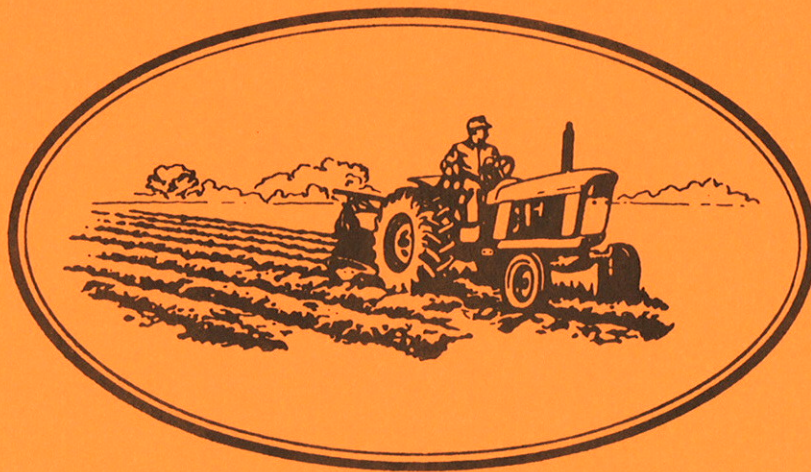


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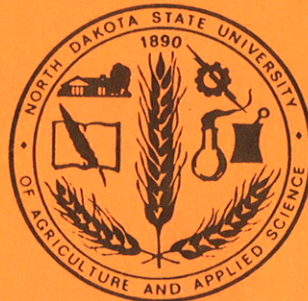
# WESTERN DAKOTA

## CROPS DAY RESEARCH REPORT



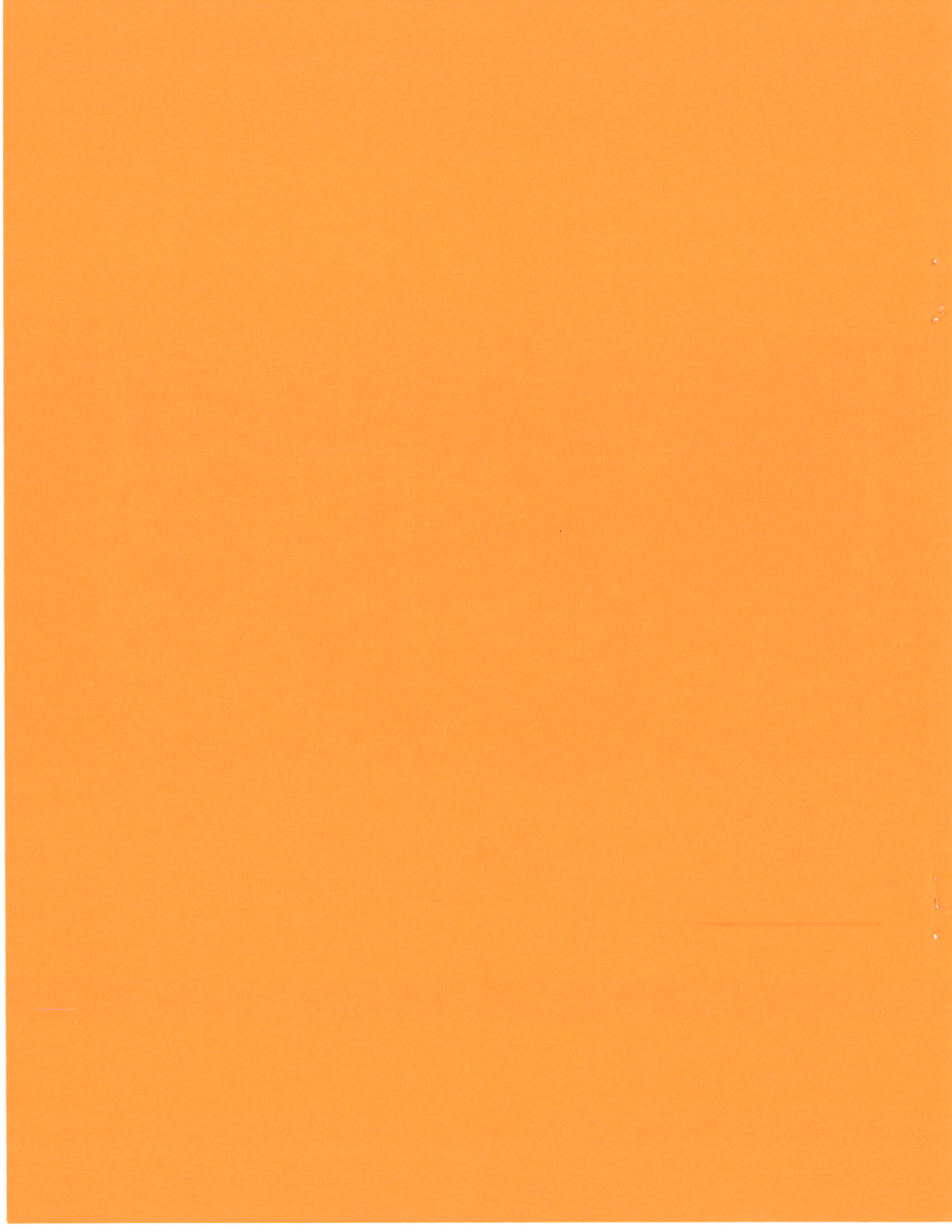
HETTINGER ARMORY  
DECEMBER 13, 1990

Tom Conlon, Agronomist  
Dickinson Research Center  
North Dakota State University  
Dickinson, North Dakota 58601



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

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7th ANNUAL WESTERN DAKOTA CROPS DAY

DECEMBER 13, 1990

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  
Dr. H. R. Lund, Director of Agriculture, NDSU, Fargo.
- 10:45 Crop Variety Updates and Highlights of Ongoing Crop Production Research  
Tom Conlon, Superintendent and Agronomist, 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  
  
Weed Control in Cereals and Corn  
Mr. Edward Cuskelly, DuPont Ag. Products  
  
Planting Top Yielding Alfalfas  
Mr. Monte Reiner, Cenex/Land O'Lakes  
  
Perennial Weed and Hopper Control  
Mr. Ivan Williams, Rhone Poulenc Ag. Co.
- 1:30 Diversification for the 90's ?  
Mr. Bob Nowatzki, producer and legislator, Langdon, ND.
- 2:00 Production, Economics and Marketing of Specialty Crops - Developing a Profitable Cropping Plan for 1991  
Mr. Steve Edwardson, Crop management specialist, Minn-Dak Growers Ltd., Dickinson, ND.
- 2:30 Winter Wheat Production and Management  
Mr. Clair Stymiest, Extension Agronomist, SDSU, Rapid City, SD.
- 3:00 Conclusion  
Drawing for door prizes, coffee and opportunity to visit with sponsors.

7th ANNUAL WESTERN DAKOTA CORNS DAY

DECEMBER 11, 1950

MEETING AGENDA

Time	Activity
9:00 am	Registration Coffee and donuts. Free time to view exhibits and visit with Ag Industry Exhibit sponsors.
10:30	Welcome Dr. W. E. Lind, Director of Agriculture, NDSD, Fargo.
10:45	Crop Variety Update and Highlights of Ongoing Crop Production Research Tom Conlon, Superintendent and Agronomist, Dickinson Research Center
	Eric Eriksson, Agronomist, Hetlinger Research & Extension Center
12:00	Lunch Provided by Program sponsors. Free time to visit with sponsors.
1:00	Ag Industry Update
	Weed Control in Cereals and Corn Mr. Edward Conkelly, Lubert Ag Products
	Planting Top Yielding Aerials Mr. Donde Reiner, Conkelly and O'Leary
	Perennial Weed and Hopper Control Mr. Ivan Williams, Rhone Poulenc Ag. Co.
2:30	Diversification for the 50's Mr. Bob Howatzki, producer and legislator, Lakston, ND
3:00	Production, Economics and Marketing of Specialty Crops - Developing a Profitable Cropping Plan for 1951 Mr. Steve Eversman, Crop Management Specialist, Minn-Dak Growers Ltd., Dickinson, ND
3:30	Winter Wheat Production and Management Mr. Earl Eversman, Extension Agronomist, NDSD, Fargo, ND
4:00	Conclusion Drawing for door prizes, coffee and opportunity to visit with sponsors.

## 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.

### 1990 WESTERN DAKOTA CROPS DAY SPONSORS

HETTINGER CHAMBER OF COMMERCE  
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CIBA GEIGY

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  
Dan Christman, Hettinger  
Amos Gietzen, Glen Ullin  
Ted Reich, Beulah  
Pat Doll, Hannover  
Golden Valley SCD, Beach





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DICKINSON RESEARCH CENTER

Growing Conditions 1988-1990

Severe drought prevailed during the year 1988. Precipitation during the fall of 1988, September through December, was nearly an inch and a half below average and continued the deficit experienced throughout the summer. Above average precipitation in April, 1989, provided adequate soil water for germination and early season crop growth. Temperatures were moderate, and crop development was fairly good through May and June, even though precipitation was below average for both months. However, above average temperatures in July coupled with below average precipitation of .68 inch combined to create very poor growing conditions for the remained of 1989.

Precipitation in the fall of 1989 was nearly average and 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 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 are nothing short of phenomenal.

Tan spot was the principal leaf disease of consequence. Common root rot was once again a problem of concern.

1988-90 Weather Data Summary

Precipitation	1987-88	1988-89	1989-90	95 Year Average
Sept. - Dec.	1.16	1.74	3.00	3.14
Jan. - Mar.	1.96	1.17	0.57	1.53
April - June	3.64	6.69	8.98	7.29
July - Aug.	1.87	1.92	1.29	3.89
Total	8.63	11.52	13.84	15.84

Average Temperature °F	1988	1989	1990	95 Year Average
April	42	42	42	41
May	59	53	51	54
June	75	60	63	61
July	71	74	67	69
August	68	69	69	67

GROWING CONDITIONS  
 HETTINGER RESEARCH AND EXTENSION CENTER  
 -1990-

Small grain trials were grown on summer fallowed ground which had been fully recharged (to 4 feet) during 1989. Cool temperatures and rain just prior to heading resulted in very good yields. Good fall precipitation combined with a mild winter and good snow cover resulted in one of the best HRWW crops in several years.

Most warm season crops (row crops) were planted on recropped ground with little stored soil moisture. Row crops were also adversely affected by cool May temperatures and a lack of consistent season long precipitation.

Major disease outbreaks were not observed on any crop.

WEATHER DATA SUMMARY  
 HETTINGER

Precipitation	1987-88	1988-89	1989-90	30 Year Average
Sept. - Dec.	1.31	2.03	4.88	2.97
Jan. - Mar.	2.24	1.62	1.14	1.13
April - June	4.79	7.38	5.62	8.08
July - August	1.78	5.69	1.88	3.81
Total	10.12	16.72	13.52	15.99

Average Temperature F.	1988	1989	1990	30 Year Average
April	43.4	42.8	43.5	42
May	58.0	54.2	52.2	54
June	74.8	61.6	65.7	64
July	71.4	74.2	70.5	70
August	69.9	70.0	71.5	69

## 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 three times (three replications) in the HRSW variety trial. In this case, the C.V.% for yield of the Hettinger HRSW variety trial was 17.4%. 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.

