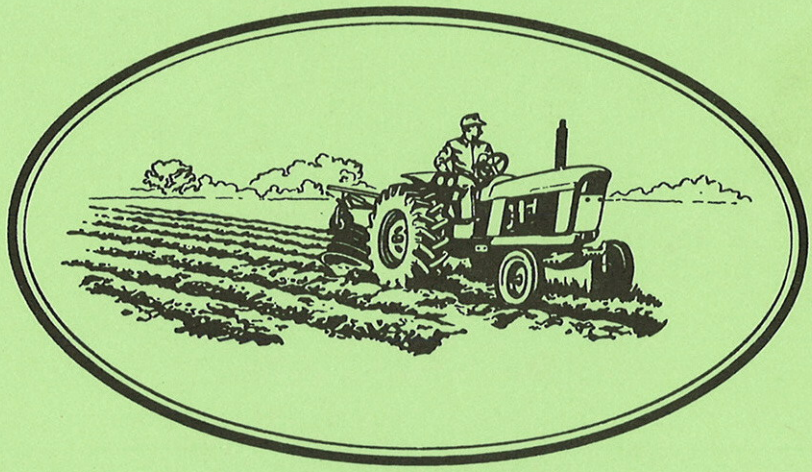
SECOND
ANNUAL

WESTERN DAKOTA

CROPS DAY RESEARCH REPORT



HETTINGER ARMORY
DEC. 12, 1985

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Dickinson Branch
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2ND ANNUAL WESTERN DAKOTA CROPS DAY
HETTINGER ARMORY HETTINGER, NORTH DAKOTA
THURSDAY, DECEMBER 12, 1985

(MST) 9:00 AM . . . . . REGISTRATION, Coffee, free time to visit with Ag Industry Program Sponsors.

10:30 AM . . . . . Reports of Agronomic Research conducted at the Dickinson Station.
- Mr. Tom Conlon, Super. & Agronomist
Dickinson Experiment Station

11:15 AM . . . . . Reports of Agronomic Research conducted at the Hettinger Station.
- Mr. Jim Jakicic, Agronomist
Hettinger Experiment Station

12:00 Noon . . . . . LUNCH provided by Program Sponsors and free time to visit with Sponsors.

1:30 P.M. . . . . WELCOME
Hettinger Chamber of Commerce
and
- Dr. H.R. Lund, Director
NDSU Agricultural Experiment Station

1:45 P.M. . . . . No-Till Cropping Systems
- Dr. Darrel Smika, Research Leader
USDA-ARS Great Plains Research Center
Akron, Colorado

2:25 P.M. . . . . So---You Want to be a No-Till Farmer...
- Mr. John Leppert
Sarles Area Farmer
Sarles, ND

3:05 P.M. . . . . Agricultural Industry Updates
Success Hard Red Spring Wheat
- Mr. Monte Reiner
Cenex Seed Company

Landmaster Herbicide for Fallow & No-Till
- Mr. Adrian Crance
Monsanto Agricultural Chemicals

New Additions to DB Green Seed Treatment
- Mr. Myron Jacobson
Agsco, Inc.

3:35 P.M. . . . . CONCLUSION - Coffee and opportunity to visit with Ag Industry Program Sponsors

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TABLE OF CONTENTS

DICKINSON EXPERIMENT STATION

Dickinson, North Dakota

Growing Conditions - 1985

Fall precipitation during the last four months of 1984 was slightly below average as was winter precipitation during the first three months of 1985, the deficiency during this seven month period amounting to 1.12 inches of water. Precipitation during the rest of the growing season was just about normal. April precipitation was considerably lower than average, amounting to .87 inches which came in the form of seven light showers scattered through the month. May rainfall was most effective for crop growth. Two periods of rain, from May 11th through the 15th amounting to 2.63 inches and from May 27th through the 31st of 1.59 inches plus a shower of .09 on the 22nd, resulted in a well above average of 4.31 inches for the month.

June rainfall, while below average was fairly well distributed and with the cool temperatures occurring during the month was sufficient to promote excellent growth of small grain crops. Row crops, principally corn, sorghum and sunflowers did not thrive during the below average temperatures in June. Weather conditions generally were not conducive to development of foliar diseases on small grain crops. Grasshoppers were a severe problem in certain localized areas in southwestern North Dakota during the year but were not severe at the station.

Weather Data Summary
Dickinson, 1985

Precipitation	1984-85	94 year average
Sept. - Dec. 1984	2.74	3.15
Jan. - Mar. 1985	.82	1.53
April - June	7.31	7.30
July - Aug.	3.66	3.91
Total	14.53	15.89

Average Temperature ^{o}F	1985 Avg.	94 year average
April	45	41
May	57	54
June	56	61
July	68	69
August	61	67

GROWING CONDITIONS
HETTINGER RESEARCH AND EXTENSION CENTER
-1985-

Winter precipitation at Hettinger was slightly below normal and 1983-1984 precipitation was 2.5" below normal which resulted in below average soil water recharge for the 1985 growing season. January was extremely cold with 3 consecutive days of -10 degree F soil temperatures resulting in extensive winter wheat injury and winter kill of alfalfa. Small grain yields and test weights were below average due to drought and above average temperatures from April to June. Available soil moisture was low but small grains benefited from the unusually cool June weather while kernel fill was in progress. These cool temperatures however delayed growth and maturation of late season crops. Corn in the area was chopped for silage since too few growing degree days accumulated to mature the corn for grain. A late June freeze (6/29) injured both alfalfa and late seeded crops.

Cultural problems of major importance this year included; wild oats cutworms, and grasshoppers. Early season warm temperatures germinated wild oats before good crop competition was established resulting in extensive post emergent control efforts. Cutworms caused a large amount of damage to sunflowers and many fields required replanting. Early and mid summer grasshopper hatches were severe in concentrated sections of the southwest.

WEATHER DATA SUMMARY
HETTINGER, 1985

Precipitation	1984-85	30 Year Avg.
Sept.-Dec. 1984	2.63	2.97
Jan.-Mar. 1985	0.96	1.13
April-June	5.75	8.08
July-August	3.26	3.81
Total	12.60	15.99

Average Temperature F	1985 Avg.	30 Year Avg.
April	47.6	42
May	58.4	54
June	58.4	64
July	72.2	70
August	64.1	69

Table 1. 1985 DICKINSON ON-STATION
HARD RED SPRING WHEAT VARIETY TRIAL

Variety	Bushels per Acre	Test Weight lbs./bu.	Heading date	Variety	Bushels per Acre	Test weight lbs./bu.	Heading date
Walera	58.7	60.0	6-30	747	46.7	59.5	6-21
ND 606	57.8	59.5	6-25	ND 618	46.1	60.0	6-25
Len	52.9	60.0	6-25	ND 621	46.0	59.0	6-28
ND 614	52.6	61.0	6-25	Katepwa	45.9	58.5	6-25
Apex 83	52.5	60.5	6-22	ND 616	45.5	57.0	6-25
Norak	52.4	61.0	6-25	Norseman	45.5	59.5	6-29
Leader	52.2	58.5	6-25	Wheaton	45.4	59.0	6-29
HY-320	52.1	60.0	6-27	Alex	43.6	61.5	6-29
Glenman	52.1	58.5	6-29	Buckshot	42.6	59.0	6-27
Stoa	51.6	59.5	6-26	ND 619	41.1	61.0	6-26
A99AR	51.4	58.5	6-28	Leif	40.9	60.0	6-29
HS81-55	51.1	59.0	6-25	Columbus	40.8	59.0	7-01
Butte	49.7	61.0	6-23	Marshall	40.4	59.5	6-27
ND 604	47.8	61.0	6-25	Waldron	40.4	58.0	6-25
Challenger	47.7	60.0	6-21	SD 8026	39.7	58.0	6-24
Guard	47.3	59.5	6-22	ND 617	39.6	61.5	6-25
ND 600	47.3	60.0	6-24	ND 597	38.2	60.5	6-24
Success	47.0	59.5	6-30	2369	37.2	59.5	6-27
ND 620	47.0	61.0	6-24	Coteau	36.5	57.5	6-30
ND 615	46.7	62.0	6-28	Erik	36.3	59.5	6-30
				Highest	58.7 bu.	60.0 lbs.	
				Lowest	36.3	59.5	
				C.V. %	13.2		
				LSD 5%	6.9		

Seeding Rate: 1,000,000 live seed/acre, (approx. 1 bu./ac.)
Seeding Date: April 22
Fertilizer applied: 50 lbs./ac. 18-46-0
Yield Goal: 45 bu./ac.
Herbicide Applied: Hoelon - Buctril tank mix.
Harvest Date: August 15

Table 2. 1985 HETTINGER ON-STATION
HARD RED SPRING WHEAT VARIETY TRIAL

Variety	Bushels per Acre	Test Weight lbs./bu.	Grain Protein %
Norak	34.6	54.1	
ND 616	33.6	55.5	
HY 320	32.8	56.0	
ND 617	32.6	58.5	
ND 618	30.9	55.3	
ND 606	30.6	56.1	
Leo 747	30.0	53.4	
ND 621	29.9	54.1	
Buckshot	29.5	53.8	
HS81-55	29.3	53.1	
2369	28.2	55.2	
Butte	28.2	55.3	
Wheaton	28.1	51.8	
ND 620	28.0	57.3	
Apex 83	27.8	54.0	
Waldron	27.7	57.1	
ND 614	27.6	54.9	
Challenger	27.6	54.2	
ND 619	27.4	55.0	
Glenman	27.3	53.7	
SD 8026	26.9	52.3	
Stoa	26.9	53.8	
Marshall	26.8	53.4	
ND 615	26.4	56.1	
Olaf	25.9	54.9	
Alex	25.8	55.9	
Success	25.7	54.3	
Leif	25.7	53.9	
Norseman	25.6	53.9	
A99AR	25.4	53.6	
Guard	24.8	51.7	
Leader	24.1	54.8	
Coteau	24.1	54.2	
ND 597	24.0	53.3	
Oslo	23.5	52.1	
Lew	23.1	54.5	
ND 604	22.8	52.9	
Era	21.8	54.7	
MT7926	21.8	55.2	
Katepwa	21.6	52.8	
Len	21.6	54.4	
Columbus	20.2	54.9	
Solar	19.8	54.2	
Walera	18.2	53.5	
Erik	14.8	52.8	
Highest	34.6 bu.	58.5 lbs.	
Lowest	14.8	51.7	
C.V. %	14.3	2.81	
LSD 5%	5.19	2.12	
LSD 1%	6.82	2.78	
# of Reps	4	4	

Seeding Rate: 1,000,000 live seeds/acre, (approx. 1 bu./ac.)
Seeding Date: April 17th
Fertilizer Applied: 50 lbs./ac. 18-46-0
Yield Goal: 45 bu./ac. (soil residual nutrients + fertilizer applied)
Herbicide Applied: 1 1/2 pint/ac. Bronate
18 gal per acre spray volume, 5 MPH
Harvest Date: August 7th

Table 3. 1985 DICKINSON OFF-STATION
HARD RED SPRING WHEAT VARIETY TRIALS

Variety	Bushels per acre						
	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6-Site
Leo 747	46.7	33.1	36.6	66.1	69.3	48.6	50.1
Alex	43.6	29.7	36.6	57.0	54.5	38.0	43.2
Apex 83	52.5	30.3	38.0	60.8	67.1	40.5	48.2
Buckshot	42.6	30.5	34.4	61.1	61.1	39.1	43.6
Butte	49.7	22.2	29.2	51.0	49.0	32.1	38.9
Coteau	36.5	29.4	34.9	59.7	55.3	35.7	41.6
Guard	47.3	32.2	38.5	63.0	65.2	43.0	48.3
Leif	40.9	33.3	36.9	64.4	61.1	41.6	46.4
Len	52.9	32.2	35.8	63.6	65.7	40.8	48.5
ND 597	38.2	24.4	29.2	57.0	52.8	29.6	37.4
Norak	52.4	30.8	39.1	68.3	69.9	44.4	50.8
Norseman	45.5	33.6	42.1	70.4	68.8	43.8	50.7
Stoa	51.6	29.7	36.0	63.9	58.6	34.6	45.7
Success	47.0	31.9	39.1	70.7	73.2	40.8	50.5
Wheaton	45.4	32.8	39.6	69.6	71.8	41.3	50.1
LSD 5%	6.9	3.6	4.8	3.9	4.6	3.7	
CV%	13.2	11.6	13.0	6.1	7.3	9.2	
Seeding date	4-22	5-1	4-29	4-30	4-26	4-19	
Harvest date	8-15	8-14	8-15	8-19	8-20	8-9	

Seeding Rate: (approx. 1 bu./acre)
Yield Goal: 45 bu./acre.
Fertilizer Applied: Based on soil tests at each site.
Herbicide Applied: Hoelon - Buctril tank mix.

