



Langdon Research Extension Center

NORTH DAKOTA STATE UNIVERSITY



Annual Research Report No. 92
December 2017

NDSU NORTH DAKOTA STATE UNIVERSITY



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The 2017 annual research report is intended to provide producers information to aid in selecting varieties and/or hybrids. Variety information and research reports on crop disease and production can also be found on our website www.ag.ndsu.edu/langdonrec/. Variety trial results from all NDSU Research Extension Centers and the Main Station at Fargo, along with crop extension bulletins, can be accessed on the web at www.ag.ndsu.edu/varietytrials/.

Choosing a variety is one of the most important decisions a producer makes in successful crop production. Characteristics to consider in selecting a variety may include yield potential, disease resistance, protein content, straw strength, plant height, test weight, yield stability across years and locations, quality and economic profitability. A variety's performance may differ from year to year and from location to location within a year due to varying environmental conditions. When selecting a variety to grow, it is best to consider a variety's performance over several years and locations.

The agronomic data presented in this publication are from replicated research plots using experimental designs that enable the use of statistical analysis. The trials are designed so that "real" yield and agronomic differences can be statistically separated from differences that occur by chance. The least significant difference (LSD) values given in the report are used for this purpose. For example, if the LSD 10% is five bushels, then if the difference between any two varieties is greater than five bushels they are said to be significantly different from one another 90 times out of 100 under those growing conditions. If the difference between two varieties is less than five bushels, they are not significantly different from one another. If there is a "NS" for the LSD 10% value it means there was no real difference between any varieties or the trial was too variable to detect a real difference. The CV stands for coefficient of variation and is expressed as a percentage. The CV is a measure of variability in the trial. Large CVs mean that a large amount of variation could not be attributed to differences in the varieties or agronomic characteristic.

The NDSU Langdon Research Extension Center, in addition to its on-station research program, conducted variety research trials at several locations in 2017. Trial locations were at Cavalier, Park River, Pekin, and Cando. These locations are in cooperation with a local farmer, the NDSU Extension Service and the County Crop Improvement Association.

2017 Weather Summary

A record setting 31.52 inches of precipitation was recorded in 2016 breaking the previous record of 28.05 inches set in 1954. The 2017 growing season precipitation ranged from 59-95 percent of normal with an average of 75 percent of normal across the region. The excessive soil moisture in 2016 provided valuable subsoil moisture in 2017 when topsoil moisture was below normal. Fall recharge at Langdon for September through October 2016 was 6.09 inches or 2.79 inches above normal. Precipitation from November 2016 through March 2017 was 4.61 inches or 2.79 inches above normal. Snowfall for 2016-2017 was 50.4 inches, 17.1 inches above normal with most of that coming in December. Winter temperatures were 5.2° F above normal. With the saturated subsoil moisture conditions coming into spring, the below normal precipitation in April and May allowed for timely planting of crops. Accumulated growing degree days averaged 8 and 46 above normal for corn and small grains, respectively, across NDAWN locations across the region. Disease levels were generally lower this year with the drier conditions. This along with the adequate rainfall and surplus subsoil moisture resulted in good to excellent yields of most crops across the region.

2017 Crop Management - Langdon						
Field Trial	Previous Crop	Seeding Rate Unit/Acre	Yield Goal	Planting Date	Harvest Date	Row Spacing
Barley	soybean	1.25 million pls	100 bu	May 10	Aug. 22	6
Carinata	soybean	610,000 pls	2500 lb	May 23	Sept. 13	6
Canola - LL, CL, SU	soybean	610,000 pls	2500 lb	May 15	Sept. 5	6
Canola - RR	soybean	610,000 pls	2500 lb	May 15	Sept. 5	6
Corn	soybean	28,000 thinned	150 bu	May 4	Oct. 19	30
Durum	soybean	1.50 million pls	60 bu	May 10	Sept. 7	6
Dry Bean	soybean	70,000-90,000 pls	2000 lb	May 19	Oct. 4	30
Faba Bean	wheat	192,000 pls	4000 lb	May 9	Sept. 29	6
Field Pea	soybean	300,000 pls	60 bu	May 9	Aug. 24	6
Flax	soybean	2.8 million pls	40 bu	May 11	Sept. 28	6
HRSW	soybean	1.50 million pls	60 bu	May 10	Aug. 29	6
HRWW	soybean	1.25 million pls	60 bu	Sept. 15, 2016	Aug. 8	6
Industrial Hemp	soybean	522,000 pls	1200 lb	June 1	Sept. 13	12
Oats	soybean	1.0 million pls	120 bu	May 10	Aug. 30	6
Rye	canola	1.0 million pls	70 bu	Sept. 15, 2016	Aug. 8	6
Soybean – Conv./LL	wheat	200,000 pls	60 bu	May 17	Oct. 10	6
Soybean – RR, Xtend	wheat	200,000 pls	60 bu	May 17	Oct. 10	6
Sunflower - Confection	flax	17,000 thinned	2500 lb	May 18	Oct. 18	30
Sunflower - Oil	flax	20,000 thinned	2500 lb	May 18	Oct. 18	30
Soil Type - Svea-Barnes loam						

pls = pure live seeds

Special thanks to our local cooperators and Extension Agents for their efforts in our off-station variety testing.

Darin Weisz - Cando
Lindy Berg - Towner County Agent
Dave Hankey - Park River
Brad Brummond - Walsh County Agent
Kent Schluchter - Cavalier
Samantha Lahman - Pembina County Agent
Doug Stein - McVille
Katelyn Hain - Nelson County Agent
Lesley Lubenow - LREC Area Extension Specialist

2017 Crop Management – Off-Station						
Location (County/Field Trial)	Previous Crop	Seeding Rate Unit/Acre	Yield Goal	Planting Date	Harvest Date	Row Spacing
Cavalier (Pembina)						
HRSW	wheat	1.50 million pls	60 bu	May 19	Aug. 31	6
Barley	wheat	1.25 million pls	100 bu	May 19	Aug. 23	6
Soybean	wheat	200,000 pls	60 bu	May 19	Oct. 6	6
Dry Bean	wheat	70,000-90,000 pls	2000 lb	May 19	Oct. 6	30
Park River (Walsh)						
HRSW	cover crop	1.50 million pls	65 bu	May 2	Aug. 23	6
Soybean	wheat	200,000 pls	60 bu	May 24	Oct. 9	6
Pekin (Nelson)						
HRSW	soybean	1.50 million pls	60 bu	May 24	Sept. 8	6
Soybean	wheat	200,000 pls	60 bu	May 24	Oct. 5	6
Cando (Towner)						
HRSW	soybean	1.50 million pls	60 bu	May 11	Aug. 28	6
Barley	soybean	1.25 million pls	100 bu	May 11	Aug. 14	6
Durum	soybean	1.50 million pls	60 bu	May 11	Aug. 28	6
Location	Soil Type					
Cavalier	Fargo silty clay					
Park River	Glyndon silt loam, soybean – Gardena silt loam					
Pekin	Svea-Cresbard loam					
Cando	Great Bend – Overly silty loam					

pls = pure live seeds

**Record of Climatological Observation
Langdon, ND**

	Precipitation		Dep. from		Temperature		Dep. from
	Normal*	2017	Normal		Normal*	2017	Normal
April	1.23	0.25	-0.98	April	38.1	39.5	+1.4
May	2.29	1.33	-0.96	May	51.5	52.3	+0.8
June	3.26	3.30	+0.04	June	60.9	62.5	+1.6
July	2.91	2.49	-0.42	July	66.2	66.9	+0.7
August	2.59	2.19	-0.40	August	64.5	64.2	-0.3
September	2.06	2.64	+0.58	September	54.5	56.8	+2.3
Total	14.34	12.20	-2.14	Total	56.0	57.0	+1.0

*115 year average

Monthly Growing Degree Days and Normals-Langdon

	Wheat Growing Degree Days			Corn Growing Degree Days			Sunflower Growing Degree Days		
	2017	Normal	Deviation	2017	Normal	Deviation	2017	Normal	Deviation
April	283	274	+9	--	--	--	--	--	--
May	611	613	-2	219	219	0	319	314	+5
June	841	875	-34	371	356	+15	536	519	+17
July	1022	1018	+4	513	499	+14	697	685	+12
August	932	962	-30	410	457	-47	589	642	-53
September	690	671	+19	270	255	+15	396	358	+38
Total	4379	4413	-34	1783	1786	-3	2537	2518	+19

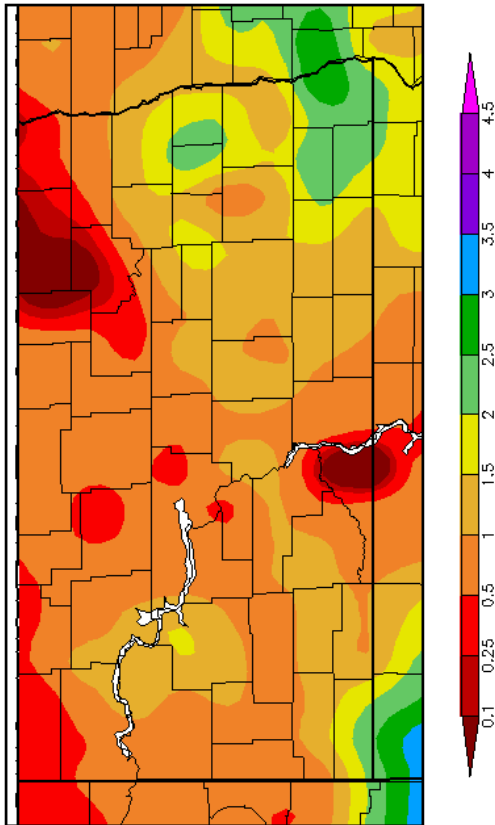
Frost Dates-Langdon and Selected Cities

	Last Spring Frost		First Fall Frost		Frost Free Days	
	32°F	28°F	32°F	28°F	32°F	28°F
Langdon						
Normal	20-May	9-May	19-Sep	29-Sep	122	143
2017	19-May	29-Apr	29-Sep	9-Oct	133	163
Cavalier						
Normal	16-May	5-May	24-Sep	5-Oct	131	153
2017	1-May	29-Apr	9-Oct	14-Oct	161	168
Park River						
Normal	8-May	30-Apr	30-Sep	10-Oct	145	163
2017	11-May	29-Apr	5-Oct	10-Oct	147	164
Pekin						
Normal	18-May	3-May	22-Sep	30-Sep	127	150
2017	1-May	29-Apr	29-Sep	10-Oct	151	164

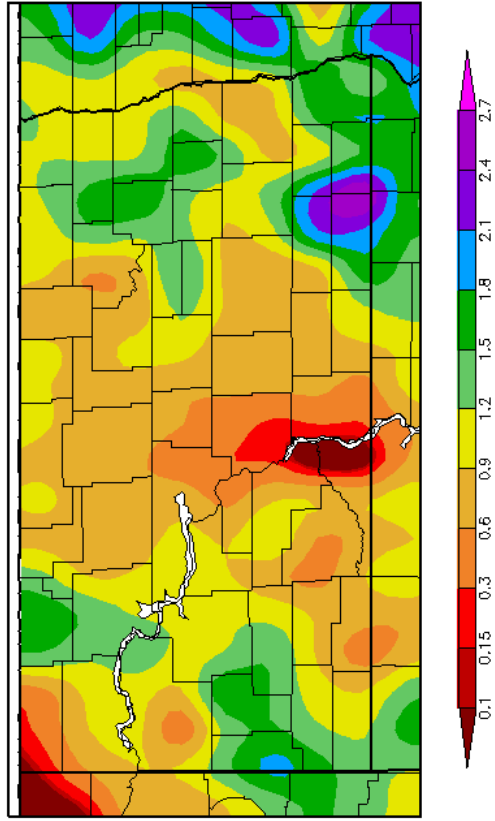
Normals are from the NWS. The 2017 frost dates are from the nearest reporting NDAWN station.

North Dakota 2017 Precipitation (inches) Maps

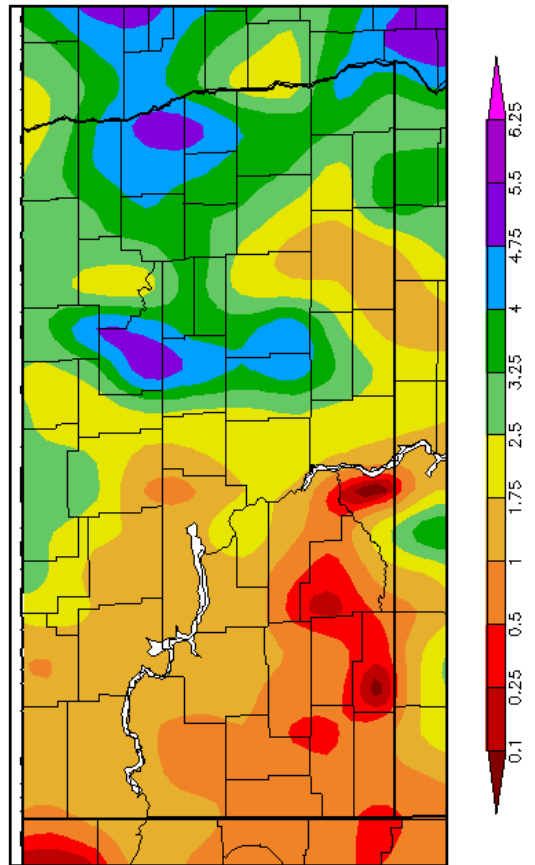
4/1/17 - 4/30/17



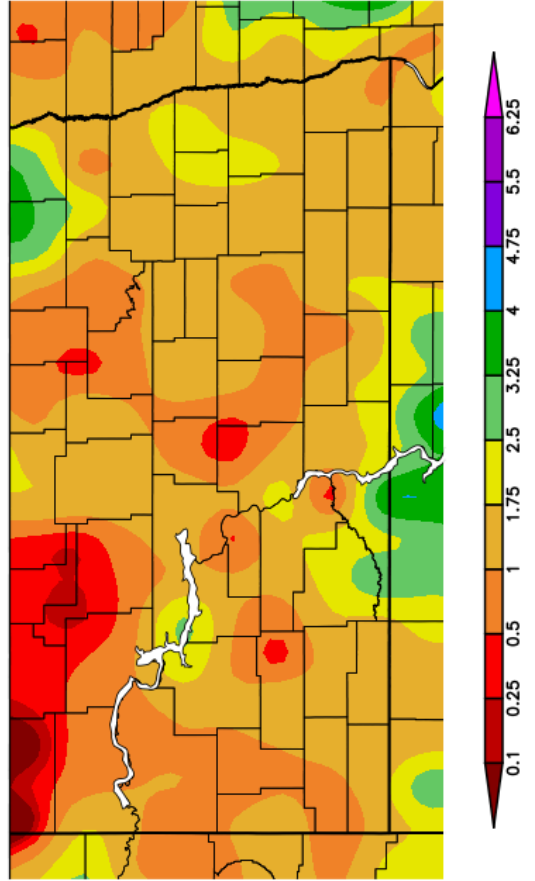
5/1/17 - 5/31/17



6/1/17 - 6/30/17

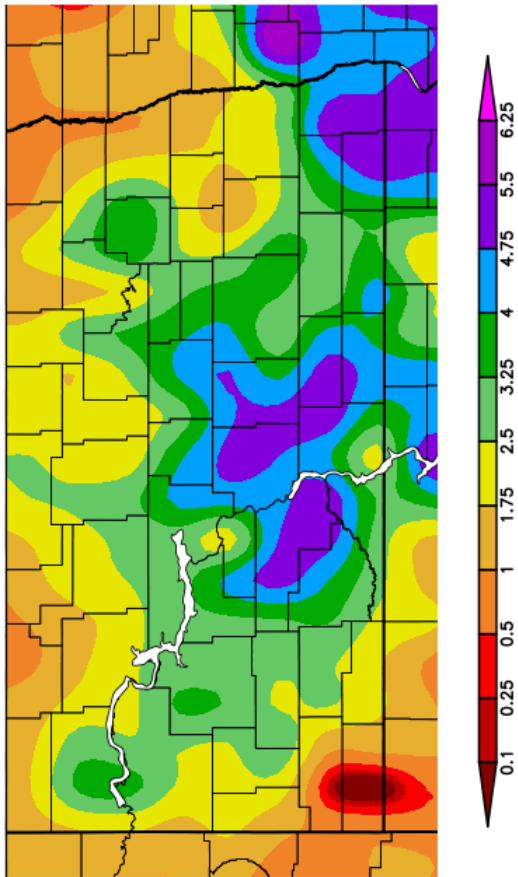


7/1/17 - 7/31/17

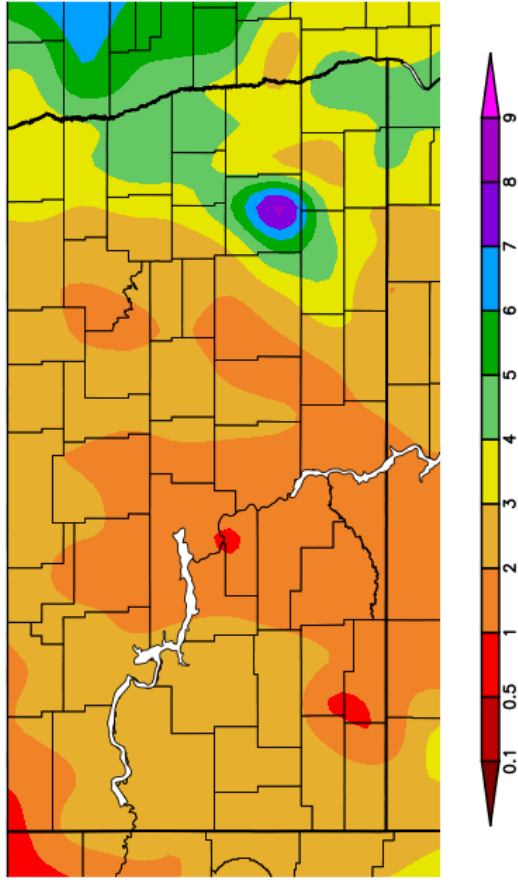


North Dakota 2017 Precipitation (inches) Maps Continued

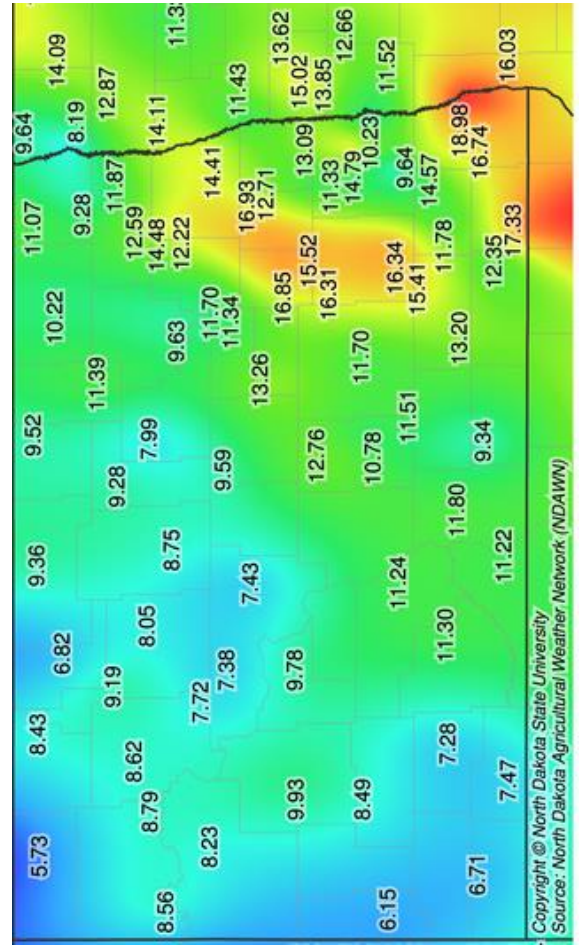
8/1/17 – 8/31/17



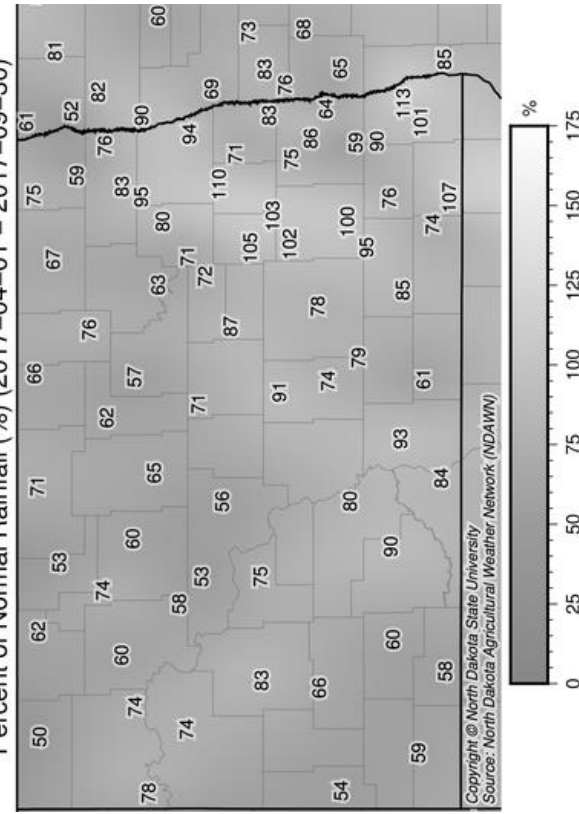
9/1/17 – 9/30/17



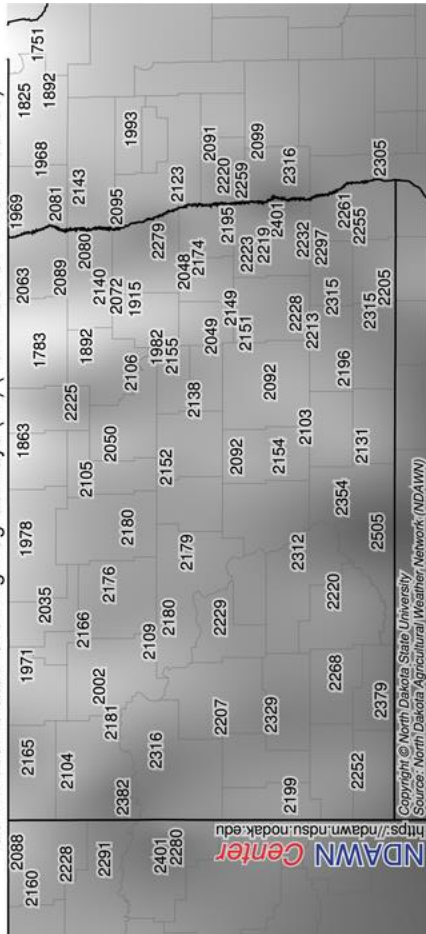
Growing Season 4/1/17 – 9/30/17



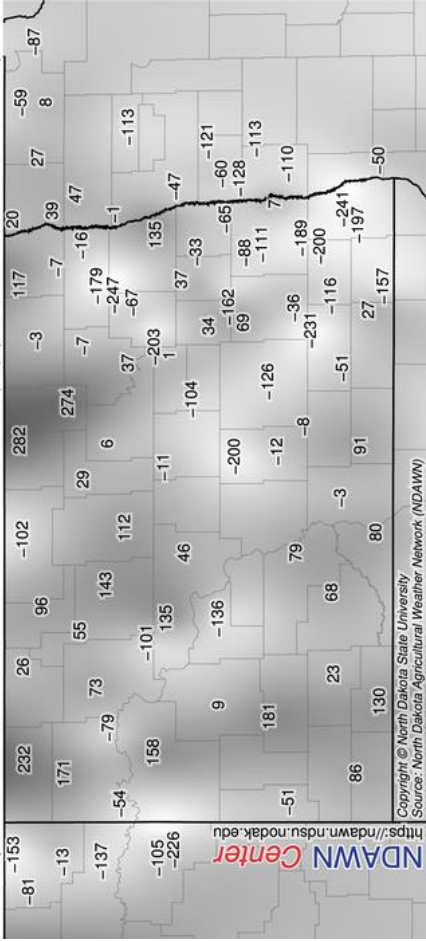
Percent of Normal Rainfall (%) (2017-04-01 – 2017-09-30)



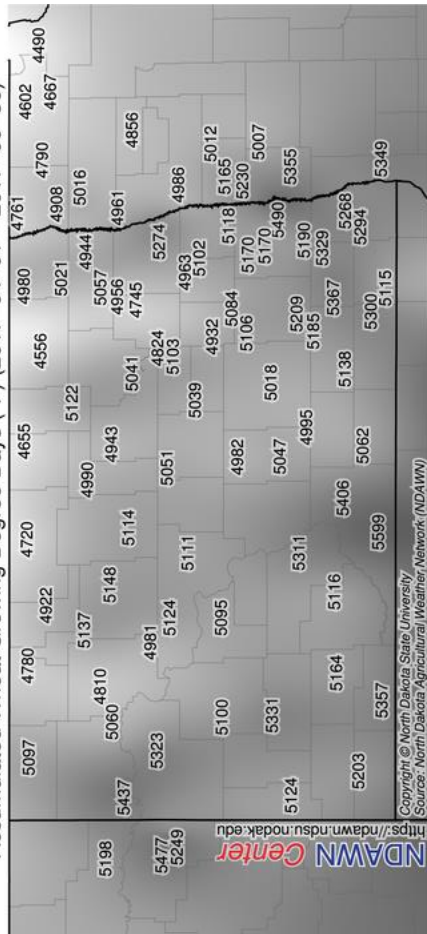
Corn Accumulated Growing Degree Days (°F) (2017-05-01 – 2017-09-30)



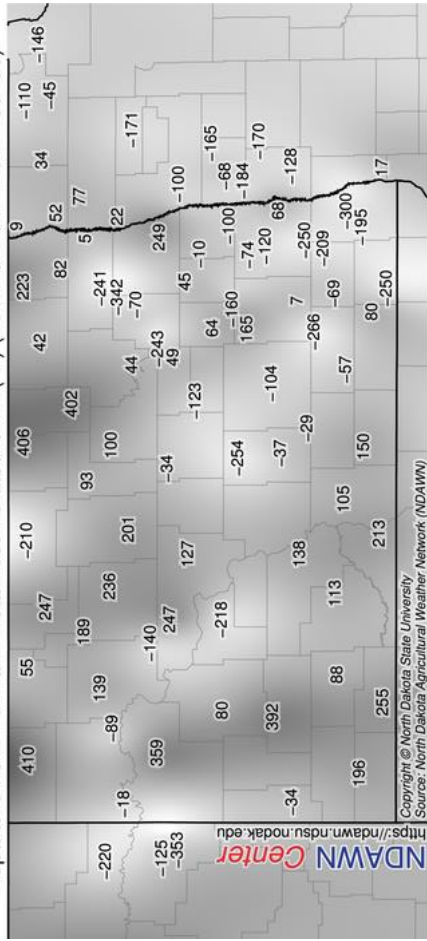
Departure from Normal Corn Accumulated GDD (°F) (2017-05-01 – 2017-09-30)



Accumulated Wheat Growing Degree Days (°F) (2017-04-01 – 2017-09-30)



Departure from Normal Wheat Accumulated GDD (°F) (2017-04-01 – 2017-09-30)



Average Data by Crop and Year Across Sites																				
Durum	Yield (bu/a)					Test Weight (lbs/bu)					Height (in)					Days to Head				
	2	3	3	3	9	2	3	3	3	9	2	2	2	2	2	2	2	2	2	2
No. Sites	13	14	15	16	17	13	14	15	16	17	13	14	15	16	17	13	14	15	16	17
Alkabo	86	69	61	62	71	61.3	59.2	60.7	57.6	61.0	42	40	36	39	43	52	57	64	62	61
Tioga	88	67	67	50	70	60.7	58.5	60.3	54.0	60.3	45	43	39	41	48	53	58	65	62	61
Divide	84	68	70	50	78	60.0	58.5	60.4	54.9	60.7	44	42	38	40	47	53	59	65	63	61
Carpio	90	67	74	57	79	61.6	58.4	61.0	57.3	61.7	45	41	38	40	45	54	59	66	63	62
Joppa	94	71	71	58	75	60.7	58.7	60.6	56.1	60.5	42	41	38	39	44	52	59	64	63	61
ND Grano	--	--	--	--	78	--	--	--	--	61.0	--	--	--	--	45	--	--	--	--	62
ND Riveland	--	--	--	--	88	--	--	--	--	61.5	--	--	--	--	46	--	--	--	--	61
Lebsock	79	69	67	--	--	61.1	59.6	62.2	--	--	41	39	37	--	--	51	55	63	--	--
Grenora	89	--	--	--	--	60.2	--	--	--	--	40	--	--	--	--	52	--	--	--	--

Barley	Yield (bu/a)					Test Weight (lbs/bu)					Protein (%)					Plump (%)					Days to Head									
	2	3	3	3	9	2	3	3	3	9	2	3	3	3	9	2	3	3	3	9	2	3	3	3	9	14	15	16	17	3yr
No. Sites	13	14	15	16	17	13	14	15	16	17	13	14	15	16	17	13	14	15	16	17	13	14	15	16	17	14	15	16	17	3yr
Lacey	135	123	110	113	129	50.4	50.0	49.2	47.1	48.4	12.6	13.1	13.2	13.4	12.5	99	95	93	92	88	91	49	63	55	55	58				
Tradition	138	124	109	104	115	50.7	49.5	48.4	46.1	47.6	12.5	12.7	13.0	13.2	12.6	99	94	92	89	88	90	49	61	57	56	58				
Innovation	130	130	109	111	124	49.4	49.8	48.5	45.9	47.7	12.4	13.3	13.2	13.2	12.8	98	97	92	90	89	90	48	61	56	56	58				
Pinnacle*	--	--	114	103	118	--	--	49.6	47.1	49.4	--	--	11.8	12.4	12.1	12.1	--	--	95	96	96	96	63	56	57	59				
ND Genesis*	--	--	105	90	115	103	--	48.1	46.4	48.0	47.5	--	10.8	11.4	10.8	11.0	--	--	94	96	94	95	--	64	58	57				
AAC Synergy*	--	--	--	--	118	--	--	--	--	48.0	--	--	--	--	12.1	--	--	--	90	--	--	--	--	--	58	--				
Quest	132	123	107	98	--	--	48.8	48.1	47.8	45.1	--	12.3	12.9	12.9	--	--	96	92	87	87	--	--	49	63	56	--				
Celebration	135	125	--	--	--	--	49.7	49.2	--	--	--	13.6	13.6	--	--	--	99	94	--	--	--	--	50	--	--	--				
Stellar-ND	132	126	--	--	--	--	49.6	48.6	--	--	--	12.3	12.7	--	--	--	99	97	--	--	--	--	49	--	--	--				

*2-row barley

Average Data by Crop and Year Across Sites

HRSW No. Sites	Yield (bu/a)															Test Weight (lbs/bu)															Protein (%)															Height (in)															Days to Head															Lodging														
	5			13			15			5			15			5			13			15			5			13			15			5			13			15			5			13			15			5			13			15																																
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100			
Faller	96	93	60	76	84	73	61.3	60.9	58.2	59.4	60.7	59.4	13.4	13.2	13.9	13.6	12.9	13.5	35	33	36	36	35	51	64	55	55	58	3.7	2.7	1.3	2.0																																																										
Prosper	92	90	57	74	82	71	61.2	60.9	58.2	59.4	60.5	59.4	13.2	13.3	13.9	13.7	13.1	13.6	36	34	36	36	35	51	64	57	55	59	4.3	3.4	2.4	2.9																																																										
Rollag	80	79	63	68	73	68	62.1	61.8	60.1	59.9	61.4	60.5	14.7	14.5	15.2	14.8	14.7	14.9	33	31	33	33	32	50	63	55	54	57	0.7	1.2	0.1	0.7																																																										
SY Soren	81	77	54	71	71	65	61.7	61.1	58.8	59.4	60.0	59.4	14.6	14.2	14.8	14.3	14.3	14.5	30	29	32	33	31	49	63	55	53	57	1.1	1.6	0.1	0.9																																																										
WB Mayville	80	75	55	60	66	60	60.9	60.6	58.1	57.5	58.9	58.2	14.6	14.1	14.7	14.6	14.4	14.6	31	29	31	32	31	49	62	55	52	56	0.3	0.5	0.0	0.3																																																										
LCS Breakaway	82	78	57	69	72	66	62.6	62.3	56.8	60.4	61.1	59.4	14.6	14.4	14.6	14.3	14.0	14.3	31	31	32	34	32	48	62	55	52	56	2.7	1.4	0.4	0.9																																																										
Elgin-ND	88	82	59	67	78	68	61.2	60.7	58.2	58.8	60.6	59.2	14.3	14.0	14.4	14.5	14.0	14.3	37	36	38	41	38	50	64	56	52	57	3.3	2.1	1.0	1.6																																																										
SY Rowyn	84	82	61	72	79	71	61.0	61.1	59.3	59.5	60.4	59.7	13.8	13.5	14.0	13.9	13.4	13.8	33	30	33	33	32	49	63	55	53	57	2.7	2.3	2.0	2.2																																																										
Linkert	77	75	63	66	67	65	61.3	60.6	59.4	58.7	60.1	59.4	15.0	14.6	15.0	14.6	14.8	14.8	31	30	31	31	31	51	63	56	53	57	0.1	0.2	0.1	0.2																																																										
SY Ingmar	--	79	62	70	71	68	--	61.5	60.1	59.6	60.0	59.9	--	14.4	14.7	14.8	14.5	14.7	31	32	33	34	33	50	63	57	54	58	0.4	1.4	0.1	0.8																																																										
HRS 3419	--	87	67	79	84	77	--	59.3	58.2	58.4	59.8	58.8	--	12.6	12.8	13.4	12.9	13.0	34	33	34	35	34	54	66	60	57	61	0.7	0.3	0.0	0.2																																																										
Bolles	--	--	55	64	73	64	--	58.3	58.5	60.2	59.0	--	--	15.8	15.7	15.4	15.6	--	32	34	35	34	--	65	58	56	60	2.8	1.8	0.0	0.9																																																											
SY Valda	--	--	62	75	81	73	--	58.8	59.4	60.1	59.4	--	--	14.0	13.9	13.5	13.8	--	31	34	34	33	--	64	57	53	58	2.2	1.8	0.6	1.2																																																											
HRS 3530	--	--	65	77	81	75	--	59.0	59.8	60.4	59.7	--	--	14.1	14.2	13.9	14.1	--	36	37	37	37	--	65	57	55	59	3.1	2.4	0.1	1.3																																																											
HRS 3504	--	--	65	69	72	69	--	56.9	57.3	57.9	57.4	--	--	13.3	13.5	13.5	13.4	--	31	32	32	32	--	65	57	55	59	1.5	0.5	0.0	0.3																																																											
Shelly	--	--	--	73	82	--	--	58.7	61.5	--	--	--	--	--	13.9	13.5	--	--	--	33	34	--	--	--	58	54	--	--	1.3	0.1	--	--																																																										
Boost	--	--	--	63	76	--	--	58.6	60.3	--	--	--	--	--	14.9	14.1	--	--	--	35	37	--	--	--	59	56	--	--	3.1	1.3	--	--																																																										
Surpass	--	--	--	67	77	--	--	58.8	60.5	--	--	--	--	--	13.9	13.7	--	--	--	34	37	--	--	--	51	50	--	--	3.7	1.7	--	--																																																										
LCS Prime	--	--	--	69	82	--	--	59.7	61.3	--	--	--	--	--	13.2	12.5	--	--	--	35	37	--	--	--	54	52	--	--	2.8	0.8	--	--																																																										
HRS 3616	--	--	--	67	75	--	--	58.2	59.7	--	--	--	--	--	15.2	14.9	--	--	--	34	35	--	--	--	56	53	--	--	2.2	0.3	--	--																																																										
HRS 3100	--	--	--	71	75	--	--	57.5	58.1	--	--	--	--	--	13.6	13.4	--	--	--	34	36	--	--	--	58	55	--	--	0.8	0.0	--	--																																																										
ND VitPro	--	--	--	64	69	--	--	61.2	62.1	--	--	--	--	--	14.8	14.6	--	--	--	35	36	--	--	--	55	52	--	--	1.4	0.3	--	--																																																										
Lang-MN	--	--	--	--	74	--	--	--	62.4	--	--	--	--	--	14.9	--	--	--	--	--	39	--	--	--	--	56	--	--	--	0.1	--	--	--																																																									
WB9590	--	--	--	--	73	--	--	--	59.6	--	--	--	--	--	14.2	--	--	--	--	--	30	--	--	--	--	52	--	--	--	0.1	--	--	--																																																									
WB9479	--	--	--	--	76	--	--	--	60.4	--	--	--	--	--	14.6	--	--	--	--	--	32	--	--	--	--	53	--	--	--	0.0	--	--	--																																																									
LCS Rebel	--	--	--	--	79	--	--	62.0	--	--	--	--	--	--	13.8	--	--	--	--	--	38	--	--	--	--	52	--	--	--	1.3	--	--	--																																																									
MS Camaro	--	--	--	--	70	--	--	60.4	--	--	--	--	--	--	13.8	--	--	--	--	--	32	--	--	--	--	53	--	--	--	0.6	--	--	--																																																									
MS Chevelle	--	--	--	--	83	--	--	60.2	--	--	--	--	--	--	12.8	--	--	--	--	--	34	--	--	--	--	52	--	--	--	1.2	--	--	--																																																									
HRS 3361	--	82	71	72	--	--	--	60.1	57.5	57.6	--	--	--	13.6	13.0	13.6	--	--	--	34	32	34	--	--	51	63	57	--	1.2	0.8	--	--																																																										
WB9507	--	91	55	76	--	--	--	60.0	55.8	57.8	--	--	--	13.8	13.8	13.6	--	--	--	34	33	35	--	--	49	62	55	--	3.5	2.5	--	--																																																										
Prevail	--	81	62	71	--	--	--	60.6	58.9	58.6	--	--	--	13.8	13.8	13.7	--	--	--	36	34	35	--	--	50	62	54	--	2.8	1.3	--	--																																																										
Focus	--	--	63	63	--	--	--	60.6	60.6	--	--	--	--	--	14.0	13.9	--	--	--	--	37	37	--	--	--	58	50	--	4.2	2.6	--	--																																																										
WB9653	--	--	60	71	--	--	--	56.2	56.9	--	--	--	--	--	13.4	13.4	--	--	--	31	32	--	--	--	64	57	--	2.1	1.5	--	--																																																											
LCS Anchor	--	--	--	62	--	--	--	--	58.6	--	--	--	--	--	14.6	--	--	--	--	--	31	--	--	--	--	55	--	--	1.3	--	--	--	--																																																									
TCG-Cornerstone	--	--	--	57	--	--	--	58.1	--	--	--	--	--	--	14.4	--	--	--	--	--	32	--	--	--	--	57	--	--	0.6	--	--	--	--																																																									
Barlow	82	81	57	--	--	--	61.8	61.6	59.5	--	--	--	14.1	14.2	14.7	--	--	--	35	34	--	--	--	48	63	--	--	3.5	--	--	--	--																																																										
LCS Iguacu	--	85	63	--	--	--	--	61.0	60.2	--	--	--	--	11.5	12.1	--	--	--	34	32	--	--	--	53	65	--	--	1.2	--	--	--	--																																																										
LCS Nitro	--	87	62	--	--	--	--	59.8	57.9	--	--	--	--	12.0	12.8	--	--	--	33	31	--	--	--	53	65	--	--	2.4	--	--	--	--																																																										

