

NDSU NORTH DAKOTA AGRICULTURAL
EXPERIMENT STATION

Thirtieth Annual Western Dakota Crops Day Research Report 2013



Hettinger Research Extension Center

www.ag.ndsu.edu/HettingerREC/

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30th Annual Western Dakota Crops Day

December 19, 2013

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 Preview of upcoming revision of N recommendations for corn and N transformations under wet soil conditions.

Dr. Dave Franzen, NDSU Extension Soil Specialist, Fargo.

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

Dr. Pat Carr, Research Agronomist, NDSU Dickinson Research Extension Center.
Roger Ashley, NDSU Extension Agronomist, Dickinson.

12:00 Lunch

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

1:00 Ag Industry Update

1:30 Crop Variety Updates and Highlights of Ongoing Crop Production Research (cont.)

Dr. Chris Graham, Extension Agronomist, SDSU West River Ag Center, Rapid City.
John Rickertsen, Research Agronomist, NDSU Hettinger Research Extension Center.

2:30 Where do we go from here? 2013-14 Crop Outlook.

Dr. Frayne Olson, NDSU Crops Economist & Market Specialist, Fargo.

3:15 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.

2013 Western Dakota Crops Day Sponsors

Hettinger Area Chamber of Commerce
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Helena Chemical Company
North Dakota Soybean Council
Nuseed
Proseed
United Grain Corporation
Wheat Growers

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

Dr. Pat Carr and Glenn Martin, Dickinson Research Extension Center
Roger Ashley, Dickinson Research Extension Center
Dr. Chris Graham and Bruce Swan, SDSU West River Ag Center, Rapid City
Dr. Joel Ransom, NDSU, Fargo
Jan Sprecher, New Leipzig
Neal and Justin Freitag, Scranton
August and Perry Kirschmann, Regent
Butch Jochim, Selfridge
Dan Christman, Hettinger
USDA – ARS Northern Great Plains Research Center, Mandan
Lennis Erikson, Ralph, SD
Duane Shea, Bison SD
Chris and Jonas Lynch, McLaughlin, SD
Keith Gietzen, Glen Ullin
Pat Doll, Hannover

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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 2013 Hettinger HRSW variety trial was 5.6 meaning that there was a 5.6 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 16. 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 10%) value at the bottom of each data column. The LSD 10% 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 SY Soren averaged 72.2 bu/a in 2013 compared to Elgin-ND at 66.7 bu/a. Did the yield difference between these varieties differ significantly? Compare the yield difference of 5.5 bu/a between the varieties (72.2 - 66.7) to the LSD value of 4.3 bu/a. Since the 5.5 bu/a difference is more than the LSD value of 4.3 bu/a, the varieties do differ significantly in yield. If the difference between these two varieties would have been 3.5 bu/a, their difference would have been less than 4.3 bu/a; 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

	28°F	32°F	Normal 32°F
Date of Last Frost	May 11	May 11	May 18
Date of First Frost	October 5	October 4	September 20
Frost Free Days	147	146	125

Precipitation (inches)

Month	2008-09	2009-10	2010-11	2011-12	2012-13	58 Year Average
October	2.4	2.3	0.4	0.8	0.7	1.1
November	2.6	0.0	0.6	0.0	0.1	0.5
December	0.6	2.0	0.6	0.2	0.5	0.3
January	0.3	0.3	1.1	0.4	0.2	0.4
February	1.8	0.2	1.0	0.5	0.2	0.4
March	3.1	0.7	0.7	0.2	0.2	0.7
April	1.1	1.8	2.3	3.0	0.2	1.6
May	1.4	3.7	4.6	2.2	7.9	2.6
June	3.5	2.9	3.4	2.4	3.7	3.3
July	2.2	3.7	1.9	3.9	2.0	2.0
August	3.5	2.4	2.3	2.2	1.8	1.7
September	0.4	3.2	0.4	0.0	3.4	1.4
April-Sept.	12.1	17.8	14.8	13.7	19.0	12.7
Total	22.8	23.2	19.2	15.7	20.7	16.2

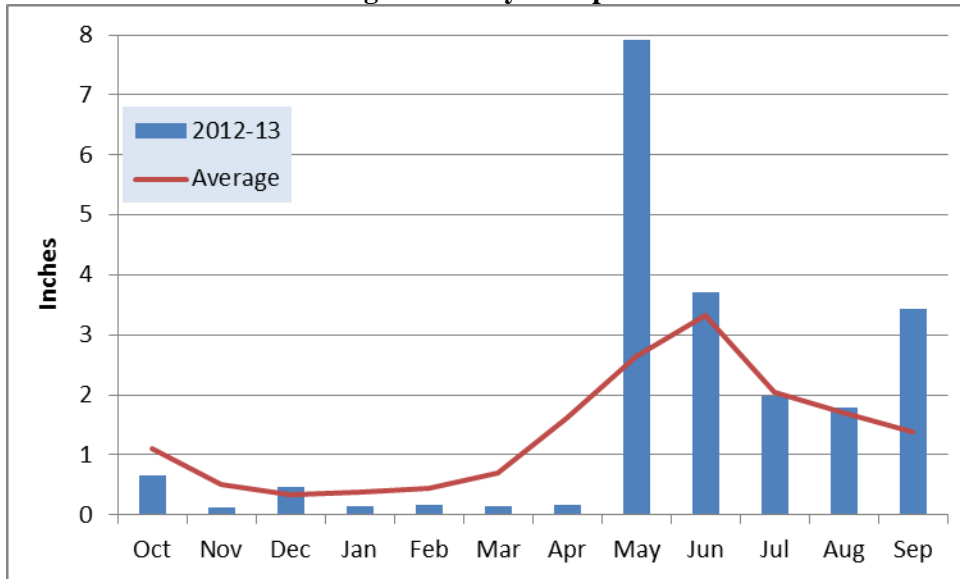
Air Temperature (°F)

Month	2008-09	2009-10	2010-11	2011-12	2012-13	58 Year Average
October	44.9	36.8	48.5	48.2	42.1	45.6
November	32.0	36.9	28.0	30.9	32.4	30.0
December	11.2	9.5	13.4	23.9	18.5	19.7
January	14.8	13.6	12.7	24.2	18.3	15.2
February	18.8	11.7	14.7	21.8	26.7	20.0
March	22.4	31.2	22.8	44.4	27.4	28.8
April	38.2	44.8	39.4	46.9	35.5	42.6
May	52.0	50.0	50.2	53.6	53.5	53.7
June	58.8	62.0	62.0	66.5	61.7	63.1
July	64.6	67.6	71.3	75.2	68.1	70.1
August	63.0	68.6	65.3	67.8	69.5	68.7
September	62.6	56.3	56.9	59.4	62.5	57.8
Average	40.3	40.7	40.4	46.9	43.0	42.9

Corn Growing Degree Days (GDD)

Month	2009	2010	2011	2012	2013	41 Year Average
May	265	210	161	266	266	260
June	344	393	358	498	381	418
July	458	536	631	688	543	586
August	461	547	555	504	553	537
September	421	278	347	411	403	320
Total	2006	2032	2052	2367	2146	2121

Hettinger Monthly Precipitation



Hettinger Average Monthly Temperature

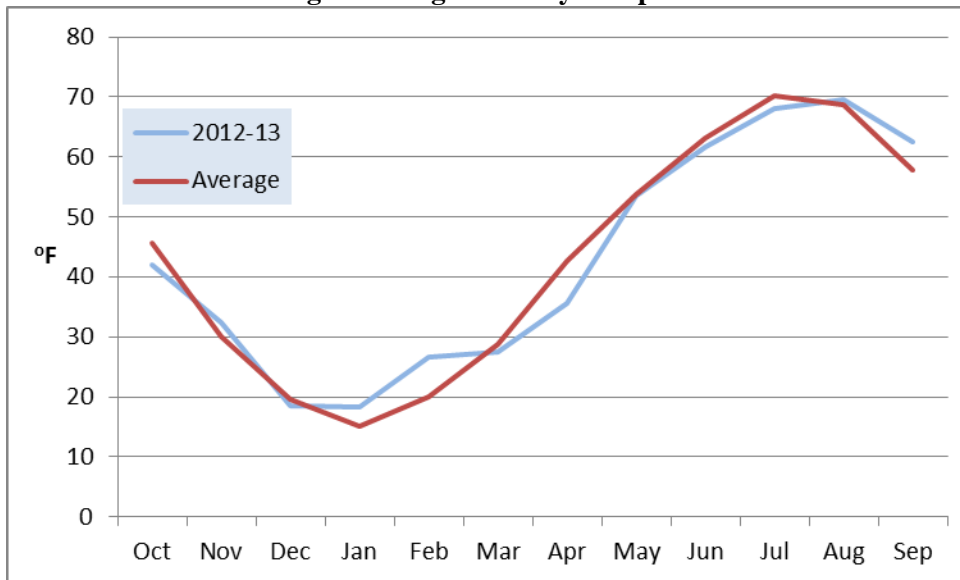


Table . 2013 Weather Summary for the Dickinson Research Extension Center, Dickinson, ND.

Month	-----Maximum temp.-----		-----Minimum temp.-----		-----Precipitation -----		-----Small grains GDD ¹ ----		-----Corn GDD ² -----	
	Long-term	Current	Long-term	Current	Long-term	Current	Long-term	Current	Long-term	Current
	1897 - 2012	year ³	1897 - 2012	year ³	1897 - 2012	year ³	1897 - 2012	year	1897 - 2012	year
November - 12	40.0	42.7	16.9	18.4	0.50	0.34				
December - 12	27.8	26.4	5.7	16.1	0.42	1.21				
January	23.1	25.4	0.2	7.1	0.50	0.07				
February	27.1	33.9	3.9	16.8	0.41	0.08				
March	38.1	36.3	15.1	15.0	0.74	0.20				
April	54.7	45.4	28.4	24.0	1.32	0.83	341	223	252	259
May	66.1	65.9	39.2	42.3	2.34	8.89	644	703	382	384
June	75.0	72.8	49.0	51.0	3.55	1.90	900	897	588	561
July	83.5	80.6	54.3	55.8	2.20	1.14	1146	1123	532	598
August	82.4	82.9	51.7	57.8	1.72	1.68	1087	1189	321	428
September	71.4	75.7	41.2	50.9	1.37	3.68	730	938		
October	57.6	51.8	30.1	31.1	0.96	4.74				
Mean	53.9	53.3	28.0	32.2						
Total					16.04	24.76	4849	5071	2076	2228
April -October Total					13.46	22.86				

¹ Small grains GDD, are growing degree days for wheat and barley, calculated by averaging the high and low temperatures for the day adjusted to fall within the range of 32°F and 95°F and then subtracting the lower base temperature, 32°F.

² Corn GDD, are growing degree days for corn, calculated by averaging the high and low temperatures for the day adjusted to fall within the range of 50°F and 86°F and then subtracting the lower base temperature, 50°F.

³ Current precipitation and long-term precipitation values since 2010, Nov - Mar courtesy of Gary Ottmar, DRE Ranch, Manning, precipitation values April - October provided by North Dakota Agricultural Weather Network. Temperature values since 2010 are generated by the North Dakota Weather Network (NDAWN) station at Dickinson.

Data compiled by Roger Ashley, Area Extension Agronomist, Sheri Schneider, Information Processing Specialist.

Table 1. North Dakota hard red spring wheat variety descriptions, agronomic traits, 2013.

Variety	Agent or Origin ¹	Year Released	Height (inches)	Straw Strength ²	Days to Head ³	Reaction to Disease ⁴			
						Stem Rust	Leaf Rust	Leaf Spot ⁵	Head Scab
Advance	SD	2012	32	6	64	MR	MR	NA	MS
Agawam ⁶	WestBred	2008	30	7	58	NA	MR/MS	NA	MS
Alpine ⁷	AgriPro	2008	34	6	62	NA	S	MS	MS
Alsen	ND	2000	34	3	63	R	MR/MS	S	MR
Barlow	ND	2009	35	6	62	R	MR/MS ⁹	MR	M
Blade	WestBred/Sabre	2007	33	4	64	R	MS ⁹	MS	M
Breaker	WestBred	2007	34	3	64	R	MR/MS ⁹	MS	M
Brennan	AgriPro	2009	30	4	62	R	MR	M	MS
Brick	SD	2009	35	5	60	R/MR	MR/MS	MS/S	MR
Briggs	SD	2002	35	7	61	R/MR	MR/MS	MS	S
Edge	WestBred/Sabre	2008	33	5	62	NA	S	MS	MS
Elgin-ND	ND	2012	36	5	65	R	M ⁹	NA	M
Faller	ND	2007	35	5	65	R	S ⁹	MR	M
Forefront	SD	2012	37	5	61	MR	MR	NA	MR
Glenn	ND	2005	37	4	61	R	MR/MS ⁹	M	MR
Howard	ND	2006	36	7	63	R	R	M	M
Jenna	AgriPro	2009	32	4	66	R	MR/MS	M	M
Kelby	AgriPro	2006	30	4	62	MR	MR/MS ⁹	M	M
Kuntz	AgriPro	2007	31	4	65	R	MS ⁹	MS	M
LCS Albany	Limagrain	2008	32	5	67	MR	S	MS	M
LCS Breakaway	Limagrain	2011	32	5	63	NA	R	MS	M
LCS Powerplay	Limagrain	2011	33	5	65	NA	MR	MS	M
Linkert	MN	2013	31	2	63	R	MR	NA	M
Mott ⁶	ND	2009	36	3	66	MR	S ⁹	MS	MS
MS Stingray	Limagrain	2013	35	NA	67	NA	MS	NA	NA
ND901CL Plus ⁸	ND	2010	36	4	60	R/MR	MR	NA	M
Norden	MN	2012	32	3	6	R	R/MR	M	M
Pivot	WestBred	2010	27	3	67	MS	S ⁹	MR	S
Prosper	ND	2011	35	5	65	R	S ⁹	M	M
RB07	MN	2007	32	5	62	R	R/MR ⁹	MS	MR
Rollag	MN	2011	32	3	63	R	MS	MR	MR
Sabin	MN	2009	33	6	65	R	MR	MS	M
Samson	WestBred	2007	31	2	63	R	MR/MS	MS	S
Select	SD	2010	35	6	60	R/MR	R/MR	R/MR	MR
Steele-ND	ND	2004	35	7	63	R	R	MS	M
SY Rowyn	Syngenta/AgriPro	2013	31	4	63	R	MR	M	M
SY Soren	Syngenta/AgriPro	2011	30	4	63	R	MR	M	M
SY Tyra ⁶	Syngenta/AgriPro	2011	31	5	62	R	MR	NA	S
SY605 CL ⁸	AgriPro	2009	34	7	62	R/MR	MR/MS	MS	S
Vantage	WestBred	2007	32	2	67	MR	MR/MS	MS	MS
Velva	ND	2011	35	4	63	R	MR/MS ⁹	M	MS
WB Digger	WestBred	2009	34	6	63	MR	MR/MS	NA	MS
WB Gunnison	WestBred	2013	31	NA	65	NA	MS	MS	MS
WB Mayville	Monsanto/WB	2011	30	4	63	R	MR/MS	MS	S

¹Refers 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. NA indicates insufficient information is available to make an accurate assessment.

²Straw 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.

³Days to Head = the number of days from planting to head emergence from the boot averaged from several locations in 2010 and 2011.

⁴R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible.

⁵Leaf spot refers to the leaf fungal diseases such as tan spot and septoria. It does not include bacterial leaf streak.

⁶Solid stemmed or semisolid stem, imparting resistance to sawfly.

⁷Hard white wheat.

⁸CL = refers to a Clearfield variety, with tolerance to the Beyond family of herbicides.

⁹These lines were resistant to moderately resistant to races prevalent prior to 2011 and show some level of susceptibility to a new race of the pathogen that was detected at low frequency in 2012.

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat	Hettinger, ND
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Variety	Days to	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	Protein	2011	2012	2013	2 yr	3 yr
	*	inches	0-9**	lbs/bu	%	----- Bushels per acre -----				
SY 605CL	67	36	0	63.1	16.2	51.7	80.3	71.8	76.1	67.9
SY Soren	69	32	0	63.0	15.7	48.8	82.2	72.2	77.2	67.7
Samson	69	31	0	61.2	15.0	53.2	79.2	70.4	74.8	67.6
Advance	69	33	4	63.0	14.4	49.0	84.9	67.8	76.4	67.2
Brennan	67	30	1	63.2	16.0	49.9	79.9	69.8	74.8	66.5
WB-Digger	69	37	1	61.8	15.2	38.6	83.5	75.8	79.6	66.0
Velva	70	37	0	59.1	15.8	49.0	79.1	68.0	73.6	65.4
Sabin	70	35	2	62.6	15.9	47.5	82.7	65.4	74.1	65.2
Elgin-ND	71	40	0	61.5	16.2	50.1	77.0	66.7	71.8	64.6
Breaker	70	36	0	61.3	15.4	44.2	76.2	69.0	72.6	63.1
Howard	68	37	1	62.3	15.7	46.1	73.0	69.9	71.4	63.0
Jenna	72	34	0	61.4	15.3	48.9	72.0	67.7	69.8	62.9
SY Tyra	72	30	0	61.8	14.3	39.0	82.5	66.0	74.3	62.5
Forefront	67	39	1	62.8	15.9	46.0	75.7	64.9	70.3	62.2
Linkert	70	30	0	62.4	16.8	45.0	80.4	61.0	70.7	62.1
Norden	69	33	0	62.8	15.3	43.4	76.5	65.8	71.2	61.9
Barlow	68	37	0	62.2	16.1	45.5	71.5	68.2	69.8	61.7
Select	66	36	0	63.6	15.2	44.7	73.1	66.0	69.6	61.3
WB-Mayville	68	30	0	61.4	16.0	41.6	76.6	62.6	69.6	60.3
Prosper	70	36	0	61.3	14.9	40.0	76.6	63.0	69.8	59.9
Rollag	68	32	0	63.0	16.4	35.2	80.4	63.9	72.2	59.8
Steele-ND	70	36	1	61.6	15.2	38.6	72.2	67.3	69.7	59.4
RB07	67	33	0	61.9	16.0	35.8	79.5	62.7	71.1	59.3
Mott	72	39	0	60.6	16.2	39.3	73.2	65.0	69.1	59.2
Glenn	67	37	0	63.1	17.2	39.5	71.4	60.2	65.8	57.0
Vantage	74	34	0	60.8	17.8	37.8	67.6	60.0	63.8	55.1
ND 901 CL Plus	68	36	0	61.7	17.4	38.9	69.0	55.7	62.4	54.5
Faller	70	35	0	59.7	15.0	38.0	68.8	54.4	61.6	53.7
WB-Gunnison	69	32	1	60.4	14.6	30.3	70.3	51.8	61.1	50.8
SY-Rowyn	69	32	0	62.0	14.8	--	83.7	69.5	76.6	--
LCS Albany	71	35	0	61.5	14.4	--	--	75.7	--	--
MS Stingray	72	36	0	60.4	13.7	--	--	70.9	--	--
LCS Powerplay	70	34	1	62.9	15.0	--	--	69.8	--	--
LCS Breakaway	68	32	0	63.9	15.8	--	--	69.6	--	--
LCS Iguacu	70	34	0	62.8	13.8			69.1		
Trial Mean	69	35	0	62.0	15.7	42.1	75.9	66.1	--	--
C.V. %	1.4	3.0	217.8	0.9	2.5	6.6	4.6	5.6	--	--
LSD 10%	1	1	1	0.6	0.5	3.5	4.1	4.3	--	--

* Days to Head = the number of days from planting to head emergence from the boot.

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

Planting Date: April 23

Harvest Date: August 19

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

Previous Crop: Spring Wheat Green Fallow

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat - 2013	Scranton, ND
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2011	2012	2013	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Advance	29	3	60.8	14.4	--	--	54.3	--	--
Barlow	35	2	59.8	16.3	34.5	48.9	61.9	55.4	48.4
Elgin-ND	34	1	59.3	15.8	--	58.2	61.6	59.9	--
Faller	31	2	58.6	14.7	28.0	41.1	55.1	48.1	41.4
Forefront	33	2	61.6	15.8	--	--	53.3	--	--
Glenn	34	2	61.1	16.2	27.8	50.7	55.2	52.9	44.6
Mott	35	0	60.6	15.9	34.3	43.3	63.7	53.5	47.1
Prosper	32	2	59.3	14.7	28.9	44.0	57.3	50.7	43.4
RB07	31	3	61.7	16.0	33.0	51.3	57.1	54.2	47.1
Sabin	31	3	61.0	15.3	35.5	49.4	53.5	51.4	46.1
Select	34	4	62.7	15.1	29.9	51.2	56.4	53.8	45.8
SY Soren	27	1	61.1	16.3	29.7	53.1	55.7	54.4	46.2
Velva	32	1	56.3	15.8	31.5	50.1	66.4	58.2	49.3
Trial Mean	32	2	60.3	15.6	28.7	49.3	57.8	--	--
C.V. %	3.6	35.7	2.3	1.7	5.2	5.8	8.0	--	--
LSD 10%	1	1	1.6	0.3	1.6	3.4	5.5	--	--

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

Planting Date: April 29

Harvest Date: August 21

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

Previous Crop: Flax

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat - 2013	Regent, ND
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2011	2012	2013	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Advance	31	4	60.6	15.2	--	--	65.1	--	--
Barlow	36	3	60.5	16.6	30.4	51.1	67.4	59.2	49.6
Elgin-ND	37	2	59.6	16.5	--	60.9	73.8	67.3	--
Faller	34	2	59.8	15.4	34.3	43.0	68.3	55.6	48.5
Forefront	40	3	62.2	16.2	--	--	71.8	--	--
Glenn	37	3	63.3	17.1	27.0	53.0	62.5	57.8	47.5
Mott	38	0	60.6	16.9	33.8	45.2	69.9	57.6	49.6
Prosper	34	3	60.1	15.1	30.0	46.0	71.4	58.7	49.1
RB07	33	4	61.1	16.0	35.2	53.6	69.0	61.3	52.6
Sabin	35	4	60.6	16.0	32.7	51.6	70.2	60.9	51.5
Select	35	4	62.2	15.1	35.4	53.5	72.1	62.8	53.7
SY Soren	29	4	60.9	16.7	34.8	55.5	72.6	64.0	54.3
Velva	33	0	58.4	16.8	34.9	52.4	73.3	62.8	53.5
Trial Mean	35	3	60.8	16.1	31.2	51.5	69.8	--	--
C.V. %	3.6	27.0	0.8	1.6	5.4	5.8	5.7	--	--
LSD 10%	1	1	0.6	1.6	1.8	3.5	4.8	--	--

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

Planting Date: April 29

Harvest Date: August 21

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

Previous Crop: Canola

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat - 2013 **New Leipzig, ND**

Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2011	2012**	2013	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Advance	29	3	59.9	14.2	--	--	55.5	--	--
Barlow	32	2	59.3	15.8	15.6	--	57.7	57.7	--
Elgin-ND	34	2	57.9	16.3	--	--	59.2	--	--
Faller	31	2	56.7	15.1	15.6	--	53.5	53.5	--
Forefront	35	2	60.9	15.8	--	--	60.3	--	--
Glenn	33	2	60.1	16.4	13.5	--	57.6	57.6	--
Mott	33	0	58.4	16.2	23.6	--	64.4	64.4	--
Prosper	31	2	56.2	15.2	15.7	--	56.7	56.7	--
RB07	29	3	59.4	16.0	19.7	--	56.2	56.2	--
Sabin	30	2	59.1	15.4	23.2	--	54.3	54.3	--
Select	33	3	61.8	15.0	22.2	--	63.2	63.2	--
SY Soren	28	3	59.4	16.4	14.2	--	59.4	59.4	--
Velva	30	1	55.8	15.9	17.1	--	65.9	65.9	--
Trial Mean	31	2	58.8	15.7	17.1	--	58.8	--	--
C.V. %	3.9	27.7	1.6	2.4	9.0	--	7.9	--	--
LSD 10%	1	1	1.1	0.5	2.2	--	5.5	--	--

