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SMALL GRAIN CROPS IN SOUTHWESTERN NORTH DAKOTA

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SUMMARY

New crop cultivars and advanced experimentals from public and private agencies must be developed for the continued viability of crop and crop-livestock systems in southwestern North Dakota. The North Dakota Agricultural Experiment Station is obligated to provide unbiased data and interpretations which can be used by producers to choose cultivars for farm production. This project will collect and publish information on the comparative performance of small grain cultivars in southwestern North Dakota. This project will also provide grain for quality evaluation.

OBJECTIVE

Evaluate genotypes of hard red spring wheat, hard red winter wheat, durum spring wheat, spring barley, and spring oat in southwestern North Dakota.

INTRODUCTION

Crop production is a significant income generator for southwestern farmers and ranchers. Cash receipts from crops accounted for 52% of total farm income in the South Central, Southwestern, and West Central Crop Reporting Districts in 1994 (Beard and Hamlin, 1996). When government payments were considered, over 57% of total farm income came directly from cash receipts for crops. This excludes the value of forages grown and fed directly to livestock on farms.

Wheat, barley, and oat are the major small grain crops grown in western North Dakota. The annual value of these cereal grains grown between 1990-94 was over $280,000,000 in the three southwestern crop reporting districts (Beard and Hamlin, 1996). Development of improved small grain cultivars is necessary to ensure that the farm income generated by grain crops, either directly by cash payment or indirectly through livestock, can be maintained or enhanced.

Cultivar comparison trials have been the foundation of yield, quality, and agronomic evaluation of crop cultivars in North Dakota. Early reports from the Agricultural Experiment Station contained data obtained from comparison trials (Hays, 1893a, 1893b). These trials still are important to obtain information for cultivar release and recommendations (Cox et al., 1988; Frohberg, 1991). Each year approximately 45 hard red spring wheat, 10 hard red winter wheat, 30 durum wheat, 30 oat, and 25 barley cultivars are evaluated in comparison studies at the Dickinson Research Extension Center (DREC). These comparisons include both named cultivars and experimental lines from NDSU, and other public and private breeding programs in the U.S. and Canada. Evaluations are used to make cultivar recommendations.

Grain produced in plots from the comparison trials is used in quality evaluations by personnel of the Department of Cereal Chemistry and Food Technology at NDSU, Fargo, ND. Quality evaluations of experimental lines are compared to cultivars currently grown by producers. The quality and agronomic performance of an experimental line at various locations is one of the major bases for the recommended release of that line as a named cultivar or its removal from consideration for further testing.

Experimental lines from other state experiment stations and private plant breeding companies also are evaluated for quality. Although data from this project are not instrumental in the eventual release or rejection of lines from these sources, it does provide information on agronomic characteristics prior to release and does assist in cultivar

recommendations.

Soils at the Dickinson Research Extension Center (DREC) are representative of a large percentage of southwestern North Dakota soils. However, not all prominent soil types occurring in the southwestern portion of the state occur at the DREC. Moreover, local climatic differences between different areas in the region exist. For these reasons, cultivar comparison studies are conducted at sites besides the DREC to provide an area test of crop cultivar performance at several locations in southwestern North Dakota.

MATERIALS AND METHODS

Seed of cultivars evaluated in comparison trials generally were provided by plant breeders at North Dakota State University in Fargo, or from drill strips at the DREC. Cultivars developed from neighboring land-grant institutions and Canada, as well as private plant breeding companies were included.

Cultural practices including tillage and seeding, fertilization, herbicide application, and harvesting followed currently acceptable agronomic procedure in implementing and maintaining cultivar comparison trials. Cultivars and genotypes of each small grain crop (hard red spring wheat, hard red winter wheat, durum wheat, spring barley, and spring oat) were evaluated using a replicated randomized complete block design. Demonstration strips also were maintained for grower observation, crop field tours, and for a sufficient amount of seed for quality evaluations. Crop trials were conducted on both previously fallowed and continuously-cropped land. Experiments were located on both conventionally-tilled and no-tilled seedbeds.

