EIGHTH
ANNUAL

WESTERN DAKOTA

CROPS DAY RESEARCH REPORT

HETTINGER ARMORY
DECEMBER 5, 1991

Glenn Martin, Research Specialist
Dickinson Branch
Agricultural Experiment Station
North Dakota State University
Dickinson, ND 58602

Eric Eriksmoen, Agronomist
Hettinger Research and
Extension Center
North Dakota State University
Hettinger, ND 58639

8th ANNUAL WESTERN DAKOTA CROPS DAY

DECEMBER 5, 1991

HETTINGER ARMORY

MST

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

10:30 Welcome

10:45 Crop Variety Updates and Highlights of Ongoing Crop Production Research
Glenn Martin, Research Specialist, Dickinson Research Center

Eric Eriksmoen, Agronomist, Hettinger Research Extension Center

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

1:00 Ag Industry Update
"New Grass Control Products from HRAVC." Bob Condon, Hoechst-Roussel Agri-Vet, Bismarck, ND

"Barley Considerations." Bill Drummond, ND Barley Council, Fargo, ND

" Eradicane 25G." Kem Cunningham, ICI Americas, Billings, MT

1:45 Grasshopper Survey Results, Biology and Management
Mr. Dave Nelson, Plant Protection Specialist, ND Department of Agriculture, Fargo, ND.

2:15 Market Quality Grain - Bugs and Dollars
Mr. Dwain Barondeau, Hettinger County Extension Agent, Mott, ND.

2:45 Conclusion
Drawing for door prizes, coffee and opportunity to visit with sponsors.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

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

1991 Western Dakota Crops Day Sponsors

HETTINGER CHAMBER OF COMMERCE
NORTH DAKOTA STATE SEED DEPARTMENT
SANDOZ CROP PROTECTION
NORTH DAKOTA BARLEY COUNCIL
TOP FARM HYBRIDS
SOUTHWEST GRAIN COOPERATIVE
MINN-DAK GROWERS LTD.
ICI AMERICAS
DOW ELANCO
HOECHST-ROUSSEL AGRI-VET
AMERICAN CYANAMID
GUSTAFSON

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

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

DICKINSON RESEARCH CENTER

Growing Conditions 1989-1991

Nearly average precipitation in the fall of 1989 provided adequate soil water for germination and establishment of winter wheat and winter rye, and some stored soil water in both re-crop and fallow. Marginal precipitation in April and May of 1990, provided sufficient soil water for germination and early growth of spring seeded crops. June was the month that made the crop, with a total of 5.80 inches of rainfall, well distributed during the month. Measurable precipitation was recorded on 14 days in June. However, luck ran out in July and August with total rainfall for the two months being 2.60 inches below average. Considering the droughty weather pattern of the past three years, yields recorded in 1990 were nothing short of phenomenal.

Precipitation in the fall of 1990 was 1.61 inches below average and provided poor conditions for establishment of winter grains. Precipitation in April was 2.52 inches, in May 1.44 inches and in June 4.46 inches totaling 8.42 inches for the three month period. This is 1.13 inches above average. July and August precipitation was 1.84 inches below average. Once again, tan spot was the principal leaf disease in western North Dakota.

1989-91 Weather Data Summary

Precipitation	1988-89	1989-90	1990-91	95 Year Average
Sept. - Dec.	1.74	3.00	1.53	3.14
Jan. - Mar.	1.17	0.57	0.74	1.53
April - June	6.69	8.98	8.42	7.29
July - Aug.	1.92	1.29	2.05	3.89
Total	11.52	13.84	12.74	15.84

Average Temperature °F	1989	1990	1991	95 Year Average
April	42	42	44	41
May	53	51	55	54
June	60	63	65	61
July	74	67	70	69
August	69	69	71	67

GROWING CONDITIONS
HETTINGER RESEARCH EXTENSION CENTER
-1991-

Hettinger went into an extremely dry Fall during 1990. Hard red winter wheat trials were planted into dry soil during the last week of September 1990 resulting in very poor and uneven emergence. Very little snow fell during the winter of 1990/91 compounding drought conditions and lack of soil water recharge. Mild temperatures and timely rains during the small grain growing season resulted in above average grain yields.

Row crops were planted during mid to late May and had ideal growing conditions through July. Row crops received only two shots of "useful" rain (>0.25 inches) during July and August resulting in very poor flower set, pollination and grain filling. Higher than normal growing degree days (2040) sped up maturity and harvest. Average daily temperatures were generally above normal however, Hettinger did not experience any period of excessively hot temperatures.

Reports of disease and insect outbreaks were scattered and inconsistent. The sunflower variety trial at Hettinger was ravaged by sunflower stem weevils causing 75% stalk breakage. Grasshoppers totally destroyed the New Leipzig corn trial and the Regent dry edible bean trial. Wheat stem sawfly caused extensive damage to hard red spring wheat and durum trials at Selfridge. Yellow dwarf disease was prevalent on both barley and oats (red leaf) at New Leipzig and Selfridge. Minor levels of tan spot, common root rot, leaf and stem rust on HRSW and bacterial blight on dry edible beans were also observed.

WEATHER DATA SUMMARY
HETTINGER

Precipitation (inches)	1988-89	1989-90	1990-91	36 year average
Sept. - Dec.	2.03	4.88	0.94	3.05
Jan. - March	1.62	1.14	1.41	1.22
April - June	7.38	5.62	9.85	7.75
July - August	5.69	1.88	2.78	3.66
Total	16.72	13.52	14.98	15.68

Average Temperature F	1989	1990	1991	36 year average
April	42.8	43.5	45.2	42.7
May	54.2	52.2	55.2	54.3
June	61.6	65.7	66.0	63.8
July	74.2	70.5	70.0	70.4
August	70.0	71.5	72.0	68.7

Growing Degree Days (50-86)	1989	1990	1991	36 year average
May	130	68	258	133
June	348	471	480	414
July	750	636	620	632
August	620	666	682	580
Total	1848	1841	2040	1759

	28 F	32 F	Normal 32 F
Date of last frost	May 3	May 4	May 18
Date of first frost	Nov. 18	Nov. 18	Nov. 20
Frost free days	138	137	125

INTERPRETING STATISTICAL ANALYSIS

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

Agricultural researchers use statistics as a tool in helping to differentiate the production variables in question so real and meaningful conclusions can be drawn from a relatively large amount of data. One of these tools is the Coefficient of Variability (C.V.%). This statistic gives an indication of the amount of variation in an experimental trial. Trials conducted at Hettinger use four replications or repetitions of the variable in question. For example, the variety Stoa HRSW appeared four times (four replications) in the HRSW variety trial. In this case, the C.V.% for yield of the Hettinger HRSW variety trial was 9.3%. This C.V.% is a relative measure of how much the yield of all HRSW varieties varied between replications. In other words, C.V.% is a measure of the precision or effectiveness of the trial and procedures used in conducting the trial.

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

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

1991 Dickinson Hard Red Spring Wheat Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.	Heading Date	Height in.
Amidon	33.6	60.0	23-Jun	34.0
Butte 86	37.7	61.0	19-Jun	33.0
Len *	39.6	61.5	23-Jun	30.0
Stoa	39.9	60.0	23-Jun	33.0
Vance *	42.4	59.0	25-Jun	30.0
Gus *	39.6	60.0	20-Jun	28.0
Grandin *	42.9	61.5	21-Jun	31.0
Bergen *	46.5	60.0	22-Jun	28.0
2369 *	49.2	61.5	25-Jun	28.0
2370 *	37.7	62.0	21-Jun	28.0
2371 *	39.3	58.5	24-Jun	28.0
2375 *	41.0	60.5	24-Jun	29.0
Sharp	41.8	62.0	19-Jun	29.0
ND 657 *	43.2	60.0	22-Jun	28.0
Marshall *	45.4	60.5	26-Jun	24.0
Prospect *	38.2	60.0	24-Jun	30.0
Fjeld *	42.9	61.0	20-Jun	28.0
Minnpro *	39.6	58.0	24-Jun	30.0
Pasqua	39.1	59.5	27-Jun	34.0
Dalen *	26.7	61.5	22-Jun	29.0
N 86-0542 *	47.9	59.5	25-Jun	28.0
ND 667	40.2	63.0	22-Jun	33.0
ND 668 *	42.9	62.0	25-Jun	30.0
ND 670 *	38.5	63.0	19-Jun	29.0
ND 671	44.6	62.5	19-Jun	24.0
ND 672 *	45.4	62.0	22-Jun	30.0
ND 655 *	46.2	63.5	21-Jun	31.0
ND 662 *	45.7	59.0	21-Jun	31.0
ND 666 *	33.6	61.0	21-Jun	33.0
MN 85324 *	42.4	60.0	22-Jun	29.0
Hi-Line *	41.0	59.5	22-Jun	29.0
Cutless *	35.8	61.0	21-Jun	26.0
ND 669	20.4	60.0	21-Jun	28.0

* semidwarf
Seeding Rate: 1,000,000 live seeds per acre (approx. 1 Bu/A)
Seeding Date: April 23 Harvest Date: August 8
Fertilizer Applied: 50 lbs/A 18-46-0
Herbicide Applied: Hoelon-Buctril tank mix
L.S.D. 5% = 7.1 Bu/A C.V. = 12.5 %

Long Term Yields - Hard Red Spring Wheat, Dickinson.

Variety	1987	1988	1989	1990	1991	Average
Amidon	28.3	12.1	23.2	47.9	33.6	29.0
Butte 86	31.1	8.8	23.5	40.2	37.7	28.3
Len	32.7	7.7	16.8	43.7	39.6	28.1
Stoa	30.8	9.9	21.2	45.9	39.9	29.5
Marshall	30.5	11.0	16.3	41.0	45.4	28.8
Gus	25.9	9.9	20.2	44.3	39.6	28.0
Grandin	36.9	9.5	18.5	49.5	42.9	31.5
Cutless	30.1	5.5	18.0	32.7	35.8	24.4
2369	35.5	10.6	21.8	57.5	49.2	34.9
Vance	--	8.8	19.8	49.5	42.4	30.1
2375	--	10.6	20.0	52.5	41.0	31.0
LSD .05	4.0	3.2	4.7	6.7	7.1	

