

2018 IHARF Agronomy Update

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Presentation Overview

- Faba bean Row Spacing x Seed Rates (2018)
- Flax Seed Treatments & Foliar Fungicides (2018, multi-site)
- Canola Seed-placed P Fertilizer Forms & *P. bilaii* inoculation (2018)
- 4R N Management Trials in Wheat & Canola (2017-18)
- Wheat Input Demo (2018)



Faba bean Response to Row Spacing & Seed Rate (ADOPT)



Seed Rate & Row Spacing Effects on Faba bean Indian Head 2018

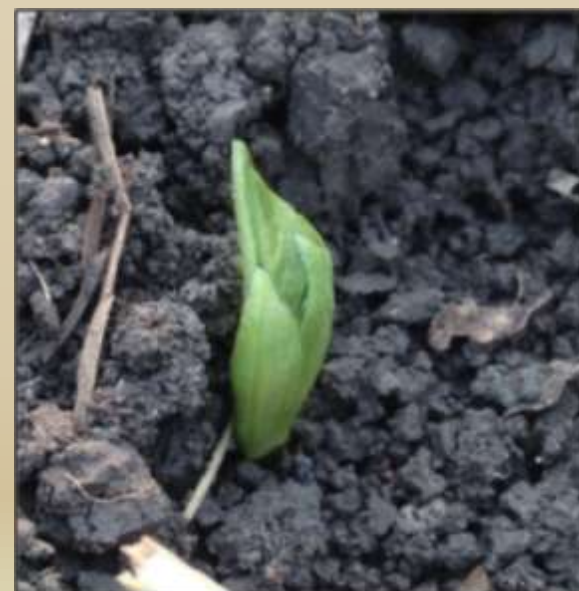
Objectives

- To demonstrate the response of faba beans to varying row spacing with a focus on establishment, ability to compete with weeds, maturity and yield
- To gather additional information on faba bean seeding rate response & assess whether the observed seeding rate responses are affected by row spacing

Treatments (12)

Row Spacing (4): 10", 12", 14", & 16"

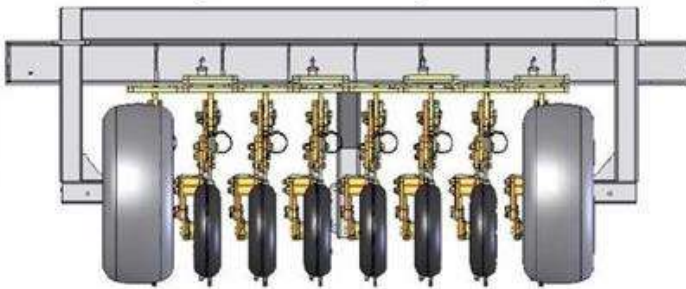
Seeding Rates (3): 25, 45, & 65 seeds/m²



IHARF-SeedMaster Plot Drill on Various Row Spacing Configurations

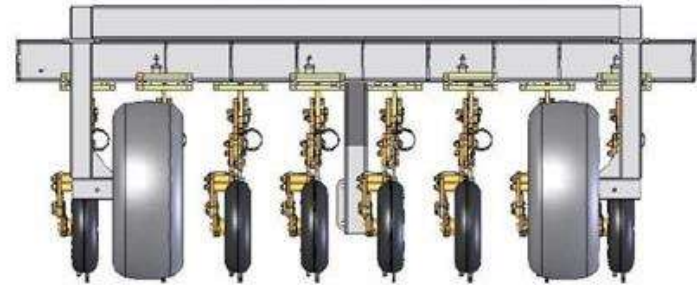
10 inch spacing

(7.5' seeded plot width)



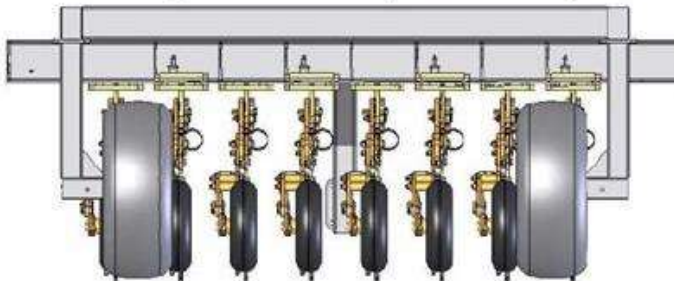
14" cm Spacing

(9.3' seeded plot width)



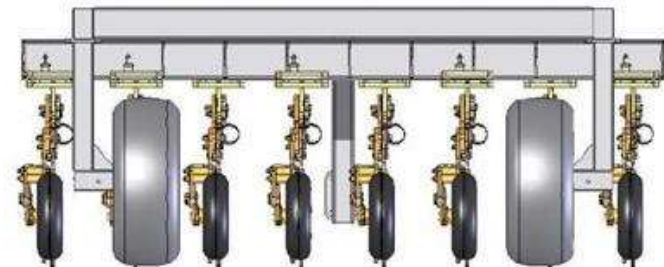
12" cm spacing

(8.0' seeded plot width)