Plant growth was monitored throughout the growing season. Variables that were measured on each plot at Dickinson included: days to heading, plant height, plant lodging at physiological maturity, grain yield, kernel weight, grain volume weight, and grain protein content. Ten random plants in each plot of three replicates within the hard red spring wheat comparison trial were evaluated for flag leaf spotting, using the system developed by McMullen and Francl (M. McMullen and L. Francl, per. comm., 1992).

Data collected at off-station sites included grain yield, grain volume weight, kernel weight, and grain protein content for wheat. Quality characteristics for product acceptance will be determined by the Department of Cereal Science

and Food Technology at North Dakota State University from grain samples provided.

Data were analyzed using a computer statistical program.

RESULTS

Keene was the highest yielding conventional height cultivar among hard spring wheat cultivars evaluated in 1996 at Dickinson. Among conventional height cultivars, Amidon, Butte 86, Ernest, Keene, and Trenton have produced the most grain over the past three years. Among semidwarf cultivars, 2398, Lars, McNeal, Norm, and Verde have produced the most grain. Gross returns among wheat cultivars evaluated in the spring wheat cultivar trial were comparable except for those generated by the following cultivars (which were lower): Lars, Penewawa (white wheat), AC Domain, AC Eatonia, AC Majestic, and BacUp.

The hard red spring wheat cultivars 2375, 2398, Amidon, Hamer, and Kulm produced more grain at Glen Ullin than the other cultivars evaluated in 1996. Higher returns were generated by Kulm than by 2371, McNeal, and Russ. The other cultivars evaluated generated similar returns to those generated by Kulm.

A hard red winter wheat trial was successfully established in a no-tillage seedbed at Dickinson in 1996. Average yield among the 10 cultivars evaluated was 72.3 bu/acre; Abiline produced the most grain (79.3 bu/acre) and Agassiz the least amount (64.1 bu/acre). Highest returns were generated by Abiline, though comparable amounts were also generated by Arapahoe, CDC Kestrel, and Seward.

Average yield among the 16 commercial durum cultivars evaluated at Dickinson was 56.6 bu/acre in 1996. Ben, Lloyd, and Renville were the highest yielding cultivars. Highest returns were generated by Dressler, Lloyd, Plenty, Renville, Sceptre, and Ward.

At Glen Ullin, four of the five cultivars evaluated generated comparable returns (Ben, Munich, Renville, and Vic); returns were lower when Voss was grown.

Yield of the 15 commercial barley cultivars averaged 62.2 bu/acre at Dickinson in 1996. Over the past three years, Excel and Stander have been the leading six-rowed barley cultivars for yield. Among two-rowed cultivars, Logan has

been the leading cultivar for yield.

Highest returns were generated by two, two-rowed cultivars (Logan and Conlon) among the barley cultivars evaluated at Dickinson in 1996. Among the cultivars evaluated at Glen Ullin, highest returns were generated by Foster and Stander.

Yield averaged 82.7 bu/acre among the 21 commercial oat cultivars evaluated at Dickinson in 1996. Derby and Calibre oat have produced the most grain over the past three years among oat cultivars compared. Derby, Calibre, and Troy generated the highest returns among oat cultivars considered in 1996 at Dickinson, while Whitestone produced highest returns at Glen Ullin.

Hard Red Spring Wheat - Fallow Glen Ullin

Variety	Seeds lbs	Test Weight lbs/bu	Returns $/acre	Protein %	% of Grandin	Grain Yield			Average Yield	
						1994	1995	1996	2 year	3 year
						bu/ac				
2371	14,780	59.9	235.72	15.1	81	--	51.8	53.9	52.9	--
2375	12,708	61.4	273.10	13.5	107	51.3	63.8	71.4	67.6	62.2
2398	12,787	60.9	263.35	13.3	105	--	--	69.6	--	--
Amidon	13,573	61.3	272.69	14.3	103	49.4	60.4	68.5	64.5	59.4
Ernest	13,623	60.9	277.39	14.6	102	--	62.9	67.6	65.2	--
Grandin	12,681	61.8	282.85	15.0	100	46.5	54.8	66.5	60.7	55.9
Hamer	12,225	60.3	271.97	14.2	103	--	--	68.6	--	--