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

** Location was not planted in 2012.

Planting Date: May 2

Harvest Date: August 21

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

Previous Crop: Sunflower

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat - 2013 **Selfridge, ND**

Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2011	2012**	2013	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Advance	32	2	60.0	16.4	--	--	63.1	--	--
Barlow	35	1	59.4	17.7	33.3	--	57.7	57.7	--
Elgin-ND	37	2	57.4	18.5	--	--	61.9	--	--
Faller	34	2	57.3	17.0	32.7	--	61.1	61.1	--
Forefront	38	2	58.9	18.9	--	--	57.8	--	--
Glenn	37	2	60.9	18.6	31.6	--	57.2	57.2	--
Mott	38	0	57.6	18.5	26.7	--	61.3	61.3	--
Prosper	34	2	58.0	17.6	33.7	--	63.5	63.5	--
RB07	33	2	57.9	18.4	30.3	--	63.1	63.1	--
Sabin	34	2	58.9	17.4	36.4	--	64.1	64.1	--
Select	37	2	60.6	17.5	34.5	--	58.4	58.4	--
SY Soren	31	0	58.9	18.4	26.5	--	58.6	58.6	--
Velva	34	1	57.4	18.0	30.6	--	60.2	60.2	--
Trial Mean	35	1	58.7	17.9	30.2	--	60.6	--	--
C.V. %	2.5	28.3	0.9	2.4	6.4	--	6.5	--	--
LSD 10%	1	1	0.6	0.5	3.3	--	4.7	--	--

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

** Location was not harvested in 2012.

Planting Date: May 2

Harvest Date: August 26

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

Previous Crop: Corn

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat - 2013	Mandan, ND
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2011**	2012	2013	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Advance	32	2	60.0	13.7	--	--	70.3	--	--
Barlow	35	2	60.9	15.2	--	71.2	72.4	71.8	--
Elgin-ND	38	2	59.4	15.4	--	69.1	78.1	73.6	--
Faller	36	3	60.6	14.2	--	64.5	76.9	70.7	--
Forefront	38	1	60.2	15.5	--	--	78.2	--	--
Glenn	38	1	61.2	15.7	--	65.4	70.8	68.1	--
Mott	38	2	60.1	15.1	--	69.1	75.0	72.0	--
Prosper	37	3	60.1	13.7	--	68.1	71.9	70.0	--
RB07	33	1	59.9	14.7	--	69.0	72.3	70.7	--
Sabin	37	2	59.8	15.2	--	77.4	79.7	78.5	--
Select	36	1	61.1	14.7	--	75.7	70.9	73.3	--
SY Soren	31	2	59.4	15.6	--	77.1	76.9	77.0	--
Velva	35	1	60.0	14.8	--	70.2	71.9	71.1	--
Trial Mean	36	2	60.2	14.9	--	70.0	74.3	--	--
C.V. %	2.9	51.9	1.8	3.1	--	3.1	7.3	--	--
LSD 10%	1	1	1.3	0.5	--	2.6	6.5	--	--

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

** Location was not harvested in 2011

Planting Date: May 2

Harvest Date: August 26

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

Previous Crop: Spring Wheat

2013 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	
						2011	2012	2013	Returns ¹	2	3
						-----bu/ac-----			\$/ac	----bu/ac---	
Advance	56	15,304	26	63.0	14.0	--	71.1	43.1	83.29	57.1	--
Barlow	53	14,096	28	63.5	14.3	60.7	78.6	38.2	52.53	58.4	59.1
Breaker	56	13,815	29	64.3	13.9	60.0	68.3	46.1	100.61	57.2	58.1
Brennan	54	14,006	26	63.0	15.1	55.7	72.8	40.8	81.90	56.8	56.5
Duclair	54	13,851	27	61.5	13.5	--	--	42.9	73.92	--	--
Elgin	56	14,138	29	63.0	13.8	59.4	69.5	48.5	113.80	59.0	59.1
Faller	56	12,798	28	61.8	12.7	48.6	76.5	48.0	95.82	62.2	57.7
Forefront	52	14,850	30	62.8	14.2	--	68.8	44.0	92.58	56.4	--
Glenn	55	14,821	28	63.3	13.6	60.7	77.8	39.9	54.11	58.9	59.5
Howard	55	13,820	29	63.0	13.0	53.0	73.4	43.4	72.11	58.4	56.6
Jenna	56	13,535	28	62.0	13.6	60.6	76.9	49.3	116.39	63.1	62.3
Kelby	53	14,242	26	62.3	16.0	54.0	65.5	37.3	64.43	51.4	52.2
LCS Albany	59	15,974	26	62.0	12.6	--	72.6	42.4	60.60	57.5	--
LCS Breakaway	53	13,566	26	63.8	15.2	--	70.1	40.8	83.16	55.4	--
LCS Powerplay	55	13,035	28	63.5	12.8	55.0	75.2	50.0	111.67	62.6	60.1
LCS Iguacu	57	14,066	27	63.0	12.8	--	--	45.9	85.48	--	--
Linkert	56	12,233	28	62.8	14.3	--	66.1	41.2	73.41	53.6	--
Mott	57	14,953	30	63.0	13.7	52.8	67.3	46.4	99.65	56.8	55.5
ND901CL	55	14,998	30	62.5	14.5	49.6	69.8	42.3	83.46	56.0	53.9
Norden	55	14,494	27	63.8	13.5	58.3	69.9	45.0	87.87	57.5	57.7
Prosper	56	13,143	28	62.3	13.0	55.8	68.0	46.6	92.68	57.3	56.8
RB07	54	15,260	29	60.5	13.8	51.3	75.3	39.6	56.88	57.4	55.4
Rolag	55	13,569	25	62.5	14.1	--	68.2	42.1	76.20	55.1	--
Sabin	55	15,923	27	62.3	13.9	56.4	67.0	41.6	70.76	54.3	55.0
Samson	54	14,066	28	62.0	13.1	62.3	71.9	51.5	124.19	61.7	61.9
Select	51	14,109	31	63.5	13.9	57.0	63.6	44.3	88.39	53.9	55.0
Steele-ND	53	14,379	29	64.3	14.4	50.3	71.1	40.7	69.50	55.9	54.0
Sy 605 CL	53	16,338	27	62.8	13.4	--	78.0	35.5	23.52	56.7	--
Sy Rowyn	53	16,332	25	62.3	14.0	--	69.9	39.2	56.90	54.6	--
Sy Soren	55	14,226	26	62.8	14.5	54.5	68.0	44.7	100.47	56.4	55.7
Sy Tyra	56	12,913	27	63.8	14.1	50.8	70.2	45.0	96.05	57.6	55.4
Vantage	59	15,817	27	63.3	14.3	47.4	63.3	39.2	59.59	51.2	50.0
Velva	55	13,152	29	63.0	13.6	55.7	78.3	45.7	92.37	62.0	59.9
WB-Digger	55	13,205	30	62.3	13.7	54.5	73.7	48.4	113.37	61.1	58.9
WB-Gunnison	55	11,969	26	62.5	13.8	37.9	66.7	40.9	65.71	53.8	48.5
WB-Mayville	53	12,744	25	62.8	15.1	54.6	71.4	39.1	69.73	55.3	55.0
WB-9879CLP	55	15,499	28	62.0	13.2	--	--	46.1	92.53	--	--
Alpine	55	13,789	27	62.5	13.8	55.1	71.8	39.6	57.41	55.7	55.5
Trial Mean	55	14,120	28	62.8	14.1	54.1	70.6	43.5	85.61	--	--
CV %	1.3	4.4	8.5	0.5	5.4	--	--	12.9	--	--	--
LSD 0.10	1	1,048	3	0.6	1.3	--	--	6.6	--	--	--

Planting Date: May 6, 2013

Harvest Date: August 21, 2013

Previous Crop: Field Pea

Seeding Rate: 1.2 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yield by protein premium or discount paid at the Southwest Grain Terminal located at Gladstone on September 19. The price paid on this date was \$6.75/bu, for a grain protein concentration of 14%. An additional \$.07/bu was paid for each additional 0.2% increase in grain protein up to 15%. An Additional \$.04/bu was paid for each additional 0.2% increase in protein up to 17% above which an additional premium was not paid. Grain was discounted \$.06/bu for each 0.2% reduction in grain protein from 14% to 12%, below which no additional discount was assigned. Returns factored in discounts for grain with a test weight <58 lb/bu [-\$.02/bu for 0.5 lb/bu between 58 and 57 lb/bu; -.03/bu for 0.5 lb/bu between 57 and 55 lb/bu; -.04/bu for 0.5 lb/bu between 55 and 54 lb/bu; and -.05/bu for 0.5 lb/bu between 54 and 52 lb/bu]. Returns also deduct \$207.83, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for spring wheat.

2013 Glen Ullin Spring Wheat - Recrop

Dickinson, ND

Variety	Seeds per Pound	Test Weight lbs/bu	Protein %	----- Grain Yield-----			Returns ¹ \$/ac	----- Average Yield -----	
				2011	2012	2012		2011	2012
Advance	13,596	64.9	13.6	--	--	89.8	387.40	--	--
Barlow	12,955	65.2	15.0	30.7	61.8	88.1	417.63	75.0	60.2
Elgin	13,555	63.0	14.8	--	65.2	94.4	455.93	79.8	--
Forefront	12,450	64.5	15.0	--	--	91.9	738.10	--	--
Glenn	12,635	64.3	14.8	27.1	64.4	85.6	393.61	75.0	59.0
Mott	13,302	64.0	14.2	37.1	64.6	95.1	434.13	79.8	65.6
Prosper	11,817	63.1	13.9	32.0	66.0	97.5	444.57	81.7	65.2
Sy Soren	13,704	63.5	15.2	--	--	86.4	408.95	--	--
Velva	12,064	63.0	14.8	33.6	67.9	97.4	470.35	82.7	66.3
Trial Mean	12,898	63.9	14.6	31.7	62.6	91.8	427.85	--	--
CV %	4.0	0.8	1.3	--	--	4.6	--	--	--
LSD 0.10	961	0.6	0.4	--	--	5.1	--	--	--

Planting Date: May 15, 2013

Harvest Date: August 30, 2013

Previous Crop: Spring Wheat

Seeding Rate: 1.2 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yield by protein premium or discount paid at the Southwest Grain Terminal located at Gladstone on September 19. The price paid on this date was \$6.75/bu, for a grain protein concentration of 14%. An additional \$.07/bu was paid for each additional 0.2% increase in grain protein up to 15%. An Additional \$.04/bu was paid for each additional 0.2% increase in protein up to 17% above which an additional premium was not paid. Grain was discounted \$0.06/bu for each 0.2% reduction in grain protein from 14% to 12%, below which no additional discount was assigned. Returns factored in discounts for grain with a test weight <58 lb/bu [-\$.02/bu for 0.5 lb/bu between 58 and 57 lb/bu; -\$0.03/bu for 0.5 lb/bu between 57 and 55 lb/bu; -\$0.04/bu for 0.5 lb/bu between 55 and 54 lb/bu; and -\$0.05/bu for 0.5 lb/bu between 54 and 52 lb/bu]. Returns also deduct \$207.83, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for spring wheat.

2013 Hannover Spring Wheat - Recrop

Dickinson, ND

Variety	Seeds per Pound	Test Weight lbs/bu	Protein %	----- Grain Yield-----			Returns ¹ \$/ac	----- Average Yield -----	
				2011	2012	2013		2	3
				-----bu/ac-----				----bu/ac----	
Advance	14,563	61.6	14.7	--	--	60.6	213.73	--	--
Barlow	13,786	58.5	15.9	29.4	60.7	53.4	179.66	57.0	47.8
Elgin	14,985	57.6	15.8	--	65.1	61.8	240.39	122.4	--
Forefront	14,493	61.1	16.1	--	--	59.7	228.32	--	--
Glenn	14,903	57.4	16.0	27.6	60.4	47.5	137.95	53.9	45.2
Mott	14,827	60.7	15.6	30.2	57.4	64.1	255.20	60.8	50.6
Prosper	13,172	59.7	14.9	27.9	55.3	66.6	260.11	60.9	49.9
Sy Soren	15,885	58.2	16.1	--	--	52.1	172.41	--	--
Velva	14,448	57.5	15.3	32.2	56.2	60.0	218.51	58.1	49.5
Trial Mean	14,563	59.1	15.6	28.2	60.1	58.4	211.80	--	--
CV %	4.2	1.1	2.2	--	--	5.4	--	--	--
LSD 0.10	1,130	0.8	0.6	--	--	3.8	--	--	--

Planting Date: May 15, 2013

Harvest Date: August 30, 2013

Previous Crop: Spring Wheat

Seeding Rate: 1.2 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yield by protein premium or discount paid at the Southwest Grain Terminal located at Gladstone on September 19. The price paid on this date was \$6.75/bu, for a grain protein concentration of 14%. An additional \$.07/bu was paid for each additional 0.2% increase in grain protein up to 15%. An Additional \$.04/bu was paid for each additional 0.2% increase in protein up to 17% above which an additional premium was not paid. Grain was discounted \$0.06/bu for each 0.2% reduction in grain protein from 14% to 12%, below which no additional discount was assigned. Returns factored in discounts for grain with a test weight <58 lb/bu [-\$.02/bu for 0.5 lb/bu between 58 and 57 lb/bu; -.03/bu for 0.5 lb/bu between 57 and 55 lb/bu; -.04/bu for 0.5 lb/bu between 55 and 54 lb/bu; and -.05/bu for 0.5 lb/bu between 54 and 52 lb/bu]. Returns also deduct \$207.83, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for spring wheat.

SDSU West River Ag Center

Hard Red Spring Wheat - 2013				Ralph, SD
Variety	Plant Height	Test Weight	Grain Protein	Yield 2013
	inches	lbs/bu	%	bu/ac
Advance		62.0	12.9	62
LCS Albany		63.2	12.2	65
Barlow		63.3	15.3	66
LCS Breakaway		61.9	14.8	55
Breaker		62.4	14.7	61
Brick		62.2	14.6	60
Briggs		61.7	-	62
Chris-Check		60.3	15.2	47
Elgin		62.7	15.1	64
Faller		61.9	13.1	66
Forefront		62.6	14.4	60
Linkert		62.9	15.1	60
LNR0551		63.4	12.6	67
WB-Mayville		61.2	14.7	48
Mott		63.2	-	62
Norden		63.6	14.0	55
LCS Powerplay		61.0	13.4	58
Prosper		61.9	13.8	62
RB07		62.6	14.6	64
Rollag		62.6	15.2	57
SY Rowyn		62.0	14.7	53
Sabin		61.3	13.8	57
Samson		60.9	14.3	60
Select		63.0	14.1	57
SY Soren		62.4	15.0	60
Traverse		61.6	13.2	66
Vantage		62.4	15.8	52
Velva		59.8	14.9	66
WB9879CLP		61.1	14.8	55
Stingray		59.8	12.9	64
SD 4178		61.9	13.7	58
SD 4189		61.4	13.6	56
Trial Mean		58.7	14.5	62.0
C.V. %		10.8	--	12.7
LSD 5%		1.5	--	7

Planting Date: April 29

Harvest Date: August 20

Seeding Rate: 1.2 million pure live seeds/ac

Previous crop: Spring wheat, no-till planted

Additional Nitrogen: 100 lb/ac mid row banded at planting.

Herbicide: Widematch (16 oz/A), LV6 (8 oz/A)

SDSU West River Ag Center

Hard Red Spring Wheat - 2013				Bison, SD
Variety	Plant Height	Test Weight	Grain Protein	Yield 2013
	inches	lbs/bu	%	bu/ac
Advance		57.1	15.9	58
LCS Albany		55.8	15.4	52
Barlow		57.4	16.2	55
LCS Breakaway		56.6	16.8	54
Breaker		58.5	16.5	52
Brick		56.2	15.1	54
Briggs		53.3	15.5	56
Chris-Check		55.4	16.3	40
Elgin		54.7	15.4	55
Faller		53.7	14.1	58
Forefront		58.7	15.2	55
Linkert		57.7	16.8	52
LNR0551		57.5	15.0	54
WB-Mayville		55.1	16.6	56
Mott		56.6	17.4	54
Norden		55.9	16.0	52
LCS Powerplay		53.4	16.4	50
Prosper		55.1	15.4	56
RB07		57.3	15.3	57
Rollag		57.7	17.0	46
SY Rowyn		57.1	16.3	56
Sabin		56.8	16.2	59
Samson		54.6	15.8	51
Select		56.2	14.7	55
SY Soren		55.0	15.7	54
Traverse		54.6	14.5	53
Vantage		57.4	17.2	45
Velva		54.1	15.5	64
WB9879CLP		46.5	15.7	55
Stingray		55.7	14.5	59
SD 4178		57.7	14.1	65
SD 4189		55.8	14.5	56
Trial Mean		55.9	15.6	54.0
C.V. %		10.8	--	4.4
LSD 5%		1.5	--	8

Planting Date: May 2

Harvest Date: August 16

Seeding Rate: 1.2 million pure live seeds/ac

Previous crop: Spring wheat, no-till planted

Additional Nitrogen: 100 lb/ac mid row banded at planting.

Herbicide: Widematch (16 oz/A), LV6 (8 oz/A)

2013 Winter Wheat - Recrop

Dickinson, ND

Variety	Heading Date	Seeds per Pound	Plant Height	Test Weight	Protein %	----- Grain Yield-----			Returns ¹	Average Yield	
						2011	2012	2013		2	3
	June		in	lbs/bu		----bu/ac----			\$/ac	bu/ac	bu/ac
AC Broadview	23	17,222	31	58.7	11.7	--	70.3	64.8	156.42	97.2	--
Accipiter	25	17,720	30	58.8	11.8	40.6	60.3	65.0	159.93	62.7	55.3
Art	20	15,697	30	63.3	12.4	65.4	60.3	61.9	145.33	61.1	62.5
Boomer	24	17,214	31	58.1	12.5	37.0	66.4	60.8	138.16	63.6	54.7
Decade	20	13,646	30	60.6	12.4	48.6	70.1	75.6	227.81	72.8	64.8
Expedition	17	14,332	29	60.9	12.0	--	--	58.5	123.17	--	--
Falcon	23	17,149	30	59.3	12.2	48.6	68.3	66.1	169.31	67.2	61.0
Flourish	23	15,402	30	58.2	12.5	--	--	68.0	182.25	--	--
Ideal	22	14,609	31	62.4	11.4	46.7	62.7	71.1	190.95	66.9	60.2
Jerry	24	14,113	33	60.9	12.0	39.1	66.0	63.5	150.89	64.7	56.2
Lyman	20	12,830	31	64.0	13.0	55.6	67.9	64.5	162.87	66.2	62.7
McGill	21	15,723	31	59.7	11.7	--	60.0	55.5	100.94	72.2	--
Moats	24	15,906	33	56.2	11.7	--	--	66.1	163.84	--	--
Freeman	18	14,451	29	59.2	11.1	--	--	65.1	149.92	--	--
Overland	20	13,441	31	63.6	11.7	50.5	75.4	63.5	148.42	69.5	63.1
Peregrine	24	15,615	34	63.0	11.1	42.7	54.9	72.0	190.34	63.4	56.5
Robidoux	20	17,467	31	59.9	12.1	--	66.4	45.3	44.00	51.9	--
SY Wolf	20	14,873	29	57.6	11.8	61.8	65.8	72.0	199.13	68.9	66.6
Sunrise	22	15,230	31	59.9	11.5	--	--	74.5	210.91	--	--
WB Grainfield	16	14,356	28	60.8	11.8	--	--	50.0	70.11	--	--
WB-Matlock	24	15,653	31	60.5	12.6	28.8	70.6	64.3	159.29	67.4	54.5
Wesley	18	13,809	30	59.4	12.6	47.8	51.8	63.1	152.07	57.4	54.2
Trial Mean	21	15,293	31	60.2	11.8	46.7	64.6	64.7	156.02	--	--
CV %	0.0	3.2	7.9	3.9	12.5	--	9.5	10.1	--	--	--
LSD 0.10	1	850	NS	2.8	NS	--	7.3	7.7	--	--	--

Planting Date: October 1, 2012

Harvest Date: August 5, 2013

Previous Crop: Pea

Seeding Rate: 1 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yield by protein premium or discount paid at the Southwest Grain Terminal located at Gladstone on August 10. The price paid on this date was \$6.51/bu for a grain protein concentration of 12%. \$.01/bu was paid for each additional 0.2% increase in grain protein up to 15%, above which an additional premium was not paid. Grain was discounted \$0.04/bu for each 0.2% reduction in grain protein from 12% to 9%, below which no additional discount was assigned. Returns factored in discounts for grain with a test weight < 60 lb/bu [-\$.01/bu for 0.5 lb/bu between 60 and 58 lb/bu; -\$0.02/bu for 0.5 lb/bu between 58 and 57 lb/bu; -\$0.03/bu for 0.5 lb/bu between 57 and 55 lb/bu; -\$0.04/bu for 0.5 lb/bu between 55 and 54 lb/bu; and -\$0.05/bu for 0.5 lb/bu between 54 and 52 lb/bu]. Returns also deduct \$229.42, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for winter wheat.

SDSU West River Ag Center

Hard Winter Wheat - 2013					Bison, SD
Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	Yield 2013
	inches	0-9*	lbs/bu	%	bu/ac
Alice		0	53.5	13.8	49
Arapahoe		0	50.7	15.3	49
Art		0	52.3	14.9	50
Camelot		0	48.1	14.9	55
WB-Cedar		0	52.0	15.1	52
Everest		0	51.7	14.6	52
Expedition		0	50.7	14.4	50
Freeman		0	49.1	13.5	53
Fuller		0	49.4	15.5	42
WB-Grainfield		0	51.3	14.7	57
Ideal		0	51.1	15.4	54
Jagalene		0	50.1	14.7	47
Jerry		0	51.6	15.5	45
LCH08-80		0	52.5	14.7	55
Lyman		0	52.0	14.4	58
WB-Matlock		0	52.5	15.5	45
Millennium		0	54.5	13.4	56
LCS Mint		0	54.1	14.2	57
Overland		0	54.1	13.6	55
WB-Redhawk		0	53.7	14.7	59
Robidoux		0	47.0	15.0	46
Settler CL		0	50.7	14.2	56
Smoky Hill		0	51.7	14.4	55
T-158		0	51.4	13.6	54
T-163		0	50.8	12.8	56
Wesley		0	50.5	15.7	52
SY Wolf		0	50.6	14.3	55
SD06158		0	50.9	14.7	55
Trial Mean		0	51.3	14.6	53.0
C.V. %		0.0	1.9	--	9.8
LSD 5%		0	1.4	--	7

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

Planting Date: September 25

Harvest Date: August 7

Previous crop: Winter wheat, no-till planted

Seeding Rate: 950,000 pure live seeds/ac

Additional Nitrogen: 100 lb/ac mid row banded at planting.