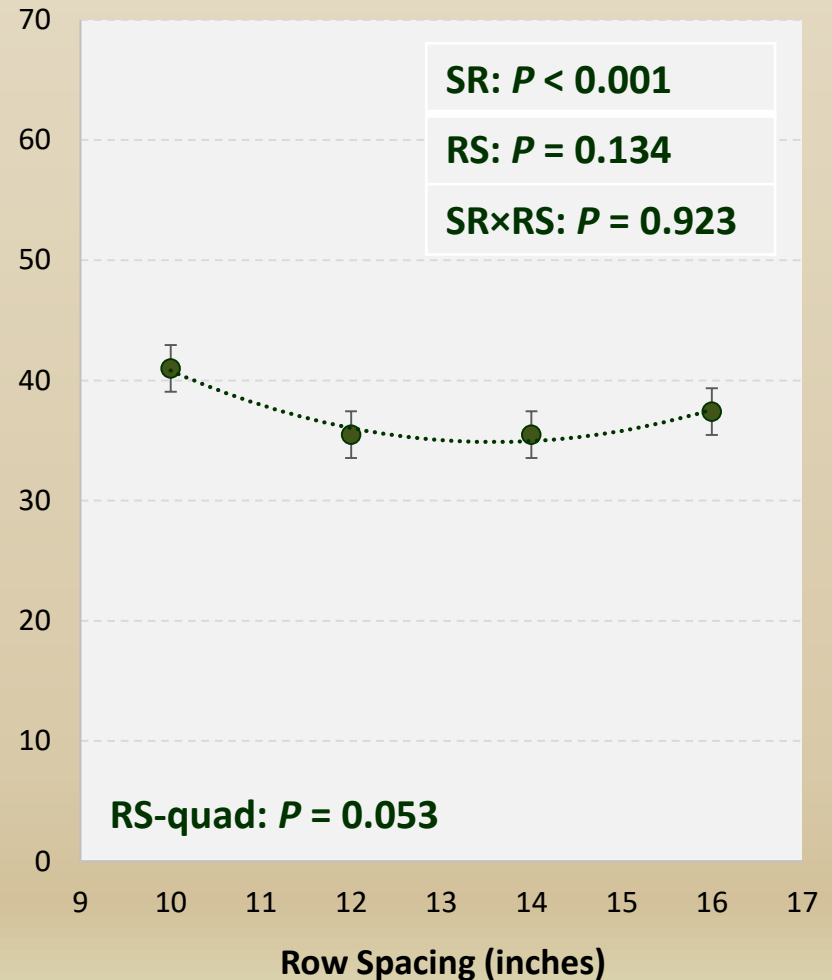
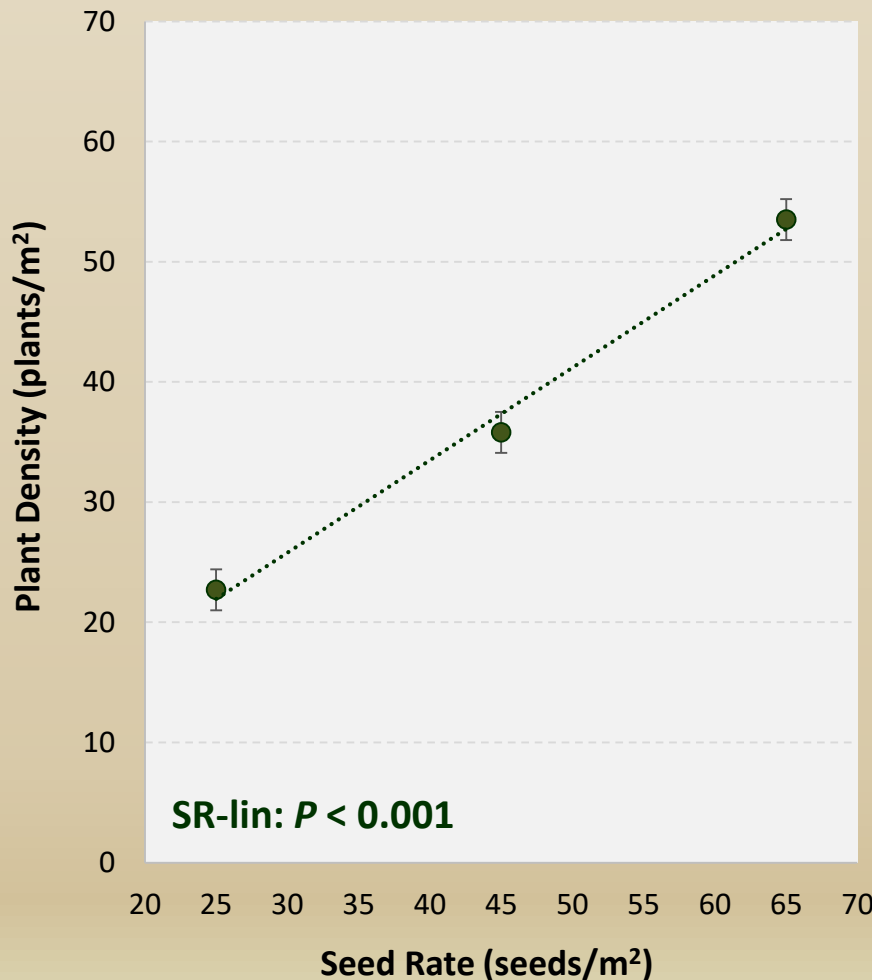