Kulm	13,656	62.0	286.32	14.8	102	48.9	59.8	67.7	63.7	58.8
McNeal	16,294	57.3	215.43	14.1	83	48.2	60.1	55.1	57.6	54.5
Keene	14,479	62.0	261.98	14.6	98	--	--	65.2	--	--
Russ	12,865	60.8	266.69	14.2	101	--	--	67.1	--	--
Trenton	12,652	61.9	275.02	14.6	100	--	59.6	66.8	63.2	--
Mean	13,527	60.8	265.21	14.4	--	--	--	65.7	--	--
C.V. %	4	0.5	4.7	1.3	--	--	--	4.0	--	--
LSD .05	694	0.4	18.1	0.3	--	--	--	3.8	--	--

Planting Date: May 28
Harvest Date: September 12
Previous crop: Fallow; Soil test results: 86lbs N and 14ppm P - applied 130lbs Urea and 25lbs DAP per acre; Applied 1.25pt Bronate per acre on June 17.
Returns were calculated by multiplying the 1996 yield by the protein premium/discount and test weight discount paid at the Southwest Grain Terminal located at Gladstone on October 4.

Hard Red Spring Wheat - Green Fallow Dickinson

Variety	Days to Head	Plant Height in	Lodging Score 0-9	Foliar Disease %	Seeds lbs	Test Weight lbs/bu
Semidwarf						

2370	61	26	0.0	67.5	16,174	61.1
2371	64	28	0.0	51.0	16,193	60.5
2375	61	27	0.0	60.5	15,159	60.6
2398	62	26	0.3	9.8	13,089	62.4
Grandin	61	27	0.0	68.3	15,935	60.3
Gus	63	25	0.0	36.2	16,843	61.1
Hamer	61	25	0.0	38.7	14,193	61.0
Lars	63	21	0.0	20.2	15,271	60.6
McNeal	63	27	0.0	29.3	14,683	61.0
Norlander	60	24	0.0	83.7	17,855	60.1
Norm	62	27	0.0	14.2	14,063	61.6
Oxen	61	26	0.0	59.3	16,186	61.4
Penewawa	63	23	0.0	40.8	15,659	61.3
Sonja	62	24	0.0	57.7	15,363	59.8
Verde	63	26	0.0	10.0	14,358	61.5
Wawawai	62	28	0.3	38.7	12,919	61.0
Whitebird	62	25	0.0	26.7	16,186	62.9
Conventional						
AC Barrie	62	30	0.0	27.7	14,922	61.5
AC Cora	62	31	0.8	24.8	15,444	60.5

AC Domain	61	30	0.0	42.7	15,883	61.1
AC Eatonia	63	29	0.8	23.8	15,267	61.8
AC Majestic	64	29	0.0	31.0	17,131	59.5
AC Reed	61	26	0.0	13.8	15,317	61.0
Amidon	62	31	0.0	19.7	14,876	61.9
Bacup	59	28	0.8	92.2	16,425	62.9
Butte 86	60	30	0.0	24.5	13,776	62.5
CDC Teal	61	29	0.0	12.0	15,179	60.9
Ernest	61	31	0.0	8.0	14,296	62.6
Gunner	63	27	0.0	24.7	16,483	62.8
Keene	62	30	0.0	25.5	15,815	62.5
Kulm	60	28	0.3	80.2	16,245	62.4
Russ	61	27	0.0	78.2	15,546	60.5
Sharp	60	31	0.3	50.8	14,790	62.9
Trenton	62	31	0.3	28.0	14,471	62.3
Mean	62	27	0.1	38.8	15,353	61.4
C.V. %	1.1	8	233.8	59.0	8	1.7
LSD .05	1	3	0.3	37.3	1,791	1.4

Planting Date: April 29; Harvest Date: August 14; Lodging: 0=No lodging, 9=Completely flat; Previous crop: Black lentil (plow down); Soil test results 118lbs N and 13ppm P - Applied 60lbs Urea and 25lbs DAP per acre; Applied 2pt Hoelon per acre on June 3; Applied .33oz Harmony Extra+.75pt MCPA ester per acre on June 3