HRSW Summary, Langdon 2013-2017

Variety	Days to Head						Height (in)					Lodging (0-9)			Fusarium Head Blight			
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	16	17	2yr	Inc (%)	Sev (%)	Index
Barlow	52	53	61	55	56	57	33	37	36	35	41	37	3.9	1.8	2.9	46	21	9
Elgin-ND	54	53	61	57	58	59	36	39	38	39	43	40	2.6	0.0	1.3	50	12	6
Faller	55	54	62	57	59	59	35	35	36	38	39	38	3.7	0.0	1.9	37	14	5
Glenn	52	52	60	53	55	56	34	37	38	37	42	39	1.7	0.5	1.1	33	26	9
LCS Breakaway	52	53	60	55	56	57	29	33	33	33	35	34	1.8	0.0	0.9	33	14	5
Prevail	53	54	60	56	56	57	33	36	35	37	39	37	1.3	0.0	0.7	34	20	8
Prosper	55	53	63	57	58	59	34	36	36	36	38	37	4.6	0.3	2.5	42	15	6
Rollag	53	53	61	56	58	58	30	33	32	35	35	34	1.8	0.0	0.9	52	14	8
SY Soren	55	53	61	56	58	58	29	31	32	33	34	33	1.9	0.0	1.0	30	13	6
WB Mayville	53	51	60	55	57	57	29	33	31	33	32	32	0.9	0.0	0.5	84	57	48
Linkert	55	54	62	57	58	59	28	29	31	32	31	31	0.6	0.0	0.3	39	13	6
SY Rowyn	52	53	61	55	58	58	30	33	34	34	34	34	3.6	0.0	1.8	19	10	3
Bolles	56	55	64	59	61	61	32	35	35	35	37	36	2.6	0.0	1.3	22	10	2
SY Ingmar	--	54	62	58	59	60	--	32	32	34	34	33	2.5	0.0	1.3	33	12	4
LCS Nitro	--	56	63	59	60	61	--	34	34	34	36	35	3.0	0.0	1.5	31	19	6
HRS 3419	--	58	64	61	61	62	--	33	35	34	37	35	0.4	0.0	0.2	35	23	11
MS Chevelle	--	51	60	54	57	57	--	33	34	34	37	35	2.8	0.0	1.4	43	19	8
Boost	--	55	63	59	60	61	--	35	36	35	38	36	3.5	0.0	1.8	26	19	5
WB9653	--	--	62	58	59	60	--	--	32	31	34	32	1.8	0.0	0.9	55	68	36
SY Valda	--	--	62	57	58	59	--	--	33	35	35	34	0.8	0.0	0.4	69	33	30
HRS 3530	--	--	64	58	60	61	--	--	39	39	39	39	2.1	0.0	1.1	50	16	8
HRS 3504	--	--	62	58	60	60	--	--	33	32	34	33	0.8	0.0	0.4	55	23	13
LCS Prime	--	--	60	55	56	57	--	--	36	35	38	36	2.4	0.0	1.2	38	28	10
Shelly	--	--	63	59	59	60	--	--	33	34	36	34	2.6	0.0	1.3	22	10	2
HRS 3100	--	--	--	58	58	--	--	--	--	35	38	--	1.4	0.0	0.7	25	14	4
HRS 3616	--	--	--	57	58	--	--	--	--	34	35	--	2.6	0.0	1.3	54	31	17
LCS Anchor	--	--	--	57	57	--	--	--	--	32	34	--	2.7	0.0	1.4	48	17	8
TCG-Cornerstone	--	--	--	58	59	--	--	--	--	33	35	--	1.3	0.0	0.7	61	41	25
TCG-Spitfire	--	--	--	61	60	--	--	--	--	33	34	--	1.2	0.0	0.6	51	35	18
Surpass	--	--	--	52	54	--	--	--	--	34	40	--	4.2	3.0	3.6	35	21	7
ND VitPro	--	--	--	56	57	--	--	--	--	35	37	--	2.0	0.0	1.0	44	9	4
Lang-MN	--	--	--	--	60	--	--	--	--	--	41	--	--	0.0	--	35	18	8
Ambush	--	--	--	--	56	--	--	--	--	--	36	--	--	0.0	--	75	44	33
Caliber	--	--	--	--	60	--	--	--	--	--	30	--	--	0.0	--	69	38	28
MS Camaro	--	--	--	--	58	--	--	--	--	--	33	--	--	0.0	--	42	24	10
LCS Rebel	--	--	--	--	57	--	--	--	--	--	41	--	--	0.0	--	21	20	6
LCS Trigger	--	--	--	--	62	--	--	--	--	--	39	--	--	0.0	--	16	14	3
TCG-Climax	--	--	--	--	63	--	--	--	--	--	38	--	--	0.0	--	48	27	15
WB9479	--	--	--	--	57	--	--	--	--	--	33	--	--	0.0	--	65	49	32
WB9590	--	--	--	--	56	--	--	--	--	--	30	--	--	0.0	--	52	58	29
WB9719	--	--	--	--	59	--	--	--	--	--	34	--	--	0.0	--	72	68	49
AKF-Astro	--	--	--	--	60	--	--	--	--	--	37	--	--	0.0	--	77	54	40
MS Stingray	58	56	65	64	--	--	33	36	37	38	--	--	0.7	--	--	--	--	--
LCS Iguacu	57	55	63	59	--	--	31	35	34	36	--	--	1.6	--	--	--	--	--
HRS 3361	56	54	62	58	--	--	32	34	33	35	--	--	1.2	--	--	--	--	--
WB9507	--	52	60	55	--	--	--	34	35	34	--	--	3.1	--	--	--	--	--
Focus	--	50	56	51	--	--	--	36	39	38	--	--	3.5	--	--	--	--	--
LCS Pro	--	--	61	55	--	--	--	--	38	40	--	--	2.4	--	--	--	--	--
Redstone	--	--	66	63	--	--	--	--	35	37	--	--	0.4	--	--	--	--	--
Prestige	--	--	59	54	--	--	--	--	35	35	--	--	2.7	--	--	--	--	--
Velva	56	55	--	58	--	--	33	36	--	37	--	--	2.1	--	--	--	--	--
TCG-Wildfire	--	--	--	58	--	--	--	--	--	37	--	--	2.4	--	--	--	--	--
LSD 5%	1.0	1.3	0.7	0.9	1.3		1.8	1.9	1.5	2.2	1.9		1.5	0.7				
LSD 10%	0.8	1.1	0.6	0.8	1.1		1.5	1.6	1.3	1.8	1.6		1.3	0.6				

HRSW Summary, Langdon 2013-2017																		
Variety	Yield (bu/a)						Test Weight (lbs/bu)						Protein (%)					
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr
Barlow	94	86	74	60	74	69	61.7	62.9	62.1	60.0	61.5	61.2	14.2	13.9	14.1	14.8	13.8	14.2
Elgin-ND	99	90	73	65	81	73	61.1	62.3	60.8	59.2	61.1	60.4	14.1	13.7	13.6	14.9	13.5	14.0
Faller	112	96	74	79	82	78	60.7	62.2	60.5	60.8	61.5	60.9	13.4	12.3	12.3	13.6	11.7	12.5
Glenn	91	76	75	64	71	70	63.0	64.0	64.5	63.0	63.8	63.8	14.6	14.4	14.3	14.7	14.3	14.4
LCS Breakaway	88	77	74	71	75	73	62.2	62.9	62.2	61.7	61.8	61.9	14.5	13.7	13.7	14.1	13.2	13.7
Prevail	89	85	74	66	76	72	60.2	61.9	61.7	59.3	61.4	60.8	14.0	13.3	13.0	14.3	13.5	13.6
Prosper	110	93	71	78	83	77	60.3	62.4	60.4	60.9	60.8	60.7	13.2	12.4	12.6	13.8	11.9	12.8
Rollag	83	85	75	71	76	74	61.6	63.0	61.5	61.3	62.4	61.7	14.8	14.1	14.0	14.8	14.4	14.4
SY Soren	86	85	74	69	76	73	61.4	63.2	61.8	60.6	61.3	61.2	14.8	13.4	13.8	14.5	13.6	14.0
WB Mayville	86	81	66	57	58	60	60.3	61.4	60.3	58.9	58.5	59.2	14.5	13.6	13.9	14.7	13.9	14.2
Linkert	81	82	76	63	64	68	60.8	62.2	61.1	59.7	60.8	60.5	15.4	13.6	14.5	15.1	14.7	14.8
SY Rowyn	95	87	78	67	86	77	60.7	62.2	61.8	60.1	62.0	61.3	14.0	12.9	12.7	14.1	12.3	13.0
Bolles	94	86	73	63	74	70	61.0	61.6	60.9	60.2	61.2	60.8	15.4	13.8	15.1	15.9	15.0	15.3
SY Ingmar	--	87	74	70	74	73	--	62.9	61.5	60.9	61.1	61.2	--	13.7	13.9	15.1	14.1	14.4
LCS Nitro	--	91	75	78	92	82	--	61.5	60.5	60.0	62.2	60.9	--	11.8	12.0	13.3	11.2	12.2
HRS 3419	--	89	83	79	92	85	--	60.0	60.6	59.1	61.6	60.4	--	12.3	12.5	13.3	12.3	12.7
MS Chevelle	--	91	80	68	86	78	--	62.1	60.5	58.5	61.3	60.1	--	12.5	12.5	13.4	12.2	12.7
Boost	--	85	72	61	79	71	--	61.4	60.6	58.5	60.7	59.9	--	13.1	13.5	15.0	13.3	13.9
WB9653	--	--	74	76	83	78	--	--	58.1	58.5	58.8	58.5	--	--	12.5	13.4	12.6	12.8
SY Valda	--	--	79	78	85	81	--	--	60.7	60.5	60.3	60.5	--	--	13.0	13.9	12.8	13.2
HRS 3530	--	--	77	78	79	78	--	--	60.3	60.8	61.3	60.8	--	--	12.8	14.3	12.7	13.3
HRS 3504	--	--	85	73	77	78	--	--	58.2	58.2	59.0	58.5	--	--	12.7	13.4	12.8	13.0
LCS Prime	--	--	78	69	88	78	--	--	61.6	60.9	61.4	61.3	--	--	11.9	13.5	11.8	12.4
Shelly	--	--	80	71	81	77	--	--	62.0	59.7	61.9	61.2	--	--	13.0	14.0	13.0	13.3
HRS 3100	--	--	--	70	75	--	--	--	58.1	60.1	--	--	--	--	13.7	13.0	--	--
HRS 3616	--	--	--	66	76	--	--	--	59.4	61.5	--	--	--	--	15.3	14.3	--	--
LCS Anchor	--	--	--	60	69	--	--	--	59.3	61.8	--	--	--	--	14.7	13.7	--	--
TCG-Cornerstone	--	--	--	58	64	--	--	--	59.5	58.9	--	--	--	--	14.5	13.6	--	--
TCG-Spitfire	--	--	--	58	76	--	--	--	59.0	59.8	--	--	--	--	14.2	13.2	--	--
Surpass	--	--	--	59	80	--	--	--	59.4	60.9	--	--	--	--	14.2	12.9	--	--
ND VitPro	--	--	--	63	72	--	--	--	62.1	62.7	--	--	--	--	15.1	14.2	--	--
Lang-MN	--	--	--	--	78	--	--	--	--	63.3	--	--	--	--	--	14.7	--	--
Ambush	--	--	--	--	72	--	--	--	--	61.5	--	--	--	--	--	13.8	--	--
Caliber	--	--	--	--	63	--	--	--	--	59.8	--	--	--	--	--	14.7	--	--
MS Camaro	--	--	--	--	67	--	--	--	--	61.6	--	--	--	--	--	13.6	--	--
LCS Rebel	--	--	--	--	84	--	--	--	--	62.4	--	--	--	--	--	13.2	--	--
LCS Trigger	--	--	--	--	98	--	--	--	--	62.3	--	--	--	--	--	11.0	--	--
TCG-Climax	--	--	--	--	72	--	--	--	--	62.8	--	--	--	--	--	15.1	--	--
WB9479	--	--	--	--	75	--	--	--	--	61.0	--	--	--	--	--	13.9	--	--
WB9590	--	--	--	--	72	--	--	--	--	60.4	--	--	--	--	--	13.3	--	--
WB9719	--	--	--	--	70	--	--	--	--	61.9	--	--	--	--	--	13.1	--	--
AKF-Astro	--	--	--	--	56	--	--	--	--	54.3	--	--	--	--	--	12.3	--	--
MS Stingray	118	93	62	76	--	--	59.9	60.1	56.6	58.8	--	--	11.4	10.7	10.9	11.6	--	--
LCS Iguacu	94	91	73	76	--	--	60.2	62.0	61.9	60.7	--	--	12.4	11.6	11.3	12.4	--	--
HRS 3361	98	85	66	71	--	--	60.5	61.3	58.6	58.7	--	--	13.5	13.5	12.5	13.8	--	--
WB9507	--	87	61	77	--	--	--	60.4	57.7	59.2	--	--	--	13.1	11.9	13.7	--	--
Focus	--	73	73	53	--	--	--	62.3	62.4	61.2	--	--	--	13.9	13.2	14.3	--	--
LCS Pro	--	--	76	68	--	--	--	--	62.0	61.1	--	--	--	--	13.5	14.4	--	--
Redstone	--	--	79	76	--	--	--	--	61.2	60.1	--	--	--	--	12.7	13.4	--	--
Prestige	--	--	78	68	--	--	--	--	61.2	59.4	--	--	--	--	12.9	14.5	--	--
Velva	99	93	--	53	--	--	60.2	61.2	--	57.7	--	--	13.8	12.5	--	14.8	--	--
TCG-Wildfire	--	--	--	64	--	--	--	--	--	59.4	--	--	--	--	--	14.2	--	--
LSD 5%	5.7	6.6	5.9	8.1	6.3		0.4	0.7	0.8	1.0	0.8		0.4	0.8	0.4	0.6	0.5	
LSD 10%	4.8	5.5	5.0	6.8	5.3		0.3	0.5	0.6	0.8	0.7		0.3	0.7	0.4	0.5	0.5	

HRSW Summary, Nelson County 2013-2017

Variety	Yield (bu/a)						Test Weight (lbs/bu)						Protein (%)						Lodging (0-9)					
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr
Faller	95	102	60	71	94	75	63.2	60.7	57.6	57.2	62.1	59.0	14.0	14.1	13.0	14.0	13.1	13.4	2.5	2.2	2.4	2.4	2.4	
SY Soren	85	81	50	72	78	67	63.6	60.9	57.4	58.0	61.4	58.9	15.2	14.3	14.1	13.6	14.0	13.9	0.6	0.0	0.3	0.0	0.3	
WB Mayville	85	86	59	66	79	68	62.8	61.0	58.9	57.0	61.6	59.2	15.0	14.4	14.1	14.3	14.6	14.3	0.2	0.0	0.1	0.0	0.1	
LCS Breakaway	83	94	59	73	79	70	63.9	62.7	59.5	58.8	63.0	60.4	15.0	14.8	13.6	14.4	13.8	13.9	0.7	1.2	1.0	0.7	1.2	
Elgin-ND	91	91	63	64	76	68	62.7	60.5	58.7	57.0	61.5	59.1	15.0	14.5	13.6	14.7	13.9	14.1	2.4	0.2	1.3	2.4	0.2	
Prosper	88	100	59	75	86	73	63.2	60.5	58.0	58.0	61.9	59.3	13.7	13.9	13.0	13.9	13.1	13.3	2.2	3.2	2.7	2.2	3.2	
Rollag	85	85	74	63	78	72	63.8	61.7	60.9	57.9	62.6	60.5	15.1	14.8	15.0	15.0	14.6	14.9	0.8	0.3	0.6	0.8	0.3	
Linkert	77	83	70	66	73	70	62.9	60.6	60.2	56.8	61.5	59.5	15.6	15.0	15.0	14.3	14.7	14.7	0.1	0.1	0.1	0.1	0.1	
SY Rowyn	86	93	63	78	85	75	62.4	61.3	58.8	59.2	61.7	59.9	14.2	13.8	13.1	13.7	13.2	13.3	1.9	2.9	2.4	1.9	2.9	
SY Ingmar	--	86	62	74	79	71	--	61.5	60.2	59.0	61.8	60.3	--	14.9	14.2	14.4	14.1	14.2	0.4	0.2	0.3	0.4	0.2	
HRS 3419	--	91	71	71	86	76	--	59.3	57.6	56.3	61.8	58.6	--	13.4	12.6	14.4	12.9	13.3	0.0	0.1	0.1	0.0	0.1	
Bolles	--	--	54	64	81	66	--	--	58.1	56.2	61.8	58.7	--	--	15.2	15.9	15.3	15.5	0.7	0.0	0.4	0.7	0.0	
HRS 3530	--	--	63	80	92	78	--	--	58.4	58.6	62.2	59.7	--	--	13.2	14.2	14.4	13.9	2.3	0.2	1.3	2.3	0.2	
HRS 3504	--	--	58	72	81	70	--	--	54.7	56.1	60.7	57.2	--	--	12.8	13.9	13.4	13.4	0.1	0.0	0.1	0.1	0.0	
SY Valda	--	--	64	79	91	78	--	--	58.1	59.1	61.6	59.6	--	--	13.2	14.0	13.1	13.4	2.6	0.5	1.6	2.6	0.5	
Shelly	--	--	--	72	90	--	--	--	56.6	62.4	--	--	--	--	14.4	13.3	--	--	0.3	0.0	0.2	0.3	0.0	
Boost	--	--	--	72	78	--	--	--	58.8	61.1	--	--	--	--	15.0	14.2	--	--	1.6	1.1	1.4	1.6	1.1	
Surpass	--	--	--	75	81	--	--	--	57.8	61.4	--	--	--	--	14.0	13.4	--	--	3.6	2.0	2.8	3.6	2.0	
LCS Prime	--	--	--	75	89	--	--	--	58.9	62.1	--	--	--	--	13.1	12.6	--	--	1.9	1.8	1.9	1.9	1.8	
HRS 3616	--	--	--	69	78	--	--	--	56.9	60.6	--	--	--	--	14.7	15.0	--	--	0.5	0.7	0.6	0.5	0.7	
ND VitPro	--	--	--	66	71	--	--	--	60.4	62.9	--	--	--	--	14.5	14.5	--	--	0.8	0.7	0.8	0.8	0.7	
HRS 3100	--	--	--	73	85	--	--	--	56.9	60.6	--	--	--	--	13.6	13.5	--	--	0.2	0.0	0.1	0.2	0.0	
Lang-MN	--	--	--	--	71	--	--	--	--	62.5	--	--	--	--	--	14.9	--	--	--	0.1	--	--	0.1	
WB9590	--	--	--	--	90	--	--	--	62.0	--	--	--	--	--	--	14.2	--	--	--	0.2	--	--	0.2	
WB9479	--	--	--	--	88	--	--	--	62.8	--	--	--	--	--	--	14.8	--	--	--	0.0	--	--	0.0	
LCS Rebel	--	--	--	--	85	--	--	--	63.4	--	--	--	--	--	14.1	--	--	--	--	0.6	--	--	0.6	
MS Camaro	--	--	--	--	76	--	--	--	61.5	--	--	--	--	--	14.3	--	--	--	--	0.5	--	--	0.5	
MS Chevelle	--	--	--	--	88	--	--	--	61.8	--	--	--	--	--	12.7	--	--	--	--	2.2	--	--	2.2	
Prevail	--	83	70	70	--	--	--	60.5	60.7	57.8	--	--	--	14.5	13.2	13.5	--	--	0.0	--	--	0.0	--	
WB9507	--	104	56	81	--	--	--	60.0	56.1	56.9	--	--	--	14.6	12.8	14.0	--	--	2.1	--	--	2.1	--	
HRS 3361	--	86	52	72	--	--	--	60.0	56.4	56.6	--	--	--	13.9	12.2	13.3	--	--	0.0	--	--	0.0	--	
Focus	--	--	70	63	--	--	--	--	61.4	59.5	--	--	--	--	13.0	14.1	--	--	2.7	--	--	2.7	--	
WB9653	--	--	54	73	--	--	--	--	53.5	56.2	--	--	--	--	12.4	13.9	--	--	1.3	--	--	1.3	--	
LCS Anchor	--	--	--	67	--	--	--	--	57.5	--	--	--	--	--	14.1	--	--	--	0.6	--	--	0.6	--	
TCG-Cornerstone	--	--	--	59	--	--	--	--	57.1	--	--	--	--	--	14.2	--	--	--	0.0	--	--	0.0	--	
Barlow	81	88	63	--	--	--	63.3	61.4	59.5	--	--	--	14.9	14.7	14.0	--	--	--	--	--	--	--	--	
LCS Iguacu	--	95	62	--	--	--	--	61.1	60.2	--	--	--	--	11.4	11.7	--	--	--	--	--	--	--	--	
LCS Nitro	--	99	66	--	--	--	--	59.8	58.1	--	--	--	--	12.4	11.9	--	--	--	--	--	--	--	--	
LSD 5%	6.5	5.0	4.4	5.7	6.6	--	0.4	0.5	1.1	0.8	0.5	--	0.5	0.4	0.6	0.3	0.4	--	0.9	1.3	--	--	0.9	
LSD 10%	5.4	4.2	3.7	4.8	5.5	--	0.4	0.4	0.9	0.6	0.4	--	0.4	0.3	0.5	0.3	0.3	--	0.8	1.1	--	--	0.8	

HRSW Summary, Pembina County 2013-2017

Variety	Yield (bu/a)						Test Weight (lbs/bu)						Protein (%)						Lodging (0-9)		
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr	16	17	2yr
Faller	100	88	50	61	96	69	61.4	61.7	56.0	60.1	62.5	59.5	13.6	13.8	14.8	13.8	13.0	13.9	2.3	0.6	1.5
Linkert	80	66	53	56	69	59	61.7	60.9	56.9	59.3	61.0	59.1	14.8	15.5	14.9	14.7	14.3	14.6	0.4	0.1	0.3
Prosper	99	80	49	57	93	66	61.4	61.9	55.7	59.3	62.1	59.0	13.3	13.7	14.8	13.9	13.3	14.0	2.3	1.5	1.9
Rollag	85	72	50	58	82	63	62.3	62.3	57.6	60.4	62.4	60.1	14.6	14.9	15.6	14.6	14.3	14.8	1.9	0.0	1.0
SY Soren	82	66	46	54	78	59	61.6	61.3	56.8	59.4	61.3	59.2	14.1	15.0	15.0	14.8	13.7	14.5	1.7	0.0	0.9
WB Mayville	83	64	45	43	67	52	61.7	61.2	54.7	57.0	59.4	57.0	14.7	14.2	15.1	14.9	13.8	14.6	0.7	0.0	0.4
LCS Breakaway	86	63	44	46	74	55	62.9	62.8	55.5	60.0	61.6	59.0	14.6	15.3	15.3	14.7	13.8	14.6	1.9	0.0	1.0
SY Rowyn	90	66	53	56	86	65	61.1	61.4	57.5	59.9	61.7	59.7	13.3	14.4	14.3	14.2	12.9	13.8	1.7	1.0	1.4
Elgin-ND	93	75	44	53	80	59	61.0	61.3	55.0	58.5	61.1	58.2	14.2	14.5	15.0	14.6	13.8	14.5	2.8	0.5	1.7
HRS 3419	--	87	60	68	94	74	--	59.6	56.0	58.8	60.7	58.5	--	12.2	13.2	13.1	12.5	12.9	0.7	0.0	0.4
SY Ingmar	--	67	56	55	78	63	--	62.2	57.9	59.9	61.3	59.7	--	15.2	14.8	14.9	14.1	14.6	1.8	0.0	0.9
Bolles	--	--	44	48	76	56	--	--	56.0	57.9	61.4	58.4	--	--	15.9	15.9	15.3	15.7	2.6	0.0	1.3
SY Valda	--	--	47	59	86	64	--	--	55.6	59.2	60.6	58.5	--	--	15.0	13.9	13.3	14.1	2.0	1.3	1.7
HRS 3530	--	--	62	57	88	69	--	--	57.8	59.3	61.3	59.5	--	--	14.0	14.4	14.0	14.1	2.4	0.0	1.2
HRS 3504	--	--	51	57	75	61	--	--	55.2	57.9	59.6	57.6	--	--	13.7	13.2	13.1	13.3	0.5	0.0	0.3
Shelly	--	--	--	51	88	--	--	--	58.8	62.7	--	--	--	--	--	13.8	13.2	--	2.1	0.1	1.1
Boost	--	--	--	44	78	--	--	--	58.2	60.0	--	--	--	--	--	14.6	14.1	--	3.7	2.7	3.2
Surpass	--	--	--	46	79	--	--	--	59.0	61.6	--	--	--	--	--	14.1	13.6	--	3.2	2.5	2.9
LCS Prime	--	--	--	46	86	--	--	--	59.4	62.5	--	--	--	--	--	13.1	12.6	--	3.1	0.0	1.6
HRS 3616	--	--	--	50	79	--	--	--	58.0	60.6	--	--	--	--	--	15.5	14.6	--	2.9	0.0	1.5
HRS 3100	--	--	--	61	79	--	--	--	58.6	59.9	--	--	--	--	--	13.7	12.9	--	0.7	0.0	0.4
ND VitPro	--	--	--	50	73	--	--	--	61.4	63.0	--	--	--	--	--	15.0	14.4	--	1.3	0.1	0.7
Lang-MN	--	--	--	--	80	--	--	--	--	63.0	--	--	--	--	--	--	14.6	--	--	0.2	--
WB9590	--	--	--	--	79	--	--	--	--	60.6	--	--	--	--	--	--	13.8	--	--	0.0	--
WB9479	--	--	--	--	77	--	--	--	--	60.6	--	--	--	--	--	--	14.4	--	--	0.0	--
LCS Rebel	--	--	--	--	83	--	--	--	--	62.1	--	--	--	--	--	--	13.8	--	--	1.6	--
MS Camaro	--	--	--	--	73	--	--	--	--	61.3	--	--	--	--	--	--	13.6	--	--	0.1	--
MS Chevelle	--	--	--	--	84	--	--	--	--	61.1	--	--	--	--	--	--	12.5	--	--	0.5	--
Prevail	--	79	47	55	--	--	--	61.2	55.1	58.3	--	--	--	13.8	14.5	13.7	--	1.6	--	--	--
WB9507	--	78	45	57	--	--	--	60.3	52.9	57.7	--	--	--	15.0	14.6	14.2	--	2.5	--	--	--
HRS 3361	--	81	58	64	--	--	--	60.6	56.7	58.0	--	--	--	14.3	12.8	13.8	--	0.8	--	--	--
Focus	--	--	50	44	--	--	--	--	58.3	60.9	--	--	--	--	14.4	14.2	--	2.0	--	--	--
WB9653	--	--	42	62	--	--	--	--	54.0	57.7	--	--	--	--	14.6	13.3	--	2.0	--	--	--
LCS Anchor	--	--	--	45	--	--	--	--	--	58.9	--	--	--	--	--	14.7	--	1.0	--	--	--
TCG-Cornerstone	--	--	--	44	--	--	--	--	--	57.6	--	--	--	--	--	14.7	--	1.2	--	--	--
Barlow	87	75	43	--	--	--	62.2	61.4	56.3	--	--	--	14.2	14.3	15.2	--	--	--	--	--	--
LCS Iguacu	--	75	62	--	--	--	--	61.8	59.0	--	--	--	--	11.9	11.9	--	--	--	--	--	--
LCS Nitro	--	77	49	--	--	--	--	60.0	55.2	--	--	--	--	12.2	13.5	--	--	--	--	--	--
LSD 5%	5.3	8.3	7.2	5.9	3.7	--	0.4	0.5	1.5	0.9	0.6	--	0.5	0.5	0.8	0.4	0.3	--	1.1	1.1	--
LSD 10%	4.4	6.9	6.0	4.9	3.1	--	0.3	0.4	1.2	0.7	0.5	--	0.4	0.4	0.7	0.3	0.3	--	0.9	0.9	--

