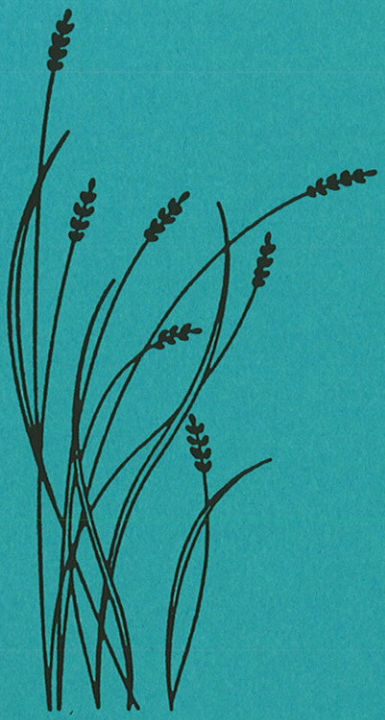
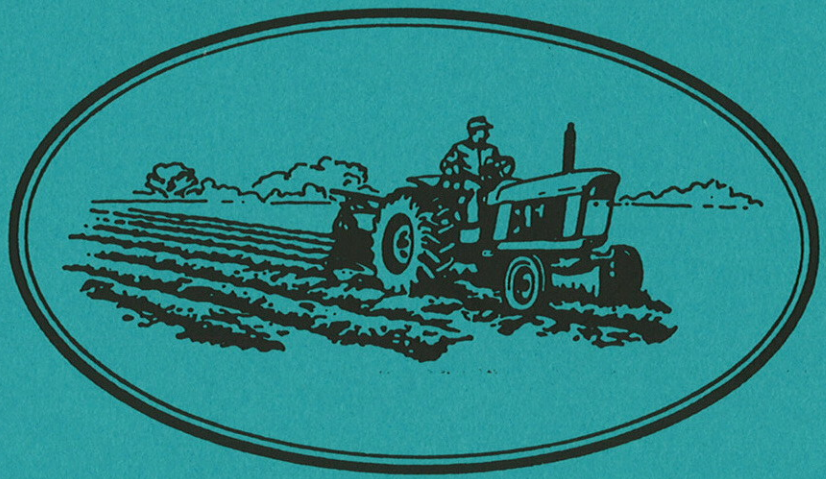


ELEVENTH
ANNUAL

WESTERN DAKOTA

CROPS DAY RESEARCH REPORT



HETTINGER ARMORY
DECEMBER 15, 1994

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This publication will be made available in alternative formats upon request. Contact Hettinger Research Extension Center, 701-567-4323.

11th ANNUAL WESTERN DAKOTA CROPS DAY
DECEMBER 15, 1994
HETTINGER ARMORY

MST

9:00 am Registration
Coffee and doughnuts. Free time to view exhibits and visit with Ag Industry Program Sponsors.

10:30 Welcome

10:45 Crop Variety Updates and Highlights of Ongoing Crop Production Research
Pat Carr, Agronomist, Dickinson Research Extension Center

Glenn Martin, Research Specialist II, Dickinson Research Extension Center

Eric Eriksmoen, Agronomist, Hettinger Research Extension Center

12:00 Lunch
Provided by Program Sponsors. Free time to visit with sponsors.

1:00 Ag Industry Update
What's New for Ally and Express
Mr. Scott Kolbeck, DuPont, Glendive, MT.

Proseed Hybrid Sunflowers - Ton Flowers
Mr. Keith Peltier, Proseed, Harvey, ND.

Products and Formulations from Rhone-Poulenc
Mr. Ivan Williams, Rhone-Poulenc, Mandan, ND.

1:30 Performance of New Varieties of Cool Season Grasses
Mr. Russell Haas, Plant Materials Specialist, USDA Plant Materials Center, Bismarck, ND.

2:00 Diversity, Intensity & Profitability - Crop Rotations in Conservation Tillage
Dr. Dwayne Beck, Director, Dakota Lakes Research Farm, Pierre, SD.

2:30 Panel Discussion: Conservation Tillage
Moderator: Dan Duerre, Golden Valley Ext. Agent
Dwayne Beck, Pierre, SD.
Dale and Kaye Schoeder, Reeder, ND.
Mike Zook, Beach, ND.
Bob Ekre, Beach, ND.
Steve Szudera, Beach, ND.

3:15 Conclusion
Drawing for door prizes, coffee and opportunity to visit with sponsors.

ACKNOWLEDGEMENTS

The Hettinger Research Extension Center and Dickinson Research Extension Center gratefully acknowledge and thank the following companies and organizations for their financial support and participation in this year's Western Dakota Crops Day. Those listed below have provided for the noon meal and have sponsored the event in total. We thank them for their commitment and support.

1994 WESTERN DAKOTA CROPS DAY SPONSORS

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We also acknowledge and thank the following individuals for their willingness to cooperate with us at our off-station plot sites. Their participation has enabled us to gather valuable information which would not otherwise be possible.

Darly Birdsall, New Leipzig
Neil and Monte Freitag, Scranton
August and Perry Kirschmann, Regent
Dale and Calvin Hepper, Selfridge
Daryl Anderson, Reeder
Amos Gietzen, Glen Ullin
Ted Reich, Beulah
Pat Doll, Hannover
Golden Valley SCD, Beach

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Special Report

GROWING CONDITIONS
HETTINGER RESEARCH EXTENSION CENTER
-1994-

Soil moisture conditions were dry going into the Fall of 1993 following a bumper crop and little precipitation from August through freeze up. HRWW stands were generally poor and uneven going into winter. Relatively heavy snow cover throughout the winter kept the frost line high in the soil profile.

Fertility levels were determined to a 4 foot depth at all research sites prior to seeding. Adequate fertilizer was applied according to yield goals set for each crop.

The planting season started during the first part of April but was abruptly delayed by snow and wet field conditions until late April.

Warm daytime temperatures and cool night time temperatures during May rapidly advanced crop growth. Early planted small grain crops started to show some moisture stress during the last week of May. Above normal amounts of rainfall during early July enhanced the small grain crop during grain filling and just prior to crop maturity. Total growing season precipitation was 12.42 inches, 3.42 inches below normal.

One to 2 inch hail along with 60 mph wind destroyed crops, including Hettinger research plots, in a narrow band from Hettinger to the Missouri river south of Bismarck.

Foliar diseases (tan spot and septoria leaf blotch) were prevalent with moderate to severe infestations in some fields. Warm and dry weather conditions during the last half of July through small grain harvest generally kept these diseases from advancing further.

Weather conditions were generally favorable for warm season crop (corn and sunflower) growth. Average monthly temperatures were generally normal except for July, below normal, and September, above normal. Precipitation, although not abundant, was timely. Moisture stress was not observed on corn or sunflower trials. A major contributing factor in this year's warm season crop growth was the number of frost free days which extended the Fall growing season well into October.

Insects generally were not a problem in small grain crops. Grasshopper populations started to increase in late July and reached epidemic proportions in some areas by August. HRWW planting was delayed into mid to late October to avoid potential stand loses. Corn borer damage was evident in some areas.

In summary, this was one of those very rare years in which both warm season and cool season crops performed well.

WEATHER DATA SUMMARY
HETTINGER

Precipitation (inches)	1991-92	1992-93	1993-94	39 year average
Sept. - Dec.	4.60	2.26	2.23	3.06
Jan. - March	1.63	1.50	2.03	1.25
April - June	7.95	7.03	4.16	7.80
July - August	6.06	5.60	4.00	3.73
Total	20.24	16.39	12.42	15.84

Average Temperature F	1991	1992	1993	1994	39 year average
April	45.2	42.7	42.1	42.7	42.8
May	55.2	57.4	54.5	56.5	54.4
June	66.0	62.5	59.2	63.8	63.8
July	70.0	61.4	62.3	67.1	70.0
August	72.0	62.7	64.2	68.1	68.5
September	58.6	56.6	52.0	60.4	57.0

Growing Degree Units (50-86)	1992	1993	1994	31 year average
May	323	255	321	338
June	391	309	414	425
July	375	375	484	496
August	429	452	519	531
September	338	245	377	390
Total	1856	1636	2115	2180

	28 F	32 F	Normal 32 F
Date of last frost	May 2	May 15	May 18
Date of first frost	Oct 9	Oct 9	Sept. 20
Frost free days	160	147	125

Dickinson Research Extension Center

Growing Conditions 1991-94

Precipitation between September through December of 1993 was 1.13 inches below average, creating poor conditions for the establishment of winter grains. However, fallowed fields were completely recharged from precipitation received during 1993. Precipitation received between January and March was less than the 100 year average but provided sufficient soil moisture for excellent establishment of most crops sown at the Dickinson Research Extension Center (DREC) in the spring of 1994.

Temperatures were nearly average from April to June. Precipitation for this time period was above average, with 72% of the total received during June. This provided very good growing conditions for development of small grain crops. July through August precipitation was 3.38 inches below the 100 year average of 5.12 inches and temperatures during this time period were also below average, thereby providing for a relatively good harvest at the DREC.

The below normal temperatures during July and August slowed the development of corn. This slow development was offset by the lack of a killing frost until very late in the season, thus allowing the corn to reach maturity and be harvested for grain.

1991-93 Weather Data Summary

Average Precipitation (inches)

	1991-92	1992-93	1993-94	100-year Average
Sept. - Dec.	3.65	2.34	1.80	3.16
Jan. - March	1.52	1.13	1.26	1.55
Apr. - June	7.29	7.88	8.06	5.23
July - Aug.	3.88	5.46	1.74	5.12
Total	15.52	16.81	12.86	15.88

Average Temperature (°F)

April	40	41	42	41
May	55	54	56	54
June	61	57	62	61
July	61	62	64	69
August	62	64	66	67

INTERPRETING STATISTICAL ANALYSIS

Field research involves the testing of one or more variables such as crop varieties, fertilizers, tillage methods, etc. Field testing of such variables are conducted in order to determine which variety, tillage method, or fertilizer etc. is best for the particular area of production. The main objectives of crop production research are to determine the best means of producing the crop and how to maximize yield and economic return from farming.

Agricultural researchers use statistics as a tool in helping to differentiate the production variables in question so that real and meaningful conclusions can be drawn from a relatively large amount of data. One of these tools is the Coefficient of Variability (C.V.%). This statistic gives an indication of the amount of variation in an experimental trial. Trials conducted at Dickinson use four replications or repetitions of the variable in question. For example, the variety Amidon HRSW appeared four times (four replications) in the HRSW variety trial. In this case, the C.V.% for yield of the Dickinson HRSW variety trial on fallow was 14.6%. This C.V.% is a relative measure of how much the yield of all HRSW varieties varied between replications. In other words, C.V.% is a measure of the precision or effectiveness of the trial and procedures used in conducting the trial.

More can be said about a field trial with a relatively low C.V.% (15 or less) than one with a C.V.% of over 15. Attempts are made to control human error and some environmental conditions such as conducting field studies on a uniform soil so variability between replicates is minimized with a resulting low value for C.V.% (15 or less). In summation, a trial with a C.V.% of 8 is more precise and more can be concluded from it than a trial with a C.V.% of 18.

Another important statistical tool is the Least Significant Difference or LSD. If the yield of variety A exceeds variety B by more than the LSD 5% value you can conclude that under like environmental conditions, variety A will significantly out-yield variety B 95% of the time. The LSD value allows you to separate varieties, tillage practices, or any other variable and determine whether or not they are actually different. The LSD 1% value is always larger than the value for LSD 5% and is used in the same manner. If the yield of variety A exceeds variety B by more than the LSD 1% value you can conclude that under like environmental conditions, variety A will significantly out-yield variety B 99% of the time. Little confidence can be placed in variety or treatment differences unless the results differ by more than the LSD value.

Hard Red Spring Wheat
Variety Descriptions

Variety	Agent or Origin[1]	Year Releases	Beard	Height	Strength of Straw	Maturity	Reaction to disease		Quality factors			Comments
							Stem Rust[2]	Leaf Rust[2]	Test Wt.	Wheat Protein	Quality Rating[3]	
Grandin	ND	1989	yes	s.dwf.	strg.	early	R	R	high	avg.	4.0	
Gus	ND	1989	yes	s.dwf.	strg.	m.early	R	R	high	high	4.0	
Amidon	ND	1988	yes	med.	med.	med.	R	R	high	avg.	4.0	Tol. to common root rot
Len	ND	1979	yes	s.dwf.	v.strg.	m.early	R	R	high	avg.	4.0	
Coteau	ND	1978	yes	med.	m.strg.	med.	R	R	avg.	high	4.0	Some res. to tan spot*
Waldron	ND	1969	no	med.	strg.	m.early	R[4,5]	MS	avg.	high	4.0	Ergot susceptible
Kulm	ND	1994	yes	med.	strg.	early	R	R	high	high	3.0	
Butte 86	ND	1986	yes	med.	m.strg.	early	R[5]	R	high	avg.	3.0	False bl. chaff
Cutless	ND	1986	yes	s.dwf.	med.	m.early	R	R	high	avg.	3.0	Res. sawfly
Stoa	ND	1984	yes	med.	m.strg.	m.early	R	R	high	avg.	3.0	
Alex	ND	1981	no	med.	med.	med.	MR[7]	R	high	avg.	3.0	Sensitive to Fargo herb.
Minnpro	MN	1989	yes	s.dwf.	strg.	m.early	R	MR	low	high	3.0	
Katepwa	Can.	1984	no	med.	med.	m.early	R[7]	MS	avg.	high	3.0	
Columbus	Can.	1981	no	med.	m.strg.	m.late	R[7]	MR	high	high	3.0	Pre-harvest seed dormancy
2371	NDSURF	1991	yes	s.dwf.	v.strg.	m.early	R[5]	R	high	avg.	3.0	
Lew	Mont.	1976	no	med.	med.	med.	R[6]	MS	high	low	2.5	Res.sawfly
2375	NDSURF	1990	yes	s.dwf.	med.	m.early	R	R	high	avg.	2.5	
2370	NDSURF	1990	yes	s.dwf.	v.strg.	m.early	R[6]	R	high	avg.	2.5	
Norm	MN	1992	yes	s.dwf.	v.strg.	med.	R	R	high	low	2.0	
Vance	MN	1989	yes	s.dwf.	strg.	med.	R	R	high	low	2.0	
Sharp	SD	1990	yes	med.	med.	early	R	R	v.high	avg.	2.0	
Prospect	SD	1988	yes	s.dwf.	v.strg.	m.early	R[6]	MR	high	avg.	2.0	
Shield	SD	1987	yes	med.	med.	early	R[7]	R	high	low	2.0	Susc. to shatter
Hi-Line	Mont.	1991	yes	s.dwf.	v.strg.	m.early	R[6]	MR	avg.	low	2.0	
CDC-Teal	CDC	1991	no	med.	med.	m.early	R	MR	high	avg.	N/A	
AC Minto	Can.	1991	no	med.	med.	med.	R[6]	MR	low	avg.	N/A	Pre-harvest seed dormancy
Pasqua	Can.	1990	yes	med.	med.	v.late	R[5]	R	high	high	3.0	Pre-harvest seed dormancy
Sonja	AgrPro	1992	yes	s.dwf.	v.strg.	m.early	R	MR	high	avg.	N/A	
Krona	AgrPro	1991	yes	s.dwf.	v.strg.	m.late	R	R	high	low	2.0	
Dalen	AgrPro	1991	yes	s.dwf.	v.strg.	early	R[5]	R	high	avg.	2.0	
Bergen	AgrPro	1990	yes	s.dwf.	v.strg.	m.early	R[6]	R	high	avg.	2.0	Some tol. to leaf spot
Nordic	AgrPro	1986	yes	s.dwf.	strg.	m.late	R	MR	high	low	2.0	Low protein
Express	WPB	1990	yes	s.dwf.	v.strg.	m.early	R	MR	low	avg.	N/A	
Rambo	WPB	1987	yes	s.dwf.	v.strg.	m.early	R[7]	R	high	avg.	2.0	Res. sawfly
Glenman	Mont.	1984	no	s.dwf.	strg.	med.	R[4,7]	MS	avg.	low	1.0	Res. sawfly

[1] Refers to agent or developer; AgrPro = AgriPro; NDSURF = North Dakota State University Research Foundation; WPB = Western Plant Breeder; CDC = Crop Development Center, University of Saskatchewan; Can. = Agriculture Canada.

[2] R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; [4] = occasionally mixed with some susceptible plant; [5] = MR, [6] = M, [7] = S or MS in artificial induced epidemics;

1.0 = Very poor quality; 2.0 = Poor quality; 2.5 = Poor to average quality; 3.0 = Average quality; 3.5 = Average to good quality; 4.0 = Good quality; N/A = Quality data not available; Quality assessed by the Department of Cereal Science, NDSU.

* During prolonged wet periods, all varieties are susceptible to tan spot.

Durum
Variety Description

Variety	Origin	Year Released	Chaff color	Height	Straw strength	Maturity	Reaction to Disease: Stem rust[1]	Reaction to Disease: Leaf rust[1]	Test wt.	Kernel size[3]	Overall[2] quality	Remarks
Renville	ND	1988	white	tall	med.	med.	R	R	high	med.	4	
Monroe	ND	1985	white	tall	strg.	early	R	R	avg.	large	4	Early
Vic	ND	1979	white	tall	med.	m.early	R	R	high	large	4	Tol. to root rot
Medora	Can.	1983	white	tall	strg.	m.early	R	R	high	large	4	
Arcola	Can.	1984	white	tall	weak	med.	R	MR	avg.	large	4	Drought tol.
Kyle	Can.	1984	white	tall	weak	med.	R	MR	avg.	large	4	Weak straw
Sceptre	Can.	1985	white	med.	strg.	m.early	R	MS	avg.	large	4	
Fjord	AgrPro	1986	white	tall	strg.	m.early	R	R	high	large	4	
Regold	WPB	1989	white	tall	weak	med.	R	R	avg.	large	4	
Plenty	Can.	1990	white	v.tall	weak	late	R	R	avg.	large	4	Tol. to root rot
Laker	WPB	1985	white	s.dwf.	strg.	med.	R	MR	avg.	med.	3	
Stockholm	AgrPro	1986	white	s.dwf.	v.strg.	med.	R	MR	avg.	med.	3	
Lloyd	ND	1983	white	s.dwf.	v.strg.	med.	R	MR	avg.	med.	3	Tol. to root rot, susc. septoria
Voss	AgrPro	1994	white	s.dwf.	v.strg.	med.	R	MR	avg.	med.	3	
Ward	ND	1972	tan	tall	v.strg.	m.early	R	R	avg.	med.	2	
Rugby	ND	1973	tan	tall	v.strg.	m.early	R	R	avg.	med.	2	
Cando	ND	1975	tan	s.dwf.	v.strg.	med.	R	MR	avg.	small	2	Shatter res., susc. septoria

[1] R = resistant; MR = moderately resistant (slow rusters); MS = moderately susceptible.

[2] 1. Very poor quality; 2. Poor quality; 3. Average quality; 4. Good quality.
Quality assessed by the Department of Cereal Science, NDSU.

[3] No. seeds/lb. Large = less than 11,000; medium = 11,000-12,000; small = more than 12,000.

Dryland Hard Red Spring Wheat Variety Trial - Fallow Dickinson, ND, 1994

Variety	Protein	Test Weight	Returns[1]	Yield				% of Grandin
				1994	1993	1992	Avg	
	%	lbs/bu	$/ac	bu/ac				
2370	15.1	61.7	183.44	44.2	42.1	52.0	46.1	88
2371	16.3	60.6	185.99	42.3	42.6	73.0	52.6	100
2375	14.7	61.2	178.02	44.1	45.1	54.0	47.7	91
AC Domain	15.7	61.5	----	39.4	35.7	----	----	----
AC Eatonia	15.5	61.5	----	39.1	----	----	----	----
Amidon	15.0	61.0	164.35	40.0	47.4	69.0	52.1	99
BW152	15.7	60.1	----	38.4	----	----	----	----
BW661	15.8	60.5	----	40.4	----	----	----	----
Bergen	14.6	60.6	193.94	49.2	54.6	82.0	61.9	118
Butte 86	15.0	61.9	179.07	43.5	41.1	56.0	46.9	90
CDC Merlin	15.5	60.0	----	42.2	----	----	----	----
CDC Teal	15.9	60.2	----	38.2	42.1	47.0	42.4	81
Dalen	14.7	62.6	174.15	43.8	51.2	70.0	55.0	105
Express	14.7	60.4	----	39.3	----	66.0	----	----
Grandin	15.1	61.4	173.72	42.3	46.8	68.0	52.4	100
Gus	15.3	61.0	188.22	44.7	49.5	79.0	57.7	110
Invader	15.7	59.9	----	38.8	----	----	----	----
Krona	13.6	59.6	164.34	45.2	----	----	----	----
Kulm	15.1	63.0	195.66	47.3	----	----	----	----
Len	15.2	60.0	175.78	42.1	37.8	57.0	45.6	87
McNeal	14.2	59.6	182.43	47.4	55.1	87.0	63.2	121
Hamer	14.8	61.7	211.65	52.3	----	----	----	----
Lars	14.5	60.1	193.59	49.3	----	----	----	----
Norlander	15.0	62.2	166.95	40.9	----	----	----	----
ND 673	14.6	61.1	177.37	44.4	47.8	60.0	50.7	97
ND 674	15.9	61.9	189.87	44.1	49.5	56.0	49.9	95
ND 677	14.6	61.9	180.82	45.3	50.8	60.0	52.0	99
ND 678	15.0	62.9	----	51.8	----	----	----	----
ND 686	14.5	62.1	----	40.0	51.4	----	----	----
ND 687	14.2	63.6	----	43.7	41.1	----	----	----
Norm	14.9	61.4	----	49.3	----	----	----	----
Penewawa	13.1	60.0	----	43.2	46.7	----	----	----
Prospect	13.8	61.7	----	51.1	----	----	----	----
SBE0437	14.3	60.5	----	49.6	----	----	----	----
SD8073	14.9	61.4	----	41.8	----	----	----	----
Sharp	14.9	63.6	----	44.3	----	----	----	----
Sonja	14.6	60.7	----	44.6	56.8	----	----	----
Stoa	15.0	60.6	185.98	45.3	46.6	56.0	49.3	94
Vance	15.2	61.5	181.97	43.6	51.5	80.0	58.4	111
XW398A4	14.7	60.6	204.58	50.7	54.3	91.0	65.3	125
Mean	14.9	61.2		44.2				
CV(%)	3.0	1.2		14.6				
LSD.05	0.6	1.0		NS				

[1]Calculated by multiplying the 1994 yield by protein discount/premium paid at Minneapolis on November 23, as follows: $3.82/bu at 14% protein, discounted $0.11 per quarter percent down to 13% protein, and $0.03 per quarter percent below 13%; an additional $0.08 paid per bushel for each quarter percent above 14% protein to 14.75% protein, an additional $0 .11 per bushel to 15% protein, and $0.05 per bushel for each quarter percent above 15% protein.