Hard Red Spring Wheat - Green Fallow Dickinson

Variety	Protein %	Returns	Grain Yield			Average Yield	
			1994	1995	1996	2 year	3 year
			bu/ac				
Semidwarf							
2370	16.1	200.96	44.2	46.8	44.5	45.7	45.2
2371	17.0	184.41	42.3	49.1	40.4	44.8	43.9
2375	14.9	190.57	44.1	49.1	45.5	47.3	46.2
2398	14.5	215.23	50.7	60.7	53.5	57.1	55.0
Grandin	15.5	180.55	42.3	54.0	41.2	47.6	45.8
Gus	16.3	192.88	44.7	52.8	42.5	47.7	46.7
Hamer	15.2	187.57	52.3	53.8	42.8	48.3	49.6
Lars	14.1	164.22	49.3	62.1	41.1	51.6	50.8
McNeal	15.4	207.81	47.4	61.5	48.6	55.1	52.5
Norlander	16.2	199.74	40.9	53.7	45.3	49.5	46.6

Norm	14.4	192.40	49.3	54.6	48.2	51.4	50.7
Oxen	15.4	200.91	--	54.5	44.7	49.6	--
Penewawa	12.6	177.81	43.2	47.0	47.2	47.1	45.8
Sonja	14.9	183.88	44.6	53.8	43.7	48.7	47.4
Verde	14.9	196.69	49.6	56.4	47.4	51.9	51.1
Wawawai	13.2	199.81	--	--	52.6	--	--
Whitebird	12.0	186.70	--	--	50.3	--	--
Conventional							
AC Barrie	15.4	194.51	40.0	50.7	43.3	47.0	44.7
AC Cora	15.9	203.83	38.4	45.3	45.0	45.1	42.9
AC Domain	16.2	175.98	39.4	39.4	38.8	39.1	39.2
AC Eatonia	16.4	173.62	39.1	36.0	38.4	37.2	37.8
AC Majestic	15.9	155.79	--	--	36.7	--	--
AC Reed	12.4	187.90	--	--	50.4	--	--
Amidon	14.8	183.81	40.0	59.6	45.3	52.4	48.3
Bacup	17.8	151.42	--	--	33.2	--	--
Butte 86	14.9	202.16	43.5	52.7	48.6	50.6	48.3
CDC Teal	15.9	215.10	38.2	45.5	47.5	46.5	43.7

Ernest	15.5	218.76	45.3	55.2	48.5	51.8	49.7
Gunner	16.5	199.14	--	--	43.7	43.7	43.7
Keene	14.9	193.76	51.8	58.8	45.8	52.3	52.1
Kulm	16.0	179.52	47.3	51.8	39.6	45.7	46.2
Russ	15.2	162.22	41.8	49.7	38.4	44.0	43.3
Sharp	14.6	179.34	44.3	48.2	44.6	46.4	45.7
Trenton	15.1	201.70	44.4	53.6	47.1	50.3	48.4
Mean	15.2	189.43	--	--	44.5	--	--
C.V. %	4.5	13.9	--	--	14.6	--	--
LSD .05	1.0	36.83	--	--	9.1	--	--

Hard Red Winter Wheat - Green Fallow Dickinson

Variety	Days to Head	Height in	Seeds lbs	Test Weight lbs/bu	Protein %	Returns $/ac	Grain Yield bu/ac
Abiline	274	26	15,818	63.0	13.6	297.22	79.3
Agassiz	279	41	14,954	59.5	13.9	240.40	64.1
Alliance	273	29	15,296	60.9	12.2	260.07	70.2
Arapahoe	275	32	14,642	60.9	13.8	279.47	74.5

CDC Kestrel	278	36	15,418	58.3	12.4	287.88	77.8
Elkhorn	279	37	15,164	60.0	13.5	241.28	64.4
Judith	275	33	13,803	58.0	13.1	291.69	78.7
Nekota	274	28	13,071	62.1	13.8	260.18	69.3
Roughrider	277	37	13,659	61.4	14.1	258.44	68.8
Seward	278	38	14,467	60.0	12.6	280.22	75.5
Mean	276	34	14,629	60.4	13.3	269.69	72.3
C.V. %	0.3	4	6.2	1.7	1.4	6.1	6.2
LSD .05	1.3	2	1316	1.5	0.3	23.77	6.5

Planting Date: September 15 (No-Till)
Harvest Date: July 29
Previous crop: Black lentil (burn down); Applied .33oz Express+.75pt 2,4-D per acre on May 30.
Returns were calculated by multiplying the 1996 yield by the protein premium/discount and test weight discount paid at the Southwest Grain Terminal located at Gladstone on October 4.