HRSW Summary, Towner County 2013-2017

Variety	Yield (bu/a)						Test Weight (lbs/bu)						Protein (%)						Lodging (0-9)		
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr	15	16	2yr
Faller	85	84	56	88	59	68	61.1	58.6	59.6	60.2	57.1	59.0	13.9	14.1	14.1	13.7	14.3	14.0	1.3	2.9	2.1
Prosper	79	79	55	83	58	65	61.3	58.3	60.4	59.8	57.2	59.1	13.7	14.3	13.9	14.0	14.3	14.1	0.6	2.7	1.7
Rollag	68	70	54	73	49	59	61.4	59.9	61.3	60.2	57.6	59.7	15.4	15.4	15.0	15.3	15.7	15.3	0.0	1.0	0.5
SY Soren	71	67	45	82	42	56	61.2	58.8	59.8	60.0	54.8	58.2	15.2	14.5	15.0	14.8	15.5	15.1	0.4	2.1	1.3
WB Mayville	68	66	47	69	43	53	60.0	58.0	59.5	57.6	53.8	57.0	14.9	14.8	15.2	14.7	15.3	15.1	0.1	0.4	0.3
LCS Breakaway	72	72	49	78	49	59	62.0	60.4	48.9	61.5	56.8	55.7	15.1	14.9	14.9	14.5	15.2	14.9	0.3	1.5	0.9
Elgin-ND	75	71	59	76	61	65	60.8	58.0	60.2	60.1	57.3	59.2	14.7	14.9	14.4	14.9	14.3	14.5	0.4	2.3	1.4
Linkert	70	64	50	75	48	57	60.1	57.9	59.9	59.4	55.7	58.3	15.7	15.1	14.9	14.9	15.5	15.1	0.0	0.0	0.0
SY Rowyn	73	78	50	81	47	59	61.1	59.2	60.3	60.1	55.8	58.7	14.2	14.3	14.4	14.3	15.0	14.6	1.1	2.2	1.7
SY Ingmar	--	74	51	76	43	57	--	59.1	60.9	59.2	54.4	58.2	--	15.0	15.0	15.3	15.4	15.2	0.2	1.2	0.7
HRS 3419	--	77	53	93	48	64	--	57.7	58.9	59.8	54.5	57.7	--	13.7	12.3	13.5	14.3	13.4	0.3	0.3	0.3
Bolles	--	--	46	77	50	58	--	--	59.0	59.9	55.6	58.2	--	--	16.4	16.0	16.3	16.2	0.7	2.5	1.6
SY Valda	--	--	56	83	54	64	--	--	60.8	59.7	56.3	58.9	--	--	13.9	14.6	14.7	14.4	0.9	1.4	1.2
HRS 3530	--	--	57	92	51	67	--	--	60.3	60.5	55.5	58.8	--	--	14.8	14.5	15.0	14.8	0.2	2.5	1.4
HRS 3504	--	--	62	75	43	60	--	--	59.3	57.1	51.8	56.1	--	--	13.3	13.8	14.7	13.9	0.2	0.6	0.4
Shelly	--	--	87	63	63	--	--	--	59.8	59.4	--	--	--	--	--	14.1	14.3	--	--	1.4	--
Boost	--	--	68	60	60	--	--	--	59.1	58.4	--	--	--	--	--	15.7	14.8	--	--	4.1	--
Surpass	--	--	82	57	--	--	--	--	60.0	58.6	--	--	--	--	--	14.1	13.9	--	--	3.1	--
LCS Prime	--	--	80	55	--	--	--	--	60.3	58.3	--	--	--	--	--	13.6	13.2	--	--	3.9	--
HRS 3616	--	--	77	58	--	--	--	--	58.8	56.1	--	--	--	--	--	15.9	15.4	--	--	3.0	--
HRS 3100	--	--	79	51	--	--	--	--	57.3	53.8	--	--	--	--	--	14.1	14.6	--	--	0.8	--
ND VitPro	--	--	73	49	--	--	--	--	61.1	59.0	--	--	--	--	--	15.0	15.0	--	--	2.2	--
Lang-MN	--	--	--	58	--	--	--	--	--	60.4	--	--	--	--	--	--	15.4	--	--	--	--
WB9590	--	--	--	42	--	--	--	--	--	54.1	--	--	--	--	--	--	15.9	--	--	--	--
WB9479	--	--	--	57	--	--	--	--	--	55.9	--	--	--	--	--	--	15.7	--	--	--	--
LCS Rebel	--	--	--	60	--	--	--	--	--	59.5	--	--	--	--	--	--	14.0	--	--	--	--
MS Camaro	--	--	--	48	--	--	--	--	--	57.5	--	--	--	--	--	--	14.7	--	--	--	--
MS Chevelle	--	--	--	68	--	--	--	--	--	57.3	--	--	--	--	--	--	13.5	--	--	--	--
Prevail	--	74	55	83	--	--	--	58.5	59.7	59.6	--	--	--	14.0	13.6	13.8	--	--	0.5	1.2	0.9
HRS 3361	--	73	50	80	--	--	--	58.1	58.6	57.6	--	--	--	13.9	13.7	14.2	--	--	0.4	0.5	0.5
WB9507	--	93	54	84	--	--	--	58.5	58.2	58.1	--	--	--	14.6	14.2	13.5	--	--	0.6	2.7	1.7
Focus	--	--	58	86	--	--	--	--	61.8	61.5	--	--	--	--	13.8	13.9	--	--	1.3	1.2	1.3
WB9653	--	--	61	74	--	--	--	--	58.5	56.6	--	--	--	--	13.5	13.9	--	--	0.5	2.2	1.4
LCS Anchor	--	--	--	78	--	--	--	--	--	59.8	--	--	--	--	--	15.0	--	--	--	1.2	--
TCG-Cornerstone	--	--	--	62	--	--	--	--	--	58.5	--	--	--	--	--	14.6	--	--	--	0.3	--
Barlow	73	75	47	--	--	--	60.8	59.9	60.8	--	--	--	14.8	15.1	14.6	--	--	--	0.9	--	--
LCS Iguacu	--	74	45	--	--	--	--	58.7	60.4	--	--	--	--	11.7	12.7	--	--	--	0.3	--	--
LCS Nitro	--	76	53	--	--	--	--	57.0	58.9	--	--	--	--	12.9	12.7	--	--	--	0.7	--	--
LSD 5%	6.1	5.5	6.6	6.9	11.3	--	0.6	0.7	0.8	0.9	2.8	--	0.4	0.3	0.5	0.5	0.6	--	NS	1.5	--
LSD 10%	5.1	4.6	5.5	5.7	9.4	--	0.5	0.6	0.7	0.8	2.3	--	0.3	0.3	0.4	0.4	0.5	--	NS	1.3	--

HRSW Summary, Walsh County 2013-2017

Variety	Yield (bu/a)						Test Weight (lbs/bu)						Protein (%)						Lodging (0-9)					
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr
Faller	87	93	62	81	89	77	59.9	61.4	57.3	58.9	60.3	58.8	12.3	11.8	15.2	13.0	12.5	13.6	3.1	0.0	6.5	2.2	1.1	3.3
Prosper	81	96	53	79	91	74	59.8	61.5	56.6	59.1	60.7	58.8	12.2	12.1	15.0	13.1	12.7	13.6	4.0	0.3	7.4	1.7	2.5	3.9
Rollag	80	82	62	74	81	72	61.6	62.3	59.3	59.9	62.2	60.5	13.6	13.4	16.5	14.3	14.4	15.1	0.2	0.0	2.1	0.4	0.0	0.8
SY Soren	82	84	55	76	82	71	60.9	61.5	58.1	58.9	61.4	59.5	13.8	13.6	15.9	13.9	14.5	14.8	0.0	0.2	1.1	1.8	0.2	1.0
WB Mayville	79	77	56	65	83	68	59.6	61.4	57.0	57.1	61.3	58.5	13.8	13.3	15.0	14.2	14.4	14.5	0.1	0.0	0.4	0.2	0.0	0.2
Elgin-ND	80	83	56	77	90	75	60.4	61.4	56.4	59.1	61.9	59.1	13.5	12.2	15.5	13.6	14.3	14.5	4.1	0.5	6.5	0.4	2.3	3.1
LCS Breakaway	80	85	57	75	83	72	61.8	62.9	58.0	60.0	62.2	60.1	13.8	13.1	15.6	13.6	13.9	14.4	2.4	0.0	4.3	1.0	0.1	1.8
Linkert	77	79	65	71	82	73	60.8	61.4	58.7	58.3	61.3	59.4	13.6	13.9	15.9	14.2	14.7	14.9	0.0	0.0	0.0	0.0	0.0	0.0
SY Rowyn	76	85	63	76	89	76	59.6	61.5	58.0	58.3	60.9	59.1	13.1	12.0	15.4	13.3	13.6	14.1	3.6	0.3	5.0	2.3	2.1	3.1
SY Ingmar	--	81	68	74	80	74	--	61.9	60.0	59.2	61.6	60.3	--	13.2	15.4	14.1	14.6	14.7	--	0.0	0.9	1.2	0.1	0.7
HRS 3419	--	93	68	83	98	83	--	59.9	57.8	58.1	60.6	58.8	--	11.3	13.2	12.5	12.5	12.7	--	0.0	0.6	0.0	0.0	0.2
Bolles	--	--	59	69	86	71	--	--	57.3	58.3	60.9	58.8	--	--	16.6	14.9	14.9	15.5	--	--	5.7	0.4	0.0	2.0
SY Valda	--	--	66	78	90	78	--	--	58.9	58.4	61.7	59.7	--	--	14.9	13.3	13.5	13.9	--	--	3.8	2.0	0.0	1.9
HRS 3530	--	--	67	80	94	80	--	--	58.3	59.8	61.7	59.9	--	--	15.6	13.5	13.4	14.2	--	--	7.2	2.7	0.1	3.3
HRS 3504	--	--	70	69	82	74	--	--	57.1	55.6	58.3	57.0	--	--	14.2	13.2	13.3	13.6	--	--	2.6	0.5	0.0	1.0
Shelly	--	--	82	87	87	--	--	--	58.7	61.1	--	--	--	--	13.1	13.4	--	--	--	--	--	0.3	0.1	--
Boost	--	--	69	86	86	--	--	--	58.2	61.2	--	--	--	--	14.2	14.1	--	--	--	--	--	2.5	0.0	--
Surpass	--	--	73	89	89	--	--	--	57.8	60.1	--	--	--	--	13.0	14.5	--	--	--	--	--	4.6	0.7	--
ND VitPro	--	--	69	80	80	--	--	--	61.1	62.8	--	--	--	--	14.3	14.9	--	--	--	--	--	0.8	0.0	--
LCS Prime	--	--	76	94	94	--	--	--	59.1	62.0	--	--	--	--	12.6	12.5	--	--	--	--	--	2.6	0.5	--
HRS 3616	--	--	73	86	86	--	--	--	57.8	59.7	--	--	--	--	14.8	15.1	--	--	--	--	--	2.2	0.1	--
HRS 3100	--	--	71	83	83	--	--	--	56.4	59.9	--	--	--	--	13.0	13.2	--	--	--	--	--	0.9	0.0	--
Lang-MN	--	--	--	82	82	--	--	--	62.9	--	--	--	--	--	15.0	--	--	--	--	--	--	--	0.0	--
WB9590	--	--	--	84	84	--	--	--	60.9	--	--	--	--	--	13.9	--	--	--	--	--	--	--	0.1	--
WB9479	--	--	--	83	83	--	--	--	61.5	--	--	--	--	--	14.4	--	--	--	--	--	--	--	0.1	--
LCS Rebel	--	--	--	84	84	--	--	--	62.5	--	--	--	--	--	13.7	--	--	--	--	--	--	--	1.7	--
MS Camaro	--	--	--	86	86	--	--	--	59.9	--	--	--	--	--	12.7	--	--	--	--	--	--	--	1.1	--
MS Chevelle	--	--	--	88	88	--	--	--	59.4	--	--	--	--	--	12.9	--	--	--	--	--	--	--	0.8	--
Prevail	--	84	65	79	--	--	--	60.8	57.5	57.9	--	--	--	13.2	14.7	13.3	--	--	--	2.7	6.3	2.5	--	--
HRS 3361	--	85	66	72	--	--	--	60.6	57.1	57.0	--	--	--	12.2	13.8	12.9	--	--	--	0.0	2.1	1.3	--	--
WB9507	--	92	59	80	--	--	--	60.6	54.2	57.1	--	--	--	11.7	15.5	12.5	--	--	--	0.0	7.1	2.1	--	--
Focus	--	--	62	69	--	--	--	59.2	59.8	--	--	--	--	--	15.4	13.2	--	--	--	--	5.8	3.5	--	--
WB9653	--	--	69	70	--	--	--	57.0	55.7	--	--	--	--	--	14.0	12.7	--	--	--	--	2.3	0.4	--	--
LCS Anchor	--	--	--	61	--	--	--	--	57.3	--	--	--	--	--	14.3	--	--	--	--	--	--	0.8	--	--
TCG-Cornerstone	--	--	--	60	--	--	--	--	57.9	--	--	--	--	--	14.2	--	--	--	--	--	--	0.4	--	--
Barlow	73	81	59	--	--	--	60.8	62.2	59.0	--	--	--	12.5	13.1	15.6	--	--	--	2.2	1.8	5.7	--	--	--
LCS Iguacu	--	91	71	--	--	--	--	61.6	59.6	--	--	--	--	10.9	12.7	--	--	--	--	0.1	4.0	--	--	--
LCS Nitro	--	94	65	--	--	--	--	60.9	56.7	--	--	--	--	10.9	13.8	--	--	--	--	0.3	3.7	--	--	--
LSD 5%	6.9	5.0	8.4	5.1	5.8	--	0.5	0.4	1.1	0.8	0.8	--	0.8	0.7	0.6	0.5	0.5	0.5	2.8	0.8	1.7	1.9	1.2	--
LSD 10%	5.8	4.2	7.0	4.3	4.8	--	0.4	0.4	0.9	0.7	0.7	--	0.7	0.6	0.5	0.4	0.4	0.4	2.3	0.7	1.5	1.5	1.0	--

Variety		Durum Summary, Langdon 2013-2017																DON (ppm)												
		Yield (bu/a)				Test Weight (lbs/bu)				Lodging (0-9)				Height (in)					Days to Head											
		13	14	15	16	17	5yr	13	14	15	16	17	5yr	11	15	16	17		4yr	14	15	16	17	4yr	14	15	16	17	4yr	
AC Commander	95	88	59	45	70	71	59.9	60.7	57.7	52.5	57.8	57.7	0.0	1.0	3.8	1.8	1.7	35	30	35	30	35	37	34	57	64	62	61	61	11.8
AC Navigator	89	84	52	35	69	66	60.1	61.3	58.0	52.9	59.9	58.4	0.5	0.8	4.1	2.8	2.1	35	29	35	29	35	41	35	55	63	60	61	60	9.2
Alkabo	97	85	70	51	71	75	61.5	62.2	61.6	56.6	61.0	60.6	0.7	0.5	5.8	1.3	2.1	40	39	39	43	40	43	40	56	64	62	61	61	6.6
Ben	90	80	72	45	66	70	61.3	62.8	61.7	55.3	60.3	60.3	0.4	2.3	6.2	4.0	3.2	42	40	41	46	42	46	42	56	64	62	60	61	7.7
Grenora	98	86	77	41	69	74	60.8	62.1	61.3	54.2	59.7	59.6	1.1	0.8	6.7	5.8	3.6	38	37	39	43	39	43	39	56	63	62	60	60	9.7
Lebsock	89	79	72	53	78	74	61.2	62.6	61.7	57.2	61.3	60.8	0.3	3.8	5.7	3.8	3.4	39	38	40	45	41	45	41	55	63	61	60	60	7.9
Maier	91	83	74	37	77	72	60.4	62.0	61.5	53.7	60.5	59.6	0.2	0.5	5.0	4.8	2.6	39	37	38	44	40	44	40	55	63	62	61	60	7.0
Mountrail	103	87	80	38	81	78	60.3	61.8	60.7	54.4	60.0	59.4	0.1	2.0	7.2	5.0	3.6	40	39	41	44	41	44	41	57	64	63	60	61	13.3
Pierce	101	82	73	41	76	75	61.9	62.3	61.9	56.7	61.5	60.9	0.4	3.0	6.6	5.3	3.8	41	39	43	46	42	46	42	55	63	62	60	60	7.7
Strongfield	102	85	65	33	63	70	61.2	60.6	59.6	53.2	58.9	58.7	0.2	3.8	6.4	4.5	3.7	39	39	39	43	40	43	40	57	64	62	61	61	10.1
Tioga	96	84	76	37	70	72	60.9	61.9	61.5	53.2	60.3	59.6	1.2	0.3	6.4	6.0	3.5	43	41	41	48	43	48	43	56	64	63	61	61	8.5
Carpio	105	79	85	43	79	78	61.9	60.6	61.3	55.6	61.7	60.2	0.0	1.0	7.6	6.5	3.8	40	39	40	45	41	45	41	58	66	63	62	62	10.8
Alzada	73	80	61	37	47	60	59.6	57.7	57.6	51.4	55.3	56.3	0.3	0.0	3.0	0.3	0.9	33	30	34	36	33	36	33	54	61	57	56	57	9.2
Joppa	102	86	82	43	75	78	60.7	61.9	61.3	55.4	60.5	60.0	0.7	0.5	6.9	6.8	3.7	42	40	40	44	42	44	42	57	64	64	61	62	6.7
Divide	94	84	78	35	78	74	60.2	61.4	61.0	53.6	60.7	59.4	0.3	1.8	6.9	6.3	3.8	41	40	41	47	42	47	42	58	64	64	61	62	6.9
CDC Verona	103	76	70	36	72	71	61.2	60.7	59.8	55.5	60.8	59.6	0.4	0.8	5.7	6.0	3.2	40	37	41	45	41	45	41	56	64	64	62	62	6.7
Rugby	86	74	66	32	61	64	60.6	62.1	61.4	54.3	60.2	59.7	0.3	4.0	7.0	8.0	4.8	43	42	42	48	44	48	44	57	62	61	60	60	10.4
VT Peak	97	81	75	55	85	79	61.7	62.6	62.5	58.6	62.4	61.6	--	0.5	4.3	4.3	--	40	38	40	45	41	45	41	56	64	62	60	61	6.2
ND Grano	108	84	80	41	78	78	62.1	61.7	61.4	55.6	61.0	60.4	--	0.8	6.4	5.0	--	40	40	40	45	41	45	41	58	65	64	62	62	8.2
ND Riveland	107	86	78	53	88	82	61.8	61.6	61.3	56.4	61.5	60.5	--	1.8	5.9	3.3	--	43	40	43	46	43	46	43	58	64	63	61	62	10.2
LSD 5%	6.4	4.9	7.6	6.3	7.2		0.5	1.0	0.9	1.2	0.9	1.4	1.4	NS	1.3	2.6		1.6	2.7	2.3	2.5				1.1	1.2	0.9	1.4		
LSD 10%	5.3	4.1	6.4	5.3	6.0		0.4	0.9	0.7	1.0	0.8		--	2.2	1.1	2.2		1.4	2.3	1.9	2.1				0.9	1.0	0.8	1.2		

2016 trial was severely damaged by fusarium head blight.

Durum Summary, Towner County 2012-2016																										
Variety	Yield (bu/a)						Test Weight (lbs/bu)						Height (in)						Days to Head						DON (ppm)	
	12	13	14	15	16	3yr	12	13	14	15	16	3yr	13	14	15	16	3yr	13	14	15	16	3yr	13	16		
Alkabo	57	74	52	52	73	59	56.9	61.0	56.2	59.8	58.6	58.2	45	40	33	38	37	46	58	64	61	61	46	4.6		
Tioga	57	79	50	57	63	57	56.5	60.5	55.1	59.1	54.8	56.3	49	42	37	41	40	47	59	66	61	62	47	4.4		
Divide	52	73	51	61	64	58	56.8	59.8	55.6	59.7	56.2	57.2	47	42	36	39	39	47	59	65	62	62	47	2.8		
Carpio	56	75	55	62	70	63	57.0	61.2	56.1	60.7	58.9	58.6	48	41	37	39	39	48	60	66	63	63	48	3.2		
Joppa	52	85	56	60	73	63	56.7	60.7	55.4	59.9	56.8	57.4	46	40	35	37	37	46	60	64	61	62	46	4.0		
ND Grano	--	--	--	--	71	--	--	--	--	--	58.2	--	--	--	--	39	--	--	--	--	63	--	--	3.1		
ND Riveland	--	--	--	--	79	--	--	--	--	--	58.5	--	--	--	--	40	--	--	--	--	62	--	--	3.3		
Lebsock	51	68	58	61	--	--	57.1	61.0	56.5	62.7	--	--	44	39	35	--	--	45	55	63	--	--	45	--		
Grenora	53	80	--	--	--	--	55.7	59.5	--	--	--	--	41	--	--	--	--	45	--	--	--	--	45	--		
LSD 5%	NS	6.7	NS	NS	4.7		NS	0.5	NS	NS	1.6		1.2	1.9	2.4	1.6		0.6	1.3	2.3	NS		0.6	1.0		
LSD 10%	NS	5.5	NS	NS	3.9		NS	0.4	NS	NS	1.3		1.0	1.5	2.0	1.3		0.5	1.1	1.9	1.1		0.5	0.8		

Rye, Langdon 2017

Variety	Julian Days to Head	Plant Height (in)	Lodging (0-9)	Test Weight (lbs/bu)	Yield (bu/a)	2 yr Avg Yield (bu/a)
Aroostok	145	58	1.8	53.6	58.5	57.1
Dacold	154	55	1.3	52.4	75.3	75.9
Hancock	149	56	1.3	55.5	78.3	77.1
ND Dylan	152	59	1.8	54.7	94.8	89.4
Rymin	152	52	0.5	55.9	89.8	77.8
Spooner	149	59	0.5	55.4	70.2	68.8
Brasetto	151	51	0.0	55.0	138.4	--
Hazlet	152	52	0.8	55.9	96.5	--
Wheeler	153	58	2.0	51.7	51.6	--
Mean	150	56	1.3	54.4	82.3	
C.V. %	0.6	4.8	66.5	1.3	12.7	
LSD 5%	1.2	3.9	1.2	1.0	15.1	
LSD 10%	1.0	3.2	1.0	0.9	12.6	

HRWW Summary, Langdon 2014-2017

Variety	Yield (bu/a)												Test Weight (lbs/bu)						Winter Survival			Julian Days to Head			Height Lodging (0-9)			Protein (%)									
	14			15			16			17			3yr			14	15	16	17	17	17	17	17	14	15	16	17	17	17	14	15	16	17	3yr			
	14	15	16	17	3yr	14	15	16	17	3yr	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17				
AC Broadview	78	76	87	25	63	59.6	58.9	56.8	43.9	53.2	97	163	39	0.0	12.4	11.3	10.1	11.6	11.0																		
AC Emerson	76	85	86	90	87	59.9	62.0	59.3	60.2	60.5	99	164	40	0.0	12.3	11.8	10.9	11.9	11.5																		
Accipiter	74	73	75	43	64	59.8	59.7	56.3	51.8	55.9	97	166	40	0.0	10.7	11.8	10.5	11.2	11.2																		
Decade	73	84	74	28	62	60.9	61.3	54.2	45.5	53.7	100	163	37	0.0	13.8	12.0	10.6	12.2	11.6																		
Flourish	69	75	90	75	80	60.5	59.1	57.4	54.9	57.1	98	163	38	0.0	12.2	11.9	11.3	11.5	11.6																		
Ideal	68	80	74	16	57	60.7	60.9	56.2	44.3	53.8	100	164	39	0.3	11.1	11.3	10.4	12.4	11.4																		
Jerry	72	76	65	17	52	60.2	59.7	56.0	46.7	54.1	97	165	42	0.0	13.3	12.0	10.7	12.9	11.9																		
Lyman	72	84	81	35	67	59.9	61.2	58.1	47.3	55.5	89	162	40	0.0	13.7	11.6	11.6	12.7	12.0																		
Moats	75	77	83	96	85	59.6	59.7	59.8	60.6	60.0	99	164	43	0.0	12.9	11.7	11.8	12.3	11.9																		
Overland	69	90	88	44	74	60.8	61.2	58.1	51.1	56.8	100	163	43	0.0	13.1	10.9	10.8	11.5	11.1																		
Peregrine	76	78	81	80	80	60.3	60.7	58.8	57.0	58.8	100	165	45	0.0	12.0	11.0	10.8	10.8	10.9																		
SY Wolf	72	84	92	67	81	61.1	61.6	58.7	53.3	57.9	95	163	39	0.0	12.8	11.4	11.3	12.5	11.7																		
WB Matlock	76	70	73	20	54	60.6	60.6	57.1	47.3	55.0	99	166	40	0.0	12.2	12.2	10.9	12.9	12.0																		
AC Gateway	71	79	88	59	75	59.2	61.3	56.5	53.6	57.1	99	164	39	0.0	13.5	12.3	11.3	12.3	12.0																		
CDC Chase	--	85	90	96	90	--	61.6	59.9	60.3	60.6	99	164	44	0.0	--	11.2	11.6	12.1	11.6																		
Northern	--	84	93	83	86	--	59.8	54.0	55.0	56.3	100	164	40	0.0	--	11.7	11.3	11.6	11.5																		
Redfield	--	79	82	53	71	--	60.5	58.0	50.7	56.4	98	162	38	0.8	--	11.5	11.1	12.2	11.6																		
Loma	--	--	76	72	--	--	--	52.9	53.7	--	91	166	37	0.0	--	--	10.9	11.9	--																		
Ruth	--	--	81	85	--	--	--	56.9	56.1	--	99	162	40	0.0	--	--	10.7	11.2	--																		
SY Monument	--	--	98	81	--	--	--	56.5	54.4	--	94	163	38	0.0	--	--	11.1	12.1	--																		
SY Sunrise	--	--	100	86	--	--	--	57.3	56.6	--	93	163	34	0.0	--	--	11.2	11.6	--																		
WB4614	--	--	88	57	--	--	--	52.6	54.7	--	99	164	38	0.0	--	--	11.5	12.5	--																		
Oahe	--	--	--	105	--	--	--	60.7	--	--	99	162	42	0.3	--	--	--	11.3	--																		
Keldin	--	--	--	84	--	--	--	56.8	--	--	98	163	40	0.0	--	--	--	11.2	--																		
LSD 5%	5.3	8.1	11.3	8.7		1.1	0.8	1.8	2.0		NS	1.3	2.2	NS	0.9	0.5	0.5	0.5	0.5																		
LSD 10%	--	6.7	9.5	7.2		--	0.7	1.5	1.7		NS	1.1	1.8	NS	--	0.4	0.5	0.4																			

Fungicides were used in 2014-2015 but not in 2016-2017.

Severe stripe rust infections resulted in reduced yields in susceptible varieties in 2017.

HRWW Disease Summary, Langdon 2017

Variety	<u>Stripe Rust</u>		<u>Powdery Mildew</u>		DON (ppm)	Yield (bu/a)	Test Weight (lbs/bu)
	% Incidence	% Severity	% Incidence	% Severity			
Jerry	86	36	1	2	0.2	16.6	46.7
Decade	78	13	3	8	0.0	27.9	45.5
Lyman	89	29	0	0	0.3	35.0	47.3
Ideal	100	58	1	3	0.0	16.3	44.3
Overland	75	7	4	7	0.0	44.1	51.1
SY Wolf	34	8	2	3	0.2	66.9	53.3
WB Matlock	99	55	1	2	0.1	19.7	47.3
Peregrine	23	3	3	13	0.0	79.5	57.0
Accipiter	69	12	1	2	0.2	42.7	51.8
Moats	7	1	0	0	0.0	96.3	60.6
Flourish	30	5	3	3	0.0	74.5	54.9
AC Broadview	100	42	4	22	0.0	25.2	43.9
AC Emerson	7	1	3	8	0.0	89.8	60.2
AC Gateway	48	8	5	15	0.0	59.1	53.6
CDC Chase	10	2	3	3	0.0	96.1	60.3
Redfield	79	11	3	10	0.0	53.1	50.7
Ruth	27	5	3	9	0.2	85.4	56.1
WB4614	53	8	2	2	0.5	57.4	54.7
SY Monument	5	1	1	2	0.4	80.7	54.4
SY Sunrise	12	2	2	3	0.5	86.2	56.6
Northern	60	6	4	10	0.5	83.0	55.0
Loma	50	3	2	2	0.6	72.3	53.7
Oahe	8	1	4	3	0.0	105.1	60.7
Keldin	39	3	3	5	0.4	83.9	56.8
Trial Mean	50	13	2	6	0.2	62.6	53.3
C.V. %	26	73	130	181	90.4	9.8	2.7
LSD 5%	21	15	NS	NS	0.3	8.7	2.0

Severe stripe rust infections resulted in reduced yields and low test weight in susceptible varieties.

Corn Grain, Langdon 2017

Brand	Hybrid	RM ¹	Hybrid Traits	Days to Silk	Harvest Moisture (%)	Test Weight (lbs/bu)	Yield	
							2017	2yr
Allegiant	7404 VT2P	74	RR2, VT2P	81	25.1	55.5	154.2	--
Allegiant	7868 VT2P	78	RR2, VT2P	87	25.9	52.4	179.6	--
Allegiant	8280 VT2P	81	RR2, VT2P	90	29.4	53.8	160.6	--
Channel	177-25VT2PRIB	77	RR2, VT2P	84	29.6	55.0	158.4	--
Channel	181-11VT2PRIB	81	RR2, VT2P	88	26.4	52.7	176.8	--
Hefty	H2512VT2	75	RR2, VT2	82	26.3	55.8	156.0	--
Hefty	H2801RR2	78	RR2	85	25.7	51.9	186.3	--
Integra	2803 VT2PRIB	78	RR2, VT2P	87	30.0	53.5	158.2	165.1
Integra	2601 VT2 PRO	76	RR2, VT2PRO	83	27.7	55.0	175.6	--
Integra	3142 VT2PRIB	81	RR2, VT2P	89	28.5	53.7	189.7	--
Integra	2508 VT2P	75	RR2, VT2P	81	26.5	54.9	153.2	--
Legacy	L-1746 VT2PRO	78	RR2, VT2P	87	29.8	53.9	170.0	--
Legacy	L-1814 VT2PRO	79	RR2, VT2P	89	28.7	53.3	185.1	167.9
Legacy	L-2213 VT2PRO	80	RR2, VT2P	85	26.4	53.1	168.0	163.5
Legacy	L-1713 RR2	77	RR2	84	27.1	52.9	188.9	--
Legacy	L-1943 VT2PRO	80	RR2, VT2P	87	27.2	53.5	177.9	--
Mustang	1276 VT2P RIB	76	RR2, VT2P	84	27.9	55.1	169.9	--
Mustang	2278 VT2P RIB	78	RR2, VT2P	87	29.4	54.0	189.9	--
Mustang	1079 RR	79	RR2	88	30.4	55.7	152.5	--
Mustang	1279 VT2P	79	RR2, VT2P	89	29.9	54.7	149.0	--
Mustang	2081 RR	81	RR2	88	28.9	53.8	179.8	--
NuTech	X5GN-7603	76	GT, LL, CB	88	25.9	53.3	176.1	--
NuTech	X5GN-8105	81	GT, LL, CB	89	30.7	55.7	183.8	--
NuTech/G2 Genetics	5F-379	79	RR2, LL, CB	87	28.3	52.1	184.0	180.2
NuTech/G2 Genetics	5F-775	75	RR2, LL, CB	82	26.9	51.6	189.5	--
PFS	78A82	81	RR2, VT2P	89	28.9	54.0	181.7	--
PFS	71D83	81	RR2, VT2P	87	30.0	54.6	174.7	--
Pioneer	P7227R	72	RR2	84	25.2	54.1	185.5	--
Pioneer	P7332R	73	RR2	82	25.8	52.4	178.8	170.0
Proseed	1377	77	GT	88	26.4	54.2	179.4	--
Proseed	1278	78	GT	89	26.5	51.6	158.4	--
Proseed	1378	78	RR2	87	27.6	51.4	175.2	165.5
Proseed	1280	80	RR2	87	29.7	55.3	163.1	149.7
Proseed	1480	80	RR2	88	27.4	53.5	188.8	169.3
Rob See Co	IC 2701	77	GT, 3110	88	25.4	53.7	178.5	--
Rob See Co	IC 2862	78	GT, 3110	83	28.8	56.4	163.5	--
Rob See Co	IC 2925	79	GT, 3110	89	26.6	55.2	163.2	--
Thunder	7578VT2P	78	RR2, VT2	89	28.6	52.5	155.6	--
Thunder	4578 RR	78	RR2	84	27.1	52.9	180.8	168.8
Thunder	6874 VT2P	74	RR2, VT2	82	26.2	55.6	151.0	--
Trial Mean				86	27.7	53.9	171.9	
C.V. %				2.2	5.2	1.6	7.9	
LSD 5%				3.1	2.3	1.4	22.2	
LSD 10%				2.6	2.0	1.2	18.5	

¹Relative maturity and hybrid traits as submitted by the company.

Yield reported at 15.5% moisture.

Barley Summary, Langdon 2013-2017																			
Variety	Height (in)						Protein (%)						Days to Head						
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr	
Lacey	28	33	37	32	41	37	12.5	12.2	13.5	13.9	12.7	13.4	52	52	61	54	55	57	
Stellar-ND	29	33	37	34	40	37	12.5	12.3	12.7	13.3	12.5	12.8	53	52	61	54	56	57	
Tradition	29	33	39	34	38	37	12.5	12.0	12.8	13.9	12.9	13.2	52	52	60	55	56	57	
Celebration	28	33	37	32	39	36	13.6	12.9	14.3	13.9	13.7	14.0	53	53	61	55	56	57	
Quest	31	34	37	33	39	36	12.2	12.2	12.8	13.0	13.5	13.1	54	52	61	55	57	58	
Innovation	26	32	36	32	40	36	12.4	13.0	13.6	13.5	13.5	13.5	52	50	60	55	56	57	
Pinnacle*	31	33	37	34	39	37	11.3	11.5	12.1	12.5	12.0	12.2	55	53	61	55	57	58	
ND Genesis*	32	32	36	30	38	35	10.3	11.8	11.0	10.9	11.3	11.1	56	54	61	57	57	58	
CDC Meredith*	--	--	36	31	36	34	--	--	12.9	12.2	12.3	12.5	--	--	65	59	60	61	
AAC Synergy*	--	--	--	31	37	--	--	--	--	11.9	11.9	--	--	--	--	58	58	--	
Sirish*	--	--	--	30	33	--	--	--	--	13.0	11.9	--	--	--	--	60	60	--	
ABI Balster*	--	--	--	31	35	--	--	--	--	12.8	12.4	--	--	--	--	59	59	--	
ABI Growler*	--	--	--	32	36	--	--	--	--	12.4	13.1	--	--	--	--	60	59	--	
LCS Genie*	--	--	--	29	32	--	--	--	--	12.4	11.0	--	--	--	--	62	61	--	
LCS Odyssey*	--	--	--	31	33	--	--	--	--	12.0	10.7	--	--	--	--	61	61	--	
Explorer*	--	--	--	--	32	--	--	--	--	--	11.5	--	--	--	--	--	58	--	
Rawson*	31	32	37	33	--	--	10.8	11.7	12.1	12.2	--	--	52	50	58	54	--	--	
AC Metcalfe*	32	29	37	--	--	--	11.7	12.6	13.2	--	--	--	56	54	62	--	--	--	
CDC Copeland*	35	32	40	--	--	--	11.8	12.2	12.3	--	--	--	59	56	66	--	--	--	
Conrad*	29	27	34	--	--	--	12.3	12.7	13.3	--	--	--	57	55	64	--	--	--	
LSD 5%	2.0	1.9	2.1	2.9	3.0		0.6	0.8	0.4	0.9	0.8		1.1	1.3	1.1	1.0	1.1		
LSD 10%	1.7	1.6	1.7	2.4	2.5		0.5	0.7	0.4	0.8	0.7		0.9	1.1	0.9	0.8	0.9		

*2-row

Conlon suffered damage from rodents in 2016 and 2017. Data is not presented.

Barley Summary, Langdon 2013-2017

Variety	Yield (bu/a)						Test Weight (lbs/bu)						Lodging (0-9)			Plump (%)					
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	16	17	2yr	13	14	15	16	17	3yr
Lacey	164	134	128	116	135	126	50.9	52.1	51.1	46.9	49.4	49.1	0.6	0.3	0.5	98	99	97	91	94	94
Stellar-ND	159	142	129	104	131	122	50.0	50.9	49.6	48.8	48.8	49.1	0.0	0.0	0.0	99	99	97	95	97	96
Tradition	163	133	131	108	122	120	50.9	51.9	49.8	46.8	48.8	48.5	1.1	2.3	1.7	98	98	96	89	94	93
Celebration	165	144	130	111	128	123	50.3	51.9	49.6	47.1	47.7	48.1	2.5	4.5	3.5	98	98	97	92	91	93
Quest	163	130	124	107	115	115	49.3	50.3	49.4	45.9	47.2	47.5	0.6	5.5	3.1	96	96	92	85	82	86
Innovation	160	138	128	113	121	121	50.2	51.8	50.2	46.3	48.6	48.4	0.0	2.5	1.3	98	99	97	91	93	94
Pinnacle*	180	138	132	106	133	123	53.1	53.9	51.9	47.9	50.8	50.2	0.9	0.0	0.5	98	98	97	96	98	97
ND Genesis*	174	128	125	105	129	120	51.3	52.6	50.5	47.3	49.1	49.0	3.1	0.0	1.6	98	98	96	96	96	96
CDC Meredith*	--	--	116	90	114	107	--	--	48.6	44.7	46.9	46.7	8.0	4.3	6.2	--	--	92	86	89	89
AAC Synergy*	--	--	--	113	131	--	--	--	--	48.0	49.5	--	2.9	3.5	3.2	--	--	--	94	94	--
Sirish*	--	--	--	88	126	--	--	--	--	44.1	48.7	--	3.5	0.3	1.9	--	--	--	85	95	--
ABI Balster*	--	--	--	92	117	--	--	--	--	43.7	46.4	--	6.6	3.3	5.0	--	--	--	84	85	--
ABI Growler*	--	--	--	94	118	--	--	--	--	45.4	45.7	--	5.4	3.8	4.6	--	--	--	84	82	--
LCS Genie*	--	--	--	77	116	--	--	--	--	43.5	47.9	--	3.2	0.3	1.8	--	--	--	83	93	--
LCS Odyssey*	--	--	--	71	129	--	--	--	--	39.9	47.3	--	5.5	0.8	3.2	--	--	--	82	95	--
Explorer*	--	--	--	--	131	--	--	--	--	--	47.7	--	--	0.0	--	--	--	--	--	91	--
Rawson*	166	122	124	107	--	--	51.8	52.1	49.0	46.8	--	--	1.2	--	--	99	99	97	97	--	--
AC Metcalfe*	154	125	120	--	--	--	52.5	53.3	51.4	--	--	--	--	--	--	97	97	95	--	--	--
CDC Copeland*	172	127	122	--	--	--	49.9	50.9	49.1	--	--	--	--	--	--	96	97	91	--	--	--
Conrad*	155	125	120	--	--	--	51.2	52.7	50.4	--	--	--	--	--	--	97	98	94	--	--	--
LSD 5%	10.3	6.7	9.4	9.1	11.1		0.6	0.9	0.9	1.7	1.2		2.4	2.8		0.7	0.9	2.5	5.4	4.4	
LSD 10%	8.6	5.5	7.8	7.6	9.3		0.5	0.7	0.7	1.4	1.0		2.0	2.4		0.6	0.8	2.1	4.5	3.7	

*2-row

Conlon suffered damage from rodents in 2016 and 2017. Data is not presented.