16" cm Spacing

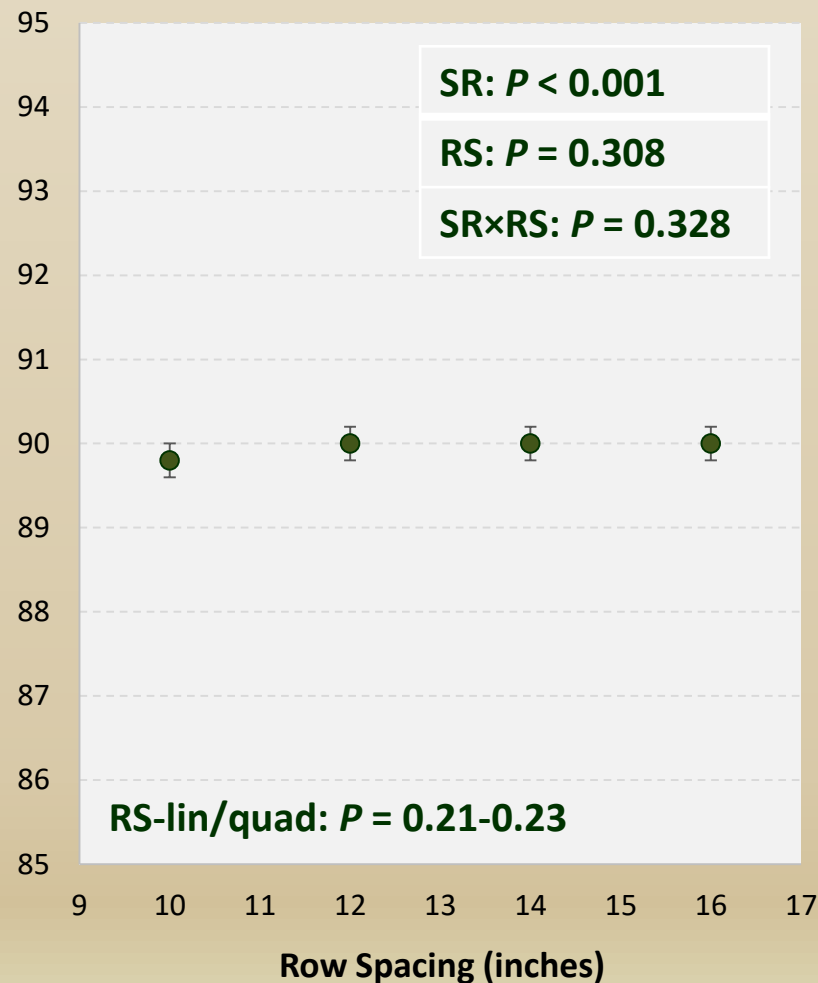
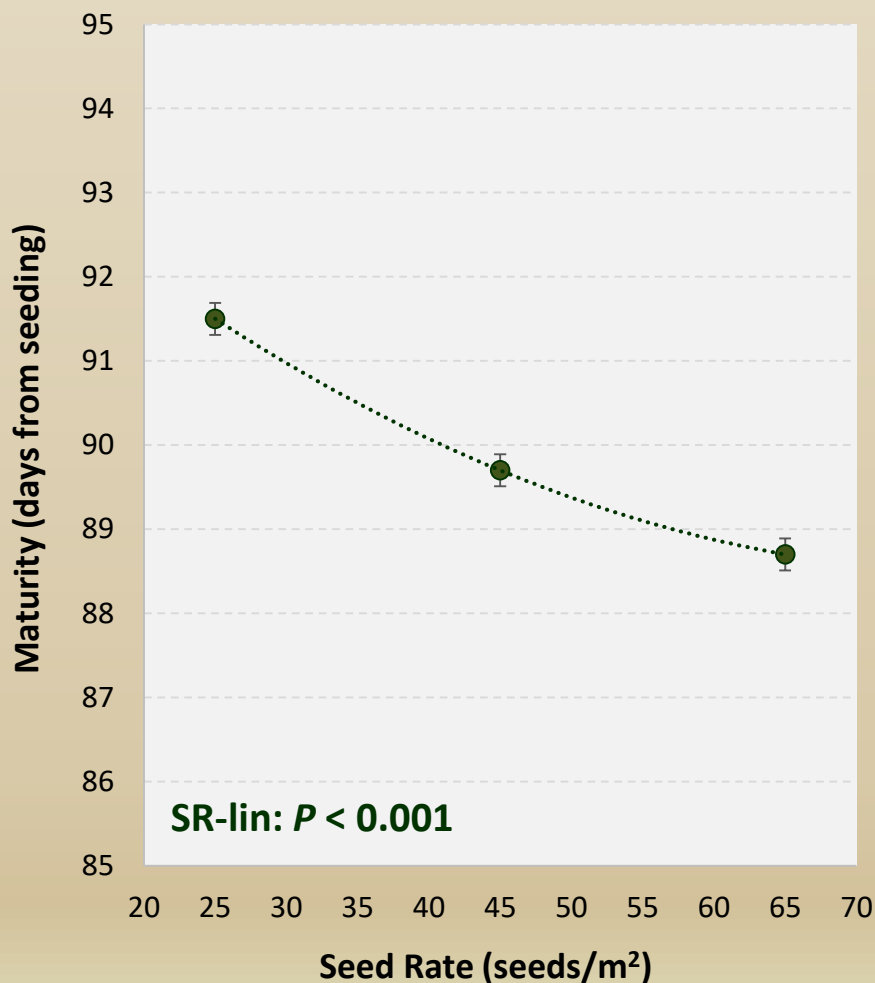
(10.7' seeded plot width)