Durum Wheat - Fallow Dickinson

Variety	Type	Days to Head	Plant Height in	Lodging Score 0-9	Seeds lbs	Test Weight lbs/bu
AC Melita	Tall	64	32	0.0	10,245	60.3

Ben	Medium	65	33	0.3	9,880	59.6
Dressler	Tall	64	32	0.0	11,159	62.1
Laker	Semidwarf	66	30	0.0	9,694	59.1
Lloyd	Semidwarf	64	30	0.0	9,740	60.6
Medora	Tall	64	32	0.0	11,070	60.3
Monroe	Tall	62	33	0.0	10,815	62.0
Munich	Medium	65	32	0.0	12,669	61.8
Plenty	Tall	64	35	0.5	11,149	61.4
Regold	Tall	65	34	0.0	10,176	58.9
Renville	Tall	64	33	0.5	11,391	60.6
Rugby	Tall	65	33	0.0	11,698	60.0
Sceptre	Medium	64	33	0.0	11,753	61.6
Vic	Tall	64	33	0.0	10,311	60.6
Voss	Semidwarf	65	28	0.0	10,367	59.5
Ward	Tall	64	33	0.3	11,792	62.4
Mean		64	32	0.1	10,869	60.7
C.V. %		0.8	7	283.8	4.2	1.5
LSD .05		0.8	3	0.4	647	1.3

Planting Date: April 29
Harvest Date: August 15
Lodging: 0=No lodging, 9=Completely flat
Previous crop: Fallow; Soil test results: 67lbs N and 9ppm P - Applied 160lbs Urea and 50lbs DAP per acre; Applied 2pt Hoelon per acre on June 3; Applied .33oz Harmony Extra+.75pt MCPA ester per acre on June 3.

Durum Wheat - Fallow Dickinson

Variety	Protein %	Returns $/ac	Grain Yield			Average Yield	
			1994	1995	1996	2 year	3 year
			bu/ac				
AC Melita	14.1	247.37	--	49.1	56.4	52.8	--
Ben	--	235.56	35.7	60.1	59.3	59.7	51.7
Dressler	14.0	256.22	--	--	58.3	--	--
Laker	13.3	244.49	40.7	50.0	57.0	53.5	49.2
Lloyd	12.9	270.37	38.1	46.9	63.8	55.3	49.6
Medora	14.1	230.66	38.7	45.0	52.5	48.8	45.4
Monroe	14.4	230.14	33.3	48.7	52.3	50.5	44.8
Munich	14.1	246.63	35.1	56.9	56.1	56.5	49.4
Plenty	14.1	251.24	35.7	50.3	57.2	53.7	47.7
Regold	13.7	241.12	33.4	53.0	55.7	54.4	47.4

Renville	14.0	267.30	38.0	54.3	60.9	57.6	51.1
Rugby	14.2	226.53	41.1	56.0	51.6	53.8	49.6
Sceptre	13.9	255.42	39.3	52.9	58.1	55.5	50.1
Vic	14.4	245.19	37.8	56.2	55.7	56.0	49.9
Voss	13.3	232.90	39.8	59.6	54.2	56.9	51.2
Ward	14.1	251.14	42.6	53.9	57.1	55.5	51.2
Mean	13.9	245.77	--	--	56.6	--	--
C.V. %	2.0	5.6	--	--	5.7	--	--
LSD .05	0.2	19.45	--	--	4.6	--	--

Returns were calculated by multiplying the 1996 yield by the protein premium/discount and test weight discount paid at the Southwest Grain Terminal located at Gladstone on October 4.