Barley Summary, Pembina County 2013-2017																														
Variety	Yield (bu/a)						Test Weight (lbs/bu)						Lodging (0-9)						Protein (%)						Plump (%)					
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	16	17	2yr	13	14	15	16	17	17	3yr	13	14	15	16	17	3yr		
Lacey	106	117	95	101	125	107	49.9	49.2	48.2	47.7	48.7	48.2	5.8	3.5	4.7	12.6	12.2	12.4	12.6	13.2	12.7	99	98	92	98	92	91	94		
Tradition	113	121	92	93	110	98	50.4	49.0	47.0	46.5	46.9	46.8	5.8	4.0	4.9	12.4	11.6	12.5	11.6	13.1	12.4	99	98	90	98	90	88	92		
Innovation	101	122	94	103	129	109	48.6	49.0	47.5	46.6	47.6	47.2	5.8	2.5	4.2	12.4	12.0	12.4	12.2	13.3	12.6	98	99	89	97	91	91	92		
Pinnacle*	--	--	100	100	116	105	--	--	48.6	47.0	48.0	47.9	6.8	4.8	5.8	--	--	11.3	11.2	12.7	11.7	--	--	94	98	94	95	95		
ND Genesis*	--	--	86	73	104	88	--	--	47.0	45.9	47.0	46.6	7.3	4.8	6.1	--	--	10.6	11.3	11.5	11.1	--	--	94	98	92	95	95		
AAC Synergy*	--	--	--	--	105	--	--	--	--	--	47.3	--	--	5.8	--	--	--	--	--	13.3	--	--	--	--	--	87	--	--		
Quest	100	108	93	88	--	--	48.3	46.3	46.5	45.2	--	--	6.0	--	--	12.3	11.3	12.1	11.7	--	--	96	94	83	93	--	--	--		
Celebration	105	117	--	--	--	--	49.0	48.2	--	--	--	--	--	--	--	13.6	12.2	--	--	--	--	99	99	--	--	--	--	--		
Stellar-ND	104	117	--	--	--	--	49.2	46.9	--	--	--	--	--	--	--	12.1	11.7	--	--	--	--	99	98	--	--	--	--	--		
LSD 5%	NS	NS	6.8	10.8	NS	NS	0.6	0.7	1.1	0.8	NS	NS	NS	NS	NS	0.6	NS	0.5	NS	0.8	0.8	0.5	0.8	5.3	1.5	NS	NS	NS		
LSD 10%	NS	NS	5.6	8.9	16.3	NS	0.5	0.5	0.9	0.7	NS	NS	NS	NS	NS	0.5	NS	0.4	NS	0.7	0.7	0.4	0.7	4.3	1.3	4.1	NS	NS		

*2-row

Barley trials are conducted in Pembina County in odd numbered years and Walsh County in even numbered years. 2014 and 2016 data is from Walsh County.

Barley Summary, Towner County 2012-2017																														
Variety	Yield (bu/a)						Test Weight (lbs/bu)						Lodging (0-9)						Protein (%)						Plump (%)					
	12	14	15	16	17	3yr	12	14	15	16	17	3yr	15	16	2yr	12	14	15	16	17	3yr	12	14	15	16	17	3yr			
Lacey	83	117	108	122	127	119	46.4	48.7	48.3	46.6	47.2	47.4	3.8	4.0	3.9	14.2	14.8	13.6	13.8	11.5	13.0	72	88	90	88	80	86			
Tradition	68	117	104	111	113	109	45.5	47.6	48.3	45.0	47.0	46.8	2.5	3.5	3.0	14.4	14.4	13.6	14.1	11.8	13.2	76	85	90	81	81	84			
Innovation	76	130	105	117	121	114	45.6	48.5	47.8	44.7	47.0	46.5	4.0	4.8	4.4	14.3	14.8	13.7	13.8	11.6	13.0	71	92	91	82	84	86			
Pinnacle*	--	--	109	102	104	105	--	--	48.4	46.5	49.4	48.1	3.8	4.0	3.9	--	--	11.9	13.4	11.6	12.3	--	--	93	93	95	94			
ND Genesis*	--	--	105	93	111	103	--	--	46.8	46.0	47.9	46.9	3.5	5.0	4.3	--	--	10.8	11.9	9.6	10.8	--	--	93	94	94	94			
AAC Synergy*	--	--	--	--	117	--	--	--	--	--	47.2	--	--	--	--	--	--	--	--	11.0	--	--	--	--	--	89	--			
Quest	78	130	104	99	--	--	45.3	47.8	47.4	44.2	--	--	3.3	6.0	4.7	13.6	15.3	13.7	14.1	--	--	66	86	87	84	--	--			
Celebration	73	114	--	--	--	--	44.6	47.4	--	--	--	--	--	--	--	14.1	15.8	--	--	--	--	77	86	--	--	--	--			
Stellar-ND	75	118	--	--	--	--	45.1	48.1	--	--	--	--	--	--	--	13.1	14.2	--	--	--	--	78	93	--	--	--	--			
LSD 5%	10.0	NS	NS	6.6	NS	NS	NS	NS	NS	1.2	NS	NS	NS	1.6	NS	NS	0.8	0.6	0.5	0.6	0.6	8.3	4.4	NS	6.0	8.7	NS			
LSD 10%	7.3	NS	NS	5.4	NS	NS	NS	NS	1.0	1.0	NS	NS	NS	1.3	NS	NS	0.6	0.5	0.4	0.5	0.5	6.0	3.6	NS	5.0	6.8	NS			

*2-row

Oat Summary, Langdon 2013-2017																	
Variety	Height (in)						Protein (%)						Lodging (0-9)				
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	12	15	16	17	3yr
AC Pinnacle	42	44	48	44	51	48	14.0	10.6	8.1	7.9	8.5	8.2	2.0	1.5	5.5	6.7	4.6
Beach	43	47	51	47	53	50	16.0	10.4	10.6	9.5	10.1	10.1	0.0	0.4	4.0	3.4	2.6
CDC Dancer	42	45	48	44	52	48	14.5	8.6	8.1	7.9	7.9	8.0	0.0	1.3	5.7	5.0	4.0
HiFi	42	44	47	43	52	47	15.6	9.7	9.5	8.6	10.2	9.4	1.7	2.6	5.5	3.4	3.8
Hyttest	44	45	50	45	51	49	18.9	10.3	13.2	11.4	12.8	12.5	3.4	4.7	7.2	4.3	5.4
Killdeer	37	39	44	40	46	43	14.6	11.2	9.3	8.2	9.3	8.9	2.0	2.6	5.5	5.2	4.4
Otana	44	46	50	42	51	48	14.3	16.0	9.7	8.4	9.7	9.3	5.9	4.1	6.7	6.1	5.6
Rockford	42	44	48	44	52	48	16.4	11.4	10.2	9.4	10.6	10.1	0.2	2.0	4.7	5.4	4.0
Souris	39	40	45	43	47	45	15.2	10.1	8.6	8.0	9.3	8.6	0.0	0.9	3.0	2.6	2.2
Stallion	44	45	48	43	52	48	17.4	8.4	12.6	10.1	10.9	11.2	5.9	1.7	8.0	5.1	4.9
CDC Minstrel	39	42	45	43	50	46	12.9	9.5	7.0	7.3	7.4	7.2	0.4	0.3	3.7	3.4	2.5
Newburg	45	48	50	47	55	51	14.7	9.5	9.1	7.7	9.3	8.7	2.6	3.2	7.5	6.3	5.7
Leggett	41	41	48	46	49	48	16.8	8.7	11.7	10.0	11.7	11.1	0.5	3.0	4.3	5.4	4.2
Jury	47	49	51	45	55	50	15.5	9.2	9.9	8.0	9.9	9.3	4.2	2.3	6.5	5.3	4.7
Paul*	--	46	49	43	55	49	--	8.5	15.1	13.4	13.8	14.1	--	1.0	6.0	5.0	4.0
Deon	--	46	48	42	52	47	--	10.2	11.8	8.7	10.0	10.2	--	0.6	4.3	3.6	2.8
Hayden	--	--	--	44	52	--	--	--	--	8.3	10.5	--	--	--	6.0	4.3	--
CS Camden	--	--	--	40	49	--	--	--	--	8.9	9.5	--	--	--	2.5	0.5	--
GM 423	--	--	--	44	52	--	--	--	--	8.8	9.4	--	--	--	5.8	6.6	--
Furlong	42	46	47	45	--	--	17.8	10.6	9.9	9.1	--	--	1.2	0.9	3.2	--	--
Goliath	47	52	52	45	--	--	15.9	12.9	10.9	9.1	--	--	--	0.3	5.3	--	--
LSD 5%	1.9	2.1	2.2	3.8	1.9		--	--	--	--	--		2.6	2.1	2.5	2.3	
LSD 10%	1.6	1.8	1.8	3.2	1.6		--	--	--	--	--		2.2	1.8	2.1	2.0	

*Naked-hull variety

Oat Summary, Langdon 2013-2017

Variety	Yield (bu/a)						Test Weight (lbs/bu)						Days to Head					
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr
AC Pinnacle	235	180	177	151	191	173	40.2	38.9	36.9	34.9	37.6	36.5	58	58	66	63	62	64
Beach	204	138	174	146	201	174	40.9	42.3	40.8	37.0	41.2	39.7	56	55	63	61	60	61
CDC Dancer	229	175	176	132	192	167	39.9	38.5	39.4	36.3	39.5	38.4	56	56	64	61	61	62
HiFi	216	171	159	139	191	163	38.7	40.1	37.2	35.8	40.9	38.0	57	56	64	62	60	62
Hyttest	176	127	139	102	142	128	41.3	42.0	41.8	38.5	41.5	40.6	54	54	63	57	56	59
Killdeer	208	178	161	154	192	169	38.1	39.4	37.7	35.9	38.6	37.4	55	55	62	58	58	59
Otana	188	144	135	100	185	140	37.5	39.2	34.8	34.3	37.9	35.7	56	57	64	62	61	62
Rockford	211	152	149	125	192	155	39.5	41.3	38.4	36.8	42.5	39.2	58	56	64	63	60	62
Souris	202	184	138	136	189	154	38.7	40.7	36.6	34.8	39.9	37.1	57	55	64	61	60	62
Stallion	194	157	160	107	169	145	40.8	41.9	41.2	35.9	40.9	39.3	56	55	64	60	60	61
CDC Minstrel	232	178	160	145	219	175	37.7	39.5	34.9	33.2	37.7	35.3	57	55	64	59	59	61
Newburg	228	176	162	139	179	160	38.2	40.0	37.8	33.7	40.0	37.2	56	55	63	60	59	61
Leggett	221	165	190	157	194	180	38.8	40.9	39.3	37.1	40.7	39.0	57	55	64	61	60	62
Jury	225	166	151	128	176	152	39.7	41.1	38.7	34.9	41.0	38.2	56	56	63	60	60	61
Paul*	--	134	127	99	165	130	--	43.9	45.1	44.2	46.2	45.2	--	58	65	65	63	64
Deon	--	163	186	162	204	184	--	40.5	39.2	35.5	39.9	38.2	--	57	65	63	61	63
Hayden	--	--	--	134	195	--	--	--	--	38.3	43.2	--	--	--	--	59	59	--
CS Camden	--	--	--	174	229	--	--	--	--	34.1	37.5	--	--	--	--	61	61	--
GM 423	--	--	--	123	193	--	--	--	--	33.5	38.6	--	--	--	--	65	62	--
Furlong	218	186	157	152	--	--	38.5	38.8	38.7	37.0	--	--	59	58	64	65	--	--
Goliath	212	165	171	132	--	--	39.7	43.8	40.4	36.2	--	--	57	56	65	63	--	--
LSD 5%	14.3	15.5	16.9	23.8	17.2		1.3	1.9	1.1	1.5	1.3		1.2	0.9	1.0	1.3	0.9	
LSD 10%	12.0	13.0	14.2	19.9	14.4		1.1	1.6	0.9	1.3	1.1		1.0	0.8	0.9	1.1	0.8	

*Naked-hull variety

Flax Summary, Langdon 2013-2017

Variety	Yield (bu/a)						Test Weight (lbs/bu)						Lodging (0-9)						Height (in)						Days to Flower					
	13	14	15	16	17	3yr	13	14	15	16	17	3yr	16	17	2yr	13	14	15	16	17	3yr	13	14	15	16	17	3yr			
Carter*	38	40	36	40	48	41	53.4	52.1	53.0	52.1	53.0	52.7	0.5	0.0	0.3	19	25	26	27	27	27	50	49	46	50	57	51			
CDC Bethune	39	39	38	39	49	42	53.8	52.3	51.9	52.2	52.9	52.3	0.5	0.0	0.3	20	26	30	28	28	29	51	48	48	50	57	52			
CDC Glas	42	43	41	41	54	45	52.5	51.2	50.8	50.8	51.1	50.9	0.2	0.1	0.2	21	26	29	26	25	27	51	51	50	51	58	53			
CDC Sanctuary	42	38	41	33	54	43	53.3	51.5	50.7	51.0	49.7	50.5	1.7	1.2	1.5	21	25	28	25	26	26	51	52	49	50	58	52			
CDC Sorrel	38	38	40	34	49	41	53.0	51.8	52.3	51.2	51.9	51.8	2.0	1.1	1.6	22	27	31	26	29	29	52	52	48	51	58	52			
Nekoma	38	38	37	38	52	43	53.7	52.3	52.6	52.1	52.9	52.5	0.6	0.2	0.4	20	26	30	27	28	28	50	48	47	49	57	51			
Omega*	39	36	36	33	46	38	53.7	52.4	53.1	52.2	52.5	52.6	1.0	0.4	0.7	20	25	26	24	26	25	51	50	47	51	57	52			
Pembina	38	38	37	38	52	42	53.3	52.0	52.8	51.2	53.0	52.3	0.3	0.2	0.3	21	26	29	27	27	28	50	51	49	50	57	52			
Prairie Blue	34	40	38	40	51	43	53.2	51.7	51.7	51.4	52.0	51.7	0.4	0.0	0.2	19	25	28	25	26	26	51	49	49	50	57	52			
Prairie Grande	31	35	37	42	50	43	53.3	51.4	51.0	51.6	52.3	51.6	0.8	0.0	0.4	18	22	27	25	27	26	51	47	46	49	55	50			
Prairie Sapphire	47	38	38	35	54	42	52.7	51.0	51.4	50.8	51.3	51.2	2.1	0.0	1.1	22	26	26	28	28	27	51	51	46	51	57	51			
Prairie Thunder	45	42	37	39	53	43	53.9	52.0	51.5	52.2	52.2	52.0	0.4	0.1	0.3	22	27	30	28	29	29	50	50	49	51	57	52			
Rahab 94	32	40	38	40	51	43	53.0	51.5	50.2	51.5	49.7	50.5	0.4	0.0	0.2	20	24	27	26	27	27	50	48	48	49	56	51			
Shape	45	38	40	44	53	45	53.0	51.3	51.4	51.4	52.3	51.7	0.0	0.0	0.0	22	25	27	28	27	27	50	49	45	50	56	50			
Webster	45	39	35	40	52	42	54.0	52.1	52.2	52.6	52.0	52.3	0.8	0.6	0.7	21	27	30	28	28	29	51	50	49	50	57	52			
York	39	38	35	41	50	42	53.6	52.0	52.4	51.7	52.2	52.1	0.3	0.0	0.2	19	25	30	26	27	28	50	48	49	49	56	51			
Bison	--	39	37	37	49	41	--	52.2	52.0	52.2	52.3	52.2	0.3	0.1	0.2	--	26	29	28	28	28	--	48	46	50	57	51			
Gold ND*	--	37	36	38	52	42	--	52.2	52.3	52.1	52.2	52.2	0.7	0.1	0.4	--	27	30	26	28	28	--	50	50	52	57	53			
CDC Neela	--	39	39	37	46	41	--	51.9	51.9	51.4	52.4	51.9	1.6	0.0	0.8	--	25	28	26	26	27	--	52	48	50	57	52			
CDC Plava	--	--	--	31	46	--	--	--	--	51.4	50.7	--	4.0	0.0	2.0	--	--	--	25	24	--	--	--	--	49	56	--			
CDC Arras	40	40	37	--	--	--	53.6	51.8	51.9	--	--	--	--	--	--	21	26	30	--	--	--	51	49	47	--	--	--			
Hanley	41	37	37	--	--	--	53.7	52.0	52.2	--	--	--	--	--	--	20	25	30	--	--	--	51	48	48	--	--	--			
Lightning	40	38	35	--	--	--	53.6	52.3	52.1	--	--	--	--	--	--	20	27	28	--	--	--	51	48	48	--	--	--			
Linott	39	39	35	--	--	--	53.5	52.2	51.9	--	--	--	--	--	--	21	25	30	--	--	--	51	49	48	--	--	--			
McGregor	37	40	39	--	--	--	53.4	51.7	51.8	--	--	--	--	--	--	21	25	29	--	--	--	51	49	48	--	--	--			
Neche	40	38	37	--	--	--	53.8	52.2	52.5	--	--	--	--	--	--	21	27	30	--	--	--	51	48	47	--	--	--			
LSD 5%	6.0	NS	3.0	4.0	4.7		0.4	0.4	0.7	0.6	1.3		1.5	1.1		1.8	1.5	1.9	2.4	1.9		1.2	1.5	0.7	1.2	0.7				
LSD 10%	5.0	NS	2.5	3.3	3.9		0.3	0.3	0.6	0.5	1.1		1.2	0.9		1.5	1.3	1.6	2.0	1.6		1.0	1.3	0.6	1.0	0.6				

*Yellow seeded.

Canola - Liberty Link, Clearfield and Sulfonylurea Varieties, Langdon 2016-2017

Company/Brand	Variety	Type ¹	Blackleg Rating ²		Status ³	Clubroot Resistant	Days to First Flower		Days to End Flower		Days to Mature		% Cover ⁴																				
			R	R			16	17	16	17	16	17	16	17	16	17	16	17	16	17	16	17	16	17	16	17	16	17	16	17	16	17	16
Bayer CropScience	InVigor L252	H,LL,TR	R	R	CA	No	47	49	48	67	68	95	98	97	76	88	82																
Bayer CropScience	InVigor L140P	H,LL,TR	R	R	CA	No	44	48	46	66	67	91	97	94	91	85	88																
Bayer CropScience	InVigor 241C	H,LL,TR	R	R	CA	Yes	44	49	47	67	69	93	98	96	94	86	90																
Bayer CropScience	InVigor L230	H,LL,TR	R	R	CA	No	43	46	45	64	63	91	96	94	95	88	92																
Bayer CropScience	InVigor L233P	H,LL,TR	R	R	CA	No	44	47	46	65	64	92	95	94	93	86	90																
Bayer CropScience	InVigor L255P	H,LL,TR	R	R	CA	Yes	--	53	--	--	71	--	102	--	--	75	--																
Canterra	CS2200CL	H,CL,TR	R	R	CA	No	46	49	48	69	70	94	98	96	78	82	80																
Cibus	C5507	H,SU,TR	R	R	CA	No	45	50	48	66	70	93	101	97	79	92	86																
Cibus	C5522	H,SU,TR	R	R	CA	No	44	49	47	67	71	93	101	97	86	94	90																
Cibus	C5513	H,SU,TR	R	R	CA	No	46	52	49	68	71	94	102	98	83	73	78																
Dyna-Gro	DG200CL	H,CL,TR	R	R	CA	No	47	48	48	69	68	96	97	97	89	96	93																
Mycogen Seeds	Nexera 2020 CL	H,CL,HO	R	R	CA	Yes	50	51	51	70	69	97	100	99	43	75	59																
Mycogen Seeds	2022CL	H,CL,HO	R	R	CA	No	45	50	48	69	69	95	100	98	60	76	68																
Mycogen Seeds	2024 CL	H,CL,HO	R	R	CA	No	--	49	--	--	69	--	99	--	--	82	--																
Mycogen Seeds	CL6665383H	H,CL,HO	R	R	EXP	No	--	50	--	--	68	--	100	--	--	83	--																
Victory/Cargill	V32-1CL	H,CL,HO	R	R	CA	No	--	47	--	--	64	--	95	--	--	90	--																
Croplan ⁵	HyCLASS 955	H,RR,TR	R	R	CA	Yes	42	46	44	62	63	89	95	92	86	78	82																
Dekalb ⁵	71-14BL	H,RR,TR	R	R	CA	No	--	46	--	--	65	--	97	--	--	79	--																
LSD 5%							1.5	1.2		1.7	1.7	1.5	1.8		12.4	13.5																	
LSD 10%							1.3	1.0		1.4	1.4	1.2	1.5		10.3	11.3																	

¹H-Hybrid, LL-Liberty Link, CL-Clearfield System, SU-Sulfonylurea, TR-Traditional Oil Type, HO-High Oleic Oil Type.

²Blackleg Rating: MR-Moderately Resistant, R-Resistant. Rating provided by company.

³Status: CA-Commercially available, EXP-Experimental.

⁴% Cover-Visual rating of percent area of plot covered by plant growth. This is a measure of stand and vigor. Plants were at 5-6 leaf stage.

⁵Roundup Ready check variety.

Canola - Liberty Link, Clearfield and Sulfonylurea Varieties, Langdon 2015-2017

Company/Brand	Variety	Lodging												Yield ¹ (lbs/a)																																																																																																																																																																																																																																																																																																																					
		Height (in)						Lodging (0-9)						Oil ¹ (%)			2015			2016			2017			2018			2019																																																																																																																																																																																																																																																																																																						
		16	17	2yr	16	17	2yr	16	17	2yr	16	17	2yr	16	17	2yr	16	17	2yr	16	17	2yr	16	17	2yr	16	17	2yr	16	17	2yr																																																																																																																																																																																																																																																																																																				
Bayer CropScience	InVigor L252	46	46	46	4.8	0.0	2.4	48.2	53.3	50.8	3393	2792	4047	3420	3411	Bayer CropScience	InVigor L140P	46	47	47	5.3	1.8	3.6	46.2	49.5	47.9	3540	2672	4032	3352	3415	Bayer CropScience	InVigor 241C	47	47	47	4.0	0.0	2.0	44.4	49.8	47.1	3303	2591	3815	3203	3236	Bayer CropScience	InVigor L230	44	45	45	4.5	0.0	2.3	45.7	52.3	49.0	--	2779	3559	3169	--	Bayer CropScience	InVigor L233P	46	47	47	2.5	1.0	1.8	48.0	50.9	49.5	--	2866	3770	3318	--	Bayer CropScience	InVigor L255P	--	51	--	--	0.0	--	--	53.5	--	--	--	--	3807	--	--	--	Canterra	CS2200CL	47	48	48	5.0	0.8	2.9	46.5	51.9	49.2	--	2603	3694	3149	--	Cibus	C5507	46	48	47	5.3	1.3	3.3	45.9	49.2	47.6	--	2334	3363	2849	--	Cibus	C5522	44	48	46	5.3	0.8	3.1	46.0	49.5	47.8	--	2250	3478	2864	--	Cibus	C5513	46	50	48	4.3	1.0	2.7	46.5	50.5	48.5	--	2291	2655	2473	--	Dyna-Gro	DG200CL	51	47	49	5.3	0.3	2.8	44.6	51.1	47.9	--	2798	4008	3403	--	Mycogen Seeds	Nexera 2020 CL	41	45	43	5.5	0.0	2.8	46.5	52.6	49.6	2894	1723	3497	2610	2705	Mycogen Seeds	2022CL	42	42	42	4.8	0.0	2.4	46.0	52.0	49.0	--	2003	3242	2623	--	Mycogen Seeds	2024 CL	--	44	--	--	0.5	--	--	51.3	--	--	--	3367	--	--	--	Mycogen Seeds	CL6665383H	--	48	--	--	0.0	--	--	53.2	--	--	--	3781	--	--	--	Victory/Cargill	V32-1CL	--	44	--	--	0.5	--	--	48.8	--	--	--	3602	--	--	--	Croplan ²	HyCLASS 955	45	37	41	5.0	1.0	3.0	52.9	55.0	54.0	3433	2640	3547	3094	3207	Dekalb ²	71-14BL	--	42	--	--	0.5	--	--	54.7	--	--	--	3499	--	--	--	LSD 5%		4.9	5.5		1.1	NS		1.6	1.6		311	351	479		LSD 10%		4.1	4.6		0.9	NS		1.3	1.3		259	294	400	
LSD 5%		4.9	5.5		1.1	NS		1.6	1.6		311	351	479		LSD 10%		4.1	4.6		0.9	NS		1.3	1.3		259	294	400																																																																																																																																																																																																																																																																																																							

¹8.5% moisture

²Roundup Ready check variety.

Canola - Roundup Ready, Langdon 2016-2017

Blackleg Clubroot

Company	Variety	Type ¹	Blackleg Rating ²	Status ³	Resistant	Days to First Flower		Days to End Flower		Days to Mature		% Cover ⁴					
						16	17	2yr	16	17	2yr	16	17	2yr			
BrettYoung	6074RR	H,TR	R	CA	No	45	48	47	67	70	69	95	99	97	92	75	84
BrettYoung	6080RR	H,TR	R	CA	No	44	47	46	67	65	66	92	96	94	94	70	82
BrettYoung	6076CR	H,TR	R	CA	Yes	47	48	48	68	69	69	95	99	97	75	71	73
BrettYoung	6086CR	H,TR	R	CA	Yes	46	48	47	67	67	67	95	99	97	77	70	74
BrettYoung	BY17-6185	H,TR	R	EXP	Yes	--	50	--	--	69	--	--	99	--	--	63	--
BrettYoung	BY17-6189	H,TR	R	EXP	Yes	--	51	--	--	71	--	--	102	--	--	66	--
BrettYoung	4187RR	H,TR	R	CA	Yes	--	52	--	--	71	--	--	102	--	--	74	--
BrettYoung	4157RR	H,TR	R	CA	Yes	--	52	--	--	71	--	--	101	--	--	78	--
Canterra	CS2000	H,TR	R	CA	Yes	48	48	48	67	66	67	96	96	96	69	74	72
Canterra	CS2100	H,TR	R	CA	No	44	46	45	67	66	67	92	97	95	77	77	77
Canterra	CS2300	H,TR	R	CA	No	--	49	--	--	71	--	--	101	--	--	74	--
Cargill	Victory V12-3	H,HO	R	CA	Yes	46	49	48	67	68	68	94	100	97	95	73	84
Cargill	15RH1142	H,TR	R	EXP	Yes	--	49	--	--	70	--	--	100	--	--	76	--
Cargill	15RH1167	H,TR	R	EXP	Yes	--	50	--	--	70	--	--	100	--	--	78	--
Cargill	Victory V14-1	H,HO	R	CA	Yes	--	51	--	--	70	--	--	101	--	--	77	--
Croplan	HyCLASS 930	H,TR	R	CA	No	42	45	44	62	64	63	90	96	93	84	63	74
Croplan	HyCLASS 955	H,TR	R	CA	Yes	42	46	44	64	64	64	90	96	93	81	67	74
Croplan	HyCLASS 970	H,TR	R	CA	No	44	48	46	66	68	67	92	97	95	77	64	71
Dekalb	DKL70-10RR	H,TR	R	CA	No	44	47	46	65	67	66	90	96	93	80	72	76
Dekalb	DKL71-14BL	H,TR	R	CA	No	42	45	44	64	65	65	91	95	93	90	70	80
Dekalb	DKL35-23	H,TR	MR	CA	No	--	46	--	--	66	--	--	95	--	--	70	--
Dyna-Gro	DG533G	H,TR	R	CA	No	44	48	46	67	70	69	93	98	96	80	73	77
Dyna-Gro	DG540G	H,TR	R	EXP	No	--	49	--	--	70	--	--	100	--	--	74	--
Integra	7150RR	H,TR	R	CA	No	43	45	44	64	63	64	92	96	94	72	71	72
Integra	7257RR	H,TR	R	CA	No	44	47	46	65	66	66	90	96	93	69	79	74
Monsanto	G15P9374	H,TR	R	EXP	Yes	--	49	--	--	68	--	--	96	--	--	70	--
Mycogen	Nexera 1022 RR	H,HO	R	CA	No	48	52	50	68	71	70	95	102	99	65	71	68
Mycogen	1024 RR	H,HO	R	CA	Yes	--	52	--	--	71	--	--	102	--	--	66	--
Mycogen	G6667223H	H,HO	R	EXP	Yes	--	50	--	--	70	--	--	100	--	--	76	--
Pioneer	45CS40	H,TR	R	CA	Yes	45	48	47	66	69	68	92	99	96	88	65	77
Pioneer	45M35	H,TR	R	CA	No	--	48	--	--	68	--	--	97	--	--	86	--
Pioneer	45CM36	H,TR	R	CA	Yes	--	47	--	--	68	--	--	99	--	--	74	--
Proseed	300 Mag	H,TR	R	CA	No	44	47	46	66	68	67	91	99	95	77	68	73
Proseed	PS 5000	H,TR	R	CA	Yes	46	46	46	68	64	66	93	96	95	82	74	78
Star	Star 402	H,TR	R	CA	No	43	45	44	65	64	65	91	98	95	69	69	69
LSD 5%						1.4	1.2	1.3	1.8	1.8	1.8	1.6	1.5	1.6	13.8	NS	NS
LSD 10%						1.2	1.0	1.1	1.5	1.5	1.5	1.3	1.2	1.3	11.6	NS	NS

¹ H-Hybrid, TR-Traditional Oil Type, HO-High Oleic Oil Type.

² Blackleg Rating: S-Susceptible, MS-Moderately Susceptible, MR-Moderately Resistant, R-Resistant. Rating provided by company.

³ Status: CA-Commercially available, EXP-Experimental.

⁴ % Cover-Visual rating of percent area of plot covered by plant growth. This is a measure of stand and vigor. Plants were at 5-6 leaf stage.

Canola - Roundup Ready, Langdon 2015-2017

Lodging

Company	Variety	Height (in)			Lodging (0-9)			Oil ¹ (%)			Yield ¹ (lbs/a)				
		16	17	2yr	16	17	2yr	16	17	2yr	15	16	17	2yr	3yr
BrettYoung	6074RR	45	48	47	3.7	0.0	1.9	46.1	50.4	48.3	3721	2679	3949	3314	3450
BrettYoung	6080RR	45	45	45	4.1	0.2	2.2	46.9	49.4	48.2	--	2791	3404	3098	--
BrettYoung	6076CR	49	52	51	4.9	0.3	2.6	45.2	49.6	47.4	--	2727	3919	3323	--
BrettYoung	6086CR	44	46	45	5.7	1.8	3.8	48.2	49.2	48.7	--	2687	3897	3292	--
BrettYoung	BY17-6185	--	55	--	--	0.7	--	--	49.2	--	--	--	3590	--	--
BrettYoung	BY17-6189	--	51	--	--	0.0	--	--	50.3	--	--	--	3802	--	--
BrettYoung	4187RR	--	54	--	--	0.0	--	--	49.8	--	--	--	4257	--	--
BrettYoung	4157RR	--	55	--	--	0.0	--	--	49.3	--	--	--	4034	--	--
Canterra	CS2000	48	48	48	4.8	1.6	3.2	46.4	49.1	47.8	--	2529	3788	3159	--
Canterra	CS2100	44	45	45	5.2	0.8	3.0	49.3	50.5	49.9	--	2752	3959	3356	--
Canterra	CS2300	--	53	--	--	0.0	--	--	49.9	--	--	--	4430	--	--
Cargill	Victory V12-3	46	48	47	4.7	1.3	3.0	47.1	48.9	48.0	--	2865	3824	3345	--
Cargill	15RH1142	--	49	--	--	0.0	--	--	49.2	--	--	--	3996	--	--
Cargill	15RH1167	--	50	--	--	0.0	--	--	48.9	--	--	--	3944	--	--
Cargill	Victory V14-1	--	52	--	--	0.0	--	--	49.0	--	--	--	3979	--	--
Croplan	HyCLASS 930	39	41	40	5.8	1.3	3.6	52.0	52.2	52.1	3601	2910	3676	3293	3396
Croplan	HyCLASS 955	38	41	40	5.5	1.7	3.6	51.9	51.8	51.9	3848	2717	3575	3146	3380
Croplan	HyCLASS 970	44	47	46	4.5	0.3	2.4	49.2	51.3	50.3	3471	2938	3643	3291	3351
Dekalb	DKL70-10RR	41	45	43	5.0	0.7	2.9	49.2	49.2	49.2	3759	2917	3853	3385	3510
Dekalb	DKL71-14BL	41	42	42	5.2	1.2	3.2	50.6	51.2	50.9	--	3156	3656	3406	--
Dekalb	DKL35-23	--	48	--	--	1.7	--	--	49.8	--	--	--	3356	--	--
Dyna-Gro	DG533G	44	48	46	2.9	0.0	1.5	47.8	49.3	48.6	--	2579	3951	3265	--
Dyna-Gro	DG540G	--	46	--	--	0.5	--	--	49.5	--	--	--	4165	--	--
Integra	7150RR	41	42	42	5.7	1.4	3.6	50.7	52.4	51.6	3781	2653	3580	3117	3338
Integra	7257RR	39	49	44	5.6	0.8	3.2	49.8	50.9	50.4	--	2711	4144	3428	--
Monsanto	G15P9374	--	44	--	--	1.1	--	--	49.1	--	--	--	4198	--	--
Mycogen	Nexera 1022 RR	46	49	48	3.0	0.0	1.5	46.4	49.2	47.8	3174	2254	3899	3077	3109
Mycogen	1024 RR	--	53	--	--	0.0	--	--	49.5	--	--	--	3391	--	--
Mycogen	G6667223H	--	51	--	--	0.0	--	--	51.6	--	--	--	3823	--	--
Pioneer	45CS40	44	47	46	4.6	0.8	2.7	47.9	49.7	48.8	--	2735	3510	3123	--
Pioneer	45M35	--	49	--	--	0.5	--	--	51.9	--	--	--	4583	--	--
Pioneer	45CM36	--	45	--	--	0.3	--	--	52.0	--	--	--	4303	--	--
Proseed	300 Mag	42	47	45	4.8	1.4	3.1	48.9	50.0	49.5	3618	2549	4119	3334	3429
Proseed	PS 5000	46	46	46	4.9	2.0	3.5	46.1	48.9	47.5	3747	2518	3725	3122	3330
Star	Star 402	41	45	43	4.9	0.3	2.6	52.9	53.2	53.1	3749	2649	4155	3402	3518
LSD 5%		3.8	1.1		1.1	1.1		1.8	1.2		367	367	512		
LSD 10%		3.2	0.9		0.9	0.9		1.5	1.0		308	307	428		

¹ 8.5% Moisture

Carinata, Langdon 2017

Variety	Days to 1st Flower	Days to End Flower	Flower Duration (days)	Days to Mature	Height (in)	Lodging (0-9)	Oil (%)	Yield (lbs/a)
A120	47	64	17	98	54	1.3	48.1	3274
DH-40.008**	52	68	16	101	56	3.0	49.1	3264
DH-56.149**	52	68	16	100	54	4.5	43.6	2932
DH-69.485**	49	68	19	100	53	2.8	46.8	3199
DH-146.872**	50	67	18	101	49	3.8	52.4	2939
L140P*	43	60	17	94	51	1.0	49.4	3632
Mean	49	66	17	99	53	2.7	48.2	3207
C.V. %	0.8	1.4	4.7	0.7	6.9	62.6	3.5	8.5
LSD 5%	0.6	1.4	1.2	1.1	NS	NS	2.5	412
LSD 10%	0.5	1.1	1.0	0.9	NS	2.1	2.1	339

*Liberty Link canola check

**Experimental lines

Dry Bean Summary, Langdon 2014-2017¹							
Variety	Type	100 Seed Weight	Yield				
			2014	2015	2017	2 yr Avg.	3 yr Avg.
		(g)	------(lb/a)-----				
LaPaz	Pinto	33.5	2900	2151	3730	2940	2927
Lariat	Pinto	35.1	2445	2133	3874	3003	2817
Stampede	Pinto	31.3	3020	1877	3144	2511	2680
Maverick	Pinto	35.0	2848	2090	3358	2724	2765
ND-307	Pinto	36.9	3113	2029	3372	2701	2838
Windbreaker	Pinto	37.5	2822	1930	3458	2694	2737
Palomino	Pinto	33.5	--	--	3138	--	--
Monterrey	Pinto	32.0	--	--	3902	--	--
SF103-8	Pinto	--	2297	2188	--	--	--
23ST27	Pinto	--	2524	2376	--	--	--
HMS Medalist	Navy	19.6	2286	1724	3118	2421	2376
Ensign	Navy	22.3	2703	2087	2061	2074	2284
T9905	Navy	22.3	2571	2168	3948	3058	2896
Vista	Navy	--	2513	2129	--	--	--
Rexeter	Navy	--	1995	1904	--	--	--
Nautica	Navy	--	1944	1660	--	--	--
Avalanche	Navy	--	2101	1923	--	--	--
Mist	Navy	--	--	1606	--	--	--
Bolt	Navy	--	--	1857	--	--	--
Fathom	Navy	--	--	1851	--	--	--
Eclipse	Black	18.4	2415	1932	3858	2895	2735
Loreto	Black	21.1	1944	1607	2391	1999	1981
Zorro	Black	20.6	2275	1933	2738	2336	2315
Merlot	Small Red	32.8	2180	1544	2353	1949	2026
Rio Rojo	Small Red	--	2656	1406	--	--	--
Rosetta	Pink	33.2	--	--	3490	--	--
Powderhorn	Great Northern	34.6	--	--	3327	--	--
Rosie	Light Red Kidney	--	1607	1823	--	--	--
Pink Panther ²	Light Red Kidney	--	1849	1532	--	--	--
Inferno	Light Red Kidney	--	--	1927	--	--	--
Talon	Dark Red Kidney	--	1754	1681	--	--	--
Montcalm	Dark Red Kidney	--	1672	1529	--	--	--
Dynasty	Dark Red Kidney	--	--	1670	--	--	--
Mean			2244	1874	3251		
C.V. %			9.3	10.4	8.2		
LSD 5%			470	320	445		
LSD 10%			388	266	370		

¹ The 2016 trial was abandoned due to excessive moisture.

