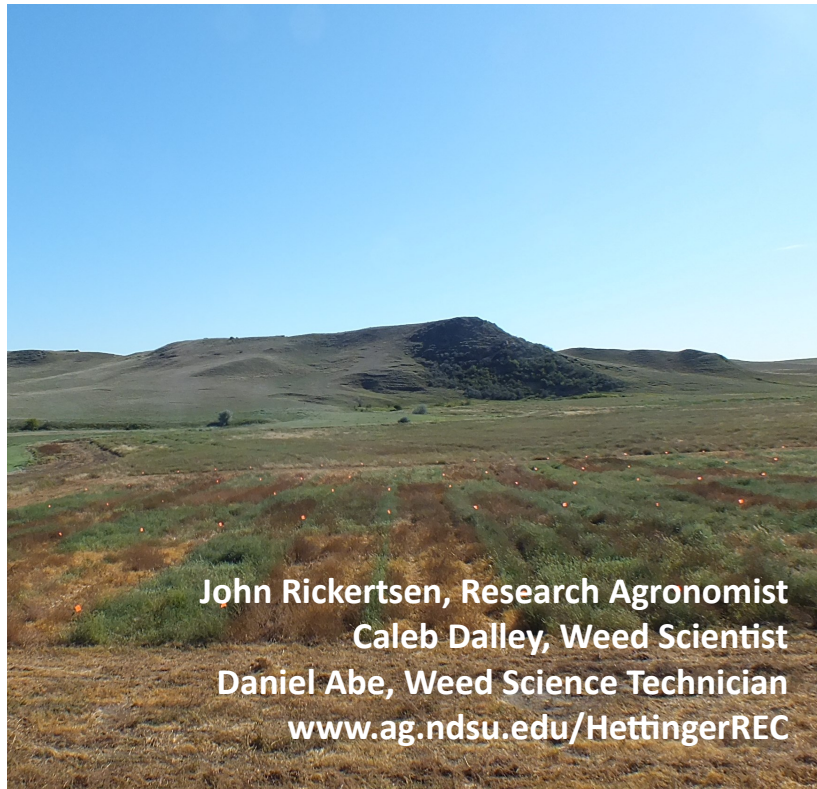


*Thirty-Fourth Annual
Western Dakota Crops Day
Research Report 2017*



NDSU

HETTINGER
RESEARCH EXTENSION CENTER



John Rickertsen, Research Agronomist
Caleb Dalley, Weed Scientist
Daniel Abe, Weed Science Technician
www.ag.ndsu.edu/HettingerREC

34th Annual Western Dakota Crops Day

December 14, 2017

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

10:10 Crop Variety Updates and Highlights of Ongoing Regional Crop Production Research

Dr. Caleb Dalley, Weed Scientist, NDSU Hettinger Research Extension Center.

Ryan Buetow, Extension Agronomist, NDSU Dickinson Research Extension Center.

Dr. Chris Graham, Extension Agronomist, SDSU West River Ag Center, Rapid City.

Patrick Wagner, SDSU Extension Entomology Field Specialist, Rapid City

12:00 Lunch

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

1:00 Crop Variety Updates and Highlights of Ongoing Crop Production Research (cont.)

John Rickertsen, Research Agronomist, NDSU Hettinger Research Extension Center.

1:30 Farm Management Program Overview & Crop Profitability

Levi Helmuth, Farm Management Education, Bismarck State College

2:00 Are Those Cows On Your Cropland?

Jay Fuhrer, Soil Health Specialist, Natural Resources Conservation Service.

2:45 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.

2017 Western Dakota Crops Day Sponsors

Hettinger Area Chamber of Commerce
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Pulse USA
South Dakota Wheat Growers Southwest
Grain
Stone Mill LLC
United Grain Corporation

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.

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Dan Christman, Hettinger
USDA – ARS Northern Great Plains Research Center, Mandan
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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 2017 Hettinger HRSW variety trial was 11.1% meaning that there was a 11.1 percent average variation between high and low yields among replications. In summation, a trial with a C.V. of 6% is more precise and reliable than a trial with a C.V. of 18%. When comparing yields, trials with a C.V. less than 15% are generally considered reliable.

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

For example, in the HRSW trial, the variety HRS 3419 averaged 41.2 bu/ac in 2017 compared to LCS Breakaway at 34.8 bu/ac. Did the yield difference between these varieties differ significantly? Compare the yield difference of 6.4 bu/ac between the varieties ($41.2 - 34.8$) to the LSD 5% value of 5.7 bu/ac. Since the 6.4 bu/ac difference is more than the LSD value of 5.7 bu/a, the varieties do differ significantly in yield. If the difference between these two varieties would have been 3.5 bu/ac, their difference would have been less than 5.7 bu/ac; therefore, the yield difference between these varieties would not have been significant.

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

Weather Summary - Hettinger

Frost Free Days

	28°F	32°F	Normal 32°F
Date of Last Frost	May 4	May 30	May 18
Date of First Frost	October 3	October 4	September 20
Frost Free Days	152	127	125

Precipitation (inches)

Month	2012-13	2013-14	2014-15	2015-16	2016-17	62 Year Average
October	0.7	4.4	0.1	2.0	0.9	1.1
November	0.1	0.2	1.0	0.0	0.4	0.5
December	0.5	0.5	0.0	0.5	0.1	0.3
January	0.2	0.1	0.1	0.2	0.6	0.4
February	0.2	0.3	0.0	0.4	0.2	0.4
March	0.2	0.6	0.2	0.2	0.9	0.7
April	0.2	1.6	1.0	3.7	1.2	1.6
May	7.9	1.6	4.0	1.0	0.6	2.7
June	3.7	5.1	5.2	0.9	0.3	3.3
July	2.0	0.9	1.0	1.5	1.7	2.0
August	1.8	5.2	1.9	1.7	1.8	1.8
September	3.4	1.3	0.9	2.3	1.9	1.4
April-Sept.	15.6	14.3	13.1	8.9	7.5	11.5
Total	20.7	21.7	15.4	14.4	10.6	16.3

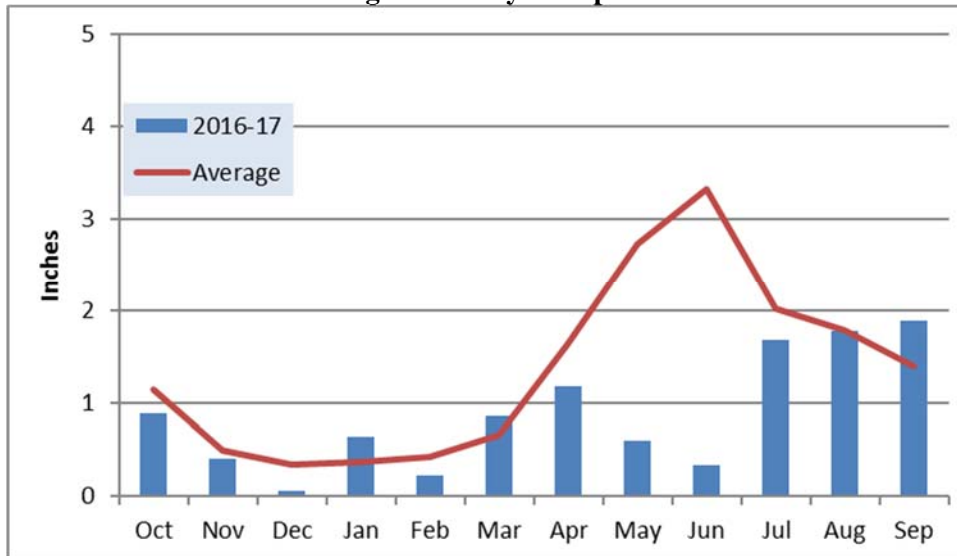
Air Temperature (°F)

Month	2012-13	2013-14	2014-15	2015-16	2016-17	62 Year Average
October	42.1	39.7	46.6	48.5	48.1	45.6
November	32.4	28.8	21.3	32.4	39.5	30.1
December	18.5	12.9	23.4	23.9	10.1	19.5
January	18.3	16.6	21.6	20.1	11.8	15.6
February	26.7	10.1	19.1	32.0	24.6	20.2
March	27.4	26.5	38.0	38.8	34.1	29.3
April	35.5	39.1	43.2	44.2	43.6	42.5
May	53.5	52.8	50.2	54.2	55.2	53.6
June	61.7	59.5	64.6	68.7	66.1	63.2
July	68.1	66.4	70.4	72.0	76.3	70.1
August	69.5	66.0	69.3	69.0	66.8	68.7
September	62.5	56.4	64.1	60.7	58.2	58.0
Average	43.0	39.6	44.3	47.0	43.0	43.0

Corn Growing Degree Days (GDD)

Month	2013	2014	2015	2016	2017	45 Year Average
May	266	245	185	298	297	260
June	381	330	444	545	519	422
July	543	526	595	626	699	588
August	553	504	578	568	520	537
September	403	313	462	380	339	325
Total	2146	1918	2264	2417	2374	2132

Hettinger Monthly Precipitation



Hettinger Average Monthly Temperature

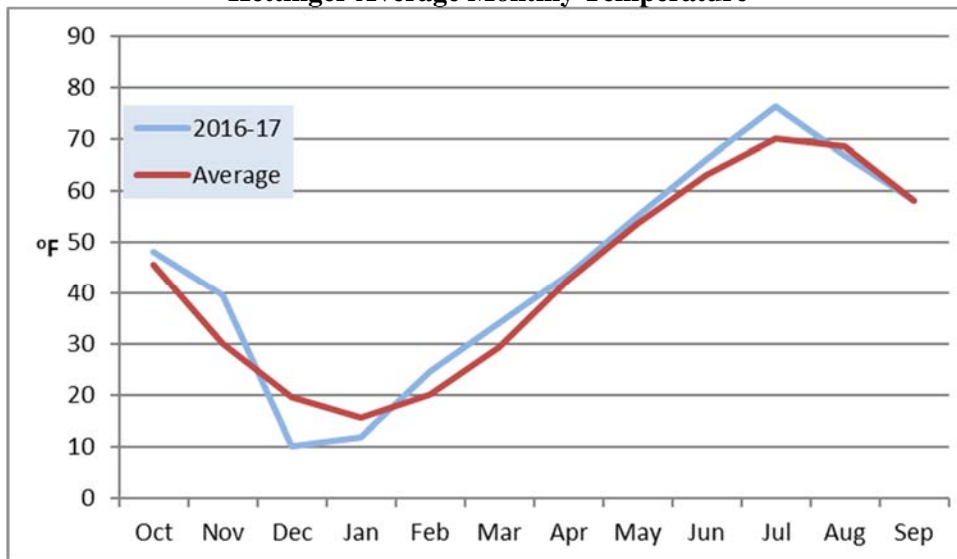


Table . 2017 Weather Summary for the Dickinson Research Extension Center Ranch Headquarters, Manning, ND.

Month	----Maximum temp.-----		-----Minimum temp.-----		-----Precipitation -----		-----Small grains GDD ¹ --		-----Corn GDD ² -----	
	Long Term 1983 - 2017	Current Year	Long Term 1983 - 2017	Current Year	Long Term 1983 - 2016	Current year	Long Term 1983 - 2017	Current year	Long Term 1983 - 2017	Current year
	-----°F -----		-----°F -----		----- inches -----					
November	39.7	50.5	18.9	28.6	0.56	0.62				
December	26.6	17.7	7.4	1.5	0.43	0.30				
January	24.9	19.9	5.6	4.3	0.43	0.56				
February	29.3	30.6	9.5	12.3	0.43	0.30				
March	40.3	40.6	19.0	17.3	0.76	0.24				
April	54.6	53.7	29.4	28.5	1.46	1.30	338	343		
May	66.4	68.4	40.7	39.8	2.65	0.84	669	691	254	284
June	75.8	78.9	50.5	48.4	3.16	1.27	922	949	399	443
July	83.7	90.6	55.7	55.5	2.33	0.72	1170	1258	612	642
August	82.7	78.1	54.0	50.7	1.96	2.67	1127	1004	569	460
September	71.6	71.5	43.9	44.3	1.51	2.28	774	778	325	324
October	56.5	56.5	31.5	30.2	1.21	0.08				
Mean	54.4	54.8	30.5	30.1						
Total					16.89	11.18	5000	5022	2159	2152

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

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

Trials Not Published

The following trials were not published in this report because of very poor yields and significant plot variation due to the drought. Trial average yields are reported below.

Trial	Average Yield
Hettinger Roundup Ready Canola VT	300 lb/ac
Hettinger Clearfield Canloa VT	273 lb/ac
Hettinger SU Canola VT	60 lb/ac
Hettinger Flax VT	3.6 bu/ac
Hettinger Lentil VT	355 lb/ac
Hettinger Clearfield Lentil VT	339 lb/ac
Hettinger Chickpea VT	460 lb/ac
Hettinger Safflower	Not harvested, very poor stands from wireworms.

Table 1. North Dakota hard red spring wheat variety descriptions, agronomic traits, 2017.

Variety	Agent or Origin ¹	Year Released	Height (inches)	Straw Strength ²	Days to Head ³	Reaction to Disease ⁴					
						Stem Rust ⁵	Leaf Rust	Stripe Rust	Tan Spot	Bact. Leaf	Head Scab
AKF-Astro ⁶	AFK	2016	28	NA	60	4	2	2	NA	7	8
Ambush	DynaGro	2016	27	5	57	1	4	3	NA	NA	5
Barlow	ND	2009	29	6	57	1	6	4	6	7	5
Bolles	MN	2015	28	4	61	2	3	5	4	8	5
Boost	SD	2016	29	5	61	1	4	3	NA	5	4
Caliber	DynaGro	2016	23	2	61	1	2	5	NA	NA	8
Elgin-ND	ND	2012	30	5	60	1	6	5	6	7	5
Faller	ND	2007	28	5	61	1	7	8	7	8	5
Glenn	ND	2005	29	4	56	1	6	4	6	7	3
HRS 3100	Croplan	2016	26	4	60	1	4	6	NA	7	6
HRS 3419	Croplan	2014	28	2	63	1	3	4	NA	6	5
HRS 3504	Croplan	2015	25	3	61	1	1	6	NA	6	7
HRS 3530	Croplan	2015	29	4	61	1	2	8	NA	7	5
HRS 3616	Croplan	2016	27	4	59	1	5	5	NA	8	7
Lang-MN	MN	2017	28	3	61	1	2	1	NA	6	5
LCS Anchor	Limagrain	2016	24	3	57	1	2	4	NA	7	6
LCS Breakaway	Limagrain	2011	25	5	57	1	3	6	4	7	5
LCS Nitro	Limagrain	2015	26	4	62	2	2	2	3	5	5
LCS Prime	Limagrain	2015	28	4	57	2	4	6	NA	8	4
LCS Rebel	Limagrain	2017	29	5	57	1	7	4	NA	7	4
LCS Trigger	Limagrain	2016	28	5	65	1	1	2	NA	6	4
Linkert	MN	2013	24	2	58	1	3	1	4	5	5
Mott ⁷	ND	2009	30	3	62	1	6	6	6	7	6
MS Camaro	Meridian	2016	25	5	59	1	1	2	NA	6	6
MS Chevelle	Meridian	2014	26	5	57	1	4	3	6	6	5
ND VitPro	ND	2016	27	3	58	1	4	3	NA	7	4
Prevail	SD	2014	26	4	57	4	3	1	4	4	5
Prosper	ND	2011	28	5	61	1	6	8	6	7	5
Rollag	MN	2011	26	3	58	1	4	2	3	7	3
Shelly	MN	2016	25	5	62	2	6	5	NA	6	5
Surpass	SD	2016	26	5	55	1	4	6	NA	7	5
SY Ingmar	Syngenta/AgriPro	2014	26	3	60	1	3	6	6	6	5
SY Rowyn	Syngenta/AgriPro	2013	25	4	58	1	3	4	2	5	5
SY Soren	Syngenta/AgriPro	2011	25	3	59	1	2	7	2	6	5
SY Valda	Syngenta/AgriPro	2015	26	4	58	1	2	7	6	7	4
TCG-Climax	21st Century Genetics	2017	28	2	64	1	6	3	NA	7	6
TCG-Cornerstone	21 st Century Genetics	2015	27	4	59	1	4	6	NA	NA	6
TCG-Spitfire	21 st Century Genetics	2015	28	4	62	1	5	4	NA	6	6
WB9479	WestBred	2017	24	4	58	1	1	1	NA	8	6
WB9590	WestBred	2017	24	NA	57	1	3	8	3	7	6
WB9653	WestBred	2015	26	4	59	2	3	8	6	7	6
WB9719	WestBred	2017	26	NA	59	1	4	2	NA	NA	6
WB-Mayville	WestBred	2011	25	3	57	1	3	6	6	8	8

¹Refers to agent or developer: MN = University of Minnesota; 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.

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.

⁴Disease reactions scores from 1-9, with 1 = resistant and 9 = very susceptible, NA = not available.

⁵Fargo stem rust nursery inoculated with *Puccinia graminis* f. sp. *Triticis* races TPMK, TMLK, RTQQ, QFCQ and QTHJ.

⁶White wheat.

⁷Solid stemmed or semisolid stem, imparting resistance to sawfly.

Table 2. Analytical milling and baking data from field plot variety trials at Carrington, Casselton, Dickinson, Hettinger, Langdon, Minot and Williston in 2015 and 2016 (unless otherwise noted)¹.