1990 Dickinson Hard Red Spring Wheat Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.	Heading Date	Height in.
Amidon	47.9	62.0	26-Jun	35
Bergen*	39.1	60.5	26-Jun	28
Butte 86	40.2	62.5	23-Jun	32
Cutless*	32.7	62.0	27-Jun	32.5
Fjeld*	45.4	62.0	27-Jun	31.5
Grandin*	49.5	61.5	26-Jun	32.5
Gus*	44.3	60.0	27-Jun	31.5
Laura	32.2	61.5	26-Jun	32
Len*	43.7	62.0	29-Jun	31.5
Marshall*	41.0	59.5	29-Jun	30
Minnpro*	40.4	60.5	27-Jun	31
N 86-0370*	46.0	62.0	29-Jun	31.5
2369*	57.5	62.5	28-Jun	31.5
2370*	44.3	61.5	26-Jun	32
2375*	52.5	60.0	27-Jun	34
2385*	43.7	60.0	25-Jun	32.5
Stoa	45.9	62.0	28-Jun	34.5
Vance*	49.5	61.5	30-Jun	30.5
MT 8402*	43.7	59.5	27-Jun	31
ND 655*	45.4	63.5	27-Jun	34
ND 656	42.9	61.5	26-Jun	35
ND 657*	48.1	62.5	27-Jun	34
ND 659*	50.9	59.5	27-Jun	33.5
ND 660	48.1	62.0	27-Jun	34
ND 661	41.8	63.0	25-Jun	34
ND 662*	58.0	62.0	27-Jun	33
ND 663	37.7	63.0	25-Jun	32
ND 664*	49.0	59.5	25-Jun	30.5
ND 665*	45.4	61.5	26-Jun	28.5
SD 2980	46.5	62.0	24-Jun	28.5
W 2501*	53.9	60.0	25-Jun	26
W 2502*	48.7	58.5	25-Jun	28.5
XW 371*	44.8	59.5	25-Jun	28.5
Golden 86*	41.0	63.0	29-Jun	24.5
Stoa+alga Min	39.9	60.0	28-Jun	28

\* Semidwarf

Seeding Rate: 1,000,000 live seeds per acre (aprox. 1 Bu/A)

Seeding Date: April 23 Harvest Date: August 3

Fertilizer Applied: 50 lbs/A 18-46-0 drill application

Herbicide Applied: Hoelon/Buctril tank mix

L.S.D. 5% = 6.72 Bu/A C.V. % = 9.00



1990 Hettinger Hard Red Spring Wheat Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	Grain Protein %	Heading date June	Plant height cm	3 year average* bu/A
ND659	61.5	59.3	17.0	25	77	
N86-0370	60.1	59.8	17.1	27	78	
XW371	59.1	60.5	16.7	25	78	
W2501	58.8	56.7	15.9	25	67	39.4
Nordic	56.8	59.6	14.6	27	79	40.0
ND665	56.8	58.6	17.3	25	74	
Gus	56.7	60.1	17.2	26	81	36.6
Columbus	56.5	58.9	18.0	27	92	37.1
ND656	55.7	61.6	17.5	25	85	
Prospect	55.5	58.9	16.2	25	82	38.2
ND664	53.9	59.9	18.0	24	79	
Vance	53.9	57.4	16.5	28	70	37.7
Grandin	52.8	59.7	17.4	25	82	39.7
ND655	51.4	60.0	18.1	25	75	
Leif	50.9	58.2	17.1	25	80	36.1
ND663	50.8	61.7	17.6	25	84	
MN85324	50.6	59.5	17.5	25	72	
Stoa	50.3	59.0	16.8	26	90	34.2
Marshall	49.8	56.8	16.8	27	70	37.5
Leo 747	49.4	59.2	17.5	21	71	
ND662	47.4	58.1	18.1	25	78	
Bergin	47.3	58.6	17.1	23	66	
ND660	45.9	59.9	16.9	26	72	
Minnpro	45.5	55.9	19.0	25	75	33.5
W2502	45.2	56.7	17.0	24	64	34.9
Len	44.7	59.2	17.4	26	75	34.0
Laura	44.6	58.9	18.2	24	84	32.8
ND666	44.6	57.7	19.1	24	79	
ND657	44.3	60.0	18.4	25	76	
2375	44.3	59.4	17.9	22	74	34.2
Coteau	44.2	58.9	18.5	27	82	32.9
Cutless	44.2	58.4	18.5	27	78	32.6
Fjeld	43.3	57.6	16.9	25	73	36.2
SD2980	43.3	61.7	17.2	22	82	
Amidon	41.8	59.5	17.8	27	90	33.4
Butte 86	41.7	59.2	17.8	22	76	32.2
2385	40.3	59.7	17.9	21	75	30.9
2370	39.9	60.0	18.2	23	74	
2369	39.1	59.2	18.2	25	72	34.7
Spillman	39.5	54.3	18.0	26	66	
Alex	38.3	60.2	18.1	26	83	34.9
ND661	33.6	57.5	18.7	23	74	
Trial mean	48.4	58.9	17.5	25	77	
C.V. %	17.4	1.8	4.6			
LSD 5%	10.6	1.7	1.3			
LSD 1%	18.2	2.3	1.7			
# of reps	3	3	3	1	2	

Planting date: 4/17/90

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

Fertilizer applied: 44 lbs/A 18-46-0

Yield goal: 60 bu/A

Herbicide application: 2 pt/A Hoelon + 1 pt/A Buctril + 2 oz/A MCPE

Harvest date: 8/1/90

Notes: \* = average of 1988 - 1990 crop years

1990 Dickinson Off-station Hard Red Spring Wheat Variety Trials

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
	Bushels per Acre						
Amidon	47.9	21.7	41.8	53.4	25.0	31.9	37.0
Bergen	39.1	22.8	42.1	58.6	25.6	42.9	38.5
Butte 86	40.2	20.4	40.4	55.6	24.5	38.0	36.5
Cutless	32.7	20.1	39.1	49.0	20.9	30.8	32.1
Grandin	49.5	25.6	41.0	62.4	24.2	35.2	39.7
Gus	42.3	25.9	45.4	61.9	25.9	39.6	40.2
Len	43.7	24.5	41.3	58.3	25.3	41.0	39.0
Minnpro	40.4	22.8	38.8	53.6	22.8	36.0	35.7
2369	57.5	28.1	45.1	59.1	25.9	46.8	43.8
2375	52.5	25.0	50.3	61.3	27.0	41.8	43.0
Stoa	45.9	24.8	45.4	58.6	25.8	40.7	40.2
Vance	49.5	27.2	49.0	60.0	25.9	42.4	42.3
Seeding Date:	April 23	April 26	April 30	May 1	May 2	April 27	
Harvest Date:	Aug. 3	Aug. 2	Aug. 20	Aug. 13	Aug. 6	Aug. 7	
LSD 5% (Bu/A):	6.72	2.34	6.97	5.52	3.91	6.80	
CV (%):	9.0	6.1	10.0	6.02	9.9	11.0	

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

1990 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	62.0	56.5	61.0	55.0	57.0	60.0	58.6
Bergen	60.5	60.0	60.0	60.0	59.0	61.5	60.2
Butte 8	62.5	60.5	60.5	59.0	59.0	62.0	60.6
Cutless	62.0	60.0	61.0	60.5	58.5	62.5	60.8
Grandin	61.5	61.0	61.0	61.0	59.5	62.0	50.8
Gus	60.0	60.0	61.0	60.0	59.5	61.5	60.3
Len	62.0	59.5	59.5	60.5	56.5	62.0	60.0
Minnpro	60.5	56.0	56.0	60.0	52.0	60.0	57.4
2369	62.5	61.0	59.5	61.0	58.5	62.0	60.8
2375	60.0	60.5	59.0	62.0	58.0	61.5	60.2
Stoa	62.0	60.5	59.5	61.5	58.0	62.0	60.6
Vance	61.5	59.0	58.0	60.5	57.0	61.5	59.6
	Protein @ 14% moisture						
Amidon	15.3	16.1	15.3	14.7	17.3	14.2	15.5
Bergen	15.6	16.0	14.5	13.9	16.1	13.7	15.0
Butte 86	15.3	15.6	15.7	14.9	17.0	14.0	15.4
Cutless	15.5	16.5	15.7	15.2	17.3	14.9	15.9
Grandin15.8	15.8	16.4	15.9	15.0	17.4	14.5	15.8
Gus	15.8	16.6	15.5	14.9	17.9	14.7	15.9
Len	15.2	16.6	15.4	14.3	17.4	13.6	15.4
Minnpro	15.1	17.6	15.8	14.6	18.0	14.3	15.9
2369	14.8	16.7	15.0	14.7	17.4	14.1	15.5
2375	15.3	16.1	15.3	14.3	17.0	13.6	15.3
Stoa	15.1	16.0	15.2	14.3	16.9	13.7	15.2
Vance	14.2	15.7	14.9	14.2	16.9	13.5	14.9

1990 HETTINGER OFF-STATION HARD RED SPRING WHEAT VARIETY TRIALS

Yield bu/A						
Variety	Hettinger	Regent	Scranton	New Leipzig	Selfridge	Average
Nordic	56.8	31.6	35.5	44.2	66.9	47.0
Butte 86	41.7	27.2	31.5	41.0	54.6	39.2
Leif	50.9	28.8	28.0	41.0	58.4	41.4
Grandin	52.8	29.7	30.7	36.3	53.1	40.5
2369	39.1	28.2	29.8	38.0	54.5	37.9
2375	44.3	30.1	29.6	46.9	60.8	42.3
Alex	38.3	27.0	33.0	38.8	55.7	38.6
Gus	56.7	23.2	29.7	36.4	51.3	39.5
Stoa	50.3	26.8	29.3	37.6	58.0	40.4
Len	44.7	26.9	28.8	36.1	51.4	32.8
Coteau	44.2	24.6	27.7	38.1	53.1	37.5
Amidon	41.8	27.9	26.4	38.8	60.8	39.1
Vance	53.9	27.6	25.6	36.8	57.9	40.4
C.V. %	17.4	14.4	16.2	9.9	9.0	
LSD 5%	13.6	n.s.	n.s.	5.5	7.3	
LSD 1%	18.2	n.s.	n.s.	7.4	9.8	
# of reps	3	4	4	4	4	

Test weight lbs/bu						
Variety	Hettinger	Regent	Scranton	New Leipzig	Selfridge	Average
Nordic	59.6	62.3	58.2	62.1	63.0	61.0
Butte 86	59.2	61.0	56.2	61.2	63.4	60.2
Leif	58.2	60.2	56.2	60.9	63.0	59.7
Grandin	59.7	61.5	55.2	60.5	63.4	60.1
2369	59.2	61.5	56.8	61.8	63.5	60.6
2375	59.4	61.1	57.0	60.7	63.6	60.4
Alex	60.2	60.8	59.6	61.5	62.8	61.0
Gus	60.1	60.6	57.6	60.9	62.6	60.4
Stoa	59.0	59.8	57.2	60.5	62.7	59.8
Len	59.2	61.0	56.2	60.2	62.6	59.8
Coteau	58.9	59.3	55.6	60.2	62.4	59.3
Amidon	59.5	60.2	55.4	60.6	62.7	59.7
Vance	57.4	59.0	55.2	59.2	61.6	58.5
C.V. %	1.8	0.7	2.9	0.8	0.6	
LSD 5%	1.7	0.6	2.4	0.7	0.6	
LSD 1%	2.3	0.9	n.s.	1.0	0.8	
# of reps	3	4	4	4	4	

Grain Protein %

Variety	Hettinger	Regent	Scranton	New Leipzig	Selfridge	Average
Nordic	14.6	16.0	15.3	14.7	13.3	14.8
Butte 86	17.8	17.4	17.3	16.2	15.9	16.9
Leif	17.1	18.4	17.7	16.5	14.2	16.8
Grandin	17.4	17.7	17.6	16.6	16.0	17.1
2369	18.2	17.6	17.0	16.2	14.8	16.8
2375	17.9	17.6	17.1	16.1	15.0	16.7
Alex	18.1	18.9	17.0	16.8	15.2	17.2
Gus	17.2	18.4	17.9	16.8	15.9	17.2
Stoa	16.8	17.1	16.9	16.0	14.4	16.2
Len	17.4	18.0	17.6	17.0	15.8	17.1
Coteau	18.5	18.9	18.1	17.5	16.3	17.9
Amidon	17.8	17.4	18.6	16.4	14.8	17.0
Vance	16.5	17.2	17.4	16.0	14.4	16.3
C.V. %	4.6	2.7	5.9	1.9	2.8	
LSD 5%	1.3	0.7	1.5	0.4	0.6	
LSD 1%	1.7	0.9	n.s.	0.6	0.8	
# of reps	3	4	4	4	4	