1991 Hettinger Hard Red Spring Wheat Variety Trial

Variety	Yield	Test weight	Grain Protein	Heading date	Plant height	3 year average*
	bu/A	lbs/bu	%	June	cm	bu/A
XW398A4	81.5	61.4	15.3	22	88	
Bergen	80.3	61.0	15.0	20	83	63.8**
Nordic	77.0	61.0	13.1	22	90	63.3
W2501	76.7	58.4	14.2	20	82	60.8
Fjeld	76.5	60.0	13.7	20	82	56.6
Dalen	76.3	61.5	15.2	20	84	
N86-0542	75.0	59.4	13.8	22	85	
2375	74.7	62.2	15.8	19	90	54.8
Prospect	74.0	60.6	14.6	20	92	59.5
Amidon	73.6	60.3	15.7	22	105	54.1
ND670	73.1	61.5	15.9	18	95	
2371	72.7	60.0	15.4	20	86	65.9**
MN85324	70.7	60.6	15.4	20	89	
ND672	70.4	61.0	15.8	22	92	
Biggar	70.1	59.0	13.1	20	83	
ND662	70.0	60.2	15.8	20	92	
Butte 86	70.0	61.5	15.9	17	95	51.0
2370	69.8	61.4	15.5	20	90	54.8**
Marshall	69.4	59.0	14.6	23	89	56.5
ND671	69.2	62.6	16.2	17	95	
Grandin	68.9	61.2	16.4	18	93	58.0
Len	68.5	60.3	15.1	21	90	53.2
Highline	68.0	60.6	15.0	19	82	
ND655	67.1	62.2	16.0	21	94	
ND668	66.8	60.5	15.6	22	96	
Vance	66.2	60.3	15.3	22	88	56.2
Stoa	65.0	60.2	15.8	21	108	52.8
Gus	64.2	60.6	16.6	21	96	55.6
Minnpro	63.8	59.1	16.4	20	89	51.7
ND667	62.7	61.3	15.7	20	98	
Sharp	62.3	62.5	15.5	16	94	49.1
ND657	60.9	60.2	16.3	20	95	
Alex	60.1	61.0	16.3	22	102	51.7
ND669	58.5	60.6	15.7	19	98	
Cutless	57.5	59.1	16.3	25	106	49.0
Pasqua	57.5	59.4	16.8	22	103	
ND666	57.0	60.4	16.9	19	95	
AC Minto	53.8	58.8	17.2	20	105	
Trial mean	68.4	60.5	15.5	20	93	
C.V. %	9.3	0.9	3.0	0.2	4	
LSD 5%	8.9	0.8	0.6	1	6	
LSD 1%	11.7	1.0	0.9	2	7	
# of reps	4	4	4	4	4	

Planting date: 4/9/91
Seeding rate: 1.1 million live seeds/A (approx. 1.1 bu/A)
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 60 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPE
Harvest date: 8/5/91
Notes: * = average of 1989 - 1991 crop years
** = 2 year average (1990 - 1991 crop years)

1991 Dickinson Off-station Hard Red Spring Wheat Variety Trials

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
			Bushels per Acre				
Amidon	33.6	24.8	20.9	45.7	25.3	49.8	33.3
Butte 86	37.7	25.9	22.3	42.4	23.1	47.3	33.1
Len *	39.6	28.3	27.2	42.1	28.3	50.6	36.0
Stoa	39.9	30.3	23.7	43.2	28.6	49.8	35.9
Vance *	42.4	33.3	28.9	40.2	31.4	50.3	37.7
Gus *	39.6	25.9	23.4	44.3	28.1	52.0	35.5
Grandin *	42.9	27.0	23.4	41.0	28.9	47.0	35.0
Bergen *	46.5	30.0	28.6	47.9	28.1	53.1	39.0
2369 *	49.2	36.0	32.5	41.3	28.1	52.0	39.8
2370 *	37.7	21.7	21.2	42.9	26.7	47.0	32.9
2371 *	39.3	40.4	32.7	44.6	30.8	49.0	39.5
2375 *	41.0	35.5	27.8	42.9	29.2	48.1	37.4
Sharp	41.8	31.9	23.9	39.3	27.5	47.0	35.2
ND 657 *	43.2	22.8	28.6	38.2	30.3	52.5	35.9

* semidwarf

Seeding Date:	23-Apr	09-Apr	07-May	07-May	08-May	08-Apr
Harvest Date:	08-Aug	01-Aug	30-Jul	12-Aug	31-Jul	06-Aug
LSD 5% (Bu/A):	7.1	6.8	7.0	4.0	7.8	5.0
CV (%):	12.5	10.6	15.1	9.9	11.8	11.4

Fertilizer Applied: according to soil test at each site.
Herbicide Applied: Hoelon-Buctril tank mix
Seeding Rate: 1 Bu/A

1991 Dickinson Off-station Hard Red Spring Wheat Variety Trials

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
			Test Wt. lbs./bu.				
Amidon	60.0	59.5	60.0	60.0	60.0	60.5	60.0
Butte 86	61.0	62.5	62.0	62.5	60.0	60.5	61.4
Len *	61.5	59.5	58.5	62.0	60.0	61.5	60.5
Stoa	60.0	60.5	60.5	60.0	59.5	61.0	60.3
Vance *	59.0	59.5	60.0	60.5	57.0	60.0	59.3
Gus *	60.0	61.0	61.0	61.5	59.5	61.5	60.8
Grandin *	61.5	61.5	61.5	62.5	60.5	62.0	61.6
Bergen *	60.0	61.5	61.5	61.5	60.0	62.0	61.1
2369 *	61.5	63.0	62.0	63.0	59.0	61.5	61.7
2370 *	62.0	62.5	61.0	61.5	61.0	62.0	61.7
2371 *	58.5	59.5	59.0	60.5	58.0	61.0	59.4
2375 *	60.5	61.0	60.0	61.0	59.5	61.5	60.6
Sharp	62.0	63.5	63.0	64.0	62.0	63.0	62.9
ND 657 *	60.0	60.0	61.5	61.0	60.0	61.0	60.6

1991 Dickinson Off-station Hard Red Spring Wheat Variety Trials

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
			Protein @ 14% moisture				
Amidon	15.9	13.4	13.1	16.4	15.8	15.1	15.0
Butte 86	16.9	15.1	13.3	15.0	16.7	16.2	15.5
Len *	16.7	14.8	14.8	15.7	16.3	15.6	15.7
Stoa	16.5	14.3	12.8	16.1	15.6	15.5	15.1
Vance *	16.6	14.1	12.9	15.4	16.5	15.1	15.1
Gus *	17.5	15.0	13.7	14.2	17.5	15.9	15.6
Grandin *	17.3	15.6	13.7	15.3	16.8	16.5	15.9
Bergen *	16.7	14.7	12.3	13.6	15.6	15.8	14.8
2369 *	16.1	13.4	12.1	13.5	14.7	15.1	14.2
2370 *	16.8	14.4	13.6	15.4	16.5	15.6	15.4
2371 *	16.9	14.4	14.3	15.6	16.9	16.4	15.8
2375 *	16.9	13.8	13.6	15.7	16.7	15.8	15.4
Sharp	17.0	14.8	12.8	15.9	15.5	15.9	15.3
ND 657 *	17.7	16.5	14.0	16.3	16.4	15.8	16.1

1991 Scranton HRSW Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average
	bu/A	lbs/bu	%	cm	bu/A
2375	43.2	61.7	15.0	79	
Nordic	40.2	59.7	13.2	76	37.2
Vance	39.9	58.9	15.0	71	
Sharp	39.4	62.4	15.2	81	
2371	37.9	60.0	15.6	66	
Len	37.1	59.2	15.4	69	33.2
Grandin	36.4	61.0	14.8	79	32.7
Butte 86	34.3	61.3	15.5	76	32.7
Gus	34.0	58.3	16.0	79	33.3
ND655	33.9	60.4	15.0	74	
Amidon	32.9	59.4	15.5	86	31.9
Stoa	32.1	58.0	15.2	81	31.1
Trial mean	36.8	60.0	15.1	76	
C.V. %	7.0	1.2	4.6		
LSD 5%	3.7	1.0	1.0		
LSD 1%	4.9	1.3	3.2		
# of reps	4	4	4	1	

Planting date: 4/10/91 Harvest date: 7/31/91
Fertilizer applied: 35 lbs/A 11-52-0
Herbicides applied: 1/4 pt/A Banvel SGF + 1/2 pt/A MCPE
Note: Crop sustained approximately 15% hail loss

1991 Regent HRSW Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average
	bu/A	lbs/bu	%	cm	bu/A
2371	65.6	60.7	14.8	84	
Vance	63.7	59.1	14.9	79	
Butte 86	62.5	61.2	15.9	84	40.6
Grandin	62.5	61.5	15.7	84	41.4
2375	62.0	62.4	15.2	79	
ND655	61.6	62.0	15.2	84	
Gus	61.5	60.5	16.2	84	39.2
Nordic	61.4	60.2	13.4	79	43.6
Sharp	60.8	62.4	15.3	91	
Amidon	60.0	60.2	15.4	89	40.6
Stoa	58.9	60.1	15.6	94	38.8
Len	58.2	60.4	15.4	84	38.9
Trial mean	61.6	60.9	15.2	85	
C.V. %	7.3	1.2	3.1		
LSD 5%	n.s.	1.1	0.7		
LSD 1%	n.s.	1.4	0.9		
# of reps	4	4	4	1	

Planting date: 4/10/91 Harvest date: 7/31/91
Fertilizer applied: 123 lbs/A 46-0-0
Herbicides applied: 1/3 oz/A Harmony Extra + 3/4 pt/A MCPE

1991 New Leipzig HRSW Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	Grain Protein %	Plant height cm	3 year average bu/A
Nordic	56.4	61.5	13.5	78	49.5
2375	55.3	62.2	15.7	75	
Sharp	52.0	62.3	15.9	86	
Vance	50.7	58.3	15.4	76	
ND655	50.7	62.0	16.4	78	
2371	49.9	59.8	16.0	71	
Butte 86	49.6	60.9	16.2	85	44.1
Grandin	49.6	61.1	16.4	80	42.5
Gus	49.1	59.9	16.4	77	41.8
Stoa	48.5	58.3	15.7	88	43.0
Len	47.3	59.5	15.9	75	41.0
Amidon	45.6	59.9	15.6	84	41.5
Trial mean	50.4	60.5	15.8	79	
C.V. %	6.7	1.3	1.8		
LSD 5%	5.7	1.3	0.5		
LSD 1%	n.s.	1.8	0.6		
# of reps	3	3	3	1	

Planting date: 4/24/91 Harvest date: 8/7/91
Fertilizer applied: 63 lbs/A 28-29-0 + 99 lbs/A 46-0-0
Herbicides applied: 2pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPE

1991 Selfridge HRSW Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	Grain Protein %	Plant height cm	3 year average bu/A
2371	37.7	55.2	15.5	80	
Len	37.2	55.8	15.0	90	41.9
2375	36.3	58.5	14.5	84	
Nordic	35.0	56.8	12.8	88	49.9
Amidon	33.8	58.3	14.3	100	44.5
ND655	33.2	58.4	14.4	87	
Gus	32.2	56.1	15.3	85	41.1
Vance	31.8	54.8	14.5	85	
Sharp	31.1	58.8	14.4	95	
Butte 86	28.6	57.6	14.8	80	41.0
Stoa	23.8	54.9	14.7	94	40.8
Grandin	22.1	56.8	14.1	82	38.4
Trial mean	31.9	56.8	14.5	88	
C.V. %	11.9	1.6	3.1		
LSD 5%	5.4	1.6	0.6		
LSD 1%	7.3	1.8	0.9		
# of reps	4	4	4	1	

Planting date: 4/24/91 Harvest date: 8/7/91
Fertilizer applied: 44 lbs/A 28-29-0 + 186 lbs/A 46-0-0
Herbicides applied: 2pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPE
Severe infestation of wheat stem sawfly

1991 Dickinson Durum Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.	Heading Date	Height in.
Lloyd *	34.1	57.0	25-Jun	26.0
Vic	36.0	61.0	24-Jun	36.0
Monroe	48.4	60.5	21-Jun	33.0
Renville	36.9	60.5	24-Jun	31.0
Medora	44.3	61.0	22-Jun	31.0
D 8460	38.0	61.0	26-Jun	31.0
D 8475	41.0	60.0	22-Jun	27.0
D 86117	39.3	61.5	24-Jun	25.0
D 86398	48.4	61.0	25-Jun	26.0
D 86741 *	45.4	62.0	21-Jun	26.0
D 86747 *	34.7	58.5	20-Jun	29.0
D 86-1523 *	38.8	62.0	22-Jun	27.0
D 87-1531 *	40.2	60.5	25-Jun	28.0
D 87038	36.6	60.5	26-Jun	32.0
D 87373 *	36.3	61.0	22-Jun	28.0
D 87436	50.6	62.5	22-Jun	28.0
D 87443	39.9	61.5	22-Jun	32.0
D 87450 *	52.0	62.0	21-Jun	28.0
D 87105	37.7	61.0	23-Jun	30.0
D 87121	34.7	61.5	21-Jun	32.0
D 87122	37.4	59.5	24-Jun	32.0
D 87130	43.7	62.0	24-Jun	32.0
D 87141	37.4	60.0	23-Jun	34.0
D 87240	39.1	59.0	25-Jun	34.0
D 87245	33.3	59.0	25-Jun	33.0

* semidwarf
Seeding Rate: 1,000,000 live seeds per acre (approx 70 lbs/A)
Seeding Date: April 24 Harvest Date: August 7
Fertilizer Applied: 50 lbs/A 18-46-0
Herbicide Applied: Hoelon-Buctril tank mix
L.S.D. 5% = 8.2 Bu/A C.V. = 14.4 %

Long Term Yields - Durum, Dickinson.

