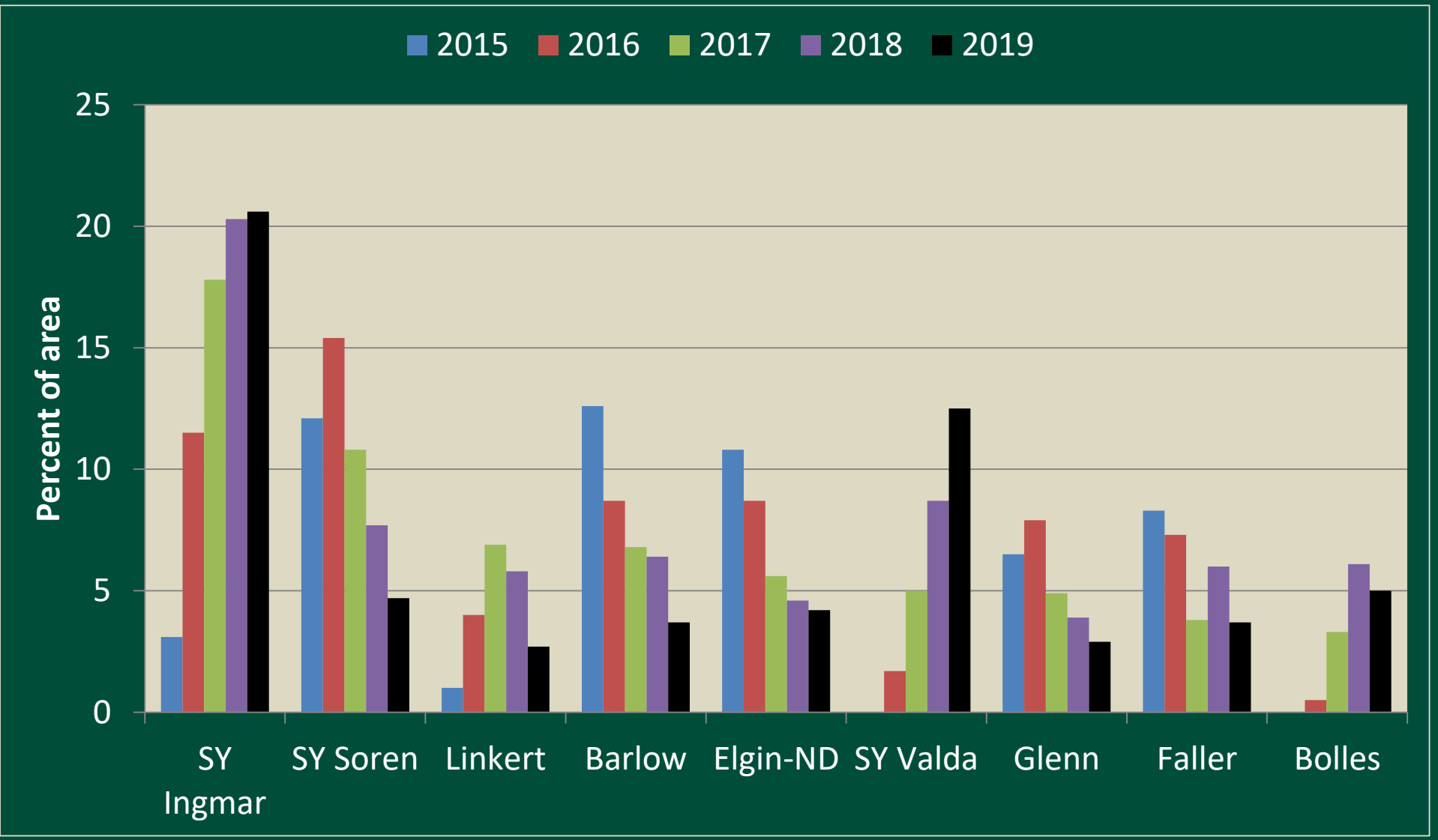
HRS Wheat Variety Performance

Greg Endres
Extension cropping systems specialist
NDSU Carrington Research Extension Center
701-652-2951; gregory.endres@ndsu.edu

Joel Ransom, Extension agronomist
Bryan Hanson, Research agronomist, Langdon REC
Ryan Buetow, Extension cropping systems specialist, Dickinson REC
Mike Ostlie, Research agronomist, Carrington REC

Trends in HRSW variety use in ND

(% of total HRS wheat acreage)



2018

NORTH DAKOTA VARIETY SHARE OF PLANTED ACRES[3]

	FIRST	SECOND	THIRD
	PERCENTAGE (%)		
Northwest	SY Ingmar 33.9	Barlow 16.8	Glenn 6.9
North Central	SY Ingmar 31.2	SY Valda 11.9	SY Soren 7.8
Northeast	Faller 18.2	SY Valda 14.9	Linkert 12.7
West Central	SY Ingmar 24.6	SY Soren 16.1	Elgin-ND 11.5
Central	SY Soren 19.6	SY Ingmar 17.2	SY Valda 8.6
East Central	WB Mayville 15.4	Linkert 11.6	SY Ingmar 10.9
Southwest	Barlow 20.5	SY Ingmar 16.0	Glenn 14.0
South Central	SY Ingmar 33.3	SY Soren 14.4	Barlow 11.7
Southeast	Bolles 14.3	SY Valda 11.4	SY Ingmar 9.9

2019

TOP 3 NORTH DAKOTA VARIETIES BY CROP DISTRICT

	First	Second	Third
	PERCENTAGE (%)		
Northwest	SY Ingmar 28.5	SY Valda 9.7	SY Rockford 7.7
North Central	SY Ingmar 26.4	SY Valda 19.0	HRS 3530 6.9
Northeast	SY Valda 20.7	Faller 14.2	Linkert 8.1
West Central	SY Ingmar 23.5	SY Soren 9.7	Glenn 7.0
Central	SY Ingmar 26.1	SY Valda 11.5	Bolles 6.9
East Central	SY Valda 17.2	SY Ingmar 12.9	WB 9479 7.8
Southwest	SY Ingmar 20.7	Elgin-ND 10.1	SY Soren 9.4
South Central	SY Ingmar 28.7	Elgin-ND 11.1	Bolles 12.8
Southeast	SY Valda 15.6	SY Ingmar 13.5	Bolles 12.8