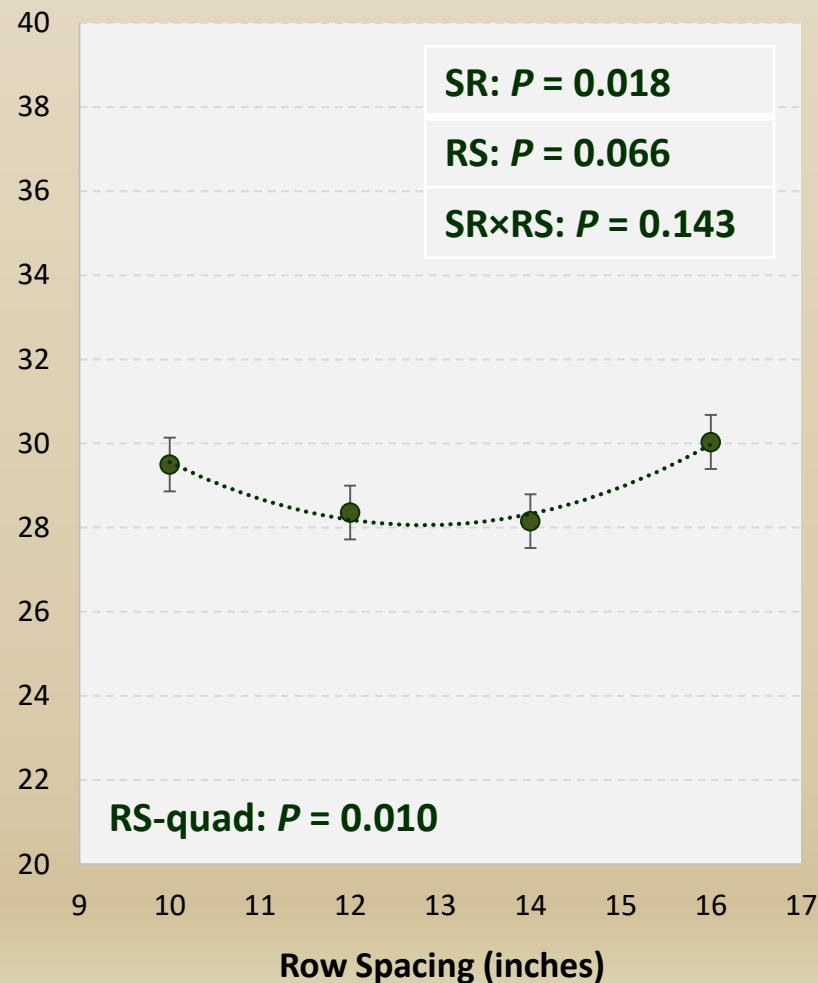
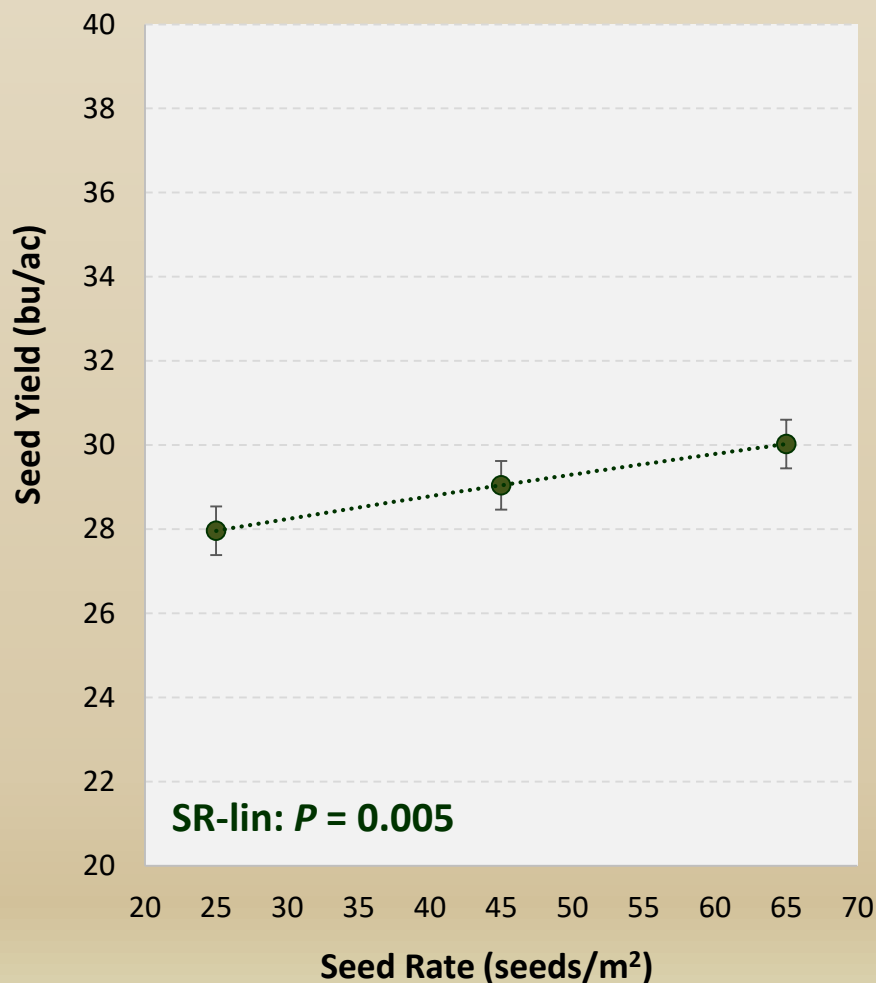
Seed Rate & Row Spacing Effects on Faba bean Emergence (IH-18)



