2019 IHARF Agronomy Update

Chris Holzapfel, MSc PAg

Presentation Overview

- **4R N Management in Spring Wheat** (2019 Update)
- **Winter Wheat Response to N Rate & Management** (2019)
- **P Rate & Placement in Canola** (2016-2018, multi-site)
- **Dry Bean N Management** (2019, multi-site)
- **Field Pea Fertility** (2019, multi-site)
- **Wheat Response to Various Input Combinations** (2018-19)
- **Pre-harvest Options for Canola** (2017-19, multi-site)

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INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION

4R Nitrogen Fertilizer Management in Spring Wheat (ADOPT 2017-19)

Indian Head 2017

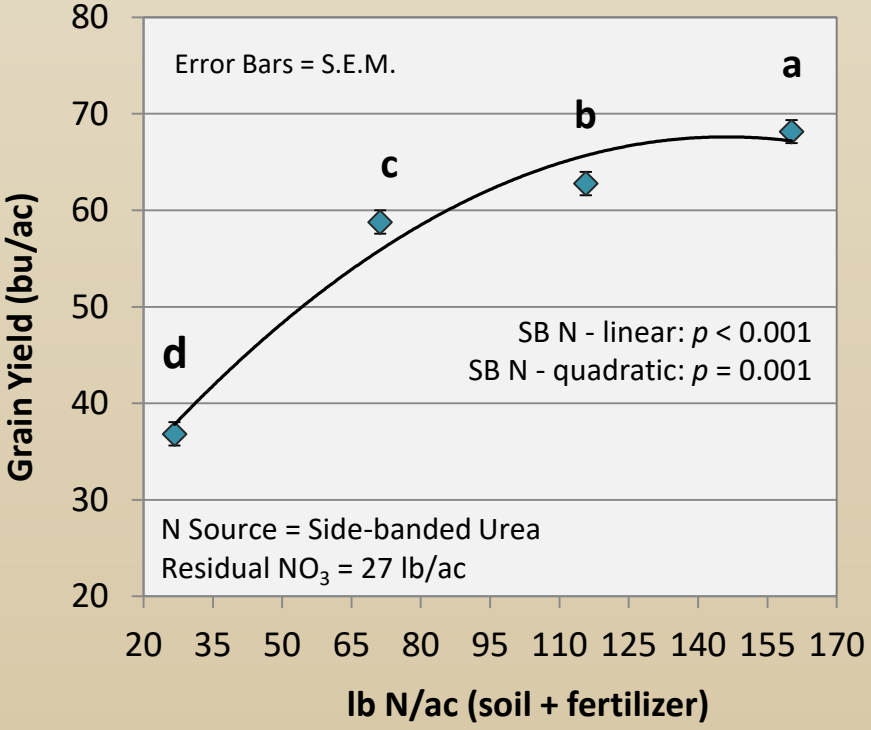
Objectives: To demonstrate crop response to varying rates of N along with different forms, timing & placement relative to side-banded, untreated urea

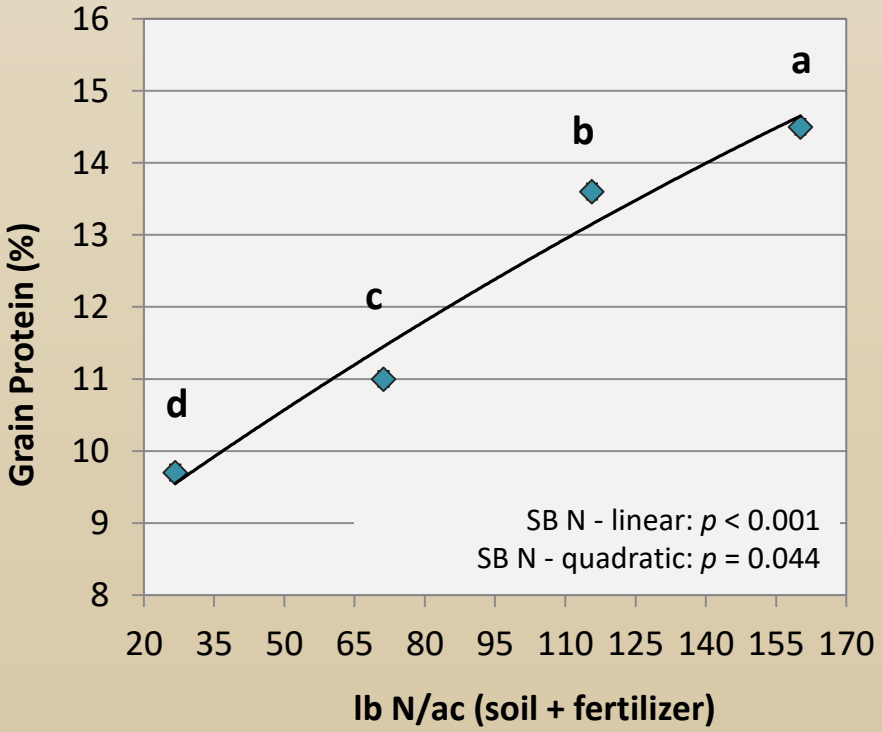
#	Form	Timing / Placement	Rate *
1	N/A	N/A	N/A
2	Urea (untreated)	Side-band (during seeding)	0.5x
3	Urea	Side-band	1.0x
4	Urea	Side-band	1.5x
5	Urea	Spring Surface Broadcast (pre-seed)	1.0x
6	Urea Ammonium-Nitrate (UAN)	Spring Surface Dribble-band	1.0x
7	Agrotain® (AT)	Spring Surface Broadcast	1.0x
8	SuperUrea® (SU)	Spring Surface Broadcast	1.0x
9	Urea / Urea	50:50 Split (side-band : in-crop)	1.0x
10	Urea / UAN	50:50 Split	1.0x
11	Urea / Agrotain®	50:50 Split	1.0x
12	Urea / SuperUrea®	50:50 Split	1.0x

* 1x = 116lb N/ac (soil + fertilizer)