A574-19

North Dakota
Hard Red Spring Wheat

Variety Trial Results for 2019 and Selection Guide

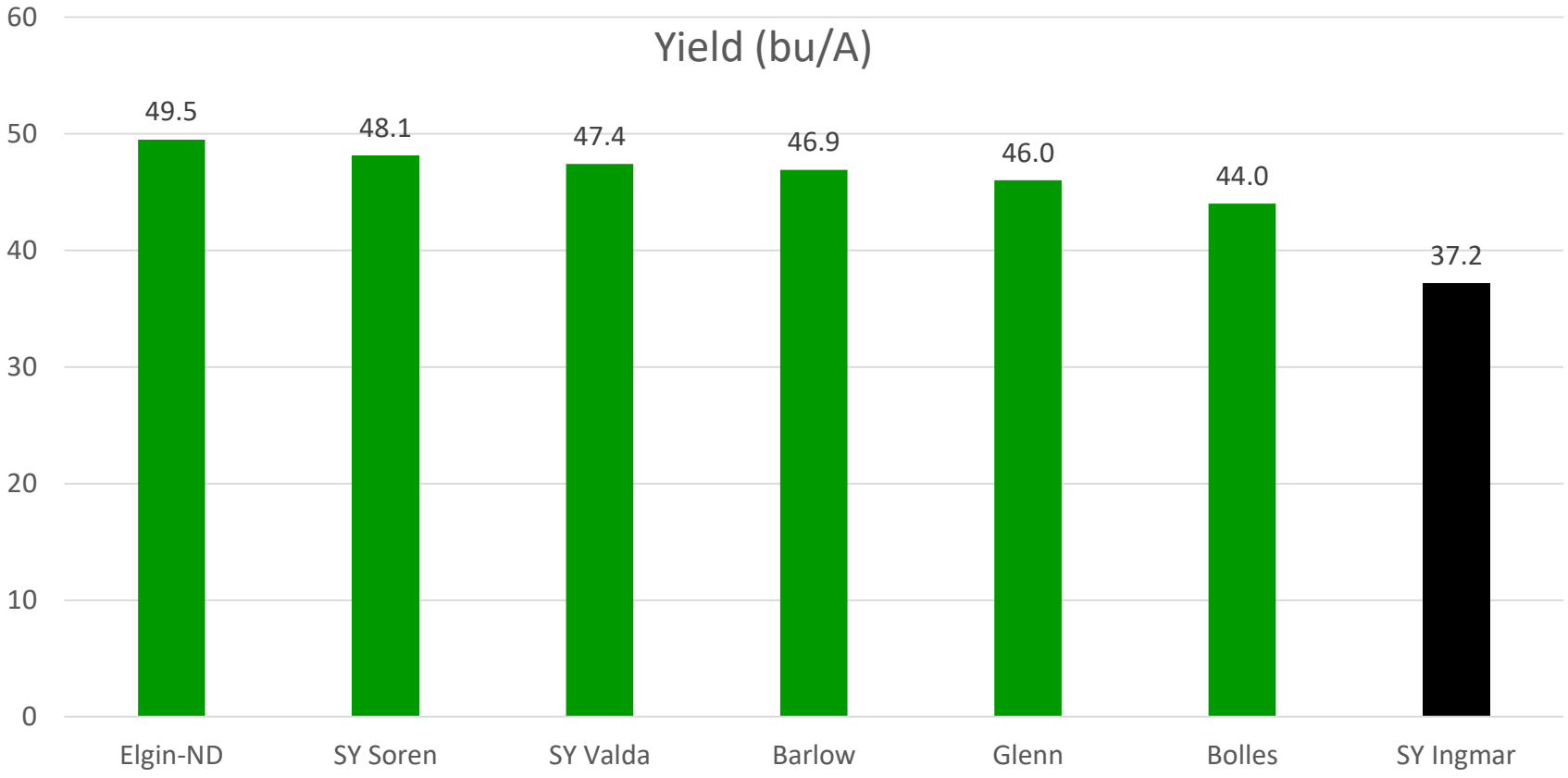
Joel Ransom, Andrew Green, Senay Simsek, Andrew Friskop, Matt Breiland, Tim Friesen, Zhaohui Liu and Shaobin Zhong (NDSU Main Station); John Rickertsen (Hettinger Research Extension Center); Eric Eriksmoen (North Central Research Extension Center, Minot); Bryan Hanson (Langdon Research Extension Center); Glenn Martin (Dickinson Research Extension Center); Gautam Pradhan (Williston Research Extension Center); Mike Ostlie (Carrington Research Extension Center)

Hard red spring (HRS) wheat was planted on 6.7 million acres in 2019, up slightly from 2018. The average yield of spring wheat was 50 bushels/acre (bu/a), similar to 2018.

SY Ingmar was the most popular HRS wheat variety in 2019, occupying 20.6% of the planted acreage, followed by SY Valda (12.5%), Bolles (5%), SY Soren (4.7%), Elgin-ND (4.2%), Barlow (3.7%), Faller (3.7%) and Glenn (2.9%). SY Ingmar, SY Soren and SY Valda were released by Syngenta/AgriPro. Bolles was released by the University of Minnesota. Barlow, Faller, Elgin-ND and Glenn are NDSU releases.

Yield of ‘popular’ HRS wheat varieties, western ND, 2017-19

(15 site-years; Dickinson, Hettinger, Mandan, Minot and Williston)

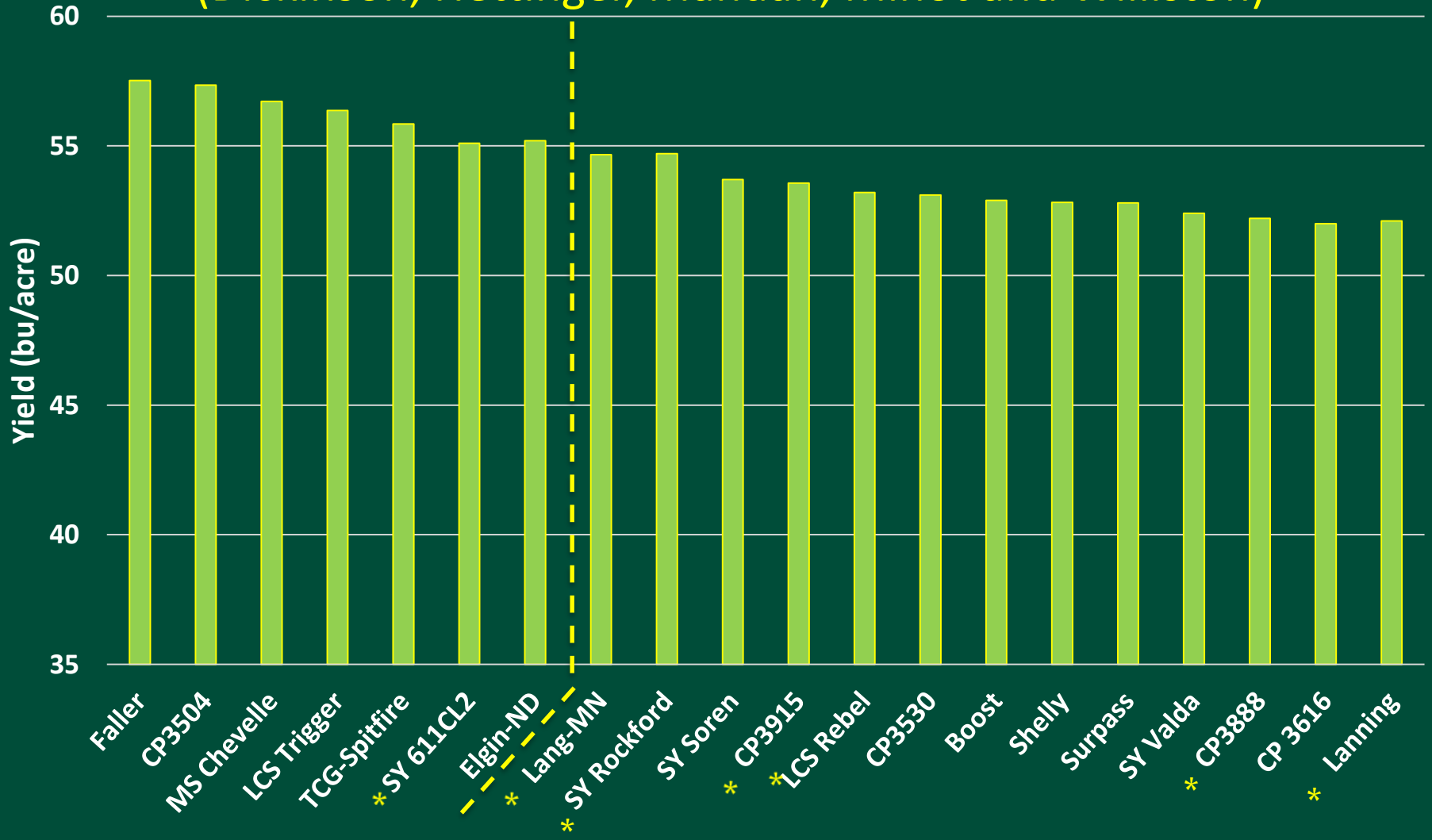


2019 Releases

Variety	Origin
Commander	DynaGro
CP3910	Croplan
CP3915	
CP3939	
MN-Washburn	U of Minnesota
SY 611CL2	Syngenta/AgriPro
SY Longmire	
SY McCloud	
TCG-Heartland	21st Century Genetics
TCG-Stalwart	