Planting

date: 4/17 4/19 4/19 4/18 4/18

Harvest

date: 8/1 8/3 8/3 8/6 8/6

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

Fertilizer applied: 44 lbs/A 18-46-0

Herbicides applied: according to weed type and population

Yield goal: 60 bu/A

n.s. = no statistical difference between varieties

1990 Dickinson Durum Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.	Heading Date	Height in.
Lloyd*	47.9	57.5	29-Jun	30.5
Medora	40.4	60.0	28-Jun	36
Monroe	45.7	61.5	23-Jun	28
Renville	39.3	59.5	28-Jun	33
Rugby	38.8	60.0	27-Jun	34
Sceptre	39.6	59.0	26-Jun	27.5
Vic	43.5	61.5	27-Jun	32.5
Ward	39.3	60.0	26-Jun	31
D 8302	51.2	59.5	27-Jun	25
D 8460	43.7	61.5	26-Jun	31.5
D 8475	45.4	60.5	26-Jun	28.5
D 8479	40.7	58.5	26-Jun	26.5
D 86117	44.6	60.0	28-Jun	27.5
D 86398	46.8	59.0	29-Jun	28.5
D 86-1523*	45.9	61.0	27-Jun	26
D 87-1531*	55.3	61.0	28-Jun	27

\* Semidwarf

Seeding Rate: 1,000,000 live seeds/A (approx. 70 lbs/A)

Seeding Date: April 24 Harvest Date: August 6

Fertilizer Applied: 50 lbs/A 18-46-0 drill application

Herbicide Applied: Hoelon/Buctril tank mix

L.S.D. 5% = 6.60 Bu/A C.V. = 9.0%

Long Term Yields - Durum, Dickinson.

Variety	1986	1987	1988	1989	1990	Average
Lloyd	51.2	43.2	9.6	26.4	47.9	35.7
Vic	36.5	32.7	11.6	22.8	43.5	29.4
Ward	45.2	36.0	8.5	17.1	39.3	29.2
Monroe	44.1	34.4	9.9	21.7	45.7	31.2
Renville	44.2	41.0	9.6	22.0	39.3	31.2
Rugby	49.6	40.7	11.8	22.8	38.8	32.7
Medora	47.8	41.0	11.6	22.8	40.4	32.7
LSD .05	1.4	4.7	2.8	6.6	6.6	

1990 Hettinger Durum Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	Grain Protein %	Heading date June	Plant height cm	3 year average* bu/A
D86741	63.2	61.2	16.4	26	73	
D861523	61.1	61.6	16.8	25	66	
D86530	57.8	60.3	16.9	27	66	
D871531	56.3	61.1	17.8	26	68	
D86717	55.7	60.5	17.6	24	57	
D86398	54.0	59.9	18.5	27	81	
Sceptre	52.3	60.2	19.2	25	78	
D86747	51.7	61.8	17.1	22	56	
D86117	51.5	61.2	17.3	27	72	
Monroe	50.8	61.0	18.0	24	88	36.7
D86743	49.3	59.7	18.0	22	58	
Renville	48.0	60.2	19.1	26	92	35.7
D86560	47.7	60.6	17.1	25	60	
CA885-3121A	46.7	61.0	19.0	27	66	
D8479	46.2	59.8	18.4	26	70	35.8
D86725	46.1	61.6	17.0	25	66	
D86686	45.8	60.1	18.2	24	54	
Rugby	45.5	60.8	19.5	25	89	32.1
Lloyd	45.1	60.7	18.8	27	62	36.0
Ward	44.6	61.1	19.1	26	90	34.9
Vic	43.5	61.4	19.0	24	86	33.6
D8475	42.5	61.6	17.8	22	69	35.5
Medora	42.1	61.0	20.6	25	78	33.8
D86683	41.7	61.2	18.3	26	64	
Regal	41.5	61.4	19.0	26	88	35.9
D8460	37.0	59.9	19.8	26	78	31.9
D8302	35.2	60.8	19.2	24	65	32.8
Trial mean	48.3	60.8	18.3	25	72	
C.V. %	26.3	1.0	6.3			
LSD 5%	n.s.	0.9	1.6			
LSD 1%	n.s.	1.2	2.2			
# of reps	4	4	4	1	2	

Planting date: 4/17/90

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

Fertilizer applied: 44 lbs/A 18-46-0

Herbicides applied: 2 pt/A Hoelon + 1 pt/A Buctril + 2 oz/A MCPE

Yield goal: 60 bu/A

Harvest date: 8/1/90

Notes: \* = average of 1988 - 1990 crop years

n.s. = no statistical difference between varieties

1990 Dickinson Off-station Durum Variety Trials.

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
	Bushels per Acre						
Lloyd	47.9	24.8	49.0	55.3	17.3	43.2	39.6
Medora	40.4	24.5	52.8	59.4	18.4	45.4	40.2
Monroe	45.7	28.1	54.5	61.1	21.2	51.4	43.7
Renville	36.3	24.2	53.1	61.3	18.4	42.9	39.4
Ward	39.3	24.5	50.6	57.2	18.7	46.8	39.5
	Test Wt. lbs./Bu						
Lloyd	57.5	58.0	59.5	60.0	54.0	61.0	58.3
Medora	60.0	59.5	61.5	62.5	60.5	62.5	61.1
Monroe	61.5	60.5	62.0	62.5	61.0	62.0	61.6
Renville	59.5	58.0	60.5	61.0	59.0	61.0	59.8
Ward	60.0	58.5	61.0	62.5	59.0	61.5	60.4
Seeding Date:	April 24	April 26	April 30	May 1	May 2	April 27	
Harvest Date:	Aug. 6	Aug. 2	Aug. 20	Aug. 13	Aug. 6	Aug. 7	
LSD 5% (Bu/A):	6.60	2.43	6.48	5.31	3.30	12.23	
CV (%):	9.0	6.1	7.8	5.6	9.4	16.7	
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)						



1990 HETTINGER OFF-STATION DURUM VARIETY TRIALS

Variety	Yield bu/A					Average
	Hettinger	Regent	Scranton	New Leipzig	Selfridge	
Monroe	50.8	26.0	37.7	37.1	44.6	39.2
Renville	48.0	27.8	33.3	39.1	45.8	38.8
Lloyd	45.1	29.9	36.9	38.4	51.7	40.4
Ward	44.6	24.4	33.0	36.9	43.6	36.5
Vic	43.5	28.2	34.5	39.6	44.8	38.1
Medora	42.1	28.6	35.2	41.8	45.2	38.6
Regal	41.5	31.7	32.4	37.6	48.8	38.4
C.V. %	26.3	19.3	16.3	10.2	14.0	
LSD 5%	n.s.	n.s.	n.s.	n.s.	n.s.	
# of reps	4	4	4	4	4	

Variety	Test weight lbs/bu					Average
	Hettinger	Regent	Scranton	New Leipzig	Selfridge	
Monroe	61.0	61.3	59.0	61.3	62.6	61.0
Renville	60.2	60.6	58.4	61.2	62.4	60.6
Lloyd	60.7	62.4	59.7	62.0	63.7	61.7
Ward	61.1	61.2	59.2	61.7	63.1	61.3
Vic	61.4	61.5	59.7	62.3	63.5	61.7
Medora	61.0	61.5	60.1	62.0	63.5	61.6
Regal	61.4	62.1	60.0	61.9	63.6	61.8
C.V. %	1.0	0.7	1.4	0.7	0.7	
LSD 5%	0.9	0.6	n.s.	0.7	0.7	
LSD 1%	1.2	0.7	n.s.	n.s.	0.9	
# of reps	4	4	4	4	4	

Variety	Grain Protein %					Average
	Hettinger	Regent	Scranton	New Leipzig	Selfridge	
Monroe	18.0	18.5	18.2	17.6	15.8	17.6
Renville	19.1	18.7	19.9	17.3	15.5	18.1
Lloyd	18.8	17.3	18.6	17.0	15.0	17.3
Ward	19.1	19.1	20.1	18.0	16.2	18.5
Vic	19.0	18.1	19.2	17.7	15.6	17.9
Medora	20.6	19.1	19.8	18.4	16.4	18.9
Regal	19.0	17.4	19.6	16.8	15.4	17.6
C.V. %	6.3	4.1	6.3	2.1	5.9	
LSD 5%	1.6	1.1	n.s.	0.5	n.s.	
LSD 1%	2.2	1.3	n.s.	0.7	n.s.	
# of reps	4	4	4	4	4	

Planting date: 4/17 4/19 4/19 4/18 4/18  
 Harvest date: 8/1 8/3 8/3 8/6 8/6  
 Seeding rate: 1.1 million live seeds/A (approx. 1.1 bu/A)  
 Fertilizer applied: 44 lbs/A 18-46-0  
 Herbicides applied: according to weed type and population  
 Yield goal: 60 bu/A  
 n.s. = no statistical difference between varieties

1990 Dickinson Barley Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.	Heading Date	Height in.
Azure (6R)	66.7	40.0	June 26	31.5
B 1602 (6R)	61.5	43.0	June 27	28.5
B 1603 (6R)	57.1	41.0	June 26	28
Bearpaw (2R)	62.6	42.5	June 30	27.5
Bowman (2R)	76.0	48.5	June 20	25.5
Excel (6R)	69.5	41.0	June 28	26.5
Gallatin (2R)	87.3	46.5	June 23	27
Harrington (2R)	77.7	44.0	June 30	28.5
Hector (2R)	76.0	45.0	June 27	28.5
Lewis (2R)	71.2	46.5	June 27	30
Morex (6R)	77.7	44.0	June 23	31
Robust (6R)	76.3	45.0	June 26	27.5
Wanubet (2R)	60.9	41.0	June 28	28.5
ND 9668 (6R)	77.7	44.0	June 26	31
ND 9675 (6R)	82.2	41.0	June 26	30
ND 9866 (2R)	50.5	48.0	June 22	28.5
ND 9870 (2R)	78.8	47.0	June 22	28.5
ND 10277 (2R)	74.3	47.0	June 20	27
ND 10278 (2R)	68.1	47.0	June 20	29.5
ND 10419 (2R)	71.5	44.5	June 20	27

Seeding Rate: 1.3 Bu/A

Seeding Date: April 24 Harvest Date: August 1

Fertilizer Applied: 50 lbs/A 18-46-0

Herbicide Applied: Hoelon/Buctril tank mix

L.S.D. 5% = 12.78 Bu/A C.V. = 11.0 %

Long Term Yields - Barley, Dickinson.