Herbicide: Widematch (16 oz/A), LV6 (5 oz/A)

SDSU West River Ag Center

Hard Winter Wheat - 2013			McLaughlin, SD		
Variety	Plant Height inches	Plant Lodge 0-9*	Test Weight lbs/bu	Grain Protein %	Yield 2013 bu/ac
Alice		0	51.9	14.0	32
Arapahoe		0	50.2	13.8	36
Art		0	54.7	14.7	33
Camelot		0	47.0	14.1	31
WB-Cedar		0	56.3	13.6	35
Everest		0	55.7	14.6	32
Expedition		0	58.1	13.6	36
Freeman		0	48.9	13.0	41
Fuller		0	52.3	14.7	33
WB-Grainfield		0	57.3	13.9	40
Ideal		0	52.3	13.2	46
Jagalene		0	50.9	14.2	33
Jerry		0	51.1	13.0	34
LCH08-80		0	52.6	13.4	33
Lyman		0	54.3	13.6	46
WB-Matlock		0	49.4	14.2	32
Millennium		0	57.7	13.3	45
LCS Mint		0	60.1	13.5	46
Overland		0	56.1	14.0	41
WB-Redhawk		0	54.9	14.1	38
Robidoux		0	49.8	12.8	27
Settler CL		0	53.5	13.1	39
Smoky Hill		0	51.2	14.0	39
T-158		0	54.2	13.2	37
T-163		0	56.7	13.3	38
Wesley		0	55.9	14.8	45
SY Wolf		0	56.3	14.8	44
SD06158		0	53.2	14.2	46
Trial Mean		0	53.7	13.8	38.0
C.V. %		0.0	7.0	--	9.0
LSD 5%		0	5.3	--	5

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

Planting Date: September 26

Harvest Date: August 15

Seeding Rate: 950,000 pure live seeds/ac

Previous crop: Spring wheat, no-till planted

Additional Nitrogen: 100 lb/ac mid row banded at planting.

Descriptions and agronomic traits of durum wheat varieties grown in North Dakota, 2013.

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

¹Refers to agent or developer: Can. = Agriculture Canada, WB = Westbred, ND = North Dakota State University, DGP = Dakota Growers Pasta.

²Straw 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.

³Days to Heading = the number of days from planting to head emergence from the boot. Averaged from several locations in 2010.

⁴R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible; Foliar Disease = reaction to tan spot and septoria leaf spot complex.

⁵Alzada has a disease-resistance package that make it more adapted to (drier growing conditions; i.e., western North Dakota).

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

NDSU Hettinger Research Extension Center

Durum Wheat - 2013	Hettinger, ND
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Variety	Days to	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	Protein	2011	2012	2013	2 yr	3 yr
	*	inches	0-9**	lbs/bu	%	----- Bushels per acre -----				
Joppa	73	39	2	61.0	12.4	46.8	66.8	51.1	59.0	54.9
DG Max	72	38	2	62.7	13.6	39.0	69.9	53.9	61.9	54.3
Ben	71	41	2	62.1	13.5	37.2	62.5	53.2	57.9	51.0
Tioga	70	39	4	62.9	12.5	28.1	64.2	59.9	62.1	50.7
Rugby	72	42	2	62.1	13.0	40.1	60.3	51.3	55.8	50.6
CDC Verona	74	39	0	59.6	14.2	35.2	60.5	55.6	58.1	50.4
Alkabo	73	37	1	61.4	12.7	34.8	64.9	50.5	57.7	50.1
AC Commander	72	31	3	60.2	13.6	33.5	72.9	43.7	58.3	50.0
Strongfield	73	38	2	61.2	14.3	28.0	66.4	52.4	59.4	48.9
Lebsock	72	38	1	62.3	12.7	33.7	63.4	49.5	56.5	48.9
Pierce	74	38	2	61.2	13.2	35.9	62.9	47.2	55.1	48.7
Grenora	72	37	2	61.1	13.1	34.6	58.3	52.6	55.5	48.5
Carpio	74	38	3	59.8	12.7	35.0	59.6	50.3	54.9	48.3
Mountrail	72	38	3	61.1	12.3	34.5	53.6	55.3	54.4	47.8
Divide	72	38	2	62.4	13.4	30.5	56.7	55.1	55.9	47.4
AC Navigator	72	31	3	61.3	13.5	26.4	73.2	42.3	57.8	47.3
Maier	74	37	2	61.1	14.4	34.4	64.8	42.3	53.6	47.2
Alzada	70	28	5	60.0	13.2	28.9	69.6	35.0	52.3	44.5
VT Peak	71	37	3	63.5	12.9	--	--	63.3	--	--
Trial Mean	72	38	2	62.0	13.0	37.7	64.5	56.0	--	--
C.V. %	3.9	1.0	36.4	0.9	2.1	5.7	4.9	7.0	--	--
LSD 10%	2	1	1	0.6	0.3	3.0	3.7	4.6	--	--

* Days to Head = the number of days from planting to head emergence from the boot.

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

Planting Date: April 23

Harvest Date: August 19

Seeding Rate: 1.2 million live seeds / acre.

Previous Crop: Spring Wheat Green Fallow

NDSU Hettinger Research Extension Center

Durum Wheat -2013	Scranton, ND
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	----- Grain Yield -----			Average Yield		
	inches	0-9*	lbs/bu	%	2011	2012	2013	2 yr	3 yr	
					----- Bushels per acre -----					
Alkabo	35	4	59.6	12.4	31.4	50.4	52.9	51.7	44.9	
Carpio	36	5	58.5	12.4	32.9	50.2	54.6	52.4	45.9	
Divide	38	5	61.5	12.9	32.1	49.5	57.5	53.5	46.4	
Grenora	34	5	59.7	12.9	31.9	44.1	53.3	48.7	43.1	
Joppa	37	5	59.8	12.1	31.6	51.5	61.2	56.4	48.1	
Mountrail	35	4	59.1	12.4	33.5	39.6	55.3	47.4	42.8	
Tioga	39	5	62.1	12.3	32.9	50.4	60.7	55.6	48.0	
Trial Mean	36	5	60.0	12.5	32.3	48.2	56.5	--	--	
C.V. %	3.3	12.6	2.8	3.6	4.1	4.7	5.8	--	--	
LSD 10%	1	1	2.1	0.6	NS	2.7	4.0	--	--	

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

Planting Date: April 29

Harvest Date: August 21

Seeding Rate: 1.2 million live seeds / acre.

Previous Crop: Flax

NDSU Hettinger Research Extension Center

Durum Wheat - 2013	Regent, ND
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	----- Grain Yield -----			Average Yield		
	inches	0-9*	lbs/bu	%	2011	2012	2013	2 yr	3 yr	
					----- Bushels per acre -----					
Alkabo	38	4	60.5	13.0	26.9	37.1	61.9	49.5	42.0	
Carpio	40	4	59.6	13.3	30.9	30.1	64.5	47.3	41.8	
Divide	39	3	60.7	14.0	26.9	33.5	65.5	49.5	42.0	
Grenora	37	4	60.2	13.4	25.6	38.1	66.7	52.4	43.5	
Joppa	39	4	60.6	12.7	32.6	40.7	69.7	55.2	47.7	
Mountrail	39	3	59.2	12.9	26.3	28.8	64.9	46.9	40.0	
Tioga	41	5	60.7	13.3	23.7	40.6	67.1	53.8	43.8	
Trial Mean	39	4	60.2	13.2	27.3	36.0	65.8	--	--	
C.V. %	2.3	14.8	0.8	2.0	6.9	5.4	5.9	--	--	
LSD 10%	1	1	0.6	0.3	2.1	2.4	4.8	--	--	

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

Planting Date: April 29

Harvest Date: August 21

Seeding Rate: 1.2 million live seeds / acre.

Previous Crop: Canola

NDSU Hettinger Research Extension Center

Durum Wheat -2013	Mandan, ND
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2010	2012	2013	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
Alkabo	40	2	61.4	11.6	67.1	78.2	80.4	79.3	75.2
Carpio	42	3	62.1	11.5	69.0	80.2	79.8	80.0	76.3
Divide	42	3	61.4	12.4	69.2	76.9	77.1	77.0	74.4
Grenora	39	3	59.8	12.4	71.7	72.5	81.2	76.9	75.1
Joppa	41	2	61.3	11.3	--	82.0	86.4	84.2	--
Mountrail	40	2	60.6	11.7	70.0	57.1	84.6	70.8	70.6
Tioga	44	3	61.4	11.6	65.6	82.4	85.3	83.8	77.8
Trial Mean	41	3	61.2	11.8	68.8	75.4	82.1	--	--
C.V. %	3.5	17.4	0.5	4.3	4.1	3.3	4.1	--	--
LSD 10%	2	1	0.4	0.6	NS	3.0	4.1	--	--

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

Planting Date: May 2

Harvest Date: August 26

Seeding Rate: 1.2 million live seeds / acre.

Previous Crop: Spring Wheat

Variety	Days	Seeds	Plant	Test	Protein	----- Grain Yield-----				Average Yield	
	to	per				Height	Weight	2010	2012	2013	Returns ¹
	Head	Pound	in	lbs/bu	%	-----bu/ac-----			\$/ac	----bu/ac----	
AC Commander	59	10,504	27	62.3	13.2	62.0	61.2	35.6	5.65	48.4	53.0
AC Navigator	60	10,534	27	62.3	13.4	51.8	52.0	34.5	-1.40	43.2	46.1
Alkabo	60	10,307	30	62.5	13.1	50.7	52.8	39.9	32.21	46.4	47.8
Alzada	56	10,060	29	61.8	12.8	53.2	49.3	35.2	3.07	42.3	45.9
Ben	59	11,758	26	62.8	14.3	50.0	59.7	36.7	12.16	48.2	48.8
CDC Verona	60	11,602	30	62.3	14.7	56.8	52.2	39.5	29.41	45.9	49.5
Carpio	61	10,440	30	62.8	12.8	59.0	56.4	43.9	56.85	50.1	53.1
DG Max	58	11,151	30	62.5	13.0	55.1	57.1	31.6	-19.52	44.4	48.0
Divide	60	12,169	30	61.8	14.0	51.8	59.1	40.3	34.65	49.7	50.4
Grenora	58	10,651	27	62.0	13.2	56.0	61.2	35.1	2.29	48.2	50.8
Joppa	59	10,611	30	62.5	12.7	61.1	57.4	41.1	39.23	49.2	53.2
Lebsock	59	11,854	26	62.8	13.5	52.8	64.8	32.2	-16.03	48.5	49.9
Maier	59	11,346	30	62.3	14.2	57.3	60.3	36.3	9.39	48.3	51.3
Mountrail	60	10,561	31	61.3	13.3	58.1	59.1	44.6	60.96	51.8	53.9
Pierce	59	11,936	29	63.3	13.4	54.3	58.5	31.7	-18.61	45.1	48.2
Rugby	59	13,539	31	62.3	14.0	44.7	54.1	32.6	-13.39	43.3	43.8
Strongfield	59	12,445	28	61.0	14.5	57.3	55.1	37.6	17.88	46.3	50.0
Tioga	60	10,236	33	63.0	13.0	56.0	56.0	37.5	17.14	46.7	49.8
VT Peak	58	11,433	28	62.8	14.8	--	--	38.9	25.66	--	--
Trial Mean	59	11,197	29	62.6	13.4	56.7	56.5	38.2	21.69	--	--
CV %	1.3	7.0	11.0	0.8	3.3	--	--	17.9	--	--	--
LSD 0.10	1	1,311	4	0.8	0.7	--	--	8.0	--	--	--

Planting Date: May 6, 2013

Harvest Date: August 22, 2013

Previous Crop: Field Pea

Seeding Rate: 1.2 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yield by the test weight discount paid at the Southwest Grain Terminal located at Gladstone on September 19. The price paid on this date was \$6.20/bu for grain with a minimum test weight of 60 lb/bu. Grain was discounted \$.02/bu for each 0.5 lb reduction in test weight between 60 and 58 lb/bu, \$.04/bu per 0.5 lb reduction between 58 and 54 lb/bu, and \$0.05/bu per 0.5 lb/bu reduction between 54 and 50 lb/bu. Returns also deduct \$215.36, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for durum.

2013 Glen Ullin Durum - Recrop

Dickinson, ND

Variety	Seeds per Pound	Test Weight lbs/bu	Protein %	-----Grain Yield-----			Returns ¹ \$/ac	Average Yield	
				2011	2012	2013		2	3
				-----bu/ac-----				----bu/ac----	
Alkabo	10,508	65.3	11.7	43.9	65.9	83.2	300.35	74.5	64.3
Carpio	10,383	66.0	11.4	45.0	64.7	87.5	327.11	76.1	65.7
Divide	9,745	65.9	11.8	49.1	63.6	87.0	324.30	75.3	66.6
Grenora	10,257	63.5	12.0	44.8	63.5	85.4	314.37	74.5	64.6
Joppa	10,333	65.5	11.6	50.5	69.4	91.9	354.68	80.7	70.6
Tioga	9,798	66.5	12.1	49.3	66.2	88.8	334.95	77.5	68.1
Trial Mean	10,171	65.5	11.8	47.1	65.6	87.3	325.96	--	--
CV %	2.9	1.0	3.7	--	--	6.4	--	--	--
LSD 0.10	585	0.8	NS	--	--	NS	--	--	--

Planting Date: May 15, 2013

Harvest Date: August 30, 2013

Previous Crop: Spring Wheat

Seeding Rate: 1.2 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yield by the test weight discount paid at the Southwest Grain Terminal located at Gladstone on September 19. The price paid on this date was \$6.20/bu for grain with a minimum test weight of 60 lb/bu. Grain was discounted \$.02/bu for each 0.5 lb reduction in test weight between 60 and 58 lb/bu, \$.04/bu per 0.5 lb reduction between 58 and 54 lb/bu, and \$0.05/bu per 0.5 lb/bu reduction between 54 and 50 lb/bu. Returns also deduct \$215.36, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for durum.

2013 Hannover Durum - Recrop

Dickinson, ND

Variety	Seeds per Pound	Test Weight lbs/bu	Protein %	-----Grain Yield-----			Returns ¹ \$/ac	Average Yield	
				2011	2012	2013		2	3
				-----bu/ac-----				----bu/ac----	
Alkabo	11,758	60.2	13.4	25.5	53.0	56.9	135.88	54.9	45.1
Carpio	10,786	60.3	14.0	29.3	53.1	67.8	203.49	60.4	50.1
Divide	11,695	60.6	14.1	30.8	54.8	61.8	166.93	58.3	49.1
Grenora	11,668	57.9	13.7	30.4	53.7	62.9	166.81	58.3	49.0
Joppa	11,232	59.3	13.4	32.7	55.1	70.6	219.69	62.8	52.8
Tioga	9,776	61.4	14.1	34.6	52.7	69.1	213.11	60.9	52.1
Trial Mean	11,153	59.9	13.8	30.5	53.7	64.8	184.32	--	--
CV %	4.0	1.6	1.9	--	--	7.2	--	--	--
LSD 0.10	906	1.4	0.5	--	--	6.9	--	--	--

Planting Date: May 15, 2013

Harvest Date: August 30, 2013

Previous Crop: Spring Wheat

Seeding Rate: 1.2 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yield by the test weight discount paid at the Southwest Grain Terminal located at Gladstone on September 19. The price paid on this date was \$6.20/bu for grain with a minimum test weight of 60 lb/bu. Grain was discounted \$.02/bu for each 0.5 lb reduction in test weight between 60 and 58 lb/bu, \$.04/bu per 0.5 lb reduction between 58 and 54 lb/bu, and \$0.05/bu per 0.5 lb/bu reduction between 54 and 50 lb/bu. Returns also deduct \$215.36, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for durum.

2013 North Dakota barley variety descriptions.

Variety	Use ¹	Origin ²	Year Released	Awn Type ³	Rachilla Hair Length ⁴	Aleurone Color	Height	Straw Strength	Relative Maturity	Reaction to Disease ⁵			
										Stem Rust	Spot-form Net Blotch	Spot Blotch	Net Blotch
Six-rowed													
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 ^{6,8}	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	M/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
Two-rowed													
AC Metcalfe	M	Canada	1997	R	L	White	Med.	Med.	Late	S	MS	MS	MS
CDC Copeland	M	Canada	1999	R	L	White	Tall	Med.	Late	S	MS	MS	MR
Champion	F	WestBred	2007	NA ⁷	L	White	Tall	NA	M.late	NA	NA	NA	NA
Conlon ⁸	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 ⁹	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
Lilly	F	Germany	NA	R	L	White	Short	M.strg.	Late	S	MS/S	S	MR/R
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
Specialty													
Enduro	SP	WestBred	2007	H	L	White	Med.	NA	M.late	NA	NA	NA	NA
Wanubet	SP	MT	1990	H	L	White	Med.	Weak	Late	S	NA	S	S

¹ M = malting; MT = being tested in plant-scale tests for malting and brewing quality; F = feed; SP = special uses (hull-less).

² BARI = Busch Agricultural Resources Inc.; MN = University of Minnesota; MT = Montana State University; ND = North Dakota State University.

³ R = rough; S = smooth; H = hull-less.

⁴ S = short; L = long.

⁵ R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible; NA = not available.

⁶ Moderately resistant to Fusarium head blight.

⁷ NA = not available.

⁸ Lower DON accumulations than other varieties tested.

⁹ Recommended as a malting barley in western U.S.

NDSU Hettinger Research Extension Center

Barley - 2013 **Hettinger, ND**

Variety	Days to	Plant	Plant		Test	Grain	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Plump	Weight	Protein	2011	2012	2013	2 yr	3 yr
	*	inches	0-9**	%	lbs/bu	%	----- Bushels per acre -----				
TWO ROW											
Rawson	69	36	2	92	46.2	11.7	66.7	87.3	116.1	101.7	90.0
Conrad	71	35	4	89	46.5	13.3	71.1	91.0	102.7	96.9	88.3
Conlon	66	34	6	96	48.9	13.2	80.9	80.2	102.1	91.2	87.7
CDC Copeland	73	39	3	91	45.2	12.7	63.4	79.0	103.5	91.3	82.0
Pinnacle	70	35	3	95	47.1	11.8	59.4	71.7	110.5	91.1	80.5
AC Metcalfe	73	37	2	92	46.1	14.9	56.8	54.7	87.4	71.1	66.3
SIX ROW											
Innovation	68	36	3	91	44.4	13.5	89.4	102.5	122.4	112.5	104.8
Tradition	69	37	3	92	45.0	12.6	91.1	93.5	124.1	108.8	102.9
Lacey	71	37	3	93	46.4	13.6	84.1	91.0	116.5	103.8	97.2
Celebration	70	36	6	88	44.2	13.8	70.2	99.5	110.7	105.1	93.5
Quest	70	39	3	89	43.5	13.3	72.3	90.6	114.0	102.3	92.3
Stellar-ND	70	38	3	92	44.4	13.1	61.7	94.3	107.9	101.1	88.0
Trial Mean	70	36	3	92	45.8	12.7	76.6	91.0	115.5	--	--
C.V. %	4	0.9	36.0	3.4	1.4	3.5	6.8	5.1	5.6	--	--
LSD 10%	2	1	1	4	0.8	0.5	7.4	5.5	7.6	--	--

* Days to Head = the number of days from planting to head emergence from the boot.

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

Planting Date: April 23

Harvest Date: August 19

Seeding Rate: 1.25 million live seeds / acre.

Previous Crop: Spring Wheat Green Fallow

NDSU Hettinger Research Extension Center

Barley - 2013	Scranton, ND
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2011	2012	2013	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
TWO ROW									
Conlon	31	6	48.1	12.9	--	86.7	81.0	83.9	--
Rawson	33	3	48.3	12.2	30.0	81.1	92.5	86.8	67.9
Pinnacle	30	3	49.0	12.0	54.4	80.4	93.5	87.0	76.1
SIX ROW									
Celebration	29	6	46.7	13.6	--	85.1	82.6	83.9	--
Quest	35	6	46.3	13.0	54.6	72.5	94.6	83.6	73.9
Innovation	30	5	47.6	12.7	56.7	88.4	80.3	84.4	75.1
Trial Mean	31	5	47.7	12.7	50.3	82.4	87.4	--	--
C.V. %	4.9	17.7	1.2	4.3	3.1	5.0	9.6	--	--
LSD 10%	2	1	0.7	0.7	1.8	5.1	10.4	--	--

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

Planting Date: April 29

Harvest Date: August 21

Seeding Rate: 1.25 million live seeds / acre.

Previous Crop: Flax

NDSU Hettinger Research Extension Center

Barley - 2013	Regent, ND
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Variety	Plant	Plant	Test	----- Grain Yield -----			----- Average Yield -----		
	Height	Lodge	Weight	2011	2012	2013	2 yr	3 yr	
	inches	0-9*	lbs/bu	----- Bushels per acre -----					
TWO ROW									
Conlon	34	6	48.4	33.5	69.1	88.4	78.8	63.7	
Rawson	35	3	48.0	39.5	48.8	107.6	78.2	65.3	
Pinnacle	35	3	48.1	43.6	65.3	106.3	85.8	71.7	
SIX ROW									
Celebration	33	6	45.4	--	52.4	98.9	75.7	--	
Quest	36	6	45.1	42.2	50.9	95.9	73.4	63.0	
Innovation	33	5	46.2	42.4	67.2	104.8	86.0	71.5	
Trial Mean	34	5	46.9	40.1	58.9	100.3	--	--	
C.V. %	4.6	17.7	0.8	6.6	6.2	4.5	--	--	
LSD 10%	2	1	0.5	3.0	4.5	5.5	--	--	

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

Planting Date: April 29

Harvest Date: August 21

Seeding Rate: 1.25 million live seeds / acre.

Previous Crop: Canola

NDSU Hettinger Research Extension Center

Barley - 2013 **New Leipzig, ND**

Variety	Plant	Plant	Test	----- Grain Yield -----			Average Yield		
	Height	Lodge	Weight	2011	2012	2013	2 yr	3 yr	
	inches	0-9*	lbs/bu	----- Bushels per acre -----					
TWO ROW									
Conlon	27	6	44.9	--	--	76.0	--	--	
Rawson	32	3	45.4	--	--	90.5	--	--	
Pinnacle	30	5	45.5	--	--	81.9	--	--	
SIX ROW									
Celebration	30	5	42.3	--	--	90.1	--	--	
Quest	31	4	43.2	--	--	92.4	--	--	
Innovation	29	5	43.9	--	--	93.0	--	--	
Trial Mean	30	5	44.2	--	--	87.3	--	--	
C.V. %	5.0	21.7	0.9	--	--	7.9	--	--	
LSD 10%	2	1	0.5	--	--	8.5	--	--	

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

Planting Date: May 2

Harvest Date: August 21

Seeding Rate: 1.25 million live seeds / acre.

Previous Crop: Sunflower

NDSU Hettinger Research Extension Center

Barley - 2013 **Selfridge, ND**

Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2010	2011	2013	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
TWO ROW									
Conlon	31	7	47.0	14.3	76.6	58.8	80.6	69.7	72.0
Rawson	32	4	45.4	13.4	74.2	44.6	83.7	64.2	67.5
Pinnacle	31	6	46.1	12.7	89.8	52.5	93.2	72.9	78.5
SIX ROW									
Celebration	32	8	43.0	16.8	--	--	74.6	--	--
Quest	34	7	43.0	14.9	--	43.4	81.5	62.5	--
Innovation	31	7	44.2	15.1	--	37.9	89.7	63.8	--
Trial Mean	32	6	44.8	14.5	81.7	47.9	83.9	--	--
C.V. %	4.6	9.7	1.2	3.9	4.3	10.4	5.4	--	--
LSD 10%	2	1	0.6	0.7	5.3	9.0	5.6	--	--

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

Planting Date: May 2

Harvest Date: August 26

Seeding Rate: 1.25 million live seeds / acre.

Previous Crop: Corn

NDSU Hettinger Research Extension Center

Barley - 2013 **Mandan, ND**

Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2010	2011	2013	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
TWO ROW									
Conlon	32	6	45.6	13.0	79.5	41.9	59.7	50.8	60.4
Rawson	33	4	46.0	11.9	89.4	43.1	88.0	65.6	73.5
Pinnacle	36	6	45.8	11.2	86.5	45.9	90.8	68.4	74.4
SIX ROW									
Celebration	34	5	43.8	14.7	90.1	36.6	41.9	39.3	56.2
Quest	36	5	44.1	12.7	--	49.8	78.7	64.3	--
Innovation	33	5	44.6	12.9	--	51.4	57.0	54.2	--
Trial Mean	34	5	45.0	12.7	87.5	44.8	69.4	--	--
C.V. %	5.4	7.2	0.8	2.4	2.7	5.6	12.0	--	--
LSD 10%	2	1	1.8	0.4	2.6	3.1	10.3	--	--

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

Planting Date: May 2

Harvest Date: August 26

Seeding Rate: 1.25 million live seeds / acre.

