

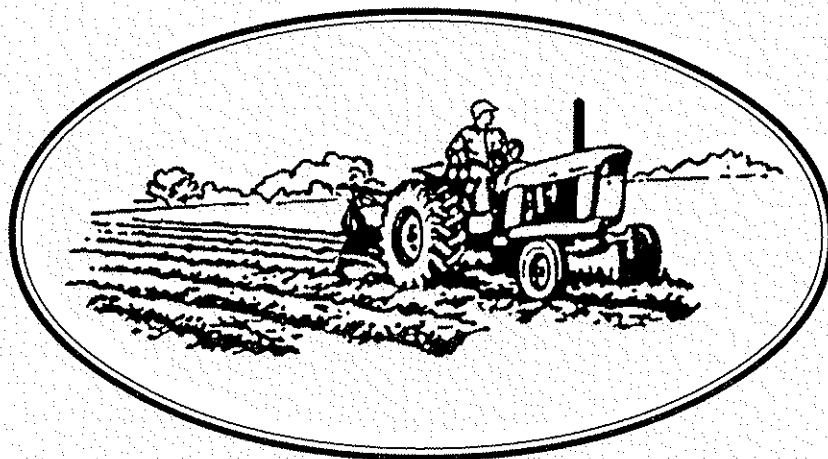
NINETEENTH  
ANNUAL

AG. REPORT NO. 19



# WESTERN DAKOTA

## CROPS DAY RESEARCH REPORT



**HETTINGER ARMORY  
DECEMBER 19, 2002**

Pat Carr, Agronomist

Glenn Martin, Research Specialist II

Burt Melchoir, Ag. Technician II

Lee Tisor, Research Specialist I

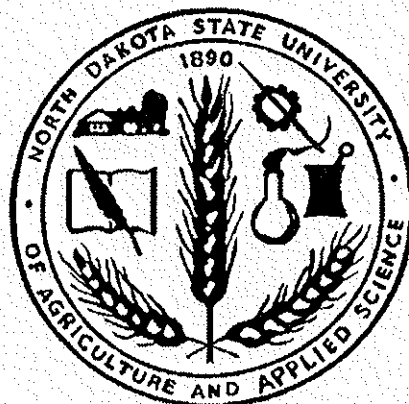
**DICKINSON RESEARCH  
EXTENSION CENTER**

North Dakota State University

Dickinson, ND 58601

e-mail: [pcarr@ndsuent.nodak.edu](mailto:pcarr@ndsuent.nodak.edu)

[www.ag.ndsu.nodak.edu/dickins/](http://www.ag.ndsu.nodak.edu/dickins/)



Eric Eriksmoen, Agronomist

Rick Olson, Ag. Technician III

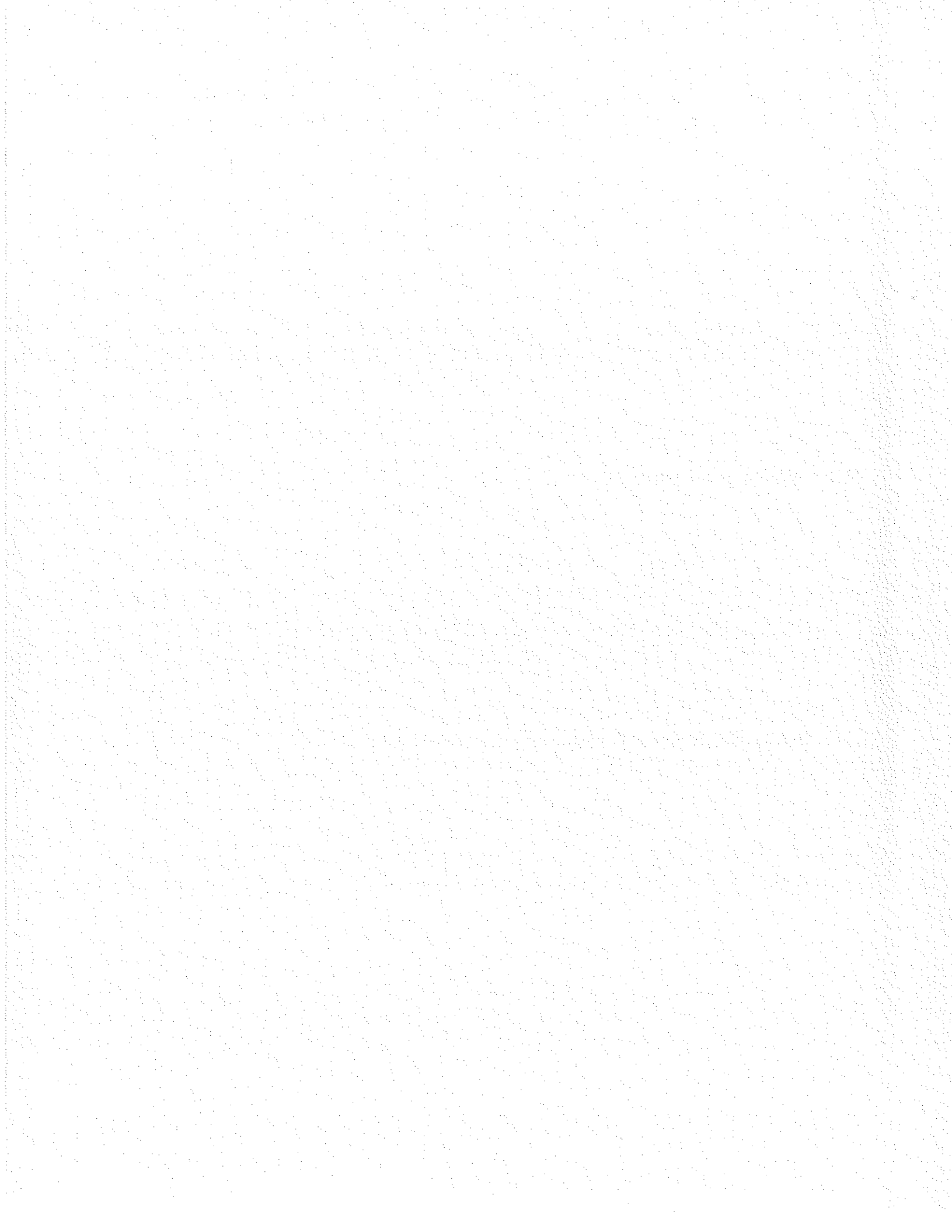
**HETTINGER RESEARCH  
EXTENSION CENTER**

North Dakota State University

Hettinger, ND 58639

e-mail: [eeriksmo@ndsuent.nodak.edu](mailto:eeriksmo@ndsuent.nodak.edu)

[www.ag.ndsu.nodak.edu/hettinge/](http://www.ag.ndsu.nodak.edu/hettinge/)



**19<sup>th</sup> Annual Western Dakota Crops Day**  
**December 19, 2002**  
**Hettinger Armory**

MST

**9:00 am Registration**

Coffee and doughnuts. Free time to view exhibits and visit with Ag. Industry Program Sponsors.

**10:00 Earlybird Drawing**

**10:20 Opening Announcements**

**10:30 Crop Sequence Calculator**, Cal Thorson, Northern Great Plains Res. Lab, Mandan.

**10:45 All about Urea & Drought Strategies for Fertilizer Use**, Dr. Jay Goos, Professor, NDSU Dept. of Soil Science, Fargo.

**12:00 Lunch**

Provided by Program Sponsors. Free time to visit with sponsors.

**1:00 Ag Industry Update**

**1:30 Management Practices for Successful Corn Production**, Dr. Joel Ransom, Extension Agronomist, Fargo

**2:00 Crop Variety Updates and Highlights of Ongoing Crop Production Research**

Dr. Pat Carr, Agronomist, Dickinson Research Extension Center

Eric Eriksmoen, Agronomist, Hettinger Research Extension Center

**3:00 Conclusion**

Drawing for door prizes, coffee and opportunity to visit with sponsors.

## Acknowledgments

The Hettinger and Dickinson Research Extension Centers 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.

### 2002 Western Dakota Crops Day Sponsors

Hettinger Chamber of Commerce	Northern Sun / ADM
Interstate Seed	Mycogen Seed
Hettinger Farmers Union Oil	Monsanto
Croplan Genetics	Gustafson LLC
National Sunflower Association	Proseed
Quality Seed Genetics	AgriPro Wheat
Farm Credit Services of Mandan	Legend Seeds
ND Dry Pea & Lentil Assn.	REA Hybrids
ND Soybean Council	Philom Bios Inc.
ND Barley Council	Minn-Dak Growers
Howe Seeds	

We also acknowledge and thank the following individuals for their willingness to cooperate with us at off-station plot sites and in providing us with materials for this publication. Their participation has enabled us to compile the enclosed information which would not otherwise be possible.

Daryl Birdsall, New Leipzig  
Neal and Monte Freitag, Scaranton  
August and Perry Kirschmann, Regent  
Dale and Calvin Hepper, Selfridge  
Daryl Anderson, Reeder  
Northern Great Plains Research Center, Mandan  
Amos Gietzen, Glen Ullin  
Ted Reich, Beulah  
Pat Doll, Hannover  
David Maus, Wibaux  
Dr. Joyce Eckhoff, E. Montana Ag. Research Station  
Harvey Peterson, Golden Valley Co. Extension Service  
Dave Bertelsen, Wibaux Co. Extension Service  
Roger Ashley, Dickinson Res. Extension Center

We also thank area County Extension Services and area County Crop Improvement Associations for their financial assistance in the printing costs of this publication.

# Notes

Table of Contents

Interpreting Statistical Analysis ..... 1

Growing Conditions

Hettinger ..... 2  
    Weather Summary ..... 3

Dickinson  
    Weather Summary ..... 4  
    Trial Information ..... 5  
    Fertility Information ..... 5

Small Grain Trials

**Hard Red Spring Wheat**

Hard Red Spring Wheat Variety Descriptions ..... 6  
2003 Analytical Milling and Baking Data ..... 7  
Dickinson Hard Red Spring Wheat Variety Trial ..... 8  
2002 Hettinger Hard Red Spring Wheat Variety Trial . 9  
Beulah Hard Red Spring Wheat 2002 ..... 10  
Hannover Hard Red Spring Wheat 2002 ..... 11  
Glen Ullin Hard Red Spring Wheat 2002 ..... 12  
Scranton Hard Red Spring Wheat Variety Trial ..... 13  
Regent Hard Red Spring Wheat Variety Trial ..... 14  
New Leipzig Hard Red Spring Wheat Variety Trial .... 15  
Selfridge Hard Red Spring Wheat Variety Trial ..... 16  
Wibaux, MT Hard Red Spring Wheat Variety Trial ..... 17  
Performance of 14 Organic Wheat Varieties ..... 18  
HRSW in the West River Region - Combined Means ..... 20  
Dormant Seeded Spring Wheat ..... 21

**Durum**

2003 Durum Variety Descriptions ..... 22  
Dickinson Durum Variety Trial ..... 23  
2002 Hettinger Durum Variety Trial ..... 24  
Scranton Durum Variety Trial ..... 25  
Regent Durum Variety Trial ..... 25  
New Leipzig Durum Variety Trial ..... 26  
Selfridge Durum Variety Trial ..... 26  
Wibaux, MT Durum Variety Trial ..... 27  
Durum in the West River Region - Combined Means .... 27  
Durum Seeding Rate at Hettinger ..... 28  
Durum Seeding Rate at Regent ..... 28  
Durum Seeding Rate at Scranton ..... 29  
Durum Seeding Rate - Combined Means ..... 29

### Barley

2002 Barley Variety Descriptions .....	30
Dickinson Barley Variety Trial .....	31
2002 Hettinger Barley Variety Trial .....	32
Beulah Barley Variety Trial .....	33
Glen Ullin Barley Variety Trial .....	33
Scranton Barley Variety Trial .....	34
Regent Barley Variety Trial .....	34
New Leipzig Barley Variety Trial .....	35
Selfridge Barley Variety Trial .....	35
Performance of 5 Organic Barley Varieties .....	36
Barley in the West River Region - Combined Means ...	37
Malt Barley Fertilizer Trial at Hettinger .....	38
Malt Barley Fertilizer Trial at New Leipzig .....	38
Malt Barley Fertilizer Trial at Selfridge .....	39
Malt Barley Fertilizer Trial - Combined Means .....	39

### Oats

2002 Oat Variety Descriptions .....	40
Dickinson Oat Variety Trial .....	41
2002 Hettinger Oat Variety Trial .....	42
Beulah Oat Variety Trial .....	43
Glen Ullin Oat Variety Trial .....	43
Scranton Oat Variety Trial .....	44
Regent Oat Variety Trial .....	44
Wibaux, MT Oat Variety Trial .....	45
Oats in the West River Region - Combined Means .....	45
Performance of 13 Organic Oat Varieties .....	46

### Hard Red Winter Wheat and Triticale

2002 Hard Red Winter Wheat Variety Descriptions ....	48
Dickinson Hard Red Winter Wheat Variety Trial .....	49
2002 Hettinger Hard Red Winter Wheat Variety Trial .	50
Hettinger Spring Triticale Variety Trial .....	51

## Oilseed and Alternative Crops

### Oilseeds

2002 Flax Variety Descriptions .....	52
Hettinger Flax Variety Trial .....	53
Hannover Flax Variety Trial .....	54
Hettinger Safflower Variety Trial .....	54
Hettinger Crambe Variety Trial .....	55
Hettinger Conventional Canola Variety Trial .....	55
Hettinger Roundup Ready Canola Variety Trial .....	56
Hettinger Clearfield Canola Variety Trial .....	57
Hettinger Oil Type Sunflower Trial .....	58
Hettinger Confection Sunflower Trial .....	60
Hettinger Mustard Variety Trial .....	60

### Grain Legumes

Dickinson Field Pea Variety Trial .....	61
Hettinger Field Pea Variety Trial .....	61
Mandan Field Pea Variety Trial .....	62
Hettinger Lentil Variety Trial .....	63
Hettinger Chickpea Variety Trial .....	64
Dickinson Chickpea Variety Trial .....	65
Seeding Date and Rate of Chickpea at Hettinger .....	66
Management of Ascochyta Blight in Chickpea .....	68
Soybean Production Trial at Hettinger .....	70

### Corn and Proso Millet

Hettinger Hybrid Corn Trial .....	71
Hettinger Proso Millet Variety Trial .....	72

### Forage Crops

Dickinson Birdsfoot Trefoil Forage Trial .....	73
Dickinson Perennial Rye Forage Trial .....	74
Dickinson Winter/Spring Intercrop Trial .....	76
Dickinson Cool Season Forage Trial .....	80

### Long Term and Tillage Trials

Dickinson Long Term Rotation Trial, Wheat .....	83
Dickinson Wheat-Pea Tillage Trial, Wheat .....	84
Dickinson Wheat-Pea Tillage Trial, Pea .....	84
Dickinson Wheat-Canola Tillage Trial, Wheat .....	85
Dickinson Wheat-Canola Tillage Trial, Canola .....	85

### Fungicide and Herbicide Trials

Evaluating Phytotoxicity of Seed Treatments .....	86
Reduced Rates and Application Timing on Wild Oats ..	88
Adjuvant Use with Discover Herbicide .....	90



## 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 to help differentiate production variables 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 and is a measure of the precision or effectiveness of the trial and the procedures used in conducting it. Attempts are made to control human error and some environmental conditions such as soil variability by replicating the variable in question. For example, there were four plots (replications) of the variety Norpro grown in the Hettinger HRSW variety trial. The plots are mixed and dispersed throughout the trial to help eliminated differences that might be a result of soil or other variations. The numbers that you see in the tables are an average of all four replications. The C.V. for yield in the 2002 Hettinger HRSW trial was 13.7% meaning that there was a 13.7 percent average variation between high and low yields among replications. In summation, a trial with a C.V. of 6 is more precise and more can be concluded from it than a trial with a C.V. of 16.

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 value, you can conclude that under like environmental conditions, variety A is expected to significantly out-yield variety B. 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 and gives you more precision than the LSD 5% value. Little confidence can be placed in variety or treatment differences unless the results differ by more than the LSD value.

# Growing Conditions

## Hettinger Research Extension Center

### 2002

The fall of 2001 was warm and very dry, eliminating most fall field work including the seeding of winter wheat and application of fertilizer. Research plots of HRWW sprouted but did not emerge prior to freeze up. The winter months of 2001/02 were generally mild with very little snow accumulation. Air temperatures from November through February were unseasonably warm, and unseasonably cold in March and April. Temperatures fluctuated wildly in April and May with a few days of warm conditions followed by several days of cold. This caused delays in planting and slow crop emergence. Winter wheat plots showed few signs of winter kill coming out of dormancy but the canola crop suffered severe frost injury resulting in many fields being totally destroyed. A lack of spring rainfall first became noticeable on alfalfa and pastures with very little top growth. Our typically wet months of May and June were very dry, receiving only half of the normal and only four rainfall events of 1/4 inch or greater, and only one event greater than 1/2 inch (0.55" on June 23). Hot daytime temperatures were the second part of this year's drought, beginning in late May and continuing through early September. Average daytime high temperatures were 81 degrees in June, 92 degrees in July and 83 degrees in August. Cool season crops were flowering during this period, causing blossoms to abort and greatly reducing the duration of flowering. The drought was most severe from Hettinger south and east. Mid-summer precipitation was more prevalent to the north. Very few small grain fields were harvested for grain in this drought stricken area and most were harvested for hay whenever a windrow could be put together. Despite the drought, many warm season crops (corn, sunflowers and safflower) performed surprisingly well and were harvested for grain.

Insect problems tended to be somewhat less severe except for canola flea beetles which even ravaged treated fields and mustard, and black sunflower stem weevils which weakened stems and caused some lodging. Heavy but localized areas of grasshoppers, cutworms and European corn borers were also reported. Conditions were generally not favorable for plant diseases, although there were reports of wheat streak mosaic virus and common root rot.

All trials at the Hettinger Research Center were planted with a no-till drill. Broadleaf crop trials were planted into summer fallow or soybean stubble and small grain trials were planted into haled out barley stubble. Residual soil fertility was determined and fertilizer was applied according to specific yield goals for each crop. Urea (46-0-0) was the primary nitrogen fertilizer source and was applied with a no-till drill prior to planting. Monoammonium phosphate (11-52-0) was applied directly with most seed at planting.

All HRSW, durum and barley trials were treated post-emergence for both grassy weeds (foxtails and wild oats) and for broadleaf weeds (kochia, Russian thistle and wild buckwheat). Most broadleaf crops were treated with a pre-emergence burn down, and with a post-emergence treatment for grassy weeds and broadleaf weeds when possible. Canola, mustard, corn, millet and sunflowers were treated post-emergence with an insecticide.

WEATHER DATA SUMMARY  
HETTINGER

<u>Precipitation</u>				47 year
Precipitation (inches)	1999-00	2000-01	2001-02	average
Sept. - Dec.	2.29	4.12	1.69	3.26
Jan. - March	3.45	1.82	1.11	1.35
April	1.40	2.13	1.14	1.69
May	3.87	1.80	0.80	2.65
June	2.80	3.65	1.34	3.44
July	2.97	4.46	1.36	2.10
August	0.78	0.13	1.11	1.67
Total	17.56	18.11	8.55	16.16

<u>Air Temperature</u>					47 year
Average Temperature F	1999	2000	2001	2002	average
April	41.8	42.6	43.0	40.2	42.5
May	53.5	55.0	55.2	49.6	54.2
June	61.2	60.5	62.7	65.4	63.5
July	69.9	71.2	71.6	76.2	69.8
August	68.5	71.8	73.0	67.5	68.9
September	53.3	58.6	59.1	61.1	57.3

<u>Growing Degree Units - Corn</u>					30 year
Growing Degree Units (50-86)	1999	2000	2001	2002	average
May	230	284	285	245	268
June	381	377	401	476	426
July	574	638	652	707	582
August	565	633	631	549	536
September	259	412	357	387	310
Total	2009	2344	2326	2364	2122

<u>Frost Free Days</u>			
	28 F	32 F	Normal 32 F
Date of last frost	May 24	May 25	May 18
Date of first frost	Sep 23	Sep 22	Sep 20
Frost free days	122	120	125

Table . 2002 Weather Summary for the Dickinson Research Extension Center, Dickinson, ND.

Month	Maximum temp. °F		Minimum temp. °F		Precipitation inches		Small grains GDD <sup>1</sup>		Corn GDD <sup>2</sup>	
	Long Term 1897 - 2001	Current Year	Long Term 1897 - 2001	Current Year	Long Term 1897 - 2001	Current year	Long Term 1897 - 2001	Current year	Long Term 1897 - 2001	Current year
November - 01	39.7	51.9	16.8	21.5	0.52	0.15				
December - 01	27.6	32.8	5.6	8.5	0.39	0.23				
January	22.6	32.1	-0.2	8.6	0.51	0.20				
February	26.8	38.8	3.7	12.7	0.40	0.53				
March	37.8	27.3	14.9	4.6	0.71	0.85				
April	54.5	50.1	28.4	24.6	1.44	1.43	343	290	255	216
May	66.3	62.4	39.2	33.6	2.28	2.09	647	546	383	436
June	75.0	76.9	49.0	50.2	3.61	4.79	901	940	582	640
July	83.3	86.7	54.1	58.1	2.22	2.98	1140	1243	528	508
August	82.4	80.6	51.5	50.1	1.75	2.81	1083	1035	318	377
September	71.2	74.7	41.0	42.5	1.38	0.20	723	807		
October	57.8	35.5	30.1	22.1	0.95	1.31				
Mean	53.8	54.1	27.8	28.1						
Total					16.16	17.57	4837	4860	2066	2177

<sup>1</sup> Small grains GDD, is growing degree days calculated with 95°F as the maximum temperature and 32°F as the base temperature.

<sup>2</sup> Corn GDD, is growing degree days calculated with 86°F as the maximum temperature and 50°F as the base temperature.

Source: Dickinson Research Extension Center. Data compiled by James Nelson, Animal Scientist; Roger Ashley, Extension Agronomist; and Lisa Vance, Information Processing Specialist.

<b>Variety Trial Information 2002</b>	<b>Dickinson Research and Extension Center</b>
---------------------------------------	--

Trial	Location	Previous Crop	Seeding Rate
			pls/ac
<b>SMALL GRAINS</b>			
Barley	Dickinson	Oat hay	1,200,000
Durum	Dickinson	Alfalfa	1,200,000
Spring wheat	Dickinson	Alfalfa	1,200,000
Winter wheat	Dickinson	Oat hay	75 lbs*
Oat	Dickinson	Fallow	1,000,000
<b>OTHER CROPS</b>			
Field Pea	Dickinson	Fallow	325,000
Chickpea	Dickinson	Fallow	120-180 lbs*
Cool Season Forage	Dickinson	Fallow	Various
Winter/Spring Cereal Forage	Dickinson	Fallow	Various

\* Rate is seed planted

<b>Variety Trial Fertility Information 2002</b>	<b>Dickinson Research and Extension Center</b>
---	--

Trial	Location	Soil test results			Fertilizer applied		
		N	P	K	N	P <sub>2</sub> O <sub>5</sub>	Form(s)
		lb/ac	ppm	ppm	lb/acre		
<b>SMALL GRAINS</b>							
Barley	Dickinson	45	--	395	40	26	34-0-0, 11-52-0
Durum	Dickinson	62	--	140	91	26	34-0-0, 11-52-0
Spring wheat	Dickinson	62	--	140	91	26	34-0-0, 11-52-0
Winter wheat	Dickinson	45	--	395	107	26	34-0-0, 11-52-0
Oat	Dickinson	--	--	--	34	26	34-0-0, 11-52-0
<b>OTHER CROPS</b>							
Field Pea	Dickinson	19		210	6	26	11-52-0
Chickpea	Dickinson	19		210	6	26	11-52-0
Cool Season Forage	Dickinson	19		210	91	26	34-0-0, 11-52-0
Winter/Spring Cereal Forage	Dickinson	19		210	91	26	34-0-0, 11-52-0

2003 North Dakota hard red spring wheat variety description table, agronomic traits.

Variety	Agent or Origin <sup>1</sup>	Year Released	Beard	Height	Straw Strength	Maturity	Reaction to Disease <sup>2</sup>				
							Stem Rust	Leaf Rust	Foliar Disease	Root Rot	Head (Scab)
2370	NDSURF	1990	yes	sdwf	v.strg	m.early	R	NA	S	S	MS*
2375	NDSURF	1990	yes	sdwf	med	m.early	R	S	S	M	MS*
2398	NDSURF	1995	yes	sdwf	strg.	m.late	R	S	MR	MS	VS
AC Intrepid	Canterra	1999	no	med	med	med	R	R	NA	M	S
AC Amazon	Can	2001	no	med/tall	med	med	R <sup>4</sup>	S	NA	NA	S
AC Superb	Can	2001	yes	sdwf	strg	m.early	R	S	S	MR	S
AC Abbey	Canterra	1999	yes	med	med	m.early	R	NA	NA	MS	S
Alsen	ND	2000	yes	s.dwf	strg	m.early	R	MR	S	M	MR
Amidon	ND	1988	yes	med	med	med	R	R	M	MR	S
Argent <sup>3</sup>	ND	1998	yes	sdwf	strg.	early	R	S	S	S	S
Aurora	N. Star G.	1999	yes	sdwf	strg	m.early	R	R	S	NA	S
Briggs	SD	2002	yes	sdwf	strg	m.early	R	R	NA	MS	NA
Butte 86	ND	1986	yes	med	m.strg.	early	R	MS	MS	MS	MS
Conan	WPB	1999	yes	s.dwf	v.strg	med	R	MR	NA	S	S
Coteau	ND	1978	yes	med	m.strg.	med	R		M	MS	MS
Dandy	N. Star G.	1998	yes	sdwf	v.strg.	early	R	S	MS	S	S
Ember	SDSU	1999	yes	sdwf	med	m.early	R <sup>6</sup>	S	S	MS	MS
Ernest	ND	1995	yes	med	med	med	R	MS	MS	MR	S
Forge	SD	1997	yes	sdwf	m.strg.	early	R	S	MR	MS	MS
Glupro	ND	1995	yes	tall	med	m.late	R	MS	S	NA	VS
Grandin	ND	1989	yes	sdwf	strg.	early	R	S	S	M	S
Granite	WPB	2002	yes	sdwf	strg	m.late	R	MR	NA	NA	NA
Gunner	AgriPro	1995	yes	med	m.strg.	med	R <sup>4</sup>	MS	MR	S	M
Hagar	AgriPro	1998	yes	sdwf	strg.	med	R	MS	M	MR	S
Hamer	AgriPro	1995	yes	sdwf	v.strg.	med	R	MR	M	NA	S
Hanna	AgriPro	2002	yes	med	med	m.early	R <sup>6</sup>	MS/MR	NA	NA	NA
HJ98	MN	1998	yes	sdwf	strg.	m.early	R <sup>4</sup>	MS	MS	MS	MS
Ingot	SD	1998	yes	sdwf	med	early	R	S	S	M	MS*
Ivan	AgriPro	1999	yes	sdwf	v.strg.	med	R	MR	S	MS	MS
Keene	ND	1996	yes	med	med	med	R	R	MR	M	S
Keystone	WPB	2001	yes	med	med	m.early	R <sup>4</sup>	R	S	MS	MS
Knudson	AgriPro	2001	yes	sdwf	strg	med	R <sup>4</sup>	MR	S	MS	M
Kulm	ND	1994	yes	med	strg.	early	R	MR	MS	MS	S
Lars	AgriPro	1995	yes	sdwf	v.strg.	med	R	R	MR	NA	S
Mckenzie	Cenex	1998	yes	med	med	m.early	R	R	S	MS	S
McNeal	MT	1995	yes	med	strg.	m.early	MS	S	M	M	VS
McVey	MN	1999	yes	med	med	med	R	S	S	MS	M
Mercury	N. Star G.	1999	yes	sdwf	strg	m.early	R	MR	S	MS	S
Norpro	AgriPro	1999	yes	sdwf	strg	med	R	R	S	M	MS
Oxen	SD	1996	yes	sdwf	strg.	m.early	R <sup>6</sup>	R	S	S	S
Parshall	ND	1999	yes	med	srtg.	m.early	R <sup>4</sup>	MS	M	S	M
Prodigy	Sask. Wht	1999	yes	med	med	med	MR	MR	NA	M	MS
Reeder	ND	1999	yes	s.dwf	strg.	m.early	R	MR	M	MS	S
Russ	SD	1995	yes	med	med	m.early	R <sup>5</sup>	R	S	S	S*
Scholar	MT	1999	yes	med	med	med	R	S	NA	M	S
Trenton	ND	1995	yes	med	med	med	R	MR	MS	S	S*
Verde	MN	1995	yes	sdwf	strg.	med	R <sup>6</sup>	MR	MR	M	MS*
Walworth	SD	2001	yes	sdwf	med	m.early	R	S	S	NA	S

1 Refers to agent or developer: NDSURF = North Dakota State University Research Foundation; CDC = Crop Development Center, University of Saskatchewan; Can = Agriculture Canada.; N. Star G.= North Star Genetics. 2 R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; VS = very Susceptible. \* Yield and/or quality often higher than expected based on visual head blight symptoms. 3 Argent is a hard white wheat with good bread making qualities. 4 MR in artificially induced epidemics. 5 M in artificially induced epidemics. 6 MS in artificially induced epidemics.