Variety	Planted 2017		Test Weight (lb/bu)	Protein 12% MB (%)	Vitreous Kernels (%)	1,000 Kwt (gram)	Falling Number (seconds)	Farinograph Stability (minutes)	Farinograph			Qual. # (mm)	Loaf DO (1-10)	Loaf Volume (cc)
	ND (% area)	OBS ²							Absorption (%)	MTI (bu)				
Barlow	6.8	10	62.3	14.4	89	32.1	389	12.1	64.3	29	153	9	993	
Bolles	3.3	10	61.1	15.2	83	33.9	425	19.8	62.5	17	234	9	1,007	
Boost	--	10	61.0	14.0	74	33.3	422	8.4	62.9	33	113	8	998	
Duclair	--	8	59.5	13.7	50	32.7	384	15.3	59.1	24	188	9	978	
Elgin-ND ³	5.6	10	61.0	14.2	79	30.9	410	9.0	63.3	30	121	9	969	
Faller ³	3.8	10	60.8	13.3	69	35.1	400	9.0	61.8	30	105	9	942	
Focus	--	9	62.1	14.0	73	32.1	415	8.6	59.8	32	118	9	963	
Glenn ³	4.9	10	64.1	14.8	92	32.8	387	14.9	63.3	21	178	9	1,001	
HRS 3419	--	8	60.4	13.2	57	30.3	423	12.6	59.8	27	155	9	907	
HRS 3530	--	8	61.3	14.0	68	34.6	405	8.0	63.2	32	102	8	981	
Lang-MN	--	10	62.7	14.1	90	31.8	418	7.7	62.5	34	98	9	964	
LCS Nitro	--	5	59.8	13.1	36	33.4	437	16.7	58.2	21	183	9	908	
LCS Prime	--	7	62.9	12.8	59	35.4	383	12.2	61.4	27	130	9	936	
Linkert ³	6.9	10	61.4	14.7	70	35.3	428	25.0	61.9	15	270	9	991	
Mott	1.1	8	61.5	14.2	71	29.3	386	10.2	61.0	30	125	9	959	
ND VitPro	--	10	63.4	14.6	93	33.8	407	8.4	62.9	31	114	10	979	
Prevail	--	10	60.9	13.4	51	33.3	390	9.9	59.3	32	112	9	934	
Prosper ³	4.5	10	60.7	13.5	64	35.0	398	10.0	60.8	30	111	9	968	
Rollag	2.9	10	62.0	14.4	70	33.7	485	7.6	64.7	28	109	9	883	
Shelly	--	10	62.4	13.1	69	33.6	425	10.9	59.3	26	118	9	905	
Surpass	--	10	61.5	13.7	52	30.2	381	9.4	59.0	30	118	9	976	
SY Ingmar	17.8	10	62.0	14.2	79	30.2	414	11.1	61.0	25	136	9	1,009	
SY Rowyn	1.0	11	61.3	13.0	49	31.1	422	16.1	59.4	21	176	9	944	
SY Soren	10.8	10	61.9	14.3	66	30.2	443	11.6	61.3	26	155	9	963	
SY Valda	5.0	10	61.3	13.3	85	32.8	394	7.0	60.6	36	100	9	872	
WB 9653	--	5	60.4	13.2	69	32.0	384	8.7	61.5	29	115	8	881	
WB-Mayville	3.1	10	61.1	14.2	74	34.2	430	13.5	62.2	26	162	9	938	
Average			61.5	13.9	70	32.7	410	11.6	61.4	27	141	9	954	

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

¹2016 Carrington and Dickinson data omitted.

²Observations (number of times tested).

³Lines used as checks.

Hard Red Spring Wheat - 2017

Hettinger, ND

Variety	Days to	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	Protein	2015	2016	2017	2 yr	3 yr
	DAP ¹	inches	0-9 ²	lbs/bu	%	----- Bushels per acre -----				
HRS 3419	65	23	0	59.7	13.4	86.8	54.7	41.2	48.0	60.9
Shelly	66	22	0	62.2	13.0	79.9	50.9	43.9	47.4	58.2
LCS Prime	61	24	0	63.2	13.3	80.4	49.1	39.2	44.2	56.2
Redstone	66	24	0	60.7	13.3	80.2	47.0	38.3	42.7	55.2
Faller	64	24	0	60.3	13.8	79.5	43.4	41.5	42.5	54.8
WB9653	64	23	0	61.7	14.4	77.9	45.8	39.4	42.6	54.4
LCS Nitro	64	23	0	59.5	13.1	82.6	44.9	35.4	40.2	54.3
Prevail	60	22	0	62.3	12.6	75.2	49.3	38.3	43.8	54.3
Surpass	59	22	0	61.2	13.1	76.0	49.7	36.7	43.2	54.1
Elgin ND	64	25	0	60.9	13.8	74.5	48.5	38.4	43.5	53.8
MS Chevelle	61	22	0	60.9	13.1	76.1	47.8	37.5	42.7	53.8
HRS 3530	64	27	0	59.8	13.9	79.6	43.7	35.9	39.8	53.1
SY Soren	63	22	0	61.4	14.1	71.9	50.1	36.5	43.3	52.8
SY Rowyn	61	22	0	61.6	13.7	74.3	48.8	33.3	41.1	52.1
SY Valda	61	23	0	61.1	13.8	71.5	49.6	35.1	42.4	52.1
SY Ingmar	64	23	0	62.0	14.4	67.0	48.1	39.9	44.0	51.7
Barlow	61	25	0	62.2	13.6	65.2	48.4	40.1	44.3	51.2
Boost	65	25	0	59.0	14.9	70.5	50.6	31.2	40.9	50.8
Prestige	60	23	0	60.7	13.8	72.6	45.8	32.6	39.2	50.3
Rollag	60	22	0	61.1	13.3	71.8	47.3	31.6	39.5	50.2
Mott	64	26	0	60.3	14.0	66.4	46.4	36.6	41.5	49.8
LCS Breakaway	61	23	0	62.6	13.0	64.1	48.4	34.8	41.6	49.1
Bolles	65	24	0	59.3	15.5	70.5	44.0	32.8	38.4	49.1
Prosper	65	25	0	60.6	12.8	70.4	36.0	39.5	37.8	48.6
Glenn	60	23	0	60.8	14.3	63.1	49.1	32.1	40.6	48.1
ND VitPro	60	24	0	62.1	14.8	64.1	48.1	31.9	40.0	48.0
Linkert	60	22	0	62.4	13.9	63.7	43.6	34.0	38.8	47.1
WB Mayville	60	22	0	61.5	14.2	60.1	45.9	32.6	39.3	46.2
LCS Trigger	67	24	0	61.8	12.1	--	55.7	44.5	50.1	--
TCG Spitfire	65	24	0	60.4	13.7	--	52.0	37.6	44.8	--
LCS Anchor	61	22	0	61.9	13.4	--	52.6	35.7	44.2	--
SY Rockford	65	24	0	59.1	13.6	--	48.7	39.3	44.0	--
HRS 3616	61	24	0	60.4	13.9	--	48.6	38.7	43.7	--
Lang MN	62	24	0	61.1	13.5	--	49.9	36.3	43.1	--
HRS 3504	64	22	0	61.3	14.7	--	48.3	32.7	40.5	--
TCG Cornerstone	63	23	0	60.3	14.3	--	43.2	32.1	37.7	--

Table continued on next page

Variety	Days to	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	Protein	2015	2016	2017	2 yr	3 yr
	DAP ¹	inches	0-9 ²	lbs/bu	%	----- Bushels per acre -----				
<i>Table continues from previous page</i>										
WB9719	62	23	0	62.3	13.5	--	--	43.4	--	--
AFK Astro (white)	61	23	0	61.1	11.5	--	--	37.9	--	--
WB9590	60	20	0	61.3	14.6	--	--	37.6	--	--
LCS Rebel	60	25	0	61.9	14.4	--	--	36.8	--	--
Dyna-Gro Ambush	60	25	0	61.6	13.7	--	--	36.3	--	--
HRS 3100	63	22	0	60.6	14.1	--	--	36.3	--	--
SY Rustler	60	22	0	59.6	13.6	--	--	34.9	--	--
TCG Climax	68	23	0	59.9	14.8	--	--	34.5	--	--
WB9479	61	21	0	62.3	15.0	--	--	34.4	--	--
Dyna-Gro Caliber	64	20	0	61.6	14.1	--	--	32.5	--	--
MS Camaro	62	22	0	60.8	13.9	--	--	31.4	--	--
Trial Mean	62	23	0	61.1	13.9	70.1	47.3	35.8	42.2	52.3
C.V. %	1.7	5.4	--	1.6	4.1	4.8	7.1	11.4	--	--
LSD 5%	1.4	1.7	--	1.4	0.8	4.7	4.7	5.7	--	--
LSD 10%	1.2	1.5	--	1.1	0.7	4.0	4.0	4.8	--	--

¹ Days to Head = the number of days from planting to head emergence from the boot.

² 0 = no lodging, 9 = 100% lodged.

Planting Date: April 17

Harvest Date: August 3

Previous Crop: Carinata

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat - 2017	Scranton, ND
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2015	2016	2017	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
HRS 3419	24	0	54.0	17.3	68.5	48.5	16.2	32.4	44.4
Prevail	22	0	55.9	15.0	59.5	45.0	19.7	32.4	41.4
LCS Nitro	21	0	54.5	16.0	63.8	42.0	13.7	27.9	39.8
SY Soren	21	0	54.7	16.5	62.6	38.3	18.1	28.2	39.7
Elgin-ND	25	0	52.9	16.2	59.5	41.7	16.4	29.1	39.2
Barlow	25	0	56.7	16.2	59.5	41.1	15.2	28.2	38.6
Glenn	24	0	57.6	16.3	55.2	42.4	16.1	29.3	37.9
SY Rowyn	22	0	56.0	15.9	59.5	37.0	16.0	26.5	37.5
Mott	23	0	55.6	17.0	56.2	36.6	15.4	26.0	36.1
WB9653	21	0	54.7	16.0	--	41.2	16.9	29.1	--
HRS 3530	26	0	54.0	17.1	--	42.8	14.8	28.8	--
LCS Prime	24	0	56.4	15.2	--	41.1	14.4	27.8	--
SY Ingmar	23	0	53.6	16.8	--	38.2	14.1	26.2	--
Shelly	22	0	56.0	15.9	--	--	18.9	--	--
Surpass	22	0	54.9	15.1	--	--	17.9	--	--
TCG-Spitfire	23	0	53.8	16.5	--	--	17.8	--	--
LCS Anchor	20	0	56.9	15.7	--	--	17.4	--	--
Lang-MN	24	0	55.1	17.1	--	--	16.4	--	--
Redstone	23	0	54.3	17.5	--	--	13.9	--	--
LCS Trigger	21	0	53.1	16.7	--	--	13.8	--	--
SY Valda	21	0	55.8	16.7	--	--	13.8	--	--
Boost	24	0	55.0	16.3	--	--	13.7	--	--
ND-VitPro	22	0	55.5	16.6	--	--	13.7	--	--
MS Chevelle	21	0	55.0	15.3	--	--	13.5	--	--
Bolles	25	0	54.1	17.9	--	--	12.5	--	--
Trial Mean	23	0	55.0	16.4	60.6	40.7	15.6	28.6	39.4
C.V. %	5.4	--	2.1	2.3	5.8	9.7	16.5	--	--
LSD 5%	1.7	--	1.7	0.5	5.0	5.6	3.6	--	--
LSD 10%	1.4	--	1.4	0.4	4.1	4.6	3.0	--	--

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

Planting Date: April 27

Harvest Date: August 11

Previous Crop: Spring Wheat

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat - 2017	Regent, ND
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2015	2016	2017	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
LCS Nitro	22	0	56.8	14.7	103.4	25.2	18.4	21.8	49.0
HRS 3419	24	0	56.3	15.6	98.8	24.2	15.9	20.1	46.3
SY Rowyn	21	0	57.7	14.9	92.0	31.2	13.8	22.5	45.7
Elgin-ND	25	0	56.5	15.6	82.4	35.3	18.8	27.1	45.5
Prevail	22	0	58.6	14.7	83.8	35.1	17.5	26.3	45.5
Mott	23	0	57.9	15.0	84.3	32.7	16.7	24.7	44.6
Barlow	24	0	60.2	14.6	82.4	31.5	17.7	24.6	43.9
SY Soren	22	0	58.2	15.3	82.5	32.9	15.4	24.2	43.6
Glenn	24	0	61.0	15.6	74.0	29.0	17.2	23.1	40.1
WB9653	21	0	58.3	15.1	--	38.1	20.1	29.1	--
SY Ingmar	24	0	59.5	15.8	--	35.2	19.8	27.5	--
LCS Prime	26	0	60.7	15.1	--	36.0	18.1	27.1	--
HRS 3530	25	0	57.3	15.7	--	36.9	14.5	25.7	--
MS Chevelle	22	0	59.8	15.8	--	--	21.3	--	--
LCS Trigger	22	0	57.7	15.2	--	--	20.7	--	--
Lang-MN	23	0	58.2	15.5	--	--	19.4	--	--
Boost	26	0	58.2	15.3	--	--	19.3	--	--
Surpass	22	0	59.2	15.6	--	--	19.0	--	--
Shelly	22	0	58.6	15.5	--	--	18.9	--	--
SY Valda	22	0	59.4	14.6	--	--	18.7	--	--
LCS Anchor	21	0	59.9	15.4	--	--	17.5	--	--
ND-VitPro	24	0	60.0	14.2	--	--	16.9	--	--
TCG-Spitfire	24	0	57.4	15.9	--	--	16.7	--	--
Bolles	26	0	57.1	14.7	--	--	15.5	--	--
Redstone	23	0	56.8	14.8	--	--	15.4	--	--
Trial Mean	23	0	58.5	15.2	87.2	32.3	17.7	24.9	44.9
C.V. %	4.6	--	1.6	4.8	4.7	7.6	13.5	--	--
LSD 5%	1.5	--	1.3	1.0	4.9	3.5	3.4	--	--
LSD 10%	1	--	1.1	0.9	4.1	2.9	2.8	--	--

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

Planting Date: April 27

Harvest Date: August 11

Previous Crop: Spring Wheat

NDSU Hettinger Research Extension Center

Hard Red Spring Wheat - 2017	Mandan, ND
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Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			Average Yield	
	Height	Lodge	Weight	Protein	2015	2016	2017	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
HRS 3419	27	0	52.4	15.2	39.4	73.5	18.3	45.9	43.7
LCS Nitro	23	0	52.0	16.0	33.2	67.6	19.9	43.8	40.2
Prevail	24	0	53.0	14.8	35.3	66.2	15.5	40.9	39.0
SY Rowyn	24	0	53.4	15.4	34.7	61.5	17.7	39.6	38.0
Elgin-ND	28	0	52.1	16.2	30.1	65.3	17.4	41.4	37.6
Mott	26	0	53.5	16.8	31.0	61.3	18.2	39.8	36.8
SY Soren	23	0	54.3	15.5	32.6	59.4	18.3	38.9	36.8
Barlow	27	0	51.4	15.3	31.9	60.9	16.0	38.5	36.3
Glenn	25	0	55.7	16.2	26.1	62.6	11.1	36.9	33.3
WB9653	24	0	52.5	14.3	--	70.1	23.7	46.9	--
HRS 3530	26	0	53.3	15.4	--	70.6	18.3	44.5	--
LCS Prime	24	0	55.0	13.9	--	70.0	18.4	44.2	--
SY Ingmar	23	0	54.1	15.8	--	58.8	20.5	39.7	--
LCS Trigger	26	0	54.6	14.8	--	--	28.7	--	--
TCG-Spitfire	26	0	53.6	15.6	--	--	23.2	--	--
MS Chevelle	24	0	53.8	14.4	--	--	22.6	--	--
Redstone	26	0	53.8	15.7	--	--	22.3	--	--
Lang-MN	25	0	53.8	15.8	--	--	21.1	--	--
LCS Anchor	22	0	53.9	15.6	--	--	19.9	--	--
SY Valda	23	0	53.4	14.7	--	--	19.1	--	--
Surpass	24	0	51.6	15.3	--	--	17.4	--	--
ND-VitPro	25	0	53.4	16.6	--	--	16.2	--	--
Boost	25	0	52.4	16.3	--	--	16.0	--	--
Shelly	22	0	54.6	15.3	--	--	15.0	--	--
Bolles	26	0	54.2	18.1	--	--	7.5	--	--
Trial Mean	25	0	53.4	15.6	32.8	64.2	18.5	41.6	38.0
C.V. %	5.1	--	3.0	4.4	8.9	7.6	15.7	--	--
LSD 5%	1.8		2.3	0.7	4.2	6.9	4.1	--	--
LSD 10%	1.5		1.9	0.6	3.5	5.7	3.4	--	--

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

Planting Date: May 3

Harvest Date: August 24

Previous Crop: Spring Wheat

NDSU Dickinson Research Extension Center

2017 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-----	
						2015	2016	2017	2 Year	3 Year
						-----bu/ac-----			-----bu/ac-----	
AKF-Astro	58	13,053	24	60.0	14.8	--	--	37.6	--	--
Barlow	55	15,893	23	61.5	17.3	69.1	48.5	38.1	43.3	51.9
Bolles	58	16,114	23	57.8	18.3	68.9	47.5	34.4	40.9	50.2
Boost	60	15,394	24	59.0	17.4	66.7	52.3	34.7	43.5	51.2
Dyna-Gro Ambush	55	15,435	22	60.3	17.1	--	--	34.1	--	--
Dyna-Gro Caliber	58	15,124	17	60.9	16.8	--	--	31.6	--	--
Elgin-ND	56	16,678	23	58.6	17.0	71.4	48.5	36.2	42.3	52.0
Faller	59	16,911	22	58.1	16.4	68.1	47.1	34.5	40.8	49.9
Glenn	54	15,865	24	61.9	17.0	67.8	51.2	34.9	43.0	51.3
HRS 3100	57	15,515	21	58.9	17.1	--	--	34.3	--	--
HRS 3419	63	20,115	22	56.9	17.8	76.6	60.5	30.7	45.6	55.9
HRS 3504	59	15,422	19	59.9	16.5	--	65.0	34.8	49.9	--
HRS 3530	59	18,020	25	56.9	17.7	72.2	59.1	33.1	46.1	54.8
HRS 3616	57	14,804	22	58.5	17.3	--	48.9	32.7	40.8	--
LCS Anchor	55	16,581	20	60.8	16.8	--	51.7	34.3	43.0	--
LCS Breakaway	56	15,646	19	61.6	17.2	77.6	51.2	32.7	41.9	53.8
LCS Nitro	61	17,686	20	57.4	16.3	85.2	57.0	32.8	44.9	58.3
LCS Prime	55	15,045	23	61.4	15.1	--	60.5	36.2	48.3	--
LCS Rebel	56	15,481	24	60.5	17.6	--	--	33.3	--	--
LCS Trigger	63	19,390	22	56.3	16.4	--	--	34.0	--	--
Lang-MN	59	19,248	22	59.4	17.6	--	--	35.7	--	--
Linkert	56	15,745	20	60.4	18.0	71.2	52.9	32.8	42.9	52.3
MS Camaro	57	17,450	20	60.3	17.3	--	--	33.5	--	--
MS Chevelle	56	16,489	20	59.9	16.3	75.9	57.7	35.3	46.5	56.3
Mott	58	18,638	22	58.0	17.2	64.1	45.1	29.8	37.5	46.3
ND-VitPro	55	15,518	22	61.6	17.5	72.7	49.8	28.8	39.3	50.5
Prevail	54	15,571	20	59.1	16.2	53.4	57.5	38.4	48.0	49.8
Prosper	59	16,469	22	58.3	15.9	71.1	55.0	33.6	44.3	53.2
Rolag	56	16,279	21	60.1	17.4	75.4	52.6	37.1	44.8	55.0
Sy Ingmar	58	17,966	21	58.3	17.3	75.7	56.7	37.0	46.8	56.5
SY Rockford	59	15,454	22	57.9	16.9	--	--	38.6	--	--
Sy Rowyn	57	19,720	19	58.4	17.4	72.4	58.6	29.1	43.8	53.4
Sy Soren	57	16,653	20	60.5	17.5	70.6	50.1	32.4	41.2	51.0
Sy Valda	57	16,993	20	59.6	16.8	78.3	63.5	38.7	51.1	60.2
Shelly	60	16,597	20	59.9	16.5	--	48.7	39.3	44.0	--
Surpass	54	17,697	22	60.8	16.0	78.0	56.2	35.6	45.9	56.6