Table 4. 1985 Hettinger and Off-Station Hard Red Spring Wheat Variety Trials.

Bushels per Acre

Variety	Hettinger	Regent	Flasher	Thunderhawk	Scranton	Average 5 Sites	Average 11 Sites
Leo 747	30.0	33.8	45.3	47.0	52.3	41.7	46.3
Alex	25.8	31.5	40.6	43.4	66.9	41.6	42.5
Apex 83	27.8	31.6	37.4	44.2	56.7	39.5	44.3
Buckshot	29.5	32.3	32.8	43.0	54.5	38.4	41.9
Butte	28.2	29.2	34.2	40.3	55.2	37.4	38.2
Coteau	24.1	28.1	30.8	36.7	47.4	33.4	38.1
Guard	24.8	30.0	38.6	43.7	57.7	39.0	44.0
Leif	25.7	31.9	37.8	43.8	66.8	41.2	44.0
Len	21.6						44.7*
ND 597	24.0	29.4	33.6	39.3	65.1	38.3	38.4
Norak	34.6	35.1	34.1	45.7	65.4	43.0	47.3
Norseman	25.6	29.7	27.8	41.0	61.5	37.1	44.5
Stoa	26.9	31.6	33.6	43.0	49.9	37.0	41.8
Success	25.7	29.9	38.7	45.6	52.0	38.4	45.0
Wheaton	28.1	32.3	33.2	44.5	56.4	38.9	45.0
Lew	23.1	28.1	33.2	39.8	46.3	34.1	
Marshall	26.8	30.0	27.3	42.1	57.6	36.8	
LSD @ 5%	5.2	NS	3.9	4.6	10.1	6.4	5.5
CV %	14.3	9.9	7.9	7.5	12.4		
Seeding Date	April 17	April 18	April 19	April 19	April 18		
Harvest Date	Aug. 7	Aug. 5	Aug. 6	Aug. 5	Aug. 19		

* Average of 7 sites

Table 5. 1985 DICKINSON OFF-STATION
HARD RED SPRING WHEAT VARIETY TRIALS

Variety	Test Weight lbs./bu.						
	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6-Site
Leo 747	59.5	58.5	60.5	59.5	58.5	59.0	59.3
Alex	61.5	58.0	61.0	59.0	60.0	61.5	60.2
Apex 83	60.5	58.0	61.0	60.0	59.5	61.5	60.1
Buckshot	59.0	56.0	61.0	57.5	57.5	61.0	58.7
Butte	61.0	59.0	61.5	60.0	60.5	61.0	60.1
Coteau	57.5	55.0	58.5	58.5	58.5	56.5	57.4
Guard	59.5	55.0	60.0	60.0	60.0	59.5	59.0
Leif	60.0	58.0	62.0	60.5	60.0	62.5	60.1
Len	60.0	58.0	60.0	58.5	59.5	60.0	59.3
ND 597	60.5	57.0	60.0	60.0	59.5	59.0	59.3
Norak	61.0	57.0	61.0	60.5	61.0	61.5	60.3
Norseman	59.5	56.0	59.5	58.0	58.5	57.5	58.2
Stoa	59.5	58.0	61.0	59.5	59.5	58.0	59.3
Success	59.5	56.0	60.0	58.5	59.0	56.5	58.3
Wheaton	59.0	55.0	58.0	58.5	59.0	57.0	57.8
Seeding Date	4-22	5-1	4-29	4-30	4-26	4-19	
Harvest Date	8-15	8-14	8-15	8-19	8-20	8-9	

Table 6. 1985 Hettinger and Off-Station Hard Red Spring Wheat Variety Trials.

Test Weight lbs./bu.

Variety	Hettinger	Regent	Flasher	Thunderhawk	Scranton	Average 5 Sites	Average 5 Sites
Leo 747	53.4	55.9	56.9	58.6	59.0	56.8	58.1
Alex	55.9	56.9	59.5	61.7	60.4	58.9	59.6
Apex 83	54.0	57.3	59.5	60.3	60.7	58.4	59.3
Buckshot	53.8	54.5	58.0	59.3	58.0	56.7	57.8
Butte	55.3	57.1	59.4	61.0	59.8	58.5	59.6
Coteau	54.2	53.9	57.6	59.3	58.2	56.6	57.1
Guard	51.7	55.3	58.7	60.0	59.9	57.1	58.1
Leif	53.9	55.9	59.4	61.3	61.3	58.4	59.5
Len	54.4						58.6*
ND 597	53.3	56.4	58.9	60.4	60.4	57.9	58.7
Norak	54.1	56.2	59.8	60.7	60.5	58.3	59.4
Norseman	53.9	53.0	57.9	59.1	58.6	56.5	57.4
Stoa	53.8	55.2	58.8	60.3	59.1	57.4	58.4
Success	54.3	55.3	57.3	59.4	57.4	56.7	57.6
Wheaton	51.8	54.3	55.7	58.7	58.4	55.8	56.9
Lew	54.5	55.7	60.6	61.3	60.2	58.5	
Marshall	53.4	54.5	57.4	59.5	58.3	56.6	

* Average of 7 sites

Table 7. 1985 DICKINSON OFF-STATION
HARD RED SPRING WHEAT VARIETY TRIALS

Variety	Protein Percent @ 14% Moisture						
	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6-Sites
Leo 747	14.1	15.3	12.9	14.3	12.7	13.6	13.8
Alex	14.6	15.8	12.2	13.3	11.3	12.8	13.3
Apex 83	13.6	14.0	11.6	13.0	11.0	11.8	12.5
Buckshot	14.5	16.0	11.9	12.8	11.5	11.6	13.1
Butte	13.6	14.2	12.6	13.8	10.6	12.5	12.9
Coteau	15.7	16.9	14.3	14.8	13.1	15.0	15.0
Guard	13.8	15.5	12.5	13.1	11.2	12.8	13.2
Leif	14.0	15.2	11.5	13.0	11.0	11.6	12.7
Len	14.3	16.1	13.3	13.9	11.8	12.5	13.7
ND 597	15.1	14.7	13.0	13.9	11.9	13.5	13.7
Norak	13.7	15.6	12.0	12.9	11.1	12.1	12.9
Norseman	14.6	16.1	13.2	13.8	12.1	13.1	13.8
Stoa	13.9	14.2	12.1	13.3	11.7	13.9	13.2
Success	14.4	15.3	12.1	12.8	11.2	13.4	13.2
Wheaton	13.6	15.0	12.0	12.6	11.1	12.9	12.9

Table 8. 1985 HETTINGER OFF-STATION
HARD RED SPRING WHEAT VARIETY TRIALS

Protein Percent @ 14% Moisture

Variety	Hettinger	Regent	Flasher	Thunderhawk	Scranton	Average 5-Sites	Average 11-Sites
Leo 747	17.9	17.9	16.4	14.2	13.8	16.0	14.8
Alex	19.5	18.3	16.1	13.3	14.0	16.2	14.6
Apex 83	16.9	17.0	14.9	13.8	13.4	15.2	13.7
Buckshot	18.6	17.2	16.2	13.7	13.2	15.8	14.3
Butte	17.7	15.8	15.8	14.1	14.3	15.5	14.1
Coteau	19.1	18.4	17.6	15.5	16.0	17.3	16.1
Guard	17.9	17.6	15.6	13.3	14.7	15.8	14.4
Leif	19.1	16.7	15.2	13.5	13.7	15.6	14.0
Len	19.5	18.7	16.1*	13.7*	13.7	16.3	14.9
ND 597	18.8	17.4	16.1	13.7	14.3	16.1	14.8
Norak	18.0	15.8	15.3	12.9	13.4	15.1	13.9
Norseman	18.6	17.9	15.8	14.0	13.1	15.9	14.7
Stoa	19.6	17.9	15.9	13.9	14.6	16.4	14.7
Success	18.7	18.2	16.0	13.6	13.6	16.0	14.5
Wheaton	17.8	17.4	15.6	13.3	13.5	15.5	14.1
Marshall	19.4	17.8	15.3	13.5	14.2	16.0	-

*Calculated value.

Table 9. 1985 DICKINSON ON-STATION
DURUM VARIETY TRIAL

Variety	Bushels per Acre	Test weight lbs./bu.	Heading date
Lloyd	55.4	60.5	6-28
D81183	51.9	61.0	6-27
D 81114	51.4	62.0	6-27
D 8193	50.1	60.0	6-27
D 81151	49.2	60.5	6-27
D 8191	49.1	60.5	6-28
C 881-4	48.5	59.5	6-29
D 8104	48.2	61.0	6-26
D 79104	48.1	60.5	6-28
D 8016	46.5	60.0	6-26
HD 81-466	46.2	61.5	6-25
FA 882-268	45.2	60.0	6-27
D 81154	44.7	61.0	6-28
Cando	44.7	61.5	6-28
D 8012	44.6	60.5	6-25
D 79209	44.4	62.0	6-28
D 79168	44.0	62.0	6-27
D 8019	42.7	60.5	6-27
Monroe	42.0	60.0	6-25
D 7925	41.0	59.5	6-21
D 79103	38.6	60.5	6-29
D 8172	38.1	60.5	6-28
Ward	36.4	60.5	6-27
Vic	33.4	60.0	6-25
Rolette	31.3	60.0	6-24
HD 81-485	31.1	59.5	6-24
LSD 5%	1.4		
C.V. %	17.0		

Seeding Date: April 23
Harvest Date: August 9

Table 10.