² Pink Panther had some preharvest shatter in 2015.

Dry Bean Summary, Pembina County 2015-2017

Variety	Type	100 Seed Weight (g)	Yield				
			2015	2016	2017	2 yr Avg.	3 yr Avg.
			----- (lb/a) -----				
LaPaz	Pinto	31.0	2961	2710	2739	2725	2803
Lariat	Pinto	31.4	2725	2430	2471	2451	2542
Stampede	Pinto	28.6	2519	2505	1279	1892	2101
Maverick	Pinto	31.1	2185	2664	2241	2453	2363
Windbreaker	Pinto	32.0	3130	2325	2766	2546	2740
Palomino	Pinto	30.4	--	2590	2469	2530	--
Monterrey	Pinto	27.4	--	2901	2341	2621	--
ND-307	Pinto	28.7	2833	--	1931	--	--
SF103-8	Pinto	--	2555	--	--	--	--
23ST27	Pinto	--	2740	--	--	--	--
HMS Medalist	Navy	16.0	1452	1775	2423	2099	1883
Ensign	Navy	18.8	1964	2121	2381	2251	2155
T9905	Navy	20.5	2001	2450	3306	2878	2586
Vista	Navy	--	1950	2304	--	--	--
Nautica	Navy	--	2038	2072	--	--	--
Mist	Navy	--	1963	2161	--	--	--
Fathom	Navy	--	1945	2138	--	--	--
Avalanche	Navy	--	2345	--	--	--	--
Rexeter	Navy	--	2118	--	--	--	--
Bolt	Navy	--	2185	--	--	--	--
Eclipse	Black	17.6	2077	2229	2606	2418	2304
Loreto	Black	19.4	1841	1871	2558	2215	2090
Zorro	Black	20.3	1876	2451	3246	2849	2524
Merlot	Small Red	29.4	2106	1890	1905	1898	1967
Rio Rojo	Small Red	--	1771	--	--	--	--
Rosie	Light Red Kidney	--	2018	1827	--	--	--
Pink Panther*	Light Red Kidney	--	1655	1635	--	--	--
Inferno	Light Red Kidney	--	2101	2647	--	--	--
Rosetta	Pink	31.4	--	2223	3110	2667	--
Powderhorn	Great Northern	33.5	--	--	2403	--	--
Talon	Dark Red Kidney	--	1470	1582	--	--	--
Montcalm	Dark Red Kidney	--	1732	2016	--	--	--
Dynasty	Dark Red Kidney	--	1994	2188	--	--	--
Mean			2151	2228	2481		
C.V. %			14.0	10.7	16.6		
LSD 5%			496	394	685		
LSD 10%			413	328	570		

*Pink Panther had some preharvest shatter in 2015 and 2016.

White mold (sclerotinia) was present in the 2017 trial and affected the yield of some varieties.

Field Pea, Langdon 2015-2017

Variety	Days to 1st Flower	Vine Length (in)	Canopy		Height Index ¹ (%)	Harvest Ease ² (0-9)	1000 KWT (g)	Test Weight (lbs/bu)	Yield			Average year	
			Ht at Harvest (in)	Harvest					2015	2016	2017		
Yellow Cotyledon Type													
Agassiz	55	42	17		40	5.0	210	62.9	77.3	40.0	80.2	60.1	65.8
DS Admiral	55	45	18		39	5.5	233	63.3	81.1	50.1	78.9	64.5	70.0
Mystique	56	45	22		50	3.3	235	63.0	83.6	34.8	81.7	58.3	66.7
Nette	52	40	17		42	5.5	211	64.2	79.4	49.6	79.8	64.7	69.6
CDC Amarillo	59	49	28		58	2.5	226	63.9	82.4	38.8	87.5	63.2	69.6
CDC Saffron	57	42	20		51	5.3	247	64.1	78.6	43.8	75.0	59.4	65.8
AAC Carver	56	46	18		38	6.0	211	63.6	--	38.9	90.8	64.9	--
Earlystar	55	45	17		38	5.8	196	63.2	--	46.9	74.6	60.8	--
Jetset	55	40	15		39	6.8	211	62.0	--	56.9	73.5	65.2	--
Spider	57	47	18		39	7.0	247	63.3	--	42.8	79.5	61.2	--
CDC Inca	58	47	27		59	2.8	219	64.1	--	--	80.8	--	--
Bridger	--	--	--		--	--	--	--	76.5	46.8	--	--	--
Abarth	--	--	--		--	--	--	--	--	35.6	--	--	--
Hyline	--	--	--		--	--	--	--	--	36.2	--	--	--
Navarro	--	--	--		--	--	--	--	--	47.0	--	--	--
Salamanca	--	--	--		--	--	--	--	--	44.4	--	--	--
Green Cotyledon Type													
CDC Striker	55	41	11		28	8.5	207	63.1	83.2	42.7	85.4	64.1	70.4
Cruiser	54	40	16		42	5.8	186	62.9	70.4	28.6	70.5	49.6	56.5
Arcadia	55	37	11		31	8.0	204	62.9	--	44.3	81.0	62.7	--
AAC Comfort	63	48	21		45	4.5	250	61.7	--	--	74.8	--	--
CDC Greenwater	58	48	25		51	3.5	242	63.5	--	--	89.1	--	--
CDC Patrick	--	--	--		--	--	--	--	--	31.5	--	--	--
CDC Raezer	--	--	--		--	--	--	--	--	47.8	--	--	--
Mean	56	44	19		43	5.3	221	63.2	78.8	42.4	80.2		
C.V. %	1.5	7.6	30.8		34.9	35.7	3.3	1.2	4.9	11.5	6.9		
LSD 5%	1.2	4.7	8.2		NS	2.7	15.5	1.1	5.5	7.0	7.9		
LSD 10%	1.0	3.9	6.9		NS	2.3	12.7	0.9	4.6	5.8	6.6		

¹ Height Index: Plant height at time of harvest relative to plant height at the end of bloom.

² Harvest Ease: 1=plants standing erect, 9=plants laying horizontal.

Faba Bean, Langdon 2017

Variety	Emergence (DAP) ¹	Plant Stand (ft ²)	Days to Ist Flower (DAP) ¹	Days to End Flower (DAP) ¹	Days to Mature (DAP) ¹	Plant Height (in)	Pod Height 1st Pod (in)	1000 KWT (g)	Protein ² (%)	Test Weight (lbs/bu)	Chocolate Brown Spot		Seed Yield		
											Inc. (%)	Severity	Yield (bu/a)	2-yr Avg.	3-yr Avg.
Boxer	18.5	4.8	50.3	78.3	122.8	56.8	19.1	497	24.6	63.9	73	26	113.6	107.4	101.0
CDC Snowdrop	21.0	2.6	53.0	79.3	121.0	50.8	17.6	297	22.4	63.0	78	37	68.2	68.9	--
Fanfare	19.0	4.2	51.8	79.8	123.3	56.1	19.1	492	25.2	64.5	76	23	124.0	109.0	103.8
Laura	19.5	4.1	51.8	78.5	123.3	53.2	17.1	468	25.1	63.7	71	17	125.0	104.8	--
Tabasco	18.5	4.6	52.0	77.8	122.3	52.3	16.7	393	22.2	63.4	77	32	91.0	86.5	80.9
Tiffany	18.8	4.1	52.0	77.8	122.0	56.9	17.9	488	26.2	63.6	58	18	116.8	--	--
Trumpet	18.3	5.0	53.0	78.8	123.5	55.2	20.8	446	25.8	64.3	43	16	127.9	--	--
Vertigo	18.5	4.5	50.3	77.3	123.3	56.7	20.2	511	25.5	64.6	74	26	124.6	112.0	--
Trial Mean	18.9	4.2	51.9	78.5	122.8	55.7	18.8	455	24.8	64.0	69	24	110.4		
C.V. %	2.6	16.6	1.4	0.8	1.3	4.8	13	2.6	1.9	0.6	15	21	6.8		
LSD 5%	0.7	1.0	1.0	0.9	NS	3.9	NS	27	0.7	0.6	18	9	11.0		
LSD 10%	0.6	0.8	0.9	0.8	NS	3.3	NS	22	0.6	0.5	--	--	9.1		

¹ DAP - Days after planting

² Protein adjusted to 16% moisture.

Targeted plant stand was 4 plants/ft².

Conventional - Liberty Link Soybean, Langdon 2017

Brand	Variety	Maturity Group ¹	Maturity date ²	Plant Height (in)	Lodging (0-9)	Protein (%)	Oil (%)	Yield		
								2017	2 yr Avg.	2-site Avg. ³
								-----bu/a-----		
Conventional:										
NDSU	ND Henson	0.0	9/15	34	1.3	35.9	14.7	52.3	52.9	52.2
Richland	MK0249	0.2	9/24	35	6.0	34.9	13.8	45.2	41.7	45.4
Liberty Link:										
Integra	30008LL	00.8	9/14	35	0.3	35.3	13.9	64.5	--	61.9
NuTech	3022L	0.2	9/21	33	0.3	34.5	14.5	54.3	--	54.4
Thunder	5401 LL	0.1	9/18	40	2.5	33.7	14.8	66.5	64.6	62.9
Trial Mean			9/18	36	1.5	34.9	14.3	52.6		
C.V. %			7.9	5.5	65.8	1.7	2.6	7.4		
LSD 5%			2.0	2.8	1.4	1.2	0.8	5.5		
LSD 10%			1.6	2.3	1.2	1.0	0.6	4.6		

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of conventional traits at Langdon REC and Walsh County (Park River).

Yield, oil and protein reported at 13% moisture.

Conventional - Liberty Link Soybean, Walsh County 2017

Brand	Variety	Maturity Group ¹	Maturity date ²	Plant Height (in)	Lodging (0-9)	Protein (%)	Oil (%)	Yield		
								2017	2 yr Avg.	2-site Avg. ³
								-----bu/a-----		
Conventional:										
NDSU	ND Henson	0.0	9/15	30	0.3	31.2	16.9	52.0	58.3	52.2
Richland	MK0249	0.2	9/20	29	0.8	30.7	15.9	45.6	53.9	45.4
Liberty Link:										
Integra	30208NLL	0.2	9/12	34	0.0	32.4	15.8	59.3	--	61.9
NuTech	3022L	0.2	9/14	32	0.0	32.8	15.9	54.5	--	54.4
Stine	01LH22	0.1	9/12	30	0.0	32.3	15.9	51.1	56.6	--
Stine	02LC26	0.2	9/15	29	0.0	30.8	16.7	63.1	64.2	--
Stine	03LH26	0.3	9/20	34	1.8	32.0	16.5	52.0	--	--
Thunder	5401LL	0.1	9/13	29	0.0	32.4	16.0	59.3	64.4	62.9
Thunder	5803 LL	0.3	9/21	34	2.8	31.8	16.4	56.3	--	--
Trial Mean			9/15	32	0.5	31.8	16.2	53.4		
C.V. %			8.3	8.5	169.0	1.3	1.6	7.7		
LSD 5%			1.8	3.8	1.2	0.9	0.5	5.8		
LSD 10%			1.5	3.2	1.0	0.7	0.4	4.8		

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of conventional traits at Langdon REC and Walsh County (Park River).

Yield, oil and protein reported at 13% moisture.

Roundup Ready Soybean, Langdon 2017

Brand	Variety	Herb. Trait	Maturity Group ¹	Plant					Yield		
				Maturity	Height	Lodging	Protein	Oil	2017	2 yr Avg.	2-site Avg. ³
				date ²	(in)	(0-9)	(%)	(%)	-----bu/a-----		
Allegiant	005X17	RRXT	00.5	9/10	37	0.1	31.7	15.1	50.5	--	47.7
Allegiant	008X30N	RRXT	00.8	9/14	37	0.3	33.0	15.5	37.6	--	39.0
Allegiant	009X08	RRXT	00.9	9/24	39	1.0	33.4	14.5	51.1	--	50.7
Allegiant	01R80	RR2Y	0.1	9/11	40	0.1	33.9	15.5	55.8	--	50.3
Channel	00717R2X	RRXT	00.7	9/11	36	0.2	33.3	14.5	57.5	--	--
Channel	0218R2X	RRXT	0.2	9/15	42	1.1	33.6	14.9	55.5	--	--
Croplan	R200516	RR2Y	00.5	9/10	36	0.1	33.8	15.1	57.1	59.6	--
Croplan	RX00926	RRXT	00.9	9/12	41	0.4	33.3	14.0	58.5	--	--
Dahlman	56009NRR2Y	RR2Y	00.9	9/14	35	0.4	34.4	14.3	51.9	--	51.2
Dahlman	5601RR2Y	RR2Y	0.1	9/11	40	1.3	33.9	15.3	59.9	--	51.5
Dahlman	67009X	RRXT	00.9	9/12	38	0.5	34.4	13.8	52.5	--	48.6
Dahlman	68008XN	RRXT	00.8	9/12	39	1.2	33.1	15.2	53.6	--	47.5
Dyna-Gro	S005RY87	RR2Y	00.5	9/10	38	0.0	34.4	15.1	54.0	59.9	50.7
Dyna-Gro	S006RY97	RR2Y	00.6	9/11	34	0.0	33.6	14.9	55.2	--	54.5
Dyna-Gro	S007XT27	RRXT	00.7	9/11	37	0.0	33.0	14.4	64.0	66.3	60.4
Dyna-Gro	S009XT68	RRXT	00.9	9/12	40	0.5	34.3	13.7	58.6	--	58.2
Dyna-Gro	S005XT38	RRXT	00.5	9/10	36	0.5	32.5	14.8	56.3	--	54.6
Hefty	H005X8	RRXT	00.5	9/12	35	0.3	32.9	14.8	37.0	--	37.0
Hefty	H007X7	RRXT	00.7	9/11	35	0.0	33.3	14.9	53.8	57.3	50.1
Hefty	H008R6	RR2Y	00.8	9/14	35	0.0	34.8	14.2	52.6	55.3	51.5
Hefty	H009X7	RRXT	00.9	9/13	41	0.5	34.4	13.9	50.5	--	47.0
Hefty	H00R6	RR2Y	0.0	9/11	40	0.5	33.8	15.7	55.7	59.8	50.8
Integra	20062	RR2Y	00.6	9/10	38	0.0	33.7	15.3	56.6	--	52.2
Integra	20087	RR2Y	00.8	9/13	32	0.0	35.0	14.1	61.8	67.3	60.7
Integra	20097	RR2Y	00.9	9/12	40	1.8	33.7	15.4	64.3	69.2	58.9
Integra	50069	RRXT	00.6	9/10	37	1.0	33.8	14.6	56.6	--	52.9
Integra	50098	RRXT	00.9	9/12	40	1.3	34.6	13.5	59.9	63.4	--
Legacy	LS-00738N RR2X	RRXT	00.7	9/10	35	0.0	34.3	14.2	61.1	--	57.8
Legacy	LS-00937 RR2X	RRXT	00.9	9/14	41	0.9	33.9	14.0	59.6	65.3	56.0
Legacy	LS-0135 RR2	RR2Y	00.9	9/12	41	1.7	34.3	15.2	65.0	68.1	57.9
Legacy	LS-0214 RR2	RR2Y	0.2	9/15	39	0.5	36.2	13.9	56.5	64.3	52.2
Legacy	LS-0237N RR2X	RRXT	0.2	9/15	41	1.7	34.1	14.4	58.3	65.2	54.3
Legacy	LS-00538 RR2X	RRXT	00.5	9/9	37	0.5	33.4	14.4	55.7	--	51.9
Legend	LS 005X853	RRXT	00.5	9/10	36	0.0	32.6	14.7	56.8	--	--
Legend	LS 007X756N	RRXT	00.7	9/11	37	0.0	34.6	14.4	57.9	--	--
Legend	LS 009X852N	RRXT	00.9	9/12	38	1.2	32.3	15.3	62.7	--	--
Mustang	00726	RR2Y	00.7	9/14	37	0.0	35.6	13.9	57.1	--	--
Mustang	02311	RR2Y	0.2	9/17	33	0.0	35.9	13.8	55.8	--	53.2
Mustang	02356	RR2Y	0.2	9/12	41	0.4	33.9	15.1	61.4	--	56.3

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of our northern region. Langdon REC and Pembina County (Cavalier).

Yield, oil and protein reported at 13% moisture.

Roundup Ready Soybean, Langdon 2017 (continued)

Brand	Variety	Herb. Trait	Maturity Group ¹	Plant					Yield		
				Maturity	Height	Lodging	Protein	Oil	2017	2 yr Avg.	2-site Avg. ³
				date ²	(in)	(0-9)	(%)	(%)	-----bu/a-----		
Mustang	00X698	RRXT	00.6	9/10	37	0.0	32.7	15.0	56.2	--	53.0
Mustang	00X828	RRXT	00.8	9/16	38	0.9	33.0	15.2	51.4	--	49.3
NDSU	ND17009GT	GT	00.9	9/11	38	2.0	36.5	14.7	52.6	--	51.5
NorthStar	NS 60053XR2	RRXT	00.5	9/9	37	0.5	32.7	14.6	57.2	--	54.1
NorthStar	NS0052R2	RR2Y	00.5	9/10	37	0.1	34.1	15.0	59.9	61.5	54.9
NorthStar	NS0072R2	RR2Y	00.7	9/17	35	0.0	35.1	14.3	53.5	60.3	51.7
NorthStar	NS60092XR2	RRXT	00.9	9/12	40	0.0	34.6	13.8	59.6	--	--
NuTech	6502	RR1	00.5	9/9	30	0.0	34.3	14.7	56.0	--	55.2
NuTech	6008R2	RR2Y	00.8	9/14	40	0.9	32.1	15.3	58.2	57.0	57.6
Peterson	16R008N	RR2Y	00.8	9/15	35	0.3	34.7	14.4	53.5	56.5	46.8
Peterson	16R01	RR2Y	0.1	9/11	38	1.6	34.6	15.2	56.3	63.1	50.3
Peterson	17X009	RRXT	00.9	9/13	41	0.9	34.2	14.1	53.2	61.8	48.4
Peterson	18X008N	RRXT	00.8	9/11	38	0.9	33.6	14.9	59.2	--	55.0
Pioneer	P005A27X	RRXT	00.5	9/8	30	0.1	35.0	13.9	53.7	--	--
Pioneer	P007A90R	RR2Y	00.7	9/8	36	0.0	34.0	14.7	59.3	--	--
Pioneer	P008T22R2	RR2Y	00.8	9/13	40	0.7	34.8	14.8	57.1	61.1	--
Prairie	PB-00856R2	RR2Y	00.9	9/16	36	0.5	35.2	14.4	46.8	53.7	46.7
Prairie	PB-00928R2	RR2Y	00.9	9/16	34	0.1	33.3	15.4	55.9	--	56.9
Prairie	PB-0146R2	RR2Y	0.1	9/13	40	0.8	33.6	15.6	56.5	63.3	50.1
Proseed	30-07	RR2Y	00.7	9/11	34	0.1	35.0	13.7	52.4	--	50.9
Proseed	40-07	RR2Y	00.7	9/9	40	0.4	33.5	13.5	54.4	58.1	54.1
Proseed	50-08N	RR2Y	00.8	9/18	36	0.4	34.9	14.2	60.8	61.7	59.3
Proseed	70-08 XN	RRXT	00.8	9/16	38	0.8	33.3	15.1	50.7	--	50.7
Proseed	XT 60-09	RRXT	00.9	9/12	41	0.5	34.9	13.6	56.5	63.3	55.4
REA	R00727	RR2Y	00.7	9/11	37	0.4	33.3	14.7	62.2	62.6	60.1
REA	RX00738	RRXT	00.7	9/14	39	1.2	33.7	13.9	53.2	--	52.4
REA	RX0228	RRXT	0.2	9/17	43	0.5	34.4	14.9	54.6	--	53.5
Syngenta/GH	GH00866	RR2Y	00.8	9/12	37	0.0	32.7	15.7	60.7	--	60.5
Syngenta/NK	S009-J1	RR2Y	00.9	9/11	31	0.0	34.5	15.2	61.5	--	64.3
Thunder	34006 R2Y	RR2Y	00.6	9/11	32	0.1	34.0	14.7	57.8	64.6	--
Thunder	SB88005	RR2Y	00.5	9/5	31	0.1	35.3	14.7	43.8	--	45.3
Thunder	37004 R2Y	RR2Y	00.4	9/11	37	0.3	34.6	14.8	55.6	--	55.0
Thunder	Astro	RR2Y	00.8	9/14	40	0.0	35.1	13.9	54.3	--	--
Thunder	SB87009	RRXT	00.9	9/16	42	0.4	34.2	13.9	53.5	--	52.0
Thunder	SB88007N	RRXT	00.7	9/12	41	1.2	33.8	14.8	56.9	--	57.5
Wensman	W10042RX	RRXT	00.4	9/11	37	0.1	32.3	15.1	54.8	--	51.3
Wensman	W10063NRX	RRXT	00.6	9/11	37	0.0	32.2	14.7	58.8	63.0	57.7
Wensman	W1011RX	RRXT	0.1	9/18	41	1.5	34.2	15.1	55.6	--	53.5
Wensman	W30085R2	RR2Y	00.8	9/17	38	0.6	34.4	14.7	57.6	59.6	57.1
Wensman	W3024R2	RR2Y	0.2	9/17	34	0.1	34.8	14.1	57.8	63.1	--
Trial Mean				9/12	37	0.5	34.0	14.6	55.7		
C.V. %				13.2	5.6	141.0	2.1	2.0	5.8		
LSD 5%				2.3	3.0	0.9	1.4	0.6	4.5		
LSD 10%				1.9	2.5	0.8	1.2	0.5	3.8		

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of our northern region. Langdon REC and Pembina County (Cavalier).

Yield, oil and protein reported at 13% moisture.

Roundup Ready Soybean, Nelson County 2017

Brand	Variety	Herb. Trait	Maturity Group ¹	Plant					Yield		
				Maturity	Lodging	Height	Protein	Oil	2017	2 yr Avg.	2-site Avg. ³
				date ²	(0-9)	(in)	(%)	(%)	----- bu/a -----		
Allegiant	01R80	RR2Y	0.1	9/5	1.4	37	33.7	15.9	70.3	--	58.9
Allegiant	02X03	RRXT	0.2	9/9	1.9	39	33.1	15.2	67.9	--	58.3
Allegiant	04X08N	RRXT	0.4	9/12	2.0	34	35.0	15.2	71.7	--	64.3
Channel	00717R2X	RRXT	00.7	9/5	1.3	33	33.8	14.6	70.6	--	61.7
Channel	0218R2X	RRXT	0.2	9/7	0.6	37	33.6	15.3	64.0	--	60.7
Dairyland	DSR-C918/R2Y	RR2Y	00.9	9/7	1.4	30	35.3	14.2	64.9	67.6	59.3
Dairyland	DST00-003/R2Y	RR2Y	0.0	9/7	1.5	32	32.8	15.5	70.0	--	68.4
Dairyland	DST-0225/R2Y	RR2Y	0.2	9/6	2.4	37	33.0	16.2	70.2	--	63.6
Dairyland	DSR-0305/R2Y	RR2Y	0.3	9/10	1.2	33	33.2	15.5	70.2	72.4	61.6
Dairyland	DSR-0404/R2Y	RR2Y	0.4	9/11	1.2	32	34.8	14.5	70.8	68.8	64.8
Dairyland	DSR-0418/R2Y	RR2Y	0.4	9/13	0.9	32	35.4	14.6	66.7	--	61.9
Dyna-Gro	S01RY86	RR2Y	0.1	9/4	1.3	37	32.9	16.3	70.7	71.8	61.9
Dyna-Gro	S03RY36	RR2Y	0.3	9/9	1.6	33	34.9	14.9	72.0	72.3	66.8
Dyna-Gro	S04XT77	RRXT	0.4	9/10	1.7	33	33.9	15.8	69.9	73.1	66.2
Hefty	H02R3	RR2Y	0.2	9/11	1.6	35	34.9	14.7	73.0	73.1	64.6
Hefty	H02X7	RRXT	0.2	9/10	2.7	40	33.1	15.2	68.8	70.3	59.0
Hefty	H03X7	RRXT	0.3	9/11	1.4	33	33.8	15.6	69.8	68.7	63.6
Hefty	H03X8	RRXT	0.3	9/12	1.6	38	32.3	15.3	67.2	--	57.8
Integra	20087	RR2Y	00.8	9/6	1.2	29	35.5	14.3	69.7	69.2	64.2
Integra	20097	RR2Y	00.9	9/5	2.8	37	33.3	15.9	71.5	70.7	62.4
Integra	20126	RR2Y	0.1	9/10	1.3	38	35.1	15.1	71.3	72.2	--
Integra	50069	RRXT	00.6	9/3	1.0	33	32.2	15.2	66.0	--	--
Legacy	LS-0135 RR2	RR2Y	00.9	9/6	2.4	39	33.4	16.3	73.1	71.5	64.5
Legacy	LS-0214 RR2	RR2Y	0.2	9/8	1.8	35	34.3	15.3	73.0	71.1	65.3
Legacy	LS-0237N RR2X	RRXT	0.2	9/12	2.0	37	34.0	14.8	71.8	72.7	63.6
Legacy	LS-0334 RR2	RR2Y	0.3	9/14	1.4	36	34.8	14.8	69.7	75.1	65.5
Legacy	LS 0337N RR2X	RRXT	0.3	9/11	1.4	32	35.2	14.7	72.9	71.3	67.0
Legacy	LS-0438N RR2X	RRXT	0.4	9/13	1.2	33	34.6	15.4	70.2	--	65.8
NDSU	ND17009GT	GT	00.9	9/5	1.7	37	35.8	15.4	60.1	--	54.0

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of our southern region. Walsh County (Park River) and Nelson County (Pekin).

Yield, oil and protein reported at 13% moisture.

Roundup Ready Soybean, Nelson County 2017 (continued)

Brand	Variety	Herb. Trait	Maturity Group ¹	Plant					Yield		
				Maturity date ²	Lodging (0-9)	Height (in)	Protein (%)	Oil (%)	2017	2 yr Avg.	2-site Avg. ³
									----- bu/a -----		
NorthStar	NS 0111R2	RR2Y	0.1	9/6	2.4	35	33.2	15.9	67.0	68.4	60.4
NorthStar	NS 60393NXR2	RRXT	0.3	9/12	0.5	36	32.3	15.2	66.2	--	--
NorthStar	NS 60442NXR2	RRXT	0.4	9/10	0.6	32	33.9	15.5	67.5	--	--
NorthStar	NS 60092XR2	RRXT	00.9	9/6	1.4	38	34.2	14.1	71.5	--	63.4
NuTech	6048	RR1	0.4	9/9	1.3	38	36.0	14.7	64.4	--	--
Peterson	16R01	RR2Y	0.1	9/5	2.0	39	34.6	15.1	73.4	72.6	61.5
Peterson	17X04N	RRXT	0.4	9/9	0.5	33	34.5	15.0	69.1	--	--
Prairie	PB-00928R2	RR2Y	00.9	9/8	0.8	32	33.4	15.6	69.7	--	64.5
Prairie	PB-0146R2	RR2Y	0.1	9/4	1.7	37	32.9	16.1	70.1	71.7	60.4
Prairie	PB-0397R2	RR2Y	0.3	9/11	1.4	34	34.3	14.9	68.6	68.8	62.8
Proseed	30-20	RR2Y	0.2	9/9	1.2	35	34.8	15.0	69.2	71.4	61.5
Proseed	20-30	RR2Y	0.3	9/12	1.0	33	35.0	14.4	68.3	--	--
Proseed	XT 604	RRXT	0.4	9/10	1.3	32	33.6	15.7	68.1	71.6	--
Proseed	50-60N	RR2Y	00.6	9/12	0.3	32	35.3	14.8	69.2	--	--
REA	RX0228	RRXT	0.2	9/8	1.4	39	33.6	15.3	66.7	--	61.0
REA	RX0327	RRXT	0.3	9/10	0.9	26	34.2	15.3	66.9	--	63.9
Stine	03RD66	RR2Y	0.3	9/12	0.5	33	34.9	14.5	71.1	--	--
Syngenta/GH	GH0391	RR2Y	0.3	9/12	1.9	32	33.6	15.1	70.5	--	62.7
Syngenta/NK	S03-S6X	RRXT	0.3	9/6	1.7	33	33.0	14.5	68.9	--	59.5
Thunder	SB88007N	RRXT	00.7	9/5	1.7	36	33.0	15.6	67.4	--	60.8
Thunder	36008 R2Y	RR2Y	00.8	9/9	1.4	33	34.1	15.0	65.2	59.0	59.3
Thunder	SB87009	RRXT	00.9	9/10	1.8	39	34.6	13.8	65.2	--	60.0
Thunder	3503 R2Y	RR2Y	0.3	9/11	1.4	32	35.2	14.8	69.5	72.7	62.1
Thunder	SB8703	RRXT	0.4	9/11	1.4	39	33.2	14.9	67.1	--	61.3
Thunder	3601 R2Y	RRXT	0.1	9/7	2.8	38	33.7	15.6	71.0	72.0	62.9
Wensman	W10063NRX	RRXT	00.6	9/5	0.7	32	33.1	15.0	71.2	--	62.5
Wensman	W1011RX	RRXT	0.1	9/10	1.5	36	33.7	15.9	65.5	--	61.5
Wensman	W1039NRX	RRXT	0.3	9/12	1.2	37	32.8	14.7	68.4	--	62.1
Wensman	W1048NRX	RRXT	0.4	9/10	1.6	33	34.4	15.1	71.0	--	--
Trial Mean				9/8	1.4	35	34.0	15.1	68.6		
C.V. %				16.6	57.7	8.2	1.8	2.7	5.4		
LSD 5%				1.9	1.1	4.0	1.2	0.8	5.2		
LSD 10%				1.6	0.9	3.3	1.0	0.7	4.4		

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of our southern region. Walsh County (Park River) and Nelson County (Pekin).

Yield, oil and protein reported at 13% moisture.