Table continued on next page

NDSU Dickinson Research Extension Center

2017 Hard Red Spring Wheat - Recrop **Dickinson, ND**

Variety	Days	Seeds	Plant Height	Test Weight	Protein	----- Grain Yield-----			Average Yield	
	to Head	per Pound				2015	2016	2017	2	3
			in	lbs/bu	%	-----bu/ac-----			----bu/ac----	
<i>Table continues from previous page</i>										
TCG-Climax	63	20,034	20	60.1	18.2	--	--	33.9	--	--
TCG Cornestone	57	13,649	20	60.4	17.0	--	52.0	36.5	44.3	--
TCG Spitfire	60	17,149	21	58.0	17.5	--	59.7	35.0	47.4	--
WB-Mayville	57	14,815	19	60.8	16.5	73.5	53.7	37.6	45.6	54.9
WB9479	56	14,874	18	60.6	17.4	--	--	28.4	--	--
WB9590	54	14,448	18	60.3	17.4	--	--	34.3	--	--
WB9653	58	15,854	20	59.5	17.1	69.5	61.8	37.3	49.5	56.2
WB9719	58	16,305	20	62.3	16.4	--	--	38.7	--	--
Trial Mean	57	16,447	21	59.8	17.1	71.3	52.7	34.4	--	--
CV %	1.7	6.3	5.6	1.4	2.1	5.9	10.4	11.2	--	--
LSD 0.05	1	2,094	2	1.1	0.7	5.9	7.6	5.4	--	--
LSD 0.10	1	1,747	1	1.0	0.6	4.9	6.4	4.5	--	--

Planting Date: April 26, 2017
 Harvest Date: August 4, 2017
 Previous Crop: Cover Crop
 Seeding Rate: 1.2 million live seeds/ac

NDSU Dickinson Research Extension Center

2017 Glen Ullin Spring Wheat - Recrop	Dickinson, ND
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Variety	Seeds per Pound	Test Weight lbs/bu	Protein %	----- Grain Yield-----			----- Average Yield -----	
				2015	2016	2017	2 Year	3 Year
				-----bu/ac-----			----bu/ac----	
Barlow	14,591	60.3	12.2	68.6	33.6	33.9	33.7	45.3
Boost	13,571	59.8	12.7	--	--	42.3	--	--
Elgin-ND	14,724	59.3	11.9	71.8	31.6	32.5	32.0	45.3
HRS3419	16,296	58.0	12.5	--	45.0	37.1	41.0	--
HRS3616	12,998	59.5	13.0	--	--	34.3	--	--
LCS Anchor	14,808	60.0	12.9	--	--	32.8	--	--
Mott	15,594	59.0	12.2	79.5	34.0	35.4	34.7	49.6
ND-Vitpro	13,829	61.5	13.0	--	--	35.3	--	--
Sy Rockford	12,880	58.5	13.0	--	--	43.0	--	--
Sy Soren	16,068	59.3	12.7	69.0	30.1	37.5	33.8	45.5
Sy Valda	13,481	60.3	11.4	--	35.3	39.8	37.6	--
WB9653	13,323	59.0	11.0	--	40.3	43.2	41.8	--
Trial Mean	14,347	59.5	12.4	68.8	36.2	37.2	--	--
CV %	3.2	0.5	4.9	9.1	7.2	16.4	--	--
LSD 0.05	1,009	0.7	1.3	9.1	3.8	NS	--	--
LSD 0.10	824	0.6	1.1	7.5	3.1	NS	--	--

Planting Date: May 4, 2017
Harvest Date: August 21, 2017
Previous Crop: wheat
Seeding Rate: 1.2 million live seeds/ac

ND Hard Winter Wheat Variety Descriptions

Table 1. 2017 North Dakota hard winter wheat variety description and agronomic traits.

Table 2. Analytical milling and baking characteristics of selected varieties evaluated across five localities (Hettinger, Langdon, Minot, Prosper and Williston) in 2016.

Table 1. 2017 North Dakota hard winter wheat variety description and agronomic traits.

Variety	Agent or Origin ²	Year	Reaction to Disease ¹				Tan Spot	Days to Heading ³	Straw ⁴ Strength	Height ⁵ (inches)	Winter ⁶ Hardiness
			Stripe Rust	Leaf Rust	Stem Rust	Scab					
AAC Gateway	A.Can.	2012	2	4	1	6	7	0	3	30	3
Accipiter	CDC	2008	2	6	1	8	8	0	4	36	2
Art	Agripro	2008	1	1	1	6	3	-6	4	33	8
Boomer	WB	2009	6	3	1	8	6	-2	4	34	3
Broadview	A.Can.	2008	4	1	1	8	NA	-2	5	32	4
Carter	WB	2010	8	NA	NA	8	NA	-2	4	32	6
CDC Chase	CDC	2013	1	1	1	6	NA	-2	6	37	4
Colter	MT	2013	3	8	1	8	9	-1	3	36	5
Decade	MT/ND	2010	8	9	1	9	4	-4	4	35	2
Emerson	A.Can.	2011	1	6	1	3	5	-2	4	33	3
Flourish	A.Can.	2010	2	6	6	8	7	-4	5	35	2
Hawken	Agripro	2007	8	3	3	8	4	-5	4	28	7
Ideal	SD	2011	4	1	3	8	4	-3	5	33	5
Jerry	ND	2001	8	3	1	8	8	0	4	37	3
Keldin	WB	2011	2	NA	NA	NA	NA	-2	4	36	3
Loma	MT	2016	1	NA	1	8	NA	0	2	34	3
Lyman	SD	2008	4	1	1	3	6	-4	7	35	5
McGill	ARS-NE	2010	6	6	3	6	8	-5	4	36	4
Moats	A.Can.	2010	1	1	1	3	7	0	5	38	2
Northern	MT	2015	1	8	1	8	6	+1	NA	35	6
Oahe	SD	2016	2	3	6	NA	NA	-3	6	37	3
Overland	NE	2006	3	2	3	8	4	-4	4	35	5
Peregrine	CDC	2008	1	3	1	6	6	+1	4	39	2
Redfield	SD	2013	4	6	8	3	NA	-3	4	33	5
Ruth	NE	2016	6	6	3	6	NA	-3	3	35	5
Smoky Hill	WB	2007	8	1	1	8	NA	0	5	35	7
Striker	WB	2009	6	3	1	8	NA	-4	4	32	5
SY Monument	Agripro	2014	3	3	NA	6	NA	-1	4	32	4
SY Sunrise	Agripro	2015	3	NA	NA	6	NA	-4	5	31	5
SY Wolf	Agripro	2010	3	3	1	6	1	-4	4	33	6
WB-Grainfield	WB	2013	6	6	NA	8	6	-5	6	33	6
WB-Matlock	WB	2010	6	6	1	6	NA	+1	4	36	2
WB4614	WB	2013	1	NA	NA	8	NA	0	5	35	3

¹Disease reaction scores from 1-9, with 1 = resistant and 9 = very susceptible, NA = not available.

²A.Can. = Agriculture and Agri-Food Canada; ARS = USDA Agricultural Research Service; CDC = Crop Development Centre, University of Saskatchewan; MT = Montana State University; NE = University of Nebraska; ND = North Dakota State University; SD = South Dakota State University; WB = WestBred. **Bold** varieties are those recently released, so data are limited and rating values may change.

³Days to heading relative to Jerry.

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

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

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

Table 2. Analytical milling and baking characteristics of selected varieties evaluated across five localities (Hettinger, Langdon, Minot, Prosper and Williston) in 2016.

	Kernel			Flour				Farinograph				Loaf				
	Test Weight (lb/bu)	1,000-KW (gram)	Hardness (score)	Falling Number (seconds)	Protein 12 MB (%)	Flour Extraction (%)	Protein (%)	Gluten Index	Flour Ash (%)	Abs %	Peak Time (min)	Stab (min)	MTI (BU)	Loaf Volume (cc)	Crumb Structure (1-10) ¹	Crumb Color (1-10) ¹
AAC Gateway	59.9	29.4	59.6	410	13.2	67.5	12.4	96.0	0.51	57.5	10.4	19.0	17.8	990	7.0	7.9
Accipiter	59.7	25.6	66.0	419	13.2	63.8	11.6	98.4	0.53	57.2	14.6	23.2	9.8	921	7.2	7.4
Broadview	58.6	27.0	52.8	406	12.6	67.0	11.6	73.4	0.52	58.1	5.0	6.9	36.8	913	7.0	7.6
CDC Chase	61.2	29.9	62.4	420	12.9	68.1	11.8	95.0	0.49	57.6	12.0	24.6	12.4	960	7.0	7.5
Colter	57.1	31.2	67.4	419	12.4	63.1	11.7	98.8	0.52	58.0	16.1	26.9	18.0	960	7.4	7.0
Decade	58.6	29.3	63.6	379	12.6	65.3	11.7	99.0	0.52	57.9	19.0	24.5	27.6	941	6.8	7.5
Emerson	60.5	26.1	57.0	371	12.8	68.5	12.2	99.6	0.51	55.9	16.3	24.7	17.2	991	7.4	7.6
Flourish	58.9	31.6	55.4	369	13.0	67.6	12.1	97.0	0.53	58.6	9.8	19.5	15.0	1,004	7.6	7.6
Ideal	59.2	29.5	61.0	384	12.1	67.2	11.1	99.2	0.51	57.4	20.0	24.7	20.0	925	6.6	7.3
Jerry	58.2	32.4	56.4	393	12.3	68.2	11.4	92.8	0.52	57.5	12.5	22.4	15.8	943	7.0	7.0
Loma	57.6	26.6	68.6	356	12.5	67.6	11.7	98.6	0.52	57.8	16.7	24.7	16.6	1,012	7.6	5.8
Lyman	60.1	34.2	68.0	406	12.4	67.5	11.8	85.4	0.50	58.6	7.7	16.4	21.2	932	7.0	7.0
Moats	60.4	29.2	71.6	442	13.1	65.4	12.0	98.0	0.51	57.6	13.8	28.8	15.2	1,024	7.6	7.8
Northern	58.6	29.4	74.6	411	12.9	65.8	11.7	83.0	0.53	60.6	11.6	16.7	22.0	1,004	7.0	7.4
Overland	60.0	32.6	63.2	425	11.7	64.8	11.1	80.0	0.50	58.5	4.6	6.0	44.4	889	6.8	7.1
Peregrine	60.9	30.0	71.0	399	12.4	66.9	10.8	96.2	0.50	56.3	12.3	25.0	16.0	890	6.8	7.1
Redfield	60.1	31.6	55.6	423	12.3	66.0	11.7	96.6	0.52	58.1	14.3	23.8	20.8	1,012	7.4	8.2
Ruth	59.5	29.6	64.2	414	12.0	65.3	11.6	93.2	0.51	57.7	9.6	18.3	21.8	948	7.0	7.3
SY Monument	58.5	33.1	59.4	372	12.0	66.1	10.8	91.6	0.49	56.8	17.8	24.0	35.0	810	6.0	6.4
SY Sunrise	59.7	33.0	58.0	405	12.0	65.0	11.2	93.4	0.50	58.1	15.7	24.6	16.0	923	6.8	6.9
SY Wolf	60.5	31.5	66.0	371	11.7	66.6	11.2	82.8	0.50	58.2	10.5	14.5	21.4	941	7.2	7.0
WB-Matlock	59.8	29.8	61.6	401	12.3	67.4	11.6	90.0	0.52	58.8	13.2	18.2	27.0	935	7.4	6.8
WB4614	56.6	33.5	24.6	251	12.5	54.1	11.3	67.4	0.49	55.0	4.6	5.4	56.2	897	6.8	6.6
Mean	59.3	30.3	61.2	393.3	12.5	65.9	11.6	91.5	0.5	57.7	12.5	20.1	22.8	946	7.1	7.2
LSD (5%)	1.4	2.0	8.3	50	0.9	4.0	0.7	8.8	0.02	1.5	10.1	10.8	12.5	89	1.0	0.7

¹Scale 1-10, with 1 being low and 10 being superior.

Hard Red Winter Wheat - 2017

Hettinger, ND

Variety	Fall	Spring	Heading	Plant	Plant	Test	Grain	---- Grain Yield ----			Average Yield		
	Stand	Stand	Date	Height	Lodge	Weight	Protein	2015	2016	2017	2 yr	3 yr	
	%	%		inches	0-9 ¹	lbs/bu	%	----- Bushels per acre -----					
SY Wolf	90	90	6/2	32	0	63.4	12.6	96.8	69.0	93.9	81.5	86.6	
Overland	90	90	6/1	36	0	64.3	12.1	86.3	72.4	91.7	82.1	83.5	
Northern	90	90	6/6	31	0	60.7	12.9	84.0	68.3	78.9	73.6	77.1	
Lyman	90	90	6/1	34	0	63.0	13.5	80.4	64.9	84.2	74.6	76.5	
Ideal	90	90	6/3	33	0	64.2	12.1	80.8	57.3	88.2	72.8	75.4	
Flourish	90	90	6/3	34	0	62.0	12.9	75.9	68.4	80.7	74.6	75.0	
Peregrine	90	90	6/5	37	0	62.7	12.0	80.6	63.1	81.1	72.1	74.9	
CDC Chase	90	90	6/4	37	0	62.9	12.1	83.7	56.3	81.3	68.8	73.8	
WB4614	90	90	6/2	29	0	60.3	12.5	78.1	71.8	71.3	71.6	73.7	
AC Emerson	90	90	6/6	33	0	62.2	13.1	86.9	63.0	70.6	66.8	73.5	
AC Gateway	90	90	6/3	30	0	62.7	13.1	79.3	64.1	76.5	70.3	73.3	
Redfield	90	90	6/2	29	0	63.3	13.0	78.4	60.2	79.2	69.7	72.6	
Decade	90	90	6/3	32	0	62.5	12.9	81.1	58.0	76.2	67.1	71.8	
AC Broadview	90	90	6/4	31	0	62.6	12.2	71.7	58.4	81.6	70.0	70.6	
Moats	90	90	6/5	37	0	61.8	12.8	70.6	60.7	80.2	70.5	70.5	
Accipiter	90	90	6/6	32	0	60.8	12.5	77.5	56.1	72.4	64.3	68.7	
WB Matlock	90	90	6/5	34	0	62.0	13.2	75.2	55.7	71.1	63.4	67.3	
Jerry	90	90	6/4	39	0	62.0	12.6	72.2	51.9	76.1	64.0	66.7	
SY Monument	90	90	6/2	33	0	62.5	11.8	--	69.1	99.6	84.4	--	
SY Sunrise	90	90	6/1	31	0	61.7	12.8	--	80.2	85.6	82.9	--	
Ruth	90	90	5/31	35	0	64.3	12.6	--	63.2	91.0	77.1	--	
Loma	90	90	6/7	30	0	57.5	13.5	--	69.7	71.5	70.6	--	
Keldin	90	90	6/4	33	0	62.5	11.6	--	--	101.2	--	--	
Oahe	90	90	6/1	39	0	63.7	12.3	--	--	83.1	--	--	
Trial Mean	90	90	6/3	33	0.0	62.3	12.6	79.5	61.2	82.2	72.4	74.0	
C.V. %	--	--	0.5	5.0	--	1.3	4.3	4.9	4.3	9.4	--	--	
LSD 0.05	NS	NS	1.1	2.3	NS	1.1	0.8	6.9	4.8	10.8	--	--	
LSD 0.10	NS	NS	0.9	2.0	NS	0.9	0.6	5.9	4.0	9.1	--	--	

¹ 0 = no lodging, 9 = 100% lodged.