Dryland Hard Red Spring Wheat Variety Trial - Fallow Dickinson, ND, 1994

Variety	Type	Days to heading	Flag leaf spotting	Height	Seeds
			%	inches	lb
2370	Semidwarf	48.2	70.8	29.0	15,622
2371	Semidwarf	54.7	14.0	32.7	15,126
2375	Semidwarf	47.7	63.9	30.5	13,556
AC Domain	Conventional	49.2	71.1	30.2	15.078
AC Eatonia	Conventional	50.5	67.8	31.7	15.723
Amidon	Conventional	52.0	37.4	31.7	15.360
BW152	Conventional	53.0	----	33.5	16,441
BW661	Conventional	53.5	----	33.2	15,152
Bergen	Semidwarf	49.0	53.3	27.5	14,104
Butte 86	Conventional	46.7	62.5	32.0	13,615
CDC Merlin	Conventional	51.7	32.5	34.0	15,331
CDC Teal	Conventional	50.5	31.6	32.2	15,313
Dalen	Semidwarf	50.2	55.0	27.0	14,124
Express	Semidwarf	50.0	37.5	24.0	15,027
Grandin	Semidwarf	49.5	50.3	29.2	14,474
Gus	Semidwarf	51.5	33.0	32.7	14,652
Invader	Conventional	55.2	----	33.5	15,076
Krona	Semidwarf	51.7	40.3	26.5	15,406
Kulm	Conventional	46.0	51.4	33.2	14,343
Len	Semidwarf	53.0	40.3	28.7	15,066
McNeal	Semidwarf	53.0	52.8	28.7	14,366
Hamer	Semidwarf	49.0	48.6	28.2	14,121
Lars	Semidwarf	50.2	41.0	25.2	15,685
Norlander	Semidwarf	46.7	53.7	26.5	16,155
ND 673	Conventional	50.0	71.1	33.2	14,818
ND 674	Semidwarf	50.2	40.8	30.2	15,137
ND 677	Conventional	50.5	41.7	33.7	14,950
ND 678	Conventional	50.5	35.7	34.2	15,311
ND 686	Semidwarf	48.5	70.8	29.0	15,485
ND 687	Semidwarf	45.0	71.2	27.7	12,793
Norm	Semidwarf	49.7	28.9	27.5	13,931
Penewawa	Semidwarf	50.2	95.5	26.7	14,938
Prospect	Semidwarf	50.0	----	29.5	14,279
SBE0437	Semidwarf	51.2	28.3	28.7	15,376
SD8073	Conventional	49.0	65.0	31.7	15,291
Sharp	Conventional	46.0	61.7	32.2	13,125
Sonja	Semidwarf	49.5	45.2	26.5	10,904
Stoa	Conventional	50.0	36.2	31.7	16,456
Vance	Semidwarf	49.5	39.8	29.7	14,484
XW398A4	Semidwarf	52.5	70.3	29.2	13,825
Mean		50.1	50.3	30.1	14,750
CV(%)		2.0	29.1	6.2	8.8
LSD .05		1.1	23.8	2.6	1181.2

Previous crop: Fallow; Soil test results: 79 lbs N, 20 ppm P_2O_5 - applied 150 lbs urea; Planted on April 21 at 1,000,000 Pure Live Seed/acre at 1.5 inch depth; Applied 2 pt Hoelon plus 1 pt Buctril on May 26; Harvested on August 16. Yield and quality data reported as is except for protein, which is reported on a 12% moisture basis.

Dryland Durum Variety Trial - Fallow — Dickinson, ND, 1994

Variety	Type[1]	Days to Heading	Height	Test weight	Yield 1994	Yield 1993	Yield 1992	Yield Avg	% of Renville
			inches	lbs/bu	bu/ac				
D8460	Med	49.7	26.5	60.0	35.1	----	----	----	----
Voss	Conv	53.5	25.0	60.7	39.8	----	----	----	----
D87130	Med	51.0	29.0	61.9	35.7	----	----	----	----
D87240	Conv	52.5	30.7	59.0	33.6	----	----	----	----
D87450	SD	48.2	24.5	59.9	35.4	----	----	----	----
D88273	Med	50.0	26.5	61.2	34.5	----	----	----	----
D88303	SD	53.5	26.2	60.7	42.5	----	----	----	----
D88450	SD	52.0	25.2	61.6	40.0	----	----	----	----
D89-476	Conv	50.7	28.7	60.6	32.3	----	----	----	----
D89111	Med	52.0	27.2	60.2	34.3	----	----	----	----
D89135	Med	51.0	27.2	60.7	33.5	----	----	----	----
D89172	Med	50.5	26.7	61.7	41.4	----	----	----	----
D89331	Conv	53.2	29.2	61.0	31.2	----	----	----	----
D89424	SD	52.7	26.0	60.7	42.0	----	----	----	----
Laker	SD	54.2	28.5	61.6	40.7	48.8	51.0	46.8	108
Lloyd	SD	51.0	24.0	59.6	38.1	45.7	47.0	43.6	101
Medora	Conv	54.0	28.5	61.9	38.7	40.5	44.0	41.1	95
Monroe	Conv	45.5	28.5	61.1	33.3	41.9	49.0	41.4	96
Plenty	Conv	52.5	32.5	59.6	35.7	51.8	50.0	45.8	106
Regold	Conv	50.7	29.7	61.4	33.4	48.9	----	----	----
Renville	Conv	52.0	32.0	60.2	38.0	44.9	47.0	43.3	100
Rugby	Conv	52.5	32.0	61.5	41.1	54.6	43.0	46.2	107
Sceptre	Med	50.5	29.0	60.4	39.3	52.1	45.0	45.5	105
Vic	Conv	52.7	30.0	61.4	37.8	48.1	43.0	43.0	99
Ward	Conv	51.2	31.0	61.2	42.6	52.0	44.0	46.2	107
Mean		51.2	28.0	60.1	37.7				
C.V.(%)		4.5	6.2	1.5	19.5				
LSD 0.05		2.6	0.9	1.3	NS				

[1]SD = semidwarf, Med = medium height, Conv = Conventional height

Previous crop: Fallow; Soil test results: 79 lbs N, 20 ppm P_2O_5 - applied 150 lbs urea; Planted on April 21 at 1,000,000 Pure Live Seed/acre at 1.5 inch depth; Applied 2 pt Hoelon plus 1 pt Buctril on May 26; ; Harvested on August 16.

Dryland Hard Red Spring Wheat Variety Trial - No-till Fallow — Beach, ND, 1994

Variety	Seeds	Test weight	Protein	Yield				% of Grandin
				1994	1993	1992	Avg	
	lbs	lbs/bu	%	bu/ac				
2375	14,400	61.2	15.5	43.3	53.8	66.0	54.4	114
Amidon	16,028	60.2	16.0	38.3	51.7	61.0	50.3	106
Bergen	16,316	58.9	15.6	37.1	54.8	64.0	52.0	109
Butte 86	15,070	61.2	15.8	40.6	48.1	60.0	49.6	104
Grandin	14,823	59.9	16.4	36.5	43.3	63.0	47.6	100
Gus	13,829	60.6	16.1	37.6	52.9	59.0	49.8	105
HiLine	16,494	59.5	16.0	40.0	----	----	----	----
Kulm	15,972	62.1	15.7	45.4	----	----	----	----
McNeal	15,916	57.9	15.9	37.4	58.8	----	----	----
Stoa	16,989	60.0	15.6	42.8	42.0	62.0	48.9	103
XW398A4	14,264	60.0	16.0	47.6	68.8	----	----	----
Mean	15,429	60.1	15.9	40.6				
CV(%)	9.92	1.6	2.7	10.7				
LSD .05	NS	1.40	NS	6.3				

Dryland Durum Variety Trial - No-till Fallow — Beach, ND, 1994

Variety	Seeds	Test weight	Yield				% of Renville
			1994	1993	1992	Avg	
	lbs	lbs/bu	bu/ac				
Medora	14,506	59.6	33.3	30.3	60.0	41.20	88
Monroe	13,501	58.6	32.9	37.8	65.0	45.23	96
Renville	15,941	58.2	35.4	36.6	69.0	47.00	100
Vic	13,394	58.0	33.2	35.4	----		
Voss	15,088	57.9	37.4	----	----		
Mean	14,485	58.5	34.4				
CV(%)	5.7	1.9	10.8				
LSD .05	1268.9	NS	NS				

Previous crop: Chemical fallow; Soil test results: 53 lbs N, 8 ppm P_2O_5 - applied 144 lbs Anhydrous ammonia prior and 300 lbs 18-46-0 prio to seeding; Planted on May 10 at 1,000,000 Pure Live Seed/acre at 1.5 inch depth; Applied 1.5 pt Bronate on June 15; Harvested on August 19.

Dryland Hard Red Spring Wheat Variety Trial - Fallow — Beulah, ND, 1994

Variety	Seeds	Test weight	Protein	Yield				% of
				1994	19[illegible]	1991	Avg	Grandin
	lbs	lbs/bu	%	bu/ac				
2375	12,3[illegible]	62.4	15.8	59.9	87.0	27.8	58.2	106
Amidon	14,00[illegible]	61.7	16.0	60.2	100.0	20.9	60.4	111
Bergen	13,325	60.0	14.9	63.7	84.0	28.6	58.8	108
Butte 86	13,088	61.7	16.7	54.5	81.0	22.3	52.6	96
Grandin	12,814	61.9	16.6	56.5	84.0	23.4	54.6	100
Gus	13,938	60.9	16.8	58.6	82.0	23.4	54.7	100
Hi Line	14,111	61.9	15.2	61.2	----	----	----	----
Kulm	14,722	63.2	16.7	58.3	----	----	----	----
McNeal	13,803	57.9	15.7	56.0	----	----	----	----
Stoa	14,224	61.0	15.8	60.1	87.0	23.7	56.9	104
XW398A4	12,054	61.1	15.1	71.0	----	----	----	----
Mean	13,489	61.2	16.0	60.0				
CV(%)	2.8	1.9	1.7	6.7				
LSD(0.05)	543.3	1.7	0.4	5.8				

Dryland Durum Variety Trial - Fallow — Beulah, ND 1994

Variety	seeds	Test weight	Yield				% of
			1994	1992	1991	Avg	Renville
	lbs	lbs/bu	bu/ac				
Medora	10,979	57.5	59.9	73.0	27.2	53.4	92
Monroe	10,347	61.6	61.4	69.0	34.1	54.8	94
Renville	11,840	60.7	72.4	75.0	27.2	58.2	100
Vic	10,456	58.9	66.6	---	33.6	----	----
Voss	10,881	56.9	64.2	---	----	----	----
Mean	10,901	59.1	64.9				
CV(%)	3.6	2.2	9.1				
LSD .05	603.3	2.0	NS				

Previous crop: Fallow; Soil test results: 30 lbs N, 28 ppm P_2O_5 - applied 150 lbs urea; Planted on May 16 at 1,000,000 Pure Live Seed /acre at 1.5 inch depth; Applied 2.5 pt Hoelon plus 1.5 pt Buctril on June 20; Harvested HRSW on August 25 and durum on August 31.

Dryland Hard Red Spring Wheat Variety Trial - Fallow — Glen Ullin, ND, 1994

Variety	Seeds	Test weight	Protein	Yield				% of Grandin
				1994	1993	1992	Avg	
	lbs	lbs/bu	%	bu/ac				
2375	11,501	58.9	13.6	51.3	50.0	71.0	57.4	103
Amidon	11,759	58.6	13.9	49.4	48.5	76.0	58.0	104
Bergen	12,529	58.5	13.0	53.9	52.5	75.0	60.5	108
Butte 86	12,264	59.5	14.1	48.5	45.0	56.0	49.8	89
Grandin	11,619	59.2	14.4	46.5	47.9	73.0	55.8	100
Gus	12,368	58.4	14.4	46.0	45.0	68.0	53.0	95
Hi Line	12,471	58.6	13.7	48.0	----	----	----	----
Kulm	12,687	59.2	14.1	48.9	----	----	----	----
McNeal	12,329	58.2	13.6	48.2	53.6	----	----	----
Stoa	13,079	58.2	13.4	49.3	42.8	65.0	52.4	94
XW398A4	11,042	59.1	13.4	56.0	58.0	----	----	----
Mean	12,150	58.8	13.8	49.6				
CV(%)	6.5	1.4	2.2	4.9				
LSD .05	NS	1.7	NS	5.8				

Dryland Durum Variety Trial - Fallow — Glen Ullin, ND, 1994

Variety	Seeds	Test weight	Yield				% of Renville
			1994	1993	1992	Avg	
	lbs	lbs/bu	bu/ac				
Medora	12,330	59.7	38.1	30.3	62.0	43.5	83
Monroe	10,866	59.0	42.2	37.8	68.0	49.3	95
Renville	13,039	59.7	48.6	36.6	71.0	52.1	100
Vic	11,213	59.7	43.7	35.4	----	----	----
Voss	11,309	59.7	47.4	----	----	----	----
Mean	11,751	59.6	44.0				
CV(%)	7.1	0.7	6.4				
LSD 0.05	1294.1	NS	NS				

Previous crop: Fallow; Soil test results: 45 lbs N, 8 ppm P_2O_5 - applied 150 lbs urea; Planted on May 16 at 1,000,000 Pure Live Seed/acre at 1.5 inch depth; Applied 2.5 pt Hoelon plus 1.5 pt Buctril on June 20; Harvested HRSW on August 20.

Dryland Hard Red Spring Wheat Variety Trial - Recrop — Hannover, ND, 1994

Variety	Seeds	Test weight	Protein	Yield				% of Grandin
				1994	1993	1992	Avg	
	lbs	lbs/bu	%	bu/ac				
2375	12,737	61.0	15.8	39.6	37.8	65.0	47.5	106
Amidon	13,952	60.1	16.5	36.6	29.5	73.0	46.4	104
Bergen	13,756	60.1	15.3	39.5	29.3	68.0	45.6	102
Butte 86	12,880	61.1	16.2	40.4	33.2	58.0	43.9	98
Grandin	12,129	61.2	17.1	35.5	27.3	71.0	44.6	100
Gus	14,006	59.7	16.7	36.5	35.3	67.0	46.3	104
HiLine	14,529	60.0	15.7	42.3	----	----	----	----
Kulm	13,788	61.9	16.5	43.0	----	----	----	----
McNeal	13,661	58.5	15.4	40.9	34.4	----	----	----
Stoa	13,854	60.5	16.0	45.6	30.9	65.0	47.2	106
XW398A4	12,349	60.5	16.1	43.9	34.2	----	----	----
Mean	13,422	60.4	16.1	40.3				
CV(%)	3.5	0.7	3.0	12.0				
LSD .05	686.7	0.6	0.7	NS				

Dryland Durum Variety Trial - Recrop — Hannover, ND, 1994

Variety	Seeds	Test weight	Yield				% of Renville
			1994	1993	1992	Avg	
	lbs	lbs/bu	bu/ac				
Medora	12,272	61.1	31.1	17.1	55.0	34.4	86
Monroe	11,400	60.6	37.8	18.9	56.0	37.6	94
Renville	12,594	60.9	39.1	19.0	62.0	40.0	100
Vic	11,255	60.4	35.5	23.8	----	----	----
Voss	11,116	61.4	33.1	----	----	----	----
Mean	11,727	60.9	35.3				
CV(%)	4.1	0.8	12.2				
LSD .05	745.7	NS	NS				

Previous crop: Corn; Soil test results: 101 lbs N, 12 ppm P_2O_5 - applied 100 lbs urea; Planted on May 16 at 1,000,000 Pure Live Seed/acre at 1.5 inch depth; Applied 2.5 pt Hoelon plus 1.5 pt Buctril on June 20; Harvested on August 24.

1994 Scranton Hard Red Spring Wheat Variety Trial

Variety	Test weight	Grain protein	Plant height	Yield 1994	1993	1992	2yr	3yr
	lbs/bu	%	cm	bu/A				
Krona	60.2	13.2	60	55.9	82.4	53.0	69.2	63.8
Norm	61.2	14.1	60	49.2	76.5	49.0	62.8	58.2
2371	60.3	14.7	60	49.4	72.6	47.6	61.0	56.5
2375	61.7	13.6	65	50.6	78.2	38.7	64.4	55.8
Grandin	62.4	15.0	67	43.0	74.7	44.6	58.8	54.1
Kulm	62.7	15.9	64	37.3	77.8	44.0	57.6	53.0
XW398A4	62.0	14.5	67	57.4	86.2		71.8	
McNeal	60.1	14.9	70	46.6	80.2		63.4	
Sonja	60.6	14.9	60	44.4	77.6		61.0	
Dalen	62.9	14.9	60	47.7	71.6		59.6	
Gus	60.4	15.4	60	47.8				
ND677	61.4	15.5	75	45.5				
Trial mean	61.3	14.7	64	47.6	77.1	45.5		
C.V. %	0.5	3.5	--	10.6	5.1	13.3		
LSD 5%	0.5	0.7	--	7.4	5.6	9.4		
LSD 1%	0.7	1.0	--	10.0	7.6	13.3		

Planting date: April 22 Harvest date: August 12
Seeding rate: 1.1 million live seeds/A (approx. 1.6 bu/A)
Yield goal: 60 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPA ester

1994 Scranton Durum Variety Trial

Variety	Test weight	Plant height	Yield 1994	1993	1992	2yr	3yr
	lbs/bu	cm	bu/A				
Ward	62.7	74	52.8	65.1	51.4	59.0	56.4
Medora	62.7	78	56.8	55.2	52.7	56.0	54.9
Renville	61.1	69	53.7	59.8	50.3	56.8	54.6
Sceptre	61.1	70	50.5	60.7	50.0	55.6	53.7
Vic	62.4	78	48.5	55.9	46.3	52.2	50.2
Plenty	62.0	79	57.0	73.2		65.1	
Voss	62.1	60	49.9				
D87240	59.4	70	48.1				
Trial mean	61.7	72	52.2	61.7	50.2		
C.V. %	0.6	--	6.5	4.3	6.0		
LSD 5%	0.6	--	5.0	4.0	5.5		
LSD 1%	0.8	--	6.7	4.9	ns		

Planting date: April 22 Harvest date: August 12
Seeding rate: 1.25 million live seeds/A (approx. 1.9 bu/A)
Yield goal: 60 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPA ester

1994 Regent Hard Red Spring Wheat Variety Trial

Variety	Test weight	Grain protein	Plant height	Yield 1994	1993	1992	2yr	3yr
	lbs/bu	%	cm	bu/A				
Krona	58.7	14.3	62	48.7	72.0	76.8	60.4	65.8
Amidon	60.2	15.6	65	42.8	62.6	80.1	52.7	61.8
Norm	60.3	14.6	64	50.4	65.2	68.5	57.8	61.4
Grandin	60.7	15.4	63	42.2	62.2	64.7	52.2	56.4
2375	60.0	15.1	68	50.5	58.3	54.7	54.4	54.5
2371	58.5	15.3	63	49.0	58.4	50.9	53.7	52.8
Kulm	62.2	16.0	68	47.9	61.3	41.8	54.6	50.3
XW398A4	60.0	15.3	58	54.4	75.8		65.1	
McNeal	59.4	15.6	68	52.6	72.3		62.4	
Sonja	59.8	15.5	63	56.0	65.3		60.6	
Dalen	61.8	15.4	60	48.0	62.4		55.2	
Gus	59.7	16.4	60	49.9				
ND677	60.5	15.8	60	46.3				
Trial mean	60.1	15.4	63	49.1	64.2	61.5		
C.V. %	0.5	1.9	--	9.5	4.2	11.9		
LSD 5%	0.4	0.4	--	6.7	3.9	11.4		
LSD 1%	0.5	0.5	--	9.0	5.2	16.1		

Planting date: April 22 Harvest date: August 12
Seeding rate: 1.1 million live seeds/A (approx. 1.6 bu/A)
Yield goal: 60 bu/A
Herbicide application: 1.5 pt/A Buctril

1994 Regent Durum Variety Trial

Variety	Test weight	Plant height	Yield 1994	1993	1992	2yr	3yr
	lbs/bu	cm	bu/A				
Septre	59.2	67	55.1	62.8	80.3	59.0	66.1
Ward	60.4	80	56.5	63.5	76.2	60.0	65.4
Medora	60.0	84	59.7	55.5	80.0	57.6	65.1
Renville	59.2	78	57.4	62.1	75.8	59.8	65.1
Vic	60.9	80	57.9	60.0	77.2	59.0	65.0
Plenty	58.9	85	58.5	70.4		64.4	
D87240	57.0	79	58.1				
Voss	59.4	62	54.2				
Trial mean	59.4	77	57.1	62.4	75.7		
C.V. %	0.8	--	5.6	6.3	7.4		
LSD 5%	0.7	--	4.7	5.9	ns		
LSD 1%	1.0	--	ns	7.3	ns		