N Rate Effects on Wheat Yield & Protein

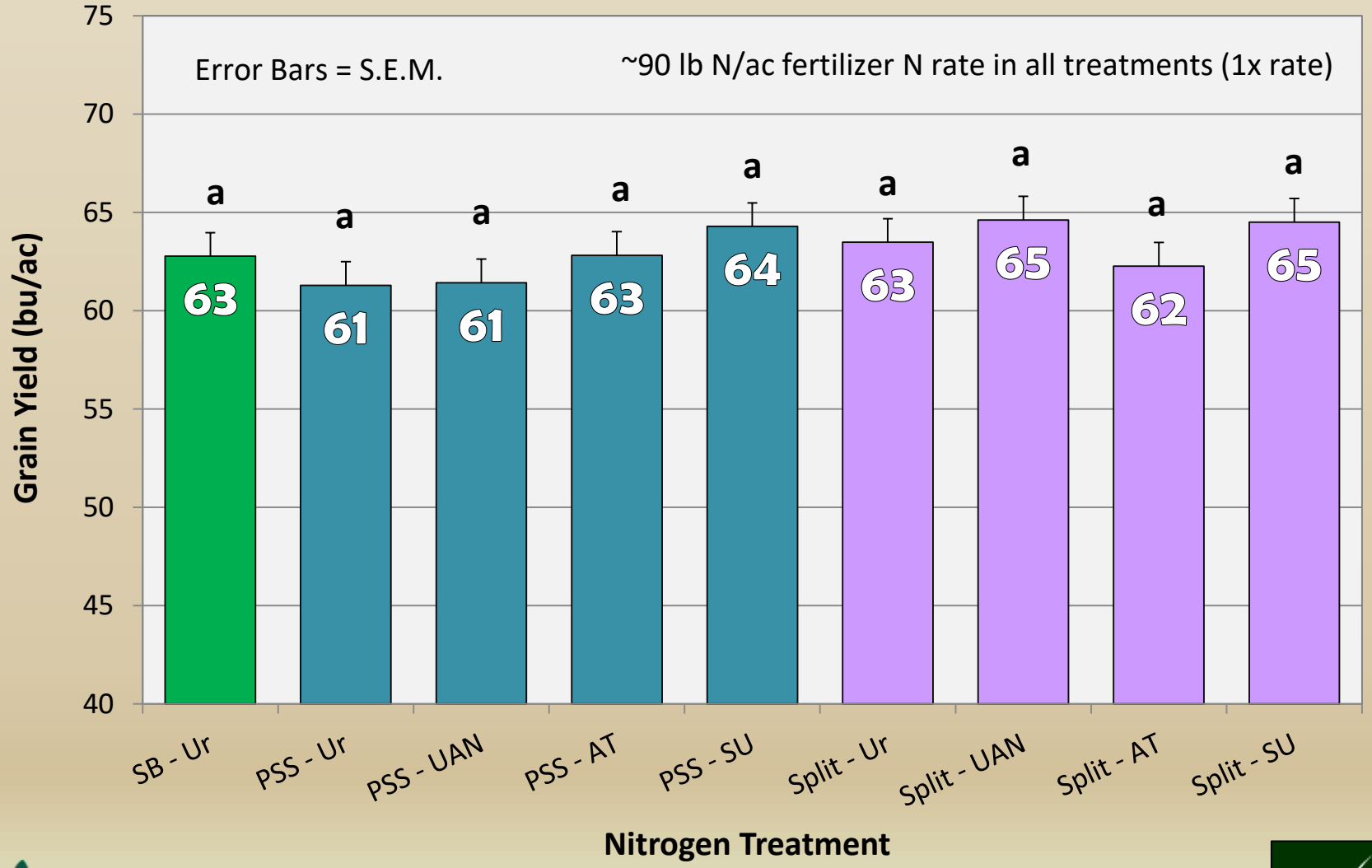
Indian Head 2017





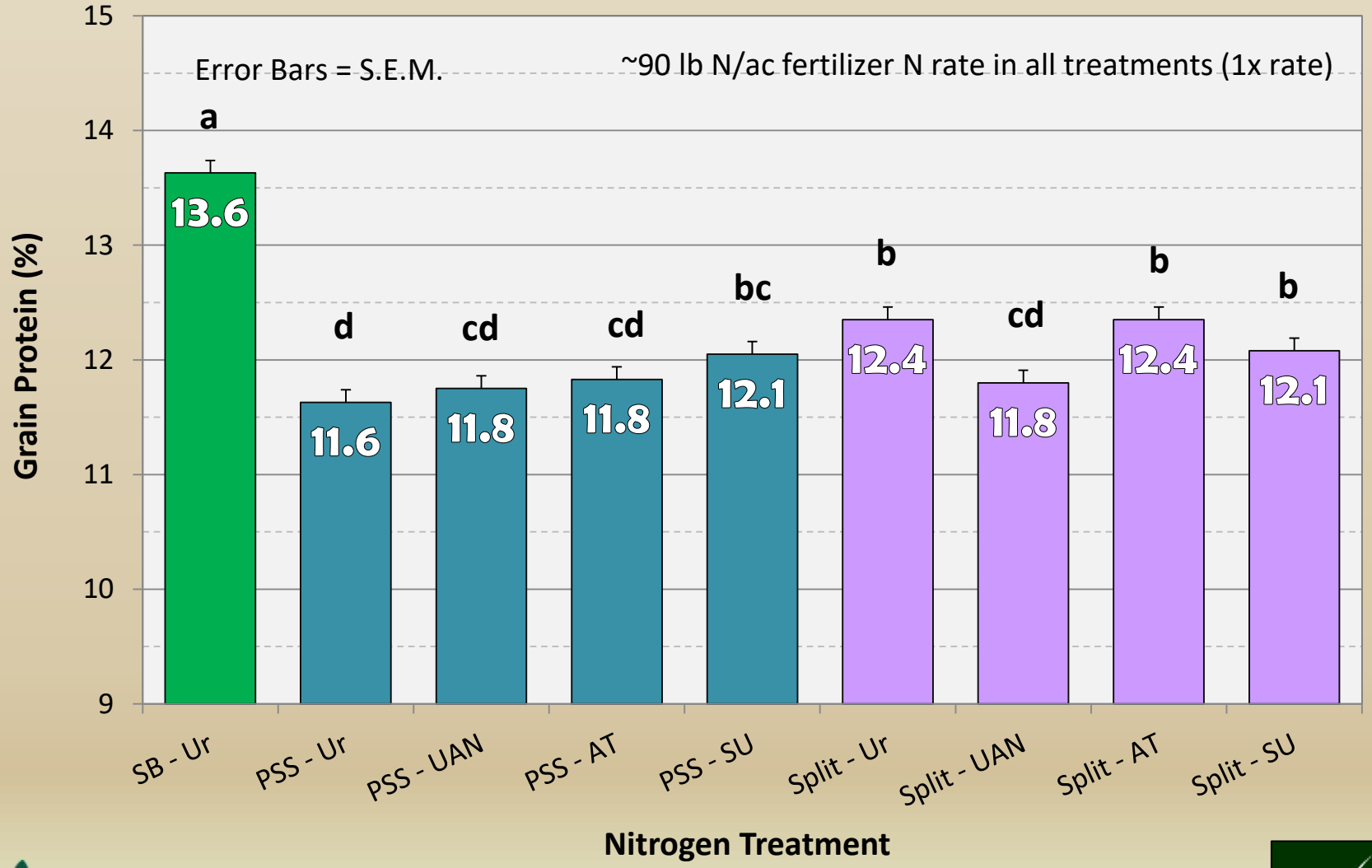
N Management Effects on Wheat Yield

Indian Head 2017



N Management Effects on Wheat Protein

Indian Head 2017



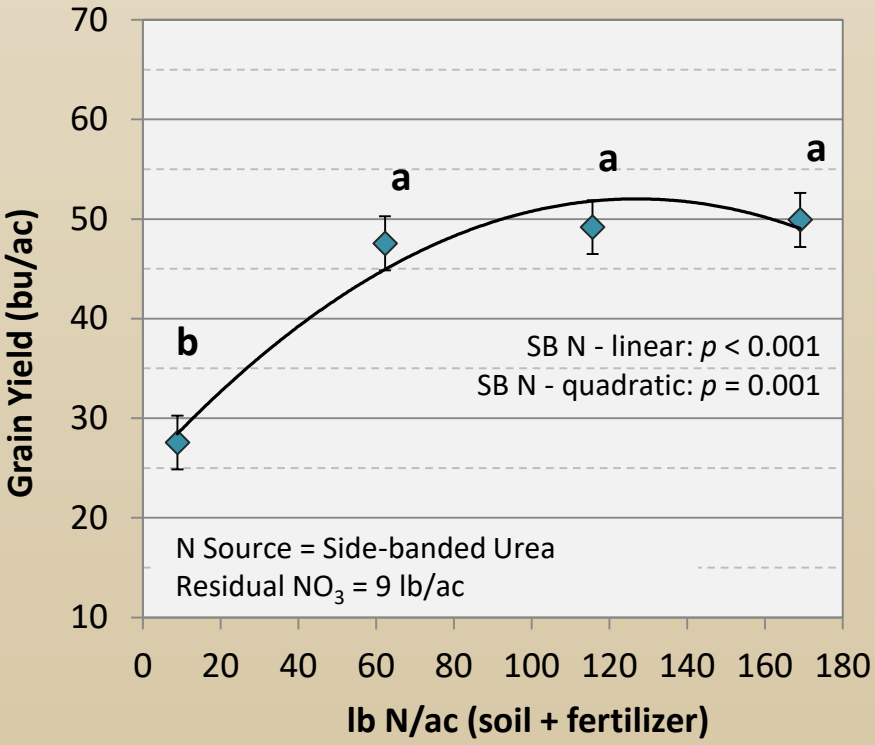
Indian Head 2018

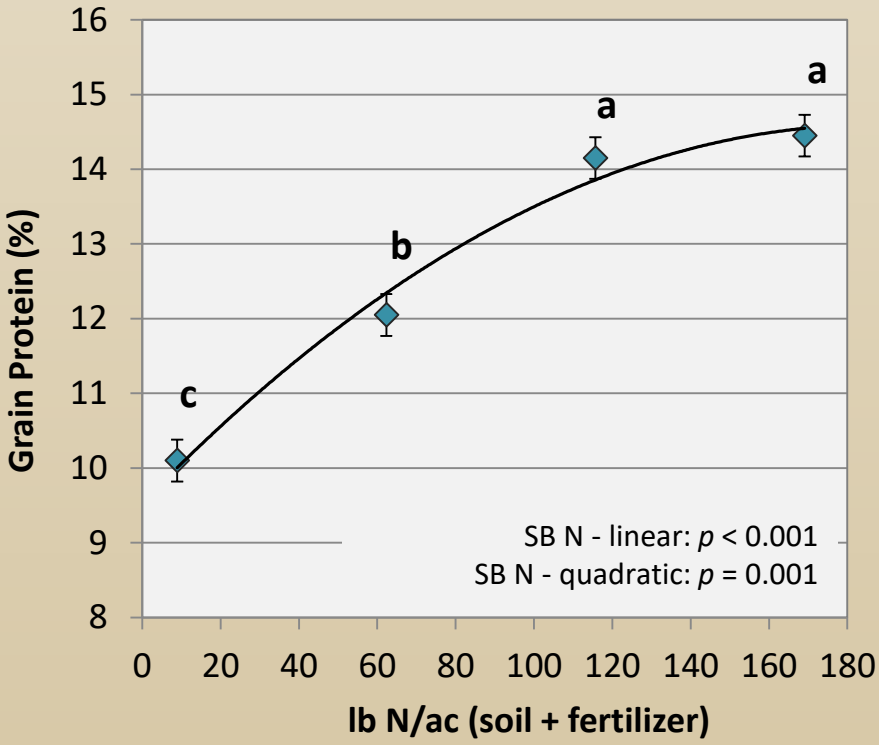
#	Form	Timing / Placement	Rate *
1	N/A	N/A	N/A
2	Urea (untreated)	Side-band (during seeding)	0.5x
3	Urea	Side-band	1.0x
4	Urea	Side-band	1.5x
5	Agrotain® (AT)	Side-band	1.0x
6	SuperUrea® (SU)	Side-band	1.0x
7	ESN® Smart Nitrogen (ESN)	Side-band	1.0x
8	Urea	Fall Surface Broadcast	1.0x
9	Agrotain® (AT)	Fall Surface Broadcast	1.0x
10	SuperUrea® (SU)	Fall Surface Broadcast	1.0x
11	Urea	Fall In-Soil Band	1.0x
12	Agrotain® (AT)	Fall In-Soil Band	1.0x
13	SuperUrea® (SU)	Fall In-Soil Band	1.0x
14	ESN® Smart Nitrogen (ESN)	Fall In-Soil Band	1.0x