Roundup Ready Soybean, Pembina County 2017

Brand	Variety	Herb. Trait	Maturity Group ¹	Maturity date ²	Protein (%)	Oil (%)	Yield		
							2017	2 yr Avg.	2-site Avg. ³
							-----bu/a-----		
Allegiant	005X17	RRXT	00.5	9/4	32.1	15.5	44.8	--	47.7
Allegiant	008X30N	RRXT	00.8	9/11	31.9	16.0	40.4	--	39.0
Allegiant	009X08	RRXT	00.9	9/14	33.3	15.3	50.3	--	50.7
Allegiant	01R80	RR2Y	0.1	9/10	32.9	16.4	44.7	--	50.3
Dahlman	68008XN	RRXT	00.8	9/10	32.5	15.2	41.4	--	47.5
Dahlman	67009X	RRXT	00.9	9/9	33.3	15.6	44.8	--	48.6
Dahlman	56009NRR2Y	RR2Y	00.9	9/12	33.3	15.4	50.6	--	51.2
Dahlman	5601RR2Y	RR2Y	0.1	9/7	32.6	16.8	43.2	--	51.5
Dyna-Gro	S005RY87	RR2Y	00.5	9/5	33.3	15.9	47.5	57.7	50.7
Dyna-Gro	S005XT38	RRXT	00.5	9/6	31.8	15.7	52.9	--	54.6
Dyna-Gro	S006RY97	RR2Y	00.6	9/8	32.5	15.6	53.8	--	54.5
Dyna-Gro	S007XT27	RRXT	00.7	9/7	32.8	15.5	56.8	61.7	60.4
Dyna-Gro	S009XT68	RRXT	00.9	9/10	33.5	14.6	57.9	--	58.2
Hefty	H005X8	RRXT	00.5	9/6	33.6	15.2	37.0	--	37.0
Hefty	H007X7	RRXT	00.7	9/8	32.2	14.9	46.4	50.8	50.1
Hefty	H008R6	RR2Y	00.8	9/11	34.0	15.0	50.5	61.4	51.5
Hefty	H009X7	RRXT	00.9	9/8	32.9	14.8	43.6	55.6	47.0
Hefty	H00R6	RR2Y	0.0	9/8	32.6	15.9	46.0	63.2	50.8
Integra	20062	RR2Y	00.6	9/5	33.1	16.1	47.8	--	52.2
Integra	20087	RR2Y	00.8	9/11	33.3	14.9	59.6	70.1	60.7
Integra	20097	RR2Y	00.9	9/11	33.3	15.8	53.4	67.2	58.9
Integra	50069	RRXT	00.6	9/5	32.9	15.2	49.1	--	52.9
Legacy	LS-00538 RR2X	RRXT	00.5	9/6	32.9	15.5	48.0	--	51.9
Legacy	LS-00738N RR2X	RRXT	00.7	9/6	32.7	15.3	54.5	--	57.8
Legacy	LS-00937 RR2X	RRXT	00.9	9/9	33.0	14.4	52.4	63.0	56.0
Legacy	LS-0135 RR2	RR2Y	00.9	9/11	32.6	16.7	50.9	65.0	57.9
Legacy	LS-0214 RR2	RR2Y	0.2	9/12	33.8	15.4	47.9	66.4	52.2
Legacy	LS-0237N RR2X	RRXT	0.2	9/13	33.4	15.3	50.4	65.1	54.3
Mustang	00X698	RRXT	00.6	9/5	32.8	15.3	49.9	--	53.0
Mustang	00X828	RRXT	00.8	9/11	32.5	15.5	47.3	--	49.3
Mustang	02356	RR2Y	0.2	9/10	31.9	16.4	51.2	--	56.3
Mustang	02311	RR2Y	0.2	9/13	34.3	14.8	50.5	--	53.2
NDSU	ND17009GT	GT	00.9	9/9	35.4	15.9	50.5	--	51.5

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of our northern region. Langdon REC and Pembina County (Cavalier).

Yield, oil and protein reported at 13% moisture.

Lodging was very minimal and is not reported.

Roundup Ready Soybean, Pembina County 2017 (continued)

Brand	Variety	Herb. Trait	Maturity Group ¹	Maturity date ²	Protein (%)	Oil (%)	Yield		
							2017	2 yr Avg.	2-site Avg. ³
NorthStar	NS 60053XR2	RRXT	00.5	9/5	32.7	14.9	51.0	--	54.1
NorthStar	NS0052R2	RR2Y	00.5	9/5	33.0	15.9	49.9	56.6	54.9
NorthStar	NS0072R2	RR2Y	00.7	9/13	33.9	15.5	49.9	60.0	51.7
NorthStar	NS 60083NXR2	RRXT	00.8	9/11	33.0	15.3	54.2	--	--
NuTech	6502	RR1	00.5	9/2	33.3	16.1	54.4	--	--
NuTech	6008R2	RR2Y	00.8	9/10	32.4	15.3	57.0	57.1	57.6
Peterson	18X008N	RRXT	00.8	9/9	32.7	15.9	40.1	--	46.8
Peterson	17X009	RRXT	00.9	9/10	33.5	14.9	43.6	59.9	48.4
Peterson	16R008N	RR2Y	00.8	9/12	33.6	14.7	50.8	60.0	55.0
Peterson	16R01	RR2Y	0.1	9/11	33.7	15.7	44.3	62.0	50.3
Prairie	PB-00856R2	RR2Y	00.9	9/12	33.2	15.1	46.7	59.6	46.7
Prairie	PB-00928R2	RR2Y	00.9	9/13	33.0	15.7	57.9	--	56.9
Prairie	PB-0146R2	RR2Y	0.1	9/11	33.4	15.7	43.8	62.1	50.1
Proseed	30-07	RR2Y	00.7	9/5	33.3	14.8	49.5	--	50.9
Proseed	40-07	RR2Y	00.7	9/2	31.7	14.7	53.8	57.2	54.1
Proseed	50-08N	RR2Y	00.8	9/13	32.9	15.2	57.7	66.3	59.3
Proseed	XT 60-09	RRXT	00.9	9/10	32.2	15.4	54.3	63.6	55.4
Proseed	70-08 XN	RRXT	00.8	9/12	32.6	15.4	50.7	--	50.7
REA	R00727	RR2Y	00.7	9/8	33.6	15.1	57.9	62.9	60.1
REA	RX00738	RRXT	00.7	9/10	32.2	15.5	51.6	--	52.4
REA	RX0228	RRXT	0.2	9/13	32.9	16.0	52.5	--	53.5
Syngenta/GH	GH00866	RR2Y	00.8	9/9	32.1	16.6	60.4	--	60.5
Syngenta/NK	S009-J1	RR2Y	00.9	9/9	32.7	16.1	67.0	--	64.3
Thunder	SB88005	RR2Y	00.5	9/2	34.9	15.3	46.8	--	45.3
Thunder	SB88007N	RRXT	00.7	9/10	32.1	15.6	58.2	--	57.5
Thunder	36008 R2Y	RR2Y	00.8	9/13	33.3	15.4	56.4	63.1	--
Thunder	37004 R2Y	RR2Y	00.4	9/8	33.0	15.8	54.3	--	55.0
Thunder	SB87009	RRXT	00.9	9/11	33.1	14.7	50.6	--	52.0
Thunder	3601 R2Y	RR2Y	0.1	9/11	33.0	15.8	51.3	66.5	--
Wensman	W10042RX	RRXT	00.4	9/6	33.3	15.7	47.9	--	51.3
Wensman	W10063NRX	RRXT	00.6	9/6	33.5	14.7	56.7	62.1	57.7
Wensman	W1011RX	RRXT	0.1	9/14	33.7	15.8	51.3	--	53.5
Wensman	W30085R2	RR2Y	00.8	9/12	33.5	14.9	56.7	--	57.1
Trial Mean				9/9	33.0	15.4	50.0		
C.V. %				15.8	2.6	3.3	6.4		
LSD 5%				1.9	NS	1.0	4.4		
LSD 10%				1.6	NS	0.8	3.7		

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of our northern region. Langdon REC and Pembina County (Cavalier).

Yield, oil and protein reported at 13% moisture.

Lodging was very minimal and is not reported.

Roundup Ready Soybean, Walsh County 2017

Brand	Variety	Herb. Trait	Maturity Group ¹	Plant Maturity	Plant Height	Lodging	Protein	Oil	Yield		
									2017	2 yr Avg.	2-site Avg. ³
									-----bu/a-----		
				date ²	(in)	(0-9)	(%)	(%)			
Allegiant	005X17	RRXT	00.5	9/5	32	0.0	31.3	16.1	41.0	--	--
Allegiant	008X30N	RRXT	00.8	9/12	31	0.8	30.9	16.8	40.9	--	--
Allegiant	009X08	RRXT	00.9	9/26	37	0.6	30.8	16.0	56.8	--	--
Allegiant	01R80	RR2Y	0.1	9/14	35	0.9	31.1	17.2	47.4	--	58.9
Allegiant	02X03	RRXT	0.2	9/14	40	1.1	31.5	16.1	48.7	--	58.3
Allegiant	04X08N	RRXT	0.4	9/22	36	1.8	31.8	16.0	56.9	--	64.3
Channel	00717R2X	RRXT	00.7	9/9	31	0.4	31.7	15.8	52.9	--	61.7
Channel	0218R2X	RRXT	0.2	9/14	42	1.3	32.2	16.2	57.4	--	60.7
Dairyland	DSR-C918/2Y	RR2Y	00.9	9/12	31	0.5	32.6	15.6	53.8	63.3	59.3
Dairyland	DST00-003/R2Y	RR2Y	0.0	9/15	35	1.1	32.2	16.3	66.9	--	68.4
Dairyland	DST-0225/R2Y	RR2Y	0.2	9/13	35	1.2	31.5	17.0	56.9	66.0	63.6
Dairyland	DSR-0305/R2Y	RR2Y	0.3	9/19	34	2.3	32.1	16.0	52.9	64.8	61.6
Dairyland	DSR-0404/R2Y	RR2Y	0.4	9/19	35	0.1	32.5	15.6	58.8	66.8	64.8
Dairyland	DSR-0418/R2Y	RR2Y	0.4	9/21	35	1.4	33.8	15.5	57.0	--	61.9
Dyna-Gro	S01RY86	RR2Y	0.1	9/13	34	1.5	31.0	16.9	53.1	60.3	61.9
Dyna-Gro	S03RY36	RR2Y	0.3	9/17	34	2.1	33.6	15.6	61.5	64.6	66.8
Dyna-Gro	S04XT77	RRXT	0.4	9/18	36	1.0	32.7	15.8	62.5	66.5	66.2
Hefty	H02R3	RR2Y	0.2	9/19	37	0.6	33.1	15.7	56.3	65.3	64.6
Hefty	H02X7	RRXT	0.2	9/15	39	0.8	31.6	16.1	49.3	60.2	59.0
Hefty	H03X7	RRXT	0.3	9/18	34	0.8	33.5	15.4	57.3	61.9	63.6
Hefty	H03X8	RRXT	0.3	9/21	35	0.9	31.1	15.4	48.5	--	57.8
Integra	20087	RR2Y	00.8	9/12	31	0.2	33.1	15.1	58.7	65.2	64.2
Integra	20097	RR2Y	00.9	9/11	36	0.9	30.4	17.1	53.2	62.9	62.4
Integra	20468	RR2Y	0.4	9/17	39	2.6	32.6	15.8	60.7	--	--
Integra	50098	RRXT	00.9	9/12	35	0.4	31.4	15.7	55.2	60.8	--
Legacy	LS-0135 RR2	RR2Y	00.9	9/12	35	0.7	31.2	17.1	55.9	65.3	64.5
Legacy	LS-0214 RR2	RR2Y	0.2	9/16	39	0.4	32.9	15.8	57.7	64.6	65.3
Legacy	LS-0237N RR2X	RRXT	0.2	9/15	40	2.2	32.0	15.5	55.4	64.2	63.6
Legacy	LS-0334 RR2	RR2Y	0.3	9/20	39	1.9	32.3	16.0	61.2	69.0	65.5
Legacy	LS 0337N RR2X	RRXT	0.3	9/18	33	1.1	32.9	16.0	61.1	66.4	67.0
Legacy	LS-0438N RR2X	RRXT	0.4	9/22	37	2.7	32.8	15.8	61.5	--	65.8
Mustang	00X698	RRXT	00.6	9/6	34	0.0	30.8	15.7	51.3	--	--
Mustang	00X828	RRXT	00.8	9/12	35	0.9	31.3	16.4	51.0	--	--
Mustang	00726	RR2Y	00.7	9/14	37	0.8	32.6	15.7	55.0	--	--

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of our southern region. Walsh County (Park River) and Nelson County (Pekin).

Yield, oil and protein reported at 13% moisture.

Roundup Ready Soybean, Walsh County 2017 (continued)

Brand	Variety	Herb. Trait	Maturity Group ¹	Plant Maturity date ²	Plant Height (in)	Lodging (0-9)	Protein (%)	Oil (%)	Yield		
									2017	2 yr Avg.	2-site Avg. ³
Mustang	02356	RR2Y	0.2	9/12	36	1.7	31.6	16.5	57.4	--	--
Mustang	02311	RR2Y	0.2	9/16	35	0.4	33.6	15.1	57.9	--	--
NDSU	ND17009GT	GT	00.9	9/11	35	0.5	34.0	16.2	47.8	--	54.0
NorthStar	NS0072R2	RR2Y	00.7	9/14	36	0.4	33.0	15.7	46.7	56.7	--
NorthStar	NS 0081NR2	RR2Y	00.8	9/13	36	0.1	32.6	15.7	55.8	63.0	--
NorthStar	NS 0111R2	RR2Y	0.1	9/13	36	1.9	31.9	16.7	53.8	63.7	60.4
NorthStar	NS 60092XR2	RRXT	00.9	9/11	32	0.7	31.5	15.5	55.3	--	63.4
NuTech	6502	RR2Y	00.5	9/10	29	0.0	31.6	16.6	46.6	--	--
NuTech	6008R2	RR2Y	00.8	9/10	34	0.0	29.3	16.4	52.0	--	--
Peterson	18X008N	RRXT	00.8	9/11	33	0.2	31.5	16.5	52.1	--	--
Peterson	17X009	RRXT	00.9	9/13	34	1.1	31.9	15.3	52.5	--	--
Peterson	16R01	RR2Y	0.1	9/11	35	1.0	30.7	17.1	49.6	61.2	61.5
Prairie	PB-00928R2	RR2Y	00.9	9/16	36	1.9	31.8	16.0	59.2	--	64.5
Prairie	PB-0146R2	RR2Y	0.1	9/13	34	0.8	30.6	17.3	50.6	60.7	60.4
Prairie	PB-0397R2	RR2Y	0.3	9/18	38	2.1	32.6	15.5	57.0	64.8	62.8
Proseed	50-08N	RR2Y	00.8	9/13	37	0.7	32.5	15.7	57.4	--	--
Proseed	XT 60-09	RRXT	00.9	9/11	35	0.2	32.2	14.9	53.7	60.4	--
Proseed	70-08 XN	RRXT	00.8	9/11	34	0.9	31.0	16.4	50.9	--	--
Proseed	30-20	RR2Y	0.2	9/16	37	0.9	32.8	15.7	53.7	63.7	61.5
Proseed	50-10	RR2Y	0.1	9/11	33	0.8	31.8	16.6	54.3	--	--
REA	RX0228	RRXT	0.2	9/14	35	0.0	32.2	16.1	55.3	--	61.0
REA	RX0327	RRXT	0.3	9/16	37	0.3	33.4	15.8	60.8	--	63.9
Syngenta/GH	GH0391	RR2Y	0.3	9/17	34	1.3	32.0	15.8	54.9	--	62.7
Syngenta/NK	S03-S6X	RRXT	0.3	9/13	32	0.0	31.9	15.5	50.1	--	59.5
Thunder	SB88007N	RRXT	00.7	9/10	35	0.5	31.6	16.3	54.1	--	60.8
Thunder	36008 R2Y	RR2Y	00.8	9/14	35	1.1	32.3	15.7	53.5	57.2	59.3
Thunder	SB87009	RRXT	00.9	9/15	39	0.8	31.8	15.3	54.8	--	60.0
Thunder	3503 R2Y	RR2Y	0.3	9/19	37	1.8	33.5	15.5	54.7	--	62.1
Thunder	SB8703	RRXT	0.4	9/16	41	2.1	31.4	16.1	55.6	--	61.3
Thunder	3601 R2Y	RR2Y	0.1	9/15	39	3.5	31.6	17.0	54.8	64.2	62.9
Wensman	W10063NRX	RRXT	00.6	9/10	31	0.5	31.4	15.9	53.8	--	62.5
Wensman	W1011RX	RRXT	0.1	9/16	37	2.1	33.3	15.6	57.5	--	61.5
Wensman	W1039NRX	RRXT	0.3	9/19	36	1.9	31.9	15.1	55.9	--	62.1
Wensman	W30099R2	RR2Y	00.9	9/12	35	1.3	32.4	15.9	54.0	60.1	--
Trial Mean				9/14	35	1.0	32.0	16.0	54.0		
C.V. %				8.7	7.4	106.0	1.6	2.1	8.0		
LSD 5%				1.7	3.6	1.5	1.0	0.7	6.1		
LSD 10%				1.4	3.0	1.2	0.8	0.6	5.1		

¹Maturity Group provided by company.

²Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

³A 2-site average of our southern region. Walsh County (Park River) and Nelson County (Pekin).

Yield, oil and protein reported at 13% moisture.

Oil Sunflower, Langdon 2017

Brand	Hybrid	Hybrid Type ¹	Status ²	Days to Maturity			Oil (%)	Test Weight (lbs/bu)	Harvest Moist. (%)	Yield @ 10% moisture				
				Flower (days) ³	Mature (days) ³	Plant Height (in)				2015	2016	2017	Average	
Croplan	545 CL	CL, NS, DMR	CA	82	126	65	46.3	32.5	27	3405	3465	3365	3415	3412
Croplan	549 CL	CL, NS, DMR	CA	77	122	70	47.9	35.4	11	3038	2880	3778	3329	3232
Croplan	458 E HO	EX, HO, DMR	CA	80	125	66	45.2	32.5	16	2831	2988	2640	2814	2820
Croplan	432 E	EX, NS, DMR	CA	77	123	66	41.9	35.2	14	3426	2449	3193	2821	3023
Croplan	455 E HO	EX, HO, DMR	CA	80	127	69	47.1	32.4	15	--	3356	3801	3578	--
Croplan	3732	NS	CA	82	127	66	46.9	32.4	15	--	--	3507	--	--
Croplan	3845 HO	HO	CA	81	126	67	49.3	32.9	16	--	--	3209	--	--
Croplan	7717 CL HO	CL, HO, DMR	CA	80	124	66	45.9	33.6	16	--	--	3134	--	--
Croplan	7919 CL HO	CL, HO, DMR	CA	82	128	68	49.4	30.2	25	--	--	3843	--	--
Croplan	568 CL HO	CL, HO, DMR	CA	85	130	65	47.2	29.3	25	--	--	3403	--	--
Croplan	450 E HO	EX, HO, DMR	CA	82	126	67	47.9	34.2	20	--	--	3394	--	--
Pioneer	P63HE60	EX, HO, DMR	CA	78	123	67	46.5	34.7	11	--	2704	3006	2855	--
Pioneer	P63HE90	EX, HO, DMR	CA	81	127	73	46.7	32.3	17	--	3476	3281	3379	--
Pioneer	P64ME01	EX, NS, DMR	CA	82	127	68	43.6	32.9	26	--	--	3095	--	--
NuSeed	Cobalt II	CL, HO, DMR	CA	79	124	64	45.8	34.5	15	2968	3083	2934	3008	2995
NuSeed	Talon	EX, NS	CA	78	123	64	45.5	29.9	12	3287	3483	3647	3565	3472
NuSeed	Falcon	EX, NS	CA	82	126	64	44.4	33.2	20	3082	3038	2888	2963	3003
NuSeed	Camaro II	CL, NS, DMR	CA	81	124	66	45.0	32.6	18	3360	3068	3457	3263	3295
NuSeed	N4HM354	CL, NS, DMR	CA	77	121	64	47.5	36.1	12	--	3508	3066	3287	--
NuSeed	N5LM307 ⁴	CL, NS, DMR	CA	77	121	63	40.4	31.2	19	--	2745	2964	2855	--
NuSeed	N4HE302	EX, HO	CA	80	124	66	45.0	30.6	17	--	--	3082	--	--

¹Type: HO = High Oleic, NS = NuSun, Trad = Traditional (linoleic), CL = Clearfield, EX = ExpressSun, DMR = Downy Mildew Resistant

²Status: CA-Commercially available, Exp-Experimental, CK-Long term hybrid check

³Days after planting

⁴Conoil

Oil, harvest yield and test weight were adjusted to 10% moisture.

Oil Sunflower, Langdon 2017 (continued)																
Brand	Hybrid	Hybrid Type ¹	Status ²	Days to Days to			Plant	Test	Harvest	Yield						
				Flower	Mature	Height				Oil	Weight	Moist.	@ 10% moisture			
				(days) ³	(days) ³	(in)	(%)	(lbs/bu)	(%)			2015	2016	2017	2yr	3yr
NuSeed	Badger DMR ⁴	CL, NS, DMR	CA	77	123	72	36.3	33.4	12	2762	3799	3728	3763	3430		
NuTech	68H7	EX, HO, DMR	CA	82	127	74	42.9	35.3	27	2837	3439	2505	2972	2927		
NuTech	63C4 CL	CL, NS, DMR	CA	77	122	65	46.0	35.8	13	--	3191	3111	3151	--		
NuTech	69M2	EX, NS, DMR	CA	83	128	74	46.3	32.5	16	--	--	3512	--	--		
Proseed	E-31 CL	CL, NS, DMR	CA	82	125	71	44.2	31.5	15	2656	2665	2940	2803	2754		
Proseed	12G25	CL, NS	CA	81	125	63	48.1	33.7	20	--	3487	3364	3425	--		
Proseed	E-21 CL	CL, NS, DMR	CA	81	125	74	38.3	31.0	23	--	--	2488	--	--		
Proseed	E-362436	NS, DMR	CA	81	124	75	45.1	35.5	15	--	--	2954	--	--		
Proseed	E-50016 CL	CL	CA	82	126	69	46.7	31.5	15	--	--	3425	--	--		
Proseed	E-71 CL	CL, NS	CA	81	125	68	41.0	30.6	16	--	--	2859	--	--		
Proseed	E-72	NS	CA	82	126	75	45.0	32.2	14	--	--	2841	--	--		
Proseed	E-73 CL	CL, NS	CA	81	126	72	40.7	30.0	16	--	--	3118	--	--		
Thunder	12N92	CL, NS, DMR	CA	77	122	64	48.5	34.8	11	--	--	3131	--	--		
Thunder	11N94	NS, DMR	CA	81	125	68	45.2	32.8	23	--	--	3308	--	--		
Thunder	35H92	HO, DMR	CA	78	123	64	46.6	35.0	11	--	--	2967	--	--		
Thunder	42H94	HO, DMR	CA	83	125	69	47.7	30.3	18	--	--	3784	--	--		
USDA	894	Trad	CK	78	125	61	44.9	33.9	13	2700	2263	2841	2552	2601		
Trial Mean				80	125	67	45.3	32.9	17	2984	3114	3177				
C.V. %				0.8	0.8	3.3	3.0	2.4	15.7	10.2	10.2	9.9				
LSD 5%				1.1	1.6	3.7	2.2	1.3	4.3	496	528	514				
LSD 10%				0.9	1.3	3.1	1.8	1.1	3.6	415	441	430				

¹Type: HO = High Oleic, NS = NuSun, Trad = Traditional (linoleic), CL = Clearfield, EX = ExpressSun, DMR = Downy Mildew Resistant

²Status: CA-Commercially available, Exp-Experimental, CK-Long term hybrid check

³Days after planting

⁴Conoil

Oil, harvest yield and test weight were adjusted to 10% moisture.

Confection (non-oil) Sunflower, Langdon 2017

Brand	Hybrid	Status ⁵	Flower (days) ⁶	Mature (days) ⁶	Plant Height (in)	Test Weight (lbs/bu)	Harvest Moist. (%)	Seed over screen				Yield								
								22/64	20/64	18/64	15/64	@ 10% moisture								
CanSun LLC	Exp 57085 ³	Exp	78	121	63	25	10	61	87	95										
Nuseed	Panther DMR ⁴	CA	75	124	62	27	12	52	80	92	3036	3143	2863	3003	3014					
Nuseed	NSKM5377 ¹	Exp	79	126	59	24	23	73	92	97										
RRC	2215	CA	76	125	61	23	21	84	92	93		3666	2861	3263						
RRC	2215 CL ¹	CA	82	129	66	22	28	85	92	93		3477	2760	3118						
RRC	2217 CP ²	CA	82	129	64	21	29	84	90	91										
USDA	924	CK	77	123	64	27	16	35	57	80	2646	2861	2444	2653	2650					
Trial Mean			79	125	63	24	20				2729	3230	2983							
C.V. %			1.5	1.0	6.4	7.5	12.3				7.8	9.0	9.7							
LSD 5%			2.1	2.1	NS	3.2	4.3				377	515	514							
LSD 10%			1.7	1.7	NS	2.6	3.5				309	422	421							

¹CL-Clearfield, ²Clearfield Plus, ³ExpressSun, ⁴Downy mildew resistant.

⁵Status: CA-Commercially available, Exp-experimental, CK-Long term hybrid check.

⁶Days after planting.

Harvest yield and test weight were adjusted to 10% moisture.

**NDSU Langdon Research Extension Center
2017 Faba Bean Seeding Rate Trial**

Faba Bean - 2017	Langdon									
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Variety/ Seeding Rate (seeds/ft ²)	Plant Stand		Stalks Harvest	Days to 1st Flower	Days to End Flower	Days to Mature	Plant		Pod		1000 KWT	Protein (%)	Test Weight (lb/bu)	Yield (bu/a)	2 yr Avg. Yield (bu/a)
	Emergence (DAP ¹)	Seedling (ft ²)					Ht (in)	1st Pod (in)	Ht (in)	Yield (bu/a)					
Tabasco-3	19.3	2.5	3.6	52.8	78.0	124.0	47.5	13.7	405	21.6	63.2	81.2	76.6		
Tabasco-4	19.0	3.8	4.3	52.3	77.8	121.8	50.1	15.6	396	20.9	63.1	88.2	86.9		
Tabasco-5	19.0	5.3	4.9	52.8	78.0	123.5	48.4	16.3	415	21.7	63.5	96.1	89.8		
Tabasco-6	18.8	5.3	6.4	52.8	77.8	123.3	48.3	16.1	398	22.3	63.1	97.3	92.8		
Boxer-3	19.5	3.9	3.8	52.0	78.3	124.5	52.1	14.8	540	24.9	63.9	108.3	102.0		
Boxer-4	19.0	3.8	5.1	51.3	78.3	123.0	53.4	17.1	537	24.3	63.8	114.4	105.8		
Boxer-5	19.0	4.8	5.5	51.3	78.0	122.8	55.1	15.5	511	24.8	64.3	121.6	108.8		
Boxer-6	18.3	6.5	6.3	51.3	78.0	121.5	55.1	16.6	521	24.4	64.0	125.9	114.5		
Mean	19.0	4.5	5.0	52.0	78.0	123.0	51.3	15.7	465	23.1	63.6	104.1			
C.V. %	2.1	22.5	16.2	1.6	0.6	1.1	5.5	9.8	4.7	3.1	0.7	5.7			
LSD 5%	0.6	1.5	1.2	1.2	NS	NS	4.2	NS	51.8	1.1	0.6	8.8			
LSD 10%	0.5	1.2	1.0	1.0	NS	1.6	3.5	NS	41.5	0.9	0.5	7.3			

¹DAP-Days after planting NS-No statistical difference between treatments. Protein adjusted to 16% moisture.

Planting Date: May 9 Harvest Date: September 29

Previous Crop: Durum Wheat Tillage: Conventional Row Spacing: 6 inches

Soil Type: Svea Barnes loam

Faba Beans are a long-maturing, cool season, annual legume that grow best under moist conditions. The current recommended seeding rate for Faba Beans is 4 seeds per square foot. Faba Beans have very large seeds often requiring a seeding rate of 3-4 bushels per acre, depending on the seed size. The research objective of this trial was to help determine the optimum seeding rate for our region. The lowest seeding rate had the lowest yield for both varieties. There were no significant differences in yield between the seeding rates 4 and 5 or 5 and 6 seeds/ft² for the varieties Boxer and Tabasco. The 2 year average indicated yield increasing numerically as seeding rates increased for both varieties. Most of the other significant differences between agronomic traits occurred between varieties.

**NDSU Langdon Research Extension Center
2017 Faba Bean Seeding Date Trial**

Faba Bean - 2017															Langdon
Variety/ Seeding Date	Emergence (DAP ¹)	Plant Stand Seedling (ft ²)	Stalks Harvest (ft ²)	Days to 1st Flower (DAP ¹)	Days to End Flower (DAP ¹)	Days to Mature (DAP ¹)	Plant Ht (in)	Pod Ht 1st Pod (in)	1000 KWT (g)	Protein (%)	Test Weight (lb/bu)	Yield (bu/a)	Yield (bu/a)	2 yr	
														Avg. Yield	
Tabasco															
May 9	19.8	3.2	3.8	54	78	123	49	17	427	22.2	63.7	94.9	81.4		
May 20	16.2	3.3	3.7	48	74	116	45	15	429	22.2	63.4	85.6	80.2		
May 30	10.5	4.0	5.1	41	77	127	53	17	418	23.6	65.1	71.9	71.9		
June 9	9.5	3.3	5.2	42	75	136	58	16	406	22.5	64.0	68.0	56.2		
<u>Boxer</u>															
May 9	19.2	4.6	4.5	52	78	122	51	16	507	24.4	63.8	125.3	106.4		
May 20	16.0	4.7	4.6	46	74	116	48	17	558	24.9	64.4	117.3	107.4		
May 30	10.5	4.8	5.4	39	77	127	62	20	521	25.9	65.3	75.7	77.0		
June 9	8.2	4.7	5.8	41	76	136	58	20	482	24.6	61.6	65.5	57.6		
Mean	13.8	4.1	4.3	45	76	125	53	17	468	23.8	0.6	88.0			
C.V. %	3.1	22.8	8.8	1.0	0.7	2.2	6.8	7.8	2.2	0.9	0.2	5.4			
LSD 5%	--	--	--	0.4 ²	--	--	--	2.1 ²	--	--	0.6 ²	7.4 ²			
Variety means averaged over seeding dates															
Tabasco	14.0	3.4	4.4	46	76	125	51	16	420	22.6	64.0	80.1	72.4		
Boxer	13.5	4.7	5.1	45	76	125	55	18	517	24.9	63.8	95.9	87.1		
LSD 5%	0.3	4.1	4.3		0.4		2.8		14.2	0.4					
Seeding Date means averaged over varieties															
May 9	19.5	3.9	4.1	53	78	122	50	16	467	23.3	63.7	110.1	93.9		
May 20	16.1	4.0	4.2	47	74	116	47	16	493	23.5	63.9	101.4	93.8		
May 30	10.5	4.4	5.3	40	77	127	52	19	469	24.8	65.2	76.8	76.0		
June 9	8.9	4.0	5.5	41	76	136	58	18	444	23.6	62.8	66.7	56.9		
LSD 5%	0.7	NS	1.0		0.9	1.2	7.2		25.9	0.8					

¹DAP-Days after planting. ²Use to compare means within each variety.

Harvest Date: For May 9 and 20 seeding dates - Sept. 29. For May 30 and June 9 seeding dates - Oct. 20.

Row Spacing: 6 inches, Previous Crop: Durum Wheat, Tillage: Conventional, Protein: Adjusted to 16% moisture.

Experimental Design: Split-Plot, A (--) in the LSD box indicates there was no significant interaction between seeding rate and date and LSD's were calculated for variety and seeding date means averaged over treatment effect.

Faba Beans are a long-maturing, cool season, annual legume that grow best under moist conditions which need to be planted early to obtain higher yields. The objective of this trial was to determine the optimum seeding date for our region. Differences occurred between the two varieties for many agronomic traits. Both varieties responded similarly to seeding date for most agronomic traits and this resulted in few variety x date interactions. Boxer had a higher yield at the May 9 and 20 seeding date but had similar yields to Tabasco at the May 30 and June 6 planting dates. The two year average indicates the first two planting dates have the greatest yield potential.

Seeding Date, Variety, and Seed Treatment Influence on Industrial Hemp Performance in North Dakota-2017

NDSU Langdon Research Extension Center

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Industrial hemp (*Cannabis sativa* L., THC level of 0.3% or less) can only be grown in North Dakota through the North Dakota Department of Agriculture pilot program or by institutions of higher education as stated in the 2014 farm bill. It has been over 70 years since industrial hemp has been raised in North Dakota. The NDSU Langdon Research Extension Center began conducting industrial hemp variety evaluations in 2015. To gain a better understanding of hemp production in North Dakota, common production practices, such as seeding dates, need to be investigated. Pure live seedling emergence (PLSE) of industrial hemp is lower, and often substantially lower, than for wheat, soybean, and corn and most other agronomic crops where 85% or greater PLSE is common and expected under average to good growing conditions. Fungicide seed treatments are a cost effective, common practice for improving PLSE in crops, and they become more important when stand establishment conditions are less than ideal. There are no labeled fungicide seed treatments currently available for industrial hemp in the USA. The objective of this study was to evaluate seeding date, variety and seed treatment effects on industrial hemp stand establishment, grain and fiber dry stalk yield and other agronomic traits.

Materials and Methods

Industrial hemp varieties utilized for this study are listed in Table 1. Seeding dates for the study were May 20, June 1 and June 12. The seeding rate was 12 pure live seeds/ft² and was adjusted for germination and 1000 kernel weight (kwt) with an additional 25 percent added to allow for seedling mortality. Planting depth was one-half inch. Plot size was 21 feet long x 4 feet wide and consisted of four 12 inch spaced rows. The experimental design was a randomized complete block split-plot design with four replications. The main treatment plot was seeding date and subplots were a factorial arrangement of variety and seed treatment. Seed treatments were Metalaxyl (3 fl oz/100 lbs. of seed), Metalaxyl+Ipconazole (1 fl oz/100 lbs. of seed) and the untreated check. The previous crop was soybeans. Total soil nitrogen from the soil test, applied and soybean N credit was equal to 160 lbs/a. Phosphorous soil test results indicated 21ppm. The fiber dry stalk yield harvest dates were August 8, 22, and 31 for the May 20, June 1 and June 12 seeding dates, respectively. Mortality was equal to 100 minus PLSE where PLSE refers to the percent of live seeds that produced a seedling. Fiber harvest consisted of one linear 10-foot row cut from each plot. The plant samples were air-dried and leaves were removed prior to weighing to determine dry stalk yield. Fiber yield and plant height were only determined on the untreated check plots. Grain harvest occurred on September 13 for all seeding dates. Industrial hemp is day-length sensitive and flowering occurs at about the same time period every summer regardless of the seeding date. A small plot combine was used to harvest the plots. Samples were dried and then processed to determine grain yield, test weight and 1000 kwt. Plant samples of all varieties, which included leaves and flowering heads, were sent for laboratory analysis of THC. All samples tested less than the 0.3% THC limit for industrial hemp classification.

Table 1. Industrial hemp varieties and characteristics for the Langdon 2017 trial.

Variety	Country	Company†	Type	Purpose
Katani	Canada	HGI	Dioecious	Grain
Delores	Canada	PIHG	Monoecious	Dual

†HGI (Hemp Genetics International)

PIHG (Parkland Industrial Hemp Growers)

- Dual purpose varieties are bred to be used for both grain and fiber production and are generally taller.
- Dioecious varieties have separate male and female plants.
- Monoecious varieties have separate male and female flowers on the same plant.
- Plant height is an important consideration in determining end use of the crop. Shorter varieties tend to have less fiber and are more suited to grain production.

Results and Discussion

The sources of variation for the various treatments and their interactions are presented in Table 2.