Previous Crop: Spring Wheat

2013 Barley - Recrop

Dickinson, ND

Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	Plump % >6/64	----- Grain Yield-----			Returns ¹ \$/ac	Average Yield	
							2011	2012	2013		Year 2	Year 3
							-----bu/ac-----				----bu/ac----	
Six Row												
Celebration	57	11,668	27	44.3	13.3	99.7	77.9	95.7	78.6	7.37	87.1	84.0
Innovation	55	10,751	25	45.5	12.5	99.7	84.0	97.2	76.3	3.11	86.7	85.8
Lacey	56	10,590	29	46.5	12.4	99.6	77.0	93.9	82.3	20.90	88.1	84.4
Quest	58	11,722	29	45.0	12.6	98.9	73.2	91.4	84.9	26.21	88.2	83.2
Stellar-ND	56	10,713	28	45.4	13.1	99.6	78.0	101.7	79.0	10.80	90.3	86.2
Tradition	55	11,174	29	47.3	12.6	99.7	85.7	78.5	74.4	-1.70	76.4	79.5
Two Row												
04/506/42/8	57	9,684	25	47.7	11.4	99.6	--	--	93.2	52.04	--	--
AC Metcalfe	59	10,549	27	47.8	10.6	99.0	60.5	71.9	70.9	-11.68	71.4	67.8
CDC Copeland	60	9,919	29	47.2	11.2	99.1	61.3	81.0	87.0	33.76	84.0	76.5
Conlon	54	8,740	26	47.7	11.9	99.6	65.4	72.8	62.8	-34.78	67.8	67.0
Conrad	60	9,600	27	49.9	11.5	99.5	50.2	86.6	84.4	26.98	85.5	73.7
Pinnacle	58	8,548	27	50.3	11.0	99.6	76.8	89.1	76.3	3.70	82.7	80.7
Rawson	58	7,724	28	51.2	11.0	99.8	60.9	93.2	83.5	24.30	88.4	79.2
Trial Mean	57	10,102	27	47.1	11.8	99.5	73.2	89.5	81.4	17.37	--	--
CV %	1.3	2.6	6.4	2.2	3.78	0.2	--	--	10.7	--	--	--
LSD 0.10	1	444	2	1.2	0.8	0.3	--	--	10.3	--	--	--

Planting Date: May 7, 2013

Harvest Date: August 14, 2013

Previous Crop: F Field Pea

Seeding Rate: 1.2 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yields by the price paid for feed barley minus the test weight discount paid at the Southwest Grain Terminal located at Gladstone on September 19. The price paid on this date was \$2.85/bu for grain with test weights heavier than 45 lb/bu. Grain with a test weight of 45 lb/bu was discounted \$.03/bu, with an additional discount of \$.04/bu per pound down to 42 lb/bu. Below 42 lb/bu, an additional discount of \$.05/bu occurred per pound. Returns also deduct \$213.65, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for barley.

2013 Glen Ullin Barley - Recrop

Dickinson, ND

Variety	Seeds	Test	%	Protein	-----Grain Yield-----			Returns ¹	Average Yield	
	per Pound	Weight	Plump		2011	2012	2013		2	3
		lbs/bu	>6/64	%	-----bu/ac-----			\$/ac	----bu/ac----	
Six Row										
Celebration	11,440	46.6	100	13.9	--	72.2	97.1	63.15	77.5	--
Innovation	10,574	48.8	100	13.0	58.4	69.1	105.8	87.98	87.5	77.8
Quest	10,986	47.2	100	13.1	56.6	67.1	107.0	91.41	87.0	76.9
Two Row										
Conlon	8,345	50.9	100	12.2	38.1	58.7	75.6	1.93	67.2	57.5
Pinnacle	8,215	49.0	100	11.4	47.4	68.1	106.5	89.95	87.3	74.0
Rawson	8,008	49.7	100	11.6	49.0	58.0	104.7	84.63	81.3	70.6
Trial Mean	9,595	48.7	100	12.5	50.2	65.5	99.5	69.85	--	--
CV %	3.7	1.3	0.0	1.5	--	--	6.5	--	--	--
LSD 0.10	714	0.8	NS	0.4	--	--	8.0	--	--	--

Planting Date: May 15, 2013

Harvest Date: August 30, 2013

Previous Crop: Spring Wheat

Seeding Rate: 1.2 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yields by the price paid for feed barley minus the test weight discount paid at the Southwest Grain Terminal located at Gladstone on September 19. The price paid on this date was \$2.85/bu for grain with test weights heavier than 45 lb/bu. Grain with a test weight of 45 lb/bu was discounted \$.03/bu, with an additional discount of \$.04/bu per pound down to 42 lb/bu. Below 42 lb/bu, an additional discount of \$.05/bu occurred per pound. Returns also deduct \$213.65, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for barley.

2013 Hannover Barley - Recrop

Dickinson, ND

Variety	Seeds	Test	%	Protein	-----Grain Yield-----			Returns ¹	Average Yield	
	per Pound	Weight	Plump		2010	2011	2012		2	3
		lbs/bu	>6/64	%	-----bu/ac-----			\$/ac	----bu/ac----	
Six Row										
Celebration	13,075	45.8	100	14.5	--	86.7	69.1	-21.42	44.8	--
Innovation	11,165	46.3	100	13.5	59.1	90.2	82.7	19.61	86.4	77.3
Quest	11,502	45.3	99	13.6	58.7	78.7	74.3	-12.83	76.5	70.6
Two Row										
Conlon	9,027	49.5	100	13.1	39.3	76.9	37.7	-121.08	57.3	51.3
Pinnacle	9,095	47.0	100	11.5	49.5	88.1	78.7	9.43	83.4	72.1
Rawson	8,463	47.0	100	11.9	55.2	79.8	76.2	3.59	78.0	70.4
Trial Mean	10,388	46.8	100	13.0	48.6	83.4	69.8	-20.45	--	--
CV %	5.8	1.6	0.2	2.3	--	--	15.2	--	--	--
LSD 0.10	1,206	1.5	NS	0.6	--	--	21.4	--	--	--

Planting Date: May 15, 2013

Harvest Date: August 30, 2013

Previous Crop: Spring Wheat

Seeding Rate: 1.2 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yields by the price paid for feed barley minus the test weight discount paid at the Southwest Grain Terminal located at Gladstone on September 19. The price paid on this date was \$2.85/bu for grain with test weights heavier than 45 lb/bu. Grain with a test weight of 45 lb/bu was discounted \$.03/bu, with an additional discount of \$.04/bu per pound down to 42 lb/bu. Below 42 lb/bu, an additional discount of \$.05/bu occurred per pound. Returns also deduct \$213.65, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for barley.

2013 North Dakota oat variety descriptions.

Variety	Origin ¹	Year Released	Grain Color	Height	Straw Strength	Maturity ²	Reaction to Diseases			Bu/Wt.	Protein ⁵
							Stem Rust ³	Crown Rust ³	Barley Y.Dwf ⁴		
AC Assiniboia	Can. Proven Seed	1997	Red	Med.	Strong	L	S	S	T	Good	ML
AC Gwen	Can. SeCan	2000	Hull-less	Tall	Strong	L	S	S	R	Good	L
AC Kaufman	Can.	2000	Yellow	Tall	Strong	L	S	S	MT	V.good	ML
AC Pinnacle	Can. QAS	1999	White	Tall	Med.	L	S	S	S	V.good	L
AC Ronald	Can. SeCan	2001	White	M.short	V.strg.	L	S	S	T	V.good	M
Beach	ND	2004	White	Tall	M.strg.	ML	S	MR/MS	MS	V.good	M
Buff	SD	2002	Hull-less	Med.	M.strg.	L	S	MR/MS	MT	Good	H
CDC Dancer	Can. Cargill	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 Orrin	Can. QAS/Cargill	2001	White	Tall	Strong	L	S	S	S	Good	ML
CDC Weaver	Can.	2005	Yellow	Med.	M.strg.	L	S	S	S	Good	M
Furlong	AAFC Winnipeg	2003	Red	Tall	M.strg.	L	S	S	T	V.good	M
Goliath	SD	2013	White	Tall	Med.	L	NA	NA	NA	Good	M
HiFi	ND	2001	White	Tall	Strong	L	MR/MS	R	T	Good	M
Horsepower	SD	2012	White	Short	Strong	EM	MS	R	MT	V.good	MH
Hyttest	SD	1986	White	Tall	M.strg.	E	S	MS	S	V.good	H
Jury	ND	2012	White	Tall	M.strg.	M	R	R	MT	V.good	M
Killdeer	ND	2000	White	Med.	Strong	M	S	MS	MT	Good	M
Leggett	AAFC Winnipeg	2005	White	Tall	Strong	L	MR	R	S	Good	M
Leonard	MN	2001	Yellow	Tall	M.strg.	L	S	S	T	Fair	ML
Loyal	SD	2000	Ivory	Tall	M.strg.	L	S	MR	T	Good	MH
Maida	ND	2005	Yellow	Med.	Strong	M	R	S	MS	V.good	MH
Minstrel	Sask.	2008	White	M.tall	Strong	L	MR/MS	S	S	Good	M
Morton	ND	2001	White	Tall	V.strg.	L	S	S	MT	V.good	M
Newburg	ND	2011	White	Tall	Med.	L	R	R	MT	Good	M
Otana	MT	1977	White	M.tall	M.weak	L	S	S	S	V.good	ML
Paul	ND	1994	Hull-less	V.tall	Strong	L	R	MR/MS	T	Good	H
Reeves	SD	2002	White	M.tall	Med.	E	S	MR	MT	Good	H
Rockford	ND	2008	White	Tall	Strong	L	S	R	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	R	NA	V.good	NA
Souris	ND	2006	White	Med.	Strong	M	MS	R	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	MH
Summit	AAFC Winnipeg	2008	White	Med.	Strong	L	S	R	MT	Good	M

¹Can = Canada; ND = North Dakota State University; SD = South Dakota State University; MT = Montana State University; Sask. = Saskatchewan.

²E = early; M = medium; L = late.

³R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible.

⁴Barley 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.

⁵H = high; M = medium; L = low.

Bolded varieties are new releases.

NDSU Hettinger Research Extension Center

Oat - 2013	Hettinger, ND
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Variety	Days to	Plant	Plant	Test	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	2011	2012	2013	2 yr	3 yr
	*	inches	0-9**	lbs/bu	----- Bushels per acre -----				
Newburg	70	50	5	32.0	122.9	126.2	172.5	149.3	140.5
CDC Minstrel	76	42	0	33.0	112.1	140.4	167.9	154.1	140.1
Furlong	75	44	2	30.2	122.7	131.1	162.2	146.7	138.7
Jury	69	48	5	34.1	116.1	135.3	163.1	149.2	138.2
Stallion	70	47	7	36.4	120.6	139.0	150.8	144.9	136.8
Killdeer	70	41	4	34.0	113.7	131.0	164.0	147.5	136.2
Shelby 427	65	43	2	36.5	127.5	127.1	145.9	136.5	133.5
AC Pinnacle	76	44	2	32.9	117.5	133.0	148.8	140.9	133.1
Rockford	74	48	2	35.6	113.5	126.9	156.1	141.5	132.2
Beach	75	47	1	35.1	113.9	120.3	152.2	136.3	128.8
Morton	72	47	1	31.9	112.1	115.5	156.8	136.1	128.1
Leggett	76	45	2	33.5	95.4	124.6	162.4	143.5	127.5
Otana	73	47	3	33.7	67.2	141.6	167.6	154.6	125.5
Souris	74	40	2	32.7	113.5	118.3	136.7	127.5	122.8
HiFi	75	45	2	32.6	103.8	111.5	135.6	123.5	117.0
CDC Dancer	76	47	0	33.7	67.7	118.9	151.5	135.2	112.7
Stark	74	46	4	35.4	90.9	94.8	138.2	116.5	108.0
Hyttest	71	47	5	36.7	70.2	120.5	130.2	125.3	107.0
Horsepower	67	39	2	35.2	--	132.9	159.5	146.2	--
Goliath	73	53	5	36.1	--	--	161.0	--	--
Trial Mean	72	46	3	34.5	104.1	124.3	157.0	--	--
C.V. %	1.7	3.0	38.7	2.9	4.1	3.8	5.0	--	--
LSD 10%	1	2	1	1.2	4.6	5.6	9.3	--	--

* Days to Head = the number of days from planting to head emergence from the boot.

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

Planting Date: April 25

Harvest Date: August 14

Seeding Rate: 750,000 live seeds / acre.

Previous Crop: Canola

NDSU Hettinger Research Extension Center

Oat - 2013	New Leipzig, ND
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Variety	Plant	Plant	Test	----- Grain Yield -----			Average Yield		
	Height	Lodge	Weight	2011	2012	2013	2 yr	3 yr	
	inches	0-9*	lbs/bu	----- Bushels per acre -----					
Jury	43	4	32.1	--	--	126.7	--	--	
Horsepower	34	3	33.9	--	--	130.8	--	--	
Morton	45	3	30.2	--	--	119.4	--	--	
Newburg	45	4	31.1	--	--	133.8	--	--	
Rockford	44	2	34.3	--	--	130.8	--	--	
Souris	35	3	32.4	--	--	106.4	--	--	
Trial Mean	41	3	32.3	--	--	124.7	--	--	
C.V. %	6.1	19.1	2.3	--	--	9.5	--	--	
LSD 10%	3	1	0.9	--	--	14.7	--	--	

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

Planting Date: May 2

Harvest Date: August 21

Seeding Rate: 750,000 live seeds / acre.

Previous Crop: Sunflower

NDSU Hettinger Research Extension Center

Oat -2013

Selfridge, ND

Variety	Plant	Plant	Test	----- Grain Yield -----			Average Yield		
	Height	Lodge	Weight	2011	2012	2013	2 yr	3 yr	
	inches	0-9*	lbs/bu	----- Bushels per acre -----					
Jury	44	5	34.3	--	--	126.9	--	--	
Horsepower	34	1	34.7	--	--	130.0	--	--	
Morton	45	3	31.0	--	--	122.2	--	--	
Newburg	46	4	33.2	--	--	131.2	--	--	
Rockford	43	2	33.6	--	--	116.6	--	--	
Souris	36	2	31.6	--	--	105.1	--	--	
Trial Mean	41	3	33.0	--	--	122.0	--	--	
C.V. %	5.3	27.9	2.6	--	--	10.9	--	--	
LSD 10%	3	1	1.0	--	--	13.6	--	--	

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

Planting Date: May 2

Harvest Date: August 26

Seeding Rate: 750,000 live seeds / acre.

Previous Crop: Corn

NDSU Hettinger Research Extension Center

Oat - 2013	Mandan, ND
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Variety	Plant	Plant	Test	----- Grain Yield -----			Average Yield		
	Height	Lodge	Weight	2010	2011	2013	2 yr	3 yr	
	inches	0-9*	lbs/bu	----- Bushels per acre -----					
Jury	48	8	33.6	--	127.6	141.0	134.3	--	
Horsepower	41	6	34.3	--	--	168.1	--	--	
Morton	51	7	28.9	133.2	107.9	119.6	113.8	120.2	
Newburg	50	8	31.7	--	144.4	150.3	147.3	--	
Rockford	48	6	34.6	142.7	136.4	141.0	138.7	140.0	
Souris	44	8	33.7	139.7	105.1	122.3	113.7	122.4	
Trial Mean	47	7	32.8	137.1	127.0	140.4	--	--	
C.V. %	3.2	16.1	2.4	3.1	3.0	9.4	--	--	
LSD 10%	2	1	1.0	4.7	4.7	16.2	--	--	

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

Planting Date: May 2

Harvest Date: August 26

Seeding Rate: 750,000 live seeds / acre.

Previous Crop: Spring Wheat

Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	----- Grain Yield-----			Returns ¹ \$/ac	Average Yield	
					2011 bu/ac	2012 bu/ac	2013 bu/ac		2 Year bu/ac	3 Year bu/ac
AC Pinnacle	62	10,817	34	33.9	154.1	111.9	150.7	131.75	131.3	138.9
Beach	61	13,043	39	39.2	129.0	118.0	142.4	131.65	130.2	129.8
CDC Dancer	61	11,721	37	35.1	118.8	114.2	132.5	96.79	123.3	121.8
CDC Minstrel	60	10,419	32	30.8	120.5	133.3	112.7	34.30	123.0	122.2
Furlong	63	9,047	34	33.6	139.2	130.3	131.0	86.90	130.6	133.5
Goliath	61	11,484	39	37.0	--	--	116.3	70.63	--	--
HiFi	61	15,463	34	32.9	114.9	117.5	117.3	54.26	117.4	116.5
Horsepower	56	13,752	29	36.5	--	93.0	111.7	58.03	102.3	--
Hyttest	59	12,815	36	34.5	105.9	132.8	124.0	75.30	128.4	120.9
Jury	60	12,398	38	36.6	124.9	131.9	124.1	85.63	128.0	127.0
Killdeer	60	12,549	33	35.7	138.5	124.8	135.1	104.45	130.0	132.8
Leggett	60	13,809	32	35.9	139.5	117.8	118.7	70.10	118.2	125.3
Morton	61	13,296	38	36.1	126.9	130.5	131.0	98.40	130.8	129.5
Newburg	60	11,369	40	35.4	128.2	139.8	143.9	123.75	141.8	137.3
Otana	61	14,124	39	36.8	110.7	133.4	139.5	121.39	136.5	127.9
Rockford	61	13,268	37	35.2	139.4	129.7	136.2	105.66	133.0	135.1
Shelby 427	56	14,198	34	36.8	117.9	125.2	109.5	54.50	117.3	117.5
Souris	59	12,399	32	35.1	115.4	127.7	131.2	94.55	129.4	124.8
Stallion	61	14,737	36	38.2	141.0	147.5	129.5	102.54	138.5	139.3
Stark*	62	12,704	38	37.6	111.0	108.0	123.9	88.85	115.9	114.3
Trial Mean	60	12,479	35	35.2	123.0	122.9	126.5	83.74	--	--
CV %	0.9	13.2	3.7	3.2	--	--	10.4	--	--	--
LSD 0.10	1	2,793	2	1.3	--	--	15.4	--	--	--

Planting Date: May 9, 2013

Harvest Date: August 19, 2013

* Hulless

Previous Crop: Field Pea

Seeding Rate: 1 million live seeds/ac

¹Returns were calculated by multiplying the 2013 yield by the test weight discount paid at the Southwest Grain Terminal located in Gladstone on September 19. The price paid was \$2.25/bu for grain with a test weight greater than 37 lb/bu. Grain with a test weight of 37 lb/bu was discounted \$.04/bu, with an additional discount of \$.04/bu per pound to 30 lb/bu. Below 30 lb/bu, an additional discount of \$.07/bu occurred per pound. Returns also deduct \$188.79, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for oats.

SDSU West River Ag Center

Oat - 2013		Bison, SD		
Variety	Plant Height	Test Weight	Grain Protein	Yield 2013
	inches	lbs/bu	%	bu/ac
Colt		37.1		112
Deon		32.5		101
Don		33.5		85
Goliath		34.8		109
HiFi		31.9		116
Horsepower		33.5		95
Jerry		35.2		96
Jury		34.1		120
Newburg		31.7		96
Rockford		34.6		106
Shelby427		35.8		83
Souris		34.0		106
Stallion		32.8		115
SD111779		35.9		114
SD111972		33.5		114
<i>Buff*</i>		41.9		72
<i>Streaker*</i>		42.0		79
Trial Mean		35.0		106.0
C.V. %		3.3		15.8
LSD 5%		1.6		24

*Hull-less varieties, multiply yield by 1.35 to compare yield with other varieties

Planting Date: May 2

Harvest Date: August 16

Seeding Rate: 1.2 million pure live seeds/ac

Previous crop: Spring wheat, no-till planted

Additional Nitrogen: 100 lb/ac mid row banded at planting.

Herbicide: Widematch (16 oz/A)

Safflower Variety Descriptions

Variety	Origin ¹	PVP ⁶	Hull Type ²	Oil Type ³	Irrigated Yield ⁴	Dryland Yield ⁴	TWT ⁴	Oil ³	Maturity	Tolerance ⁵	
										Alt.	BB
Cardinal	MT/ND	yes	N	high lino	v good	v good	high	fair	med	T	MT
Centennial	MT/ND	yes	STP	linoleic	m good	good	med	v good	m late	MT	MT
Finch	MT/ND	no	N	linoeic	good	v good	v high	fair	m early	MS	T
MonDak	MT/ND	yes	N	high oleic	good	v good	high	fair	m early	T	MT
Morlin	MT/ND	yes	STP	high linoleic	v good	good	med	good	m late	T	T
Nutrasaff	MT/ND	yes	RED	linoeic	good	good	med	high	med	T	MT
S-541	ST	no	STP	linoeic	fair	v good	m high	v good	m late	MS	MS
Montola 2000	MT/ND	yes	N	high oleic	m good	good	med	good	early	MS	MS
Montola 2001	MT/ND	yes	STP	high oleic	good	fair	med	good	med	MT	MT
Montola 2003	MT/ND	yes	N	high oleic	v good	v good	m high	good	m early	MT	MT
Montola 2004	MT/ND	yes	N	high oleic	good	good	m high	good	m early	MS	MT

¹ ST = SeedTec International, MT = Montana, ND = North Dakota

² STP = striped, N = normal, RED = reduced

³ Lino - linoleic

⁴ Relative ratings of yield, test weight, and oil will vary under conditions of moderate-severe disease infestation

⁵ Alt = Alternaria leaf spot disease, BB = bacterial blight, S = susceptible, MS = moderately susceptible, MT = moderately tolerant, T = tolerant

⁶ "yes" indicates the variety is protected and the seed may be sold for planting purposes only as a class of certified seed (Title V option)

Safflower - 2013

Hettinger, ND

Variety	Days to Flower	Plant Height	Test Weight	-----Grain Yield-----			Average Yield	
				2011	2012	2013	2-Yr	3-Yr
	DAP*	inches	lbs/bu	----- lbs per acre -----				
Cardinal	93	37	36.1	1607	2381	2394	2388	2127
Finch	90	34	37.8	1785	2073	2272	2173	2043
MonDak	92	32	35.2	2078	2358	2303	2331	2246
Montola 2003	92	30	34.6	2057	2060	2186	2123	2101
Morlin	92	30	33.9	--	--	1776	--	--
Nutrasaff	91	34	34.6	938	1366	2124	1745	1476
Hybrid 9049	89	32	36.1	2100	2601	2978	2790	2560
Hybrid 1601	90	33	33.0	1791	2993	2182	2588	2322
Trial Mean	91	32	35.2	1777	2272	2277	2305	2125
C.V. %	0.9	4.6	2.8	8.0	10.6	8.8	--	--
LSD 10%	2.0	1	1.2	140	320	244	--	--

* Days after planting.

Planting Date: April 26

Harvest Date: September 11

Seeding Rate: 300,000 live seeds / acre.

