Note: Millet Yields in Block #3 were the same as Millet yields in Block #1.

Table 53. 2000 Crop-Corn-Block #4

Treatment	Oz prod /Acre	Harvest Moisture % 10-16-00	Test Wt. (lbs/bushel) 10-16-00	Yield (bushels/acre) 10-16-00
Check	N/A	12.20%	53.50	46.10
Maverick	.66	12.15%	54.88	60.78
Maverick	1.32	10.98%	52.70	48.85
Maverick	2.64	11.70%	52.55	44.92
	LSD =	1.722	1.970	13.808
	CV =	9.16	2.31	17.21

Table 54. 2000 Crop-Soybeans-Block #5

Treatment	Oz prod /Acre	Height (inches) 7-13-00	Stand (Plants/4') 7-13-00	Test Wt. (Lbs/bushel) 10-16-00	Yield (bushels /acre) 10-16-00
Check	N/A	7.3"	28.8	57.30	12.32
Maverick	.66	7.5"	26.8	57.00	12.48
Maverick	1.32	7.0"	26.3	57.15	10.70
Maverick	2.64	6.8"	29.0	56.67	11.45
	LSD =	1.62	5.62	0.565	3.402
	CV =	14.23	12.69	0.62	18.12

Table 55. 2000 Crop-Sunflowers-Block #6

Treatment	Oz prod /Acre	Height (inches) 8-8-00	Stand (Plants/4') 8-8-00	Harvest Moisture % 10-30-00	Test Wt. (Lbs/bushel) 10-30-00	Yield (Lbs /acre) 10-30-00
Check	N/A	27.8"	3.0	10.38%	25.63	2238.3#
Maverick	.66	22.3"	3.0	8.60%	23.75	1577.8#
Maverick	1.32	16.5"	3.0	8.32%	22.65	1300.3#
Maverick	2.64	9.8"	2.3	8.00%	21.60	435.3#
	LSD =	4.57	0.77	1.019	2.250	347.84
	CV =	15.0	17.02	7.22	6.01	15.67

Tolerance of Proso Millet to Maverick Herbicide

Don Brown Farm Scenic SD
Henry Roghair Farm Murdo SD

Objectives:

1.) Evaluate the tolerance proso millet after fall application of Maverick on winter wheat different soils in western SD.
2.) Measure plant height during the growing season.
3.) Measure proso millet grain yields form 1X, 2X and untreated plots.

Procedures:

The Scenic location was on a sandy clay loam soil with a pH of 6.4 and organic matter levels of 1.8 percent. The site had limited amounts of precipitation during the fall and winter months but had good spring precipitation. Two acre blocks of 1X and 2X rates of Maverick herbicide were applied on October 20, 1999. The entire field was planted to millet by the producer in the early summer. The millet field was inspected July 7th 2000 for the condition of the crop and stunting if any. Sample areas were harvested with the producer's combine and pounds per acre yields of the proso millet were calculated.

The Murdo location was on a heavy clay loam soil with a pH of 7.3 and an organic matter content of 3.3 percent. . Two acre blocks of 1X and 2X rates of Maverick herbicide were applied October 10,1999. The site was dry during the fall but received good moisture in the spring. The producer planted the field to proso millet in late June of 2000. After planting, the field was very dry in late summer. The plots were harvested in late September by the producer and a measured sample was placed in a weigh-wagon to get an accurate yield measurement of each plot of proso millet. Results of the Scenic and Murdo millet yields are listed in table 56.

Results:

Table 56. Millet Yields

Location	Yield - Pounds Per Acre		
	1X Rate	2X Rate	Untreated
Scenic	1524	1482	1804
Murdo	1677	1666	1761

Discussion:

The Maverick herbicide was applied in the fall similar to the time when the herbicide would be applied to a winter wheat field in the fall of 1999. The proso millet was planted in the field to simulate the results that would be obtained if the winter wheat was winter killed and the field was replanted to millet in the early summer. There was no stunting or delayed emergence of the proso millet in the treated areas when compared to the untreated areas at either location.

The yields of the untreated area at the Scenic location appeared higher than the plots that were treated with Maverick. However, the treated plots were slightly farther away from a tree belt, which could have reduced the yield of the treated areas. There appeared to be no reduction in stand at the Scenic location on July 7th, in fact there appeared to be fewer weeds in the 2X rate than the untreated areas.