Planting date: April 22 Harvest date: August 12
Seeding rate: 1.25 million live seeds/A (approx. 1.9 bu/A)
Yield goal: 60 bu/A
Herbicide application: 1.5 pt/A Buctril

1994 New Leipzig Hard Red Spring Wheat Variety Trial

Variety	Test weight	Grain protein	Plant height	Yield 1994	1993	1991	2yr	3yr
	lbs/bu	%	cm	bu/A				
2375	59.5	15.0	62	36.8	63.1	55.3	50.0	51.7
Grandin	59.3	16.0	65	33.1	63.9	49.6	48.5	48.9
2371	57.6	16.0	60	35.3	61.3	49.9	48.3	48.8
Amidon	59.0	16.2	69	36.7	56.8	45.6	46.8	46.4
Krona	59.6	13.7	54	47.3	64.8		56.0	
McNeal	59.0	16.5	61	40.5	70.1		55.3	
XW398A4	59.9	15.9	62	43.5	65.4		54.4	
Dalen	60.7	15.3	51	39.4	68.8		54.1	
Sonja	58.4	15.4	59	39.6	67.5		53.6	
Kulm	60.8	16.1	67	36.9	66.0		51.4	
Norm	59.7	15.1	51	40.2	60.5		50.4	
Gus	58.9	16.4	62	35.8				
ND677	58.8	16.5	65	33.1				
Trial Mean	59.3	15.7	61	38.1	64.2	50.4		
C.V. %	0.6	2.0	--	6.7	6.2	6.7		
LSD 5%	0.6	0.5	--	4.3	5.8	5.7		
LSD 1%	0.8	0.7	--	5.8	7.7	ns		

Planting date: April 21 Harvest date: August 15
Seeding rate: 1.1 million live seeds/A (approx. 1.6 bu/A)
Yield goal: 60 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPA ester

1994 Selfridge Hard Red Spring Wheat Variety Trial

Variety	Test weight	Grain protein	Plant height	Yield 1994	1993	1992	2yr	3yr
	lbs/bu	%	cm	bu/A				
Norm	59.8	13.0	78	67.1	59.4	69.4	63.2	65.3
Krona	59.0	11.6	70	64.1	54.2	76.7	59.2	65.0
2375	59.9	12.9	82	59.2	52.6	63.2	55.9	58.3
2371	58.4	13.2	70	57.0	54.5	63.2	55.8	58.2
Kulm	61.0	13.5	95	56.3	55.6	53.2	56.0	55.0
Amidon	60.6	13.2	98	48.1	41.0	69.1	44.6	52.7
Grandin	59.0	13.8	73	44.6	46.6	62.7	45.6	51.3
XW398A4	60.2	12.6	79	64.4	63.2		63.8	
Sonja	58.8	13.2	68	64.7	62.6		63.6	
McNeal	60.3	12.8	81	56.9	49.4		53.2	
Dalen	60.0	13.4	73	46.5	51.4		49.0	
ND677	60.2	13.5	88	52.6				
Gus	59.0	14.1	87	50.0				
Trial mean	59.7	13.1	80	56.3	56.5	66.0		
C.V. %	0.8	5.2	--	7.1	8.5	9.8		
LSD 5%	0.7	1.0	--	5.7	6.5	10.1		
LSD 1%	0.9	1.3	--	7.6	8.7	14.2		

Planting date: April 21 Harvest date: August 15
Seeding rate: 1.1 million live seeds/A (approx. 1.6 bu/A)
Yield goal: 60 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPA ester

1994 Hettinger Off-Station HRSW Variety Trials
Combined Means - 4 Sites**

Variety	Test weight	Grain protein	Plant height	Yield 1994	1993*	1992*	2yr	3yr
	lbs/bu	%	cm	bu/A				
Krona	59.4	13.2	62	53.5	65.8	76.1	59.6	65.1
Norm	60.3	14.1	63	52.6	64.2	68.1	58.4	61.6
Amidon	60.2	14.9	76	42.9	58.2	70.7	50.6	57.3
2371	58.7	14.8	63	47.8	61.6	61.5	54.7	57.0
2375	60.3	14.1	69	49.4	61.5	58.8	55.4	56.6
Grandin	60.4	15.0	67	40.8	60.8	62.7	50.8	54.8
XW398A4	60.6	14.5	66	55.2	72.0		63.6	
Sonja	59.4	14.7	62	51.9	66.1		59.0	
McNeal	59.8	14.8	70	49.8	66.2		58.0	
Kulm	61.7	15.3	73	45.6	63.3		54.4	
Dalen	61.4	14.7	61	45.3	59.8		52.6	
Gus	59.5	15.5	67	46.1				
ND677	60.4	15.2	72	44.8				

* 6 sites - Hettinger fallow & recrop, Regent, Scranton, New Leipzig and Selfridge
** Regent, Scranton, New Leipzig and Selfridge.

1994 Hettinger Off-station Durum Variety Trials
Combined means - 5 sites**

Variety	Test weight	Plant Height	Yield 1994*	1993	1992	2yr	3yr
	lbs/bu	cm	bu/A				
Renville	60.2	74	55.6	54.7	68.0	55.2	59.4
Ward	61.6	77	54.6	58.4	64.6	56.5	59.2
Medora	61.4	81	58.2	52.1	67.3	55.2	59.2
Septre	60.2	68	52.8	55.8	68.8	54.3	59.1
Vic	61.6	79	53.2	50.6	64.4	51.9	56.1
Plenty	60.4	82	57.8	62.1		60.0	
D87240	58.2	74	53.1				
Voss	60.8	61	52.0				

* 2 sites - Regent and Scranton.
** 5 sites - Hettinger, Scranton, Regent, New Leipzig and Selfridge.

Barley
Variety Descriptions

Variety	Origin	Year released	Awn type[1]	Aleurone color	Height	Straw strength	Rel. maturity	Reaction to[2] Rel. yield	Stem rust	Loose smut	Leaf diseases	Quality[3]
6-rowed												
Azure	ND	1982	S	blue	med.	strg.	m.early	v.good	S	S	MS	M or F
Robust	MN	1983	S	white	tall	m.strg.	med.	v.good	S	S	MS	M or F
Morex	MN	1978	S	white	tall	med.	early	fair	S	S	MS	M or F
Excel	MN	1990	S	white	m.short	v.strg.	med.	v.good	S	S	MS	M or F
B 1602	BARI	1989	R	white	med.	m.strg.	med.	good	S	S	MS	C or F
B 1603	BARI	1990	R	white	med.	med.	med.	fair	S	S	MS	M or F
Hazen	ND	1984	S	white	med.	v.strg.	med.	v.good	S	S	MS	F
Stander	MN	1993	S	white	m.short	v.strg.	med.	v.good	S	S	MS	F
2-rowed												
Bowman	ND	1984	S	white	short	m.strg.	m.early	good	S	S	MS	F
Clark	Mont	1981	R	white	m.short	m.weak	m.late	good	S	S	MS	F[4]
Gallatin	Mont	1986	R	white	med.	m.strg.	m.late	v.good	S	S	S	F
Harrington	Can.	1981	R	white	med.	m.weak	late	good	S	S	MS	F[4]
Stark	ND	1991	S	white	med.	m.strg.	m.late	v.good	VS	S	MR	F
Hector	Can.	1973	R	white	med.	weak	m.late	fair	S	S	S	F
Specialty												
Wanubet	Mont	1990	R	white	med.	weak	late	v.poor	S	S	MS	NA

[1] Rough or smooth awned.

[2] R = resistant; S = susceptible; MS = moderately susceptible; MR = moderately resistant.

[3] M = malting; F = feed; C = malting under contract only.

[4] Recommended as a malting barley in western U.S.

Oat
Variety Description

Varieties listed in order of maturity	Origin	Year released	Color grain	Height	Straw strength	Maturity[2]	Resis. to stem rust[1]	Crown rust	Tol.to barley yellow dwarf[4]	Rel. yield	bu/Wt	P.
Don	IL	1985	white	m.short	strg.	E	VS	S	T	good	v.good	M
Horicon	WI	1989	tan	short	strg.	E	S	R-MR	T	good	v.good	M
Settler	SD	1989	white	tall	m.strg.	E	S	MR	MT	good	v.good	M
Hazel	IL	1985	ivory	short	strg.	E	S	S	T	good	good	M
Hytest	SD	1986	white	tall	m.strg.	E	S	MR-MS	S	fair	v.good	H
Prairie	WI	1991	white	short	strg.	E	S	S	T	good	good	M
Premier	MN	1990	yellow	short	med.	M	R	MR	MT	v.good	v.good	H
Jerry	ND	1994	white	tall	strg.	M	R	MR	MT	v.good	v.good	M
Newdak	ND/NY	1990	white	med.	strg.	M	R	S	T	v.good	good	M
Brawn	IL	1993	yellow	short	v.strg.	M	S	S	T	v.good	good	M
Riel	Can.	1985	red	tall	m.strg.	M	R	S	S	v.good	v.good	M
Proat	MN	1985	white	med.	strg.	M	S	MR	S	good	v.good	H
Steele	ND	1984	white	tall	strg.	M	R	S	MT	good	good	M
Sandy	SD	1986	white	tall	m.strg.	M	S	MR-MS	S	good	good	MH
Kelsey	Can.	1967	white	m.tall	m.weak	L	S	S	S	v.good	good	VL
Moore	MN	1979	white	tall	strg.	L	S	MR	S	v.good	good	M
Valley	ND	1988	ivory	short	strg.	L	R	MS	MT	v.good	v.good	
Whitestone	ND	1994	white	short	strong	L	R	MR	MT	v.good	good	
Otana	MT	1977	white	m.tall	m.weak	L	S	S	S	v.good	v.good	ML
Troy	SD	1991	ivory	tall	m.strg.	L	S	R	T	good	good	M
Monida	ID	1985	white	m.tall	m.weak	L	S	S	MS	v.good	fair	L
Porter	IN	1982	tan	med.	strg.	L	S	MS	T	v.good	v.good	M
AC Belmont	Can.	1993	naked	med.	strg.	L	R	S	MT	fair	v.good	M
Paul	ND	1994	naked	v.tall	strong	L	R	R	T	v.good	good	H
Dumont	Can.	1982	white	m.tall	m.weak	L	R	S	MS	good	good	ML
Fidler	Can.	1980	white	med.	strg.	L	R	MR	MT	good	fair	L
Bay	WI	1993	yellow	med.	v.strg.	L	S	MR-S	T	good	good	H
Terra	Can.	1977	naked	med.	m.strg.	L	S	S	MS	good	v.good	M
AC Marie	Can.	1992	white	tall	weak	VL	R	S	MT	fair	fair	ML

[1] Stem rust races most prevalent now. S = susceptible; M = moderately; R = resistant; v = very

[2] E = early; M = medium; L = late.

[3] H = high; M = medium; L = low; V = very; VL = very low

[4] S = susceptible; MS = moderately susceptible; MT = moderately tolerant; T = tolerant.

Varieties rated MT or T have a relatively good degree of protection against barley yellow dwarf virus.

Dryland Barley Variety Trial - Fallow — Dickinson, ND, 1994

Variety	Type	Days to heading	Height	Protein	Seed	Test weight	Yield				% of Stark
							1994	1993	1992	Avg	
			inches	%	lb	lbs/bu	bu/ac				
6884-2912	6R	54.0	28.7	13.9	12,981	43.5	90.5	----	----	----	----
Azure	6R	49.0	30.7	13.3	12,237	46.6	94.6	79.2	64.0	79.3	93
B 1602	6R	53.0	28.7	14.1	13,481	43.9	95.0	72.6	77.0	81.5	95
Bob	2R	49.0	27.0	15.8	11,097	49.2	67.4	----	----	----	----
Bowman	2R	48.0	25.5	13.4	10,387	49.2	81.0	67.2	79.0	75.7	88
Excel	6R	50.0	27.0	13.7	13,096	46.6	95.7	85.3	86.0	89.0	104
Gallatin	2R	53.0	26.2	14.3	12,247	46.2	96.9	67.3	80.0	81.4	95
Harrington	2R	57.0	25.2	14.2	11,860	44.7	89.8	70.2	88.0	82.7	97
Hazen	6R	50.0	31.0	13.6	12,632	44.2	91.2	92.9	69.0	84.4	99
M66	6R	49.0	27.2	14.1	12,510	46.9	106.8	----	----	----	----
MT 860756	2R	54.0	23.7	13.8	11,064	47.7	89.9	93.7	----	----	----
Manley	2R	58.0	27.5	14.3	11,336	44.1	88.0	97.2	----	----	----
Morex	6R	49.0	31.5	14.0	12,984	48.1	84.1	66.0	69.0	73.0	85
ND 10981	6R	50.0	30.2	13.6	12,203	44.2	91.2	86.2	76.0	84.5	99
ND 11055	6R	49.0	28.2	14.1	12,704	45.4	97.8	87.5	73.0	86.1	101
ND 11231-11	2R	49.0	26.0	13.1	10,292	48.6	98.1	81.1	----	----	----
ND 11853-3R	2R	48.0	25.0	14.5	9958	47.9	87.8	72.9	----	----	----
ND 12201	6R	50.0	30.2	13.6	12,509	45.5	90.8	87.3	----	----	----
ND 13297	2R	48.0	27.5	13.6	10,076	48.4	104.1	----	----	----	----
ND 13299	2R	47.0	24.7	13.5	10,466	48.4	94.9	----	----	----	----
ND 13300	2R	49.0	26.7	13.6	11,140	48.7	106.6	----	----	----	----
Robust	6R	50.0	29.2	14.7	12,317	47.5	90.4	72.9	80.0	81.1	95
Royal	6R	51.0	23.7	14.4	13,005	45.0	84.5	----	----	----	----
Shonkin	2R	54.0	26.5	14.9	12,502	49.0	81.2	----	----	----	----
Stander	6R	51.0	27.0	13.5	11,846	46.9	102.8	87.9	84.0	91.6	107
Stark	2R	50.0	27.5	13.5	10,155	49.4	97.0	81.8	78.0	85.6	100
Mean		50.9	27.4	14.0	11,811	46.8	92.2				
CV%		2.1	3.5	6.1	4.0	2.6	8.1				
LSD.05		1.2	1.3	1.2	669.3	1.7	10.5				

Previous crop: Fallow; Soil test results: 72 lbs N, 24 ppm P_2O_5 - applied 100 lbs urea; Planted on April 20 at 750,000 Pure Live Seed/acre at 1.5 inch depth; Applied 2 pt Hoelon plus 1 pt Buctril on May 26; Harvested on August 1. Yield and quality data reported as is except for protein, which is reported on a 12% moisture basis.

Dryland Oat Variety Trial - Fallow — Dickinson, ND, 1994

Variety	Days to Heading	Height	Seeds	Test Weight	Yield				% of Otana
					1994	1993	1992	Avg	
		inches	lb	lbs/bu	bu/ac				
AC Belmont	54.0	36.0	17,841	39.4	134.6	143.0	----	----	----
Bay	53.7	30.2	12,895	33.9	159.1	192.0	----	---	----
Brown	52.0	31.0	11,482	36.0	143.5	----	----	----	----
Calibre	54.7	38.0	11,383	37.6	180.6	136.0	104.0	140.2	104
Derby	55.0	38.2	11,866	37.2	172.0	130.0	110.0	137.3	102
Dumont	55.7	39.0	11,785	35.9	163.7	144.0	97.0	134.9	100
Hytest	50.0	38.7	12,238	41.7	117.0	116.0	99.0	110.7	82
Jerry	50.2	33.7	12,820	39.0	139.4	149.0	101.0	129.8	96
Kelsey	53.2	38.7	13,693	37.5	159.6	----	----	----	----
Milton	53.0	32.5	13,364	37.7	138.9	163.0	----	----	----
Monida	55.7	36.5	14,435	36.7	174.5	141.0	112.0	142.5	106
ND852107	53.7	37.5	13,516	37.1	170.8	135.0	109.0	138.3	103
ND862095	54.0	36.0	12,800	38.7	161.6	154.0	96.0	137.2	102
ND880107	55.7	40.0	13,127	36.9	144.7	120.0	----	----	----
ND880224	56.5	37.5	12,120	35.6	166.4	174.0	107.0	149.1	111
ND881374	54.5	39.2	12,521	36.2	162.1	150.0	----	----	----
ND881508	55.5	39.5	13,201	38.6	163.5	136.0	----	----	----
ND900117	51.2	31.5	12,317	39.1	131.7	----	----	----	----
Newdak	49.2	34.2	12,940	36.4	155.4	132.0	108.0	131.8	98
Otana	54.7	38.5	13,591	38.7	170.6	129.0	104.0	134.5	100
Paul	54.5	37.2	16,843	40.5	107.7	127.0	78.0	104.2	77
Porter	53.5	36.5	13,110	39.2	157.8	184.0	103.0	148.3	110
Prairie	51.0	32.0	12,828	36.0	157.0	143.0	97.0	132.3	98
Riel	54.2	36.7	12,492	36.7	154.1	159.0	109.0	140.7	105
Robert	56.0	37.0	11,289	36.7	148.0	156.0	103.0	135.7	101
Troy	54.0	40.2	14,487	39.1	139.8	133.0	106.0	126.3	94
Valley	51.7	31.5	13,214	39.9	143.5	159.0	97.0	133.2	99
Whitestone	55.7	32.5	13,788	37.9	154.0	130.0	103.0	129.0	96
Mean	53.7	36.1	13,142	37.7	152.6				
CV(%)	3.1	4.4	5.5	2.2	6.3				
LSD(0.05)	1.9	2.2	1025.5	1.2	13.6				

Previous crop: Fallow; Soil test results: 130 lbs N, 18 ppm P_2O_5 - applied 30 lbs urea/ac; Planted on April 19 at 750,000 Pure Live Seed/acre at 1.5 inch depth; Applied Stampede 80 EDF (1.25 lbs EDF + 0.5 pt MCPA ester) on May 23 when oat in 4-leaf stage - some yellowing of Kelsey, ND852107, ND862095 and ND880107 was seen following application; Harvested on August 8.

Dryland Barley Variety Trial - No-till Fallow — Beach, ND, 1994

Variety	Seeds	Test weight	Protein	Yield 1994	Yield 1993	Yield 1992	Yield Avg	% of Stark
	lbs	lbs/bu	%	bu/ac				
Azure	13,215	47.7	14.4	67.7	45.3	----	----	
Bowman	10,941	51.1	14.5	77.8	71.5	81.0	76.8	96
Excel	15,505	45.5	14.7	80.3	57.5	106.0	81.3	101
Gallatin	12,682	48.0	14.8	75.3	67.2	99.0	80.5	100
Manley	14,034	46.2	16.1	63.0	----	----	----	
Robust	13,968	48.2	14.7	73.0	36.2	----	----	
Stark	10,613	50.6	14.6	73.9	72.9	94.0	80.3	100
Mean	12,994	48.2	14.9	73.0				
CV(%)	3.2	1.9	1.7	5.6				
LSD .05	621.6	1.4	0.4	6.0				

Dryland Oat Variety Trial - No-till Fallow — Beach, ND, 1994

Variety	Seeds	Test weight	Yield 1994	Yield 1993	Yield 1992	Yield Avg	% of Otana
	lbs	lbs/bu	bu/ac				
Bay	16,624	33.2	94.9	----	----	----	----
Dumont	14,831	36.2	81.1	105.7	143.0	109.9	93
Jerry	14,167	36.9	84.5	129.9	----	----	----
Kelsey	16,398	37.0	95.6	101.6	----	----	----
Milton	16,443	34.9	75.2	----	----	----	----
Otana	15,845	37.7	94.9	112.4	147.0	118.1	100
Paul	20,598	44.1	57.6	----	----	----	----
Whitestone	16,426	36.6	107.3	----	----	----	----
Mean	16,417	37.1	86.4				
CV(%)	4.9	2.5	5.2				
LSD .05	1180.5	1.4	6.7				

Previous crop: Chemical fallow; Soil test results: 53 lbs N, 8 ppm P_2O_5 - applied 144 lbs Anhydrous ammonia and 300 lbs 18-46-0 prior to seeding; Planted on May 16 at 750,000 Pure Live Seed/acre at 1.5 inch depth; applied 1.5 pt Bronate on June 15; Harvested on August 19.

Dryland Barley Variety Trial - Fallow — Beulah, ND, 1994

Variety	Seeds	Test weight	Protein	Yield 1994	Yield 1992	Yield 1991	Yield Avg	% of Stark
	lbs	lbs/bu	%	bu/ac				
Azure	11,016	49.1	14.5	90.6	----	54.3	----	----
Bowman	9383	51.7	14.5	79.3	102.0	60.2	79.1	88
Excel	11,514	50.0	13,8	111.5	141.0	----	----	----
Gallatin	10,481	52.7	14.6	91.9	129.0	61.2	94.0	105
Manley	10,604	50.4	14.6	95.9	----	----	----	----
Robust	11,387	50.9	15.1	86.7	----	----	----	----
Stark	8882	52.2	14.7	86.6	122.0	60.5	89.7	100
Mean	10,467	51.0	14.5	91.2				
CV(%)	3.8	1.7	2.5	4.8				
LSD .05	588	1.3	0.5	6.5				

Dryland Oat Variety Trial - Fallow — Beulah, ND, 1994

Variety	Seeds	Test weight	Yield 1994	Yield 1992	Yield 1991	Yield Avg	% of Otana
	lbs	lbs/bu	bu/ac				
Bay	15764	33.0	116.7	----	----	----	----
Dumont	14426	36.0	101.7	135.0	82.5	108.7	95
Jerry	13966	38.5	108.3	----	----	----	----
Kelsey	16353	35.2	115.1	----	----	----	----
Milton	15550	36.0	106.6	----	----	----	----
Otana	16222	35.9	108.9	150.0	78.4	114.2	100
Paul	19129	42.6	86.6	----	----	----	----
Whitestone	15809	35.4	121.4	----	----	----	----
Mean	15902	36.6	108.2				
CV(%)	5.7	2.5	7.6				
LSD .05	1334.1	1.3	12.0				

Previous crop: Fallow; Soil test results: 30 lbs N, 28 ppm P_2O_5 - applied 150 lbs urea; Planted on May 16 at 750,000 Pure Live Seed/acre at 1.5 inch depth; Applied 2.5 pt Hoelon plus 1.5 pt Buctril on barley and 1.5 pt Buctril on oat on June 20; Harvested on August 25.