Previous Crop: No-till Green Fallow Spring Wheat

NDSU Hettinger Research Extension Center

Oil Type Sunflower - 2013 **Hettinger, ND**

Brand	Variety	Oil Type & Traits	Days to Bloom	Plant Height	Lodging	Test Weight	Oil Content	Yield 2013
		*	**	inches	%	lbs/bu	%	lbs/ac
AgVenture	3H93CL/DM	HO, CL, DM	75	73	13	27.4	34.1	1417
AgVenture	3H94CL/DM	NS, CL, DM	78	77	3	27.9	34.3	2593
AgVenture	3H95CL	HO, CL, DM	77	74	6	26.8	33.7	1486
Croplan	432 E	NS, EX, DM	74	75	12	28.0	32.5	1979
Croplan	460 E	NS, EX	79	79	11	26.3	34.6	1783
Croplan	559 CL	NS, CL, DM	79	83	8	27.0	35.1	1773
Croplan	548 CL	NS, CL, DM	78	82	6	28.8	34.5	2057
Croplan	13-59 CL	NS, CL, DM	80	78	7	26.0	33.0	2407
Genosys	11G08	NS	80	82	10	28.0	34.6	1966
Genosys	12G20	HO, CL	76	74	14	27.4	34.6	2153
Genosys	12E06	HO, DM	75	86	10	28.3	33.3	2101
Genosys	12E12	HO, CL, DM	77	87	3	26.6	33.0	1868
Genosys	12E13	HO, CL, DM	77	80	4	25.4	32.4	1635
Genosys	12E14	HO, CL, DM	80	88	6	24.7	32.1	1924
Mycogen Seeds	8N358CLDM	NS, CL, DM	76	79	10	28.8	37.1	1310
Mycogen Seeds	8N421CLDM	NS, CL, DM	78	77	5	27.3	34.0	1807
Mycogen Seeds	8H449CLDM	NS, CL, DM	78	72	24	31.2	38.6	1928
Mycogen Seeds	8D310CL	NS, CL	80	83	19	24.3	32.4	1636
Mycogen Seeds	8N270CLDM	NS, CL, DM	74	74	30	27.4	35.0	828
Seeds 2000	Falcon	NS, EX	77	73	3	28.5	33.4	2392
Seeds 2000	Durango	NS, EX	81	71	7	27.8	34.5	1885
Seeds 2000	Camaro II	NS, CL, DM	78	79	8	27.7	33.5	2047
Seeds 2000	Torino	NS, CL	81	74	5	28.6	34.3	2147
Seeds 2000	Cobalt II	HO, CL, DM	76	73	12	28.1	34.1	1614
Seeds 2000	Daytona	HO, CL	78	75	3	27.3	34.4	1655
Seeds 2000	NLK12S069	NS, EX	77	75	14	24.7	32.4	1539
Seeds 2000	NLK12S070	NS, EX	75	70	15	26.3	34.9	1626
Seeds 2000	Hornet	HO, CL, DM	80	80	18	26.8	33.4	2399
Syngenta	3845 HO	HO	77	78	14	26.3	34.8	1906
Syngenta	7111 HO/CL/DM	HO, CL, DM	74	72	24	27.9	34.2	1438
Syngenta	3733 NS/DM	NS, DM	80	75	40	26.2	35.7	1098
Proseed	E-21 CL	HO, CL	77	82	10	26.5	33.0	1646
Proseed	E-85 CL	HO, CL	78	85	10	25.4	33.7	1646
Proseed	E-31 CL	HO, CL	79	83	6	25.8	32.5	1908
Proseed	E-362436	HO	75	88	13	28.7	33.2	1946
Trial Mean			77	78	11	27.1	34.0	1816
C.V. %			1.5	3.7	88.8	2.4	4.2	15.6
LSD 10%			1	3	12	0.8	1.7	345

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

** Days after planting.

Planting Date: May 15

Harvest Date: October 26

Previous Crop: Wheat

NDSU Hettinger Research Extension Center

Canola - Roundup Ready - 2013	Hettinger, ND
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Brand	Variety	Oil Type	Days to Bloom	Bloom Duration	Days to Mature	Plant Height	Lodging	Test Weight	Oil Content	Seed Yield	
										2013	2Yr Avg
		*	**	days	**	inches	0 - 9***	lbs/bu	%	-----lbs/a-----	
Cargill	V12-1	HO	50	22	91	39	1	50.8	43.9	1718	1419
Cargill	V12-2	HO	50	22	92	38	0	50.6	44.0	1533	--
Cargill	v2045	HO	48	22	91	37	0	50.9	44.2	1411	1238
Cargill	v2170	TR	50	23	92	36	0	50.8	44.2	1566	1246
Croplan	930	TR	47	23	90	41	0	52.9	45.3	1647	--
Croplan	955	TR	48	22	89	41	1	52.4	45.3	2054	1536
Croplan	969	TR	47	22	89	40	1	52.6	44.8	2008	--
BrettYoung	6070 RR	TR	48	23	93	40	0	52.0	43.2	1539	1325
BrettYoung	6040 RR	TR	48	23	92	41	0	53.0	42.5	1696	--
Mycogen Seeds	Nexera 1012 RR	HO	50	26	98	42	0	51.0	44.0	1593	1204
Mycogen Seeds	Nexera 1016 RR	HO	48	23	92	40	1	52.0	42.2	1301	1068
Mycogen Seeds	G1570046H	HO	50	24	95	40	0	50.6	41.5	1482	--
Mycogen Seeds	G1570048H	HO	51	22	94	37	0	49.6	42.1	1119	--
Proseed	CS 1	TR	47	23	90	38	2	52.9	44.7	1650	--
Proseed	CD 2	TR	47	22	89	37	1	52.7	45.0	1570	--
Star Specialty Seed	Star 402	TR	48	22	90	38	0	52.6	46.8	1700	1293
Star Specialty Seed	Star 514	TR	46	23	90	37	3	53.1	44.5	1460	--
DeKalb	DKL30-42	TR	47	24	93	36	2	52.2	42.7	1422	--
DeKalb	DKL38-48	TR	47	23	91	36	1	52.9	43.9	1727	--
DeKalb	DKL55-55	TR	47	24	92	34	2	52.5	45.5	1370	--
DeKalb	DKL70-07	TR	48	25	95	35	1	51.8	44.5	1770	--
DeKalb	DKL72-40	TR	48	23	92	36	0	52.0	46.3	1639	--
Trial Mean			48	23	92	38	1	51.8	44.3	1607	--
C.V. %			1.2	3.3	3.3	7.3	142	1.3	1.8	12.6	--
LSD 10%			1	1	1	3	1	0.8	1.0	240	--

* Type: TR-Traditional Oil Type, HO-High Oleic Oil Type.

** Days after planting.

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

Planting Date: May 7

Harvest Date: August 17

Previous Crop: No-till Green Fallow Spring Wheat

NDSU Hettinger Research Extension Center

Canola - Clearfield - 2013 **Hettinger, ND**

Brand	Variety	Oil Type	Days to Bloom	Bloom Duration	Days to Mature	Plant Height	Lodging	Test Weight	Oil Content	Seed Yield	
										2013	2-Yr. Avg.
		*	**	days	**	inches	0 - 9***	lbs/bu	%	-----lbs/a-----	
Croplan	VT X 121 CL	TR	43	25	90	33	3	51.8	42.1	757	--
Mycogen	Nexera 2012 CL	HO	47	23	92	32	1	50.5	44.4	621	672
Mycogen	CL268726H	HO	49	22	91	34	0	51.1	45.9	1056	--
Mycogen	CL2537357H	HO	49	22	92	36	0	50.8	45.3	1126	--
Trial Mean			47	23	91	34	1	51.0	44.4	890	--
C.V. %			0.6	2.3	0.8	2.3	51.0	1.7	1.9	14.5	--
LSD 10%			0.4	0.7	1.0	3.2	0.6	1.1	1.1	167	--

* Type: TR-Traditional Oil Type, HO-High Oleic Oil Type.

** Days after planting.

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

Planting Date: May 7

Harvest Date: August 17

Previous Crop: No-till Green Fallow Spring Wheat

NDSU Hettinger Research Extension Center

Dry Bean - 2013	Hettinger, ND
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Variety	Type	Days to	Plant	Plant	100 Seed	Test	----- Grain Yield -----			----- Average Yield -----	
		Flowering	Height	Lodge	Weight	Weight	2010	2011	2013	2 yr	3 yr
		DAP*	inches	0-9**	grams	lbs/bu	----- lbs per acre -----				
LaPaz	Pinto	58	21	3	29.7	60.4	1995	1916	2779	2348	2230
Lariat	Pinto	55	21	5	32.9	57.1	2122	2068	2571	2320	2254
Mariah	Pinto	53	18	4	32.0	57.2	--	--	2780	--	--
Maverick	Pinto	53	18	4	33.0	56.5	1987	1791	2152	1972	1977
Medicine Hat	Pinto	53	19	4	34.1	54.7	2066	1532	2409	1971	2002
ND-307	Pinto	55	19	4	34.0	55.4	--	2184	2813	2499	--
Stampede	Pinto	55	19	4	31.3	55.2	1559	1914	2552	2233	2008
Windbreaker	Pinto	54	19	3	35.9	55.1	1942	1645	2216	1931	1934
Avalanche	Navy	55	20	3	19.6	58.9	1556	1549	2571	2060	1892
Ensign	Navy	55	20	4	18.1	58.3	1380	1401	2780	2091	1854
HMS Medalist	Navy	55	21	1	16.3	59.6	1447	1253	2562	1908	1754
Norstar	Navy	56	19	5	16.5	61.2	--	--	1653	--	--
Navigator	Navy	54	22	1	15.4	59.5	--	--	2505	--	--
Vista	Navy	57	22	3	15.1	59.4	1611	1370	1994	1682	1658
T9905	Navy	57	20	3	17.4	59.9	--	--	3082	--	--
Merlot	Sm Red	56	20	5	32.1	58.1	1589	1496	1961	1729	1682
Rio Rojo	Sm Red	55	21	4	25.6	62.5	--	--	2548	--	--
Sedona	Pink	59	21	5	29.9	54.1	838	612	1533	1073	994
Eclipse	Black	57	20	1	15.5	57.0	1784	1707	2246	1977	1912
Loreto	Black	59	21	2	16.2	59.5	1227	1502	2190	1846	1640
Zorro	Black	57	22	1	16.3	57.0	2043	1573	2155	1864	1924
Trial Mean		57	20	3	24.9	57.8	1640	1656	2402	--	--
C.V. %		--	8.0	19.8	4.5	1.9	6.1	7.5	7.7	--	--
LSD 10%		--	2	1	1.3	1.3	165.0	177.0	217.0	--	--

* Days after planting.

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

Planting Date: May 22

Harvest Date: September 13

Seeding Rate: 100,000 live seeds / acre.

Previous Crop: Spring Wheat Green Fallow

NDSU Hettinger Research Extension Center

Chickpea - 2013 **Hettinger, ND**

Variety	Days to		Lodging	1,000	Seeds	Test	----- Grain Yield -----			----- Average Yield -----	
	Flower	Height		Seed Wt.	Lb	Weight	2011	2012	2013	2 yr	3 yr
	DAP*	inches	0 - 9**	gm	seeds	lb/bu	-----lb/a-----				
Kabuli Type											
CDC Alma	60	14	0	479	953	55.9	--	--	2131	--	--
CDC Frontier	60	17	0	426	1066	56.0	1106	2855	2380	2618	2114
CDC Luna	59	15	0	434	1049	53.7	1114	3134	1976	2555	2075
CDC Orion	58	16	0	489	931	53.4	--	--	2202	--	--
Dylan	59	16	0	410	1112	55.3	145	1445	1214	1330	935
Sawyer	59	18	0	491	924	54.1	1090	2242	1781	2012	1704
Sierra	60	18	0	480	945	49.6	457	1457	610	1034	841
Small Kabuli Type											
B-90	63	17	0	253	1797	51.6	1029	2813	1914	2364	1919
Desi Type											
CDC Anna	60	18	0	217	2095	49.8	1692	2651	2281	2466	2208
Mean	60	17	0	433	1130	54.0	777	2227	1924	--	--
C.V. %	0.6	9.0	0.0	4.5	5.2	2.6	35.0	6.6	11.4	--	--
LSD 10%	1	2	0	23	70	1.7	98	180	262	--	--

* Days after planting.

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

Planting Date: April 26

Harvest Date: September 6

Previous Crop: No-till Green Fallow Spring Wheat

NDSU Hettinger Research Extension Center

Field Pea - 2013

Hettinger, ND

Variety	Days to Flower		Vine Length	Canopy Height	Height Index ¹	Lodging	Seed Protein	Seed 1,000	Seeds Lb	Test Weight	Seed Yield			
	Duration	Mature									2013	2-Yr Avg	3-Yr Avg	
	DAP ²	DAP ²	inches	inches	%	0 - 9 ³	%	gm	seeds	lb/bu	bu/a	bu/a		
Yellow Cotyledon Type														
Agassiz	57	23	94	29	21	72	4	27.4	247	1837	63.6	52.6	48.7	52.0
Bridger	56	20	90	24	20	85	3	26.5	237	1917	63.1	53.0	52.6	--
CDC Meadow	56	22	92	25	17	69	5	25	216	2104	63.4	50.5	--	--
DS Admiral	56	17	88	25	17	67	6	25.4	223	2041	62.3	54.0	51.4	54.2
Gunner	57	21	92	25	18	72	5	26.1	225	2016	62.5	47.8	47.9	51.9
Korando	55	22	91	24	14	58	6	27.2	277	1644	62.5	49.2	51.1	55.5
Navarro	54	21	89	24	16	69	5	26.8	247	1861	62.9	49.2	--	--
Nette	55	17	86	23	18	81	5	24.9	225	2022	63.6	48.5	--	--
SW Midas	58	19	91	23	14	59	6	25.4	209	2167	63.7	51.0	50.0	52.8
Vegas	57	18	89	24	20	83	2	28.3	237	1921	64.7	41.9	44.7	49.6
Green Cotyledon Type														
CDC Striker	55	18	87	22	11	47	8	25.1	219	2075	62.7	52.6	51.2	49.8
Cruiser	57	21	92	23	14	63	6	26.6	207	2206	61.7	44.9	44.9	44.6
K2	56	22	91	20	18	90	3	25.6	215	2115	62.7	39.8	42.3	46.7
Majoret	56	19	89	24	14	56	7	27.7	221	2053	62.9	50.9	46.1	46.2
SW Arcadia	55	18	87	22	9	42	9	25.2	224	2058	62.2	54.3	53.2	52.6
Mean	57	19	90	24	17	69	5	26.4	237	1937	63.2	49.1	48.7	50.5
C.V. %	0.8	7.0	1.3	7.2	11.3	13.8	21.9	1.8	6.0	5.9	1.4	7.6	--	--
LSD 10%	1	2	1	2	2	11	1	0.6	17	135	1.0	4.4	--	--

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

² Days after planting.

³ Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: April 30

Harvest Date: August 8

Previous Crop: No-till Green Fallow Spring Wheat

2013 Field Pea - Recrop

Dickinson, ND

Variety	Days to Bloom	Bloom Duration	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	--Grain Yield--			Returns ¹ \$/ac	Average Yield	
							2011	2012	2013		2	3
							-----bu/ac-----				--bu/ac--	
Yellow Types												
Agassiz	54	16	1,924	24	63.0	24.3	50.3	38.4	37.6	227.61	38.0	42.1
DS Admiral	53	15	1,979	27	64.1	24.9	45.6	39.0	40.9	265.17	39.9	41.8
CDC Meadow	53	15	2,180	26	64.5	24.5	--	--	38.0	232.20	--	--
CDC Treasure	53	16	2,158	27	64.6	23.9	--	--	40.9	265.25	--	--
Green Types												
Cruiser	53	14	2,444	24	63.9	25.2	36.1	33.8	29.9	249.18	31.9	33.3
CDC Striker	52	14	2,340	18	64.0	24.1	43.0	38.2	27.2	207.39	32.7	36.1
Majoret	52	15	2,001	23	64.1	26.0	45.4	37.7	34.8	325.32	36.2	39.3
CDC Raezer	55	12	1,929	25	63.6	24.7	--	--	34.5	320.83	--	--
Trial Mean	53	15	2,120	24	64.0	24.7	45.5	37.8	35.5	261.62	--	--
CV %	1.5	8.1	3.5	6.0	0.7	1.6	--	--	11.4	--	--	--
LSD 0.10	1	1	90	2	0.6	0.5	--	--	4.9	--	--	--

Planting Date: May 3, 2013

Harvest Date: August 5, 2013

Previous Crop: Barley

Seeding Rate: 325,000 live seeds/ac

Grain protein percentages reported on a 0% moisture basis

¹Returns were calculated by multiplying the 2013 yield by the average price for yellow (\$11.67/bu) and green (\$15.42/bu) peas listed on the Northern Pulse Growers Association web site (<http://northernpulse.com/>) on September 17, 2013. Returns also deduct \$211.47, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for Field Pea.

SDSU West River Ag Center

Field Pea - 2013						Bison, SD
Variety	Seed Color	Canopy Height inches	Seed Size seeds/lb	Test Weight lbs/bu	Grain Protein %	Yield 2013 bu/ac
Shamrock	Green		2148	60.5	25.0	31
Mystique	Yellow		1988	59.6	27.0	29
Salamanca	Yellow		1978	62.7	26.9	27
AC Agassiz	Yellow		2053	61.5	27.5	27
Korando	Yellow		1843	58.9	26.5	27
Spider	Yellow		2103	62.3	27.1	26
Bridger	Yellow		2148	61.6	26.5	26
Gunner	Yellow		2063	61.4	26.3	26
D. S. Admiral	Yellow		2043	61.0	25.1	26
Check (Vegas)	Yellow		2225	60.4	26.8	25
Vegas	Yellow		2243	61.6	27.3	25
Jetset	Yellow		1985	60.9	26.2	25
Nette	Yellow		2035	61.1	25.1	23
Navarro	Yellow		1883	57.7	25.2	23
K2	Green		2245	62.4	26.0	22
Torch	Yellow		1893	60.2	26.4	22
CDC Striker	Green		2000	60.6	27.6	22
SW Midas	Yellow		2228	60.7	26.0	22
Bluemoon	Green		2028	63.0	26.1	21
Cruiser	Green		2345	60.8	26.8	21
Commander	Yellow		2085	--	27.4	20
Viper	Green		2120	--	26.6	18
Daytona	Green		1995	--	26.6	18
SW Arcadia	Green		2320	--	26.1	17
Trial Mean			2083	60.9	26.4	23.5
C.V. %			3.9	2.4	--	19.4
LSD 5%			115	NS	--	8

Planting Date: May 2

Harvest Date: August 7

Seeding Rate: 300,000 pure live seeds/ac

Previous crop: Spring wheat, no-till planted

Additional Nitrogen: Inoculated

Herbicide: Prowl H2O (2 1/2 pts/A) + Spartan (4 oz/A) pre

SDSU West River Ag Center

Field Pea - 2013						Ralph, SD
Variety	Seed Color	Canopy Height	Seed Size	Test Weight	Grain Protein	Yield 2013
		inches	seeds/lb	lbs/bu	%	bu/ac
Shamrock	Green	18	1803	60.9	23.9	58
Vegas	Yellow	17	2028	61.1	24.8	55
Salamanca	Yellow	18	1808	61.6	24.7	54
Gunner	Yellow	19	1915	61.9	23.3	52
Korando	Yellow	17	1673	62.0	25.3	52
Check (Vegas)	Yellow	17	1935	61.6	24.5	50
SW Midas	Yellow	16	2283	60.8	23.7	49
Torch	Yellow	17	1860	61.3	24.1	48
Spider	Yellow	17	1848	62.1	24.6	48
Commander	Yellow	18	2103	62.3	24.0	48
AC Agassiz	Yellow	17	2040	61.8	22.8	46
Daytona	Green	15	1758	60.8	24.5	46
Bridger	Yellow	18	2053	60.9	23.5	44
Jetset	Yellow	16	2013	63.4	23.9	44
Mystique	Yellow	19	1873	61.6	24.7	43
K2	Green	14	2075	62.3	23.8	42
Nette	Yellow	16	1950	62.4	23.2	41
Bluemoon	Green	15	1878	61.2	23.4	40
D. S. Admiral	Yellow	16	2025	62.4	23.6	40
Cruiser	Green	14	2295	61.8	24.8	39
Viper	Green	15	1948	62.3	24.5	38
SW Arcadia	Green	13	2265	60.7	23.3	36
Navarro	Yellow	15	1703	62.8	24.5	35
CDC Striker	Green	16	1995	63.4	25.8	34
Trial Mean		16	1963	61.8	24.1	45.0
C.V. %		14.8	3.7	1.8	--	26.6
LSD 5%		3	103	1.7	--	NS

Planting Date: April 29

Harvest Date: August 20

Seeding Rate: 300,000 pure live seeds/ac

Previous crop: Spring wheat, no-till planted

Additional Nitrogen: Inoculated

Herbicide: Prowl H2O (2 1/2 pts/A) + Spartan (4 oz/A) pre, Select (6 oz/A) post

NDSU Hettinger Reserach Extension Center

Lentil - 2013 **Hettinger, ND**

Variety	Days to Flower				Seed Protein %	1,000 Seed Wt. gm	Seeds Lb seeds	Test Weight lb/bu	Grain Yield			Average Yield	
	Flower DAP*	Duration days	Height inches	Lodging 0 - 9**					2011	2012	2013	2 yr	3 yr
Large Green Type													
CDC Greenland	63	21	12	4	22.4	63	7262	62.2	1551	1928	1789	1859	1756
Pennell	62	23	11	6	22.9	69	6623	62.2	1254	1698	1457	1578	1470
Riveland	63	19	12	6	22.5	68	6634	63.1	1010	1388	1580	1484	1326
Medium Green Type													
CDC Richlea	63	20	12	6	21.2	51	8855	63.6	1463	1986	1890	1938	1780
Avondale	63	21	12	5	21.7	49	9278	64.1	--	--	2171	--	--
Small Green Type													
CDC Viceroy	63	19	13	4	24.6	33	13685	63.5	1710	1962	3046	2504	2239
Essex	63	20	11	6	22.2	45	10042	65.1	1252	1875	2171	2023	1766
Eston	63	21	11	4	23.8	36	12678	64.5	--	--	2273	--	--
Small French Green Type													
CDC Lemay	62	21	10	6	22.3	34	13425	63.1	1140	1689	2393	2041	1741
Medium Red Type													
CDC Red Rider	63	21	14	3	22	46	9826	62.0	--	--	3133	--	--
Small Red Type													
CDC Redberry	62	21	12	2	23	41	10990	63.3	1870	1876	2919	2398	2222
CDC Rouleau	63	19	11	6	20.8	37	12278	62.4	1656	1776	1926	1851	1786
Extra Small Red Type													
CDC Rosetown	62	22	12	2	23	32	14121	64.6	1711	2130	2942	2536	2261
Spanish Brown Type													
Morena	63	20	12	5	23	39	11579	64.6	1260	2094	2478	2286	1944
Mean	63	20	11	5	23	47	10297	63.4	1484	1932	2283	--	--
C.V. %	0.7	2.6	8.4	20.6	2.0	5.4	5.8	1.4	6.9	5.8	12.3	--	--
LSD 10%	1	1	1	1	0.6	3	707	1.1	111	133	332	--	--

* Days after planting.