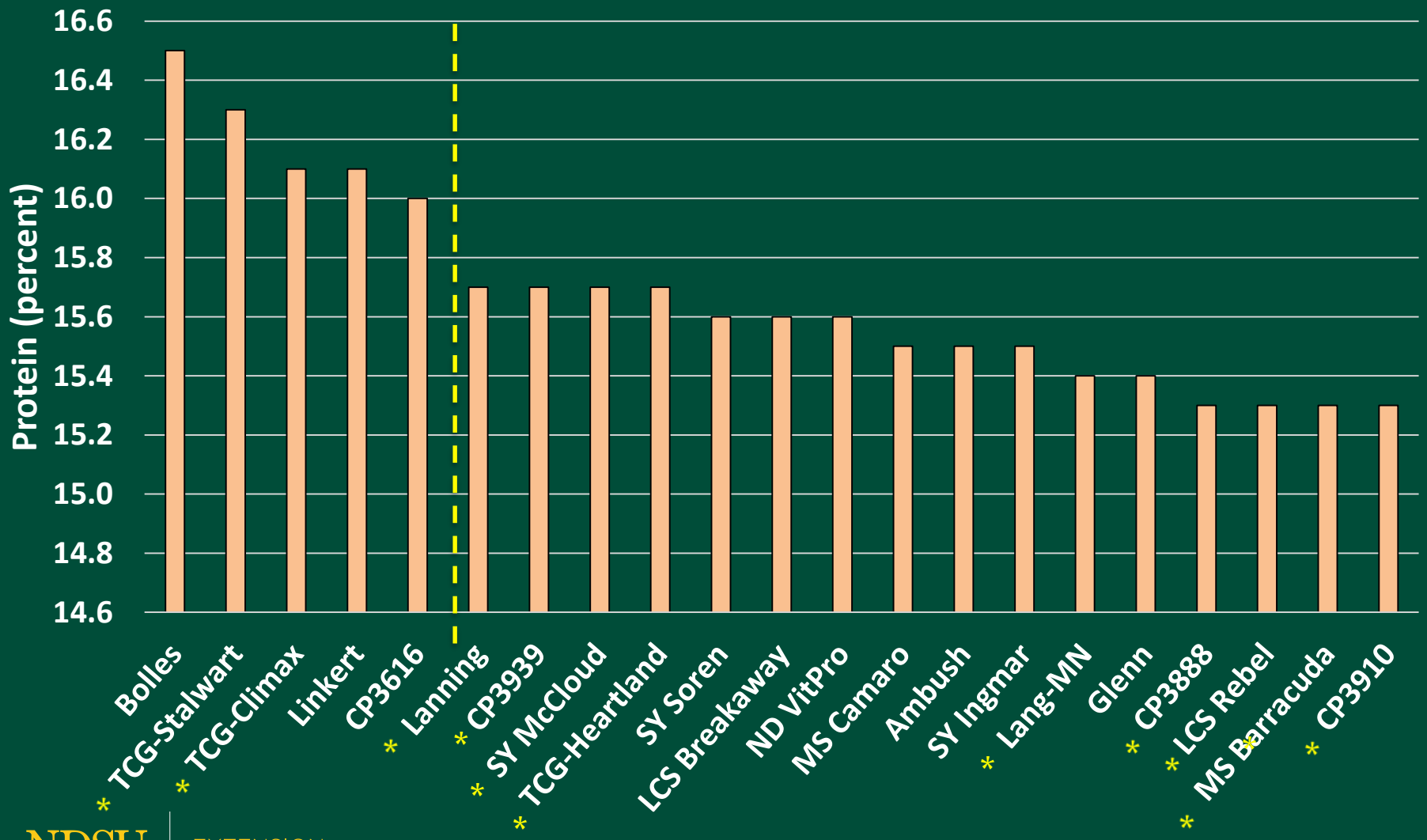
Varieties with yields > trial mean, western North Dakota, 2019

(Dickinson, Hettinger, Mandan, Minot and Williston)



*2017-19 release

Varieties with **protein** ≥ 15.2%, North Dakota (9 locations), 2019



NDSU | EXTENSION

*2017-19 release

Varieties with yield > mean (51.7 bu/A) western locations and protein ≥15%, 2019

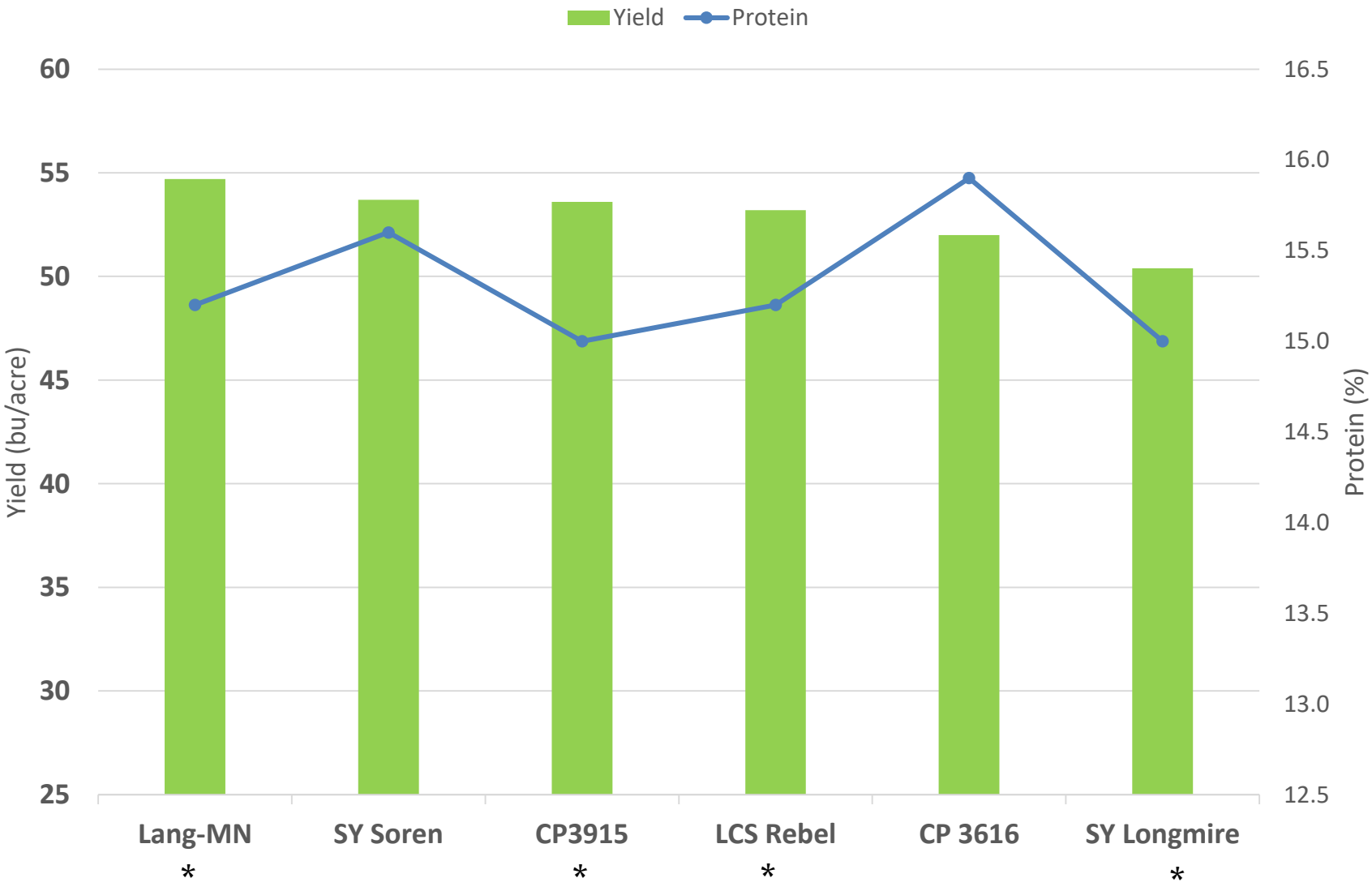


Table 1. North Dakota hard red spring wheat variety descriptions, agronomic traits, 2019.

