



# Thirty-Third Annual Western Dakota Crops Day Research Report 2016



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

# **33<sup>rd</sup> Annual Western Dakota Crops Day**

## **December 15, 2016**

### **Hettinger Armory**

**MST**

**9:00 AM Registration**

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

**10:00 Early Bird Drawing and Opening Announcements**

**10:15 Growing Soybeans in Southwest North Dakota**

Greg Endres, Extension Area Agronomist, NDSU Carrington Research Ext. Center.  
John Rickertsen, Research Agronomist, NDSU Hettinger Research Extension Center.

**11:00 Crop Variety Updates and Highlights of Ongoing Crop Production Research**

Dr. Chris Graham, Extension Agronomist, SDSU West River Ag Center, Rapid City.  
Patrick Wagner, SDSU Extension Entomology Field Specialist, Rapid City

**11:55 Honoring Rick Olson for 38 Years of Service to Hettinger REC**

**12:00 Adams County Corn Commodity Election**

**12:00 Lunch**

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

**1:00 An Update on Best Management Practices for Spring Wheat Production.**

Dr. Joel Ransom, Extension Agronomist Small Grains and Corn, NDSU Department of Plant Sciences.

**1:45 Crop Variety Updates and Highlights of Ongoing Crop Production Research (cont.)**

Dr. Caleb Dalley, Weed Scientist, NDSU Hettinger Research Extension Center.  
Ryan Buetow, Extension Agronomist, NDSU Dickinson Research Extension Center.  
John Rickertsen, Research Agronomist, NDSU Hettinger Research Extension Center.

**3:00 Conclusion**

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

# **Acknowledgments**

The Hettinger Research Extension Center gratefully acknowledges and thanks 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 made this event possible. We greatly appreciate their commitment and support.

## **2016 Western Dakota Crops Day Sponsors**

Hettinger Area Chamber of Commerce  
AGT Foods  
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Farm Credit Services of Mandan  
Gartner Seed Farm  
Helena Chemical Company  
Legacy Seeds  
North Dakota Grain Growers Association  
North Dakota Soybean Council  
Proseed  
Pulse USA  
South Dakota Wheat Growers  
Southwest Ag, Inc.  
Southwest Grain  
United Grain Corporation

# Table of Contents

Interpreting Statistical Analysis . . . . .	1
<b>Growing Conditions</b>	
Hettinger Weather Summary . . . . .	2
Dickinson Weather Summary . . . . .	4
<b>Spring Wheat</b>	
ND Hard Red Spring Wheat Variety Descriptions. . . . .	5
Hettinger Hard Red Spring Wheat Variety Trial . . . . .	7
Scranton Hard Red Spring Wheat Variety Trial . . . . .	9
Regent Hard Red Spring Wheat Variety Trial . . . . .	10
New Leipzig Hard Red Spring Wheat Variety Trial . . . . .	11
Mandan Hard Red Spring Wheat Variety Trial . . . . .	12
Dickinson Hard Red Spring Wheat Variety Trial . . . . .	13
Hannover Hard Red Spring Wheat Variety Trial . . . . .	15
Glen Ullin Hard Red Spring Wheat Variety Trial . . . . .	16
<b>Winter Wheat and Winter Rye</b>	
ND Hard Winter Wheat Variety Description . . . . .	17
Hettinger Hard Red Winter Wheat Variety Trial . . . . .	19
Dickinson Winter Wheat Variety Trial . . . . .	20
Hettinger Winter Rye Variety Trial . . . . .	21
Dickinson Winter Rye Variety Trial . . . . .	22
<b>Durum</b>	
ND Durum Wheat Variety Descriptions . . . . .	23
Hettinger Durum Variety Trial . . . . .	25
Scranton Durum Variety Trial . . . . .	26
Regent Durum Variety Trial . . . . .	26
Mandan Durum Variety Trial . . . . .	27
Dickinson Durum Variety Trial . . . . .	28
Hannover Durum Variety Trial . . . . .	29
<b>Barley</b>	
ND Barley Variety Descriptions . . . . .	30
Hettinger Barley Variety Trial . . . . .	31
Scranton Barley Variety Trial . . . . .	32
Regent Barley Variety Trial . . . . .	33
New Leipzig Barley Variety Trial . . . . .	34
Dickinson Barley Variety Trial . . . . .	35
Glen Ullin Barley Variety Trial . . . . .	36
Hannover Barley Variety Trial . . . . .	36
<b>Oat</b>	
ND Oat Variety Descriptions . . . . .	37
Hettinger Oat Variety Trial . . . . .	38
Dickinson Oat Variety Trial . . . . .	39

<b>Oilseeds</b>	
Hettinger Safflower Variety Trial . . . . .	40
Hettinger Oil Type Sunflower Variety Trial . . . . .	41
Hettinger Canola Clearfield and Sulfonylurea Variety Trial . . . . .	42
Hettinger Roundup Ready Canola Variety Trial . . . . .	43
Hettinger Flax Variety Trial . . . . .	44
<b>Grain Legumes</b>	
Hettinger Dry Bean Variety Trial . . . . .	45
Hettinger Chickpea Variety Trial . . . . .	46
Hettinger Field Pea Variety Trial . . . . .	47
Dickinson Field Pea Variety Trial . . . . .	49
Hettinger Lentil Variety Trial . . . . .	50
Dickinson Lentil Variety Trial . . . . .	51
Hettinger Clearfield Lentil Variety Trial . . . . .	52
Hettinger Conventional Soybean Variety Trial . . . . .	53
Hettinger Roundup Ready Soybean Variety Trial . . . . .	54
<b>Corn</b>	
Hettinger Corn Variety Trial. . . . .	55
<b>Weed Control</b>	
Postemergence Options for Weed Control in Spring Wheat . . . . .	56
Anthem Flex Applied as Preemergence Burndown for Weed Control in Spring Wheat . . . . .	57
PRE/POST Combinations of Varro, Olympus, and Huskie Complete for Weed Control in Spring Wheat . . . . .	59
Varro tank-mixes for Weed Control in Spring Wheat . . . . .	60
Comparison of Varro Tank-mix Combinations for Weed Control in Durum . . . . .	61
Lentil Tolerance to Pre and Postemergence application of the Herbicide Pyroxasulfone . . . . .	62
Options for PRE Weed Control in Lentil . . . . .	63
Safflower Tolerance and Weed Control Efficacy with PRE Herbicides . . . . .	65
Flax Tolerance to Pre and Postemergence application of the Herbicide Pyroxasulfone . . . . .	66
<b>Special Reports</b>	
Nitrogen Management Options for Soybean . . . . .	67
Observing Effects of Rotation, Nitrogen, and Fungicide on Fungal Leaf Disease of Wheat . . . . .	68
Soybean Planting Dates . . . . .	69
<b>Note Pages</b> . . . . .	72

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## Interpreting Statistical Analysis

Field research involves the testing of one or more variables such as crop varieties, fertilizer rates, weed control methods, planting dates, etc. Field testing of such variables is conducted in order to determine which variety, fertilizer rate, herbicide, date, etc. is best for the particular area of production. The main objectives of crop production research are to determine the best means of producing a crop and how to maximize yield and economic return from farming.

Agricultural researchers use statistics as a tool to help differentiate production variables so meaningful conclusions can be drawn from the data gathered from research trials. Attempts are made to control human error and environmental conditions such as soil variability by replicating the variable in question. For example, there were four plots (replications) of the every variety grown in the Hettinger HRSW variety trial. These plots are randomly placed throughout the trial to help eliminate differences that might be a result of soil or other variations.

The coefficient of variation (C.V.%) listed at the bottom of each data column is a relative measure of the amount of variation recorded for a particular trait expressed as a percentage of the mean for that trait. It is a measure of the precision or effectiveness of the trial and the procedures used in conducting it. The numbers that you see in the tables are an average of all four replications. The C.V. for yield in the 2015 Hettinger HRSW variety trial was 4.7% meaning that there was a 4.7 percent average variation between high and low yields among replications. In summation, a trial with a C.V. of 6% is more precise and reliable than a trial with a C.V. of 18%. When looking at yield, trials with a C.V. less than 15% are generally considered reliable.

To determine if one variety, fertilizer rate, herbicide, planting date, etc. is better than another, use the least significant difference (LSD 5%) value at the bottom of each data column. The LSD 5% value is a statistical method of indicating if a trait like yield differs when comparing two hybrids. If the yield of hybrid A exceeds hybrid B by more than the LSD value, you can conclude that under like environmental conditions, hybrid A is expected to significantly out-yield hybrid B. The LSD value allows you to separate variety yields or any other variable and determine whether or not they are actually different.

For example, in the HRSW trial, the variety HRS3419 averaged 54.7 bu/ac in 2016 compared to LCS Nitro at 44.9 bu/ac. Did the yield difference between these varieties differ significantly? Compare the yield difference of 9.8 bu/ac between the varieties ( $54.7 - 44.9$ ) to the LSD 5% value of 4.7 bu/ac. Since the 9.8 bu/ac difference is more than the LSD value of 4.7 bu/a, the varieties do differ significantly in yield. If the difference between these two varieties would have been 3.5 bu/ac, their difference would have been less than 4.7 bu/ac; therefore, the yield difference between these varieties would not have been significant.

When selecting a variety or hybrid evaluate as much performance information as possible. Give more weight to information from trials close to home and look at relative performance over many locations and years. Performance averaged over many tests is called “yield stability.” Good yield stability means that, while a variety may or may not be the best yielder at all locations, it ranks high in yielding potential at many locations and years. A hybrid that ranks in the upper 20% at all locations exhibits better yield stability than one that is the top variety at one location but ranks in the lower 40% at the other locations.

## Weather Summary - Hettinger

### Frost Free Days

	<b>28°F</b>	<b>32°F</b>	<b>Normal 32°F</b>
Date of Last Frost	May 15	May 16	May 18
Date of First Frost	October 6	October 6	September 20
<b>Frost Free Days</b>	<b>143</b>	<b>142</b>	<b>125</b>

### Precipitation (inches)

<b>Month</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>61 Year Average</b>
October	0.8	0.7	4.4	0.1	2.0	1.1
November	0.0	0.1	0.2	1.0	0.0	0.5
December	0.2	0.5	0.5	0.0	0.5	0.4
January	0.4	0.2	0.1	0.1	0.2	0.4
February	0.5	0.2	0.3	0.0	0.4	0.5
March	0.2	0.2	0.6	0.2	0.2	0.7
April	3.0	0.2	1.6	1.0	3.7	1.6
May	2.2	7.9	1.6	4.0	1.0	2.7
June	2.4	3.7	5.1	5.2	0.9	3.3
July	3.9	2.0	0.9	1.0	1.5	2.1
August	2.2	1.8	5.2	1.9	1.7	1.8
September	0.0	3.4	1.3	0.9	2.3	1.4
<b>April-Sept.</b>	<b>13.7</b>	<b>15.6</b>	<b>14.3</b>	<b>13.1</b>	<b>8.9</b>	<b>11.5</b>
<b>Total</b>	<b>15.7</b>	<b>20.7</b>	<b>21.7</b>	<b>15.4</b>	<b>14.4</b>	<b>16.4</b>

### Air Temperature (°F)

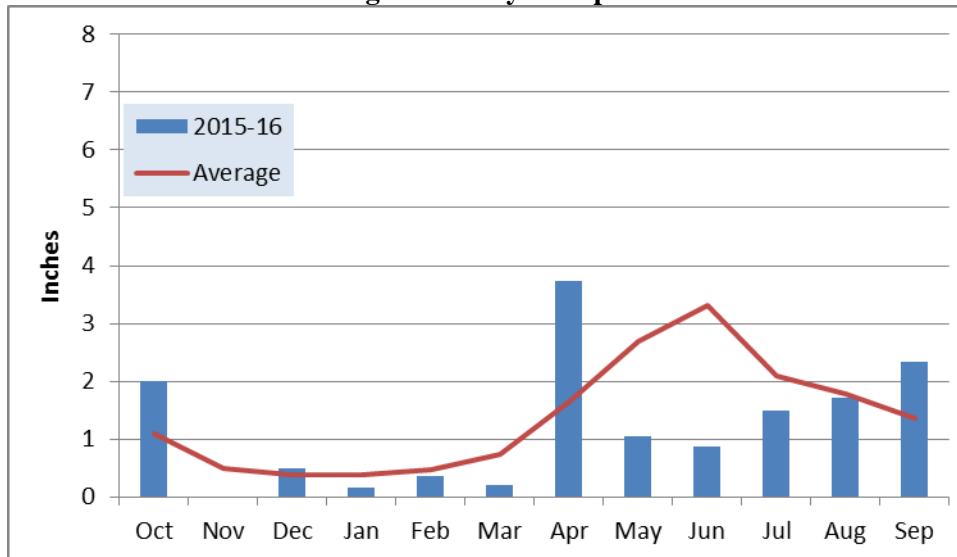
<b>Month</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>61 Year Average</b>
October	48.2	42.1	39.7	46.6	48.5	45.5
November	30.9	32.4	28.8	21.3	32.4	29.9
December	23.9	18.5	12.9	23.4	23.9	19.7
January	24.2	18.3	16.6	21.6	20.1	15.5
February	21.8	26.7	10.1	19.1	32.0	20.0
March	44.4	27.4	26.5	38.0	38.8	29.1
April	46.9	35.5	39.1	43.2	44.2	42.5
May	53.6	53.5	52.8	50.2	54.2	53.6
June	66.5	61.7	59.5	64.6	68.7	63.1
July	75.2	68.1	66.4	70.4	72.0	70.1
August	67.8	69.5	66.0	69.3	69.0	68.7
September	59.4	62.5	56.4	64.1	60.7	58.0
<b>Average</b>	<b>46.9</b>	<b>43.0</b>	<b>39.6</b>	<b>44.3</b>	<b>47.0</b>	<b>43.0</b>



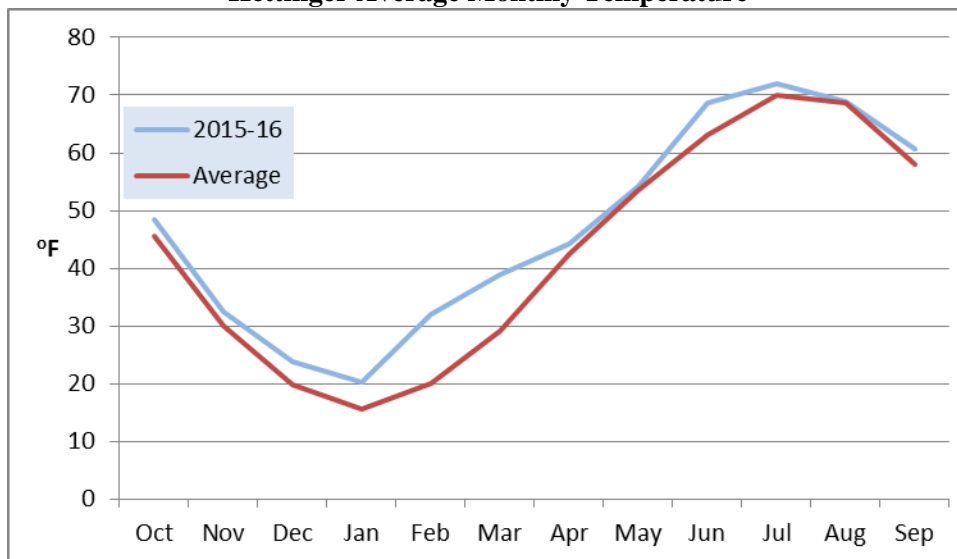
### Corn Growing Degree Days (GDD)

Month	2012	2013	2014	2015	2016	44 Year Average
May	266	266	245	185	298	259
June	498	381	330	444	545	420
July	688	543	526	595	626	585
August	504	553	504	578	568	538
September	411	403	313	462	380	325
<b>Total</b>	<b>2367</b>	<b>2146</b>	<b>1918</b>	<b>2264</b>	<b>2417</b>	<b>2126</b>

### Hettinger Monthly Precipitation



### Hettinger Average Monthly Temperature



**2016 Weather Summary for the Dickinson Research Extension Center Ranch Headquarters, Manning, ND.**

Month	-----Maximum temp.----- Long Term      Current		-----Minimum temp.----- Long Term      Current		-----Precipitation ----- Long Term		-----Small grains GDD <sup>1</sup> ----- Long Term		-----Corn GDD <sup>2</sup> ----- Long Term	
	1983 - 2016	Year	1983 - 2016	Year	1983 - 2016	Current year	1983 - 2016	Current year	1983 - 2016	Current year
	-----°F -----		-----°F -----		----- inches -----					
November - 15	39.4	43.1	18.6	10.2	0.55	0.14				
December - 15	26.9	30.6	7.6	13.4	0.44	0.21				
January	25.1	26.2	5.7	10.3	0.43	0.25				
February	29.3	39.4	9.4	-0.1	0.43	0.41				
March	40.3	48.5	19.0	20.4	0.77	0.16				
April	54.7	54.1	29.4	29.2	1.46	3.44	339	345		
May	66.3	69.5	40.8	37.7	2.70	2.26	673	719	258	310
June	75.8	79.5	50.6	51.9	3.22	1.96	927	962	405	486
July	83.5	83.7	55.7	56.4	2.38	3.61	1167	1162	609	582
August	82.8	83.6	54.1	52.1	1.94	1.86	1130	1153	572	577
September	71.6	70.0	43.9	47.0	1.49	2.66	774	790	325	316
October	56.5	56.5	31.5	35.8	1.25	1.80				
Mean	54.3	57.1	30.5	30.4						
Total					17.05	18.76	5011	5130	2169	2269

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

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

Source: Dickinson Research Extension Center. Data compiled by Garry Ottmar, Ranch Manager; Ryan Buetow, Area Extension Specialist/ Cropping System; and Sheri Schneider, Information Processing Specialist.

**Table 1. North Dakota hard red spring wheat variety descriptions, agronomic traits, 2016.**

Variety	Agent or Origin <sup>1</sup>	Year Released	Height (inches)	Straw Strength <sup>2</sup>	Days to Head <sup>3</sup>	Reaction to Disease <sup>4</sup>					
						Stem Rust <sup>5</sup>	Leaf Rust	Stripe Rust	Tan Spot	Bact. Leaf	Head Scab
Barlow	ND	2009	35	6	62	R	MS	M	MS	MS/S	M
Bolles	MN	2015	32	4	66	R/MR	MR	MR	MR	S	M
<b>Boost</b>	<b>SD</b>	<b>2016</b>	<b>30</b>	<b>5</b>	<b>64</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>MR</b>
Brennan	AgriPro	2009	30	4	62	R	MR	M	MS	S	MS
Duclair <sup>6</sup>	MT	2011	31	4	65	R	MR	NA	S	S	MS
Egan	MT	2014	35	NA	65	NA	NA	NA	NA	NA	NA
Elgin-ND	ND	2012	36	5	65	R	MS	M	MS	MS/S	M
Faller	ND	2007	35	5	65	R	S	S	MS	MS	M
Focus	SD	2015	35	5	60	R	MR/MS	MS	S	MS/S	MR
Forefront	SD	2012	37	5	61	R/MR	MR	MS	S	S	MR
Glenn	ND	2005	37	4	61	R	MS	M	MS	M/MS	MR
HRS 3361	Croplan	2013	33	3	65	NA	MR	MS	NA	NA	M
HRS 3378	Croplan	2013	32	4	64	NA	MR	MS	NA	NA	M
HRS 3419	Croplan	2014	32	2	68	NA	MR	R	NA	NA	MR
HRS 3504	Croplan	2015	31	3	67	NA	NA	NA	NA	NA	NA
HRS 3530	Croplan	2015	36	4	68	NA	MS	S	NA	NA	NA
<b>HRS 3616</b>	<b>Croplan</b>	<b>2016</b>	<b>32</b>	<b>4</b>	<b>64</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
Jenna	AgriPro	2009	32	4	66	R	MR	M	M	M/MS	M
LCS Albany	Limagrain	2008	32	5	67	R	MR	MS	R	MS	M
<b>LCS Anchor</b>	<b>Limagrain</b>	<b>2016</b>	<b>31</b>	<b>3</b>	<b>64</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
LCS Breakaway	Limagrain	2011	32	5	63	R	R	MS	MR	MS	M
LCS Iguacu	Limagrain	2014	33	3	66	R	MS	MS	R	MS/S	M
LCS Nitro	Limagrain	2015	32	4	65	R/MR	R	MR	R	M	M
LCS Powerplay	Limagrain	2011	33	5	65	R	MS	M	S	MS	M
LCS Prime	Limagrain	2015	33	4	61	NA	MS	NA	NA	NA	MR
LCS Pro	Limagrain	2015	32	5	66	R	MS	NA	S	S	M
Linkert	MN	2013	31	2	63	R	MR	R	MR	MS/S	M
Mott <sup>6</sup>	ND	2009	36	3	66	R	MS	MS	MS	S	MS
MS Chevelle	Meridian	2014	30	5	63	R	MR	MR	MS	MS	M
MS Stingray	Meridian	2013	35	3	67	R	MS	S	R	M	MR
ND901CLPlus <sup>7</sup>	ND	2010	36	4	60	MR	MR/MS	NA	NA	NA	M
Prestige	Pulse-USA	2015	31	3	62	NA	MS	NA	NA	NA	NA
Prevail	SD	2014	31	4	64	R/MR/MS	MR	MR	MR	M/MS	M
Prosper	ND	2011	35	5	65	R	MS	S	MS	MS/S	M
RB07	MN	2007	32	5	62	R	MS	NA	MR	S	MR
Redstone	Pulse-USA	2014	32	3	67	NA	R	NA	NA	NA	NA
Rollag	MN	2011	32	3	63	R	MR/MS	R	R	M/MS	MR
<b>Shelly</b>	<b>MN</b>	<b>2016</b>	<b>34</b>	<b>5</b>	<b>65</b>	<b>NA</b>	<b>MR/MS</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>M</b>
<b>Surpass</b>	<b>SD</b>	<b>2016</b>	<b>31</b>	<b>5</b>	<b>59</b>	<b>NA</b>	<b>MR/MS</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>MR</b>
SY Ingmar	Syngenta/AgriPro	2014	31	3	64	R	MR	MS	MS	S	M
SY Rowyn	Syngenta/AgriPro	2013	31	4	62	R	MR	M	R	M/MS	M
SY Soren	Syngenta/AgriPro	2011	30	3	63	R	MR	MS	R	S	M
SY Tyra <sup>6</sup>	Syngenta/AgriPro	2011	31	5	62	R	R	R	MS	S	S
SY Valda	Syngenta/AgriPro	2015	31	4	64	R	R	MS	MS	S	MR
SY605CL <sup>7</sup>	Syngenta/AgriOri	2009	34	7	62	R/MR	MR/MS	NA	MS	NA	S
TCG-Cornerstone	21 <sup>st</sup> Century Genetics	2015	31	4	64	NA	MR/MS	NA	NA	NA	MS
TCG-Spitfire	21 <sup>st</sup> Century Genetics	2015	36	4	66	NA	MS	NA	NA	NA	MS
TCG-Wildfire	21 <sup>st</sup> Century Genetics	2015	37	5	64	NA	MS	NA	NA	NA	MS
Velva	ND	2011	35	4	63	R	MS	MS	R	M/MS	MS
<b>WB9312</b>	<b>WestBred</b>	<b>2016</b>	<b>30</b>	<b>4</b>	<b>63</b>	<b>NA</b>	<b>MR</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
WB9507	WestBred	2013	32	5	61	R/MR	MR	S	MR	S	MR
WB9653	WestBred	2015	31	4	65	R/MR	MR	S	MS	S	M
WB-Mayville	WestBred	2011	30	3	63	R	R	MS	MS	S	S

<sup>1</sup>Refers to agent or developer: MN = University of Minnesota; MT = Montana State University; ND = North Dakota State University; SD = South Dakota State University; **Bold** varieties are those recently released, so data is limited and rating values may change.

<sup>2</sup>Straw Strength = 1 to 9 scale, with 1 the strongest and 9 the weakest. These values are based on recent data and may change as more data become available.

<sup>3</sup>Days to Head = the number of days from planting to head emergence from the boot averaged from several locations.

<sup>4</sup>R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; NA = Not adequately tested; S = susceptible.

<sup>5</sup>Fargo stem rust nursery inoculated with Puccinia graminis f. sp. Tritici races TPMK, TMLK, RTQQ, QFCQ and QTHJ.

<sup>6</sup>Solid stemmed or semisolid stem, imparting resistance to sawfly.

<sup>7</sup>CL = Refers to a Clearfield variety, with tolerance to the Beyond™ family of herbicides.

**Table 2. Analytical milling and baking data from field plot variety trials at Carrington, Casselton and Langdon in 2014 and 2015 (unless otherwise noted).**

Variety	Planted 2016		Test Weight (lb/bu)	Protein 12% MB (%)	Vitreous Kernels (%)	Falling Number (seconds)	Farinograph Stability (minutes)	Farinograph Absorption (%)	Loaf Volume (cc)	Mill and Bake Quality Rating (1-5 Stars) <sup>2</sup>
	Eastern ND	OBS <sup>1</sup>								
Barlow	2.8	5	62.3	13.8	70	366	7.3	64.7	946	***
Bolles	--	5	61.9	14.6	83	401	12.1	61.5	966	****
Elgin-ND	5.9	5	61.5	13.4	66	390	8.3	62.6	920	***
Faller	12.6	5	61.5	12.6	63	394	7.2	61.3	908	***
Glenn <sup>3</sup>	5.0	5	64.1	14.5	78	375	10.2	64.2	958	*****
Linkert	8.6	5	61.6	14.3	54	420	13.8	62.0	980	****
Prevail	--	5	61.6	13.3	46	396	6.6	60.7	958	**
Prosper	8.4	5	61.6	12.3	48	383	7.2	61.0	872	***
Rollag	4.1	5	62.6	14.4	80	448	5.7	66.3	879	*
SY Ingmar	11.9	5	62.2	14.0	78	417	8.8	61.3	1,004	***
SY Rowyn	1.4	5	61.7	12.8	54	439	11.8	59.7	948	****
SY Soren	12.4	5	62.4	13.7	51	433	7.1	62.3	963	***
WB9507	--	3	59.0	12.7	58	430	9.4	60.6	947	***
WB-Mayville	6.6	5	61.0	13.7	68	389	8.2	62.5	928	***

Analyses conducted at the NDSU Hard Red Spring Wheat Quality Laboratory in Fargo, N.D.

<sup>1</sup>Observations.

<sup>2</sup>Mill and Bake Quality Rating scale 1 to 5, with 1 being low and 5 being superior.