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

Planting Date: April 26

Harvest Date: August 15

Previous Crop: No-till Green Fallow Spring Wheat

Variety	Days to Bloom	Bloom Duration	Seeds per Pound	Test Weight lbs/bu	Protein %	---Grain Yield---			Returns ¹ \$/ac	Average Yield	
						2011	2012	2013		2	3
						----lbs/ac----			Year	Year	
										---lbs/ac---	
Large Green Types											
CDC Greenland	53	21	6,675	61.0	21.5	2,006	1,616	1,743	108.00	1,679	1,788
Pennell	54	20	6,515	59.4	22.7	2,239	1,708	1,548	73.22	1,628	1,832
Riveland	52	18	5,970	60.4	21.3	2,043	1,430	1,451	55.97	1,441	1,641
Medium Green Type											
CDC Richlea	53	18	8,699	62.3	20.4	2,292	1,907	1,872	131.11	1,889	2,024
Small Green Type											
CDC Viceroy	54	19	14,684	64.0	24.0	2,364	1,736	1,920	139.71	1,828	2,007
Essex	53	21	9,723	64.1	20.8	--	1,730	2,010	155.88	1,870	--
Small French Green Type											
CDC Lemay	54	21	14,159	63.5	21.7	2,084	1,627	1,571	77.43	1,599	1,761
Medium Red Type											
CDC Red Rider	53	21	10,237	63.5	21.6	2,501	1,899	1,837	124.86	1,868	2,079
Small Red Types											
CDC Redberry	54	20	10,797	63.4	22.6	2,220	1,856	1,567	76.63	1,711	1,881
CDC Rouleau	54	19	11,857	62.6	20.7	2,135	1,780	1,755	110.24	1,767	1,890
Extra Small Red Type											
CDC Rosetown	53	22	15,974	64.5	23.9	2,375	1,738	1,725	104.94	1,731	1,946
Spanish Brown Type											
Morena	52	18	11,067	63.8	22.0	--	1,752	1,833	124.22	1,793	--
Trial Mean	53	20	10,962	63.0	22.2	2,226	1,706	1,673	95.51	--	--
CV %	1.4	7.4	2.4	0.8	1.5	--	10	13	--	--	--
LSD 0.10	1	2	318	0.6	0.4	--	198	268	--	--	--

Planting Date: May 3, 2013

Harvest Date: August 5, 2013

Previous Crop: Barley

Seeding Rate: 600,000 live seeds/ac

Grain protein percentages reported on a 0% moisture basis

¹Returns were calculated by multiplying the 2013 yield by the average price for lentils (\$17.87/cwt) listed on the Northern Pulse Growers Association web site (<http://northernpulse.com/>) on September 17, 2013. Returns also deduct \$203.38, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for Lentil.

NDSU Hettinger Reserach Extension Center

Clearfield Lentil - 2013

Hettinger, ND

Variety	Days to Flower	Flower			Seed	1,000	Seeds	Test	----- Grain Yield -----			Average Yield	
	Flower DAP*	Duration	Height	Lodging	Protein	Seed Wt.	Lb	Weight	2011	2012	2013	2 yr	3 yr
	days	days	inches	0 - 9**	%	gm	seeds	lb/bu	-----lb/a-----				
Large Green Type													
CDC Imigreen	56	20	16	3	23.8	61	7394	64.1	--	1212	2640	1926	--
Medium Green Type													
CDC Impress	55	21	14	6	20.7	52	8792	62.7	1760	1795	3260	2528	2272
Small Red Type													
CDC Maxim	55	21	13	3	23.0	39	11702	63.5	1874	2039	3132	2586	2348
Extra Small Red Type													
CDC Impala	56	20	15	3	23.9	28	15975	65.2	1712	1807	3086	2447	2202
Mean	55	21	14	4	23	45	10966	63.9	1755	1663	3029	--	--
C.V. %	0.8	1.6	8.6	20.2	1.5	2.4	2.5	0.5	4.6	5.5	8.2	--	--
LSD 10%	1	1	1	2	0.5	1	355	0.4	77	112	322	--	--

* Days after planting.

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

Planting Date: April 26

Harvest Date: August 15

Previous Crop: No-till Green Fallow Spring Wheat

Variety	Days to Bloom	Bloom Duration	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	Returns ¹ \$/ac	Grain Yield lbs/ac
Large Green Types								
CDC Imigreen-CL	44	26	6,895	16	61.4	22.5	69.52	1,527
Medium Green Type								
CDC Impress-CL	43	26	8,870	14	62.5	20.3	144.25	1,945
Small Red Types								
CDC Maxim-CL	42	25	11,581	12	63.6	20.7	51.83	1,428
Extra Small Red Type								
CDC Impala-CL	42	27	15,620	13	64.5	22.7	138.29	1,912
Trial Mean	43	26	10,742	14	63.0	21.5	100.97	1,703
CV %	1.6	3.7	2.2	10.3	0.4	0.9	--	12.2
LSD 0.10	1	1	312	2	0.3	0.3	--	269.5

Planting Date: May 3, 2013

Harvest Date: August 5, 2013

Previous Crop: Barley

Seeding Rate: 600,000 live seeds/ac

Grain protein percentages reported on a 0% moisture basis

¹Returns were calculated by multiplying the 2013 yield by the average price for lentils (\$17.87/cwt) listed on the Northern Pulse Growers Association web site (<http://northernpulse.com/>) on September 17, 2013. Returns also deduct \$203.38, the sum of all listed costs from the December 2012 Farm Management Planning Guide Projected 2013 Crop Budgets South West North Dakota for Lentil.

NDSU Hettinger Reaserch Extension Center

Soybean - Conventional - 2013	Hettinger, ND
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Variety	Maturity	Plant	Test	Oil	Protein	-----Grain Yield-----			Average Yield	
		Height	Weight	Content	Content	2011	2012	2013	2-Yr	3-Yr
		inches	lbs/bu	%	%	----- Bushels per acre -----				
Traill	00.0	30	57.6	16.1	36.8	37.8	22.6	44.4	33.5	34.9
Cavalier	00.9	27	55.8	16.3	35.5	37.5	30.5	42.6	36.6	36.9
Ashtbula	0.4	34	55.4	15.9	39.1	37.8	33.6	46.1	39.9	39.2
Sheyenne	0.7	33	55.6	16.3	36.0	43.9	38.5	47.1	42.8	43.2
ProSoy	0.8	35	55.9	16.3	35.4	34.3	34.4	38.3	36.4	35.7
ND1005T	0.5	30	56.4	14.6	39.5	35.8	30.1	43.1	36.6	36.3
ND06-4642	0.5	28	56.3	15.9	35.6	--	--	47.2	--	--
Trial Mean	--	31	56.2	15.9	36.8	37.7	31.6	44.1	37.6	37.7
C.V. %	--	3.9	0.9	2.4	1.8	3.4	4.9	5.9	--	--
LSD 10%	--	1	0.6	0.5	0.8	1.8	1.9	1.7	--	--

Planting Date: May 15

Harvest Date: September 17

Previous Crop: No-till Green Fallow Spring Wheat

NDSU Hettinger Research Extension Center

Soybean - Roundup Ready - 2013

Hettinger, ND

Company	Variety	Maturity	Plant	Test	Oil	Protein	-----Grain Yield-----		Average
			Height	Weight	Content	Content	2011	2013	2-Yr
			inches	lbs/bu	%	%	----- Bushels per acre -----		
Proseed	PX 02	0.2	31	54.9	15.4	38.1	43.5	49.0	46.3
Proseed	PX 06	0.6	28	56.3	15.4	36.6	38.9	43.3	41.1
Integra Fortified Seed	20090 - GENRR2Y	0.9	29	55.4	16.4	34.1	--	46.1	--
Integra Fortified Seed	20300 - GENRR2Y	0.3	30	55.6	15.0	37.9	--	40.5	--
Integra Fortified Seed	20600 - GENRR2Y	0.6	31	55.8	15.2	36.9	--	43.1	--
Integra Fortified Seed	20902 - GENRR2Y	0.9	31	55.7	15.0	38.0	--	39.6	--
Trial Mean		--	30	55.6	15.4	36.9		43.6	43.7
C.V. %		--	4.9	0.9	1.9	0.8		6.2	--
LSD 10%		--	2	0.6	0.4	0.3		3.3	--

Planting Date: May 15

Harvest Date: September 22

Previous Crop: No-till Green Fallow Spring Wheat

NDSU Hettinger Research Extension Center

Corn - 2013

Hettinger, ND

Company	Hybrid	Traits*	Relative Maturity*	Plant Height	Ear Height	Stalk Lodge	Moisture Content	Test Weight	Yield 2013
			days	inches	inches	%	%	lbs/bu	bu/ac
Proseed	PX85R	VT2P	85	104	44	0	22.8	55.9	147
Proseed	PX85B	VT2P	85	100	39	0	20.2	57.2	109
Proseed	1283	VT2P	83	94	40	0	18.4	56.2	135
Proseed	PX82M	GTCBLL	82	100	41	2	19.7	53.8	124
Proseed	1083	VIPGTCBLL	83	97	42	1	18.5	53.8	163
Integra	9352	VT2PRO	85	102	44	0	25.1	56.8	155
Integra	3537	VT2PRO	85	102	45	0	22.5	55.8	151
Integra	3314-3110	GT	83	92	40	0	21.8	54.5	134
Integra	9333	VT2PRO	83	102	47	0	21.4	57.8	130
AgVenture	R2774	RR	84	96	45	1	20.1	52.2	134
AgVenture	GL2949AB	RR/BT	84	99	42	0	20.7	55.4	145
AgVenture	GL2708AB	RR/BT	87	102	43	3	25.5	55.5	126
AgVenture	GL4132ABW	RR/BT/RW	89	100	46	0	27.4	55.9	135
AgVenture	R4492	RR	91	99	43	0	21.0	55.8	147
Trial Mean			--	99	43	1	21.8	55.5	138
C.V. %			--	4.5	7.4	143.2	8.9	1.2	11.8
LSD 10%			--	5	4	1	2.3	0.8	19

* Traits and relative maturity provided by the company.

Planting Date: May 15

Harvest Date: October 26

Previous Crop: Wheat

NDSU Hettinger Research Extension Center

Grain Sorghum - 2013 **Hettinger, ND**

Company	Hybrid	50% Bloom		Plant Height	Lodging	Moisture Content	Test Weight	Yield 2013
		Date	DAP*					
			days	inches	%	%	lbs/bu	bu/ac
Sorghum Partners	251	8/18	73	43	59	20.0	52.7	25
Sorghum Partners	SP3303	8/26	81	43	26	16.4	45.9	40
Sorghum Partners	K35-Y5	8/25	80	43	73	16.5	42.2	41
Sorghum Partners	KS310	8/24	79	45	56	17.0	39.1	31
Sorghum Partners	SP3425	8/26	81	39	55	21.2	44.9	31
DeKalb	DKS26-60	8/20	75	42	65	16.1	45.0	54
DeKalb	DKS28-05	8/20	75	48	48	18.3	43.6	40
DeKalb	DKS29-28	8/23	78	41	63	17.6	44.9	40
Monsanto	MSK180	8/27	82	47	55	22.7	39.7	38
Monsanto	MSK181	8/27	82	47	19	23.9	39.0	34
Mycogen	1G557	8/22	77	44	49	17.2	43.3	46
Mycogen	1G600	9/3	89	46	41	24.4	33.2	19
Trial Mean		--	79	44	51	19.3	42.8	36
C.V. %		--	1.1	3.5	34.7	9.7	4.2	28.0
LSD 10%		--	1	2	21	2.2	2.2	12

* Days after planing.

Planting Date: June 7

Harvest Date: October 27

Previous Crop: Durum wheat

The grain sorghum suffered from heavy lodging due to the blizzard on October 4-5.

Many of the hybrids were not mature at that time which led to poor test weights and yields.

Bayer Broadleaf Weed Control in HRSW

John Rickertsen, Hettinger, ND

Trt. No.	Treatment Description	Rate Unit	20-Jun		3-Jul		15-Aug			22-Aug	
			bindw ----% control----	wibw	bindw ----% control----	wibw	bindw -----% control-----	wibw	jabr	TWT lb/bu	Yield bu/ac
1	UNTREATED		0	0	0	0	0	0	0	60.5	25.7
2	HUSKIE AMS	11 OZ/A 0.5 LB WT/A	90	99	25	99	10	99	10	61.8	29.3
3	HUSKIE AMS	13.5 OZ/A 0.5 LB WT/A	95	99	13	99	5	99	3	61.1	31.6
4	HUSKIE COMPLETE AMS	13.7 OZ/A 0.5 LB WT/A	95	99	68	99	30	99	90	61.9	39.5
5	VARRO Bison Advanced	6.85 OZ/A 0.8 PT/A	95	99	83	99	78	99	88	62.3	35.1
6	WideMatch MCPA	16 OZ/A 8 OZ/A	48	85	83	99	65	99	8	63.3	29.2
7	Affinity TankMix Starane Ultra NIS	0.6 OZ WT/A 4.32 OZ/A 0.25 % V/V	85	99	80	99	35	99	0	61.9	30.5
	Mean		73	83	50	85	32	85	28	61.8	31.6
	LSD (.05)		6	3	6	1	34	1	8	1.7	8.1
	CV		5.5	2.6	7.9	0	80.8	0	19.2	1.8	17.3

Planting Date: 5/6/13
Harvest Date: 8/22/13
Variety: Select HRSW

Application Date: 6/12/13
Application Time: 8:45-9:00 PM
Air Temp: 64
Relative Humidity: 68%
Wind Speed / Dir: 0-5 SSE
% Clouds: 30%
Crop Stage: 4-5 leaf

bindw = field bindweed
wibw = wild buckwheat
jabr = japanese brome

Summary

No crop injury was observed. All herbicide treatments provided excellent control of wild buckwheat. Huskie, Huskie Complete, Varro and Affinity showed good early season control of bindweed but only Widematch and Varro had some season long control. The other herbicide treatments were limited in season long control of bindweed. This trial had a significant japanese brome infestation and only Huskie Complete and Varro had some control of it. The lack of control of japanese brome in the other treatments was a major factor in their reduced yields compared to treatments 4 and 5.

Bayer Spring Burndown and Japanese Brome Control on HRSW

Trt. No.	Treatment Description	Rate	Rate Unit	Appl. Time	14-Jun	14-Jun	27-Jun	15-Aug	22-Aug		
					VCRR	jabr	jabr	jabr	TWT	Yield	
					-----% control-----					lb/bu	bu/A
1	ROUNDUP WEATHERMAX AMS HUSKIE AMS	16 OZ/A 17 LB/100 GAL 11 OZ/A 0.5 LB/A		PP PP POST POST	0	53	73	53	58.9	31.7	
2	ROUNDUP WEATHERMAX AMS HUSKIE COMPLETE	16 OZ/A 17 LB/100 GAL 13.7 OZ/A		PP PP POST	1	85	95	99	61.4	51.8	
3	ROUNDUP WEATHERMAX AMS HUSKIE COMPLETE AMS	16 OZ/A 17 LB/100 GAL 13.7 OZ/A 0.5 LB/A		PP PP POST POST	1	90	91	97	60.1	46.2	
4	ROUNDUP WEATHERMAX AMS HUSKIE COMPLETE OLYMPUS AMS	16 OZ/A 17 LB/100 GAL 13.7 OZ/A 0.2 OZ/A 17 LB/100 GAL		PP PP POST POST POST	1	90	98	99	63.0	51.4	
5	ROUNDUP WEATHERMAX OLYMPUS AMS HUSKIE COMPLETE AMS	16 OZ/A 0.2 OZ/A 17 LB/100 GAL 13.7 OZ/A 0.5 LB/A		PP PP PP POST POST	0	85	96	99	58.4	38.8	
6	ROUNDUP WEATHERMAX OLYMPUS AMS HUSKIE COMPLETE OLYMPUS AMS	16 OZ/A 0.2 OZ/A 17 LB/100 GAL 13.7 OZ/A 0.2 OZ/A 0.5 LB/A		PP PP PP POST POST POST	0	93	98	99	57.5	47.4	
7	ROUNDUP WEATHERMAX AMS RIMFIRE MAX HUSKIE MSO	16 OZ/A 17 LB/100 GAL 3 OZ/A 11 OZ/A 20.8 OZ/A		PP PP POST POST POST	0	88	97	99	60.1	43.8	
8	ROUNDUP WEATHERMAX OLYMPUS AMS RIMFIRE MAX HUSKIE MSO	16 OZ/A 0.2 OZ/A 17 LB/100 GAL 3 OZ/A 11 OZ/A 20.8 OZ/A		PP PP PP POST POST POST	1	88	97	94	59.1	40.9	
9	ROUNDUP WEATHERMAX AMS Everest 2.0 HUSKIE NIS	16 OZ/A 17 LB/100 GAL 1 OZ/A 11 OZ/A 0.25 % V/V		PP PP POST POST POST	3	84	97	99	60.6	43.4	
10	ROUNDUP WEATHERMAX PRE-PARE AMS Everest 2.0 HUSKIE NIS	16 OZ/A 0.3 OZ/A 17 LB/100 GAL 0.5 OZ/A 11 OZ/A 0.25 % V/V		PP PP PP POST POST POST	1	89	86	97	58.8	34.8	
Mean					1	84	93	93	59.8	43.0	
LSD (.05)					2	10	16	16	3.0	9.3	
CV					165.9	8.4	11.5	4.3	3.5	14.9	

jabr = japanese brome

Planting Date: 5/6/13
Harvest Date: 8/22/13
Variety: Select HRSW

	PP	POST
Application Date:	5/7/13	6/6/2013
Application Time:	4:30-5:00 PM	3:00-3:30 PM
Air Temp:	75	65
Relative Humidity:	18%	68%
Wind Speed / Dir:	5-8 SSE	3-5 SSE
% Clouds:	30	25
Crop Stage:	--	4 leaf

Summary

Very little crop injury was observed. The Roundup + Huskie treatment (treatment 1) provided good control of the emerged japanese brome, but no control of later emerging plants. All the other treatments provided good season long control of japanese brome.

Bayer Grass Control in HRSW

John Rickertsen, Hettinger, ND

Trt. No.	Treatment Description	Rate Unit	20-Jun			3-Jul		15-Aug		22-Aug	
			VCRR	wiot ----% control----	jabr	wiot ----% control----	jabr	wiot ----% control----	jabr	TWT lb/bu	Yield bu/A
1	UNTREATED		0	0	0	0	0	0	0	60.9	32.6
2	RIMFIRE MAX HUSKIE BASIC BLEND	3 OZ WT/A 11 OZ/A 1 % V/V	3	91	94	91	97	93	98	61.6	43.2
3	RIMFIRE MAX HUSKIE HSOC	3 OZ WT/A 11 OZ/A 12 OZ/A	0	92	95	96	99	99	99	61.4	41.5
4	RIMFIRE MAX Affinity TankMix Starane BASIC BLEND	3 OZ WT/A 0.6 OZ/A 5.28 OZ/A 1 % V/V	0	92	93	93	99	99	99	62.6	42.3
5	VARRO Bison Advanced	6.85 OZ/A 12.8 OZ/A	0	91	95	88	99	99	99	62.9	44.0
6	HUSKIE COMPLETE AMS	13.7 OZ/A 0.5 LB WT/A	0	90	95	91	99	99	99	61.6	38.5
7	WOLVERINE	27.4 OZ/A	0	25	94	28	97	58	96	60.5	30.4
	Mean		0	69	81	69	84	78	84	61.6	38.9
	LSD (.05)		2	2	3	6	3	2	2	1.4	7.2
	CV		305.0	5.6	2.3	5.6	2.2	10.3	2.0	17.1	12.5

Planting Date: 5/6/13
Harvest Date: 8/22/13
Variety: Select HRSW

Application Date: 6/12/13
Application Time: 8:30-8:45 PM
Air Temp: 64
Relative Humidity: 68%
Wind Speed / Dir: 0-5 SSE
% Clouds: 30%
Crop Stage: 4-5 leaf

wiot = wild oat
jabr = japanese brome

Summary

Very little to no crop injury was observed. All herbicide treatments provided good control of japanese brome and all the herbicide treatments with the exception of Wolverine (treatment 7) provided good control of wild oats.

2013 foliar fungicide application on hard red spring wheat, Bowman, ND

Roger Ashley and Glenn Martin, Dickinson, ND

'Vantage' hard red spring wheat was no-till seeded on 30 Apr 2013 in a field that had grown wheat in the previous two years. Wolverine herbicide (fenoxaprop + bromoxynil + pyrasulfotole) was applied to all treatments on 2 Jun. Where an early season application of Stratego was to be applied, the fungicide was tank mixed with the herbicide and then applied. The flag leaf application of fungicide Prosaro 421, was made on 24 Jun and the flowering application of Prosaro 421 was made on 8 Jul. Induce, a non-ionic surfactant (NIS) at the rate of 0.125% v/v was included in the Prosaro 421 fungicide applications. Weather conditions at the time of application on 2 Jun was air temperature = 63.5°F, relative humidity at 53.4% with a wind from the southeast at 6.5-7.3 mph. During the flag leaf application on 24 Jun air temperature was 74°F, relative humidity at 81% with wind from the southeast at 7-9 mph. The flowering application was made on 8 Jul air temperature was 75°F relative humidity of 73% with a wind from the southwest at 5.8 mph. Crop injury was not observed on any of the treatments 4 to 21 days after treatment. Precipitation was 185% of normal for the season with May, July, and August being exceptionally wet with 459, 146, and 179% respectively of normal. Evaluations for crop disease occurred on 7 Jun, 15 Jul and 29 Jul. All leaves on ten consecutive plants in each plot were evaluated during the 7 Jun evaluation while the flag leaf and two leaves below the flag leaf were evaluated on ten consecutive plants in each plot during the 15 Jul and 29 Jul evaluations. Tan spot was the primary disease detected on 7 Jun and 15 Jul while tan spot and septoria were detected on 29 Jul. Scab was detected during the last evaluation and incidence recorded. Harvest occurred on 29 Aug. Grain samples from the untreated check were submitted to the NDSU Diagnostic Laboratory. DON was not detected in any of these samples. No significant differences were detected among treatments for the incidence of leaf spotting diseases. However compared to the untreated check disease severity was significantly reduced following the fungicide application. Yield was higher for treatments which included an application Prosaro at flag leaf or flowering compared to the untreated check and Stratego only application at the 6-leaf stage. Bayer CropScience provided financial support for this trial. Thanks to Miles Hansen for the use of this plot area on his farm.

Treatment ¹	Rate	Timing ²	7-Jun		15-Jul		29-Jul		Scab	Yield	Grain ⁵ Test wt
			I ³	S ⁴	I ³	S ⁴	I ³	S ⁴			
	fl oz/a		----- % -----					bu/a	lb/bu		
Untreated check	-	-	100	34.5	80.0	7.5	100	54.0	10	54.3	63.2
Stratego	4	A	100	14.8	100.0	6.0	100	41.0	7.5	55.3	62.5
Prosaro 421	5	B	100	37.0	47.5	1.0	100	4.8	2.5	62.3	62.8
Stratego + Prosaro 421	4 + 6.5	A + C	100	13.0	5.0	0.3	100	3.5	0.0	60.3	63.5
Prosaro 421	6.5	C	100	34.8	32.5	0.8	100	4.8	0.0	59.2	64.1
Mean			100	26.8	53.0	3.1	100	21.6	4.0	58.3	63.2
CV%			0	15.9	69.7	59.4	0.0	25.5	75.7	4.33	0.83
LSD 0.05			NS	6.6	NS	2.8	NS	8.5	4.7	3.89	0.81

¹ Treatment listed is foliar applied fungicide. Fungicide applied at 6th leaf stage was tank mixed with herbicide.

² Timing refers to the growth stage of wheat when the fungicide was applied. A = 5 to 6 leaf stage (2 Jun); B = Flag leaf (24 Jun); C = Flowering (8 Jul).

³ I = Incidence or percent of plants infected with at least one lesion.

⁴ S = Severity is the percentage of the leaf infected with a leaf disease

⁵ Reported grain yield and test weight are adjusted to a 12% moisture basis.

2013 Wheat Pest Survey in North Dakota

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Venkata Chapara, Area Crop Protection Specialist, NC Research Extension Center, Minot, ND
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Chet Hill, Area Extension Specialist, Williston Research Extension Center, Williston, ND
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Scott Knoke, County Ag Extension Agent, Benson County Extension Office, Minnewaukan, ND

Introduction

The purpose of the Wheat Pest Survey is to detect the presence and population density of diseases and insect pests that are common in wheat grown in North Dakota and to verify the absence of invasive exotic pests. Six full-time survey scouts operated out of the Dickinson Research Extension Center, the North Central Research Extension Center (Minot), the Carrington Research Extension Center, the Langdon Research Extension Center, the Williston Research Extension Center and the Fargo Agricultural Experiment Station. A part-time crop scout also operated out of the Benson County Extension Office. Survey information was provided on a timely basis to North Dakota producers and others in agriculture to assist them with pest management decisions via weekly ag newsletters and internet.