Variety	1987	1988	1989	1990	1991	Average
Lloyd	43.2	9.6	26.4	47.9	34.1	32.2
Vic	32.7	11.6	22.8	43.5	36.0	29.3
Monroe	34.4	9.9	21.7	45.7	48.4	32.0
Renville	41.0	9.6	22.0	39.3	36.9	29.8
Medora	41.0	11.6	22.8	40.4	44.3	32.0
LSD .05	4.7	2.8	6.6	6.6	8.2	

1991 Hettinger Durum Variety Trial

Variety	Yield	Test weight	Grain Protein	Heading date	Plant height	3 year average*
	bu/A	lbs/bu	%	June	cm	bu/A
D87240	79.4	59.3	15.6	22	95	
D87245	77.5	59.2	16.1	23	102	
D86741	76.3	61.9	14.9	20	83	
D86398	76.2	61.0	15.7	23	102	
D87130	75.7	61.9	16.3	21	101	
Ward	75.7	61.5	15.3	21	100	55.6
D86747	74.2	63.1	14.9	19	87	
D87450	73.9	60.2	14.3	19	83	
Regal	73.2	61.2	16.0	22	109	54.6
D871531	72.2	59.8	15.2	22	82	
D87373	72.0	61.2	15.5	20	83	
D87038	71.6	58.9	15.9	23	90	
Renville	71.4	60.9	16.0	22	99	53.3
D87443	71.1	62.2	14.2	20	85	
D87122	71.0	60.2	16.3	21	94	
D87141	71.0	61.7	16.3	20	64	
D86117	69.8	60.8	15.2	22	87	
D87105	69.4	61.6	16.1	21	99	
Lloyd	69.2	59.5	15.4	23	80	53.6
Vic	68.9	61.4	16.3	20	101	51.7
D8460	68.8	60.7	16.2	21	89	
Sceptre	67.6	59.3	16.4	22	96	60.0**
Rugby	67.1	61.5	16.2	22	104	
D8475	66.4	61.8	15.9	20	102	
Medora	66.0	61.1	16.4	22	106	50.7
Laker	65.9	58.4	14.8	24	94	
D861523	65.0	61.7	15.8	21	85	
D87436	64.5	62.6	14.5	20	80	
D87121	63.9	62.4	15.8	19	92	
Monroe	63.4	60.5	15.0	19	95	
Trial mean	70.6	60.9	15.6	21	92	
C.V. %	11.5	1.6	4.3	0.1	12	
LSD 5%	n.s.	1.4	0.9	1	16	
LSD 1%	n.s.	1.8	1.2	2	21	
# of reps	4	4	4	4	4	

Planting date: 4/9/91
Seeding rate: 1.1 million live seeds/A (approx. 1.1 bu/A)
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 60 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPE
Harvest date: 8/5/91
Notes: * = average of 1989 - 1991 crop years
** = 2 year average (1990 - 1991 crop years)
n.s. = no statistical difference between varieties

1991 Dickinson Off-station Durum Variety Trials

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
			Bushels per Acre				
Lloyd *	34.1	55.6	27.2	45.1	18.7	57.2	39.6
Vic	36.0	54.7	33.6	43.5	29.4	50.9	41.3
Monroe	48.4	61.1	34.1	43.2	33.0	49.5	44.9
Renville	36.9	51.7	27.2	42.6	21.5	56.7	39.4
Medora	44.3	58.9	27.2	44.6	27.2	55.8	43.0
			Test Wt. lbs./bu.				
Lloyd *	57.0	60.5	57.0	60.0	57.0	60.0	58.6
Vic	61.0	62.5	58.0	63.0	59.0	59.0	60.4
Monroe	60.5	63.0	60.0	62.0	60.0	61.5	61.2
Renville	60.5	62.0	59.0	61.5	59.0	61.5	60.6
Medora	61.0	63.0	58.0	63.0	61.5	61.5	61.3
* semi-dwarf							
Seeding Date:	24-Apr	09-Apr	07-May	07-May	08-May	08-Apr	
Harvest Date:	07-Aug	01-Aug	30-Jul	12-Aug	31-Jul	06-Aug	
LSD 5% (Bu/A):	8.2	7.7	8.2	7.0	8.8	3.5	
CV (%):	14.4	12.6	9.4	15.2	13.0	8.8	

Fertilizer Applied: according to soil test at each site.
Herbicide Applied: Hoelon-Buctril tank mix
Seeding Rate: 1,000,000 live seeds/A (approx. 70 lbs/A)

1991 Scranton Durum Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average*
	bu/A	lbs/bu	%	cm	bu/A
Monroe	39.4	60.0	16.4	74	39.0
Ward	37.3	59.8	17.2	79	35.7
Renville	36.5	57.6	17.0	76	36.4
Medora	35.5	59.2	17.4	76	37.2
Vic	33.8	59.9	16.6	71	35.1
Regal	33.4	58.1	16.4	81	36.0
Lloyd	32.8	58.6	16.0	64	37.2
Trial mean	35.5	59.0	16.7	74	
C.V. %	7.5	1.5	2.4		
LSD 5%	4.0	1.3	0.6		
LSD 1%	5.4	1.7	0.8		
# of reps	4	4	4	1	

Fertilizer applied: 35 lbs/A 11-52-0
Herbicides applied: 1/4 pt/A Banvel SGF + 1/2 pt/A MCPE
Note: Crop sustained approximately 15% hail loss

1991 Regent Durum Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average*
	bu/A	lbs/bu	%	cm	bu/A
Renville	65.5	60.3	15.2	97	40.6
Ward	63.6	61.3	15.9	94	39.4
Monroe	62.4	62.2	15.2	91	41.8
Vic	60.7	62.0	15.3	91	39.8
Medora	60.5	61.9	15.2	91	43.1
Regal	57.8	59.4	15.0	99	40.1
Lloyd	57.0	58.1	14.1	71	40.7
Trial mean	61.1	60.7	15.1	91	
C.V. %	6.0	2.1	9.3		
LSD 5%	5.4	1.9	2.1		
LSD 1%	n.s.	2.6	2.8		
# of reps	4	4	4	1	

Fertilizer applied: 123 lbs/A 46-0-0
Herbicides applied: 1/3 oz/A Harmony Extra + 3/4 pt/A MCPE

Planting date: 4/10/91 Harvest date: 7/31/91
Seeding rate: 1.1 million live seeds/A (approx. 1.1 bu/A)
Yield goal: 60 bu/A
* = average of 1989 - 1991 crop years
n.s. = no statistical difference between varieties

1991 New Leipzig Durum Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average*
	bu/A	lbs/bu	%	cm	bu/A
Medora	61.9	61.1	16.4	88	49.3
Renville	60.9	59.6	16.0	92	46.7
Monroe	60.9	61.1	16.3	92	44.8
Ward	59.1	61.0	16.3	91	45.2
Vic	57.1	61.3	16.4	87	44.9
Regal	56.0	60.9	15.5	95	43.8
Lloyd	54.3	59.6	15.6	70	44.8
Trial mean	58.6	60.6	16.1	88	
C.V. %	5.1	1.0	2.1		
LSD 5%	5.2	1.0	0.6		
LSD 1%	n.s.	1.4	0.8		
# of reps	3	3	3	1	

Fertilizer applied: 63 lbs/A 28-29-0 + 99 lbs/A 46-0-0
Herbicides applied: 2pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPE

1991 Selfridge Durum Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average*
	bu/A	lbs/bu	%	cm	bu/A
Medora	41.0	57.8	15.4	96	41.8
Monroe	38.1	56.6	16.2	100	39.7
Lloyd	36.4	55.6	14.9	75	42.6
Ward	36.3	56.7	15.5	100	40.2
Renville	31.4	53.4	16.8	100	39.9
Regal	31.1	56.8	16.8	100	40.2
Vic	29.1	56.6	16.0	100	37.8
Trial mean	34.8	56.2	15.9	96	
C.V. %	15.2	1.9	7.5		
LSD 5%	7.8	1.6	n.s.		
LSD 1%	n.s.	2.2	n.s.		
# of reps	4	4	4	1	

Fertilizer applied: 44 lbs/A 28-29-0 + 186 lbs/A 46-0-0
Herbicides applied: 2pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPE
Note: Severe infestation of wheat stem sawfly

Planting date: 4/24/91 Harvest date: 8/7/91
Seeding rate: 1.1 million live seeds/A (approx. 1.1 bu/A)
Yield goal: 60 bu/A
* = average of 1989 - 1991 crop years
n.s. = no statistical difference between varieties

1991 Dickinson Barley Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.	Heading Date	Height in.
Morex (6R)	70.5	52.0	20-Jun	28.0
Azure (6R)	68.1	51.0	21-Jun	29.0
Bowman (2R)	73.2	53.0	18-Jun	25.0
Stark (2R)	73.9	53.0	20-Jun	30.0
Gallatin (2R)	81.5	53.0	20-Jun	28.0
Wanubet (2R)	55.0	56.0	22-Jun	28.0
Robust (6R)	71.5	53.0	22-Jun	30.0
Hazen (6R)	73.6	50.0	21-Jun	28.0
Excel (6R)	69.1	50.0	21-Jun	27.0
B 1602 (6R)	69.8	54.0	21-Jun	26.0
B 1603 (6R)	64.6	51.0	20-Jun	26.0
ND 11231 (6R)	78.4	54.0	18-Jun	25.0
ND 9668 (6R)	63.6	50.0	21-Jun	27.0
Russell (6R)	69.8	52.0	18-Jun	22.0
Bearpaw (2R)	69.8	50.0	24-Jun	28.0
Harrington (2R)	62.2	48.0	25-Jun	30.0
Hector (2R)	69.1	52.0	21-Jun	28.0
ND 9870 (2R)	81.5	52.0	20-Jun	27.0
ND 10981 (6R)	67.4	50.0	21-Jun	30.0

Seeding Rate: 1.3 Bu/A
Seeding Date: April 24 Harvest Date: July 29
Fertilizer Applied: 50 lbs/A 18-46-0
Herbicide Applied: Hoelon-Buctril tank mix
L.S.D. 5% = 8.6 Bu/A C.V. = 8.6 %

Long Term Yields - Barley, Dickinson.