2003 North Dakota hard red spring wheat variety descriptions, quality traits.

Variety	Quality factors		
	Test Weight	Wheat Protein	Overall Quality Rating
2370	high	avg.	Poor-Average
2375	high	avg.	Poor-Average
2398	avg.	low	Poor
AC Intrepid†	avg.	avg.	Average
AC Abbey	N/A	N/A	N/A
AC Superb	N/A	N/A	N/A
Alsen	high	avg.	Average-Good
Amidon	high	avg.	Average
Argent	high	avg.	Good
Aurora	low	low	Poor
Briggs	N/A	N/A	N/A
Butte 86	high	avg.	Average
Conant†	avg.	avg.	Poor-Average
Coteau	avg.	high	Good
Dandy	high	avg.	Poor
Ember	high	low	Poor
Ernest	high	high	Poor-Average
Forge	high	low	Poor-Average
Glupro	avg.	v.high	Good
Grandin	high	avg.	Good
Granite	N/A	N/A	N/A
Gunner	high	high	Average-Good
Hagar †	avg.	low	Poor-Average
Hamer	avg.	avg.	Poor
Hanna	N/A	N/A	N/A
HJ98 †	avg.	low	Poor
Ingot	high	avg.	Poor-Average
Ivan	high	low	Poor
Keene	high	avg.	Average
Keystone	N/A	N/A	N/A
Knudson	N/A	N/A	N/A
Kulm	high	high	Average-Good
Lars	avg.	low	Poor
McKenzie	high	avg.	Poor-Average
McNeal	avg.	avg.	Poor-Average
McVey	low	low	Poor
Mercury	avg.	low	Poor
Norpro	avg.	low	Poor
Oxen	avg.	avg.	Average-Good
Parshall	high	avg.	Good
Prodigy†	avg.	high	Poor-Average
Reeder	high	avg.	Average
Russ	avg.	avg.	Average
Scholar	high	avg.	Poor-Average
Trenton	high	avg.	Average
Verde	avg.	low	Poor
Walworth†	avg.	avg.	Poor-Average

† Based on limited testing, rating may change.

The overall HRSW quality rating is based on a large number of quality parameters . These parameters are related to the physical kernel traits including protein content; milling performance; flour attributes; dough characteristics; and baking performance. Some of these quality parameters considered in the assessment of overall quality are listed in the adjacent table.

Both protein quantity and quality are of extreme importance in establishing the rating score for hard red spring wheat varieties. Baking quality data given in this report is based on white sliced bread evaluation. Flour used for white sliced bread normally contains between 11.5-12.5% protein. However, the majority of hard red spring wheat used either domestically or in the export market is blended with lower protein wheat or lower quality wheat to improve baking performance. Another major use for hard red spring wheat is for specialty products such as bagels and frozen dough that require a high protein content with strong gluten properties. In addition, the majority of hard red spring wheat is exported at the 14.0% protein level.

Hard red spring wheat produced in the Upper Midwest is purchased largely for its quality. Continued production of high quality wheat is paramount to maintaining future markets.

## Hard Red Spring Wheat - Recrop

Dickinson, ND

Variety	Days to Head	Seeds per Pound	Plant Height	Test Weight	Protein	Grain Yield			Average Yield	
						2000	2001	2002	2 Year	3 Year
			in	lbs/bu	%	-----bu/ac-----			----bu/ac----	
AC Corinne	64	11,885	28	58.7	--	--	--	36.5	--	--
AC Glenavon	63	11,953	28	58.8	--	--	--	38.6	--	--
AC Superb	62	13,166	26	60.8	--	--	37.6	47.7	42.7	--
AIsen	60	14,975	26	60.6	60.9	37.7	45.7	41.7	48.1	--
Amazon	63	11,286	30	59.7	--	--	40.9	--	--	--
Briggs	60	16,029	27	60.0	--	36.2	44.9	40.6	--	--
Dandy	61	13,638	27	60.3	64.3	31.4	44.0	37.7	46.6	--
Granite	64	15,572	21	62.8	--	--	41.5	--	--	--
Gunner	63	18,275	26	60.9	61.8	40.9	43.8	42.3	48.8	--
Hank	59	14,286	24	56.8	--	--	45.3	--	--	--
Hanna	62	15,072	29	61.0	--	38.1	45.4	41.7	--	--
Ingot	59	15,826	29	62.1	67.3	30.6	45.9	38.2	47.9	--
Ivan	63	15,621	20	61.0	59.9	44.9	48.6	46.7	51.1	--
Keene	62	16,898	26	61.2	70.6	38.9	47.2	43.1	52.2	--
Keystone	60	17,015	26	60.3	--	37.2	43.9	40.6	--	--
Knudson	61	14,058	23	61.0	--	39.5	44.6	42.0	--	--
Laser	59	13,839	27	57.5	--	--	41.8	--	--	--
McKenzie	60	16,783	28	58.6	73.4	39.7	43.4	41.5	52.2	--
Mercury	61	14,488	20	59.7	70.2	36.0	44.2	40.1	50.1	--
Norpro	61	16,814	22	60.2	69.5	42.4	45.9	44.1	52.6	--
Oxen	60	17,069	24	58.1	64.0	41.7	45.2	43.5	50.3	--
Parshall	60	18,768	27	60.8	59.4	37.0	44.9	40.9	47.1	--
Reeder	60	17,365	25	60.7	72.0	42.0	47.1	44.6	53.7	--
Russ	60	16,037	27	59.6	54.6	36.3	40.0	38.2	43.6	--
Walworth	60	15,443	24	58.9	54.1	43.0	41.5	42.3	46.2	--
HJ98	61	16,839	24	60.6	64.4	41.1	47.8	44.4	51.1	--
Ernest	62	14,476	27	61.3	57.7	38.6	45.0	41.8	47.1	--
Ember	60	16,232	24	61.0	75.2	37.8	43.2	40.5	52.1	--
Trial Mean	61	15,422	26	60.2	65.6	38.5	44.1	--	--	--
C.V. %	1.0	5.3	4.4	1.2	10.6	11.1	7.1	--	--	--
LSD .05	1	1,143	2	1.0	9.7	6.0	4.4	--	--	--

Planting Date: May 2  
Harvest Date: August 15



## 2002 Hard Red Spring Wheat - Continuously Cropped No-till

Hettinger

Variety	Days to Head	Plant Height inches	Test Weight lbs/bu	Protein %	----- Grain Yield -----			Average Yield	
					1999	2000	2002	2 year	3 year
					-----bu/ac-----				
Norpro	75	21	58.5	17.9	86.3	66.9	23.1	45.0	58.8
Mercury	74	19	57.1	17.6	81.9	67.6	22.1	44.8	57.2
Oxen	73	20	57.8	17.9	81.5	61.9	24.3	43.1	55.9
Reeder	74	19	57.0	17.7	82.5	55.8	22.7	39.2	53.7
McKenzie	74	21	57.2	17.2	74.7	52.2	22.3	37.2	49.7
Alsen	74	21	58.2	18.4	69.3	52.1	23.9	38.0	48.4
Russ	74	21	57.4	17.4	67.8	54.4	21.2	37.8	47.8
Dandy	74	23	57.0	17.8	69.0	51.2	20.7	36.0	47.0
Keene	75	21	57.4	17.7	68.7	46.3	24.9	35.6	46.6
Parshall	74	21	57.7	18.1	68.5	45.1	23.3	34.2	45.6
Gunner	76	21	56.3	18.2	66.5	46.7	21.0	33.8	44.7
Ingot	72	22	60.0	18.0	67.0	45.0	21.6	33.3	44.5
Walworth	72	21	56.8	17.8	55.3	58.6	19.0	38.8	44.3
Briggs	73	22	57.7	17.9		71.9	23.3	47.6	
Hanna	74	23	57.2	17.4		68.0	23.8	45.9	
Zeke	72	20	55.0	18.8		62.6	20.7	41.6	
Hank	73	20	56.1	18.2			23.9		
AC Superb	75	21	56.5	17.9			23.3		
Keystone	74	21	58.5	17.4			22.6		
CDC Bounty	75	23	55.8	18.1			22.4		
Granite	78	18	57.4	18.6			22.0		
Laser	72	24	55.2	17.6			21.6		
AC Corinne	76	24	52.9	17.6			21.2		
Knudson	75	21	58.2	18.1			20.9		
AC Glenavon	76	25	53.4	17.8			20.8		
Amizon	76	25	54.6	17.9			19.3		
AC Intrepid	72	23	54.7	17.5			19.1		
Trial Mean	74	22	57.1	18.0	70.0	53.0	21.8	--	--
C.V. %	1.1	6.2	1.7	3.3	6.2	6.7	13.7	--	--
LSD .05	1	2	1.4	0.8	6.0	4.9	NS	--	--
LSD .01	2	2	1.8	1.1	7.9	6.5	NS	--	--

Planting Date: April 12, 2002 Harvest Date: July 29, 2002

Seeding rate: 1.1 million live seeds/A (approx. 1.6 bu/A).

Previous crop: 1998 = field pea, 1999 = soybean, 2001 = barley

Note: The 2002 trial sustained severe heat and moisture stress.

NS = no statistical differences between varieties.

	Seeds per Pound	Plant Height	Test Weight		Protein		Yield
		in	lbs/bu		%		bu/acre
Crop rotation							
HRS wht-fallow	14,846	23	59.1		17.7	a	30.1
HRS wht-barley-oat	14,697	21	58.9		16.7	b	28.1
HRS wht-pea-can	14,745	22	58.7		17.5	a	24.1
	NS <sup>1</sup>	*	NS		*		NS
HRS wheat variety							
Alsen	14,443	22	58.5	a <sup>2</sup>	18.1	a	25.2
Briggs	14,504	22	58.8	ab	17.1	a	26.6
Gunner	15,863	24	60.0	b	18.0	a	32.2
Hanna	14,562	25	59.2		16.8		27.3
Ingot	14,668	24	59.3		17.4		29.9
Ivan	14,176	19	59.5		15.5		23.0
McKenzie	15,642	23	58.2		17.7		27.8
Norpro	12,541	21	59.5	ab	17.5	a	32.2
Oxen	15,114	20	59.0		17.4		24.7
Parshall	15,082	22	59.5	b	17.7	a	26.7
Reeder	14,400	21	58.8		16.2		25.8
Walworth	16,199	21	57.0		17.8		28.1
	*	NS	*		*		NS
Trial Mean	14,805	22	59.0		17.3		27.3

<sup>1</sup>NS = not significant; \* = significant at the P<0.05 level. Statistical analyses and other constraints limited separation of tillage and variety treatments to grain test weight, protein, and yield. In addition, variety comparisons were limited to Alsen, Briggs, Gunner, Norpro, and Parshall.

<sup>2</sup> Different letters in columns indicate that treatments varied at the P<0.05 level

Planting Date: May 16

Harvest Date: August 19

	Seeds per Pound	Plant Height	Test Weight		Protein		Yield	
		in	lbs/bu		%		bu/acre	
Crop rotation								
HRS wht-fallow	17,414	24	57.9	a <sup>2</sup>	16.1		17.1	
HRS wht-barley-oat	17,937	24	56.7	b	16.0		16.0	
HRS wht-pea-can	18,261	23	57.7	a	16.0		15.9	
	NS <sup>1</sup>	NS	*		NS		NS	
HRS wheat cultivar								
Alsen	17,616	23	55.9	ab	16.5	cb	13.3	a
Briggs	16,768	22	58.2	b	15.6	a	15.4	ab
Gunner	21,786	26	58.4	bc	17.0	b	14.9	a
Hanna	17,423	26	57.1		15.7		14.6	
Ingot	19,030	25	60.4		15.8		16.0	
Ivan	17,033	22	57.9		14.7		20.4	
McKenzie	17,754	25	55.9		16.1		17.8	
Norpro	16,576	24	54.6	a	16.2	c	17.7	b
Oxen	16,445	21	58.1		16.4		16.8	
Parshall	18,871	23	58.4	c	16.1	c	14.8	a
Reeder	17,165	23	58.1		15.2		18.3	
Walworth	18,869	23	57.9		16.5		18.2	
	*	NS	*		*		*	
Trial Mean	18,004	23	57.6		16.1		16.2	

<sup>1</sup>NS = not significant; \* = significant at the P<0.05 level. Statistical analyses and other constraints limited separation of tillage and variety treatments to grain test weight, protein, and yield. In addition, variety comparisons were limited to Alsen, Briggs, Gunner, Norpro, and Parshall.

<sup>2</sup> Different letters in columns indicate that treatments varied at the P<0.05 level

Planting Date: May 16

Harvest Date: August 19

	Seeds per Pound	Plant Height	Test Weight		Protein		Yield	
		in	lbs/bu		%		bu/acre	
Crop rotation								
HRS wht-fallow	15,989	25	59.2		16.1		25.0	
HRS wht-barley-oat	16,904	22	59.5		15.2		22.4	
HRS wht-pea-can	16,559	23	59.2		15.3		20.6	
	NS <sup>1</sup>	NS	NS		NS		NS	
HRS wheat variety								
Alsen	16,214	24	58.9	b <sup>2</sup>	16.4	ab	17.2	a
Briggs	15,661	21	59.7	ab	15.4	b	22.5	b
Gunner	20,268	25	58.7	b	16.9	a	17.6	a
Hanna	15,671	28	58.9		14.4		27.5	
Ingot	18,047	25	62.2		15.8		18.4	
Ivan	15,304	19	58.4		13.7		23.3	
McKenzie	16,956	27	58.9		15.0		30.6	
Norpro	15,505	23	58.9	b	15.6	b	25.5	bc
Oxen	15,801	21	59.4		15.9		19.6	c
Parshall	17,073	24	60.6	a	15.7	b	26.2	
Reeder	15,354	21	58.9		14.5		25.1	
Walworth	17,145	23	59.1		16.4		18.3	
	*	*	*		*		*	
Trial Mean	16,562	24	59.5		15.6		23.2	

<sup>1</sup>NS = not significant; \* = significant at the P<0.05 level. Statistical analyses and other constraints limited separation of tillage and variety treatments to grain test weight, protein, and yield. In addition, variety comparisons were limited to Alsen, Briggs, Gunner, Norpro, and Parshall.

<sup>2</sup> Different letters in columns indicate that treatments varied at the P<0.05 level

Planting Date: May 20

Harvest Date: August 20

**2002 Hard Red Spring Wheat - Continuously Cropped No-till**

**Scranton**

Variety	Plant Height	Test Weight	Protein	----- Grain Yield -----			Average Yield	
				2000	2001	2002	2 year	3 year
	inches	lbs/bu	%	-----bu/ac-----				
Reeder	25	59.7	16.3	67.0	60.7	44.2	52.4	57.3
Oxen	25	58.1	16.1	65.5	52.8	41.0	46.9	53.1
Alsen	25	60.0	--	63.7	53.4	39.3	46.4	52.1
Parshall	28	60.1	16.6	64.3	52.9	38.6	45.8	51.9
Keene	29	60.0	16.5	61.8	52.6	41.1	46.8	51.8
Ingot	29	61.3	16.5	52.9	51.0	37.1	44.0	47.0
Mercury	22	58.1	16.1		50.7	40.6	45.6	
Walworth	26	57.2	16.3		51.3	37.6	44.4	
Briggs	27	59.3	16.7			39.3		
Trial Mean	27	59.2	16.4	61.5	54.1	40.0	--	--
C.V. %	3.2	0.9		8.1	10.9	5.3	--	--
LSD .05	1	0.8		8.4	8.5	3.1	--	--
LSD .01	2	1.0		11.4	NS	4.1	--	--

Planting Date: April 16, 2002

Harvest Date: August 14, 2002

Seeding rate: 1.1 million live seeds/A (approx. 1.6 bu/A).

Previous Crop: 1999 = HRWW, 2000 = safflower, 2001 = lentil.

NS = no statistical difference between varieties.

2002 Hard Red Spring Wheat - Continuously Cropped No-till

Regent

Variety	Test Weight	Protein	----- Grain Yield -----			Average Yield	
			2000	2001	2002	2 year	3 year
	lbs/bu	%	-----bu/ac-----				
Reeder	56.3	17.6	39.1	74.0	32.1	53.0	48.4
Oxen	56.0	17.0	32.3	69.0	30.0	49.5	43.8
Alsen	57.6	16.9	31.7	67.5	32.0	49.8	43.7
Keene	57.2	16.2	29.8	66.3	32.7	49.5	42.9
Ingot	59.4	17.8	29.7	67.0	30.8	48.9	42.5
Parshall	56.9	17.9	29.9	66.3	28.4	47.4	41.5
Mercury	56.6	16.5		73.5	32.7	53.1	
Walworth	55.3	17.4		68.3	31.4	49.8	
Briggs	56.8	17.8			27.1		
Trial Mean	56.7	17.1	32.2	68.2	30.6	--	--
C.V. %	1.4		11.2	4.2	8.5	--	--
LSD .05	1.1		6.1	4.2	3.8	--	--
LSD .01	1.5		8.2	5.6	NS	--	--

Planting Date: April 16, 2002

Harvest Date: August 1, 2002

Seeding rate: 1.1 million live seeds/A (approx. 1.6 bu/A).

Previous Crop: 1999 = HRWW, 2000 = safflower, 2001 = lentil.

NS = no statistical difference between varieties.

2002 Hard Red Spring Wheat - Continuously Cropped No-till

New Leipzig

Variety	Plant Height	Test Weight	Protein	----- Grain Yield -----			Average Yield	
				2000	2001	2002	2 year	3 year
	inches	lbs/bu	%	-----bu/ac-----				
Reeder	20	55.8	18.6	45.9	60.2	16.7	38.4	40.9
Oxen	21	55.2	18.4	44.7	52.4	12.7	32.6	36.6
Alsen	21	55.8	18.9	43.9	53.3	11.1	32.2	36.1
Parshall	22	56.0	19.2	43.0	49.0	12.0	30.5	34.7
Keene	22	55.9	18.4	41.3	49.3	13.6	31.4	34.7
Ingot	24	58.6	18.0	41.6	46.9	13.5	30.2	34.0
Walworth	22	53.7	19.2		52.2	12.6	32.4	
Mercury	20	53.8	18.1		51.0	11.0	31.0	
Briggs	23	55.3	18.8			13.0		
Trial Mean	22	55.3	18.8	42.1	51.1	12.9	--	--
C.V. %	4.2	0.9		8.1	7.3	16.2	--	--
LSD .05	2	0.9		NS	5.4	NS	--	--
LSD .01	2	1.2		NS	7.2	NS	--	--

Planting Date: April 17, 2002

Harvest Date: July 31, 2002

Seeding rate: 1.1 million live seeds/A (approx. 1.6 bu/A).

Previous Crop: 1999 = HRWW, 2000 = safflower, 2001 = lentil.

Note: The 2002 trial sustained severe heat and moisture stress.

NS = no statistical difference between varieties.

<b>2002 Hard Red Spring Wheat - Continuously Cropped No-till</b>	<b>Selfridge</b>
--	------------------

Variety	Plant Height	Test Weight	Protein	----- Grain Yield -----			----- Average Yield -----	
				2000	2001	2002	2 year	3 year
	inches	lbs/bu	%	-----bu/ac-----				
Oxen	19	57.5	--	51.1	79.9	29.3	54.6	53.4
Reeder	20	56.8	17.7	52.3	82.2	25.4	53.8	53.3
Ingot	22	60.2	17.2	48.9	70.6	28.5	49.6	49.3
Alsen	20	58.1	18.5	48.9	73.0	22.9	48.0	48.3
Parshall	21	57.5	17.8	46.4	75.8	18.6	47.2	46.9
Keene	20	58.1	17.5	47.3	69.5	22.8	46.2	46.5
Mercury	19	56.1	17.2		82.4	23.8	53.1	
Walworth	20	55.4	17.2		72.6	23.9	48.2	
Briggs	23	57.6	17.6			24.4		
Trial Mean	20	57.4	17.7	49.3	74.8	23.3	--	--
C.V. %	5.9	1.4	--	4.3	4.7	16.9	--	--
LSD .05	2	1.1	--	3.6	5.0	5.7	--	--
LSD .01	2	1.5	--	4.9	6.7	7.7	--	--

Planting Date: April 25, 2002  
 Harvest Date: July 31, 2002  
 Seeding rate: 1.1 million live seeds/A (approx. 1.6 bu/A).  
 Previous Crop: 1999 & 2000 = HRWW, 2001 = lentil.  
 Note: The 2002 trial sustained severe heat and moisture stress.



Performance of spring wheat grown under dryland conditions at Wibaux, MT.

Planted: 16 May 2002

Harvested: 23 August 2002 Cooperator: David Maus

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	\$/acre <sup>1</sup> +/- McNeal
Parshall	24	15.5	59.8	<b>39.6</b>	70.85
Scholar	24	16.2	60.2	32.3	34.43
Hank	20	15.8	57.0	31.4	29.94
MT9806	23	16.9	58.7	31.0	27.94
Reeder	20	17.1	57.5	30.8	26.94
McKenzie	21	16.0	57.3	29.8	21.95
Alsen	22	16.7	59.5	29.2	18.96
Ember	21	15.9	59.6	28.8	16.96
Outlook	22	15.8	57.0	27.0	7.98
Ernest	26	16.4	58.8	26.9	7.48
AC Barrie	23	16.6	57.2	26.8	6.98
Amidon	24	15.8	57.8	26.7	6.48
Conan	20	16.5	59.9	25.9	2.49
McNeal	23	16.3	57.5	25.4	0.00
MT9929	20	15.6	57.6	25.0	-2.00
Rambo	21	16.1	59.6	24.5	-4.49
Express	21	16.2	57.9	24.3	-5.49
Gunner	24	17.1	59.0	23.9	-7.49
Explorer*	20	15.9	58.2	26.0	**
MTHW9420*	18	15.4	57.7	26.1	**
average	21.8	16.2	58.4	28.1	
p value	<0.001	0.402	<0.001	0.036	
CV (S/Mean)	7.9	5.3	1.5	16.4	
CV(SE/Mean)	4.6	3.1	0.8	9.5	
LSD 0.05	2.9	ns	1.4	7.6	

<sup>1</sup>Wheat prices summarized by Gregg Carlson, NARC, Havre, MT, from 6-year average of daily market values for PNW, supplied by the Montana Wheat and Barley Committee

\* hard white wheat

\*\* no average price for hard white wheat available at this time.

Table 1. Performance of fourteen different organic wheat cultivars in southwestern North Dakota 2002.

Variety (Source)	Plant Counts			Plant Heights			Kernels -no./lb-	Plant Height ---inches---	Protein -%-	Yield -bu/ac-	Test Weight ---lbs/bu---
	May 30	June 7	Vigor*	May 30	June 7	June 7					
AC Cadillac	1,126,447	959,454	1.9	4.5	5.8	17,745	26.1	15.9	23.4	59.3	
Alsen	1,156,809	990,828	2.3	3.7	5.3	17,854	21.9	15.8	27.5	59.5	
BacUp	1,225,631	1,187,172	2.5	4.1	5.4	18,672	23.2	16.3	21.1	61.0	
Chris	1,133,532	1,057,625	2.6	4.3	5.5	21,141	27.9	15.4	23.1	57.8	
Coteau	1,294,453	1,279,271	1.4	4.0	5.3	18,719	24.0	16.0	25.0	56.4	
Glupro	1,029,287	898,729	2.6	4.0	5.5	18,151	27.5	18.9	18.2	54.6	
Gunner	1,316,718	1,113,290	1.5	3.9	5.4	20,328	24.9	15.1	28.4	61.0	
Ingot	1,037,384	1,053,577	2.1	4.3	5.7	18,069	24.8	14.7	27.3	61.0	
Parshall	1,360,238	1,163,894	1.5	4.1	5.4	17,894	23.8	14.8	29.2	60.8	
Parshall SWG	1,410,842	1,280,283	1.9	3.9	5.9	17,537	23.8	15.0	29.6	60.8	
Red Fife	1,265,102	1,165,918	2.3	4.3	5.3	16,148	30.3	14.2	20.2	56.1	
Reeder	984,756	864,318	2.3	4.3	5.9	18,053	21.9	14.9	29.1	59.1	
Stoa Conv	666,962	647,732	3.8	3.1	5.3	16,826	25.9	14.2	23.4	54.4	
Stoa Organic	1,567,715	1,339,996	1.8	3.7	5.4	18,278	25.4	15.0	31.5	58.4	
Waldron	1,487,760	1,434,120	1.9	4.2	5.5	18,041	26.9	14.3	26.5	57.5	
Walworth	1,119,362	1,019,166	1.9	4.1	5.6	18,873	22.3	15.5	27.5	58.3	
Trial Mean	1,198,937	1,090,961	2.1	4.0	5.5	18,271	25.0	15.4	25.7	58.5	
C.V. %	13.7	16.1	14.2	5.9	3.8	4.8	5.1	4.2	7.9	1.4	
LSD .05	233,232	249,648	0.4	0.3	0.3	1,258	1.8	0.9	2.9	1.2	

The study was established on May 15.

\* 1=high vigor, 5=low vigor at 15 days after seeding

Table 2. Performance of fourteen different organic wheat cultivars in southwestern North Dakota 2002.