Several 'high risk' exotic diseases, insect pests and nematodes were surveyed to assist with early detection of these invasive pests. Two exotic insect pests, Old World bollworm (*Helicoverpa armigera*) and Egyptian cottonworm (*Spodoptera littoralis*) were surveyed using insect pheromone traps. Field scouts also surveyed wheat fields for black stem rust, flag smut, dwarf bunt, *Cephalosporium* stripe and cereal leaf beetle to support export of wheat from North Dakota. Exotic nematodes also were identified from soil samples collected from wheat fields. These data provide valuable data to support the export of agricultural commodities and confirm the lack of invasive pests in North Dakota.

Results:

Maps from the 2013 IPM Wheat Survey in North Dakota were uploaded weekly onto the NDSU IPM website. Field survey results of these pests on wheat, and other crops were mapped and posted to the following web site:

<http://www.ag.ndsu.nodak.edu/aginfo/ndipm/index.htm>

NDSU field scouts surveyed a total of 1,298 wheat fields. The survey was initiated on May 23 and continued through August 14, 2013. Crops were surveyed from the 2-leaf stage through kernel hard (ripening) stage. Field scouts surveyed for winter wheat, hard red spring wheat, and durum wheat insect pests. In addition to fields surveyed, crop scouts also set out traps across the state for exotic insects, as well as collected soil samples from wheat fields for analysis of nematode content.

Insects

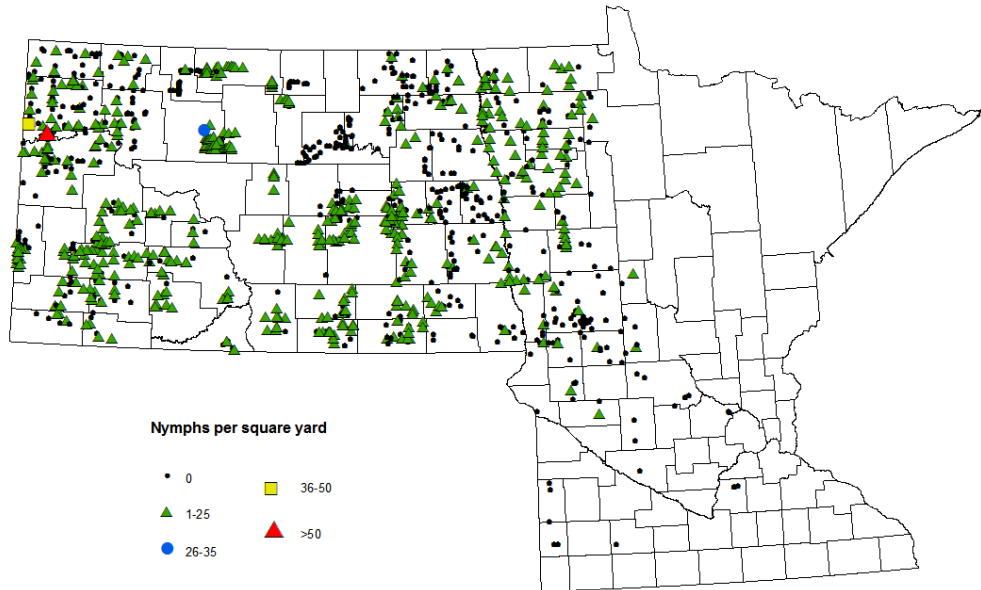
Grasshoppers

Scouts swept for grasshoppers using a 15-inch sweep net in field edges of surveyed wheat fields. Grasshoppers were found in all 53 North Dakota counties. Grasshoppers were found in 73% of fields surveyed from early June through the end of survey (mid-August). The average number of grasshoppers per square yard was 5.5 among the positive observations, with ranges from 1 to 64 grasshopper(s) per square yard. Populations of grasshoppers were the

highest in the northwest region of North Dakota. Most fields were generally below recommended treatment levels throughout North Dakota. This may have been due to wet weather conditions in May-June that were not favorable for grasshopper emergence and development. As a result, grasshoppers were a localized pest problem in North Dakota in 2013.

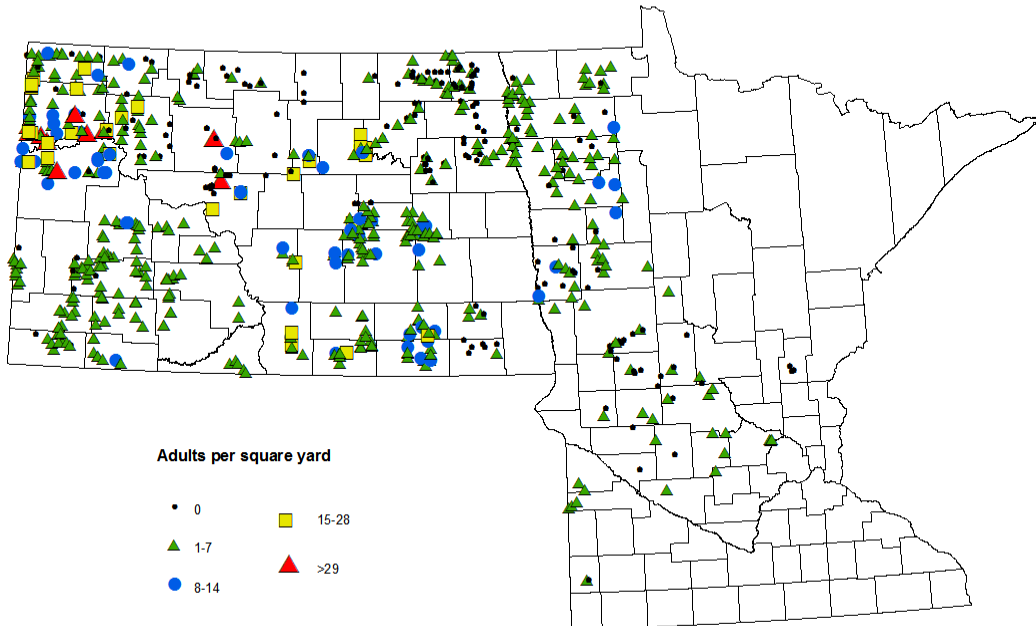
Grasshoppers

Season Final, 2013



Grasshoppers

Season Final, 2013

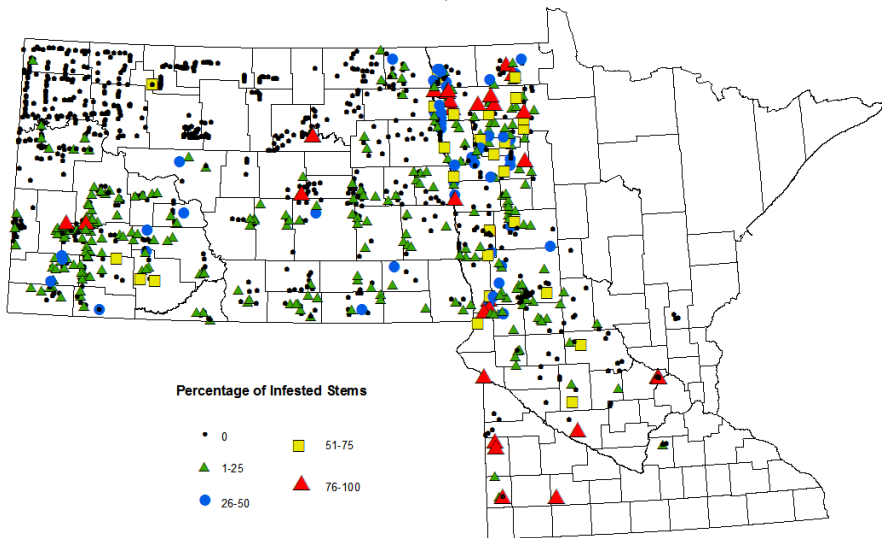


Cereal Aphids

Cereal aphids were counted on 100 stems (20 stems at 5 locations within a field) and recorded as the percent infested stems. Aphids were found in only 29% of the fields surveyed (Fig 3). The average percent infested stems was 22% among the positive, with ranges from 0 to 100%. Peak population densities occurred from mid-July to the end of the survey. The treatment threshold is when 85% of stems have one or more aphids present prior to completion of heading. There was limited insecticide spraying for control of wheat aphids, mainly in the east central, Red River Valley and southwest region.

Aphids in Wheat

Season Final, 2013

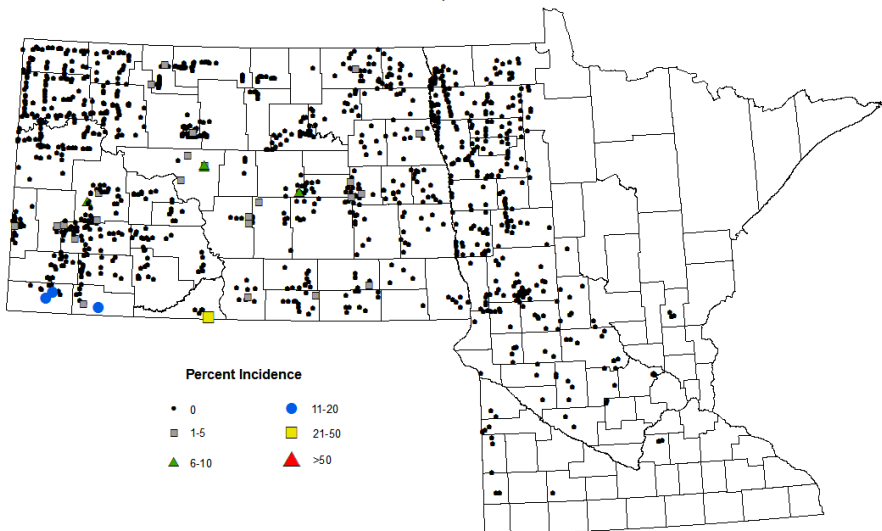


Wheat stem maggot

Wheat stem maggots (*Meromyza americana*) were sampled on 100 plants (20 plants at 5 locations) and incidence was recorded as the percent of plants with white heads. Wheat stem maggots were found in only 5% of fields surveyed from heading to maturity in 2013. White heads were observed from mid-July through late July. The average percent of infested plants with white heads was 5% among the positive observations, with ranges from 2 to 24%. The incidence of wheat stem maggot infested heads was lower in 2013 than the high of 17% white heads that occurred in 2007, and was similar to the low levels of 2012.

Wheat Stem Maggot

Season Final, 2013

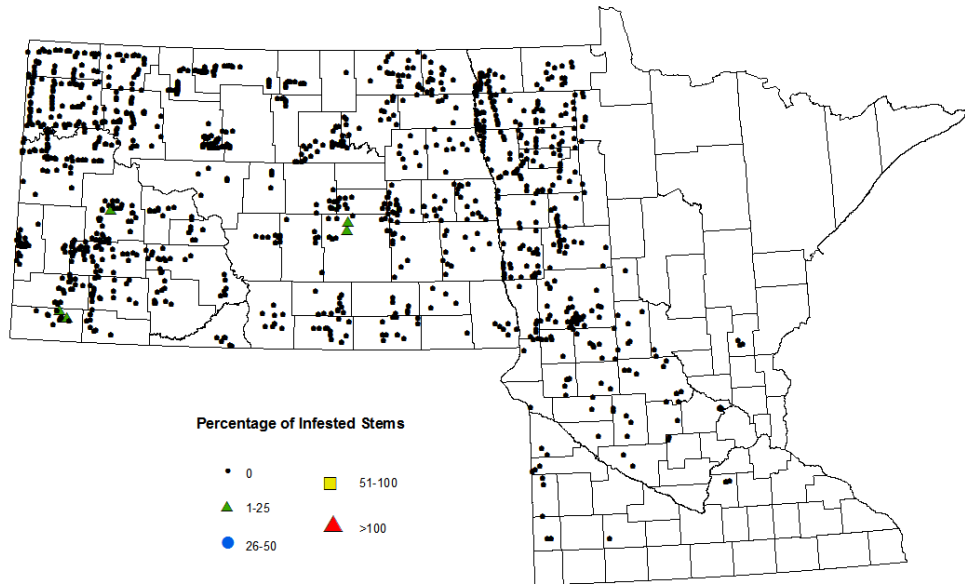


Wheat stem sawfly

Wheat stem sawfly (*Cephus cinctus*) has become a major insect pest of wheat in western North Dakota. We estimated that North Dakota wheat producers loss an estimated \$28-70 million in 2009 due to wheat stem sawfly. Crop scouts surveyed for wheat stem sawfly by sweeping wheat fields. Four sweeps at five different sites were used for a total of 20 sweeps per field. Wheat stem sawflies were found in <1% of wheat fields surveyed in 2013. The average number of sawflies per 20 sweeps was 1.4 among the positive observations, with ranges from 1 to 2. Wheat stem sawfly was very low in 2013.

Wheat Stem Sawfly

Season Final, 2013

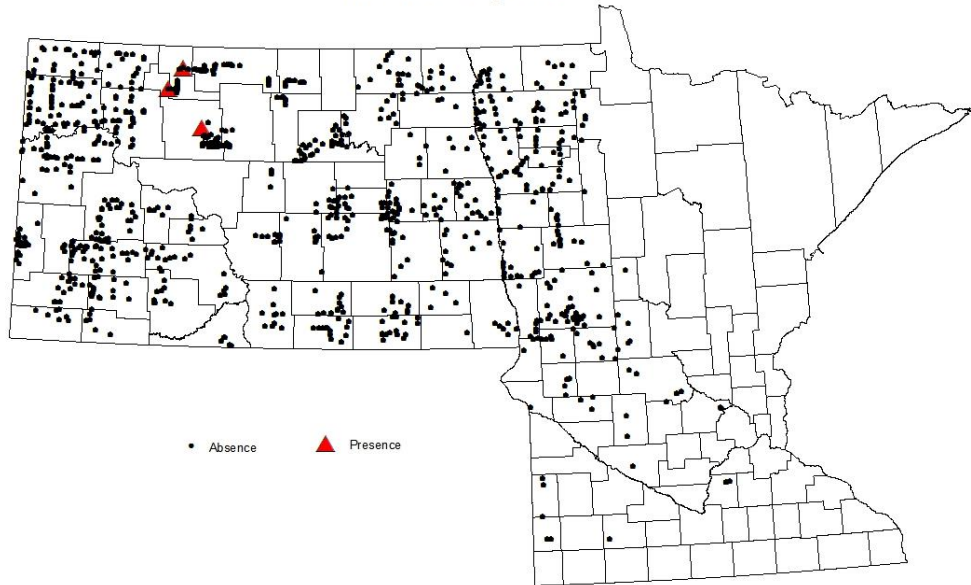


Cereal Leaf Beetle

Cereal leaf beetle (*Oulema melanopus*) is an export concern for shipments of hay from North Dakota to California and Canada, and it is monitored for state regulatory purposes. Cereal leaf beetle was detected in three new counties surveyed in North Dakota in 2013. These new county records include: Ward County at NCREC in Minot, Burke County near Flaxton, and Renville County near Mohall. Cereal leaf beetle was first detected in Williams and McKenzie Counties in June 2000. Cereal leaf beetle can be an economic pest of wheat and barley. Adults and larvae feed on the leaves, with the larvae being responsible for the majority of the damage. Damage looks like windowpaning on the upper leaf surface. However, economic infestations were not reported in 2013.

Cereal Leaf Beetle

Wheat & Barley 2013



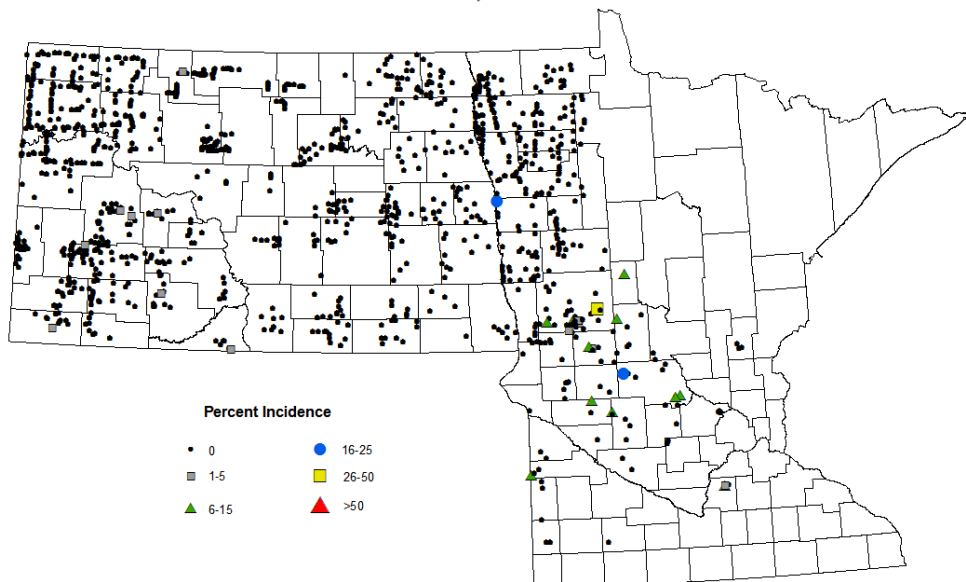
Diseases

Wheat Leaf Rust

Wheat leaf rust (*Puccinia triticina*) was found in only 2% of all fields surveyed, similar to 2012. Leaf rust severity averaged 7.8%, and ranged from 1 - 33%. However, severe leaf rust was observed on July 17th in susceptible winter wheat cultivars near Napoleon, by Steve Dvorak, agronomist for Ducks Unlimited. Varieties that he observed rust in were Decade, LCS Mint, and CDC Ptarmigan. Rust observations were in the plots not treated with fungicides.

Wheat Leaf Rust Percent Severity

Season Final, 2013

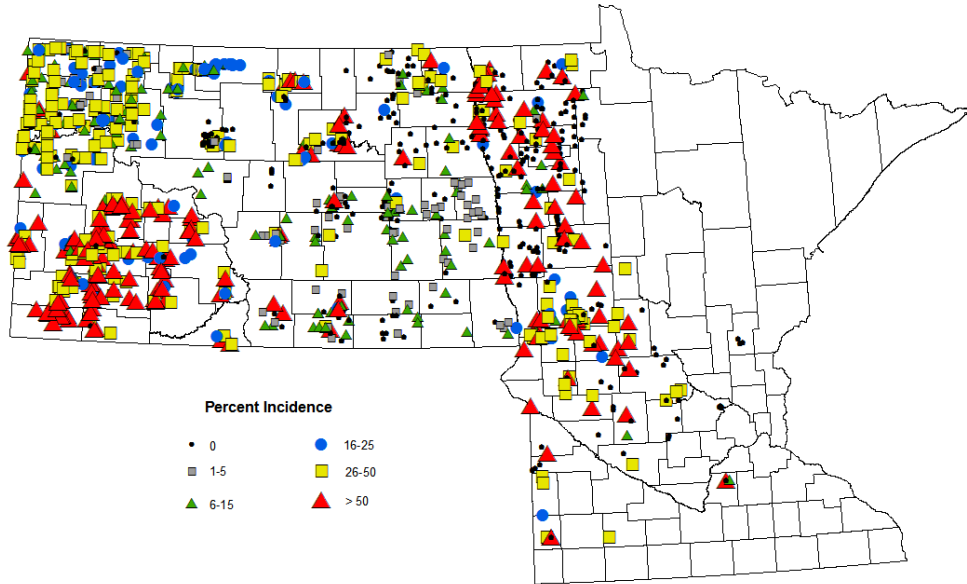


Tan Spot

Tan spot fungal leaf disease was the most common disease and was observed in about 69% of the surveyed fields. The average severity was low at 7.2% with a range of 1-100%.

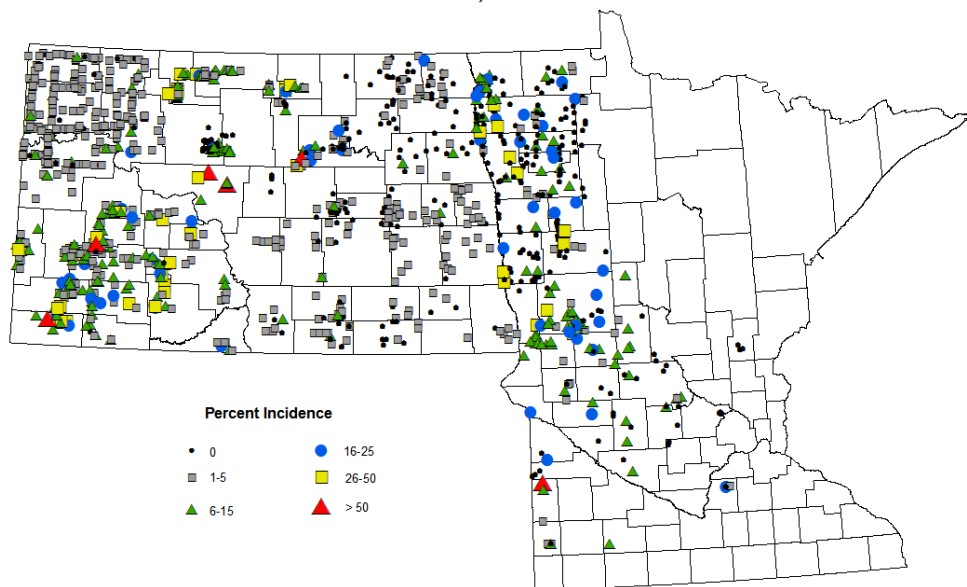
Tan Spot Percent Incidence

Season Final, 2013



Tan Spot Percent Severity

Season Final, 2013



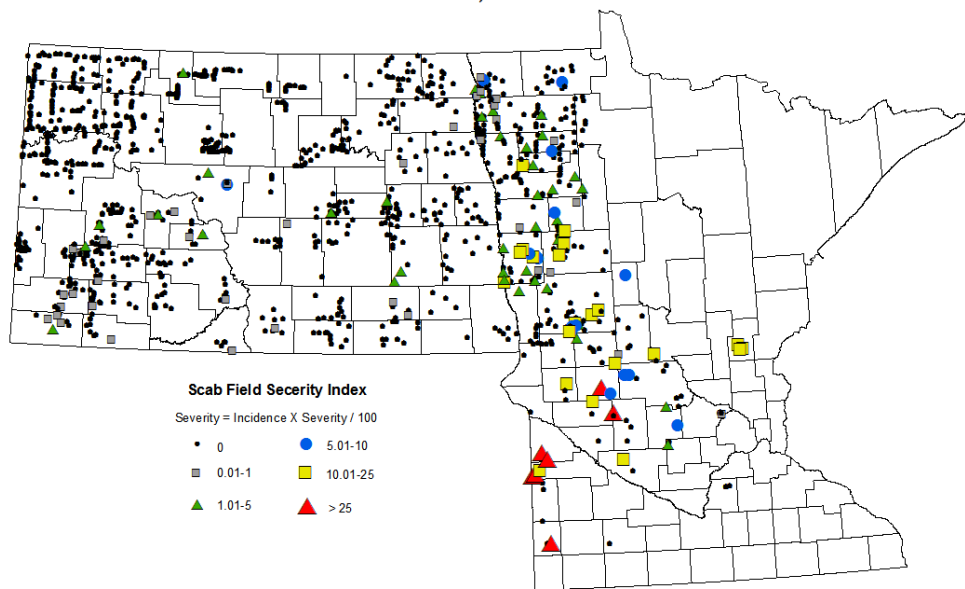
Fusarium Head Blight (or Scab)

Fusarium head blight (FHB) increased in 2013 from 2012. Scab was found in 46% of the post-flowering wheat fields surveyed; however, symptomatic fields averaged a low field severity rating of 6.4% from those fields showing symptoms.