Durum - Fallow Glen Ullin

Variety	Seeds lbs	Test Weight lbs/bu	Protein %	Returns $/acre	% of Renville	Grain Yield			Average Yield	
						1994	1995	1996	2 year	3 year
						bu/ac				
Ben	10,346	62	14.0	299	96	--	--	67.7	--	--

Munich	12,673	60	13.8	306	100	--	63.4	69.9	66.7	--
Renville	11,900	61	13.7	308	100	48.6	66.5	70.3	68.4	61.8
Vic	10,524	62	14.2	293	94	43.7	65.3	66.1	65.7	58.4
Voss	10,967	61	13.8	266	86	--	--	60.5	--	--
Mean	11,282	61.3	13.9	294.52	--	--	--	66.9	--	--
C.V. %	3.5	0.6	1.1	4.7	--	--	--	4.5	--	--
LSD .05	602.4	0.5	0.2	21.3	--	--	--	4.7	--	--

Planting Date: May 28
Harvest Date: September 12
Previous crop: Fallow; Soil test results: 86lbs N and 14ppm P - applied 130lbs Urea and 25lbs DAP per acre; Applied 1.25pt Bronate per acre on June 17.
Returns were calculated by multiplying the 1996 yield by the protein premium/discount and test weight discount paid at the Southwest Grain Terminal located at Gladstone on October 4.

Barley - Green Fallow Dickinson

Variety	Days to head	Plant Height in	Lodging Score 0-9	Seeds lbs	Test Weight lbs/bu
Six Row					
Azure	59	31	2.5	14,047	43.5

Excel	61	30	1.3	14,448	42.5
Foster	60	31	0.3	14,189	42.6
Hazen	59	27	0.8	13,190	43.8
Morex	58	31	4.0	13,303	44.6
Robust	60	31	2.5	13,846	43.8
Royal	61	26	0.0	13,377	45.0
Stander	61	27	0.0	15,450	42.0
Two-Row					
Bowman	58	28	1.5	10,983	48.0
Chinook	64	28	1.0	12,726	46.1
Conlon	58	28	0.3	9,490	48.6
Gallatin	63	28	0.0	11,452	47.6
Harrington	66	27	0.0	13,243	44.1
Logan	61	29	0.0	9,707	48.1
Stark	62	30	0.0	9,847	48.5
Mean	61	29	0.9	12,594	45.3
C.V. %	1.6	11	127.1	7.8	3.6
LSD .05	1	5	1.6	1,396	2.3
Planting Date: April 30					

Harvest Date: August 5
Lodging: 0=No lodging, 9=Completely flat
Previous crop: Black lentil (plow down); Soil test results: 32lbs N, 12ppm P - applied 250lbs Urea and 25lbs DAP per acre; Applied 2pt Hoelon per acre on June 3; Applied .33oz Harmony Extra +.75pt MCPA ester per acre on June 3.

Barley - Green Fallow Dickinson

Variety	Protein %	Returns $/ac	Grain Yield			Average Yield	
			1994	1995	1996	2 year	3 year
			bu/ac				
Six Row							
Azure	14.6	129.49	94.6	57.8	60.7	59.2	71.0
Excel	14.1	140.51	95.7	65.2	67.2	66.2	76.0
Foster	14.1	134.14	97.8	56.3	64.1	60.2	72.7
Hazen	14.6	133.98	91.2	51.5	62.2	56.8	68.3
Morex	14.9	118.83	84.1	45.8	54.2	50.0	61.4
Robust	14.8	122.41	90.4	56.7	56.8	56.7	68.0
Royal	14.5	135.13	84.5	48.7	61.8	55.2	65.0
Stander	14.6	131.10	102.8	67.1	62.2	64.7	77.4
Two-Row							
Bowman	15.3	128.91	81.0	56.7	56.3	56.5	64.7

Chinook	15.0	128.58	--	62.9	57.7	60.3	--
Conlon	14.2	143.72	94.9	68.9	62.7	65.8	75.5
Gallatin	14.1	155.26	96.9	54.8	68.5	61.6	73.4
Harrington	15.0	122.93	89.9	50.4	56.9	53.7	65.7
Logan	14.2	171.61	98.1	73.0	74.9	73.9	82.0
Stark	14.7	129.29	97.0	58.9	56.2	57.6	70.7
Mean	14.6	136.70			62.2		
C.V. %	3.2	15.2			13.4		
LSD .05	0.7	29.67			11.8		

Returns were calculated by multiplying the 1996 yield by the price for feed barley minus the test weight discount paid at the Southwest Grain Terminal located at Gladstone on October 4.