Variety	1986	1987	1988	1989	1990	Average
Azure	76.0	61.9	7.2	31.6	66.7	48.7
Bowman	82.2	52.3	14.8	26.1	76.0	50.3
Morex	85.6	56.4	11.7	28.2	77.7	51.9
Robust	79.8	61.5	8.9	32.7	76.3	51.8
Hector	80.8	70.5	19.3	44.0	76.0	58.1
Lewis	95.9	63.3	14.4	39.9	71.2	56.9
Gallatin	99.3	72.5	15.5	41.3	87.3	63.2
LSD .05	7.3	4.5	4.2	7.6	11.0	

1990 Hettinger Barley Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	Grain Protein %	Heading date June	Plant height cm	3 year average* bu/A
Gallatin	101.0	51.0	14.1	25	82	65.3
ND10419	97.2	52.1	15.4	25	80	
ND9668	87.6	49.4	14.7	28	86	
ND9870	87.5	52.0	15.8	25	80	
ND9866	86.9	51.8	15.4	25	78	
Hector	85.7	49.4	16.0	25	81	55.2
ND10277	83.8	51.2	15.0	22	77	
Hazen	82.0	48.6	14.6	26	86	53.1
Azure	79.7	47.7	14.6	27	91	53.2
ND10278	76.7	50.6	15.1	22	74	
Bowman	76.3	51.5	16.1	22	74	55.7
Morex	73.2	48.0	15.3	25	86	49.8
Harrington	70.5	47.5	16.2	7/4	72	
Lewis	68.1	49.3	16.7	7/4	66	51.5
ND9675	64.9	45.2	15.1	27	72	
Wanubet	64.2	55.2	17.6	7/4	66	
Bearpaw	62.8	44.6	17.4	30	72	
Robust	62.4	47.7	16.1	27	88	45.3
B1603	58.0	45.8	16.2	29	72	44.9
Excel	53.4	45.8	16.2	29	72	
B1602	50.3	45.2	15.6	7/2	72	40.3
Trial mean	74.8	49.0	17.7	27	77	
C.V. %	25.5	3.2	7.1			
LSD 5%	27.0	2.2	1.6			
LSD 1%	n.s.	3.0	2.1			
# of reps	4	4	4	1	2	

Planting date: 4/17/90

Seeding rate: 750,000 live seeds/A (approx. 1.3 bu/A)

Fertilizer applied: 44 lbs/A 18-46-0

Herbicides applied: 2 pt/A Hoelon + 1 pt/A Buctril +  
2 oz/A MCPE

Yield goal: 80 bu/A

Harvest date: 8/1/90

Notes: \* = average of 1988 - 1990 crop years

n.s. = no statistical difference between varieties.

1990 Dickinson Off-station Barley Variety Trials.

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
	Bushels per Acre						
Azure	67.7	34.7	82.5	64.6	33.4	69.8	58.8
Bowman	76.0	40.2	73.1	82.9	46.1	73.9	65.4
Gallatin	87.3	40.9	69.1	88.7	45.0	70.1	66.9
Hector	76.0	44.7	68.4	70.8	41.9	69.8	61.9
Morex	77.7	47.8	79.8	65.0	35.1	67.7	62.2
Robust	76.3	43.3	86.3	72.9	33.4	71.2	63.9
	Test Wt. lbs./Bu						
Azure	40.0	47.5	46.5	50.0	48.0	48.0	46.7
Bowman	48.5	49.5	48.0	51.0	49.5	51.0	49.6
Gallatin	46.5	48.0	46.5	51.0	47.5	49.5	48.2
Hector	45.0	49.0	45.5	48.0	50.5	48.0	47.7
Morex	44.0	48.5	45.0	49.0	48.5	48.0	47.2
Robust	45.0	48.5	47.0	51.0	47.5	49.0	48.0
Seeding Date:	April 24	April 26	April 30	May 1	May 2	April 27	
Harvest Date:	Aug. 1	Aug. 2	Aug. 20	Aug. 13	Aug. 6	Aug. 7	
LSD 5% (Bu/A):	12.78	6.49	8.33	4.91	4.86	13.25	
CV (%):	11.0	9.7	6.9	4.2	7.8	11.8	
Fertilizer Applied:	According to soil test at each site						
Herbicide Applied:	Hoelon-Buctril tank mix						
Seeding Rate:	1.3 Bu/A						

1990 HETTINGER OFF-STATION BARLEY VARIETY TRIALS

Variety	Yield bu/A					Average
	Hettinger	Regent	Scranton	New Leipzig	Selfridge	
Bowman	76.3	59.3	63.4	51.7	73.2	64.8
Gallatin	101.0	56.0	57.2	48.7	78.0	68.2
Hector	85.7	62.3	60.7	56.8	86.3	70.4
Bearpaw	62.8	48.6	55.5	54.3	77.0	59.6
Azure	79.7	43.6	49.5	40.5	78.0	58.3
Robust	62.4	46.8	51.5	37.9	72.3	54.2
Morex	73.2	43.1	50.6	41.8	64.0	54.5
C.V. %	25.5	20.1	20.6	19.0	13.9	
LSD 5%	27.0	n.s.	n.s.	13.3	n.s.	
# of reps	4	4	4	4	4	

Variety	Test weight lbs/bu					Average
	Hettinger	Regent	Scranton	New Leipzig	Selfridge	
Bowman	51.5	49.4	50.8	51.7	51.8	51.0
Gallatin	51.0	49.0	45.2	50.5	50.9	49.3
Hector	49.4	48.6	46.1	50.2	51.0	49.1
Bearpaw	44.6	46.1	42.6	47.4	47.6	45.7
Azure	47.7	44.2	43.7	46.7	49.4	46.3
Robust	47.7	45.0	44.9	47.3	50.1	47.0
Morex	48.0	45.4	44.7	48.6	49.8	47.3
C.V. %	3.2	1.6	2.6	1.7	1.5	
LSD 5%	2.2	1.1	1.7	1.2	1.1	
LSD 1%	3.0	1.5	2.3	1.7	1.5	
# of reps	4	4	4	4	4	

Variety	Grain Protein %					Average
	Hettinger	Regent	Scranton	New Leipzig	Selfridge	
Bowman	16.1	15.6	15.9	15.1	13.8	15.3
Gallatin	14.1	15.9	15.0	15.8	13.0	14.8
Hector	16.0	15.8	17.2	15.3	12.9	15.4
Bearpaw	17.4	16.3	17.7	15.6	13.8	16.2
Azure	14.6	15.4	16.4	14.3	12.8	14.7
Robust	16.1	15.8	17.0	15.2	13.5	15.5
Morex	15.3	15.5	16.6	14.8	13.0	15.0
C.V. %	7.1	4.3	8.9	3.8	4.2	
LSD 5%	1.6	n.s.	n.s.	0.8	n.s.	
# of reps	4	4	4	4	4	

Planting  
 date: 4/17 4/19 4/19 4/18 4/18  
 Harvest  
 date: 8/1 8/3 8/3 8/6 8/6  
 Seeding rate: 750,000 live seeds/A (approx. 1.3 bu/A)  
 Fertilizer applied: 44 lbs/A 18-46-0  
 Herbicides applied: according to weed type and population  
 Yield goal: 80 bu/A  
 n.s. = no statistical difference between varieties

1990 Dickinson Oats Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.	Heading Date	Height in.
Dumont	74.7	38.0	1-Jul	31.5
Hystest	68.5	39.5	28-Jun	31.5
Monida	76.7	39.5	30-Jun	31
Newdak	78.8	36.0	26-Jun	28
Otana	81.2	38.5	30-Jun	28
Porter	76.8	39.0	1-Jul	31.5
Riel	74.2	39.0	30-Jun	30.5
Robert	68.0	34.5	2-Jul	29.5
Steele	73.7	36.5	30-Jun	33
Tibor	63.3	37.0	30-Jun	30
Trucker	76.7	36.5	30-Jun	30.5
Valley	74.7	38.5	29-Jun	35.5
ND 820294	78.8	40.0	29-Jun	30.5
ND 820559	81.9	38.5	29-Jun	34
ND 821742	74.7	37.0	1-Jul	29
ND 830185	75.7	36.5	29-Jun	31.5
ND 830646	77.3	37.5	2-Jul	30
ND 840341	75.2	37.0	2-Jul	30
ND 840413	68.0	37.0	28-Jun	30

Seeding Rate: 1.5 Bu/A  
 Seeding Date: May 2 Harvest Date: August 2  
 Fertilizer Applied: 50 lbs/A 18-46-0 drill application  
 Herbicide Applied: Bucril  
 L.S.D. 5% = 12.0 Bu/A C.V. = 10.0%

Long Term Yields - Oats, Dickinson.

Variety	1986	1987	1988	1989	1990	Average
Otana	101.6	77.0	12.2	44.6	81.2	63.3
Dumont	116.5	84.5	9.1	31.8	74.7	63.3
Steele	106.2	73.5	20.8	34.2	73.7	61.6
Monida	126.8	86.8	24.8	28.9	76.7	68.8
Porter	114.0	78.7	23.4	26.5	76.8	63.9
Valley	126.3	61.4	19.5	33.0	74.7	63.0
Hystest	99.5	55.0	14.8	31.3	68.5	53.8
Riel	112.4	67.7	14.3	39.4	74.2	61.6
LSD .05	15.5	6.9	4.9	4.4	10.0	

1990 Hettinger Oat Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	Heading date June	Plant height cm	3 year average* bu/A
Otana	102.2	41.0		88	94.0
Riel	97.5	39.4	27	75	72.9
ND851634	96.7	41.1	29	81	
ND862095	95.5	41.0	28	75	
ND862106	94.2	40.6	27	78	
Monida	91.4	36.2	31	74	71.5
Robert	87.7	37.6	29	73	63.9
ND861253	86.4	39.8	27	88	
ND840341	84.2	40.7	28	77	58.0
Kelsey	80.9	38.9	27	78	60.3
ND820294	79.7	36.6	27	69	53.8
ND860416	79.4	40.2	29	82	
ND851098	79.2	40.1	7/2	76	
ND852107	78.7	39.7	28	75	
MN84231	77.9	38.0	27	61	
Valley	77.7	40.2	29	68	56.6
ND862585	75.4	39.1	28	72	
Newdak	75.2	36.6	25	60	54.5
Dumont	74.4	40.3	29	72	52.0
Border	73.7	34.4	7/2	62	66.1
ND862415	73.2	39.2	29	70	
ND830646	72.2	37.9	29	64	55.6
ND861246	71.7	40.2	25	90	
ND820559	71.5	38.3	27	61	55.5
Steele	69.9	39.0	27	70	53.7
Hyttest	67.1	42.0	25	82	53.7
Trucker	66.6	41.2	28	72	55.8
Porter	65.1	38.9	29	70	51.2
ND830185	64.1	38.4	25	70	47.8
ND821742	56.6	37.5	27	62	51.0
ND840413	56.1	37.2	27	74	50.3
Tibor	53.4	43.3	25	80	52.6**
Trial mean	77.1	39.2	28	73	
C.V. %	26.4	1.6		9	
LSD 5%	n.s.	0.9		10	
LSD 1%	n.s.	1.2		13	
# of reps	4	4	1	2	

Planting date: 4/17/90

Seeding rate: 750,000 live seeds/A (approx. 1.5 bu/A)

Fertilizer applied: 44 lbs/A 18-46-0

Herbicides applied: 1 pt/A Buctril + 1 pt/A MCPE

Yield goal: 100 bu/A

Harvest date: 8/1/90

Notes: \* = average of 1988 - 1990 crop years

\*\* = average of 1989 and 1990 crop years

n.s. = no statistical difference between varieties

1990 Dickinson Off-station oats Variety Trials.

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
	Bushels per Acre						
Dumont	74.7	57.7	88.0	105.1	46.4	86.5	76.4
Monida	76.7	62.8	80.3	101.0	45.3	79.3	74.2
Newdak	78.8	49.4	88.6	96.8	46.9	77.8	73.1
Otana	80.3	57.4	87.0	105.1	51.5	88.1	78.2
Riel	70.0	54.6	68.0	86.0	48.9	73.7	66.9
Valley	74.7	56.3	101.5	107.2	53.6	80.9	79.0
	Test Wt. lbs./Bu						
Dumont	38.0	38.5	35.0	39.0	37.0	38.5	37.7
Monida	39.5	34.5	36.0	39.0	31.0	35.0	35.8
Newdak	36.0	35.0	36.0	37.0	33.5	34.0	35.3
Otana	38.5	38.0	38.0	40.0	36.0	37.5	38.0
Riel	39.0	35.5	35.0	38.0	35.5	36.0	36.5
Valley	38.5	38.0	39.0	40.0	35.5	38.0	38.2
Seeding Date:	May 2	April 26	April 30	May 1	May 2	April 27	
Harvest Date:	Aug. 2	Aug. 2	Aug. 20	Aug. 13	Aug. 6	Aug. 7	
LSD 5% (Bu/A):	12.0	6.10	10.70	9.72	6.98	9.58	
CV (%):	10.0	6.8	7.9	6.1	9.0	7.4	
Fertilizer Applied:	According to soil test at each site						
Herbicide Applied:	Buctril						
Seeding Rate:	1.5 Bu/A						