<sup>3</sup>Glenn is the current Wheat Quality Council check variety for comparing new experimental lines and newly released varieties.

2015 Carrington data omitted due to poor quality.

**Table 3. Analytical milling and baking data from field plot variety trials at Dickinson, Hettinger, Minot and Williston in 2014 and 2015. (unless otherwise noted).**

Variety	Planted 2016		Test Weight (lb/bu)	Protein 12% MB (%)	Vitreous Kernels (%)	Falling Number (seconds)	Farinograph Stability (minutes)	Farinograph Absorption (%)	Loaf Volume (cc)	Mill and Bake Quality Rating (1-5) <sup>2</sup>
	Western ND	OBS <sup>1</sup>								
Barlow	11.8	7	61.7	13.7	58	346	8.3	62.8	939	***
Bolles	--	7	59.7	15.0	52	392	24.6	60.8	978	****
Elgin-ND	10.8	7	60.9	13.2	38	374	9.6	61.0	876	***
Faller	3.4	7	60.5	12.7	43	374	7.6	60.1	870	***
Glenn <sup>3</sup>	9.9	7	63.3	13.8	64	360	9.7	61.8	924	*****
Linkert	0.7	7	60.9	13.9	43	396	20.7	60.8	933	****
Prevail	--	7	60.2	12.7	27	311	8.7	56.9	903	**
Prosper	5.3	7	60.6	13.1	41	362	7.7	60.7	924	***
Rollag	2.3	6	61.5	14.1	49	450	6.8	64.6	888	*
SY Ingmar	11.1	5	61.8	14.4	61	408	10.2	60.3	974	***
SY Rowyn	0.7	6	61.0	13.2	45	408	19.6	59.1	941	****
SY Soren	17.6	6	62.0	14.0	40	411	7.8	61.0	959	***
WB 9507	--	5	58.9	13.6	42	370	8.3	61.9	976	***
WB Mayville	0.5	6	61.1	13.8	54	381	9.6	61.9	931	***

Analyses conducted at the NDSU Hard Red Spring Wheat Quality Laboratory in Fargo, N.D.

<sup>1</sup>Observations

<sup>2</sup>Mill and Bake Quality Rating scale 1 to 5, with 1 being low and 5 being superior.

<sup>3</sup>Glenn is the current Wheat Quality Council check variety for comparing new experimental lines and newly released varieties.

2015 Dickinson data omitted due to poor quality.

**NDSU Hettinger Research Extension Center**

**Hard Red Spring Wheat - 2016**

**Hettinger, ND**

Variety	Days to	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	DAP <sup>1</sup>	inches	0-9 <sup>2</sup>	lbs/bu	%	----- Bushels per acre -----				
HRS3419	30	78	0	57.3	13.4	97.9	86.8	54.7	70.8	79.8
LCS Nitro	27	78	0	57.3	13.4	94.4	82.6	44.9	63.8	74.0
Faller	30	78	0	57.1	13.2	94.1	79.5	43.4	61.5	72.3
MS Stingray	30	79	0	55.7	12.6	95.9	73.8	43.2	58.5	71.0
Prevail	28	74	0	59.0	13.6	87.2	75.2	49.3	62.3	70.6
Elgin-ND	33	77	0	56.8	14.6	88.5	74.5	48.5	61.5	70.5
LCS Iguacu	30	77	0	60.2	12.3	88.2	72.9	47.5	60.2	69.5
SY Soren	27	77	0	57.9	14.5	86.2	71.9	50.1	61.0	69.4
SY Rowyn	28	76	0	58.3	13.8	85.0	74.3	48.8	61.6	69.4
SY605CL	30	75	0	59.1	14.2	83.1	71.5	49.0	60.3	67.9
Rollag	27	75	0	58.8	14.5	84.2	71.8	47.3	59.6	67.8
LCS Breakaway	29	75	0	58.8	13.6	86.4	64.1	48.4	56.3	66.3
Focus	32	73	0	59.6	13.4	83.6	66.3	48.2	57.3	66.0
SY Ingmar	28	77	0	58.8	14.3	82.1	67.0	48.1	57.6	65.7
WB9507	29	76	0	53.9	13.3	92.8	65.6	36.2	50.9	64.9
Bolles	30	77	0	58.8	15.8	79.8	70.5	44.0	57.3	64.8
Barlow	31	76	0	59.0	14.5	80.1	65.2	48.4	56.8	64.6
LCS Pro	33	76	0	58.3	14.0	83.6	60.4	49.7	55.1	64.6
Prosper	27	80	0	54.9	13.3	86.3	70.4	36.0	53.2	64.2
Mott	30	78	0	58.5	14.5	78.9	66.4	46.4	56.4	63.9
ND 825	31	75	0	60.9	15.3	78.2	64.1	48.1	56.1	63.5
Velva	29	78	0	56.2	13.7	85.7	61.5	43.0	52.3	63.4
Glenn	32	73	0	60.1	14.9	77.1	63.1	49.1	56.1	63.1
WB Mayville	25	75	0	55.8	13.9	79.7	60.1	45.9	53.0	61.9
ND901CLPlus	30	77	0	57.7	15.2	73.5	59.2	41.5	50.4	58.1
Shelly	28	78	0	56.8	13.7	--	79.9	50.9	65.4	--
LCS Prime	29	76	0	57.5	13.0	--	80.4	49.1	64.8	--
Redstone	29	78	0	56.2	13.4	--	80.2	47.0	63.6	--
Surpass	30	73	0	58.8	13.4	--	76.0	49.7	62.9	--
WB9653	27	77	0	56.8	13.2	--	77.9	45.8	61.9	--
HRS 3530	32	77	0	55.4	14.2	--	79.6	43.7	61.7	--
SY Valda	29	77	0	57.7	13.4	--	71.5	49.6	60.6	--
Prestige	28	73	0	58.3	13.4	--	72.6	45.8	59.2	--
Duclair	30	76	0	56.2	13.5	--	64.5	48.5	56.5	--

*Table continued on next page*

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat - 2016

Hettinger, ND

Variety	Days to	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	DAP <sup>1</sup>	inches	0-9 <sup>2</sup>	lbs/bu	%	----- Bushels per acre -----				
<i>Table continues from previous page</i>										
LCS Trigger	28	79	0	57.3	12.4	--	--	55.7	--	--
LCS Anchor	27	74	0	59.4	13.9	--	--	52.6	--	--
TCG Spitfire	28	79	0	56.1	13.8	--	--	52.0	--	--
Egan	30	77	0	56.4	14.8	--	--	51.6	--	--
MN10261-1	29	77	0	59.6	14.4	--	--	49.9	--	--
07S0027-3	29	78	0	55.0	13.8	--	--	48.7	--	--
HRS 3616	28	76	0	57.2	14.3	--	--	48.6	--	--
HRS 3504	27	77	0	56.7	13.4	--	--	48.3	--	--
TCG Wildfire	30	76	0	58.5	13.7	--	--	45.3	--	--
TCG Cornerstone	26	78	0	57.1	14.3	--	--	43.2	--	--
WB9312	26	75	0	55.8	12.2	--	--	39.1	--	--
Trial Mean	30	76	0	57.8	14.0	84.8	70.1	47.3	58.6	67.0
C.V. %	5.0	0.9	818.3	2.3	3.7	5.2	4.8	7.1	--	--
LSD 5%	2.2	1.0	0.1	1.8	0.7	6.2	4.7	4.7	--	--
LSD 10%	1.7	0.8	0.1	1.5	0.6	5.2	4.0	4.0	--	--

<sup>1</sup> Days to Head = the number of days from planting to head emergence from the boot.

<sup>2</sup> 0 = no lodging, 9 = 100% lodged.

Planting Date: April 1

Harvest Date: July 25

Previous Crop: Chemical Fallow

**NDSU Hettinger Research Extension Center**

<b>Hard Red Spring Wheat - 2016</b>	<b>Scranton, ND</b>
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	204	2015	2016	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Barlow	31	0	61.1	13.0	61.9	59.5	41.1	50.3	54.2
Elgin ND	30	0	59.5	12.4	60.2	59.5	41.7	50.6	53.8
Focus	29	0	62.1	12.6	--	--	38.3	--	--
Glenn	29	0	62.5	13.0	54.6	55.2	42.4	48.8	50.7
HRS 3419	27	0	57.4	11.5	--	68.5	48.5	58.5	--
HRS 3530	31	0	58.8	12.3	--	--	42.8	--	--
LCS Breakaway	26	0	60.3	13.6	--	--	38.6	--	--
LCS Iguacu	26	0	59.3	12.3	--	66.2	37.3	51.8	--
LCS Nitro	25	0	57.5	11.8	--	63.8	42.0	52.9	--
LCS Prime	28	0	59.0	11.5	--	--	41.1	--	--
Mott	28	0	58.4	13.5	62.2	56.2	36.6	46.4	51.7
MS Stingray	26	0	57.0	11.4	--	66.5	39.5	53.0	--
Prestige	27	0	59.4	11.4	--	--	46.6	--	--
Prevail	27	0	60.8	11.8	66.4	59.5	45.0	52.3	57.0
SY Ingmar	26	0	60.1	13.3	--	--	38.2	--	--
SY Rowyn	24	0	59.2	12.7	56.8	59.5	37.0	48.3	51.1
SY Soren	24	0	58.8	13.5	62.6	62.6	38.3	50.5	54.5
Velva	26	0	58.7	12.5	59.7	55.5	37.9	46.7	51.0
WB9507	28	0	55.4	12.1	--	62.9	40.2	51.6	--
WB9653	25	0	58.4	12.2	--	--	41.2	--	--
SY605CL	28	0	61.2	12.4	65.7	61.1	40.3	50.7	55.7
Trial Mean	27	0	59.3	12.4	60.5	60.6	40.7	50.9	53.3
C.V. %	4.4	--	2.0	6.4	7.6	5.8	9.7	--	--
LSD 5%	1.7	NS	1.7	1.1	6.3	5.0	5.6	--	--
LSD 10%	1.4	NS	1.4	0.9	5.2	4.1	4.6	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 4

Harvest Date: August 9

Previous Crop: Spring Wheat

**NDSU Hettinger Research Extension Center**

<b>Hard Red Spring Wheat - 2016</b>	<b>Regent, ND</b>
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	----- Grain Yield -----			Average Yield	
	inches	0-9*	lbs/bu	%	2014	2015	2016	2 yr	3 yr
					----- Bushels per acre -----				
Barlow	27	0	57.8	16.4	60.2	82.4	31.5	57.0	58.0
Elgin ND	28	0	56.4	16.4	64.4	82.4	35.3	58.9	60.7
Focus	27	0	58.1	15.5	--	--	30.9	--	--
Glenn	27	0	59.3	16.0	56.0	74.0	29.0	51.5	53.0
HRS 3419	25	0	56.9	15.7	--	98.8	24.2	61.5	--
HRS 3530	28	0	57.1	15.9	--	--	36.9	--	--
LCS Breakaway	25	0	58.2	16.2	--	--	31.1	--	--
LCS Iguacu	25	0	58.3	15.1	--	93.2	26.3	59.8	--
LCS Nitro	23	0	56.3	16.2	--	103.4	25.2	64.3	--
LCS Prime	26	0	58.2	13.6	--	--	36.0	--	--
Mott	25	0	56.9	16.3	57.8	84.3	32.7	58.5	58.3
MS Stingray	25	0	55.8	13.4	--	97.4	31.8	64.6	--
Prestige	25	0	57.1	14.9	--	--	36.1	--	--
Prevail	25	0	57.7	14.7	62.6	83.8	35.1	59.5	60.5
SY Ingmar	23	0	57.3	16.2	--	--	35.2	--	--
SY Rowyn	23	0	56.8	14.9	54.5	92.0	31.2	61.6	59.2
SY Soren	23	0	56.2	16.5	60.8	82.5	32.9	57.7	58.7
Velva	25	0	53.5	15.4	61.1	80.6	32.5	56.6	58.1
WB9507	26	0	54.7	15.2	--	95.1	31.8	63.5	--
WB9653	23	0	56.8	15.8	--	--	38.1	--	--
SY605CL	26	0	57.5	16.1	65.9	82.3	33.3	57.8	60.5
Trial Mean	25	0	57.0	15.5	60.7	87.2	32.3	59.5	58.6
C.V. %	4.6	--	2.1	4.0	8.0	4.7	7.6	--	--
LSD 5%	1.6	NS	1.7	0.9	5.7	4.9	3.5	--	--
LSD 10%	1	NS	1.4	0.7	4.7	4.1	2.9	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 4

Harvest Date: August 9

Previous Crop: Spring Wheat



**NDSU Hettinger Research Extension Center**

<b>Hard Red Spring Wheat - 2016</b>	<b>New Leipzig, ND</b>
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Barlow	26	0	56.9	16.1	64.0	51.4	33.7	42.6	49.7
Elgin ND	26	0	55.2	16.5	65.6	47.8	33.4	40.6	48.9
Focus	26	0	57.3	15.6	--	--	35.7	--	--
Glenn	27	0	57.5	16.0	53.3	45.4	37.9	41.7	45.5
HRS 3419	23	0	53.5	15.1	--	49.4	17.1	33.3	--
HRS 3530	26	0	54.9	16.3	--	--	41.7	--	--
LCS Breakaway	24	0	54.1	16.3	--	--	31.8	--	--
LCS Iguacu	23	0	54.1	15.0	--	52.5	25.8	39.2	--
LCS Nitro	25	0	50.6	14.7	--	47.3	27.9	37.6	--
LCS Prime	26	0	56.8	14.2	--	--	44.9	--	--
Mott	23	0	55.1	16.2	55.7	44.5	32.8	38.7	44.3
MS Stingray	23	0	55.0	13.8	--	49.3	32.4	40.9	--
Prestige	24	0	52.4	16.1	--	--	36.9	--	--
Prevail	25	0	53.9	15.3	66.4	50.1	34.2	42.2	50.2
SY Ingmar	23	0	54.2	16.1	--	--	36.0	--	--
SY Rowyn	23	0	52.8	15.2	58.3	52.4	37.1	44.8	49.3
SY Soren	22	0	54.9	15.9	65.2	51.8	32.2	42.0	49.7
Velva	22	0	55.5	16.2	67.9	41.7	35.3	38.5	48.3
WB9507	24	0	50.6	15.6	--	45.9	31.4	38.7	--
WB9653	21	0	53.9	15.3	--	--	39.0	--	--
SY605CL	23	0	57.1	15.6	65.6	57.5	35.9	46.7	53.0
Trial Mean	24	0	54.6	15.6	62.7	49.1	34.0	40.5	48.8
C.V. %	6	--	3.5	3.7	7.4	6.7	14.6	--	--
LSD 5%	2.0	NS	2.7	0.8	5.5	4.6	7.0	--	--
LSD 10%	1.7	NS	2.3	0.7	4.6	3.8	5.8	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 5

Harvest Date: August 15

Previous Crop: Flax

**NDSU Hettinger Research Extension Center**

<b>Hard Red Spring Wheat - 2016</b>	<b>Mandan, ND</b>
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Barlow	32	2	55.1	12.4	73.4	31.9	60.9	46.4	55.4
Elgin ND	32	0	54.1	11.4	76.9	30.1	65.3	47.7	57.4
Focus	32	2	56.6	11.2	--	--	65.5	--	--
Glenn	33	1	57.4	11.9	69.7	26.1	62.6	44.4	52.8
HRS 3419	30	0	53.4	10.4	--	39.4	73.5	56.5	--
HRS 3530	32	0	55.2	11.4	--	--	70.6	--	--
LCS Breakaway	28	0	55.0	11.6	--	--	56.3	--	--
LCS Iguacu	29	0	53.8	10.6	--	38.6	60.9	49.8	--
LCS Nitro	28	0	53.7	11.4	--	33.2	67.6	50.4	--
LCS Prime	30	0	55.5	10.6	--	--	70.0	--	--
Mott	34	0	54.9	12.1	76.0	31.0	61.3	46.2	56.1
MS Stingray	33	0	51.3	9.8	--	36.7	63.9	50.3	--
Prestige	30	0	53.0	11.5	--	--	64.3	--	--
Prevail	30	0	53.9	11.8	73.9	35.3	66.2	50.8	58.5
SY Ingmar	28	0	54.3	12.3	--	--	58.8	--	--
SY Rowyn	28	0	53.3	11.3	74.7	34.7	61.5	48.1	57.0
SY Soren	27	0	53.7	12.0	72.5	32.6	59.4	46.0	54.8
Velva	29	0	52.9	11.5	72.9	24.4	62.6	43.5	53.3
WB9507	30	0	50.7	10.8	--	34.7	59.8	47.3	--
WB9653	27	0	53.0	10.8	--	--	70.1	--	--
SY605CL	30	1	55.7	11.3	72.8	37.1	66.8	52.0	58.9
Trial Mean	30	0	54.1	11.3	74.3	32.8	64.2	48.6	56.3
C.V. %	4.1	108.3	2.2	4.6	7.3	8.9	7.6	--	--
LSD 5%	1.8	0.6	1.7	0.9	6.5	4.2	6.9	--	--
LSD 10%	1.5	0.5	1.4	0.7	5.4	3.5	5.7	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 5

Harvest Date: August 15

Previous Crop: Spring Wheat

**NDSU Dickinson Research Extension Center**

**2016 Hard Red Spring Wheat - Recrop** **Dickinson, ND**

Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	----- Grain Yield-----			Average Yield	
						2014	2015	2016	2 Year	3 Year
						-----bu/ac-----			----bu/ac----	
Barlow	67	13,277	25	60.3	14.8	91.1	69.1	48.5	58.8	69.6
Bolles	70	12,971	25	58.2	16.3	88.8	68.9	47.5	58.2	68.4
Boost	70	12,310	25	61.1	15.7	86.8	66.7	52.3	59.5	68.6
Duclair	68	13,208	24	57.9	13.9	88.5	63.9	49.8	56.9	67.4
Egan	68	14,113	22	55.9	15.1	--	--	45.4	--	--
Elgin-ND	69	13,092	25	57.8	13.9	88.9	71.4	48.5	60.0	69.6
Faller	70	12,909	24	58.5	14.1	95.1	68.1	47.1	57.6	70.1
Focus	64	12,876	25	62.1	14.5	--	--	49.6	--	--
Glenn	68	12,744	25	59.2	15.3	86.0	67.8	51.2	59.5	68.3
HRS 3361	69	13,385	23	59.9	14.0	83.9	64.1	55.3	59.7	67.8
HRS 3419	69	15,696	24	59.2	12.2	69.8	76.6	60.5	68.6	69.0
HRS 3504	69	12,577	22	61.4	12.7	--	--	65.0	--	--
HRS 3530	69	12,635	25	60.5	14.4	--	72.2	59.1	65.6	--
HRS 3616	67	11,668	23	61.3	14.3	--	--	48.9	--	--
LCS Anchor	66	13,283	21	60.9	15.5	--	--	51.7	--	--
LCS Breakaway	65	12,855	22	62.6	13.4	88.9	77.6	51.2	64.4	72.6
LCS Iguacu	68	12,595	22	60.2	12.8	78.2	80.9	54.0	67.4	71.0
LCS Nitro	69	13,324	22	57.6	13.8	80.9	85.2	57.0	71.1	74.4
LCS Prime	67	12,017	24	60.1	13.3	--	--	60.5	--	--
LCS Pro	67	10,432	27	62.1	13.7	92.2	77.7	60.7	69.2	76.9
Linkert	67	12,196	23	61.0	14.7	87.2	71.2	52.9	62.0	70.4
MS Chevelle	67	13,564	22	60.8	12.5	--	75.9	57.7	66.8	--
MS Stingray	71	13,131	25	59.4	12.6	87.4	68.8	52.1	60.4	69.4
Mott	69	14,635	26	58.5	15.0	87.0	64.1	45.1	54.6	65.4
ND901CL Plus	68	13,328	25	61.8	14.9	79.5	67.1	49.5	58.3	65.4
Prestige	64	12,946	24	59.1	13.8	--	77.1	54.1	65.6	--
Prevail	65	12,782	24	60.2	13.7	85.3	53.4	57.5	55.5	65.4
Prosper	70	13,079	24	59.5	14.2	88.7	71.1	55.0	63.1	71.6
RB07	66	14,215	22	58.6	15.3	61.1	73.7	47.6	60.7	60.8
Redstone	71	16,537	24	58.9	12.4	--	71.0	56.6	63.8	--
Rolag	66	12,657	24	60.7	14.2	86.5	75.4	52.6	64.0	71.5
Sy Ingmar	69	14,101	23	62.4	14.0	88.3	75.7	56.7	66.2	73.6
Sy Rowyn	66	14,708	23	60.5	13.6	87.0	72.4	58.6	65.5	72.7
Sy Soren	67	14,355	21	59.5	14.5	86.9	70.6	50.1	60.4	69.2
Sy Valda	66	12,979	22	61.0	12.9	--	78.3	63.5	70.9	--
Shelly	70	12,856	23	60.5	13.4	--	--	48.7	--	--

*Table continued on next page*

**NDSU Dickinson Research Extension Center**

**2016 Hard Red Spring Wheat - Recrop** **Dickinson, ND**

Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	----- Grain Yield-----			----- Average Yield-----	
						2014	2015	2016	2 Year	3 Year
						-----bu/ac-----			-----bu/ac-----	
<i>Table continued from previous page</i>										
Surpass	63	14,197	24	60.7	13.6	--	78.0	56.2	67.1	--
Sy 605 CL	66	15,318	24	58.7	14.1	89.8	72.0	45.9	59.0	69.2
Sy Tyra	70	12,641	21	61.0	13.3	90.8	73.1	51.9	62.5	71.9
TCG Cornenstone	69	12,502	21	59.2	14.8	--	--	52.0	--	--
TCG Spitfire	72	12,025	23	60.6	14.3	--	--	59.7	--	--
TCG Wildfire	68	14,492	23	58.6	14.2	--	--	52.0	--	--
Velva	70	13,289	24	60.1	14.3	96.0	67.0	55.3	61.2	72.8
WB9312	65	13,820	22	61.4	12.8	--	--	56.1	--	--
WB9507	68	11,233	24	59.2	13.7	89.0	71.3	52.8	62.0	71.0
WB9653	67	12,718	22	60.4	14.3	--	69.5	61.8	65.6	--
WB-Mayville	66	11,753	21	60.1	15.1	93.2	73.5	53.7	63.6	73.5
Trial Mean	67	13,134	24	60.3	14.3	86.1	71.3	52.7	--	--
CV %	1.6	3.5	4.9	2.3	5.1	5.4	5.9	10.4	--	--
LSD 0.05	1	906	2	1.9	1.4	--	5.9	7.6	--	--
LSD 0.10	1	757	1	1.6	1.2	5.5	4.9	6.4	--	--

Planting Date: April 13, 2016  
 Harvest Date: August 3, 2016  
 Previous Crop: Rye  
 Seeding Rate: 1.2 million live seeds/ac

**NDSU Dickinson Research Extension Center**

<b>2016 Hannover Spring Wheat - Recrop</b>	<b>Dickinson, ND</b>
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Variety	Seeds per Pound	Test Weight lbs/bu	Protein %	----- Grain Yield-----			----- Average Yield-----	
				2014	2015	2016	2 Year	3 Year
				-----bu/ac-----			-----bu/ac-----	
Barlow	14,935	59.0	15.1	69.3	61.1	43.1	52.1	57.8
Elgin-ND	16,229	57.0	14.9	73.5	63.2	41.2	52.2	59.3
HRS3419	16,601	56.3	13.4	--	--	43.4	--	--
HRS3530	14,472	57.4	13.8	--	--	41.1	--	--
LCS Nitro	14,743	56.0	13.9	--	--	39.9	--	--
Mott	16,033	57.6	14.7	74.1	65.0	37.8	51.4	58.9
Prestige	15,122	57.4	13.9	--	--	43.7	--	--
Sy Soren	15,228	58.9	14.3	68.3	62.6	44.7	53.6	58.5
Sy Valda	13,325	59.1	13.7	--	--	46.2	--	--
WB9653	13,135	57.9	13.0	--	--	53.9	--	--
<b>Trial Mean</b>	14,982	57.7	14.1	72.3	59.4	43.5	--	--
CV %	2.9	1.0	5.1	4.0	5.5	11.7	--	--
LSD 0.05	988	0.9	1.6	--	4.7	7.4	--	--
LSD 0.10	800	0.7	1.3	3.5	3.9	6.1	--	--

Planting Date: May 4, 2016

Harvest Date: August 22, 2016

Previous Crop: wheat

Seeding Rate: 1.2 million live seeds/ac

**NDSU Dickinson Research Extension Center**

**2016 Glen Ullin Spring Wheat - Recrop** **Dickinson, ND**

Variety	Seeds per Pound	Test Weight lbs/bu	Protein %	----- Grain Yield-----			----- Average Yield-----	
				2014	2015	2016	2 Year	3 Year
				-----bu/ac-----			-----bu/ac-----	
Barlow	18,023	57.0	14.5	71.5	68.6	33.6	51.1	57.9
Elgin-ND	16,688	56.4	14.7	73.3	71.8	31.6	51.7	58.9
HRS3419	18,003	56.1	12.8	--	--	45.0	--	--
HRS3530	16,630	56.9	13.8	--	--	39.0	--	--
LCS Nitro	15,403	55.8	13.8	--	--	39.2	--	--
Mott	17,088	56.6	14.0	77.2	79.5	34.0	56.8	63.6
Prestige	17,984	55.5	14.8	--	--	33.8	--	--
Sy Soren	18,241	55.6	15.4	70.2	69.0	30.1	49.5	56.4
Sy Valda	14,826	58.4	13.6	--	--	35.3	--	--
WB9653	14,357	57.9	12.9	--	--	40.3	--	--
Trial Mean	16,724	56.6	14.0	72.4	68.8	36.2	--	--
CV %	4.2	1.1	1.8	6.8	9.1	7.2	--	--
LSD 0.05	1,608	0.9	0.6	--	9.1	3.8	--	--
LSD 0.10	1,303	0.7	0.5	NS	7.5	3.1	--	--

Planting Date: May 4, 2016

Harvest Date: August 22, 2016

Previous Crop: wheat

Seeding Rate: 1.2 million live seeds/ac

Trial received hail damage @ boot stage

**Table 1. 2016 North Dakota hard winter wheat variety description and agronomic traits.**

Variety	Agent or Origin <sup>2</sup>	Year	Reaction to Disease <sup>1</sup>				Maturity <sup>3</sup>	Straw <sup>4</sup> Strength	Height <sup>5</sup> (inches)	Winter <sup>6</sup> Hardiness
			Stripe Rust	Leaf Rust	Stem Rust	Scab				
AAC Gateway	A.Can.	2012	R/MR	MR/MS	R	MS	0	3	30	3
Accipiter	CDC	2008	R/MR	MS	R	S	0	4	36	2
Art	Agripro	2008	R	R	R	MS	-6	4	33	8
Boomer	WB	2009	MS	MR	R	S	-2	4	34	3
Broadview	A.Can.	2008	MR/MS	R	R	S/VS	-2	5	32	4
Carter	WB	2010	S	NA	NA	S	-2	4	32	6
CDC Chase	CDC	2013	R	R	R	MS	-2	6	37	4
CDC Falcon	WB	2000	R	MS	NA	S	-2	5	34	4
Colter	MT	2013	MR	S	R	S	-1	3	36	5
Darrell	SD	2006	NA	S	R	MS	-4	4	35	6
Decade	MT/ND	2010	S	VS	R	VS	-4	4	35	2
Emerson	A.Can.	2011	R	MS	R	MR	-2	4	33	3
Flourish	A.Can.	2010	R/MR	MS	MS	S	-4	5	35	2
Hawken	Agripro	2007	S	MR	MR	S	-5	4	28	7
Ideal	SD	2011	MR/MS	R	MR	S	-3	5	33	5
Jerry	ND	2001	S	MR	R	S	0	4	37	3
<b>Loma</b>	<b>MT</b>	<b>2016</b>	<b>R</b>	<b>NA</b>	<b>R</b>	<b>S</b>	<b>0</b>	<b>2</b>	<b>34</b>	<b>3</b>
Lyman	SD	2008	MR/MS	R	R	MR	-4	7	35	5
McGill	ARS-NE	2010	MS	MS	MR	MS	-5	4	36	4
Moats	A.Can.	2010	R	R	R	MR	0	5	38	2
Northern	MT	2015	R	S	R	S	+1	NA	35	6
Overland	NE	2006	MR	MR/R	MR	S	-4	4	35	5
Peregrine	CDC	2008	R	MR	R	MS	+1	4	39	2
Radiant <sup>7</sup>	A.Can.	2001	R	S	S	S	+1	2	36	2
Redfield	SD	2013	MR/MS	MS	S	MR	-3	R	33	5
<b>Ruth</b>	<b>NE</b>	<b>2016</b>	<b>MS</b>	<b>MS</b>	<b>MR</b>	<b>MS</b>	<b>-3</b>	<b>3</b>	<b>32</b>	<b>5</b>
Smoky Hill	WB	2007	S	R	R	S	0	5	35	7
Striker	WB	2009	MS	MR	R	S	-4	4	32	5
SY Monument	Agripro	2014	MR	MR	NA	MS	-1	4	32	4
SY Sunrise	Agripro	2015	MR	NA	NA	MS	-4	5	31	5
SY Wolf	Agripro	2010	MR	MR	R	MS	-4	4	33	6
WB-Grainfield	WB	2013	MS	MS	NA	S	-5	6	33	6
WB-Matlock	WB	2010	MS	MS	R	MS	+1	4	36	2
WB4614	WB	2013	R	NA	NA	S	0	5	35	3
Wesley	NE/SD/WY	2000	MR	MS	R	S	-5	5	32	6
Yellowstone	MT	2005	R	S	S	VS	+2	6	33	5

<sup>1</sup>R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible; VS = very susceptible; NA = not available.