* 1x = 116 lb/ac (soil + fertilizer) for wheat

N Rate Effects on Wheat Yield & Protein

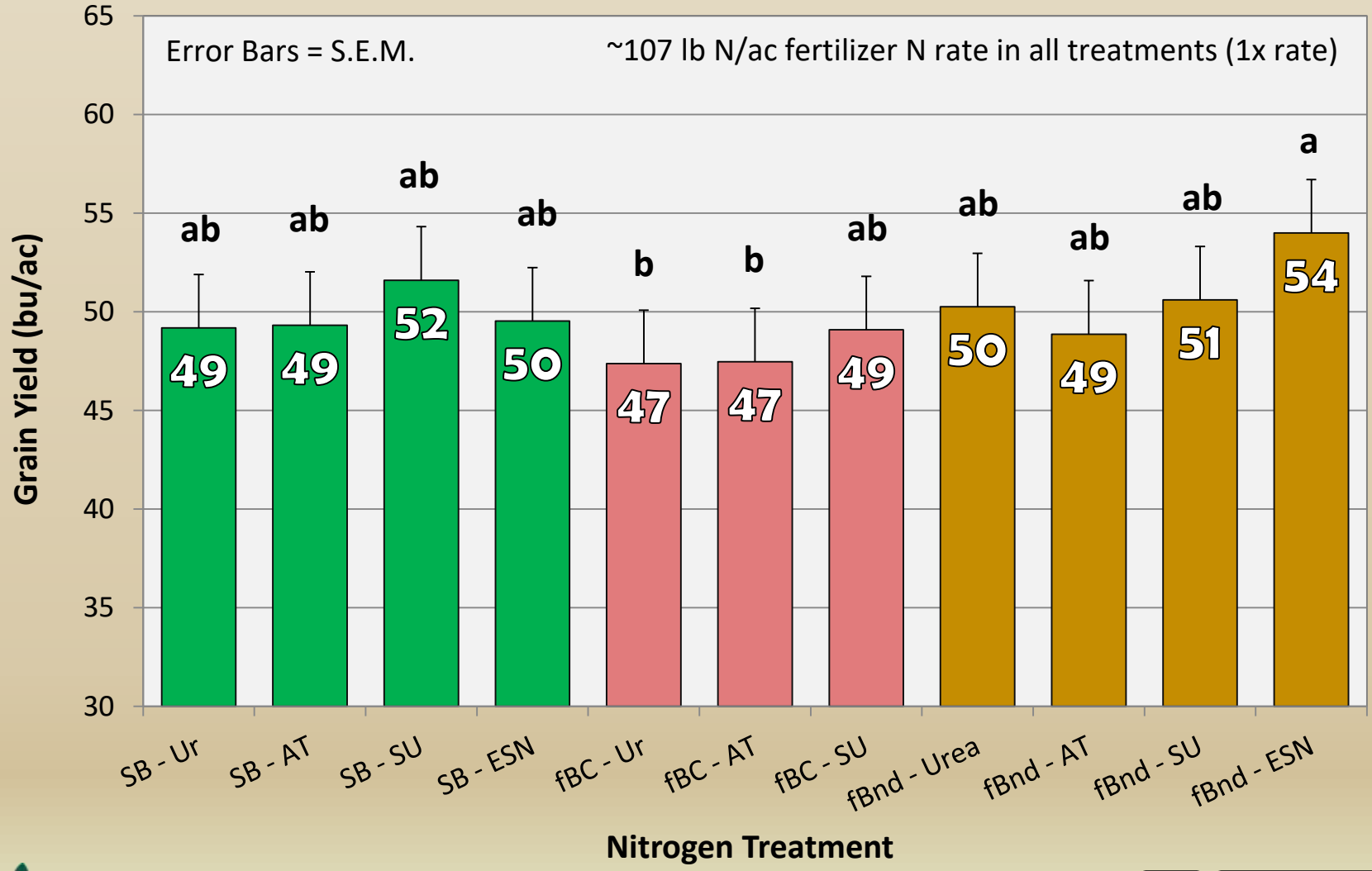
Indian Head 2018





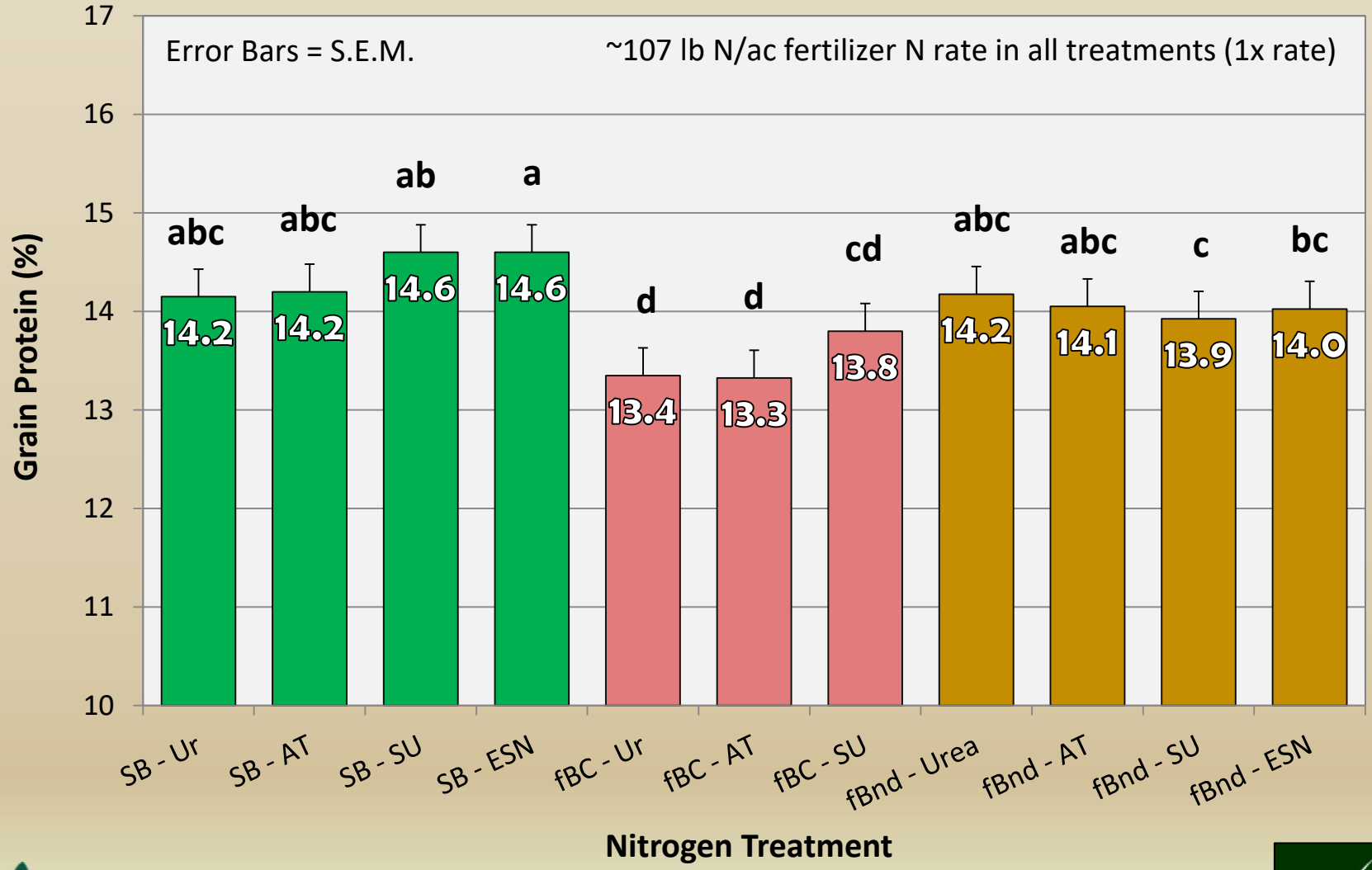
N Management Effects on Wheat Yield

Indian Head 2018



N Management Effects on Wheat Protein

Indian Head 2018



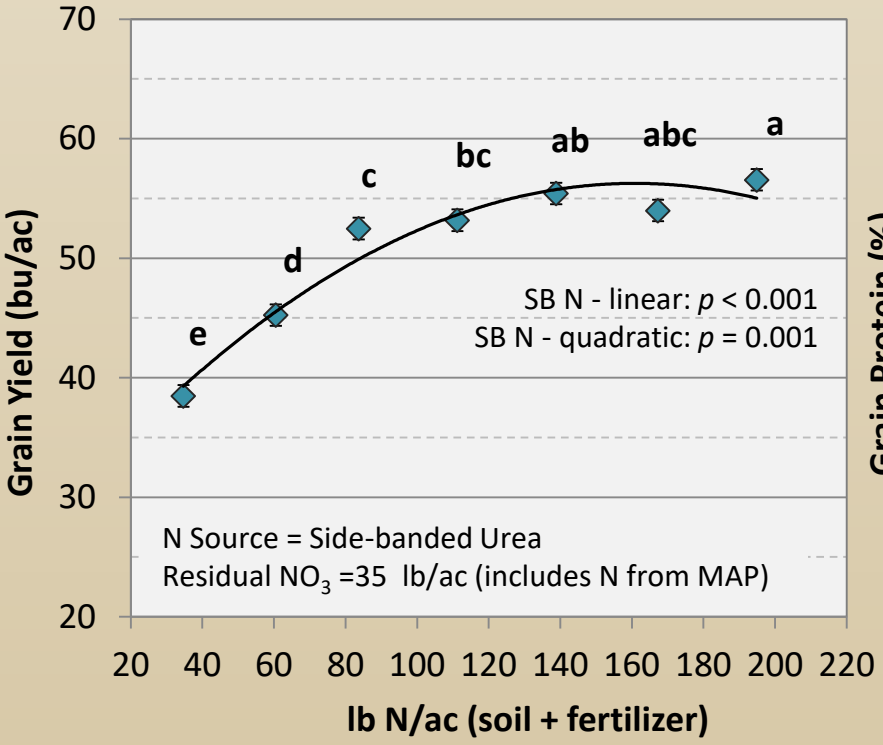
Indian Head 2019

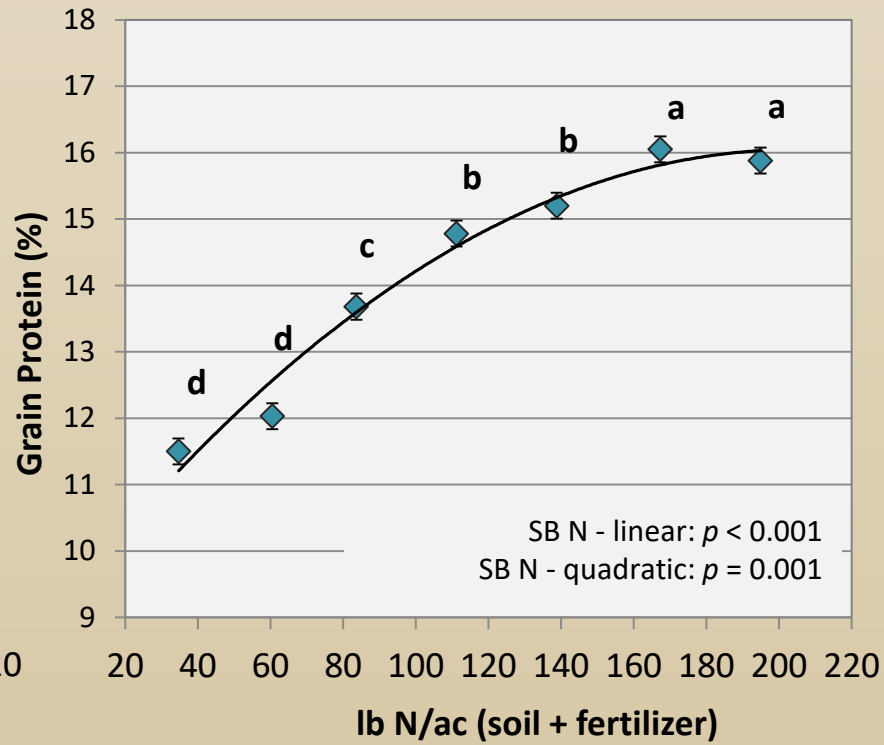
#	Form	Timing / Placement	Rate *
1	N/A	N/A	N/A
2	Urea (untreated)	Side-band (during seeding)	0.50x
3	Urea	Side-band	0.75x
4	Urea	Side-band	1.00x
5	Urea	Side-band	1.25x
6	Urea	Side-band	1.50x
7	Urea	Side-band	1.75x
8	ESN® Smart Nitrogen	Side-band	1.0x
9	Agrotain® treated urea	Side-band	1.0x
10	SuperUrea®	Side-band	1.0x
11	Urea	Fall Surface Broadcast	1.0x
12	ESN® Smart Nitrogen	Fall Surface Broadcast	1.0x
13	Agrotain® treated urea	Fall Surface Broadcast	1.0x
14	SuperUrea®	Fall Surface Broadcast	1.0x
15	Urea	Spring Surface Broadcast (pre-seed)	1.0x
16	ESN® Smart Nitrogen	Spring Surface Broadcast	1.0x
17	Agrotain® treated urea	Spring Surface Broadcast	1.0x
18	SuperUrea®	Spring Surface Broadcast	1.0x