Barley - Fallow Glen Ullin

Variety	Seeds lbs	Test Weight lbs/bu	Protein %	Returns $/acre	% of Stark	Grain Yield			Average Yield	
						1994	1995	1996	2 year	3 year
						bu/ac				

Six Row										
Foster	11,257	49.9	12.8	260.00	130	--	65.3	110.7	88.0	--
Stander	11,531	50	13.0	276	138	--	--	117.5	--	--
Two Row										
Bowman	9,916	52	14.1	172	86	68.8	51.3	72.9	62.1	64.3
Chinook	10,771	51	14.2	238	118	--	--	100.2	--	--
Conlon	8,860	53	13.8	217	107	--	70.8	91.4	81.1	--
Logan	9,396	52.4	13.8	244.84	121	--	71.4	103.3	87.4	--
Stark	8,981	53	14.4	202	100	84.6	61.9	85.1	73.5	77.2
Mean	10,101	51.5	13.7	229.88	--	--	--	97.3	--	--
C.V. %	4.5	1.2	1.2	5.9	--	--	--	5.6	--	--
LSD .05	675.2	0.9	0.2	20.2	--	--	--	8.1	--	--

Planting Date: May 28
Harvest Date: August 27
Previous crop: Fallow; Soil test results: 86lbs N and 14ppm P - applied 130lbs Urea and 25lbs DAP per acre; Applied 1.25pt Bronate per acre on June 17.
Returns were calculated by multiplying the 1996 yields by the price paid for feed barley minus the test weight discount paid at the Southwest Grain Terminal located at Gladstone on October 4.

Oat - Green Fallow Dickinson

Variety	Days to Head	Plant Height in	Lodging Score 0-9	Seeds lbs	Test Weight lbs/bu
AC Belmont	68	30	0.0	18,694	38.3
Bay	68	28	0.0	16,865	31.8
Brawn	66	30	0.0	11,926	33.4
Calibre	69	26	1.3	13,648	38.4
Derby	70	29	0.5	12,133	38.9
Dumont	68	31	1.0	14,698	36.1
Hytest	65	32	0.5	13,957	39.8
Jerry	64	31	0.0	15,152	37.3
Jim	63	28	0.0	14,561	36.0
Milton	67	29	0.0	16,259	36.4
Monida	69	26	0.3	17,653	35.3
Newdak	63	30	0.3	17,741	33.8
Otana	68	28	0.8	16,129	37.3
Paul	70	26	0.5	18,439	43.0
Porter	67	29	1.3	15,601	36.6
Prairie	65	27	0.3	16,904	31.5
Riel	66	30	0.0	15,097	35.6
Robert	69	28	0.0	12,070	35.1

Troy	68	30	0.5	16,283	37.3
Valley	66	30	0.0	16,945	36.8
Whitestone	68	32	0.0	16,254	34.9
Mean	67	29	0.3	15,572	36.3
C.V. %	1.7	11	143.1	7.5	2.6
LSD .05	1.6	5	0.7	1,656.5	1.3

Planting Date: April 24
Harvest Date: August 7
Lodging: 0=No lodging, 9=Completely flat
Previous crop: Sweet clover (plow down); Soil test results 54lbs N and 18ppm P - Applied 210lbs Urea per acre; Applied .33oz Harmony Extra+.75pt MCPA ester per acre on June 3.