Planting Date: September 14

Harvest Date: July 17

Previous Crop: HRSW Green Fallow

NDSU Dickinson Research Extension Center

2017 Winter Wheat - Recrop **Dickinson, ND**

Variety	Winter Survival	Heading Date	Seeds per Pound	Plant Height	Test Weight	Protein %	Grain Yield			Average Yield	
							2015	2016	2017	2015	2016
		from 1/1		in	lbs/bu		-----bu/ac-----			bu/ac	bu/ac
AC Broadview	100	160	17,267	20	56.5	13.6	75.1	37.2	54.3	45.7	55.5
AC Emerson	100	159	19,491	23	59.2	14.6	79.7	31.7	52.5	42.1	54.7
AC Gateway	100	160	17,061	21	58.4	15.0	71.5	32.0	48.3	40.1	50.6
Accipiter	100	162	19,441	22	56.4	13.5	83.9	37.8	53.8	45.8	58.5
CDC Chase	100	159	17,641	25	57.7	13.2	76.3	35.1	56.4	45.7	55.9
Decade	100	159	15,952	23	58.8	14.2	66.2	34.0	59.1	46.6	53.1
Flourish	100	158	16,029	23	56.4	14.7	72.1	33.7	54.7	44.2	53.5
Ideal	100	159	16,258	20	58.4	13.0	55.5	40.3	52.1	46.2	49.3
Jerry	100	160	15,468	24	56.6	13.8	65.7	28.9	58.4	43.7	51.0
Keldin	100	161	13,332	23	58.3	13.8	--	--	59.9	--	--
Loma	100	162	18,184	19	55.5	15.2	--	31.6	45.2	38.4	--
Lyman	100	158	14,257	24	60.7	14.1	75.6	35.6	54.7	45.1	55.3
Moats	100	161	18,298	25	56.4	14.2	67.2	31.8	57.6	44.7	52.2
Northern	100	161	15,625	20	59.8	14.5	81.0	36.5	51.5	44.0	56.4
Oahe	100	159	13,754	22	59.9	13.2	--	--	54.5	--	--
Overland	100	159	15,171	24	59.6	13.6	77.5	31.7	58.2	45.0	55.8
Peregrine	100	160	18,168	28	57.2	12.5	79.1	37.9	58.6	48.3	58.5
Redfield	100	158	15,354	22	59.2	13.6	70.2	33.9	53.3	43.6	52.4
Ruth	100	158	14,824	22	59.6	13.4	--	27.6	53.5	40.6	--
SY Monument	100	158	15,693	22	57.6	12.3	--	48.7	62.0	55.3	--
SY Sunrise	100	156	14,803	20	60.0	12.4	--	38.7	60.2	49.4	--
SY Wolf	100	158	15,670	25	60.1	13.6	77.0	44.7	57.9	51.3	59.9
WB Matlock	100	159	16,709	24	58.0	14.0	75.3	40.2	60.9	50.5	58.8
WB4614	100	160	18,076	22	58.0	14.1	67.8	38.6	56.2	47.4	54.2
Trial Mean	100	159	16,311	23	58.4	13.8	72.8	34.4	55.2	--	--
CV %	0	0.6	4.1	6.8	1.4	1.7	13.0	16.5	9.0	--	--
LSD 0.05	0	1	1,385	2	1.1	0.5	13.3	9.3	7.0	--	--
LSD 0.10	0	1	1,149	2	0.9	0.4	11.1	7.7	5.9	--	--

Planting Date: September 9, 2016
 Harvest Date: July 20, 2017
 Previous Crop: Cover Crop
 Seeding Rate: 1 million live seeds/ac

Winter Rye - 2017

Hettinger, ND

Variety	Spring	Heading	Plant	Plant	Test	----- Grain Yield -----			----- Average Yield -----	
	Stand	Date	Height	Lodge	Weight	2015	2016	2017	2 yr	3 yr
	%		inches	0-9 ¹	lbs/bu	----- Bushels per acre -----				
Dacold	90	6/1	50	0	54.2	87.8	72.9	76.6	74.8	79.1
ND Dylan	90	5/31	48	0	55.6	84.9	64.6	74.5	69.6	74.7
Hancock	90	5/28	50	0	56.6	73.7	59.9	66.1	63.0	66.6
Aroostok	90	5/25	50	0	57.2	54.3	45.6	53.2	49.4	51.0
Rymin	90	5/31	47	0	56.8	69.8	62.1	85.4	66.0	--
Brasetto	90	5/31	42	0	54.0	--	--	97.8	--	--
Hazlet	90	5/31	46	0	56.7	--	--	84.9	--	--
Spooner	90	5/29	53	0	57.6	64.4	57.3	61.4	--	--
Wheeler	90	6/1	53	0	54.3	--	--	50.8	--	--
Trial Mean	90	5/29	49	0	56.0	72.7	60.5	70.0	64.5	67.8
C.V. %	0	--	4.6	--	0.9	6.9	9.0	6.7	--	--
LSD 0.05	0.0	--	3.3	--	0.7	7.3	8.0	6.8	--	--
LSD 0.10	0.0	--	2.7	--	0.6	6.0	6.7	5.6	--	--

¹ 0 = no lodging, 9 = 100% lodged.

Planting Date: September 14

Harvest Date: July 12

Previous Crop: HRSW Green Fallow

ND Durum Wheat Variety Description

Table 1. Descriptions and agronomic traits of durum wheat varieties grown in North Dakota, 2017.

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	Bact. Leaf Streak	Head Scab
AC Commander	Can.	2002	28	5	62	1	1	6	NA	NA
AC Navigator	Can.	1999	29	5	63	1	1	5	NA	NA
Alkabo	ND	2005	29	2	62	1	1	5	7	6
Alzada ⁵	WB	2004	26	6	60	1	1	8	NA	9
Ben	ND	1996	31	3	61	1	1	4	7	8 ⁶
Carpio	ND	2012	30	5	63	1	1	5	8	5
CDC Verona	Can.	2010	30	4	63	1	1	4	NA	8
Divide	ND	2005	31	5	63	1	1	5	8	5
Grenora	ND	2005	28	5	62	1	1	5	8	6
Joppa	ND	2013	30	5	62	1	1	5	7	5
Lebsock	ND	1999	29	3	61	1	1	5	7	6
Maier	ND	1998	31	5	62	1	1	5	NA	8 ⁶
Mountrail	ND	1998	29	5	62	1	1	5	7	8 ⁶
ND Grano ⁷	ND	2017	30	5	63	1	1	NA	NA	6
ND Riveland ⁷	ND	2017	32	4	62	1	1	NA	NA	5
Pierce	ND	2001	31	5	61	1	1	6	7	8
Rugby	ND	1973	32	5	62	1	1	4	NA	8 ⁶
Strongfield ⁷	Can.	2004	31	6	63	1	1	6	NA	8
Tioga	ND	2010	32	4	62	1	1	5	7	6
VT Peak	Viterra	2010	30	6	61	NA	NA	NA	NA	NA

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

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 2017.

⁴Disease reaction scores from 1-9, with 1 = resistant and 9 = very susceptible. NA = Not adequately tested. Foliar Disease = reaction to tan spot and septoria leaf spot complex.

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

⁶Indicates yields and/or quality often have been higher than would be expected based on visual symptoms.

⁷Low cadmium accumulating variety.

Table 2. Durum wheat variety quality descriptions, milling and processing data averaged for five years (2011-2016) from drill strips (32 locations/year).

Variety	Test Weight (lb/bu)	Vitreous Kernels (%)	Large Kernels (%)	Falling Number (sec)	Wheat Protein ¹ (%)	Gluten Index ²	Pasta Color ³ (1-12)	Spaghetti Firmness (g-cm)	Overall Quality ⁴
AC Commander	60.2	92	55	507	13.7	90	9.0	4.5	Good
AC Navigator	60.7	93	54	500	13.8	69	8.9	4.5	Good
Alkabo	61.7	85	54	406	13.5	48	9.0	4.1	Good
Alzada ^{5,6}	59.7	90	65	486	13.9	89	8.6	4.4	Average
Carpio	61.5	80	60	456	13.5	92	9.0	4.3	Good
Divide	61.1	87	52	445	13.7	76	8.8	4.1	Good
Grenora	60.7	90	54	429	13.6	65	8.9	4.2	Good
Joppa ⁵	61.8	85	50	401	12.8	83	9.2	3.9	Good
Maier	61.1	91	51	408	14.2	53	8.8	4.5	Good
Mountrail	60.6	90	45	424	13.8	22	8.5	3.8	Average
Pierce	61.5	93	47	408	13.9	59	8.8	4.3	Good
Strongfield	60.6	88	54	433	14.3	66	8.7	4.4	Good
Tioga	61.0	86	57	408	13.5	78	8.8	4.3	Good
Average	60.9	89	54	439	13.7	69	8.8	4.3	

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

Table 3. Durum wheat variety quality descriptions, milling and processing data for 2016 at all locations in the drill strips.

Variety	Test Weight (lb/bu)	Vitreous Kernels (%)	Large Kernels (%)	Falling Number (sec)	Wheat Protein ¹ (%)	Gluten Index ²	Pasta Color ³ (1-12)	Spaghetti Firmness (g-cm)	Overall Quality ⁴
AC Commander	60.9	93	60	503	13.3	91	9.0	4.7	Good
AC Navigator	61.3	92	53	508	13.7	72	8.8	4.5	Good
Alkabo	61.8	86	50	422	13.2	47	9.0	4.0	Good
Alzada ⁶	60.5	90	61	515	13.5	94	8.9	4.5	Good
Carpio	61.7	84	58	457	13.3	94	9.0	4.3	Good
Divide	61.1	85	47	438	13.2	78	8.7	4.0	Good
Grenora ⁵	60.2	87	48	433	13.4	68	8.6	3.9	Average
Joppa	61.5	89	39	427	13.0	89	9.1	4.0	Good
Maier	60.9	91	53	423	14.0	57	8.6	4.4	Good
Mountrail	61.0	91	42	434	13.4	34	8.5	3.8	Average
ND Grano ⁷	61.9	90	43	455	13.5	76	9.2	4.4	Good
ND Riveland ⁷	61.8	90	60	449	13.5	84	8.9	4.2	Good
Strongfield	60.6	88	47	445	14.2	71	8.4	4.3	Good
Tioga	61.1	83	54	414	13.2	82	8.7	4.1	Good
Average	61.2	89	51	452	13.5	74	8.8	4.2	

¹Wheat protein is reported on a 12 percent moisture basis.

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

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

⁴Overall Quality is determined based on agronomic, milling and spaghetti processing performance.

⁵Average of 27 drill strips instead of 32 for other varieties in Table 1. Grenora average of four locations instead of five for other varieties in Table 3.

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

⁷Low cadmium accumulating variety.

NDSU Hettinger Research Extension Center

Durum Wheat - 2017	Hettinger, ND
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Variety	Days to Head	Plant Height	Plant Lodge	Test Weight	Grain Protein	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Weight	Protein	2015	2016	2017	2 yr	3 yr
	DAP ¹	inches	0-9 ²	lbs/bu	%	----- Bushels per acre -----				
Joppa	71	28	0	56.3	12.9	78.8	41.1	35.7	38.4	51.9
ND Riveland	72	29	0	57.1	13.8	80.6	37.4	37.3	37.4	51.8
VT Peak	70	25	0	58.4	13.5	79.2	35.1	37.2	36.2	50.5
Tioga	70	26	0	57.9	14.4	81.5	34.3	33.8	34.1	49.9
Divide	71	25	0	57.2	13.9	82.6	33.4	33.5	33.5	49.8
Mountrail	71	25	0	57.7	13.2	76.6	31.8	38.9	35.4	49.1
ND Grano	71	26	0	57.4	14.0	75.8	33.8	35.7	34.8	48.4
Strongfield	71	26	0	56.7	14.2	70.7	35.5	38.9	37.2	48.4
Grenora	71	23	0	57.7	13.9	76.3	33.4	33.3	33.4	47.7
Carpio	71	26	0	55.1	13.6	71.6	32.2	36.5	34.4	46.8
CDC Verona	71	26	0	56.7	14.8	66.5	33.7	36.0	34.9	45.4
Alkabo	72	25	0	57.1	13.5	70.0	33.3	32.6	33.0	45.3
Lebsock	69	24	0	58.4	13.0	60.6	35.6	37.8	36.7	44.7
AC Commander	70	24	0	58.4	14.4	59.7	35.0	38.0	36.5	44.2
AC Navigator	71	25	0	59.4	14.3	56.2	36.3	37.3	36.8	43.3
Ben	68	26	0	58.1	14.7	60.5	31.6	35.1	33.4	42.4
Pierce	71	27	0	56.3	13.7	55.3	35.1	34.7	34.9	41.7
Maier	69	25	0	56.7	14.8	59.3	30.4	33.5	32.0	41.1
Rugby	68	27	0	56.3	14.3	59.3	25.5	34.1	29.8	39.6
Alzada	68	25	0	56.3	13.6	41.7	34.4	34.0	34.2	36.7
Trial Mean	70	26	0	57.3	14.0	73.5	35.1	36.1	35.5	46.77
C.V. %	1.1	5.1	--	2.5	3.4	6.2	17.2	9.7	--	--
LSD 5%	1.1	1.9	NS	2.0	0.7	6.4	8.4	4.9	--	--
LSD 10%	0.9	1.6	NS	1.7	0.6	5.3	7.1	4.1	--	--

¹ Days to Head = the number of days from planting to head emergence from the boot.

² 0 = no lodging, 9 = 100% lodged.

Planting Date: April 7

Harvest Date: July 24

Previous Crop: HRSW Green Fallow

NDSU Hettinger Research Extension Center

Durum Wheat - 2017	Scranton, ND
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	----- Grain Yield -----			Average Yield	
	inches	0-9 ¹	lbs/bu	%	2015	2016	2017	2 yr	3 yr
					----- Bushels per acre -----				
Mountrail	23	0	*	16.5	63.1	42.7	8.5	25.6	38.1
Tioga	23	0	*	17.3	62.1	42.6	9.6	26.1	38.1
Joppa	22	0	56.8	16.1	60.1	40.8	10.0	25.4	37.0
Divide	24	0	*	16.6	62.0	38.1	8.5	23.3	36.2
Carpio	21	0	53.6	16.9	56.5	38.0	10.3	24.2	34.9
Alkabo	23	0	56.6	16.0	58.4	34.7	8.7	21.7	33.9
Trial Mean	23	0	55.1	16.6	60.4	39.5	9.8	24.4	36.4
C.V. %	4.9	--	--	1.7	6.0	8.4	20.2	--	--
LSD 5%	1.7	NS	--	0.4	5.5	5.0	2.9	--	--
LSD 10%	1.4	NS	--	0.3	4.6	4.1	2.4	--	--

¹ 0 = no lodging, 9 = 100% lodged.

* Not enough sample for a test weight.

Planting Date: April 27

Harvest Date: August 11

Previous Crop: Spring Wheat

Durum Wheat - 2017	Regent, ND
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	----- Grain Yield -----			Average Yield	
	inches	0-9 ¹	lbs/bu	%	2015	2016	2017	2 yr	3 yr
					----- Bushels per acre -----				
Divide	25	0	60.4	15.1	89.0	31.3	14.5	22.9	44.9
Tioga	25	0	60.1	15.8	89.2	31.1	13.1	22.1	44.5
Joppa	25	0	60.2	14.6	88.0	29.9	12.9	21.4	43.6
Carpio	23	0	59.1	15.3	88.0	29.3	12.3	20.8	43.2
Mountrail	25	0	59.2	14.8	80.5	32.3	15.6	24.0	42.8
Alkabo	24	0	60.1	14.9	83.0	26.6	9.8	18.2	39.8
Trial Mean	24	0	59.9	15.1	47.4	86.3	13.3	21.6	43.1
C.V. %	3.3	--	1.6	1.9	9.3	2.6	16.5	--	--
LSD 5%	1.2	NS	1.4	0.4	5.5	3.4	3.2	--	--
LSD 10%	1.0	NS	1.1	0.4	4.6	2.8	2.7	--	--

¹ 0 = no lodging, 9 = 100% lodged.

Planting Date: April 27

Harvest Date: August 11

Previous Crop: Spring Wheat

NDSU Hettinger Research Extension Center

Durum Wheat - 2017	Mandan, ND
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	----- Grain Yield -----			Average Yield	
	inches	0-9 ¹	lbs/bu	%	2015	2016	2017	2 yr	3 yr
					----- Bushels per acre -----				
Mountrail	26	0	49.5	15.3	24.8	73.6	25.5	49.6	41.3
Joppa	27	0	48.9	15.2	26.2	69.8	24.9	47.4	40.3
Tioga	29	0	51.0	15.8	26.9	72.9	19.9	46.4	39.9
Carpio	27	0	51.9	16.1	26.7	70.2	21.6	45.9	39.5
Divide	28	0	50.9	16.3	28.9	70.7	15.9	43.3	38.5
Alkabo	26	0	49.1	16.0	25.3	62.5	20.2	41.4	36.0
Trial Mean	27	0	50.4	15.9	26.5	70.0	21.3	45.6	39.3
C.V. %	2.9	--	2.6	1.7	9.1	4.8	12.3	--	--
LSD 5%	1.2	NS	2.1	0.4	3.6	5.1	3.9	--	--
LSD 10%	1.0	NS	1.6	0.3	3.0	4.2	3.2	--	--

¹ 0 = no lodging, 9 = 100% lodged.