Stand Establishment

Significant differences occurred for stand density, PLSE, and mortality for seeding date and seed treatment. Stand density and PLSE was greater for the May 20 seeding date compared to the June 1 and 12 seeding date. Seeding mortality was higher at the two later seeding dates (Table 3). Pure live seed emergence averaged 78% across seeding dates in 2017. This value is comparable to conventional crops such as wheat, soybeans and corn and is approximately two to three times (or more) greater than previous industrial hemp studies at the Langdon REC in 2015 and 2016. Rainfall of 2.55 inches during the first two weeks of June may have contributed to wet soil conditions that reduced stand density for seeding dates of June 1 and June 12 compared to the May 20 seeding where rainfall was only 0.87 inches from May 1 to May 22 (NDAWN). In 2015 soil crusting after planting on June 5, and saturated soil conditions after planting on June 20, 2016 reduced PLSE that ranged from 3 to 9% and 28 to 36%, respectively (Johnson et al., 2016). Stand density was 1.5 plants/ft² higher and PLSE 10% greater for the Metalaxyl + Iponazole seed treatment compared to the check (Table 4). Seeding mortality was lower for the Metalaxyl + Iponazole seed treatment compared to the check while the Metalaxyl treatment was similar to both the Metalaxyl + Iponazole and the check treatments.

Grain and Fiber Stalk Yield

Grain yield was 18% lower at the June 12 seeding date compared to the average yield of seeding dates of May 20 and June 1 (Table 3). Yield response to seeding dates was similar in trials conducted in Manitoba, Canada in 2014 and 2015. (Kostuik et al, 2014 and McEachern et al., 2015). Katani and Delores produced nearly identical grain yield when averaged across seeding dates and seed treatments (Table 5). Although stand density, PLSE, and mortality were significantly affected by seed treatments, there was no effect on grain yield (Table 4). Fiber dry stalk yield was significantly greater at the May 20 and June 1 seeding dates compared to the June 12 seeding date with the taller variety, Delores, having significantly higher yields (Tables 3 and 5).

Test Weight, 1000 KWT, and Plant Height

Variety differences occurred for test weight, 1000 kwt, and plant height, and varied among seeding dates resulting in a variety x seeding date interaction (Table 2). The differences were small and only the main effects of seeding date and variety are reported. The variety Katani had significantly lower 1000 kwt compared to Delores with no differences in 1000 kwt occurring among seeding dates (data not shown). Katani had a higher test weight than Delores while the May 20 and June 1 seeding dates had a significantly higher test weight compared to the June 12 seeding date (Table 4 and 5). Plant height averaged across the three seeding dates for Delores and Katani was 89 and 65 inches, respectively (data not shown).

Table 2. Sources of variation (SOV) and significant F-tests for industrial hemp traits evaluated at Langdon, ND, in 2017.

SOV	Stand density	PLSE	Mortality	Test weight	1000 kwt	Grain yield	Fiber dry stalk yield	Height
Date (D)	*	*	*	*	ns	*	†	ns
Variety (V)	ns	ns	ns	*	*	ns	*	*
D X V	ns	ns	ns	*	*	ns	ns	*
Seed trt (S)	*	*	*	ns	ns	ns	--	--
D x S	ns	ns	ns	ns	ns	ns	--	--
V x S	ns	ns	ns	ns	ns	ns	--	--
D x V x S	ns	ns	ns	ns	ns	ns	--	--
CV %	16.7	16.7	58.4	1.6	3.3	15.0	13.1	3.5

*=significant at P≤0.05; †=significant at P≤0.10; ns = not significant

Table 3. Industrial hemp stand density, pure live seed emergence, mortality, test weight, grain yield and fiber dry stalk yield for planting dates at Langdon, ND, in 2017.

Seeding Date	Stand density	PLSE	Mortality	Grain yield	Test weight	Fiber dry stalk yield
	Plants/ft ²	%	%	lb/a	lb/bu	lb/a
May 20	13.5	84	16	1875	41.9	5304
June 1	11.9	75	25	1935	41.7	5595
June 12	11.9	75	25	1562	40.7	4542
LSD (0.05)	1.2	6	6	209	0.3	693 ¹

¹LSD (0.10)

Table 4. Industrial hemp stand density, pure live seed emergence, mortality and grain yield for three seed treatments at Langdon, ND in 2017.

Seed Treatment	Stand density Plants/ft ²	PLSE %	Mortality %	Grain yield lb/a
Metalaxyl	12.3	77	23	1733
Metalaxyl + Ipconazole	13.3	83	17	1873
Check	11.8	73	27	1801
LSD (0.05)	1.2	7	7	ns

Table 5. Industrial hemp variety effect on 1000 kwt, test weight, and grain and fiber dry stalk yield at Langdon, ND in 2017.

Variety	1000 kwt g	Test weight lb/bu	Grain yield lb/a	Fiber dry stalk yield lb/a
Katani	15.4	42.0	1783	3021
Delores	19.0	40.9	1799	7271
LSD (0.05)	0.8	0.3	ns	621

Conclusions

- Seeding date influenced stand density, PLSE, mortality, and grain and fiber dry stalk yield.
- The late seeding date resulted in reduced grain yield; however, seed treatment did not affect grain yield.
- Seed treatment with Metalaxyl + Ipconazole improved stand density and PLSE, and reduced mortality, compared with the untreated check.
- Industrial hemp PLSE, mortality and stand establishment are sensitive to soil crusting and wet soil conditions.
- Live seed mortality is often greater for industrial hemp than commonly grown agronomic crops and requires careful grower management regarding planting date, seeding depth, and seed quality.

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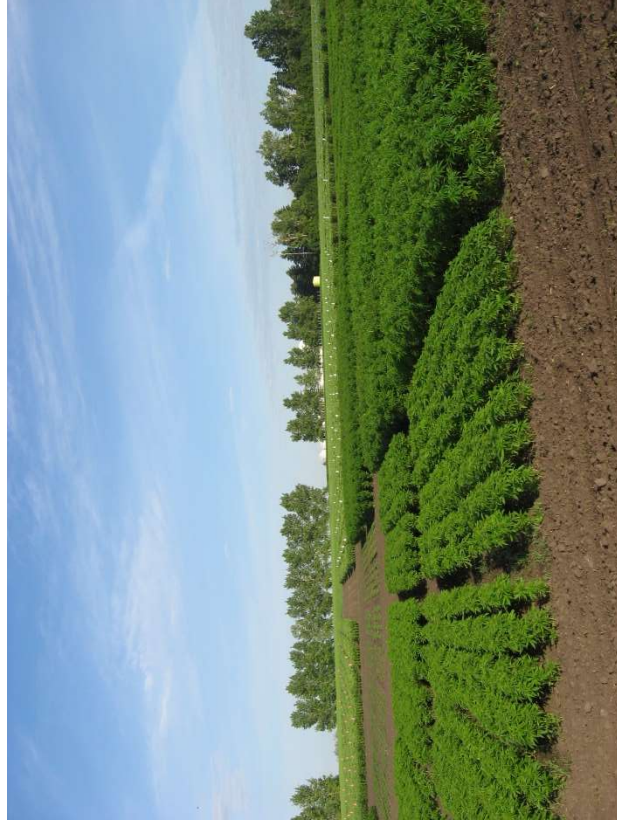
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Industrial Hemp Variety Performance in North Dakota - 2017 NDSU Langdon Research Extension Center

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An industrial hemp variety trial (*Cannabis sativa* L., THC level of 0.3% or less) was conducted at the NDSU Langdon Research Extension Center. The objective of this study was to screen varieties (Table 1) from various sources, monitor and record plant growth and development, determine grain and dry stalk yield, note pest incidence, and record agronomic traits. Variety trials were previously conducted in 2015 and 2016. The 2015 trials were the first industrial hemp evaluations in North Dakota in over 70 years, and provided grain and fiber yield for Canadian and French varieties. The 2016 trial was lost due to herbicide drift, replanted and lost again to saturated soil conditions.

Table 1. Industrial hemp varieties and characteristics for the Langdon 2017 trial.

Variety	Country	Company†	Type	Purpose
CRS-1	Canada	HGI	Dioecious	Grain
CFX-1	Canada	HGI	Dioecious	Dual
CFX-2	Canada	HGI	Dioecious	Grain
Grandi	Canada	HGI	Dioecious	Grain
Katani	Canada	HGI	Dioecious	Grain
Picolo	Canada	HGI	Dioecious	Grain
Canda	Canada	PIHG	Monoecious	Dual
Delores	Canada	PIHG	Monoecious	Dual
Joey	Canada	PIHG	Monoecious	Dual
X-59	Canada	Terramax	Dioecious	Grain

†HGI (Hemp Genetics International)

PIHG (Parkland Industrial Hemp Growers)

- Dual purpose varieties are bred to be used for both grain and fiber production.
- Dioecious varieties have separate male and female plants.
- Monoecious varieties have separate male and female flowers on the same plant.
- Plant height is an important consideration in determining end use of the crop. Shorter varieties tend to have less fiber and are more suited to grain production.
- Dual purpose varieties are generally taller.

Materials and Methods

Seeding date was June 1 with plants emerging five to six days later. The seeding rate was 12 pure live seeds/ft² and was adjusted for germination and 1000 kernel weight (kwt) with an additional 25 percent added to allow for seedling mortality. Planting depth was one-half inch. Plot size was 21 feet long x 4 feet wide and consisted of four 12 inch spaced rows. The experimental design was a randomized complete block with four replications. Previous crop was soybeans. The fiber dry stalk yield harvest date was August 8. Fiber harvest consisted of one linear 10 foot row cut from each plot. The plant samples were air-dried and leaves were removed prior to weighing to determine dry stalk yield. Grain harvest occurred on September 13. A small plot combine was used to harvest the plots. Samples were dried then processed to determine yield, test weight and 1000 kwt. Plant samples of all varieties, which included leaves and flowering heads, were sent for laboratory analysis of THC. All samples tested less than the 0.3% THC limit for industrial hemp classification.

Results and Discussion

There were no significant differences in pure live seed emergence (PLSE) among the varieties tested (Table 2). Pure live seed emergence values in 2017 were approximately two to three times (or more) greater than the previous four industrial hemp studies at the Langdon REC, in 2015 and 2016, where PLSE ranged from 3 to 61%. There were significant differences among varieties for seedling mortality that ranged from 20 to 41%. Seed/seedling mortality for traditional crops such as wheat, corn, and soybean commonly ranges from 10 to 15% under good/average conditions. Varieties CFX-1 (41%) and Picolo (35%) had the highest seedling mortality but final plant stand were not different among varieties and ranged from 9.5 to 12.9 plants/ft², which was close to the target plant population of 12 plants/ft². Fiber dry stalk yield was greatest for the dual purpose varieties which also had the greatest plant height and included the varieties CRS-1, Canda, Delores, and Joey. Canda, Delores, and Joey had significantly higher 1000 kwt compared to other varieties while X-59, Picolo, Katani, and Grandi were the highest test weight varieties. Yields of industrial hemp varieties were excellent and ranged from 1685 to 2052 lb/a. Grain yield for Canadian industrial hemp varieties in 2015 ranged from 632 to 1363 lb/a. Sclerotinia Stem Rot (White Mold) common in canola, dry bean and sunflower was observed in the trial but was at a very low incidence level.



Table 2. Grain and fiber yield and various agronomic traits of Canadian industrial hemp varieties.

Variety	PLSE ¹ (%)	Seedling Mortality (%)	Plant Stand (ft ²)	Plant Height (inches)	Fiber Dry		1000 KWT (g)	Test Weight (lb/bu)	Grain Yield (lb/a)	Grain Yield ² 2 yr Avg. (lb/a)
					Stalk Yield (lb/a)	Yield (lb/a)				
CRS-1	80	20	12.9	80	5914	17.9	41.3	1891	1477	
CFX-1	59	41	9.5	73	4470	17.6	40.8	2052	1708	
CFX-2	80	20	12.8	68	4610	17.5	40.7	1949	1569	
Grandi	76	24	12.2	67	3302	16.1	41.9	1729	--	
Katani	75	25	12.1	68	3733	16.0	42.1	1820	--	
Picolo	65	35	10.4	67	3291	15.8	42.1	1686	--	
Canda	78	22	12.4	86	6579	20.1	41.1	2005	1634	
Delores	78	22	12.6	87	5863	19.5	41.3	1959	--	
Joey	63	28	10.0	85	6074	19.3	41.7	1961	--	
X-59	72	28	11.6	74	4022	18.1	42.4	2022	--	
Mean	73	27	11.6	75	4786	17.8	41.5	1907		
C.V. %	15.4	40.8	15.6	2.5	19.7	2.4	1.3	8.7		
LSD 5%	NS	NS	NS	2.8	1367	0.6	0.8	240		
LSD 10%	NS	13.4	NS	2.3	1135	0.5	0.6	199		

¹ Pure live seed emergence

² 2015 and 2017

Conclusions

- The industrial hemp varieties tested appear to be suitable to the Langdon region of North Dakota.
- Seed mortality is an important issue in hemp production and not well understood and requires further research for improvement.
- Additional studies to identify superior varieties plus other crop production practices are needed.

Acknowledgements

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Increased Spread of Clubroot to New Fields in Cavalier County

Project Title: Survey and Creating Awareness on Identification and Management Plan of Clubroot on Canola in Northeastern North Dakota

Survey done by: Venkat Chapara, Lesley Lubenow and Naeem Kalwar

A two-year survey program has been conducted in seven counties of northeastern North Dakota to determine the spread of clubroot on canola.

Survey Procedure: Clubroot scouting was done by visually inspecting canola crop roots. The disease survey was conducted in seven northeastern counties in North Dakota. Counties included were Pembina, Walsh, Nelson, Ramsey, Towner, Rolette and Cavalier. County selection was done on hypothesis of clubroot propagules movement in all directions through equipment, soil or water to neighboring counties of Cavalier. In each county, one field in every 2,500 acres was selected and scouted. GPS coordinates were gathered to identify the positive fields with intent to keep monitoring for future research. In all, a minimum of 5-10 fields per county were targeted for scouting. The survey was done in two phases.

1st phase:

In the growing season, stems were sampled from distinct patches of diseased or prematurely senescing plants in the field. Patches visible from the edge of the field were checked by digging out plants and observing the roots for symptoms of clubroot.

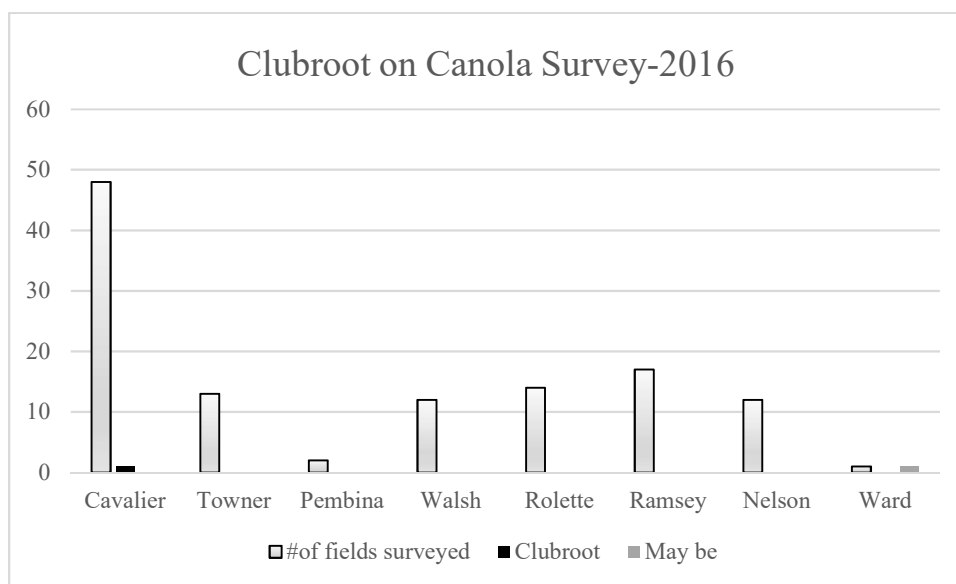
2nd phase:

After swathing:

The methodology of scouting at swathing was based on the methodology followed in Canada by the Alberta Agricultural and Rural Development (AARD) for clubroot disease survey. AARD indicated that the incidence of clubroot is more in the field entrances. The survey was done from the field main entrances. From the main entrance in the field, the survey group walked along in a “W” pattern by stopping at 10 spots and uprooting 10 consecutive stems from the ground at each spot. Excess soil was shaken off. Roots were visually examined for presence of galls. At sample sites where infection was observed or suspected, root specimens with galls, along with soil, were double bagged and labeled with the field location. Infected roots and soil samples from possible fields with clubroot were submitted to Dr. Luis Del Rio’s laboratory for molecular confirmation and pH determination, respectively. Each sampling point was separated by 100 meters. In all, roots of 100 stems were evaluated for the presence of clubroot and incidence was noted. Disease severity was done by using a rating scale.

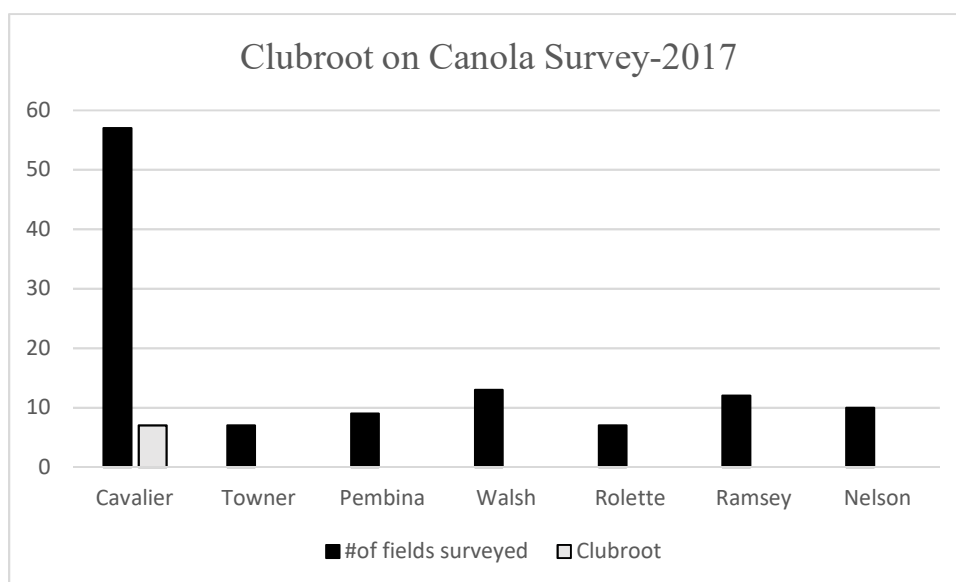
Clubroot Rating Scale: In fields where clubroot is found, roots within the 1 m² area at each sampling location were dug from the soil and rated on a four-point scale, where: 0 = no galls, 1 = a few small galls, 2 = moderate galling and 3 = severe galling.

Figure 1: Fields surveyed in 2016 for prevalence of clubroot over 8 counties.



In 2016, 119 fields in eight counties were surveyed by our research group (Figure 1). One positive clubroot field has been identified in Cavalier County. The level of clubroot incidence in the positive clubroot field was 99% with maximum severity of root galling (Rating Scale range 3). One field in Ward County (Figure 1) was found with severity rating of 2. The molecular analysis (Polymerase Chain Reaction) report from Dr. Luis Del Rio indicated negative to clubroot. The clubroot like symptoms on canola root can be attributed to root hybridization in canola, which is often confused with clubroot symptoms.

Figure 2: Fields surveyed in 2017 for prevalence of clubroot over 8 counties.



In 2017, 115 canola fields were surveyed and seven fields have been identified as potentially infected with clubroot. Samples were sent for molecular diagnosis to Dr. Luis Del Rio’s laboratory in Fargo.

Determination of Soil pH: Soil samples from clubroot positive fields and from the clubroot suspected fields were collected as per the procedure described by the Manitoba Agriculture, Food and Rural Development (MAFRD), Canada. The soil samples were submitted to the NDSU soil-testing laboratory in Fargo and the soil pH is presented in Table 1.

Table 1: Latest pH of soil samples collected in each county from canola fields during the 2017 clubroot survey.

Depth of soil sample	pH	GPS Coordinates		County	Clubroot Response
		N	W		
0-6	6.46	48. 54. 612	98. 04. 805	Cavalier	Negative
0-6	6.96	48. 47. 405	98. 12. 758	Cavalier	Negative
0-6	7.12	48. 52. 560	97. 17. 661	Pembina	Negative
0-6	6.45	48. 57. 790	97. 36. 738	Pembina	Negative
0-6	7.18	48. 26. 733	98. 20. 928	Ramsey	Negative
0-6	7.06	48. 42. 256	99. 48. 990	Rolette	Negative
0-6	6.85	48. 53. 596	99. 39. 401	Rolette	Negative
0-6	6.97	48.48. 909	99. 18. 456	Towner	Negative
0-6	7.26	48. 50.908	99. 09. 096	Towner	Negative
0-6	7.19	48. 28. 808	97. 43. 905	Walsh	Negative
0-6	8.13	48. 34. 342	98. 12. 243	Walsh	Negative

*All the positive clubroot samples have soil pH ranging from 4.5 to 5.7.

Clubroot on Canola Awareness Meetings:

Clubroot on canola awareness meetings were conducted across the area; five in Cavalier, two in Pembina, two in Walsh, and one in Towner County during the growing season. The survey report were sent at the end of the season to growers and other commodity groups. Ramsey and Nelson counties were covered in the Lake Region Roundup meeting on January 4, 2017. One meeting in Rolette County was conducted the last week of March. The same number of meetings will be conducted in 2018-2019.

Outcome: Meetings on creating awareness of clubroot on canola and its management in various counties showed measurable improvement in growers understanding the disease clubroot on canola. Several growers came forward to cooperate in clubroot management research. Phone calls in the growing season and requests for personal visits to the grower’s fields with clubroot concerns increased. Knowledge of crop rotation, planting resistant varieties and sanitation implementation were the major topics and will be considered for future canola production in the northeastern North Dakota region.

Acknowledgements:

Funding provided by the North Central Canola Research Program and the Northern Canola Grower’s Association in 2016.

Agriculture extension agents who helped in the survey and in conducting clubroot awareness meetings in respective counties.

Evaluation of Various Chemicals, Cruciferous Hosts and Canola Cultivars to Manage Clubroot on Canola in Field Conditions

Venkat Chapara

Objective 1: Evaluating the effects of adding fungicides and pH- altering soil amendments to soil of clubroot on canola incidence and severity in field conditions.

Nine treatments consisting of fungicides and various compounds (Table 1) that can alter pH or other characteristics of the soil were amended to soil and were compared with non-treated checks to evaluate their efficacy against clubroot pathogens under field conditions.

Treatments of wood ash, pellet lime, beetlime and gypsum were applied seven days before planting into the soil at a depth of three to four inches and thoroughly mixed in soil with a rototiller.

Whereas, the rest of the treatments were applied just before planting into the soil at a depth of three to four inches thoroughly mixed in the soil with a rototiller.

Table 1: List of products that were amended in soil to manage clubroot on canola

PRODUCT	TRADE NAME	DOSAGE
CYAZOFAMID	Ranman	7.5 l/ha
FLUAZINAM	Allegro	2000 g/ha
PCNB	Terrachlor	237 ml/plant as a drench
WOOD ASH	Fly Ash	7.5 t/ha
CALCIUM CARBONATE	Pellet Lime	7.5 t/ha
BEET LIME	Versa Lime	15 t/ha
GYPSUM	Gypsum	7.5 t/ha
NANO-PARTICLE	Zn	500mg Zn
NON-IONIC SURFACTANT	Aqua-Gro 2000	10g/m Incorporated into rows just before planting
NON-TREATED	Check	

Variety: DKL 30-42 RR

Plot Size: 3 ft. x 5ft.

Planted on: 6/5/2017 (Hand planted after thorough tillage with a rototiller.)

Field Design: Randomized Complete Block Design (RCBD) with four replications.

Clubroot Evaluated on: 7/31/2017

Rating scale used: Clubroot rating scale: 0 = no galling; 1 = a few small galls (small galls on less than 1/3 of roots), 2 = moderate galling (small to medium-sized galls on 1/3 to 2/3 of roots), 3 = severe galling (medium to large-sized galls on more than 2/3 of roots) (S.E. Strelkov).

Figure 1: Efficacy of fungicides and soil ameliorating products against clubroot incidence in field conditions.

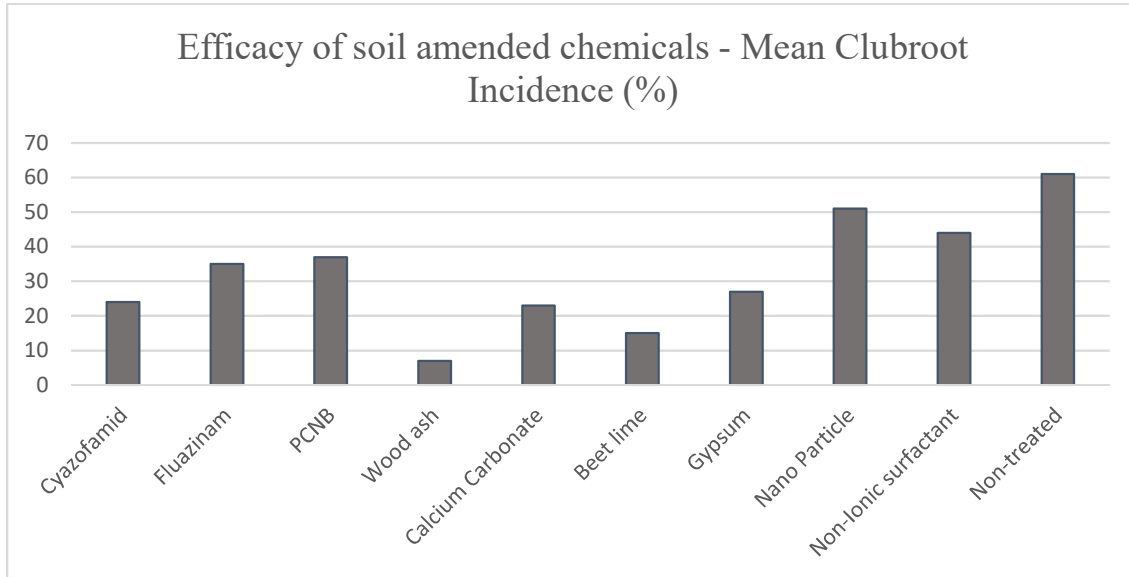


Figure 2: Efficacy of fungicides and soil ameliorating products against clubroot severity in field conditions.

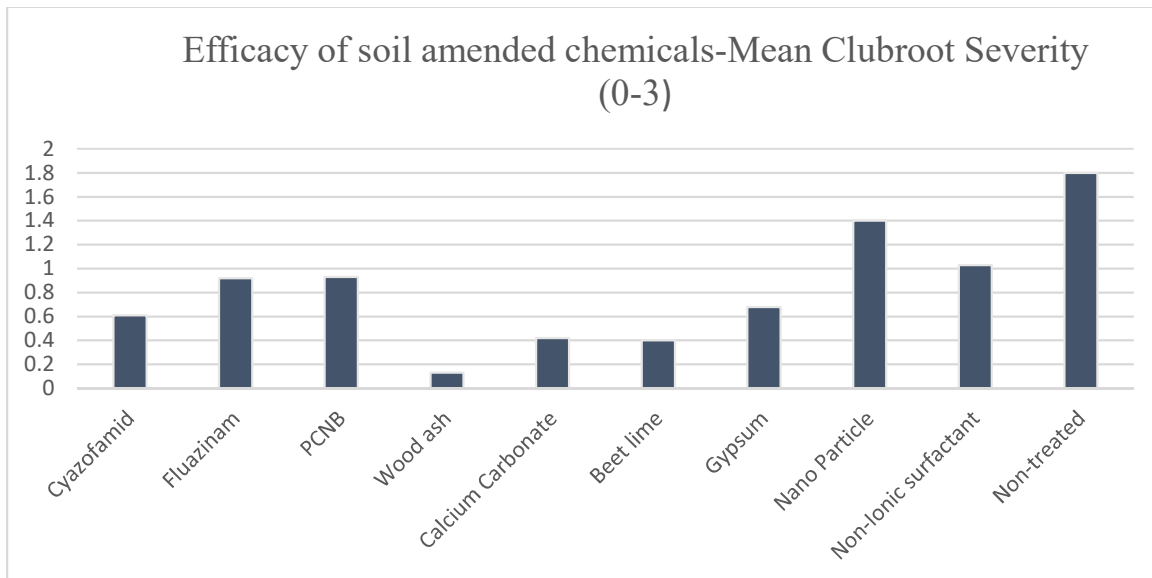
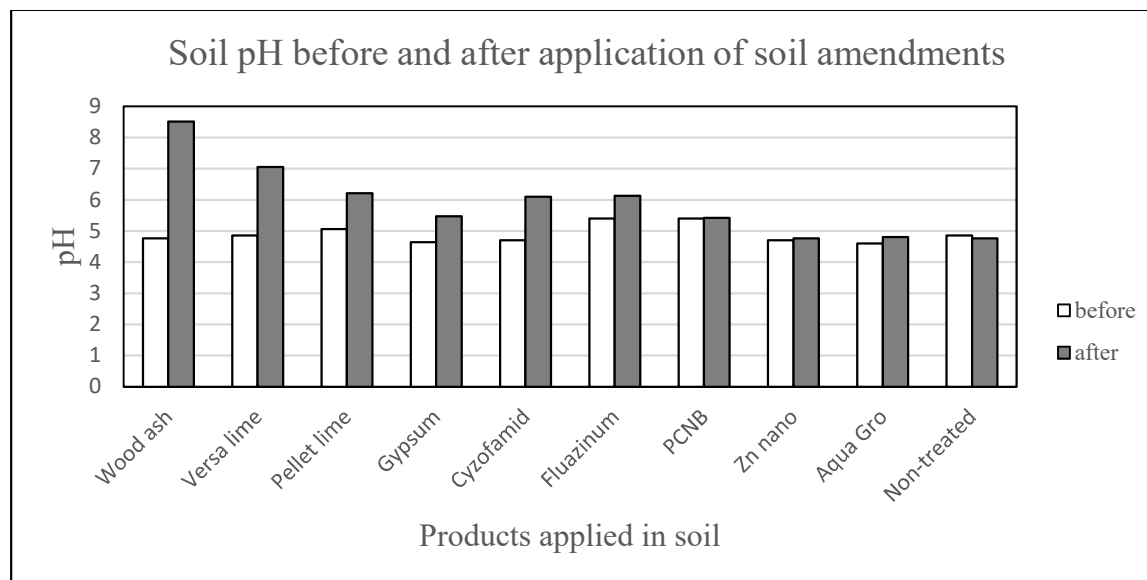


Figure 3: Soil pH before and after application of soil amendments to manage clubroot on canola.



Results: Significant differences in clubroot incidence and severity were observed in wood ash treatment followed by beet lime and calcium carbonate than the other treatments used. However, results of wood ash are debatable as the emergence was very poor in all four replications. In general emergence and growth of many crop plants cease at 8.5 pH. This could be one of the reasons for low emergence in wood ash treated plots. Beet lime (Versa lime) and calcium carbonate (Pellet lime) results are considerable. These results are worth testing for a few more seasons in field conditions. The pH changes from acidity to alkalinity of the soil in the treated plots after application of beet lime and versa lime can result in low clubroot disease incidence and severity.

Objective 2: Evaluating the symptoms caused by clubroot pathogen on various hosts of brassica family in field conditions.

Cruciferous host plants: Ten host plants from cruciferous family were planted

Plot Size: 3 ft. x 5ft.

Planted on: 6/5/2017 (Hand planted after thorough tillage with a rototiller.)

Field Design: Randomized Complete Block Design (RCBD) with four replications.

Clubroot Evaluated on: 7/31/2017

Figure 4: Mean clubroot incidence (%) on various cruciferous hosts.

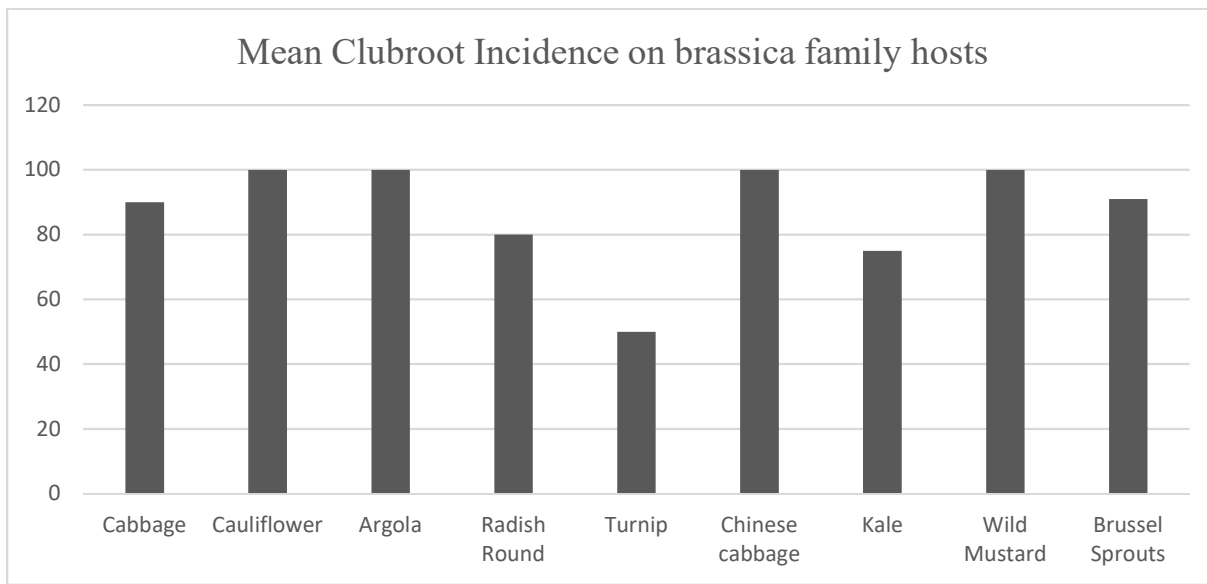
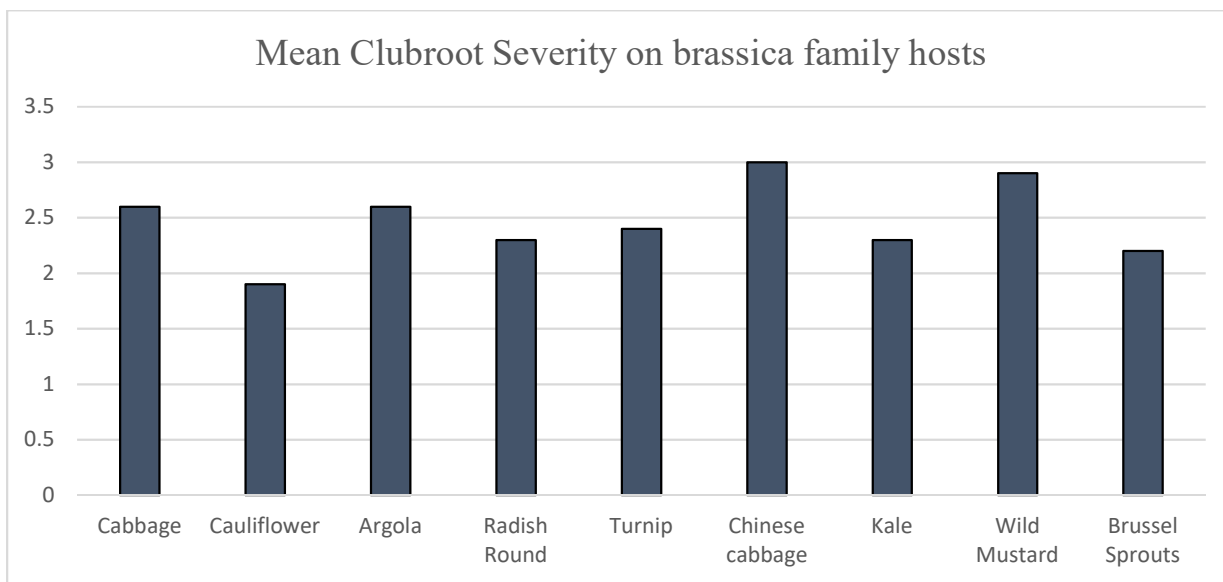


Figure 5: Mean clubroot severity (%) on various cruciferous hosts.