The Murdo location was more in the middle of a field and there appeared to be no stunting or reduction in yields from the treatments.

It would appear from these limited results that the proso millet crop was not adversely affected by the fall application of the Maverick herbicide.

Control of Volunteer Winter Wheat, Downy Brome and Pennycress by Herbicides.
Krebsbach Farm
New Underwood SD

Objectives:
1) Evaluate the control of volunteer winter wheat with rates of Assure II.
2) Compare the control of Assure with and without Roundup herbicide.

Procedures:
The plots were 10ft. by 40 ft. long and were replicated 4 times in a randomized complete block design. The treatments were applied April 17, 2000 with 8002 nozzles at 30 psi and 3.5 mph, delivering 10 gallons per acre. The volunteer wheat was in 5-7 tiller growth stage and downy brome had 4-8 tiller and was a very heavy stand of 50 plants per square foot. The air temperature was 77 degrees and the soil temperature was 55 degrees. The topsoil was very wet the field had snow and it had just melted off 2 days prior to the application. Control notes were taken May 11,2000 on volunteer winter wheat, downy brome, and penny-cress.

Results:
Table 57.

Treatment	Oz prod /Acre	Spray Date	% Control Volunteer Wheat as of May 11,2000	% Control Downy Brome as of May 11,2000	% Control Pennycress as of May 11,2000
Roundup Ultra	24	4-17-00	98.3	95.8	99.0
Assure II	4.4	4-17-00	68.8	73.8	30.0
Assure II	6.5	4-17-00	85.0	76.3	37.5
Assure II	8.7	4-17-00	88.8	86.3	45.0
Assure II	10.9	4-17-00	92.5	88.8	36.3
Roundup Ultra Assure II	24 4.4	4-17-00	98.0	98.0	98.0
Roundup Ultra Assure II	24 6.5	4-17-00	99.0	99.0	84.3
Roundup Ultra Assure II	24 8.7	4-17-00	98.0	94.5	99.0
Roundup Ultra Assure II	24 10.9	4-17-00	99.0	99.0	99.0
Untreated	N/A	N/A	1.0	1.0	1.0
LSD=			6.01	5.27	15.60
CV =			5.0	4.47	17.1

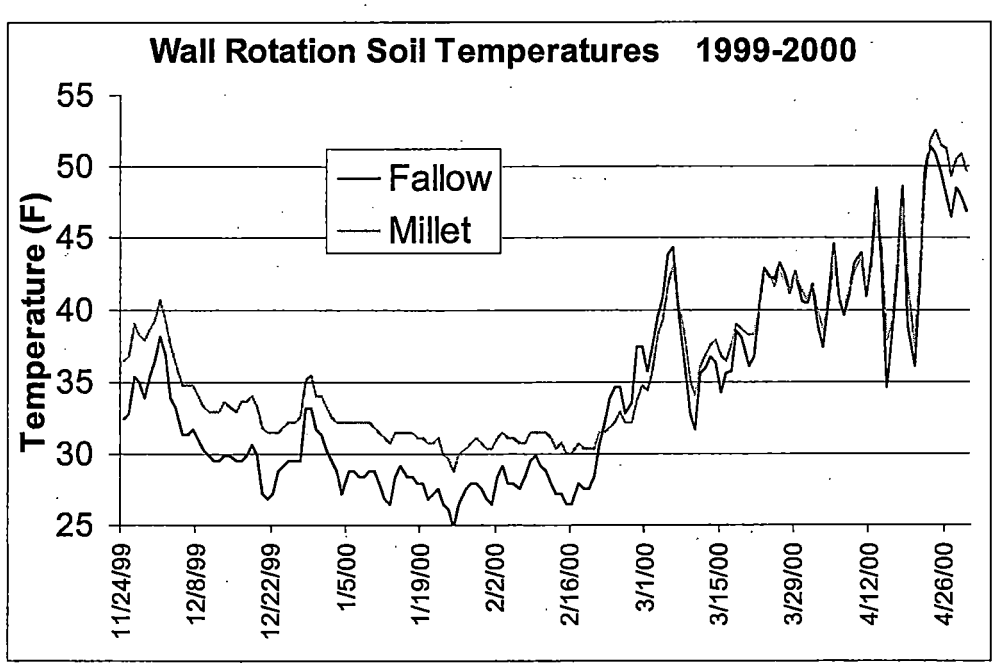
Discussion:

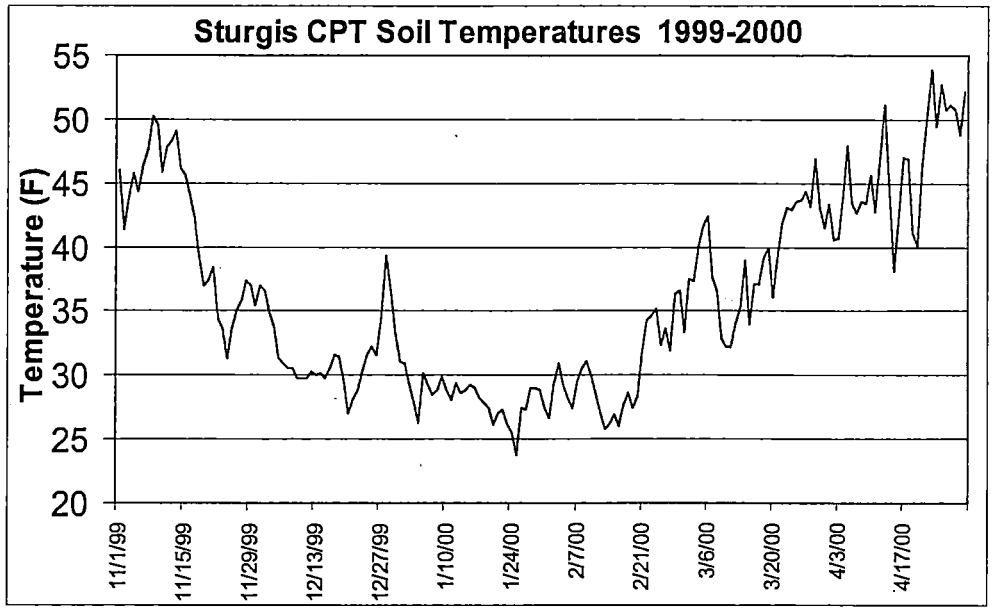
The Assure II at lower use rates was not as effective in controlling volunteer winter wheat alone. The Roundup at 24 ounces per acre was very effective in controlling all three weeds rated in this trial. It would appear that if you were to use Assure II to control roundup ready wheat you would have to use the higher rates tested.

Soil Temperature Probes

Discussion: The probes are placed in the soil to a depth of 2 ½ inches below the surface each fall after the winter wheat is planted. The objective is to measure soil temperature in plots located in wheat fields in different areas in western South Dakota. Research has indicated that most winter wheat currently grown in western SD can tolerate temperatures down to 15 degrees soil temperatures at the crown depth below the soil surface. More winter hardy varieties can tolerate winter temperature down to 0 degrees at the crown depth. Surface residue or snow provides excellent protection from cold air temperatures for the wheat seedlings. The data taken from the Wall Rotation Study demonstrates this effect even during the mild winter of 1999-2000. The soil temperatures even on the fallow only got down to 25 degrees. The soil temperatures at the same location in the millet stubble planted back to winter wheat had soil temperatures during January and February of about 3-4 degrees warmer. The difference in soil temperatures would be even greater if the air temperature were colder. The stubble protection also provides for a more uniform soil temperature during the winter. The soil temperature probes were first purchased by the South Dakota Wheat Commission in the summer of 1997. The hope was that we could better predict winter-kill by measuring the soil temperatures in actual wheat fields. From 1997 to present we have not had cold enough winters to cause winter-kill of the seedling wheat.

During the winter of 2000-2001 the soil temperatures up through January only reached a low of 18 degrees on fallow fields with little protection from the cold winds. The probes are installed at all 7 crop performance testing locations in the western portion of the state, this should help us determine differences in winter hardiness of varieties tested.