Planting Date: May 3

Harvest Date: August 24

Previous Crop: Spring Wheat

NDSU Dickinson Research Extension Center

2017 Durum - Recrop **Dickinson, ND**

Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	----- Grain Yield-----			----- Average Yield-----	
						2015	2016	2017	2015	2016
AC Commander	59	13,145	21	58.3	17.0	63.5	47.6	31.1	39.3	47.4
AC Navigator	61	11,940	21	59.3	16.1	61.4	43.7	31.6	37.6	45.5
Alkabo	60	11,829	23	58.8	15.8	68.2	53.1	32.0	42.5	51.1
Alzada	59	11,201	23	58.3	15.7	59.6	39.9	35.0	37.4	44.8
Ben	60	11,713	26	58.0	16.7	68.1	43.7	33.0	38.3	48.3
CDC Verona	60	13,192	23	56.8	18.1	59.0	47.7	29.8	38.8	45.5
Carpio	61	11,736	23	58.8	15.8	67.4	52.5	33.2	42.8	51.0
Divide	61	12,795	25	57.8	16.4	73.7	54.2	33.2	43.7	53.7
Grenora	61	12,852	23	57.5	16.2	75.0	51.5	35.2	43.3	53.9
Joppa	61	13,629	23	56.8	16.5	69.1	56.7	34.0	45.3	53.2
Lebsock	59	12,879	22	57.5	17.0	68.2	52.8	31.8	42.3	50.9
Maier	59	12,383	25	58.0	17.1	72.0	45.1	32.4	38.7	49.8
Mountrail	61	12,611	24	58.0	16.7	68.4	50.3	35.9	43.1	51.5
Pierce	59	12,143	24	58.3	16.4	71.4	48.2	32.5	40.4	50.7
Rugby	61	13,061	26	57.3	17.3	66.3	45.8	31.8	38.8	48.0
Strongfield	62	12,463	25	58.3	17.0	63.9	51.2	33.8	42.5	49.7
Tioga	61	12,383	24	58.3	16.9	74.7	51.5	32.8	42.1	53.0
VT Peak	58	12,113	23	59.3	16.6	--	51.7	30.0	40.8	--
Trial Mean	61	12,406	24	58.3	16.8	69.3	50.2	31.9	--	--
CV %	2.6	7.4	5.7	1.4	4.2	6.3	9.6	9.9	--	--
LSD 0.05	2	1,853	2	1.6	1.4	6.1	6.8	4.4	--	--
LSD 0.10	2	1,545	2	1.4	1.2	5.1	5.7	3.7	--	--

Planting Date: April 26, 2017

Harvest Date: August 7, 2017

Previous Crop: Cover Crop

Seeding Rate: 1.2 million live seeds/ac

ND Barley Variety Descriptions

Table 1. 2016 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	M/F	MN	2010	S	L	White	M.short	V.strg.	Med.	S	MR	MR/R	MS/S
Rasmusson	M/F	MN	2008	S	S	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Robust	F	MN	1983	S	S	White	Med.	M.strg.	Med.	S	MS/S	MR/R	MS/S
Stellar-ND	M/F	ND	2005	S	L	White	M.short	V.strg.	Med.	S	MS	MR/R	MS/S
Tradition	M/F	BARI	2003	S	L	White	M.short	V.strg.	Med.	S	MS	MR/R	MS/S
Two-rowed													
AAC Synergy	M/F	Syngenta	2015	R	L	White	M.short	Strg.	M.late	MR	MR/R	MR	MR
ABI Balster	M/F	BARI	2015	R	L	White	M.short	Med.	Med.	NA	MR	NA	NA
ABI Growler	M/F	BARI	2015	R	L	White	M.short	M.strg.	Med.	NA	MS/S	NA	NA
AC Metcalfe	M	Canada	1997	R	L	White	Med.	Med.	Late	S	MS	MS	S
CDC Copeland	M	Canada	1999	R	L	White	Tall	Med.	Late	S	MS	MS	MR
CDC Meredith	M	Canada	2008	R	L	White	Med.	Med.	Late	MR	MR	S	MS
Conlon ⁷	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 ⁸	F	Canada	1981	R	L	White	Med.	M.weak	Late	S	S	S	MS
Haxby	F	MT	2003	R	L	White	Med.	Med.	Med.	S	MS	MS	NA
Hockett	M/F	MT	2008	R	L	White	Med.	Med.	Med.	S	NA	NA	NA
LCS Genie	M	Limagrain	NA	S	S	White	Short	V.strg.	Med.	NA	MS	NA	NA
LCS Odyssey	M/F	Limagrain	NA	R	S	White	Short	Med.	Med.	NA	MS	NA	NA
Lilly	F	Germany	NA	R	L	White	Short	M.strg.	Late	S	MS/S	S	MR/R
ND Genesis ⁹	M/F	ND	2015	S	L	White	Med.	M.strg.	M.late	S	MR	MR	MS
Pinnacle	M/F	ND	2006	S	L	White	Med.	Strg.	M.late	S	S	MR	MS
Rawson	F	ND	2005	R	L	White	Med.	Med.	Med.	S	MS	MR	MS
Scarlett	M	Germany	1995	R	L	White	Short	Med.	Late	S	NA	S	MR
Sunshine	F	Germany	NA	R	L	White	Short	M.strg.	Late	S	S	S	MS
Specialty													
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 Lower DON accumulations than other varieties tested.

⁸ Recommended as a malting barley in western U.S.

NDSU Hettinger Research Extension Center

Barley - 2017 **Hettinger, ND**

Variety	Days to	Plant	Plant		Test	Grain	----- Grain Yield -----			Average Yield	
	Head	Height	Lodge	Plump	Weight	Protein	2015	2016	2017	2 yr	3 yr
	DAP ¹	inches	0-9 ²	%	lbs/bu	%	----- Bushels per acre -----				
TWO ROW											
CDC Meredith	76	19	0	62	37.7	11.9	110.0	68.2	41.6	54.9	73.3
Pinnacle	75	21	0	79	43.1	11.5	103.5	64.6	49.4	57.0	72.5
ND Genesis	77	22	0	80	43.7	11.2	103.2	69.0	40.0	54.5	70.7
Conlon	71	22	0	85	43.1	11.3	82.6	60.4	24.2	42.3	55.7
ABI Balster	75	21	0	73	43.4	12.3	--	73.2	53.0	63.1	--
LCS Genie	77	21	0	76	45.9	10.9	--	67.0	53.7	60.4	--
Sirish	76	19	0	75	45.6	11.3	--	71.4	48.6	60.0	--
LCS Odyssey	77	19	0	82	46.4	10.5	--	70.7	47.1	58.9	--
AAC Synergy	75	21	0	79	43.5	10.7	--	75.7	41.8	58.8	--
ABI Growler	76	19	0	69	41.9	12.9	--	68.0	34.7	51.4	--
Explorer	74	19	0	82	44.3	11.1	--	--	57.8	--	--
SIX ROW											
Stellar-ND	71	21	0	74	42.2	11.6	86.6	62.5	47.5	55.0	65.5
Lacey	73	21	0	75	44.5	11.5	84.3	59.5	49.9	54.7	64.6
Tradition	74	24	0	77	44.7	11.8	83.9	63.3	46.3	54.8	64.5
Innovation	74	21	0	78	44.5	12.1	87.2	62.1	40.4	51.3	63.2
Celebration	74	21	0	80	43.6	12.4	76.4	61.4	47.9	54.7	61.9
Quest	71	22	0	76	43.3	11.6	66.2	64.4	52.1	58.3	60.9
Trial Mean	74	21	0	77	43.7	11.5	90.7	67.7	45.4	56.3	66.3
C.V. %	1.2	6.9	--	5.2	4.2	6.3	5.4	7.5	15.0	--	--
LSD 5%	1.3	2.0	NS	5.7	2.6	1.0	6.9	7.2	9.6	--	--
LSD 10%	1.1	1.7	NS	4.8	2.1	0.9	5.8	6.0	8.0	--	--

¹ Days to Head = the number of days from planting to head emergence from the boot.

² 0 = no lodging, 9 = 100% lodged.

Planting Date: April 7

Harvest Date: July 24

Previous Crop: Carinata

NDSU Hettinger Research Extension Center

Barley - 2017	Scranton, ND
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	----- Grain Yield -----			----- Average Yield -----	
	inches	0-9*	lbs/bu	%	2015	2016	2017	2 yr	3 yr
TWO ROW									
ND Genesis	24	0	29.8	18.3	85.2	66.5	11.3	38.9	54.3
Pinnacle	23	0	41.7	17.0	79.7	56.7	11.0	33.9	49.1
CDC Meredith	22	0	30.2	19.1	--	57.5	9.5	33.5	--
SIX ROW									
Innovation	22	0	35.9	18.3	78.6	60.8	12.1	36.5	50.5
Tradition	23	0	36.3	17.7	--	59.8	12.1	36.0	--
Trial Mean	23	0	34.8	18.1	77.6	60.3	11.2	35.7	51.3
C.V. %	6.0	--	6.4	7.1	8.2	10.2	23.1	--	--
LSD 5%	2.1	NS	3.5	2.0	9.6	9.4	4.0	--	--
LSD 10%	1.7	NS	2.8	1.6	8.0	7.7	3.3	--	--

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

Planting Date: April 27

Harvest Date: August 11

Previous Crop: Spring Wheat

Barley - 2017	Regent, ND
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Variety	Plant Height	Plant Lodge	Test Weight	Grain Protein	----- Grain Yield -----			----- Average Yield -----	
	inches	0-9*	lbs/bu	%	2015	2016	2017	2 yr	3 yr
TWO ROW									
ND Genesis	23	0	45.2	14.1	112.1	39.7	19.3	29.5	57.0
Pinnacle	23	0	46.5	14.7	106.1	24.5	17.4	21.0	49.3
CDC Meredith	22	0	41.4	16.1	--	44.1	19.1	31.6	--
SIX ROW									
Innovation	22	0	46.3	15.5	84.8	27.4	19.5	23.5	43.9
Tradition	23	0	46.7	15.2	--	30.8	21.1	26.0	--
Trial Mean	23	0	45.2	15.1	93.2	33.3	19.3	26.3	50.1
C.V. %	6.0	--	3.2	2.8	8.0	18.8	27.4	--	--
LSD 5%	2.1	NS	2.2	0.7	11.3	9.6	8.1	--	--
LSD 10%	1.7	NS	1.8	0.5	9.4	7.9	6.6	--	--

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

Planting Date: April 27

Harvest Date: August 11

Previous Crop: Spring Wheat

NDSU Hettinger Research Extension Center

Barley - 2017 **Mandan, ND**

Variety	Plant	Plant	Test	Grain	----- Grain Yield -----			----- Average Yield -----	
	Height	Lodge	Weight	Protein	2015	2016	2017	2 yr	3 yr
	inches	0-9*	lbs/bu	%	----- Bushels per acre -----				
TWO ROW					**	**			
CDC Meredith	22	0	33.3	15.8			22.3	--	--
Pinnacle	23	0	31.1	15.3			20.3	--	--
ND Genesis	25	0	30.2	13.7			19.1	--	--
SIX ROW									
Innovation	24	0	29.1	15.9			6.6	--	--
Tradition	25	0	31.8	15.9			7.2	--	--
Trial Mean	24	0	31.2	15.3			15.1	--	--
C.V. %		--						--	--
LSD 5%		NS						--	--
LSD 10%		NS						--	--

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

** Mandan location was destroyed by wildlife in 2015 & 2016

Planting Date: May 3

Harvest Date: August 24

Previous Crop: Spring Wheat

NDSU Dickinson Research Extension Center

2017 Barley - Recrop **Dickinson, ND**

Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	Protein %	% Plump >6/64	----- Grain Yield-----			----- Average Yield-----	
							2015	2016	2017	2	3
							-----bu/ac-----			-----bu/ac-----	
<i>Six Row</i>											
Celebration	62	14,775	20	46.3	17.7	50	102.3	74.3	49.2	61.7	75.3
Innovation	58	12,603	18	49.8	17.5	74	97.9	77.8	50.0	63.9	75.3
Lacey	57	13,714	19	48.3	16.8	53	110.3	75.2	45.6	60.4	77.0
Quest	60	13,653	20	48.3	17.1	50	91.7	74.5	47.3	60.9	71.2
Stellar-ND	60	13,520	17	46.5	15.7	52	107.9	75.2	46.7	60.9	76.6
Tradition	60	13,283	20	50.0	16.9	59	81.3	69.5	45.6	57.6	65.5
<i>Two Row</i>											
AAC Synergy	64	13,037	18	47.5	16.1	56	--	90.3	47.4	68.8	--
ABI Balster	66	13,023	17	46.3	15.8	46	--	92.4	47.8	70.1	--
ABI Growler	66	15,536	16	44.5	17.9	45	--	86.9	46.3	66.6	--
ND Genesis	63	12,211	19	48.8	14.6	71	124.5	88.7	49.3	69.0	87.5
CDC Meredith	65	14,355	17	44.5	16.7	45	126.2	94.9	44.2	69.5	88.4
Conlon	57	11,837	17	50.5	15.5	86	103.4	54.2	45.8	50.0	67.8
Explorer	63	11,758	16	49.5	15.4	62	--	--	54.1	--	--
LCS Genie	67	12,328	16	48.5	15.9	53	--	97.1	46.2	71.6	--
LCS Odyssey	65	12,694	18	46.8	16.4	69	--	92.7	52.7	72.7	--
Pinnacle	61	11,774	18	50.0	15.5	81	126.2	80.3	45.7	63.0	84.1
Sirish	65	13,761	17	48.3	16.9	46	--	91.4	45.3	68.3	--
Trial Mean	61	12,825	18	48.3	16.0	63	110.4	81.3	48.8	--	--
CV %	2.2	5.5	6.2	1.5	2.9	10.0	9.9	9.2	9.7	--	--
LSD 0.05	2	1,444	2	1.5	0.9	13	15.5	10.6	6.7	--	--
LSD 0.10	2	1,197	1	1.3	0.8	11	12.9	8.8	5.6	--	--

Planting Date: April 26, 2017

Harvest Date: July 27, 2017

Previous Crop: Cover Crop

Seeding Rate: 1.2 million live seeds/ac

Grain protein percentages reported on a 0% moisture basis

NDSU Dickinson Research Extension Center

2017 Glen Ullin Barley - Recrop	Dickinson, ND
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Variety	Seeds per Pound	Test Weight lbs/bu	% Plump >6/64	Protein %	-----Grain Yield-----			Average Yield	
					2015	2016	2017	2	3
					-----bu/ac-----			----bu/ac----	
Six Row									
Innovation	10,908	47.5	95	12.6	86.4	60.7	63.3	62.0	70.1
Quest	11,969	45.0	84	13.0	91.8	59.1	66.8	62.9	72.5
Tradition	11,370	47.8	93	13.1	--	--	65.6	--	--
Two Row									
ND Genesis	8,948	45.5	97	12.2	93.0	72.5	65.8	69.1	77.1
Pinnacle	8,800	47.3	95	12.0	94.0	60.8	58.5	59.7	71.1
Sirish	9,610	48.5	97	12.7	--	--	67.3	--	--
Trial Mean	10,268	46.9	93	12.6	90.1	61.2	64.6	--	--
CV %	3.5	1.2	1.2	5.0	6.9	6.3	11.3	--	--
LSD 0.05	913	1.4	3	NS	9.4	5.8	NS	--	--
LSD 0.10	715	1.1	2	NS	7.7	4.7	NS	--	--

Planting Date: May 4, 2017

Harvest Date: August 10, 2017

Previous Crop: Soybean

Seeding Rate: 1.2 million live seeds/ac

Grain protein percentages reported on a 0% moisture basis

ND Oat Variety Description

Table 6. 2016 North Dakota oat variety descriptions.

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

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

²E = early; M = medium; L = late.

³R = resistant; MR = moderately resistant; MS = moderately susceptible; NA = not available; 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.

NDSU Hettinger Research Extension Center

Oat - 2017 **Hettinger, ND**

Variety	Days to Head	Plant Height	Plant Lodge	Test Weight	----- Grain Yield -----			Average Yield	
	DAP ¹	inches	0-9 ²	lbs/bu	2015	2016	2017	2 yr	3 yr
					----- Bushels per acre -----				
AC Pinnacle	72	31	0	34.2	180.4	77.4	79.5	78.5	112.4
Rockford	71	31	0	35.4	186.3	65.3	76.2	70.8	109.3
GM423	74	31	0	29.2	182.0	65.1	75.0	70.1	107.4
CDC Minstrel	73	28	0	31.8	186.3	65.9	66.6	66.3	106.3
CDC Dancer	72	29	0	35.7	177.4	62.4	72.4	67.4	104.1
Deon	72	31	0	34.5	173.0	64.0	70.9	67.5	102.6
Souris	71	28	0	34.3	169.5	64.0	74.2	69.1	102.6
Killdeer	70	27	0	35.0	186.8	61.6	58.2	59.9	102.2
Newburg	68	31	0	33.1	181.6	63.9	57.5	60.7	101.0
Leggett	73	31	0	33.4	174.5	61.5	65.6	63.6	100.5
HiFi	72	30	0	31.3	180.7	61.6	57.5	59.6	99.9
Jury	68	32	0	34.7	175.8	55.5	58.0	56.8	96.4
Otana	72	31	0	34.3	156.2	63.8	67.2	65.5	95.7
Stallion	72	31	0	36.5	160.5	59.6	58.2	58.9	92.8
Beach	73	31	0	34.1	164.8	59.6	50.9	55.3	91.8
Hystest	69	35	0	36.0	144.7	53.7	63.5	58.6	87.3
Paul (hull-less)	74	33	0	34.7	149.4	46.2	39.3	42.8	78.3
Hayden	70	29	0	35.8	--	68.9	75.4	72.2	--
CS Camden	73	31	0	31.5	--	--	73.3	--	--
Trial Mean	71	30	0	33.7	176.5	62.8	62.3	62.9	100.5
C.V. %	1.2	10.8	--	3.6	5.6	9.1	26.0	--	--
LSD 5%	1.2	4.6	NS	1.7	13.8	8.0	22.7	--	--
LSD 10%	1.0	3.8	NS	1.4	11.6	6.7	19.0	--	--

¹ Days to Head = the number of days from planting to head emergence from the boot.

² 0 = no lodging, 9 = 100% lodged.