1985 HETTINGER ON-STATION
DURUM VARIETY TRIAL

Variety	Bushels per Acre	Test Weight lbs./bu.	Test Weight (Rank)
D 79168	34.7	58.8	(5)
Lloyd	34.0	58.4	(7)
C881-4	33.9	59.2	(3)
Monroe	33.8	55.9	(19)
HD81-485	33.4	59.6	(1)
D 8194	33.2	58.4	(7)
D 81151	33.1	55.0	(23)
D 79103	32.9	59.4	(2)
D 8193	32.8	56.1	(18)
HD81-466	31.8	58.4	(7)
D 79209	31.6	58.6	(6)
D 8191	31.4	56.9	(13)
D 81154	31.4	56.7	(15)
D 81114	31.0	57.5	(11)
D 8172	31.0	56.4	(17)
Cando	30.5	56.8	(14)
D 81183	30.1	57.7	(10)
Crosby	29.8	55.7	(20)
D 7925	29.4	56.8	(14)
Rolette	28.8	58.9	(4)
Vic	28.4	58.2	(9)
D 79104	28.3	56.5	(16)
Ward	26.0	57.4	(12)
FA882-268	25.8	55.5	(21)
D 8012	25.7	56.7	(15)
Rugby	25.6	58.3	(8)
D 8019	23.3	55.4	(22)
D 8016	22.0	54.5	(24)
Highest	34.7 bu.	59.6 lbs.	
Lowest	22.0	54.5	
C.V. %	12.6	1.87	
LSD 5%	5.33	1.51	
LSD 1%	7.06	2.00	

Seeding Rate: 1,000,000 live seeds/acre, (approx. 1 bu./ac.)
Seeding Date: April 17th
Fertilizer Applied: 50 lbs./ac. 18-46-0
Yield Goal: 45 bu./ac. (soil residual nutrients + fertilizer applied)
Herbicide Applied: 1 1/2 pint/ac. Bronate
18 gal. per acre spray volume, 5 MPH
Harvest Date: August 7th

Table 11. 1985 DICKINSON OFF-STATION
DURUM VARIETY TRIALS

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	Average 6 Sites
		Bushels per acre					
Cando	44.7	24.2	41.8	59.4	49.3	45.9	44.2
Lloyd	55.4	24.8	48.1	64.2	56.3	49.5	49.7
Monroe	42.0	28.3	41.3	61.6	53.7	50.7	46.3
Vic	33.4	23.7	36.0	55.0	53.4	47.3	41.5
Ward	36.4	24.5	40.2	49.9	46.4	47.9	40.9
LSD 5%	1.4	3.7	3.4	5.9	3.9	5.5	4.0
C.V. %	17.0	13.4	7.6	7.7	5.7	10.5	
		Test weight lbs./bu.					
Cando	61.5	56.0	62.0	60.0	59.0	62.5	60.2
Lloyd	60.5	56.0	61.0	59.5	59.5	62.5	59.8
Monroe	60.0	57.5	62.0	60.5	59.0	62.5	60.3
Vic	60.0	56.5	61.5	60.5	60.5	62.5	60.3
Ward	60.5	57.0	61.5	59.5	60.0	63.0	60.3
Dates							
Seeding:	4-23	5-1	4-29	4-30	4-30	4-19	
Harvest:	8-9	8-14	8-15	8-19	8-20	8-9	

Seeding Rate: (approx. 70 lbs./acre)
Yield Goal: 45 bu./acre
Fertilizer Applied: Based on soil tests at each site.
Herbicide Applied: Hoelon Buctril tank mix.

Table 12. 1985 Hettinger and Off-Station Durum Variety Trials.

Bushels per Acre

Variety	Hettinger	Regent	Flasher	Thunderhawk	Scranton	Average 5 Sites	Average 11 Sites
Cando	30.5	31.7	37.1	45.8	90.9	47.2	45.6
Lloyd	34.0	31.2	39.7	47.9	86.3	47.8	48.8
Monroe	33.8	33.4	37.9	44.1	75.3	44.9	45.6
Vic	28.4	30.2	38.5	43.4	72.9	42.7	42.0
Ward	26.0	29.7	33.4	42.5	73.6	41.0	41.0
Crosby	29.8	31.0	36.9	43.8	73.4	43.0	
LSD @ 5%	5.3	NS	3.1	2.7	7.2	4.9	4.5
CV%	12.6	5.6	5.6	4.0	6.1		

Test Weight lbs./bu.

Cando	56.8	56.3	59.8	60.8	62.2	59.2	59.7
Lloyd	58.4	58.6	61.4	62.6	61.1	60.4	60.1
Monroe	55.9	56.4	59.7	59.9	62.3	58.8	59.6
Vic	58.2	58.6	61.3	62.1	62.7	60.6	60.4
Ward	57.4	56.9	60.3	61.0	62.5	59.6	60.0
Crosby	55.7	55.7	60.2	61.1	62.8	59.1	
Seeding Date	April 17	April 18	April 19	April 19	April 19		
Harvest Date	Aug. 7	Aug. 5	Aug. 6	Aug. 5	Aug. 19		

Table 13. 1985 DICKINSON ON-STATION
OATS AND BARLEY VARIETY TRIALS

OATS			BARLEY		
Variety	Bushels per Acre	Test weight lbs./bu.	Variety	Bushels per Acre	Test weight lbs./bu.
ND 810106	99.0	34.5	Harrington	82.4	48.5
ND 810104	98.5	34.5	ND 6989	77.9	50.0
ND 820603	91.5	35.5	Lewis	77.5	50.5
ND 78355	91.5	36.5	Morex	77.4	49.0
Kelsey	90.4	36.0	Robust	75.3	48.5
W 80474	89.3	36.5	Piston	73.7	49.0
Border	88.8	30.5	Bowman	73.6	51.5
ND 810665	87.7	35.5	Hector	68.3	49.0
Moore	85.6	33.5	ND 7369	67.5	46.5
Monida	85.0	32.0	Azure	66.4	47.0
ND 810917	83.9	35.0	Hazen	64.7	47.0
Dumont	82.9	35.5	ND 7309	59.9	48.0
Otana	81.3	35.0	Glenn	53.1	48.0
Porter	81.2	35.0			
ND 78373	78.5	36.0			
Pierce	77.5	36.5			
Steele	76.4	35.0			
Proat	74.8	34.0			
Menominee	73.2	32.5			
Highest	99.0	36.5		82.4	51.5
Lowest	73.2	30.5		53.1	46.5
C.V. %	8.6			16	
LSD 5%	7.3			10.7	

Seeding Rate:	(approx. 1.5 bu./acre)	(1.3 bu./acre)
Seeding Date:	April 18	April 23
Fertilizer Applied:	50 lbs. 18-46-0	
Yield Goal:	80 bu./acre	65 bu./acre
Herbicide Applied:	Buctril	Hoelon-Buctril
Harvest Date:	August 5	August 7

Table 14. 1985 HETTINGER ON-STATION
OAT AND BARLEY VARIETY TRIALS

OAT				BARLEY			
Variety	Bushels per Acre	Test Weight lbs./bu.	Grain Protein %	Variety	Bushels per Acre	Test Weight lbs./bu.	Grain Protein %
ND 810104	66.0	29.3		Bowman	52.5	52.3	16.4
ND 78355	64.7	30.2		Hector	50.8	48.5	21.4
Otana	64.6	29.5		A6B080-761	50.6	43.3	18.1
W80474	64.0	31.2		Clark	50.5	43.7	21.2
Border	61.0	26.4		Gallatin	49.8	47.0	21.2
ND 810106	58.2	29.1		ND 6989	49.6	48.8	20.2
Porter	56.1	29.4		Azure	49.2	41.7	22.3
ND 820603	55.9	29.8		Lewis	48.7	48.4	19.6
Moore	55.6	28.7		Glenn	46.3	43.3	20.2
Dumont	54.9	31.6		Morex	46.2	41.8	19.4
Proat	54.4	31.0		Hazen	45.9	41.2	18.3
ND 810917	53.1	28.3		ND 7309	43.6	42.5	19.5
Monida	52.6	28.2		Harrington	42.9	43.5	21.1
ND 810665	52.2	30.8		Piston	42.9	43.3	21.4
Kelsey	51.0	30.5		ND 7359	37.5	43.5	19.3
Menominee	50.9	31.2		Summit	37.3	45.1	23.7
Fidler	50.7	28.8		Bumper	37.2	39.3	21.1
ND 78373	50.4	32.3		Robust	36.8	44.8	22.0
Steele	49.6	31.7		Abee	36.3	41.5	17.9
Pierce	44.2	30.4					
Highest	66.0 bu.	32.3 lbs.		Highest	52.5 bu.	52.3	23.7
Lowest	44.2	26.4		Lowest	36.3	39.3	16.4
C.V. %	13.93	3.52		C.V. %	11.93	3.86	
LSD 5%	10.95	1.49		LSD 5%	7.62	2.43	
LSD 1%	14.59	1.99		LSD 1%	10.16	3.25	
# of Reps	4	4		# of Reps	4	4	Bulk

Seeding Rate: 750,000 live seeds/acre
(approx. 1.5 bu./ac. oats and 1.3 bu./ac. barley)
Seeding Date: April 17th
Fertilizer Applied: 50 lbs./ac. 18-46-0
Yield Goal: 80 bu./ac. oats and 65 bu./ac. barley
(soil residual nutrients + fertilizer applied)
Herbicide Applied: 1 1/2 pint/ac. Bronate, applied May 29th
18 gal. per acre spray volume, 5 MPH
Harvest Date: August 7th

Table 15. 1985 DICKINSON OFF-STATION OAT VARIETY TRIALS

Variety	Dickinson	Beach	Beulah	Glen Ullin	Hannover	Manning	6-Sites
			Bushels per acre				
Border	88.8	19.0	76.6	88.2	88.2	69.8	71.8
Dumont	82.9	21.9	78.6	90.8	94.2	67.2	72.6
Monida	85.0	26.6	84.9	94.3	91.5	71.5	75.6
Otana	81.3	23.2	75.9	87.8	94.9	69.4	72.1
Porter	81.2	25.9	81.4	96.4	105.3	75.6	77.6
Steele	76.4	22.5	74.6	91.7	82.4	69.4	69.5
LSD 5%	7.3	4.6	6.7	5.2	6.0	6.1	5.9
CV%	8.6	15.3	6.6	11.8	5.1	6.1	
			Test Weight lbs./bu.				
Border	30.5	30.0	31.0	33.0	32.0	30.5	31.2
Dumont	35.5	35.5	36.5	38.5	37.5	36.5	36.7
Monida	32.0	31.0	36.0	35.5	34.5	32.0	33.5
Otana	35.0	32.5	38.0	37.5	37.0	36.5	36.1
Porter	35.0	33.0	37.0	37.5	37.5	37.0	36.2
Steele	35.0	34.5	36.5	37.0	36.0	35.5	35.8
Seeding Date:	4-18	5-1	4-29	4-30	4-26	4-19	
Harvest Date:	8-05	8-14	8-15	8-19	8-20	8-09	

Seeding Rate: (approx. 1.5 bu./acre)
Yield Goal: 80 bu./acre
Fertilizer Applied: Based on soil test at each site.
Herbicide Applied: Buctril.

Table 16. 1985 Hettinger and Off-Station Oat Variety Trials.