Dryland Barley Variety Trial - Fallow — Glen Ullin, ND, 1994

Variety	Seeds	Test weight	Protein	Yield				% of Stark
				1994	1993	1992	Avg	
	lbs	lbs/bu	%	bu/ac				
Azure	10,919	46.6	14.1	84.7	59.0	----	----	----
Bowman	9558	48.6	14.3	68.8	48.7	91.0	69.50	85
Excel	11,372	45.9	13.3	96.6	58.6	106.0	87.07	106
Gallatin	10,582	49.2	13.8	91.2	48.0	113.0	84.07	102
Manley	10,126	46.4	13.6	92.5	----	----	----	----
Robust	10,697	47.5	14.1	86.3	54.6	----	----	----
Stark	8700	49.7	14.1	84.6	51.4	110.0	82.00	100
Mean	10,279	47.7	13.9	86.4				
CV(%)	4.1	1.9	1.5	3.9				
LSD .05	631.6	1.4	0.3	4.9				

Dryland Oat Variety Trial - Fallow — Glen Ullin, ND, 1994

Variety	Seeds	Test weight	Yield				% of Otana
			1994	1993	1992	Avg	
	lbs	lbs/bu	bu/ac				
Bay	14,302	30.9	102.9	----	----	----	----
Dumont	12,767	34.7	118.7	119.4	134.0	124.03	97
Jerry	14,781	36.0	107.6	107.6	----	----	----
Kelsey	14,396	35.4	116.1	99.7	----	----	----
Milton	20,221	33.7	100.9	----	----	----	----
Otana	14,124	36.1	122.3	123.2	137.0	127.50	100
Paul	12,748	41.0	77.4	----	----	----	----
Whitestone	14,783	34.4	99.2	----	----	----	----
Mean	14,765	35.3	105.6				
CV(%)	6.2	2.8	10.7				
LSD.05	1357.9	1.4	16.6				

Previous crop: Fallow; Soil test results: 45 lbs N, 8 ppm P_2O_5 - applied 150 lbs urea; Planted on May 16 at 750,000 Pure Live Seed/acre at 1.5 inch depth; Applied 2.5 pt Hoelon plus 1.5 pt Buctril on barley and 1.5 pt Buctril on oat on June 20; Harvested on August 26.

Dryland Barley Variety Trial - Recrop — Hannover, ND, 1994

Variety	Seeds	Test weight	Protein	Yield				% of
				1994	1993	1992	Avg	Stark
	lbs	lbs/bu		bu/ac				
Azure	10,862	48.7	15.2	55.2	47.6	----	----	----
Bowman	9545	51.6	14.7	55.3	34.8	100.0	63.4	89
Excel	11,700	49.2	14.3	70.7	50.0	111.0	77.2	108
Gallatin	11,168	50.6	15.3	57.9	34.5	109.0	67.1	94
Manley	11,618	48.7	16.1	50.2	----	----	----	----
Robust	11,471	50.6	15.1	54.3	49.4	----	----	----
Stark	9010	52.5	15.2	57.0	48.6	109.0	71.5	100
Mean	10,768	50.3	15.2	57.2				
CV(%)	3.1	1.1	1.8	11.8				
LSD .05	499.8	0.8	0.4	10.1				

Dryland Oat Variety Trial - Recrop — Hannover, ND, 1994

Variety	Seeds	Test weight	Yield				% of
			1994	1993	1992	Avg	Otana
	lbs	lbs/bu		bu/ac			
Bay	16,429	35.4	54.5	----	----		
Dumont	13,875	38.4	59.0	99.1	130.0	96.2	93
Jerry	15,033	39.7	60.3	98.0	----	----	----
Kelsey	17,039	38.1	78.4	106.8	----	----	----
Milton	15,355	37.9	61.4	----	----	----	----
Otana	15,892	39.1	71.3	105.2	134.0	103.5	100
Paul	24,207	43.6	54.1	----	----	----	----
Whitestone	15,840	38.2	61.8	----	----	----	----
Mean	16,709	38.8	62.6				
CV(%)	4.9	1.7	18.4				
LSD .05	1209	1.0	NS				

Previous crop: Corn; Soil test results: 101 lbs N, 12 ppm P_2O_5 - applied 100 lbs urea; Planted on May 16 at 750,000 Pure Live Seed/acre at 1.5 inch depth; Applied 2.5 pt Hoelon plus 1.5 pt Buctril on barley and 1.5 pt Buctril on oat on June 20; Harvested on August 24.

1994 Scranton Barley Variety Trial

Variety	Test weight	Grain protein	Plant height	Yield 1994	1993	1992	2yr	3yr
	lbs/bu	%	cm	bu/A				
Excel	46.9	12.4	80	74.0	77.8	113.6	75.9	88.5
Stark	50.2	12.9	78	71.0	70.9	115.6	71.0	85.8
Bowman	49.6	13.3	77	70.3	66.5	95.6	68.4	77.5
Gallatin	48.6	13.0	80	71.1	70.6		70.8	
ND11231-11	49.7	12.9	70	71.9				
Manley	47.6	13.6	76	63.5				
Harrington	46.4	12.8	75	55.7				
Trial mean	48.4	13.0	77	68.2	71.7	109.7		
C.V. %	1.0	4.7	--	7.3	17.5	4.7		
LSD 5%	0.7	0.9	--	7.3	ns	7.8		
LSD 1%	1.0	ns	--	10.0	ns	10.7		

Planting date: April 21 Harvest date: August 15
Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A)
Yield goal: 100 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPA ester

1994 Regent Barley Variety Trial

Variety	Test weight	Grain protein	Plant height	Yield 1994	1993	1992	2yr	3yr
	lbs/bu	%	cm	bu/A				
Excel	50.4	13.8	60	94.7	82.9	151.4	88.8	109.7
Stark	53.3	13.9	62	99.8	82.2	140.5	91.0	107.5
Bowman	52.0	14.1	60	88.8	58.6	120.0	73.7	89.1
Gallatin	52.6	14.4	60	97.8	75.6		86.7	
ND11231-11	52.3	13.8	65	97.3				
Harrington	51.2	14.4	60	92.7				
Manley	52.0	15.1	65	89.9				
Trial mean	52.0	14.2	62	94.4	77.4	131.9		
C.V. %	0.9	2.4	--	5.1	11.5	4.6		
LSD 5%	0.7	0.5	--	7.1	13.3	9.0		
LSD 1%	0.9	0.7	--	9.7	17.2	12.3		

Planting date: April 22 Harvest date: August 12
Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A)
Yield goal: 100 bu/A
Herbicide application: 1.5 pt/A Buctril

1994 New Leipzig Barley Variety Trial

Variety	Test weight	Grain protein	Plant height	Yield 1994	Yield 1993	Yield 1991	Yield 2yr	Yield 3yr
	lbs/bu	%	cm	bu/A				
Excel	48.6	14.2	56	56.5	78.2	80.6	67.4	71.8
Gallatin	51.7	15.0	60	56.9	69.0	66.2	63.0	64.0
Bowman	51.2	15.1	62	42.2	74.8	65.9	58.5	61.0
Stark	51.4	15.0	66	41.9	68.5	62.2	55.2	57.5
ND11231-11	51.0	14.2	55	40.2				
Manley	49.7	16.4	54	37.0				
Harrington	49.5	16.0	61	36.7				
Trial mean	50.4	15.2	59	44.9	73.1	61.6		
C.V. %	1.2	3.9	--	9.9	14.0	14.4		
LSD 5%	1.1	1.1	--	8.0	ns	13.0		
LSD 1%	1.5	1.5	--	11.3	ns	ns		

Planting date: April 21 Harvest date: August 15
Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A)
Yield goal: 100 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPA ester

1994 New Leipzig Oat Variety Trial

Variety	Test weight	Yield 1994	Yield 1993	Yield 1991	Yield 2yr	Yield 3yr
	lbs/bu	bu/A				
Otana	39.9	60.3	96.5	83.2	78.4	80.0
Troy	39.7	63.4	131.1		97.2	
Prairie	36.9	60.8	123.1		92.0	
Whitestone	39.6	63.6				
Jerry	40.0	61.4				
Trial mean	39.2	61.9	120.4	75.2		
C.V. %	0.7	12.6	12.3	15.8		
LSD 5%	0.5	ns	22.4	--		
LSD 1%	0.7	ns	31.0	--		

Planting date: April 21 Harvest date: August 15
Seeding rate: 750,000 live seeds/A (approx. 1.7 bu/A)
Yield goal: 150 bu/A
Herbicide application: 1.5 pt/A Buctril

1994 Selfridge Barley Variety Trial

Variety	Test weight	Grain protein	Plant height	Yield 1994	1993	1992	2yr	3yr
	lbs/bu	%	cm	bu/A				
Excel	46.9	12.4	80	74.0	77.8	113.6	75.9	88.5
Stark	50.2	12.9	78	71.0	70.9	115.6	71.0	85.8
Bowman	49.6	13.3	77	70.3	66.5	95.6	68.4	77.5
Gallatin	48.6	13.0	80	71.1	70.6		70.8	
ND11231-11	49.7	12.9	70	71.9				
Manley	47.6	13.6	76	63.5				
Harrington	46.4	12.8	75	55.7				
Trial mean	48.4	13.0	77	68.2	71.7	109.7		
C.V. %	1.0	4.7	--	7.3	17.5	4.7		
LSD 5%	0.7	0.9	--	7.3	ns	7.8		
LSD 1%	1.0	ns	--	10.0	ns	10.7		

Planting date: April 21 Harvest date: August 15
Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A)
Yield goal: 100 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPA ester

1994 Selfridge Oat Variety Trial

Variety	Test weight	Plant height	Yield 1994	1993	1992	2yr	3yr
	lbs/bu	cm	bu/A				
Otana	38.9	107	110.3	108.4	157.3	109.4	125.3
Troy	39.5	90	120.1	130.8		125.4	
Prairie	36.2	88	118.7	130.2		124.4	
Settler	39.1	87	102.7	92.6		97.6	
Whitestone	38.7	80	141.8				
Jerry	39.6	98	119.9				
Trial mean	38.7	92	118.9	118.8	167.5		
C.V. %	0.8	--	6.3	8.5	7.3		
LSD 5%	0.4	--	11.1	15.1	-		
LSD 1%	0.6	--	15.2	20.8	-		

Planting date: April 21 Harvest date: August 15
Seeding rate: 750,000 live seeds/A (approx. 1.7 bu/A)
Yield goal: 150 bu/A
Herbicide application: 1 pt/A Buctril

1994 Hettinger Off-Station Barley Variety Trials
Combined Means - 4 Sites**

Variety	Test weight	Grain protein	Plant height	Yield				
				1994	1993*	1992*	2yr	3yr
	lbs/bu	%	cm	bu/A				
Excel	50.1	13.0	66	85.8	104.2	136.6	95.0	108.9
Stark	52.4	13.4	69	80.1	86.2	124.5	83.2	96.9
Bowman	51.5	13.8	66	74.8	78.4	108.3	76.6	87.2
Gallatin	51.6	13.7	65	85.1	83.4		84.2	
ND11231-11	51.8	13.2	64	82.2				
Manley	50.7	14.2	64	77.3				
Harrington	49.6	13.8	64	74.0				

* 6 sites - Hettinger fallow & recrop, Regent, Scranton, New Leipzig and Selfridge
** Regent, Scranton, New Leipzig and Selfridge.

1994 Hettinger Off-station Oat Variety Trials
Combined means - 6 sites**

Variety	Test weight	Yield				
		1994*	1993	1992	2yr	3yr
	lbs/bu	bu/A				
Otana	39.4	85.3	131.0	167.8	108.2	128.0
Prairie	36.6	89.8	142.6		116.2	
Troy	39.6	91.8	135.3		113.6	
Whitestone	39.2	102.7				
Jerry	39.8	90.6				

* 2 sites - New Leipzig and Selfridge.
** 6 sites - Hettinger fallow and recrop, Scranton, Regent, New Leipzig and Selfridge.

Hard Red Winter Wheat
Variety Descriptions

Variety	Agent or origin	Year	Quality	Leaf rust[1]	Stem rust[1]	Maturity	Straw strength	Height	Winter-hardiness[b]
Roughrider	ND	1975	4.0[a]	S	R[3]	med.	m.strg.	med.	good
Agassiz	ND	1983	3.0	S	R	med.	med.	med.	good
Seward	ND	1987	2.0	S	R	med.	strong	med.	good
Norstar	Can.	1977	3.0	S	S	late	med.	tall	good
Rita	SD	1980	3.0	MS	MR[2]	early	strong	med.	fair
Rose	SD	1981	2.0	S	MS[2]	early	v.strg.	short	fair
Winridge	MT	1980	1.0	S	S	med.	strong	med.	poor
Norwin*	MT	1983	2.0	S	MS	med.	strong	v.short	fair
Siouxland	NE	1984	2.0	MR	R	early	strong	med.	poor
Arapahoe	NE	1989	2.0	MR	MR	med.	med.	med.	fair
Judith	MT	1988	3.0	S	S	med.	strong	med.	fair
Abilene*	AgriPro	1987	2.5	S	MR	early	strong	v.short	poor

[a] 1.0 = Very poor quality; 2.0 = Poor quality; 2.5 = Poor to average quality; 3.0 = Average quality; 3.5 = Average to good quality; 4.0 = Good quality; Quality assessed by the Department of Cereal Science and Food Technology, NDSU.

[b] Varieties with less than good winterhardiness should be seeded only in tall stubble or in standing solid seeded or narrow strip flax.

* Semidwarf.

[1] R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible.

[2] Susceptible in artificially induced epidemics.

[3] Slow rusting type of resistance to race 15.

1993 Hettinger Dormant Planted HRWW Trial

Hard red winter wheat (HRWW) is typically planted in the Fall of the year allowing the seed to germinate and produce foliage prior to freeze up. HRWW must be exposed to near freezing temperatures following germination to vernalize, a requirement for head development. Although cold tolerance (winterhardiness) varies between varieties, even the most winter hardy varieties will die at soil temperatures of 0 F. If HRWW could be planted in late Fall after soil temperatures have fallen below 40 F to prevent seed germination, the crop may be able to avoid these killing temperatures and still germinate and vernalize the following Spring.

This study was initiated to investigate agronomic and quality characteristics among and between HRWW varieties which were planted in early and late Fall.

HRWW was planted in small replicated plots on September 14, 1992 (Early) and on November 17, 1992 (Late). All seed was treated with Vitavax prior to planting. Plots were planted using double disc openers with a 7 inch row spacing and were harvested on August 19, 1993. Fall establishment was generally good for all early treatments. None of the late treatments germinated prior to freeze up.

Significant decreases in late planted treatment yields were observed on winterhardy varieties Roughrider and Agassiz. Significant increase in late planted treatment yield was observed on TAM 107, a southern less winterhardy variety. Yields tended to correspond with percent winter survival. Test weight and grain protein were significantly lower for all varieties planted at the late planting date. Early planted treatments had on average a 10 day advantage in maturity (Heading date) over late planted treatments.

Variety	Planting date*	Yield	Test weight	Grain protein	Heading date	Plant height	Winter survival
		bu/A	lbs/bu	%	June	cm	%
Agassiz	E	40.6	58.4	14.3	19	86	82
	L	25.2	55.5	13.5	28	89	72
Arapahoe	E	34.6	59.5	13.9	14	72	74
	L	44.1	57.9	13.1	25	65	81
Roughrider	E	50.0	60.2	14.7	16	82	92
	L	25.1	55.7	13.6	28	78	54
TAM 107	E	17.2	59.5	14.0	12	60	50
	L	31.1	55.6	12.6	18	60	82
Trial mean	E	35.6	59.4	14.2	15	75	74
	L	31.4	56.2	13.2	25	73	72
Difference		-4.2	-3.2	-1.0	10	-2	-2
C.V. %		22.0	1.8	2.3	6	8	18
LSD 5%		10.8	1.5	0.5	2	ns	20

* E = Early (9/14/92), L = Late (11/17/92)
ns = no statistical difference between Early and Late planted treatments.

1993 Hettinger Double Disc vs. Hoe Opener Planted HRWW

This study was initiated to determine agronomic and quality characteristics among and between hard red winter wheat varieties which were planted with a double disc opener and with a hoe opener.

Both types of openers are currently being used to plant HRWW by area producers. The double disc opener offers an advantage of better depth control and the ability to slice through stubble. The hoe opener offers an ability to dig down deeper to moist soil and to leave a furrow for snow coverage.

Seed was planted on the same day, using the same drill frame and the same seeding rate. The double disc openers were spaced 7 inches apart and the hoe openers were spaced 10 inches apart.

There was no statistical difference between type of opener used for yield, test weight, grain protein or heading date. Plant height was significantly lower for TAM 107 planted with the hoe opener than planted with the double disc opener. Percent winter survival was higher in all varieties planted with the hoe opener. This was especially evident with Arapahoe and TAM 170, varieties which have lower winter hardiness.

Variety	Opener	Yield	Test weight	Grain protein	Heading date	Plant height	Winter survival
		bu/A	lbs/bu	%	June	cm	%
Roughrider	DD	50.0	60.2	14.7	16	82	92
	Hoe	42.7	60.5	14.4	15	80	95
Seward	DD	43.1	58.6	12.4	18	78	84
	Hoe	48.4	60.2	12.7	17	79	95
Arapahoe	DD	34.6	59.5	13.9	14	72	74
	Hoe	37.3	60.2	14.1	13	69	94
TAM 107	DD	17.2	59.5	14.0	12	60	50
	Hoe	18.2	59.9	13.8	12	53	84
Trial mean	DD	36.2	59.4	13.8	15	73	75
	Hoe	36.6	60.2	13.8	14	70	92
Difference		0.4	0.8	0	-1	-3	17
C.V. %		19.1	1.4	1.7	5	5	14
LSD 5%		ns	ns	ns	ns	5	17

Planting date: 9/14/92
Seeding rate: 1.1 million live seeds/A (approx. 1.1 bu/A)
Harvest date: 8/19/93
ns = no statistical difference between type of opener used.

Dickinson Seeding Rate Trial

A seeding rate trial with Hard Red Spring Wheat was conducted at Beach, Beulah, Glen Ullin, and Hannover to determine if earlier seeding recommendations for southwestern North Dakota should be modified to take into account recent varietal improvements and crop management changes. Amidon was sown at rates ranging from 500,000 to 1,500,000 Pure Live Seed/acre (PLS/acre) in conventional-fallow environments at Beulah and Glen Ullin, in a no-till fallow environment at Beach, and in a recropped environment at Hannover.

More grain was produced as the seeding rate was increased from 500,000 to 1,000,000 PLS/acre; however, increasing the seeding rate beyond 1,000,000 PLS/acre failed to significantly increase yield at any location. The impact of seeding rate was less consistent on test weight than on grain yield; grain was heavier as the seeding rate was increased from 500,000 PLS/acre to 1,000,000 PLS/acre at Beulah and Hannover, while test weight was not affected at Beach and Glen Ullin. Grain protein content generally was not affected by changes in the seeding rate. These preliminary data support the past recommendation of planting 1,000,000 PLS/acre for optimum performance of HRSW in southwestern North Dakota. This trial will be continued in 1995.

HRSW Seeding Rate Trial — Dickinson, ND, 1994

Location	Seeding rate	Seeds	Protein	Test weight	Grain yield
	PLS/acre	lbs	%	lbs/bu	bu/acre
Beach	500,000	16,029	14.2	59.0	26.5
	750,000	16,307	13.9	59.6	30.6
	1,000,000	16,670	14.1	60.2	29.6
	1,250,000	16,267	14.0	60.1	31.2
	1,500,000	17,028	14.0	60.1	32.1
Mean		16,460	14.0	59.8	30.0
CV(%)		2.7	1.8	1.0	6.1
LSD .05		NS	NS	NS	2.8
Beulah	500,000	13,628	16.3	60.2	57.9
	750,000	14,007	16.3	60.6	62.6
	1,000,000	13,881	16.3	61.4	67.3
	1,250,000	14,414	16.1	61.9	69.9
	1,500,000	14,382	16.1	61.5	68.4
Mean		14,063	16.2	61.1	65.2
CV(%)		2.6	1.3	0.8	3.1
LSD .05		554.9	NS	0.7	3.1
Glen Ullin	500,000	13,815	14.5	57.5	47.0
	750,000	13,799	13.9	58.0	50.8
	1,000,000	13,334	14.2	58.1	52.2
	1,250,000	12,321	14.2	57.9	57.4
	1,500,000	13,233	13.9	57.0	57.0
Mean		13,300	14.2	57.8	52.9
CV(%)		8.4	1.7	0.8	6.7
LSD .05		NS	0.4	NS	5.5
Hannover	500,000	14,388	16.6	59.6	29.1
	750,000	14,113	16.8	59.9	32.7
	1,000,000	14,027	16.6	60.6	37.2
	1,250,000	14,078	16.8	60.5	35.9
	1,500,000	14,393	16.8	60.9	37.1
Mean		14,200	16.7	60.3	34.4
CV(%)		3.2	1.4	0.9	9.9
LSD .05		NS	NS	0.8	5.3

Dickinson Hard Red Spring Wheat Variety By Cropping Sequence Trial

A trial was begun at Dickinson in 1994 to: (1) compare the relative performance of HRSW across three 2-year cropping sequences (wheat-fallow, wheat-wheat, wheat-corn); and (2) determine if contrasting varieties perform differently across these cropping sequences. Preliminary data reveal that wheat following wheat produced less grain than wheat following corn or wheat following fallow. This probably was explained by the higher incidence of tan spot and septoria that was observed in the wheat plots following wheat than those following corn or fallow. There was no yield advantage for wheat in 1994 from fallowing in 1993 compared to growing corn in 1993.