				Reaction to Disease[4]							
Variety	Agent or Origin[1]	Year Released	Height (inches)	Straw Strength[2]	Days to Head[3]	Stem Rust[5]	Leaf Rust	Stripe Rust	Tan Spot	Bact. Leaf Streak	Head Scab
Ambush	DynaGro	2016	29	5	58	1	4	3	NA	6	5
Barlow	ND	2009	30	6	58	1	6	4	6	4	4
Bolles	MN	2015	29	4	62	2	3	5	4	7	5
Boost	SD	2016	30	5	62	1	4	3	8	2	5
Commander	**DynaGro**	**2019**	**28**	**6**	**59**	**NA**	**4**	**NA**	**NA**	**4**	**5**
CP3504	Croplan	2015	27	3	61	1	1	6	8	4	6
CP3530	Croplan	2015	31	5	61	1	2	8	6	5	5
CP3616	Croplan	2016	29	4	60	1	5	5	4	6	6
CP3888	Croplan	2017	28	4	60	NA	1	NA	NA	6	6
CP3910	**Croplan**	**2019**	**27**	**5**	**58**	**NA**	**1**	**NA**	**NA**	**8**	**6**
CP3915	**Croplan**	**2019**	**28**	**4**	**59**	**NA**	**1**	**NA**	**NA**	**4**	**5**
CP3939	**Croplan**	**2019**	**29**	**4**	**59**	**NA**	**3**	**NA**	**NA**	**6**	**6**
Elgin-ND	ND	2012	31	5	59	1	6	5	6	6	4
Faller	ND	2007	30	5	61	1	7	8	7	5	4
Glenn	ND	2005	30	4	58	1	6	4	6	4	4
Lang-MN	MN	2017	30	5	61	1	2	1	7	3	4
Lanning	MT	2017	26	3	60	NA	NA	NA	NA	8	6
LCS Breakaway	Limagrain	2011	26	5	58	1	3	6	4	6	6
LCS Cannon	Limagrain	2018	27	4	57	NA	7	NA	NA	7	6
LCS Rebel	Limagrain	2017	30	5	58	1	7	4	8	4	5
LCS Trigger	Limagrain	2016	29	5	64	1	1	2	6	3	4
Linkert	MN	2013	26	2	60	1	3	1	4	6	5
MN-Washburn	**MN**	**2019**	**27**	**3**	**60**	**NA**	**1**	**NA**	**NA**	**5**	**5**
Mott[6]	ND	2009	32	3	60	1	6	6	6	5	6
MS Barracuda	Meridian	2018	27	3	57	NA	2	NA	NA	7	6
MS Camaro	Meridian	2016	26	5	59	1	1	2	8	7	6
MS Chevelle	Meridian	2014	28	5	59	1	4	3	6	7	6
ND VitPro	ND	2016	29	3	59	1	4	3	7	3	4
Shelly	MN	2016	27	5	61	2	6	5	3	7	5
Surpass	SD	2016	28	5	58	1	4	6	8	4	5
SY 611CL2	**Syngenta/AgriPro**	**2019**	**27**	**5**	**59**	**NA**	**NA**	**NA**	**NA**	**6**	**5**
SY Ingmar	Syngenta/AgriPro	2014	28	3	60	1	3	6	6	5	5
SY Longmire[6]	**Syngenta/AgriPro**	**2019**	**28**	**5**	**60**	**NA**	**7**	**NA**	**NA**	**6**	**7**

Straw Strength

2	3	4	5	5
Linkert	CP3504	Bolles	Ambush	**SY611CL2**
TCG-Climax	**MN-Washburn**	CP3616	Boost	**SY Longmire**
	Mott	**CP3888**	CP3530	**TCG-Heartland**
	MS Barracuda	**CP3915**	**CP3910**	
	ND VitPro	**CP3939**	Elgin-ND	6
	SY Ingmar	Glenn	Faller	Barlow
	SY Rockford	**LCS Cannon**	**Lang-MN**	**Commander**
	SY Soren	**SY McCloud**	LCS Breakaway	
		SY Valda	**LCS Rebel**	
		TCG-Spitfire	LCS Trigger	
		TCG-Stalwart	MS Camaro	
			MS Chevelle	
			Shelly	
			Surpass	

1=strongest, 9=weakest. Bold text = 2017-19 release.

Scab tolerance of HRS wheat varieties

- Rating 4 (NDSU ratings scale: 1=resistant, 9=very susceptible)
  - **2017-19 release**
    - Lang-MN*
  - **Established**
    - Barlow, Elgin-ND, Faller, Glenn, LCS Trigger, ND VitPro

Bacterial Leaf Streak ratings

Most resistant	Rating	Most susceptible	Rating
Boost	2	**TCG-Stalwart**	9
Lang-MN LCS Trigger ND VitPro	3	**CP3910** **Lanning** **SY Rockford**	8
Barlow **Commander** CP3504 Glenn Surpass	4	Bolles **LCS Cannon** **MS Barracuda** MS Chevelle Shelly SY Soren **TCG-Heartland**	7

Figure 1. Symptoms of bacterial leaf streak (BLS). Photo credit: Marcia McMullen

Table 7. Quality data from 2018 western locations.

Variety	Test Weight[1]	Vitreous Kernels[2]	1,000 KWT[3]	Falling Number[4]
	(lb/bu)	(%)	(gram)	(seconds)
Ambush	64.2	97	36.8	398
Barlow	64.3	98	33.8	414
Bolles	63.0	97	36.5	431
Boost	62.5	97	36.4	414
CP3504	62.6	96	35.4	454
CP3530	62.0	95	34.5	445
CP3616	63.4	97	37.4	404
CP3888	63.0	94	36.2	450
Elgin-ND	62.9	97	33.3	377
Faller	64.0	99	38.7	397
Glenn	65.7	99	33.7	382
Lang-MN	64.4	98	33.6	386
Lanning	62.7	93	37.5	404
LCS Breakaway	64.5	96	37.0	414
LCS Cannon	64.7	94	33.0	373
LCS Rebel	64.5	98	36.7	405
LCS Trigger	62.1	99	31.2	454
Linkert	63.4	97	39.5	452
MN Washburn	63.1	98	32.8	405
MS Barracuda	63.4	97	38.1	451
MS Camaro	63.9	96	34.8	383
MS Chevelle	63.4	97	33.2	371
ND VitPro	65.1	99	35.8	409
Shelly	64.0	98	36.0	444
Surpass	62.8	98	31.3	381
SY Ingmar	64.1	97	33.5	414
SY Rockford	61.9	97	35.8	409
SY Soren	64.1	97	33.0	422
SY Valda	63.2	99	35.5	398
TCG-Climax	63.6	97	32.4	267
TCG-Spitfire	62.4	95	38.6	419

[1]Test weight - Expressed in pounds (lbs) per bushel. A high test weight is de

[2]Vitreous kernels - Expressed as a percentage of seeds having a vitreous-colc greater than 75% vitreous kernels.

[3]1,000 KWT - Estimate of weight of 1,000 seeds based on a clean 10g sampl

[4]Falling Number - Expressed in seconds at a 14% moisture basis. It is used a A high falling number is desirable, preferably greater than 400 seconds.

Baking quality and **Preharvest sprouting** of HRS wheat varieties (Univ of MN, 2019)

Table 2. Grain quality of hard red spring wheat varieties in Minnesota in single-year (2019) and multiple-year comparisons.