Bushels per Acre

Variety	Hettinger	Regent	Flasher	Thunderhawk	Scranton	Average 5 Sites	Average 11 Sites
Border	61.0	76.4	74.7	64.8	96.1	74.6	73.1
Dumont	54,9	62.5	61.8	54.1	80.9	62.8	68.2
Monida	52.6	67.7	67.2	67.3	106.4	72.2	74.1
Otana	64.6	75.9	70.7	68.5	91.8	74.3	73.1
Porter	56.1	69.9	70.7	71.8	92.7	72.2	75.2
Steele	49.6	57.9	56.6	50.9	68.0	56.6	63.6
Kelsey	51.0	68.0	67.2	52.4	87.2	65.2	
Proat	54.4	64.8	62.5	43.9	76.7	60.3	
Pierce	44.2	64.0	57.1	44.2	81.4	58.2	
LSD @ 5%	11.0	7.5	8.4	5.6	11.7	9.1	7.6
CV %	13.9	7.6	8.8	6.6	9.2		
Seeding Date	April 17	April 18	April 19	April 19	April 18		
Harvest Date	Aug. 7	Aug. 5	Aug. 6	Aug. 5	Aug. 19		

Test Weight lbs./bu.

Border	26.4	28.7	28.6	33.1	33.4	30.0	30.7
Dumont	31.6	35.1	35.5	38.5	37.0	35.5	36.2
Monida	28.2	29.8	30.9	35.1	33.0	31.4	32.5
Otana	29.5	33.2	33.6	38.7	36.5	34.3	35.3
Porter	29.4	33.8	33.5	38.5	37.1	34.5	35.4
Steele	31.7	35.4	34.8	37.4	36.5	35.2	35.5
Kelsey	30.5	32.7	34.2	37.4	36.0	34.2	
Proat	31.0	33.8	34.8	37.5	36.8	34.8	
Pierce	30.4	34.5	35.0	37.8	37.0	34.9	

Table 17. 1985 DICKINSON OFF-STATION
BARLEY VARIETY TRIALS

Variety	Dickinson	Beach	Beulah	Glen Ullin	Han-nover	Man-ning	6-Sites
			Bushels per acre				
Azure	66.4	25.6	59.3	49.5	64.6	59.7	54.2
Bowman	73.6	28.3	61.2	59.6	65.6	56.9	57.5
Hazen	64.7	28.8	55.6	61.9	59.6	57.9	54.8
Hector	68.3	35.6	54.7	58.7	64.2	65.3	57.8
Morex	77.4	38.8	63.0	55.9	69.7	65.3	61.7
Piston	73.7	20.1	64.4	63.7	76.6	64.2	60.5
LSD 5%	10.7	6.0	4.8	11.5	6.9	7.9	7.9
CV%	16.0	15.8	6.2	15.3	8.1	9.0	
			Test Weight lbs./bu.				
Azure	42.5	38.0	43.0	43.0	44.0	43.0	42.3
Bowman	46.0	44.5	47.5	47.0	47.5	47.5	46.7
Hazen	43.0	37.5	45.0	43.0	44.5	45.0	43.0
Hector	45.0	43.0	45.0	45.5	47.5	47.5	45.6
Morex	45.0	39.0	44.0	44.0	44.5	44.0	43.4
Piston	47.0	43.0	47.0	45.0	48.0	48.0	46.3
Seeding Date:	4-23	5-01	4-29	4-30	4-26	4-19	
Harvest Date:	8-07	8-14	8-15	8-16	8-20	8-09	

Seeding Rate: (approx. 1.3 bu./acre
Yield Goal: 65 bu./acre
Fertilizer Applied: Based on soil test at each site.
Herbicide Applied: Hoelon-Buctril

Table 18. 1985 Hettinger and Off-Station Barley Variety Trials

Bushels per Acre

Variety	Hettinger	Regent	Flasher	Thunderhawk	Scranton	5 Sites	11 Sites
Azure	49.2	56.6	56.1	51.0	88.7	60.3	57.0
Bowman	52.5	78.8	75.7	70.3	98.5	75.2	65.5
Hazen	45.9	53.1	49.1	46.7	102.7	59.5	56.9
Hector	50.8	72.3	64.7	67.2	107.5	72.5	64.5
Morex	46.2	55.8	42.2	43.7	81.7	53.9	58.2
Piston	42.9	63.0	57.7	56.6	112.8	66.6	63.2
Robust	36.8	53.1	39.7	44.8	100.4	55.0	
LSD @ 5%	7.6	3.8	9.5	5.4	11.4	8.0	8.2
CV %	11.9	4.2	11.6	6.6	7.7		
Seeding Date	April 17	April 18	April 19	April 19	April 18		
Harvest Date	Aug. 7	Aug. 5	Aug. 6	Aug. 5	Aug. 19		

Test Weight lbs./bu.

Azure	41.7	42.6	44.0	45.7	48.9	44.6	43.3
Bowman	52.3	49.9	50.3	50.8	52.6	51.2	48.7
Hazen	41.2	41.1	44.5	45.1	48.5	44.1	43.5
Hector	48.5	47.0	47.4	49.2	50.9	48.6	47.0
Morex	41.8	41.3	44.7	45.7	48.6	44.4	43.9
Piston	43.3	45.0	45.4	47.1	50.9	46.3	46.3
Robust	44.8	43.3	46.4	46.2	50.3	46.2	

Table 19. 1985 DICKINSON ON-STATION
WINTER RYE VARIETY TRIALS

Variety	Bushels per Acre	Test Weight lbs./bu.	Heading date	Height inches
Chaupon	72.7	52.0	5-31	45
Cougar	74.3	52.5	5-27	48
Hancock	65.4	52.0	5-29	49
Musketeer	65.4	52.0	5-24	48
Puma	62.5	53.0	5-23	51

LSD 5% 7.54 bu.
CV % 10.2
Seeding date: Sept. 10, 1984
Harvest date: Aug. 5, 1985
Seeding Rate: (approx. 56 lbs./acre)
Yield Goal: 60 bu./acre
Fertilizer Applied: 50 lbs. 18-46-0
Herbicide Applied: Buctril

1985 DICKINSON ON-STATION
HARD RED WINTER WHEAT VARIETY TRIALS

Variety	Bushels per Acre	Test Weight lbs./bu.	Heading date	Height inches
Agassiz	50.0	60.5	6-14	40
Froid	46.7	59.5	6-14	39
Norstar	55.0	60.0	6-15	43
Roughrider	52.1	61.0	6-11	39
Sioux	41.4	59.5	6-06	29
Winoka	44.6	61.5	6-14	40

LSD 5% 2.47 bu.
CV% 4.8
Seeding date: Sept. 10, 1984
Harvest date: Aug. 6, 1985
Seeding Rate: (approx. 50 lbs./acre)
Yield Goal: 60 bu./acre
Fertilizer Applied: 50 lbs. 18-46-0
Herbicide Applied: Buctril

Table 20.

1985 HETTINGER ON-STATION
WINTER RYE & HARD RED WINTER WHEAT
VARIETY TRIALS

HARD RED WINTER WHEAT				WINTER RYE			
Variety	Bushels per Acre	Test Weight lbs./bu.	Grain Protein %	Variety	Bushels per Acre	Test Weight lbs./bu.	Test Weight (Rank)
Not Harvested Inconsistent Stand Due to Severe Winter Injury				Chaupon	51.4	49.2	(7)
				Musketeer	51.2	51.9	(2)
				Hancock	48.6	51.2	(5)
				Frederick	45.7	51.8	(3)
				Puma	44.1	51.6	(4)
				Cougar	42.7	50.9	(6)
				Danko	33.9	52.3	(1)
				Highest	51.4 bu.	52.3	
				Lowest	33.9	49.2	
				C.V. %	10.19	0.81	
				LSD 5%	6.87	0.61	
				LSD 1%	9.41	0.84	
				# of Reps	4	4	

Seeding Rate: 60 lb./ac. Winter Wheat (Pure Live Seed, PLS)
56 lb./ac. Winter Rye (PLS)
Seeding Date: September 13, 1984
Fertilizer Applied: None at planting due to dry soil conditions.
Applied 80 lb./ac. 28-29-0 as spring top dress.
Yield Goal: 60 bu./ac. winter wheat and rye
(soil residual nutrients + fertilizer applied)
Herbicide Applied: 1 1/2 pint/ac. Bronate, applied May 1st
18 gal. per acre spray volume, 5 MPH
Harvest Date: August 7th

Table 21.

1985 HETTINGER OFF-STATION
HARD RED WINTER WHEAT VARIETY TRIALS

REGENT

Variety	Bushels per Acre	Test Weight lbs./bu.	Grain Protein %
Entire trial winterkilled			

FLASHER

Variety	Bushels per Acre	Test Weight lbs./bu.	Grain Protein %
Roughrider	46.9	60.4	15.3
Norstar	43.2	60.3	15.2
Winoka	36.7	61.0	14.6
Agassiz	32.9	60.4	15.5
Sundance	29.3	57.9	15.3
Froid	28.6	58.4	14.8
Rose	21.7	61.3	14.7
Rita	Winterkilled		
Highest	46.9 bu.	61.3 lbs.	15.5
Lowest	21.7	57.9	14.6
C.V. %	13.69	0.88	
LSD 5%	6.95	0.78	
LSD 1%	9.52	1.07	
# of Reps	4	4	Bulk

THUNDERHAWK

Variety	Bushels per Acre	Test Weight lbs./bu.	Grain Protein %
Agassiz	50.8	59.9	13.4
Norstar	50.1	59.2	12.4
Winoka	47.3	60.2	13.1
Roughrider	45.9	58.9	13.2
Rose	42.2	60.3	13.8
Froid	41.6	57.9	12.9
Rita	40.7	57.2	12.9
Sundance	40.0	58.7	13.5
Highest	50.8 bu.	60.3 lbs.	13.8
Lowest	40.0	57.2	12.4
C.V. %	10.33	1.42	
LSD 5%	6.81	1.23	
LSD 1%	NS	1.67	
# of Reps	4	4	Bulk

SCRANTON

Variety	Bushels per Acre	Test Weight lbs./bu.	Grain Protein %
Norstar	74.5	61.3	13.6
Sundance	74.4	59.9	14.1
Agassiz	68.3	60.6	14.3
Roughrider	61.0	60.7	14.6
Rose	60.5	61.4	14.4
Winoka	58.7	61.4	14.6
Froid	58.2	59.5	14.2
Highest	74.5 bu.	61.4 lbs.	14.6
Lowest	58.2	59.5	13.6
C.V. %	9.61	1.12	
LSD 5%	9.29	1.01	
LSD 1%	12.73	1.38	
# of Reps	4	4	Bulk

Table 22

1985 HETTINGER OFF-STATION
WINTER RYE VARIETY TRIALS

REGENT

Variety	Bushels per Acre	Test Weight lbs./bu.	Test Weight (Rank)
Musketeer	38.5	50.0	(2)
Chaupon	34.3	47.7	(4)
Frederick	33.4	50.0	(2)
Puma	29.8	50.3	(1)
Cougar	23.3	49.2	(3)
Hancock	Winterkilled		
Danko	Winterkilled		
Highest	38.5 bu.	50.3 lbs.	
Lowest	23.3	47.7	
C.V. %	18.5	0.93	
LSD 5%	9.12	0.71	
LSD 1%	NS	0.99	
# of Reps	4	4	

FLASHER

Variety	Bushels per Acre	Test Weight lbs./bu.	Test Weight (Rank)
Chaupon	90.1	51.3	(6)
Musketeer	83.5	54.1	(2)
Puma	80.7	53.9	(3)
Cougar	78.1	53.5	(4)
Frederick	78.0	54.2	(1)
Hancock	67.2	52.8	(5)
Danko	Winterkilled		
Highest	90.1 bu.	54.2 lbs.	
Lowest	67.2	51.3	
C.V. %	9.15	0.64	
LSD 5%	10.97	0.52	
LSD 1%	NS	0.72	
# of Reps	4	4	