Variety (Source)	June Biomass				July Biomass				Crop Competitiveness* -% Control-	
	Crop Dry Matter	Broadleaf Weed Dry Matter	Grass Weed Dry Matter	Crop Dry Matter	Broadleaf Weed Dry Matter	Grass Weed Dry Matter	Crop Dry Matter	Broadleaf Weed Dry Matter		Grass Weed Dry Matter
AC Cadillac	634	2	7	2,560	12	197				51
Alsen	584	12	9	2,205	30	350				35
BacUp	665	1	5	2,242	91	386				44
Chris	405	10	8	2,004	62	429				44
Coteau	739	7	5	2,558	61	254				49
Glupro	547	1	9	2,265	29	341				41
Gunner	715	11	4	2,494	30	214				55
Ingot	745	3	10	2,519	33	214				46
Parshall	759	14	5	2,417	68	295				46
Parshall SWG	631	6	0	2,741	63	219				35
Red Fife	586	7	6	1,998	32	359				48
Reeder	562	5	14	2,031	33	304				38
Stoa Conv	402	6	19	1,180	66	901				18
Stoa Organic	645	6	6	2,624	47	290				58
Waldron	740	5	5	2,607	9	288				51
Walworth	746	20	5	2,902	89	213				53
Trial Mean	632	7	8	2,334	47	328				44
C.V. %	26.9	119.5	103.16	12.3	112.5	39.8				25.7
LSD .05	NS	NS	NS	478	NS	218				16

\*Measure of weed suppression

2002 Hard Red Spring Wheat in the West River Region

Combined Means

Variety	Days to Head	Plant Height	Seeds / Pound	Test Weight	Protein	Grain Yield			Average Yield	
						2000	2001	2002	2 year	3 year
		inches		lbs/bu	%	bu/ac				
Norpro	68	22	15359	58.3	16.8	56.2	54.3	28.9	41.6	46.5
Reeder	67	22	16071	58.0	16.7	54.0	55.6	28.6	42.1	46.1
Ivan	69	20	15534	59.2	14.6	54.7	52.6	28.8	40.7	45.4
Keene	68	24	16898	58.3	17.3	49.4	52.9	30.4	41.6	44.2
Oxen	66	21	16107	57.7	17.0	48.5	51.6	27.1	39.4	42.4
Alsen	67	23	15812	58.2	17.7	49.2	49.4	25.6	37.5	41.4
Parshall	67	24	17448	58.6	17.4	49.1	49.3	25.9	37.6	41.4
Ingot	66	25	16893	60.4	17.1	48.8	47.7	26.9	37.3	41.1
Mercury	68	20	14488	56.9	17.1		57.6	29.1	43.4	
Walworth	66	22	16914	56.8	17.3		50.4	25.6	38.0	
McKenzie	67	25	16784	57.8	16.5			28.4		
Hanna	68	26	15682	58.7	16.1			27.7		
Briggs	66	23	15740	58.2	17.1			26.3		
Gunner	70	24	19048	58.9	17.5			25.9		
# of locations	2	8	4	9	8	11	12	9	21	32

Locations: 2002 = Hettinger, Dickinson, Scranton, Regent, Selfridge, New Leipzig, Beulah, Hannover & Glen Ullin.  
 2001 = Dickinson, Scranton, Regent, Selfridge, New Leipzig, Mandan, Beulah, Hannover, Glen Ullin, Wibaux MT, Ralph SD and Bison SD.  
 2000 = Hettinger, Dickinson, Scranton, Regent, Selfridge, New Leipzig, Mandan, Beulah, Hannover, Glen Ullin and Wibaux MT.

## 2002 Dormant Seeded Spring Wheat

Hettinger

Variety	Plant Stand	Days to Head	Plant Height	Grain Protein	Yield
	#/sq ft	1/1	inches	%	bu/ac
Ivan	5.14	179	17	14.7	13.7
2375	5.71	177	18	16.4	11.2
Ernest	5.14	176	20	17.2	11.2
Oxen	2.85	177	19	16.7	11.2
Keene	2.29	179	19	17.0	10.0
McNeal	4.57	178	20	16.3	8.7
2398	4.00	179	19	16.6	8.1
Ember	4.57	176	20	15.5	7.5
Russ	2.86	177	20	16.1	6.8
Parshall	4.00	176	18	17.4	5.6
Scholar	5.14	179	19	17.0	5.0
Grandin	4.00	179	18	16.4	5.0
Alsen	4.57	178	18	16.5	4.4
Ingot	4.00	177	18	16.7	3.7
Butte 86	2.86	178	19	15.5	3.1
Reeder	4.00	178	19	16.3	2.5

Planting date: November 15, 2001

Harvest date: August 15, 2002

Seeding rate: 1.1 million live seeds/acre.

Previous crop: Barley

Notes: This trial was not replicated. The trial sustained severe heat and moisture stress.

2003 North Dakota durum wheat variety descriptions, agronomic traits.

Variety	Agent or Origin <sup>1</sup>	Year Released	Chaff Color	Height	Straw Strength	Maturity	Reaction to Disease <sup>2</sup>			
							Stem Rust	Leaf Rust	Foliar Disease	Scab
AC Avonlea	Can.	1997	white	med	med.	med.	R	R	M	S
AC Melita	Can.	1995	white	tall	med.	med.	R	NA	NA	S
AC Morse	Can.	1996	white	s.dwf.	strong	med.	R	R	M	NA
AC Navigator	Can.	1999	white	s.dwf.	weak	med.	R	R	M	S
AC Pathfinder	Can.	1999	white	med.	weak	med.	R	R	M	S
Belzer	ND	1997	white	tall	med.	late	R	R	M	MR
Ben	ND	1996	white	med.	strong	med.	R	R	MR	S*
Cando	ND	1975	tan	s.dwf.	v.strong.	med.	R	R	M	VS
<b>Dilse</b>	<b>ND</b>	<b>2002</b>	<b>white</b>	<b>med.</b>	<b>strong</b>	<b>late</b>	<b>R</b>	<b>R</b>	<b>M</b>	<b>MS</b>
Dressler	AgriPro	1996	white	tall	med.	med.	R	MR	NA	VS
Fjord	AgriPro	1986	white	tall	strong.	m.early	R	R	M	S
Kari	Agripro	1998	white	med	strong	med	R	R	M	S
Kyle	Can.	1984	white	tall	weak	med.	R	MR	M	NA
Laker	WPB	1985	white	s.dwf.	strong.	med.	R	MR	S	S
Lebsock	ND	1999	white	med	strong	med	R	R	M	MS
Lloyd	ND	1983	white	s.dwf.	v.strong.	med.	R	MR	S	VS
Maier	ND	1998	white	med	strong	m-late	R	R	M	S*
Medora	Can.	1983	white	tall	strg.	m.early	R	R	MS	VS
Monroe	ND	1985	white	tall	med.	early	R	R	M	VS
Mountrail	ND	1998	white	med	strong	late	R	R	M	S*
Munich	ND	1995	white	med.	v.strg.	med.	R	R	MR	S*
<b>Pierce</b>	<b>ND</b>	<b>2001</b>	<b>white</b>	<b>med.</b>	<b>m.strong</b>	<b>med.</b>	<b>R</b>	<b>R</b>	<b>MS</b>	<b>S</b>
Plaza	ND	1999	white	s.dwf.	strong	late	R	R	M	MS
Plenty	Can.	1990	white	tall	weak	late	R	R	MR	MS
Renville	ND	1988	white	tall	med.	med.	R	R	M	S*
Rugby	ND	1973	tan	tall	v.strong.	m.early	R	R	MR	S*
Vic	ND	1979	white	tall	med.	m.early	R	R	MR	S*
Voss	AgriPro	1994	white	s.dwf.	v.strong.	med.	R	MR	MS	S
Ward	ND	1972	tan	tall	v.strong.	m.early	R	R	MR	S

1 Refers to agent or developer: WPB = Western Plant Breeder.

2 R = resistant; MR = moderately resistant (slow rusters); M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible; Foliar Disease = reaction to tan spot and septoria leaf spot complex. Letter ratings for head blight (scab) based on visual head symptoms. \* Indicates yields and/or quality have often been higher than would be expected based on visual symptoms. **Bold** varieties were released in 2001 and 2002.

Variety	Days to Head	Seeds per Pound	Plant Height	Test Weight	Protein	Grain Yield			Returns	Average Yield	
						2000	2001	2002		2 Year	3 Year
			in	lbs/bu	%	-----bu/ac-----			\$/ac	----bu/ac----	
AC Avonlea	61	11,339	26	60.9	16.3	45.8	54.1	34.1	155.24	44.1	44.7
AC Morse	60	13,196	25	59.4	16.3	42.3	55.2	35.3	160.09	45.3	44.3
Belzer	62	11,614	25	60.7	15.7	39.3	41.9	34.3	155.84	38.1	38.5
Ben	61	10,002	25	61.8	16.9	40.7	42.2	31.3	142.58	36.8	38.1
Dilse	62	12,177	26	60.8	17.1	46.1	45.3	36.5	166.02	40.9	42.6
Lebsock	61	11,016	26	62.2	15.2	38.9	45.5	36.4	165.81	41.0	40.3
Maier	62	11,556	25	61.9	16.5	47.1	47.6	35.5	161.49	41.5	43.4
Monroe	62	11,683	25	60.9	15.4	39.5	44.0	34.7	157.99	39.4	39.4
Mountrail	62	11,811	25	61.8	15.9	50.4	51.2	35.1	159.80	43.2	45.6
Munich	61	12,015	23	60.3	15.8	42.2	44.6	31.1	141.37	37.8	39.3
Pierce	61	11,970	26	61.0	16.2	49.4	45.3	34.5	157.22	39.9	43.1
Plaza	62	11,748	24	61.7	15.6	44.6	48.3	33.4	152.09	40.9	42.1
Renville	60	10,691	26	60.7	15.6	44.8	36.6	31.0	140.96	33.8	37.5
Rugby	61	11,544	26	61.4	16.1	39.9	43.1	32.8	149.27	38.0	38.6
Trial Mean	61	11,911	25	61.2	15.9	43.4	46.6	34.2	155.69	--	--
C.V. %	0.9	5.7	4.6	1.0	2.7	11.8	13	10.0	10.1	--	--
LSD .05	1	959	2	0.8	0.9	7.1	8.5	4.8	22.04	--	--

Planting Date: May 2

Harvest Date: August 16

Returns were calculated by multiplying the 2002 yield by the test weight discount paid at the Southwest Grain Terminal located at Gladstone on September 12. The price paid on this date was \$4.55/bu, assuming a minimum test weight of 60 lb/bu. Grain was discounted \$.01/bu for each 0.5 lb reduction in test weight between 60 and 59 lb/bu, \$.03/bu per 0.5 lb reduction between 59 and 58 lb/bu, \$.04/bu between 58 and 55 lb/bu, and \$.05/bu per 0.5 lb/bu reduction between 55 and 50 lb/bu.

## 2002 Durum - Continuously Cropped No-till

Hettinger

Variety	Days to Head	Plant Height	Test Weight	Protein	----- Grain Yield -----			Average Yield	
					1999	2000	2002	2 year	3 year
		inches	lbs/bu	%	-----bu/ac-----				
Mountrail	76	22	55.4	18.8	91.4	55.9	22.6	39.2	56.6
Munich	76	20	54.9	19.7	86.8	59.6	22.0	40.8	56.1
Plaza	77	22	56.8	19.0	79.9	65.4	22.3	43.8	55.9
Maier	76	20	54.6	20.2	84.0	63.9	17.3	40.6	55.1
Lebsock	76	23	57.7	18.0	81.8	57.1	26.0	41.6	55.0
Pierce	76	21	56.1	18.7	80.9	59.9	22.1	41.0	54.3
Renville	76	23	56.1	18.1	78.3	58.4	26.2	42.3	54.3
Dilse	77	21	54.6	20.8	81.7	57.7	22.0	39.8	53.8
Ben	76	22	55.9	20.4	83.7	54.0	22.8	38.4	53.5
Belzer	76	22	55.4	18.5	78.4	60.2	21.7	41.0	53.4
Monroe	74	23	57.0	18.9	76.0	53.8	24.2	39.0	51.3
Rugby	76	23	56.1	19.4	76.5	50.7	21.6	36.2	49.6
AC Napoleon	75	22	54.8	19.7			22.2		
Trial Mean	76	22	56.2	18.9	80.4	58.4	23.4	--	--
C.V. %	0.9	6.4	1.3	2.9	4.3	7.6	15.3	--	--
LSD .05	1	2	1.0	0.8	4.9	6.2	NS	--	--
LSD .01	1	3	1.3	1.0	6.4	8.2	NS	--	--

Planting Date: April 12, 2002

Harvest Date: July 29, 2002

Seeding rate: 1.25 million live seeds/A (approx. 2.2 bu/A).

Previous crop: 1998 = field pea, 1999 = soybean, 2001 = barley

Note: The 2002 trial sustained severe heat and moisture stress.

NS = no statistical differences between varieties.



**2002 Durum - Continuously Cropped No-till**
**Scranton**

Variety	Plant Height	Test Weight	Protein	----- Grain Yield -----			Average Yield	
				2000	2001	2002	2 year	3 year
	inches	lbs/bu	%	-----bu/ac-----				
Mountrail	26	59.1	16.2	71.1	49.0	39.1	44.0	53.1
Maier	26	60.2	16.6	68.5	45.4	41.9	43.6	51.9
Ben	26	60.1	16.5	64.1	52.4	38.1	45.2	51.5
Lebsock	26	61.1	15.6	60.0	49.8	41.1	45.4	50.3
Pierce	27	60.5	15.5		51.4	39.2	45.3	
Dilse	26	59.9	16.9			40.3		
Trial Mean	26	60.1	16.2	65.9	49.7	40.0	--	--
C.V. %	3.9	0.6		7.2	5.3	4.9	--	--
LSD .05	NS	0.6		NS	4.0	NS	--	--
LSD .01	NS	0.8		NS	5.5	NS	--	--

Planting Date: April 16, 2002

Harvest Date: August 14, 2002

Seeding rate: 1.25 million live seeds/A (approx. 2.2 bu/A).

Previous Crop: 1999 = HRWW, 2000 = safflower, 2001 = lentil.

NS = no statistical difference between varieties.

**2002 Durum Wheat - Continuously Cropped No-till**
**Regent**

Variety	Test Weight	Protein	----- Grain Yield -----			Average Yield	
			2000	2001	2002	2 year	3 year
	lbs/bu	%	-----bu/ac-----				
Lebsock	56.8	16.9	44.2	68.1	28.0	48.0	46.8
Montrail	53.4	17.4	44.5	68.2	27.6	47.9	46.8
Maier	53.8	17.6	41.3	67.0	26.2	46.6	44.8
Ben	53.7	17.8	41.3	63.9	26.4	45.2	43.9
Pierce	55.5	17.3		63.8	26.7	45.2	
Dilse	52.6	18.7			22.5		
Trial Mean	54.3	17.6	42.3	65.7	26.2	--	--
C.V. %	1.8		4.0	2.5	6.8	--	--
LSD .05	1.8		NS	2.4	3.3	--	--
LSD .01	2.5		NS	3.4	NS	--	--

Planting Date: April 16, 2002

Harvest Date: August 1, 2002

Seeding rate: 1.25 million live seeds/A (approx. 2.2 bu/A).

Previous Crop: 1999 = HRWW, 2000 = safflower, 2001 = lentil.

NS = no statistical difference between varieties.

**2002 Durum Wheat - Continuously Cropped No-till**

**New Leipzig**

Variety	Plant Height	Test Weight	Protein	----- Grain Yield -----			Average Yield	
				2000	2001	2002	2 year	3 year
	inches	lbs/bu	%	-----bu/ac-----				
Mountrail	18	55.8	20.2	38.5	50.6	14.0	32.3	34.4
Maier	20	54.9	20.5	34.9	52.1	14.2	33.2	33.7
Lebsock	19	57.8	18.9	35.1	52.7	11.1	31.9	33.0
Ben	20	56.6	19.4	32.7	48.6	15.4	32.0	32.2
Pierce	20	55.9	19.5		48.7	12.5	30.6	
Dilse	18	55.2	20.9			11.3		
Trial Mean	19	56.0	19.9	35.9	50.1	13.1	--	--
C.V. %	5.7	0.5		6.1	4.4	11.3	--	--
LSD .05	NS	0.5		3.3	3.3	2.2	--	--
LSD .01	NS	0.8		4.5	NS	3.1	--	--

Planting Date: April 17, 2002

Harvest Date: July 31, 2002

Seeding rate: 1.25 million live seeds/A (approx. 2.2 bu/A).

Previous Crop: 1999 = HRWW, 2000 = safflower, 2001 = lentil.

Note: The 2002 trial sustained severe heat and moisture stress.

NS = no statistical difference between varieties.

**2002 Durum Wheat - Continuously Cropped No-till**

**Selfridge**

Variety	Plant Height	Test Weight	Protein	----- Grain Yield -----			Average Yield	
				2000	2001	2002	2 year	3 year
	inches	lbs/bu	%	-----bu/ac-----				
Mountrail	20	59.0	17.5	61.1	78.7	22.1	50.4	54.0
Lebsock	20	59.5	17.0	62.5	77.6	20.4	49.0	53.5
Maier	20	58.7	16.9	65.2	72.7	19.9	46.3	52.6
Ben	20	59.3	17.0	60.2	76.3	18.5	47.4	51.7
Pierce	20	59.6	17.2		72.9	18.7	45.8	
Dilse	19	58.0	17.8			19.4		
Trial Mean	20	59.0	17.2	62.0	75.4	19.8	--	--
C.V. %	6.3	1.0		6.4	3.9	8.6	--	--
LSD .05	NS	NS		NS	4.4	NS	--	--

Planting Date: April 25, 2002

Harvest Date: July 31, 2002

Seeding rate: 1.25 million live seeds/A (approx. 2.2 bu/A).

Previous Crop: 1999 & 2000 = HRWW, 2001 = lentil.

Note: The 2002 trial sustained severe heat and moisture stress.

Performance of durum grown under dryland conditions at Wibaux, MT.

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre
AC Avonlea	23	17.1	60.1	37.2 a
AC Morse	21	16.9	58.5	28.2
AC Napoleon	21	17.0	58.3	25.9
AC Navigator	21	16.2	62.0	28.0
AC Pathfinder	25	16.2	61.4	35.3
Belzer	25	17.2	58.8	27.7
Ben	24	16.6	60.7	31.4
Dilse	22	17.7	60.1	27.1
Kyle	23	16.6	61.0	26.5
Lebsock	22	15.8	61.2	30.8
Maier	23	17.1	61.0	30.0
Mountrail	23	16.3	60.0	36.4 a
Munich	22	17.1	58.5	30.0
Pierce	21	16.1	61.4	32.8
Plaza	22	17.0	60.9	25.8
Renville	23	17.2	60.2	28.9
average	23	16.8	60.2	30.1
p value	0.039	0.064	<0.001	0.018
CV (S/Mean)	6.5	3.8	0.9	13.6
CV(SE/Mean)	3.7	2.2	0.5	7.8
LSD 0.05	2.4	1.1	0.9	6.8

a indicates significantly greater yield than check variety, Renville, at a probability of 0.05

Planted: 16 May 2002      Harvested: 23 August 2002      Cooperator: David Maus

<b>2002 Durum Wheat in the West River Region</b>	<b>Combined Means</b>
--	-----------------------

Variety	Days to Head	Plant Height	Seeds / Pound	Test Weight	Protein	Grain Yield			Average Yield	
						2000	2001	2002	2 year	3 year
		inches		lbs/bu	%	-----			-----	
Mountrail	69	22	11,811	57.8	17.5	54.6	52.9	28.1	40.5	45.2
Lebsock	68	23	11,016	59.5	16.8	50.4	49.9	27.7	38.8	42.7
Maier	69	22	11,556	57.9	17.9	52.3	49.1	26.4	37.8	42.6
Ben	68	23	10,002	58.3	17.8	49.8	49.1	26.3	37.7	41.7
Pierce	68	22	11,970	58.6	17.2		50.7	26.6	38.6	
Dilse	70	22	12,177	57.3	18.6			25.6		
# of locations	2	6	1	7	7	11	12	7	19	30

Locations: 2002 = Hettinger, Dickinson, Scranton, Regent, Selfridge, New Leipzig and Wibaux MT.  
 2001 = Dickinson, Scranton, Regent, Selfridge, New Leipzig, Mandan, Beulah, Hannover, Glen Ullin, Wibaux MT, Ralph SD and Bison SD.  
 2000 = Hettinger, Dickinson, Scranton, Regent, Selfridge, New Leipzig, Mandan, Beulah, Hannover, Glen Ullin and Wibaux MT.

<b>2002 Durum Seeding Rate - No-till</b>	<b>Hettinger</b>
--	------------------

Variety	Seeding Rate		Plant Stand 1000's/ac	Days to Head days	Plant Height inches	Test Weight lbs/bu	Protein %	Grain Yield bu/ac
	million's	lbs/ac						
Ben	1.00	107	597	74	22	55.2	19.3	21.4
Ben	1.25	134	728	74	23	55.2	19.9	23.3
Ben	1.50	160	809	74	23	54.9	20.0	23.7
Maier	1.00	102	535	74	23	54.2	19.4	22.9
Maier	1.25	128	660	74	24	55.8	19.8	24.2
Maier	1.50	155	722	75	23	55.0	19.2	24.0
Trial Mean			673	74	23	55.1	19.6	23.2
C.V. %			19.1	1.0	5.5	2.1	3.4	6.6
LSD .05			NS	NS	NS	NS	NS	NS

Planting Date: April 15, 2002

Harvest Date: July 29, 2002

Previous Crop: barley

NS = no statistical difference between varieties.

This trial sustained severe heat and moisture stress.

<b>2002 Durum Seeding Rate - No-till</b>	<b>Regent</b>
--	---------------

Variety	Seeding Rate		Test Weight lbs/bu	Protein %	Grain Yield bu/ac
	million's	lbs/ac			
Ben	1.00	107	56.2	17.8	23.9
Ben	1.25	134	56.4	17.7	24.0
Ben	1.50	160	55.2	17.6	23.8
Maier	1.00	102	54.9	17.7	24.4
Maier	1.25	128	55.7	17.8	22.6
Maier	1.50	155	56.3	17.8	22.4
Trial Mean			55.8	17.7	23.5
C.V. %			1.2	2.1	5.5
LSD .05			1.0	NS	NS

Planting Date: April 16, 2002

Harvest Date: August 1, 2002

Previous Crop: lentil

NS = no statistical difference between seeding rates.

This trial sustained severe heat and moisture stress.

<b>2002 Durum Seeding Rate - No-till</b>	<b>Scranton</b>
--	-----------------

Variety	Seeding Rate		Test Weight	Protein	Grain Yield
	million's	lbs/ac	lbs/bu	%	bu/ac
Ben	1.00	107	60.1	15.9	41.7
Ben	1.25	134	60.3	16.0	40.4
Ben	1.50	160	59.8	16.2	39.3
Maier	1.00	102	60.0	16.1	42.7
Maier	1.25	128	60.4	16.0	40.9
Maier	1.50	155	60.3	16.0	40.2
Trial Mean			60.2	16.0	40.9
C.V. %			0.6	1.5	5.1
LSD .05			NS	NS	NS

Planting Date: April 16, 2002 Harvest Date: August 1, 2002  
 Previous Crop: lentil  
 NS = no statistical difference between seeding rates.

<b>2002 Durum Seeding Rate - No-till</b>	<b>Combined Means</b>
--	-----------------------

Variety	Seeding Rate		Plant Stand	Days to Head	Plant Height	Test Weight	Protein	Grain Yield
	million's	lbs/ac	1000's/ac	days	inches	lbs/bu	%	bu/ac
Ben	1.00	107	597	74	22	57.2	17.6	29.0
Ben	1.25	134	728	74	23	57.2	17.9	29.4
Ben	1.50	160	809	74	23	56.7	17.9	28.8
Maier	1.00	102	535	74	23	56.4	17.7	30.0
Maier	1.25	128	660	74	24	57.2	17.7	29.6
Maier	1.50	155	722	75	23	57.5	17.8	29.0
# of Locations*			1	1	1	3	3	3

\*Locations: Hettinger, Scranton & Regent  
 The Hettinger and Regent trials sustained severe heat and moisture stress.

## 2002 North Dakota barley variety descriptions

Variety	Use <sup>1</sup>	Origin	Year Released	Awn Type <sup>2</sup>	Aleurone Color	Height	Straw Strength	Relative Maturity	Reaction to Disease <sup>3</sup>			
									Stem Rust	Loose Smut	Spot Blotch	Net Blotch
<b>Six-row</b>												
Azure	M/F	ND	1982	S	blue	med.	m. strg.	m. early	S	S	MR-R	MS-S
Excel	M/F	MN	1990	S	white	m. short	strg.	med.	S	S	MR-R	MS-S
Foster	M/F	ND	1995	S	white	m. short	strg.	med.	S	S	MR-R	MS-S
Hazen	F	ND	1984	S	white	med.	m. strg.	med.	S	S	MR-R	MS-S
Morex	M/F	MN	1978	S	white	tall	med.	early	S	S	MR	S
Robust	M/F	MN	1983	S	white	med	m.strg.	med.	S	S	MR-R	MS-S
Stander	F	MN	1993	S	white	m. short	v.strg.	m. late	S	S	MR-R	MS-S
MNBrite*	F	MN	1997	S	white	tall	med	early	S	S	MR-R	MS-S
Lacey	F†	MN	1999	S	white	m. short	strg.	med.	S	S	MR-R	MS-S
Drummond	F†	ND	2000	S	w	m. short	v strg	med	S	S	MR-R	MS-S
Legacy	F†	BARI	2000	S	w	med	strg	m. late	S	S	MR-R	MS-S
<b>Two-row</b>												
Bowman	F	ND	1984	S	white	m.short	med.	early	S	S	MS-S	S-MS
Conlon <sup>4</sup>	M/F	ND	1996	S	white	m.short	med.	early	S	S	MS-MR	MR-R
Gallatin	F	MT	1986	R	white	med.	med.	late	S	S	MS	MS
Harrington <sup>5</sup>	F	Can.	1981	R	white	med.	m.weak	v.late	S	S	S	MR-MS
Logan	F	ND	1995	S	white	med.	strg.	med.	S	S	MS-MR	MR
Stark	F	ND	1991	S	white	m.tall	med.	late	S	S	S-MS	MS-S
Merit <sup>5</sup>	F	AB	1998	R	white	med	m.weak	v.late	S	S	MS	MR
<b>Specialty</b>												
Wanubet	SP	MT	1990	R	white	med.	weak	late	S	S	S	S

† Malting designation pending.

\* Moderately resistant to Fusarium head blight.