Seed Rate & Row Spacing Effects on Faba bean Maturity (IH-18)



Seed Rate & Row Spacing Effects on Faba bean Seed Yield (IH-18)



10" – 40 seeds/m²



12" – 40 seeds/m²



July 18, 2018

14" – 40 seeds/m²



16" – 40 seeds/m²



Seed Rate & Row Spacing Effects on Faba bean

Summary & Conclusions

- Results are not conclusive with only 1 site-year of data available
- Faba beans appeared to be relatively insensitive to row spacing within the 10-16” range evaluated and under relatively dry, low yielding conditions
- The observed seeding rate response was stronger than expected, possibly due to the extremely dry conditions
- Seeding rate appeared to have a greater impact on maturity and the ability of faba beans to compete with weeds than row spacing; however, weed pressure was very low in all treatments



Flax Seed Treatment and Foliar Fungicide Options (SaskFlax-ADOPT)



Flax Response to Seed Treatment & Foliar Fungicide Options

Objectives

- To demonstrate the response of flax to various seed-applied and foliar fungicide options with a focus on establishment, maturity, and yield

Treatments (9)

Seed Treatments: None, Vitaflo-280, Insure Pulse

Foliar Fungicides*: None, Headline EC, Priaxor

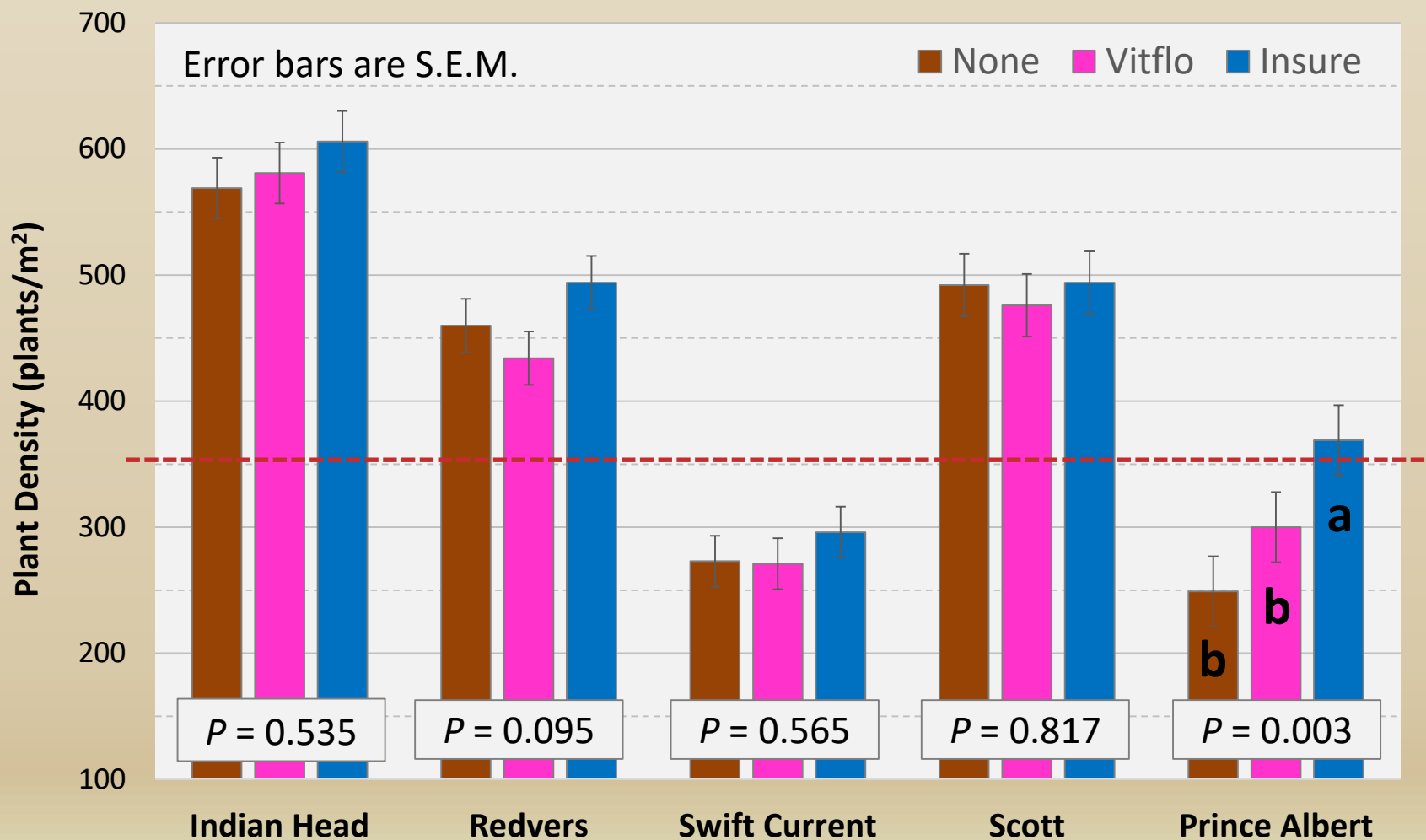
Locations (5)