Wheat varieties responded differently across the crop sequences. In 1994, grain yield of the conventional-height varieties (AC Minto, Amidon, Butte 86, Sharp, and Stoa) tended to be slightly elevated following fallow compared to that following corn, whereas those of the semidwarf varieties (Bergen, Grandin, Hi Line, Norm, and 2371) tended to be elevated following corn compared to fallow. Yield tended to be less in a wheat-wheat sequence compared to a wheat-fallow sequence for all varieties except Bergen and Grandin. These trial will be continued over the next three years so more definitive conclusions can be made about the relative performance of selected wheat varieties across alternative cropping sequences.

HRSW Variety by Cropping Sequence Trial — Dickinson, ND, 1994

Cropping Sequence (CS)	Height	Test weight	Yield
	inches	lbs/bu	bu/ac
Wheat-fallow	32.3	61.2	49.9
Wheat-corn	32.7	60.8	50.3
Wheat- wheat	32.0	60.4	47.6
Mean	32.3	60.8	49.3
LSD .05	NS	0.3	NS
Varieties (V)			
AC Minto	38.7	60.0	46.0
Amidon	34.6	61.3	51.0
Bergen	27.7	61.2	53.9
Butte 86	31.5	61.3	47.1
Grandin	30.8	60.7	47.1
Hi Line	30.2	60.5	50.9
Norm	28.9	61.0	50.5
2371	35.6	59.0	44.9
Sharp	31.6	62.7	49.9
Stoa	33.8	60.6	51.3
Mean	32.5	60.8	49.3
CV(%)	11.7	1.0	6.5
LSD .05	1.7	0.5	2.6

Previous crop: Corn in wheat-corn sequence, HRSW in wheat-wheat sequence, fallow in wheat-fallow sequence; Soil test results: 75 lbs N and 27 ppm P_2O_5 (wheat following corn), 78 lbs N and 19 ppm P_2O_5 (wheat following wheat), 172 lbs N and 29 ppm P_2O_5 (wheat following fallow) - applied 160 lbs urea (wheat following corn and following wheat plots), no fertilizer applied to wheat following fallow plots; Planted all varieties at 1,000,000 Pure Live Seed/acre on May 11; Applied 2 pt Hoelon plus 1 pt Buctril on June 3; Harvested on August 18.

HRSW Variety by Cropping Sequence Trial — Dickinson, ND, 1994

Variety	Crop sequence (CS)				
	wheat-fallow	wheat-corn	% of fallow	wheat-wheat	% of fallow
	bu/acre				
AC Minto	48.0	45.3	94	44.7	93
Amidon	54.0	50.5	94	48.5	90
Bergen	50.5	57.3	113	53.9	107
Butte 86	49.7	46.2	93	45.5	92
Grandin	44.2	51.8	117	45.4	103
HiLine	51.1	53.7	105	47.8	94
Norm	49.7	52.9	106	48.7	98
2371	44.7	45.8	102	44.2	99
Sharp	53.0	49.9	94	46.9	88
Stoa	54.0	49.8	92	50.2	93
Mean	49.9	50.3		47.6	
Cropping sequence			*		
Variety (V)			*		
CS x V			*		

*Significant at the P<0.05 level.

Dickinson Hard Red Spring Wheat Seeding Rate by Tillage Trial

A trial was started at Dickinson in 1994 to: (1) compare the relative performance of HRSW across conventional-till, reduced-till, and no-till environments in a wheat-fallow cropping sequence; (2) determine if seeding rate needs to be adjusted across the three environments; and (3) evaluate how the three environments and contrasting seeding rates affects the performance of five different HRSW varieties.

Preliminary data reveal that seeding wheat at 500,000 pure live seed per acre (PLS/acre) produced less grain with a lower test weight than seeding wheat at either 1,000,000 or 1,500,000 PLS/acre in 1994. Seeding wheat at 1,500,000 PLS/acre produced more grain with heavier test weight than seeding wheat at 1,000,000 PLS/acre, except in a reduced-tillage environment (approximately 30 percent residue covering the soil at seeding). Successfully establishment of plants, on the basis of planted seed, was much lower (average = 56%) than expected (80%). This low success rate of establishment can partially be explained by the poor quality of the seed that was sown. Seed used in 1994 was small and, in some instances, infected with scab and other fungal pathogens as a result of environmental conditions in 1993, when the seed was produced. Better quality seed than what was used was not available.

HRSW Variety by Seeding Rate by Tillage Trial — Dickinson, ND, 1994

	Tillage	Established plants	Establishment success	Yield	Test weight
		number/acre	% of planted	bu/ac	lbs/bu
	Conventional	587,004	59	48.7	60.3
	Reduced-till	559,521	56	43.6	58.7
	No-till	542,267	54	48.6	59.3
Seeding rate PLS/acre					
500,000	Conventional	269,719	54	43.6	59.6
500,000	Reduced-till	263,025	53	38.9	58.1
500,000	No-till	259,270	52	41.4	59.1
1,000,000	Conventional	626,950	63	47.8	60.4
1,000,000	Reduced-till	580,256	58	47.4	59.2
1,000,000	No-till	540,744	54	49.3	59.4
1,500,000	Conventional	864,343	58	54.7	60.7
1,500,000	Reduced-till	835,281	56	44.3	58.8
1,500,000	No-till	826,791	55	55.0	59.6

Previous crop: Fallow (mechanically cultivated in the conventional-till environment, lightly disked and sprayed with herbicides in the reduced-till environment, sprayed with herbicides in the no-till environment); Soil test results: varied by plot and replicate - applied 150 lbs 34-0-0 to conventional-till and reduced-till plots and 116 lbs 34-0-0 to no-till plots (sufficient for 60 bu/acre yield in each environment); Planted at 500,000, 1,000,000, and 1,500,000 Pure Live Seed/acre, depending on treatment; Applied Dakota (0.5 pt Breen foxtail plus 1 pt MCPA) plus 0.3 oz Harmony Extra on May 26; Harvested on August 17 (replicates 1,2, and 3) and August 18 (replicate 4).

HRSW Variety by Seeding Rate by Tillage Trial — Dickinson, ND, 1994

Variety	Tillage	Established plants	Establishment success	Yield	Test weight
AC Minto	Conventional	872,942	87	46.7	59.8
	Reduced-till	724,639	72	42.4	58.7
	No-till	752,939	75	48.1	59.0
Amidon	Conventional	568,990	57	51.2	60.7
	Reduced-till	523,275	52	45.2	59.2
	No-till	560,827	57	49.5	59.5
Bergen	Conventional	612,528	61	53.1	60.5
	Reduced-till	622,325	62	47.2	58.7
	No-till	540,690	54	52.0	59.6
Grandin	Conventional	477,560	48	45.3	60.6
	Reduced-till	542,323	54	41.3	58.9
	No-till	500,690	50	46.4	59.8
Norm	Conventional	403,001	40	47.3	59.7
	Reduced-till	385,041	38	41.7	58.1
	No-till	356,197	36	46.7	58.8
Tillage (T)		NS		NS	*
Seeding rate (SR)		*		*	*
Variety (V)		*		*	*
T x SR		NS		NS	NS
V x T		NS		NS	NS
V x SR		*		NS	NS
V x SR x T		NS		NS	NS

* Significant at the P < 0.05 level

Nitrogen Fertilizer Application with Hard Red Spring Wheat Seed at Planting

How much nitrogen (N) fertilizer can safely be applied with hard red spring wheat (HRSW) seed at planting?

Application of small amounts of fertilizer with small grain seed at planting is currently a common practice. This practice improves early seedling growth and vigor by supplying a readily available source of nutrients to the young developing plant when spring soil temperatures are normally cold and soil nutrient availability to the young root system is lower in the soil profile.

Interest in applying higher amounts of fertilizer with the seed at planting, especially N fertilizers, have been generated by the desire to reduce the number of field operations, emphasis on reduced tillage and by new developments in planting equipment which spread seed over a wider portion of the seedbed.

Application of higher rates of N fertilizer with the seed may cause severe germination injury resulting in poor seedling emergence, stand reduction and reduced grain yields.

This study was conducted to observe yield and agronomic responses of HRSW to varying rates of N fertilizer placed with the seed at planting. The study was conducted at 4 locations in southwestern North Dakota, each having a different soil type, Scranton (silt loam), Regent (silty clay), New Leipzig (loam) and Selfridge (clay loam).

Small plots were planted with a double disc seed opener on April 21 and 22. Urea (46-0-0) fertilizer was applied with Grandin HRSW seed at 20, 30, 40, 50, 60 and 70 pound rates of actual nitrogen per acre.

Combined means from all locations for grain yield, test weight, grain protein, plant height and plant stand are shown in the following table.

Agronomic responses of HRSW to N fertilizer applied with seed at planting. (combined means - 4 locations)

Fertilizer (actual N)	Grain yield	Test weight	Grain protein	Plant height	Plant stand/A
lbs/A	bu/A	lbs/bu	%	cm	1000's
20	37.5	60.1	15.0	68	821
30	36.8	59.9	15.1	66	854
40	34.0	59.6	14.9	66	756
50	33.5	59.7	15.1	66	742
60	31.5	59.3	15.3	67	467
70	29.2	59.1	15.4	65	429
C.V. %	23.6	1.7	5.9	14	38
LSD 5%	5.5	ns	ns	ns	180

Grain yields for the 60 and 70 pound per acre N rates were reduced by 16 and 22 percent, respectively, over the 20 pound per acre N rate. This reduction in grain yield was caused primarily by a 43 and 48 percent reduction in plant stand for the 60 and 70 pound per acre N rates, respectively, over the 20 pound per acre N rate. Test weight, grain protein and plant height were not significantly altered by the rate of N fertilizer applied. Based on these results, the use of Urea fertilizer and the use of double disc openers, there appears to be relatively good crop safety with 20 and 30 pound per acre N rates, moderate crop safety with 40 and 50 pound per acre N rates and poor crop safety with 60 and 70 pound per acre N rates.

Several factors influence the amount of N fertilizer which may be safely applied with small grain seed. Some of these include row spacing, type of seed opener, the width of seed spread through the opener, soil texture, soil pH, soil moisture, precipitation, fertilizer placement, type of fertilizer and type of crop. Further discussion on these factors and on fine tuning fertilizer rates for specific farming practices may be found in North Dakota State University Extension bulletin EB-62, "Fertilizer Application with Small Grain Seed at Planting" or by contacting your local county Extension agent.

Dickinson Hard Red Spring Wheat N Fertilizer by Fungicide by Tillage Trial

A trial was started in 1993 to evaluate the affect of N fertilizer and early-season application of fungicide on tan spot suppression across conventional-, reduced-, and no-tillage environments. To do this, a single application of mancozeb at 1.0 lb a.i per acre was applied to plots across each tillage environment. Check (no fungicide) plots were included in each tillage environment. Nitrogen as 34-0-0 was applied, based on soil test results, at high and low rates. The high rate corresponded to a fertilizer plus soil N amount of 100 lbs N per acre and the low rate to 50 lbs N per acre.

Applications of mancozeb have failed to significantly reduce leaf spotting in the two years this trial has been conducted, although incidence of leaf spotting tended to be less when fungicide was applied in 1994 than when it was not. Similarly, tillage environment has failed to affect grain yield in both years. Application of N fertilizer did increase grain yield in 1994; it is unknown whether similar results would have occurred in 1993 since soil N levels were high without applying fertilizer.

Some results have been inconsistent in the two years this trial has been conducted. Leaf spotting was most prominent on plants in a reduced-till environment in 1993, while in 1994 leaf spotting was not different across the three tillage environments. Grain produced by plants in a conventional-tillage environment had lighter test weight than that produced in reduced- or no-till environment in 1994 but not in 1993. The tillage by fungicide interaction was significant in 1993 but not in 1994. These data reveal that this trial should be continued so more definitive conclusions can be reached.

N-Fertilizer by Fungicide by Tillage System Trial — Dickinson, ND, 1994

Treatment	Leaf spotting		Yield		Test weight	
	1993	1994	1993	1994	1993	1994
	% of flag leaf		bu/ac		lbs/bu	
Tillage system						
No-till	26.0	36.2	31.9	43.2	57.7	60.6
Reduced-till	37.1	30.9	34.6	45.4	57.4	60.2
Conventional	33.7	46.7	38.3	40.6	57.6	59.7
Fungicide						
No Fungicide	31.5	41.6	35.1	43.7	57.5	60.2
Fungicide	33.0	34.2	34.7	42.4	57.6	60.2
N Fertilizer						
Low Rate	----	37.5	----	40.6	----	60.5
High Rate	----	38.4	----	45.5	----	59.8

Previous crop: Wheat; Soil test results: 48 lbs N, 22 ppm P_2O_5 (Conventional), 49 lbs N, 20 ppm P_2O_5 (Reduced-till), 42 lbs N, 23 ppm P_2O_5 (no-till) - applied 34-0-0 at varying amounts so that, depending on plot, either 50 or 100 lbs total N (soil N plus fertilizer N) was available; planted Stoa HRSW at 1,000,000 Pure Live Seed/acre on April 13 at a 1.4 inch depth; Applied Dakota (0.5 pt Green foxtail plus 1 pt MCPA) plus 0.3 oz Harmony Extra on May 26; Harvested on August 22.

N-Fertilizer by Fungicide by Tillage System Trial — Dickinson, ND, 1994

Treatment	Leaf spotting		Yield		Test weight	
	1993	1994	1993	1994	1993	1994
	% of flag leaf		bu/ac		lbs/bu	
No-till + Low N	----	36.5	----	40.9	----	60.9
No-till + Low N + Fungicide	----	40.7	----	42.5	----	60.7
No-till + High N	25.6	32.2	29.8	42.8	57.6	60.2
No-till + Fungicide + High N	26.4	35.3	33.9	46.6	57.8	60.5
Reduced-till + Low N	----	34.0	----	46.6	----	60.5
Reduced-till + Low N + Fungicide	----	24.5	----	39.6	----	60.6
Reduced-till + High N	33.1	40.3	37.4	50.7	57.5	59.9
Reduced-till + High N + Fungicide	41.2	24.8	33.6	44.6	57.2	60.0
Conventional + Low N	----	56.2	----	38.2	----	60.4
Conventional + Low N + Fungicide	----	33.0	----	35.7	----	60.0
Conventional + High N	35.9	50.4	38.1	42.6	57.5	59.1
Conventional + High N + Fungicide	31.6	47.1	38.4	45.7	57.6	59.4
Tillage	*	NS	NS	NS	NS	*
Fungicide	NS	NS	NS	NS	NS	NS
Tillage x Fungicide	NS	NS	*	NS	NS	NS
N Rate	---	NS	---	*	---	*
N Rate x Tillage	----	NS	----	NS	----	NS
N Rate x Fungicide	----	NS	----	NS	----	NS
N Rate x Fungicide x Tillage	----	NS	----	NS	----	NS

Dickinson HRSW Variety by N Fertilizer Trial

A Hard Red Spring Wheat Variety by fertilizer trial was started at Dickinson and several other research/extension centers in 1994, at the request of Kent Mckay, NDSU Extension Agronomist located at Minot. The trial is designed to determine: (1) how N fertilizer influences leaf spotting; and (2) determine if the relative performance of selected HRSW varieties changes as the amount of N to the plant is varied. To meet these objectives, six HRSW varieties were each sown in plots containing four different levels of available N : (1) fertilizer plus soil N sufficient to produce 20 bu/acre; (1) fertilizer plus soil N sufficient to produce 30 bu/acre; (1) fertilizer plus soil N sufficient to produce 40 bu/acre; (1) fertilizer plus soil N sufficient to produce 50 bu/acre.

The study was located in a field sown to oat in 1993. Volunteer oat was a persistent problem throughout the growing season even though multiple applications as Hoelon were made. Perhaps for this reason, a linear response to increasing amounts of available N was not observed. Greatest yield was produced at the highest N rate (52 bu/acre), but similar amounts of grain were produced by the other three N rates. Test weight decreased as N rate was increased; leaf spotting was not significantly influenced by N rate. This trial will be continued to 1995 so more definitive statements can be made about the relative performance of contrasting HRSW varieties across different N environments.

N-Fertilizer by Hard Red Spring Wheat Variety Trial — Dickinson, ND, 1994

	leaf spotting	Test weight	Grain yield
N-rate (N)	%	lbs/bu	bu/acre
20	12.5	62.5	45.0
30	13.3	62.4	46.4
40	15.2	62.3	43.7
50	15.2	61.7	52.4
Mean			
LSD .05	NS	*	*
Variety (V)			
Amidon	9.9	61.9	47.5
Grandin	10.0	62.2	46.8
Gus	10.4	61.9	44.9
Kulm	25.6	63.2	47.0
Norm	9.3	62.1	47.9
2375	19.2	62.2	47.2
Mean	14.0	62.2	46.9
CV(%)	57.4	0.9	7.8
LSD .05	*	*	NS
N x V	NS	NS	NS

*Significant at the P<0.05 level.

Previous crop: Oat; Soil test results: 54 lbs N, 14 ppm P_2O_5 - applied 34-0-0 with 10 ft Gandy gravimetric applicator at 4 rates: 47 lbs/acre (20 bu/acre), 121 lbs/acre (30 bu/acre), 194 lbs/acre (40 bu/acre), and 268 lbs/acre (50 bu/acre); Planted HRSW cultivars at 1,000,000 PLS/acre on May 11 at a 1.4 inch depth; Applied 2 pt Hoelon plus 1 pt Bronate on May 31 and 2.5 pt Hoelon on June 15; Harvested on August 22.

Winter Rye
Variety Descriptions

Variety	Origin	Year released	Height	Straw strength	Maturity	Seed color	Seed size	Test wt.	Winter hardiness
Dacold	ND	1989	med.	good[1]	v.late	bl-grn.	med.	low	good
Prima	Can.	1984	tall	good	med.	blue	large	med.	v.good
Frederick	SD	1984	tall	fair	late	tan	med.	high	good
Musketeer	Can.	1980	tall	good	m.early	blue	large	med.	v.good
Rymin	MN	1973	tall	v.good	late	grn-gray	large	high	fair[2]

[1] Under certain environments lodging has been observed

[2] Varieties with fair winter hardiness should not be seeded on bare land

Flax
Variety Description

Variety	Origin	Year released	Relative maturity	Seed[1] color	Seed size	Plant height	Wilt	Rust	Relative yield ability	Oil yield	Oil quality
Neche	ND	1988	mid	br.	med.	med.	R	R	good	good	good
Flanders	Can.	1989	late	br.	med.	med.	MS	R	good	good	good
Somme	Can.	1989	mid	br.	med.	med.	MS	R	good	good	good
Omega	ND	1989	mid	yel.	med.	med.	MS	R	v.good	v.good	good
Day	SD	1989	early	br.	med.	med.	MR	R	good	good	good
Prompt	SD	1988	early	br.	med.	med.	MR	R	good	good	good
Verne	MN	1987	early	br.	med.	med.	R	R	v.good	good	good
Linton	ND	1985	early	br.	med.	med.	R	R	v.good	good	good
NorMan	Can.	1984	mid	br.	med.	med.	MR	R	good	good	good
Rahab	SD	1984	mid	br.	med.	med.	MR	R	good	good	good
Clark	SD	1983	early	br.	med.	med.	MR	R	good	good	good
NorLin	Can.	1982	early	br.	med.	med.	MS	R	good	good	good
Flor	ND	1981	early	br.	med.	med.	MS	R	v.good	good	good
McGregor	Can.	1980	late	br.	med.	tall	R	R	v.good	good	good
Culbert 79	SD	1979	early	br.	med.	med.	MR	R	good	good	good
Dufferin	Can.	1975	late	br.	med.	tall	R	R	good	good	good
Linott	Can.	1966	early	br.	med.	med.	MS	R	good	good	good

[1] bl. = Blue; br. = Brown; yel. = Yellow.

1994 Hettinger Flax Variety Trial

Variety	Test weight	Yield			
		1994	1993	1992	2yr*
	lbs/bu	bu/A			
Linton	53.7	7.8	38.7	37.7	38.2
Norlin	52.7	8.1	43.2	32.4	37.8
Norman	53.4	8.2	41.3	33.1	37.2
Flor	52.7	7.1	39.8	32.1	36.0
Flanders	52.4	8.2	34.2	37.2	35.7
Somme	52.5	6.5	38.2	31.8	35.0
Neche	52.4	6.3	36.2	33.3	34.8
Omega	52.5	8.4	35.3	31.0	33.2
Linora	53.0	8.4	37.4	27.8	32.6
Prompt	52.0	6.2	36.4	27.0	31.7
Verne	53.1	7.5	35.4	27.5	31.4
Rahab 94	53.0	8.5	40.2		
McDuff	52.4	8.5	36.7		
Verne 93	53.0	6.7			
Trial mean	52.7	7.6	36.6	31.2	
C.V. %	0.9	14.4	9.5	13.2	
LSD 5%	0.7	1.6	5.8	5.9	
LSD 1%	0.9	2.1	7.8	7.8	

Planting date: May 3 Harvest date: September 14
Seeding rate: 30 lbs live seeds/A
Yield goal: 30 bu/A
Herbicide application: 1.5 pt/A Treflan MTF
* 2 year yield average (1993 & 1992)
Trial was injured by hail on 7/4/94.