1 M = malting; F = feed; SP = special uses (hulles).

2 Rough or smooth awned.

3 R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible; N/A = not available.

4 Lower DON accumulation than other varieties tested.

5 Recommended as a malting barley in western US.

Variety	Days to Head	Seeds per Pound	Plant Height	Test Weight	Protein	Lodging	% Plump	Grain Yield			Average Yield		
								2000	2001	2002	Returns	2 Year	3 Year
			in	lbs/bu	%		>6/64	-----bu/ac-----			\$/ac	---bu/ac---	
<b>Six Row</b>													
Drummond	72	13,951	27	42.0	14.9	1	81	45.0	110.3	74.4	150.21	92.3	76.6
Excel	70	13,963	25	40.0	13.3	2	75	58.9	110.9	74.1	142.52	92.5	81.3
Foster	70	14,114	25	39.8	12.9	2	75	54.1	109.0	80.8	154.46	94.9	81.3
Lacey	70	14,438	25	40.9	13.6	2	71	51.2	105.6	76.5	150.81	91.1	77.8
Legacy	72	13,836	26	38.9	14.2	1	78	55.1	105.2	72.9	137.42	89.1	77.7
MNBrite	72	14,414	27	40.4	16.1	2	68	50.0	101.5	73.6	143.56	87.6	75.0
Morex	70	15,164	24	40.3	14.2	4	65	43.3	99.6	72.7	140.86	86.2	71.9
Robust	72	14,412	26	41.7	14.8	2	73	51.6	104.3	75.0	150.68	89.6	77.0
Stander	71	13,710	26	40.9	14.1	1	85	55.6	111.1	72.8	143.26	92.0	79.8
<b>Two Row</b>													
Bowman	68	11,297	25	44.0	14.4	2	92	43.2	86.6	83.6	174.52	85.1	71.1
Conlon	68	11,123	25	44.3	14.2	2	94	41.6	95.4	78.1	165.48	86.8	71.7
Harrington	76	13,885	26	40.8	14.5	1	81	46.4	91.5	77.8	152.77	84.6	71.9
Logan	71	11,359	24	45.3	14.4	1	89	46.1	91.1	86.9	185.28	89.0	74.7
Merit	79	14,062	25	39.6	14.9	1	76	45.6	118.8	73.8	141.39	96.3	79.4
Stark	72	11,814	27	44.7	15.0	2	85	51.3	98.4	82.3	174.20	90.3	77.3
Valier	75	13,759	26	44.6	14.4	1	73	--	109.4	80.4	169.46	94.9	--
Trial Mean	71	13,543	26	41.6	14.25	2	80	49.5	104.9	77.4	154.75	--	--
C.V. %	1.3	4.4	4.1	3.2	4.0	34.9	6.8	11.2	5.5	5.0	6.4	--	--
LSD .05	1	842	1	1.9	1.2	1	8	7.8	8.1	5.4	14.07	--	--

Planting Date: April 16

Harvest Date: July 31

Lodging 0=No lodging, 9=Completely flat

Returns were calculated by multiplying the 2002 yields by the price paid for feed barley minus the test weight discount paid at the Southwest Grain Terminal located at Gladstone on September 12. The price paid on this date was \$2.15/bu, assuming that the test weight was heavier than 45 lb/bu. Grain with a test weight of 45 lb/bu was discounted \$.03/bu, with an additional discount of \$.04/bu per pound down to 42 lb/bu. Below 42 lb/bu, an additional discount of \$.05/bu occurred per pound.

2002 Barley - Continuously Cropped No-till

Hettinger

Variety	Days to Head	Plant Height	Test Weight	Grain Protein	----- Grain Yield -----			Average Yield	
					1999	2000	2002	2 year	3 year
		inches	lbs/bu	%	-----bu/ac-----				
<b>2 Row</b>									
Logan	75	18	48.5	15.4	110.4	77.2	33.3	55.2	73.6
Merit	82	17	46.5	14.6	115.2	78.2	15.6	46.9	69.8
Conlon	72	17	49.0	14.5	96.3	77.8	23.9	50.8	66.0
Stark	75	19	51.1	15.2	92.4	72.6	30.6	51.6	65.2
Bowman	74	19	50.2	15.0	87.9	71.7	30.0	50.8	63.2
Harrington	80	18	47.0	15.0	91.4	70.1	16.5	43.3	59.3
Valier	79	18	48.5	15.9			25.1		
<b>6 Row</b>									
Morex	76	19	45.6	14.9	105.2	84.5	23.1	53.8	70.9
Excel	74	19	45.6	14.7	103.0	83.9	20.0	52.0	69.0
Stander	75	19	46.3	14.4	97.9	85.9	22.8	54.4	68.9
Lacey	74	17	44.8	15.0	93.4	84.1	24.3	54.2	67.3
Drummond	75	19	43.4	15.2	96.8	82.2	21.4	51.8	66.8
Foster	74	18	42.3	14.4	99.1	77.4	21.0	49.2	65.8
Legacy	76	18	44.1	13.9	93.3	80.2	18.5	49.4	64.0
Robust	76	19	47.7	15.4	87.0	69.1	24.4	46.8	60.2
Trial Mean	75	18	46.3	14.8	98.6	79.1	22.9	--	--
C.V. %	1.3	7.9	4.4	2.7	7.5	6.6	18.0	--	--
LSD .05	1	2	2.9	0.6	10.5	7.4	5.8	--	--
LSD .01	2	NS	3.8	0.8	14.0	9.9	7.8	--	--

Planting Date: April 12, 2002

Harvest Date: July 22, 2002

Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A).

Previous Crop: 1998 = field pea, 1999 = soybean, 2001 = barley.

Notes: The 2002 trial sustained severe heat and moisture stress.

NS = no statistical difference between varieties.



**Beulah Barley - Recrop**

Dickinson, ND

Variety	Seeds / Pound	Plant Height	Test Weight	Protein	Grain Yield	Returns*
		in	lbs/bu		bu/ac	\$/ac
Conlon	13,777	20	44.8	15.4	24.5	51.83
Drummond	13,038	17	45.3	15.5	21.7	45.61
Haybet	13,982	21	44.8	17.3	17.7	37.76
Lacey	13,126	18	46.3	15.0	24.5	52.46
Legacy	13,182	21	48.2	15.2	30.9	66.48
Trial Mean	13,421	19	45.9	15.7	23.9	50.83
C.V. %	9.5	6.8	3.3	4.4	23.2	23.3
LSD .05	NS	2.5	NS	1.3	NS	NS

Planting Date: May 16

Harvest Date: August 19

**Glen Ullin Barley - Recrop**

Dickinson, ND

Variety	Seeds / Pound	Plant Height	Test Weight	Protein	Grain Yield	Returns*
		in	lbs/bu		bu/ac	\$/ac
Conlon	10,299	21	46.7	16.0	16.8	36.15
Drummond	14,118	20	45.3	15.0	23.9	51.08
Haybet	14,572	22	44.8	17.7	9.4	19.84
Lacey	13,534	21	45.7	12.9	31.3	67.01
Legacy	13,725	22	46.2	15.5	28.0	60.28
Trial Mean	13,250	21	45.7	15.4	21.9	46.87
C.V. %	4.6	7.3	1.8	6.2	17.6	18.1
LSD .05	1,158	NS	NS	1.8	NS	NS

Planting Date: May 20

Harvest Date: August 20

\* Returns were calculated by multiplying the 2002 yields by the price paid for feed barley minus the test weight discount paid at the Southwest Grain Terminal located at Gladstone on September 12. The price paid on this date was \$2.15/bu, assuming that the test weight was heavier than 45 lb/bu. Grain with a test weight of 45 lb/bu was discounted \$.03/bu, with an additional discount of \$.04/bu per pound down to 42 lb/bu. Below 42 lb/bu, an additional discount of \$.05/bu occurred per pound.

<b>2002 Barley - Continuously Cropped No-till</b>	<b>Scranton</b>
---	-----------------

Variety	Plant Height	Test Weight	Protein	----- Grain Yield -----			Average Yield	
				2000	2001	2002	2 year	3 year
	inches	lbs/bu	%	-----bu/ac-----				
Robust	26	46.1	13.5	63.0	79.7	42.4	61.0	61.7
Stark	25	48.0	13.6	69.3	69.2	36.4	52.3	58.0
Conlon	25	45.0	13.6	63.9	55.3	34.8	45.0	51.3
Legacy	23	44.8	13.3			49.3		
Trial Mean	25	45.6	13.4	66.1	68.1	42.1	--	--
C.V. %	5.2	2.6		5.4	9.2	14.4	--	--
LSD .05	NS	2.2		NS	10.8	11.2	--	--
LSD .01	NS	3.1		NS	16.4	NS	--	--

Planting Date: April 16, 2002 Harvest Date: August 14, 2002  
 Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A).  
 Previous Crop: 1999 = HRWW, 2000 = safflower, 2001 = lentil.  
 NS = no statistical difference between varieties.

<b>2002 Barley - Continuously Cropped No-till</b>	<b>Regent</b>
---	---------------

Variety	Test Weight	Protein	----- Grain Yield -----			Average Yield	
			2000	2001	2002	2 year	3 year
	lbs/bu	%	-----bu/ac-----				
Stark	48.6	14.4	66.5	93.9	44.0	69.0	68.1
Conlon	46.7	14.5	64.9	97.8	31.4	64.6	64.7
Robust	45.6	14.1	63.1	90.6	32.2	61.4	62.0
Legacy	44.9	14.2			30.1		
ND16301	44.6	13.7			32.6		
Trial Mean	46.1	14.2	65.7	94.1	34.1	--	--
C.V. %	1.2		10.2	6.2	6.0	--	--
LSD .05	0.8		NS	NS	3.2	--	--
LSD .01	1.2		NS	NS	4.4	--	--

Planting Date: April 16, 2002 Harvest Date: August 1, 2002  
 Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A).  
 Previous Crop: 1999 = HRWW, 2000 = safflower, 2001 = lentil.  
 NS = no statistical difference between varieties.

**2002 Barley - Continuously Cropped No-till**

**New Leipzig**

Variety	Plant Height	Test Weight	Protein	----- Grain Yield -----			----- Average Yield -----	
				2000	2001	2002	2 year	3 year
	inches	lbs/bu	%	-----bu/ac-----				
Stark	19	45.2	15.0	40.5	84.3	7.4	45.8	44.1
Robust	21	43.9	14.4	38.6	75.6	12.0	43.8	42.1
Conlon	--	--	--	36.1	67.4	0	33.7	34.5
Legacy	18	43.5	14.0			14.4		
Trial Mean	19	43.6	14.3	38.8	75.7	11.9	--	--
C.V. %	4.2	0.7	--	9.7	1.9	17.8	--	--
LSD .05	2	0.7	--	NS	2.4	4.1	--	--
LSD .01	2	1.0	--	NS	3.7	6.1	--	--

Planting Date: April 17, 2002

Harvest Date: July 31, 2002

Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A).

Previous Crop: 1999 = HRWW, 2000 = safflower, 2001 = lentil.

Note: The 2002 trial sustained severe heat and moisture stress.

NS = no statistical difference between varieties.

**2002 Barley - Continuously Cropped No-till**

**Selfridge**

Variety	Plant Height	Test Weight	Protein	----- Grain Yield -----			----- Average Yield -----	
				2000	2001	2002	2 year	3 year
	inches	lbs/bu	%	-----bu/ac-----				
Conlon	18	47.1	12.9	56.0	120.0	21.7	70.8	65.9
Stark	20	48.7	13.8	51.9	98.4	26.5	62.4	58.9
Robust	16	46.6	14.1	57.0	95.6	17.5	56.6	56.7
Legacy	15	47.2	14.1			16.4		
Trial Mean	17	47.1	13.6	54.3	104.7	19.9	--	--
C.V. %	9.6	1.3		11.1	5.1	10.7	--	--
LSD .05	2	0.9		NS	9.3	3.2	--	--
LSD .01	3	1.3		NS	14.1	4.5	--	--

Planting Date: April 25, 2002

Harvest Date: July 31, 2002

Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A).

Previous Crop: 1999 & 2000 = HRWW, 2001 = lentil.

Note: The 2002 trial sustained severe heat and moisture stress.

Table 1. Performance of five organic barley cultivars in southwestern North Dakota 2002.

Variety	Plant Counts			Vigor*	Plant Height			Kernels no./lb	Plant Height ---inches---	Yield -bu/ac-	Test Weight ---lbs/bu---
	May 30	June 7	June 7		May 30	June 7	June 7				
Conlon	1,332,912	1,185,148	1.3	3.7	5.5	11,450	18.8	47.1	42.7		
Drummond	896,704	793,472	2.6	3.3	4.7	14,512	19.9	43.0	40.2		
Lacey	1,196,281	1,068,758	1.9	3.7	5.2	16,013	18.8	46.8	37.3		
Legacy	1,024,227	916,946	2.6	3.2	4.9	14,259	19.4	38.0	39.8		
Robust	1,137,580	991,840	2.1	3.6	5.1	15,046	19.9	45.8	39.0		
Trial Mean	1,117,541	991,233	2.1	3.5	5.1	14,256	19.3	44.1	39.8		
C.V. %	16.3	13.8	20.8	6.3	6.0	4.8	3.7	9.1	2.6		
LSD .05	280,558	210,045	0.7	0.3	0.5	1,057	NS	6.2	1.5		

\*1 = high vigor, 5 = low vigor at 15 days after seeding

Table 2. Performance of five organic barley cultivars in southwestern North Dakota 2002.

Variety	June Biomass						July Biomass		
	Crop Dry Matter	Broadleaf Weed Dry Matter	Grass Weed Dry Matter	Crop Dry Matter	Broadleaf Weed Dry Matter	Grass Weed Dry Matter	Crop Dry Matter	Broadleaf Weed Dry Matter	Grass Weed Dry Matter
Conlon	1,457	8	8	3,330	22	95	3,330	22	95
Drummond	987	18	16	2,763	36	192	2,763	36	192
Lacey	1,037	16	16	3,515	24	146	3,515	24	146
Legacy	1,149	19	23	2,991	39	166	2,991	39	166
Robust	1,197	12	20	3,270	35	111	3,270	35	111
Trial Mean	1,165	15	16	3,174	31	142	3,174	31	142
C.V. %	20.1	79.6	45.1	13.1	42.9	48.9	13.1	42.9	48.9
LSD .05	NS	NS	NS	NS	NS	NS	NS	NS	NS

NS = Not Significant

2002 Barley in the West River Region

Combined Means

Variety	Days to Head	Plant Height	Seeds / Pound	Test Weight	Protein	Grain Yield			Average Yield	
						2000	2001	2002	2 year	3 year
		inches		lbs/bu	%	bu/ac				
Stark	74	22	11,814	47.7	14.5	58.7	86.1	37.9	62.0	60.9
Conlon	70	21	11,733	46.2	14.4	56.7	78.2	33.0	55.6	56.0
Robust	74	22	14,412	45.3	14.4	57.1	69.9	33.9	51.9	53.6
Legacy	74	20	13,836	44.7	14.3			32.6		
# of locations	2	7	3	8	8	6	9	8	17	23

Locations: 2002 = Hettinger, Dickinson, Scranton, Regent, Selfridge, New Leipzig, Beulah & Glen Ullin.  
 2001 = Dickinson, Scranton, Regent, Selfridge, New Leipzig, Mandan, Wibaux MT, Ralph SD and Bison SD.  
 2000 = Hettinger, Dickinson, Scranton, Regent, Selfridge & New Leipzig.



2002 Malt Barley Fertilizer Trial

Hettinger

Variety	Potash 0-0-60	Plant Stand	Days to Head	Plant Height	Grain Yield	Test Weight	Grain Protein	Plump >6/64	Thin <5/64
	lbs/ac	1000's		inches	bu/ac	lbs/bu	%	%	%
Drummond	0	485	76	20	26.7	40.2	14.8	20	12
	25	436	75	21	24.7	40.4	15.2	22	11
	50	448	75	22	27.9	41.0	15.4	32	7
	100	485	77	20	27.6	40.4	14.7	37	6
Robust	0	454	76	20	27.8	42.6	15.2	34	7
	25	380	76	20	27.5	42.4	15.0	34	8
	50	373	76	22	30.3	41.2	15.3	30	8
	100	411	76	21	30.1	42.6	15.2	30	10
Trial Mean		434	76	21	27.8	41.3	15.1	30	9
C.V. %		18.7	2.2	7.5	12.2	3.2	3.5	--	--
LSD .05		NS	NS	NS	NS	NS	NS	--	--

Planting Date: April 12, 2002

Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A).

Notes: The trial sustained severe heat and moisture stress.

NS = no statistical difference between fertilizer treatments.

Harvest Date: July 22, 2002

Previous Crop: 2001 = barley.

2002 Malt Barley Fertilizer Trial

New Leipzig

Variety	Potash 0-0-60	Grain Yield	Test Weight	Grain Protein	Plump >6/64	Thin <5/64
	lbs/ac	bu/ac	lbs/bu	%	%	%
Drummond	0	12.5	43.3	14.4	36	6
	25	14.6	42.7	14.2	35	6
	50	12.8	43.3	14.4	48	4
	100	14.3	42.9	14.2	48	4
Robust	0	10.7	43.6	14.1	55	3
	25	9.4	43.6	14.4	58	3
	50	8.6	43.8	14.8	51	6
	100	13.9	43.9	14.5	52	3
Trial Mean		11.9	43.4	14.4	48	4
C.V. %		25.8	1.4	3.0	--	--
LSD .05		NS	NS	NS	--	--

Planting Date: April 17, 2002

Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A).

Previous Crop: 2001 = lentil.

Notes: The trial sustained severe heat and moisture stress.

NS = no statistical difference between fertilizer treatments.

Harvest Date: July 31, 2002

2002 Malt Barley Fertilizer Trial

Selfridge

Variety	Potash 0-0-60	Grain Yield	Test Weight	Grain Protein	Plump > 6/64	Thin < 5/64
	lbs/ac	bu/ac	lbs/bu	%	%	%
Drummond	0	11.3	44.6	14.1	69	1
	25	13.5	44.9	14.0	66	1
	50	16.0	45.0	13.8	66	2
	100	15.3	44.9	14.2	60	3
Robust	0	13.8	46.2	14.0	84	1
	25	15.3	47.3	14.2	77	0
	50	12.6	45.8	13.9	80	1
	100	16.5	46.6	14.2	82	0
Trial Mean		14.3	45.7	14.1	73	1
C.V. %		18.5	2.5	2.4	--	--
LSD .05		NS	NS	NS	--	--

Planting Date: April 25, 2002

Harvest Date: July 31, 2002

Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A).

Previous Crop: 2001 = lentil.

Notes: The trial sustained severe heat and moisture stress.

NS = no statistical difference between fertilizer treatments.

2002 Malt Barley Fertilizer Trial in SW North Dakota

Combined Means

Variety	Potash 0-0-60	Plant Stand	Days to Head	Plant Height	Grain Yield	Test Weight	Grain Protein	Plump > 6/64	Thin < 5/64
	lbs/ac	1000's		inches	bu/ac	lbs/bu	%	%	%
Drummond	0	485	76	20	16.8	42.7	14.4	42	6
	25	436	75	21	17.6	42.7	14.5	41	6
	50	448	75	22	18.9	43.1	14.5	49	4
	100	485	77	20	19.1	42.7	14.4	48	4
Robust	0	454	76	20	17.4	44.5	14.4	58	4
	25	380	76	20	17.4	44.4	14.5	56	4
	50	373	76	22	17.2	43.6	14.7	54	5
	100	411	76	21	20.2	44.4	14.6	55	4
Locations		*	*	*	**	**	**	**	**

\* Hettinger

\*\* Hettinger, New Leipzig and Selfridge

Seeding rate: 750,000 live seeds/A (approx. 1.4 bu/A).

Notes: All locations sustained severe heat and moisture stress.

## 2002 North Dakota Oat Variety Descriptions

Variety*	Origin	Year Released	Grain		Straw Strength	Maturity <sup>2</sup>	Reaction to Diseases			Quality Factors		
			Color	Height			Stem rust <sup>1</sup>	Crown rust	Barley Y. Dwf. <sup>4</sup>	Rel. Yield	bu/Wt	Protein <sup>3</sup>
Hyttest	SD	1986	white	tall	m.strg.	E	S	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	MS	MT	v.good	v.good	H
Milton	MN	1994	yellow	med.	strg.	L	S	MS	MT	v.good	v.good	M
Jerry	ND	1994	white	tall	strg.	M	R	MS	MT	v.good	v.good	M
Newdak	ND/NY	1990	white	med.	strg.	M	R	S	T	v.good	good	M
Jim	MN	1995	yellow	med.	strg.	M	S	MS	MT	good	good	M
Brawn	IL	1993	yellow	short	v.strg.	M	S	S	T	v.good	good	M
Killdeer	ND	2000	white	med	strong	M	R	MR	MT	v.good	good	M
Richard	MN	2000	yellow	tall	strong	M	S	MR	T	v.good	good	M
Valley	ND	1988	ivory	short	strg.	L	R	MS	MT	v.good	v.good	M
Whitestone	ND	1994	white	short	strg.	L	R	MS	MT	v.good	good	L
Otana	MT	1977	white	m.tall	m.weak	L	S	S	S	v.good	v.good	ML
CDC Boyer	SVAS	1994	white	tall	m.strg	L	S	MR	S	good	v.good	ML
Jud	ND	1997	ivory	tall	med.	L	R	MR	T	v. good	good	MH
Troy	SD	1991	ivory	tall	m.strg.	L	S	MS	T	good	good	M
AC Belmont	Can.	1993	naked	med.	strg.	L	R	S	MT	good	v.good	M
CDC Pacer	SVAS	1996	white	tall	m.strg	L	S	S	S	good	good	L
Paul	ND	1994	naked	v.tall	strg.	L	R	R-MR	T	v.good	good	H
AC Medallion	Cargill	1997	white	tall	med.	L	R	R	MT	good	good	ML
Dumont	Can.	1982	white	m.tall	m.weak	L	R	S	MS	good	good	ML
AC Preakness	Proven	1996	white	tall	strong	L	R	S	M	good	good	L
Bay	WI	1993	yellow	med.	v.strg.	L	S	MR-S	T	good	fair	H
Youngs	ND	1999	white	med.	strong	L	R	MR	MT	v.good	good	M
AC Assiniboia	Proven	1997	red	med	strong	L	R	R	T	v. good	good	ML
Triple Crown	Canterra	1998	white	tall	strong	L	S	R	S	good	good	L
Loyal	SD	2000	ivory	tall	m.strong	L	MS	R-MR	T	v.good	good	MH
Vista	WI	2000	yellow	tall	strong	L	S	R	MT	v.good	good	M
Gem	WI	1996	yellow	tall	strong	L	S	R	MT	good	good	MH
Belle	WI	1995	yellow	tall	strong	L	S	R	MT	good	good	M
Ebeltoft	ND	1999	white	tall	strong	VL	R	MR	S	good	v.good	M
AC Marie	Can.	1992	white	tall	weak	VL	R	S	MT	fair	fair	ML

\* Varieties listed in order of maturity.

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

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.



Variety	Days to Head	Seeds per Pound	Plant Height	Lodging	Test Weight	Grain Yield			Returns	Average Yield	
						2000	2001	2002		2 Year	3 Year
			in	0 - 9	lbs/bu	-----bu/ac-----			\$/ac	----bu/ac----	
AC Assiniboia	76	12,242	26	1.0	29.6	122.6	139.2	68.6	113.49	103.9	110.1
AC Medallion	76	12,113	29	1.3	31.5	123.6	138.1	68.1	120.17	103.1	109.9
AC Ronald	76	13,717	26	1.3	32.1	--	--	76.2	137.12	--	--
CDC Boyer	76	11,324	28	1.3	29.3	128.6	135.6	72.5	119.84	104.1	112.2
CDC Pacer	76	11,651	28	2.5	32.6	131.2	158.8	84.4	151.34	121.6	124.8
Ebeltoft	77	12,219	25	1.0	27.2	142.1	154.2	78.8	126.35	116.5	125.0
HiFi	76	13,207	28	1.3	32.2	129.1	132.0	63.4	112.75	97.7	108.2
Hyttest	74	12,716	30	2.3	35.5	87.2	118.4	69.1	133.94	93.8	91.6
Jerry	73	13,593	29	4.3	34.6	85.3	133.6	68.8	134.89	101.2	95.9
Killdeer	73	13,615	24	1.0	32.6	125.4	139.3	78.4	141.71	108.8	114.4
Loyal	77	13,882	29	1.3	32.1	124.4	122.1	67.0	120.42	94.6	104.5
Monida	77	14,076	27	1.5	31.0	147.3	148.0	75.7	129.67	111.9	123.7
Morton	76	13,661	29	1.0	32.5	112.1	128.8	67.8	120.44	98.3	102.9
Otana	76	14,049	29	1.3	32.9	130.0	134.1	78.5	142.78	106.3	114.2
Paul*	77	14,032	27	1.0	37.1	88.6	105.1	39.9	--	72.5	77.9
Sesqui	75	13,962	26	2.3	32.5	--	--	77.3	137.63	--	--
Triple Crown	77	16,522	28	1.0	19.7	131.4	148.1	43.8	66.62	96.0	107.8
Vista	74	12,665	30	1.0	31.4	--	146.8	77.0	135.61	111.9	--
Wabasha	73	15,162	27	1.8	32.9	--	--	70.3	127.18	--	--
Youngs	76	12,072	29	1.8	30.7	137.3	139.7	75.8	130.14	107.8	117.6
Trial Mean	75	13,292	28	1.8	31.9	123.5	137.3	70.5	125.55	--	--
C.V. %	0.7	7.3	4.5	55.4	4.0	6.7	7.6	10.4	11.3	--	--
LSD .05	1	1,361	2	1.4	1.8	11.7	14.7	10.3	19.88	--	--

Planting Date: April 16

Harvest Date: August 8

Lodging 0=No lodging, 9= Completely flat

\* Naked

Returns were calculated by multiplying the 2002 yield by the test weight discount paid at the Southwest Grain Terminal located in Gladstone on September 12. The price paid was \$2.00/bu, assuming that the test weight was heavier than 37 lb/bu. Grain with a test weight of 37 lb/bu was discounted \$.04/bu, with an additional discount of \$.04/bu per pound down to 30 lb/bu. Below 30 lb/bu, an additional discount of \$.07/bu occurred per pound.

2002 Oats - Continuously Cropped No-till

Hettinger

Variety	Days to head	Plant Height	Test Weight	----- Grain Yield -----			Average Yield	
				1999	2000	2002	2 year	3 year
		inches	lbs/bu	----- bu/ac -----				
Killdeer	76	21	31.2	155.3	108.2	38.8	73.5	100.8
Ebeltoft	79	22	30.0	151.7	109.7	34.2	72.0	98.5
Monida	80	23	28.6	142.8	95.9	42.5	69.2	93.7
Otana	78	25	32.5	131.0	100.6	39.2	69.9	90.3
Jerry	75	24	34.7	137.2	90.8	41.0	65.9	89.7
Youngs	78	25	31.6	139.6	90.4	34.4	62.4	88.1
HiFi	78	24	31.2	139.9	91.0	31.3	61.2	87.4
AC Assiniboia	78	24	30.0	127.7	93.9	34.2	64.0	85.3
AC Medallion	78	24	33.2	116.4	91.5	30.4	61.0	79.4
Morton	78	23	31.5	125.3	79.7	30.4	55.0	78.5
CDC Pacer	77	24	28.2	114.0	84.2	37.3	60.8	78.5
Triple Crown	81	24	25.1	124.4	92.8	12.9	52.8	76.7
CDC Boyer	78	27	31.4	108.4	78.3	41.5	59.9	76.1
Hytest	76	25	35.4	94.4	65.1	33.3	49.2	64.3
Paul*	80	25	39.5	70.7	55.8	16.7	36.2	47.7
Loyal	78	25	30.9		97.9	43.3	70.6	
Wabasha	74	24	33.1			40.6		
Sesqui	78	22	31.6			39.4		
Vista	76	26	31.9			30.6		
Reeves	72	26	35.2			29.6		
Buff*	72	23	39.5			24.8		
Trial Mean	77	24	32.4	128.4	91.2	35.6	--	--
C.V. %	0.9	5.6	2.3	11.8	10.5	17.4	--	--
LSD .05	1	2	1.1	21.3	13.5	8.7	--	--
LSD .01	1	3	1.4	28.2	17.9	11.6	--	--

\* = Naked (hulless) type.