Indian Head, Redvers, Swift Current, Scott, & Prince Albert, Saskatchewan

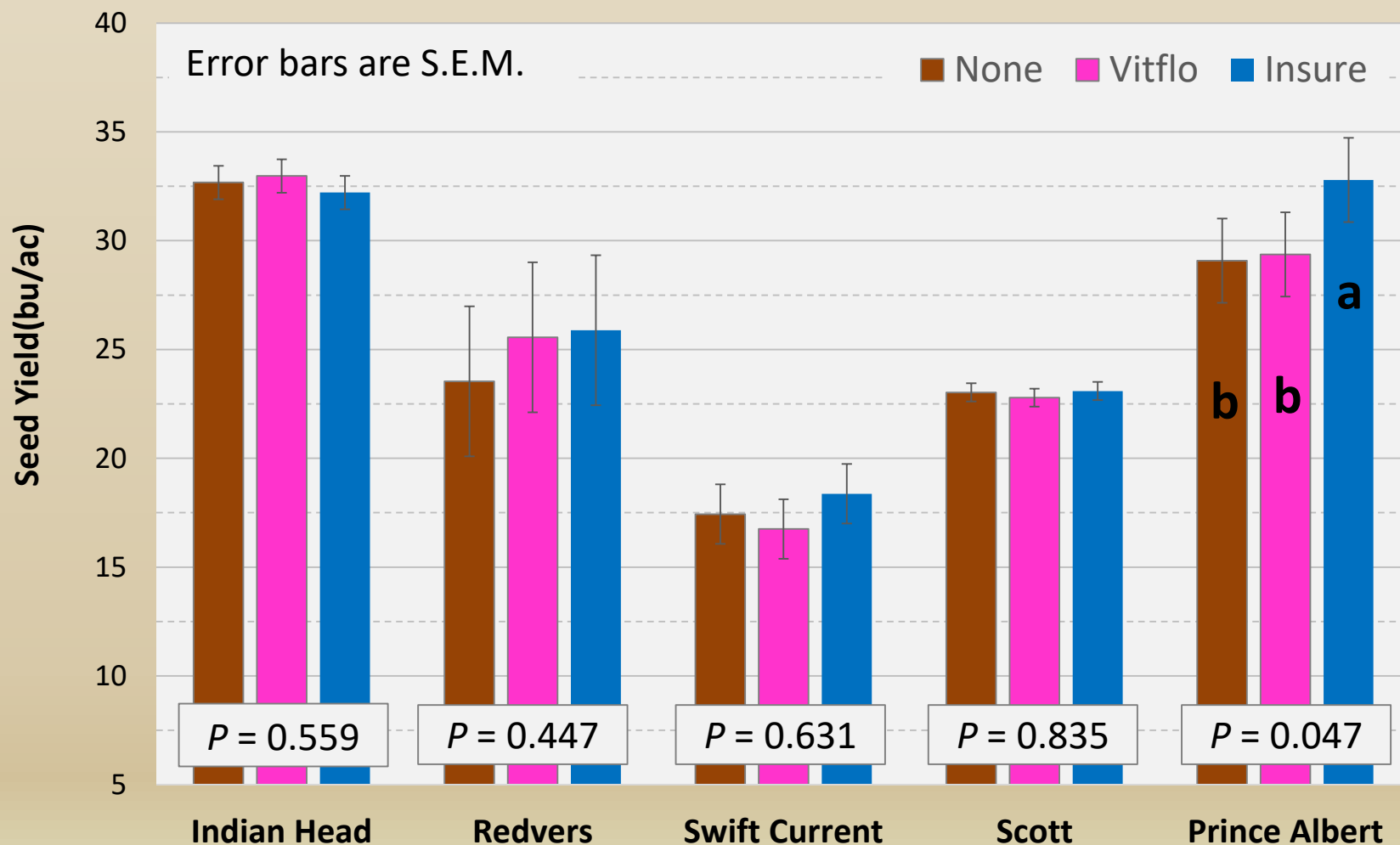
*fungicides applied 7-10 after initiation of flowering in a minimum of 15 U.S. gal/ac solution volume