<sup>2</sup>A.Can. = Agriculture and Agri-Food Canada; CDC = Crop Development Centre, University of Saskatchewan; WB = WestBred; SD = South Dakota State University; MT = Montana State University; ND = North Dakota State University; ARS = USDA Agricultural Research Service; NE = University of Nebraska; WY = Wyoming.

<sup>3</sup>Days to heading relative to Jerry.

<sup>4</sup>Straw strength = 1 to 9 scale, with 1 strongest and 9 weakest. These ratings may change as additional data become available.

<sup>5</sup>Based on the average of several environments, and should be used for comparing varieties. The environment can impact the height of varieties.

<sup>6</sup>Relative winter hardiness rating: 1 = excellent, 10 = very poor. These values are subject to change as additional information becomes available.

<sup>7</sup>Curl mite resistant.

**Table 2. Analytical milling and baking characteristics of selected varieties evaluated across five localities (Carrington, Dickinson, Hettinger, Minot and Williston) in 2015.**

	Kernel				Flour				Farinograph				Loaf			
	Test Weight (lb/bu)	1000-KW (gram)	Hardness (score)	Falling Number (seconds)	Protein 12 MB (%)	Flour Extraction (%)	Protein (%)	Gluten Index	Flour Ash (%)	Abs %	Peak Time (min)	Stab (min)	MTI (BU)	Loaf Volume (cc)	Crumb Structure (1-10) <sup>1</sup>	Crumb color (1-10) <sup>1</sup>
AAC Gateway	62.0	34.1	69.2	386	12.8	69.8	12.1	93	0.5	57.2	7.9	15.1	20.2	1,030	7.2	8.0
Accipiter	61.7	30.6	69.2	390	11.5	65.6	10.6	95	0.51	56.2	4.8	10.4	24.4	950	7.4	7.6
Broadview	60.9	32.7	59.8	406	11.3	64.4	10.5	76	0.5	56.7	4.4	5.6	42.0	906	6.9	7.5
CDC Chase	62.4	33.7	69.4	371	12.0	67.9	11.0	91	0.48	57.1	5.5	16.1	25.8	939	7.0	7.0
CDC Falcon	60.8	31.4	61.8	416	11.9	64.8	11.1	97	0.51	55.4	4.0	11.8	20.0	966	7.6	7.5
Colter	58.7	33.9	69.8	385	12.0	67.9	11.2	97	0.51	56.8	9.7	15.8	24.0	956	7.6	6.9
Decade	61.4	33.0	68.6	385	12.3	67.5	11.3	98	0.49	57.0	15.2	24.0	17.8	960	7.4	7.2
Emerson	62.6	30.7	64.6	341	12.8	68.9	11.8	97	0.49	55.8	15.3	23.2	17.0	1,043	6.8	7.7
Flourish	60.1	34.7	62.6	379	12.4	66.8	11.6	95	0.5	57.6	6.2	14.4	24.4	1,051	7.0	7.4
Ideal	61.6	33.9	65.4	308	11.5	67.5	10.5	98	0.49	56.6	4.6	13.1	31.4	933	7.0	6.6
Jerry	60.5	36.7	59.8	404	11.8	68.2	11.0	89	0.5	56.9	4.9	9.8	32.4	942	7.2	6.9
Lyman	61.5	37.9	74.0	378	12.4	67.9	11.4	80	0.5	57.9	5.8	10.9	26.8	929	6.8	6.2
MT1078	61.6	32.9	78.8	394	12.2	66.3	11.3	93	0.51	56.9	10.3	17.1	16.8	989	7.2	7.4
Moats	58.4	33.6	80.8	401	12.1	64.9	11.3	99	0.52	59.2	10.0	19.7	12.8	1,012	6.6	6.8
Northern	61.0	32.4	83.0	426	12.3	67.7	11.6	85	0.53	60.5	5.2	8.9	27.6	995	6.4	7.3
Overland	61.8	35.4	67.0	388	11.8	67.1	10.7	77	0.5	57.6	3.8	5.5	40.6	859	6.2	6.1
Peregrine	61.7	33.3	76.2	361	11.5	69.8	10.4	94	0.49	56.4	4.5	11.0	28.6	888	6.6	6.4
Redfield	61.8	34.0	63.0	392	12.1	66.0	11.3	93	0.5	56.9	15.0	22.3	20.4	1,017	6.8	7.7
SY Wolf	62.1	35.2	74.2	365	12.0	66.7	11.1	83	0.5	58.0	6.4	11.0	23.4	942	7.2	6.2
WB Matlock	62.1	34.6	65.4	392	12.0	66.9	11.2	86	0.52	58.1	8.3	12.6	22.4	916	6.8	6.3
WB4614	61.0	31.7	73.2	384	12.3	66.3	11.3	86	0.5	58.2	5.2	9.0	26.6	989	6.6	6.0
Mean	61.2	33.6	69.3	383	12.0	67.1	11.2	91	0.5	57.3	7.5	13.7	25.0	962	7.0	7.0
LSD (5%)	1.2	2	3.7	47	0.5	2.4	0.5	8	0.01	1	7.9	8.9	10.1	64	0.9	0.8

<sup>1</sup>Scale 1-10, with 1 being low and 10 being superior.



NDSU Hettinger Research Extension Center

**Hard Red Winter Wheat - 2016** **Hettinger, ND**

Variety	Fall	Fall	Spring	Heading	Plant	Plant	Test	Grain	Grain Yield			Average Yield	
	Growth	Stand	Stand	Date	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	1-5 <sup>1</sup>	%	%		inches	0-9 <sup>2</sup>	lbs/bu	%	----- Bushels per acre -----				
SY Wolf	5	90	90	6/9	32	0	59.7	13.8	95.7	96.8	69.0	82.9	87.2
Overland	4	90	90	6/7	35	1	59.9	12.8	91.6	86.3	72.4	79.4	83.4
AC Emerson	3	90	90	6/10	32	0	59.7	14.3	94.9	86.9	63.0	75.0	81.6
Decade	3	90	90	6/10	32	4	56.9	13.8	102.9	81.1	58.0	69.6	80.7
Peregrine	3	90	90	6/11	38	1	59.7	13.9	96.2	80.6	63.1	71.9	80.0
Lyman	3	90	90	6/8	33	2	59.4	13.9	91.0	80.4	64.9	72.7	78.8
Ideal	3	90	90	6/9	32	0	57.6	13.2	95.8	80.8	57.3	69.1	78.0
Flourish	3	90	90	6/9	35	1	56.0	14.4	88.8	75.9	68.4	72.2	77.7
AC Gateway	4	90	90	6/10	31	0	59.4	14.7	87.9	79.3	64.1	71.7	77.1
Redfield	3	90	90	6/8	30	0	57.8	14.2	88.0	78.4	60.2	69.3	75.5
WB Matlock	4	90	90	6/9	35	0	58.9	13.5	86.6	75.2	55.7	65.5	72.5
Moats	3	90	90	6/9	37	1	58.9	14.6	85.6	70.6	60.7	65.7	72.3
AC Broadview	4	90	90	6/9	34	2	56.1	13.7	84.9	71.7	58.4	65.1	71.7
Accipiter	2	90	90	6/11	33	1	56.3	13.9	81.2	77.5	56.1	66.8	71.6
Jerry	3	90	90	6/10	36	0	57.3	13.7	85.2	72.2	51.9	62.1	69.8
Northern	4	90	90	6/10	31	0	55.5	15.0	--	84.0	68.3	76.2	--
WB4614	5	90	90	6/9	30	0	55.7	14.0	--	78.1	71.8	75.0	--
Colter	2	76	75	6/10	32	0	55.5	14.3	--	80.4	69.2	74.8	--
CDC Chase	5	90	90	6/10	38	0	59.9	14.6	--	83.7	56.3	70.0	--
SY Sunrise	4	90	90	6/7	31	0	59.4	13.1	--	--	80.2	--	--
SY Monument	5	90	90	6/8	33	0	57.7	14.4	--	--	69.1	--	--
Loma	3	90	90	6/11	30	0	55.4	13.1	--	--	69.7	--	--
Ruth	4	90	90	6/7	32	0	58.4	13.7	--	--	63.2	--	--
Trial Mean	3	90	90	6/9	34	0.5	58.2	14.1	88.1	79.5	61.2	71.3	77.2
C.V. %	11.6	0.5	0.1	0.4	3.9	146.4	1.6	3.3	4.9	4.3	7.7	--	--
LSD 0.05	0.5	0.6	0.1	0.9	1.9	1.1	1.3	0.7	6.9	4.8	6.7	--	--
LSD 0.10	0.5	0.5	0.1	0.7	1.6	1.0	1.1	0.5	5.9	4.0	5.6	--	--

<sup>1</sup> 1 = least growth, 5 = most growth.

<sup>2</sup> 0 = no lodging, 9 = 100% lodged.

Planting Date: September 21

Harvest Date: July 19

Previous Crop: Chemical Fallow

**NDSU Dickinson Research Extension Center**

**2016 Winter Wheat - Recrop** **Dickinson, ND**

Variety	Heading Date	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	----- Grain Yield-----			----- Average Yield-----	
						2014	2015	2016	Year 2	Year 3
						-----bu/ac-----			bu/ac	bu/ac
AC Broadview	6-Jun	17,480	24	58.0	12.5	104.1	75.1	37.2	56.2	72.1
AC Emerson	7-Jun	21,266	26	57.0	14.5	93.1	79.7	31.7	55.7	68.2
AC Gateway	7-Jun	16,922	22	59.8	14.5	91.2	71.5	32.0	51.7	64.9
Accipiter	10-Jun	17,726	23	58.0	13.9	102.8	83.9	37.8	60.9	74.8
CDC Chase	6-Jun	18,744	24	59.0	14.3	--	76.3	35.1	55.7	--
Colter	8-Jun	14,473	25	60.3	11.5	105.4	75.0	45.4	60.2	75.3
Decade	7-Jun	16,957	23	58.5	14.4	102.2	66.2	34.0	50.1	67.5
Flourish	6-Jun	17,257	24	57.8	13.7	99.5	72.1	33.7	52.9	68.4
Ideal	7-Jun	14,998	23	61.5	11.4	96.2	55.5	40.3	47.9	64.0
Jerry	9-Jun	15,617	25	56.8	13.6	99.9	65.7	28.9	47.3	64.9
Lyman	6-Jun	14,680	26	60.3	13.6	87.0	75.6	35.6	55.6	66.1
Loma	9-Jun	18,114	20	56.5	14.9	--	--	31.6	--	--
Moats	7-Jun	19,375	25	57.3	13.4	87.8	67.2	31.8	49.5	62.3
Ruth	3-Jun	16,186	23	59.8	13.7	--	--	27.6	--	--
Northern	8-Jun	19,103	23	54.8	13.7	--	81.0	36.5	58.8	--
Overland	4-Jun	15,450	25	59.5	13.0	94.4	77.5	31.7	54.6	67.8
Peregrine	8-Jun	17,392	29	58.8	12.2	96.5	79.1	37.9	58.5	71.2
Redfield	7-Jun	15,725	24	59.0	13.4	--	70.2	33.9	52.0	--
SY Monument	6-Jun	16,178	24	57.5	12.4	--	--	48.7	--	--
SY Sunrise	3-Jun	14,815	21	59.8	12.7	--	--	38.7	--	--
SY Wolf	4-Jun	15,318	24	60.5	12.2	96.5	77.0	44.7	60.8	72.7
WB Matlock	7-Jun	16,754	25	59.3	13.1	100.6	75.3	40.2	57.7	72.0
WB4614	6-Jun	15,067	22	55.8	12.4	--	67.8	38.6	53.2	--
Trial Mean	7-Jun	16,702	24	58.6	13.5	94.9	72.8	34.4	--	--
CV %	0.0	7.4	5.9	2.2	7.8	9.4	13.0	16.5	--	--
LSD 0.05	1	2,527	2	2.7	2.2	--	13.3	9.3	--	--
LSD 0.10	1	2,099	2	2.2	1.8	10.6	11.1	7.7	--	--

Planting Date: September 22, 2015  
 Harvest Date: July 20, 2016  
 Previous Crop: Rye  
 Seeding Rate: 1 million live seeds/ac

**NDSU Hettinger Research Extension Center**

**Winter Rye - 2016**

**Hettinger, ND**

Variety	Spring	Heading	Plant	Plant	Test	----- Grain Yield -----			----- Average Yield -----	
	Stand	Date	Height	Lodge	Weight	2012	2015	2016	2 yr	3 yr
	%		inches	0-9 <sup>1</sup>	lbs/bu	----- Bushels per acre -----				
Dacold	90	6/1	60	6	52.6	71.1	87.8	72.9	80.4	77.3
DR02	90	5/31	54	3	54.1	74.2	84.9	64.6	74.8	74.6
Hancock	90	5/27	54	3	54.2	63.5	73.7	59.9	66.8	65.7
Spooner	90	5/27	51	2	55.5	48.9	64.4	57.3	60.9	56.9
Aroostok	90	5/25	52	3	55.4	46.0	54.3	45.6	50.0	48.6
Musketeer	90	5/27	53	5	54.3	--	77.2	70.7	74.0	--
Rymin	90	5/27	53	4	54.2	--	69.8	62.1	66.0	--
DREB15	90	5/24	54	3	54.5	--	--	50.7	--	--
Trial Mean	90	5/27	54	4	54.4	55.4	72.7	60.5	67.5	64.6
C.V. %	0	0.3	3.4	25.8	1.0	15.5	6.9	9.0	--	--
LSD 0.05	0.0	0.7	2.7	1.3	0.8	10.5	7.3	8.0	--	--
LSD 0.10	0.0	0.5	2.2	1.1	0.7	8.6	6.0	6.7	--	--

<sup>1</sup> 0 = no lodging, 9 = 100% lodged.

Planting Date: September 21

Harvest Date: July 19

Previous Crop: Chemical Fallow

**NDSU Dickinson Research Extension Center**

**2016 Winter Rye - Organic**

**Dickinson, ND**

Variety	Heading Date	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Grain Yield bu/ac
Aroostok	17-May	22,906	46	55.5	25.2
DR02	23-May	19,676	43	55.0	37.2
DREB15	17-May	20,558	43	55.1	30.8
Dacold	1-Jun	19,283	42	55.0	39.5
Musketeer	23-May	20,595	44	55.9	31.7
Rymin	22-May	18,939	42	55.5	31.6
Spooner	22-May	18,861	46	55.9	28.8
Trial Mean	22-May	20,117	44	55.4	32.1
CV %	1.4	4.4	5.1	0.6	6.8
LSD 0.05	0.4	1,321	3	0.5	3.2
LSD 0.10	0.4	1,091	3	0.4	2.7

Planting Date: October 8, 2015  
 Harvest Date: July 20, 2016  
 Previous Crop: Cover crop mix

**Table 1. Descriptions and agronomic traits of durum wheat varieties grown in North Dakota, 2016.**

Variety	Agent or Origin <sup>1</sup>	Year Released	Height (inches)	Straw Strength <sup>2</sup>	Days to Heading <sup>3</sup>	Reaction to Disease <sup>4</sup>				
						Stem Rust	Leaf Rust	Foliar Disease	Bact. Leaf Streak	Head Scab
AC Commander	Can.	2002	32	5	68	R	R	MS	NA	NA
AC Napoleon	Can.	2001	40	5	68	R	R	S	NA	NA
AC Navigator	Can.	1999	32	5	66	R	R	M	NA	S
Alkabo	ND	2005	36	2	67	R	R	M	MS	MS
Alzada <sup>5</sup>	WB	2004	30	6	63	R	R	S	NA	VS
Belzer	ND	1997	39	5	66	R	R	M	NA	M
Ben	ND	1996	39	3	67	R	R	MR	MS	S <sup>6</sup>
Carpio	ND	2012	37	5	69	R	R	M	MS/S	M
CDC Verona	Can.	2010	38	4	69	R	R	MR	NA	S
DG Max	DGP	2008	38	5	66	R	MR	MR	NA	MS
DG Star	DGP	2007	37	4	64	R	R	M	NA	NA
Dilse	ND	2002	37	5	68	R	R	M	M	MS
Divide	ND	2005	38	5	68	R	R	M	MS/S	M
Grande D'Oro	WB/DGP	2005	37	4	68	R	R	M	NA	NA
Grenora	ND	2005	35	5	67	R	R	M	MS/S	MS
Joppa	ND	2013	39	5	68	R	R	M	MS	M
Kyle	Can.	1984	39	7	68	R	MR	M	NA	NA
Lebsock	ND	1999	37	3	67	R	R	M	MS	MS
Maier	ND	1998	37	5	67	R	R	M	NA	S <sup>6</sup>
Mountrail	ND	1998	37	5	68	R	R	M	MS	S <sup>6</sup>
MS-Dart	Meridian	2015	37	5	68	NA	NA	NA	NA	NA
Pierce	ND	2001	38	5	67	R	R	MS	MS	S
Plaza	ND	1999	29	7	68	R	R	M	NA	MS
Rugby	ND	1973	38	5	64	R	R	MR	NA	S <sup>6</sup>
Silver	MT	2012	31	5	62	NA	NA	NA	NA	NA
Strongfield	Can.	2004	37	6	68	R	R	MS	NA	S
Tioga	ND	2010	39	4	68	R	R	M	MS	MS
VT Peak	Viterra	2010	37	6	68	NA	NA	NA	NA	NA
Wales	WB	2008	36	3	67	R	R	M	NA	S <sup>6</sup>
WB-Belfield	WB	2011	30	2	62	R	R	S	NA	S
Westhope	WB	2009	36	3	67	R	R	MS	NA	S

<sup>1</sup>Refers to agent or developer: Can. = Agriculture Canada, WB = Westbred, ND = North Dakota State University, DGP = Dakota Growers Pasta, Montana State = MT.

<sup>2</sup>Straw Strength = 1-9 scale, with 1 the strongest and 9 the weakest. Based on recent data. These values may change as more data become available.

<sup>3</sup>Days to Heading = the number of days from planting to head emergence from the boot. Averaged from several locations and years.

<sup>4</sup>R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible; NA = Not adequately tested. Foliar Disease = reaction to tan spot and septoria leaf spot complex.

<sup>5</sup>Alzada has a disease-resistance package that makes it more adapted to drier growing conditions (for example, western North Dakota).

<sup>6</sup>Indicates yields and/or quality often have been higher than would be expected based on visual symptoms. NA = Not adequately tested.

**Table 2. Durum wheat variety quality descriptions, milling and processing data averaged for five years (2010-2015) from drill strips (33 locations/year).**

Variety	Test Weight (lb/bu)	Vitreous Kernels (%)	Large Kernels (%)	Falling Number (sec)	Wheat Protein <sup>1</sup> (%)	Gluten Index <sup>2</sup>	Pasta Color <sup>3</sup> (1-12)	Spaghetti Firmness (g-cm)	Overall Quality <sup>4</sup>
AC Commander	59.5	93	52	495	14.1	89	9.0	5.4	Average
AC Navigator	60.0	93	59	486	14.2	68	8.9	5.4	Good
Alkabo	61.2	86	51	399	13.8	47	9.0	4.8	Good
Alzada <sup>5,6</sup>	59.1	91	62	467	14.2	88	8.5	5.3	Average
Carpio	61.0	82	59	447	13.9	91	8.9	5.1	Good
Divide	60.7	88	51	442	14.1	76	8.9	4.9	Good
Grenora	60.3	92	52	424	13.9	63	8.8	5.0	Good
Joppa	60.7	87	44	405	13.5	83	9.2	4.8	Good
Maier	60.4	92	47	399	14.7	54	8.8	5.2	Good
Mountrail	59.8	91	42	417	14.4	22	8.4	4.4	Average
Pierce	60.8	94	44	406	14.3	60	8.8	5.0	Good
Strongfield	60.2	89	52	426	14.7	65	8.7	5.1	Good
Tioga	60.7	88	57	402	13.8	76	8.7	5.1	Good
Average	60.3	90	51	432	14.1	68	8.8	5.1	

For all numbered footnotes, refer to bottom of Table 3.

**Table 3. Durum wheat variety quality descriptions, milling and processing data for 2015 at all locations in the drill strips.**

Variety	Test Weight (lb/bu)	Vitreous Kernels (%)	Large Kernels (%)	Falling Number (sec)	Wheat Protein <sup>1</sup> (%)	Gluten Index <sup>2</sup>	Pasta Color <sup>3</sup> (1-12)	Spaghetti Firmness (g-cm)	Overall Quality <sup>4</sup>
AC Commander <sup>5</sup>	58.9	90	38	596	14.2	91	9.3	4.2	Average
AC Navigator	59.6	89	39	576	14.0	75	9.2	4.1	Average
Alkabo	62.1	82	47	469	13.5	46	9.4	3.4	Good
Alzada <sup>6</sup>	58.8	86	56	545	14.4	85	8.7	4.0	Average
Carpio	61.6	78	54	517	14.1	92	9.1	3.8	Good
Divide	61.4	86	48	501	14.2	75	9.1	3.8	Good
Grenora	60.9	87	51	505	13.8	58	9.2	3.8	Good
Joppa	61.5	85	40	479	13.4	83	9.4	3.6	Good
Lebsock <sup>5</sup>	61.7	89	41	509	14.1	32	8.8	3.7	Good
Maier	61.4	87	44	483	14.3	55	9.1	4.0	Good
Mountrail	60.6	91	39	491	14.1	18	9.1	3.4	Average
Pierce	61.8	91	44	483	14.2	60	9.1	3.7	Good
Strongfield	60.6	89	48	516	14.8	65	8.9	3.9	Good
Tioga	61.4	87	55	468	13.8	77	9.2	3.8	Good
Average	60.9	87	46	510	14.1	65	9.1	3.8	

<sup>1</sup>Wheat protein is reported on a 12 percent moisture basis.

<sup>2</sup>Gluten index is unitless. Numbers less than 15 = very weak and greater than 80 = very strong gluten proteins.

<sup>3</sup>Pasta Color Score: Higher number indicates better color, with 8.5+ typically considered good.

<sup>4</sup>Overall Quality is determined based on agronomic, milling and spaghetti processing performance.

<sup>5</sup>Average of 31 drill strips instead of 33 for other varieties in Table 1. Lebsock average of five locations and AC Commander average of six locations instead of seven for other varieties in Table 3.

<sup>6</sup>Alzada has good quality when grown in environments where it is adapted. Low test weight can affect quality in some environments.