1994 Hettinger Safflower Variety Trial

Variety	Test weight	Oil content	Yield			
			1994	1993	1992	2yr*
	lbs/bu	%	lbs/A			
AC Stirling	42.3	35.5	553	1831	1017	1424
Finch	44.1	39.6	667	1333	1386	1360
Montola 2000	41.4	43.7	947	1277	1361	1319
S-541	41.4	45.0	727	1271	1298	1284
Centennial	41.4	44.6	687	1250	1215	1232
Morlin	39.7	42.4	613	1192	1264	1228
Saffire	42.7	31.8	460	1354	1071	1212
C/W 4440	39.3	39.7	667	1017	1334	1176
Girard	42.0	40.4	327	768	1058	913
S-208	--	39.6	240	569	1250	910
90B 6011	39.6	40.7	700	1626		
88B 3006	38.9	42.6	593	1280		
Montola 2001	39.4	42.5	687			
AC-2	40.4	40.6	627			
Trial mean	40.9	40.6	607	1253	1155	
C.V. %	1.8	--	14	20	26	
LSD 5%	1.1	--	123	357	428	
LSD 1%	1.5	--	165	478	571	

Planting date: May 2 Harvest date: September 23
Seeding rate: 400,000 live seeds/A
Yield goal: 2000 lbs/A
Herbicide application: 1.5 pt/A Treflan MTF
% oil content is based on 8% moisture.
* 2 year yield average (1993 & 1992)
Trial was injured by hail on 7/4/94.

1994 Hettinger Sunflower Trial

Brand	Hybrid	Grain Yield lbs/A	Test weight lbs/bu	Oil content* %
Proseed	140	2614	28.4	43.5
Proseed	229	2352	28.6	41.1
Proseed	107	2111	27.8	41.0
Limagrain	H4	2109	34.7	41.0
Pioneer	XF426	2088	29.0	43.1
Limagrain	H3	2086	32.9	38.9
Dekalb	DK3868	2069	31.0	41.9
Proseed	143	2019	28.8	39.8
Limagrain	H2	2018	31.6	41.6
Pioneer	XF435	2011	29.3	42.5
Dekalb	DK3881	2008	30.0	43.6
Pioneer	6230	1973	32.0	38.9
Pioneer	6339	1927	28.0	43.8
Proseed	121	1888	29.0	41.5
Proseed	109	1869	29.2	41.2
Proseed	141	1806	28.0	42.4
Pioneer	DO707	1787	30.1	41.0
Limagrain	H1	1781	29.4	43.4
Limagrain	H5	1766	31.2	41.8
Dekalb	DK3904	1695	31.0	--
Pioneer	DO827	1663	31.1	39.1
Cenex/LOL	755	1632	30.7	40.6
Dekalb	DK3790	1608	32.2	40.7
Cenex/LOL	745	1437	29.3	40.2
Trial mean		1893	30.0	41.2
C.V. %		19	3.1	--
LSD 5%		498	1.3	--
LSD 1%		658	1.7	--

Planting date: May 12 Harvest date: October 11
Seeding rate: 21,000 seeds/A, thinned to 18,000 plants/A
Row spacing: 30"
Yield goal: 2500 lbs/A
Herbicides applied: 1.5 pt/A Treflan EC + 2.5 pt/A Eptam, pre-plant incorporated
Insecticides: 12 oz/1000' row Furidan CR-10 with the seed
3/4 lb/A Parathion on 7/29/94
Grain yields are on an 8% moisture bases.
* Oil content based on 10% moisture.

Corn grown as silage is an excellent forage crop. However, soybean meal generally is added to correct protein deficiencies. The soybean meal added to the feed ration is an off-farm cost to producers in southwestern North Dakota, since soybean is not adapted to local growing conditions and little is grown. Adaptation screening trials suggest that lupin may successfully be grown in western North Dakota. If so, lupin could be grown and substituted for soybean meal in livestock rations. Lupin seed is high in protein (35%) and TDN (78%), and unlike soybeans it can be fed directly to livestock without heat treatment.

Lupin, fababean, lentil, and field pea were evaluated in variety comparison trials at Dickinson in 1994. Seed of 18 lupin, 4 fababean, 6 lentil, and 6 field pea varieties or advanced experimentals was provided by the Carrington Research Extension Center. Cultural practices including tillage and seeding, fertilization, herbicide application, and harvesting followed currently acceptable agronomic procedure in implementing and maintaining cultivar comparison trials.

Lupin

Grain yield varied from 313 to 1415 pounds per acre among the entries in the lupin nursery in 1994. Primorski produced the greatest amount of seed. Seedling blight and rodent feeding were observed in several plots at the time of seedling emergence and shortly thereafter. The Anthracnose pathogen was observed among white lupin varieties in certain plots at the onset of bloom. These factors probably explain the relatively high variability in yield (indicated by the high CV[%]) which could not be explained by cultivar differences.

Of the lupin cultivars evaluated at Dickinson between 1992 and 1994, RSI 2085 produced the most grain. Grain yield of this cultivar during this period was 116% that of Primorski, another white lupin. Grain yield of yellow lupin cultivars evaluated over this time have been considerably less than that of the white lupin cultivars, suggesting that yellow lupin is not adapted to growing conditions in the southwest.

Dryland Lupin Nursery - Fallow — Dickinson, ND, 1994

Entry	Type	Days to bloom	Height	Seed yield 1994	1993	1992	Avg	% of Primorski
			inches		lbs/ac			%
Boruta	Y	46.0	26.7	331.5	----	----	----	----
Chinette	W	30.2	25.5	648.8	----	----	----	----
Danja	B	29.2	19.2	1263.3	2126.8	----	----	----
Gungurru	B	29.5	16.0	1012.6	1756.8	----	----	----
Jenny	W	30.5	27.7	1058.4	----	----	----	----
Juno	Y	41.5	24.0	596.7	1438.1	679.0	905	50
Manru	Y	51.2	32.0	313.1	835.3	420.9	523	29
Merrit	B	30.0	15.5	1150.2	1449.3	----	----	----
Primavera	W	30.0	23.5	1163.4	----	----	----	----
Primorski	W	29.0	27.2	1415.5	1455.8	2507.7	1,793	100
Progress	W	32.2	28.2	831.8	2007.0	----	----	----
RSI 2085	W	35.0	26.0	957.7	2564.5	2728.3	2,083	116
RSI 1013NH	W	31.0	23.5	1022.2	----	----	----	----
RSI 2019	W	33.7	26.7	731.2	2394.9	----	----	----
Ultra	W	33.5	27.0	939.2	2262.8	2226.3	1,809	101
Vegus-W	Y	40.0	25.5	443.2	1151.4	----	----	----
Yandee	B	29.5	19.5	947.6	1806.9	----	----	----
Yorrel	B	29.7	19.2	1348.8	1510.5	----	----	----
Mean		33.6	24.5	898.6				
CV(%)		4.8	9.0	20.7				
LSD .05		2.3	3.1	263.8				

Fababean

Grain yield was low for the four varieties evaluated at Dickinson in 1994. Yield ranged from 383 lbs per acre for Aladin to 630 lbs per acre for Encore. These low yields can partially be explained by field conditions at seeding. Heavy wheat stubble was disked into the soil prior to planting. The stubble interfered with the planter's ability to sow seed at a uniform depth. Seeding depth ranged from 0.25 inches to 1.5 inches. As a result, uneven and, in some plots, poor crop stands developed. Results of this trial are insufficient to conclude if fababean is adapted to growing conditions in western North Dakota.

Dryland Fababean Trial - Recrop — Dickinson, ND, 1994

Variety	Height	Seed yield
	inches	lbs/acre
Aladin	26.0	383.4
Encore	23.7	630.0
Outlook	24.0	364.4
Pegasus	25.2	437.5
Mean	24.7	453.8
CV(%)	6.6	17.9
LSD .05	NS	130.0

Lentil

Lentil yield ranged from 545 lbs per acre for Laird to 1106 lbs per acre for Crimson in 1994. Crimson is a variety of lentil developed by USDA-ARS scientists located at Pullman, Washington, for semiarid regions like western North Dakota. It tends to mature earlier and be shorter than the dominant varieties grown. Of the three varieties grown at Dickinson in 1992 and 1994, Crimson has produced the most grain.

Lentil is short compared to wheat and other crops grown in western North Dakota. Distance from the top of plants to the soil surface averaged only 11 inches for the lentil varieties evaluated at Dickinson in 1994. Lowest pods formed 2 inches or more below the top of plants. We suggest that lentil production in western North Dakota may be best suited to level fields that are free of rocks. Reduced- and no-till seedbeds are probably better suited than conventionally-tilled seedbeds for lentil, since the plants will be supported by standing stubble and may stand more upright.

Dryland Lentil Variety Trial - Recrop — Dickinson, ND, 1994

Variety	Height	Test weight	Grain yield			% of
			1994	1992	Avg	Brewer
	inches	lbs/bu		lbs/ac		%
Brewer	11.7	59.00	652.2	2503.0	1,577.60	100
Crimson	9.1	63.87	1106.2	3255.0	2,180.60	140
Eston	10.2	62.62	700.6	2647.0	1,673.80	110
Laird	14.8	59.00	544.6	----	----	----
Richlea	11.2	60.75	846.2	----	----	----
Spanish Browns	8.7	63.12	783.9	----	----	----
Mean	10.9	61.39	772.28			
CV(%)	11.2	1.80	19.34			
LSD .05	1.8	1.7	225.1			

Field Pea

Average grain yield for the six field pea varieties evaluated in 1994 was 1606 lbs per acre. Yields would have been much higher if crop stand had been better than what was achieved. As in the case of fababean, wheat stubble interfered with planting of field pea seed and, in some plots, a poor crop stand resulted. Compared to fababean, however, field pea seems adapted to growing conditions in southwestern North Dakota. Yield of field pea varieties evaluated at Dickinson in 1992 and 1994 has averaged around 2000 lbs per acre.

Dryland Pea Variety Trial - Recrop — Dickinson, ND, 1994

Variety	Height	Test weight	Grain yield			% of
			1994	1992	Avg	Trapper
	inches	lbs/bu		lbs/ac		
Century	15.1	64.4	1678.1	2152.2	1,915.15	83
Emerald	13.3	63.7	1523.9	----	-----	-----
Express	14.3	62.1	1611.1	----	-----	-----
Profi	16.2	63.1	1699.0	----	----	-----
Sirius	16.2	64.1	1692.8	1767.6	1,730.20	75
Trapper	14.1	64.6	1429.8	3208.0	2,318.90	100
Mean	14.9	63.7	1605.8			
CV(%)	18.9	0.54	11.01			
LSD .05	NS	0.5	NS			

Previous crop: Fallow (lupin), HRSW (fababean, lentil, field pea); Soil test results: 102 lbs N, 32 ppm P_2O_5 (lupin), 33 lbs N, 33 ppm P_2O_5 (fababean, lentil, field pea) - applied no fertilizer but inoculated all seed to encourage biological fixation of N; Applied 1 pt Treflan preplant incorporated; Planted all crops on May 4 at a 1.4 inch depth: Applied 2,4-D on August 31 to lupin, fababean, and lentil as a dry down treatment; Harvested pea trial on 19 August, lentil on September 6, and fababean and lupin on September 8.

1994 Hettinger Pinto Bean Variety Trial

Variety	Test weight	Yield 1994	1992	1990	2yr*
	lbs/bu	lbs/A			
Fiesta	55.9	993	1431	925	1178
Othello	56.2	827	1492	607	1050
Bill Z	54.4	793	1538		
Topaz	53.4	953	1285		
CO59196	57.2	867			
Chase	54.3	560			
Trial mean	55.3	832	1386	830	
C.V. %	0.8	23	17	18	
LSD 5%	0.7	281	ns	ns	
LSD 1%	1.0	386	ns	ns	

Planting date: May 17 Harvest date: September 23
Seeding rate: 60 lbs live seeds/A
Yield goal: 1500 lbs/A
Herbicide application: 1.5 pt/A Treflan MTF
* 2 year yield average (1992 & 1990)
Trial was injured by hail on 7/4/94.

1994 Hettinger Navy Bean Variety Trial

Variety	Test weight	Yield 1994	1992	1989	2yr*
	lbs/bu	lbs/A			
Mayflower	58.6	380	1038	1763	1400
Norstar	59.9	1053	910	1483	1197
Schooner	59.0	593	532		
Agri-1	--	273			
Trial mean	59.3	575	846	1609	
C.V. %	1.3	29	22	22	
LSD 5%	ns	258	293	ns	
LSD 1%	ns	364	420	ns	

Planting date: May 17 Harvest date: September 23
Seeding rate: 45 lbs live seeds/A
Yield goal: 1500 lbs/A
Herbicide application: 1.5 pt/A Treflan MTF
* 2 year yield average (1992 & 1989)
Trial was injured by hail on 7/4/94.

Dickinson Corn Trial

Corn is an important annual forage in southwestern North Dakota. Corn was planted on approximately 230,000 acres of cropland in 1991; this represents a 25% increase in corn acreage since 1980. The importance of corn in the region supports adaptation trials of newly developed hybrids. These trials should reflect changes in corn production strategy, including increased planting rates and narrower row spacing.

A corn trial was conducted at Dickinson in a recropped environment in 1994. Corn seed was solicited from private seed companies. Cultural practices including tillage and seeding, fertilization, herbicide application, and harvesting followed currently acceptable agronomic procedure in implementing and maintaining cultivar comparison trials.

Corn silage yield was 3.7 tons of dry matter per acre among the nine hybrids evaluated. Significant differences in silage yield were not observed among the hybrids, in part because of soil and other uncontrolled variability. Silage yield for the two hybrids included in the corn trial at Dickinson over the last three years has been around 4 tons/acre.

For the first time in three years, corn produced grain at Dickinson. Grain yield ranged from 43 bushels per acre for Pioneer 3963 to 62 bushels per acre for Pioneer 3905, though significant differences in grain yield among hybrids were not observed. Test weight was light (<56 lbs/bu), with the exception of grain produced by Cargill 1077 (58.6 lbs/bu).

Dryland Corn Hybrid Trial - Recrop — Dickinson, ND, 1994

			Yield						
				Silage					
			70%	DM basis				Grain	Test
Brand	Hybrid	RM	Moisture	1994	1993	1992	Avg	1994	weight
		days		tons/ac				bu/ac	lbs/bu
Cargill	1077	75	14.4	4.3	2.9	----	----	44.7	58.6
Cargill	2037	80	12.8	3.8	3.3	4.7	3.9	46.5	50.4
Dekalb	DK 343	84	12.1	3.6	3.1	----	----	50.6	52.0
Dekalb	DK 401	90	10.3	3.1	----	4.7	----	46.9	49.4
Pioneer	3905	87	13.7	4.1	----	----	----	62.0	55.0
Pioneer	3917	87	11.6	3.5	3.2	----	----	49.7	51.1
Pioneer	3921	86	10.5	3.1	----	----	----	56.4	51.4
Pioneer	3963	79	12.3	3.7	3.3	4.9	4.0	43.0	55.5
Pioneer	3979	76	12.9	3.9	----	5.1	----	55.3	54.9
Mean			12.3	3.7				50.6	53.1
CV(%)			24.6	24.6				20.6	2.9
LSD .05			NS	NS				NS	2.2

Previous crop: Barley; Soil test results: 28 lbs N, 10 ppm P_2O_5 - applied 100 lbs urea; Planted at approximately 20,000 seed/acre on May 18; Applied 0.67 oz Accent plus 1 pt Scoil; Chopped for silage on September 19.

1994 Hettinger Hybrid Corn Trial

Brand	Hybrid	Relative maturity	Grain yield	Test weight	Silage yield	Harvest moisture
		days	bu/A	lbs/bu	Tons/A	%
Pioneer	3905	87	66.6	55.3	6.20	60
NK	SB85	85	64.4	49.7	5.89	64
Dekalb	343	84	61.7	54.7	6.20	57
Cargill	2037	80	61.2	53.5	7.07	52
Dekalb	401	90	60.6	50.8	6.21	63
Pioneer	3963	79	59.0	54.8	7.25	52
Pioneer	3917	87	58.5	55.0	5.92	59
Dekalb	442	94	57.5	49.0	7.35	58
Dekalb	306	80	57.5	52.5	4.81	55
Dekalb	Exp.429	79	56.3	51.3	5.90	49
Pioneer	3984	75	55.4	57.8	5.90	48
Public*	MN 13		52.9	51.9	7.17	56
Cargill	1077	75	46.1	59.0	5.38	42
Public*	Rainbow Flint		27.5	47.0	6.34	63
Trial mean			56.1	53.0	6.28	
C.V. %			15.7	2.4	16.44	
LSD 5%			12.6	1.8	1.49	
LSD 1%			16.8	2.5	2.01	

Previous crop: Hard Red Spring Wheat
Planting date: May 12 Harvest date: Silage - September 7
Grain - October 10
Seeding rate: 21,000 seeds/A, thinned to 18,000 plants/A
Row spacing: 30"
Herbicides applied: 4 pt/A Eradicane + 3 pt/A Bladex 4L - PPI
0.5 oz/A Accent + 1/2 pt/A 2,4-D (LV4) +
2 pt/A Scoil - Post
Insecticide applied: 12 oz/1000'row Furidan CR-10 with seed
Grain yields are on a 13.5% moisture bases.
Silage yields are on a 70% moisture bases.
* Public open pollinated variety.

1994 New Leipzig Hybrid Corn Trial

Brand	Hybrid	Relative maturity	Grain yield	Test weight	Silage yield	Harvest moisture
		days	bu/A	lbs/bu	Tons/A	%
Pioneer	3963	79	57.8	56.6	5.05	55
Pioneer	3905	87	56.6	57.9	4.03	64
Dekalb	343	84	55.3	56.6	5.24	60
Pioneer	3984	75	54.1	59.3	6.09	44
Pioneer	3917	87	53.8	57.6	6.65	56
Dekalb	306	80	53.6	53.8	5.30	55
Dekalb	Exp429	79	52.6	51.5	3.09	66
Public*	MN 13		52.1	54.4	3.84	67
Dekalb	442	94	51.6	54.0	5.39	62
Dekalb	401	90	49.1	55.0	5.25	62
Cargill	2037	80	44.1	54.0	5.25	53
Cargill	1077	75	42.3	61.6	3.88	32
Public*	Rainbow Flint		34.2	45.9	6.26	70
Trial mean			51.4	55.6	4.93	
C.V. %			17.9	1.9	16.02	
LSD 5%			13.2	1.5	1.12	
LSD 1%			17.6	2.0	1.51	

Previous crop: Fallow
Planting date: May 13 Harvest date: Silage - September 7
Grain - October 11
Seeding rate: 21,000 seeds/A, thinned to 18,000 plants/A
Row spacing: 30"
Herbicides applied: 0.5 oz/A Accent + 1/2 pt/A 2,4-D (LV6) + 2 pt/A Scoil
Insecticide applied: 12 oz/1000'row Furidan CR-10 with seed
Grain yields are on a 13.5% moisture bases.
Silage yields are on a 70% moisture bases.
* Public open pollinated variety.
Trial had a moderate infestation of corn borers.

Dickinson Buckwheat Trial

North Dakota has been the leading buckwheat producer within the U.S. for several years. Within the state, the southwest continues to be an important buckwheat producing region. When grown under contract, buckwheat production can be quite profitable. In addition, buckwheat can be used to break pest cycles when incorporated into cropping sequences dominated by small grains. Buckwheat can also provide growers in the southwest with new market opportunities.

MinnDak Growers Ltd. specializes in the marketing of buckwheat and other alternative crops in the southwest. Steve Edwardson, MinnDak's Crop Production Specialist, is located in Dickinson and is an excellent source of information on the market potential of buckwheat and other selected alternative crops.

The buckwheat variety trial located at Dickinson included more entries (7) than in previous years. This reflects the close cooperation between scientists located at Dickinson and other research/extension centers in the State, and the Crop Specialist at MinnDak Growers Ltd, in 1994 so that the potential of buckwheat as an alternative crop could be more thoroughly explored

Dryland Buckwheat Variety Trial - Recrop — Dickinson, ND, 1994

Variety	Height	First flower	Seeds	Test weight	Yield 1994	Yield 1992	Yield Avg
	inches	June	lbs	lbs/bu		lbs/ac	
85624	33.5	20	13,691	37.1	1541.7	1260.0	1400.8
Common	30.5	19	18,599	43.5	1617.4	1650.0	1633.7
Giant American	36.2	20	14,522	37.2	1555.3	1178.0	1366.6
Expt 1	34.0	20	16,624	38.5	1174.6	----	----
Mancan	36.5	20	15,891	37.7	1618.6	1094.0	1356.3
Manor	34.7	20	15,566	39.1	1395.8	1137.0	1266.4
Winsor Royal	35.7	20	15,147	38.4	1484.8	----	----
Mean	34.5	19.9	16,197	38.8	1484.0		
CV(%)	4.6		5.1	3.8	15.2		
LSD.05	2.4		1198.9	3.9	NS		

Previous crop: Durum; Soil test results: 35 lbs N, 17 ppm P_2O_5 - no fertilizer applied; Planted on May 17 at 670,000 Pure Live Seed/acre; No postemergent herbicides applied; Harvested on September 1.

Dickinson Potato Trial

Potato is grown for seed in Golden Valley, North Dakota. For this reason, a potato trial was conducted at Dickinson in 1994. The trial was conducted in a recropped field. Potato yield ranged from 3.1 tons/acre for Red Norland to 5.5 for Red Pontiac. The high CV(%) for this trial suggest that interpretations on the relative performance of entries included in this trial should be made with caution.