Planting Date: April 6

Harvest Date: August 3

Previous Crop: Barley

NDSU Dickinson Research Extension Center

2017 Oat - Recrop **Dickinson, ND**

Variety	Days to Head	Seeds per Pound	Plant Height in	Test Weight lbs/bu	----- Grain Yield-----			----- Average Yield-----	
					2015	2016	2017	2 Year	3 Year
					-----bu/ac-----			-----bu/ac-----	
AC Pinnacle	63	15,100	25	32.6	161.6	150.3	83.4	116.9	131.8
Beach	61	14,034	27	34.8	115.6	130.9	70.3	100.6	105.6
CDC Dancer	63	15,223	27	32.8	141.3	135.3	74.4	104.8	117.0
CDC Minstrel	62	13,407	23	33.0	149.9	133.9	70.2	102.1	118.0
CS Camden	62	13,263	26	28.7	--	--	72.4	--	--
Deon	63	14,425	27	31.4	150.5	126.9	76.1	101.5	117.8
GM 423	64	13,622	27	26.9	142.4	140.2	73.6	106.9	118.7
Hayden	62	13,247	28	33.6	--	140.7	80.9	110.8	--
HiFi	63	14,696	26	30.2	140.7	123.3	69.7	96.5	111.2
Hyttest	59	14,127	30	33.9	108.8	108.3	66.0	87.2	94.4
Jury	61	15,107	31	31.2	134.0	111.2	73.2	92.2	106.1
Killdeer	60	14,501	24	33.3	149.8	125.3	81.8	103.6	119.0
Leggett	61	14,973	24	32.5	150.1	133.4	70.9	102.2	118.1
Newburg	61	14,562	31	30.5	143.0	115.9	73.2	94.5	110.7
Otana	62	15,697	30	31.8	127.3	126.1	76.5	101.3	110.0
Paul*	65	15,884	27	36.2	105.0	91.8	43.3	67.6	80.0
Rockford	62	14,551	27	33.9	144.1	133.2	71.2	102.2	116.2
Souris	62	16,322	24	32.4	145.0	111.5	78.2	94.8	111.6
Stallion	63	17,194	30	31.9	134.6	118.4	83.2	100.8	112.0
Trial Mean	62	14,578	27	31.8	140.5	122.8	72.9	--	--
CV %	1.9	5.8	6.7	3.1	8.4	9.0	9.6	--	--
LSD 0.05	2	1,734	3	1.4	16.6	15.5	9.8	--	--
LSD 0.10	1	1,442	2	1.1	13.9	12.9	8.2	--	--

Planting Date: April 27, 2017

Harvest Date: July 31, 2017

* Hulless

Previous Crop: Cover Crop

Seeding Rate: 1 million live seeds/ac

NDSU Hettinger Research Extension Center

Oil Type Sunflower - 2017

Hettinger, ND

Company/Brand Hybrid		Oil Type & Traits	Days to Bloom	Plant Height	Lodging %	Test Weight lbs/bu	Oil Content %	Grain Yield		
								2017	2-Year	3-Year
		*	**	inches				-----lbs/ac-----		
Croplan	3732	NS	73	38	2	25.7	39.8	1581	--	--
Croplan	3845 HO	HO	73	41	15	25.6	41.8	1944	--	--
Croplan	432 E	NS, EX, DM	66	43	16	25.9	36.5	1893	2121	2128
Croplan	455 E HO	HO, EX, DM	71	38	24	24.9	39.0	1562	2107	--
Croplan	458 E HO	HO, EX, DM	70	38	17	24.7	38.7	1924	2255	2453
Croplan	545 CL	NS, CL, DM	73	43	18	24.9	38.4	1878	2427	2828
Croplan	549 CL	HO, CL, DM	69	48	25	26.3	39.6	1875	2225	2565
Croplan	568 CL HO	HO, CL, DM	75	41	33	25.1	40.0	1820	--	--
Croplan	7717 CL HO	HO, CL	69	49	34	26.2	41.6	1825	2098	2422
Croplan	7919 CL HO	HO, CL, DM	73	47	14	25.0	41.4	2467	2698	--
Mycogen	8D310CL	TR, CL	74	47	18	24.0	35.7	1692	1857	2254
Mycogen	8H449CLDM	HO, CL, DM	72	38	16	28.4	42.8	2011	2441	2906
Mycogen	E83529CL	HO, CL, DM	80	47	6	24.6	39.4	1994	--	--
Mycogen	MY8H456CL	HO, CL, DM	74	43	15	25.2	42.9	2132	--	--
Nuseed	Badger DMR	NS, CL, DM	69	45	9	25.5	35.2	2172	2136	2196
Nuseed	Camaro II	NS, CL, DM	72	45	18	26.6	40.0	2065	2239	2585
Nuseed	Falcon	NS, EX	72	42	6	25.2	39.5	1996	2144	2477
Nuseed	Hornet	HO, CL, DM	74	44	26	25.0	42.1	2260	2764	3240
Nuseed	N4HM340	HO, CL, DM	75	43	14	23.8	38.6	1993	--	--
Nuseed	N4HM354	NS, CL, DM	70	42	15	26.2	42.1	2111	2550	--
Nuseed	N4HP470	HO, CLP, DM	73	47	8	26.2	44.2	2535	--	--
Nuseed	N5LM307	NS, CL	68	44	10	23.8	36.0	1803	2008	--
Nuseed	NHK12S111	HO, EX	69	43	10	24.8	39.8	1884	--	--
Proseed	12G25 CL	HO, CL	71	41	11	26.1	43.8	1806	2304	--
Proseed	E 50016 CL	NS, CL	74	38	26	24.5	39.3	1547	--	--
Proseed	E-21 CL	NS, CL, DM	73	47	34	23.5	35.8	1602	--	--
Proseed	E-31 CL	NS, CL, DM	71	46	23	23.4	35.9	1967	2181	2229
Proseed	E-362436	NS, CL, DM	70	49	13	26.8	40.3	1919	--	--
Proseed	E-71 CL	NS, CL, DM	74	45	14	22.6	35.3	1585	--	--
Proseed	E-72	NS	76	52	13	24.1	41.8	1881	--	--
Proseed	E-73 CL	NS, CL, DM	74	41	14	22.3	37.9	1763	--	--
Thunder Seed	11N94	NS, CL, DM	74	44	9	26.2	40.3	1817	--	--
Thunder Seed	12N92	NS, CL, DM	69	42	5	25.2	40.5	2010	--	--
Thunder Seed	35H92	HO, CL, DM	70	44	14	25.7	41.0	1823	--	--
Thunder Seed	42H94	HO, CL, DM	76	48	15	25.3	42.5	2343	--	--
USDA (CK)	Honeycomb NS	NS	62	41	4	25.7	36.6	791	1154	1368
USDA (CK)	894	TR	71	46	9	24.9	38.8	1897	2083	2394
Croplan (CK)	450 E HO	HO, EX, DM	72	41	11	24.7	38.9	1996	--	--
Croplan (CK)	559CL	NS, CL, DM	73	47	23	25.4	40.5	2162	2261	--
Mycogen (CK)	8N270CLDM	NS, CL, DM	64	40	25	25.9	40.5	1659	1908	2103
Trial Mean			72	44	16	25.1	39.6	1900	2188	2410
C.V. %			5.3	9.4	9.7	3.1	4.1	20.6	--	--
LSD 5%			2.3	5.8	13.6	1.1	2.3	547	--	--
LSD 10%			1.9	4.8	11.3	0.9	1.9	458	--	--

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

** Days after planting.

Planting Date: May 31

Harvest Date: October 27
36

Previous Crop: Wheat

NDSU Hettinger Research Extension Center

Dry Bean - 2017	Hettinger, ND
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Variety	Type	Maturity	Plant	Plant	Test	----- Grain Yield -----			----- Average Yield -----	
			Height	Lodge	Weight	2015	2016	2017	2 yr	3 yr
		DAP ¹	inches	0-9 ²	lbs/bu	----- lbs per acre -----				
LaPaz	Pinto	105	21	5	58.4	2024	1318	1507	1413	1616
Lariat	Pinto	110	23	7	58.4	2021	1252	1140	1196	1471
Maverick	Pinto	102	21	5	58.7	1714	1070	1386	1228	1390
Monterrey	Pinto	102	21	4	59.1	--	1454	1496	1475	--
ND-307	Pinto	102	21	5	55.9	1735	1122	1214	1168	1357
Palomino	Pinto	111	20	5	57.7	1809	1099	1282	1191	1397
Stampede	Pinto	105	22	5	56.6	2028	1382	1415	1399	1608
Windbreaker	Pinto	104	18	5	57.2	1699	1069	1110	1090	1293
HMS Medalist	Navy	104	19	2	64.2	1597	1282	1466	1374	1448
T9905	Navy	104	18	3	62.5	1744	1438	1652	1545	1611
Merlot	Sm Red	104	23	4	60.2	1802	1230	1449	1340	1494
Rosetta	Pink	101	22	3	61.6	--	1261	1597	1429	--
Eclipse	Black	102	18	2	62.8	1791	1429	1451	1440	1557
Loreto	Black	104	18	3	64.5	1618	1284	1298	1291	1400
Zorro	Black	106	17	2	62.3	1986	1333	1391	1362	1570
Powderhorn	Great Northern	100	18	2	58.6	--	--	1900	--	--
Trial Mean		105	20	4	60.0	1746	1226	1427	1329	1478
C.V. %		1.5	6.2	18.1	1.6	7.3	9.8	13.1	--	--
LSD 5%		2.7	1.8	0.9	1.4	181	170	266	--	--
LSD 10%		2.2	1.5	0.8	1.2	151	142	222	--	--

¹ Days after planting.

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

Planting Date: June 2

Harvest Date: October 4

Previous Crop: Soybean

NDSU Dickinson Research Extension Center

2017 Chickpea - Recrop	Dickinson, ND
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Variety	Days	Days	Plant Height in	1000	Seeds	Test Weight lbs/bu	-----Seed Size (mm)-----				Yield lbs/ac
	to Flower	to Mature		seed weight gm	per Pound		<8	8-9	9-10	>10	
							-----%-----				
<i>Kabuli type</i>											
CDC Frontier	53	78	10	353	1,284	62.0	10	42	42	7	1150
CDC Luna	53	78	8	372	1,222	61.3	10	27	47	16	764
Sawyer	51	75	10	416	1,092	61.0	4	25	48	23	891
Sierra	51	75	10	436	1,041	59.4	10	13	33	44	573
<i>Small Kabuli Type</i>											
B-90	54	78	11	275	1,650	62.8	59	41	0	0	867
<i>Desi Type</i>											
CDC Anna	50	76	11	208	2,180	60.4	92	8	0	0	775
Trial Mean											
	52	77	10	343	1,411	61.1	31	26	28	15	837
CV %	2.2	1.9	8.2	2.9	2.5	0.5	8.4	12.8	8.5	20.9	10.9
LSD 0.05	2	2	1	15	53	0.5	4	5	4	5	137
LSD 0.10	1	2	1	12	44	0.4	3	4	3	4	113

Planting Date: April 27, 2017
Harvest Date: August 21, 2017
Previous Crop: Cover Crop

NDSU Hettinger Research Extension Center

Field Pea - 2017

Hettinger, ND

Variety	Days to Flower	Flower Duration	Days to Mature	Canopy Height	Seed Protein	1,000 Seed Wt.	Seeds Lb	Test Weight	Seed Yield		
	DAP ¹	days	DAP ¹	inches	%	gm	seeds	lb/bu	2017	2-Yr. Avg.	3-Yr. Avg.
Yellow Cotyledon Type											
Agassiz	48	18	78	15	29.4	170	2668	*	12.1	16.3	27.8
Bridger	47	16	74	13	26.2	158	2872		12.7	15.6	26.8
DS Admiral	49	16	76	14	27.9	177	2569		13.0	16.0	30.0
Durwood	48	17	76	15	27.9	172	2640		14.0	18.1	--
Gunner	50	16	77	16	29.2	165	2756		12.6	18.4	27.4
Hyline	51	13	75	12	28.3	170	2675		11.9	14.7	26.2
Korando	45	18	74	12	26.3	200	2268		14.4	--	--
LG Amigo	47	17	75	12	26.3	158	2883		13.8	--	--
LGPN4906	48	17	76	15	28.2	171	2660		12.7	15.7	--
LGPN4908	45	18	74	12	26.4	179	2537		11.6	--	--
LGPN4909	45	18	74	12	27.3	192	2366		14.0	--	--
LGPN4910	50	15	76	14	27.7	165	2750		10.4	--	--
Majestic	50	15	76	14	27.9	172	2644		10.7	--	--
Mystique	50	15	76	14	27.8	167	2715		13.1	16.7	--
Navarro	45	18	74	12	26.6	189	2398		14.5	17.3	--
Nette 2010	46	18	75	15	26.1	168	2710		14.4	17.1	30.7
PUSA 0628	45	18	74	13	25.8	215	2110		14.4	--	--
Salamanca	49	16	76	14	27.8	178	2556		14.7	17.8	28.2
Spider	51	16	78	16	29.2	178	2546		10.7	13.5	26.9
SW Midas	50	15	76	13	28.5	145	3133		14.6	15.1	28.4
Green Cotyledon Type											
Aragorn	46	18	75	12	26.2	151	3001		11.7	--	--
Arcadia	47	16	75	12	26.6	143	3182		12.4	15.0	--
Bluemoon	48	16	75	14	28.1	184	2461		11.5	--	--
CDC Striker	48	17	76	13	26.6	147	3087		13.1	14.5	26.8
Cruiser	48	17	76	13	26.8	148	3057		13.1	14.0	25.3
Ginny	47	17	75	13	26.9	153	2970		10.6	--	--
Greenwood	46	19	76	13	25.9	146	3116		12.0	--	--
LG Koda	51	13	75	13	27.3	170	2667		12.7	--	--
LGPN1125	50	13	74	13	27.4	184	2466		12.4	--	--
LGPN1904	51	15	77	15	28.6	166	2737		13.4	17.3	--
LGPN1906	45	18	74	14	26.2	188	2417		13.4	--	--
Shamrock	52	14	77	13	26.8	153	2964		11.3	--	--
Viper	46	17	74	15	27.1	172	2647		13.2	15.5	--
Marrowfat Type											
Orka	47	16	74	14	26.3	253	1795		11.4	--	--
Trial Mean	48	16	75	13	27.3	172	2677		12.7	15.8	27.7
C.V. %	1.1	6.2	1.1	12.8	1.5	3.2	3.2		14.8	--	--
LSD 5%	0.7	1.4	1.2	2	0.6	8	121		2.6	--	--
LSD 10%	0.6	1.2	1.0	2	0.5	6	101		2.2	--	--

¹ Days after planting.

* Not enough sample for a test weight.

Planting Date: April 28

Harvest Date: July 26

Previous Crop: Spring Wheat

NDSU Dickinson Research Extension Center

2017 Field Pea - Recrop Dickinson, ND

Variety	Days to Flower	Days to Mature	1000 Seed Weight gm	Seeds per Pound	Plant Height in	Vine Length in	Height Index %	Test Weight lbs/bu	--Grain Yield--			Average Yield		
									2015	2016	2017	2015	2016	2017
Yellow Types														
Agassiz	50	66	189	2,406	14	16	85	65.9	59.9	31.2	21.6	26.4	26.4	37.6
DS Admiral	51	66	218	2,082	14	16	90	65.5	57.0	29.7	23.1	26.4	26.4	36.6
Durwood	49	65	197	2,301	16	19	86	64.8	--	--	22.8	--	--	--
Nette 2010	49	63	209	2,172	14	18	81	65.8	--	27.9	25.4	26.6	26.6	--
Spider	51	67	200	2,264	16	18	87	65.6	--	22.6	18.5	20.5	20.5	--
Green Types														
Arcadia	49	63	177	2,568	12	14	88	62.1	--	30.3	25.8	28.0	28.0	--
CDC Striker	49	64	178	2,552	13	14	89	64.3	56.4	28.4	24.8	26.6	26.6	36.6
Cruiser	49	65	174	2,612	14	16	89	64.5	54.155	26.72	22.7	24.687	24.687	34.51
LG Koda	50	64	202	2,254	14	15	89	65.7	--	--	21.3	--	--	--
Viper	49	63	205	2,211	18	19	91	66.6	--	--	22.0	--	--	--
Trial Mean	49	65	195	2,342	14	17	88	65.0	58.1	28.1	22.8	--	--	--
CV %	2.2	1.4	3.5	3.5	8.3	9.8	5.8	2.5	7.5	7.4	8.5	--	--	--
LSD 0.05	2	1	10	118	2	2	7	2.4	6.4	3.1	2.8	--	--	--
LSD 0.10	1	1	8	98	1	2	6	2.0	5.3	2.6	2.3	--	--	--

Planting Date: April 28, 2017
 Harvest Date: July 21, 2017
 Previous Crop: Cover Crop
 Seeding Rate: 325,000 live seeds/ac

NDSU Dickinson Research Extension Center

2017 Lentil - Recrop	Dickinson, ND
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Variety	Days	Days	1000	Seeds	Plant	Vine	Height	Test	---Grain Yield---			Average Yield	
	to	to	Seed	per					2015	2016	2017	2	3
	Flower	Mature	Weight	Pound	Height	Length	Index	Weight	-----lbs/ac-----			---lbs/ac---	
			gm		in	in	%	lbs/bu					
Large Green Types													
CDC Greenland	50	74	56	8,102	11	12	88	59.6	2,155	971	800	885	1,308
Pennell	50	77	59	7,733	10	11	87	59.6	1,583	1,302	721	1,011	1,202
Riveland	50	74	66	6,888	10	12	88	59.8	1,659	1,124	698	911	1,160
Medium Green Type													
CDC Richlea	50	76	45	10,110	9	11	89	61.8	2,337	1,584	858	1,221	1,593
Small Green Type													
CDC Viceroy	50	74	31	14,772	10	11	87	62.9	2,544	1,521	730	1,125	1,598
Small French Green Type													
CDC Lemay	53	75	31	14,814	9	10	85	62.3	1,949	1,315	369	842	1,211
Medium Red Type													
CDC Red Rider	51	76	42	10,937	10	12	83	62.1	2,551	1,585	816	1,201	1,651
Small Red Types													
CDC Redberry	51	74	41	11,191	10	11	84	61.5	1,811	1,229	700	965	1,247
CDC Rouleau	53	75	37	12,147	9	11	87	60.4	2,241	1,511	590	1,050	1,447
Extra Small Red Type													
CDC Rosetown	52	78	26	17,171	9	11	87	62.4	2,124	1,406	759	1,083	1,430
Trial Mean	51	75	42	11,555	10	11	87	61.3	2,095	1,355	697	--	--
CV %	2.4	1.0	3.2	2.5	5.9	7.1	3.4	1.3	12.3	9.0	10.7	--	--
LSD 0.05	2	1	2	412	1	1	4	1.2	373	177	107	--	--
LSD 0.10	1	1	2	342	1	1	4	1.0	310	147	89	--	--

Planting Date:

Harvest Date: April 27, 2017

Previous Crop: August 1, 2017

Seeding Rate: 600,000 live seeds/ac

NDSU Hettinger Research Extension Center

Soybean - Roundup Ready - 2017 **Hettinger, ND**

Company/Branch	Variety	Maturity	Mature Date	Plant Height	Test Weight	Seed Oil	Seed Protein	Yield 2017	Average Yield	
									2-Yr	3-Yr
				inches	lbs/bu	%	%			
Proseed	40-07	0.07	9/6	18	52.8	17.1	30.1	17.4	--	--
Proseed	50-10	0.1	9/14	23	53.5	18.0	31.1	25.1	--	--
Proseed	30-20	0.2	9/13	23	52.3	17.9	32.6	26.3	26.6	35.1
Integra	20300	0.3	9/17	21	54.3	16.2	33.9	25.2	26.1	34.2
Integra	50319N Xtend	0.3	9/17	21	53.9	16.9	32.3	21.9	--	--
REA Hybrids	RX0327	0.3	9/17	21	53.4	17.9	31.4	23.5	--	--
Proseed	40-50	0.5	9/21	23	54.9	16.1	34.1	24.5	--	--
Proseed	50-60	0.6	9/23	22	54.5	16.2	33.7	24.5	--	--
Integra	20617N	0.6	9/23	22	55.0	16.4	33.3	26.0	--	--
Integra	50629N Xtend	0.6	9/25	22	55.2	16.3	32.8	22.8	--	--
REA Hybrids	RX0628	0.6	9/23	22	54.5	16.3	33.2	23.4	--	--
REA Hybrids	RX1027	1	9/26	20	55.8	17.3	31.4	21.3	--	--
Trial Mean			9/19	21	54.2	16.9	32.5	23.5	26.3	34.7
C.V. %			0.1	6.2	1.2	2.4	2.6	11.0	--	--
LSD 5%			1.2	1.9	0.9	0.6	1.2	3.7	--	--
LSD 10%			1.0	2	0.8	0.5	1.0	3.1	--	--

Planting Date: May 23
 Harvest Date: September 28, October 4
 Previous Crop: Canola

NDSU Hettinger Research Extension Center

Corn - 2017 **Hettinger, ND**

Company	Hybrid	Traits ¹	Relative	Plant	Ear	Stalk	Moisture	Test	Grain Yield		
			Maturity ¹	Height	Height	Lodge	Content	Weight	2017	2-Yr	
			days	inches	inches	%	%	lbs/bu	-----bu/ac-----		
Integra	2803	RR2, VT2P	78	69	19	0	12.8	46.1	40.9	--	
Integra	3142	RR2, VT2P	81	66	17	0	13.4	45.4	43.1	--	
Integra	3325	RR2, AV-3010A	83	64	17	0	25.2	44.9	58.7	95.2	
Integra	3537	RR2, VT2P	85	69	18	0	16.3	42.1	56.0	93.2	
Legacy	L-2314	RR2, VT2P	83	64	17	0	12.1	44.0	49.5	--	
Legacy	L-2516	RR2, VT2P	85	67	19	0	12.4	44.8	65.5	101.5	
Legacy	L-2643	RR2, VT2P	86	69	21	0	13.5	43.2	54.8	--	
Legacy	L-2817	RR2, VT2P	87	71	17	0	14.6	42.4	51.9	--	
Legacy	L-2847	RR2, VT2P	87	70	19	0	21.0	42.2	57.5	--	
Proseed	1278	GT	78	72	19	0	15.0	45.4	40.1	--	
Proseed	1480	RR2, VT2P	80	68	17	0	10.7	46.3	47.0	--	
Proseed	1383	GT	83	70	16	0	11.6	44.1	46.1	90.1	
Proseed	1483	RR2, VT2P	83	67	19	0	10.4	44.7	58.9	--	
Proseed	1384	RR2, VT2P	84	71	17	0	11.3	46.5	53.7	85.9	
Proseed	1185	RR2	85	75	22	0	12.7	41.6	54.6	--	
Proseed	PX 787	RR2, VT2P	87	75	20	0	13.8	44.5	63.1	--	
Trial Mean				69	18	0	14.2	44.3	52.6	93.2	
C.V. %				5.3	14.6	--	21.1	3.0	15.3	--	
LSD 5%				5.2	3.8	--	4.3	1.9	11.4	--	
LSD 10%				4.3	3.2	--	3.6	1.6	9.5	--	

¹ Traits and relative maturity provided by company.

Planting Date: May 19

Harvest Date: October 27

Previous Crop: Spring Wheat

Weed Control Trials in 2017

Caleb Dalley, HREC, Hettinger, ND, 2017

During the 2017 growing season, weed control trials were established in spring wheat, durum, barley, oats, canola, field pea, lentils, chickpea, faba bean, flax, and safflower, as well as several trials that were conducted postharvest. Unfortunately, due to the lack of rainfall, most of these trials offered limited amounts of useful information. During the months of May and June, there was less than one inch of total rainfall. Many of the trials were conducted to evaluate the potential use of preemergence applied herbicides for weed control in the previously mentioned crops. Lack of rainfall resulted in poor incorporation and activation of these herbicides and in no case did any of the tested herbicide treatments result in herbicide injury to the crops in which they were applied. Most preemergence herbicides require a minimum of a half-inch of rainfall to adequately incorporate and activate the herbicide. This activation is best when this rainfall comes as a single event, rather than accumulation of lesser amounts of rainfall spread over several days or weeks. Lack of rainfall also limited weed emergence and growth, limiting the amount of data that could be collected from trials evaluating postemergence applied herbicides. With the extreme drought conditions, most crop yields in trials were extremely low and variable. However, due to July and August rainfalls, that encouraged weed growth in fields that had already been harvested, several trials were conducted to evaluate post-harvest weed control. Trials being reported this year include a trial evaluating preemergence and early postemergence herbicides that have potential utility in oats, and evaluation of fall and spring applied herbicides for downy brome control prior to planting field peas, and the evaluation of herbicides that can be used to control kochia and Russian thistle post-harvest.

Postharvest Control of Kochia and Russian Thistle

Caleb Dalley, HREC, Hettinger, ND, 2017

Three field trials were conducted to evaluate herbicide options for controlling kochia following harvest. During 2017, drought conditions led to many small grain fields to be harvested for forage rather than grain. Following forage harvest kochia, Russian thistle and other weeds populations rapidly flourished in the absence of any crop cover. Herbicide options were explored in an effort to control these weeds. Three trials were conducted near Hettinger North Dakota. Two trials were located on a fields that had been planted to barley and harvested for hay forage, the other had been planted to cereal rye and had been grazed. All three fields had high populations of kochia, although one of the fields was primarily infested with Russian thistle. Results at all three location differed considerably.

Location previously planted to rye. Herbicide treatments were applied on August 18, 2017 to kochia that ranged from 2 to 18 inches in height with an average height of 4 inches. Weeds present at this site were kochia, redroot pigweed, common lambsquarter, and common mallow. At 7 DAT, all treatments containing Gramoxone control kochia 97 to 99%, regardless of addition of adjuvant or 2,4-D. The next best treatment was Sharpen which provided 81% control. These are both quick acting contact types of herbicides. Glyphosate alone controlled kochia 77% at 7 DAT and improved to 80% or more at later evaluations. The addition of dicamba (Sterling Blue) and 2,4-D or Starane Ultra did not significantly improve control. Starane Ultra alone controlled kochia 68 to 77%. The addition of 2,4-D or dicamba improved control. Other treatments provided fair control of kochia, and reduced continued growth.

Table 1. Kochia control in field planted to cereal rye and grazed.

Treatment	Rate	Kochia control				
		7 DAT	14 DAT	21 DAT	30 DAT	45 DAT
		%				
1 Untreated		0 f	0 f	0 d	0 f	0 h
2 Glyphosate + AMS	48 oz/a	55 e	78 bcd	82 b	85 b	85 bcd
3 Glyphosate +AMS	24 oz/a	77 bc	80 b	82 b	84 b	84 d
Sterling Blue	0.5 pt/a					
2,4 D LV6	1 pt/a					
4 Glyphosate	24 oz/a	73 cd	71 e	78 b	76 cd	71 g
Sharpen + MSO + AMS	2 oz/a					
5 Sharpen+ MSO + AMS	2 oz/a	74 cd	74 cde	75 bc	70 de	70 g
6 Sharpen	2 oz/a	81 b	76 b-e	81 b	74 cde	70 g
Aim + MSO + AMS	2 oz/a					
7 Glyphosate	24 oz/a	76 bcd	79 bcd	80 b	80 bc	81 de
Starane Ultra + AMS	0.7 pt/a					
8 Starane Ultra	0.7 pt/a	71 d	77 bcd	76 bc	68 e	75 efg
9 Starane Ultra	0.7 pt/a	78 bc	80 bc	80 b	79 bc	84 cd
2,4 D LV6	1 pt/a					
10 Starane Ultra	0.7 pt/a	76 bcd	79 bcd	79 b	79 bc	85 bcd
Sterling Blue	0.5 pt/a					
11 Bison+ MSO + AMS	2 pt/a	73 cd	73 de	70 c	73 cde	81 de
12 Carnivore + MSO + AMS	2 pt/a	78 bc	80 b	83 b	79 bc	79 def
13 Distinct + MSO + AMS	8 oz/a	76 bcd	78 bcd	81 b	77 cd	79 def
14 Glyphosate	24 oz/a	78 bc	79 bcd	79 b	85 b	81 de
Distinct + MSO + AMS	8 oz/a					
15 Widematch	1.33 pt/a	71 d	75 b-e	69 c	66 e	72 fg
16 Gramoxone SL	48 oz/a	98 a	96 a	97 a	95 a	92 ab
17 Gramoxone SL + NIS	48 oz/a	97 a	98 a	98 a	95 a	91 abc
18 Gramoxone SL + HSCO	48 oz/a	99 a	97 a	98 a	95 a	96 a
19 Gramoxone SL + MSO	48 oz/a	98 a	96 a	98 a	97 a	97 a
20 Gramoxone SL	48 oz/a	98 a	97 a	97 a	97 a	96 a
2,4 D LV6 + NIS	1 pt/a					
LSD P=0.05		6.9	5.9	8.4	8.3	7.3
Standard Deviation		2.8	4.2	5.9	3.7	5.2
CV		4.58	5.38	7.5	5.9	6.6
Treatment F		158	95	49	84	62
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0001	0.0001

Abbreviations: DAT, days after treatment; AMS, ammonium sulfate; MSO, methylated soybean oil; HSOC, high surfactant oil concentrate; NIS, non-ionic surfactant.

Location previously planted to barley. Herbicide treatments were applied on July 26, 2017 to kochia ranging from 2 to 12 inches averaging 6 inches. This location was primarily infested with kochia and volunteer barley. The best treatment at all evaluation dates was Gramoxone, which controlled kochia 92% at 14 DAT. Glyphosate alone, even at 48 oz/A provided poor control of kochia. The only other treatments providing good kochia control were Distinct (dicamba + diflufenzopyr) or WideMatch (clopyralid + fluroxypyr). This field will need to be monitored for possible resistance to glyphosate.

Treatment	Rate	Kochia control		
		7 DAT	14 DAT	21 DAT
			%	
1 Untreated		0 i	0 l	0 k
2 Glyphosate	24 oz/a	15 h	0 l	0 k
3 Glyphosate + AMS	24 oz/a	25 g	20 k	10 j
4 Glyphosate + AMS	32 oz/a	26 g	28 ijk	15 j
5 Glyphosate + AMS	48 oz/a	27 g	33 hij	28 hi
6 Glyphosate + AMS	24 oz/a	31 g	20 k	15 j
Sharpen	2 oz/a			
7 Sharpen + COC + AMS	2 oz/a	71 bc	60 de	36 fg
8 Sharpen + MSO + AMS	2 oz/a	70 bc	61 cde	50 bcd
9 Glyphosate + AMS	24 oz/a	46 f	25 jk	13 j
Aim	2 oz/a			
10 Aim + MSO + AMS	2 oz/a	58 de	40 ghi	25 i
11 Sharpen	2 oz/a	71 bc	67 bcd	43 def
Aim + MSO + AMS	2 oz/a			
12 Glyphosate + AMS	24 oz/a	58 de	53 ef	53 bc
Starane Ultra	0.5 pt/a			
13 Starane Ultra	0.5 pt/a	54 ef	38 ghi	36 fg
14 Starane Ultra	1 pt/a	65 cd	47 fg	36 fg
15 Starane Ultra	0.5 pt/a	58 de	43 fgh	45 cde
2,4 D LV6	0.5 pt/a			
16 Starane Ultra	0.5 pt/a	64 cd	53 ef	55 b
Sterling Blue	0.25 pt/a			
17 Glyphosate + AMS	24 oz/a	69 bc	65 cde	40 efg
Bison	2 pt/a			
18 Bison	2 pt/a	68 bc	63 cde	28 hi
19 Carnivore	2 pt/a	68 bc	53 ef	34 gh
20 Glyphosate + AMS	24 oz/a	63 cde	54 ef	42 d-g
Carnivore	2 pt/a			
21 Distinct + MSO + AMS	8 oz/a	71 bc	72 bcd	80 a
22 Glyphosate + AMS	24 oz/a	75 b	73 bc	81 a
Distinct + MSO	8 oz/a			
23 WideMatch	1.33 pt/a	65 cd	78 b	78 a
24 Gramoxone SL	48 oz/a	88 a	92 a	85 a
LSD P=0.05		7.6	13.2	8.7
Standard Deviation		4.0	8.0	6.1
CV		8.5	17.2	16.2
Treatment F		56	26	62
Treatment Prob(F)		0.0001	0.0001	0.0001

Russian thistle location. Herbicide treatments were applied on August 22, 2017. Weeds present at this location included Russian thistle, kochia, common lambsquarters, and green foxtail. The primary weed, Russian thistle was 12 to 18 inches in height, which was greater than an ideal height. Other weeds were not as tall, but were above ideal heights for good control. At 7 DAT, as with the other locations, Gramoxone, with and without adjuvants or 2,4-D provided the greatest control of kochia, Russian thistle and common lambsquarters. Glyphosate alone or tank-mixed with dicamba and 2,4-D or Starane Ultra or Sharpen or Distinct provided excellent control of kochia, Russian thistle and common lambsquarters at 14 DAT and thereafter. Other treatments provide only fair or poor control of these three weeds. Weeds were above ideal height and it was encouraging that control was still possible with both glyphosate and Gramoxone tank-mixes.

Treatment	Rate	Kochia			Russian thistle			Lambquarters		
		7 DAT	14 DAT	21 DAT	28 DAT	7 DAT	14 DAT	21 DAT	28 DAT	21 DAT
1 Untreated		0 g	0 d	0 c	0 d	0 h	0 g	0 e	0 e	0 f
2 Glyphosate + AMS	48 oz/a	54 c-f	95 ab	97 a	100 a	54 fg	100 a	100 a	100 a	100 a
3 Glyphosate +AMS Sterling Blue	24 oz/a	51 def	96 a	99 a	99 ab	63 ef	97 a	99 a	100 a	100 a
4 Glyphosate	0.5 pt/a									
2,4 D LV6	1 pt/a									
5 Sharpen + MSO + AMS	24 oz/a	67 bc	100 a	100 a	100 a	79 bc	100 a	100 a	100 a	100 a
6 Sharpen+ MSO + AMS	2 oz/a									
7 Sharpen	2 oz/a	44 ef	66 c	70 b	71 c	76 bcd	81 bc	79 b	79 b	71 cd
Aim + MSO + AMS	2 oz/a	45 def	69 c	66 b	65 c	72 cde	78 cd	75 bc	77 bc	68 cd
8 Glyphosate	2 oz/a	60 cd	96 ab	98 a	99 ab	65 def	98 a	100 a	100 a	99 a
Starane Ultra + AMS	24 oz/a									
9 Starane Ultra	0.7 pt/a	46 def	69 c	69 b	73 c	56 fg	61 ef	58 d	68 cd	54 de
Starane Ultra	0.7 pt/a	45 def	68 c	68 b	67 c	53 fg	59 ef	63 d	64 d	66 cde
2,4 D LV6	1 pt/a									
10 Starane Ultra	0.7 pt/a	58 cde	70	68 b	70 c	64 def	64 ef	64 cd	69 cd	61 cde
Sterling Blue	0.5 pt/a									
11 Bison+ MSO + AMS	2 pt/a	40 f	61 c	63 b	65 c	46 g	68 de	65 cd	69 cd	64 cde
Carnivore + MSO +	2 pt/a	45 def	69 c	64 b	69 c	46 g	58 ef	58 d	60 d	69 cd
AMS										
13 Distinct + MSO + AMS	8 oz/a	50 def	70 c	66 b	73 c	58 fg	55 f	56 d	63 d	59 de
14 Glyphosate	24 oz/a	46 def	86 b	92 a	96 ab	63 ef	95 a	99 a	98 a	97 a
Distinct + MSO + AMS	8 oz/a									
15 Widematch	1.33 pt/a	52 c-f	65 c	61 b	69 c	56 fg	63 ef	60 d	66 d	49 e
16 Gramoxone SL	48 oz/a	95 a	98 a	99 a	98 ab	99 a	100 a	100 a	100 a	97 a
17 Gramoxone SL + NIS	48 oz/a	99 a	98 a	99 a	100 a	99 a	100 a	100 a	100 a	95 ab
18 Gramoxone SL + HSCO	48 oz/a	97 a	98 a	97 a	98 ab	99 a	100 a	100 a	100 a	96 a
19 Gramoxone SL + MSO	48 oz/a	97 a	98 a	96 a	98 ab	99 a	100 a	100 a	100 a	95 ab
20 Gramoxone SL	48 oz/a	80 ab	91 ab	90 a	90 b	88 ab	91 ab	91 a	93 a	78 bc
2,4 D LV6 + NIS	1 pt/a									
LSD P=0.05		19.9	9.8	12.7	9.0	13.4	11.2	11.5	9.3	17.7
Standard Deviation		0.07	6.9	8.9	6.4	9.4	7.9	8.1	10.0	12.5
CV		10.0	8.8	11.5	8.0	14.2	10.1	10.4	8.2	16.5
Treatment F		29.2	47.8	28.9	55.3	25.7	41.8	40.8	56.8	16.4
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Fall and Spring Application of Dual and Broadaxe for Downy Brome Control in Spring Field Peas

Caleb Dalley, HREC, Hettinger, ND, 2017

Fall POST treatments were applied on October 28, 2016 to a fallow field heavily infested with downy brome. These fall treatments were evaluated for downy brome control 13 days after treatment and again in the spring on May 2, 2017 before planting (186 DAT). At 13 DAT, glyphosate tank-mixed with Dual II Magnum (metolachlor) or Broadaxe XC (sulfentrazone + metolachlor) controlled downy brome 89 to 94%, compared to 80 to 82% with glyphosate alone. When evaluated in the spring before planting, downy brome control was 95 to 99% with glyphosate tank-mixed with Dual II Magnum or Broadaxe, compared to 64 to 66% with glyphosate alone. Field pea were planted and then spring POST treatments were applied on May 5, 2017. Downy brome control was evaluated 21 and 28 DAT (spring POST). At 28 DAT, fall POST tank-mixes of glyphosate with Dual II Magnum or Broadaxe continued to provide 92 to 100% control of downy brome, compared to 48% control for glyphosate alone in the fall. Spring POST tank mixes of glyphosate with Dual II Magnum or Broadaxe controlled downy brome 93 to 97% compared to 86% for a spring only glyphosate application or 90% for a fall and spring application of glyphosate. Extremely dry conditions occurred at Hettinger in 2017. Less than an inch of rainfall occurred during the months of May and June. Due to the dry conditions, pea germination and survival was very low. Stand counts were taken on June 9. Plots treated with fall POST tank-mixes had stand counts of 34 to 38 peas plants per square meter compared to 12 to 25 plants per square meter for spring POST treatments. The desired stand counts was 75 to 80 plants per square meter. Pea height was measured on June 21. Pea heights ranged from 20 to 23 cm for fall POST tank-mixes compared to 17 to 22 for spring POST treatments. Dry conditions persisted for the remainder of the cropping season and did not allow for harvesting the peas due to low population and low seed set. However, it was very apparent that fall POST allowed for better establishment of field pea, even when control of downy brome was similar for fall and spring treatments. It was also apparent that fall application of metolachlor provided much better control than glyphosate alone.