NDSU Hettinger Research Extension Center

**Durum Wheat - 2016**

**Hettinger, ND**

Variety	Days to	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	DAP <sup>1</sup>	inches	0-9 <sup>2</sup>	lbs/bu	%	----- Bushels per acre -----				
Joppa	77	30	0	58.3	11.8	85.7	78.8	41.1	60.0	68.5
Divide	77	26	0	58.4	12.6	81.6	82.6	33.4	58.0	65.9
Tioga	76	28	0	58.4	13.0	79.8	81.5	34.3	57.9	65.2
VT Peak	76	29	0	60.3	12.1	80.4	79.2	35.1	57.2	64.9
Mountrail	77	27	0	57.1	12.1	83.3	76.6	31.8	54.2	63.9
Alkabo	78	27	0	58.7	12.4	82.6	70.0	33.3	51.7	62.0
Carpio	78	26	0	56.2	12.6	80.5	71.6	32.2	51.9	61.4
Strongfield	78	27	0	57.1	13.3	75.7	70.7	35.5	53.1	60.6
CDC Verona	77	27	0	57.9	12.7	79.1	66.5	33.7	50.1	59.8
Grenora	77	26	0	57.6	12.5	68.1	76.3	33.4	54.9	59.3
Lebsock	77	29	0	59.3	11.6	71.8	60.6	35.6	48.1	56.0
Ben	77	29	0	58.6	12.3	73.0	60.5	31.6	46.1	55.0
AC Commander	78	24	0	57.6	13.4	69.7	59.7	35.0	47.4	54.8
Rugby	76	27	0	57.6	12.7	74.9	59.3	25.5	42.4	53.2
AC Navigator	77	26	0	59.6	12.8	65.1	56.2	36.3	46.3	52.5
Maier	80	26	0	63.3	12.7	66.3	59.3	30.4	44.9	52.0
Pierce	77	28	0	59.1	12.2	64.3	55.3	35.1	45.2	51.6
Alzada	77	27	0	58.0	12.3	56.8	41.7	34.4	38.1	44.3
Trial Mean	77	28	0	59.4	12.4	78.2	73.5	35.1	53.1	60.3
C.V. %	0.9	5.4	--	2.2	8.6	4.5	6.2	17.2	--	--
LSD 5%	1.0	2.1	NS	1.8	1.5	5.0	6.4	8.4	--	--
LSD 10%	0.8	1.8	NS	1.5	1.3	4.1	5.3	7.1	--	--

<sup>1</sup> Days to Head = the number of days from planting to head emergence from the boot.

<sup>2</sup> 0 = no lodging, 9 = 100% lodged.

Planting Date: April 4

Harvest Date: July 26

Previous Crop: Soybean Green Fallow

**NDSU Hettinger Research Extension Center**

<b>Durum Wheat - 2016</b>	<b>Scranton, ND</b>
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	Grain Yield			Average Yield	
	inches	0-9*	lbs/bu	%	2014	2015	2016	2 yr	3 yr
					----- Bushels per acre -----				
Alkabo	29	0	59.8	12.4	64.9	58.4	34.7	46.6	52.7
Carpio	29	0	59.8	13.0	57.8	56.5	38.0	47.3	50.8
Divide	29	0	60.0	12.2	61.5	62.0	38.1	50.1	53.9
Joppa	30	0	59.8	12.1	63.5	60.1	40.8	50.5	54.8
Mountrail	31	0	59.7	11.6	67.6	63.1	42.7	52.9	57.8
Tioga	31	0	61.0	12.0	61.1	62.1	42.6	52.4	55.3
<b>Trial Mean</b>	30	0	60.0	12.2	62.7	60.4	39.5	49.9	54.2
C.V. %	3.0	--	0.8	6.1	6.3	6.0	8.4	--	--
LSD 5%	1.3	NS	0.8	1.1	4.8	5.5	5.0	--	--
LSD 10%	1.1	NS	0.6	0.9	4.0	4.6	4.1	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 4

Harvest Date: August 9

Previous Crop: Spring Wheat

<b>Durum Wheat - 2016</b>	<b>Regent, ND</b>
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	Grain Yield			Average Yield	
	inches	0-9*	lbs/bu	%	2014	2015	2016	2 yr	3 yr
					----- Bushels per acre -----				
Alkabo	26	0	53.9	14.7	46.9	83.0	26.6	54.8	52.2
Carpio	26	0	53.1	16.4	46.9	88.0	29.3	58.7	54.7
Divide	26	0	54.4	15.0	46.9	89.0	31.3	60.2	55.7
Joppa	27	0	55.3	14.8	49.9	88.0	29.9	59.0	55.9
Mountrail	25	0	55.0	14.3	47.2	80.5	32.3	56.4	53.3
Tioga	28	0	55.3	14.4	46.3	89.2	31.1	60.2	55.5
<b>Trial Mean</b>	26	0	54.5	14.9	47.4	86.3	30.0	58.2	54.6
C.V. %	3.4	--	1.9	3.2	9.3	2.6	12.4	--	--
LSD 5%	1.3	NS	1.5	0.9	5.5	3.4	5.6	--	--
LSD 10%	1.1	NS	1.3	0.7	4.6	2.8	4.6	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 4

Harvest Date: August 9

Previous Crop: Spring Wheat



**NDSU Hettinger Research Extension Center**

<b>Durum Wheat - 2016</b>	<b>Mandan, ND</b>
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Alkabo	31	2	55.0	11.7	74.2	25.3	62.5	43.9	54.0
Carpio	33	4	56.7	11.7	67.6	26.7	70.2	48.5	54.8
Divide	32	3	56.7	11.7	69.3	28.9	70.7	49.8	56.3
Joppa	32	4	56.4	10.5	74.9	26.2	69.8	48.0	57.0
Mountrail	31	2	57.1	10.8	76.0	24.8	73.6	49.2	58.1
Tioga	34	4	57.0	10.9	68.7	26.9	72.9	49.9	56.2
Trial Mean	32	3	56.5	11.2	71.8	26.5	70.0	48.2	56.1
C.V. %	3.3	22.5	1.0	4.0	7.4	9.1	4.8	--	--
LSD 5%	1.6	1.1	0.9	0.7	6.6	3.6	5.1	--	--
LSD 10%	1.3	0.9	0.7	0.6	5.5	3.0	4.2	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 5

Harvest Date: August 15

Previous Crop: Spring Wheat

**NDSU Dickinson Research Extension Center**

<b>2016 Durum - Recrop</b>	<b>Dickinson, ND</b>
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Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	----- Grain Yield-----			----- Average Yield -----	
						2014	2015	2016	2014	2015
						-----bu/ac-----			-----bu/ac-----	
AC Commander	72	10,481	21	59.0	13.8	72.5	63.5	47.6	55.5	61.2
AC Navigator	73	9,970	21	60.4	14.3	68.4	61.4	43.7	52.5	57.8
Alkabo	72	10,932	24	61.4	12.3	74.3	68.2	53.1	60.7	65.2
Alzada	67	10,140	20	59.7	13.8	56.7	59.6	39.9	49.8	52.1
Ben	71	10,949	25	60.9	13.5	71.5	68.1	43.7	55.9	61.1
CDC Verona	72	10,452	24	61.5	14.1	70.7	59.0	47.7	53.3	59.1
Carpio	72	11,019	24	60.5	12.9	67.0	67.4	52.5	60.0	62.3
Divide	73	10,749	25	60.1	12.7	77.3	73.7	54.2	64.0	68.4
Grenora	72	10,205	24	58.5	12.3	78.1	75.0	51.5	63.3	68.2
Joppa	72	10,537	26	60.8	11.9	80.4	69.1	56.7	62.9	68.7
Lebsock	72	11,177	25	61.9	12.3	72.6	68.2	52.8	60.5	64.6
Maier	72	11,328	24	61.5	12.3	75.5	72.0	45.1	58.5	64.2
Mountrail	72	10,841	24	59.0	12.1	83.2	68.4	50.3	59.3	67.3
Pierce	72	11,195	25	61.8	13.1	74.3	71.4	48.2	59.8	64.6
Rugby	72	10,917	27	60.3	13.4	70.5	66.3	45.8	56.1	60.9
Strongfield	73	10,172	24	58.7	11.9	72.2	63.9	51.2	57.6	62.5
Tioga	72	10,578	25	61.4	12.9	78.3	74.7	51.5	63.1	68.2
VT Peak	71	10,107	25	61.9	13.4	--	--	51.7	--	--
<b>Trial Mean</b>	72	10,539	25	60.7	12.8	76.7	69.3	50.2	--	--
<b>CV %</b>	1.3	4.2	6.1	1.4	4.8	6.9	6.3	9.6	--	--
<b>LSD 0.05</b>	1	894	2	2.0	1.2	--	6.1	6.8	--	--
<b>LSD 0.10</b>	1	745	2	1.6	1.0	6.2	5.1	5.7	--	--

Planting Date: April 12, 2016  
 Harvest Date: August 4, 2016  
 Previous Crop: Rye  
 Seeding Rate: 1.2 million live seeds/ac

**NDSU Dickinson Research Extension Center**

<b>2016 Hannover Durum - Recrop</b>	<b>Dickinson, ND</b>
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Variety	Seeds per Pound	Test Weight lbs/bu	Protein %	-----Grain Yield-----			-----Average Yield-----	
				2014	2015	2016	2	3
				-----bu/ac-----			-----bu/ac-----	
Alkabo	11,753	58.6	12.6	71.4	76.2	44.3	60.3	64.0
Carpio	11,470	58.9	12.6	64.6	73.2	43.1	58.1	60.3
Divide	11,526	58.5	13.0	57.8	75.6	41.5	58.6	58.3
Joppa	12,002	58.8	12.2	64.5	76.3	45.8	61.0	62.2
Mountrail	11,828	58.4	13.0	--	--	47.6	--	--
Tioga	10,687	57.8	12.4	62.1	73.4	48.3	60.9	61.3
Trial Mean	11,504	58.6	12.7	65.3	70.7	45.9	--	--
CV %	4.6	0.7	1.7	10.3	6.2	9.8	--	--
LSD 0.05	1,227	0.6	0.5	--	6.6	6.6	--	--
LSD 0.10	989	0.5	0.4	8.3	5.4	5.4	--	--

Planting Date: May 4, 2016

Harvest Date: August 22, 2016

Previous Crop: Wheat

Seeding Rate: 1.2 million live seeds/ac

**Table 1. 2016 North Dakota barley variety descriptions.**

Variety	Use <sup>1</sup>	Origin <sup>2</sup>	Year Released	Awn Type <sup>3</sup>	Rachilla Hair Length <sup>4</sup>	Aleurone Color	Height	Straw Strength	Relative Maturity	Reaction to Disease <sup>5</sup>			
										Stem Rust	Spot-form Net Blotch	Spot Blotch	Net Blotch
<b>Six-rowed</b>													
Celebration	M/F	BARI	2008	S	S	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Drummond	M/F	ND	2000	S	L	White	M.short	V.strg.	Med.	S	MR	MR/R	MS/S
Innovation	MT	BARI	2009	S	L	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Lacey	M/F	MN	1999	S	S	White	M.short	Strg.	Med.	S	MR	MR/R	MS/S
Legacy	M/F	BARI	2000	S	L	White	Med.	Strg.	M.late	S	MS	MR/R	MS/S
Quest <sup>6</sup>	M/F	MN	2010	S	L	White	M.short	V.strg.	Med.	S	MR	MR/R	MS/S
Rasmusson	M/F	MN	2008	S	S	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Robust	F	MN	1983	S	S	White	Med.	M.strg.	Med.	S	MS/S	MR/R	MS/S
Stellar-ND	M/F	ND	2005	S	L	White	M.short	V.strg.	Med.	S	MS	MR/R	MS/S
Tradition	M/F	BARI	2003	S	L	White	M.short	V.strg.	Med.	S	MS	MR/R	MS/S
<b>Two-rowed</b>													
AAC Synergy	M/F	Syngenta	2015	R	L	White	M.short	Strg.	M.late	MR	MR/R	MR	MR
ABI Balster	M/F	BARI	2015	R	L	White	M.short	Med.	Med.	NA	MR	NA	NA
ABI Growler	M/F	BARI	2015	R	L	White	M.short	M.strg.	Med.	NA	MS/S	NA	NA
AC Metcalfe	M	Canada	1997	R	L	White	Med.	Med.	Late	S	MS	MS	S
CDC Copeland	M	Canada	1999	R	L	White	Tall	Med.	Late	S	MS	MS	MR
CDC Meredith	M	Canada	2008	R	L	White	Med.	Med.	Late	MR	MR	S	MS
Conlon <sup>7</sup>	M/F	ND	1996	S	L	White	M.short	Med.	M.early	S	MR	MS	MR/R
Conrad	M	BARI	2007	R	L	White	Tall	M.weak	Late	S	MS	NA	NA
Eslick	F	MT	2003	R	L	White	Med.	M.weak	M.late	S	NA	MS	NA
Harrington <sup>8</sup>	F	Canada	1981	R	L	White	Med.	M.weak	Late	S	S	S	MS
Haxby	F	MT	2003	R	L	White	Med.	Med.	Med.	S	MS	MS	NA
Hockett	M/F	MT	2008	R	L	White	Med.	Med.	Med.	S	NA	NA	NA
LCS Genie	M	Limagrain	NA	S	S	White	Short	V.strg.	Med.	NA	MS	NA	NA
LCS Odyssey	M/F	Limagrain	NA	R	S	White	Short	Med.	Med.	NA	MS	NA	NA
Lilly	F	Germany	NA	R	L	White	Short	M.strg.	Late	S	MS/S	S	MR/R
ND Genesis <sup>9</sup>	M/F	ND	2015	S	L	White	Med.	M.strg.	M.late	S	MR	MR	MS
Pinnacle	M/F	ND	2006	S	L	White	Med.	Strg.	M.late	S	S	MR	MS
Rawson	F	ND	2005	R	L	White	Med.	Med.	Med.	S	MS	MR	MS
Scarlett	M	Germany	1995	R	L	White	Short	Med.	Late	S	NA	S	MR
Sunshine	F	Germany	NA	R	L	White	Short	M.strg.	Late	S	S	S	MS
<b>Specialty</b>													
Wanubet	SP	MT	1990	H	L	White	Med.	Weak	Late	S	NA	S	S

<sup>1</sup> M = malting; MT = being tested in plant-scale tests for malting and brewing quality; F = feed; SP = special uses (hull-less).<sup>2</sup> BARI = Busch Agricultural Resources Inc.; MN = University of Minnesota; MT = Montana State University; ND = North Dakota State University.<sup>3</sup> R = rough; S = smooth; H = hull-less.<sup>4</sup> S = short; L = long.<sup>5</sup> R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible; NA = not available.<sup>6</sup> Moderately resistant to Fusarium head blight.<sup>7</sup> Lower DON accumulations than other varieties tested.<sup>8</sup> Recommended as a malting barley in western U.S.

**NDSU Hettinger Research Extension Center**

**Barley - 2016**

**Hettinger, ND**

Variety	Days to	Plant	Plant		Test	Grain	----- Grain Yield -----			----- Average Yield -----	
	Head	Height	Lodge	Plump	Weight	Protein	2014	2015	2016	2 yr	3 yr
	DAP <sup>1</sup>	inches	0-9 <sup>2</sup>	%	lbs/bu	%	----- Bushels per acre -----				
<b>TWO ROW</b>											
ND Genesis	81	26	0	97	45.8	11.9	114.4	103.2	69.0	86.1	95.5
Pinnacle	79	24	0	96	47.8	11.4	115.1	103.5	64.6	84.1	94.4
Rawson	77	24	0	96	45.8	12.6	102.1	93.2	66.1	79.7	87.1
Conlon	74	24	0	98	46.5	13.0	118.2	82.6	60.4	71.5	87.1
CDC Meredith	81	22	0	85	41.9	11.9	--	110.0	68.2	89.1	--
AAC Synergy	80	25	0	94	44.7	12.1	--	--	75.7	--	--
ABI Balster	81	22	0	89	43.9	11.8	--	--	73.2	--	--
SY Sirish	80	21	0	92	45.8	11.3	--	--	71.4	--	--
LCS Odyssey	80	21	0	93	43.2	10.9	--	--	70.7	--	--
ABI Growler	81	22	0	88	43.4	12.6	--	--	68.0	--	--
LCS Genie	81	21	0	93	45.9	12.6	--	--	67.0	--	--
<b>SIX ROW</b>											
Innovation	75	24	0	90	44.4	12.6	122.3	87.2	62.1	74.7	90.5
Stellar-ND	74	24	0	89	44.0	13.1	122.2	86.6	62.5	74.6	90.4
Tradition	74	27	0	93	46.5	12.6	120.2	83.9	63.3	73.6	89.1
Lacey	76	23	0	90	45.4	13.0	114.2	84.3	59.5	71.9	86.0
Celebration	76	24	0	89	43.3	13.4	115.3	76.4	61.4	68.9	84.4
Quest	77	24	0	86	43.7	13.5	110.4	66.2	64.4	65.3	80.3
Trial Mean	78	23	0	92	45.0	12.4	115.5	90.7	67.7	76.3	88.5
C.V. %	1.1	4.8	--	2.6	1.5	4.3	3.0	5.4	7.5	--	--
LSD 5%	1.2	1.6	NS	3.4	1.0	0.7	4.9	6.9	7.2	--	--
LSD 10%	1.0	1.3	NS	2.9	0.8	0.6	4.1	5.8	6.0	--	--

<sup>1</sup> Days to Head = the number of days from planting to head emergence from the boot.

<sup>2</sup> 0 = no lodging, 9 = 100% lodged.

Planting Date: April 4

Harvest Date: July 28

Previous Crop: Soybean Green Fallow

**NDSU Hettinger Research Extension Center**

<b>Barley - 2016</b>	<b>Scranton, ND</b>
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			----- Average Yield -----	
	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
<b>TWO ROW</b>									
ND Genesis	27	0	42.3	11.9	--	85.2	66.5	75.9	--
CDC Meredith	23	0	40.0	12.2	--	--	57.5	--	--
Pinnacle	25	0	45.9	12.3	81.3	79.7	56.7	68.2	72.6
<b>SIX ROW</b>									
Innovation	24	0	44.4	13.0	83.0	78.6	60.8	69.7	74.1
Tradition	25	0	45.7	12.8	--	--	59.8	--	--
Trial Mean	25	0	43.7	12.4	80.7	77.6	60.3	71.3	73.4
C.V. %	2.5	--	2.8	4.6	7.3	8.2	10.2	--	--
LSD 5%	1.0	NS	1.9	0.9	7.3	9.6	9.4	--	--
LSD 10%	0.8	NS	1.5	0.7	6.1	8.0	7.7	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 4

Harvest Date: August 9

Previous Crop: Spring Wheat

**NDSU Hettinger Research Extension Center**

**Barley - 2016** **Regent, ND**

Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			----- Average Yield -----	
	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
<b>TWO ROW</b>									
ND Genesis	25	0	44.7	13.5	--	112.1	39.7	75.9	--
CDC Meredith	22	0	46.6	16.0	--	--	44.1	--	--
Pinnacle	23	0	36.4	14.1	73.2	106.1	24.5	65.3	67.9
<b>SIX ROW</b>									
Innovation	22	0	47.3	15.1	77.1	84.8	27.4	56.1	63.1
Tradition	24	0	47.7	15.7	--	--	30.8	--	--
Trial Mean	23	0	44.5	14.9	79.0	93.2	33.3	65.8	65.5
C.V. %	6.3	--	1.3	2.5	12.5	8.0	18.8	--	--
LSD 5%	2.2	NS	1.0	0.6	12.3	11.3	9.6	--	--
LSD 10%	1.8	NS	0.8	0.5	10.2	9.4	7.9	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 4

Harvest Date: August 9

Previous Crop: Spring Wheat

**NDSU Hettinger Research Extension Center**

**Barley - 2016** **New Leipzig, ND**

Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			----- Average Yield -----	
	Height	Lodge	Weight	Protein	2014	2015	2016	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
<b>TWO ROW</b>									
ND Genesis	24	0	42.6	13.5	--	51.3	37.5	44.4	--
CDC Meredith	19	0	43.1	16.0	--	--	36.0	--	--
Pinnacle	22	0	45.3	14.1	81.8	51.5	44.8	48.2	59.4
<b>SIX ROW</b>									
Innovation	21	0	41.7	15.1	78.5	51.2	41.1	46.2	56.9
Tradition	23	0	42.6	15.7	--	--	30.3	--	--
Trial Mean	22	0	43.1	14.9	79.8	52.1	37.9	46.2	58.2
C.V. %	6.1	--	2.0	2.5	7.6	6.1	8.5	--	--
LSD 5%	2.1	NS	1.3	0.6	7.5	5.7	5.0	--	--
LSD 10%	1.7	NS	1.1	0.5	6.2	4.7	4.1	--	--

\* 0 = no lodging, 9 = 100% lodged.

Planting Date: April 5

Harvest Date: August 15

Previous Crop: Flax

**Mandan location was destroyed by deer.**



NDSU Dickinson Research Extension Center

2016 Barley - Recrop Dickinson, ND

Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	% Plump >6/64	----- Grain Yield-----			----- Average Yield-----	
							2014	2015	2016	2	3
							-----bu/ac-----			-----bu/ac-----	
<b>Six Row</b>											
Celebration	71	11,451	19	49.1	15.2	98.3	124.1	102.3	74.3	88.3	100.2
Innovation	69	10,216	20	50.8	14.5	99.3	135.7	97.9	77.8	87.9	103.8
Lacey	69	10,473	20	50.6	14.8	99.0	133.9	110.3	75.2	92.7	106.4
Quest	70	11,069	21	49.9	14.2	98.5	133.2	91.7	74.5	83.1	99.8
Stellar-ND	69	11,166	20	49.3	14.1	98.6	142.6	107.9	75.2	91.5	108.5
Tradition	70	10,796	20	51.1	15.6	99.1	140.6	81.3	69.5	75.4	97.2
<b>Two Row</b>											
AAC Synergy	74	9,453	21	50.9	13.6	98.8	--	--	90.3	--	--
ABI Balster	75	9,885	20	49.9	13.9	97.4	--	--	92.4	--	--
ABI Growler	75	10,110	21	49.1	14.6	97.3	--	--	86.9	--	--
ND Genesis	73	8,737	21	50.8	13.2	99.0	126.5	124.5	88.7	106.6	113.2
CDC Meredith	74	10,112	24	49.5	13.4	97.3	--	126.2	94.9	110.5	--
Conlon	68	8,733	19	51.5	14.5	98.9	106.8	103.4	54.2	78.8	88.1
LCS Genie	75	9,468	19	51.0	13.2	98.6	--	--	97.1	--	--
LCS Odyssey	75	10,151	20	50.4	12.4	99.1	--	--	92.7	--	--
Pinnacle	70	8,701	21	52.5	13.9	99.1	130.3	126.2	80.3	103.2	112.3
Rawson	70	8,490	20	51.4	13.6	99.2	120.4	124.5	73.9	99.2	106.3
SY Sirish	75	9,389	18	51.9	12.8	99.1	--	--	91.4	--	--
Trial Mean	72	9,754	21	50.6	13.9	98.6	133.1	110.4	81.3	--	--
CV %	1.3	4.9	7.7	0.9	5.5	0.3	9.5	9.9	9.2	--	--
LSD 0.05	1	672	2	0.7	1.6	0.5	--	15.5	10.6	--	--
LSD 0.10	1	561	2	0.6	1.3	0.4	14.9	12.9	8.8	--	--

Planting Date: April 14, 2016

Harvest Date: August 5, 2016

Previous Crop: Pea

Seeding Rate: 1.2 million live seeds/ac

Grain protein percentages reported on a 0% moisture basis

**NDSU Dickinson Research Extension Center**

<b>2016 Glen Ullin Barley - Recrop</b>	<b>Dickinson, ND</b>
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Variety	Seeds per Pound	Test Weight lbs/bu	% Plump >6/64	Protein %	-----Grain Yield-----			-----Average Yield-----	
					2014	2015	2016	2	3
					-----bu/ac-----			-----bu/ac-----	
<b>Six Row</b>									
Celebration	15,195	44.6	96	14.9	--	--	56.2	--	--
Innovation	13,137	45.1	96	14.7	125.4	86.4	60.7	73.5	90.8
Quest	12,832	44.9	94	13.8	127.1	91.8	59.1	75.4	92.6
<b>Two Row</b>									
ND Genesis	11,334	44.9	96	12.6	125.6	93.0	72.5	82.8	97.0
Pinnacle	11,602	47.0	96	13.3	123.3	94.0	60.8	77.4	92.7
Rawson	10,644	45.4	95	13.7	98.3	80.4	58.0	69.2	78.9
Trial Mean	12,457	45.3	96	13.8	123.0	90.1	61.2	--	--
CV %	6.2	0.9	1.3	3.0	4.8	6.9	6.3	--	--
LSD 0.05	1,975	0.6	NS	1.1	--	9.4	5.8	--	--
LSD 0.10	1,549	0.5	NS	0.8	7.3	7.7	4.7	--	--

Planting Date: May 4, 2016  
 Harvest Date: August 22, 2016  
 Previous Crop: wheat

<b>2016 Hannover Barley - Recrop</b>	<b>Dickinson, ND</b>
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Variety	Seeds per Pound	Test Weight lbs/bu	% Plump >6/64	Protein %	-----Grain Yield-----			-----Average Yield-----	
					2014	2015	2016	2	3
					-----bu/ac-----			-----bu/ac-----	
<b>Six Row</b>									
Celebration	12,014	46.5	98	14.1	--	--	83.6	--	--
Innovation	11,016	47.6	99	13.7	111.4	105.0	97.4	101.2	104.6
Quest	12,005	46.8	98	14.6	97.0	89.4	86.5	87.9	91.0
<b>Two Row</b>									
ND Genesis	10,155	47.1	98	12.4	95.5	92.1	93.9	93.0	93.8
Pinnacle	9,800	48.5	98	13.0	111.2	100.9	92.9	96.9	101.7
Rawson	9,032	47.1	98	13.5	91.1	90.8	87.3	89.0	89.7
Trial Mean	10,670	42.3	98	13.6	104.3	95.9	90.3	--	--
CV %	2.9	0.7	0.2	4.1	5.3	4.4	9.2	--	--
LSD 0.05	793	0.5	0	1.4	--	6.3	12.6	--	--
LSD 0.10	621	0.4	0	1.1	8.2	5.2	10.3	--	--

Planting Date: May 4, 2016  
 Harvest Date: August 22, 2016  
 Previous Crop: wheat  
 Seeding Rate: 1.2 million live seeds/ac  
 Grain protein percentages reported on a 0% moisture basis

**Table 6. 2016 North Dakota oat variety descriptions.**

Variety	Origin <sup>1</sup>	Year Released	Grain Color	Height	Straw Strength	Maturity <sup>2</sup>	Reaction to Diseases			Bu/Wt.	Protein <sup>5</sup>
							Stem Rust <sup>3</sup>	Crown Rust <sup>3</sup>	Barley Y.Dwf <sup>4</sup>		
AAC Justice	AAFC/MN	2015	White	Tall	Strong	L	S	R	NA	Good	NA
AC Assiniboia	AAFC	1997	Red	Med.	Strong	L	S	S	T	Good	M/L
AC Kaufman	AAFC	2000	Yellow	Tall	Strong	L	S	S	MT	V.good	M/L
AC Pinnacle	AAFC	1999	White	Tall	Med.	L	S	S	S	V.good	L
Beach	ND	2004	White	Tall	M.strg.	M/L	S	MR/MS	MS	V.good	M
Buff	SD	2002	Hull-less	Med.	M.strg.	L	S	MR/MS	MT	Good	H
CDC Dancer	Sask.	2000	White	Tall	Strong	L	S	MS	S	V.good	M
CDC Minstrel	Sask.	2006	White	Tall	M.strg.	L	S	S	S	Good	M
CDC Weaver	Sask.	2005	Yellow	Med.	M.strg.	L	S	S	S	Good	M
Deon	MN	2013	Yellow	Tall	Strong	L	S	R	T	V.good	
Furlong	AAFC	2003	Red	Tall	M.strg.	L	S	S	T	V.good	M
Goliath	SD	2013	White	Tall	Med.	L	NA	MR/MS	NA	Good	M
Hayden	SD	2015	White	Med	Med	M	S	MR/MS	MT	V Good	M
HiFi	ND	2001	White	Tall	Strong	L	MR/MS	S	T	Good	M
Horsepower	SD	2012	White	Short	Strong	E/M	MS	S	MT	V.good	M/H
Hyttest	SD	1986	White	Tall	M.strg.	E	S	MS	S	V.good	H
Jury	ND	2012	White	Tall	M.strg.	M	R	S	MT	V.good	M
Killdeer	ND	2000	White	Med.	Strong	M	S	MS	MT	Good	M
Leggett	AAFC	2005	White	Tall	Strong	L	MR	R	S	Good	M
Loyal	SD	2000	Ivory	Tall	M.strg.	L	S	MR	T	Good	M/H
Maida	ND	2005	Yellow	Med.	Strong	M	R	S	MS	V.good	M/H
Morton	ND	2001	White	Tall	V.strg.	L	S	S	MT	V.good	M
Newburg	ND	2011	White	Tall	Med.	L	R	S	MT	Good	M
Otana	MT	1977	White	M.tall	M.weak	L	S	S	S	V.good	M/L
Paul	ND	1994	Hull-less	V.tall	Strong	L	R	MR/MS	T	Good	H
Rockford	ND	2008	White	Tall	Strong	L	S	S	MT	V.good	M
Sesqui	MN	2001	Yellow	M.tall	Strong	L	S	S	T	Good	M
Shelby 427	SD	2008	White	Med.	Strong	E	S	S	NA	V.good	NA
Souris	ND	2006	White	Med.	Strong	M	MS	S	MS	V.good	M
Stallion	SD	2006	White	Tall	Med.	L	S	MR	NA	V.good	M
Stark	ND	2004	Hull-less	Tall	M.strg.	L	R	MR/MS	T	V.good	M
Streaker	SD	2008	Hull-less	Tall	M.weak	M	S	R/MR	NA	V.good	M/H
Summit	AAFC	2008	White	Med.	Strong	L	S	S	MT	Good	M

<sup>1</sup> AAFC = Agriculture & Agri-Food Canada; MN = University of Minnesota; ND = North Dakota State University; SD = South Dakota State University; Sask. = University of Saskatchewan; MT = Montana State University.