1990 HETTINGER OFF-STATION OAT VARIETY TRIALS

Variety	Yield bu/A					Average
	Hettinger	Regent	Scranton	New Leipzig	Selfridge	
Monida	91.4	69.0	59.8	71.3	85.9	75.5
Border	73.7	72.4	71.7	64.6	98.6	76.2
Riel	97.5	66.3	75.9	58.6	77.7	75.2
Otana	102.2	69.7	68.5	63.4	76.2	76.0
Newdak	75.2	59.1	68.2	54.6	66.4	64.7
Valley	77.7	52.7	52.3	47.6	54.4	56.9
Steele	69.9	34.6	45.6	44.1	40.7	47.0
C.V. %	26.4	19.9	23.7	15.3	14.4	
LSD 5%	n.s.	17.8	n.s.	13.1	15.2	
LSD 1%	n.s.	24.2	n.s.	17.8	20.7	
# of reps	4	4	4	4	4	

	Test weight lbs/bu					
	Hettinger	Regent	Scranton	New Leipzig	Selfridge	
Monida	36.2	36.4	39.3	38.1	39.4	37.9
Border	34.4	34.9	35.4	36.0	38.5	35.8
Riel	39.4	38.8	39.1	39.0	40.2	39.3
Otana	41.0	38.9	40.0	39.0	41.5	40.1
Newdak	36.6	36.0	36.3	36.4	38.0	36.7
Valley	40.2	38.5	39.4	39.8	41.0	39.8
Steele	39.0	36.6	38.7	39.0	38.9	38.4
C.V. %	1.6	2.2	1.7	1.8	1.2	
LSD 5%	0.9	1.2	1.0	1.0	0.7	
LSD 1%	1.2	1.6	1.3	1.4	1.0	
# of reps	4	4	4	4	4	

Planting date: 4/17 4/19 4/19 4/18 4/18  
 Harvest date: 8/1 8/3 8/3 8/6 8/6  
 Seeding rate: 750,000 live seeds/A (approx. 1.5 bu/A)  
 Fertilizer applied: 44 lbs/A 18-46-0  
 Herbicides applied: according to weed type and population  
 Yield goal: 100 bu/A  
 n.s. = no statistical difference between varieties

1990 Dickinson Hard Red Winter Wheat Variety Trial

Variety	Bu/A Avg.	Test Wt lbs.	Protein %
Agassiz	49.8	62.0	14.3
Arapahoe	48.4	61.5	15.5
Judith	51.0	61.5	15.0
Roughrider	51.9	61.5	15.0
Seward	55.6	62.0	12.4

Protein is at 14% Moisture

Seeding Rate: 50 lbs/A

Seeding Date: Sept. 13, 1989

Harvest Date: Aug. 28, 1990

Fertilizer Applied: 50 lbs/A 18-46-0

Herbicide Applied: Hoelon/Buctril tank mix

L.S.D. 5% = 3.53 Bu/A C.V. = 6.00 %

Long Term Yields - Hard Red Winter Wheat, Dickinson.

Variety	1984	1985	1986	1987	1988	1989	1990	Average
Roughrider	44.1	52.1	46.5	20.8	0.0	0.0	51.9	30.8
Winoka	45.4	44.6	48.4	24.2	0.0	0.0	--	--
Agassiz	45.9	50.0	50.6	17.3	0.0	0.0	49.8	30.5
Siouxland	--	--	59.4	11.8	0.0	0.0	--	--
Seward	--	--	--	24.4	0.0	0.0	55.6	--
LSD .05	7.3	2.5	3.8	4.8	0.0	0.0	2.53	

Yield Averages include value of 0 for 1988 and 1989.

1990 Dickinson Hard Red Winter Wheat Yield Trial.

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Variety	Bu/A Avg.	Test Wt lbs.
Abilene	40.3	62.5
Agissiz	50.5	62.5
Arapahoe	44.7	61.0
Judith	41.8	59.5
Norstar	49.7	62.0
Rose	45.5	62.5
Roughrider	48.0	62.0
Seward	46.7	61.5
Siouxland	45.6	62.0
Winoka	39.1	63.0
8212	49.1	61.5
8407	39.4	61.5
85137	41.8	61.5
8530	47.3	62.0
8581	40.5	61.0
86105	36.4	58.5

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Seeding Rate: 50 lbs/A

Seeding Date: September 13

Harvest Date: August 28

Fertilizer Applied: 50 lbs/A 18-46-0 drill application

Herbicide Applied: Hoelon/Buctril tank mix

L.S.D. 5% = 6.42 Bu/A

C.V. = 9.14%

1990 Hettinger Hard Red Winter Wheat Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	Grain Protein %	Heading date June	Plant height cm	Winter survival %	3 year average* bu/A
Rose	76.9	61.2	14.9	13	82	61	40.9
Arapahoe	76.4	57.9	14.4	7	64	51	61.9**
Seward	76.4	58.6	14.1	13	74	79	43.5
ND8530	72.0	57.8	15.6	11	74	64	
Judith	70.0	57.5	15.4	10	74	50	
ND8407	69.1	58.6	15.3	11	72	47	39.6
Siouxland	68.3	57.5	14.7	11	64	69	38.5
Roughrider	67.9	59.7	16.4	13	76	47	39.4
ND85137	67.7	58.4	15.3	11	64	62	
ND86105	64.0	58.0	14.4	13	67	58	
ND8581	63.9	58.4	15.2	10	68	49	
Norstar	63.8	60.4	15.8	18	82	59	36.0
Winoka	63.3	60.2	15.4	14	68	48	51.9**
Agassiz	60.4	58.9	16.3	13	72	53	33.0
Abilene	58.4	60.2	14.8	9	54	66	48.4**
Trial mean	67.3	58.7	15.3	11	66	54	
C.V. %	13.8	1.6	4.1				
LSD 5%	13.2	1.3	0.8				
LSD 1%	18.0	1.8	1.1				
# of Reps	4	4	4	1	2	2	

Planting date: 9/7/89

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

Fertilizer applied: 112 lbs/A 18-46-0 at planting

Yield goal: 60 bu/A

Herbicide application: None

Harvest date: 7/27/90

Notes: \* = average of 1988 - 1990 crop years

\*\* = average of 1989 and 1990 crop years

1990 HETTINGER OFF-STATION HARD RED WINTER WHEAT TRIAL

Variety	Yield bu/A				Average
	Hettinger	Regent	Scranton	New Leipzig	
Rose	76.9	35.5	34.4	47.6	48.6
Arapahoe	76.4	32.9	36.1	54.7	50.0
Seward	76.4	42.0	37.0	54.2	52.4
Siouxland	68.3	37.6	40.4	49.4	48.9
Roughrider	67.9	39.5	41.2	50.7	49.8
Winoka	63.3	36.7	35.3	51.5	46.7
Agassiz	60.4	41.0	38.8	56.4	49.2
Abilene	58.4	44.4	31.4	52.9	46.8
C.V. %	13.8	13.1	9.5	6.0	
LSD 5%	13.2	n.s.	5.1	4.6	
LSD 1%	18.0	n.s.	n.s.	6.2	
# of reps	4	4	4	4	

Variety	Test weight lbs/bu				Average
	Hettinger	Regent	Scranton	New Leipzig	
Rose	61.2	60.5	60.2	61.8	60.9
Arapahoe	57.9	59.6	58.5	60.9	59.2
Seward	58.6	59.0	57.9	59.4	58.7
Siouxland	57.5	59.5	59.7	61.5	59.6
Roughrider	59.7	60.9	58.2	61.3	60.0
Winoka	60.2	61.8	59.8	62.5	61.1
Agassiz	58.9	60.6	58.0	62.0	59.9
Abilene	60.2	60.5	60.8	62.7	61.0
C.V. %	1.6	1.0	1.1	0.8	
LSD 5%	1.3	0.9	1.0	0.7	
LSD 1%	1.8	1.2	1.3	0.9	
# of reps	4	4	4	4	

Variety	Grain protein %				Average
	Hettinger	Regent	Scranton	New Leipzig	
Rose	14.9	15.5	14.2	13.8	14.6
Arapahoe	14.4	15.3	14.4	13.0	14.3
Seward	14.1	14.0	13.1	12.9	13.5
Siouxland	14.7	14.9	13.9	12.6	14.0
Roughrider	16.4	16.2	15.3	13.9	15.4
Winoka	15.4	15.0	13.9	13.4	14.4
Agassiz	16.3	16.2	15.4	13.2	15.3
Abilene	14.8	14.9	14.6	13.2	14.4
C.V. %	4.1	3.0	2.4	8.4	
LSD 5%	0.8	0.7	0.5	1.6	
LSD 1%	1.1	0.9	0.7	2.2	
# of reps	4	4	4	4	

Seeding date: 9/7                    9/8                    9/8                    9/12  
Harvest date: 7/27                    8/3                    8/3                    8/6  
Yield goal: 60 bu/A  
Fertilizer applied: 112 lbs/A 18-46-0 at planting  
Herbicides applied: according to weed type and population  
n.s. = no statistical difference between varieties.

1990 Hettinger Fall Applied Fertilizer on HRWW

This study was initiated to determine agronomic and quality characteristics among and between 5 hard red winter wheat varieties which had fertilizer (18-46-0) applied in the fall and no fall applied fertilizer.

Fall applied phosphorus fertilization has been shown to benefit winter survival by stimulating root growth and fall tillering. The secondary root system that develops with tillering is essential for a healthy deep rooted plant capable of withstanding stress. Dry nitrogen fertilizers on the other hand should be applied as soon as possible in the spring but no later than the fifth leaf stage. Tillering starts with the fourth leaf.

112 pounds per acre of 18-46-0 was applied on September 7, 1989. No nitrogen fertilizer was applied in the spring due to high residual soil N levels (110 lbs/A, 0-12").

Results from this trial (Table 1) show an average yield advantage of almost 12 bu/A when fall fertilizer was applied. Other advantages of fall applied fertilizer in this study include higher average test weight (0.8 lbs/bu), earlier maturing (2 days), taller (2 cm) and increased winter survival (14 %).

Table 1.

Variety	Fall fertilizer	Yield bu/A	Test weight lbs/bu	Grain Protein %	Heading date June	Plant height cm	Winter survival %
Agassiz	yes	60.4	58.9	16.3	13	72	71
	no	54.8	57.8	16.4	16	79	53
Arapahoe	yes	76.4	57.9	14.4	7	64	61
	no	54.0	57.3	14.6	8	60	51
Roughrider	yes	64.3	59.4	16.5	13	75	59
	no	54.1	58.2	16.9	13	68	47
Seward	yes	76.4	58.6	14.1	13	74	79
	no	62.7	57.4	14.0	17	72	67
Siouxland	yes	68.3	57.5	14.7	11	64	69
	no	60.8	57.7	14.0	11	60	50
Trial mean	yes	69.2	58.5	15.2	11	70	68
	no	57.3	57.7	15.2	13	68	54
Difference		11.9	0.8	0.0	-2	2	14
C.V. %		13.4	1.4	3.3			
LSD 5%		12.3	1.2	0.7			
LSD 1%		16.6	1.6	1.0			
# of reps		4	4	4	1	2	2

Planting date: 9/7/90

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

Yield goal: 60 bu/A

Harvest date: 7/27/90

1990 Dickinson Winter Rye Variety Trial

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Variety	Bu/A Avg.	Test Wt lbs.
Frederick	38.6	55.0
Dacold	81.5	55.0
Musketeer	62.4	55.5
Prima	74.5	55.5

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Seeding Rate: 60 lbs/A  
 Seeding Date: September 13      Harvest Date: August 10  
 Fertilizer Applied: 50 lbs/A 18-46-0 drill application  
 No weed control required.  
 L.S.D. 5% = 9.6 Bu/A      C.V. = 6.0%

Long Term Yields - Winter Rye, Dickinson.