THUNDERHAWK

Variety	Bushels per Acre	Test Weight lbs./bu.	Test Weight (Rank)
Chaupon	63.2	50.8	(5)
Musketeer	50.2	52.4	(3)
Hancock	48.1	52.1	(4)
Puma	46.4	52.9	(2)
Frederick	44.3	52.4	(3)
Danko	31.9	53.2	(1)
Highest	63.2 bu.	53.2 lbs.	
Lowest	31.9	50.8	
C.V. %	10.54	0.59	
LSD 5%	7.52	0.46	
LSD 1%	10.4	0.64	
# of Reps	4	4	

SCRANTON

Variety	Bushels per Acre	Test Weight lbs./bu.	Test Weight (Rank)
Chaupon	69.9	52.2	(5)
Musketeer	62.7	53.5	(4)
Puma	59.3	54.3	(1)
Hancock	56.3	53.5	(4)
Frederick	54.9	53.7	(2)
Danko	34.2	53.6	(3)
Cougar	Winterkilled		
Highest	69.9 bu.	54.3 lbs.	
Lowest	34.2	52.2	
C.V. %	8.17	0.88	
LSD 5%	6.92	0.71	
LSD 1%	9.57	0.98	
# of Reps	4	4	

1985 ROW CROP VARIETY TESTING AT THE HETTINGER STATION

Jim Jakicic

Summary

Field research was performed on corn for grain and silage at two sites, Hettinger and Regent, and on sunflowers at Hettinger. A dry bean variety trial was also established at Hettinger. Table 1 shows yield results for dry beans, Table 2 for the Regent corn trial, Table 3 for the Hettinger corn trial, and Table 4 for the Hettinger sunflower trial.

Various varieties of pinto, navy, and black turtle beans were selected for study at Hettinger. Fertilizer was applied at a rate of 60 lbs./ac. of 18-46-0 prior to planting. Fertility levels were adequate for a 2,200 lb./ac. dry bean yield provided precipitation levels and climatic conditions were favorable. Weed control was accomplished with the use of 2.5 pint/ac. of Sonalan applied pre-plant and incorporated with a field cultivator. Pintos were seeded at 65 lbs./ac. pure live seed and navy bean varieties were seeded at 45 lbs./ac. pure live seed. The trial was planted on June 4th and harvested on October 18th. Seeding was delayed approximately 3 weeks due to a lack of seed which resulted in late maturation and frost damage of the beans.

Grain and silage yields for the corn trial at Regent appear in Table 2. An abnormally cool June and below average precipitation led to relatively low grain yields and grain test weights. None of the varieties matured fully prior to the first fall frost which occurred September 20th. Grain dry down was slow and grain molding was evident throughout the plots.

Soil tests at Regent called for the addition of 110 lbs./ac. of 28-29-0 to attain a yield goal of 80 bu./ac. grain and 13 tons/ac. silage. The fertilizer was broadcast and tilled in with a field cultivator. Herbicide treatment consisted of a pre-plant incorporated application of 2.5 qt./ac. Bladex 4L plus 1 qt./ac. Atrazine 4L. The herbicides were applied using 18 gallons of water per acre. Weed control was excellent throughout the growing season with good suppression of kochia and other broadleaf weeds. The seedbed was uniform and in good condition with no large soil clods at the time of herbicide application.

Plots were sampled for silage yields when the grain was denting and whole plant moisture levels were approximately 70%. Grain and silage moisture levels were determined by oven-dry method. Test weights are bushel weights of dry corn (approximately 5% moisture).

Table 3 shows results of the Hettinger corn variety trial. None of the varieties at Hettinger produced grain due to drought and exceptionally cool temperatures during the first 7 weeks of growth. Pollination of ears was very poor and grain never matured. Row spacing of both corn trials was 30" and plots were hand thinned to a stand of 18,000 plants per acre. The Hettinger trial was planted on recrop oat stubble while the Regent trial was planted on fallow.

Table 4 contains data relative to the sunflower trial at Hettinger. Sunflower yields were very low as evidenced by the data. Factors which attributed to low yields included drought and cool growing season temperatures, bird damage, and lodging due to stem weevil activity. Test weights were generally higher than normal due to the small size of seed produced in the dry growing conditions. Harvest samples were inadequate for the proper determination of oil percentage.

The trial was seeded on recrop oat stubble ground at over 100,000 plants per acre and then hand thinned to a stand of 18,000 plants per acre. Row spacing was 30". Fertilization consisted of a broadcast application of 60 lbs. 18-46-0 per acre with a yield goal of 2000 lbs./ac. Sonalan was applied as a pre-plant treatment at 2.25 pints/ac. and then incorporated with a field cultivator. Weed control was excellent throughout the growing season.

Table 1. 1985 HETTINGER ON-STATION
-DRY BEAN VARIETY TRIAL

Variety	Type	Pounds per Acre	Relative Maturity Days	Test Weight lbs./bu.	2 Year Average lbs./ac.
UI 114	Pinto	1384	90	57.5	1199
Fiesta	Pinto	1282	88	58.2	1172
Olathe	Pinto	1241	85	56.0	1233
Pindak	Pinto	1224	88	58.5	1134
Holberg	Pinto	1203	85	58.5	1067
Nodak	Pinto	1168	85	58.1	1234
Upland	Navy	1021	88	61.3	980
Bunsi	Navy	954	88	61.4	
Fleetwood	Navy	826	86	61.8	953
Opal	Navy	817	85	58.8	853
Neptune	Navy	678	82	54.9	
C-20	Navy	413	77	54.1	562
UI 37	Small Red	1050	80	58.0	
Domino	Black	956	88	57.4	
Midnight	Black	813	90	55.1	1010
Black Magic	Black	803	89	55.1	
Highest		1384 lbs.		61.8 lbs.	
Lowest		413		54.1	
C.V. %		16.38		2.27	
LSD 5%		230.8		1.87	
LSD 1%		308.2		2.5	
# of Reps		4		4	

Seeding Rate: Navy beans (45 lbs./ac. pure live seed)
Pinto beans (65 lbs./ac. pure live seed)
Black turtle beans (55 lbs./ac. pure live seed)
Seeding Date: June 4th
Row Spacing: 30"
Planting Site: Fallow
Fertilizer Applied: 60 lbs./ac. 18-46-0
Yield Goal: 2,200 lb./ac.
Herbicide Applied: 2 1/2 pint/ac. Sonalan
Harvest Date: October 18th

Table 2. REGENT CORN GRAIN AND SILAGE TRIAL
-1985-

Variety	Relative Maturity Days	Bushels Per Acre at 15.5% Moisture	Test Weight lbs/bu	Silage % Moisture at Harvest	Silage Tons/Acre at 70% Moisture
Pioneer 3881	90	32.0	37.2	67.8	10.2
Keltgen KS80	80	27.5	43.7	63.7	8.7
Pioneer 3978	85	24.0	45.7	65.9	9.2
Dahlgren DC-408	80	23.0	45.7	66.3	7.2
Cargill 822	85	22.9	48.2	67.3	12.1
Sigco 0852	85	22.3	45.7	64.2	9.8
Dahlgren DC-418	85	22.2	47.5	68.5	9.2
Cenex 3088	88	20.3	43.8	65.9	9.5
Interstate 244	88	19.4	43.0	68.3	8.2
Stauffer 2206	86	18.7	42.5	68.8	9.7
Stauffer 2184	85	17.6	48.2	68.8	7.4
Jacques JX21	82	17.6	45.9	69.6	7.3
Sigco 077	77	17.4	44.8	67.3	8.2
Jacques JX15		16.8	46.8	66.8	8.2
Pioneer 3953	80	15.7	45.3	67.5	9.5
Cargill 809	80	13.7	46.5	68.3	11.0
Cargill 829	90	11.5	33.7	69.8	9.3
Keltgen KS89	89	10.4	36.5	69.0	6.8
Interstate 309	89	10.0	43.5	67.2	9.8
Highest		32.0 bu.	48.2 lbs.	69.8 %	12.1 Ton
Lowest		10.0	33.7	63.7	6.8
C.V. %		9.39	3.83	4.51	9.83
LSD 5%		2.55	2.39	NS	1.26
LSD 1%		3.40	3.18	NS	1.68

Plant Population: 18,000 plants per acre
Seeding Date: May 15th
Row Spacing: 30"
Planting Site: Fallow
Fertilizer Applied: 110 lbs./ac. 28-29-0
Yield Goal: 80 bu./ac. grain
13 tons/ac. silage
Herbicide Applied: 2.50 quart/ac. Bladex 4L + 1 quart/ac. Atrazine 4L preplant incorporated
Harvest Date: November 6th

Table 3. HETTINGER CORN GRAIN AND SILAGE TRIAL
-1985-

Variety	Relative Maturity Days	Silage % Moisture at Harvest	Silage Tons per Acre at 70% Moisture
Northrup King PX 9242	95	70.1	6.5
Stauffer 2206	86	70.6	6.4
Agsco Sugarbush H		73.1	6.2
Dahlgren DC-418	85	68.1	6.2
Keltgen KS80	80	69.8	6.2
Cenex 3088	88	70.4	6.1
Pioneer 3881	90	71.5	6.0
Stauffer 2184	85	70.5	6.0
Top Farm sx1087	87	71.1	5.9
Agsco 3XAA-1	80	69.7	5.8
Cargill 829	90	72.0	5.8
Interstate 244	88	69.9	5.8
Cargill 809	80	72.6	5.7
Top Farm sx87	85	71.5	5.6
Pioneer 3803	95	68.9	5.4
Interstate 309	89	72.6	5.2
Keltgen KS 89	89	72.3	5.2
Agsco 4XA	85	72.7	5.2
Cargill 822	85	74.2	4.7
Northrup King PX 9151	90	74.7	4.6
Dahlgren DC-422	85	73.9	4.4
Jacques JX 21	82	73.5	4.3
Highest		74.7 %	6.4 tons
Lowest		68.1	4.3
C.V. %		3.73	19.3
LSD 5%		3.76	NS
LSD 1%		NS	NS

Plant Population: 18,000 plants per acre
Seeding Date: May 14th
Row Spacing: 30"
Planting Site: Recrop oat stubble
Fertilizer Applied: 60 lbs./ac. 18-46-0
Yield Goal: 80 bu./ac. grain
13 tons/ac. silage
Herbicide Applied: 2.50 quart/ac. Bladex 4L + 1 quart/ac. Atrazine 4L preplant incorporated
Harvest Date: September 13 (Silage) No grain Harvested

Notes: None of the above varieties matured before the first killing frost on September 20th and as a result, no grain was produced. Cool June temperatures and drought inhibited yield potential and subsequent maturation.