<sup>2</sup>E = early; M = medium; L = late.

<sup>3</sup>R = resistant; MR = moderately resistant; MS = moderately susceptible; NA = not available; S = susceptible.

<sup>4</sup>Barley Yellow Dwarf Virus; S = susceptible; MS = moderately susceptible; MT = moderately tolerant; T = tolerant; NA = not available.

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

<sup>5</sup>H = high; M = medium; L = low.

**NDSU Hettinger Research Extension Center**

**Oat - 2016** **Hettinger, ND**

Variety	Days to	Plant	Plant	Test	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	2014	2015	2016	2 yr	3 yr
	DAP <sup>1</sup>	inches	0-9 <sup>2</sup>	lbs/bu	----- Bushels per acre -----				
Beach	79	30	0	38.2	171.0	164.8	59.6	112.2	131.8
CDC Dancer	78	29	0	37.3	165.2	177.4	62.4	119.9	135.0
Deon	80	29	1	36.0	200.9	173.0	64.0	118.5	146.0
Furlong	82	27	0	33.5	192.8	194.6	59.0	126.8	148.8
Goliath	80	33	2	37.5	195.8	177.5	54.6	116.1	142.6
Hayden	79	28	0	37.0	--	--	68.9	--	--
HiFi	79	28	0	36.0	130.1	180.7	61.6	121.2	124.1
Hyttest	76	30	2	39.7	109.0	144.7	53.7	99.2	102.5
Jury	78	31	2	36.2	196.0	175.8	55.5	115.7	142.4
Killdeer	79	26	0	36.3	185.5	186.8	61.6	124.2	144.6
Leggett	81	26	0	35.9	193.2	174.5	61.5	118.0	143.1
CDC Minstrel	82	25	0	33.7	191.5	186.3	65.9	126.1	147.9
Newburg	78	31	1	35.7	192.7	181.6	63.9	122.8	146.1
Otana	78	30	1	36.4	181.3	156.2	63.8	110.0	133.8
AC Pinnacle	81	27	0	36.9	173.5	180.4	77.4	128.9	143.8
Rockford	79	30	0	38.7	199.8	186.3	65.3	125.8	150.5
Souris	79	25	0	36.6	128.9	169.5	64.0	116.8	120.8
Stallion	79	29	1	37.4	157.1	160.5	59.6	110.1	125.7
Paul (hull-less)	84	30	0	41.1	131.7	149.4	46.2	97.8	109.1
Trial Mean	79	29	1	36.0	175.8	176.5	62.8	117.2	135.5
C.V. %	1.5	4.1	110.2	3.6	6.3	5.6	9.1	--	--
LSD 5%	1.7	1.7	0.9	1.8	15.6	13.8	8.0	--	--
LSD 10%	1.4	1.4	0.7	1.5	13.0	11.6	6.7	--	--

<sup>1</sup> Days to Head = the number of days from planting to head emergence from the boot.

<sup>2</sup> 0 = no lodging, 9 = 100% lodged.

Planting Date: April 4

Harvest Date: July 25

Previous Crop: Soybean Green Fallow

**NDSU Dickinson Research Extension Center**

**2016 Oat - Recrop** **Dickinson, ND**

Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	----- Grain Yield-----			----- Average Yield-----	
					2014	2015	2016	2014	2015
					-----bu/ac-----			-----bu/ac-----	
AC Pinnacle	73	11,330	26	37.1	216.2	161.6	150.3	156.0	176.0
Beach	72	12,831	29	38.1	169.9	115.6	130.9	123.3	138.8
CDC Dancer	72	12,066	26	37.0	170.9	141.3	135.3	138.3	149.1
CDC Minstrel	70	11,515	24	35.5	193.7	149.9	133.9	141.9	159.2
Deon	73	12,050	26	35.5	175.4	150.5	126.9	138.7	150.9
Furlong	72	10,321	28	34.0	165.7	163.3	130.5	146.9	153.1
Goliath	71	12,133	30	36.4	160.3	128.8	103.5	116.2	130.9
Hayden	71	11,421	26	36.6	--	--	140.7	--	--
HiFi	72	13,561	27	34.4	162.9	140.7	123.3	132.0	142.3
Hyttest	71	12,257	28	37.3	178.8	108.8	108.3	108.6	132.0
Jury	70	12,579	28	37.1	151.2	134.0	111.2	122.6	132.1
Killdeer	71	12,016	23	35.4	152.0	149.8	125.3	137.5	142.4
Leggett	72	12,183	26	36.0	197.1	150.1	133.4	141.7	160.2
Newburg	70	11,992	28	36.0	178.0	143.0	115.9	129.5	145.7
Otana	70	13,634	27	36.9	178.5	127.3	126.1	126.7	144.0
Paul*	73	18,940	26	38.6	132.3	105.0	91.8	98.4	109.7
Rockford	71	13,376	27	36.6	174.4	144.1	133.2	138.7	150.6
Souris	71	13,328	23	35.8	173.5	145.0	111.5	128.3	143.3
Stallion	70	14,138	27	39.1	176.1	134.6	118.4	126.5	143.0
Trial Mean	71	12,428	27	35.7	168.6	140.5	122.8	--	--
CV %	1.4	5.1	4.3	3.8	7.7	8.4	9.0	--	--
LSD 0.05	1	1,288	2	1.9	--	16.6	15.5	--	--
LSD 0.10	1	1,072	1	1.6	15.2	13.9	12.9	--	--

Planting Date: April 12, 2016  
 Harvest Date: August 2, 2016  
 \* Hulless  
 Previous Crop: Rye  
 Seeding Rate: 1 million live seeds/ac

**NDSU Hettinger Research Extension Center**

<b>Safflower - 2016</b>	<b>Hettinger, ND</b>
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Variety	Oil Type	Days to Flower	Plant Height	Test Weight	Oil Content	-----Grain Yield-----			-----Average Yield-----	
						2014	2015	2016	2-Yr	3-Yr
		DAP <sup>1</sup>	inches	lbs/bu	%	----- lbs per acre -----				
Cardinal	Linoleic	96	24	42.8	35.2	1043	2497	1805	2151	1782
Finch	Linoleic	91	23	43.3	37.1	897	2672	1669	2171	1746
MonDak	Oleic	92	22	40.7	36.8	1070	3050	1559	2305	1893
Montola 2003	Oleic	93	20	39.5	38.6	991	3346	1555	2451	1964
Nutrasaff	Linoleic	93	23	34.8	45.1	867	2162	1223	1693	1417
Hybrid 1601	Oleic	93	20	39.1	36.6	1195	3750	2095	2923	2347
Hybrid 200	Oleic	92	22	40.5	35.0	--	3412	1723	2568	--
Trial Mean		93	22	40.2	37.3	983	3011	1661	2323	1858
C.V. %		0.7	4.7	1.8	1.9	21.7	7.7	13.6	--	--
LSD 5%		1.0	1.5	1.0	1.0	NS	337	333	--	--
LSD 10%		0.8	1.2	0.9	0.9	NS	279	276	--	--

<sup>1</sup> Days after planting.

Planting Date: April 13

Harvest Date: August 30

Previous Crop: Chemical Fallow

**NDSU Hettinger Research Extension Center**

**Oil Type Sunflower - 2016**

**Hettinger, ND**

Company/Brand	Hybrid	Oil Type & Traits	Days to Bloom	Plant Height	Lodging	Test Weight	Oil Content	Grain Yield		
								2016	2-Year	3-Year
		*	**	inches	%	lbs/bu	%	-----lbs/ac-----		
AgVenture	AF3H681ES	HO, EX, DM	74	59	5	30.7	40.3	2156	2218	1784
AgVenture	AF3N680ES	HO, EX, DM	74	54	1	29.2	37.2	2293	--	--
AgVenture	AF3N692ES	NS, EX, DM	75	57	0	28.9	39.2	2838	3084	2336
AgVenture	AF3N94CD	NS, CL, DM	74	57	9	32.2	40.7	2698	--	--
AgVenture	AF4H95CD	HO, CL, DM	77	56	8	29.8	39.1	2812	--	--
AgVenture	XF2H14CD	HO, CL, DM	72	56	5	31.7	42.0	2602	--	--
Croplan	432 E	NS, EX, DM	72	51	1	30.2	37.9	2348	2132	1679
Croplan	455 E HO	HO, EX, DM	72	55	6	30.2	39.6	2651	--	--
Croplan	458 E HO	HO, EX, DM	73	57	0	28.8	39.6	2586	2552	--
Croplan	545 CL	NS, CL, DM	75	56	1	29.5	37.4	2976	3029	2549
Croplan	549 CL HO	HO, CL, DM	71	56	1	30.8	38.3	2574	2735	--
Croplan	553 CL HO	HO, CL, DM	76	53	13	30.2	41.1	3081	3247	--
Mycogen Seeds	8D310CL	TR, CL	76	59	11	27.8	33.8	2021	2453	2256
Mycogen Seeds	8H449CLDM	HO, CL, DM	74	52	3	32.9	45.0	2871	3139	2693
Mycogen Seeds	8H456CLDM	HO, CL, DM	75	59	5	28.3	42.4	2587	3361	--
Nuseed	Badger DMR	NS, CL, DM	73	54	3	29.4	34.7	2099	2226	1893
Nuseed	Camaro II	NS, CL, DM	75	53	6	31.4	39.9	2412	2758	2389
Nuseed	Cobalt II	HO, CL, DM	73	51	2	30.4	38.9	2302	2440	1970
Nuseed	Daytona	HO, CL	74	56	1	30.1	36.9	2473	2735	--
Nuseed	Falcon	NS, EX	74	51	2	31.1	37.4	2291	2643	2287
Nuseed	Hornet	HO, CL, DM	74	53	3	30.7	40.8	3268	3478	2959
Nuseed	N4HM354	HO, CL	74	53	1	30.8	40.0	2550	--	--
Nuseed	N5LM307	NS, CL	73	58	0	27.9	34.4	2212	--	--
Nuseed	Talon	NS, EX	72	50	4	28.6	37.7	2259	2576	2169
Proseed	12G04	HO	75	56	7	30.1	41.0	2566	--	--
Proseed	12G25	HO, CL	73	53	6	32.0	38.6	2802	--	--
Proseed	E-31 CL	HO, CL	74	53	5	28.6	35.5	2395	2253	1796
Proseed	E-50061CL	HO, CL, DM	74	51	0	29.5	38.7	2422	--	--
Syngenta	NX64189	HO, CL, DM	75	51	2	29.4	39.3	2382	--	--
Syngenta	NX64288	HO, CL, DM	75	48	14	32.0	46.7	2658	--	--
Syngenta	SY7717	HO, CL	71	55	7	31.1	38.6	2371	2584	2413
Syngenta	SY7919	HO, CL, DM	75	53	6	29.3	40.9	2929	--	--
AAFC/USDA(CK Honeycomb NS	NS		67	51	0	28.9	34.4	1517	1475	--
USDA (CK)	894	TR	74	52	1	30.6	38.7	2269	2549	2157
Croplan (CK)	559CL		75	58	0	30.7	39.1	2360	--	--
Mycogen (CK)	8N270CLDM	NS, CL, DM	69	47	3	30.8	38.5	2156	2201	--
Trial Mean			74	54	4	30.1	39.0	2494	2630	2222
C.V. %			7.2	1.5	115.7	2.6	5.3	13.1	--	--
LSD 5%			5.4	1.6	7.5	1.1	2.9	458	--	--
LSD 10%			4.5	1.3	6.3	0.9	2.4	384	--	--

\* Type: TR-Traditonal, NS-NuSun, HO-High Oleic, CL=Clearfield, EX=ExpressSun, DM=Downy Mildew Resistant

\*\* Days after planting.

Planting Date: May 17

Harvest Date: October 26

Previous Crop: Wheat

**NDSU Hettinger Reserach Extension Center**

<b>Canola - Clearfield and Sulfonylurea - 2016</b>	<b>Hettinger, ND</b>
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Brand	Variety	Type <sup>1</sup>	Days to Bloom	Bloom Duration	Days to Mature	Plant Height	Lodging	Oil Content	Seed Yield	
			DAP <sup>2</sup>	days	DAP <sup>2</sup>	inches	0 - 9 <sup>3</sup>	%	2016	2-Yr. Avg.
Mycogen	Nexera 2020 CL	CL, HO	49	17	84	30	0	46.5	685	1484
Mycogen	Nexera 2022 CL	CL, HO	48	17	83	30	0	46.8	778	--
Mycogen	CL3701975H	CL, HO	48	18	83	28	0	45.7	643	--
Cibus	C1511	SU, TR	47	22	88	32	0	41.4	610	1276
Cibus	C1516	SU, TR	47	22	87	30	0	40.6	581	1155
Cibus	C5507	SU, TR	47	23	88	30	0	44.5	522	--
Cibus	C5522	SU, TR	47	22	87	29	0	44.0	471	--
Cibus	C5513	SU, TR	48	23	88	29	0	42.7	545	--
Trial Mean			47	20	86	30	0	44.0	604	--
C.V. %			0.9	2.9	0.5	3.4	0.0	1.9	12.0	--
LSD 5%			0.8	0.9	0.7	1.5	0.0	1.3	107	--
LSD 10%			0.5	0.6	0.5	1.2	0.0	1.0	88	--

<sup>1</sup> Type: SU-Sulfonylurea Tolerant, CL-Clearfield, TR-Traditional Oil Type, HO-High Oleic Oil Type.

<sup>2</sup> Days after planting.

<sup>3</sup> Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: May 3

Harvest Date: August 9



**NDSU Hettinger Reserch Extension Center**

**Canola - Roundup Ready - 2016**

**Hettinger, ND**

Brand	Variety	Oil Type <sup>1</sup>	Days to Bloom	Bloom Duration	Days to Mature	Plant Height	Lodging	Oil Content	Seed Yield		
									2016	2-Yr. Avg.	3-Yr. Avg.
			DAP <sup>2</sup>	days	DAP <sup>2</sup>	inches	0 - 9 <sup>3</sup>	%	-----lbs/a-----		
Brett Young	6074 RR	TR	46	19	83	27	0	45.4	853	1531	--
Brett Young	6080 RR	TR	46	17	81	30	0	46.7	782	--	--
Canterra Seeds	CS2000	TR	46	19	83	30	0	44.9	817	--	--
Canterra Seeds	CS2100	TR	46	16	80	31	0	46.9	910	--	--
Cargill	V12-1	HO	47	17	82	30	0	44.9	905	1586	1723
Cargill	V12-3	HO	46	17	81	31	0	45.7	903	--	--
Cargill	V22-1	HO	46	19	83	28	0	45.5	758	1495	--
Croplan	HyClass 930	TR	44	15	78	29	0	50.2	1040	--	--
Croplan	HyClass 955	TR	44	16	78	30	0	49.2	892	--	--
Croplan	HyClass 970	TR	46	17	80	31	0	48.2	828	--	--
Croplan	HyClass 972	TR	46	17	81	29	0	44.9	912	--	--
Dekalb	DKL30-20RR	TR	44	16	78	29	0	48.9	939	--	--
Dekalb	DKL38-48RR	TR	45	16	80	28	0	47.7	852	--	--
Integra	7150RR	TR	45	15	78	28	0	47.7	776	--	--
Integra	7257RR	TR	45	15	78	28	0	46.5	784	--	--
Mycogen Seeds	1020RR	HO	48	18	83	30	0	44.9	881	--	--
Mycogen Seeds	1022RR	HO	50	15	83	30	0	44.0	710	1351	--
Proseed	300 Mag	TR	45	18	81	28	0	47.0	800	1386	1478
Proseed	PS 5000	TR	46	19	83	30	0	44.6	793	1439	--
Star Seed	Star 402	TR	44	16	78	29	0	50.8	839	1407	1567
Trial Mean			46	17	81	29	0	46.4	822	--	--
C.V. %			0.9	4.3	0.8	4.0	--	2.2	10.9	--	--
LSD 5%			0.6	1.0	0.9	1.7	--	1.4	126	--	--
LSD 10%			0.5	0.8	0.7	1.4	--	1.2	106	--	--

<sup>1</sup> Type: TR-Traditional Oil Type, HO-High Oleic Oil Type.

<sup>2</sup> Days after planting.

<sup>3</sup> Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: May 4

Harvest Date: August 5

**NDSU Hettinger Research Extension Center**

**Flax - 2016**

**Hettinger, ND**

Variety	Days to	Plant	Test	Oil	-----Grain Yield-----			Average Yield	
	Bloom	Height	Weight	Content	2014	2015	2016	2-Yr	3-Yr
	**	inches	lbs/bu	%	----- bu per acre -----				
Bison	62	17	56.6	45.0	--	--	18.7	--	--
Carter*	63	16	54.9	45.0	29.5	35.5	18.2	26.9	27.7
CDC Bethume	62	17	56.9	44.8	30.4	32.5	19.1	25.8	27.3
CDC Glas	63	17	56.5	46.7	35.2	35.4	21.1	28.3	30.6
CDC Neela	61	16	56.0	45.9	37.6	36.2	21.6	28.9	31.8
CDC Sanctuary	63	17	56.6	45.8	35.6	35.1	22.5	28.8	31.1
CDC Sorel	63	18	56.7	45.9	32.8	32.8	21.4	27.1	29.0
Gold ND*	63	17	56.9	46.0	32.8	33.1	19.4	26.3	28.4
Nekoma	63	16	56.2	45.5	32.8	32.8	19.3	26.1	28.3
Omega*	63	16	57.5	44.8	31.2	27.2	19.4	23.3	25.9
Pembina	63	17	55.8	46.2	31.5	30.5	17.6	24.1	26.5
Prairie Blue	64	17	56.7	46.8	34.4	33.8	19.2	26.5	29.1
Prairie Grande	63	17	55.8	45.8	32.8	33.2	19.7	26.5	28.6
Prairie Sapphire	63	17	56.3	48.0	33.7	30.5	19.9	25.2	28.0
Prairie Thunder	64	16	56.5	45.7	33.1	28.2	18.9	23.6	26.7
Rahab 94	62	16	56.6	46.8	34.4	33.1	17.8	25.5	28.4
Shape	63	17	56.7	47.0	33.2	31.4	18.7	25.1	27.8
TAM201F	64	16	55.4	45.2	--	--	17.9	--	--
Webster	62	17	56.0	46.3	31.7	30.8	20.1	25.5	27.5
York	63	17	57.1	45.6	31.7	33.8	19.4	26.6	28.3
Trial Mean	63	17	56.4	45.9	32.2	32.4	19.5	27.4	29.4
C.V. %	1.1	4.8	1.1	1.7	10.0	6.9	9.6	--	--
LSD 5%	1.0	1.1	0.9	1.1	4.5	3.2	2.7	--	--
LSD 10%	0.8	0.9	0.7	0.9	3.8	2.6	2.2	--	--

\* Yellow seed type.

\*\* Days after planting.

Lodging notes were taken at harvest, however no lodging was observed.

Planting Date: April 13

Harvest Date: August 16

Previous Crop: Durum Wheat

**NDSU Hettinger Research Extension Center**

<b>Dry Bean - 2016</b>	<b>Hettinger, ND</b>
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Variety	Type	Plant	Plant	Test	----- Grain Yield -----			----- Average Yield -----	
		Height	Lodge	Weight	2014	2015	2016	2 yr	3 yr
		inches	0-9*	lbs/bu	----- lbs per acre -----				
LaPaz	Pinto	17	5	48.7	2140	2024	1318	1671	1827
Lariat	Pinto	16	7	48.1	2081	2021	1252	1637	1785
Maverick	Pinto	16	5	48.6	1824	1714	1070	1392	1536
ND-307	Pinto	17	5	47.0	1892	1735	1122	1429	1583
Palomino	Pinto	16	5	46.9	1727	1809	1099	1454	1545
Stampede	Pinto	18	5	47.2	1922	2028	1382	1705	1777
Windbreaker	Pinto	14	5	48.6	1833	1699	1069	1384	1534
Monterrey	Pinto	20	4	48.1	--	--	1454	--	--
Ensign	Navy	16	3	52.1	1682	1710	1360	1535	1584
HMS Medalist	Navy	16	2	52.5	1658	1597	1282	1440	1512
T9905	Navy	16	3	51.8	1913	1744	1438	1591	1698
Vista	Navy	17	3	54.1	1809	1619	1251	1435	1560
Merlot	Sm Red	17	4	48.6	1752	1802	1230	1516	1595
Rosetta	Pink	17	3	50.4	--	--	1261	--	--
Eclipse	Black	16	2	51.7	2098	1791	1429	1610	1773
Loreto	Black	16	3	53.8	1855	1618	1284	1451	1586
Zorro	Black	17	2	51.5	--	1986	1333	1660	--
Montcalm	Dk Red Kidney	16	3	47.9	--	1404	937	1171	--
Talon	Dk Red Kidney	16	3	47.2	--	1505	952	1229	--
Pink Panther	Lt Red Kidney	17	4	44.9	--	1705	1025	1365	--
Rosie	Lt Red Kidney	16	3	49.2	--	1586	1196	1391	--
Trial Mean		16	4	49.5	1867	1746	1226	1477	1635
C.V. %		8.5	18.9	1.5	8.2	7.3	9.8	--	--
LSD 5%		2.0	1.0	1.1	216	181	170	--	--
LSD 10%		1.6	0.8	0.9	180	151	142	--	--

\* 0 = no lodging, 9 = lying flat on ground.

Planting Date: May 23

Harvest Date: September 13

Previous Crop: Canola

**NDSU Hettinger Research Extension Center**

**Chickpea - 2016** **Hettinger, ND**

Variety	Days to Flower DAP <sup>1</sup>	Height inches	Lodging 0 - 9 <sup>2</sup>	-----Seed Size (mm)-----				Test Weight lb/bu	----- Grain Yield -----			-----Average Yield-----		
				<8	8-9	9-10	>10		2014	2015	2016	2 yr	3 yr	
				-----%-----				-----lbs/ac-----						
<b>Kabuli Type</b>														
CDC Frontier	48	24	0	16	69	13	1	54.4	4719	4952	2119	3536	3930	
CDC Luna	47	20	0	18	62	18	2	53.4	3844	4787	2054	3421	3562	
Sawyer	48	24	0	8	36	38	18	53.4	3223	3954	1387	2671	2855	
Sierra	49	23	0	8	21	38	33	52.5	1936	3845	879	2362	2220	
<b>Small Kabuli Type</b>														
B-90	48	22	0	85	14	1	0	55.9	4204	4345	1867	3106	3472	
<b>Desi Type</b>														
CDC Anna	47	22	0	91	8	0	0	53.7	4718	4299	2136	3218	3718	
Mean	48	22	0	32	37	23	8	53.9	3369	3858	1736	3052	3293	
C.V. %	1.3	5.9	--	9.2	7.0	14.7	18.5	1.2	11.1	8.2	12.7	--	--	
LSD 5%	1	2	NS	4	4	5	2	1.0	531	448	324	--	--	
LSD 10%	1	2	NS	4	3	4	2	0.8	443	374	268	--	--	

<sup>1</sup> Days after planting.