Variety	Test Weight		Grain Protein[1]		Baking Quality[2]	Pre-harvest Sprouting[3,4]
	2018	2 yr	2018	2 yr		
	---(lbs/bu) ---		-------(%) -------		(1-9)	(1-9)
Bolles	59.6	59.2	15.5	16.1	1	1
Boost	59.3	59.2	14.1	14.6	2	5
CP3530	60.0	59.5	13.8	14.6	3	2
CP3888	59.0	–	14.1	–	–	2
CP3910	60.3	–	13.9	–	–	3
CP3915	60.2	–	14.0	–	–	1
CP3939	59.9	–	14.5	–	–	2*
Dyna-Gro Ambush	61.3	60.5	14.4	14.9	2	3*
Dyna-Gro Ballistic	59.3	58.9	13.6	13.9	–	3*
Dyna-Gro Caliber	60.2	59.6	14.9	15.5	2	3*
Dyna-Gro Commander	60.3	–	14.2	–	–	1
Dyna-Gro Velocity	61.1	–	14.6	–	–	2
Lang-MN	61.0	60.6	14.3	14.8	3	1
Lang-MN (0.7x)	61.1	–	14.4	–	–	–
LCS Breakaway	61.4	61.0	14.6	15.0	5	2
LCS Cannon	61.5	61.2	13.7	14.2	–	3
LCS Rebel	61.3	61.0	14.4	14.9	3	5
LCS Trigger	60.0	59.9	11.9	12.4	–	2
Linkert	60.5	59.9	14.9	15.4	1	1
MN-Washburn	60.1	59.8	13.6	14.0	3	1
MS Barracuda	60.4	60.0	14.5	15.0	–	3
MS Camaro	59.6	59.3	14.7	15.1	–	2
MS Chevelle	59.6	59.5	13.2	13.6	5	4
ND-VitPro	61.8	61.4	14.8	15.2	2	1
Prosper	59.9	59.7	13.1	13.7	5	1
Rollag	60.8	60.2	14.9	15.6	6	2
Shelly	59.4	59.4	13.5	14.1	5	1
Surpass	59.4	59.0	14.3	14.7	3	1
SY 611 CL2	60.9	–	14.1	–	–	2*
SY Ingmar	60.1	60.1	14.8	15.1	2	2
SY Longmire	59.2	–	14.3	–	–	2*
SY McCloud	61.5	61.1	14.6	15.0	–	2*
SY Valda	60.3	60.0	13.6	14.0	6	2
TCG-Climax	61.5	61.4	15.1	15.6	3	3
TCG-Heartland	60.9	–	14.9	–	–	2
TCG-Spitfire	58.3	58.7	13.5	13.9	2	3*
WB-Mayville	60.4	59.8	14.8	15.4	2	3
Mean	60.2	60.0	14.1	14.6		
No. Environments	11	27	12	29		

[1] 12% moisture basis

[2] 2014 -2018 crop years, where applicable

[3] 1-9 scale in which 1 is best and 9 is worst. Values of 1-3 should be considered as resistant

[4] Falling number data was collected from four locations in 2019. Varieties with an * following their pre-harvest sprouting rating had lower than expected falling numbers based on their rating.

VOLUME 36 | NUMBER 3 | FEBRUARY 2020

TOP YIELDING VARIETIES - 2019 DATA

VARIETY	YIELD EAST +/- from avg	YIELD WEST +/- from avg	PROTEIN % pt from avg	STRAW STRG (1-9)	BLS RESIS (1-9)	FHB RESIS (1-9)
	60.6 bu	51.7 bu	15%			
CP 3504	+6.2	+5.6	-1.0	3	4	6
MS CHEVELLE	+3.0	+5.0	-1.1	5	7	6
SY VALDA	+5.6	+0.7	-0.8	4	6	5
TCG-SPITFIRE	+5.6	+4.1	-0.8	4	4	6
COMMANDER	+4.8	-8.0	-0.2	6	4	5
ELGIN-ND	+2.3	+3.5	-0.2	5	5	4

Notes: Statewide yield averages for 2019 were 60.6 bushels/acre in the east, 51.7 in the west, and protein averaged 15 percent. On the straw and disease ratings lower numbers indicate more strength and more resistance.

BALANCED VARIETIES - 2019 DATA

VARIETY	YIELD EAST +/- from avg	YIELD WEST +/- from avg	PROTEIN % pt from avg	STRAW STRG (1-9)	BLS RESIS (1-9)	FHB RESIS (1-9)
	60.6 bu	51.7 bu	15%			
CP 3530	+4.3	+1.4	-0.2	5	5	5
SY INGMAR	+2.2	-0.1	+0.4	3	5	5
LANG-MN	+0.6	+3.0	+0.2	5	3	4
LCS REBEL	+1.2	+1.5	+0.2	5	4	5
CP 3915	+1.8	+1.9	0.0	4	4	5

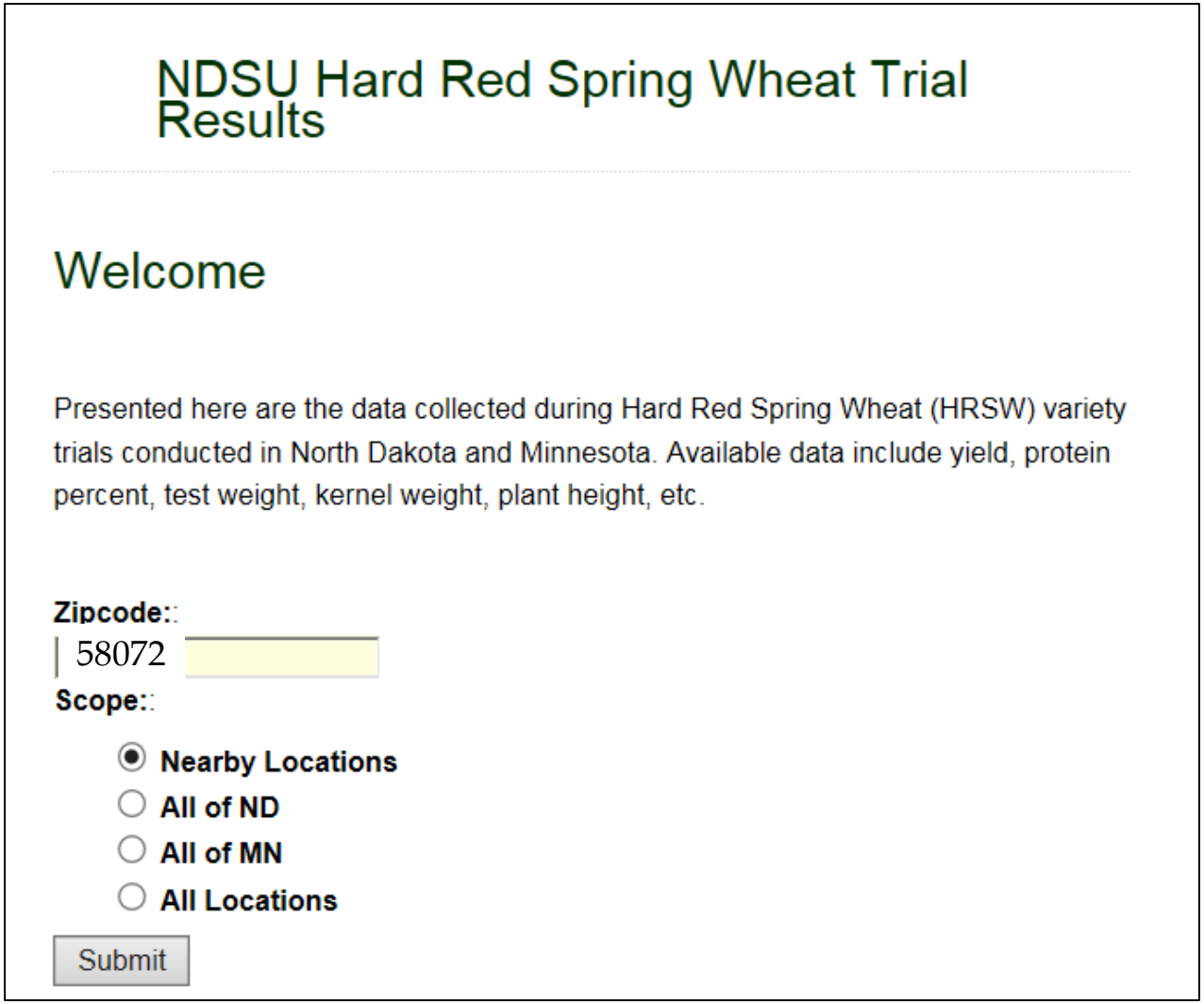
Consider these HRSW varieties for 2020 production (based on NDSU tests):