Planting Date: April 12, 2002

Harvest Date: July 30, 2002

Seeding Rate: 750,000 live seeds/A (approx. 1.7 bu/A).

Previous Crop: 1998 & 99 = soybean, 2001 = barley.

Note: The 2002 trial sustained severe heat and moisture stress.

## Beulah Oat - Recrop

Dickinson, ND

Variety	Seeds / Pound	Plant Height	Test Weight	Grain Yield		Returns*	2 Year Average
				2001	2002		
		in	lbs/bu	----bu/ac----		\$/ac	
Ebeltoft	21,841	22	23.6	--	67.0	103.25	--
Killdeer	17,692	22	29.6	42.1	60.4	101.62	51.2
Morton	15,852	27	26.2	57.7	64.6	99.48	61.2
Youngs	18,599	27	23.4	--	62.4	96.03	--
Trial Mean	19,122	25	25.4	47.2	56.8	89.22	--
C.V. %	12.8	4.9	4.6	11.4	10.7	--	--
LSD .05	NS	2.3	2.2	10.1	11.5	--	--

Planting Date: May 16

Harvest Date: August 19

## Glen Ullin Oat - Recrop

Dickinson, ND

Variety	Seeds / Pound	Plant Height	Test Weight	Grain Yield		Returns*	2 Year Average
				2001	2002		
		in	lbs/bu	----bu/ac----		\$/ac	
Ebeltoft	13,722	25	25.0		23.0	35.44	--
Killdeer	13,916	23	29.0	149.3	9.2	14.94	79.2
Morton	12,740	26	28.0	179.0	13.6	20.91	96.3
Youngs	13,038	28	23.0		18.7	28.87	--
Trial Mean	13,356	26	27.4	153.8	16.0	25.59	--
C.V. %	7.8	4.0	1.8	8.5	9.2	--	--
LSD .05	NS	2	0.9	24.6	2.8	--	--

Planting Date: May 20

Harvest Date: August 20

\* Returns were calculated by multiplying the 2002 yield by the test weight discount paid at the Southwest Grain Terminal located in Gladstone on September 12. The price paid was \$2.00/bu, assuming that the test weight was heavier than 37 lb/bu. Grain with a test weight of 37 lb/bu was discounted \$.04/bu, with an additional discount of \$.04/bu per pound down to 30 lb/bu. Below 30 lb/bu, an additional discount of \$.07/bu occurred per pound.



Performance of oat varieties on dryland on the David Maus Farm, Wibaux, MT.

Variety	Yield	Gross return <sup>1</sup>
	Bu/Acre	\$/Acre
Derby	53.5	107.10
Killdeer	59.1	118.16
Otana	47.4	94.84
Paul	27.2	54.48
Whitestone	39.6	79.22
Mean	45.4	90.76
CV%	18.6	
LSD .05	15.9	

<sup>1</sup> Gross return calculated at \$2.00 per bushel x yield.

Planting date: May 16.

Harvest August 23, 2002.

<b>2002 Oats in the West River Region</b>	<b>Combined Means</b>
---	-----------------------

Variety	Days to Head	Plant Height	Seeds / Pound	Test Weight	Grain Yield			Average Yield	
					2000	2001	2002	2 year	3 year
		inches		lbs/bu	----- bu/ac -----				
Ebeltoft	78	24	15,927	28.8	113.7	106.7	56.6	81.6	92.3
Killdeer	74	23	15,074	31.9	115.0	108.8	53.4	81.1	92.4
Youngs	77	28	14,570	29.3	110.1	106.9	52.0	79.4	89.7
HiFi	77	28	13,207	32.9		116.3	55.8	86.0	
Morton	77	27	14,084	31.8		115.9	50.7	83.3	
# of locations	2	5	3	6	10	11	6	17	27

Locations: 2002 = Hettinger, Dickinson, Scranton, Regent, Beulah & Glen Ullin.

2001 = Dickinson, Scranton, Regent, Selfridge, New Leipzig, Mandan, Beulah, Glen Ullin, Hannover, Wibaux MT, and Bison SD.

2000 = Dickinson, Hettinger, Regent, Selfridge, New Leipzig, Mandan, Beulah, Glen Ullin, Hannover and Wibaux MT.

Table 1. Performance of thirteen different organic oat cultivars in southwestern North Dakota 2002.

Variety (Source)	Plant Counts		Vigor*	Plant Heights			Kernels -no./lb-	Plant Height ----inches----	Yield -bu/ac-	Test Weight ---lbs/bu---
	May 30	June 7		May 30	June 7	June 7				
AC Assiniboia	1,220,571	1,145,677	1.6	3.3	23.3	13,374	23.3	50.7	28.9	
Buff	1,095,072	1,050,541	2.1	3.3	22.5	18,304	22.5	34.0	45.5	
Ebeltoft	1,333,924	1,315,706	1.4	3.2	22.2	14,390	22.2	49.2	27.3	
HiFi	1,171,991	1,122,399	1.9	3.5	24.8	15,589	24.8	44.7	25.8	
Hyst DREC	1,191,220	1,126,447	1.3	3.8	29.2	13,379	29.2	48.7	36.7	
Hyst Organic	1,438,168	1,313,682	1.0	3.8	26.8	13,655	26.8	46.1	37.3	
Leonard	1,395,661	1,356,190	1.5	3.4	25.1	15,091	25.1	55.8	32.6	
Morton	1,157,822	1,102,157	1.6	3.5	27.0	15,227	26.9	48.2	31.3	
Otana DREC	1,244,861	1,142,640	1.9	3.1	27.0	15,711	26.9	54.6	32.5	
Otana Kudrna	908,849	914,922	2.9	3.1	27.4	15,280	27.4	49.5	32.7	
Richard	939,212	914,922	2.0	3.8	24.9	15,500	24.9	54.7	32.3	
Sesqui	1,113,290	1,033,336	1.9	3.3	23.7	15,888	23.7	51.8	34.1	
Triple Crown	1,279,271	1,212,474	1.8	3.7	23.1	20,973	23.1	28.8	15.5	
Wabasha	1,270,163	1,171,991	1.8	3.1	23.5	16,563	23.5	48.7	35.3	
Youngs	1,249,921	1,184,136	1.8	3.2	25.8	13,251	25.8	51.3	29.4	
Trail Mean	1,200,666	1,140,481	1.8	3.4	25.1	15,487	25.1	47.8	31.8	
CV %	11.7	12.1	20.8	5.5	4.2	6.0	4.2	6.7	4.0	
LSD .05	207,346	207,939	0.5	0.3	1.5	1,333	1.5	5.0	1.8	

The study was established on May 15.

\*1=high vigor, 5= low vigor at 15 days after seeding

Table 2. Performance of thirteen different organic oat cultivars in southwestern North Dakota 2002.

Variety (Source)	June Biomass			July Biomass			Crop Competitiveness* % Control
	Crop Dry Matter	Broadleaf Weed Dry Matter	Grass Weed Dry Matter	Crop Dry Matter	Broadleaf Weed Dry Matter	Grass Weed Dry Matter	
AC Assiniboia	694	27	27	2,433	61	112	66
Buff	625	16	62	2,571	104	222	65
Ebeltoft	884	20	27	2,957	48	154	74
HiFi	861	15	15	2,590	49	141	75
Hyttest DREC	924	17	23	2,720	26	161	58
Hyttest Organic	1,088	5	19	2,446	33	129	61
Leonard	849	21	30	3,066	37	190	70
Morton	866	16	46	2,899	50	269	64
Otana DREC	607	13	16	2,812	24	182	68
Otana Kudrna	575	28	29	2,711	65	383	65
Richard	670	25	25	2,569	42	197	66
Sesqui	821	16	22	2,897	31	245	60
Triple Crown	853	19	24	2,619	34	138	83
Wabasha	778	14	21	2,779	28	227	64
Youngs	762	13	22	3,006	29	175	71
Trial Mean	790	18	27	2,738	44	195	67
C.V.%	18.8	59.9	73.8	13.1	83.6	44.9	9.0
LSD .05	249	NS	NS	NS	NS	NS	9

\* Measure of weed suppression

## 2002 Hard Red Winter Wheat Variety Descriptions

Variety	Agent or Origin	Year	Quality	Leaf rust <sup>2</sup>	Stem rust <sup>2</sup>	Maturity	Straw strength	Height	Winter <sup>1</sup> hardiness
Roughrider	ND	1975	Good	S	R <sup>3</sup>	med.	m. strong	med.	good
Norstar	Can.	1977	Average	S	S	late	med.	tall	good
Rita	SD	1980	Average	MS	MR <sup>4</sup>	early	strong	med.	fair
Rose	SD	1981	Poor	S	MS <sup>4</sup>	early	v. strong	short	fair
Agassiz	ND	1983	Average	S	R	med.	med.	med.	good
Seward	ND	1987	Poor	S	R	med.	m. strong	med.	good
Arapahoe	NE	1989	Poor	MS	MR	med.	med.	med.	fair
CDC Kestrel	Can.	1994	Poor	S	S	med.	m. strong	med.	good
Eikhorn	ND	1995	Average	MR	R <sup>5</sup>	med.	med.	med.	good
AC Readymade	Can.	1996	NA	S	S	med.	strong	med.	good
Erhardt	MT	1996	NA <sup>6</sup>	S	R	med.	strong	med	good
McGuire	MT	1996	NA	S	R	m. early	strong	m. tall	fair
Morgan	WPB	1996	NA	NA	NA	med.	m. strong	med.	good.
Rampart <sup>7</sup>	MT	1996	NA	S	R	med.	strong	med.	poor
Alliance	NE	1997	NA	S	NA	early	strong	short	good
Crimson	SD	1997	NA	MS	NA	med.	m. strong	med.	NA
Nekota	SD/NE	1997	NA	MS	NA	early	v. strong	v. short	good
Tandem	SD	1997	Good	S	NA	early	med.	med.	NA
Windstar	NE	1997	NA	MS	NA	early	med.	med.	NA
Ransom	ND	1998	Good	R	NA	m. early	med.	med.	good
Culver	NE	1999	NA	NA	NA	m. early	m. strong	med.	good
Harding	SD	1999	NA	MS/MR	NA	med.	m. strong	med.	good
Millenium	NE/SD	1999	NA	NA	NA	med.	strong	m. short	fair
CDC Raptor	Can		NA	NA	NA	med.	m. strong	m. short	good
CDC Falcon	Can/WPB	2000	NA	NA	NA	med.	m. strong	short	good
Nuplains	NE	2000	NA	NA	NA	med.	m. strong	short	fair-poor
Wesley	NE/SD/WY	2000	NA	NA	NA	m. early	m. strong	short	fair
Wahoo	NE/WY	2001	NA	S	R	med.	m. strong	med.	fair
Expedition	SD	2002	Average	MS	R	med.	strong	med.	good
Jerry	ND	2001	Good	MR	R	med.	strong	med.	good

<sup>1</sup> Varieties with less than good winterhardiness should be seeded only in tall stubble. <sup>2</sup> R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible. <sup>4</sup> Susceptible in artificially induced epidemics. <sup>3</sup> Slow rusting type of resistance to race 15. <sup>5</sup> Occasionally mixed with some susceptible plants. <sup>6</sup> NA = data not available, or data insufficient to give rating. <sup>7</sup> Saw fly resistant.



## Hard Red Winter Wheat - Recrop

Dickinson, ND

Variety	Heading Date <sup>1</sup>	Seeds per Pound	Height	Lodging Score <sup>2</sup>	Test Weight	Protein	Grain Yield			Average Yield		
							2000	2001	2002 <sup>3</sup>	Returns	2 Year	3 Year
	June		in	0-9	lbs/bu	%	-----bu/ac-----			\$/ac	----bu/ac----	
Agassiz	24	21,376	36	1.8	50.8	15.0	73.5	51.7	40.8	163.08	46.3	55.4
Alliance	19	19,644	29	2.0	50.9	13.2	75.9	32.7	46.9	185.88	39.8	51.8
Arapahoe	22	21,147	33	2.0	50.6	14.4	84.0	48.7	46.9	187.44	47.8	59.9
CDC Falcon	23	26,150	28	1.0	48.0	14.2	--	--	55.4	203.80	--	--
CDC Kestrel	24	24,424	34	1.8	46.1	14.1	77.9	48.7	39.4	137.80	44.1	55.4
CDC Raptor	24	24,321	29	2.3	48.9	14.4	--	--	41.3	156.94	--	--
Crimson	22	22,344	32	2.0	49.7	14.7	79.6	34.3	46.8	183.26	40.6	53.6
Culver	20	17,999	30	1.5	51.5	13.6	--	--	43.6	175.39	--	--
Elkhart	20	18,659	29	1.8	50.1	14.1	--	--	43.2	170.91	--	--
Elkhorn	25	20,914	36	2.5	49.4	15.2	73.5	50.1	37.3	144.09	43.7	53.7
Erhardt	23	20,741	31	1.8	52.6	15.0	72.9	43.3	35.9	149.30	39.6	50.7
Expedition	18	17,262	30	1.8	54.1	13.9	--	--	50.3	214.70	--	--
Harding	22	19,796	34	2.0	51.6	14.6	82.6	42.1	52.5	214.12	47.3	59.1
Jerry	23	19,043	32	1.8	51.6	14.7	81.0	43.4	43.3	176.46	43.3	55.9
Millenium	20	19,367	32	1.8	53.4	13.8	--	--	49.3	206.65	--	--
Morgan	25	22,845	32	1.8	48.4	14.6	--	--	40.4	151.17	--	--
Nekota	19	19,337	30	1.5	51.8	14.0	75.1	35.1	47.4	193.51	41.3	52.5
Northstar	27	22,566	36	2.3	48.6	15.1	72.2	51.6	32.9	125.10	42.2	52.2
Nuplains	23	21,419	29	1.8	52.8	14.3	--	--	48.5	201.68	--	--
Pontiac	17	19,415	28	1.8	56.0	14.0	--	--	37.1	163.02	--	--
Ransom	23	20,437	34	2.5	46.0	14.3	79.0	45.4	44.6	156.14	45.0	56.3
Roughrider	25	21,091	33	3.3	55.1	15.2	70.2	46.1	22.8	99.50	34.5	46.4
Seward	26	21,515	33	2.3	50.7	15.3	68.7	42.4	33.7	134.88	38.1	48.3
Tandem	20	16,724	32	2.3	53.9	14.2	81.6	32.3	39.2	166.38	35.7	51.0
Wahoo	21	19,912	29	1.5	50.0	14.0	--	--	48.0	190.00	--	--
Wesley	19	16,945	27	1.8	52.2	14.2	--	--	45.2	186.43	--	--
Windstar	22	21,086	31	3.3	52.4	14.3	76.1	42.0	43.2	178.07	42.6	53.8
Trial Mean	22.1	20,610	31.4	2.0	50.9	14.4	69.2	74.8	42.8	171.68	--	--
C.V. %	4.0	4.5	6.0	43.7	4.7	1.2	7.5	6.2	12.4	--	--	--
LSD .05	1	1,323	3	NS	3.4	0.4	7.3	6.5	8.2	--	--	--

Planting Date: September 21 , 2001

Harvest Date: August 1, 2002

<sup>1</sup>Winterkill notes were not recorded since little winter injury was observed.<sup>2</sup>Lodging 0 = No lodging, 9 = Completely flat<sup>3</sup>Wheat streak mosaic virus infested the study; symptoms were most visible for Roughrider but also affected at least some plots of Erhardt, Jerry, Ransom, Roughrider, and Tandem.

Returns were calculated by multiplying the 2002 yield by protein premium or discount paid at the Southwest Grain Terminal located at Gladstone on September 12. The price paid on this date was \$4.42/bu, assuming that grain protein concentration was 12%. An additional \$.01/bu was paid for each additional 0.25% increase in grain protein up to 14% protein. Grain was discounted \$0.02/bu for each 0.25% reduction in grain protein from 12% to 10%, below which no additional discount was assigned. Returns factored in discounts for grain with a test weight < 60 lb/bu [-\$.01/bu per 1 lb/bu between 60 and 58 lb/bu; -\$.01/bu per 0.5 lb/bu between 58 and 57 lb/bu; -\$.02/bu per 0.5 lb/bu between 57 and 55 lb/bu; and -\$.04/bu per 0.5 lb/bu between 55 and 50 lb/bu; and -\$.06/bu per 0.5 lb/bu between 50 and 46 lb/bu].

Variety	% Winter Surviv	Days to Head	Plant Height	Test Weight	Grain Protein	----- Grain Yield -----			Average Yield	
						1999	2000	2002	2 year	3 year
		1/1	inches	lbs/bu	%	-----bu/ac-----				
Morgan	99	173	27	54.0	16.3	81.7	88.0	32.4	60.2	67.4
Arapahoe	99	168	24	56.7	16.0	74.5	91.3	34.9	63.1	66.9
NeKota	98	166	22	57.5	14.8	71.6	91.2	37.6	64.4	66.8
Ransom	98	171	24	54.4	16.0	71.8	93.3	32.2	62.8	65.8
Jerry	98	170	25	55.5	16.2	73.7	87.4	35.7	61.6	65.6
Alliance	99	166	23	56.0	15.0	68.6	89.2	34.2	61.7	64.0
CDC Kestrel	98	172	26	51.5	15.4	73.0	86.9	30.1	58.5	63.3
Harding	98	169	23	55.2	16.3	64.7	84.2	34.5	59.4	61.1
Windstar	97	169	26	58.5	16.0	72.2	74.4	34.7	54.6	60.4
Crimson	98	170	26	55.6	16.1	66.9	81.0	33.0	57.0	60.3
Erhardt	98	171	23	55.9	16.6	71.3	82.5	27.2	54.8	60.3
Tandem	95	169	24	56.8	15.5	66.5	78.1	32.8	55.4	59.1
Norstar	99	175	28	55.1	16.3	68.2	75.0	28.6	51.8	57.3
Roughrider	98	172	27	55.4	16.5	69.1	72.5	29.7	51.1	57.1
Seward	99	173	29	54.4	15.8	67.3	67.3	31.8	49.6	55.5
Elkhorn	98	172	29	54.0	16.3	60.6	70.4	28.4	49.4	53.1
Agassiz	99	172	30	53.7	16.3	61.5	66.8	27.6	47.2	52.0
CDC Falcon	99	169	22	53.9	16.6		99.6	40.3	70.0	
Wahoo	99	167	23	56.2	15.8			41.1		
Wesley	99	166	21	57.6	15.6			40.5		
S96-71	99	168	22	56.5	15.7			40.1		
Millennium	98	168	24	57.2	15.4			38.2		
S96-35	98	172	25	55.6	15.6			36.3		
Elkhart	95	167	24	56.0	16.2			35.3		
CDC Raptor	98	171	25	53.9	16.2			34.0		
Culver	98	168	24	55.0	15.2			33.2		
Nuplains*	98	169	22	55.5	16.3			30.5		
Pontiac	98	166	23	55.3	15.9			30.5		
Trial Mean	98	170	25	55.5	15.9	70.0	80.3	33.8	--	--
C.V. %	1.6	0.4	7.1	2.0	2.0	14.3	7.5	9.4	--	--
LSD .05	NS	1	3	1.9	0.5	NS	9.8	5.2	--	--
LSD .01	NS	2	4	2.5	0.7	NS	13.1	7.0	--	--

Planting Date: September 18, 2001

Harvest Date: July 22, 2002

Seeding Rate: 1.1 million live seeds/A (approx. 1.6 bu/A)

Previous Crop: 1998 &amp; 99 = Field Pea, 2001 = Hailed out Barley (chem. fallow)

NS = no statistical difference between varieties

\*Hard white winter wheat

Notes: The 2001 trial was hailed out. The 2002 trial was grown under severe drought.

2002 Spring Triticale - Continuously Cropped No-till

Hettinger

Variety	Days to Head	Plant Height	Test Weight	----- Grain Yield -----			Average Yield	
				1999	2000	2002	2 year	3 year
		inches	lbs/bu	-----bu/ac-----				
RSI 310	70	23	48.4	54.6	56.6	6.2	31.4	39.1
Companion	70	25	51.1	39.3	44.2	9.1	26.6	30.9
Wapiti	70	22	--	40.8	42.2	3.3	22.8	28.8
Marvel	71	22	40.8	32.1	43.1	5.0	24.0	26.7
Lazer	70	25	51.1		44.1	10.4	27.2	
Trical 2700	75	22	45.8		43.8	8.2	26.0	
Trial Mean	71	23	48.1	40.5	45.7	7.1	--	--
C.V. %	0.6	9.2	1.2	5.8	11.3	36.3	--	--
LSD .05	1	ns	1.0	3.5	7.7	3.8	--	--
LSD .01	1	ns	1.4	4.8	10.6	5.3	--	--

Planting Date: April 15, 2002

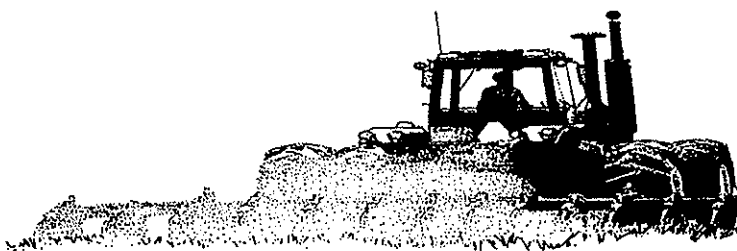
Harvest Date: July 30, 2002

Seeding rate: 1 million live seeds/A.

Previous Crop: 1998 = field pea, 1999 & 2001 = soybean.

ns = no statistical difference between varieties.

Notes: The 2002 trial sustained severe heat and moisture stress.



## 2002 North Dakota Flax Variety Descriptions

Variety <sup>1</sup>	Origin	Year Released	Relative Maturity <sup>2</sup>	Seed Color <sup>3</sup>	Plant Height	Wilt	Relative Yield
NorLin	Can.	1982	early	br.	med.	MS	good
AC-Watson	Can.	1996	early	br.	short	MR	v.good
CDC-Valour	Can.	1996	early	br.	short	MR	v.good
Linton	ND	1985	early	br.	med.	R	v.good
Prompt	SD	1988	early	br.	med.	MR	good
AC-Emerson	Can.	1994	mid.	br.	med.	VR	v.good
CDC-Normandy	Can.	1995	mid.	br.	short	MR	v.good
Cathay	ND	1998	mid	br.	med	MR	v. good
Pembina	ND	1998	mid	br.	med	MR	v. good
Nече	ND	1988	mid	br.	med.	R	good
Omega	ND	1989	mid	yel.	med.	MS	v.good
NorMan	Can.	1984	mid	br.	med.	MR	good
Rahab 94	SD	1994	mid	br.	med.	MR	good
CDC Arras	Can.	1999	mid.	br.	med.	MR	v.good
CDC Bethume	Can.	1999	mid./late	br.	med. tall	MR	v.good
AC Carnduff	Can.	1998	mid/late	br.	med. tall	MR	v.good
Flanders	Can.	1989	late	br.	med.	MS	good
Webster	SD	1998	late	br	tall	MR	v. good
McDuff	Can.	1993	late	br.	med.tall	MR	v.good
AC Linora	Can.	1993	late	br.	tall	R	v.good
McGregor	Can.	1980	late	br.	tall	R	v.good
Shelby	SD	2000	late	br	tall	MR	good

1 All varieties have resistance to prevalent races of rust; all have good oil yield and oil quality.

2 Varieties listed order of maturity.

3 br = brown, yel = yellow.

## 2002 Flax - Continuously Cropped No-till

Hettinger

Variety	Days to 10% Bloom	Plant Height  inches	----- Grain Yield -----			Average Yield	
			2000	2001	2002	2 Year	3 Year
			----- bu/ac -----				
York	59	13	29.9	34.6	5.2	19.9	23.2
CDC Bethume	58	14	31.4	32.0	5.6	18.8	23.0
CDC Arras	59	13	28.4	31.4	6.5	19.0	22.1
Webster	59	15	29.5	29.0	5.8	17.4	21.4
CDC Carnduff	58	13	28.5	28.9	6.6	17.8	21.3
Shelby	60	14	27.4	29.8	5.7	17.8	21.0
Norlin	59	14	27.5	30.1	4.7	17.4	20.8
CDC Normandy	59	13	27.6	30.3	4.5	17.4	20.8
AC Watson	58	13	27.6	29.0	4.8	16.9	20.5
AC Linora	60	16	27.5	27.6	5.4	16.5	20.2
Neché	59	14	27.5	27.9	4.5	16.2	20.0
Rahab 94	60	12	27.6	26.7	5.0	15.8	19.8
Pembina	58	13	26.6	26.6	5.8	16.2	19.7
Cathay	60	14	24.1	28.6	5.3	17.0	19.3
Prompt	59	15	25.9	26.6	5.1	15.8	19.2
AC Emerson	58	13	24.3	27.4	5.2	16.3	19.0
Omega	60	15	23.9	25.3	2.9	14.1	17.4
Flanders	59	13		32.3	5.1	18.7	
McDuff	60	14		27.7	5.7	16.7	
Nekoma	58	13		25.0	4.6		
Trial Mean	59	14	27.2	28.8	5.2	--	--
C.V. %	0.8	7.3	5.3	8.5	15.2	--	--
LSD .05	1	1	2.0	3.5	1.1	--	--
LSD .01	1	2	2.7	4.6	1.5	--	--

Planting Date: May 5, 2002

Harvest Date: August 19, 2002

Seeding rate: 32 lbs/Acre

Previous crop: 1999 = soybean, 2000 = fallow, 2001 = barley.

Note: The 2001 trial sustained minor hail damage on June 18.

The 2002 trial sustained severe heat and moisture stress.

**2002 Hannover Flax - Recrop**

**Dickinson, ND**

Variety	Seeds / Pound	Plant Height	Test Weight	Grain Yield
		in	lbs/bu	bu/ac
Arras	88,855	17	54.3	8.4
Bethume	92,104	19	54.3	9.9
Normandy	97,364	18	54.5	7.8
Omega	82,526	18	53.7	7.9
Webster	91,337	20	54.7	8.4
Trial Mean	90,437	19	54.3	8.5
C.V. %	6.0	5.2	0.9	14.5
LSD .05	NS	NS	NS	NS

Planting Date: May 16

Harvest Date: August 19

NS = not significant

**2002 Safflower Variety Trial - No-till**

**Hettinger**

Variety	Days to Flower	Plant Height	Test Weight	Oil*	Grain Yield			Average Yield	
					1999	2000	2002	2	3
		inches	lbs/bu	%	pounds per acre				
S-518	80	15	34.4	35.8	1271	1847	1127	1487	1415
Montola 2000	79	14	36.2	36.3	1067	1640	880	1260	1196
Montola 2003	80	16	36.7	34.1	1260	1553	720	1136	1178
S-541	80	17	34.3	37.2	913	1393	947	1170	1084
Finch	77	17	41.6	33.0	887	1100	853	976	947
Montola 2004	78	15	38.4	34.1			900		
Trial Mean	79	15	36.7	35.1	1034	1493	908	--	--
C.V. %	0.7	5.8	2.9	1.8	19.4	13.4	9.4	--	--
LSD .05	1	1	1.5	0.9	287	286	123	--	--
LSD .01	1	2	2.1	1.2	385	382	166	--	--

Planting Date: April 29, 2002

Harvest Date: August 19, 2002

Seeding rate: 400,000 live seeds/acre.