* 1x = 116 lb/ac (soil + fertilizer) for wheat

N Rate Effects on Wheat Yield & Protein

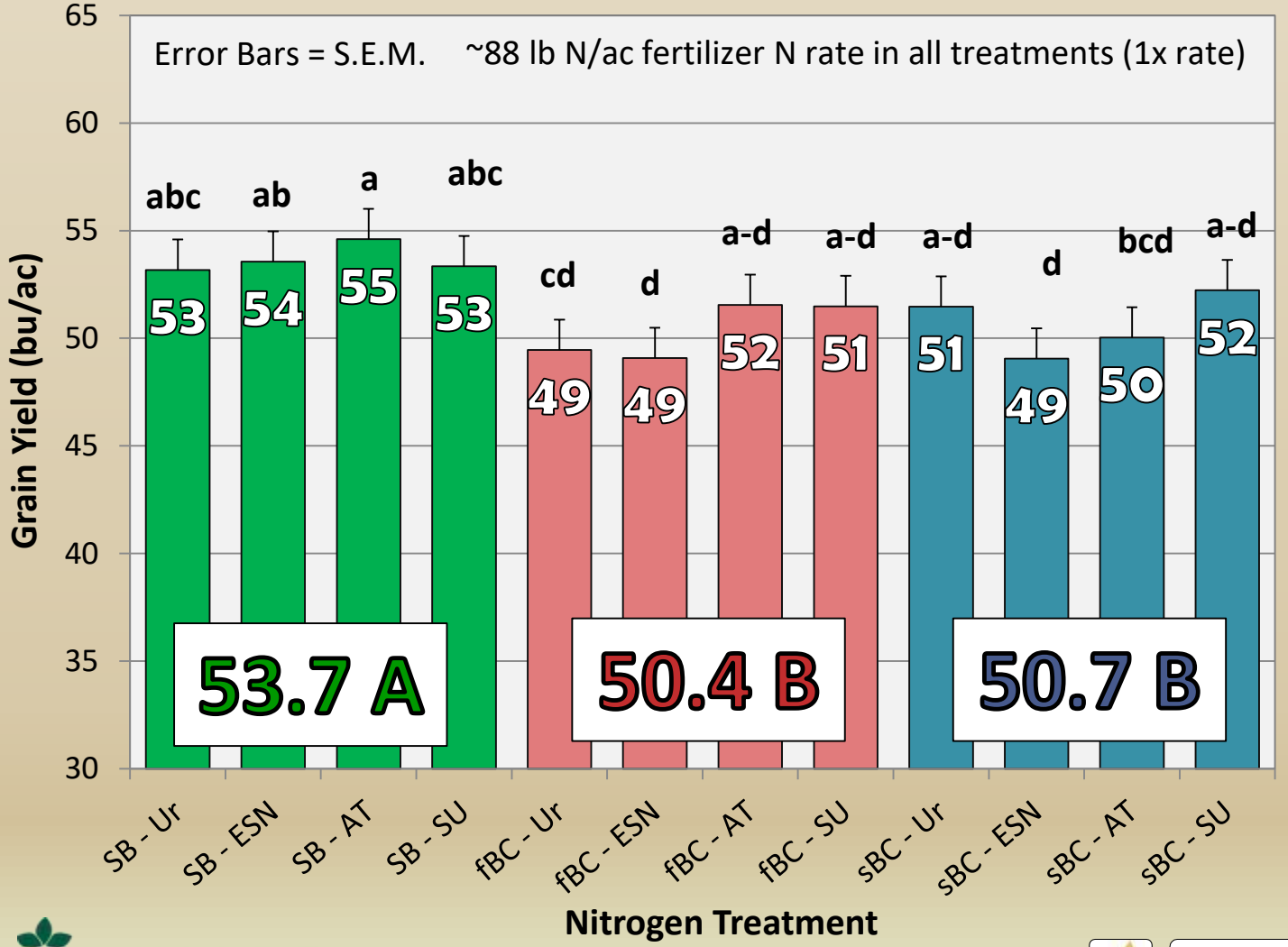
Indian Head 2019





N Management Effects on Wheat Yield

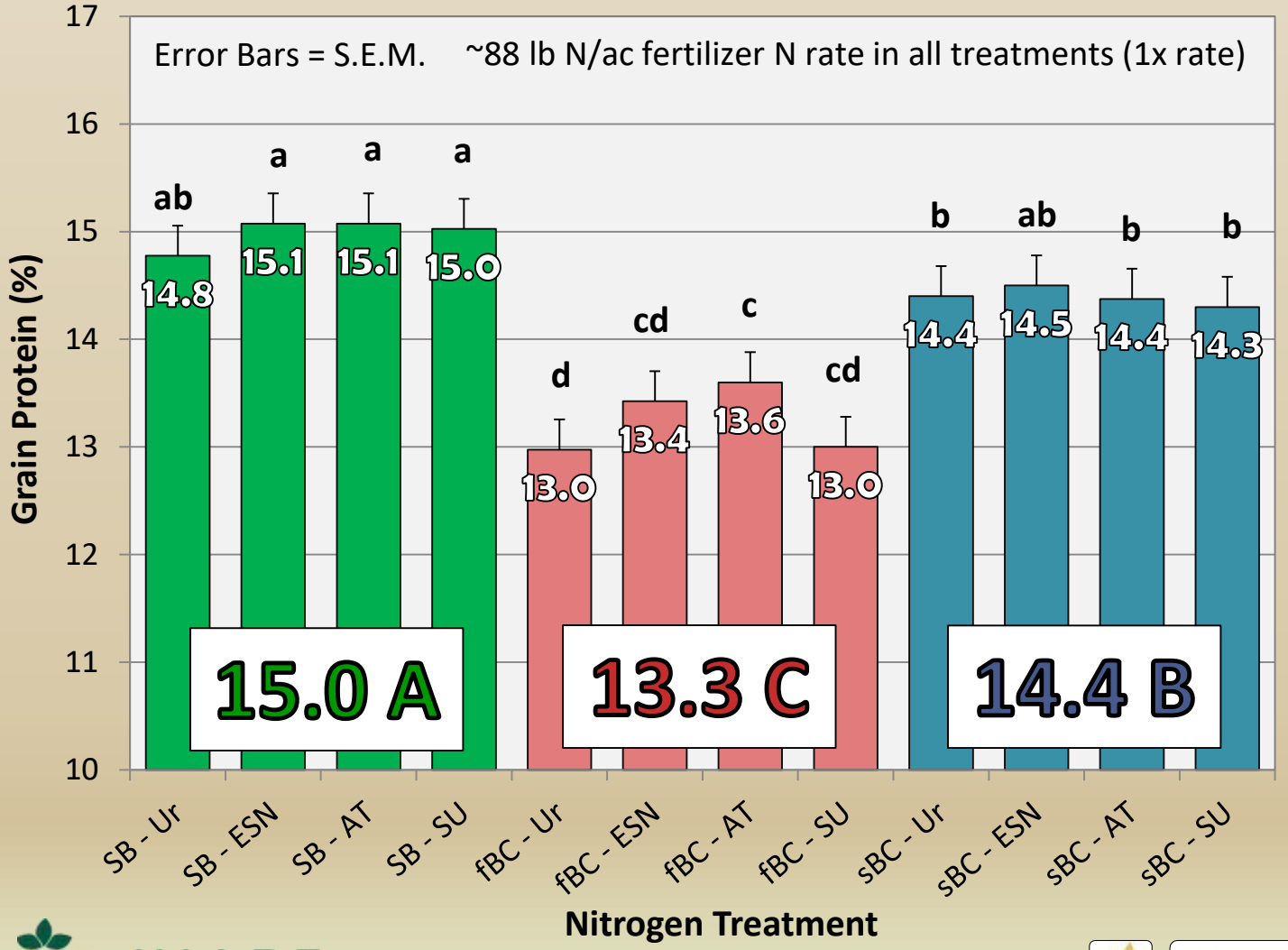
Indian Head 2019



Source	Pr > F
Form (F)	0.392
Time / Place (TP)	0.003
F x TP	0.719

N Management Effects on Wheat Protein

Indian Head 2019



Source	Pr > F
Form (F)	0.232
Time / Place (TP)	<0.001
F x TP	0.750

Winter Wheat Nitrogen Rate & Placement / Timing (ADOPT)