Sturgis CPT Soil Temperatures 1999-2000
Temperature (F)
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11/29/99
12/13/99
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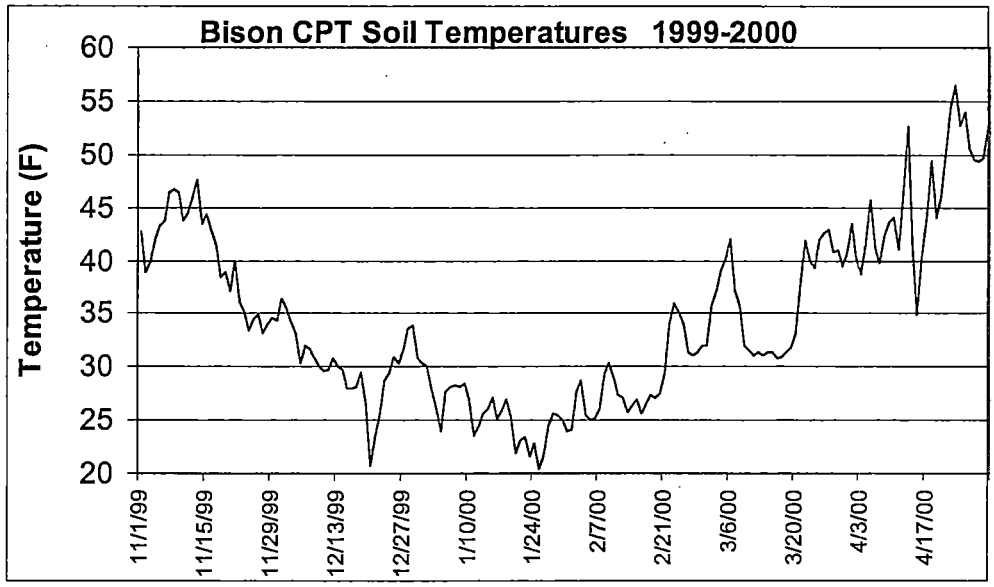
Bison CPT Soil Temperatures 1999-2000
Temperature (F)
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11/29/99
12/13/99
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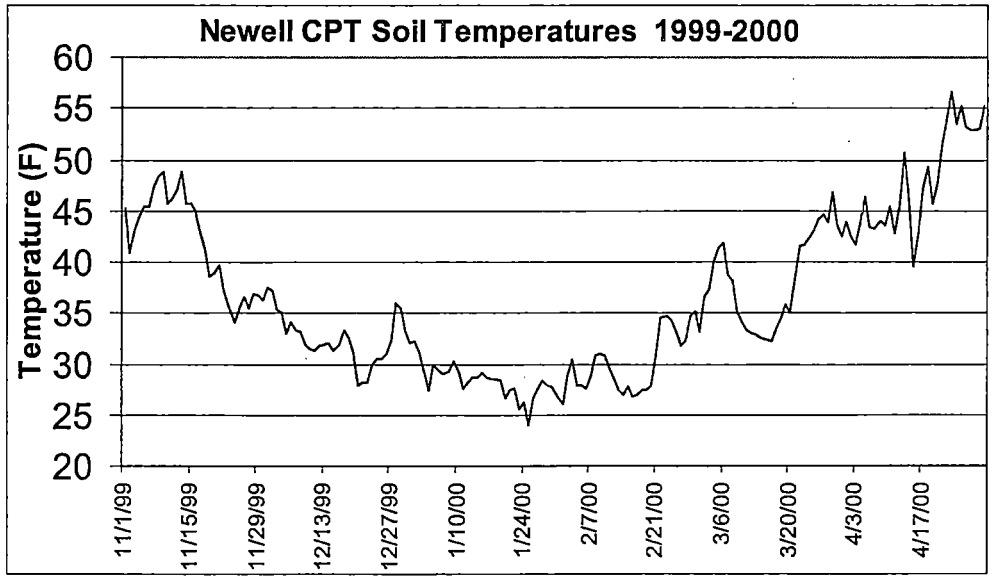
4/17/00