Table 4 . 1985 DICKINSON ON-STATION
CORN HYBRID TRIALS

Variety	Silage Trials		Grain Trials		
	Ton/acre @70% Moisture	Harvest Moisture %	Grain Bu./ Acre	Trials Moisture %	Test Weight
Agsco 3XAA-1	11.1	74.3	56.3	20.8	52.5
Agsco 4XA	10.8	76.2	59.2	25.4	49.0
Asgco Sugarbush H	16.1	80.7	49.0	30.0	47.0
Cargill 809	11.1	80.5	54.5	22.4	50.5
Cargill 822	12.3	77.2	62.7	19.2	54.0
Cargill 829	13.2	79.9	45.6	25.0	42.0
Cenex 2090	10.5	78.6	61.8	28.8	45.0
Cenex 3088	11.2	77.2	61.6	22.5	49.5
Dahlgren DC-408	15.0	76.3	73.3	15.0	52.5
Dahlgren DC-418	12.5	77.7	66.3	20.4	54.0
Interstate IS 244	11.3	75.9	61.2	22.1	47.5
Interstate IS 309	12.4	78.1	56.5	18.3	46.5
Keltgen KS 80	11.6	75.7	54.9	21.4	49.0
Keltgen KS 89	13.2	78.6	58.1	28.5	42.0
Northrup King PX 9055	11.3	79.4	63.9	17.0	52.5
Sigco 077	12.1	77.2	66.7	17.8	44.0
Sigco 0852	12.1	78.4	68.0	21.4	49.0
Stauffer 35	10.7	80.5	54.7	24.9	48.5
Stauffer 2184	11.5	78.4	65.3	20.3	50.0
Keltgen KS-88	11.1	76.1	63.1	19.7	53.5
Keltgen KS-940	13.4	78.2	59.6	26.2	43.0
Jacques JX-15	11.1	77.3	67.1	17.0	52.5
Jacques JX-21	11.6	79.6	71.3	19.2	50.0
LSD =	1.3 ton		13.5 bu.		
CV =	10.5%		13.8%		
Seeding date:	May 16		May 16		
Harvest date:	September 3		October 17		

Table 5. HETTINGER OIL SUNFLOWER VARIETY TRIAL
-1985-

Variety	Pounds Per Acre at 10.0% Moisture	Test Weight lbs/bu
Continental Pacific Hysun 33	511	36.3
Cargill 208	499	35.2
Continental Pacific 354	479	36.3
Cargill 207	479	35.8
Seedtec 316	472	36.6
Northrup King Sunbred 285	470	36.0
Dahlgren DO-664	467	35.1
Arrowhead 757	467	35.1
Northrup King Sunbred 262	450	38.4
Sigco 475	439	36.1
Dahlgren DO-855	434	36.4
Dahlgren DO-730	422	37.3
TNT-Sunflo XR-38	408	35.3
Sokota 5000	397	35.1
Seedtec 317	396	34.5
Jacques Challenger	389	34.5
Stauffer EX 1424	381	36.9
TNT-Sunflo 634	370	34.5
Jacques Discovery	369	35.1
Arrowhead 747	365	34.6
Keltgen K066	357	35.2
Stauffer S1300	335	36.6
Cenex 8101	327	36.2
Sokota 2057	322	33.2
Highest	511 lbs	38.4 lbs
Lowest	322	33.2
C.V. %	11.7	3.06
LSD 5%	69	1.5
LSD 1%	91	2.0

Plant Population: 18,000 plants per acre
Seeding Date: May 14th
Row Spacing: 30"
Planting Site: Recrop oat stubble
Fertilizer Applied: 60 lbs./ac. 18-46-0
Yield Goal: 2000 lb./ac.
Herbicide Applied: 2.25 pints/ac. Sonalan pre-plant incorporated
Harvest Date: October 11th
Notes: Lack of adequate and representative samples prevented the determination of oil percentage.
Test weights were relatively high due to the small size of seed produced.

Table 6. 1985 HETTINGER ON-STATION
SAFFLOWER VARIETY TRIAL

Variety	Type	Pounds per Acre	Test Weight lbs./bu.	% Oil
81B6078	Linoleic	487	40.1	
S 208	Linoleic	374	38.5	
C/W A-24	Linoleic	370	39.7	
80B1341	Linoleic	363	39.7	
81B3565	Linoleic	342	39.6	
Oker	Linoleic	340	39.4	
82B1606		313	41.6	
S 541	Linoleic	310	38.6	
82B2282		283	38.2	
Rehbein	Linoleic	278	39.8	
82B2909		265	39.8	
82B3550		251	39.2	
Hartman	Linoleic	231	40.3	
Highest		487 lbs.	41.6 lbs.	
Lowest		231	38.2	
C.V. %		9.31	3.10	
LSD 5%		43.23	1.76	
LSD 1%		58.01	NS	

Seeding Rate: 25 lbs./ac. pure live seed
Seeding Date: May 7th
Fertilizer Applied: 60 lbs./ac. 18-46-0
Yield Goal: 2000 lbs./ac. (soil residual nutrients + added fert.)
Herbicide Applied: 1 1/2 pint/ac. Treflan 4E
Harvest Date: September 26th

Table 7. 1985 HETTINGER ON-STATION
SPECIALTY CROP VARIETY TRIALS

BUCKWHEAT

Variety	Pounds per Acre	Test Weight lbs./bu.	Test Weight (Rank)
Manor	518	39.5	(1)
Winsor Royal	510	39.1	(2)
Mancan	474	38.9	(3)
Highest	518 lb.	39.5 lbs.	
Lowest	474	38.9	
C.V. %	5.45	1.51	
LSD 5%	NS	NS	
LSD 1%	NS	NS	
# of Reps	4	4	

MUSTARD

Variety	Pounds per Acre	Test Weight lbs./bu.	Type
Kirby	93.3		Yellow
Domo	83.5		Oriental
Gisilba	50.0		Yellow
Yellow #2	40.3		Yellow
Tilney	40.2		Yellow
Highest	93.3 lb.		
Lowest	40.2		
C.V. %	9.42		
LSD 5%	8.92		
LSD 1%	12.5		
# of Reps	4		

FLAX

Variety	Pounds per Acre	Test Weight lbs./bu.	Test Weight (Rank)
Complete Loss Due to Drought and Bromoxynil Injury			

RAPESEED

Variety	Pounds per Acre	Test Weight lbs./bu.	Test Weight (Rank)
Complete Loss Due to Drought			

Table 8. 1985 Dickinson On-Station Buckwheat Variety Trial.

Variety	Yield Pounds/Acre	Test Weight
Common	1915	50.0
Mancan	1743	44.0
Manor	1932	46.0
Windsor Royal	1550	46.0

Lsd @ 5% 13.9

CV - 14.4%

Seeding date June 7

Harvest date October 2

CHEMICAL vs. CONVENTIONAL FALLOW
USING ORTHO PARAQUAT/PLUS + GLEAN HERBICIDES

JIM JAKICIC

Summary

Studies of the agronomic benefits and detriments of chemical fallow vs. conventional fallow for subsequent planting to hard red spring wheat began in 1984 at the Hettinger Branch Experiment Station. As an alternative to three separate summer fallow tillage operations, Ortho "Paraquat/Plus" was tank mixed with Dupont "Glean" and Ortho X-77 Spreader and applied to actively growing weeds at two rates (1 pint "Paraquat/Plus" + 1/3 oz. Glean and 2 pints "Paraquat/Plus" + 1/3 oz. "Glean" per acre). Due to wet soil conditions in June and late acquisition of chemical, spraying was delayed for two weeks beyond the optimum time for chemical application. Burn-down of weeds due to a June 19th application was good to excellent, however regrowth occurred and a second application of 1 pint "Paraquat/Plus" per acre was needed on July 10th. "Paraquat/Plus" + "Glean" controlled Wild Buckwheat, Kochia, Redroot Pigweed, and volunteer wheat but was ineffective in controlling mid-summer growth of Field Bindweed (Creeping Jenny). Stoa hard red spring wheat, a 1984 NDSU release, will be planted in 1985 to provide data on grain yield and quality and any crop injury due to the herbicides.

Introduction

Chemical fallow is one alternative to mechanical tillage operations which are frequently performed two to three times or more during a fallow season in southwestern North Dakota. To be a viable alternative though, the cost of chemical fallow must be competitive with the costs incurred in tilling to control weed growth and soil moisture loss. An important cost, but one which is difficult to define is the loss of use and loss of productivity of agricultural lands due to erosion of soil by water and wind. Chemical fallow reduces wind and water erosion and conserves soil moisture by maintaining a cover of straw and stubble throughout the fallow season.

Ortho "Paraquat/Plus" is a non-selective contact herbicide that kills all green plant tissue which comes into contact with the herbicide. "Paraquat" has no soil residual activity which is the reason for adding "Glean" to the tank mix. "Glean" controls most broadleaf weeds and suppresses foxtail and is characterized as having a relatively long soil residual activity (up to 48 months depending on soil organic matter content and soil pH). Tank mixing "Paraquat/Plus" and "Glean" is not a labeled treatment in North Dakota at this time.

Experimental Procedure

Design of the experiment was a randomized complete block with three replications. Plots measured 70 feet by 150 feet (approximately 0.25 acres). The trial site consisted of a level area (approximately 2.5 acres) composed of Belfield-Daglum silt loams which comprise a large portion of Adams county. This soil is relatively difficult to farm due to its formation of a hard crust and cloddy conditions upon dehydration.

"Paraquat/Plus" + "Glean" + "X77 Spreader" was applied to actively growing weeds on June 19th, approximately two weeks late due to wet soil conditions and late acquisition of herbicides. Herbicides were applied at two rates:

PARAQUAT/PLUS		GLEAN		X77 SPREADER
1 pint/acre	+	1/3 oz./acre	+	1 quart/100 gal. spray
2 pint/acre	+	1/3 oz./acre	+	1 quart/100 gal. spray

A second application of "Paraquat/Plus" only, at 1 pint/acre on July 10th was necessary to control a mid-summer emergence of Field Bindweed. Each application was applied with a skid mounted sprayer on a pick-up calibrated at 40 psi and 5 mph with an output of 20.8 gallons spray/acre.

Yield of Stoa hard red spring wheat and any phytotoxicity to the crop will be determined during the 1985 growing season. Soil moisture content of chemical and conventional fallow plots are likely to differ and determinations will be made prior to planting.

Results and Discussion

Prevailing weed species at the time of first herbicide application included: Wild Buckwheat, Kochia, Redroot Pigweed, volunteer winter wheat, and a relatively small amount of Green Foxtail (Pigeongrass). Both herbicide treatments were moderately effective in achieving a burn-down of prevailing weeds though more effective control would have been obtained if the first spraying had been accomplished the first few days of June.

A second treatment of all chemical fallow plots was needed to control emerging Field Bindweed in mid-July. Treatment with 1 pint/acre "Paraquat/Plus" + 1 quart X-77 Spreader/100 gal. spray was ineffective in controlling the bindweed. "Paraquat/Plus" produced a slight burning of bindweed but did not control the weed to any appreciable extent. Field bindweed continued to grow and spread until late September freezing temperatures prevailed.

Applying 2 pints of "Paraquat/Plus" per acre was approximately 20% more effective in controlling weeds than the 1 pint/acre rate. An important factor to consider in "Paraquat/Plus" application rates is its cost. As of January 1985, farmer costs for the above chemicals in Hettinger were as follows:

Paraquat/Plus	Glean	X-77 Spreader	Total Cost
1 pint/acre $5.74/acre	1/3 oz./acre $5.40/acre	1 quart/4.8 acres * $0.81/acre	$11.95/acre
2 pints/acre $11.48/acre	1/3 oz./acre $5.40/acre	1 quart/4.8 acres * $0.81/acre	$17.69/acre

* Rate and cost of X-77 Spreader when spraying approximately 21 gal./acre

The total chemical cost for each treatment plus a second spray treatment of 1 pint "Paraquat/Plus"/acre in July was $17.69/acre at the 1 pint "Paraquat/Plus" rate and $23.43/acre at the 2 pints "Paraquat/Plus" rate.