New (release 2017-19):

- LCS Rebel: yield + protein; (straw; leaf rust and tan spot S)
- Lang-MN: yield + protein; scab and BLS T; (straw; tan spot S)
- CP 3915: yield + protein; leaf rust T

Variety Selection Tool

www.ag.ndsu.edu/varietyselectiontool/



NDHRS16-13-97 is a hard red spring wheat line with good yield potential, strong end-use quality, and very good disease resistance. The pedigree of the line is (ND709-9/ND2902). ND709-9 was an experimental line with the pedigree (ND 2709/3/GRANDIN*3//RAMSEY/ND 622). ND2902 was an experimental line with the pedigree (ND674//ND2710/ND688). The line was both crossed and derived by Dr. Richard Frohberg. It is medium-tall, similar to Barlow with straw strength most similar to Glenn. It carries the leaf rust gene Lr34 and has shown moderate resistance in adult plants. It has also shown high levels of resistance to bacterial leaf streak. The Fusarium head blight resistance is Sumai-3 derived, with resistance similar to Elgin-ND and Barlow. It has shown strong milling and baking quality during its testing, with mixograph scores similar to Glenn. In drill strip plots in 2018, its Farinograph stability was most similar to Glenn and Farinograph absorption most similar to Barlow. It has been yield tested in over 60 environments in the past four years, and has had a yield similar to SY Ingmar in western locations, and similar to Barlow in eastern locations.

Table 4. Agronomic data for western locations, 2016-2019.

Name	Days to Heading	Plant Height	Lodging	Test Weight	Wheat Protein	Grain Yield
	D.A.P.	Inches	0-9	lb/bu	%	bu/ac
NDHRS16-13-97	**54.62**	**29.06**	**1.40**	**60.49**	**14.45**	**53.76**
BARLOW	54.40	28.82	1.38	60.81	15.04	53.08
BOLLES	55.63	28.13	0.70	59.48	15.79	52.97
ELGIN-ND	54.77	29.96	1.59	59.67	14.62	55.03
FALLER	55.35	28.22	1.36	59.20	14.17	55.46
GLENN	54.71	29.00	1.06	61.70	15.01	51.68
NDVITPRO	54.26	27.38	1.02	61.10	15.40	51.65
SYINGMAR	54.72	25.84	1.00	60.35	15.01	53.42
SYVALDA	54.54	25.72	0.94	59.76	14.37	54.77

Research updates: HRSW variety response to problem soils

- Acid (low pH)
- Salt-affected

Acid Soil Issue

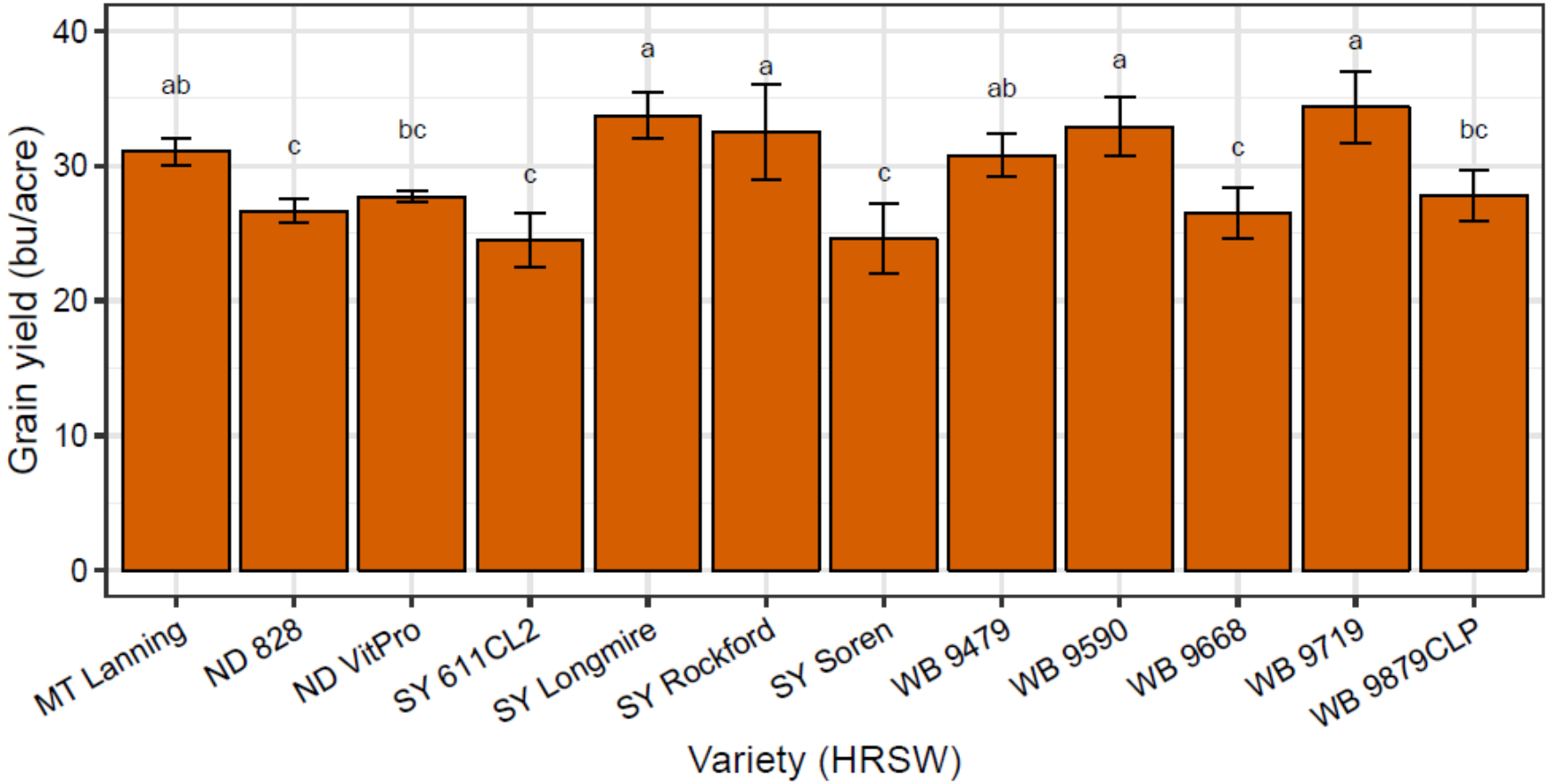
- If the soil pH is less than 5.5 this will impact the availability of certain nutrients
  - Typically causes stunted root/plant growth and yield reduction
- Liming and variety selection are two potential management tools for dealing with this issue

Table 1. Wheat variety assessment on acidic soil near Dickinson, ND. Soil test results showed pH of 5.7, 4.5, and 4.2 and 0-2", 2-6", and 6-12" respectively. Trial planted May 9th, 2018.