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Variety	1986	1987	1988	1989	1990	5 Year Average
Musketeer	35.4	37.6	15.2	0.0	62.4	30.5
Puma	43.2	33.9	8.5	0.0	--	--
Frederick	33.0	35.1	15.0	0.0	38.6	24.3
LSD .05	4.8	3.6	3.2	0.0	--	

Yield averages include value of 0 for 1989.

1990 Hettinger Winter Rye Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	Heading date June	Plant height cm	3 year average*
Dacold	72.4	50.2	8	88	
Prima	70.1	51.4	5/30	109	51.5
ND6	69.0	52.5	1	100	
Musketeer	67.9	51.8	5/27	104	45.7
ND5	66.0	49.6	4	95	
Fredrick	61.8	51.9	5/27	102	44.3
X-79-8	58.0	50.8	5/30	106	
Trial mean	66.5	51.1		100	
C.V. %	7.0	1.1		5	
LSD 5%	6.9	0.9		n.s.	
LSD 1%	9.4	1.2		n.s.	
# of reps	4	4	1	2	

Planting date: 9/7/89  
 Seeding rate: 1.1 million live seeds/A (approx. 1.1 bu/A)  
 Fertilizer applied: 112 lbs/A 18-46-0 at planting  
 Herbicides applied: none  
 Yield goal: 80 bu/A  
 Harvest date: 7/27/90  
 Notes: \* = average of 1988 - 1990 crop years  
 n.s. = no statistical difference between varieties

1990 New Leipzig Winter Rye Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	2 year average*
Prima	66.3	54.9	53.0
Dacold	59.5	52.8	
Musketeer	59.4	55.1	48.0
Fredrick	54.4	55.0	45.6
Trial mean	59.9	54.4	
C.V. %	14.3	1.0	
LSD 5%	n.s.	0.9	
LSD 1%	n.s.	1.2	
# of reps	4	4	

Planting date: 9/12/89  
 Seeding rate: 1.1 million live seeds/A (approx. 1.1 bu/A)  
 Fertilizer applied: 112 lbs/A 18-46-0 at planting  
 Herbicides applied: none  
 Yield goal: 80 bu/A  
 Harvest date: 8/6/90  
 Notes: \* = average of 1989 and 1990 crop years  
 n.s. = no statistical difference between varieties



### 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 comonly grown types is restricted. For this reason, farmers are interested in comparative performance.

#### 1990 Dickinson Misc. Small Grain Variety Trial

Variety	Lbs/A Avg.	Test Wt lbs.
Bowman Barley	4241	51.0
Speltz	2970	38.0
Gazelle Spr. Rye	3135	53.0
Kramer Triticale	2723	44.0

Seeding Date: May                      Harvest Date: July  
 Fertilizer Applied: 50 lbs/A 18-46-0  
 Herbicide Applied: Hoelon/Buctril tank mix  
 L.S.D. 5% = 391 lbs/A      C.V. = 7.5 %

#### Dickinson Misc. Small Grains 5 Yr. Average

Variety	1990	1989	Pounds/Acre		1986	5 Year Average
			1988	1987		
Bowman Barley	4241	1931	247	1699	3946	2413
Speltz	2970	1601	160	908	3268	1781
Gazelle Spr. Rye	3135	1073	145	1338	2705	1679
Kramer Triticale	2723	759	13	662	3168	1465

### 1990 Hettinger Triticale Variety Trial

Variety	Yield bu/A	Test weight lbs/bu	Heading date June	Plant height cm	Winter survival %	2 year average*
Double Crop	65.6	52.0	11	100	47	35.9
I18	64.2	50.8	8	100	50	
239	59.4	50.3	8	106	58	32.0
Trial mean	63.1	51.0		102	52	
C.V. %	20.2	1.2		5	25	
LSD 5%	n.s.	1.0		n.s.	n.s.	
# of Reps	4	4	1	2	2	

Planting date: 9/7/89

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

Fertilizer applied: 112 lbs/A 18-46-0 at planting

Yield goal: 80 bu/A

Herbicide application: None

Harvest date: 7/27/90

Notes: \* = average of 1988 and 1990 crop years

n.s. = no statistical difference between varieties

### 1990 Dickinson Flax Yield Trial

Variety	Bu/A Avg.	Test Wt lbs.
Clark	8.3	56.5
Flor	6.9	56.5
Verne	6.1	56.0
Neché	7.5	56.5
CI 3131	5.9	56.0

Seeding Rate: 40 lbs/A

Seeding Date: May 7      Harvest Date: Aug. 23

Fertilizer Applied: 50 lbs/A 18-46-0

Herbicide Applied: Hoelon/Buctril tank mix

L.S.D. 5% = 1.14 Bu/A      C.V. = 6.6%

1990 Dickinson Safflower Production Trial

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Decription	Lbs/A Avg.	Test Wt lbs.
Centennial	1067.3	42.0
MT 3697	955.3	44.0
87B 3797	991.3	42.0
89A 3687	787.8	43.5
Meyer Crambe	603.3	27.0
Westar Canola	162.0	53.0
Tobin Canola	130.8	51.0

Seeding Rate: 30 lbs/A

Seeding Date: May 4

Harvest Date: Safflower Sept. 10

Crambe and Canola Aug 15

L.S.D. 5% = 143.6 lbs/A C.V. = 13.5 %

1990 Hettinger Safflower Variety Trial

Variety	Yield lbs/A	Test weight lbs/bu	Heading date July	Plant height cm	3 year average* lbs/A
87B4311	1492	41.7	16	50	
86B1465-5	1477	40.6	14	45	
85B4431	1391	41.2	14	43	
S-541	1054	41.8	15	42	1501
87B3739	1033	42.2	16	37	
Girard	1011	41.8	16	47	1257
85B3910	990	40.2	12	39	
Centennial	882	41.3	16	38	
Finch	875	44.6	12	40	1462
85B1837	846	41.0	13	35	
Hartman	774	42.2	16	37	
87B1298	774	42.2	16	37	
S-317	739	39.5	15	42	1403
87B3797	731	41.8	13	34	
S-208	724	41.2	16	38	884
MT3697	617	43.6	14	39	
89A3697	617	42.8	14	36	
Saffire	588	42.2	11	34	
87B1650	545	43.1	16	35	
Oker	445	40.2	14	36	964
82B1277	373	40.6	14	36	
85B3918	316	36.5	16	38	
Trial mean	804	41.7	14	38	
C.V. %	39	2.8	0.2	11	
LSD 5%	447	1.7	2	n.s.	
LSD 1%	598	2.2	2	n.s.	
# of reps	4	4	1	2	

Planting date: 5/2/90

Seeding rate: 350,000 live seeds/A

Fertilizer applied: 44 lbs/A 18-46-0

Herbicides applied: 1 pt/A Treflan EC, Pre-plant incorp.

Harvest date: 8/28/90

Notes: \* = average of 1987, 1989 and 1990 crop years

n.s. = no statistical difference between varieties

## 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.

### 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.							6 yr
Variety	1985	1986	1987	1988	1989	1990	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.

1990 Hettinger Buckwheat Variety Trial

Variety	Yield lbs/A	Test weight lbs/bu	3 year average* lbs/A
Mancan	338	40.1	515
Tokyo	265	44.2	366**
Common	261	44.3	337**
Giant American	214	37.8	264**
Mannor	188	39.8	569
Windsor Royal	149	38.4	475
Trial mean	236	41.6	
C.V. %	50	3.0	
LSD 5%	n.s.	2.3	
# of reps	4	4	

Planting date: 6/4/90

Seeding rate: 700,000 live seeds/A

Fertilizer applied: 100 lbs/A 46-0-0 + 44 lbs/A 18-46-0

Herbicides applied: none

Yield goal: 2000 lbs/A

Harvest date: 9/10/90

Notes: \* = average of 1987, 1989 and 1990 crop years

\*\* = average of 1989 and 1990 crop years

n.s. = no statistical difference between varieties

## Hybrid Corn Comparison Trial

Corn silage and grain yields were very good considering the severe drought that prevailed through the growing season of 1990. This once again emphasized 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.

### 1990 Dickinson Hybrid Corn Comparison Trial

Hybrid	Silage Tons/A	Harvest Moisture	Grain Bu/A.	Test Wt lbs.
Cargill 809	7.07	74.5	33.6	52.0
Cargill 2037	8.49	74.0	10.7	53.0
Cenex 809	8.16	71.5	37.0	51.5
Dahlgren K2204	8.22	71.0	6.2	52.5
Hammel H85	7.85	73.5	26.3	53.0
Hammel H90	8.89	73.5	17.7	52.0
Interstate 232A	7.45	71.5	18.6	52.5
Interstate Silo King	6.56	74.5	18.0	53.0
Interstate SF80A	6.55	74.5	23.0	54.5
Interstate SF78	6.95	68.5	37.3	55.5
Jacques 2750	7.02	70.5	10.3	59.0
Jacques 3630	7.10	75.0	8.0	53.0
Pioneer 3831	8.90	72.5	11.9	52.5
Pioneer 3921	7.68	73.5	18.0	52.5
Pioneer 3965A	6.59	77.0	15.5	54.5
Moisture basis:	70%		15.5%	
Seeding Date:	April 14			
Harvest Date:	Aug. 23		Sept. 8	
L.S.D. 5% =	1.05 tons/A		6.67 Bu/A	
C.V. =	7.00 %		16.0 %	
Seeding Rate:	18,000 seeds/A			
Row Width:	36 inches			
Harvest Population:	14,500 plants/A			
Herbicide Applied:	Prowl, Preemergence			

1990 Hettinger Hybrid Corn Silage Trial

Hybrid	Relative maturity days	Silage yield tons/A	Harvest moisture %
Interstate 232A	85	4.5	42.8
Jacques 3630	85	3.8	48.2
Cargill 2137		3.5	43.0
Betagold 824	80	3.3	36.7
Betagold Ingrid	95	3.1	42.0
Betagold Anna	85	2.9	43.1
Cargill 809	85	2.6	38.5
Interstate SF80A	80	2.5	40.6
Interstate EXSF78	78	2.5	42.7
Interstate Silo king	80	2.1	42.5
Betagold Gerda	90	2.1	36.3
Jacques 2750	80	1.7	41.0
Trial mean		2.9	41.4
C.V. %		54.1	
LSD 5%		n.s.	
# of reps		4	1

Planting date: 5/17/90

Seeding rate: 21,000 seeds/A (culled to 18,000 plants/A)

Fertilizer applied: 100 lbs/A 46-0-0

Herbicides applied: 2 pt/A Bladex + 4 pt/A Lasso, Pre-plant incorp.