Variety	1987	1988	1989	1990	1991	Average
Morex	56.4	11.7	28.2	77.7	70.5	48.9
Azure	61.9	7.2	31.6	66.7	68.1	47.1
Bowman	52.3	14.8	26.1	76.0	73.2	48.5
Stark	--	--	33.7	50.5	73.9	52.7
Gallatin	72.5	15.5	41.3	87.3	81.5	59.6
Bearpaw	--	--	41.6	62.6	69.8	58.0
Robust	61.5	8.9	32.7	76.3	71.5	50.2
Hector	70.5	19.3	44.0	76.0	69.1	55.8
Excel	--	--	25.1	69.5	69.1	54.6
B 1602	--	12.0	28.2	61.5	69.8	42.9
B 1603	--	11.0	22.3	57.1	64.6	38.8
LSD .05	4.5	4.2	7.6	12.8	8.6	

1991 Hettinger Barley Variety Trial

Variety	Yield	Test weight	Grain Protein	Heading date	Plant height	3 year average*
	bu/A	lbs/bu	%	June	cm	bu/A
Stark	93.1	54.1	11.3	17	89	85.0
Bowman	92.6	53.7	11.3	16	77	77.1
ND9870	92.3	54.4	11.4	20	88	
Gallatin	90.2	54.3	11.4	19	85	87.2
Russell	88.5	50.1	10.4	16	80	
Excel	86.7	51.4	11.0	20	89	68.3
ND11231	82.3	53.7	11.0	15	78	
Hector	78.7	52.1	11.5	20	86	74.3
Morex	74.8	51.1	11.3	20	93	70.5
Azure	73.1	51.1	11.2	18	92	70.9
B1602	71.6	53.0	11.4	21	91	57.2
Robust	71.5	51.8	11.5	19	92	64.4
ND9668	71.2	50.7	11.1	20	96	
Hazen	69.2	50.8	11.4	20	84	71.0
Harrington	66.6	51.4	11.6	22	89	68.6**
ND10981	65.1	49.9	11.0	20	89	
Bearpaw	65.0	51.5	12.0	25	81	66.3
B1603	58.5	51.5	11.8	19	70	56.7
Wanubet	52.0	55.5	13.1	22	87	58.1**
Trial mean	76.0	52.2	11.4	19	86	
C.V. %	16.7	1.5	2.2	0.2	9	
LSD 5%	17.9	1.1	0.4	2	11	
LSD 1%	23.8	1.5	0.5	2	14	
# of reps	4	4	4	4	4	

Planting date: 4/9/91
Seeding rate: 750,000 live seeds/A (approx. 1.25 bu/A)
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 80 bu/A
Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPE
Harvest date: 7/30/91
Notes: * = average of 1989 - 1991 crop years
** = 2 year average (1990 - 1991 crop years)

1991 Dickinson Off-station Barley Variety Trials

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
			Bushels per Acre				
Morex	70.5	86.3	47.8	45.7	60.5	61.5	62.0
Azure	68.1	81.5	54.3	46.8	55.7	63.6	61.6
Bowman	73.2	85.6	60.2	48.5	60.2	62.9	65.1
Stark	73.9	90.4	60.5	51.9	59.5	64.3	66.7
Gallatin	81.5	93.5	61.2	49.5	61.2	61.9	68.1
Wanubet	55.0	68.4	42.6	31.3	39.9	54.3	48.6
			Test Wt. lbs./bu.				
Morex	52.0	49.0	50.0	47.5	48.5	50.0	49.5
Azure	51.0	48.0	46.0	46.5	43.0	42.0	46.1
Bowman	53.0	50.0	49.0	49.0	47.5	52.0	50.1
Stark	53.0	53.0	51.0	50.0	52.0	52.0	51.8
Gallatin	53.0	53.0	49.0	45.0	47.0	46.0	48.8
Wanubet	56.0	49.0	44.0	47.0	47.5	49.0	48.8
Seeding Date:	23-Apr	09-Apr	07-May	07-May	08-May	08-Apr	
Harvest Date:	29-Jul	01-Aug	30-Jul	31-Jul	31-Jul	30-Jul	
LSD 5% (Bu/A):	8.6	6.7	7.5	6.0	8.0	6.3	
CV (%):	8.6	6.4	5.9	7.3	11.7	7.4	

Fertilizer Applied: according to soil test at each site.
Herbicide Applied: Hoelon-Buctril tank mix
Seeding Rate: 1.3 Bu/A

1991 Scranton Barley Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average*
	bu/A	lbs/bu	%	cm	bu/A
Gallatin	75.0	52.9	10.8	71	68.0
ND9870	71.7	52.7	10.4	81	
Stark	71.2	52.5	10.5	74	
Excel	67.9	51.1	10.2	74	
Hector	65.8	53.5	10.7	71	65.4
Bearpaw	62.1	51.1	11.0	61	58.8**
Azure	61.9	50.4	10.5	81	55.5
Bowman	60.6	51.8	10.5	61	64.8
Trial mean	67.0	52.0	10.6	72	
C.V. %	8.3	0.9	1.9		
LSD 5%	9.7	0.9	0.3		
LSD 1%	13.4	1.2	0.5		
# of reps	4	4	4	1	

Fertilizer applied: 35 lbs/A 11-52-0
Herbicides applied: 1/4 pt/A Banvel SGF + 1/2 pt/A MCPE
Note: Crop sustained approximately 15% hail loss

1991 Regent Barley Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average*
	bu/A	lbs/bu	%	cm	bu/A
Excel	91.2	52.0	10.1	79	
ND9870	90.3	55.5	10.9	84	
Bowman	83.4	55.2	10.9	71	64.7
Stark	82.9	54.9	10.8	76	
Gallatin	82.7	53.6	10.8	81	61.5
Hector	78.4	52.3	10.9	79	62.0
Azure	73.2	51.6	10.3	79	49.9
Bearpaw	65.1	49.6	11.2	79	56.8**
Trial mean	80.9	53.1	10.7	78	
C.V. %	5.6	1.4	4.2		
LSD 5%	6.7	1.1	0.7		
LSD 1%	9.1	1.5	0.9		
# of reps	4	4	4	1	

Fertilizer applied: 123 lbs/A 46-0-0
Herbicides applied: 1/3 oz/A Harmony Extra + 3/4 pt/A MCPE

Planting date: 4/10/91 Harvest date: 7/31/91
Seeding rate: 750,000 live seeds/A (approx. 1.25 bu/A)
Yield goal: 80 bu/A
* = average of 1989 - 1991 crop years
** = 2 year average (1990 - 1991)

1991 New Leipzig Barley Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average*
	bu/A	lbs/bu	%	cm	bu/A
Excel	80.6	50.8	10.7	65	
Hector	70.1	50.8	11.6	75	57.0
Gallatin	66.2	52.0	11.4	62	55.9
Bowman	65.9	54.9	11.1	62	56.7
Stark	62.2	53.8	11.2	69	
Bearpaw	57.3	47.6	11.4	68	55.8**
ND9870	56.0	53.4	11.1	66	
Azure	34.9	49.8	11.2	77	41.4
Trial mean	61.6	51.6	11.2	68	
C.V. %	14.4	2.8	2.5		
LSD 5%	13.0	2.2	0.4		
LSD 1%	17.6	2.9	0.6		
# of reps	4	4	4	1	

Fertilizer applied: 63 lbs/A 28-29-0 + 99 lbs/A 46-0-0
Herbicides applied: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPE
Notes: Moderate infestation of Barley Yellow Dwarf disease
Moderate stem lodging on Hector

1991 Selfridge Barley Variety Trial

Variety	Yield	Test weight	Grain Protein	Plant height	3 year average*
	bu/A	lbs/bu	%	cm	bu/A
ND9870	77.9	49.8	10.3	97	
Excel	72.9	45.4	10.6	85	
Stark	71.7	50.6	10.4	89	
Gallatin	67.5	48.1	11.2	87	70.5
Azure	61.0	46.6	10.6	84	60.0
Hector	56.2	46.2	11.4	95	
Bearpaw	53.9	44.0	11.8	77	65.4**
Bowman	45.3	50.6	10.6	89	61.8
Trial mean	63.2	47.6	10.9	88	
C.V. %	15.3	2.7	3.3		
LSD 5%	14.2	1.9	0.5		
LSD 1%	19.3	2.5	0.7		
# of reps	4	4	4	1	

Fertilizer applied: 44 lbs/A 28-29-0 + 186 lbs/A 46-0-0
Herbicides applied: 2 pt/A Hoelon + 1 pt/A Buctril + 1.5 oz/A MCPE
Notes: Moderate infestation of Barley Yellow Dwarf disease
Moderate stem lodging on Hector

Planting date: 4/24/91 Harvest date: 8/7/91
Seeding rate: 750,000 live seeds/A (approx. 1.25 bu/A)
Yield goal: 80 bu/A
* = average of 1989 - 1991 crop years
** = 2 year average (1990 - 1991)

1991 Dickinson Oat Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.	Heading Date	Height in.
Dumont	81.1	31.0	22-Jun	34.0
Monida	85.3	33.5	24-Jun	35.0
Otana	81.8	34.0	24-Jun	34.0
Newdak	81.1	31.5	22-Jun	33.0
Valley	79.8	35.0	23-Jun	34.0
Hytest	77.0	33.5	22-Jun	32.0
Porter	77.0	35.0	24-Jun	30.0
Riel	81.1	34.0	24-Jun	32.0
Trucker	87.3	32.5	22-Jun	32.0
SD 840104	74.9	37.5	23-Jun	32.0
ND 821742	77.7	34.0	25-Jun	31.0
ND 840341	74.9	32.0	25-Jun	32.0
ND 852107	88.0	34.0	22-Jun	31.0
ND 860416	90.8	35.0	25-Jun	32.0
ND 862095	74.3	37.5	23-Jun	30.0
ND 862106	81.8	37.5	24-Jun	30.0
ND 851098	79.8	34.0	25-Jun	31.0
ND 870258	82.5	35.0	25-Jun	27.0
ND 870952	77.0	38.5	18-Jun	30.0
ND 873126	72.9	31.5	21-Jun	31.0
ND 873146	57.8	37.5	21-Jun	31.0

Seeding Rate: 1.5 Bu/A
Seeding Date: April 22 Harvest Date: August 2
Fertilizer Applied: 50 lbs/A 18-46-0
Herbicide Applied: Buctril
L.S.D. 5% = 10.5 Bu/A C.V. = 7.3 %

Long Term Yields - Oats, Dickinson.