Potato Trial — Dickinson, ND, 1994

Variety	Type	Yield
		tons/acre
Burbank	Russet	4.8
Goldrush	Russet	3.7
ND1871-3R	Red	4.2
ND2471-6	White	4.6
ND2417-8	White	4.5
Norchip	White	3.3
Norking	Russet	3.7
Norkotah	Russet	4.2
Red Norland	Red	3.1
Norqueen	Russet	2.8
Red Pontiac	Red	5.5
Shepody	Russet	4.6
Mean		4.1
CV(%)		15.2
LSD .05		0.9

Previous crop: Pulses; Planted on May 13; Harvested on September 26 (1 and 2 replicates) and September 27 (3 and 4 replicates)

1994 Hettinger Proso Millet Variety Trial

Variety	Test weight lbs/bu	Grain yield lbs/A
Rise	55.6	1423
Sunup	56.2	1411
Cerise	57.9	1359
Snobird	56.8	1353
Trail mean	56.6	1387
C.V. %	0.9	22
LSD 5%	0.8	ns
LSD 1%	1.1	ns

Planting date: May 17
Seeding rate: 25 lbs/A
Yield goal: 1500 lbs/A
Harvest date: September 14
Injured by hail on July 4

1994 Hettinger Millet Hay Variety Trial

Variety	Moisture at harvest %	Yield* 1994	1993	1992	2 yr**
		-----Tons per acre----			
Rise Proso	65	1.82	3.70	3.50	3.60
Sunup Proso	68	1.69	3.56	3.43	3.50
Manta Foxtail	62	2.71			
Butte Foxtail	69	2.20			
Minsum Proso	66	1.97			
Japanese Barnyard	71	1.92			
Cerise Proso	66	1.89			
Hybrid Pearl	75	1.56			
Trial mean		1.97	3.02	3.01	
C.V. %		15.53	13	18	
LSD 5%		0.45	ns	ns	
LSD 1%		0.61	ns	ns	

Planting date: May 17 Harvest date: August 11
Seeding rate: 25 lbs/A
Yield goal: 3 Tons/A
Herbicide used: 16 oz/A 2,4-D ester
* Yields are on a dry weight bases.
** 2 year average (1993 & 1992).
Trial was injured by hail on 7/4/94.

Dickinson Cereal-Pea Intercrop Trial

An alternative to growing corn for silage is to grow other cereals like barley or oat as haylage. While past work indicates that both these crops produce less total digestible nutrients than corn grown for either grain or silage, it may be possible to enhance the feed value of barley or oat haylage by growing these cereals together with field pea. Canadian researchers concluded that intercropping barley with field peas significantly increased crude protein content of the hay produced. Similarly, protein yield sometimes was increased when oats were intercropped with field peas in western North Dakota rather than grown alone. While past work in North Dakota indicates that hay yields can be decreased when oats were intercropped with either field pea or vetch, a depression in grain yield does not always result. In a 1959-60 study, dry matter production of oat-field pea mixtures compared favorably with monocropped oat in recropped environments at Dickinson, Minot, and Williston. Likewise, recent work indicated that dry matter yield was maintained when oats and peas were intercropped at Dickinson. The influence of intercropping on hay yield and protein content must be established for widespread adoption of this practice in the Southwest. For this to be known, the influence of cereal to pea plant populations on intercrop performance must be established.

To determine if cereal-pea mixtures are adapted to western North Dakota, a trial was started in 1993. Dumont and Magnum oats, and Bowman and Horsford barley were sown alone and mixed with Trapper field pea. Seeding rates for monocultures were 325,000, 750,000, and 1,125,000 pure live seed (PLS) per acre for cereal grains and 162,500, 325,000, and 487,500 PLS per acre for peas. Both crop species were sown at 0.5, 1.0, and 1.5 of a monoculture seeding rate in intercrops and alone. Therefore, fifteen different cereal:pea intercrop treatments were evaluated for each cereal cultivar: 0.5:0.0, 1.0:0.0, 1.5:0,0, 0.5:0.5, 1.0:0.5, 1.5:0.5, 0.5:1, 1:1, 1.5:1, 0.5:1.5, 1:1.5, 1.5:1.5, 0.0:0.5, 0.0:1.0, and 0.0:1.5. The experiment was conducted under dryland conditions in both fallow and recrop environments.

Consistent trends have not been observed among cereal-pea mixtures evaluated at Dickinson during 1993 and 1994. In 1993, oat-pea mixtures generally produced more hay than barley-pea mixtures, regardless of whether the oat was a conventional (Dumont) or forage (Magnum) type. In 1994, hay yield of cereal-pea mixtures were higher when a forage-type cereal was grown, regardless of whether the cereal crop was barley or oat.

Hay yield of cereal crops grown alone at 750,000 PLS per acre was generally greater than any cereal-pea mixture when the cereal crop was sown at 375,000 PLS per acre. When the cereal was sown at 750,000 or 1,125,000 PLS per acre in combination with pea, some cereal-pea mixtures produced more hay than the cereal crops grown alone at 750,000 PLS per acre, depending on the year, tillage environment, and cereal cultivar considered. These data indicate that further work is needed to determine if hay production of cereal-pea intercrops at selected seeding rates is consistently greater than that produced by the cereal crop when grown alone. Still, it seems that sowing oat or barley at 375,000 PLS per acre along with pea at 375,000 PLS per acre, as has been suggested by some proponents of cereal-pea mixtures in North Dakota, may produce less hay than a sole cereal crop. This may an acceptable trade-off for some livestock producers if the quality of the cereal-pea hay is improved compared to that of the cereal crop when grown alone. This project will continue so that the influence of intercropping on hay quality, and the impact of seeding rates on cereal-pea hay yield, can be better quantified.

Cereal/Pea Intercrop Trial — Dickinson, ND, 1994

Cereal Variety	seeding rate		harvest moisture				Hay yield			
			fallow		recrop		fallow		recrop	
	cereal	pea	1993	1994	1993	1994	1993	1994	1993	1994
	PLS/acre		%				DM/acre			
Bowman			71	77	72	77	4.1	2.4	2.7	2.5
Dumont			79	79	75	80	4.2	2.7	3.0	2.5
Horsford			70	71	74	62	4.3	3.2	2.6	4.2
Magnum			77	69	75	63	4.4	3.6	3.0	3.9
	0	162,500	----	77	----	72	----	2.1	----	2.7
	0	325,000	----	78	----	71	----	2.2	----	3.2
	0	487,500	----	78	----	73	----	2.4	----	3.0
	375,000	0	79	71	79	89	----	3.2	----	3.0
	375,000	162,500	75	73	75	70	4.1	2.9	2.5	3.1
	375,000	325,000	75	75	77	72	4.1	2.7	2.6	3.1
	375,000	487,500	76	76	77	72	3.9	2.8	2.8	3.3
	750,000	0	74	71	69	69	4.3	3.4	2.8	3.4
	750,000	162,500	73	73	74	71	4.4	3.2	2.7	3.2
	750,000	325,000	74	74	74	71	4.4	3.2	2.9	3.4
	750,000	487,500	74	74	75	71	4.2	3.1	3.0	3.5
	1,125,000	0	----	71	----	67	----	3.5	----	3.5
	1,125,000	162,500	73	71	71	69	4.3	3.6	2.9	3.7
	1,125,000	325,000	73	72	73	69	4.4	3.3	2.9	3.5
	1,125,000	487,500	74	74	74	71	4.5	3.2	----	3.5
Mean			75	74	75	71	4.3	3.0	2.8	3.3
CV(%)			3.5	3.4	2.8	6.6	14.1	10.6	11.6	17.1
LSD .05			2.0	2.0	2.0	NS	NS	0.2	0.2	0.4

Previous crop: Fallow (fallow), HRSW (recrop); Soil test results: 82 lbs N, 27 ppm P_2O_5 (fallow), 91 lbs N, 29 ppm P_2O_5 (recrop) - pea seed inoculated to stimulate biological N fixation; Planted on May 3 (both environments); Cut for hay: Bowman - July 11 (both environments), Dumont - July 12 (fallow) and July 13 (recrop), Magnum and Horsford - July 18 (fallow), Magnum and Horsford - July 19 (recrop)

1994 Hettinger Alternative Forage Trial

Crop	Variety	Moisture at harvest	Yield*			
			1994	1993	1993	2 yr**
		%	--------tons/A--------			
HRSW	Sharp	59	1.13	1.95		
Barley	Azure	56	1.58	2.77		
Barley	Horsford	58	2.18	3.48	4.58	4.03
Oat	Whitestone	60	1.93			
Triticale	Frank	61	1.40	3.66	4.42	4.04
Millet	Golden German	70	2.64		2.61	
Millet	Hybrid Pearl	73	1.93	3.16	1.28	2.22
Millet	Siberian	63	2.84	3.25	2.46	2.86
Field Pea	Magnus	69	1.19		2.60	
Oat/Pea	Whitest./Trap.	58	1.92			
Corn	Pioneer 3963	70	1.30	3.14	4.88	4.01
Sudangrass	Piper	61	1.42	3.21	3.34	3.28
Sorghum	Sorgo 10	67	1.42	4.30	2.83	3.56
Sorghum/sudan	Sudax	67	1.97	4.26	3.34	3.80
C.V. %			22.04	15.86	28.99	
LSD 5%			0.56	0.82	1.21	
LSD 1%			0.75	1.10	1.62	

* Yield is on a dry weight bases.
** 2 year average (1993 & 1992).
Trial was injured by hail on 7/4/94.

Dickinson Alfalfa Research

An alfalfa cultivar trial was planted on May 8, 1992, at Dickinson. Establishment of alfalfa in some plots was poor due to sandblasting of alfalfa seedlings. As a result, conclusions about the relative performance of entries in this trial should be made with caution. The trial was terminated in 1994.

An alfalfa establishment trial was begun by NDSU scientists located at Dickinson and Fargo in 1994. This research explores alternative methods of establishing alfalfa over a 7-year period: (1) clean seeding in a no-till environment; and (2) seeding with oat in a conventional-till environment.

Volunteer barley was common in both tillage environments in 1994. As a result, a nurse crop occurred with alfalfa in both no-till (barley) and conventional-till (barley and oat) plots. This is reflected in the grain yield produced in both environments. Pre- and postemergent herbicides will be used to control volunteer barley in no-till plots in 1995 and in subsequent years.

Alfalfa Variety Trial — Dickinson, ND, 1994

Brand	Entry	Moisture		Hay yield (DM basis)					% of
		1 cut	2 cut	1994/1	1994/2	1993	1992	Avg	Vernal
		%		Tons/acre					
Cenex	Blazer (PI)	61	63	1.7	2.4	2.9	1.9	2.2	98
Cenex	Blazer XL (AC)	63	65	2.0	2.0	2.9	2.3	2.3	101
Cenex	Blazer XL (PI)	61	66	2.0	2.5	2.8	2.0	2.3	102
Cenex	640 Blend (PI)	61	64	2.3	2.1	2.3	1.6	2.1	91
Cenex	740 Blend (PI)	62	64	1.9	2.2	2.8	2.0	2.2	98
Public	Ladak	60	64	1.6	1.9	3.2	1.9	2.1	94
Cenex	Legend (AC)	60	66	1.9	2.3	2.7	1.9	2.2	96
Cenex	Legend (PI)	60	64	2.1	2.0	2.8	2.2	2.3	100
Dahlgren	Milkmaker II	61	65	2.2	2.2	3.0	1.5	2.2	98
Interstate	Roughrider	62	63	2.0	2.0	4.0	1.5	2.4	104
Public	Travois	61	65	2.2	2.1	3.8	1.8	2.5	109
Public	Vernal	61	64	2.2	2.4	2.5	2.0	2.3	100
Interstate	WL-225	61	64	1.8	2.3	2.4	1.9	2.1	92
Mean		61	64	2.0	2.2	2.9	1.9		
CV(%)		2.7	3.0	25.6	16.3	27.3	19.6		
LSD .05		NS	NS	NS	NS	NS	NS		

/1 First cutting; /2 Second cutting

Alfalfa Establishment Trial — Dickinson, ND, 1994

Tillage	Plant count			Hay		Grain
	Oat	Alfalfa	Barley	Moisture	Yield	Yield
		plants/acre		%	tons/acre	lbs/acre
No-till	----	201,739	----	60	2.2	1730
Conventional	356,107	356,106	182,954	55	2.8	3480
Mean	----	278,923	----	58	2.5	2605
CV(%)		27.8		1.1	1.4	15.2
LSD .05				0.8		892

HETTINGER ALFALFA VARIETY DEMONSTRATION

Planting date: 4/28/92

Source	Variety	Plants/ft^2 8/28/92	6/30/93	5/4/94
AgriPro	9750	17	13	13
AgriPro	Dart	24	14	7
Northrup King	MultiKing 1	16	13	9
Northrup King	Spredor 2	10	16	13
Garst	636	8	12	14
Garst	645	11	13	11
Dekalb	120	28	16	12
Dekalb	122	9	17	9
Pioneer	5364	30	17	15
Pioneer	5262	25	12	11
public	Ladak	35	13	11
public	Travois	36	10	8
public	Vernal	22	18	9
Interstate	Clipper	33	22	10
Interstate	WL225	18	13	10
Cenex LOL	Blazer	27	19	11
Cenex LOL	Legend	29	12	12
Cargill	Trident II	11	14	9
Cargill	Crown II	30	14	12
Jacques	Multi-plier	12	11	11
Jacques	Chief	31	20	9
Planting date:	7/8/93		8/17/93	
ARS-Mandan	Rangelander		24	14
Ag. Canada	Anik		17	10
ARS-Mandan	Heinricks		19	9

Planting rate: 10 lbs/A

Nurse crop: Oats @ 25 lbs/A

Herbicides applied: 4/1/92 1.5 pt/A Treflan EC (PPI)
6/6/92 1.5 pt/A Poast + 2 pt/A Dash
5/3/93 1.5 pt/A Poast + 2 pt/A Dash

Dickinson Weed Control Research

Two postemergent herbicide trials with HRSW were located at Dickinson in 1994. These trials, under the direction of John Nalewaya in the Department of Plant Sciences at NDSU, were designed to evaluate the efficacy of experimental and named compounds in controlling the dominant weeds encountered in the field the studies were conducted: wild buckwheat (Wibw), redroot pigweed (Rrpw), common lambsquarters (Colq), and Russian thistle (Ruth). Control ranged from 38% to 99%, depending on the weed species and herbicide(s) considered. This level of control failed to translate into more grain compared to the control (untreated) treatment.

A field trial was conducted at Dickinson in 1994 to determine the effect of rotary hoeing and harrowing on crop and weed yields in lentil, flax, and hard red spring wheat. Treatments compared were: (1) rotary hoeing at three to five days after seeding; (2) rotary hoeing at three to five days after seeding and again when plants were 2-5 in. tall; (3) harrowing with a spring tooth harrow at three to five days after seeding; (4) harrowing at three days after seeding and again when seedlings were 2-5 in tall; (5) rotary hoeing at three to five days after seeding plus herbicides; (6) harrowing at three to five days after seeding plus herbicides; and (7) herbicides alone. Herbicide treatments included a postemergent application of 0.25 lb a.i./ac Buctril for flax when rotary hoed or harrowed and 0.4 lb a.i./ac Poast plus 0.25 lb a.i.ac Buctril when not hoed or harrowed; a postemergent application of 0.38 lb a.i./ac Sencor for lentil when rotary hoed or harrowed and 0.4 lb a.i./ac Poast plus 0.38 lb a.i./ac Sencor when not hoed or harrowed; and a postemergent application of 0.25 lb a.i./ac Buctril for wheat when rotary hoed or harrowed and 0.9 lb a.i./ac Hoelon plus 0.25 lb a.i.ac Buctril when not hoed or harrowed. A check (no weed control) treatment was included in each replicate.

Most effective control of weeds resulted when herbicides were used alone or in combination with either the harrow or rotary hoe. Without herbicides, single or multiple cultivations using a harrow or rotary hoe failed to control weeds as effectively as any control treatment including herbicides. However, hoeing or harrowing without herbicides reduced broadleaf weeds compared to the check (no control) treatment.

Seed yield was comparable between plots in which weeds were mechanically controlled and plots in which only herbicides were used to control weeds, regardless of which crop was grown. Crop stand was reduced by both pre- and postemergent cultivation with either the harrow or rotary hoe. Greatest reductions occurred when the rotary hoe was used compared to the harrow. Of the crops evaluated, flax stand was reduced most dramatically and wheat the least.

Phenoxy Herbicide Benefit in Hard Red Spring Wheat - Fallow — Dickinson, ND, 1994

Treatment	% Control					Grain yield	Test weight
	Wht	Wibw	Rrpw	Colq	Ruth		
	% control					bu/ac	lbs/bu
Buctril	0	87	72	89	90	54.0	59.0
2,4-D-dma	0	87	75	97	94	57.4	58.5
MCPA-dma	0	38	76	99	20	55.1	58.9
MCPA-dma+Banvel-dma	0	93	94	99	99	57.8	59.1
Banvel-dma	0	81	87	94	88	54.7	59.1
F8426+X-77	0	38	64	81	65	54.9	58.9
F8426+2,4-D+X-77	1	62	93	99	99	54.6	59.1
Buctril + MCPA	1	75	98	99	86	54.4	59.4
Untreated	0	0	0	0	0	54.3	59.0
Mean						55.2	59.0
CV(%)	441	37	20	15	28	6.5	1.28
LSD .05	NS	33	21	18	35	NS	NS

Broadleaf Weed Control - Hard Red Spring Wheat - Fallow — Dickinson, ND, 1994

Treatment	% Control					Grain yield	Test weight
	Wht	Wibw	Rrpw	Colq	Ruth		
			%			bu/ac	lbs
Ally+2,4-D+NIS	0	73	95	99	99	52	59.9
Ally+MCPA+NIS	0	61	99	99	99	55	59.0
Ally+2,4-D+Banvel+NIS	2	65	99	99	99	50.7	58.6
Ally+MCPA+Banvel+NIS	1	66	99	99	98	50.8	59.9
Express+2,4-D+NIS	0	54	92	97	99	51.7	59.4
Express+MCPA+NIS	3	49	74	99	65	46.3	59.6
Express+2,4-D+Banvel+NIS	1	61	99	99	97	45.5	58.7
Express+MCPA+Banvel+NIS	1	57	99	97	96	49.0	59.7
Express+Buctril(5)+MCPA+NIS	1	70	96	99	94	48.6	59.4
Express+Buctril(6)+MCPA+NIS	0	71	84	96	79	48.7	59.1
Express+2,4-D+Tordon(.19)+NIS	1	87	88	99	99	46.8	59.2
Express+2,4-D+Tordon(.25)+NIS	0	91	98	99	99	46.8	59.4
2,4-D+Banvel	0	58	86	99	98	45.6	58.7
MCPA+Banvel	3	61	86	97	55	46.5	59.6
2,4-D+Tordon	1	83	80	97	99	45.7	59.6
Buctril+MCPA(5)	1	64	70	92	86	47.0	59.2
Ally+2,4-D	0	68	97	98	98	48.0	60.0
Ally+2,4-D+Tordon(.187)+NIS	0	58	97	99	99	48 9	59.9
Ally+2,4-D+Tordon(.25)+NIS	0	88	93	99	99	46.0	59.1
Buctril+MCPA(8)	0	73	90	99	95	51.5	59.9
Untreated	0	0	0	0	0	44.0	58.7
Mean						48.4	59.4
CV(%)	237	29	12	4	15	11.15	1.75
$LSD_{(0.05)}$	NS	26	14	6	18	NS	NS

Planting date: 13 April, 1994
Crop Variety: Stoa HRSW
Application date: 26 May, 1994
Temperature: 60° F
Crop Growth Stage: 5 to 6 leaf stage
Sky: clear
Wind: 0-5 mph
Rainfall: none

Weed and Growth Stage:
Russian thistle 2-3"
Common lambsquarters 2-4"
Redroot pigweed 2"
Field bindweed 1-6" diameter
Wild buckwheat 1-2"
Other: Yellow blossom sweetclover 6"

Mechanical/Chemical Weed Control in Flax - Fallow — Dickinson, ND, 1994

Treatment	Stand	% of check	Weed biomass		Crop yield	
			Grass	Broadleaves	Seed	Straw
	plants/acre	%	lbs/ac		bu/ac	lbs/ac
Check (no control)	3,231,132		336.9	2030.9	10.7	1863.7
Harrow + Herbicide	2,351,795	73	229.0	88.6	23.8	2840.1
Herbicide	2,877,827	89	12.6	166.7	16.9	2420.0
Harrow x 1	2,860,697	89	428.4	1049.8	18.6	2609.6
Harrow x 2	2,473,133	77	309.8	1206.8	20.0	2095.6
Rotary Hoe + Herbicide	2,177,641	67	249.1	65.0	22.1	2402.5
Rotary hoe x 1	2,181,924	68	187.4	1758.7	14.7	2261.3
Rotary hoe x 2	1,718,702	53	263.2	1173.5	18.8	2671.7
Mean	2,484,107		252.0	942.5	18.2	2496.8
CV(%)	17.1		55.8	60.9	21.7	19.9
LSD 0.05	623,806		206.7	844.5	5.8	NS

Mechanical/Chemical Weed Control in Lentil - Fallow **Dickinson, ND, 1994**

Treatment	Stand	% of check	Weed biomass		Crop yield	
			Grass	Broadleaves	Grain	Straw
	plants/acre	%	lbs/ac			
Check (no control)	271,224		931.6	4981.6	66.0	129.2
Harrow + Herbicide	266,941	98	595.0	597.0	902.6	915.4
Herbicide	289,067	107	152.0	1380.8	641.2	833.3
Harrow x 1	217,693	80	1520.1	2455.8	123.0	224.8
Harrow x 2	209,127	77	1274.2	2429.8	187.9	283.3
Rotary Hoe + Herbicide	216,979	80	952.7	251.8	861.9	890.2
Rotary hoe x 1	178,436	66	1113.2	2776.5	177.9	281.4
Rotary hoe x 2	165,589	61	708.9	4633.5	254.7	215.7
Mean	226,883		906.0	2438.0	402.0	471.7
CV(%)	20.3		73.7	42.4	65.5	42.8
LSD 0.05	67,625		981.3	1522.0	387.4	297.1

Mechanical/Chemical Weed Control in Hard Red Spring Wheat - Fallow **Dickinson, ND, 1994**

Treatment	Stand	% of check	Weed biomass		Crop yield	
			Grass	Broadleaves	Grain	Straw
	plants/acre	%	lbs/ac		bu/ac	lbs/ac
Check (no control)	663,070		507.9	2576.7	17.2	1336.9
Harrow + Herbicide	559,577	84	388.0	282.6	29.9	3170.7
Herbicide	576,707	87	182.2	62.6	23.4	2560.2
Harrow x 1	546,016	82	584.3	1132.1	17.6	2193.5
Harrow x 2	580,989	88	467.0	1193.8	24.5	2877.7
Rotary Hoe + Herbicide	540,306	81	248.0	81.6	30.1	3294.6
Rotary hoe x 1	527,458	79	359.6	1126.5	22.2	2732.1
Rotary hoe x 2	513,897	77	324.9	1186.5	27.3	3332.6
Mean	563,503		382.8	955.3	24.0	2687.3
CV(%)	10.4		72.1	115.9	22.2	24.5
LSD 0.05	86,204		NS	NS	7.8	969.2

Previous crop: Weedy fallow; Soil test results: 52 lbs N, 12 ppm P_2O_5 - applied 160 lbs urea; Planted HRSW (Stoa), Lentil (Crimson), and flax (Linton) on May 3; First rotary hoeing and harrowing performed on May 10 and second on May 27: applied postemergent herbicides on June 3; Harvested weeds and crop in HRSW plots on August 1-2: Harvested weeds and crop in flax on August 4-5: Harvested weeds and crop in lentil plots on August 8 and 9.