<sup>2</sup> Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: May 3

Harvest Date: August 17

Previous Crop: Winter Wheat

NDSU Hettinger Research Extension Center

Field Pea - 2016

Hettinger, ND

Variety	Days to Flower		Vine Length	Canopy Height	Height Index <sup>1</sup>	Lodging 0-9 <sup>3</sup>	Seed Protein %	1,000 Seed Wt. gm	Seeds Lb	Test Weight lb/bu	Seed Yield			
	Duration days	Mature DAP <sup>2</sup>									inches	inches	%	2016
<b>Yellow Cotyledon Type</b>														
Abarth	61	11	85	18	18	99	5	25.2	239	1898	59.5	18.2	--	--
Agassiz	61	12	87	20	17	89	3	26.5	215	2110	56.3	20.5	35.7	41.4
Bridger	60	12	85	20	18	91	4	26.2	208	2181	60.3	18.5	33.9	42.5
DS Admiral	60	11	86	20	15	73	4	26.3	206	2227	59.9	19.0	38.5	44.1
Durwood	61	12	87	22	15	67	3	26.7	230	1982	58.4	22.2	--	--
Gunner	61	12	87	22	17	76	4	27.0	219	2074	58.9	24.2	34.9	42.1
Hyline	61	12	87	19	15	81	6	25.3	229	1981	58.0	17.5	33.4	--
LGPN4243	60	12	86	19	16	82	5	27.4	238	1912	58.5	18.3	37.7	--
LGPN4244	59	12	85	19	18	97	4	26.2	206	2208	59.3	22.2	39.8	--
LGPN4902	61	12	86	20	18	90	2	26.9	188	2422	59.1	17.8	--	--
LGPN4903	60	12	86	21	18	87	2	25.2	206	2203	58.7	20.5	34.5	--
LGPN4906	60	12	86	19	17	88	4	26.8	203	2242	58.3	18.6	--	--
LGPN4907	60	11	85	19	14	74	6	25.4	266	1710	58.6	19.0	--	--
Mystique	61	12	87	21	18	85	4	26.4	223	2039	59.2	20.3	--	--
Navarro	57	16	87	20	15	77	6	27.3	257	1770	57.8	20.1	--	--
Nette 2010	59	13	86	21	15	71	3	25.4	217	2091	58.4	19.7	38.8	44.8
Pulse USA 0014	60	12	86	22	17	79	3	26.6	220	2064	59.6	19.4	--	--
Pusle USA EXP115	61	11	86	20	20	96	3	27.8	222	2044	61.8	19.6	--	--
Salamanca	60	12	86	21	19	87	4	28.3	241	1883	58.8	20.8	34.9	--
Spider	62	14	90	21	16	77	6	27.5	235	1934	59.0	16.2	35.1	--
SW Midas	61	12	87	17	14	80	5	25.7	202	2247	57.9	15.6	35.3	40.5

Table continued on next page

NDSU Hettinger Research Extension Center

Field Pea - 2016

Hettinger, ND

Variety	Days to Flower		Days to Mature	Vine Length inches	Canopy Height inches	Height Index <sup>1</sup> %	Lodging 0 - 9 <sup>3</sup>	Seed Protein %	1,000 Seed Wt. gm	Seeds Lb	Test Weight lb/bu	Seed Yield	
	Flower Duration DAP <sup>2</sup> days	Mature DAP <sup>2</sup> days										2016	2-Yr. Avg. 3-Yr. Avg.
<i>Table continues from previous page</i>													
<b>Green Cotyledon Type</b>													
Arcadia	60	12	86	16	15	92	6	26.5	180	2521	58.8	17.6	--
CDC Striker	61	11	86	18	14	82	6	26.3	195	2336	59.2	15.9	33.7 40.2
Cruiser	60	13	87	18	15	81	7	26.3	190	2394	60.1	14.9	31.4 36.4
K2	60	12	86	18	15	87	3	25.9	206	2205	59.9	18.2	--
LGPN1903	62	11	87	19	16	84	4	26.9	211	2150	56.0	17.9	--
LGPN1904	62	11	87	21	19	92	1	26.4	219	2072	58.6	21.1	--
LGPN1905	60	12	86	18	14	77	3	25.7	228	1994	58.8	17.4	--
LN1123	62	10	86	20	16	81	3	25.7	212	2145	60.6	20.4	--
Pulse USA 0214	61	12	87	20	14	74	5	27.5	243	1871	59.1	18.6	--
Viper	60	11	85	20	18	90	5	27.7	222	2044	58.5	17.7	--
<b>Marrowfat Type</b>													
Pulse USA 1536	62	11	87	23	17	71	2	29.5	312	1457	57.9	15.7	--
Trial Mean	60	12	86	20	16	83	4	26.6	221	2075	58.9	18.9	35.5 41.5
C.V. %	1.1	7.7	0.9	8.1	15.0	13.7	37.2	1.3	3.8	4.0	2.1	14.8	--
LSD 5%	0.6	1.3	1.1	2.3	3.4	16.0	2.1	0.5	12	117	1.7	3.9	--
LSD 10%	0.5	1.1	1.0	1.9	2.8	13.0	1.7	0.4	10	98	1.4	3.1	--

<sup>1</sup> Harvest Index; Plant height at time of harvest relative to plant height at end of bloom.

<sup>2</sup> Days after planting.

<sup>3</sup> Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: April 15

Harvest Date: July 25

Previous Crop: Durum Wheat

NDSU Dickinson Research Extension Center

2016 Field Pea - Recrop

Variety	Days to Flower	Days to Mature	1000 Seed Weight gm	Seeds per Pound	Plant Height in	Vine Length in	Height Index %	Test Weight lbs/bu	--Grain Yield--			Average Yield	
									2014	2015	2016	Year	Year
<b>Yellow Types</b>													
Agassiz	58	88	236	1,924	15	16	90	63.4	56.0	59.9	31.2	45.5	49.0
DS Admiral	58	88	241	1,886	15	16	93	64.4	50.0	57.0	29.7	43.4	45.6
Spider	61	95	271	1,676	17	20	88	63.3	--	--	22.6	--	--
<b>Green Types</b>													
Arcadia	58	87	220	2,062	13	15	86	63.2	--	--	30.3	--	--
Cruiser	58	87	201	2,256	14	17	84	63.6	45.5	54.2	26.7	40.4	42.1
CDC Striker	58	87	219	2,074	13	15	87	63.0	48.0	56.4	28.4	42.4	44.3
Nette	58	88	236	1922	15	17	88	63.7	--	--	27.9	--	--
Trial Mean	58	89	232	1,971	14	16	88	63.5	48.9	58.1	28.1	--	--
CV %	0.3	0.2	2.9	3.0	5.7	6.7	6.5	2.2	6.0	7.5	7.4	--	--
LSD 0.05	0	0	10	88	1	2	9	2.0	--	6.4	3.1	--	--
LSD 0.10	0	0	8	73	1	1	7	1.7	3.6	5.3	2.6	--	--

Planting Date: April 14, 2016  
 Harvest Date: July 22, 2016  
 Previous Crop: Rye  
 Seeding Rate: 325,000 live seeds/ac  
 Grain protein percentages reported on a 0% moisture basis

**NDSU Hettinger Reserach Extension Center**

<b>Lentil - 2016</b>	<b>Hettinger, ND</b>
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Variety	Days to	Height	Lodging	Seed	1,000	Seeds	Test	----- Grain Yield -----			----- Average Yield -----	
	Flower			Protein	Seed Wt.	Lb	Weight	2014	2015	2016	2 yr	3 yr
	DAP <sup>1</sup>	inches	0 - 9 <sup>2</sup>	%	gm	seeds	lb/bu	-----lbs/acre-----				
<b>Large Green Type</b>												
CDC Greenland	61	12	1	24.5	66	6930	58.6	2182	2823	1219	2021	2075
Pennell	61	10	1	24.8	67	6794	58.0	2269	2527	1079	1803	1958
Riveland	61	13	1	24.2	71	6393	57.4	2075	2374	1118	1746	1856
<b>Medium Green Type</b>												
Avondale	61	12	1	23.2	53	8574	59.5	2700	2844	1164	2004	2236
CDC Richlea	61	11	1	23.7	51	8898	60.4	2084	2804	1299	2052	2062
<b>Small Green Type</b>												
CDC Viceroy	61	11	1	25.1	38	11953	62.4	2388	2951	1352	2152	2230
Eston	61	10	1	25.3	39	11788	61.8	2601	2823	867	1845	2097
ND Eagle	61	9	2	24.2	42	10812	61.7	2577	3409	890	2150	2292
<b>French Green Type</b>												
CDC Lemay	61	10	2	24.9	39	11788	61.4	2603	3005	598	1802	2069
<b>Small Red Type</b>												
CDC Red Rider	61	11	1	23.6	49	9261	61.4	2475	2974	1359	2167	2269
CDC Redberry	61	11	1	25.0	48	9553	61.5	2731	3295	902	2099	2309
CDC Rosetown	61	10	1	25.0	36	12639	63.1	2319	2768	1304	2036	2130
CDC Rouleau	61	11	1	23.1	41	11205	60.5	2842	3154	1157	2156	2384
<b>Spanish Brown Type</b>												
Pardina	61	9	3	23.7	44	10309	61.2	2602	3266	645	1956	2171
Trial Mean	61	10	2	24.2	49	9690	60.8	2394	2687	1043	1932	2128
C.V. %	0.6	7.4	38.6	1.3	4.0	3.8	1.0	10.2	7.0	11.8	--	--
LSD 5%	0.5	1.1	0.8	0.4	2.8	517	0.9	344	264	174	--	--
LSD 10%	0.4	0.9	0.7	0.4	2.3	432	0.7	289	221	145	--	--

<sup>1</sup> Days after planting.

<sup>2</sup> Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: April 15

Harvest Date: August 1

Previous Crop: Peas



**NDSU Dickinson Research Extension Center**

**2016 Lentil - Recrop** **Dickinson, ND**

Variety	Days	Days	1000	Seeds	Plant	Vine	Height	Test	---Grain Yield---			Average Yield	
	to	to	Seed	per					2014	2015	2016	2	3
	Flower	Mature	Weight	Pound	Height	Length	Index	Weight	-----lbs/ac-----			---lbs/ac---	
			gm		in	in	%	lbs/bu					
<b><i>Large Green Types</i></b>													
CDC Greenland	49	83	58	7,799	10	13	74	58.0	2,259	2,155	971	1,563	1,795
Pennell	49	81	56	8,793	9	11	79	59.8	2,666	1,583	1,302	1,443	1,850
Riveland	48	81	70	6,480	9	12	75	63.3	2,188	1,659	1,124	1,391	1,657
<b><i>Medium Green Type</i></b>													
CDC Richlea	49	81	49	9,338	9	12	79	63.2	2,799	2,337	1,584	1,961	2,240
<b><i>Small Green Type</i></b>													
CDC Viceroy	48	81	36	12,744	9	13	74	64.9	3,047	2,544	1,521	2,032	2,371
<b><i>Small French Green Type</i></b>													
CDC Lemay	49	81	34	13,196	9	11	79	64.0	2,042	1,949	1,315	1,632	1,769
<b><i>Medium Red Type</i></b>													
CDC Red Rider	49	82	43	10,497	9	12	80	62.9	2,796	2,551	1,585	2,068	2,311
<b><i>Small Red Types</i></b>													
CDC Redberry	49	82	43	10,528	9	11	80	65.1	2,339	1,811	1,229	1,520	1,793
CDC Rouleau	50	81	39	11,496	9	13	70	62.4	2,679	2,241	1,511	1,876	2,144
<b><i>Extra Small Red Type</i></b>													
CDC Rosetown	49	81	29	15,569	9	11	79	64.2	2,577	2,124	1,406	1,765	2,036
Trial Mean	49	81	46	10,644	9	12	77	62.8	2,539	2,095	1,355	--	--
CV %	0.7	0.5	11.4	10.4	7.0	8.9	8.3	3.5	8.8	12.3	9.0	--	--
LSD 0.05	1	1	8	1600	1	2	9	3.2	--	373	177	--	--
LSD 0.10	0	0	6	1328	1	1	8	2.6	268	310	147	--	--

Planting Date: May 5, 2016  
 Harvest Date: August 4, 2016  
 Previous Crop: Rye  
 Seeding Rate: 600,000 live seeds/ac  
 Grain protein percentages reported on a 0% moisture basis

**NDSU Hettinger Research Extension Center**

**Clearfield Lentil - 2016** **Hettinger, ND**

Variety	Days to	Plant	Plant	Seed	1,000	Seeds	Test	----- Grain Yield -----			----- Average Yield -----	
	Flower	Height	Lodging	Protein	Seed Wt.	Lb	Weight	2014	2015	2016	2 yr	3 yr
	DAP <sup>1</sup>	inches	0 - 9 <sup>2</sup>	%	gm	seeds	lb/bu	-----lbs/acre-----				
<b>Medium Green Type</b>												
CDC Imigreen CL	61	12	1	25.6	58	7825	60.0	2311	3012	1601	2307	2308
CDC Impress CL	61	11	3	23.0	52	8824	60.1	--	--	1705	--	--
<b>Small Green Type</b>												
CDC Invincible CL	61	10	3	25.4	38	12119	62.1	--	3624	1925	2775	--
<b>French Green Type</b>												
CDC Peridot CL	61	10	1	24.3	42	10812	62.3	--	--	1483	--	--
<b>Small Red Type</b>												
CDC Maxim CL	61	10	0	23.1	42	10800	61.7	3566	4007	1601	2804	3058
CDC Impala CL	61	10	0	25.3	35	12971	62.8	2754	3428	1710	2569	2631
CDC Dazil CL	61	10	0	23.1	38	12103	61.2	--	--	1623	--	--
CDC Proclaim CL	61	9	1	23.3	43	10677	60.8	--	--	1741	--	--
Mean	61	10	1	24.1	43	10766	61.4	2817	3518	1655	2614	2666
C.V. %	0.6	6.0	58.1	1.0	3.4	3.3	1.1	6.6	7.6	8.6	--	--
LSD 5%	0.5	0.9	0.8	0.4	2.2	529	1.0	286	428	210	--	--
LSD 10%	0.4	0.7	0.7	0.3	1.8	438	0.8	240	347	174	--	--

<sup>1</sup> Days after planting.

<sup>2</sup> Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: April 15

Harvest Date: August 1

Previous Crop: Field Pea

**NDSU Hettinger Reaserch Extension Center**

**Soybean - Conventional - 2016**

**Hettinger, ND**

Company/Brand	Variety	Maturity	Mature Date	Plant Height	Test Weight	Seed Oil	Seed Protein	Yield 2016	Average Yield	
									2-Yr	3-Yr
				inches	lbs/bu	%	%	-----bu/a-----		
NDSU	ND-Henson	0.00	8/31	19	51.0	17.7	32.8	23.2	24.8	--
NDSU	Ashtbula	0.4	9/7	20	50.6	18.7	31.2	23.6	24.7	32.4
NDSU	Sheyenne	0.7	9/10	22	50.2	17.7	31.1	27.2	27.6	35.3
NDSU	ND Bison	0.7	9/13	21	49.9	17.5	31.4	27.2	--	--
Trial Mean			9/8	20	50.5	18.0	31.6	26.0	25.7	33.9
C.V. %			0.6	7.5	0.6	1.4	1.7	8.9	--	--
LSD 5%			1.1	2.3	1.7	0.4	0.8	3.5	--	--
LSD 10%			0.9	1.9	1.4	0.3	0.7	2.8	--	--

Planting Date: May 4

Harvest Date: September 13

Previous Crop: Wheat

**NDSU Hettinger Research Extension Center**

**Soybean - Roundup Ready - 2016** **Hettinger, ND**

Company/Brand	Variety	Maturity	Mature Date	Plant Height	Test Weight	Seed Oil	Seed Protein	Yield 2016	Average Yield	
									2-Yr	3-Yr
				inches	lbs/bu	%	%	-----bu/a-----		
Legacy Seed	LS-0135	0.1	8/30	22	49.6	17.4	34.1	19.7	--	--
Legacy Seed	LS-0214	0.2	9/5	22	48.8	17.6	33.6	25.7	--	--
Proseed	30-20	0.2	9/4	22	49.4	17.7	33.5	26.9	39.5	44.1
Integra	20300	0.3	9/11	21	49.4	16.7	33.7	26.9	38.8	41.3
Legacy Seed	LS-0334	0.3	9/12	21	49.5	17.2	33.1	27.5	40.5	43.5
Integra	20418	0.4	9/6	24	49.5	17.3	33.2	27.0	--	--
REA Hybrids	64G94	0.4	9/5	22	49.4	18.4	31.9	26.3	36.1	--
Proseed	XT605	0.5	9/9	23	48.4	16.8	34.1	26.2	--	--
Integra	20600	0.6	9/9	24	49.2	17.4	31.7	31.0	42.7	45.3
Legacy Seed	LS-0635N	0.6	9/9	24	49.9	16.9	33.4	30.1	42.6	--
REA Hybrids	66G14	0.6	9/10	24	48.2	16.8	32.9	30.5	41.2	--
Integra	20775N	0.7	9/12	23	48.0	17.2	33.0	29.0	--	--
REA Hybrids	R0815	0.8	9/11	22	48.3	17.4	32.5	30.3	39.7	--
Trial Mean			9/8	23	49.1	17.3	33.1	27.5	40.4	45.3
C.V. %			1.0	9.3	1.5	1.5	1.6	13.2	--	--
LSD 5%			1.8	3.0	1.0	0.4	0.7	5.2	--	--
LSD 10%			1.6	2.5	0.9	0.3	0.6	4.3	--	--

Planting Date: May 4  
 Harvest Date: September 13  
 Previous Crop: Safflower

**NDSU Hettinger Research Extension Center**

**Corn - 2016** **Hettinger, ND**

Company	Hybrid	Relative Maturity <sup>1</sup> days	Days to Silk DAP <sup>2</sup>	Plant Height inches	Ear Height inches	Stalk Lodge %	Moisture Content %	Test Weight lbs/bu	Grain Yield	
									2016 -----bu/ac-----	2-Yr
AgVenture	AV2985AB	85	73	83	30	0	20.4	55.8	141.6	--
AgVenture	AV4491AM	91	75	81	33	0	26.0	54.9	107.1	--
AgVenture	RL2289AM	82	69	82	32	0	15.6	53.6	134.7	128.3
AgVenture	RL3645AM	89	74	87	33	0	19.0	52.8	129.5	124.7
Integra	3236 VT2PRIB	82	72	84	29	0	19.3	56.5	115.0	--
Integra	3325 GT/CB/LL	83	74	78	25	0	25.0	56.9	131.6	--
Integra	3537 VT2PRIB	85	73	86	33	0	22.4	56.1	130.3	129.9
Integra	9352 VT3PRO	85	72	83	28	0	21.9	56.0	138.8	131.8
Legacy	L-2245 VT2PRO	82	74	84	32	0	19.6	58.1	124.1	--
Legacy	L-2516 VT2PRO	85	72	81	28	0	20.8	55.0	137.5	--
Legacy	L-2813 VT2PRO	87	75	85	30	0	23.2	55.1	133.3	135.3
Legacy	L-2916 VT2PRO	88	71	84	27	0	23.1	56.1	134.1	--
Legacy	L-2924 VT2PRO	89	73	89	31	0	23.4	54.3	133.7	129.7
Proseed	1083	83	73	84	29	0	18.8	55.6	138.1	--
Proseed	1283	83	71	79	25	0	20.1	58.9	126.4	115.0
Proseed	1286	86	73	85	31	0	22.7	55.9	122.6	122.6
Proseed	1383	83	73	83	27	0	19.4	55.9	134.0	--
Proseed	1384	84	71	83	28	0	21.0	57.2	118.1	117.2
Proseed	1385	85	73	87	28	0	21.8	54.8	104.2	--
Proseed	1483	83	72	82	30	0	20.6	56.0	111.8	--
Proseed	1487	87	74	85	32	0	21.0	55.4	136.2	--
REA Hybrids	2A871-RIB	87	71	86	29	0	21.9	56.9	103.9	109.0
REA Hybrids	2B840-RIB	84	72	86	30	0	20.7	54.8	119.3	123.0
REA Hybrids	2B850-RIB	85	72	80	28	0	18.0	56.4	134.0	128.2
REA Hybrids	2B860-RIB	86	70	84	31	0	18.7	55.8	131.7	--
REA Hybrids	3A330-RIB	90	74	86	30	0	22.8	53.9	123.8	--
Trial Mean			72	84	29	0	21.0	55.7	126.7	124.5
C.V. %			1.6	3.3	10.4	1019.0	9.5	1.7	8.5	--
LSD 5%			1.6	3.9	4.3	0.2	2.8	1.4	15.2	--
LSD 10%			1.3	3.3	3.6	0.1	2.4	1.1	12.7	--

<sup>1</sup> Relative maturity provided by the company.

<sup>2</sup> Days after planting

Planting Date: May 17

Harvest Date: October 26

Previous Crop: Wheat

## Postemergence Options for Weed Control in Spring Wheat

Caleb Dalley, HREC, Hettinger, ND, 2016

A field trial was conducted to evaluate weed control and spring wheat tolerance to several POST herbicides. Spring wheat 'Elgin' was planted on May 6, 2016 at a rate of 100 lbs/A using a John Deere 1590 no-till drill into barley stubble using no-till practices. At planting, starter fertilizer (18-46-0) was applied to the drill at a rate of 40 lbs/A. Prior to planting, urea was broadcast applied at a rate of 120 lbs/A. Wheat emerged on May 15. Treatments were applied on June 10 using a tractor mounted research sprayer with flat fan nozzles spaced at 20 inches using a spray volume of 10 gal/A to wheat that was in the tillering stage with an average height of 11 inches to the longest extended leaf. Weeds present at time of application included prickly lettuce (1/m<sup>2</sup>, 26.5 cm in height), green foxtail (156/m<sup>2</sup>, 7.4 cm in height), Shepherd's purse (0.5/m<sup>2</sup>, 53 cm in height), wild oat (4.5/m<sup>2</sup>, 32.4 cm in height), common lambsquarters (1/m<sup>2</sup>, 2 cm in height), kochia (0.5/m<sup>2</sup>, 16 cm in height), horseweed (0.5/m<sup>2</sup>, 19 cm in height), and Japanese brome (2.5/m<sup>2</sup>, 39.5 cm in height). Wheat injury was evaluated at 7, 13, 21, and 28 days after treatment (DAT) and weed control was evaluated at 13, 21, and 28 DAT. Injury, in the form of slight chlorosis (yellowing) of wheat was observed at 7 DAT with nearly all treatments. However, injury was slight and was not observed at later evaluations. There was some wheat injury in the form of slight stunting observed in later evaluations, but it was inconsistent and did not result in any significant differences between treatments. Wild oat control was greatest (93%) at 28 DAT with the Axial XL + WideMatch treatment all other treatments provided good wild oat control (77 to 82%). Prickly lettuce control was greatest with PerfectMatch + 2,4-D (93%) and Huskie Complete (94%) All other treatments control prickly lettuce within a range of 80 to 87%. Common lambsquarters control was greatest with Goldsky + 2,4-D (100%), PerfectMatch + 2,4-D (98%), TeamMate + Hat Trick (100%), and Huskie Complete (100%) poor control was observed with Glodsky (68%), Axial SL + WideMatch (55%), and Everest + WideMatch (63%) PerfectMatch alone controlled common lambsquarters at 84%. Kochia control was greatest with Goldsky + 2,4-D (99%) Goldsky alone (72%) and TeamMate + Hat Trick (78%) provided fair control all other treatment provided good control of kochia (83-89%). Horseweed control was greatest with Huskie Complete (100%) PerfectMatch + 2,4-D (94%) and TeamMate + Hat Trick (93%) provided excellent control all other treatments provided good control of horseweed (81-85%). Green foxtail control was greatest with Axial XL + WideMatch (88%) other treatments controlled green foxtail in a range from 78 to 83%. Wheat was harvested on August 4 using a Kincaid plot harvester with a 5 foot head. No differences in wheat yield was observed for any of the treatments in this trial. Weed densities were relatively low and did not significantly reduce wheat yield in the untreated control compared to other treatments, although yield was in most cases lower than in treatments where weeds were controlled.