Conclusions

The "Paraquat/Plus" + "Glean" treatments were moderately effective in controlling all weed species except field bindweed. Control would have been better if the plots were sprayed on or near June 1st while weed development was in its early stages.

Yield results and soil moisture calculations to be collected during the 1985 growing season will help verify benefits and or detriments of chemical fallow with "Paraquat/Plus" + "Glean" in southwestern North Dakota. The project leader recommends continuation of this study for at least two more years to gather enough data for purposes of drawing reasonable and sound conclusions relating to "Paraquat/Plus" + "Glean" herbicide combinations for chemical fallow prior to planting hard red spring wheat in southwestern North Dakota.

VITAVAX-200 FLOWABLE FUNGICIDE TREATMENT FOR SMALL GRAINS

Jim Jakicic

Summary

A three year investigation began in 1984 to test the response of three small grains, hard red spring wheat, barley, and oats, to seed treatment with Vitavax-200 fungicide. The main objectives were to determine if Vitavax-200 could effectively decrease the incidence of seed-borne and soil-borne fungal diseases and if the treatment had any significant effect on the yield and test weight of three wheat, oat, and barley varieties. Results of this trial showed no significant differences in the yield or test weight of wheat, barley, or oats due to the seed treatment. Occurences of seed-borne fungal diseases were non-existant within the plots, consequently the effectiveness of treatment with Vitavax-200 against these diseases could not be determined.

Introduction

Vitavax-200 is a systemic fungicide applied as a seed treatment to seed prior to planting. The word "systemic" indicates that the fungicide is actively transported into the growing plant via its root system which provides the plant with an immunity or protection against certain diseases. Vitavax-200 has been shown to provide control of various fungi that cause seed and seedling diseases in certain crops. Diseases of wheat, barley, and oats controlled by Vitavax-200 are shown below.

Barley:	False Loose Smut	Wheat:	Common Bunt
	Covered Smut		Flag Smut
	Loose Smut		Loose Smut
	Barley Stripe		Seedling Stage Wheat Scab
			Seedling Stage Black Point
		Oats:	Covered Smut
			Loose Smut

Vitavax-200 is a composition of both carboxin and thiram fungicides which effectively control the above diseases. Fungicidal seed treatments are used to provide protection against: (1) internal seed-borne pathogens such as the loose smuts of cereals; (2) seed surface pathogens such as the covered smuts of barley and oats and common bunt of wheat; and (3) soil-borne pathogens such as seed rots and seedling blights.

Experimental Procedure

Three varieties each of hard red spring wheat, barley and oats were chosen for study based on acceptable agronomic performance in southwestern North Dakota over previous years. Seed of Len, Stoa, and Marshall wheat;

Azure, Bowman, and Morex barley; and Kelsey, Otana, and Steele oats were treated with 3 fluid ounces of Vitavax-200 fungicide per 100 pounds of seed in a small batch lab treater. The fungicide was diluted 2:1 (2 parts water to 1 part chemical) with water prior to application to the seed.

Kernel weights (weight/1000 kernels) and germination percentages were determined in order to calculate seeding rates. All wheat varieties were seeded at a rate of 1,000,000 live seeds per acre while all barley and oat varieties were seeded at 750,000 live seeds per acre. These rates are approximately equivalent to 60 pounds of wheat (1 bushel), 65 pounds of barley (1.3 bushels), and 48 pounds of oats (1.5 bushels) per acre.

The experiment included treated and untreated plots of each variety organized in a randomized complete block design with four replications. The experimental site was a level area composed of Shambo Loam soil type. Fertilization consisted of a broadcast application of 60 pounds per acre of 18-46-0. Applied fertilizer plus soil residual nutrients was adequate for the following yield goals: 55 bu./ac. wheat, 80 bu./ac. barley, and 100 bu./ac. oats. The trial was planted on April 16th and sprayed for broadleaf weeds on June 1st. Herbicide application consisted of 2/3 pint of Brominal 3+3/acre with a sprayer output of 10 gal./acre and a travel speed of 10 MPH. Plots were harvested on August 8th.

Results and Discussion

Table 1 shows yield and test weight results for wheat, barley, and oat varieties which were untreated (UT) and treated (T) with Vitavax-200. Vitavax-200 fungicide had no significant effect on the yield or test weight of any variety of wheat, barley, or oat. In this case, no benefit was derived from treating the seed with fungicide. It is important to note however that fungal diseases controlled by Vitavax-200 were not present in the trial. Both treated and untreated plots were free from diseases such as covered and loose smut and common bunt of wheat. This indicates that seed used in the study was relatively free of diseases generally controlled by Vitavax-200 fungicide.

Control of broadleaf weeds by Brominal 3+3 was excellent. A small percentage (< 3%) of distorted heads in all wheat and barley varieties was observed prior to the flowering stage. This damage could be attributed to a moderate hail storm which occured prior to flowering in June.

Although these results show no particular benefit from treating seed of wheat, barley, or oats with carboxin type fungicide, seed treatment is a recommended preventative measure, especially with barley and wheat. Smuts on oats have not been a problem in North Dakota but they have caused severe oat losses in other states. Crop varieties differ in their susceptibility to fungal diseases such as loose smut. For example, Alex hard red spring wheat is more susceptible to loose smut than are the majority of wheats. Carboxin seed treatment of Alex is recommended as a routine practice. New races of loose smut fungus may appear in future years. One which has recently appeared in North Dakota infects all barley varieties released prior to 1984. New varieties which possess resistance to this new race will not be available for at least four or five years. The best method of control of fungal diseases such as loose and covered smut is through prevention with carboxin type seed treatment.

Table 1. Yield and Test Weight of HRSW, Barley, and Oats when Treated (T) and Untreated (UT) with Vitavax-200 Fungicide.

WHEAT

Variety	Yield bu./ac.	Test Weight lbs./bu.
Marshall UT	51.1	59.0
Marshall T	51.4	58.5
Len UT	48.1	57.3
Len T	46.1	58.4
Stoa UT	47.4	59.3
Stoa T	47.1	57.9
Highest	51.4	59.3
Lowest	46.1	57.3
C.V. %	4.91	1.94
LSD 5%	3.59	NS
LSD 1%	NS	NS

OATS

Variety	Yield bu./ac.	Test Weight lbs./bu.
Otana UT	103.6	39.0
Otana T	103.6	39.3
Kelsey UT	100.4	37.3
Kelsey T	101.4	37.6
Steele UT	84.2	36.7
Steele T	87.5	36.6
	103.6	39.3
	84.2	36.6
	2.91	1.16
	4.24	0.66
	5.86	0.91

BARLEY

Variety	Yield bu./ac.	Test Weight lbs./bu.
Bowman UT	56.2	50.4
Bowman T	56.9	50.3
Morex UT	54.0	48.6
Morex T	54.1	48.2
Azure UT	53.4	47.6
Azure T	52.5	48.1
Highest	56.9	50.4
Lowest	52.5	47.6
C.V. %	8.03	1.84
LSD 5%	NS	1.35
LSD 1%	NS	1.87

SEEDING DATES AND RATE OF SEEDING FOR HARD RED SPRING WHEAT, BARLEY, AND OATS

Jim Jakicic

Summary

A seeding date and rate trial was established in 1984 to determine the optimum time to seed and at what rate to seed hard red spring wheat, barley, and oats in southwestern North Dakota. Planting dates were April 6th, April 16th, April 23rd, and May 7th. Each crop was planted at four seeding rates which included 0.3, 0.7, 1.1, and 1.5 million live seeds per acre. The experimental design consisted of a split plot with date of seeding as the main plot and rate of seeding as the subplot.

Seeding date and rate trials require numerous years of data to support meaningful conclusions about the effects of seeding date and rate on the yield and quality of small grains. Preliminary results indicate that time of seeding and seeding rate have significant effects on yield and quality of small grains.

Introduction

Time of seeding of small grains and the rate at which they are sown have a pronounced effect on final yield and economic return to producers. Studies conducted by the Williston Experiment Station have shown seeding rates for HRSW, barley, and oats should approximate 1.0, 0.75, and 0.75 million live seeds per acre respectively. Date and rate studies on HRSW, barley, and oats began in 1984 at Hettinger and will continue for a period of 10 years to develop longer term averages with which to base seeding date and rate recommendations for extreme southwestern North Dakota.

Experimental Procedure

A split plot experimental design with four replications was used to test for yield differences of Alex hard red spring wheat, Otana oats, and Robust barley due to date of seeding and seeding rate. Each crop was seeded on four dates (April 6th, 16th, 23rd, and May 7th) at four seeding rates (0.3, 0.7, 1.1, and 1.5) million live seeds per acre.

Fertilization consisted of a broadcast application of 18-46-0 at 60 lbs./ac. over the entire trial. Applied plus soil residual nutrients were adequate for the following yield goals; 45 bu./ac. HRSW, 80 bu./ac. oats, and 65 bu./ac. barley. The plots were harvested on August 7th.

Results and Discussion

Data pertaining to Alex hard red spring wheat are shown in Table 1. Seeding date had a significant effect ($P<.005$) on the yield and test weight of Alex wheat but did not affect grain protein. Both yield and test weight tended to be highest when the wheat was planted in early to mid April. The effect

of seeding rate on yield and grain protein was significant (P<.005). Both the yield and percent grain protein of Alex tended to be highest when seeded at 1,100,000 pure live seeds/ac. or approximately 1 bu./ac. Seeding rate did not affect test weight of the grain. The data show a significant date by rate interaction for both yield and test weight which prohibits the discussion of one seeding date relative to another. Additional data is required before definitive conclusions are made.

Table 1. YIELD, TEST WEIGHT, AND GRAIN PROTEIN OF ALEX HRSW SEEDED AT 0.3, 0.7, 1.1, AND 1.5 MILLION LIVE SEEDS PER ACRE ON APRIL 6, 16, 23, AND MAY 7.

Seeding Rate *			Seeding	Yield	Test Weight	% Grain
PLS/ac.	lbs./ac.	bu./ac.	Date	bu./ac.	lbs./bu.	Protein
300,000	16	0.27	April 6	21.1	55.8	15.6
700,000	38	0.63	April 6	20.7	53.3	16.2
1,100,000	60	1.00	April 6	26.4	54.4	16.0
1,500,000	82	1.37	April 6	27.1	56.1	15.5
Mean				23.8	54.9	15.8
300,000	16	0.27	April 16	21.8	54.3	15.4
700,000	38	0.63	April 16	28.3	56.0	15.5
1,100,000	60	1.00	April 16	27.0	54.1	16.0
1,500,000	82	1.37	April 16	21.7	53.3	16.1
Mean				24.7	54.4	15.7
300,000	16	0.27	April 23	19.2	50.4	15.2
700,000	38	0.63	April 23	22.2	53.0	15.8
1,100,000	60	1.00	April 23	21.8	52.7	16.7
1,500,000	82	1.37	April 23	26.1	54.2	16.2
Mean				22.3	52.6	16.0
300,000	16	0.27	May 7	17.0	48.5	15.4
700,000	38	0.63	May 7	19.5	51.7	16.4
1,100,000	60	1.00	May 7	23.4	52.3	15.6
1,500,000	82	1.37	May 7	20.6	52.7	16.8
Mean				20.1	51.3	16.1

* Seeding rate conversions to lbs./ac. and bu./ac. assume 97% germination and 60 lbs./bu. wheat seed

Results of the seeding date and rate trial on Otana oats is shown in Table 2. With respect to grain test weight, date or time of seeding effects were significant (P<.005). Planting on April 6th and 16th tended to produce the highest test weights. Seeding rate had no significant effect on the test weight of Otana oats.