Winter Wheat Rate, Timing, and Placement Treatments (2018-19)

#	Rate (lb N/ac)	Timing / Placement
1	no N fertilizer	n/a
2	53	fall Side-band (fSB)
3	80	
4	107	
5	134	
6	160	
7	53	spring Broadcast (sBC)
8	80	
9	107	
10	134	
11	160	
12	53	50:50 Split Application (split)
13	80	
14	107	
15	134	
16	160	

- Rates are 11 lb residual NO_3-N/ac + fertilizer

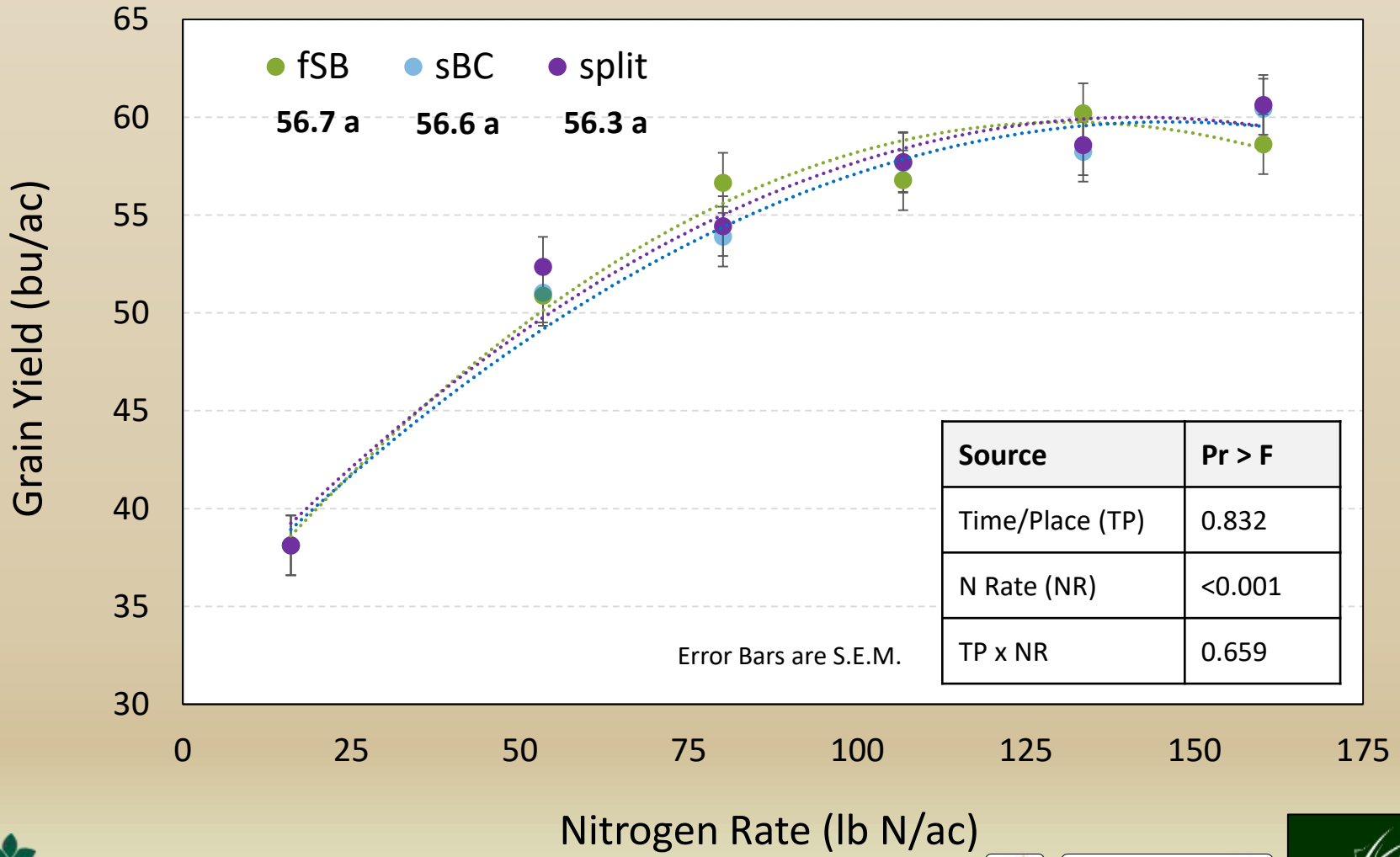
Objectives: To demonstrate winter wheat response to varying rates of urea supplied as either a side-band, spring broadcast, or split-applications

Locations: Indian Head & Swift Current, continued in 2019-20 at Indian Head

Agronomic Info (Indian Head):

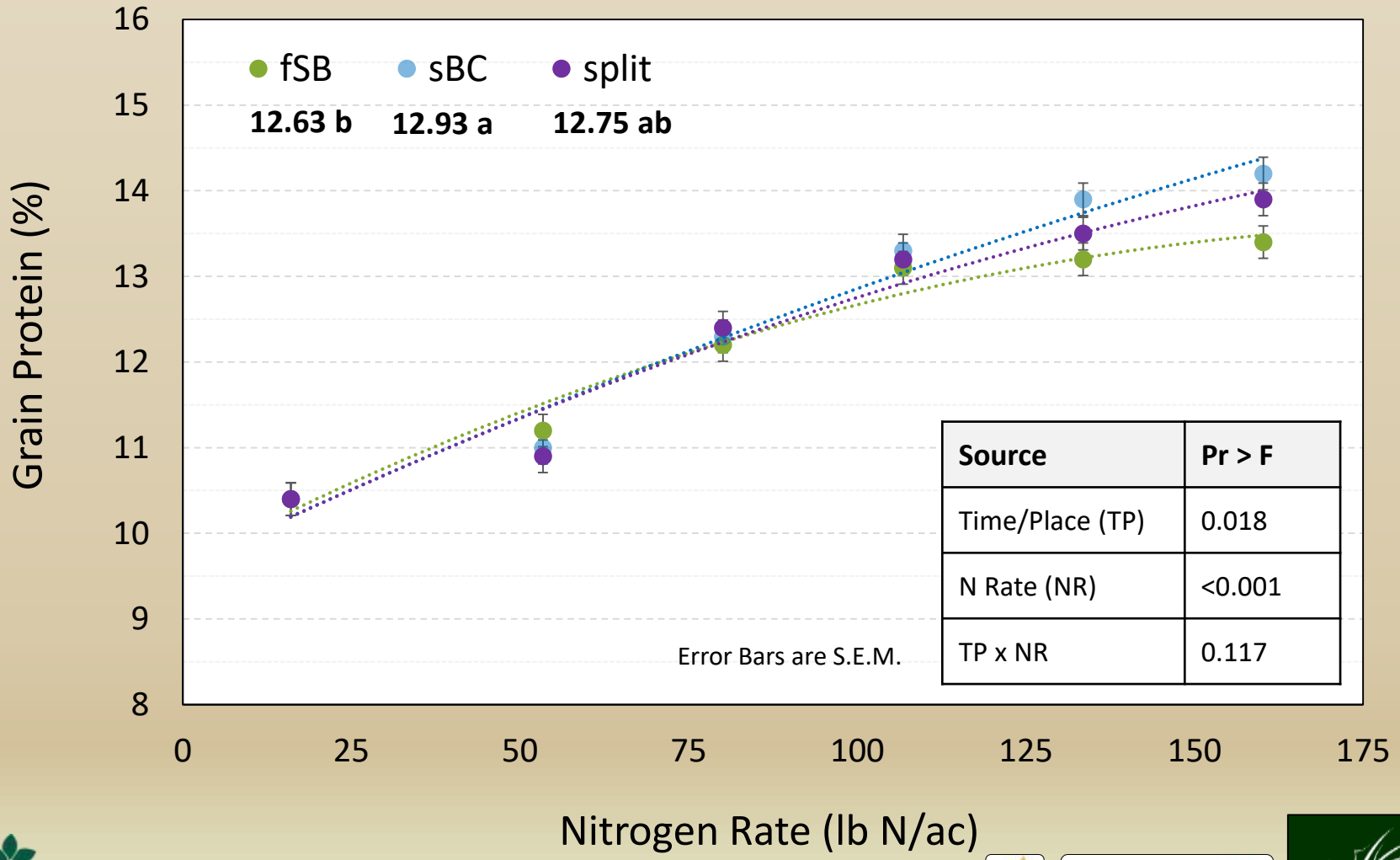
- *Variety AAC Goldrush*
- *Seeding/Side-banding, Sept. 21 (2018)*
  - *Seeded into moisture but dry conditions followed*
- *Spring Broadcast, Apr. 16 (2019)*
  - *6/10" of precipitation within 24 hours of spring broadcast applications (this did not occur at Swift Current)*
- *Combined August 16 (2019)*