Variety	Yield	Test Weight	Aluminum	Manganese
	(bu/ac)		Tissue samples collected around early flag leaf	
Soren	39.9c	59.3a	91.7	283.5
Alum	49.4b	56.3b	72.4	209.5
Glenn	50.7b	57.0a	54.0	264.5
Bolles	50.8b	57.8ab	118.2	277.8
Lanning	58.7a	55.5b	88.7	255.8
LSD (0.05)	5.2	2.3	ns	ns

Spring wheat variety performance on an acidic soil

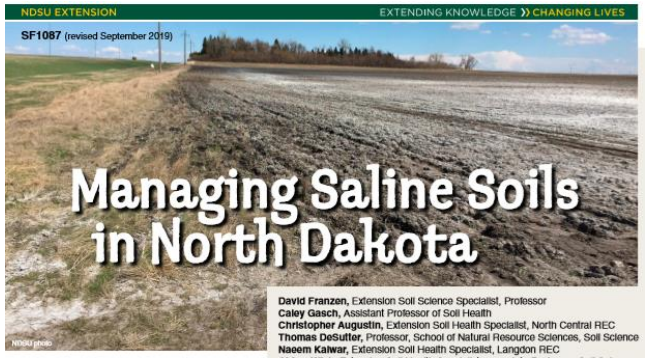
Dickinson, ND 2019



Error bars indicate standard error of the mean.

Ryan Buetow, NDSU, Dickinson, ND

Do HRSW varieties differ in tolerance to salt-affected soils?



David Franzen, Extension Soil Science Specialist, Professor
Caley Gasch, Assistant Professor of Soil Health
Christopher Augustin, Extension Soil Health Specialist, North Central REC
Thomas DeSutter, Professor, School of Natural Resource Sciences, Soil Science
Naoem Kalwar, Extension Soil Health Specialist, Langdon REC
Abbey Wick, Extension Soil Health Specialist, Associate Professor, Soil Science

Saline Soils

Saline soils contain salts in great enough abundance that crop yields suffer and sometimes makes successful crop production impossible. Excessive salts injure plants by disrupting plant water uptake and interfering with the uptake of nutrients essential for plant growth and development.

Saline soils often are referred to as "salty," "sour" or "alkali" by farmers and landowners; however, the proper name for these soils is "saline." The soil test used to characterize saline soils from nonsaline soils is the soil EC test. The EC is the acronym for "electrical conductivity," which is the laboratory method relating electrical conductivity of a current through a soil with salts in the soil solution, called "soluble salts."

Nearly all North Dakota soils have salt EC values greater than zero. Recent North Dakota experiments indicate that soils with an EC value greater than 0.2 millimho per centimeter (mmho/cm)—the common term of electrical conductance used by soil scientists—have a negative effect on most North Dakota crops. A mmho/cm is equivalent to a deci-siemen/meter (dS/m), so 0.2 mmho/cm is equivalent to 0.2 dS/m.

A salt is any compound that is a product of the reaction of an acid with a base. Sodium chloride (table salt, or NaCl) is a salt. Gypsum (calcium sulfate, or $CaSO_4$), epsom salts (magnesium sulfate, or $MgSO_4$) and glauber salts (sodium sulfate, or $NaSO_4$) are salts. Calcium chloride ($CaCl_2$), magnesium chloride ($MgCl_2$) and lime (calcium carbonate, or $CaCO_3$) also are salts.

Of this list, all are soluble salts except for lime. Calcium carbonate is weakly soluble—about 100 times less soluble than gypsum—so it is not characterized as a soluble salt and does not contribute to salinity in soils.

In general, chloride salts are most active with respect to their negative effect on crop production. A soil with EC dominated by chloride salts will result in lower crop yield, compared with a soil with similar EC dominated by sulfate salts.

Salts are the product of the mineral geology of North Dakota, the semiarid climate has lasted for thousands of years, and mineral weathering. The underlying bedrock in North Dakota is shale. Shale is a sedimentary rock developed from ancient muds released through regional soil erosion and deposited millions of years ago in shallow seas.

Nearly all of North Dakota was covered by a shallow ocean within the past 100 million years, and the erosion of the surrounding landscapes deposited clays into the ocean to great depths. With time and pressure from overburden, the mud, along with all the minerals that were a part of the sediment deposits, including a great deal of sodium from the ocean saltiness, turned to rock.

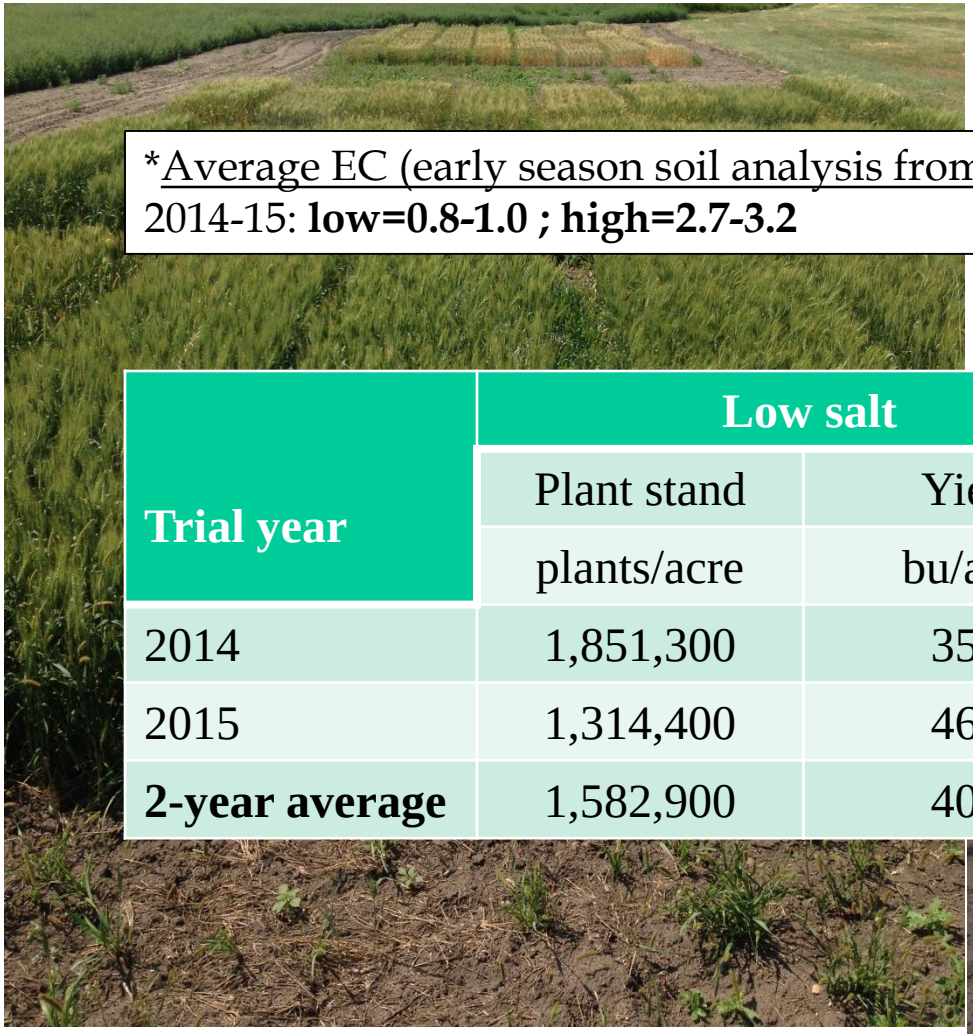
North Dakota has experienced several glaciations within the past 100,000 years. Each of these glaciers has moved ground limestone and granite from rocks from what is now Canada into North Dakota and left these materials behind.

NDSU | EXTENSION
North Dakota State University, Fargo, ND

Table 1. Approximate threshold salinity values for field crops and percent reduction in yield due to salinity.