Row width: 30"

Yield goal: 18 tons/A

Harvest date: 8/28/90

Notes: Yields are based on 70% moisture

n.s. = no statistical difference between hybrids

No grain was harvested due to extreme drought



1990 Regent Hybrid Corn Trial

Hybrid	Relative maturity days	Silage yield tons/A	Harvest moisture %	Grain yield bu/A	Test weight lbs/bu
Betagold 824	80	6.0	48.5	46.5	56.5
Betagold Ingrid	95	5.9	44.7	46.0	53.2
Betagold Gerda	90	7.5	43.4	41.2	55.8
Interstate EXSF78	78	5.1	56.8	38.6	57.8
Betagold Anna	85	7.4	45.5	36.7	57.0
Interstate 232A	85	6.1	55.2	34.1	54.6
Interstate SF80A	80	5.0	54.1	33.8	56.7
Interstate Silo king	80	6.7	54.8	31.2	55.2
Trial mean		6.2	50.4	38.5	55.8
C.V. %		18.1		24.4	2.5
LSD 5%		1.6		n.s.	2.0
LSD 1%		n.s.		n.s.	2.8
# of reps		4	1	4	4

Planting date: 5/17/90

Seeding rate: 21,000 seeds/A (culled to 18,000 plants/A)

Fertilizer applied: 44 lbs/A 28-29-0

Herbicides applied: 1.5 pt/A Basagran + 1.5 pt/A crop oil

Row width: 30"

Yield goal: silage - 18 tons/A, grain - 100 bu/A

Harvest date: silage - 8/27/90, grain - 10/9/90

Notes: yields are based on 70% moisture for silage and 13.5%  
moisture for grain

n.s. = no statistical difference between hybrids

1990 New Leipzig Hybrid Corn Trial

Hybrid	Relative maturity days	Silage yield tons/A	Harvest moisture %	Grain yield bu/A	Test weight lbs/bu
Betagold Anna	85	5.7	48.1	29.1	56.6
Betagold Ingrid	95	5.3	53.8	23.5	54.2
Interstate Silo King	80	5.4	48.4	19.0	53.6
Interstate EXSF78	78	5.5	47.3	16.1	57.4
Interstate SF80A	80	3.5	48.2	12.7	56.4
Betagold Gerda	90	5.0	51.8	10.1	56.2
Betagold 824	80	5.2	49.8	6.7	57.0
Interstate 232A	85	5.3	48.0	5.4	54.4
Trial mean		5.2	49.4	15.5	55.7
C.V. %		25.9		47.6	2.1
LSD 5%		n.s.		13.1	2.1
# of reps		3	1	3	3

Planting date: 5/17/90

Seeding rate: 21,000 seeds/A (culled to 18,000 plants/A)

Fertilizer applied: 100 lbs/A 28-29-0

Herbicides applied: 1/2 pt/A Atrazine 4L + 1/2 pt/A Banvel SGF

Row width: 30"

Yield goal: silage - 18 tons/A, grain - 100 bu/A

Harvest date: silage - 8/28/90, grain - 10/9/90

Notes: Yields are based on 70% moisture for silage and 13.5% moisture for grain

n.s. = no statistical difference between hybrids

## Dry Edible Bean Production

Dry edible bean production in the three southwestern agricultural statistics reporting districts increased from 3400 harvested acres in 1985 to 21000 acres in 1988, and dropped to 17000 acres in 1989. Production was highest in 1985, 1986 and 1987 averaging more than 1200 pounds per acre for that three year period. Yields of 240 and 427 pounds per acre in the drought years of 1988 and 1989 combined to reduce the five year average yield to 879 pounds per acre.

### 1990 Dickinson Bean Variety Trial.

Variety	Lbs/A Avg.	Test Wt lbs.	Row Width inches
Hyden navy	404	60.0	12
Othello pinto	752	60.0	12
Nodak pinto	815	60.5	12
UC-5 Garbanzo	1180	58.0	12
Brewer lentil	291	61.5	6

Seeding Date: May 22  
 Fertilizer Applied: 50 lbs/A 18-46-0  
 Herbicide Applied: Treflan, ppi  
 L.S.D. 5% = 126 Lbs/A      C.V. = 11.5 %

Hyden Navy	520	62.0	36
Othello pinto	792	60.0	36
Nodak pinto	832	61.5	36

Seeding, Fertilizer and Herbicide Application same as for 12 inch spacing.  
 L.S.D. 5% = 101 Lbs/A      C.V. = 8.8 %

1990 Hettinger Specialty Crops Trial

Crop	Variety	Yield lbs/A	Test weight lbs/bu	Planting rate lbs/A	Harvest date
Mung beans		301	59.8	45	9/10
Lupine beans	Ultra	481	55.8	75	9/10
Faba beans	Outlook	798	61.1	140	8/28
Millet	Rise	630	48.7	15	8/28
Coriander		2093	27.1	10	9/10
Natto beans		*		60	
Field peas	Trapper	*		120	
Lentils		**		45	
Paloma peas		*		120	
Camalena		*		4	

Planting date: 5/17/90

Fertilizer applied: 44 lbs/A 18-46-0

Herbicide applied: 1 pt/A Treflan EC, Pre-plant incorp.

\* = not harvested due to poor stand / possible herbicide injury

\*\* = not harvested due to shatter loss and low profile

1990 Hettinger Pinto Bean Variety Trial

Variety	Yield lbs/A	Test weight lbs/bu	3 year average* lbs/A
Othello	850	51.0	1080
111	822	53.3	
Sierra	793	51.5	1334**
Olathe	759	51.6	1045**
Nodak	729	52.0	886
126	630	51.9	
Topaz	621	49.0	751
UI-114	609	52.2	720
Fiesta	597	51.4	724
Trial mean	713	51.5	
C.V. %	24	2.0	
LSD 5%	n.s.	1.5	
LSD 1%	n.s.	2.0	
# of reps	4	4	

Planting date: 5/14/90

Seeding rate: 61 lbs/A

Fertilizer applied: 44 lbs/A 18-46-0

Herbicides applied: 1 pt/A Treflan EC, Pre-plant incorp.

Row width: 30"

Yield goal: 2500 lbs/A

Harvest date: 9/10/90

Notes: \* = average of 1988 - 1990 crop years

\*\* = average of 1989 and 1990 crop years

n.s. = no statistical difference between varieties

1990 Regent Pinto Bean Variety Trial

Variety	Yield lbs/A	Test weight lbs/bu	2 year average* lbs/A
Fiesta	947	53.2	822
Othello	883	53.3	1062
Nodak	883	52.3	952
Olathe	847	51.2	
Topaz	827	49.4	600
UI-114	823	53.8	763
126	777	53.6	766
111	709	53.1	728
Trial mean	836	52.5	
C.V. %	25	1.9	
LSD 5%	n.s.	1.5	
LSD 1%	n.s.	2.0	
# of reps	4	4	

Planting date: 5/17/90  
 Seeding rate: 61 lbs/A  
 Fertilizer applied: 44 lbs/A 18-46-0  
 Herbicides applied: 1.5 pt/A Basagran + 1.5 pt/A crop oil  
 Row width: 30"  
 Yield goal: 2500 lbs/A  
 Harvest date: 9/10/90  
 Notes: \* = average of 1989 and 1990 crop years  
 n.s. = no statistical difference between varieties

1990 Hettinger Soybean Variety Trial

Variety	Yield bu/A	Test weight lbs/bu
Ozzie	10.3	54.5
Maple Amber	6.4	53.0
McCall	5.8	
Maple Isle	5.3	53.0
Maple Ridge	4.3	
KG-20	4.2	54.0
Trial mean	6.0	53.7
C.V. %	44.7	0.5
LSD 5%	3.7	n.s.
# of reps	4	4

Planting date: 5/14/90  
 Seeding rate: 60 lbs/A  
 Fertilizer applied: 44 lbs/A 18-46-0  
 Herbicide applied: 1 pt/A Treflan EC  
 Harvest date: 9/10/90

1990 Hettinger Amaranth Variety Trial

<u>Variety</u>	<u>Yield</u>
	bu/A
MT-3	242
K-343	215
K-283	196
K-432	163
Trial mean	207
C.V. %	25
LSD 5%	n.s.
<u># of reps</u>	<u>4</u>

Planting date: 6/4/90

Fertilizer applied: 100 lbs/A 46-0-0 +  
44 lbs/A 18-46-0

Herbicides applied: none

Harvest date: 9/26/90

Notes: n.s. = no statistical difference  
between varieties

This trial was planted on recrop.

1990 Hettinger Canola Variety Trial

Variety	Type*	Yield lbs/A	Test weight lbs/bu	Heading	Plant	Harvest
				date June	height cm	date August
Hyola 40	A	726	51.6	12	78	17
AU-238	A	706	52.3	16	87	17
MLCP-008	A	704	52.8	17	79	17
Delta	A	694	52.7	16	84	17
Hyola 41	A	683	50.7	12	78	17
Pactol	A	683	50.4	17	74	17
AU-154	A	607	51.3	16	77	17
Vanguard	A	594	51.0	15	84	17
Westar	A	588	51.7	16	81	17
DSVSR-126	A	560	50.1	18	85	7
Global	A	558	51.5	18	88	7
Celebra	A	489	51.2	17	80	17
HC-130	A	480	51.8	16	76	7
Taparoo	A	462	50.8	12	65	17
MLCP-035	A	441	48.4	20	86	17
Mari	A	428	47.1	16	72	17
SV-02306	A	408	51.4	18	74	7
Topas	A	390	49.9	18	81	7
SV-02344	A	368	49.8	20	76	7
Stallion	A	358	42.4	18	73	7
Moneta	A	348	51.8	20	76	7
Golda	A	335	51.9	20	80	7
Candida	A	307	50.4	17	72	7
Evita	A	300	52.7	18	74	7
SV-02378	A	297	50.1	19	70	7
Tobin	P	241	50.4	7	72	24
Trial mean		490	50.6	17	78	
C.V. %		27		0.1	7	
LSD 5%		183		1	8	
LSD 1%		245		2	11	
# of reps		4	1	4	2	

Planting date: 4/20/90

Seeding rate: 10 lbs/A

Fertilizer applied: 44 lbs/A 18-46-0

Pesticides applied: 1 pt/A Treflan EC, PPI

10 lbs/A Counter 5G applied with seed

Notes: \* = Plant type: A = Argentinian, P = Polish

1990 Hettinger Tame Mustard Variety Trial

Variety	Type*	Yield lbs/A	Test weight lbs/bu	Heading date June
Oriental	O	518	53.5	11
Brown	B	496	54.6	12
Domo	O	397	54.1	12
Tilney	Y	392	55.5	8
Kirby	Y	373	55.1	7
Gisilba	Y	301	54.8	10
Trial mean		413	54.6	10
C.V. %		18	1.3	0.2
LSD 5%		109	1.1	2
LSD 1%		150	n.s.	3
# of reps		4	4	4

Planting date: 4/24/90

Seeding rate: 10 lbs/A

Fertilizer applied: 44 lbs/A 18-46-0

Pesticides applied: 1 pt/A Treflan EC, PPI  
10 lbs/A Counter 5G applied with seed

Harvest date: 8/2/90

Notes: \* = Plant type: O = Oriental, B = Brown, Y = Yellow

1990 Hettinger Crambe Variety Trial

Variety	Yield lbs/A	Test weight lbs/bu	Plant height cm
Bel Ann	157	26.4	52
Belenzia	124	28.5	52
Meyer	77	26.4	52
Trial mean	119	27.1	52
C.V. %	34		6
LSD 5%	n.s.		n.s.
# of reps	4	1	4

Planting date: 4/24/90

Seeding rate: 16 lbs/A

Fertilizer applied: 44 lbs/A 18-46-0

Herbicides applied: 1 pt/A Treflan EC, Pre-plant incorp.

Harvest date: 8/28/90

Notes: n.s. = no statistical difference between varieties  
Approximately 75% of the yield was lost due to  
shatter.