Nitrogen Rate & Placement / Timing Effects on Winter Wheat Yield (IH-19)



Source	Pr > F
Time/Place (TP)	0.832
N Rate (NR)	<0.001
TP x NR	0.659

Nitrogen Rate & Placement / Timing Effects on Winter Wheat Protein (IH-19)



Source	Pr > F
Time/Place (TP)	0.018
N Rate (NR)	<0.001
TP x NR	0.117

Fertilizer Rate & Placement in Canola: How much is too much?

Jessica Weber
General Manager
Western Applied Research Corporation
www.warc.ca
@WARC_SK

Locations & Treatments

- Scott, Indian Head, & Melfort
- 2016, 2017, 2018
  - 5 Phosphorus Rates
  - 3 Placements
    - Seed-placed (SP)
    - Side-band (SB)
    - Seed-placed + 13 S
- Fertilizer sources were urea, monoammonium phosphate, and ammonium sulphate

Trt #	lb/ ac P_2O_5	Placement
1	0	SP
2	18	SP
3	36	SP
4	53	SP
5	71	SP
6	0	SB
7	18	SB
8	36	SB
9	53	SB
10	71	SB
11	0 & 13S	SP
12	18 & 13S	SP
13	36 & 13S	SP
14	53 & 13S	SP
15	71 & 13S	SP

Site Information

- **Scott**
- SBU 10%
- Dark Brown Climatic Zone
  - Loam soil
  - Moderate OM (4%)
  - 10” Row Spacing

- **Indian Head**
- SBU 6%
- Thin Black Climatic Zone
  - Clay Loam
  - Moderate OM (3-6%)
  - 12” Row Spacing

- **Melfort**
- SBU 8%
- Thick Black Climatic Zone
  - Clay Loam
  - High OM (10%)
  - 12” Row Spacing

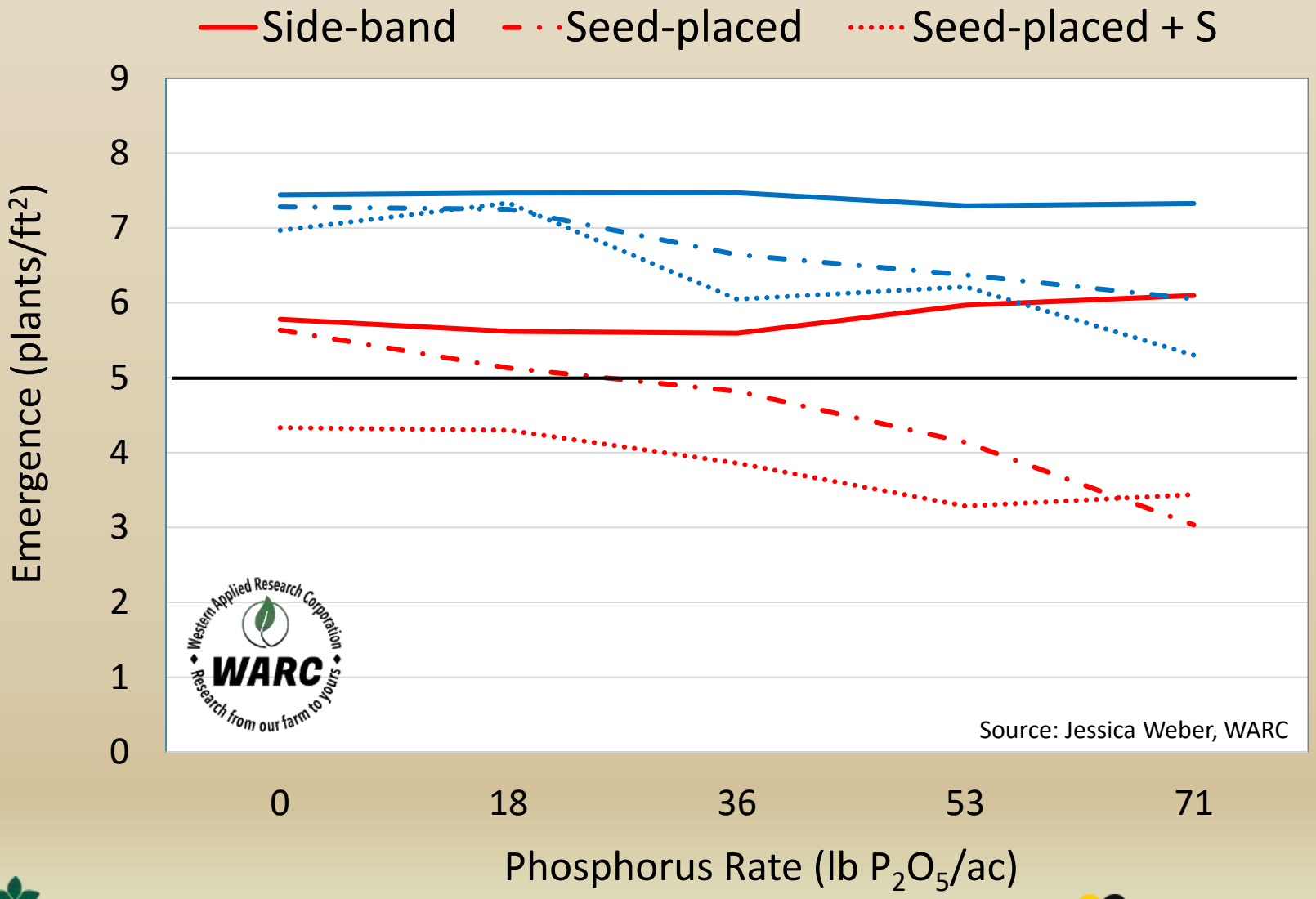
Table 2. Soil Characteristics at Indian Head, Melfort, and Scott, SK in 2016, 2017, and 2018.

	Indian Head (IH)			Melfort (ME)			Scott (SC)		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
Soil Zone	Thin Black			Thick Black			Dark Brown		
Soil Texture	Clay Loam			Clay Loam			Loam		
Salinity	Non - Saline		Saline	Non-Saline			Non-Saline		
Soil pH (0-6”)	7.9	8.0	7.2	6.2	6.1	6.2	5.2	5.6	5.8
Organic Matter (%) (0-6”)	2.7	4.8	5.5	12.3	11.5	9.5	4.1	3.5	4.4
NO_3-N (lb/ac) (0-6”)	10	11	7	39	35	21	17	9	9
NO_3-N (lb/ac) (6-24”)	21	15	9	29	38	19	51	15	2
NO_3-N (lb/ac) (0-24”)	31	26	16	68	73	40	68	24	11
P_2O_5 (ppm) (0-6”)	6	7	9	11	43	12	18	9	18
K_2O (ppm) (0-6”)	540+	701	719	357	796	598	312	380	332
SO_4-S (lb/ac) (0-6”)	9	16	56	10	40	26	8	10	14
SO_4-S (lb/ac) (6-24”)	28	60	360+	14	40	20	8	10	20
SO_4-S (lb/ac) (0-24”)	37	76	416+	24	80	46	16	20	34