Treatment	Rate	Wheat injury			Wild Oat	Green foxtail	Kochia	Prickly Lettuce	Common lambsquarters	Test wt	Yield
		7 DAT	13 DAT	21 DAT							
1 Untreated		%			control at 28 DAT (%)					lbs/bu	bu/A
2 Goldsky	16 oz/a	0 d	0 a	0 a	0 d	0 f	0 d	0 e	0 e	55 a	39.9 a
Activator 90	0.5 % v/v	5 ab	0 a	1 a	81 bc	81 bcd	72 c	85 cd	68 c	55 a	40.5 a
AMS	1.51 lb/a										
3 Goldsky	16 oz/a	6 a	2 a	3 a	82 b	80 cde	99 a	87 bc	100 a	55 a	43.7 a
2,4-D ester LV	7.26 oz/a										
AMS	1.51 lb/a										
4 PerfectMatch	16 oz/a	3 c	1 a	0 a	82 b	79 de	85 b	85 cd	84 b	55 a	42.6 a
Activator 90	0.5 % v/v										
AMS	1.51 lb/a										
5 PerfectMatch	16 oz/a	4 bc	0 a	3 a	80 bc	82 bc	83 bc	93 ab	98 a	55 a	39.3 a
2,4-D ester LV	7.26 oz/a										
AMS	1.51 lb/a										
6 TeamMate	1 oz/a	0 d	0 a	3 a	77 c	78 e	78 bc	83 cd	100 a	55 a	39.6 a
Hat Trick	1.5 pt/a										
AMS	1.51 lb/a										
7 Huskie complete	13.7 oz/a	7 a	3 a	3 a	82 b	78 e	89 ab	94 a	100 a	55 a	42.6 a
8 Axial SL	16.4 oz/a	2 cd	0 a	0 a	93 a	88 a	84 bc	82 cd	55 d	55 a	40.5 a
WideMatch	16 oz/a										
AMS	1.51 lb/a										
9 Everest 2.0	0.75 oz/a	7 a	0 a	3 a	81 bc	83 b	83 bc	80 d	63 cd	54 a	43.4 a
WideMatch	16 oz/a										
Activator 90	0.25 % v/v										
AMS	1.51 lb/a										
LSD P=.10		2.2	NS	NS	3.9	2.3	12.9	6.7	9.7	1.1	4.77
Standard Deviation		1.8	1.9	2.5	3.2	1.9	10.3	5.5	8.0	0.9	3.94
CV		48.4	286.41	158.13	4.46	2.68	13.82	7.14	10.8	1.67	9.53
Treatment F		9.137	1.320	1.037	290	796	31.5	113	68	0.506	0.754
Treatment Prob(F)		0.0001	0.2809	0.4368	0.0001	0.0001	0.0001	0.0001	0.0001	0.8398	0.6451

## **Anthem Flex Applied as Preemergence Burndown for Weed Control in Spring Wheat**

Caleb Dalley, HREC, Hettinger, ND, 2016

A field trial was conducted to evaluate weed control and spring wheat tolerance to Anthem Flex applied as part of a PRE burndown combined with POST application of WideMatch compared to other PRE/POST and total POST herbicide options. Anthem Flex combines the contact herbicide carfentrazone with the soil active preemergence herbicide pyroxasulfone. Spring wheat 'Elgin' was planted at a rate of 100 lb/A on May 6, 2016 using a John Deere 1590 no-till drill. At planting, 40 lb/A of starter fertilizer (18-46-0) was drilled into the planting drill. Prior to planting, urea fertilizer (46-0-0) was broadcast applied at a rate of 120 LB/A. PRE burndown treatments were applied on May 9 using a tractor mounted research sprayer at a spray volume of 10 gal/A using flat fan nozzles spaced at 20 inches and using CO<sub>2</sub> as a propellant. Wheat emerged on May 15. Little rainfall occurred between planting and crop emergence (0.36 inches) and daily rainfall never exceed 0.2 inches. POST treatments were applied on June 15 using the same equipment and procedures as previously described. Weeds present in the trial included field pennycress, shepherd's purse, flixweed, horseweed, common mallow, Japanese brome and common lambsquarters, and green foxtail. Wheat was evaluated for injury at 8 and 17 days after crop emergence and at 7, 16, 21, and 28 days after POST treatment application (DAT). No injury was observed as a result of PRE treatments at any of the evaluation dates. Mild injury in the form of stunting or slight yellowing was observed following POST application of Goldsky and WideMatch plus Axial. Injury would not have been noticed if not for side by side comparisons with untreated wheat. A general rating of annual mustard control was taken at 18 days after the PRE application. All Anthem Flex plus glyphosate treatments control annual mustards 97-99%. Horseweed was controlled 100% with all PRE treatments of Anthem Flex plus glyphosate, regardless of rate. POST treatments controlled horseweed in a range of 74% with Goldsky to 88% with Olympus followed by WideMatch. Common lambsquarters was controlled 96 to 100% with PRE treatments of Anthem Flex plus glyphosate. At 28 DAT, common lambsquarters control was 71% or less with POST treatments. Prickly lettuce was controlled 100% with PRE application of Anthem Flex plus glyphosate. At 28 DAT, common lambsquarters control ranged from 65% with Goldsky to 80% with WideMatch plus Axial. Green foxtail control at 28 days after POST application ranged from 75 to 83% with PRE application of Anthem Flex plus glyphosate, with no significant increase in control as rate increased, however, there was a trend for increased green foxtail control as Anthem Flex rate increased from 2.5 oz/A (75%) to 4.5 oz/A (83%). Anthem Flex plus glyphosate followed by Everest 2.0 and WideMatch controlled green foxtail at 89%. POST applications provided poor control of green foxtail (30-54%). Spring wheat was harvested on August 4 using a Kincaid plot combine with a 5 foot header. All PRE Anthem Flex plus glyphosate treatments yielded similar to the weed free control. The highest yield was recorded in plots where the highest rate of Anthem Flex was used (4.5 oz/A). Yield was less than the weed free control with POST treatments of WideMatch plus Axial and Goldsky. Olympus PRE followed by WideMatch POST yielded similar to the weed free control. This year's trial alone would conclude that Anthem Flex is safe when applied PRE to spring wheat. However, conditions at Hettinger were very dry during 2016 with less than 4 inches of rain occurring between planting and harvest compared with average rainfall of around 8 inches during this time period. Further evaluation of Anthem Flex during average or above average rainfall is needed to come to firm conclusions regarding the safety of Anthem Flex applied PRE to spring wheat in western North Dakota.

Treatment	Rate	Wheat injury			Common lambsquarters	Green foxtail	Prickly Lettuce	Horseweed	Test wt	Yield
		7 DAT	16 DAT	28 DAT						
		%			control at 28 DAT (%)				lbs/bu	bu/A
1 Anthem Flex Glyphosate AMS WideMatch	2.5 oz/a 32 oz/a 17 lb/100 gal 1.33 pt/a	0 c	0 a	0 b	100 a	75 c	100 a	100 a	54 a	22.7 ab
2 Anthem Flex Glyphosate AMS WideMatch	3 oz/a 32 oz/a 17 lb/100 gal 1.33 pt/a	0 c	0 a	0 b	96 a	76 c	100 a	100 a	53 abc	25.6 a
3 Anthem Flex Glyphosate AMS WideMatch	3.5 oz/a 32 oz/a 17 lb/100 gal 1.33 pt/a	0 c	0 a	0 b	100 a	81 bc	100 a	100 a	53 ab	25.8 a
4 Anthem Flex Glyphosate AMS WideMatch	4.5 oz/a 32 oz/a 17 lb/100 gal 1.33 pt/a	0 c	0 a	0 b	100 a	83 bc	100 a	100 a	53 abc	27.0 a
5 Anthem Flex Glyphosate AMS Everest 2.0 WideMatch	3.5 oz/a 32 oz/a 17 lb/100 gal 1 oz/a 1.33 pt/a	0 c	0 a	0 b	100 a	89 b	100 a	100 a	53 ab	23.3 ab
6 WideMatch Axial XL	1.33 pt/a 16.4 oz/a	3 b	0 a	3 a	68 bc	54 d	80 b	85 b	52 c	14.3 d
7 Olympus WideMatch	0.9 oz/a 1.33 pt/a	0 c	0 a	0 b	71 b	30 f	74 c	88 b	53 abc	25.1 a
8 GoldSky	1 pt/a	6 a	0 a	1 b	59 c	40 e	65 d	74 c	53 bc	17.1 cd
9 Weed Free Glyphosate AMS Olympus	 32 oz/a 17 lb/100 gal 0.9 oz/a	0 c	0 a	0 b	100 a	100 a	100 a	100 a	53 bc	25.7 a
10 Untreated		0 c	0 a	0 b	0 d	0 g	0 e	0 d	50 d	19.0 bc
LSD P=.10		1.1	NS	1.3	10.6	9.0	4.6	4.6	1.5	4.46
Standard Deviation		0.9	0.0	1.1	8.8	7.4	3.8	3.8	1.3	3.70
CV		118.34	0.0	252.43	11.05	11.87	4.64	4.54	2.43	16.4
Treatment F		14.9	0.00	3.38	53.8	70.07	277.9	262.1	3.71	5.43
Treatment Prob(F)		0.0001	1.0000	0.0067	0.0001	0.0001	0.0001	0.0001	0.0039	0.0003



## PRE/POST Combinations of Varro, Olympus, and Huskie Complete for Weed Control in Spring Wheat

Caleb Dalley, HREC, Hettinger, ND, 2016

A field trial was conducted to evaluate weed control and spring wheat tolerance to pre and postemergence combinations of Varro, Olympus, and Huskie Complete. Spring wheat 'Elgin' was planted using a John Deere 1590 into barley stubble. At planting, starter fertilizer (18-46-0) was drilled into the planting furrow at a rate of 40 lbs/A. Prior to planting urea (46-0-0) was broadcast applied at a rate of 120 lbs/A using a drop spreader. PRE treatments were applied on May 9 using a tractor mounted research sprayer at a spray volume of 10 gal/A using flat fan nozzles spaced at 20 inches. Wheat emerged on May 15. The growing season at Hettinger was dryer than average with only 3.4 inches of rain falling in between planting and harvest; compared to an average of 7.9 inches during this time period. Low rainfall limited the efficacy of soil applied PRE herbicides. POST treatments were applied as previously described on June 2. At time of application, wheat was in the tillering stage and had an average height of 7 inches to the longest extended leaf. Crop injury and weed control were evaluated at 12, 22, and 35 days after treatment (DAT). Minor injury (,6%), in the form of stunted growth, was observed with some treatments at 12 DAT. No significant injury was observed at 22 or 35 DAT. Weed control increased in nearly all cases when going from 12 to 35 DAT. At 35 DAT, Japanese brome, prickly lettuce, and horseweed control were 89 to 100%; wild oat control ranged from 88 to 95%; and green foxtail control ranged from 77 to 87%. Wheat was harvested on August 4 using a Kincaid plot harvester with a 5 foot wide header. No significant differences in yield were observed due to herbicide treatment. All herbicide combinations provided good or excellent weed control with little to no injury to the spring wheat crop. POST options for weed control were valuable in a season where low rainfall limited the efficacy of soil-applied PRE herbicides.

Treatment	Rate	Wheat injury			J. brome	G. foxtail	Wild oat	Horseweed	Test wt	Yield
		12 DAT	22 DAT	35 DAT						
		%			control at 35 DAT (%)			-lbs/bu-	-bu/A-	
1 Untreated		0 d	0 a	0 a	0 c	0 c	0 e	0 c	53 a	30.5 a
2 Varro	6.85 oz/a	1 cd	1 a	0 a	96 b	84 a	88 d	92 b	55 a	30.2 a
Carnivore	1 pt/a									
AMS	0.5 lb/a									
3 Varro	6.85 oz/a	2 bcd	1 a	0 a	100 a	85 a	92 a-d	93 b	55 a	31.8 a
Carnivore	1 pt/a									
Olympus	0.2 oz/a									
AMS	0.5 lb/a									
4 Olympus	0.2 oz/a	6 a	2 a	0 a	100 a	83 a	94 ab	94 ab	54 a	31.2 a
Varro	6.85 oz/a									
Carnivore	1 pt/a									
AMS	0.5 lb/a									
5 Olympus	0.2 oz/a	0 d	1 a	0 a	100 a	87 a	95 a	94 ab	55 a	33.9 a
Varro	6.85 oz/a									
Carnivore	1 pt/a									
Olympus	0.2 oz/a									
AMS	0.5 lb/a									
6 Huskie Complete	13.7 oz/a	4 ab	3 a	0 a	99 a	84 a	89 cd	100 a	54 a	31.5 a
AMS	0.5 lb/a									
7 Huskie Complete	13.7 oz/a	3 bc	4 a	0 a	100 a	87 a	89 bcd	96 ab	55 a	36.2 a
Olympus	0.2 oz/a									
AMS	0.5 lb/a									
8 Olympus	0.2 oz/a	4 ab	3 a	0 a	98 ab	77 b	90 bcd	89 b	53 a	32.3 a
Huskie Complete	13.7 oz/a									
AMS	0.5 lb/a									
9 Olympus	0.2 oz/a	4 abc	0 a	0 a	100 a	85 a	93 abc	95 ab	55 a	33.7 a
Huskie Complete	13.7 oz/a									
Olympus	0.2 oz/a									
AMS	6.85 lb/a									
LSD P=.10		2.8	2.5	NS	2.3	4.6	5.0	7.2	1.5	4.47
Standard Deviation		2.3	2.1	0.0	1.9	3.8	4.1	6.0	2.21	11.4
CV		85.73	119.04	0.0	2.2	5.07	5.07	7.15	1.247	1.065
Treatment F		3.158	1.947	0.000	1166	221	221	111	1.247	1.065
Treatment Prob(F)		0.0145	0.1010	1.0000	0.0001	0.0001	0.0001	0.0001	0.3178	0.4200

## Varro tank-mixes for Weed Control in Spring Wheat

Caleb Dalley, HREC, Hettinger, ND, 2016

A field trial was conducted to evaluate weed control and spring wheat tolerance to postemergence applications of Varro tank-mixes. Spring wheat 'Elgin' was planted into no-till barley stubble on May 6, 2016 using a John Deere 1590 no-till drill. During planting, starter fertilizer (18-46-0) was drilled into the planting furrow at a rate of 40 lbs/A. Prior to planting, urea (46-0-0) was broadcast applied at a rate of 120 lbs/A using a broadcast spreader. Spring wheat emerged on May 15. Below average rainfall occurred at the research field where this trial was conducted with only 3.4 inches of rain falling between planting and harvest, compared to an average rainfall of 7.9 inches during this time period. Herbicide treatments were applied on June 2 using a tractor mounted research sprayer at a spray volume of 10 gal/A using flat fan nozzles spaced at 20 inches. Wheat was at the tillering stage and averaged 7 inches to the longest extended leaf. Wheat injury and weed control were evaluated at 12, 22, and 35 days after application. Only minor injury was observed with any treatment consisting of primarily slight stunting in growth and there were no significant differences in injury due to treatment. At 35 DAT, Japanese brome control ranged from 81% with Wolverine to 98% with Varro + Widematch + 2,4-D ester; Wild oat control ranged from 84 to 91% with no significant differences due to treatment; green foxtail control with Varro tank-mixes ranged from 80 to 89%, compared to 78% with the Huskie Complete treatment, and 83% with Wolverine Advanced. Common lambsquarters control was 90 to 100% with all treatments except Varro + Bison (80%); prickly lettuce was control 95 to 100% with all treatments. Wheat was harvested on August 1 using a Kincaid plot harvester with a 5 foot header. There were no significant differences in yield due to herbicide treatment, although yield was lowest in the untreated plots. POST options for weed control are valuable, especially in years where deficiencies in rainfall limit the efficacy of soil-applied PRE herbicides.

Treatment	Rate	Wheat injury			J. brome	G. foxtail	Wild oat	Test wt	Yield
		12 DAT	22 DAT	35 DAT					
		% control at 35 DAT (%)						-lbs/bu-	bu/A
1 Untreated		0 a	0 a	0 a	0 d	0 e	0 b	54 a	44.7 a
2 Varro Bison AMS	6.85 oz/a 1 pt/a 0.5 lb/a	1 a	4 a	0 a	93 ab	82 bcd	84 a	56 a	57.1 a
3 Varro Weld AMS	6.85 oz/a 18 oz/a 0.5 lb/a	1 a	1 a	0 a	92 ab	89 ab	90 a	55 a	57.0 a
4 Varro Carnivore AMS	6.85 oz/a 1 pt/a 0.5 lb/a	1 a	1 a	0 a	95 ab	86 abc	90 a	55 a	53.7 a
5 Varro WideMatch 2,4-D ester AMS	6.85 oz/a 1 pt/a 0.5 pt/a 0.5 lb/a	0 a	2 a	0 a	98 a	84 a-d	91 a	53 a	65.3 a
6 Varro WideMatch MCPA Ester AMS	6.85 oz/a 1 pt/a 0.5 pt/a 0.5 lb/a	0 a	4 a	0 a	96 a	84 a-d	90 a	55 a	56.5 a
7 Varro WideMatch Affinity TankMix AMS	6.85 oz/a 1 pt/a 0.6 oz/a 0.5 lb/a	1 a	3 a	0 a	92 ab	80 cd	91 a	54 a	54.3 a
8 Varro Olympus Carnivore AMS	6.85 oz/a 0.2 oz/a 1 pt/a 0.5 lb/a	4 a	3 a	0 a	87 bc	89 a	91 a	56 a	67.6 a
9 Huskie complete	13.7 oz/a	3 a	3 a	0 a	90 abc	78 d	89 a	55 a	64.5 a
10 Wolverine Adv	0.5 lb/a	0 a	2 a	0 a	81 c	72 abc	84 a	54 a	61.6 a
LSD P=.10		NS	NS	NS	9.7	7.4	8.5	NS	NS
Standard Deviation		1.9	2.5	0	8.1	6.2	7.0	1.5	13.8
CV		172.7	107.5	0	9.8	8.17	8.8	2.7	23.7
Treatment F		1.638	1.075	0	6.502	75.328	64.038	1.563	0.965
Treatment Prob(F)		0.1543	0.4218	1.000	0.0001	0.0001	0.0001	0.1970	0.4967

## Comparison of Varro Tank-mix Combinations for Weed Control in Durum

Caleb Dalley, HREC, Hettinger, ND, 2016

A field trial was conducted to evaluate crop safety and weed control with tank-mixes of Varro (thiencarbazone-methyl) in durum wheat. Durum 'Carpio' was planted on May 11, 2016 with a John Deere 1590 no-till drill at a rate of 120 lbs/A. Starter fertilizer (18-46-0) was applied at planting at a rate of 40 lbs/A. Prior to planting, urea (46-0-0) was applied at a rate of 100 lbs/A. Durum emerged on May 23. Herbicide treatments were applied on June 2 when durum was at the 3 to 6 leaf stage with an average height to the longest extended leaf of 5 inches. Weeds present in the trial included kochia, wild buckwheat, and Russian thistle. The trial was evaluated at 11, 21, and 35 days after treatment (DAT). No injury was observed due to any of the treatments applied in this study at any of the dates treatments were rated. At 21 DAT, Russian thistle control ranged from 70% with Wolverine and from 73 to 83% with Varro tank-mixes and 83% with Huskie Complete. Also at 21 DAT, wild buckwheat control ranged from 81 to 95% control, with Varro plus Carnivore, Varro plus Bison, and Huskie Complete having the highest control ratings. At 21 DAT, kochia control ranged from 64 to 85%, with Wolverine Advanced at 64% and Varro plus WideMatch plus 2,4-D ester at 85%. Due to droughty conditions this season, durum wheat yield was very low and variable with yield ranging from 12.5 to 23.3 bu/A and test weights ranging from 43 to 45 lbs/bu with no yield difference due to treatment.

Treatment	Rate	Spring wheat injury			Kochia	Russian thistle	Wild buckwheat	Test wt Aug 10	Yield Aug 10
		11 DAT	21 DAT	35 DAT					
		%			— Control at 21 DAT (%) —			lbs/bu	bu/A
1 Untreated		0 a	0 a	0 a	0 d	0 d	0 d		
2 Varro	6.85 oz/a	0 a	0 a	0 a	70 bc	79 ab	91 ab	45.2 a	12.5 a
Bison	1 pt/a								
AMS	0.5 lb/a								
3 Varro	6.85 oz/a	0 a	0 a	0 a	75 abc	73 bc	83 c	43.7 a	22.9 a
Weld	18 oz/a								
AMS	0.5 lb/a								
4 Varro	6.85 oz/a	0 a	0 a	0 a	78 ab	80 ab	95 a	43.9 a	24.0 a
Carnivore	1 pt/a								
AMS	0.5 lb/a								
5 Varro	6.85 oz/a	0 a	0 a	0 a	85 a	83 a	88 abc	45.8 a	21.5 a
WideMatch	1 pt/a								
2,4-D ester	0.5 pt/a								
AMS	0.5 lb/a								
6 Varro	6.85 oz/a	0 a	0 a	0 a	68 bc	77 abc	81 c	43.9 a	17.5 a
WideMatch	1 pt/a								
MCPA Ester	0.5 pt/a								
AMS	0.5 lb/a								
7 Varro	6.85 oz/a	0 a	0 a	0 a	79 ab	79 ab	86 bc	45.6 a	18.6 a
WideMatch	1 pt/a								
Affinity TankMix	0.6 oz/a								
AMS	0.5 lb/a								
8 Varro	6.85 oz/a	0 a	0 a	0 a	74 bc	83 a	91 ab	45.3 a	23.3 a
Olympus	0.2 oz/a								
Carnivore	1 pt/a								
AMS	0.5 lb/a								
9 Huskie complete	13.7 oz/a	0 a	0 a	0 a	75 abc	83 a	87 bc	45.3 a	21.0 a
AMS	0.5 lb/a								
10 Wolverine Adv	27.4 oz/a	0 a	0 a	0 a	64 c	70 c	84 c	44.6 a	21.5 a
LSD P=.05		NS	NS	NS	11.1	8.6	7.4	NS	NS
Standard Deviation		0.0	0.0	0.0	9.1	7.1	6.2	1.9	6.1
CV		0.0	0.0	0.0	13.7	10.1	7.9	4.2	30.6
Treatment F		0.000	0.000	0.000	27.9	29.3	81.5	0.764	1.409
Treatment Prob(F)		1.000	1.000	1.000	0.0001	0.0001	0.0001	0.6499	0.2391

## Lentil Tolerance to Pre and Postemergence application of the Herbicide Pyroxasulfone

Caleb Dalley, HREC, Hettinger, ND, 2016

A field trial was conducted to evaluate lentil tolerance to the herbicide pyroxasulfone. Lentil were planted at a rate of 75 lb/A on May 4, 2016 using a John Deere 1590 no-till drill. During planting, 40 lbs of starter fertilizer (18-46-0) and pea/lentil inoculant were applied in the planting drill. Preemergence treatments were applied on the same day as planting. Glyphosate (0.75 lb ae/A) was also applied to the entire trial site after planting to control emerged weeds. Herbicides were applied using a tractor mounted research sprayer at a volume of 10 gallons per acre using flat fan nozzles and compressed CO<sub>2</sub> as a propellant. The site of this trial in Hettinger experienced below average rainfall for the summer months which limited both the injury of herbicide treatments to lentil and weed control from these treatments. During May there was 1.04 inches of rain recorded; in June there was 0.87 inches of rain; in July there was 0.81 inches of rain. Most rainfall occurred in amounts of less than 0.2 inches and only one daily rainfall totaled greater than 0.5 inches. Due to low rainfall, few annual weeds emerged following planting with the primary weed present in the trial after planting being field bindweed, although there was a scattered population of kochia and wild buckwheat. No herbicide treatment was effective at controlling any of these weeds, partly due to less than ideal incorporation of the herbicides due to low rainfall. Lentil were harvested on August 1. All treatments yielded less lentil than the hand weeded control. Yields were very low due to the dry summer and averaged less than 900 lbs per acre for most treatments. Additional trials evaluating lentil response to pyroxasulfone should be conducted to develop firm conclusions concerning its safety.

Treatment	Rate	Lentil injury			Lentil Height	Test wt Aug 10	Yield Aug 10
		7 DAE	16 DAE	36 DAE			
		-%			-cm-	-lbs/bu-	-lbs/A-
1 Pyroxasulfone	1.5 oz/a	0 a	0 a	0 a	21 a	56 a	872 b
2 Pyroxasulfone	2.1 oz/a	0 a	0 a	0 a	21 a	54 a	838 b
3 Pyroxasulfone	3.5 oz/a	0 a	0 a	0 a	22 a	53 a	879 b
4 Prowl H2O Pyroxasulfone	51 oz/a 1.0 oz/a	0 a	0 a	0 a	22 a	49 a	902 b
5 Prowl H2O Pyroxasulfone	51 oz/a 1.7 oz/a	0 a	0 a	0 a	21 a	53 a	867 b
6 Prowl H2O Pyroxasulfone	51 oz/a 2 oz/a	0 a	0 a	0 a	22 a	53 a	851 b
7 Prowl H2O Pursuit	51 oz/a 2 oz/a	0 a	0 a	0 a	22 a	56 a	954 b
8 Untreated check		0 a	0 a	0 a	22 a	56 a	899 b
9 Hand weeded check		0 a	0 a	0 a	23 a	55 a	1086 a
LSD P=.10		NS	NS	NS	NS	4.0	127.49
Standard Deviation		0.0	0.0	0.0	0.87	3.2	105.39
CV		0.0	0.0	0.0	4.0	5.97	11.64
Treatment F		0.000	0.000	0.000	1.546	2.358	2.067
Treatment Prob(F)		1.000	1.000	1.000	0.1937	0.0724	0.0808

## **Options for PRE Weed Control in Lentil**

Caleb Dalley, HREC, Hettinger, ND, 2016

A field trial was conducted to evaluate lentil tolerance and weed control with herbicides applied preplant and preemergence. Lentil were planted on May 4, 2016 at a rate of 75 lbs/A using a John Deere 1590 no-till drill. Lentil were planted no-till into wheat stubble. Pea/lentil inoculant was applied to the planting drill during planting along with starter fertilizer (18-46-0) at a rate of 40 lb/A. Preplant herbicide application (treatment 10) was applied on May 3, 2010 using a tractor-mounter research sprayer using a spray volume of 10 gal/A with compressed CO<sub>2</sub> as the propellant. PRE herbicide treatments were applied on May 4, 2016 using the same methods as described previously. Lentil emerged on May 16. In May of 2016, just over one inch of rainfall occurred, mostly in small increments that were ineffective at activating and incorporating PRE herbicides. The first rainfall with an accumulation of more than 0.15 inches was on May 30, when 0.46 inches of rain fell at Hettinger. The remaining summer months were also dry, with less than four inches of accumulated rainfall between May 1 and August 1. This resulted in reduced survival, growth, and yield of lentil, but also reduced weed emergence in plots as well. Weeds present at planting were all controlled effectively with glyphosate. Few weeds beyond field bindweed emerged and grew after planting. No injury was observed for any of the treatments applied preplant or preemergence at evaluations taken 19 and 28 days after planting. Lentil was harvested on August 1 using a Kincaid plot harvester with a 5 foot header. Lentil seed moisture ranged from 11 to 14% and was adjusted to 12% moisture when calculating yields. Lentil yield ranged from 56 lbs/A in the untreated control to 1067 lbs/A in lentil treated with BAS 85800H (4.5 oz/A). In herbicide treated lentil, the lowest yield occurred in lentil treated PRE with Zidua at 3 oz/A (824 lbs/A), however, the highest rate of Zidua SC (6.25 oz/A) yielded similar (953 lbs/A) to the treatment with the highest yield. Lentil treated with Prowl H<sub>2</sub>O preplant yielded more than lentil treated PRE with Prowl. Due to dry conditions, further research is needed to determine crop safety and herbicide efficacy with PRE herbicides in lentil.