Variety	1987	1988	1989	1990	1991	Average
Dumont	84.5	9.1	31.8	74.7	81.1	56.3
Monida	86.8	24.8	28.9	76.7	85.3	60.5
Otana	77.0	12.2	44.6	81.2	81.8	59.3
Riel	67.7	14.3	39.4	74.2	81.1	55.4
Valley	61.4	19.5	33.0	74.7	79.8	53.7
Hytest	55.0	14.8	31.3	68.5	77.0	49.3
Porter	78.7	23.4	26.5	76.8	77.0	56.5
LSD .05	6.9	4.9	4.4	12.0	10.5	

1991 Hettinger Oat Variety Trial

Variety	Yield	Test weight	Heading date	Plant height	3 year average*
	bu/A	lbs/bu	June	cm	bu/A
ND821742	133.3	38.0	22	102	
ND860416	129.0	37.9	25	111	
Border	127.1	34.4	25	95	97.8
Robert	125.9	37.4	26	105	98.0
Kelsey	125.0	36.9	22	95	97.6
ND862095	121.0	39.4	24	94	
Valley	119.5	39.8	23	99	
ND840341	118.3	38.0	23	105	
Porter	115.9	39.3	24	98	84.4
SD840104	115.1	38.4	22	104	
Otana	114.9	38.0	23	106	101.0
ND870258	113.8	38.1	24	93	
Monida	111.7	34.4	25	97	98.9
ND852107	107.9	38.4	23	115	
Riel	106.9	39.0	22	92	97.9
ND870952	106.4	40.2	20	108	
Dumont	104.1	36.9	25	101	82.7
Steele	100.9	36.8	22	106	82.8
ND851098	98.8	36.7	25	100	
ND873126	97.8	37.3	20	100	
Newdak	94.6	36.2	20	92	82.5
ND873146	90.8	38.8	22	102	
Hytest	88.5	42.0	20	111	77.1
Tibor	88.3	43.0	24	114	64.5
ND862106	82.6	38.6	22	95	
Burnett	74.5	40.1	16	100	
Don	65.7	38.4	16	88	
Hazel	61.9	38.5	17	90	
Starter	57.7	37.9	19	82	
Trial mean	103.4	38.2	22	100	
C.V. %	24.1	1.6	0.2	11	
LSD 5%	35.1	0.9	2	16	
LSD 1%	46.6	1.1	2	21	
# of reps	4	4	4	4	

Planting date: 4/9/91
Seeding rate: 750,000 live seeds/A (approx. 1.5 bu/A)
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 100 bu/A
Herbicide application: 1 pt/A Buctril + 1 pt/A MCPE - 5/21/91
1 pt/A Bronate - 6/8/91
Harvest date: 7/30/91
Notes: * = average of 1989 - 1991 crop years

1991 Dickinson Off-station Oat Variety Trials

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
			Bushels per Acre				
Dumont	81.1	91.8	82.5	85.1	56.7	84.0	80.2
Monida	85.3	99.0	78.9	87.1	56.7	91.8	83.1
Otana	81.8	101.1	78.4	89.2	58.8	83.0	82.0
Newdak	81.1	102.6	82.5	89.2	56.7	90.8	83.8
Valley	79.8	96.4	72.2	87.7	51.6	75.3	77.1
Hytest	77.0	79.9	69.6	85.1	52.1	72.2	72.6
			Test Wt. lbs./bu.				
Dumont	31.0	35.0	38.0	37.0	37.0	38.0	36.0
Monida	33.5	34.0	35.0	37.0	34.0	38.0	35.3
Otana	34.0	36.0	38.0	36.0	37.0	38.0	36.5
Newdak	31.5	33.0	34.0	35.0	34.0	34.0	33.6
Valley	35.0	36.0	37.0	38.0	35.5	38.0	36.6
Hytest	33.5	35.0	35.0	37.5	32.5	37.0	35.1
Seeding Date:	22-Apr	09-Apr	07-May	07-May	08-May	08-Apr	
Harvest Date:	02-Aug	01-Aug	30-Jul	12-Aug	31-Jul	30-Jul	
LSD 5% (Bu/A):	10.5	7.9	7.1	5.0	13.5	6.0	
CV (%):	7.3	6.5	4.9	4.3	10.3	7.2	

Fertilizer Applied: according to soil test at each site.
Herbicide Applied: Buctril
Seeding Rate: 1.5 Bu/A

1991 Scranton Oat Variety Trial

Variety	Yield	Test weight	Plant height	3 year average*
	bu/A	lbs/bu	cm	bu/A
Newdak	91.6	34.6	89	79.9**
Otana	87.2	35.8	84	69.5
Border	83.5	32.8	79	74.1
Burnett	78.8	38.6	89	
Riel	66.7	35.8	79	68.3
Monida	65.4	33.1	79	64.5
Hazel	55.2	35.2	76	
Trial mean	75.5	35.1	82	
C.V. %	30.9	3.2		
LSD 5%	n.s.	1.6		
LSD 1%	n.s.	2.2		
# of reps	4	4	1	

Fertilizer applied: 35 lbs/A 11-52-0
Herbicides applied: 1/4 pt/A Banvel SGF + 1/2 pt/A MCPE
Notes: * = average of 1989 - 1991 crop years
** = 2 year average (1990 - 1991)
n.s. = no statistical difference between varieties
Crop sustained approximately 15% hail loss

1991 Regent Oat Variety Trial

Variety	Yield	Test weight	Plant height	3 year average*
	bu/A	lbs/bu	cm	bu/A
Riel	151.4	39.4	104	84.6
Monida	150.7	33.0	102	84.8
Newdak	146.3	35.4	99	72.2
Border	145.6	32.7	89	84.6
Otana	143.3	36.1	104	79.0
Hazel	126.1	38.8	91	
Trial mean	143.9	35.9	98	
C.V. %	4.9	1.2		
LSD 5%	10.6	0.7		
LSD 1%	14.5	0.9		
# of reps	4	4	1	

Fertilizer applied: 123 lbs/A 46-0-0
Herbicides applied: 1/3 oz/A Harmony Extra + 3/4 pt/A MCPE
Notes: * = average of 1988, 1990 and 1991 crop years

Planting date: 4/10/91 Harvest date: 7/31/91
Seeding rate: 750,000 live seeds/A (approx. 1.5 bu/A)
Yield goal: 100 bu/A

1991 New Leipzig Oat Variety Trial

Variety	Yield	Test weight	Plant height	3 year average*
	bu/A	lbs/bu	cm	bu/A
Monida	92.6	36.2	86	86.3
Border	92.6	33.9	73	79.2
Newdak	89.7	35.5	84	72.2**
Otana	83.2	38.6	96	71.1
Hazel	63.0	36.8	60	
Riel	58.4	37.8	84	65.2
Burnett	46.9	39.0	80	
Trial mean	75.2	36.8	80	
C.V. %	15.8	2.7		
LSD 5%	17.5	1.5		
LSD 1%	23.9	2.0		
# of reps	4	4	1	

Fertilizer applied: 63 lbs/A 28-29-0 + 99 lbs/A 46-0-0
Herbicides applied: 1 pt/A Buctril + 1.5 oz/A MCPE
Note: Moderate infestation of Barley Yellow Dwarf disease

1991 Selfridge Oat Variety Trial

Variety	Yield	Test weight	Plant height	3 year average*
	bu/A	lbs/bu	cm	bu/A
Monida	108.8	30.3	104	85.3
Otana	105.3	34.7	113	79.7
Riel	104.7	37.1	110	83.8
Border	101.6	30.5	98	87.1
Newdak	95.6	34.4	104	81.0**
Hazel	90.2	35.1	95	
Burnett	86.9	36.2	100	
Trial mean	99.0	34.0	103	
C.V. %	9.2	1.8		
LSD 5%	13.5	0.9		
LSD 1%	18.4	1.2		
# of reps	4	4	1	

Fertilizer applied: 44 lbs/A 28-29-0 + 186 lbs/A 46-0-0
Herbicides applied: 1 pt/A Buctril + 1 pt/A MCPE
Note: Moderate infestation of Barley Yellow Dwarf disease

Planting date: 4/24/91 Harvest date: 8/7/91
Seeding rate: 750,000 live seeds/A (approx. 1.5 bu/A)
Yield goal: 100 bu/A
* = average of 1989 - 1991 crop years
** = 2 year average (1990 - 1991)

1991 Hettinger Flax Variety Trial

Variety	Yield bu/A	Test weight lbs/bu
Clark	30.5	53.4
Linott	30.2	53.4
Prompt	29.5	53.0
Somme	29.5	52.3
Culbert	29.0	53.3
Flor	28.5	52.6
Neche	28.3	52.4
Norman	27.6	52.7
Norlin	27.1	52.8
Verne	27.0	53.3
Omega	26.6	52.8
Day	25.6	52.4
Flanders	25.3	52.1
Linton	20.9	52.1
Dufferin	20.0	52.2
McGregor	17.6	52.1
Trial mean	26.5	52.7
C.V. %	16.2	0.8
LSD 5%	6.2	0.2
LSD 1%	8.3	0.3
# of reps	4	4

Planting date: 5/9/91
Planting rate: 25 lbs/A
Fertilizer applied: 44 lbs/A 11-52-0
Herbicides applied: 2 pt/A Hoelon + 1 pt/A Buctril
Harvest date: 8/14/91

1991 Dickinson Flax Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.
Clark	13.8	53.5
Flor	13.6	53.0
Verne	19.4	54.5
Neche	15.0	54.0
CI 3131	17.1	53.5
Mcgregor	9.1	52.0

Seeding Rate: 40 lbs/A
Seeding Date: May 9 Harvest Date: August 9
Fertilizer Applied: 50 lbs/A 18-46-0
L.S.D. 5% = 2.4 Bu/A C.V. = 10.7 %

Miscellaneous Small Grains

Speltz has been grown at the Dickinson station since 1907. Triticale has been grown in production trials since its development in the 1950's and has also been used in feeding trials with beef cattle and swine. Spring rye has also been grown intermittently over the past fifty years.

Production trials with miscellaneous small grains continue on a limited basis to determine adaptability of newly developed varieties. Production of these miscellaneous species is often not equal to the more commonly grown cereal grains. However, they sometimes can be used as non-compliance crops in the federal farm program where acreage of the commonly grown types is restricted. For this reason, farmers are interested in comparative performance.

1991 Dickinson Misc. Small Grain Variety Trial

Variety	Lbs/A Avg.	Test Wt lbs.
Bowman Barley	2002	51.5
Speltz	1870	37.0
Gazelle Spr. Rye	1892	53.0
Kramer Triticale	880	42.0

Seeding Date: May 1 Harvest Date: August 9
Fertilizer Applied: 50 lbs/A 18-46-0
Herbicide Applied: Buctril
L.S.D. 5% = 931.7 lbs/A C.V. = 28.1 %

Dickinson Misc. Small Grains 5 Yr. Average

Variety	Pounds/Acre 1987	1988	1989	1990	1991	5 Year Average
Bowman Barley	1699	247	1931	4241	2002	2024
Speltz	908	160	1601	2970	1870	1502
Gazelle Spr. Rye	1338	145	1073	3135	1892	1517
Kramer Triticale	662	13	759	2723	880	1007

1991 Dickinson Safflower Performance Trial

Variety	Lbs/A Avg.	Test Wt lbs.
S-541	1273.2	42.5
S-208	1274.7	41.5
Finch	1079.4	45.5
Girard	820.2	42.0
Centennial	935.5	41.5
C/W 4440	995.7	40.0
Carmex	1220.3	42.5
Montola 2000	1185.0	40.5
MT 3697	928.5	43.0
88B3006	832.0	41.0
85B4431	1040.9	42.0
87B4287	673.8	42.5

Seeding Rate: 30 lbs/A
Seeding Date: May 8 Harvest Date: September 13
Fertilizer Applied: 50 lbs/A 18-46-0
L.S.D. 5% = 192.2 lbs/A C.V. = 13.1 %

1991 Dickinson Safflower Demonstration

Variety	lbs./A Avg.	Test Wt lbs.
Sigco AGC 353	1122.0	44.0
S-541	1122.0	38.0
Finch	1056.0	41.5
Girrard	924.0	39.5
819-1-2	792.0	40.0
S-208	1188.0	39.5
MT 3697	792.0	41.0
Sigco AGC 65	792.0	43.0

Seeding Rate: 30 lbs./A
Seeding Date: May 10 Harvest Date: September 13
Fertilizer Applied: 50 lbs/A 18-46-0

1991 Hettinger Safflower Variety Trial

Variety	Yield	Test weight	Date of 1st flower	3 year average*
	lbs/A	lbs/bu	July	lbs/A
S-541	877	40.0	12	1278
Carmex	877	39.9	11	
C/W 4440	877	38.5	11	
88B3217	868	38.3	14	
Finch	840	40.1	10	1204
S-208	774	38.9	11	651
89B6145	765	39.5	10	
Centennial	728	38.6	13	805**
Montola 2000	700	38.6	11	
87B1650	690	38.8	14	
87B1298	672	40.2	13	
87B4311	653	40.7	15	
85B4431	606	40.0	13	
85B1837	606	39.7	14	
88B3006	597	38.8	15	
87B4287	513	39.7	15	
Girard	504	39.8	12	867
MT-3697	504	39.4	13	903
Trial mean	703	39.4	13	
C.V. %	19	1.2	0.2	
LSD 5%	216	0.8	2	
LSD 1%	290	1.1	3	
# of reps	3	3	3	

Planting date: 4/23/91
Planting rate: 350,000 live seeds/A
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 2000 lbs/A
Herbicides applied: 1/2 oz/A Pinnacle, 2 pt/A Poast
Harvest date: 8/26/91
Notes: * = average of 1989, 1990 and 1991 crop years
** = average of 1990 and 1991 crop years
Moderate herbicide injury on all varieties

Millet

Foxtail and Proso millets are among the oldest hay crops grown at the Dickinson Branch Station. Results of comparison trials with millets and other crop species used as annual hay crops are recorded in the station's first annual report dated 1907. One of the millet varieties grown that year, Siberian, was also included in the 1991 trials, and continues to be one of the better yielding varieties most years.