VARIOUS RATES OF WILD OAT HERBICIDES ON SMALL GRAINS

Product	Rate	Weed control 1992	1993	1994*	Approx. cost/A
	oz/A	%	%	%	$
Hoelon + POC	32 + .25%	68	84	65	13.17
Hoelon + POC	24 + .25%	23	79	53	9.91
Hoelon + POC	16 + .25%	16	64	37	6.64
Hoelon + POC	8 + .25%	15	64	28	3.38
Tiller	24	--	87	50	13.43
Tiller	18	--	82	50	10.08
Tiller	12	--	75	20	6.72
Tiller	6	--	48	35	3.36
Assert + MVO	16 + 1%	89	82	86	14.98
Assert + MVO	12 + 1%	82	74	65	11.64
Assert + MVO	8 + 1%	66	62	70	8.29
Assert + MVO	4 + 1%	64	57	63	4.94
Avenge + NIS	40 + .25%	45	42	78	12.94
Avenge + NIS	30 + .25%	43	46	54	9.80
Avenge + NIS	20 + .25%	37	32	50	6.66
Avenge + NIS	10 + .25%	42	9	28	3.52
Untreated	0	0	0	0	0.00
C.V. %		55	38	47	
LSD 5%		29	22	23	

* % wild oat control for 1994 is a combined average of 2 trials; an early applied trial and a late application (see below).

MVO = Methylated Vegetable Oil
POC = Petroleum Oil Concentrate
NIS = Non Ionic Surfactant

Planting date: 4/14/94

Date of application: Early - 5/20/94, Late - 5/31/94

Crop & growth stage: Grandin HRSW, Early - 3 leaf, Late - 5 leaf

Weed & growth stage: Wild oat, Early - 3 leaf, Late - 4 leaf

Reference to commercial products and trade names are made with no intended endorsement. Herbicices, treatments and treatment rates used in this trial do not imply endorsement of non-labeled uses. USE ALL PESTICIDES ONLY AS LABELED.

VARIOUS RATES OF BROADLEAF HERBICIDES IN SMALL GRAIN CROPS

Product	Rate	Weed control 1992	1993	1994*	Approx. cost/A
	oz/A	%	%	%	$
Amber + MCPE	1/4 + 8	93	94	95	3.63
Amber + MCPE	1/8 + 8	94	90	96	2.34
Amber + MCPE	1/10 + 8	97	65	91	2.06
Ally + MCPE	1/10 + 8	96	89	98	3.72
Ally + MCPE	1/15 + 8	99	96	87	3.04
Ally + MCPE	1/20 + 8	88	97	93	2.37
Express + MCPE	1/6 + 8	97	81	92	4.34
Express + MCPE	1/10 + 8	95	70	90	3.01
Express + MCPE	1/15 + 8	79	85	86	2.34
Harmony Extra + MCPE	1/3 + 8	96	91	94	4.84
Harmony Extra + MCPE	1/6 + 8	95	76	94	2.93
Harmony Extra + MCPE	1/10 + 8	90	65	91	2.16
MCPE	8	90	79	84	1.01
Untreated	0	0	0	0	0.00
C.V. %		15	34	10	
LSD 5%		10	36	8	

* % kochia control for 1994 is a combined average of 2 trials; an early applied trial and a late application (see below).

Planting date: 4/14/94

Date of application: Early - 5/20/94, Late - 5/31/94

Crop & growth stage: Grandin HRSW, Early - 3 leaf, Late - 5 leaf

Weed & growth stage: Kochia, Early = 1/2 - 3/4", Late = 1/2 - 2"

Reference to commercial products and trade names are made with no intended endorsement. Herbicides, treatments and treatment rates used in this trial do not imply endorsement of non-labeled uses. USE ALL PESTICIDES ONLY AS LABELED.

Soil Conservation Service
Plant Materials Center
Bismarck, North Dakota

Project No.: 38A339X Hettinger, North Dakota

Project Title: Field evaluation of cool-season grasses for pasture, range, wildlife habitat, and protection of surface and ground water.

Cooperators:
USDA, Soil Conservation Service (SCS); in cooperation with the North Dakota State University (NDSU), Hettinger Research and Extension Center (HREC); Adams County Soil Conservation District (ACSCD); and Mr. Joseph Clement, private landowner.

Location:
Legal Description; SE1/4 sec. 24, T. 129, R. 96, Adams County, North Dakota. Approximately 2 miles south of Hettinger.

Objective:
The objective of this study is to evaluate the performance and adaptation of native and introduced cool-season grass species and varieties for use in pastures, range, wildlife habitat, and water quality projects in southwestern North Dakota and surrounding regions of South Dakota, Montana, and Wyoming.

Site Information:
One hundred and one different varieties or experimental lines were seeded in 6 ft. x 25 ft. plots on April 6, 1992. Plots were replicated three times. Seeding rate varied with species but followed recommended seeding rates as specified in the North Dakota SCS Technical Guide. Species with no specified seeding rates were generally planted at 20-25 seeds/ft^2. Soil at the site is a Vebar-Flasher fine sandy loam, which is typically low in organic matter and available water capacity.

Summary:
The plots were off to a good start following the April 6, 1992, seeding. Moisture conditions in 1992 and 1993 were excellent, resulting in dense stands. Forage production was also abundant in 1993. Droughty conditions in the summer of 1994 reduced forage yields considerably. Weeds were abundant in 1992 and 1993 but were chemically controlled. Weeds were not severe in 1994. Residue is managed using a spring burn.

The evaluation period is scheduled for 6 years. Forage production will be determined annually for the last 5 years of the project. Yields are expected to vary considerably on an annual basis. It is suggested that long-term production averages are generally more meaningful than annual comparisons. Stand densities, disease resistance, and seed production are other critical factors in determining overall plant performance.

PROJECT: 38A339X Hettinger, North Dakota

PROJECT TITLE: Field evaluation of cool season grasses for pasture, rangeland, wildlife habitat, and protection of surface and ground water.

Table HE-2: Plant performance 1992-1994. Seeding Date: April 6, 1992.

SPECIES/ENTRY/NO.	(1) EMERGENCE 1992	WEED (2) COMPETITION 1992	1993	STAND (3) DENSITY 1992	1993	STAND(4) RATING 1994	PLANT(5) HEIGHT 1993	(6) DISEASE 1993	SEED (7) PRODUCTION 1993	1994	FORAGE(8) YIELD 1993	1994
FAIRWAY WHEATGRASS												
1. Parkway	2.0	1.7	1.7	53	75	3.3	28	2.0	2.3	5.7	2260A	838B
2. Kirk	3.3	2.7	2.0	52	68	3.3	31	2.0	1.3	4.3	2961A	1235B
3. SD-77	3.7	3.0	1.7	39	64	2.0	30	2.0	1.0	4.0	3187A	1632AB
4. Ephraim	3.3	3.7	1.7	40	59	3.0	26	2.0	2.7	5.0	1957A	1346AB
5. Ruff	3.7	3.3	1.7	48	69	3.0	29	2.0	1.7	4.7	2864A	1198B
6. NEAC1	3.7	2.3	2.7	46	56	3.3	24	2.0	2.0	4.3	1962A	1079B
7. NEAC2	3.7	2.3	2.3	48	66	2.7	29	2.0	1.7	4.7	3454A	1377AB
CRESTED WHEATGRASS												
8. Summit	3.3	3.0	1.7	45	62	3.0	30	2.0	1.7	3.3	2777A	2207A
9. Nordan	4.0	4.3	2.7	41	66	3.0	31	2.0	2.0	2.7	3382A	1609AB
10. NEAD1	3.0	3.7	1.7	45	72	2.7	31	2.0	1.7	4.3	2458A	1017B
FAIRWAY x CRESTED CROSS												
11. Hycrest	3.3	2.7	1.7	42	68	3.0	32	2.0	1.3	4.3	2688A	1330AB
12. Hycrest #2	3.0	2.7	1.3	40	61	3.0	28	1.7	1.7	3.3	2475A	1586AB
SIBERIAN WHEATGRASS												
13. P-27	5.3	4.7	3.0	38	51	3.3	33	2.0	1.3	4.7	2860A	1340AB

(1) Rating of stand uniformity and emergence seven weeks after seeding: 1=excellent, 5=fair, 9=no emergence

(2) Weed competition rated 7/21/92 and 8/17/93; 1=none, 5=moderate, 9=severe

(3) Estimated density; percent of full rows in sample frames

(4) Rating of plot stand, 8/16/94

(5) Plant height in inches, 8/17/93

(6) Rating of disease problems, mainly stem and leaf rust, 8/17/93; 1=none, 5=moderate, 9=severe

(7) Rating of potential seed production by the number of culms, 8/17/93, 8/16/94; 1=excellent, 5=fair, 9=poor

(8) Student-Newman-Kuel's Multiple Range Test, means with same letter for each species grouping (separated by line) are not significantly different (P=.05), yield in lb/ac, oven dry matter

PROJECT: 38A339X Hettinger, North Dakota

SPECIES/ENTRY/NO.	(1) EMERGENCE 1992	WEED (2) COMPETITION 1992	1993	STAND (3) DENSITY 1992	1993	STAND(4) RATING 1994	PLANT(5) HEIGHT 1993	(6) DISEASE 1993	SEED (7) PRODUCTION 1993	1994	FORAGE (8) YIELD 1993	1994
INTERMEDIATE WHEATGRASS												
14. Chief	3.0	4.7	1.7	52	60	1.3	42	2.0	1.3	4.7	4040A	2050A
15. Clarke	2.7	3.3	2.0	60	75	1.7	42	2.0	1.7	4.7	4806A	1811A
16. Reliant	2.0	1.3	1.0	58	77	1.0	44	2.0	1.3	5.0	4330A	2135A
17. Oahe	1.7	2.3	1.3	56	61	2.3	42	2.0	1.7	6.3	3919A	1593A
18. SD-54	2.0	1.3	1.0	47	66	1.7	44	2.0	1.7	4.3	5526A	2184A
19. *Tegmar	1.0	1.0	1.0	88	48	----	31	2.0	2.0	----	----	----
20. *Greenar	----	----	1.0	----	58	----	37	2.0	2.0	----	----	----
21. Slate	1.3	1.7	1.3	64	70	2.0	43	2.0	2.0	3.7	3510A	1829A
22. NETI1	2.7	3.7	2.0	64	64	1.7	45	2.0	1.3	4.7	3897A	2390A
23. NETI2	1.7	2.0	1.3	60	70	1.7	43	2.0	1.7	4.0	4081A	2197A
24. NETI3	2.0	2.0	1.7	58	60	1.0	44	2.0	1.3	3.3	4619A	2615A
25. NE50C3	3.0	2.7	2.0	48	70	1.3	42	2.0	2.0	3.3	4213A	3014A
26. NECASPIAN3	2.0	2.7	1.3	62	60	1.0	47	2.0	1.0	3.0	4592A	2506A
27. *Amur	----	1.0	1.0	41	40	----	43	2.0	2.0	----	----	----
PUBESCENT WHEATGRASS												
28. Greenleaf	3.0	3.3	2.0	56	67	1.7	44	2.0	2.0	6.7	3978A	2220A
29. MDN-759	2.7	2.0	1.0	55	64	2.0	42	2.0	2.0	5.3	3583A	2001A
30. Manska	2.0	2.3	1.3	44	63	1.3	41	2.0	1.7	3.7	4300A	2693A
31. *Topar	----	1.0	1.0	58	52	----	31	2.0	2.0	----	----	----
32. *Luna	----	1.0	1.0	60	50	----	39	2.0	2.0	----	----	----
TALL WHEATGRASS												
33. Orbit	3.3	5.3	1.7	49	61	2.0	48	2.0	2.0	4.0	4397A	2151A
34. Alkar	3.3	4.7	1.7	40	66	2.7	46	2.0	2.0	3.7	4664A	2162A
35. Platte	3.0	4.3	1.3	54	63	2.0	51	2.0	2.0	3.0	3536A	1894A
36. *Jose	----	1.0	1.0	82	70	----	53	2.0	2.0	----	----	----
37. *Largo	----	2.0	1.0	46	51	----	53	2.0	2.0	----	----	----
QUACKGRASS												
38. RS Hoffman	3.3	3.3	1.0	48	63	1.3	38	2.0	3.3	7.7	3454A	1327A

* Entries preceeded by an asterisk are not replicated, forage production data not collected.

PROJECT: 38A339X Hettinger, North Dakota

SPECIES/ENTRY/NO.	(1) EMERGENCE 1992	WEED (2) COMPETITION 1992	1993	STAND (3) DENSITY 1992	1993	STAND(4) RATING 1994	PLANT(5) HEIGHT 1993	(6) DISEASE 1993	SEED (7) PRODUCTION 1993	1994	FORAGE(8) YIELD 1993	1994
BLUEBUNCH x QUACK CROSS												
77. RS-1 Hybrid N	3.3	4.0	1.7	40	67	1.7	44	2.0	2.3	7.0	3768A	1588A
78. RS-1 Hybrid R	3.0	3.0	1.7	53	64	2.0	38	2.0	3.0	7.0	3434A	1864A
SMOOTH BROMEGRASS												
39. Magna	3.3	2.7	1.0	40	77	1.3	35	2.0	2.3	5.3	3999A	1883AB
40. S-7133	3.0	3.7	2.0	37	66	3.3	34	2.0	3.7	6.7	2826A	1234ABC
41. Manchar	3.3	3.0	2.0	42	76	1.3	32	2.0	2.0	3.7	2888A	1389ABC
42. Rebound	3.7	2.7	1.3	44	80	1.0	31	2.0	3.3	8.0	2684A	1388ABC
43. Cottonwood	4.7	3.0	1.0	38	80	1.0	33	2.0	3.3	5.7	3190A	2016A
44. Lincoln	3.0	2.0	1.7	44	76	1.7	30	2.0	3.3	6.7	3033A	1782AB
SMOOTH x MEADOW CROSS												
45. S-9183	3.7	2.7	1.7	38	64	3.7	34	2.0	2.7	6.3	2843A	849C
MEADOW BROMEGRASS												
46. Fleet	1.7	2.0	1.0	53	76	1.0	34	2.0	4.0	8.0	3668A	785C
47. Paddock	2.7	2.0	1.0	54	73	2.0	32	2.0	5.7	8.3	3139A	841C
48. Regar	2.7	4.3	1.0	33	74	2.3	29	2.0	6.7	8.7	2855A	1045BC
ORCHARDGRASS												
49. *Paiute	----	3.0	2.0	76	41	----	26	2.0	8.0	----	----	----
RUSSIAN WILDRYE												
50. Mayak	4.7	4.0	3.0	40	57	3.3	40	2.0	4.3	9.0	2105A	282A
51. Swift	4.7	5.0	2.3	26	53	2.7	40	2.0	5.0	9.0	2439A	738A
52. Cabree	4.3	3.3	1.7	36	63	3.7	37	2.0	3.0	8.7	2255A	449A
53. Vinall	3.0	4.3	3.0	27	62	3.7	41	2.0	3.3	8.7	2101A	429A
54. Mankota	5.7	5.3	3.0	41	56	4.0	42	2.0	3.0	8.0	2327A	504A
55. MDN-1831	5.7	5.7	1.7	31	49	4.0	40	1.7	2.7	8.3	2356A	548A
56. Bozoisky Select	5.3	4.0	1.7	40	56	4.0	46	2.0	2.0	8.3	2513A	620A
57. PI-272136	4.3	2.3	1.7	29	56	3.3	43	2.0	4.0	8.3	2112A	339A
58. Syn A NL	5.3	5.7	2.0	29	52	5.0	42	2.0	3.3	8.3	2571A	680A

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MAMMOTH WILDRYE												
59. ND-691	3.0	3.7	2.0	18	45	3.7	35	2.0	7.7	7.3	[illegible]A	1433AB
60. PI-478832	3.3	4.0	2.0	30	50	2.0	38	2.0	6.7	7.0	4234A	2088A
61. Volga	4.3	4.0	3.0	20	42	4.3	[illegible]	2.0	7.3	7.3	2779A	1609AB
EUROPEAN DUNEGRASS												
62. ND-2100	7.0	7.3	7.7	6	19	7.3	20	1.3	9.0	8.7	10488	540B
ALTAI WILDRYE												
63. Prairieland	2.7	3.3	1.7	40	66	1.3	38	2.0	7.7	8.0	3137A	1555A
64. Pearl	3.0	4.0	2.0	33	66	3.3	38	2.0	6.7	7.0	3104A	1171A
65. Eejay	3.3	5.3	3.0	31	62	2.3	38	2.3	8.0	8.0	3507A	1643A
BEARDLESS WILDRYE												
71. Shoshone	5.0	6.0	2.7	9	60	1.3	27	2.0	8.0	9.0	2223B	1098A
DAHURIAN WILDRYE												
66. Arthur	2.3	1.7	1.7	58	71	[illegible]	46	2.0	1.0	1.7	4049	955
BASIN WILDRYE												
67. M-718	6.0	5.3	4.0	9	33	5.0	43	7.0	7.7	7.0	[illegible]A	1758A
68. PI-478831	2.7	2.0	2.3	32	72	4.0	40	7.0	7.3	7.3	1498A	1624A
69. Magnar	4.3	5.7	2.3	26	57	3.0	44	4.0	5.7	6.3	2431A	2112A
CANADA WILDRYE												
70. *Mandan	----	2.0	1.0	59	51	----	41	2.0	1.0	----	----	---
BEARDLESS BLUEBUNCH												
72. *Whitmar	----	3.0	3.0	69	59	----	26	2.0	5.0	----	----	----

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BLUEBUNCH WHEATGRASS												
73. PI-232127	1.3	3.0	2.0	45	58	2.3	27	3.0	6.7	7.3	1933A	995A
74. PI-232128	2.0	3.7	2.0	32	50	2.3	28	2.0	7.3	8.3	2262A	1212A
75. Goldar	1.0	3.7	2.0	57	79	2.0	27	2.0	6.7	8.3	2332A	941A
76. Secar	1.3	3.0	2.0	61	80	2.7	28	3.3	6.3	8.0	1975A	1294A
SHEEP FESCUE												
79. *Covar	----	4.0	7.0	9	22	----	20	1.0	3.0	----	----	----
HARD FESCUE												
80. *Durar	----	3.0	5.0	16	38	----	28	1.0	2.0	----	----	----
INDIAN RICEGRASS												
81. Mandan 57-2	5.0	6.3	5.3	26	37	6.7	24	2.0	3.0	2.3	2160A	323A
82. Nezpar	5.0	4.0	3.7	19	49	5.7	28	2.0	2.3	4.0	1960A	403A
83. *Paloma	----	6.0	8.0	24	24	----	20	2.0	3.0	----	----	----
CANBY BLUEGRASS												
84. *Canbar	5.0	6.0	8.0	2	25	----	16	5.0	3.0	----	----	----
GREEN NEEDLEGRASS												
85. Lodorm	3.7	5.7	2.3	45	67	2.3	36	2.0	2.3	2.3	3322A	1331A
86. SD-93	3.0	4.0	2.3	23	56	4.3	35	2.0	3.0	3.3	2196A	1035A
GREEN NEEDLEGRASS x RICEGRASS CROSS												
87. *Mandan	----	6.0	6.0	24	54	----	31	2.0	3.0	----	----	----
STREAMBANK WHEATGRASS												
88. *Sodar	----	6.0	5.0	54	73		26	5.0	5.0		---	

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THICKSPIKE WHEATGRASS												
89. Elbee	2.0	3.0	1.7	48	71	1.7	28	2.0	3.0	8.3	2046B	412B
90. Critana	3.7	4.0	2.0	43	68	2.0	26	3.7	4.3	8.0	2480A	711A
WESTERN WHEATGRASS												
91. Walsh	3.7	4.3	2.3	50	74	1.3	24	2.0	7.0	8.0	2253A	983B
92. Rodan	3.3	4.0	1.3	53	79	1.0	26	2.0	6.0	8.3	3780A	2205AB
93. *Rosana	---	6.0	3.0	54	57	----	22	2.0	6.0	----	----	----
94. Flintlock	3.0	4.0	2.0	36	54	1.3	31	2.0	5.7	8.0	3575A	2730A
95. *Barton	---	6.0	3.0	24	50	----	26	2.0	5.0	----	----	----
96. *Arriba	---	6.0	3.0	53	49	----	30	2.0	4.0	----	----	----
SLENDER WHEATGRASS												
97. Revenue	2.7	1.7	2.0	71	64	2.0	39	2.0	1.0	1.3	4146A	2011A
98. Adanac	1.7	2.0	2.3	69	62	1.7	37	2.7	1.3	1.3	2559B	1143A
99. Pryor	4.0	2.7	2.3	35	50	4.3	33	2.7	1.7	2.3	2082B	1367A
100. *San Luis	----	6.0	3.0	36	59	----	35	3.0	1.0	----	----	----
101. Primar	2.0	2.0	2.3	40	62	3.3	36	2.3	1.7	2.3	2831B	1185A