Moderate to high risk of FHB (head scab) for susceptible wheat and durum varieties occurred across many areas of the state, especially in the northern and northwest counties of North Dakota. The late maturing crops were at increased risk of infection in these areas. High temperatures during the week of July 16th diminished risk for many diseases. Last year, FHB occurred in small grain crops in the northwest due to late season rain events. However, most of the state was very dry and FHB was generally not found. Fungicides were recommended for protection of crops in moderate to high risk areas and for any late maturing crops in 2013.

Wheat Scab Field Severity Index

Season Final, 2013



Other Diseases Observed:

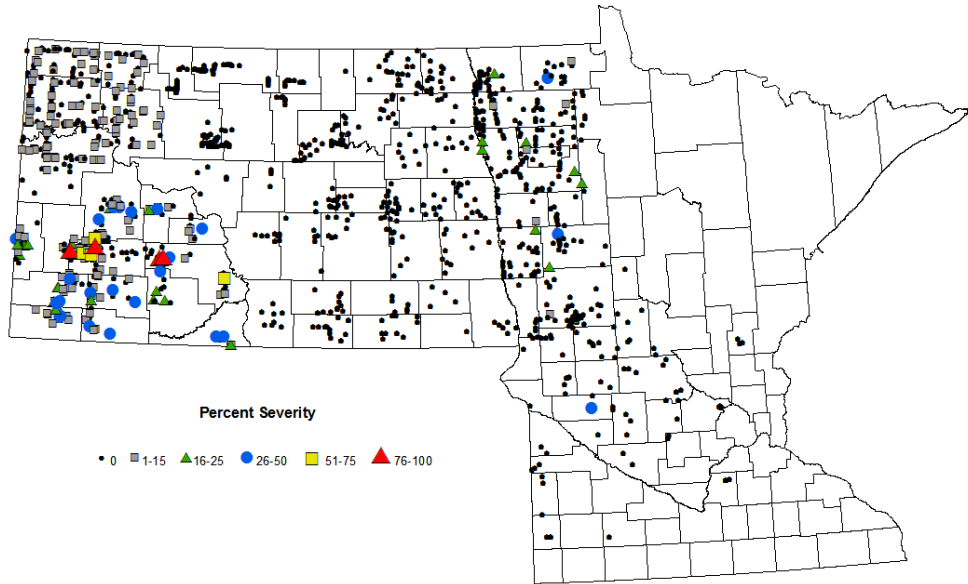
Septoria leaf spot was observed in 18% of surveyed fields with an average severity of 12.8%. Higher levels of incidence were found primarily in western counties. Septoria leaf spot generally was not detected until after anthesis. Loose smut was found in only 5.6% of surveyed fields primarily in western and east central counties, with an average of 6.4% of tillers infected in those fields showing symptoms. Ergot was found in only 3.2% of surveyed fields, with an average of 8.4% of tillers infected in those fields showing symptoms. Higher field levels of ergot were reported in the western counties.

Diseases Not Observed in Wheat Survey:

The following diseases were not observed in the 2013 wheat survey: black stem rust, flag smut; dwarf bunt; and *Cephalosporium* stripe.

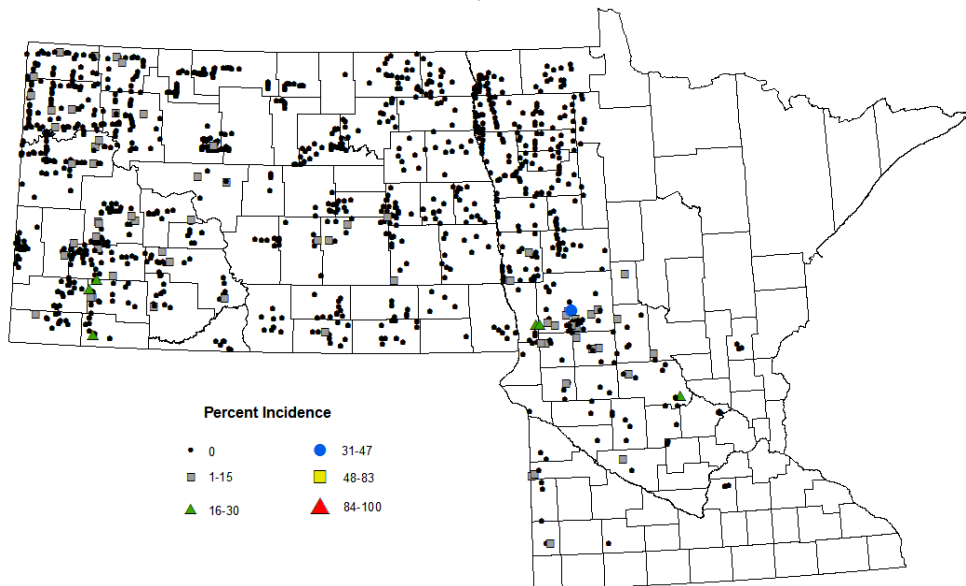
Wheat Septoria SSP Severity

Season Final, 2013



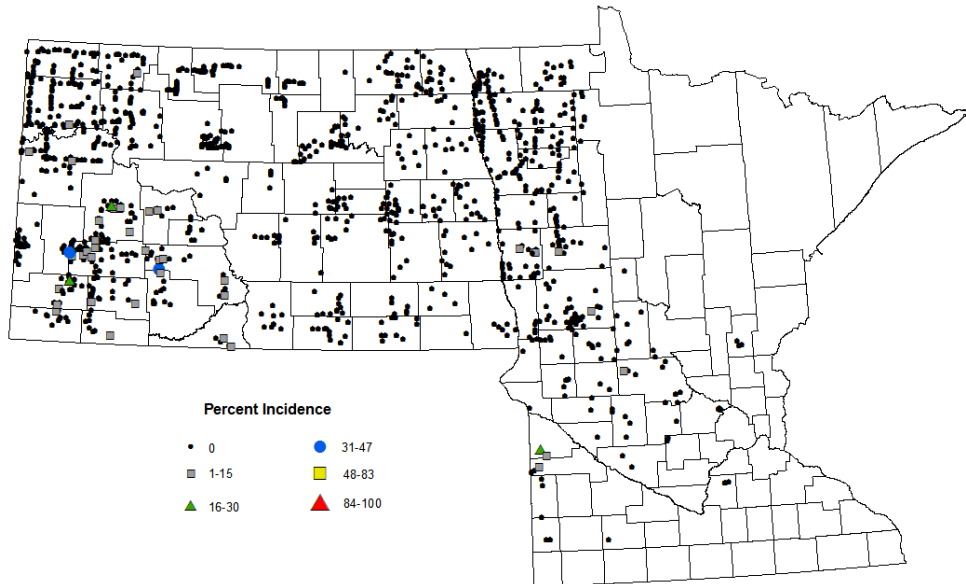
Wheat Loose Smut Incidence

Season Final, 2013



Wheat Ergot Percent Incidence

Season Final, 2013



Acknowledgements: The authors wish to thank the North Dakota Department of Agriculture, the North Dakota Legislature and EIPM NIFA for financial support of this survey effort. Many thanks to the field IPM scouts of 2013: Kyle Aasand, Gary Brandon, Brandi Herauf, Kalissa Syverson, Brett Gallagher, April Howatt and Kristine Keller. We appreciate the assistance of Darla Bakko and Keith Abeyratne in the Department of Plant Pathology for data formatting and ArcMap programming.

Small-Grain Average Yields in Variety Trials at Dickinson NDSU Dickinson Research Extension Center

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²Formerly at the Dickinson Research Extension Center

Average yield of the small-grain variety trials was determined from the early 20th century through 2013 by Jeff Gunderson (former research specialist at Dickinson) and, more recently, Glenn Martin (senior agronomy research specialist). Results demonstrate an increase in average yield for the hard red spring wheat (HRSW) variety trial of over 200%, from 17 bu/ac during the 1910-20 decade to almost 56 bu/ac for the current decade (2010-13; Fig. 1). This increase in yield is the result of several factors, including continual improvements in wheat genetics by breeders at North Dakota State University and other research institutions, use of fertilizers and pesticides beginning in the 1960s, and replacement of clean-till with no-till management in the 1990s.

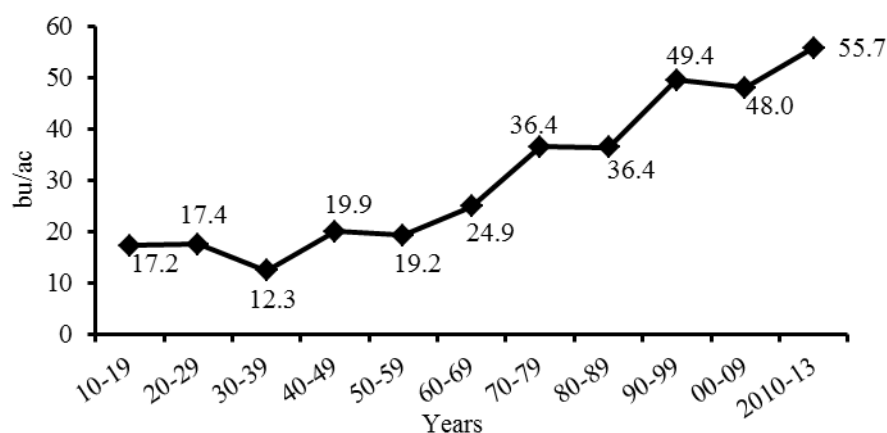


Figure 1. Average grain yield of varieties included in the hard red spring wheat variety trial at the NDSU Dickinson Research Extension Center.

Average yield increases in other small-grain variety trials at Dickinson have been comparable or greater than those of the spring wheat variety trial. For example, average yield of the barley variety trial has increased almost 300% from the 1910-20 decade to the present decade (2010-13; Fig. 2), as well as average yield of the oat variety trial (Fig. 3). Even average yield data of the durum variety trial, which was not established at Dickinson until the 1950s, shows a yield increase of over 100% (Fig. 4). These data demonstrate the value of having strong small-grain breeding programs located at North Dakota State University, along with incorporating promising new production methods into variety trial management at Dickinson and other research locations.

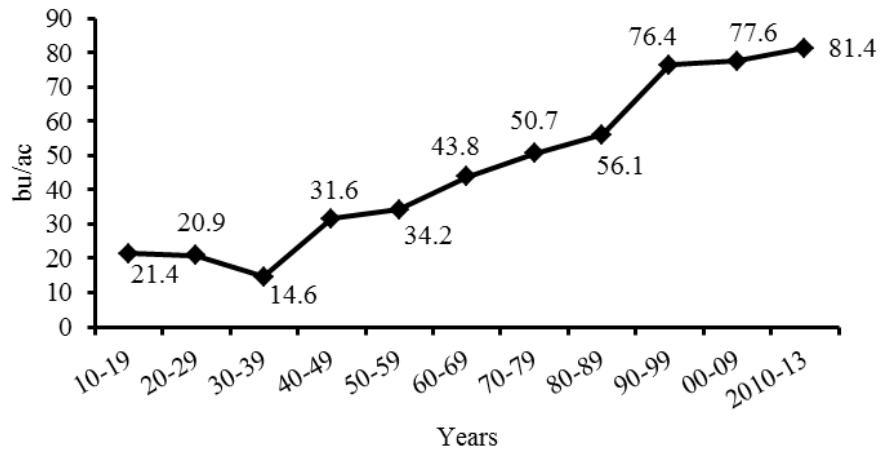


Figure 2. Average grain yield of varieties included in the barley variety trial at the NDSU Dickinson Research Extension Center.

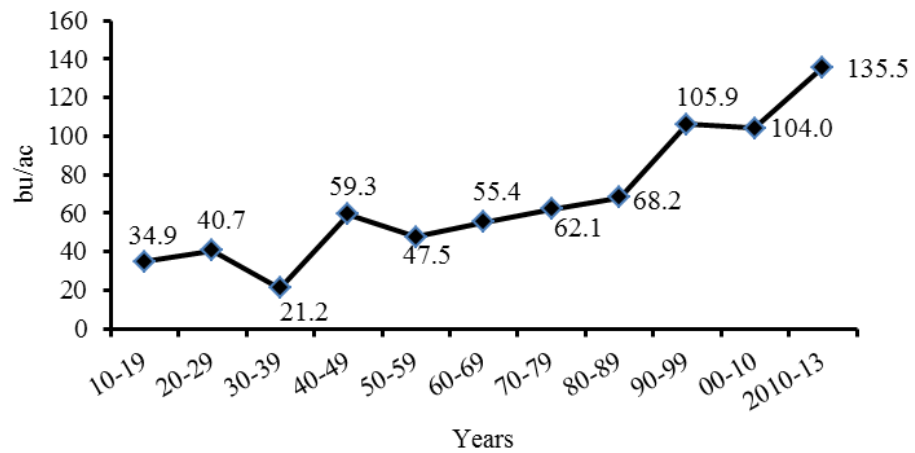


Figure 3. Average grain yield of varieties included in the oat variety trial at the NDSU Dickinson Research Extension Center.

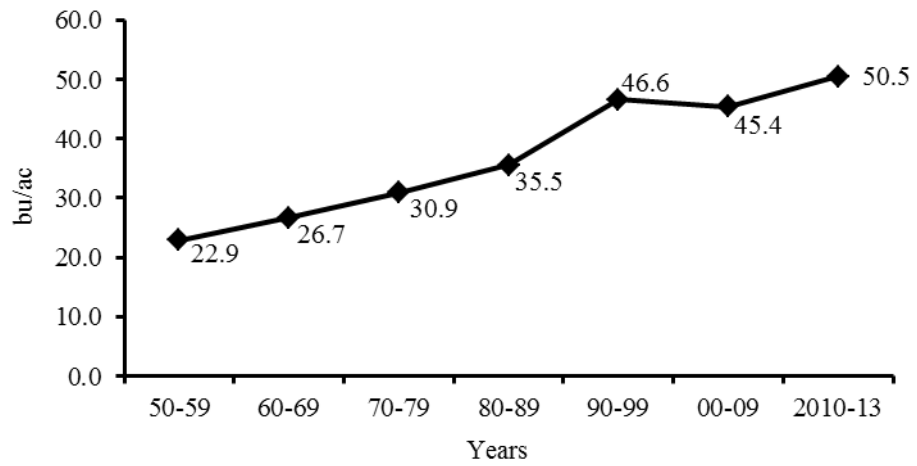


Figure 4. Average grain yield of varieties included in the durum variety trial at the NDSU Dickinson Research Extension Center.

Previous Crop and Tillage Effects on Barley Variety Performance
NDSU Dickinson Research Extension Center

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A study begun in 2010 was completed in 2013 where barley variety performance was compared following canola, corn, field pea, and spring wheat. Three six-rowed (Lacey, Stellar-ND, and Tradition) and three two-rowed (Conlon, Conrad, and Pinnacle) varieties were seeded after each of the four crops in a no-till system. Interactions between previous crop and variety selection were not detected for grain yield or test weight (data not presented). Likewise, we were unable to detect differences in barley yield across the four different crops in all years except 2010, when more grain was produced following field pea than corn and wheat ($P < 0.05$; Table 1). Lacey and Tradition produced comparable or greater amounts of grain compared with other varieties in each of the four years of the study. Lowest yields were produced by Conlon. Conlon along with Tradition produced grain with a test weight comparable or heavier than the test weight of grain produced by the other four varieties. These results indicate that barley grain yield and test weight generally is not impacted by the previous crop, and that Tradition seems to be the best adapted of the six varieties included in this study for grain yield and test weight under the growing conditions that occurred during this study.

Table 1. Previous crop by barley variety trial, NDSU Dickinson Research Extension Center, 2010-2013.

Tillage system	Grain yield bu/acre					Grain test weight lb/bu				
	2010	2011	2012	2013	Average	2010	2011	2012	2013	Average
Canola	90 ab ¹	57	55	59	65	48	38	44 a	46	44
Corn	70 c	65	43	65	61	46	38	42 b	45	43
Pea	95 a	70	57	54	70	48	38	43 ab	47	44
Wheat	86 bc	59	59	51	64	48	38	44 a	46	44
Varieties										
Conlon	74 b	53 d	41 c	32 c	50	49 a	40 a	45 a	47 a	45
Conrad	90 a	58 c	58 a	66 a	68	47 bc	36 c	43 bc	46 ab	43
Lacey	88 a	66 ab	56 a	70 a	70	48 ab	38 b	44 ab	44 c	44
Pinnacle	86 a	66 ab	58 a	57 b	67	48 ab	37 bc	42 c	47 a	43
Stellar-ND	89 a	65 b	51 b	58 b	66	46 c	38 b	43 bc	45 bc	43
Tradition	84 a	69 a	56 a	63 ab	68	48 ab	40 a	44 ab	47 a	45

¹Means in the same grouping within a column that do not share a common corresponding letter differ at $P < 0.05$.

A second study conducted from 2010 through 2013 investigated barley performance following corn in conventional-, reduced-, and no-till systems that had been in place since 1993. Six barley varieties were included in this study; they were the same varieties as those included in the previous crop study. We were unable to detect a significant difference ($P < 0.05$) in barley grain yield across the three different tillage systems in any year (Table 2), although there was a non-significant trend ($P = 0.09$) for more grain to be produced under no-till than under the other two tillage systems in 2012. Lacey produced grain at levels comparable or greater than amounts produced by other varieties in each year of the study. Conversely, Conlon produced low grain yields relative to other varieties in three of four years. Grain test weight was heavier for Conlon than other varieties in 2010. These results indicate that Lacey might be preferred among the six varieties included in this study if the goal of barley production is to maximize yield, whereas Conlon might be preferred if the goal is to optimize grain test weight. Results of this study and the previous crop study indicate that barley variety recommendations are not affected by either the previous crop or tillage system under conditions similar to those which occurred during these two studies in southwestern North Dakota.

Table 2. Barley variety performance in long-term tillage plots, NDSU Dickinson Research Extension Center 2010- 2013.

Tillage system	Grain yield					Grain test weight				
	2010	2011	2012	2013	Average	2010	2011	2012	2013	Average
Conventional	58	66	71	67	66	44 b	40	38 b	46	42
Reduced	67	65	74	60	67	45 b	41	38 b	46	43
No-till	63	56	87 ¹	52	65	47 a	40	41 a	46	44
Varieties										
Conlon	58 c ²	54 c	63 c	57	58	48 a	42 a	39 ab	47	44
Conrad	62 bc	57 bc	78 ab	66	66	45 bc	40 b	40 a	43	42
Lacey	65 ab	69 a	81 ab	62	72	45 bc	40 b	39 ab	46	43
Pinnacle	67 a	62 b	83 a	56	71	45 bc	39 b	39 ab	46	42
Stellar-ND	60 bc	62 b	83 a	58	68	44 c	39 b	38 b	44	41
Tradition	63 ab	69 a	76 b	59	69	46 b	42 a	39 ab	47	44

¹There was a non-significant trend ($P = 0.09$) for grain yield to be elevated under no-till in 2012.

²Means in the same grouping within a column that do not share a common corresponding letter differ at $P < 0.05$.

Corn Emergence and Development Demonstrations

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Jorey Dahner, Grant County Extension Agent

Demonstrations of corn emergence and development were established in three southwest North Dakota counties, Grant, Hettinger, and Slope, to provide producers the opportunity to learn about the importance of uniformity of seeding depth and placement have on grain yield of neighboring plants and overall field grain yields. Cooperating producers in these counties used their normal seeding and management practices when planting, fertilizing, and controlling weeds through the field where these demonstration plots were located. Two of the cooperators seeded their corn using no-till methods (row cleaner ahead of opener) while the third producer used strip-till in during the previous fall planting into the strip-till in the spring. The target plant population ranged from 20,900 plants per acre to 24,000 plants per acre. All fields studied were seeded with 30 inches between rows therefore the desired spacing between plants within the row was 10 to 8.7 inches. A minimum of 12 rows, each row 30 feet long, in three locations (replication) within the field were staked shortly after planting. Thereafter on a weekly basis over the next six weeks fields were visited to observe emergence and development of corn plants. In one replication late emerging plants were tagged with plastic stake with the emergence date noted. After all plants had emerged plant spacing was measured and recorded. Any set of plants that were located within two inches of each other was identified as a “double.” Any set of plants where there was more than 12 inch spacing between plants was considered a “skip.” At harvest a row determined to have the greatest variability and a row with the least variability in emergence in each replication was harvested. In one replication in each field individual ears from the row with the most variability within the row were picked, dried, shelled by hand and grain weight measured to maintain identity of production from individual plants. The row with the least variability within that replication was bulk harvested by hand, dried, shelled, and grain weight measured. For the remaining two replications the entire 30 feet of rows were picked, dried, and shelled by hand and grain weight measured. Photo and grain yields given in tables are from the demonstrations conducted in southwest North Dakota.

Uniform seed placement depth in uniformly distributed crop residue produces uniform emergence. Uniform seeding depth appears to be more critical than uniform spacing. Corn plants coming up at the same time are equally competitive for nutrients, water, and sunlight. When a plant develops ahead of its neighbor, it hurts yield significantly. Producers should spend more time worrying about uniformity of emergence rather than uniformity of plant spacing. The effect was the same across the three locations this year and likely to be the same across years. The results from these demonstration tend to support what previous university research studies have shown.

Variability of plant emergence on corn grain yield.

Emergence	Grain yield			
	Grant	Hettinger	Slope	Combined locations
	----- bu/acre -----			
Most Variable	70.0	100.4	89.0	84.7
Least Variable	159.5	159.3	103.8	138.6
Mean	114.8	129.8	96.4	111.6
CV%	11.8	13.4	10.5	24.8
LSD 0.05	47.5	NS	NS	30.2

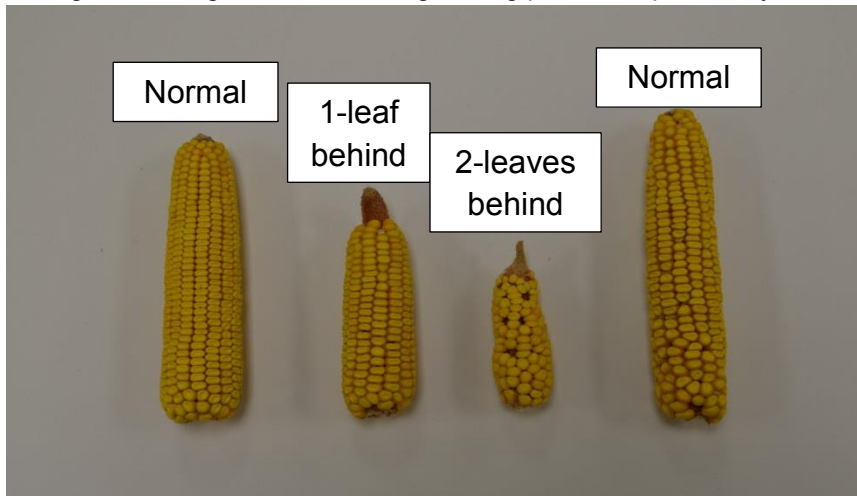
Grain yield from individual plants as affected by within row plant spacing.

Spacing	Grain yield			
	Grant	Hettinger	Slope	Combined locations
	----- grams/ear -----			
Normal	110.8	138.3	132.5	127.2
Skip	118.3	159.3	124.6	134.1
Doubles	-	144.9	36.7	82.8
Mean	114.6	147.5	97.9	120.7
CV%	-			25.6
LSD 0.05	-			NS

Grain yield of individual plants affected by emergence.

Emergence	Grain yield			
	Grant	Hettinger	Slope	Combined locations
	----- grams/ear -----			
Normal	147.7	153.7	128.5	143.3
1-leaf behind	110.5	115.2	76.9	100.9
2-leaf behind	45.3	91.5	20	52.3
Mean	101.2	120.1	111.7	98.8
CV%	-	-	-	14.2
LSD 0.05	-	-	-	31.8

Emergence timing in relation to neighboring plants, Slope County demonstration.



The authors wish to thank Reggie Pahl, Darwyn Mayer, and Miles Hansen for their assistance and use of their resources in conducting these demonstrations.

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