Source: Jessica Weber, WARC

Fertilizer Rate & Placement Effects on Plant Density

Scott (Course Textured Soils) vs. Indian Head (Fine Textured Soils)



Visible Effects of Fertilizer Placement on Canola Stand – Scott SK

137 lb MAP/ac
Side-band

137 lb MAP/ac
Seed-placed

137 lb MAP/ac
+ 54 lb AS/ac
Seed-placed

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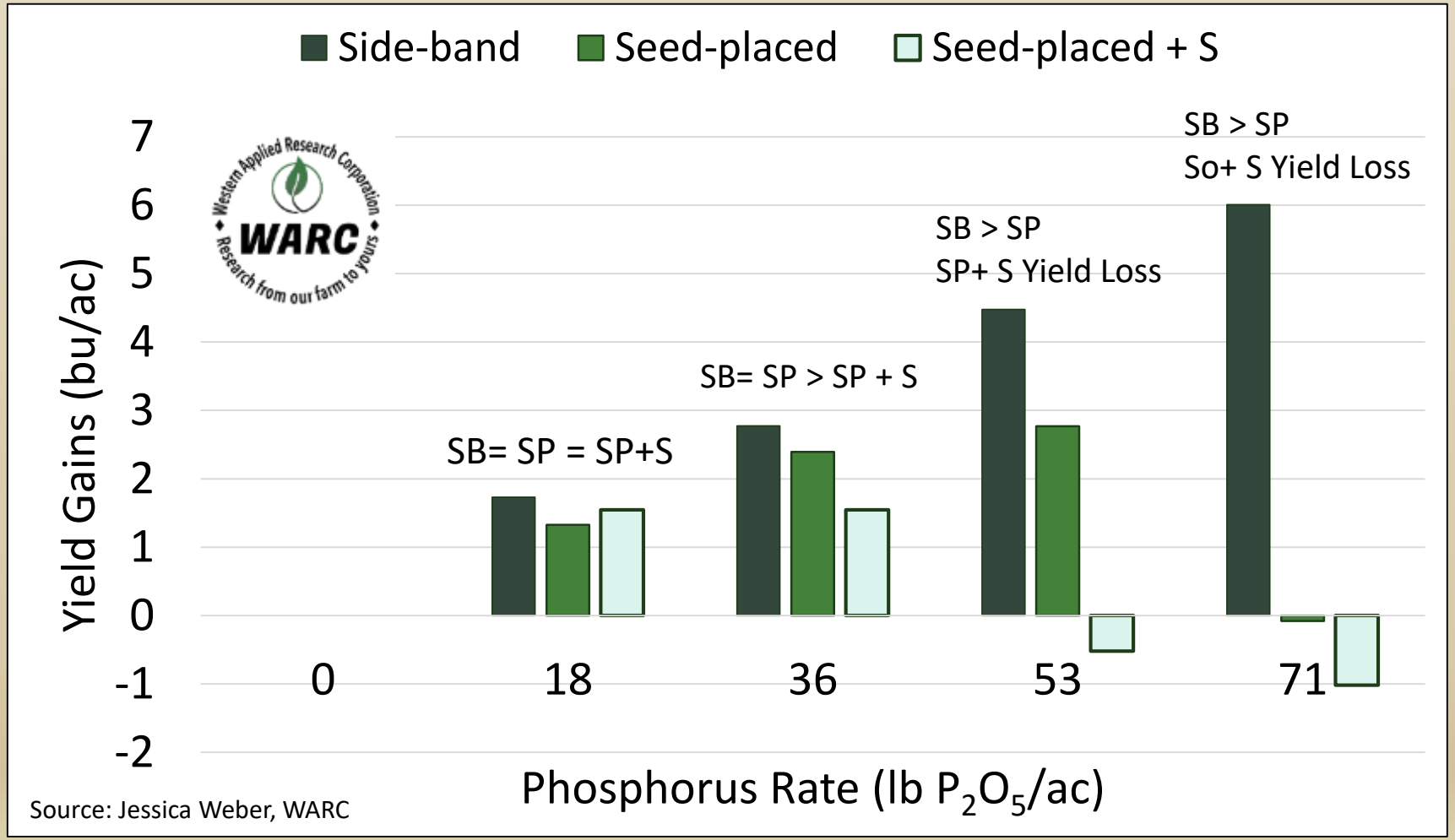
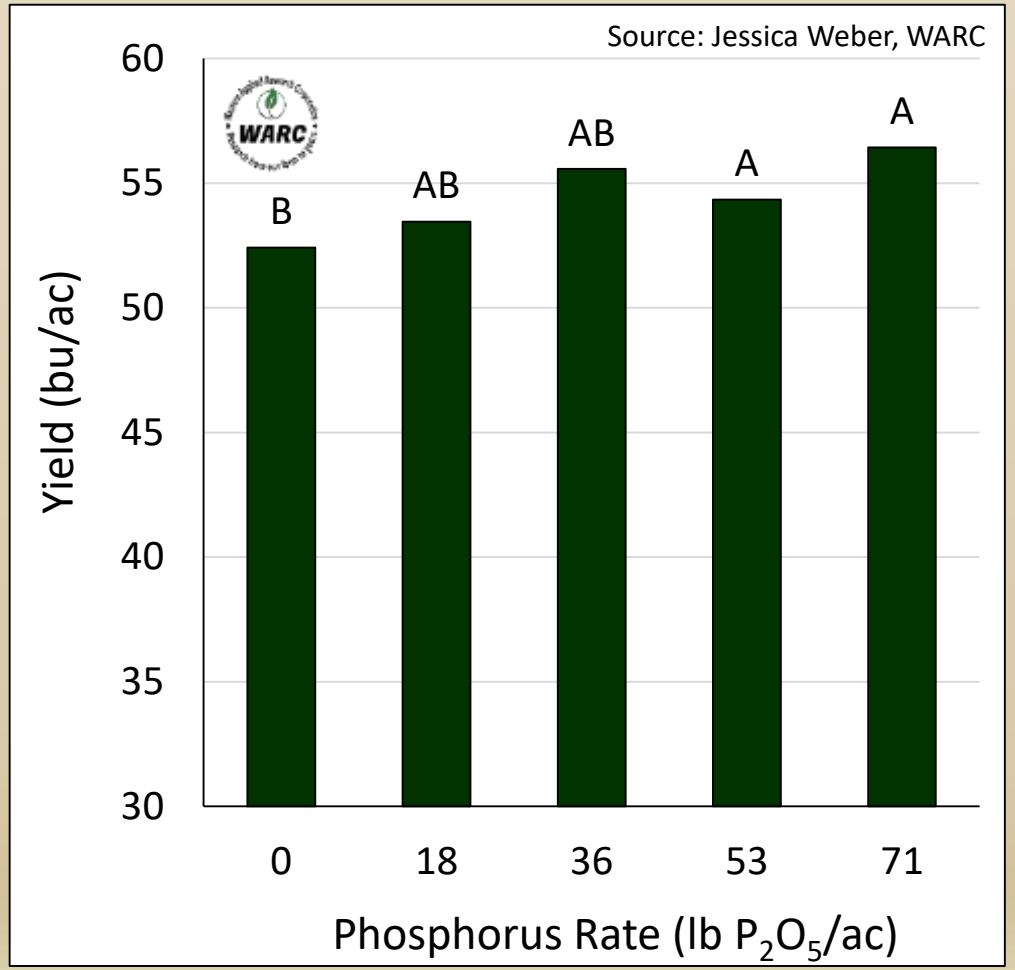
Fertilizer Rate x Placement Effects on Canola Yield – Scott SK (2016-18)



Source: Jessica Weber, WARC

Fertilizer Rate Effect on Canola Yield – Indian Head & Melfort (4/6 site-years)

- No response at IH-16 or ME-17
- No placement effect or rate x placement interaction at Indian Head and Melfort for Yield
- ME-16 – 16 bu/ ac gain vs check
- IH-18 - 2 bu/ ac gain vs check
- On average, 4 bu/ac gain vs check



THANK YOU

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SAVE THE DATE!!!

IHARF Annual Field Day, Tuesday July 21