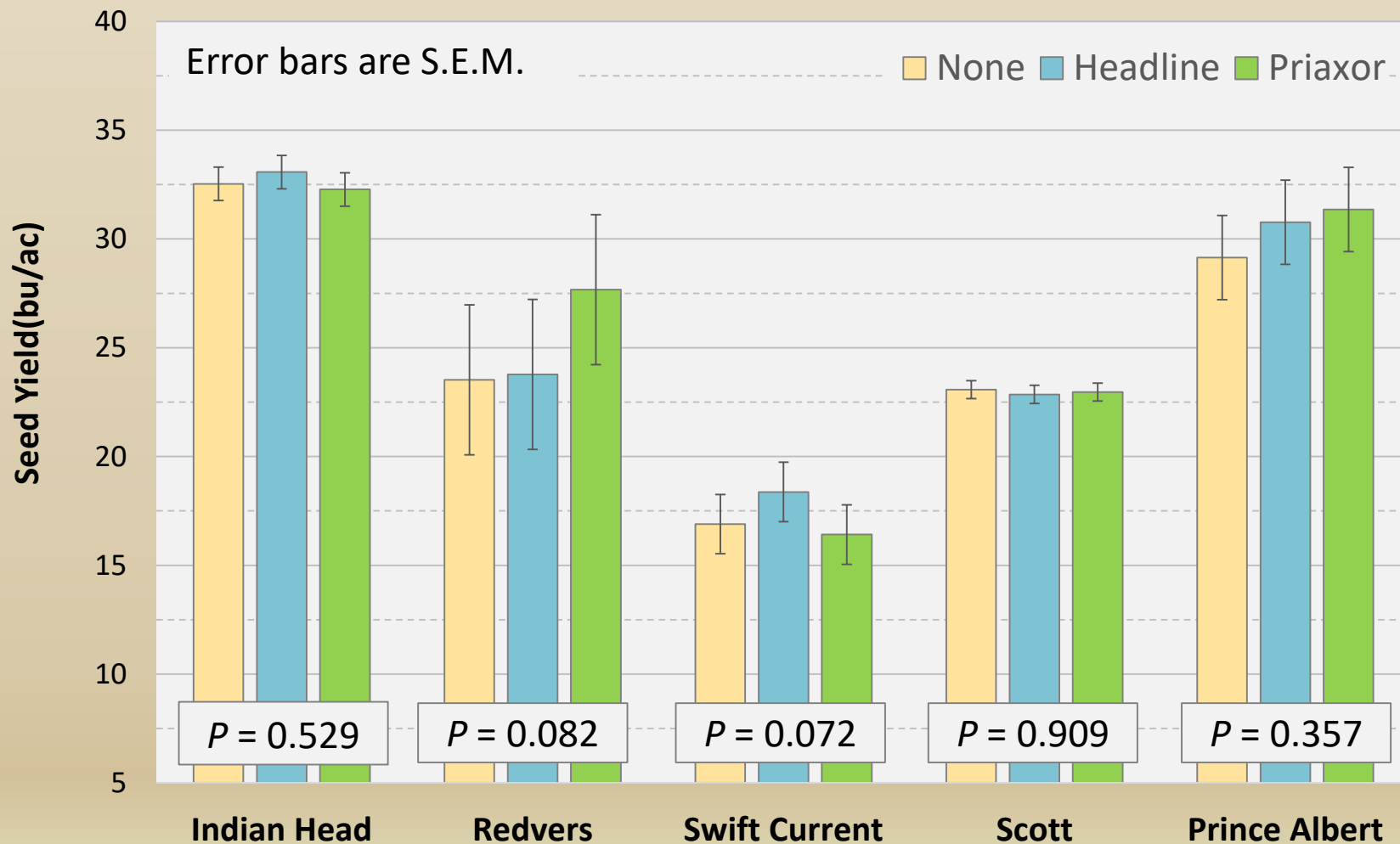
Seed Treatment Effects on Flax Emergence (5 locations - 2018)