Differences observed in the grain yield of Otana oats were due to both date and rate treatment effects (P<.005) and a significant (P<.005) date x rate interaction was observed. Yields tended to be highest when oats were planted on April 16th but because of a significant date x rate interaction, dates relative to one another cannot be discussed. A seeding rate of 1,100,000 pure live seeds/ac. or approximately 2.25 bu./ac. tended to produce the highest yields.

Percent grain protein was affected by date of seeding (P<.005) and tended to increase as planting date was delayed until late April and early May. Seeding rate had no effect on percent grain protein.

Table 2. YIELD, TEST WEIGHT, AND GRAIN PROTEIN OF OTANA OATS SEEDED AT 0.3, 0.7, 1.1, AND 1.5 MILLION LIVE SEEDS PER ACRE ON APRIL 6, 16, 23, AND MAY 7.

Seeding Rate *			Seeding	Yield	Test Weight	% Grain
PLS/ac.	lbs./ac.	bu./ac.	Date	bu./ac.	lbs./bu.	Protein
300,000	20	0.63	April 6	49.4	33.2	13.7
700,000	46	1.44	April 6	56.4	33.0	13.6
1,100,000	72	2.25	April 6	56.4	32.7	13.7
1,500,000	98	3.06	April 6	56.5	32.4	12.6
Mean				54.7	32.8	13.4
300,000	20	0.63	April 16	56.3	31.9	13.5
700,000	46	1.44	April 16	60.2	32.2	13.5
1,100,000	72	2.25	April 16	75.8	32.9	12.7
1,500,000	98	3.06	April 16	64.8	32.6	13.4
Mean				64.3	32.4	13.3
300,000	20	0.63	April 23	42.6	29.7	14.9
700,000	46	1.44	April 23	56.5	31.9	14.0
1,100,000	72	2.25	April 23	63.3	32.1	14.3
1,500,000	98	3.06	April 23	64.7	31.2	15.0
Mean				56.7	31.2	14.6
300,000	20	0.63	May 7	45.0	29.5	14.7
700,000	46	1.44	May 7	43.1	30.3	14.2
1,100,000	72	2.25	May 7	46.5	29.6	14.5
1,500,000	98	3.06	May 7	52.9	29.8	14.1
Mean				46.9	29.8	14.4

* Seeding rate conversions to lbs./ac. and bu./ac. assume 97% germination and 32 lbs./bu. oat seed

Summary results for Robust barley appear in Table 3. Robust barley appeared to be more influenced by date and rate effects than either Alex wheat or Otana oats. Date and rate effects were significant ($P<.005$) for all three variables; yield, test weight, and percent grain protein. Differences in grain test weight due to seeding rate were significant at a level of $P<.05$.

Test weights tended to be highest when Robust barley was planted in early to mid April while planting on April 23rd produced the highest overall yield. Percent grain protein tended to increase with later planting dates.

Lower seeding rates tended to result in higher test weight grain and yield reached a maximum at a seeding rate of 1,100,000 pure live seeds/ac. or approximately 89 lbs. or 1.9 bu./ac. Percent grain protein tended to decrease as seeding rate increased.

Table 3. YIELD, TEST WEIGHT, AND GRAIN PROTEIN OF ROBUST BARLEY SEEDED AT 0.3, 0.7, 1.1, AND 1.5 MILLION LIVE SEEDS PER ACRE ON APRIL 6, 16, 23, AND MAY 7.

Seeding Rate *			Seeding	Yield	Test Weight	% Grain
PLS/ac.	lbs./ac.	bu./ac.	Date	bu./ac.	lbs./bu.	Protein
300,000	24	0.50	April 6	25.6	44.5	15.0
700,000	57	1.19	April 6	32.0	45.1	14.3
1,100,000	89	1.86	April 6	33.0	43.4	13.7
1,500,000	122	2.54	April 6	32.1	45.2	13.5
Mean				30.7	44.6	14.1
300,000	24	0.50	April 16	30.8	44.9	14.8
700,000	57	1.19	April 16	33.7	43.5	13.9
1,100,000	89	1.86	April 16	35.3	43.8	13.8
1,500,000	122	2.54	April 16	33.6	44.1	13.6
Mean				33.4	44.1	14.0
300,000	24	0.50	April 23	28.3	43.2	15.8
700,000	57	1.19	April 23	38.9	44.1	15.0
1,100,000	89	1.86	April 23	40.6	44.5	14.5
1,500,000	122	2.54	April 23	35.6	41.5	14.0
Mean				35.8	43.3	14.8
300,000	24	0.50	May 7	24.5	42.2	15.7
700,000	57	1.19	May 7	31.6	41.1	15.4
1,100,000	89	1.86	May 7	36.7	40.4	15.2
1,500,000	122	2.54	May 7	38.6	39.9	14.8
Mean				32.9	40.9	15.3

* Seeding rate conversions to lbs./ac. and bu./ac. assume 97% germination and 48 lbs./bu. barley seed.

RESPONSE OF HARD RED SPRING WHEAT, BARLEY, AND OATS TO CAROLINA DAKOTA SEED COATING

Jim Jakicic, Tom Conlon, and Dave Claypool

Summary

Carolina Dakota seed coating is a starch based water absorbant material which is suggested to promote germination, improve stands, and increase yield of small grains. This seed coating was tested at Hettinger and Dickinson using Marshall wheat, Azure barley, and Steele oat under both unfertilized and fertilized with nitrogen conditions to determine if it had any effect on yield, test weight, or stand establishment of the small grains. Results at Hettinger showed Carolina Dakota seed coating had no significant effect on yield, test weight or stand establishment of Marshall wheat or Steele oat and had no effect on test weight or stand of Azure barley but significantly decreased yield of Azure barley under both fertilized and unfertilized conditions. No significant difference in percent grain protein was observed due to the seed coating or addition of nitrogen fertilizer. Results at Dickinson showed no significant affect on yield or test weight of any small grain due to the seed coating or soil fertility.

Introduction

Carolina Dakota seed coating is composed of a starch based water absorbant material and graphite which promotes adhesion to the seed. The coating has a high affinity for water and draws water from the surrounding soil for concentration around the seed. It is claimed to promote germination and stand establishment in small grains, especially under relatively dry soil conditions. This theory was tested using Marshall wheat, Steele oat, and Azure barley. A nitrogen fertility variable was included to determine if crop response was different under a higher nitrogen fertility regime.

Experimental Procedure

A split plot design with four replications was used to test for differences between treated and untreated seed of Marshall wheat, Steele oats, and Azure barley. Seed was treated at a rate of 1 pound seed coating per 100 pounds of seed. Seeding rates were 1,000,000 live seeds per acre for wheat (approx. 1 bu./ac.), and 750,000 live seeds per acre for oats and barley (approx. 1.5 bu./ac. oat and 1.3 bu./ac. barley). Sixty pounds of 18-46-0 was broadcast applied to all main plots which served as the fertilizer variable.

The Hettinger trial was planted on April 16th and stand counts were taken prior to tillering. Plots at Hettinger were harvested August 8th. Dickinson's trial was planted May 21st and harvested August 16th.

Results and Discussion

A heavy snowfall occurred 10 days after planting at Hettinger which provided very moist germinating conditions upon melting. Since moisture for germination was readily available, the effects of the seed coating may have

been minimized. The site at Dickinson was moderately dry at planting. Table 1 shows results for the study at Hettinger. Results at Dickinson appear in Table 2. Use of the seed coating did not significantly increase yield, test weight, or plant population of Marshall wheat or Steele oats at Hettinger. Soil fertility had no affect on this response. A significant decrease in yield was observed with Azure barley at Hettinger when treated with the seed coating under both fertility treatments. The Dickinson trial showed no significant affect on yield or test weight of Marshall wheat, Steele oats, or Azure barley due to the seed coating.

Results of this study are 1st year results only. An additional 2 years testing will be conducted at both sites to compile more data before firm conclusions are drawn relative to Carolina Dakota seed coating.

Table 1. Yield, Test Weight, % Grain Protein, and Plant Population of Marshall Wheat, Steele Oat, and Azure Barley as Affected by Carolina Dakota Seed Coating and Nitrogen Fertility. Hettinger 1984.

N0 = Unfertilized
N1 = Fertilized
T0 = Untreated
T1 = Treated
NS = No significant difference (P = .05)

Variety	Treatment		Yield bu./ac.	Test Weight lbs./bu.	Grain Protein %	Plants/Acre X 1000
Marshall	N0	T0	36.7	59.1	14.4	573
Marshall	N0	T1	37.2	59.3	14.6	660
Marshall	N1	T0	43.1	59.1	14.2	759
Marshall	N1	T1	46.0	59.1	13.9	629
F TRT			NS**	NS	NS	NS
Steele	N0	T0	66.5	34.5	15.0	511
Steele	N0	T1	67.5	34.7	15.3	554
Steele	N1	T0	75.0	34.7	15.0	585
Steele	N1	T1	66.1	34.5	15.1	542
F TRT			NS	NS	NS	NS
Azure	N0	T0	46.1	46.5	13.2	616
Azure	N0	T1	40.5	46.0	13.4	579
Azure	N1	T0	57.5	46.3	13.5	641
Azure	N1	T1	46.4	46.1	13.4	660
F TRT			7.04*	NS	NS	NS

* Significant difference (P = .05) in yield due to seed treatment
** No significant difference due to seed treatment or addition of nitrogen to the soil.

Summary of results at Hettinger

1. Use of the seed coating did not significantly increase yield, test weight, % grain protein, or plant population of Marshall wheat or Steele oats at either nitrogen fertility level.

2. A significant decrease in yield was observed with Azure barley when treated with the seed coating under both fertility treatments.

Table 2. Yield and Test Weight of Marshall Wheat, Steele Oat, and Azure Barley as Affected by Carolina Dakota Seed Coating and Nitrogen Fertility, Dickinson, 1984.

N0 = Unfertilized
N1 = Fertilized
T0 = Untreated
T1 = Treated
NS = No significant difference (P = .05)

Variety	Treatment		Yield bu./ac.	Test Weight lbs./bu.
Marshall	N0	T0	34.2	59.3
Marshall	N0	T1	33.1	59.0
Marshall	N1	T0	34.5	58.8
Marshall	N1	T1	33.3	59.3
F TRT			NS*	NS
Steele	N0	T0	64.7	36.0
Steele	N0	T1	65.9	35.3
Steele	N1	T0	62.1	36.0
Steele	N1	T1	59.2	39.3
F TRT			NS	NS
Azure	N0	T0	52.5	48.0
Azure	N0	T1	53.8	49.0
Azure	N1	T0	51.2	47.5
Azure	N1	T1	48.7	46.5
F TRT			NS	NS

* No significant difference due to seed treatment or addition of nitrogen to the soil.

Summary of results at Dickinson

1. The Dickinson trial showed no significant affect on yield or test weight of Marshall wheat, Steele oats, or Azure barley due to the seed coating or soil fertility.