Oat - Green Fallow Dickinson

Variety	Returns $/ac	Grain Yield			Average Yield	
		1994	1995	1996	2 year	3 year
		bu/ac				
AC Belmont	84.88	134.6	91.3	74.0	82.6	100.0
Bay	75.85	159.1	110.3	75.9	93.1	115.1
Brawn	84.09	143.5	100.6	84.1	92.3	109.4

Calibre	111.54	180.6	98.1	96.7	97.4	125.1
Derby	121.47	172.0	99.4	101.2	100.3	124.2
Dumont	78.35	163.7	80.0	73.9	76.9	105.9
Hytest	95.72	117.0	73.0	79.8	76.4	89.9
Jerry	94.41	139.4	95.4	85.3	90.4	106.7
Jim	93.94	--	71.7	91.3	81.5	--
Milton	72.36	138.9	82.3	70.1	76.2	97.1
Monida	87.63	174.5	105.9	87.6	96.8	122.7
Newdak	81.77	155.4	93.0	81.8	87.4	110.1
Otana	95.46	170.6	95.0	84.7	89.8	116.8
Paul	77.64	107.7	92.0	64.7	78.4	88.1
Porter	98.81	157.8	103.8	91.0	97.4	117.5
Prairie	93.27	157.0	100.1	93.3	96.7	116.8
Riel	59.90	154.1	79.9	59.9	69.9	98.0
Robert	86.03	148.0	95.3	86.0	90.7	109.8
Troy	100.99	139.8	100.2	90.0	95.1	110.0
Valley	74.07	143.5	91.3	70.2	80.7	101.7
Whitestone	96.24	154.0	107.1	96.2	101.7	119.1
Mean	88.78	--	--	82.7	--	--

C.V. %	16.1	--	--	14.3	--	--
LSD .05	20.23	--	--	16.7	--	--

Returns were calculated by multiplying the 1996 yield by the price paid for feed oats minus the test weight discount paid at the Southwest Grain Terminal located at Gladstone on October 4.

Oat - Fallow Glen Ullin

Variety	Seeds lbs	Test Weight lbs/bu	Returns $/acre	% of Jerry	Grain Yield			Average Yield	
					1994	1995	1996	2 year	3 year
					----------bu/ac----------				
Bay	15,519	34	117.71	103	--	--	117.7	--	--
Jerry	15,504	40	136.77	100	107.6	103.7	114.0	108.9	108.4
Jim	14,061	39	122.64	90	--	--	102.2	--	--
Paul	20,112	40	97.60	71	77.4	83.2	81.3	82.3	80.6
Troy	17,441	39	136.54	100	--	--	113.8	--	--
Whitestone	16,268	36	134.49	115	99.2	132.2	130.8	131.5	120.7
Mean	16,484	38	124.29	--	--	--	110.0	--	--
C.V. %	7.4	3	5.8	--	--	--	4.8	--	--
LSD .05	1,838	2	10.8	--	--	--	7.9	--	--

Planting Date: May 28
Harvest Date: August 27
Previous crop: Fallow; Soil test results: 86lbs N and 14ppm P - applied 130lbs Urea and 25lbs DAP per acre; Applied 1.25pt Bronate per acre on June 17.
Returns were calculated by multiplying the 1996 yield by the price paid for feed oats minus the test weight discount paid at the Southwest Grain Terminal located at Gladstone on October 4.

LITERATURE CITED

Beard, L.W., and W.G. Hamlin. 1996. North Dakota agricultural statistics. Bull. No. 65. North Dak. State Univ. Agric. Expt. Stat. and U.S. Dept. Agric. Ag. Stat. Fed. Bldg., Fargo, ND.

Cox, D.J., B.L. D'Appolonia, and J.D. Miller. 1988. Registration of 'Seward' wheat. Crop Sci. 28:378-379.

Fowler, D.B. 1982. Date of seeding, fall growth, and winter survival of winter wheat and rye. Agron. J. 74:1060-1063.

Frohberg, R.C. 1991. Economic impact of plant breeding programs. p. 3-4. *In* G. Moran (ed.) North Dakota Farm Res. Bimonthly Bull. Vol. 48(4). Fargo, ND.

Hays, W.M. 1893a. p. 72. *In* Grain and forage crops. North Dak. Agric. Expt. Stat. Bull. No. 10.

Hays, W.M. 1893b. p. 32. *In* Grain and forage crops. North Dak. Agric. Expt. Stat. Bull. No. 11.

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