Previous crop: 1998 = HRSW, 1999 = soybean, 2001 = fallow.

\*Oil content is adjusted to 8% moisture.

**2002 Crambe - No-till**

**Hettinger**

Variety	10% Bloom	90% Bloom	Matur.	Plant Height	Test Weight	-----Yield-----			Avg. Yield	
						2000	2001	2002	2 Year	3 Year
	days	days	days	inches	lbs/bu	----- lbs/ac -----				
Belann	54	72	81	16	23.2	1953	1260	240	750	1151
Meyer	54	72	81	15	22.4	1987	1180	173	676	1113
Trial Mean	54	72	81	16	22.4	2038	1213	198	--	--
C.V. %	1.0	0	0	8.4	4.4	12.7	17.5	24.9	--	--
LSD .05	NS	NS	NS	NS	NS	NS	NS	NS	--	--

Planting Date: May 2, 2002                      Harvest Date: August 12, 2002                      Seeding Rate: 20 lbs/ac.  
 Previous Crop: 1999 = Field pea, 2000 = soybean, 2001 = fallow.  
 NS = no statistical difference between varieties.  
 Notes: The 2002 trial sustained severe heat and moisture stress. The 2001 trial sustained moderate hail damage.

**2002 Conventional Canola - No-till**

**Hettinger, North Dakota**

Brand	Variety	Type*	Days to Bloom	Duration of Flowering	Days to Mature	Plant Height	Oil Content	Yield
				days		inches	%	lbs/ac
Proseed	AP9387RH	H	68	16	96	24	34.7	289
AgriProgress	AP9388RH	H	67	17	95	24	34.7	455
Croplan Gen.	Hudson	OP	67	17	95	21	33.1	292
Interstate	Hyola 401	H	62	18	94	21	32.9	762
Aventis	InVigor 2573	H, LL	68	15	94	24	34.7	440
Aventis	InVigor 2663	H, LL	67	15	94	25	34.8	498
Aventis	InVigor 2733	H, LL	63	18	93	22	36.5	456
Brett-Young	LBD 279	OP	67	17	96	21	35.5	385
RR check	DKL 34-55	OP, RR	69	16	96	25	36.3	376
RR check	Hyola 357RR	H, RR	65	18	95	21	31.3	618
Trial Mean			67	16	95	23	34.4	422
C.V. %			1.2	1.3	0.7	15.0	6.6	25.7
LSD .05			1	2	1	NS	NS	157
LSD .01			2	2	1	NS	NS	211

\*Type: H = Hybrid, OP = Open Pollinated, LL = Liberty Link, RR = Roundup Ready.  
 Planting date: April 11, 2002                      Harvest date: July 25, 2002                      Previous crop: Fallow  
 Notes: The trial sustained severe heat and moisture stress. Oil content is adjusted to 8.5% moisture.  
 NS = no statistical difference between varieties.

Brand	Variety	Type*	Days to Bloom	Duration of Flowering	Days to Mature	Plant Height	Oil Content	Yield
				days		inches	%	lbs/ac
AgPro	SP Banner	OP	67	16	94	20	32.5	428
	Bumper	OP	70	14	96	19	33.2	98
	NR00-1301	OP	68	15	95	22	31.1	128
	NR00-4026	OP	68	14	94	19	31.7	244
AgriProgress	PF1857195	OP	70	15	96	23	35.6	369
	AP2062-9C	H	69	15	95	26	31.4	455
	AP2227	H	67	16	94	23	30.3	407
	AP7554	H	68	18	96	23	36.0	417
	AP7975	H	68	16	96	23	31.8	324
	AP7978	H	69	15	97	24	34.3	263
	AP7979	H	67	17	95	23	32.1	403
	APS12	H	68	17	95	24	34.0	302
	APS13	H	69	16	95	22	32.8	329
Brett Young	APS15	H	68	16	96	20	33.0	310
	LBD 499RR	H	69	16	96	20	31.1	275
	LBD 612RR	OP	69	17	96	23	32.3	197
Canterra	LBD 799RR	S	68	17	96	21	33.0	222
	1812	S	69	16	96	21	33.3	210
	Croplan Gen.	Crosby	OP	69	15	97	23	31.4
Croplan Gen.	HyClass 2061	H	68	16	96	21	32.8	369
	HyClass 767SW	S	67	17	95	23	32.2	319
	HyClass 905RR	H	70	15	97	25	34.8	382
	Minot	OP	68	16	96	22	34.7	306
Dekalb	DKL 223	H	64	18	94	19	32.0	387
	DKL 34-55	OP	70	15	96	22	35.9	212
	DKL 35-85	OP	70	14	97	22	31.0	182
	SW Peak	S	66	18	94	22	34.6	444
IntegraSeed	Raiderr	OP	74	12	98	22	34.0	93
	Rulerr	H	68	14	94	23	33.9	364
Interstate	357 Magnum	H	64	18	95	19	32.0	333
	Dakota	OP	65	16	93	19	31.6	321
	ExcalibuR	H	68	17	96	22	34.1	405

Continued



## continued 2002 Roundup Ready Canola - No-till

Hettinger, North Dakota

Brand	Variety	Type*	Days to Bloom	Duration of Flowering	Days to Mature	Plant Height	Oil Content	Yield
				days		inches	%	lbs/ac
Interstate	SW GladiatoR	S	66	18	94	17	32.0	264
	Hyola 357RR	H	66	16	95	17	32.8	295
Proseed	AP2013-9C	H	69	16	95	23	34.0	264
	AP2066-9C	H	67	16	94	23	30.6	307
	Razor	S	70	15	96	22	31.4	144
	Roughrider	OP	68	16	95	22	36.5	313
Seeds 2000	SW BadgeRR	S	68	17	96	22	32.1	220
Trial Mean			68	16	95	22	32.9	301
C.V. %			1.5	1.0	0.9	10.7	7.7	22.7
LSD .05			1	1	1	3	3.5	96
LSD .01			2	1	2	4	NS	127

\*Type: H = Hybrid, OP = Open Pollinated, S = Synthetic.

Planting date: April 11, 2002 Harvest date: July 25, 2002 Previous crop: Fallow

Notes: The trial sustained severe heat and moisture stress. Oil content is adjusted to 8.5% moisture. NS = no statistical difference between varieties.

## 2002 Clearfield Canola - No-till

Hettinger, North Dakota

Brand	Variety	Type*	Days to Bloom	Duration of Flowering	Days to Mature	Plant Height	Oil Content	Yield
				days		inches	%	lbs/ac
Canterra	1604	OP	70	16	98	21	31.3	239
Canterra	1670	OP	69	17	97	23	33.5	382
Interstate	289CL	OP	70	16	94	25	34.4	211
NPZ Lembke	AP164-05	OP	67	17	96	22	31.4	219
NPZ Lembke	AP164-10	OP	64	22	95	21	36.1	429
NPZ Lembke	AP164-11	OP	65	21	96	22	35.3	392
Croplan Gen.	KAB 36	OP	68	13	95	25	35.6	476
AgPro	N000-0488	OP	68	18	97	22	33.6	257
Trial Mean			68	17	96	22	33.9	326
C.V. %			0.5	0.8	0.8	9.3	4.5	19.6
LSD .05			1	1	1	NS	2.2	94
LSD .01			1	1	2	NS	3.0	128

\*Type: OP = Open Pollinated

Planting date: April 11, 2002 Harvest date: July 25, 2002 Previous crop: Fallow

Notes: The trial sustained severe heat and moisture stress. Oil content is adjusted to 8.5% moisture. NS = no statistical difference between varieties.

2002 Oil Type Sunflower - Continuously Cropped No-till

Hettinger

Brand	Hybrid	Days to Bloom	Days to Mature	Plant Height	Test Weight	Oil Content	Yield			Avg. Yield	
							2000	2001	2002	2 Year	3 Year
		days	days	inches	lbs/bu	%	lbs/ac				
Croplan Gen.	CL322*	79	121	48	31.2	38.8		1857	2161	2009	
Croplan Gen.	CL308*	76	121	45	33.1	44.3		2095			
Dekalb	DKF29-90	76	122	50	35.0	43.1	2205	1929	2073	2001	2069
Dekalb	DKF31-01NS*	78	122	58	32.7	36.7	2024	1628	2395	2012	2016
Dekalb	DKF33-33NS*	77	120	50	33.2	37.7		1571			
Dekalb	DK3868	79	121	48	33.5	43.0	2394	2139	2170	2154	2234
Dekalb	DK3875	80	122	46	31.0	39.0	3029	3293	1574	2434	2632
IntegraSeed	432	81	124	46	30.0	41.6		2260			
IntegraSeed	435	82	121	46	31.7	40.7		1993			
IntegraSeed	536NS*	78	119	43	32.0	39.4		1480			
IntegraSeed	541NS*	80	121	48	31.0	37.7		2261			
IntegraSeed	550NS*	82	122	44	29.7	39.7		2196			
IntegraSeed	544NS*	80	121	44	29.4	37.1		2069			
IntegraSeed	567NS*	80	121	42	31.2	41.8		2025			
Interstate	F63105NS*	79	120	44	31.3	38.9		1583			
Interstate	IS6521	76	120	46	34.3	40.2	2401	2043	2147	2095	2197
Interstate	IS6039	78	119	48	33.3	41.0	2031	2097	1749	1923	1959
Interstate	F90039HO**	78	122	51	31.4	41.5		2296			
Interstate	990213NS*	82	122	44	29.4	39.6		1594			
Interstate	HySun 450*	82	124	44	30.6	39.4		2434	2307	2370	
Interstate	IS4049	80	121	48	30.6	42.1	1668	2686	2103	2394	2152
Interstate	IS5331	78	120	36	30.3	40.0		1538	2100	1819	
Interstate	HySun 521*	78	121	38	31.7	38.3		2049	1937	1993	
Interstate	F00001	77	120	48	30.8	37.8		1616			
Kaystar	9404	80	122	47	30.0	37.2	2317	2289	2262	2276	2289
Mycogen	8377NS*	80	122	49	31.0	40.7	1738	1238	1903	1570	1626

continued

2002 Oil Type Sunflower - continued

Hettinger

Brand	Hybrid	Days to Bloom	Days to Mature	Plant Height	Test Weight	Oil Content	Yield			Avg. Yield	
							2000	2001	2002	2 Year	3 Year
		days	days	inches	lbs/bu	%	lbs/ac				
Mycogen	8N327*	78	121	48	32.7	41.7			2115		
Mycogen	8N421*	80	123	52	30.9	41.5			2431		
Mycogen	SF260	80	120	47	31.3	42.7		2476	1890	2183	
Mycogen	SF270	76	120	42	32.5	37.4			1502		
Proseed	9612	80	122	53	30.5	36.3	1856	1803	1847	1825	1835
Proseed	9405*	81	123	45	26.5	37.2			1757		
Proseed	K-405*	80	121	44	28.5	36.2			1606		
Proseed	K-441*	80	120	47	30.4	38.2			2170		
Proseed	K-653*	81	121	46	28.4	34.8			2220		
Seeds 2000	Bronco*	81	123	42	30.4	40.4	2205	2025	2210	2118	2147
Seeds 2000	Blazer*	78	122	40	30.5	40.3			2264		
E. Mat. check	Hysun 311		116								
M. Mat. check	C270		120								
L. Mat. check	P6451		122								
Check	USDA 894	79	119	48	30.7	38.5	1800		2112		
Trial Mean		79	121	46	31.1	39.7	1950	2002	1991	--	--
C.V. %		2.0	1.4	7.1	2.6	4.0	14.0	12.6	15.9	--	--
LSD .05		2	3	7	1.3	2.6	442	356	515	--	--
LSD .01		3	4	9	1.7	3.4	587	469	683	--	--

\* Nusun

\*\* High Oleic

Planting date: May 13, 2002

Harvest date: October 9, 2002

Seeding rate: 21,000 seeds/acre, thinned to 18,000 plants/acre.

Row spacing: 28"

Previous crop: HRSW

Yields and oil content are adjusted to 10% moisture. Oil content has been adjusted for nusun types.

2002 Confection Sunflower - Continuously Cropped No-till Hettinger

Brand	Hybrid	Yield	Test weight	Days to Bloom	Days to mature	Plant height	Seed over Screen		
							22/64	20/64	18/64
		lbs/ac	lbs/bu	days	days	inches	----- % -----		
Interstate Seed	IS8048	2039	26.4	76	122	41	35	39	8
Interstate Seed	IS33139	2214	25.0	80	124	46	41	38	11
IntegraSeed	INT626	2024	27.0	77	123	46	36	43	11
USDA Check	Hyb 924	2033	26.4	76	123	38	21	46	16
Trial Mean		2077	26.2	77	123	43	33	42	12
C.V. %		5.9	2.8	3.1	1.7	7.8	28.3	15.1	26.1
LSD .05		NS	NS	NS	NS	NS	NS	NS	NS

Planting date: May 13, 2002      Harvest date: October 9, 2002      Previous crop: HRSW  
 Seeding rate: 20,000 seeds/acre, thinned to 18,000 plants/acre.      Row spacing: 28"  
 NS = no statistical difference between hybrids.

2002 Mustard - Continuously Cropped No-till Hettinger

Variety	Days to First Flower	Days to Last Flower	Days to Maturity	Plant Height	Yield			Average Yield		
					1999	2000	2002	2 Year	3 Year	
				inches	----- lbs/ac -----					
<b>Yellow</b>										
AC Pennant	48	67	78	19	2240	2040	504	1272	1595	
AC Base	47	67	78	26	2251	1827	513	1170	1530	
Tilney	48	68	78	28	2178	1653	504	1078	1445	
Viscount	49	68	79	20	1974	1667	448	1058	1363	
Ace	48	68	78	21			504			
<b>Oriental</b>										
AC Vulcan	56	70	80	20	2365	2409	187	1298	1654	
Forge	56	71	81	19	2276	2060	168	1114	1501	
Trial Mean		50	68	79	22	2214	1922	404	--	--
C.V. %		0.8	0.6	0.6	17.6	10.2	6.2	15.8	--	--
LSD .05		1	1	1	6	ns	182	95	--	--
LSD .01		1	1	1	8	ns	252	130	--	--

Planting Date: April 23, 2002      Harvest Date: July 22, 2002  
 Seeding Rate: Yellow = 12 lbs/ac, Oriental = 6 lbs/ac.  
 Previous crop: 1998 & 1999 = HRSW, 2001 = Fallow.  
 ns = no statistical difference between varieties.  
 Notes: The 2002 trial sustained severe heat and moisture stress.

**Field Pea - Recrop**

Dickinson, ND

Variety	Type	Days to Flower	Flower Duration	Seeds per Pound	Plant Height	Protein	Test Weight	Grain Yield			Average Yield	
								2000	2001	2002	2 Year	3 Year
			days			%	lbs/bu	----bu/ac----			----bu/ac----	
Atomic	G	61	6	1,556	12		63.9	37.0	47.9	4.0	25.9	29.6
Carneval	Y	60	8	2,049	14		63.0	40.9	50.5	8.4	29.4	33.3
Eclipse	Y	61	7	1,838	14		63.9	--	--	9.9	--	--
Integra	Y	59	7	1,760	15		62.1	--	42.4	6.9	24.6	--
Majoret	G	61	6	1,986	12		64.3	43.9	47.4	7.9	27.7	33.1
Scuba	G	59	7	2,154	13		62.1	--	44.9	6.3	25.6	--
Toledo	G	60	6	1,647	12		61.8	--	--	4.7	--	--
Trial Mean	--	60	7	1,856	13		63.0	43.2	45.4	6.9	--	--
C.V. %	--	0.3	6.4	2.7	8.2		0.8	8.6	7.4	10.9	--	--
LSD .05	--	0	1	74	2		0.8	5.4	5.0	1.1	--	--

Planting Date: April 26

Harvest Date: July 30

Type: Y = Yellow, G = Green

**2002 Field Pea Variety Trial - Continuously Cropped No-till**

Hettinger

Variety	Seed Type	Days to First Flower	Days to Last Flower	Days to Matur.	Plant Ht. at Harvest	1000 Seed Weight	Yield			Average Yield	
							1999	2000	2002	2 year	3 year
	*				inches	grams	----- bu/ac -----				
Atomic	G	62	70	85	12	196	65.7	47.0	5.8	26.4	39.5
Toledo	G	60	68	81	12	167	59.9	36.8	6.4	21.6	34.4
Carneval	Y	63	70	82	15	177	56.2	30.2	5.9	18.0	30.8
CDC Mozart	Y	62	69	82	10	157		50.0	6.5	28.2	
Integra	Y	62	68	81	13	159		38.8	5.3	22.0	
Crusier	G	60	69	79	13	166			8.1		
DS-49543	G	60	69	82	13	182			7.6		
SW Salute	Y	62	69	81	14	150			7.5		
Scuba	G	60	68	79	12	159			5.3		
Trial Mean		61	69	81	13	168	58.8	35.3	6.5	--	--
C.V. %		0.5	0.8	0.7	9.3	21.7	10.1	11.4	27.3	--	--
LSD .05		1	1	1	2	ns	8.6	5.7	ns	--	--
LSD .01		1	1	1	2	ns	ns	7.7	ns	--	--

\*Seed Type: Y = Yellow, G = Green.

Planting Date: April 23, 2002

Harvest Date: July 19, 2002

Seeding Rate: 250,000 live seeds/acre

Previous Crop: 1998 = HRSW, 1999 = Field Pea, 2001 = Fallow

Notes: The 2002 trial sustained severe heat and moisture stress.

## 2002 Field Pea Variety Trial

Mandan

Variety	Seed Type	Plant Ht. at Harvest	Lodging	Test Weight	1000 Kernel Weight	Grain Yield
		inches	0-9*	lbs/bu	grams	bu/A
SW Salute	Yellow	17	1.0	62.3	222	19.6
SWA 5122	Yellow	19	1.2	61.2	201	19.4
Crusier	Green	16	2.2	62.0	210	16.5
SWA 5099	Yellow	17	1.5	61.7	234	15.4
Circus	Yellow	18	1.2	62.6	223	14.8
Toledo	Green	17	2.2	60.8	253	14.0
SWA 5111	Yellow	18	1.5	58.8	199	11.7
SWA 5097	Yellow	18	1.5	60.8	240	11.2
Integra	Yellow	19	2.5	60.4	253	11.0
SWA 5095	Yellow	17	2.2	62.5	250	10.9
Majoret	Green	17	1.2	64.0	242	10.7
Carneval	Yellow	19	1.2	55.1	228	10.4
SW 995877	Yellow	16	3.0	62.9	221	9.8
Trial Mean		17	1.8	61.2	229	13.5
C.V. %		8.1	36.0	3.9	6.0	27.6
LSD .05		2	0.9	ns	20	5.3
LSD .01		ns	1.2	ns	26	7.2

\*Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: April 25

Harvest Date: July 31

Seeding Rate: 250,000 live seeds/acre

Previous Crop: HRSW

Notes: The trial sustained severe heat and moisture stress during flowering resulting in poor seed set.

2002 Lentil Variety Trial

Hettinger

Variety	Days to First Flower	Days to Last Flower	Harvest Height	1000 Kernel wt.	Yield			Average Yield	
					1999	2000	2002	2 year	3 year
			inches	grams	lbs/ac				
CDC Vantage	64	77	10	36	1248	800	433	616	827
CDC Milestone	65	77	7	30	1220	740	293	516	751
CDC Richlea	66	78	9	41	1160	680	360	520	733
Crimson	65	77	8	30	1113	800	231	516	715
Laird	71	76	13	43	673	140	53	96	289
Pennel	69	85	9	51			347		
CDC Sovereign	70	78	12	43			307		
Merrit	64	77	10	50			258		
Trial Mean	67	78	10	41	1017	524	296	--	--
C.V. %	0.5	0.7	7.1	7.6	20.9	29.2	33.1	--	--
LSD .05	1	1	1	5	311	225	146	--	--
LSD .01	1	1	1	6	422	307	199	--	--

Planting Date: April 15, 2002

Harvest Date: August 12, 2002

Seeding Rate: 550,000 live seed/acre.

Previous Crop: 1998 = HRSW, 1999 = Field pea, 2001 = Fallow.

Notes: The 2002 trial sustained severe heat and moisture stress.

Variety	Days to First Flower	Days to Last Flower	Days to Matur.	Plant Height	1000 Seed Weight	Test Weight	Yield			2 year Avg.*
							1999	2001	2002	
				inches	grams	lbs/bu	lbs/ac			
<b>Large Kabuli:</b>										
Sanford	66	72	94	12	354	60.4	1860	113	727	1294
Evans	64	72	94	11	333	59.7	1620	80	800	1210
CDC Yuma	63	72	93	11	354	59.4	1773	1387	533	1153
Dwellely	67	73	--	11	422	56.6	1533	80	693	1113
CDC Xena	64	73	91	10	380	61.2		200	1100	
CDC Diva	60	72	91	9	370	61.1			893	
CDC ChiChi	62	72	93	10	330	57.7			667	
Sierra	67	70	--	11	391	59.2			640	
<b>Small Kabuli:</b>										
CDC Chico	59	72	86	9	234	60.0	2307	1313	1153	1730
B-90	63	74	91	11	268	61.8	2380	2400	1007	1694
<b>Green Kabuli:</b>										
CDC Verano	60	73	93	7	174	60.3		167	773	
<b>Large Desi:</b>										
CDC Nika	59	69	86	9	225	59.0		2040	960	
<b>Small Desi:</b>										
Myles	59	70	86	10	165	55.8	2667	1860	1027	1847
CDC Desiray	59	70	85	9	163	56.4		1773	1013	
CDC Anna	59	72	91	9	179	57.7		2507	853	
Trial Mean	62	72	89	10	292	58.9	2026	1011	816	--
C.V. %	1.7	1.8	1.0	9.1	8.0	1.3	17.9	17.7	19.7	--
LSD .05	1	2	1	1	33	1.1	531	255	228	--
LSD .01	2	2	2	2	44	1.4	720	342	305	--

Planting Date: April 23, 2002

Harvest Date: August 12, 2002

Previous Crop: 1998 = field pea, 2000 = barley, 2001 = fallow.

\*2 year average yield (1999 & 2002).

Notes: The 2001 trial sustained moderate hail damage and severe *ascochyta* blight infection. The 2002 trial sustained severe heat and moisture stress.

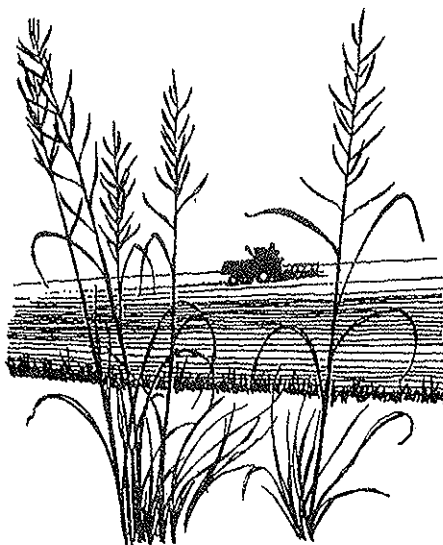


Variety	Type	Days to Flower	Seeds per Pound	Plant Height	Test Weight	Grain Yield		2 Year Average
						2001	2002	
				in	lbs/bu	----lbs/ac----		lbs/ac
Amit	K	51	1,706	13	61.9	--	702	--
CDC Anna	D	49	2,246	13	60.8	--	836	--
CDC Yuma	K	48	1,109	14	61.6	1,847	705	1,276
Chico	K	45	1,642	13	61.6	--	786	--
Dwelley	K	53	842	12	59.9	998	595	796
Myles	D	49	2,603	13	57.4	2,368	663	1,515
Sierra	K	50	845	12	58.3	--	682	--
Trial Mean	--	49	1,570	13	60.2	1,539	710	--
C.V. %	--	1.3	10.2	9.1	1.2	23.5	15.0	--
LSD .05	--	1	239	NS	1.0	NS	NS	--

Planting Date: May 13

Harvest Date: September 24

Type: K = Kabuli, D = Desi



## Seeding Date and Rate of Chickpea at Hettinger 1999 & 2002

Chickpeas are cool season legumes and should be seeded in the early spring. Seed of the large kaboli types are expensive (\$0.50/lb) and current recommended seeding rates are 174,000 seeds per acre (120 - 140 lbs/Ac). Guidelines on planting dates and seeding rates for southwestern North Dakota have generally been adapted from Canadian sources and have not been researched in this area in the past. This study was initiated to determine more specific production practices for southwestern North Dakota and encompasses results from the 1999 and 2002 growing seasons. The study was also seeded in 2000 and 2001 but were infested with *ascochyta blight* and subsequently destroyed.

Sanford chickpeas were seeded in 1999 and Dwelley chickpeas were seeded in 2002. Both varieties are a large *kaboli* types and were seeded at three different rates; 174, 131 and 87 thousand pure live seeds per acre on three different dates; mid-April (April 19, 1999 and April 15, 2002), late April/early May (May 3, 1999 and April 29, 2002) and in mid-May (May 18, 1999 and May 13, 2002). The seed was inoculated with *rhizobia* and treated for seed-borne *ascochyta* with thiabendazole (LSP). The trials were planted no-till into spring wheat stubble in 1999 and into summer fallow in 2002. Both trials were harvested on August 26.