The proso millets, both red and white, are grown principally for grain. Hay from Proso and German foxtail is inferior in quality to that made from Siberian millet. Grain yields from the Proso millets usually are less than yields from cereal grain species. In 1991 grain yield from all species could not be determined due to severe hail losses.

Dickinson Millet Variety Trial

	Hay yield tons/A @ 12% moisture					
Variety	1987	1988	1989	1990	1991	Average 5-yr.
White Proso	2.0	2.1	0.0	1.8	3.3	1.47
Red Proso	1.7	2.2	0.0	2.1	3.6	1.50
Siberian	1.6	1.9	0.0	2.5	3.4	1.50
Piper Sudan	--	--	--	1.8	4.1	--
Monida Oats	--	--	--	--	4.1	--
Magnum Oats	--	--	--	--	3.9	--

1991 Dickinson Canola Trial

Variety	Lbs/A Avg.	Test Wt lbs.
Tobin Canola	Lost due to hail	
Westar Canola	287.1	51.5
Western Canola-Rape	326.9	52.0
Meyer Crambe	451.9	28.0

Seeding Rate: 30 Lbs/A
Seeding Date: May 15 Harvest Date: August 2
Fertilizer Applied: 50 lbs/A 18-46-0
L.S.D. 5% = 167.3 lbs/A C.V. = 39.2 %

1991 Hettinger Canola Variety Trial

Variety	Yield	Test weight	Date of 1st flower	Harvest date	3 year average*
	lbs/A	lbs/bu			lbs/A
Hyola 41	2333	50.4	6/3	7/23	1508**
Hyola 40	1780	50.4	6/3	7/29	874
Global	1600	49.4	6/7	8/3	801
Tobin	1380	50.6	5/31	7/23	621
Westar	1167	50.7	6/8	7/30	634
Topas	893	47.6	6/9	8/5	471
Trial mean	1526	49.8			
C.V. %	14	1.7			
LSD 5%	328	1.3			
LSD 1%	450	1.7			
# of reps	4	4	4	4	

Planting date: 4/5/91
Planting rate: 10 lbs/A
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 2500 lbs/A
Herbicides applied: 1.5 pt/A Treflan EC - pre plant incorp.
1/2 pt/A Stinger - post emergence
Insecticide applied: 10 lbs/A Counter 5G with the seed
Notes: * = average of 1989, 1990 and 1991 crop years
** = average of 1990 and 1991 crop years

1991 Hettinger Specialty Crops Trial

Crop	Yield	Test weight	Planting rate	Harvest date
	lbs/A	lbs/bu	lbs/A	
Field pea	735	64.3	120	8/14
Lentils/Flax*	327/348	60.2/51.7	75/20	8/14
Nato beans	403	57.4	60	9/4
Mung beans	446	61.1	55	9/4
Garbanzo beans	- poor emergence -		60	
Black eyed beans	350	46.9	50	9/20
Azuki beans	- no seed set -		50	
Coriander	713	26.9	12	9/4
Proso millet	1147	51.4	20	8/14

Planting date: 5/20/91
Fertilizer applied: 44 lbs/A 11-52-0
Herbicides applied: none
Notes: * = lentils plus a flax companion crop

Hybrid Corn Comparison Trial

Corn silage and grain yields were very good in 1991. This once again emphasizes the adaptability of corn as an alternative crop for southwest North Dakota and the advisability of utilizing it in the diversified crop-livestock production systems recommended for southwest North Dakota.

1991 Dickinson Hybrid Corn Trial.

Hybrid	Silage Tons/A	Harvest Moisture	Grain Bu/A	Test Wt. Lbs/Bu
Interstate Frida	12.8	58.4%	59.9	48.2
Interstate Silo King	11.5	66.1%	61.3	46.9
Top Farm 482	12.2	68.0%	72.7	47.4
Top Farm 1181	12.4	65.8%	61.4	47.4
Jacques 2650	13.2	65.2%	66.1	47.8
Jacques 3220	14.7	63.6%	60.4	44.0
Pioneer 3963	11.7	65.7%	63.1	48.2
Pioneer 3917	11.8	70.0%	50.5	46.9
Hammel H85	11.0	69.9%	66.5	47.4
Hammel H90	13.0	67.1%	55.7	44.8
Dahlgren K2204	9.8	69.4%	48.0	41.4
Dahlgren K1114	10.9	64.4%	56.9	46.9
Cargill 2127	13.2	66.5%	56.4	47.8
Cargill 2037	11.4	70.0%	43.6	42.7
Cenex 809	9.3	70.1%	56.6	45.2
Moisture basis:	70 %		15.5%	
Seeding Date: May 13				
Harvest Date	Aug. 22		Oct. 2	
L.S.D. 5% =	2.4 tons/A		16.0 bu/A	
C.V. =	14.3 %		19.1 %	

Seeding Rate: 18,000 seeds/A
Row Width: 36 inches
Harvest Population: 14,500 plants/A

1991 Hettinger Hybrid Corn Trial

Seed Company	Hybrid	Relative maturity days	Silage yield* tons/A	Harvest moisture %
Prairie Gold	Ada	85	3.45	66.4
Top Farm	482	80	3.39	69.5
Top Farm	1181	78	3.14	66.1
Interstate	Frida	78	3.07	64.5
Jacques	2650	80	3.02	67.6
Prairie Gold	892	90	3.00	70.6
Kaystar	305	87	2.98	69.8
Prairie Gold	801	80	2.95	64.9
Pioneer	3963	79	2.79	70.1
Pioneer	3917	87	2.75	71.3
Prairie Gold	824	80	2.71	73.8
Prairie Gold	Gerda	90	2.70	68.7
Kaystar	275	80	2.63	70.3
Interstate	Silo King	80	2.25	68.6
Trial mean			2.92	68.7
C.V. %			17.96	
LSD 5%			n.s.	
# of reps			4	1

Planting date: 5/17/91
Planting rate: 21,000 seeds/A (culled to 18,000 live plants/A)
Row spacing: 30"
Fertilizer applied: 100 lbs/A 28-29-0
Herbicide applied: 1/2 oz/A Accent
Harvest Date: 8/19/91
Notes: * = Silage yield adjusted to a 70% moisture bases.
Moderate hail damage on 6/24/91.
Grain was not harvested because of a lack of ears set under drought conditions.

1991 Regent Hybrid Corn Trial

Seed Company	Hybrid	Relative maturity	Grain yield*	Test weight	Silage yield**	Harvest moisture
		days	bu/A	lbs/bu	tons/A	%
Pioneer	3917	87	53.9	57.0	4.69	70.1
Pioneer	3963	79	53.1	56.4	4.88	66.4
Top Farm	1181	78	49.6	56.1	4.97	64.5
Interstate	Frida	78	48.3	56.5	4.08	67.2
Top Farm	482	80	45.8	55.0	3.96	68.2
Prairie Gold	892	90	45.4	55.6	3.52	73.1
Interstate	Silo King	80	45.2	52.8	3.81	67.8
Prairie Gold	Ada	85	43.9	55.0	3.84	70.6
Prairie Gold	824	80	43.1	55.8	5.14	62.6
Prairie Gold	801	80	42.8	54.8	3.94	71.6
Prairie Gold	Gerda	90	39.1	54.3	5.43	65.8
Trial mean			46.2	55.3	4.38	
C.V. %			16.0	1.3	14.29	
LSD 5%			n.s.	1.1	0.90	
LSD 1%			n.s.	1.5	1.22	
# of reps			4	4	4	1

Planting date: 5/18/91
Planting rate: 21,000 seeds/A (culled to 18,000 live plants/A)
Row spacing: 30"
Fertilizer applied: 100 lbs/A 28-29-0
Herbicide applied: 2/3 oz/A Accent
Harvest Date: 8/19/91 - silage, 10/3/91 - grain
Notes: * = Grain yield adjusted to a 13.5% moisture bases.
** = Silage yield adjusted to a 70% moisture bases.
n.s. = No statistical difference between hybrids.

1991 Hettinger Pinto Bean Variety Trial

Variety	Yield lbs/A	Test weight lbs/bu	3 year average* lbs/A
Topaz	986	55.9	937
Fiesta	925	56.0	932
Nodak	864	55.8	990
126	849	56.6	740**
UI-114	819	56.3	900
Sierra	758	55.9	1142
Othello	607	54.6	1053
Trial mean	830	55.9	
C.V. %	18		
LSD 5%	n.s.		
# of reps	3	1	

Planting date: 5/20/91
Planting rate: 60 lbs/A
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 2500 lbs/A
Herbicide applied: 1/4 oz/A Pinnacle
Harvest date: 8/26/91
Notes: * = average of 1989 - 1991 crop years.
** = average of 1990 and 1991 crop years.
n.s. = no statistical difference between varieties.
Pinnacle herbicide is not registered for use on pinto beans. It caused severe injury to all varieties in this trial.