Newell CPT Soil Temperatures 1999-2000
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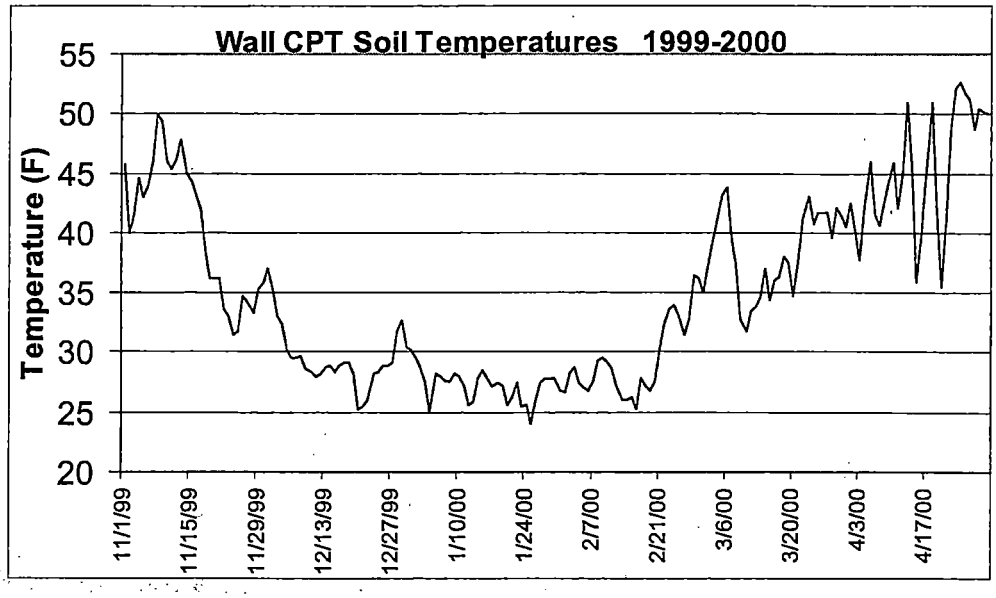
Wall CPT Soil Temperatures 1999-2000
Temperature (F)
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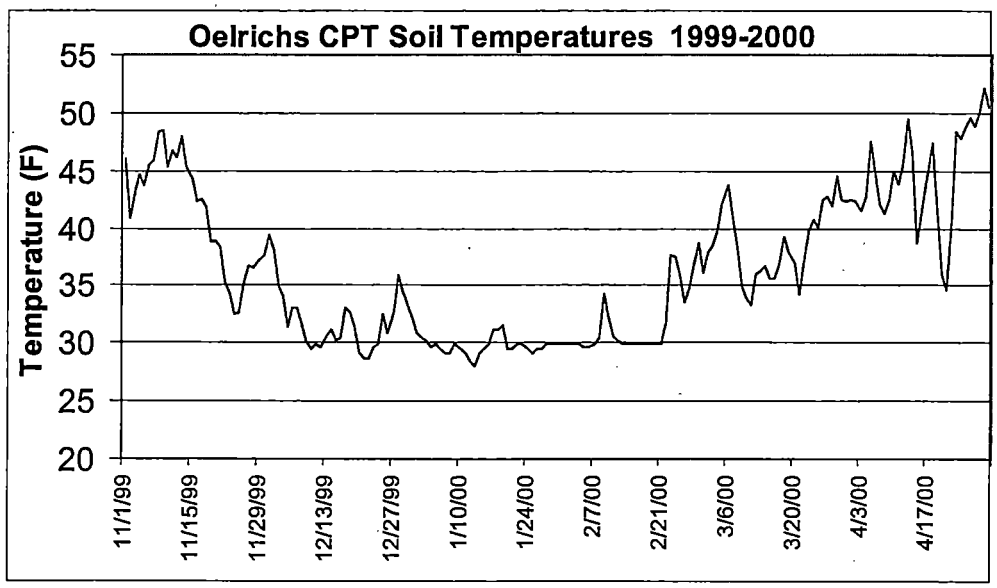
Oelrichs CPT Soil Temperatures 1999-2000
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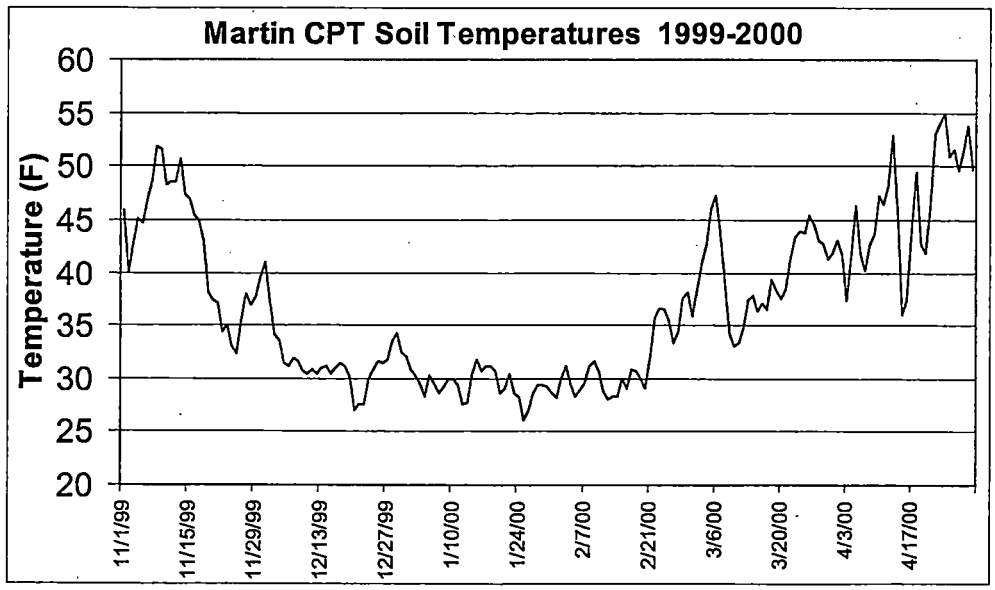
Martin CPT Soil Temperatures 1999-2000
Temperature (F)
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12/27/99
1/10/00
1/24/00
2/7/00
2/21/00
3/6/00
3/20/00
4/3/00
4/17/00