Seeding Rate								Combined Means 1999 & 2002		
Seeding Rate	Days to Emerg.	Days to Bloom	Duration of Bloom	Days to Mature	Plant Height	1000 Seed Weight	Test Weight	Yield		
seeds/A			days		inches	grams	lbs/bu	lbs/ac		
174,000	21	60	15	99	11	377	61.5	1911	384	1148
131,000	21	60	15	99	10	384	61.4	1869	437	1153
87,000	21	60	15	99	10	382	61.4	1838	541	1190
C.V. %	0	14.4	10.2	0	6.8	7.4	1.0	20.7	33.2	25.7
LSD .05	NS	NS	NS	NS	NS	NS	NS	NS	126	NS

Seeding Date								Combined Means 1999 & 2002		
Seeding Date	Days to Emerg.	Days to Bloom	Duration of Bloom	Days to Mature	Plant Height	1000 Seed Weight	Test Weight	Yield		
			days		inches	grams	lbs/bu	lbs/ac		
Mid-April	29	70	16	99	11	380	61.9	2191	499	1345
Late April	22	60	16	99	10	393	61.6	1962	540	1251
Mid-May	13	50	15	99	10	370	60.8	1465	324	894
C.V. %	0	1.9	10.1	0	7.0	6.9	0.5	10.8	29.0	18.6
LSD .05	1	1	NS	NS	NS	NS	0.2	227	110	123

**Chickpea Seeding Date and Rate**

**Combined Means 1999 & 2002**

Seeding Date	Seeding Rate seeds/A	Days to Emerg.	Days to Bloom	Duration of Bloom days	Days to Mature	Plant Height inches	1000 Seed Weight grams	Test Weight lbs/bu	Yield		
									1999	2002	Avg.
									----- lbs/ac -----		
Mid-April	174,000	29	70	16	99	11	379	62.0	2173	439	1306
Mid-April	131,000	29	70	16	99	11	385	61.8	2220	420	1320
Mid-April	87,000	29	70	16	99	11	376	62.0	2180	639	1410
Late April	174,000	22	60	16	99	11	381	61.8	2027	490	1258
Late April	131,000	22	60	16	99	10	406	61.6	2000	504	1252
Late April	87,000	22	60	16	99	10	391	61.4	1860	625	1242
Mid-May	174,000	13	50	15	99	11	372	60.8	1533	224	878
Mid-May	131,000	13	50	15	99	10	359	60.9	1387	387	887
Mid-May	87,000	13	50	15	99	11	380	60.8	1473	359	916
C.V. %			1.9	10.1	0	7.0	7.1	0.7	11.7	24.5	18.6
LSD .05			1	NS	--	NS	NS	0.6	318	162	215

**Summary**

The 1999 growing season was almost ideal for chickpea production with an abundance of moisture and mild temperatures, unlike the 2002 season with hot and dry conditions. Minor levels of ascochyta blight were noted in 1999 and were absent in 2002. There was no significant difference between seeding rates for any agronomic or quality factors for either year. Yields were similar regardless of seeding rate for the 1999 trial and tended to increase slightly with decreasing rates for the 2002 trial. This may have been due to fewer plants completing for the limited supply of moisture in 2002. In both years, the lower seeding rate provided an adequate stand to maintain yield. Seeding date played a key role in quality factors and yield. Seed weight tended to decline, although not significantly, as seeding date was delayed and test weight declined significantly, especially with the mid-May seeding date. Yield also declined significantly after the late April seeding date. Weed infestations tended to increase with lower seeding rates and with later seeding dates. Post-emergence broadleaf weed control is limited to pyridate (Tough) herbicide which tends to cause more temporary stunting of weeds rather than control. Sulfentrazone (Spartan) appears to have a good fit for broadleaf weed control in chickpea. *Ascochyta blight* was observed throughout the 1999 trial and appeared to be more pronounced on the higher seeding rates and on the first seeding date. Heavy foliage tends to restrict air movement and provides for a more humid environment for disease development. As would be expected due to warmer soils, days from planting to seedling emergence was reduced significantly with later seeding dates. The extended germination period of the first seeding date however, did not cause a reduction in plant stand. In conclusion, planting of chickpeas should be curtailed by the end of April and seeding rates as low as 87,000 seeds per acre is enough to provide for an adequate stand to maintain yield.

**Management of *Ascochyta Blight* in Chickpea by Cultivar Selections and Fungicide Application at Hettinger (Large Kaboli type)**

Variety	Fungicide Treatment	Grain Yield	Test Weight	1000 Seed Weight	Disease on Seed	Seed Size (mm)		
						>9	8-9	<8
	*	lbs/ac	lbs/bu	grams	0-5 **	----- % -----		
Sierra	1	780	55.7	422	0.5	60	28	12
Sierra	2	721	55.4	430	0.8	59	28	13
Sierra	3	683	53.5	401	1.2	58	23	19
Sierra	4	873	56.6	423	0.8	59	27	13
Sierra	5	676	55.9	404	0.5	51	34	15
Combined means:		747	55.4	416	0.8	57	28	14
CDC Yuma	1	378	55.2	376	0.8	37	45	17
CDC Yuma	2	396	55.3	364	0.8	39	54	15
CDC Yuma	3	528	57.6	372	0.2	37	45	18
CDC Yuma	4	568	56.5	389	0.2	48	38	14
CDC Yuma	5	506	57.2	381	0.5	36	45	19
Combined means:		475	56.4	376	0.5	39	44	17
Dwellely	1	733	56.0	421	0.5	62	28	10
Dwellely	2	606	54.8	434	0.8	61	28	11
Dwellely	3	538	55.2	421	1.0	59	31	10
Dwellely	4	613	55.8	430	0.2	60	29	11
Dwellely	5	568	54.9	437	0.8	62	27	11
Combined means:		612	55.3	428	0.6	61	28	11
Trial Mean		883	57.2	319	0.3	52	33	14
C.V. %		27.9	2.8	4.7	129	10.8	14.3	20.7
LSD .05		347	2.3	21	0.6	8	7	4
LSD .01		460	3.0	28	0.8	11	9	5

**\*Fungicide Treatments:**

- 1 = Untreated
- 2 = 6.2 oz/A Quadris at pre-bloom (June 24).
- 3 = 6.2 oz/A Quadris at mid-bloom (July 9).
- 4 = 6.2 oz/A Quadris at pre-bloom + 6.2 oz/A Quadris at mid-bloom.
- 5 = 7.2 oz/A Headline at pre-bloom + 5.7 oz/A AMS 21619 at mid-bloom.

\*\*Disease on Seed 0-5: 1 = none observed, 5 = all seed is visibly diseased.

Planting Date: April 29, 2002

Harvest Date: August 12, 2002

Notes: The trial sustained severe heat and moisture stress throughout the growing season resulting in very low levels of *ascochyta* blight infections.

**Management of *Ascochyta Blight* in Chickpea by Cultivar Selections and Fungicide Application at Hettinger (Desi and Small Kaboli type)**

Variety	Fungicide Treatment	Grain Yield	Test Weight	1000 Seed Weight	Disease on Seed
	*	lbs/ac	lbs/bu	grams	0-5**
B-90	1	1192	60.0	276	0
B-90	2	1271	61.1	270	0
B-90	3	1218	60.4	276	0
B-90	4	1066	58.4	273	0
B-90	5	990	59.5	276	0
Combined means:		1147	59.9	274	0
CDC Chico	1	1227	60.5	245	0
CDC Chico	2	1182	59.9	243	0
CDC Chico	3	1357	60.0	243	0
CDC Chico	4	1199	60.2	241	0
CDC Chico	5	1315	60.2	242	0.2
Combined means:		1256	60.2	243	0
Myles	1	1105	55.6	168	0
Myles	2	1064	55.8	168	0
Myles	3	1207	56.0	170	0.2
Myles	4	981	56.4	168	0
Myles	5	979	55.7	170	0
Combined means:		1072	55.9	169	0
Trial Mean		883	57.2	319	0.3
C.V. %		27.9	2.8	4.7	129
LSD .05		347	2.3	21	0.6
LSD .01		460	3.0	28	0.8

**\*Fungicide Treatments:**

1 = Untreated

2 = 6.2 oz/A Quadris at pre-bloom (June 24).

3 = 6.2 oz/A Quadris at mid-bloom (July 9).

4 = 6.2 oz/A Quadris at pre-bloom + 6.2 oz/A Quadris at mid-bloom.

5 = 7.2 oz/A Headline at pre-bloom + 5.7 oz/A AMS 21619 at mid-bloom.

\*\*Disease on Seed 0-5: 1 = none observed, 5 = all seed is visibly diseased.

Planting Date: April 29, 2002

Harvest Date: August 12, 2002

Notes: The trial sustained severe heat and moisture stress throughout the growing season resulting in very low levels of *ascochyta* blight infections.

## 2002 Soybean Production Trial at Hettinger

Seeding Date											Combined Means
Seeding Date	Plant Stand / Acre	Canopy Closure	10% Bloom	Days to Mature	Plant Height	Pod Height	Test Weight	1000 Seed Weight	Oil Content	Seed Protein	Grain Yield
	1000's	days	days	days	cm	cm	lbs/bu	grams	%	%	bu/ac
May 13	173	59	61	108	31	5	57.4	115	16.8	40.6	9.2
May 22	125	50	55	103	31	3	57.5	109	16.6	40.4	8.4
Sig. Diff.	**	**	**	**	NS	**	NS	**	NS	NS	NS

Row Spacing											Combined Means
Row Spacing	Plant Stand / Acre	Canopy Closure	10% Bloom	Days to Mature	Plant Height	Pod Height	Test Weight	1000 Seed Weight	Oil Content	Seed Protein	Grain Yield
inches	1000's	days	days	days	cm	cm	lbs/bu	grams	%	%	bu/ac
7	154	49	58	105	30	4	57.4	110	16.5	40.9	9.1
14	144	60	58	106	32	4	57.5	114	16.9	40.2	8.5
Sig. Diff.	NS	**	NS	NS	*	NS	NS	*	NS	*	NS

Seeding Rate											Combined Means
Seeding Rate	Plant Stand / Acre	Canopy Closure	10% Bloom	Days to Mature	Plant Height	Pod Height	Test Weight	1000 Seed Weight	Oil Content	Seed Protein	Grain Yield
1000's	1000's	days	days	days	cm	cm	lbs/bu	grams	%	%	bu/ac
175	127	55	58	105	31	4	57.6	112	16.8	40.4	8.6
225	171	54	58	105	31	4	57.4	112	16.6	40.7	9.0
Sig. Diff.	**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Variety											Combined Means
Variety	Plant Stand / Acre	Canopy Closure	10% Bloom	Days to Mature	Plant Height	Pod Height	Test Weight	1000 Seed Weight	Oil Content	Seed Protein	Grain Yield
	1000's	days	days	days	cm	cm	lbs/bu	grams	%	%	bu/ac
Walsh	157	54	57	104	30	4	57.5	112	16.4	41.1	8.3
Barnes	141	55	59	106	32	4	57.5	112	16.9	40.0	9.3
Sig. Diff.	*	NS	**	**	NS	NS	NS	NS	**	**	**

Significant differences: \*P<0.5, \*\*P<0.1, NS = none.

## 2002 Corn - Continuously Cropped No-till

Hettinger

Brand	Hybrid	RM	Trait	Days to silk	Silage moist.	Silage Yield*	Ear height	Root Lodg.	Test Weight	Grain Yield**
		days			%	Tons/ac	inches	%	lbs/bu	bu/ac
Dekalb	DKC 37-81	87	RR	81	56	3.35	24	11	55.2	55.4
Dekalb	DKC 39-47	89	RR	84			28	19	50.1	50.9
Dekalb	DKC 42-22	92	YG	88			26	27	44.6	38.4
Dekalb	DKC 42-70	92	RR	86			26	26	48.1	41.2
Dekalb	DKC 44-46	94	RR,YG	86			27	5	44.6	55.6
Dekalb	DKC 39-00	89	RR	82	56	3.21	22	12	53.4	50.6
Garst	8992RR	83	RR	81			18	2	54.6	69.4
Garst	8904RR	87	RR	86	58	3.15	24	3	52.0	58.8
Garst	8947RR	91	RR	86	53	4.32	25	1	46.4	53.6
Garst	8802RR	95	RR	88	46	5.23	26	3	43.8	51.9
IntegraSeed	7985RR	85	RR	86			24	4	45.4	56.7
IntegraSeed	6183RR/Bt	83	RR,Bt	88			27	2	46.7	38.3
IntegraSeed	7185RR	85	RR	84			24	2	52.6	61.7
IntegraSeed	7188RR	88	RR	85			24	7	44.8	34.8
IntegraSeed	7190RR	90	RR	88			27	5	45.9	49.4
IntegraSeed	7184RR	84	RR	86			26	3	54.1	60.8
Kaystar	KX-285RR	85	RR	83			24	5	53.6	70.5
Proseed	RRXET83	83	RR	80			20	1	56.2	72.2
REA Seeds	1772	77	RR	82			26	4	54.8	63.0
REA Seeds	1879	87	RR	87			24	21	49.4	60.0
Trial Mean				85		3.78	25	8	49.9	54.9
C.V. %				1.7		15.9	7.6	114	3.0	19.4
LSD .05				2		0.94	3	13	2.1	15.1
LSD .01				3		1.32	4	17	2.8	20.0

Planting date: May 13, 2002

Seeding rate: 21,000 seeds/acre, thinned to 19,000 plants/acre.

Row spacing: 28"

Harvest date: Silage - September 17

Grain - October 8

Previous crop: Oats

\*Silage yields are adjusted to 0% moisture.

\*\*Grain yields are adjusted to 13.5% moisture.

2002 Proso Millet Continuously Cropped No-till

Hettinger

Variety	Days to Head	Test Weight	----- Grain Yield -----			Avg. Yield	
			2000	2001	2002	2 year	3 year
		lbs/bu	-----lbs/ac-----				
Huntsman	69	52.4	951	2067	1960	2014	1659
Sunup	64	52.5	1207	1880	1600	1740	1562
Earlybird	63	51.7	1327	2033	1073	1553	1478
Sunrise	64	52.5	1147	1860	960	1410	1322
Rise	63	52.5	1280	1647	640	1144	1189
Snowbird	64	52.1	860	1620	980	1300	1153
Minsum	64	52.2	773	1353	1289	1321	1138
Dawn	61	52.8	1333	1207	507	857	1016
Turghai	62	55.1	647	1407	693	1050	916
Cerise	62	--	660	1120	280	700	687
9217	68	52.4			1867		
Trial mean	64	52.6	1131	1755	1121	--	--
C.V. %	3.3	1.3	10.5	18.2	20.6	--	--
LSD .05	3	1.0	171	460	335	--	--
LSD .01	4	1.3	231	619	453	--	--

Planting Date: May 30, 2002

Harvest Date: September 23, 2002

Seeding rate: 25 lbs/Ac.

Previous crop: 1999 & 2000 = Soybean, 2001 = oats.

Notes: The 2000 trial had moderate European corn borer damage. The 2002 trial sustained severe heat and moisture stress.



Variety	Yield						Harvest Moisture	
	DM			12% moisture		1 <sup>st</sup> cut	2 <sup>nd</sup> cut	
	1 <sup>st</sup> cut <sup>1</sup>	2 <sup>nd</sup> cut	Total	1 <sup>st</sup> cut	2 <sup>nd</sup> cut			
	-----Tons/ac-----					-----%-----		
George Black Medic	0.1	--	0.1	0.1	--	74	--	
Norcen Birdsfoot Trefoil	0.1	--	0.1	0.1	--	75	--	
Travois Alfalfa	0.9	0.7	1.6	1.0	0.8	75	65	
Fairway Crested Wheatgrass	0.4	--	0.4	0.4	--	56	--	
Fairway / George	0.2	--	0.2	0.2	--	63	--	
Fairway / Norcen	0.2	--	0.2	0.3	--	64	--	
Fairway / Rhizomateous BFT (RBFT)	0.3	--	0.3	0.4	--	58	--	
Fairway / Travois	0.8	0.7	1.5	0.9	0.8	71	66	
Manchar Smooth Brome	0.4	--	0.4	0.4	--	67	--	
Manchar / George	0.5	--	0.5	0.5	--	67	--	
Manchar / Norcen	0.4	--	0.4	0.4	--	68	--	
Manchar / RBFT	0.3	--	0.3	0.4	--	68	--	
Manchar / Travois	0.8	0.3	1.1	0.9	0.4	70	67	
Manska Pubescent Wheatgrass	0.9	0.7	1.6	1.0	0.8	64	67	
Manska / George	0.6	--	0.6	0.7	--	66	--	
Manska / Norcen	0.8	--	0.8	0.9	--	68	--	
Manska / RBFT	0.7	--	0.7	0.8	--	64	--	
Manska / Travois	1.4	--	1.4	1.6	--	65	--	
Regar Meadow Brome	0.3	--	0.3	0.4	--	62	--	
Regar / George	0.4	--	0.4	0.5	--	63	--	
Regar / Norcen	0.5	--	0.5	0.6	--	59	--	
Regar / RBFT	0.3	--	0.3	0.3	--	65	--	
Regar / Travois	0.6	0.7	1.3	0.7	0.8	72	66	
Swift Russian Wildrye	0.1	--	0.1	0.1	--	52	--	
Trial Mean	0.5	0.6	--	0.6	0.7	66	66	
C.V. %	37.2	33.7	--	37.2	33.7	5.8	1.7	
LSD .05	NS <sup>2</sup>	NS	--	NS	NS	5	NS	

Seeding date = May 14, 2001

<sup>1</sup>1<sup>st</sup> cut for Manska Pubescent Wheatgrass and combinations = June 24; 1<sup>st</sup> cut for other treatments = June 12<sup>th</sup>; 2<sup>nd</sup> cut = July 18<sup>th</sup> for all treatments.<sup>2</sup>NS = no significant difference

Perennial Rye Forage Trial Site 1 - 2002

Dickinson, ND

Variety	Yield										DM Yield 2 yr avg
	Dry Matter		12% Moisture				Harvest Moisture				
	1 <sup>st</sup> Cutting	2 <sup>nd</sup> Cutting	Total	1 <sup>st</sup> Cutting	2 <sup>nd</sup> Cutting	1 <sup>st</sup> Cutting	2 <sup>nd</sup> Cutting	1 <sup>st</sup> Cutting	2 <sup>nd</sup> Cutting	%	
	-----Tons/ac-----										-Tons/ac-
Crested wheatgrass	0.8	0.3	1.1	0.9	0.4	0.9	0.4	69	63		0.9
Dumont oat	1.4	--	1.4	1.6	--			67	--		1.4
<sup>1</sup> Perennial rye	--	--	--	--	--			--	--		.9*
Regal meadow brome	0.7	1.0	1.7	0.8	1.1	0.8	1.1	73	53		1.5
Robust barley	1.3	--	1.3	1.4	--			70	--		1.4
Russian wildrye	2.0	0.4	2.4	2.3	0.4	2.3	0.4	67	41		2.0
Western wheatgrass	1.0	0.5	1.5	1.1	0.6	1.1	0.6	71	52		1.5 <sup>2</sup>
Trial Mean	1.2	0.6	1.6	1.4	0.6	1.4	0.6	70	52		--
C.V.%	18.7	8.6	16.5	18.7	8.6	18.7	8.6	1.2	11.5		--
LSD .05	NS <sup>3</sup>	0.1	NS	NS	0.1	NS	0.1	1	10		--

<sup>1</sup>Plots in this study were established in 2000; perennial rye was damaged over the winter in 2001 and killed completely over the winter in 2002.

<sup>2</sup>Only one year's data.

<sup>3</sup>NS=no significant difference.

Perennial Rye Forage Trial Site 1 2002

Dickinson, ND

Variety	CP <sup>1</sup>		CP	ADF		NDF		TDN		RFV		Nitrate	
	1 <sup>st</sup> cut	2 <sup>nd</sup> cut		1 <sup>st</sup> cut	2 <sup>nd</sup> cut	1 <sup>st</sup> cut	2 <sup>nd</sup> cut	1 <sup>st</sup> cut	2 <sup>nd</sup> cut	1 <sup>st</sup> cut	2 <sup>nd</sup> cut	1 <sup>st</sup> cut	2 <sup>nd</sup> cut
Crested wheatgrass	24.3	20.0	472.0	30	32	57	56	66	64	75	106	730	460
Dumont oat	11.9	--	331.6	38	--	59	--	59	--	94	--	487	--
Regal meadow brome	23.1	13.4	547.1	32	37	56	58	64	60	107	96	1090	147
Robust barley	13.8	--	342.0	31	--	51	--	65	--	118	--	310	--
Russian wildrye	15.1	10.5	683.0	37	38	66	54	60	60	84	104	1087	163
Western wheatgrass	21.9	16.9	566.0	32	35	63	61	64	61	95	93	317	137
Trial Mean	18.4	15.2	490.5	33	35	59	57	63	62	96	100	670	227
C.V.%	7.0	5.4	25.6	4.0	2.5	3.0	2.5	1.7	1.1	24.5	3.1	31.2	84.8
LSD .05	2.3	1.6	NS	2	2	3	3	2	1	NS	6	NS	NS

<sup>1</sup>CP = Crude Protein, ADF = Acid Detergent Fiber, NDF = Neutral Detergent Fiber, and TDN = Total Digestible Nutrient concentrations; RFV = Relative Feed Value.

2001-02 Winter/Spring Intercrop Trial-Recrop Site 1

Variety	Dry matter production <sup>1</sup>			Harvest Moisture			Spring Cereal Height 1 <sup>st</sup> Cut inches	Average 2000-2002 DM Yield <sup>2</sup> -Tons/ac-	
	1 <sup>st</sup> Cutting	2 <sup>nd</sup> Cutting	3 <sup>rd</sup> Cutting	Total	1 <sup>st</sup> Cutting g	2 <sup>nd</sup> Cutting g			3 <sup>rd</sup> Cutting g
	-----Tons/ac-----				-----%-----				
2700 Spring Triticale	3.6	--	--	3.6	57	--	--	41	2.6
2700 Triticale/Dacold Winter Rye	2.5	0.1	0.2	2.8	59	68	77	41	2.2
2700 Triticale/Frostat Winter Triticale	2.8	0.2	--	3.0	61	73	--	42	--
2700 Triticale/Roughrider Winter Wheat	2.8	0.1	--	2.9	60	64	--	40	2.1
Dumont oat	2.6	--	--	2.6	69	--	--	33	2.1
Dumont oat/Dacold Winter Rye	1.8	0.2	0.1	2.1	74	65	78	31	--
Dumont oat/Frostat Winter Triticale	2.1	0.3	--	2.4	76	70	--	29	--
Dumont oat/Roughrider Winter Wheat	1.9	0.1	--	2.0	72	60	--	32	1.6
Haybet barley	2.5	--	--	2.5	70	--	--	29	2.0
Haybet barley/Dacold Winter Rye	2.2	0.1	0.1	2.4	73	67	78	28	--
Haybet barley/Frostat Winter Triticale	2.0	0.2	--	2.2	75	70	--	29	--
Haybet barley/Roughrider Winter Wheat	2.2	0.1	--	2.3	74	64	--	29	1.7
Trial Mean	2.4	0.2	0.2	2.6	68	67	78	34	2.0
C.V. %	13.6	44.6	14.2	--	2.7	3.6	1.0	4.5	--
LSD .05	0.5	NS <sup>3</sup>	NS	--	3	3	NS	2	--

Seeding date: May 5, 2001

1<sup>st</sup> cutting = July 2001 according to the growth stage, 2<sup>nd</sup> cutting round 45 days later; 3<sup>rd</sup> cutting = May 28, 2002.

<sup>2</sup>Mean of yields from selected treatments across site-years (2000 through 2002)

<sup>3</sup>NS=no statistical difference

2002 Winter/Spring Intercrop Trial-Recrop Site 1

Dickinson, ND

Variety	CP <sup>1</sup>			ADF			NDF			TDN			RFV		
	1 <sup>st</sup> cut	2 <sup>nd</sup> cut	3 <sup>rd</sup> cut	1 <sup>st</sup> cut	2 <sup>nd</sup> cut	3 <sup>rd</sup> cut	1 <sup>st</sup> cut	2 <sup>nd</sup> cut	3 <sup>rd</sup> cut	1 <sup>st</sup> cut	2 <sup>nd</sup> cut	3 <sup>rd</sup> cut	1 <sup>st</sup> cut	2 <sup>nd</sup> cut	3 <sup>rd</sup> cut
%															
2700 Spring Triticale	9.0	--	--	44	--	--	70	--	--	44	--	--	73	--	--
2700 /Dacold W. Rye	9.1	--	16.4	40	--	25	66	--	45	50	--	69	83	--	143
2700 /Frostat W. Triticale	9.7	--	--	43	--	--	67	--	--	46	--	--	76	--	--
2700 /Roughrider W. W.	10.2	--	--	39	--	--	65	--	--	51	--	--	83	--	--
Dumont Oat	11.4	--	--	42	--	--	66	--	--	48	--	--	80	--	--
Dumont /Dacold W. Rye	11.4	--	18.1	40	--	27	65	--	50	49	--	68	83	--	128
Dumont /Frostat W. Triticale	11.9	--	--	42	--	--	64	--	--	47	--	--	83	--	--
Dumont /Roughrider W. W.	11.7	--	--	41	--	--	66	--	--	49	--	--	80	--	--
Haybet Barley	11.7	--	--	43	--	--	69	--	--	46	--	--	75	--	--
Haybet /Dacold W. Rye	11.8	--	18.0	40	--	26	66	--	46	49	--	69	81	--	139
Haybet /Frostat W. Triticale	11.8	--	--	41	--	--	65	--	--	49	--	--	82	--	--
Haybet /Roughrider W. W.	12.0	--	--	41	--	--	68	--	--	48	--	--	77	--	--
Trial Mean	11.0	--	17.5	41	--	26	66	--	47	48	--	69	80	--	137
C.V. %	8.2	--	7.0	4.9	--	2.9	5.1	--	6.6	5.4	--	0.8	7.3	--	6.9
LSD .05	1.5	--	NS	NS	--	NS	NS	--	NS	NS	--	1	NS	--	NS

<sup>1</sup>CP = Crude Protein, ADF = Acid Detergent Fiber, NDF = Neutral Detergent Fiber, TDN = Total Digestible Nutrients, and RFV = Relative feed value.

Variety	Yield										Spring Cereal Height 1 <sup>st</sup> Cut
	Dry Matter		12% Moisture				Harvest Moisture				
	1 <sup>st</sup> Cutting	2 <sup>nd</sup> Cutting	Total	1 <sup>st</sup> Cutting	2 <sup>nd</sup> Cutting	1 <sup>st</sup> Cutting	2 <sup>nd</sup> Cutting	1 <sup>st</sup> Cutting	2 <sup>nd</sup> Cutting	%	
2700 Spring Triticale	2.0	--	2.0	2.3	--	58	--	37			
2700 Triticale/Dacold Winter Rye	1.7	0.2	1.9	1.9	0.2	58	46	34			
2700 Triticale/Frostat Winter Triticale	1.6	0.2	1.8	1.9	0.2	61	43	35			
2700 Triticale/Roughrider W. Wheat	1.8	--	1.8	2.1	--	59	--	36			
Dumont Oat	1.7	--	1.7	1.9	--	61	--	25			
Dumont oat/Dacold Winter Rye	1.7	0.2	1.9	1.9	0.2	61	41	25			
Dumont oat/Frostat Winter Triticale	1.4	0.3	1.7	1.6	0.4	64	46	24			
Dumont oat/Roughrider W. Wheat	1.4	--	1.4	1.6	--	61	--	23			
Haybet Barley	1.4	--	1.4	1.6	--	68	--	23			
Haybet barley/Dacold Winter Rye	1.3	0.2	1.5	1.4	0.2	68	41	22			
Haybet barley/Frostat Winter Triticale	1.2	0.4	1.6	1.4	0.4	72	45	22			
Haybet barley/Roughrider W. Wheat	1.3	--	1.3	1.5	--	68	--	22			
Trial Mean	1.5	0.2	--	1.8	0.3	63	43	27			
C.V. %	20.7	26.3	--	20.7	26.3	5.2	9.7	7.6			
LSD .05	NS	NS	--	NS	NS	5	NS	3			

Seeding date: April 26, 2002.  
 1<sup>st</sup> cutting according to the growth stage; 2<sup>nd</sup> cutting around 80 days later.  
 NS=no statistical difference.