1991 Dickinson Bean Variety Trial

Variety	lbs./A Avg.	Test Wt lbs.	Row Width inches
Hyden navy	593	56.0	12
Othello pinto	1366	53.0	12
Nodak pinto	1030	55.0	12
UC-5 Garbanzo	1771	55.0	12
Brewer lentil	553	59.0	6

Seeding Date: May 15 Harvest Date: August 2
Fertilizer Applied: 50 lbs/A 18-46-0
L.S.D. 5% = 233.9 lbs./A C.V. = 14.3 %

Hyden navy	657	56.0	36
Othello pinto	954	53.0	36
Nodak pinto	1002	55.0	36

Seeding and fertilizer same as for 12 inch spacing.
L.S.D. 5% = 111.0 lbs./A C.V. = 7.4 %

1991 Hettinger Soybean Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	2 year average* bu/A
Evans	15.1	56.6	
Ozzie	13.8	56.2	12.0
McCall	12.9	53.0	9.4
KG-20	10.1	55.2	7.2
ND87-2263	9.9	53.0	
ND87-2280	9.5	53.5	
Maple Amber	8.2	55.6	7.3
Maple Isle	7.7	57.4	6.5
Maple Ridge	7.1	55.3	4.3
Trial mean	10.5	55.1	
C.V. %	14.1		
LSD 5%	2.5		
LSD 1%	3.5		
# of reps	3	Bulk	

Planting date: 5/20/91 Planting rate: 60 lbs/A
Fertilizer applied: 44 lbs/A 11-52-0
Herbicide applied: 1/4 oz/A Pinnacle
Harvest date: 9/20/91
* = 2 year average (1990 and 1991 crop years)

1991 Hettinger Navy Bean Variety Trial

Variety	Yield lbs/A	Test weight lbs/bu	3 year average* lbs/A
Norstar	835	56.6	891
Hyden	743	58.6	679
Avanti	735	54.5	
Upland	686	56.3	930**
Mayflower	583	57.4	
Seafarer	537	54.7	778**
Trial mean	686	56.4	
C.V. %	24		
LSD 5%	n.s.		
# of reps	4	1	

Planting date: 5/20/91 Planting rate: 45 lbs/A
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 2500 lbs/A
Herbicide applied: 1/4 oz/A Pinnacle
Harvest date: 8/26/91
Notes: * = average of 1987, 1988 and 1991 crop years.
** = average of 1987 and 1991 crop years.
n.s. = no statistical difference between varieties.
Pinnacle herbicide is not registered for use on navy beans. It caused severe injury to all varieties in this trial.

Buckwheat Production in Southwestern North Dakota

Buckwheat can be grown successfully in Southwestern North Dakota. It has become popular with area farmers, and is considered to be a crop of minor importance in the Missouri Slope region.

Grain yields at various experiment station locations in North Dakota over the past few years have varied depending on the growing season. Yields recorded in Dickinson station trials are equal or better than those recorded in other areas of the state.

Construction of the MinnDak elevator in Dickinson in 1988, belonging to a company which specializes in buckwheat and other specialty crops may help to increase the acreage of these crops in southwest North Dakota by providing a ready market for them.

In 1991 the buckwheat grown at Dickinson was destroyed by a localized hail storm. Due to the loss the 1990 buckwheat variety trial yields have been included as a reference.

1990 Dickinson Buckwheat Variety Trial

Variety	Lb/A Avg.	Test wt lbs.
Common	729	49.5
Mancan	401	44.0
Giant American	355	47.5
Manor	507	45.0

Seeding Rate: 50 lbs/A
Seeding Date: June 1 Harvest Date: Sept.
Fertilizer Applied: 50 lbs/A 18-46-0
LSD 5% = 78 lbs/Acre C.V. = 9.9%

Long term yields - Buckwheat, Dickinson.

Variety	1985	1986	1987	1988	1989	1990	6 yr Avg.
Mancan	1826	1290	1810	338	183	401	975
Manor	2116	1523	1810	338	0	507	1049
Common	2280	1380*	3016	637	249	729	1382

* calculated missing value.

1991 Hettinger Buckwheat Variety Trial

Variety	Grain yield lbs/A	Test weight lbs/bu	3 year average* lbs/A
Windsor Royal	326		298
Tokyo	288	43.4	340
Common	267	42.8	314
Mancan	252	37.6	337
Exp 85624	215	31.2	
Mannor	194	37.3	265
Giant American	181		236
Trial mean	246	37.3	
C.V. %	65		
LSD 5%	n.s.		
# of reps	4	1	

Planting date: 6/3/91 Harvest date: 9/4/91
Planting rate: 700,000 live seeds/A
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 2000 lbs/A
Herbicide applied: none
Notes: * = average of 1989 - 1991 crop years.
n.s. = no statistical difference between varieties.

1991 Hettinger Grain Sorghum Trial

Seed Company	Hybrid	Grain yield bu/A	Test weight lbs/bu
Northrup King	1210	29.9	55.0
Dekalb	18	27.8	56.7
Kaystar	501	25.9	54.0
Dekalb	X109	24.4	55.5
Pioneer	X5902	18.6	54.2
Cargill	X70001	16.8	52.6
Cargill	577	16.5	54.2
Dahlgren	27B	15.7	53.2
Jacques	111E	14.7	53.0
Dahlgren	33B	10.5	52.6
Trial mean		20.4	54.2
C.V. %		35.9	1.3
LSD 5%		10.7	1.1
LSD 1%		14.4	1.4
# of reps		4	4

Planting date: 6/3/91
Planting rate: 8 lbs/A
Row spacing: 30"
Fertilizer applied: 100 lbs/A 28-29-0
Herbicide applied: none
Harvest date: 10/10/91
Notes: Slight hail damage.
Grown under drought conditions.

1991 Hettinger Tame Mustard Variety Trial

Variety	Type	Yield	Test weight	Date of 1st flower	Harvest date	2 year average*
		lbs/A	lbs/bu	June	July	lbs/A
Tilney	Yellow	1280	56.4	2	23	836
Kirby	Yellow	1227	56.8	2	23	800
Oriental	Oriental	940	52.8	3	23	729
Common	Brown	633	53.9	4	23	564
Gisilba	Yellow	507	55.9	3	23	404
Domo	Oriental	213		6	29	305
Trial mean		800	55.1	3		
C.V. %		14	0.9	0.06		
LSD 5%		170	0.7	1		
LSD 1%		233	1.0	1		
# of reps		4	4	4		

Planting date: 4/5/91
Planting rate: 10 lbs/A
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 2500 lbs/A
Herbicides applied: 1.5 pt/A Treflan EC - pre plant incorp.
1/2 pt/A Stinger - post emergence
Insecticide applied: 10 lbs/A Counter 5G with the seed
Notes: * = average of 1990 and 1991 crop years

1991 Hettinger Crambe Variety Trial

Variety	Yield	Test weight	2 year average*
	lbs/A	lbs/bu	lbs/A
Prophet	1287	23.4	
Belenzia	1133	24.3	628
Bel Ann	1113	25.3	635
Meyer	1100	24.6	588
Indy	1033	24.5	
Trial mean	1133	24.4	
C.V. %	16	3.6	
LSD 5%	n.s.	n.s.	

Planting date: 4/9/91
Planting rate: 25 lbs/A
Fertilizer applied: 44 lbs/A 11-52-0
Yield goal: 2500 lbs/A
Herbicides applied: 1.5 pt/A Treflan EC
1/2 pt/A Stinger
Harvest date: 7/29/91
Notes: * = average of 1990 and 1991 crop years
n.s. = no statistical difference between varieties

1991 Dickinson Variety Phosphorus efficiency Trial

Variety	Bu/A Avg.	Test Wt lbs.
Marshall no P	44.6	55.5
Marshall 10# P	44.8	59.5
Marshall 20# P	47.9	57.5
Marshall 40# P	46.8	59.0
Butte 86 no P	44.0	60.5
Butte 86 10# P	44.3	60.0
Butte 86 20# P	47.0	60.5
Butte 86 40# P	49.2	60.5

Seeding Rate: 1,000,000 live seeds per acre (approx. 1 Bu/A)
Seeding Date: May 1 Harvest Date: August 2
Fertilizer Applied: at indicated rates
Herbicide Applied: Hoelon-Buctril tank mix
L.S.D. 5% = 4.7 Bu/A C.V. = 7.0 %

1991 Dickinson Root Rot Control on Wheat

Variety	Bu/A Avg.	Test Wt lbs.
Amidon - Control	18.9	54.0
Amidon + DB Green	21.9	55.0
Amidon + DB Green + Imazilil	21.5	54.0
Stoa - Control	22.1	54.0
Stoa + DB Green	23.9	54.0
Stoa + DB Green + Imazilil	23.4	54.0

Seeding Rate: 1,000,000 live seeds per acre (approx 1 Bu/A)
Seeding Date: May 2 Harvest Date: August 1
Fertilizer Applied: 50 lbs/A 18-46-0
Herbicide Applied: Hoelon-Buctril tank mix
L.S.D. 5% = 3.8 Bu/A C.V. = 11.5 %

1991 Dickinson Root Rot Control on Durum

Variety	Bu/A Avg.	Test Wt lbs.
Vic - Control	27.6	57.0
Vic + DB Green	28.8	58.0
Vic + DB Green + Imazilil	26.6	59.0
Ward - Control	30.4	60.0
Ward + DB Green	29.2	60.0
Ward + DB Green + Imazilil	29.6	61.0

Seeding Rate: 1,000,000 live seeds per acre (approx. 70 lbs/A)
Seeding Date: May 2 Harvest Date: August 2
Fertilizer Applied: 50 lbs/A 18-46-0
Herbicide Applied: Hoelon-Buctril tank mix
L.S.D. 5% = 7.8 Bu/A C.V. = 18.0 %

1991 Root Rot Control on Barley

Variety	Bu/A Avg.	Test Wt lbs.
Azure - Control	41.5	46.0
Azure + DB Green	43.4	45.5
Azure + DB Green + Imazilil	40.3	48.0
Bowman - Control	32.1	48.0
Bowman + DB Green	33.7	48.0
Bowman + DB Green + Imazilil	35.5	47.5

Seeding Rate: 1.3 Bu/A
Seeding Date: May 2 Harvest Date: August 1
Fertilizer Applied: 50 lbs/A 18-46-0
Herbicide Applied: Hoelon-Buctril tank mix
L.S.D. 5% = 5.5 Bu/A C.V. = 9.7 %

1991 Hettinger Spring Applied Treflan TR-10 Trial

OBJECTIVE:

To observe the relative herbicidal efficacy and crop tolerance when Treflan TR-10 was applied pre-plant incorporated in the spring for weed control in spring planted hard red spring wheat and durum.

MATERIALS AND METHODS:

Five rates of Treflan TR-10 (2, 3, 4, 5, and 7.5 lbs/A product) plus untreated checks were applied pre-plant incorporated on April 5, 1991. 44 lbs/A of 18-46-0 fertilizer was broadcast and a second incorporation pass was done on April 19. Grandin HRSW and Sceptre durum were planted on April 22 in a randomized complete block design with 4 replications. Grassy weed control and broadleaf weed control were obtained on each plot along with a rating for total weed control. Grassy weeds included foxtails and wild oats. Broadleaf weeds included kochia, russian thistle, and field bindweed. Percent weed control was recorded at 3 different growth stages. Crop injury was determined by visual observation of stunting, chlorosis and general plant appearance at tillering, and was rated on a scale of 0 for no injury observed, 1 for slight injury observed and 2 for moderate injury observed. Plant population and plant height were also recorded. Plots were harvested on August 6 and grain yields and test weights were recorded.

RESULTS AND DISCUSSION:

There was no significant difference for grain yield or plant height within each crop (see table). Significant differences for plant population were observed however, there does not appear to be a clear trend towards reduced stands with increasing herbicide rates. Slight crop injury was noted on the higher application rate on HRSW and slight to moderate crop injury was observed on all application rates on durum except for the 2 lb/A rate. Injured plants were spindly, stunted, slightly chlorotic and less vigerous in appearance. This injury however, does not appear to have an effect on grain yield and may be a result of the plants outgrowing the injury under ideal growing conditions. As would be expected, both grassy weed control and broadleaf weed control tended to increase with increasing herbicide rates.