2000-2001 PREVIEW

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

SDSU Wheat and Oilseed Crop Rotation Study at Wall, SD

This 14 acre trial was initiated in the spring of 1994. There are 9 cropping sequences that are currently being evaluated. This rotation study looks at the economics, sustainability, and conservation compliance of wheat when grown in combination with minor oil seed crops (safflower, sunflower). This is an important part of crop research in western South Dakota and is funded by The South Dakota Wheat Commission and The South Dakota Oil Seeds Council.

No-Till Date of Planting Studies (2 locations)

The 2 trials have been planted for the past 5 years into Wheat and millet stubble at 4 planting dates. The objectives of the study is to determine if there should be different varieties recommended for no-till planting into stubble and if there is a difference in yields as a result of planting dates. The 2 locations over the last 4 years have given us a lot of good data upon which to make recommendations. See Results on pages 60-70.

Variety Testing of Winter Wheat and Spring Grains (8 locations)

There are currently 7 CPT West River sites for evaluation of winter wheat. This year has 38 varieties of winter wheat at each location. There are trials at: Bison, Hayes, Sturgis, Wall, Newell, Oelrichs, and Martin. A 24 entry wheat strip trial is also planted at Kennebec. Spring grains such as oats, barley, spring wheat, durum, and millet will have on-going evaluation at various test sites this spring.

Crown Rot and Root Rot control using Seed Treatments (1 location)

This study is once again looking at control of fungal pathogens of winter wheat through use of various seed treatments and tolerance of current popular varieties. In the past there has been major differences in the currently grown varieties of winter wheat.

Crop Rotation Interval for Maverick (Mon 37500)

This study has been designed to evaluate how sensitive corn, millet, sunflowers, soybeans, and wheat are to this herbicide. This trial utilizes varying rates of MON37500 herbicide at 1x, 2x, and 4x rates to control Cheat grass in winter wheat when applied in the fall of 1998.

Variety Testing of Oilseed Crops (2 locations)

Safflower varieties will be evaluated throughout the 2001 growing season at Wall and Oelrichs.

Variety Testing of Field Peas and Garbanzo Beans (3 locations)

Field peas and garbanzo beans will be evaluated for grain yield at Selby, Wall, and Bison. Field peas will be further researched as a cover crop.

Soil Temperature Probes / Weather Station

The support of the South Dakota Wheat Commission in the case of soil temperature probes and the South Dakota Crop Improvement Association in the case of the weather station located at Wall, SD helps to make more scientific measurements possible. Soil temperature Probes are used to better predict winter survivability of fall seeded crops and other aspects of crop production. The weather station documents daily measurements of the effect of weather on various crops. See results on pages 84-86.