2002 Winter/Spring Intercrop Trial-Recrop Site 2

Dickinson, ND

Variety	1 <sup>st</sup> Cut					2 <sup>nd</sup> Cut				
	CP <sup>1</sup>	ADF	NDF	TDN	RFV	CP	ADF	NDF	TDN	RFV
2700 Spring Triticale	10.4	40	62	58	86	--	--	--	--	--
2700 Triticale/Dacold Winter Rye	11.4	38	61	59	91	19.7	31	54	65	113
2700 Triticale/Frostat Winter Triticale	12.3	37	60	60	93	14.0	34	55	62	105
2700 Triticale/Roughrider W. Wheat	11.5	39	63	59	86	--	--	--	--	--
Dumont Oat	12.7	38	60	59	91	--	--	--	--	--
Dumont oat/Dacold Winter Rye	13.7	36	59	61	95	19.1	33	50	64	119
Dumont oat/Frostat Winter Triticale	13.6	34	57	62	101	12.5	35	56	62	103
Dumont oat/Roughrider W. Wheat	14.1	38	58	59	95	--	--	--	--	--
Haybet Barley	13.3	34	58	62	100	--	--	--	--	--
Haybet barley/Dacold Winter Rye	15.4	33	55	63	106	17.7	33	50	64	120
Haybet barley/Frostat Winter Triticale	16.7	31	54	64	112	14.0	36	55	61	104
Haybet barley/Roughrider W. Wheat	14.1	34	57	63	101	--	--	--	--	--
Trial Mean	13.3	36	59	61	97	16.2	34	53	63	111
C.V. %	8.0	4.0	3.6	1.8	4.9	10.3	6.5	4.6	2.7	6.2
LSD .05	1.8	2	4	2	8	3.0	NS	4	NS	12

<sup>1</sup>CP = Crude Protein, ADF = Acid Detergent Fiber, NDF = Neutral Detergent Fiber, TDN = Total Digestible Nutrients, and RFV = Relative feed value.

Variety	Cereal	Harvest	Growth	DM				
	Height	Moisture	Stage <sup>1</sup>	Yield	CP <sup>2</sup>	ADF	NDF	RFV
	inches	----%----		Ton/ac	----- % -----			
Bestford barley	26	72	2	1.6	13.9	40	63	85
Conlon barley	31	71	2	1.4	13.1	36	58	98
Foster barley	26	70	2	1.9	13.1	37	55	102
Haybet barley	25	68	2	2.0	13.9	38	57	98
Lewis barley	25	72	2	1.8	13.6	38	61	91
Logan barley	25	73	2	1.9	13.7	38	57	97
Robust barley	23	67	2	2.2	12.0	36	57	101
Stander barley	24	72	2	1.6	13.9	36	56	102
Stark barley	27	70	2	2.1	12.7	38	58	97
Washford barley	23	71	2	2.0	13.4	41	59	90
Westford barley	25	76	2	1.7	14.1	41	61	87
BZ 598227 barley	25	73	2	1.7	14.0	39	57	96
MT 981060 barley	25	69	2	2.1	14.1	38	58	96
Celsia oat	26	68	2	2.1	11.6	41	58	92
Forage Plus oat	27	69	1	1.8	13.1	42	60	87
Mammoth oat	33	64	1	2.2	11.6	43	61	86
Otana oat	28	74	1	1.7	12.4	45	64	78
Paul oat	29	66	2	2.0	9.8	40	59	91
Triple Crown oat	29	70	1	2.1	12.6	41	60	87
Triple Crown/Arvika pea	30	69	1	1.9	13.3	43	61	84
Triple Crown/Carneval pea	30	67	1	1.8	11.9	44	62	82
Triple Crown/Trapper pea	30	64	1	2.2	11.1	46	61	81
Pronghorn triticale	33	62	2	2.2	12.2	39	56	97
Sandro triticale	30	58	2	2.0	12.4	39	59	92
Gazelle spring rye	40	58	2	2.3	9.1	44	64	80
Lucille emmer	35	57	2	2.2	9.6	46	63	78
SK3P speltz	36	61	2	1.7	13.0	41	63	84
93ST59 wheat/speltz	30	58	2	2.2	10.3	45	60	84
Trial Mean	28	67	--	2.0	12.5	40	60	90
C.V. %	6.5	3.1	--	15.3	5.3	3.6	2.6	3.8
LSD .05	3	3	--	NS	1.0	2	3	6

<sup>1</sup>Growth Stage at harvest: 1=Milk, 2=Early Soft Dough.

<sup>2</sup>CP=Crude Protein, ADF=Acid Detergent Fiber, NDF=Neutral Detergent Fiber, RFV=Relative Feed Value.

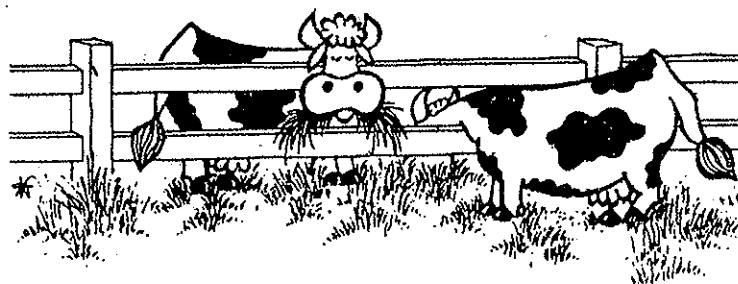


## 2002 Cool Season Forage Trial -Chemical Fallow

Dickinson, ND

Variety	Harvest	12%	DM yield			
	Moisture	Moisture	2000	2001	2002	3 yr avg
	-%-	-Tons/ac-	----- Tons/ac -----			
Bestford barley	72	1.9	--	--	1.6	--
Conlon barley	71	1.6	0.7	2.6	1.4	1.6
Foster barley	70	2.2	0.9	2.7	1.9	1.8
Haybet barley	68	2.3	1.1	3.1	2.0	2.1
Lewis barley	72	2.1	--	3.2	1.8	--
Logan barley	73	2.2	0.7	2.3	1.9	1.6
Robust barley	67	2.5	0.7	2.1	2.2	1.7
Stander barley	72	1.8	1.0	2.1	1.6	1.6
Stark barley	70	2.3	0.7	2.7	2.1	1.8
Washford barley	71	2.2	--	2.6	2.0	--
Westford barley	76	2.0	--	2.6	1.7	--
Experimental-1	73	2.0	--	--	1.7	--
Experimental-2	69	2.4	--	--	2.1	--
Celsia oat	68	2.3	1.0	3.0	2.1	2.0
Forage Plus oat	69	2.1	--	3.7	1.8	--
Mammoth oat	64	2.5	1.2	3.0	2.2	2.1
Otana oat	74	1.9	--	3.0	1.7	--
Paul oat	66	2.3	1.0	3.2	2.0	2.1
Triple Crown oat	70	2.4	2.3	3.3	2.1	2.6
Triple Crown/Arvika	69	2.2	--	3.0	1.9	--
Triple/Carneval	67	2.0	--	2.9	1.8	--
Triple Crown/Trapper	64	2.5	--	2.9	2.2	--
Pronghorn triticale	62	2.5	--	3.5	2.2	--
Sandro triticale	58	2.3	0.8	4.1	2.0	2.3
Gazelle spring rye	58	2.6	1.6	3.7	2.3	2.5
Lucille emmer	57	2.5	--	3.5	2.2	--
SK3P spelt	61	2.0	--	3.3	1.7	--
93-ST-5-9 wheat/spelt	58	2.5	--	3.3	2.2	--
Trial Mean	67	2.2	1.3	3.0	2.0	--
C.V. %	3.1	15.3	24.2	11.3	15.3	--
LSD .05	3	NS	NS	0.5	NS	--

Variety	Growth Stage	Contribution to Yield					
					2-Year Average		
		Head	Leaf	Stem	Head	Leaf	Stem
		----- % -----			----- % -----		
93-ST-5-9 wheat/spelt	2	35	16	49	31	17	53
Conlon barley	2	35	16	48	32	16	52
Forage Plus oat	1	38	21	41	34	19	48
Haybet barley	2	29	19	52	25	21	55
Lucille emmer	2	31	17	52	30	17	54
Robust barley	2	49	15	36	35	20	45
SK3P spelt	2	24	20	56	24	18	58
Sandro triticale	2	37	17	47	41	14	46
Triple Crown oat	1	32	23	44	34	21	46
Trial Mean	--	34	18	47	--	--	--
C.V. %	--	6.7	8.7	3.5	--	--	--
LSD .05	--	3	2	2	--	--	--



**2002 Long Term Rotation Trial, Wheat**

**Dickinson, ND**

Rotation <sup>1</sup>	Yield	Height	Seeds per Pound	Test Weight	Protein	Returns
	bu/ac	inches		lbs/bu	%	\$/ac
Organic -(1)	32.6	23	18134	59.0	16.1	236.35
Organic -(4)	21.1	21	17,328	62.1	15.0	152.98
Continuous	27.8	26	17,128	62.2	16.4	128.81
Cool (1)	33.3	26	17,758	59.3	16.3	153.97
Cool (3)	36.4	26	17,336	60.5	16.7	168.62
Cool/Warm	37.2	26	15,696	60.5	16.3	172.08
Trial Mean	31.4	25	17,230	60.6	16.1	168.80
C.V. %	14.6	8.4	6.7	2.9	4.2	--
LSD .05	6.0	2.7	NS	2.3	0.9	--

NS = No Statistical Difference

<sup>1</sup> **Organic** = (1) hard red spring(HRS) wheat + alfalfa - (2) alfalfa - (3) alfalfa plowdown - (4) HRS wheat - (5) corn - (6) oat + pea(hayed)

**Continuous** = HRS wheat grown continuously

**Cool** = (1) HRS wheat - (2) field pea - (3) HRS wheat - (4) canola

**Cool/Warm** = (1) HRS wheat - (2) field pea - (3) corn - (4) buckwheat

\*Organic returns were calculated based on a 2002 food grade price of \$7.25 per bushel .

Returns were calculated by multiplying the 2002 yield by protein premium or discount paid at the Southwest Grain Terminal located at Gladstone on September 12. The price paid on this date was \$4.59/bu, assuming that grain protein concentration was 14%. An additional \$.01/bu was paid for each additional 0.25% increase in grain protein up to 15% protein, above which an additional premium was not paid. Grain was discounted \$0.02/bu for each 0.25% reduction in grain protein from 14% to 12%, below which no additional discount was not assigned. Returns factored in discounts for grain with a test weight < 58 lb/bu [-\$0.01/bu for 0.5 lb/bu between 58 and 57 lb/bu; -\$0.02/bu for 0.5 lb/bu between 57 and 55 lb/bu; -\$0.03/bu for 0.5 lb/bu between 55 and 50 lb/bu; and -\$0.04/bu for 0.5 lb/bu between 50 and 46 lb/bu].

**Wheat-Pea Tillage Trial, Wheat 2002**

**Dickinson, ND**

	Yield	Test Weight	Protein	Seeds / Pound
	bu/ac	lbs/bu	%	
<b>Tillage</b>				
Conventional	28.5	51.6	17.5	18,582
Reduced	30.4	53.5	16.9	18,706
None	38.8	58.4	16.3	15,600
F-test	*	*	*	*
<b>Rotation</b>				
Wheat/Pea	37.7	53.4	16.8	17,689
Wheat/Wheat	27.4	55.7	17.0	17,570
F-test	*	*	NS	NS
Trial Mean	32.6	54.5	16.9	17,629
C.V. %	15.9	2.4	2.8	8.2

\* = significant at the P<.05 level

NS = not significant

**Wheat-Pea Tillage Trial, Pea 2002**

**Dickinson, ND**

	Seeds per Pound	Test Weight	Grain Yield			3 Year Average
			2000	2001	2002	
		lbs/bu	-----lbs/ac-----			lbs/ac
<b>Tillage</b>						
Conventional	2,280	62.5	2,035	2,761	1,226	2,007
Reduced	2,145	63.8	2,611	2,762	1,345	2,239
None	1,915	64.4	3,472	3,011	1,358	2,614
Trial Mean	2,113	63.5	2,706	2,845	1,310	--
C.V. %	3.5	0.8	11.5	9.8	13.2	--
LSD .05	128	0.9	539	NS	NS	--

NS = not significant

<b>Wheat-Canola Tillage Trial, Wheat 2002</b>	<b>Dickinson, ND</b>
---	----------------------

	Plant Stand	Yield	Test Weight	Protein	Seeds per Pound	Tillers per plant
	plants/acre	bu/ac	lbs/bu	%		
<b>Tillage</b>						
Conventional	1,300,019	22.9	48.7	17.9	20,785	1.1
Reduced	1,256,499	26.0	54.3	16.4	18,599	1.0
None	1,139,098	27.7	57.0	16.8	17,707	1.1
F-test	*	NS	*	NS	NS	NS
<b>Rotation</b>						
Wheat/Canola	1,271,681	25.5	50.8	17.4	19,885	1.3
Wheat/Wheat	1,192,064	25.6	55.9	16.7	18,176	0.9
F-test	NS	NS	*	*	*	NS
Trial Mean	1,231,872	25.5	53.4	17.0	19,030	1.1
C.V.%	10.3	23.5	5.8	3.2	5.1	41.8

\* = significant at the P<.05 level                      NS = not significant

<b>Wheat-Canola Tillage Trial, Canola 2002</b>	<b>Dickinson, ND</b>
--	----------------------

	Seeds per Pound	Plant Count	Test Weight	Oil @ 8.5% Moisture	Grain Yield		2 Year Average
		plants/acre	lbs/bu	%	2001	2002	
					lbs/ac		lbs/ac
<b>Tillage</b>							
Conventional	101,252	201,910	49.0	38.8	926	14	470
Reduced	89,139	280,347	49.0	38.5	999	29	514
None	104,495	173,572	49.5	38.9	1,117	100	608
Trial Mean	98,295	218,610	49.3	38.7	1,014	48	--
C.V. %	4.5	20.8	2.6	1.0	20.2	110.6	--
LSD .05	7,585	78,814	NS	NS	NS	NS	--

NS = not significant

## Evaluating the phytotoxicity of seed treatments in spring wheat, 2002.

The experiment was conducted in a producer's field near Dickinson, ND that had previously been seeded to sunflower in 2001, corn in 2000, and wheat in 1999. The soil was a Belfield-Savage silty clay loam (5-65-30%) sand-silt-clay, pH 7.1, O.M. 3.3%, N 46lb/A, P 10 PPM, K 350 PPM, SO<sub>4</sub>-S 41 lb/A, Cl 21lb/A). A randomized complete block design with six replications was used. Plots were 10 ft wide by 45 ft long with a 4 ft buffer strip of winter wheat seeded between each plot. A herbicide was applied on 4 May to kill volunteer sunflower and emerged weeds and then 150 lb/A of 21-0-0-24 S, 55 lb/A 11-55-0, and 50 lbs/A 0-0-60-60 Cl fertilizer/A was broadcast 18 May. Hard red spring wheat seed was treated with various seed treatments and rates except the check which was untreated. Seed was planted at the rate of 1.5 million seed/A on 21 May with a no-till drill with double disk openers. Rainfall of nearly an inch occurred on 22 May. Two post-emergent herbicide applications were used to control weeds. The first application was on 27 May with 0.4 oz Harmony Extra + 6.4 fl oz Puma. The second application occurred on 27 June with 1 pt/A of Buctril. Rainfall was 92% of normal for May but 132% of normal for both June and July. Emergence and vigor evaluations were conducted when approximately 50% of the plants had emerged on 3 June and again on 17 of June. Emergence counts (three counts per plot), vigor, and leaf stage were conducted on all six replications during the first evaluation and emergence counts (two counts per plot) and vigor were conducted on four replications during the second evaluation. Hail on 18 July completely destroyed the plot and surrounding fields so evaluations at boot and harvest could not be completed.

Emergence counts on 3 June were significantly lower than the check plot when rates of all seed treatments applied at 5X and 10X but after emergence was completed only Vitavax 200 + FloPro IMZ at rates 5X and 10X were less than the check. Vigor was low for Vitavax 200 + FloPro IMZ for rates 5X and greater on 3 June but only the 10X rates for Vitavax 200 + FloPro IMZ and Charter PB were significantly lower than the check on the 17 June evaluation. Leaf development was slowed by Raxil MD applied at the 10X rate and Vitavax 200 + FloPro IMZ applied at the 5X and 10X rate.

Emergence counts for Alsen hard red spring wheat treated with selected seed treatment fungicides at various rates at Dickinson, ND, 2002

Treatment	----- June 3 -----			--- June 17 ---	
	Plant density no/ft <sup>2</sup>	Vigor <sup>a</sup>	Leaf stage <sup>b</sup>	Plant density no/ft <sup>2</sup>	Vigor <sup>a</sup>
Check	20.0	6.8	1.63	30.8	7.3
Charter PB 1X	19.5	7.3	1.63	30.5	7.5
Charter PB 5X	18.0	6.7	1.58	30.8	6.8
Charter PB 10X	14.1	5.5	1.58	28.3	5.5
Raxil MD 1X	19.8	6.8	1.63	30.9	7.8
Raxil MD 5X	16.6	6.8	1.63	30.9	7.3
Raxil MD 10X	14.3	5.7	1.27	29.7	7.5
Vitavax 200 + FloPro IMZ 1X	19.5	6.0	1.67	30.0	7.3
Vitavax 200 + FloPro IMZ 5X	15.5	5.3	1.21	27.0	6.3
Vitavax 200 + FloPro IMZ 10X	3.6	1.7	0.38	10.5	4.0
Mean	16.1	5.9	1.42	27.9	6.7
CV%	11.3	20.7	12.7	7.3	13.6
LSD 0.05	1.4	1.4	0.21	3.0	1.3
LSD 0.01	1.9	1.9	0.28	4.0	1.8

<sup>a</sup> Vigor score on a scale of 1 – 10; 1 = low vigor, 10 = high vigor.

<sup>b</sup> Leaf stage is the average number of leaves per plant emerged.

R.O. Ashley and M.P. McMullen Dickinson Research Extension Center, Dickinson, ND, 58601, and Department of Plant Pathology, NDSU, Fargo, ND, 58105
---

Grain yield, test weight, protein, height, and head density at harvest of Parshal hard red spring wheat grown under various seed treatments, Jay Elkin Farm, Taylor, ND, 2002.

Treatment	Head density	Height	Grain		
			Yield	Test weight	Protein
	no/yd <sup>2</sup>	inches	bu/a	lb/bu	%
Check	308.3	25.4	44.9	62.8	15.5
Fumigated	317.2	23.7	39.6	61.7	15.9
DB Green L + RR	317.5	25.7	43.4	61.9	16.3
Dividend XL 1.67FS	292.1	24.8	45.1	62.2	15.5
Raxil XT 35WP	310.1	25.6	44.2	61.4	15.8
Raxil MD	306.0	25.9	45.0	62.0	16.0
Raxil XT 35WP + Gaucho 480	321.8	26.0	48.6	63.0	15.4
Raxil MD	318.8	26.0	48.6	62.5	15.7
Raxil MD Extra + Gaucho 480	322.0	25.6	43.2	62.3	15.7
Raxil MD Extra	307.2	24.7	42.7	61.4	15.8
Mean	314.4	25.3	44.9	62.2	15.7
CV%	8.8	4.5	5.9	1.3	4.2
LSD .05	NS	1.2	3.8	1.2	NS

Grain yield, test weight, protein, height, and head density at harvest of Roughrider hard red winter wheat grown under various seed treatments, Ryan Kadmas Farm, Dickinson, ND, 2002.

Treatment	Head density	Height	Grain <sup>1</sup>		
			Yield	Test weight	Protein
	no/yd <sup>2</sup>	inches	bu/a	lbs/bu	%
Check	314.4	31.2	46.2	59.2	13.9
Dividend XL 1.67FS	316.8	31.0	47.3	59.3	13.8
Raxil XT 35WP	341.5	32.4	49.7	59.2	13.9
Raxil XT 35WP + Gaucho 480	337.0	31.4	46.9	59.8	13.8
Raxil MD	328.4	31.8	50.4	59.7	13.7
Mean	329.6	31.8	48.3	59.7	13.8
CV%	11.6	3.0	4.6	0.9	1.4
LSD .05	NS	NS	3.3	0.8	NS

<sup>1</sup> All grain yields, test weights, and proteins are adjusted to a 12% moisture basis.

<sup>2</sup> Gaucho 480 is an insecticide.

**2002 Reduced Rates and Application Timing of Wild Oat Herbicides at Hettinger.**

(Eriksmoen) The objective of this trial was to look at the relationship between various rates of wild oat herbicides applied at 2 different growth stages of HRSW. Reeder HRSW was planted on April 30. The first post-applied treatments were applied to 3 leaf wheat and to 3 leaf wild oats on May 31 with 63 deg. F, 66% RH, sunny sky and 10 mph wind. The second post-applied treatments were applied to 5 leaf wheat and to 5 leaf wild oats on June 11 with 45 deg. F, 65% RH, sunny sky and 5 mph wind. All treatments were applied with a tractor mounted CO2 propelled plot sprayer delivering 17 gpa at 40 psi through 8001 flat fan nozzles to a 5 foot wide area the length of 10 by 22 foot plots. The trial was sprayed with 8 ounces/Ac Starane + 1 pint/Ac Buctril on June 7 to control broadleaf weeds. The experiment was a randomized complete block design with four replications. Wild oat populations were 22 plants per sq. foot. Evaluations for wild oat control were on July 2 and July 16. Patches of downy brome, Japanese brome and foxtail barley were non-uniformly scattered throughout the trial and were evaluated for control when observed. The trial was not harvested due to a thin and short wheat stand caused by severe drought.

App. Timing	Treatment	Product Rate	Wild Oat Rate	2001 Wiot	July 2, 2002				7/16	
					Wiot	Dobr	Jabr	Fxba	Wiot	
HRSW		oz/acre		----- % Control -----						
3 leaf	Puma	10.6	Full	72	98	0	0	--	99	
3 leaf	Puma	7.9	3/4	59	93	0	0	10	88	
3 leaf	Puma	5.3	1/2	25	75	0	15	--	75	
5 leaf	Puma	10.6	Full	92	79	--	50	--	72	
5 leaf	Puma	7.9	3/4	82	58	--	0	--	44	
5 leaf	Puma	5.3	1/2	62	22	--	0	--	21	
3 leaf	Everest + NIS	0.60 + 0.25%	Full	90	98	50	96	--	99	
3 leaf	Everest + NIS	0.45 + 0.25%	3/4	89	99	50	94	--	99	
3 leaf	Everest + NIS	0.30 + 0.25%	1/2	88	98	70	99	--	97	
5 leaf	Everest + NIS	0.60 + 0.25%	Full	62	98	--	90	--	99	
5 leaf	Everest + NIS	0.45 + 0.25%	3/4	84	98	--	--	--	99	
5 leaf	Everest + NIS	0.30 + 0.25%	1/2	72	95	--	90	--	99	
3 leaf	Discover + DSV	3.20 + 12.8	Full	90	99	0	0	0	99	
3 leaf	Discover + DSV	2.40 + 12.8	3/4	90	99	--	17	--	98	
3 leaf	Discover + DSV	1.60 + 12.8	1/2	86	94	50	0	--	97	
5 leaf	Discover + DSV	3.20 + 12.8	Full	95	98	--	0	--	99	
5 leaf	Discover + DSV	2.40 + 12.8	3/4	95	98	--	50	--	99	
5 leaf	Discover + DSV	1.60 + 12.8	1/2	92	98	--	0	--	99	
3 leaf	Achieve + SC+ AMS	7.0 + 0.5% + 1%	Full	71	80	0	45	--	79	
3 leaf	Achieve + SC+ AMS	5.25 + 0.5% + 1%	3/4	84	62	--	45	0	70	
3 leaf	Achieve + SC+ AMS	3.50 + 0.5% + 1%	1/2	75	68	0	48	50	55	
5 leaf	Achieve + SC+ AMS	7.0 + 0.5% + 1%	Full	81	65	--	0	--	71	
5 leaf	Achieve + SC+ AMS	5.25 + 0.5% + 1%	3/4	89	82	--	--	--	82	
5 leaf	Achieve + SC+ AMS	3.50 + 0.5% + 1%	1/2	52	72	--	99	--	82	
C.V. %					32.9	20.2	74	83	--	20.6
LSD 5%					25	23	ns	40	--	23

\*NIS=non ionic surfactant, DSV adjuvant, SC=super charge, AMS=ammonium sulfate.



### Summary

Crop injury was minimal (>1% stunting) and was not consistent across replications (data not shown). Full and 3/4 rates of Puma provided good wild oat control when applied at the 3 leaf stage. Wild oat control was significantly reduced when Puma was applied at the 5 leaf stage. This is the opposite of what took place in 2001 where Puma applied at the 5 leaf stage resulted in higher wild oat control than when applied at the 3 leaf stage. This was probably due to additional wild oat flushes emerging after the 3 leaf stage application in 2001, with Puma providing good control of small wild oats and less activity on larger wild oats. All application rates and timing of application of Everest and Discover provided excellent wild oat control in 2002. Achieve treatments did not provide adequate wild oat control. Everest treatments had fair control of downy brome and excellent control of Japanese brome. Achieve treatments also provided fair control of Japanese brome but no activity on downy brome. Some herbicidal activity was observed on Foxtail barley with Puma and Achieve.



**2002 Adjuvant use with Discover Herbicide at Hettinger.** (Eriksmoen) Russ hard red spring wheat was seeded on April 27. Treatments were applied to 4 leaf wheat and to 3 ½ leaf green foxtail on June 7 with 58 F, 50 % RH, cloudy sky and 8 mph wind. Treatments were applied with a tractor mounted CO2 propelled plot sprayer delivering 17 gpa at 40psi through 8001 flat fan nozzles to a 5 foot wide area the length of 10 by 28 foot plots. The trial was sprayed with 1 pt/A Buctril + 8 oz/A Starane on June 14 to control broadleaf weeds. The experiment was a randomized complete block design with three replications. Green foxtail populations were 20 plants per sq. foot. Evaluations for crop injury were on June 21 and for foxtail control on July 1. The trial was not harvested due a short and thin crop caused by severe drought.

Treatment	Product Rate	7/1 Fxtl
	oz /A	% control
1 Discover + DSV*	3.2 + 12.8	99
2 Discover + DSV	1.6 + 6.8	95
3 Discover + DSV + NIS*	1.6 + 6.8 + .25%	96
4 Discover + DSV + MSO*	1.6 + 6.8 + .25%	95
5 Discover + DSV + VOC*	1.6 + 6.8 + .25%	98
6 Discover + DSV + Basic Blend*	1.6 + 6.8 + .25%	96
7 Untreated	0	0
C.V. %		3.7
LSD 5%		5

\*Adjuvant: DSV=Score, NIS=Non-Ionic Surfactant (Preference), MSO=Methylated Seed Oil (Destiny), VOC=Vegetable Oil Concentrate (Prime Oil EV), Basic Blend=Quad 7.

### Summary

The objective of this study was to look for differences in weed control when Discover Herbicide is applied at low rates with various adjuvants. Crop injury was not observed on any treatment (data not shown). Green foxtail control was excellent for all herbicide treatments and did not vary significantly between the recommended rate (trt 1), the lower Discover rate (trt 2) or the lower Discover rate plus various adjuvants (trts 3-6).



Disclaimer. The information given herein is for educational purposes only. Any reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement is implied by the Hettinger or Dickinson Research Extension Center staff.

This publication will be made available in alternative formats for people with disabilities upon request. Contact the Hettinger Research Extension Center at 701-567-4323.

1000 copies of this publication were printed at a cost of \$1.50 each.