Treatment	Rate	Timing	Downy Brome Control			Injury 14 DAS	Stand 21 DAE	Height 33 DAE
			13 DAF	At Spring	28 DAS			
			%			plants/m ²	bu/A	
1 Untreated			0 d	0 c	0 d	0 a	0 d	0 e
2 Glyphosate	32 oz/a	Fall	94 a	99 a	98 a	0 a	34 a	20 abc
Broadaxe XC	25 oz/a							
3 Glyphosate	32 oz/a	Fall	91 ab	96 a	92 ab	0 a	34 a	21 ab
Broadaxe XC	19 oz/a							
4 Glyphosate	32 oz/a	Fall	92 ab	99 a	95 ab	0 a	36 a	22 a
Broadaxe XC	19 oz/a							
Dual II Magnum	10 oz/a							
5 Glyphosate	32 oz/a	Fall	92 ab	97 a	100 a	0 a	36 a	22 a
Broadaxe XC	19 oz/a							
Dual II Magnum	26 oz/a							
6 Glyphosate	32 oz/a	Fall	89 b	95 a	94 ab	0 a	38 a	23 a
Dual II Magnum	32 oz/a							
7 Glyphosate	32 oz/a	Fall	80 c	64 b	48 c	0 a	10 cd	18 cd
8 Glyphosate	32 oz/a	Fall+Spring	82 c	66 b	90 ab	0 a	32 ab	22 a
9 Glyphosate	32 oz/a		Spring	0 d	0 c	96 ab	0 a	16 bcd
Broadaxe XC	25 oz/a							
10 Glyphosate	32 oz/a	Spring	0 d	0 c	93 ab	0 a	9 cd	19 bcd
Broadaxe XC	19 oz/a							
11 Glyphosate	32 oz/a	Spring	0 d	0 c	96 ab	0 a	23 abc	18 cd
Broadaxe XC	10 oz/a							
Dual II Magnum	16 oz/a							
12 Glyphosate	32 oz/a	Spring	0 d	0 c	97 a	0 a	13 cd	21.8 a
Broadaxe XC	10 oz/a							
Dual II Magnum	23 oz/a							
13 Glyphosate	32 oz/a	Spring	0 d	0 c	94 ab	0 a	12 cd	18.7 bcd
Dual II Magnum	32 oz/a							
14 Glyphosate	32 oz/a	Spring	0 d	0 c	86 b	0 a	25 abc	20.4 abc
LSD P=0.05			4.7	7.9	10.1	NS	17.6	2.7
Standard Deviation			3.3	5.5	7.1	0	12.3	1.8
CV			7.5	12.5	8.4	0	54.7	9.1
Treatment F			775	289	60.2	0	4.2	4.1
Treatment Prob(F)			0.0001	0.0001	0.0001	1.0000	0.0002	0.0032

Abbreviations: DAF, days after fall application; DAS, days after spring application; DAE, days after emergence
Granular Ammonium Sulfate (AMS) was added to all treatments at a rate of 8.5 lbs/100 gallons spray solution.

Herbicide Options for Weed Control in Oats

Caleb Dalley, HREC, Hettinger, ND, 2017

A field trial was conducted to evaluate herbicides with potential utility for weed control in oats. None of the herbicides tested in this trial are registered for use in oats at this time. Oats 'High Test' were planted on May 12, 2017 at a rate of 80 lbs/A and a depth of 2 inches using a 10-ft John Deere 1590 no-till drill with 7.5 inch row spacing. Starter fertilizer (18-46-0) was applied at 40 lbs/A at planting. Prior to planting, urea fertilizer (46-0-0) was applied at a rate of 40 lbs/A, and the field was treated with glyphosate (Cornerstone Plus @ 24 oz/A + AMS) on April 29 to control existing weeds. PRE treatments were applied on May 12 using a tractor mounted research sprayer at a spray volume of 10 gal/A. Oats emerged on May 21. EPOST application of Armezon + COC (Trt 12) was applied on May 23 when oats were at the 1-leaf stage. POST application of Armezon + COC (Trt 13) was applied on June 13 when oats were at the 4-leaf stage measuring 10.5 inches to the longest extended leaf. Oats were evaluated for injury at 3, 4, and 6 weeks after emergence. At 4 WAE, the only treatment resulting in injury was the application of Armezon at the 4-leaf stage. At the 6 WAE evaluation, injury was also observed when Armezon was applied at both the 1-leaf (8%) and 4-leaf (28%) stages. None of the other herbicide treatments resulted in visual injury. However, Hettinger was extremely dry in 2017 and daily rainfall never exceeded 0.25 inches in either May or June. This limited incorporation and activation of PRE herbicides which may have had different results in a year with average precipitation. Oat height was measured at 7 weeks after planting. No differences in oat height were observed. Oats were harvested on August 17. No differences in yield were observed. Yields were very low, ranging from 4 to 10 bu/A, and were highly variable due to the extreme drought conditions. Further evaluations are needed under more ideal growing conditions in order to come to a conclusion on the safety of these herbicides.

Treatment	Rate	Timing	Injury			Height	Yield
			34 DAPRE	7 DAPOST	21 DAPOST		
				%		cm	bu/A
1 Untreated			0 a	0 b	0 c	40.8 a	8.0 a
2 Zidua	3 oz/a	PRE	0 a	0 b	0 c	38.4 a	6.8 a
3 Warrant	1.5 qt/a	PRE	0 a	0 b	0 c	37.5 a	3.9 a
4 Dual II Magnum	1.67 pt/a	PRE	0 a	0 b	0 c	37.6 a	7.4 a
5 Prowl	3 pt/a	PRE	0 a	0 b	0 c	37.5 a	6.3 a
6 Outlook	18 oz/a	PRE	0 a	0 b	0 c	37.5 a	5.8 a
7 Zidua	3 oz/a	PRE	0 a	0 b	1 bc	37.3 a	5.3 a
8 Warrant	1.5 qt/a	PRE	0 a	0 b	0 c	37.6 a	7.5 a
9 Dual II Magnum	1.67 pt/a	PRE	0 a	0 b	0 c	37.3 a	7.4 a
10 Prowl	3 pt/a	PRE	0 a	0 b	0 c	37.8 a	7.1 a
11 Outlook	18 oz/a	PRE	0 a	0 b	0 c	37.8 a	9.7 a
12 Armezon	1 fl oz/a	1-leaf	0 a	0 b	8 b	36.1 a	6.3 a
COC	1 % v/v						
13 Armezon	1 fl oz/a	3-leaf	0 a	14 a	28 a	38.2 a	3.8 a
COC	1 % v/v						
LSD P=0.05			NS	1.8	6.9	2.72	4.21
Standard Deviation			0	1.2	4.8	1.89	2.93
CV			0	111.44	173.72	5.01	44.66
Treatment F			0	41.739	10.298	1.214	1.223
Treatment Prob(F)			1.000	0.0001	0.0001	0.3122	0.3059

Abbreviations: DAPRE, days after preemergence application; DAPOST, days after postemergence application; COC, crop oil concentrate.

Nitrogen Relationships in Soybean in Southwest North Dakota

Best management practices are needed to achieve optimal crop yields. Soybean has the ability to form a symbiotic relationship with nitrogen (N)-fixing bacteria; however, it may be possible to increase yield through addition of synthetic N fertilizer, however addition of N reduces the plants need to form a relationship with N-fixing bacteria. It may be possible that with a dryer environment in southwest North Dakota that the N-fixing bacteria are less productive. The Dickinson Research Extension Center worked with the Hettinger Research Extension Center to observe the effects of different agronomic management strategies on soybean growth and yield. Objectives of the research were to evaluate yield and growth differences between four N management strategies applied to two soybean cultivars with different maturities grown at two populations. The research was conducted at two locations, however only data from the Hettinger location was recorded due to herbicide damage. Soybean production has been increasing in southwest North Dakota recently and there are many questions on the proper management for the regional differences compared to the Red River Valley. 2017 was a difficult year with drought conditions, however rains during August contributed to soybean yields (Tables 1 and 2).

Table 1. NDAWN rainfall data for Hettinger, ND during the 2017 growing season.

Month	Precipitation (in)
April	1.18
May	0.60
June	0.34
July	1.68
August	1.78
September	1.89
October	0.01

Rainfall in August aligned with reproductive growth of soybeans allowing the plants to attain decent average yields considering the poor conditions during vegetative growth. Although there were no significant differences among N treatments alone (Table 2.), there were differences in yield with the interaction between populations of 80,000 and 160,000 plants per acre and the N treatments (Table 3.), this interaction needs to be further investigated before making any conclusions. No significant yield differences were found between populations, 80,000 plants/acre averaged 23.3 bu/ac while 160,000 plants/acre averaged 24.2 bu/ac. This lack of difference in yield may be due to the drought, however more work will need to be conducted to observe the effects of plant population on yield in western ND.

In August, five soybean plants per plot were excavated to observe the number of nodules per plant. Table 2 shows that there were significant differences between the inoculated and non inoculated treatments. While there is no significant decrease in nodule production with the fertilized treatment, a higher rate of N would most likely further decrease nodule number. While there is a difference in number of nodules, this did not translate into a difference in yield.

Table 2. Nodules per plant and yield across nitrogen treatments for soybean in Hettinger,ND 2017.

Nitrogen Management	Nodule/plant	Bushels/acre
No inoculant/no N added	0.6b	22.4
No inoculant/30 lbs N added	1.4b	24.1
Inoculant/no N added	23.3a	23.9
Inoculant/30 lbs N added	19.9a	24.4
LSD (0.05)	10.44	ns

Table 3. 2017 soybean yields in Hettinger, ND across plants per acre and nitrogen treatments. Soybeans were planted May 18th.

Nitrogen Management	Yield	
	bu/acre	
	80,000	160,000
No inoculant/no N added	24.0ab	20.9b
No inoculant/30 lbs N added	21.3b	26.8a
Inoculant/no N added	23.4ab	24.5ab
Inoculant/30 lbs N added	24.4ab	24.5ab
LSD (0.05)	3.9	

Drought conditions in 2017 reduced yield capacity for soybeans. Under drought conditions a plant population half of the recommended seeding rate was able to yield just as well as the full rate. While it may be possible that with higher rainfall a larger yield is possible, more work should be conducted before changing recommendations. Under drought conditions with a reduced yield potential, it could be possible to reduce seed input costs without losing bushels.

Hettinger Soybean Planting Date Study
John Rickertsen, HREC, Hettinger, ND, 2017

Soybean acreage has increased over the years in North Dakota (ND) but mostly in the East. A recent realization that there is limited data on soybean production research in Western ND, amidst growing interest from farmers and stakeholders to start or expand production in Western, Central, and Northern, ND, has highlighted research needs to focus as well on areas often considered, marginally productive. Soybean is a profitable crop, useful in diversifying rotations and for use in later planting when wet conditions have not permitted timely small grain planting. Two critical decisions that farmers make each year that greatly affect yield potential and economic returns are, when to plant, and variety selection (maturity class). It is important to assess the performance of soybean maturity classes and planting west of the Missouri River, as the climate and soils are very different than the tradition soybean growing regions in eastern North Dakota. The objectives are therefore to facilitate the farmer's planting decisions, by assessing the performance of three soybean maturity classes in response to three planting dates and three plant populations across locations. Growth stages, and yields will be assessed for three varieties, three planting populations, across three planting dates in Hettinger, (Adams County), and Minot (Ward County, and Carrington (Foster County).

Three soybean varieties of three maturity classes were be planted in 2015, 2016 and 2017 at Hettinger (dryland), Minot (dryland), and Carrington (dryland and irrigated) to assess growth performance and grain yields. For Hettinger the planting dates were May 4, May 19 and June 2. In 2017, three planting densities of 200,000, 175,000, and 150,000 plants/ac were evaluated for each variety. Data was recorded on flowering, height, maturity date, yield, test weight, seed protein and seed oil content.

The results in the following tables shown May19 to have the highest yields followed by May 4 then June 2. In 2015 and 2016 planting date had no impact on test weight, oil or protein. In 2017 test weights and protein increased and oil decreased with later planting dates. Seeding rates had no effect on yields. From the results so far, our recommendation is to plant soybean the second to third week of May for best yields and to allow soybeans to mature before fall freeze.

Soybean Planting Date - 2017 **Hettinger, ND**

Treatment	Mature Date	Harvest Date	Plant Height inches	Test Weight lbs/bu	Seed Oil %	Seed Protein %	Grain Yield bu/ac
Planting Date							
May 4	9/8	9/27	20	51.7	18.1	32.8	26.6
May 19*	9/20	10/3	22	53.4	17.3	33.8	26.3*
June 2	9/27	10/3	23	54.7	17.0	34.7	21.7
LSD 5%	1	--	1	0.7	0.3	0.3	2.7
Variety							
Proseed 30-20 (0.2)	9/14	10/1	21	52.6	17.8	34.2	19.9
Proseed 30-80 (0.8)	9/23	10/1	22	54.0	17.1	33.3	21.7
LSD 5%	1	--	1	0.6	0.2	0.2	2.3
Population							
150,000	9/18	10/1	22	53.3	17.4	33.8	21.2
175,000	9/18	10/1	22	53.1	17.6	33.8	20.0
200,000	9/18	10/1	22	53.4	17.4	33.7	21.1
LSD 5%	1	--	1	0.7	0.3	0.3	2.7
Trial Mean	9/18	--	22	53.3	17.5	33.8	20.8
C.V. %	0.1	--	7.8	2.4	2.6	1.5	22.3

*May 19 date had very poor stands from pheasant damage right after planting, which reduced yields for that date.

Substituted yields for variety 30-20 from nearby soybean yield trial planted on May 19.

Soybean Planting Date Three Year Averages - 2015 - 2017 **Hettinger, ND**

Treatment	Mature Date	Harvest Date	Plant Height inches	Test Weight lbs/bu	Seed Oil %	Seed Protein %	Grain Yield bu/ac
Planting Date							
May 4	9/5	9/16	24.7	52.5	17.4	33.0	27.0
May 19*	9/14	9/22	24.3	53.2	17.2	33.3	31.0
June 2	9/19	9/27	24.3	52.8	17.0	33.6	26.3

* Used variety 30-20 yield (26.3 bu/ac) from nearby soybean yield trial in 2017.

2017 National Sunflower Survey in Southwest North Dakota

In the fall of 2017 the National Sunflower Survey was conducted across North Dakota (ND), South Dakota, Minnesota, Colorado, Kansas, Nebraska, and Texas in the U.S. and also in Manitoba. The survey observes yield limiting factors such as weeds, insect damage, and diseases along with yield potential factors such as plant population, head size, and kernel size. Southwest ND faced extreme drought conditions in 2017.

32 fields were surveyed in southwest ND. With each field surveyed, a number 1 and number 2 yield limiting factor were identified (Table 1.). Drought was the number 1 factor in 59% of fields surveyed. Plant spacing within the row was highest occurring factor as the second most limiting factor. This was likely from poor emergence after planting due to the drought.

Table 1. Frequency of occurrence as number 1 and number 2 yield limiting factors in sunflower for 32 fields in southwest North Dakota in 2017.

Factor	Yield Limiting Factor #1	Yield Limiting Factor #2
	%	
No problem	0	22
Birds	6	0
Disease	0	0
Drought	59	13
Uneven plant growth	0	9
Hail	3	9
Herbicide damage	0	0
Insects	0	0
Lodging	0	0
Plant spacing within the row	19	28
Weeds	13	13
Other	0	6

The drought conditions in 2017 were a major factor in sunflower production. It had an effect on crop growth directly and indirectly including reduced herbicide activity, reduced disease incidence, and reduced lodging along with issues with emergence. The top 5 weeds found throughout the southwest in order of occurrence were kochia, green foxtail, Russian thistle, volunteer grains, and Canada thistle. The disease with the highest presence for the region was Phoma. Rainfall across the region was highly variable, and as so yields surveyed for the region ranged from 875 to 3,844 lbs/acre with an average of 1,663 lbs/acre.

For more information on the survey or for statewide and national results contact Ryan Buetow at ryan.buetow@ndsu.edu.

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