Product rate	Crop	Grain yield	Test weight	Plant pop.	Plant height	Crop injury	Weed Control Grass	Bdlf	Total
lbs/A		bu/A	lbs/bu	X1000	cm		%	%	%
2.0	HRSW	69.8	61.7	697	92	0	78	93	83
3.0	HRSW	76.7	59.3	664	93	0	81	98	88
4.0	HRSW	69.0	59.8	762	88	0	84	89	85
5.0	HRSW	70.0	61.1	544	89	0	94	83	89
7.5	HRSW	78.6	61.6	610	91	1	88	96	92
Check	HRSW	71.0	58.5	762	87	0	0	0	0
2.0	Durum	51.4	57.4	882	83	0	67	79	72
3.0	Durum	45.2	62.1	958	83	1	88	87	86
4.0	Durum	44.0	51.1	871	79	2	90	90	89
5.0	Durum	41.8	53.0	795	79	2	81	93	93
7.5	Durum	48.1	53.1	860	81	2	93	93	93
Check	Durum	44.9	52.6	969	81	0	0	0	0
C.V. %		22.0		20	7		13	14	11
LSD 5%		18.7		23	9		14	15	11
LSD 1%		-		31	-		18	21	15
# of Reps		4	1	4	4	4	4	4	4

CONCLUSION:

Based on the above data and personal observation, crop tolerance to spring applied Treflan TR-10 on HRSW appears to be good. Both weed control and crop safty are acceptable at the 3.0, 4.0 and 5.0 lbs/A product rates. Weed control at the low rate (2 lbs/A product) is not acceptable. Possible crop injury at the high rate (7.5 lbs/A product) may be compounded under adverse environmental conditions.

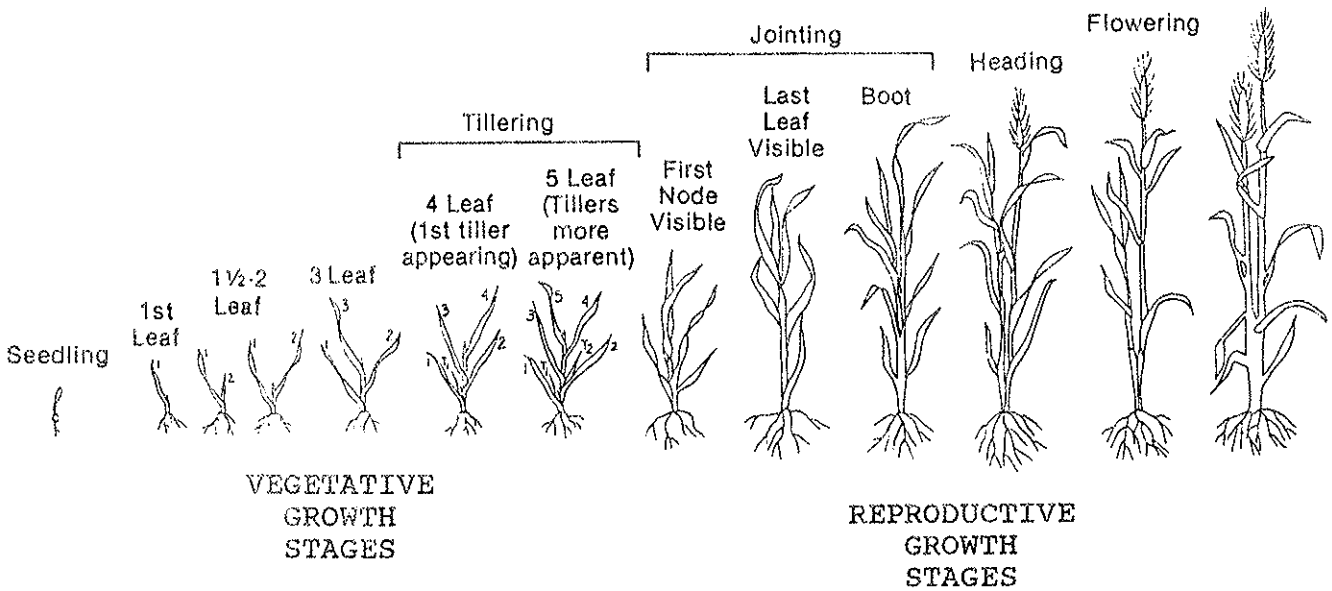
Durum appears to be susceptible to injury caused by spring applied Treflan TR-10. Further studies must be conducted prior to recommendation of this practice.

1991 Hettinger Banvel Herbicide Trial

Banvel and Banvel SGF are herbicides used to control broadleaf weeds in wheat, barley and oats. Banvel may be applied alone but is usually applied with other herbicides to increase broadleaf weed control. Recommended rates are 2 oz/A (4 oz/A SGF) to 4 oz/A (8 oz/A SGF). Oats are more tolerant to Banvel than spring wheat and barley has only marginal tolerance. Timing of application is very specific and differs from crop to crop and from one tank mix to another. Crop injury and yield reduction may occur if application is done improperly.

This trial was conducted to determine yield differences between Banvel and Banvel tank mixes applied at different growth stages of barley. Three treatments were applied: Banvel alone at 3 oz/A, 3 oz/A Banvel plus 8 oz/A 2,4-D (LV4), and 3 oz/A Banvel plus 8 oz/A MCPA ester. These treatments were applied at the 2 leaf stage (May 23), tillering (May 29), jointing (June 5), and at the early boot (June 10) growth stage (see figure 1). Plots were planted with Bowman barley on April 22 at a rate of 750,000 live seeds per acre. Forty four pounds per acre of 11-52-0 fertilizer was broadcast and incorporated prior to planting. Plots were harvested on July 29.

Figure 1. Growth stages of small grains.



The following table shows grain yields at growth stage intervals of each herbicide treatment. There is no statistical difference between herbicide treatments within each growth stage. In other words, crop injury and yield reduction cannot be attributed to the type of herbicide treatment used. Statistical differences are seen between the vegetative growth stages (2 leaf and tillering) and the reproductive growth stages (jointing and early boot) within each herbicide treatment. Crop injury and yield reduction in this case is attributed to the timing of application. All herbicide applications during the reproductive growth stages resulted in reduced yields.

Grain yields at growth stage intervals of different herbicide treatments.

Herbicide treatment	Growth stage	Grain yield bu/A
Banvel	2 leaf	51.2
	tillering	68.4
	jointing	34.2
	early boot	34.2
Banvel + MCPA	2 leaf	49.4
	tillering	45.7
	jointing	39.1
	early boot	41.9
Banvel + 2,4-D	2 leaf	54.7
	tillering	59.4
	jointing	25.1
	early boot	26.7
	LSD 5% = 25.5 bu/A	

In summary, Banvel and Banvel tank mixes with MCPA and 2,4-D are effective treatments to control many broadleaf weeds. Application of this product must be done prior to the crops reproductive growth stage in order to avoid crop injury and yield reduction.

1991 Hettinger Corn Herbicide Trial

Treatment and Timing*	Application Rate (product)	Weed Control Broadleaf %	Grass %	Crop injury %	Cost/A $
Eradicane PPI	4 pt	8	93	10	11.25
Bladex PPI	1 pt	50	85		2.43
Bladex PPI	2 pt	53	75	7	4.85
Bladex PPI	10 pt	40	76	0	24.25
Bladex + Eradicane PPI	1 pt + 3 pt	57	83	6	10.85
Eradicane PPI + Banvel P	4 pt + 3/4 pt	99	98	0	16.68
Bladex PPI + Banvel P	2 pt + 3/4 pt	25	66	0	10.29
Bladex + Banvel PE	4 pt + 1 pt	78	62	2	16.95
Prowl PE	3 pt	48	76	9	9.00
Prowl + Bladex PE	2 pt + 2 pt	15	78	1	10.85
Beacon + 2,4-D PE	1/2 oz + 1/2 pt	96	34	1	12.89
Accent + 2,4-D + Scoil P	1/4 oz + 1/2 pt + 1 1/2 pt	83	85	1	8.55
Stinger P	1/4 pt	9	16	2	13.22
Curtail P	1 pt	66	5	2	3.06
Buctril P	1 pt	95	0	4	5.12
2,4-D P	1 pt	96	0	6	1.56
Banvel P	3/4 pt	92	0	12	5.44
Banvel + 2,4-D P	1/2 pt + 1/2 pt	98	7	4	4.40
Untreated		0	0	0	
Mean		62	44	4	
C.V. %		38	44	149	
LSD 5%		23	24	ns	
LSD 1%		31	32	ns	
# of reps		4	4	4	

Planting date: 5/17/91

Planting rate: 16,000 seeds/A

Variety: Prairie Gold 824

* = Application timing: PPI - pre-plant incorporated 5/17/91
PE - pre-emergence 5/17/91
P - post emergence 6/10/91

ns = no statistical difference between treatments.

Notes: Bladex 4L was used on all Bladex treatments.
LV4 was used on all 2,4-D treatments.
Crop was not harvested due to drought.

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

1991 Hettinger Alternative Forage/Hay Trial

Crop	Variety/Type	Yield[a]	Crude Protein	ADF[b]	IVDMD[c]	Nitrate[d]
		tons/A	%	%	%	%
Alfalfa	Nitro annual	1.49	19.2	26.4	73.2	1.8
HRSW	Amidon	2.22	15.0	37.4	61.1	4.6
Barley	Hazen	2.33	17.9	34.8	65.6	5.4
Oats	Monida	2.23	16.5	35.5	60.3	6.1
Millet	German	2.01	17.4	25.2	78.8	5.4
Millet	Pearl	2.81	21.3	28.2	73.5	7.0
Millet	Siberian	2.10	16.3	29.3	76.6	3.4
Millet	Sunup proso	2.02	17.1	26.7	73.7	4.4
Sorghum	Forage	2.37	18.5	24.8	75.9	5.1
Sudangrass	Piper	2.33	13.4	29.2	73.8	3.6
Sorghum/Sudan	Greentreat II	2.75	17.8	26.5	74.5	5.1
Sorghum/Sudan	Highland sweet	2.31	16.4	30.3	74.7	6.0
Field peas	Trapper	1.73	21.7	28.4	73.4	5.7
Faba beans	Common	0.93	24.3	26.5	78.1	1.4
Lupine beans	Ultra	0.69	24.7	30.1	76.0	0.9
Amaranth	Common	1.71	23.8	16.5	78.0	10.4
Trial mean		2.00	18.6	28.5	73.0	
C.V. %		15.00	2.0	1.4	1.2	
LSD 5%		0.43	0.8	0.3	1.4	
LSD 1%		0.57	1.1	0.5	1.9	
# of reps		4	2	2	3	1

Planting dates: 5/20/91 and 6/3/91
Harvest dates: 7/15/91 and 7/29/91
Fertilizer applied: 44 lbs/A 11-52-0
Herbicides applied: None

a Yield is on a dry weight bases.
b Acid Detergent Fiber is an indication of fiber content.
c In-Vitro Dry Matter Digestibility is an estimation of the ruminants ability to digest the feed.
d Nitrate levels higher than 3% are potentially toxic to livestock. Nitrate levels in this trial were exceptionally high due to drought and high residual nitrogen levels in the soil.

Potential Small Grain Varieties for use in Forage/Hay Production

Area ranchers are often faced with decisions regarding the use of small grain crops for forage or hay production. The following table contains a list of small grain varieties grown at Hettinger, which were selected as having higher potential feed yields. Varieties were selected based on visual observation of plant height and leafiness during the late boot stage. No attempt was made to determine actual feed quality or forage yield.

HRSW	Durum	Barley	Oats
Butte 86	Monroe	Excel	Otana
Amidon	Regal	B1602	Monida
Stoa	Ward	Hazen	Valley
Alex	Medora	Azure	Border
2375	Rugby	Robust	Hytest
Sharp	Vic	Morex	Tibor
AC Minto			Robert
			Steele