Treatment	Rate	Timing	Lentil injury		Test wt	Yield	
			7 DAE	16 DAE		-lbs/bu-	-bu/A-
			%				
1 Roundup PowerMAX	22 fl oz/a	PRE	0 b	1 bc	38 a	13.7 c	824 d
Zidua	3 oz wt/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
2 Roundup PowerMAX	22 fl oz/a	PRE	1 b	0 c	56 a	15.8 abc	956 a-d
Zidua SC	2.5 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
3 Roundup PowerMAX	22 fl oz/a	PRE	0 b	0 c	58 a	15.6 abc	930 a-d
Zidua SC	3.75 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
4 Roundup PowerMAX	22 fl oz/a	PRE	0 b	0 c	55 a	15.8 abc	942 a-d
Zidua SC	5 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
5 Roundup PowerMAX	22 fl oz/a	PRE	0 b	0 c	53 a	16.0 abc	953 a-d
Zidua SC	6.25 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
6 Roundup PowerMAX	22 fl oz/a	PRE	0 b	3 bc	56 a	14.8 bc	892 bcd
Sharpen	0.75 fl oz/a	PRE					
Pursuit	2 fl oz/a	PRE					
Methylated Seed Oil	16 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
7 Roundup PowerMAX	22 fl oz/a	PRE	0 b	0 c	57 a	16.1 abc	977 abc
Sharpen	0.75 fl oz/a	PRE					
Prowl H2O	1.054 fl oz/a	PRE					
Methylated Seed Oil	16 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
8 Roundup PowerMAX	22 fl oz/a	PRE	0 b	0 c	54 a	17.1 ab	1040 a
Bas 85800H	3 fl oz/a	PRE					
Methylated Seed Oil	16 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
9 Roundup PowerMAX	22 fl oz/a	PRE	0 b	0 c	56 a	17.6 a	1067 a
Bas 85800H	4.5 fl oz/a	PRE					
Methylated Seed Oil	16 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
10 Roundup PowerMAX	22 fl oz/a	PRE	6 a	14 a	56 a	14.7 bc	860 cd
Prowl H2O	32 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
11 Roundup PowerMAX	22 fl oz/a	PREPLA	0 b	5 b	56 a	17.6 a	1062 a
Prowl H2O	32 fl oz/a	PREPLA					
Ammonium Sulfate	5.67 lb/100 gal	PREPLA					
12 Roundup PowerMAX	22 fl oz/a	PRE	0 b	0 c	57 a	17.4 a	1038 ab
Outlook	14 fl oz/a	PRE					
Ammonium Sulfate	5.67 lb/100 gal	PRE					
13 Untreated Check			0 b	0 c		0.9 d	56 e
LSD P=.10			1.7	4.2	NS	2.4	149
Standard Deviation			1.4	3.5	9.0	2.01	124
CV			269	205	16.6	13.53	13.95
Treatment F			4.821	4.847	1.396	18.714	17.791
Treatment Prob(F)			0.0001	0.0001	0.2311	0.0001	0.0001

## Safflower Tolerance and Weed Control Efficacy with PRE Herbicides

Caleb Dalley, HREC, Hettinger, ND, 2016

Safflower was planted into no-till wheat stubble on May 4, 2016 using a John Deere 1590 no-till drill. At planting 40 lbs/A of starter fertilizer (18-46-0) was added to the planting drill. Prior to seeding, urea fertilizer (46-0-0) was broadcast applied at a rate of 75 lbs/A. Herbicide treatments were applied on May 5, the day after planting, using a tractor-mounted research sprayer at a 10 gal/A spray volume using flat fan nozzles and compressed CO<sub>2</sub> as a propellant. Glyphosate (Roundup PowerMAX) was tank-mixed with all herbicide treatments (22 oz/A) plus AMS (5.8 lb/100 gal). The month after planting was dryer than average with just over one inch of rainfall, most of which occurred in small increments with only one rainfall greater than 0.15 inches when 0.46 inches of rain fell on May 30, at 26 days after planting. The small amounts of rain resulted in poor PRE weed control and also resulted in reduced stand of safflower. Dry conditions continued through the summer months, with 1.04, 0.87, 1.5, 1.71 inches of rainfall in May, June, July, and August, respectively, which was less than half of average rainfall for these months. Low rainfall reduced safflower growth and ultimately seed yield.

At planting, weeds present included prickly lettuce, tumble mustard, and downy brome. All were effectively controlled with herbicide treatments applied after planting. Safflower tolerance to herbicide treatments was evaluated at 20, 27, and 39 days after treatment. The only herbicide treatments that caused significant injury were ones containing sulfentrazone. Injury with these treatments included yellow or chlorotic spotting of younger leaves. PRE control of wild buckwheat and wild oat were evaluated 39 days after treatment and were poor due to lack of incorporation of herbicides at planting due to low rainfall. Safflower was harvested on September 6 using a Kincaid plot harvester. Yield was reduced comparing safflower treated with Zidua at 2 oz/A compared with Spartan Charge. All other herbicide treatments were similar in yield. Yield in the untreated control was reduced 85% compared with the hand weeded control. This year's trial would suggest that Zidua is safe for application in safflower. Outlook also appeared to be safe for PRE application to safflower at both rates tested. However, due to the lower than average rainfall for 2016, further evaluations are needed to confirm the safety of these herbicide in safflower. There was a slight reduction in yield and some visual injury observed for Spartan Charge (carfentrazone + sulfentrazone), however, yield was not less than the hand-weeded control.

Treatment	Rate	Safflower injury			Test wt	Yield
		7 DAE	14 DAE	26 DAE		
		%			-lbs/bu-	-lbs/A-
1 Prowl H2O	32 oz/A	0 b	2 bcd	0 b	41 bc	1207 ab
2 Zidua	2 oz/A	0 b	2 bc	0 b	42 ab	1341 a
3 Zidua SC	3.25 oz/A	1 ab	3 abc	0 b	41 bc	1219 ab
4 Zidua SC	7 oz/A	1 ab	1 bcd	0 b	41 bc	1280 ab
5 Zidua SC	10.6 oz/A	3 a	1 bcd	5 b	42 abc	1185 ab
6 Outlook	10 oz/A	0 b	1 cd	0 b	42 ab	1330 ab
7 Outlook	20 oz/A	0 b	0 d	0 b	43 a	1336 ab
8 Spartan	3.5 oz/A	2 a	9 a	5 b	41 bc	1190 ab
9 Spartan Charge	4.4 oz/A	2 a	4 ab	16 a	40 c	1004 b
10 Check (Weed Free)		0 b	0 d	0 b	41 bc	1111 ab
11 Untreated		0 b	0 d	0 b	12 d	170 c
LSD P=.10		2.2	6.8	6.8	1.3	336
Standard Deviation		0.3	0.4	5.6	1.1	280
CV		189	103.7	234.8	46.79	24.9
Treatment F		1.915	2.968	3.203	271.6	5.654
Treatment Prob(F)		0.0841	0.0107	0.0082	0.0001	0.0001

## Flax Tolerance to Pre and Postemergence application of the Herbicide Pyroxasulfone

Caleb Dalley, HREC, Hettinger, ND, 2016

A field trial was conducted to evaluate flax tolerance to the herbicide pyroxasulfone. Flax was planted at a rate of 30 lb/A on May 5, 2016 using a John Deere 1590 no-till drill at a depth of 1.5 inches into wheat stubble. Starter fertilizer (18-46-0) was applied at a rate of 40 lbs/A at planting. Prior to planting, urea was broadcast applied at a rate of 100 lbs/A (46 lbs N). Preemergence treatments were applied on the same day of planting using a tractor mounted research sprayer at a volume of 10 gal/A using compressed CO<sub>2</sub> as a propellant. Glyphosate was applied (0.75 lbs ae/A) across all treatments except the untreated control to control emerged weeds. Flax emergence occurred on May 16. Postemergence applications were made on June 6 (21 days after flax emergence) using the same methods previously described. Flax was harvested on August 1 using a Kincaid research plot combine with a 5 foot header. Injury was evaluated 7, 16, and 36 days after flax emergence (DAE). Injury was slight to none and was not significant during any of the evaluations taken and flax height was not reduced by any of the herbicide treatments when measure 36 DAE. Lack of rainfall following planting reduced exposure of the flax to the PRE herbicides applied and may not be representative of what would be expected during a year with average or above average rainfall. PRE burndown with glyphosate was effective at controlling weeds present. Few annual weeds emerged following the burndown, likely because of the dry conditions, and no evaluation for weed control could be taken. Flax yields were reduced only in the untreated plots, which were heavily infested with downy brome and tumble mustard. Yields were low due to the dry conditions at Hettinger this year. Additional trials should be conducted to further evaluate safety of pyroxasulfone in flax to increase confidence in crop safety.

Treatment	Rate	Flax injury			Flax Height	Test wt Aug 10	Yield Aug 10
		7 DAE	16 DAE	36 DAE			
		%			-cm-	-lbs/bu-	-lbs/A-
1 Pyroxasulfone	1.48 oz/a	1 bc	0 a	0 a	36.0 a	56 a	766.8 a
2 Pyroxasulfone	2.1 oz/a	0 c	0 a	0 a	34.9 a	55 a	805.1 a
3 Pyroxasulfone	3.45 oz/a	4 ab	0 a	0 a	34.9 a	55 a	667.7 ab
4 Spartan Pyroxasulfone	6 oz/a 1.03 oz/a	4 abc	0 a	0 a	35.3 a	56 a	687.5 ab
5 Spartan Pyroxasulfone	6 oz/a 1.64 oz/a	4 ab	0 a	2 a	35.2 a	54 a	599.1 ab
6 Spartan Pyroxasulfone	6 oz/a 2.05 oz/a	6 a	0 a	4 a	32.5 a	56 a	522.9 b
7 Spartan Section 2 EC	6 oz/a 8.04 oz/a	3 abc	0 a	1 a	33.4 a	55 a	693.1 ab
8 Untreated check		0 c	0 a	0 a	30.1 a	55 a	249.7 c
9 Hand weeded check		0 c	0 a	0 a	33.7 a	56 a	660.2 ab
LSD P=.10		3.5	NS	NS	3.53	NS	240
Standard Deviation		2.9	0.0	0.0	2.92	1.2	199
CV		120	0.0	0.0	8.59	2.12	31.6
Treatment F		2.282	0.000	0.000	1.561	0.786	2.738
Treatment Prob(F)		0.0565	1.000	1.000	0.0001	0.6251	0.0267



## Nitrogen Management Options for Soybean

Ryan Buetow, DREC, Dickinson, ND, 2016

A field trial was conducted to observe the effects of four N treatments grown with the university recommended population of 150,000 plants per acre at locations in Dickinson and north of Glen Ullin. The cultivar chosen was Integra 20300 as it had done well in previous variety trials in the region. Plots were planted in Dickinson on May 18<sup>th</sup> and in Glen Ullin May 20<sup>th</sup>. Five plants per plot were excavated on August 9<sup>th</sup> to observe average nodules per plant. Combined across locations addition of granular inoculant increased the number of nodules and increased yield as expected.

Treatment	Average Root Nodules Per Plant
Control	0.3 bc
No Inoculant + 30 lbs N	0.2 c
Inoculant	2.5 ab
Inoculant + 30 lbs N	3.9 a

LSD 0.05

Treatment	Yield
Control	22.1b
No Inoculant + 30 lbs N	23.2b
Inoculant	29.3a
Inoculant + 30 lbs N	29.4a

LSD 0.05

## Observing Effects of Rotation, Nitrogen, and Fungicide on Fungal Leaf Disease of Wheat

Ryan Buetow, DREC, Dickinson, ND, 2016

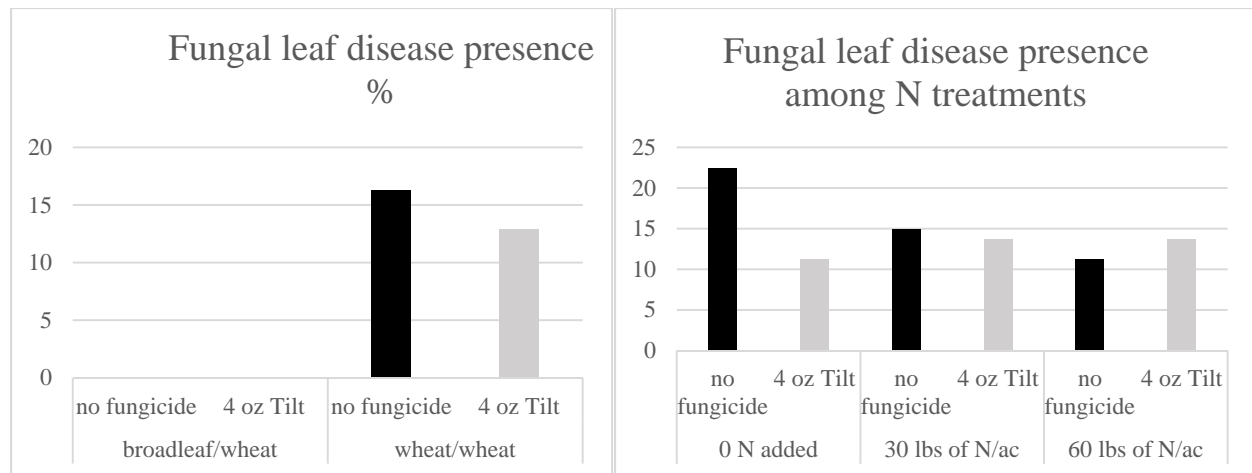
A field trial was conducted over the 2016 growing season in cooperation with producer Ryan Kadrmas. The plots were located north of Dickinson, ND near the Stark/Dunn county line. There were two fields representing two rotations. One field was spring wheat following sunflower and the other was winter wheat following spring wheat. The variety of spring wheat planted was LCS Nitro at a seeding rate of 115 lbs/acre at 13,000 seeds/lb. The spring wheat was planted March 21<sup>st</sup> 2016. The variety of winter wheat planted was LCS T158 planted at 90 lbs/acre at 12,000 seeds/lb. Winter wheat was planted September 18<sup>th</sup> 2015.

The spring wheat and winter wheat were fertilized on May 6<sup>th</sup>. There were 3 fertilizer treatments. 0 lbs of additional N, 30 lbs of additional N through urea, and 60 lbs of additional N through urea. The winter wheat was sprayed with fungicide on May 9<sup>th</sup> with a rate of 4 oz of Tilt fungicide and the spring wheat was sprayed on June 27<sup>th</sup>.

Measurements were taken throughout the growing season on disease incidence, height, and postharvest measurements such as grain yield and protein. A reading was taken on greenness of the plots to measure the normalized difference vegetation index (NDVI).

Winter wheat was harvested July 21<sup>st</sup> and the spring wheat was harvested August 11<sup>th</sup>. Grain samples were sent to Southwest Grain elevator in Dickinson, ND for protein analysis.

Although no statistical differences were observed among the treatments, with few exceptions, fungicide-treated plots had lower levels of fungal leaf diseases than non-treated plots. Both site locations experienced below-normal rain fall totals, yet disease levels were not observed in the wheat on sunflower research site. This helps portray the importance of crop rotation in managing wheat diseases in southwest ND.



NDSU Hettinger Research Extension Center

Soybean - Planting Date - 2016								Hettinger, ND
Treatment	Flower Date	Mature Date	Harvest Date	Plant Height	Test Weight	Seed Oil	Seed Protein	Grain Yield
				inches	lbs/bu	%	%	bu/ac
<b>Planting Date</b>								
May 4	6/28	9/5	9/12	23	51.1	17.4	33.0	24.7
May 19	7/5	9/13	9/19	25	50.5	17.5	32.9	31.7
June 2	7/13	9/18	9/25	24	48.2	17.3	32.6	25.9
LSD 5%	0	1	0	1	0.4	NS	NS	1.2
<b>Variety</b>								
Ashtabula (0.4)	7/1	9/7	9/19	24	50.2	18.1	32.2	23.9
Proseed 50-60 (0.6)	7/6	9/12	9/19	23	50.3	17.1	32.6	28.7
Proseed 30-80 (0.8)	7/6	9/15	9/19	24	49.1	17.5	32.1	28.2
ProSoy (0.8)	7/6	9/13	9/19	25	50.1	16.8	34.4	29.0
LSD 5%	0	1	NS	1	0.5	0.2	0.4	1.4
<b>Population</b>								
80,000	7/5	9/12	9/19	24	49.8	17.4	32.8	27.1
120,000	7/5	9/12	9/19	24	50.3	17.4	32.7	27.6
160,000	7/5	9/12	9/19	24	50.1	17.3	33.0	28.0
200,000	7/5	9/12	9/19	24	49.7	17.4	32.8	27.0
LSD 5%	NS	NS	NS	NS	0.5	NS	NS	NS
<b>Date x Variety</b>								
May 4 - Ashtabula	6/23	8/30	9/12	22	51.7	18.3	31.9	19.4
May 4 - Proseed 50-60	6/29	9/5	9/12	22	51.6	17.0	33.0	27.2
May 4 - Proseed 30-80	6/29	9/11	9/12	24	49.7	17.4	32.8	27.7
May 4 - ProSoy	6/29	9/6	9/12	24	51.5	16.8	34.3	24.3
May 19 - Ashtabula	7/1	9/8	9/19	25	50.5	18.1	32.4	29.1
May 19 - Proseed 50-60	7/6	9/13	9/19	23	51.6	17.4	32.5	32.0
May 19 - Proseed 30-80	7/6	9/15	9/19	23	50.0	17.8	31.9	30.0
May 19 - ProSoy	7/5	9/15	9/19	28	50.1	16.8	34.7	35.8
June 2 - Ashtabula	7/10	9/14	9/25	23	48.6	18.0	32.2	23.2
June 2 - Proseed 50-60	7/14	9/18	9/25	24	47.8	17.0	32.4	26.7
June 2 - Proseed 30-80	7/14	9/20	9/25	24	47.6	17.5	31.7	26.8
June 2 - ProSoy	7/13	9/18	9/25	25	48.8	16.7	34.1	26.9
LSD 5%	0	1/2	0	NS	0.8	NS	NS	2.5
Trial Mean	7/5	9/12	9/19	24	50.0	17.4	32.8	27.4
C.V. %	--	0.1	--	8.9	2.2	3.3	3.2	13.0

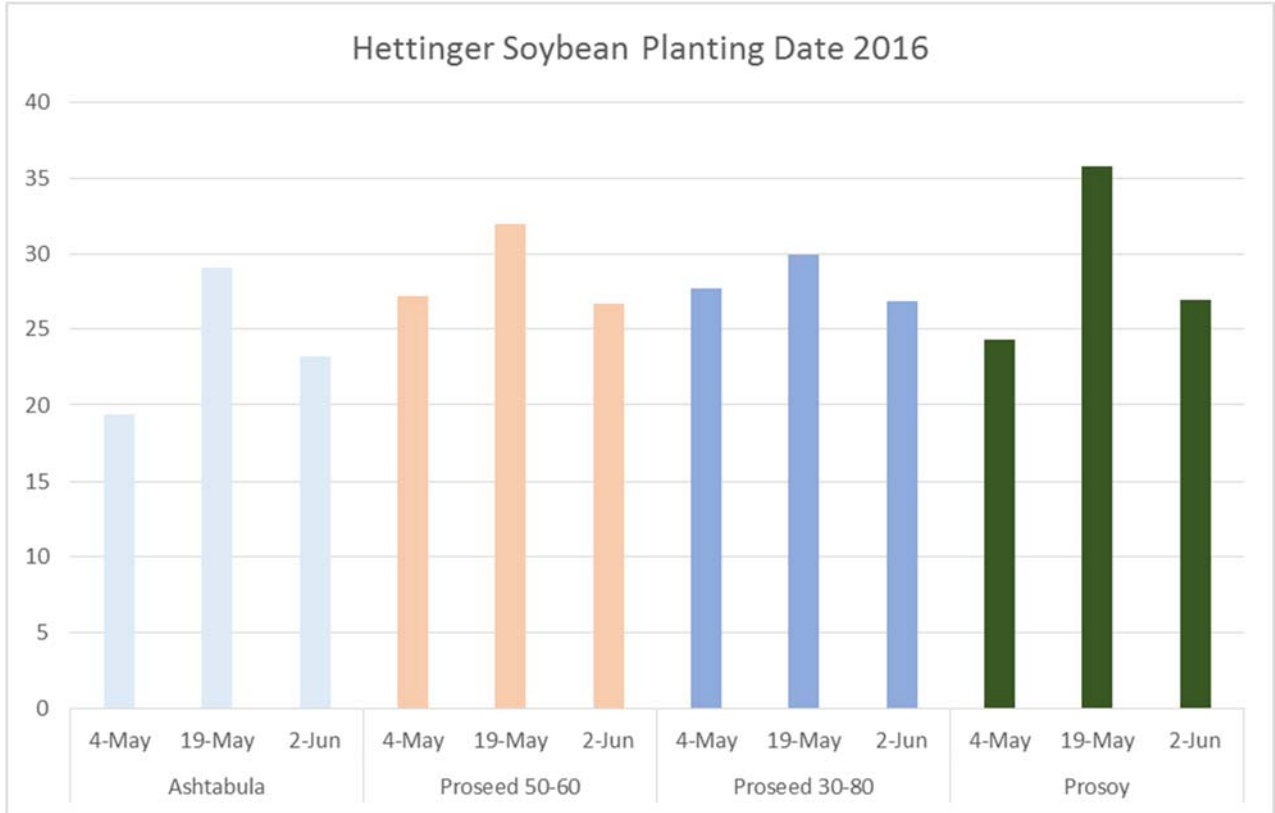
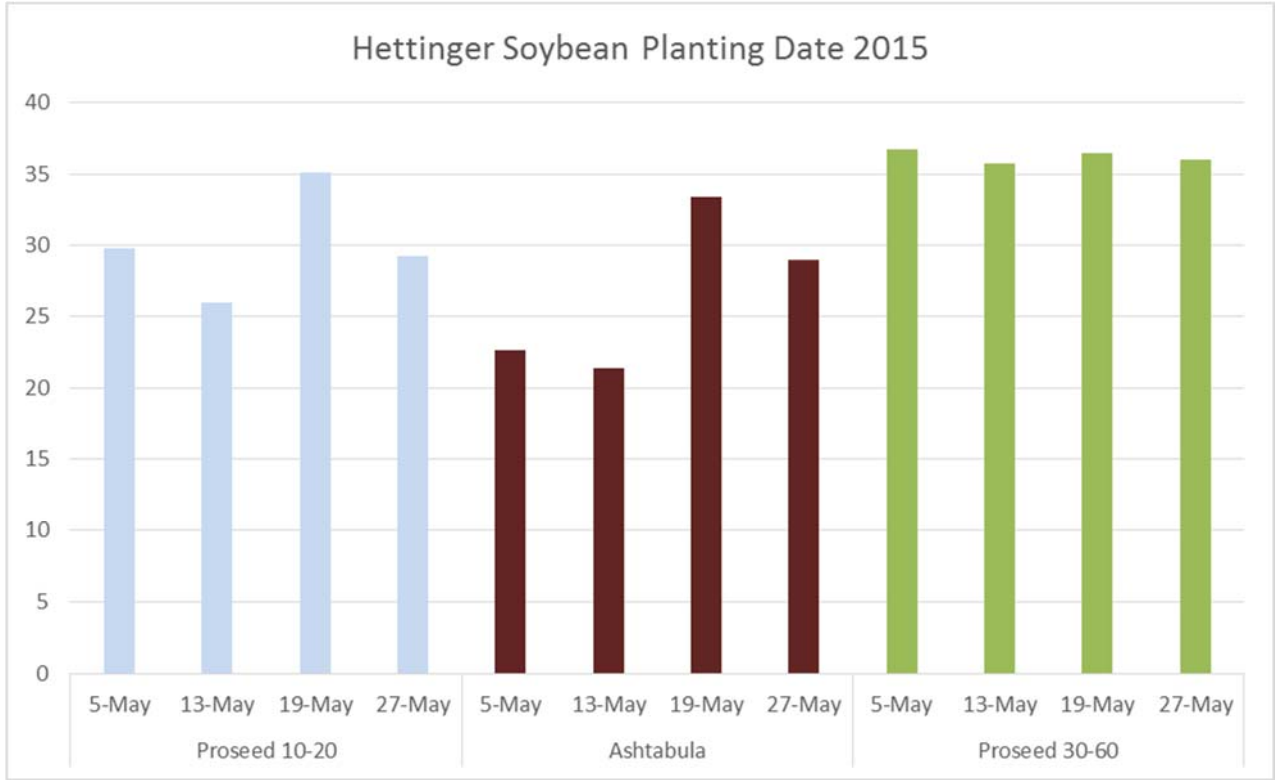
**Analysis of Variance**

Source	DF	Anova SS	MS	F Value	Pr > F
Rep	3	485.02	161.67	12.64	<.0001
Date	2	1808.76	904.38	70.72	<.0001
Variety	3	819.56	273.19	21.36	<.0001
Date*Variety	6	464.10	77.35	6.05	<.0001
Population	3	33.07	11.02	0.86	0.4625
Date*Population	6	64.41	10.74	0.84	0.5414
Variety*Population	9	73.26	8.14	0.64	0.7643
Date*Variety*Population	18	138.50	7.69	0.60	0.8936

NDSU Hettinger Research Extension Center

**Soybean - Planting Date - 2015** **Hettinger, ND**

Treatment	Flower Date	Mature Date	Harvest Date	Plant Height inches	Test Weight lbs/bu	Seed Oil %	Seed Protein %	Grain Yield bu/ac
<b>Planting Date</b>								
5/5	7/10	9/4	9/12	31	54.7	16.8	33.2	29.7
5/13	7/10	9/8	9/12	27	55.5	16.6	33.2	27.7
5/19	7/11	9/10	9/16	26	55.6	16.7	33.3	35.0
5/27	7/12	9/14	9/24	26	55.4	16.6	33.4	31.4
LSD 5%	0.5	2.0	2.0	1.1	0.4	NS	NS	1.2
<b>Variety</b>								
Proseed 10-20 (0.2)	7/11	9/6	9/15	28	55.3	16.0	33.2	30.0
Ashtabula (0.4)	7/11	9/8	9/15	29	55.2	17.5	32.8	26.6
Proseed 30-60 (0.6)	7/11	9/12	9/18	26	55.5	16.5	33.7	36.2
LSD 5%	0.4	0.0	2.0	0.9	NS	0.1	0.2	1.0
<b>Date X Variety</b>								
5/5 - Proseed 10-20	7/10	9/1	9/10	32	54.0	16.3	33.1	29.8
5/5 - Ashtabula	7/10	9/3	9/10	32	55.0	17.5	32.7	22.6
5/5 - Proseed 30-60	7/10	9/8	9/16	28	55.2	16.6	33.7	36.7
5/13 - Proseed 10-20	7/10	9/5	9/10	28	55.6	15.8	33.1	25.9
5/13 - Ashtabula	7/11	9/7	9/10	29	55.4	17.4	32.9	21.4
5/13 - Proseed 30-60	7/11	9/11	9/16	24	55.7	16.5	33.5	35.7
5/19 - Proseed 10-20	7/11	9/7	9/16	26	55.4	16.0	33.3	35.1
5/19 - Ashtabula	7/11	9/9	9/16	27	55.3	17.6	32.8	33.4
5/19 - Proseed 30-60	7/12	9/13	9/16	25	56.0	16.6	33.8	36.4
5/27 - Proseed 10-20	7/12	9/11	9/24	26	56.3	16.0	33.4	29.3
5/27 - Ashtabula	7/12	9/13	9/24	28	55.0	17.4	32.9	29.0
5/27 - Proseed 30-60	7/13	9/17	9/24	26	54.9	16.3	33.8	36.0
	NS	--	--	NS	***	NS	NS	***
Trial Mean	7/11	9/9	9/16	27	55.3	16.7	33.3	30.9
C.V. %	0.0	0.0	0.0	4.8	0.9	1.3	1.0	4.1



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