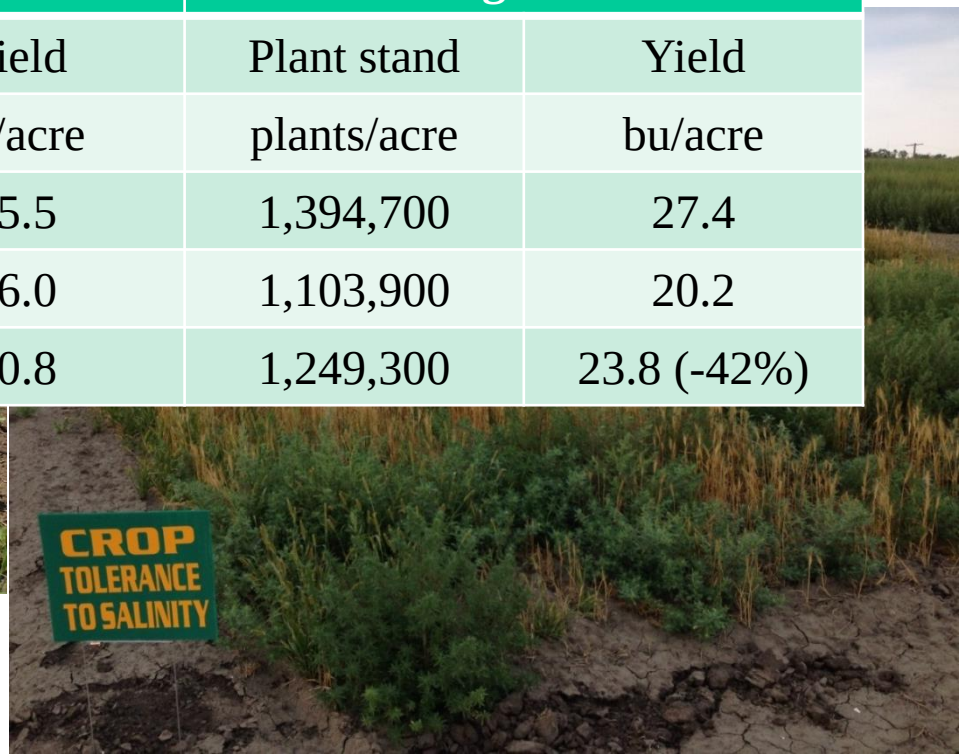
Crop	Threshold salinity 1:1 EC, mmhos/cm	% Yield reduction due to salts			
		10	25	50	100
		mmhos/cm necessary to reduce relative yield			
Alfalfa	1	1.6	2.5	4.2	7.9
Barley	2	3	4.5	6	12
Canola	1.5	2	3	4	7.5
Chickpea	0.75	1	1.6	2.3	4
Corn	1	2	3	4	5.5
Dry bean	0.5	0.8	1.3	1.7	3
Faba bean	0.75	1	1.75	2.5	4.5
Field pea	0.3	1	1.8	3.75	7
Flax	0.5	0.6	1	1.5	3
Lentil	0.6	0.75	1.25	1.5	3
Oats	2.3	3	4	6	8
Rye	3.8	5.4	6.3	7.2	10
Safflower	3.5	4.5	6.5	8	14
Soybean	0.6	1	1.75	2.3	4
Sugarbeet	3	4	6	8	12
Sunflower	0.75	1	2.2	5	10
Wheat	1	2	3.5	5.5	11

HRS wheat variety tolerance to salt-affected soils, Carrington, 2014-15



*Average EC (early season soil analysis from 0-6" depth; dS/m as 1:1 soil:water paste)
2014-15: **low=0.8-1.0 ; high=2.7-3.2**

Trial year	Low salt		High salt	
	Plant stand	Yield	Plant stand	Yield
	plants/acre	bu/acre	plants/acre	bu/acre
2014	1,851,300	35.5	1,394,700	27.4
2015	1,314,400	46.0	1,103,900	20.2
2-year average	1,582,900	40.8	1,249,300	23.8 (-42%)



HRS wheat variety tolerance to salt-affected soil, Carrington, 2014-15

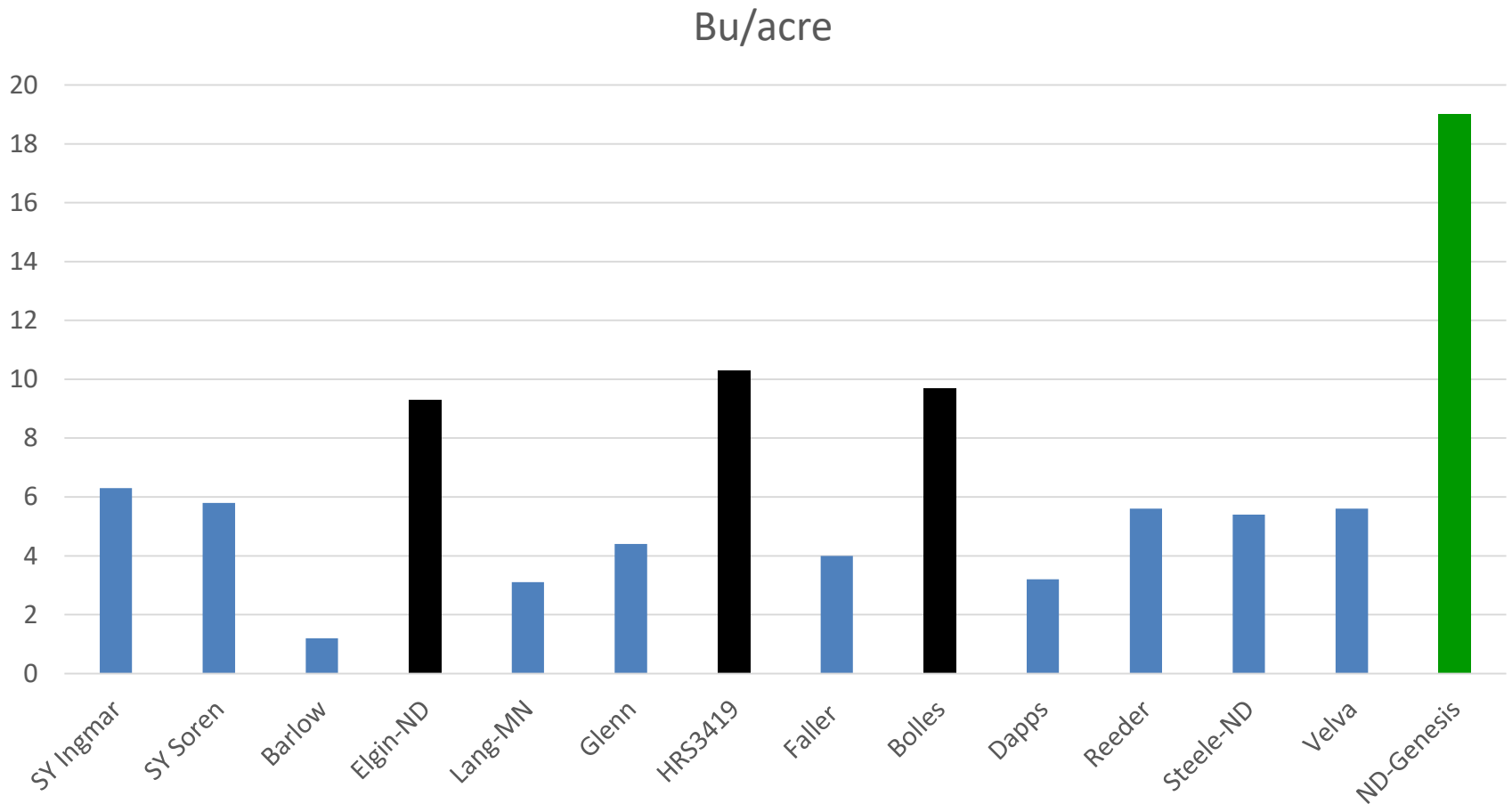
2014

Variety	Seed yield loss high vs. low salt (%)
Barlow	4
Prevail	25
SY Soren	13
Linkert	35
LCS Powerplay	34
WB Mayville	20

2015

Variety	Seed yield loss high vs. low salt (%)
Barlow	51
Prevail	64
SY Soren	65
Bolles	56
LCS Iguacu	51
HRS 3378	47

HRSW variety response to high-salt soil*, Carrington, 2019



*EC (1:1 test): 4.1-5.8 mmho/cm

A. Green and M. Ostlie

Questions or Comments?