Results: Out of the ten cruciferous hosts planted, seeds of shepherd’s purse did not germinate. The remaining nine host plants showed positive response to clubroot infection. The cruciferous host turnip had significantly less incidence of clubroot. More seasons of evaluations in field conditions are needed.

Objective 3: Evaluation of commercial canola cultivars against clubroot pathogen in field conditions.

Plot Size: 3 ft. x 5ft.

Nine commonly cultivated canola varieties have been planted along with an experimental line of canola (Table 2).

Table 2: Commonly cultivated canola varieties in Cavalier County.

S.No	Cultivar	Clubroot Response	Source
1	DKL 30-42	Susceptible	CHS
2	InVigor L252	Susceptible	Grower
3	InVigor L233P	Susceptible	Grower
4	Integra 7150rr	Susceptible	Wilbur-Ellis
5	Integra 7257rr	Susceptible	Wilbur-Ellis
6	45CS40	CR	Pioneer
7	45H33	CR	Pioneer
8	InVigor L241C	CR	Bayer
9	Bayer Exptl.	CR	Bayer
10	Nexera 1022RR	CIR	Simplot

Note:

CR: Clubroot resistant

CIR: Clubroot intermediately resistant

Planted on: 6/5/2017 (Hand planted after thorough tillage with a rototiller.)

Field Design: Randomized Complete Block Design (RCBD) with four replications.

Clubroot Evaluated on: 7/31/2017

Figure 6: Mean clubroot incidence (%) on various commercially available cultivars of canola.

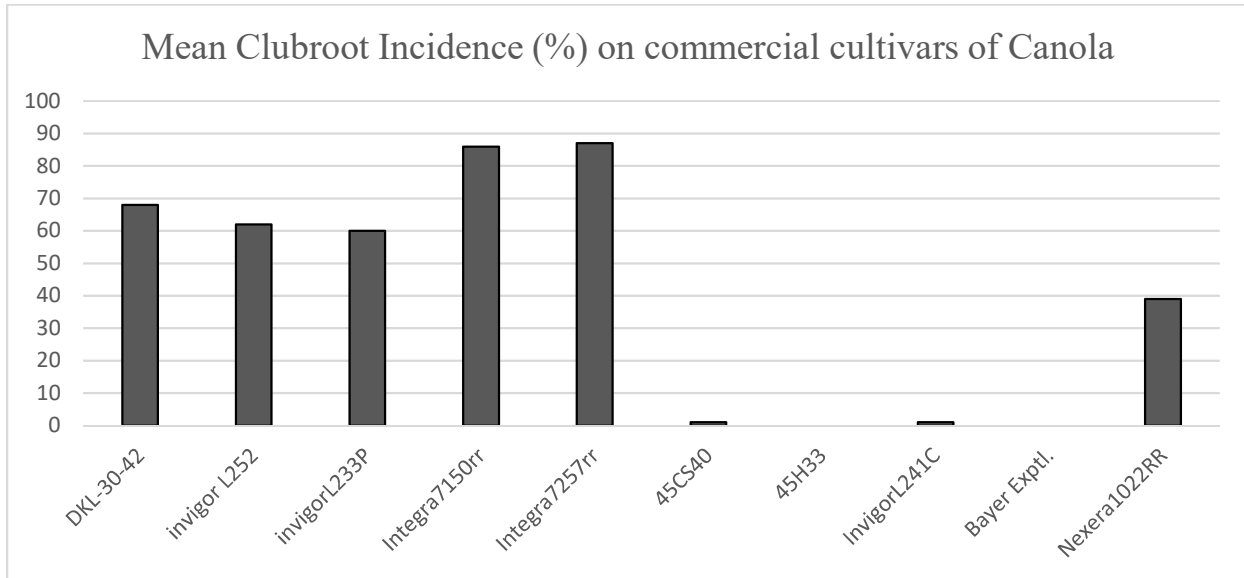
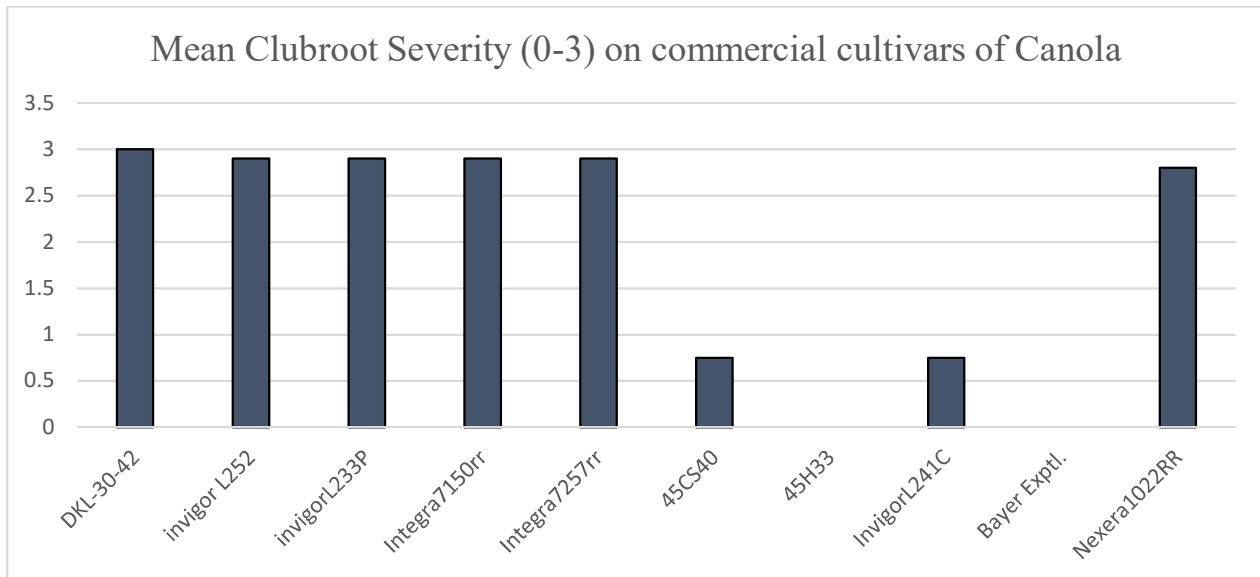


Figure 7: Mean clubroot severity (0-3) on various commercially available cultivars of canola.



Note: Bayer Experimental variety is now available as InVigor© L255P in North Dakota.

Results: Canola cultivars 45H33 and an experimental line of canola (InVigor© L255P) showed zero percent in clubroot incidence and severity followed by low incidence (1%) and severity (0.75%) in canola cultivars “45CS40” and “InvigorL241C” and were significantly different from the other varieties tested.

Additional commercial cultivars to this list will be very helpful to the growers.

Acknowledgements:



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Fungicide Evaluation to Manage White Mold in Canola

Amanda Arens and Venkat Chapara

The research trial was conducted at the Langdon Research Extension Center and was planted on May 19th 2017 with the canola variety “DKL 30-42 (Roundup Ready)” in a randomized complete block design and replicated four times. Canola production recommendations for northeast North Dakota from the North Dakota State University Extension Service were followed. The plot size was 5 ft. x 16 ft. long with a canola border between each plot. The trial was irrigated with an overhead sprinkler system set for 1 hour every day beginning one week before the start of bloom to 4 weeks after bloom to help increase disease infection levels. Fungicides were applied at 20% bloom using a CO₂-pressurized backpack style sprayer with a three nozzle boom (XR-8002) at 20 GPA and were repeated 8 days after first spray. The amount of white mold infection obtained in the research plots was natural. Fifty plants per plot were rated on a scale of 0-5 (where 1=superficial lesions or small branch infected; 2=large branch(es) dead; 3=main stem at least 50% girdled; 4=main stem girdled but plant produced good seed; 5=main stem girdled, much reduced yield). The levels of incidence and severity were recorded for each plant prior to swathing (August 18). A white mold disease severity index was calculated with weighted scale of incidence and severity ratings.

Table 1: Efficacy of commercially available fungicides in managing white mold and their influence on yield and test weight.

Treatments	Dosage	White Mold	Yield	Test Weight
	(Fl oz/A)	DSI*	(lbs/A)	(lbs/bu)
Approach + NIS	9	0.03	3794	52
Endura + NIS	6	1.33	4086	52
Proline + NIS	4.3	0.28	4200	52
Quash + NIS	3	0.19	3968	52
Topsin	231(g/A)	0.23	4372	52
CHECK	Check	1.46	3769	52
Mean		0.59	4031	52
CV (%)		59	14	0.76
LSD		0.62	1014	0.7
p-Value		0.0006	NS	NS

NIS: Non-Ionic Surfactant 0.25% V/V

DSI*: White Mold Disease Severity Index

NS: Non-Significant

The results indicate there were significant differences obtained among the fungicides tested and the non-treated check. More white mold DSI was observed in Endura and the non-treated check while Approach was low. There were no significant differences among the treatments when yield and test weights were compared.

Acknowledgements: Bryan Hanson, Travis Hakanson and Lawrence Henry for their technical support.

Management of Blackleg in Canola with Fungicides

Amanda Arens and Venkat Chapara

The research trial was conducted at the Langdon Research Extension Center and was planted on May 19, 2017 with the canola variety “DKL 30-42 (Roundup Ready)” in a randomized complete block design with four replications. Canola production recommendations for northeast North Dakota from the North Dakota State University Extension Service were followed.

The plot size was 5 ft. x 16 ft. long with a canola border between each plot. Two applications of fungicides were applied at the 2-4 leaf stage and 14 days after the first application using a CO₂-pressurized backpack style sprayer with a three nozzle boom (XR-8002) at 10 GPA. The level of blackleg was of natural infection. The severity of blackleg infection was evaluated on 100 plants averaged over four replicates after swathing on August 25. Individual plants were uprooted, cut through the basal part of the stem and scored on the percent of diseased tissue visible in the cross-section. The ratings were zero when no diseased tissue was visible in the cross-section, and 100 if the diseased tissue occupied 100 percent of the cross-section with significant constriction of affected tissues, drying of tissue and brittle or the plant was completely dead.

The results indicate there were no significant differences obtained among the variables tested when compared with that of the non-treated check except in yields. Yields of Proline treated plots are significantly different from the other treatments in the trial.

Table 1: Efficacy of commercially available fungicides in managing black leg and their influence on yield and test weight.

Treatment	Dosage (Fl oz/A)	Application Timing	Black Leg		Yield (lbs/A)	Test Weight (lb/bu)
			Incidence (%)	Mean Severity*		
Non-treated	Check	Check	36	0.48	2646	52
Headline	6	2-4 leaf+14DAA	29	0.25	2385	52
Priaxor	6	2-4 leaf+14DAA	21	0.34	2479	52
Proline	4	2-4 leaf+14DAA	20	0.28	3121	52
Mean			27	0.34	2657	52
CV (%)			63	41	11	0.3
LSD			26	0.21	438	0.25
p-Value			NS	NS	0.01	NS

*Black Leg Mean Severity: was calculated by multiplying the category value (0-5)*actual severity (0.2,0.4,0.6,0.8,1.0), and summing, then dividing by the infected plant count.

NIS: Non-Ionic Surfactant was added at 0.25% V/V in all the fungicide treatments.

Acknowledgements: Bryan Hanson, Travis Hakanson and Lawrence Henry for their technical support.

Management of Fusarium Head Blight in Spring Wheat Cultivars with Fungicides

Venkat Chagara, Amanda Arens, and Andrew Friskop

Objective: To evaluate the efficacy of fungicides in single and sequential applications to manage Fusarium head blight (FHB) in hard red spring wheat (HRSW).

Methods:

Location: NDSU Langdon Research Extension Center.

Experimental Design: Randomized complete block with split plot arrangement, four replications.

Previous crop: Soybean

Cultivars of HRSW tested: WB Mayville and SY Ingmar

Planting: 1.2 million pure live seeds/A planted on May 5, 2017. A border plot was planted between treated plots to minimize interference from spray drift.

Plot size: Seven rows at six inch spacing, 5 ft. x 20 ft., mowed back to 5 ft. x 16 ft.

Herbicides Applied: Axial XL (16.4 Fl. oz/A) + Huskie (15 Fl. oz/A) + Prowl H₂O (36 Fl. oz/A)

Inoculation: Plots were inoculated by spreading corn spawn inoculum at around boot stage (Feekes 9-10) at the rate of 300 g/plot.

Disease development: Supplemental moisture was provided by running overhead irrigation from Feekes 9 to 11.25 at the rate of one hour per day to create a conducive environment for FHB development.

Fungicide treatments: Fungicides were applied, with a CO₂-pressurized backpack sprayer with a three nozzle boom (XR-8002) and the water volume used was 20 GPA. Fungicide application was made at Feekes 10.51 (anthesis) on July 7 and repeated 4 days after the first spray (July 13, 2017). Refer to Table 1 for the treatments, dosages and application timings.

Disease Assessment: Data on FHB incidence was obtained by counting the number of heads showing FHB symptoms out of 50 heads. FHB head severity was rated using 0-100% scale on arbitrary 50 heads, excluding two outer rows. FHB index (Index) was calculated using formula: Index = (SEV*INC)/100.

Harvest: Plots were harvested on August 24 with a small plot combine and the yield was determined.

Data Analysis: Statistical analysis was done using SAS. Fisher's least significant difference (LSD) was used to compare means at $p = 0.05$. Actual means are presented in the table for simplicity of understanding.

Results:

The HRSW Cultivar “WB-Mayville” is significantly different from the cultivar “SY-Ingmar” in all the parameters tested in the current research trial. On the cultivar “WB-Mayville,” all the fungicide treated treatments are significantly different from both checks when compared with the parameters tested. Similarly, on the HRSW cultivar “SY-Ingmar” both the checks are significantly different than the fungicide treatments. The treatment Proline at anthesis and foliar at 4 days after anthesis has low FHB Index (0.03), and higher DON (4.9 ppm). Whereas, the treatment Prosaro at anthesis and 4 days after anthesis with FHB Index of 0.04 and lower DON (1.1 ppm) content when compared with all the treatments of the trial. However, there were no significant differences in yields, test weights, seed count, FDK parameters among the fungicide treatments and were significant to the non-treated inoculated and non-treated non-inoculated checks.

Table 1: Fungicides tested alone and in combinations on two HRSW varieties at two application timings to manage Fusarium head blight and evaluation of their influence on yield and other grain characteristics: toxin (DON) content, FDK, and test weight.

Treatments, Dosage and Application Time	Cultivar	Fusarium Head Blight Index	Yield Bu/A	Test weight lbs/bu	Seed count #	Seed weight (g)	FDK (%)	DON (ppm)
Non-treated, Non-inoculated	MB-Mayville	30.5	32	57	107	3	13	9.9
Non-treated, Inoculated	MB-Mayville	16	33	58	106	3	11	7.9
Prosaro @ 6.5 oz - Feekes 10.51	MB-Mayville	1.0	60	60	101	4	3	5.5
Prosaro @ 6.5 oz - Feekes 10.51, Caramba @ 14 oz at 4 days after 1st application	MB-Mayville	0.1	61	61	106	4	2	1.5
Caramba @ 14 oz - Feekes 10.51, Folcur @ 4 oz - at 4 days after 1st application	MB-Mayville	1.2	54	60	104	4	2	4
Proline @ 5.7 oz - Feekes 10.51, Folcur @ 4 oz - at 4 days after 1st application	MB-Mayville	1.0	59	60	104	4	4	1.5
Prosaro @ 6.5 oz - Feekes 10.51 + 4 days	MB-Mayville	1.1	60	61	103	4	2	3.5
Non-Treated, Non-Inoculated	SY-Ingmar	6	45	59	103	3	6	7
Non-treated, Inoculated	SY-Ingmar	17	42	59	102	3	4	8
Prosaro @ 6.5 oz - Feekes 10.51	SY-Ingmar	0.4	59	60	104	3	3	1.4
Prosaro @ 6.5 oz - Feekes 10.51, Caramba @ 14 oz at 4 days after 1st application	SY-Ingmar	0.1	68	61	100	3	0.25	1.8
Caramba @ 14 oz - Feekes 10.51, Folcur @ 4 oz at 4 days after 1st application	SY-Ingmar	0.4	67	61	102	3	0.75	2.9
Proline @ 5.7 oz - Feekes 10.51, Folcur @ 4 oz at 4 days after 1st application	SY-Ingmar	0.03	66	61	102	3	0.75	4.9
Prosaro @ 6.5 oz - Feekes 10.51 + 4 days	SY-Ingmar	0.04	66	60	102	3	0.5	1.1
	Mean	5.3	55	60	103	3	4	5
	CV (%)	101	12	1	4	7	55	93
	LSD (0.05)	8	9	0.9	6	0.3	2.9	6.3
	p-Value>F	<0.001	<0.001	<0.001	NS	<0.001	<0.001	NS

Note: Non-treated, non-inoculated received no artificial inoculum

DON: Deoxynivalenol

FDK: Fusarium Damaged Kernels

Acknowledgements: Bryan Hanson, Travis Hakanson and Lawrence Henry for their technical support and USWBSI for funding.

DETERMINING THE ECONOMIC RESPONSE OF SODIC SOILS TO REMEDIATION BY GYPSUM, ELEMENTAL SULFUR AND VERSALIME IN NORTHEAST NORTH DAKOTA ON TILED FIELDS

By

Naeem Kalwar (Extension Area Specialist/Soil Health)

INTRODUCTION:

Saline and sodic soils have been reported in North Dakota since the 1960s. NDSU Extension Bulletin No. 2 reported more than 1 million acres are affected by high salt levels, whereas, more than 2 million acres are said to have excessive levels of sodium (Salt Affected Problem Soils in North Dakota, Their Properties and Management by Gordon A. Johnsgard, reprinted in 1974). This is a result of high salt and sodium levels in the soil parent material and the underlying sodium-rich shale present in the bedrock below the soil sediments. Rising groundwater levels and resulting capillary rise of soil water leads to the accumulation of excessive soluble salts (salinity) and sodium (sodicity).

Saline soils will have excessive levels of soluble salts in the soil solution which are a combination of positively and negatively charged ions (for example, table salt; Na^+Cl^-). High levels of ions (positive and negative) from soluble salts restrict normal water uptake by plant roots, even when soils are visibly wet, resulting in drought-stressed plants (“osmotic effect”).

Saline soils having higher levels of calcium (Ca^{2+}) based salts will have good structure. That happens as calcium (Ca^{2+}) ions encourage aggregation of soil particles called flocculation (clumping together), resulting in well-defined pores facilitating free water movement through the soil profile.

In contrast to saline soils, sodic soils are highly saturated with sodium ions (Na^+) at the soil cation exchange sites. High Na^+ levels compared to Ca^{2+} in combination with low salt levels can promote “soil dispersion,” which is the opposite of flocculation. Soil dispersion causes the breakdown of soil aggregates, resulting in poor soil structure (low “tilth” qualities). Due to the poor soil structure, sodic soils have dense soil layers, resulting in very slow permeability of water through the soil profile. Due to poor soil structure, when wet, sodic soils will be gummy and may seem like they have “no bottom” to them, and when dry, they can be very hard.

OBJECTIVES:

Remediation of soil sodicity requires application of amendments that supply Ca^{2+} followed by salinity remediation practices of improving soil drainage and lowering the groundwater level. Ca^{2+} displaces Na^+ from the cation exchange sites and Na^+ moves into soil solution where it converts into a salt (Na_2SO_4) and leaches out with rainfall or irrigation.

An effective way to lower groundwater levels is to install a field tile drainage system. Since tiles are generally three to four feet below the surface, the efficiency of a tile drainage system depends upon the permeability of soil layers above the tiles. This requires analyzing soils for salts and Na^+ . In case of high Na^+ levels, not adding Ca^{2+} can render tiling ineffective. That could be achieved by sampling the areas in question and getting the samples analyzed by a soil laboratory. For detailed information on sampling for salts and Na^+ , please refer to the NDSU Publication: SF-1809; “Soil Testing Unproductive Areas”. Another NDSU publication that provides detailed information regarding the suitability of soils for tiling is: SF-1617; “Evaluation of Soils for Suitability for Tile Drainage Performance”.

Challenges for landowners considering tiling could be:

1. If the Na^+ levels are high in the soils they would like to tile?
2. In case of high levels of Na^+ , what should they do first, tile or apply the amendments?

In July 2014, the Langdon Research Extension Center (LREC) tilled a field that had excessive levels of Na⁺ and moderately high levels of soluble salts. This consisted of 12 research plots with three replications. In order to replicate field conditions, the project site was tilled in July 2014 prior to starting sodicity remediation by applying soil amendments that are suitable and easily available to northeast North Dakota growers. Soil amendments were applied one-year after tiling in July and August of 2015.

The following objectives were set in order to achieve research goals.

- Can tiling be successful on sodic or saline-sodic soils prior to starting sodicity remediation?
- Comparing the relationship between varying water table levels and resulting soil salt and Na⁺ levels.
- Analyzing water samples from the lift station, upstream and downstream for human and livestock health.

TRIAL LOCATION AND SITE DESCRIPTION:

This trial site is located at the NDSU Langdon Research Extension Center, Langdon, North Dakota. As per web soil survey, soil series are Cavour-Cresbard and Hamerly-Cresbard loams.

TRIAL DESIGN AND PLOT SIZE:

Trial design is a randomized complete block. Each plot is 325 X 80 feet.

METHODOLOGY:

Soil Chemical Analysis

Four feet deep soil samples in 12" increments from each plot were collected in September 2014, directly after tiling. Using the same protocol, site was sampled again in June 2016 (two-year after tiling and one-year after applying the amendments) and in June 2017 (three years after tiling and two years after applying the amendments). Each sampling activity included 48 soil samples (12 plots x 4 depths = 48 samples). All samples were analyzed for Salts (Electrical Conductivity or EC) and sodium (Sodium Adsorption Ratio or SAR), pH, calcium carbonate equivalent (CCE), bicarbonate (HCO₃⁻), chlorides (Cl⁻), sulfates (SO₄²⁻), saturation percentage, calcium (Ca²⁺), magnesium (Mg²⁺), sodium (Na⁺), potassium (K⁺) and nitrate-nitrogen (NO₃-N⁻) for 0-4 feet depths. Soil phosphorus (P) and organic matter percent (O.M. %) were analyzed at the 0-2 feet depths. In addition, cation exchange capacity (CEC) was measured for the first foot.

Weekly Groundwater Level Measurements

Groundwater levels were measured on a weekly basis in 2015, 2016 and 2017 from May-October through the seven-foot deep observation wells installed in each plot in 2015.

Water Sample Analysis

Water samples were collected from the lift station, upstream and downstream in fall-2015 and May, July and September of 2016 and in May and August of 2017. The samples were analyzed by the ND Department of Health for Group 2 complete mineral chemistry, Group 7 trace metals and Group 30 nutrients.

Treatments and Replications

Soil amendment rates were calculated to bring the SAR (SAR-final) numbers to an acceptable level of 3 in the first foot. This was done by deducting three from the actual SAR numbers (SAR-initial). SAR-final values were converted into Exchangeable Sodium Percentage (ESP) by using the formula given in "Diagnosis and Improvement of Saline and Alkali Soils" (USDA Salinity Laboratory Staff, Agriculture Handbook No. 60, 1954, Page-26). Gypsum rates were then calculated by using a standard formula given in the same handbook (page-49). For each ton of 100% pure gypsum, 0.19 ton of 100% pure elemental sulfur was applied (Reclaiming Saline, Sodic, and Saline-Sodic Soils. University of California, ANR Publication 8519, August 2015). Considering the very low solubility of VersaLime, for each ton of 100% pure gypsum, three tons of VersaLime were applied. Differences in

amendment purities were compensated by using the formula given in “Reclaiming Sodic and Saline/Sodic Soils” (Drought Tips Number 92-33, University of California Cooperative Extension, 1993).

The following treatments were applied in three replications.

- i. Control.
- ii. Full rate of 99.5% pure gypsum to lower soil SAR-final levels to 3.
- iii. Full rate of VersaLime to lower the soil SAR-final levels to 3.
- iv. Full rate of 90% pure elemental sulfur (S⁰) to lower the soil SAR-final levels to 3.

Details of amendment rates for each treatment and replication are in Table 1 below.

Table 1. Details of Amendment Rates for each Treatment.

Treatments and Replications	99.5% Gypsum tons/plot	90% Elemental Sulfur tons/plot	VersaLime tons/plot
R1T1	0	0	0
R1T2	4.47	0	0
R1T3	0	0	8.74
R1T4	0	2.10	0
R2T1	0	0	0
R2T2	7.25	0	0
R2T3	0	0	30.45
R2T4	0	0.61	0
R3T1	0	0	0
R3T2	10.67	0	0
R3T3	0	0	22.93
R3T4	0	2.16	0
Total	22.40	4.87	62.14

Note: Gypsum and elemental sulfur were applied on June 29th, whereas, VersaLime was applied on July 23, 2015. After spreading, all of the amendments were rototilled into the soil. Control plots were also rototilled for uniformity purposes. Control structures for all of the treatments were fully opened right after the incorporation of the amendments in order to simulate free drainage and achieve maximum leaching conditions.

RESULTS AND DISCUSSION:

This is a preliminary report as the data is still being analyzed. The findings below are based on the statistical analysis of the 2016 and 2017 soil salt, Na⁺ and pH levels versus 2014 results by using SAS package 9.4 at 95% confidence interval. In addition, soil analysis results used for statistical analysis were averages of the zero to four feet depths of each plot (treatment).

At the Time of Tiling (2014):

At the time of tiling, all plots had moderately high salt levels with control plots having the lowest levels (EC mean = 7.39 dS/m) and gypsum plots having the highest levels (EC mean = 9.58 dS/m). The soil Na⁺ levels in all of the plots were high to very high with control having the lowest levels (SAR mean = 12.58) and gypsum plots having the highest levels (SAR mean = 18.36). Soil pH of all plots were close to neutral. Details are in Table 2.

Table 2. The Treatment means of the Soil Salt, Na⁺ and pH Levels at the Time of Tiling (2014).

Soil Property	2014 Treatment Means			
	Control	Gypsum	VersaLime	E-Sulfur
EC (dS/m)	7.39	9.58	9.19	8.91
SAR	12.58	18.36	16.33	16.58
pH	7.05	7.04	7.14	6.94

Two-years After Tiling and One-year After the Application of Soil Amendments (2016):

Statistically, there were no significant differences in the soil EC (salts), SAR (Na⁺) and pH levels (Table 3) compared to the levels at the time of tiling.

Table 3. 2016 Statistical Data of the Soil Salt, Na⁺ and pH Levels.

Soil Properties	Mean	C.V. %	LSD	F-value	P > F
EC (dS/m)	3.75	18.70	1.32	3.82	0.0576
SAR	16.45	27.65	8.57	3.04	0.0924
pH	7.90	0.88	0.13	0.48	0.7074

Based on the differences in treatment means, compared to 2014, soil salt levels decreased in 2016 in all plots irrespective of the treatment effects under improved drainage due to tiling. The largest decrease was observed in control plots, followed by gypsum, VersaLime and E-sulfur. This is logical as initially gypsum, VersaLime and E-sulfur reactions lead to higher salt levels. In addition, despite having the highest EC levels at the time of tiling, gypsum plots recorded the highest decrease in EC after the control plots. Soil Na⁺ levels, however, increased in gypsum and E-sulfur plots by 17% and 10% respectively. In 2016, soil pH levels increased in all plots compared to 2014. The reason for higher soil pH levels in 2016 could be due to the higher soil moisture levels at the time of sampling in June 2016 when North Dakota Agriculture Weather Network (NDAWN) Langdon Station recorded a monthly total of 3.97” of rainfall. At the time of 2014 sampling in September, Langdon recorded a monthly total of 0.68” of rainfall. Detailed comparisons of treatment means are in Table 4.

Table 4. Comparison of 2016 and 2014 Treatment Means.

Treatment	Comparison of 2016 and 2014 Treatment Means			
	Year	EC (dS/m)	SAR	pH
Control	2016	2.59	10.72	7.87
	2014	7.39	12.58	7.05
	Difference	-4.80	-1.86	0.81
Gypsum	2016	3.98	21.51	7.91
	2014	9.584	18.36	7.04
	Difference	-5.59	3.15	0.86
VersaLime	2016	4.03	15.32	7.89
	2014	9.19	16.33	7.14
	Difference	-5.16	-1.01	0.75
E-Sulfur	2016	4.39	18.27	7.94
	2014	8.91	16.58	6.94
	Difference	-4.51	1.68	0.99

Three-years After Tiling and Two-years After the Application of Soil Amendments (2017):

In 2017, soil SAR levels (Na⁺) were significantly lower in control plots versus gypsum and VersaLime plots. This may be a result of control plots having the lowest EC and SAR levels at the time of tiling (2014). No significant differences were found in soil EC (salts) and pH. Details are in Table 5.

Table 5. 2017 Statistical Data of the Soil Salt, Na⁺ and pH Levels.

Soil Properties	Mean	C.V. %	LSD	F-value	P > F
EC (dS/m)	6.59	21.82	2.71	2.07	0.1829
SAR	15.15	15.14	4.32	5.88	0.0202
pH	7.92	1.62	0.24	0.49	0.6995

The comparisons of 2017 and 2014 treatment means showed a steady decrease in soil salt levels in 2017 as well. Like 2016, gypsum plots recorded highest decrease in EC after control plots. This could be due to the higher solubility and fast reacting nature of gypsum versus VersaLime and E-sulfur. Soil Na⁺ levels decreased in control, gypsum and e-sulfur plots, whereas, an increase (SAR mean = 1.14) was observed in the VersaLime plots. Soil pH levels also increased in 2017 compared to 2014 in all plots. That may again be due to the higher soil moisture levels in June of 2017 when soil samples were taken as Langdon recorded 2.94" of rainfall during the month (Table 6).

Table 6. Comparison of 2017 and 2014 Treatment Means.

Treatment	Comparison of 2017 and 2014 Treatment Means			
	Year	EC (dS/m)	SAR	pH
Control	2017	4.81	10.77	7.90
	2014	7.39	12.58	7.05
	Difference	-2.58	-1.81	0.84
Gypsum	2017	7.01	17.64	7.95
	2014	9.58	18.36	7.04
	Difference	-2.56	-0.72	0.90
VersaLime	2017	7.37	17.48	7.99
	2014	9.19	16.33	7.14
	Difference	-1.82	1.14	0.85
E-Sulfur	2017	7.17	14.71	7.87
	2014	8.91	16.58	6.94
	Difference	-1.73	-1.86	0.93

Changes in Soil Salt and Sodium Levels in 2017 versus 2016:

Based on the differences in the treatment means, in 2017, soil salt levels increased in all plots versus 2016. This could be an effect of drier weather in 2017, which resulted in the accumulation of soluble salts in the first four feet depth instead of downward movement. In 2017, Langdon recorded 10.11" of rainfall with a Potential Evapotranspiration (PET) of 34.89" from May 1 to October 31. For the same period in 2016, Langdon recorded 23.11" of rainfall with a Potential Evapotranspiration of 31.47". Soil Na⁺ levels increased in VersaLime plots in 2016, whereas, in 2017 increase was observed in VersaLime and control plots. Details are in Table 7.

Table 7. Comparison of 2017 and 2016 Treatment Means.

Treatment	Comparison of 2014 and 2017 Treatment Means			
	Year	EC (dS/m)	SAR	pH
Control	2017	4.81	10.77	7.90
	2016	2.59	10.72	7.87
	Difference	2.21	0.05	0.02
Gypsum	2017	7.01	17.64	7.95
	2016	3.98	21.51	7.91
	Difference	3.02	-3.87	0.03
VersaLime	2017	7.37	17.48	7.99
	2016	4.03	15.32	7.89
	Difference	3.33	2.16	0.09
E-Sulfur	2017	7.17	14.71	7.87
	2016	4.39	18.27	7.94
	Difference	2.77	-3.55	-0.06

Relationship between Groundwater Levels and the Varying Salt and Sodium Levels

The fluctuations in seasonal rainfall and resulting groundwater levels did affect soil salt levels. Largest decrease in EC levels were recorded in 2016 with shallower groundwater levels and higher seasonal rainfall (23.11”). In 2017, soil EC levels went up versus 2016, under lower groundwater levels and lower seasonal rainfall (10.11”). Overall, average individual groundwater levels in 2017 were 1.07 to 1.98 feet lower than 2016 (Table 8) with a rainfall shortfall of 13.0”. No effect of groundwater levels were recorded on SAR levels in 2015, 2016 and 2017 as gypsum plots had the highest means and control had the lowest means in all three years. The changes in soil pH were found to be consistent with soil moisture availability. Considering the four feet sampling depth, higher rainfall combined with shallower groundwater levels will result in higher soil moisture levels and high soil pH.

Table 8. Comparison of 2016 and 2017 Groundwater Level Treatment Means

Treatment	2015 Means	2016 Means	2017 Means
Control	4.44	3.78	4.98
Gypsum	4.53	3.49	5.20
VersaLime	4.96	4.09	5.75
E-Sulfur	3.99	3.55	5.11

Water Quality Draining from the Research Project Site for Human and Livestock Health

All minerals and nutrients affecting human and livestock health, were found to be within the acceptable limits in the samples coming out the Langdon REC Groundwater Management Research Project site.

CONCLUSION:

Based on four year’s data, soil salt levels consistently decreased in 2016 and 2017 compared to the levels at the time of tiling. However, sodium levels did increase in 45.83% of the individual soil samples in 2016 as well as in 2017. Increased sodium levels mean higher amendment costs and longer wait to achieve maximum productivity. Landowners considering tiling, should consider the following recommendations before installing an expensive tile system. That will save them money and ensure correct use of technology:

- Potential fields **“should be analyzed for salts and sodium”**.
- If sodicity is established, **“application of soil amendments should be considered before tiling”**.

Langdon REC Foundation Seed Stocks Program

The Langdon REC supports a Foundation Seed Stocks Program to help increase and distribute the newest NDSU varieties of HRSW, Durum, Barley, Soybeans and Flax. We also periodically increase seed for the University of Minnesota and South Dakota Ag Experiment Station. Each year approximately 350 acres are planted for the FSS program. The harvested acreage is available for sale to producers and seedsmen in the region. The varieties of crops that are available for the 2018 growing season are listed below:

HRSW – Glenn, Faller, Prosper, Elgin-ND, Linkert, Bolles, ND VitPro

Barley – Lacey

Flax – Omega

Soybeans - ND Henson, ND17009GT

Growers who have grown seed for certification in one of the last four years who request seed prior to December 1 will be guaranteed an allocation. Any seed inventories available after December 1 will be sold on a first come, first serve basis. Seed availability and prices may be obtained by calling the Langdon Research Extension Center at 701-256-2582.

Visit our website at www.ag.ndsu.edu/langdonrec/

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