1990 Dickinson Safflower Quality Trial

Description	Lbs/A Avg.	Test Wt lbs.
Centennial	890.3	40.5
MT 3697	745.3	42.0
87B 3797	767.8	41.5
89A 3697	768.8	42.5
Meyer Crambe	434.8	27.0
Westar Canola	158.0	53.0
Tabin Canola	166.5	51.0
R 500 Rape	0.0	--
87B 3882-3	501.5	42.0
88B 2903	773.3	39.0
88B 3515	1057.3	38.5
87B 3449-3	469.5	39.0

Seeding Rate: 30 lbs/A  
 Seeding Date: May 4  
 Harvest Date: Safflower Sept. 10  
                   Crambe And Canola Aug. 15  
 Fertilizer Applied:  
 Herbicide Applied:  
 L.S.D. 5% = 158.8 lbs/A      C.V. = 15.5%

## 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 1990 trials, and continues to be one of the better yielding varieties most years. However, growing conditions were unfavorable for millet in 1990 and while there was some grazing possible on fields of millet, poor growth prevented cutting for hay, in many plantings.

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 1990 Red Proso produced 521 lbs/A and White Proso 561 lbs/A, compared to 2024 lbs/A of Monida oats grown in the same comparison trial.

### Dickinson Millet Variety Trial

Variety	Hay yield tons/A @ 12% moisture				Average 4-yr.
	1987	1988	1989	1990	
White Proso	2.0	2.1	0.0	1.76	1.47
Red Proso	1.7	2.2	0.0	2.1	1.50
German Foxtail	1.9	1.8	0.0	--	--
Siberian	1.6	1.9	0.0	2.49	1.50
Piper Sudan	--	--	--	1.80	--

1990 Hettinger Alternative Forage Trial

<u>Crop</u>	<u>Variety</u>	<u>Yield*</u> tons/A	<u>Planting</u> <u>rate</u> lbs/A
Turnip	Civasto-R	0	10
Tyfon		0	10
Rape	Dwarf Essex	0	10
Rape	Emerald	0	10
Millet	Siberian	1.09	15
Millet	German	1.18	15
Millet	Hybrid Pearl	0.96	15
Oats	Haylander	0.30	80
Oats	Monida	0.36	80
Sorghum/sudan	Greentreat II	1.56	30
Sorghum/sudan	Highland Sweet	1.15	30
Sorghum	(forage)	1.60	30
Sudangrass	(hybrid)	1.21	20
Kochia		0	10
Alfalfa	Nitro	0	10

Planting date: 5/21/90

Harvest date: 9/12/90

\* = yield is calculated on a dry weight bases

1990 Dickinson PB50 Fungus Trial

Treatment	Bu/A Avg.	Test Wt lbs.
Stoa No P	36.0	60.0
Stoa Plus P	44.0	61.0
Stoa Plus P Plus PB50	43.5	61.0
Stoa Plus PB50	41.5	61.0

Seeding Rate: 1,000,000 live seeds/A (approx 1/Bu)  
 Seeding Date: May 1 Harvest Date: Aug.6  
 Fertilizer drill applied: 65 lbs/A where indicated.  
 Herbicide Applied: Hoelon/Buctril tank mix  
 L.S.D. 5% = 3.18 Bu/A C.V. = 4.50%

Root Rot Control on Wheat - 1990

Treatment	Yield Bu/A	Test Wt lbs.
Amidon - Control	22.7	58.0
Amidon + Vitavax	22.1	58.0
Amidon + Vitavax + Imazilil	20.5	58.0
Stoa - Control	25.3	57.5
Stoa + Vitavax	20.6	56.5
Stoa + Vitavax + Imazilil	17.4	56.0

L.S.D. 5% = 2.0 Bu/A C.V. = 6.0 %

Root Rot Control on Barley - 1990

Treatment	Yield Bu/A	Test Wt lbs.
Azure - Control	31.9	43.0
Azure + Vitavax	31.9	43.5
Azure + Vitavax + Imazilil	27.4	46.0
Bowman - Control	32.8	49.0
Bowman + Vitavax	32.0	47.0
Bowman + Vitavax + Imazilil	27.8	49.0
L.S.D. 5% = 5.77 Bu/A      C.V. = 11.8 %		

Root Rot Control on Durum - 1990

Treatment	Yield Bu/A	Test Wt lbs.
Vic - Control	19.3	58.0
Vic + Vitavax	19.0	57.0
Vic + Vitavax + Imazilil	20.9	59.0
Ward - Control	22.3	59.0
Ward + Vitavax	18.5	59.0
Ward + Vitavax + Imazilil	18.1	58.0
L.S.D. 5% = 2.96 Bu/A      C.V. = 9.4 %		

1990 HRSW SEED SIZE TRIAL

It has been well established that soil temperature, soil crusting, depth of planting, seedbed preparation and other factors all contribute to seedling germination and emergence. When ideal environmental conditions exist, seed size probably has little influence on germination and emergence. When one or more environmental conditions are not ideal, larger seeds which tend to be more vigorous, are more able to withstand those adversities and emerge.

This study was initiated to determine germination of HRSW seed of different sizes. Three different treatments (seed sizes) were planted in a randomized complete block design at 5 locations. Treatments were 1) no seed sizeing (bin run), 2) kernels larger than 6/64" in diameter (large), and 3) kernels 6/64" in diameter and smaller (small). Agronomic and quality characteristics were also analyzed. Environmental conditions were not taken into account.

Results from this trial (Table 1) show a slight plant stand and yield advantage for the large seed over the bin run and small seed. Test weight and grain protein were essentially the same across all seed sizes.

Table 1.

Location	Plant stand			Yield			Test weight			Grain protein		
	large	bin	small	large	bin	small	large	bin	small	large	bin	small
	plants/A (x1000)			bu/A			lbs/bu			%		
Hettinger	986	974	855	76.5	72.4	65.5	62.6	62.5	62.6	16.6	16.6	16.4
Scranton	773	728	833	13.1	11.0	13.8	57.1	57.1	57.2	16.8	16.8	16.9
Regent	672	788	713	42.2	40.7	40.2	62.8	62.8	62.7	15.8	15.8	15.8
New Leipzig	714	635	645	24.2	17.6	21.8	61.6	60.9	61.3	17.4	18.0	17.3
Selfridge	653	597	482	31.9	33.3	25.1	62.8	63.0	62.6	15.9	15.9	15.9
Average	760	744	706	37.6	35.0	33.3	61.4	61.4	61.3	16.5	16.6	16.5

Hettinger    Scranton    Regent    New Leipzig    Selfridge  
 Planting date: 4/20            4/19            4/19            4/18            4/18  
 Harvest date: 8/02            8/03            8/03            8/06            8/06  
 Planting rate: 1.1 million live seeds/A  
 Fertilizer applied: 44 lbs/A 18-46-0  
 Variety: Pioneer 2369  
 1000 kernel weight: large - 25.0g, bin - 21.0g, small - 19.0g

1990 Hettinger Crop/Forage Companion Crop Trial

Fall grazing of winter wheat is a common practice in several areas of the U.S. Grazing of small grain stubble after harvest is also a common practice. This trial was initiated to determine the possibility of planting hard red spring wheat/hard red winter wheat mixtures in the spring, harvesting the HRSW for grain and then grazing the remaining stubble/HRWW foliage.

Grandin HRSW and Siouland HRWW were planted at 4 different ratios along with a pure stand of HRSW and a pure stand of HRWW. Treatments were 1) 100% HRWW, 2) 50% HRSW/50% HRWW, 3) 75% HRSW/25% HRWW, 4) 85% HRSW/15% HRWW, 5) 95% HRSW/5% HRWW, and 6) 100% HRSW. All treatments were planted in a randomized complete block design at Hettinger with 4 replications at a seeding rate of 1.1 million live seeds per acre. Forty-four pounds of 18-46-0 fertilizer was broadcast and incorporated prior to planting and all treatments were treated with 1 pint per acre Buctril plus 1 pint per acre MCP ester to control broadleaf weeds. Grain was harvested on 8/2/90. HRWW foliage/HRSW stubble was cut and dried on 9/12/90. Foliage yields were analyzed on a dry weight bases.

Ideal springtime growing conditions favored germination and seedling growth. Lack of precipitation during the late summer months (1.95" from July - Sept.) resulted in all HRWW dying and poor foliage yields. Stem and leaf rust was prevalent on the HRWW beginning in July.

Highly significant statistical differences were detected for grain yields between mixtures (Table 1). As would be expected, there was a linear correlation ( $r = 0.87$ ) between grain yield and percent HRSW in the mixture. There were no statistical difference for test weight between treatments. Slight but significant differences for grain protein were detected.

Based on data presented in this trial, there is no distinct advantage to planting HRSW/HRWW mixtures to achieve greater forage production however, further studies will need to be conducted to confirm this. Future studies will also need to be conducted to address disease problems and other possible crop/forage companion crop combinations.

Table 1.

Treatment	Grain yield bu/A	Foliage yield tons/A	Test weight lbs/bu	Grain protein %
100% HRWW		0.44		
50% HRSW/50% HRWW	39.2	0.44	61.8	16.5
75% HRSW/25% HRWW	54.8	0.45	61.8	16.6
85% HRSW/15% HRWW	56.8	0.47	62.2	16.6
95% HRSW/5% HRWW	61.1	0.56	62.0	16.9
100% HRSW	64.8	0.42	61.9	17.0
C.V. %	7.5		0.6	1.4
LSD 5%	6.3		n.s.	0.4
LSD 1%	8.8		n.s.	n.s.
# of reps	4	1	4	4

1990 HETTINGER FERTILIZER TRIAL

Calcium sulfate (gypsum) is a commercial amendment used in the reclamation of sodic soils. Sodic soils are treated by replacing the adsorbed sodium with a soluble source of calcium. Calcium solubilized from gypsum replaces sodium and the sodium is leached out. The sulfate component of gypsum contains sulfur, an essential secondary nutrient for plant growth. Sulfur deficiencies have been observed in North Dakota, although rarely. Gypsum is not a recommended source of sulfur.

Many crop producers in this area have reported positive crop responses to applications of potassium chloride (potash). Potash is a commonly used fertilizer in many parts of the U.S. Small grain crops require about 2.5 pounds of potassium per bushel of grain. Potassium levels in most of our soils are adequate (greater than 500 lbs/A). The chloride constituent of potash is an essential plant micronutrient and is utilized in the photosynthetic process. Chloride deficiencies are very rare. Symptoms may include leaf yellowing or bronzing and poor root development. Exact plant requirements are not known.

This trial was initiated to determine agronomic and quality characteristics of HRSW which had gypsum and potash fertilizer applied with the seed. Treatments (fertilizer types) plus a check were applied in a randomized complete block design at Hettinger. Treatments were 1) 50 lbs/A gypsum and 2) 60 lbs/A potash. These treatments and the check also had 100 lbs/A 46-0-0 + 44 lbs/A 18-46-0 broadcast and incorporated prior to planting.

Results from this trial (Table 1) show a slight yield and heads/A advantage, although not significantly, for both gypsum and potash treatments. Quality factors were essentially equal for all treatments.

Table 1.

Treatment	Rate lbs/A	Yield bu/A	Test weight lbs/bu	Grain protein %	Heads/A x 1000	Plant height cm
Check	0	19.9	57.0	18.3	1352	63.5
Gypsum	50	20.2	56.6	18.0	1423	62.8
Potash	60	23.6	57.5	17.6	1493	63.2
C.V. %		31.1	1.8	5.2		
LSD 5%		n.s.	n.s.	n.s.		
# of reps		4	4	4	4	4

Variety: Grandin

Planting date: 4/23

Seeding rate: 1.1 million live seeds/A

Herbicide applied: 1 pt/A Hoelon + 1 pt/A Buctril + 2 oz/A MCPE

Harvest date: 8/2

n.s. = no statistical difference between treatments