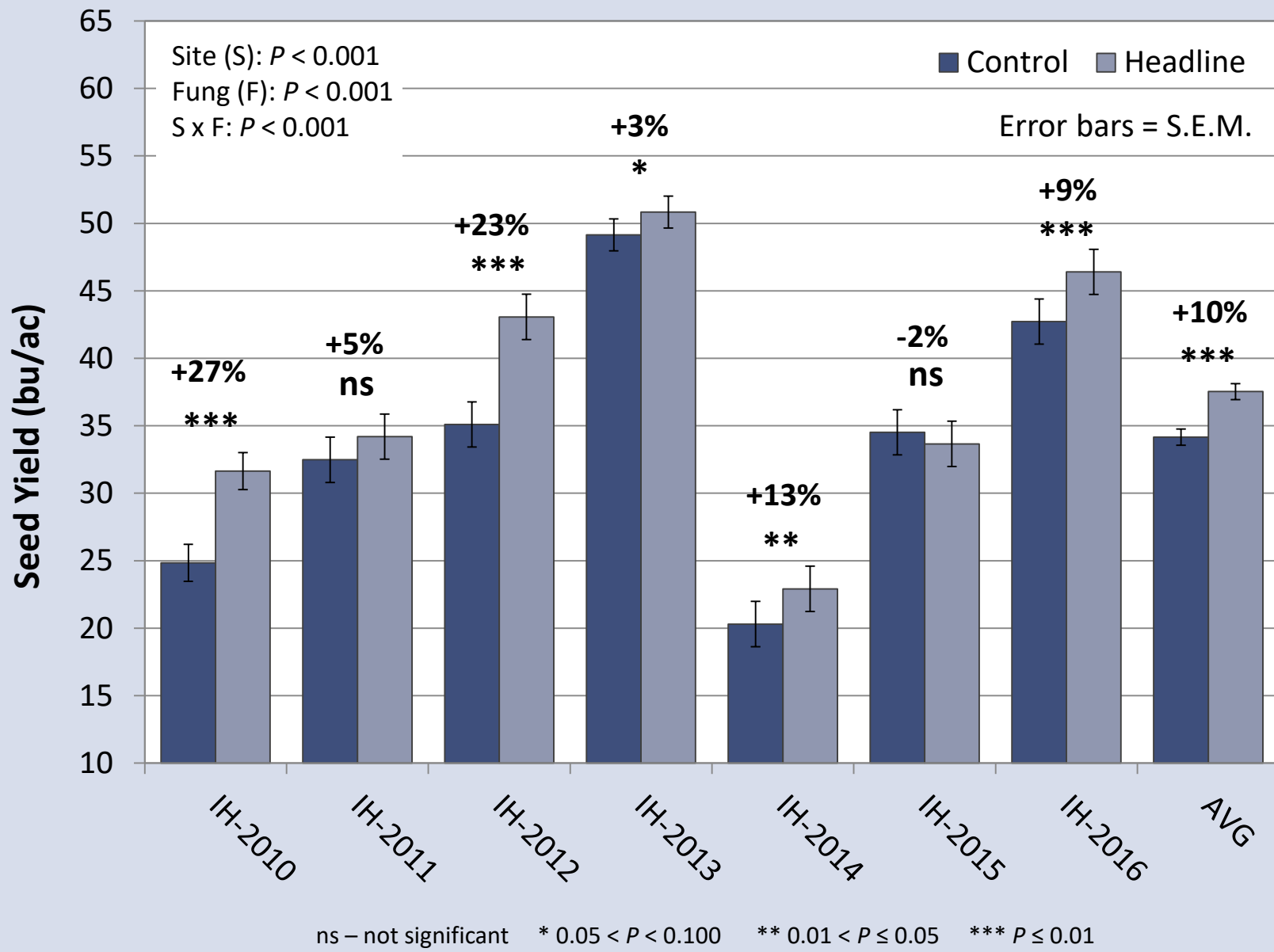


Seed Treatment Effects on Flax Seed Yield (5 locations - 2018)



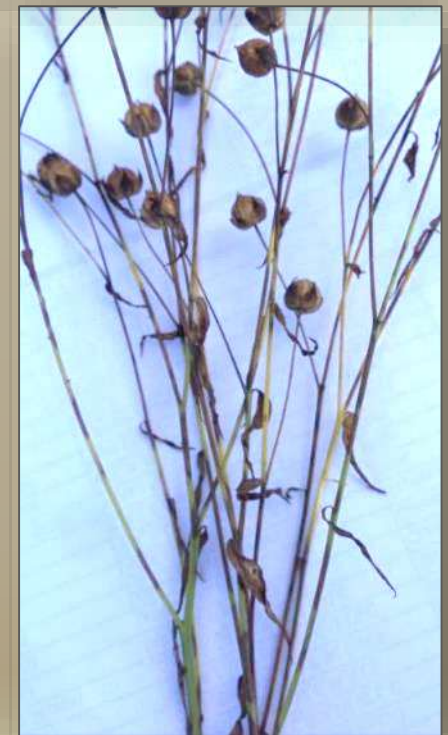
Foliar Fungicide Effects on Flax Seed Yield (5 locations - 2018)







source: www.flaxcouncil.ca



Flax Response to Seed Treatment & Foliar Fungicide Options: Summary & Conclusions

- Flax response to seed treatment in small plot trials has been variable, with occasional benefits detected but a high frequency of non-responsive sites
- Significant responses have mostly been limited to higher plant populations which may or may not lead to yield benefits depending on the absolute numbers
- Probability of economic benefit is likely low with sound seed, normal seeding conditions, adequate seed rates, and no known history of root disease in flax (i.e. fusarium wilt, root rot/seedling blight)
- No responses to fungicide in the current trial – consistent with previous results showing no benefit under low disease pressure (all sites were dry)
- Past IHARF trials at Indian Head have shown at least marginally significant responses 5/7 seasons with an overall 10% yield benefit to fungicide



Canola Phosphorus Fertilizer Form & *P. bilaii* Inoculant (ADOPT)



Canola Response to P Form & *P. bilaii* Inoculant Indian Head 2018

Objectives

- To demonstrate the relative crop safety and agronomic performance of seed-placed granular phosphorus (P) fertilizer forms with & without a P solubilizing *P. bilaii* inoculant

Treatments (10)

P Rates: 0, 22, & 45 lb P₂O₅/ac

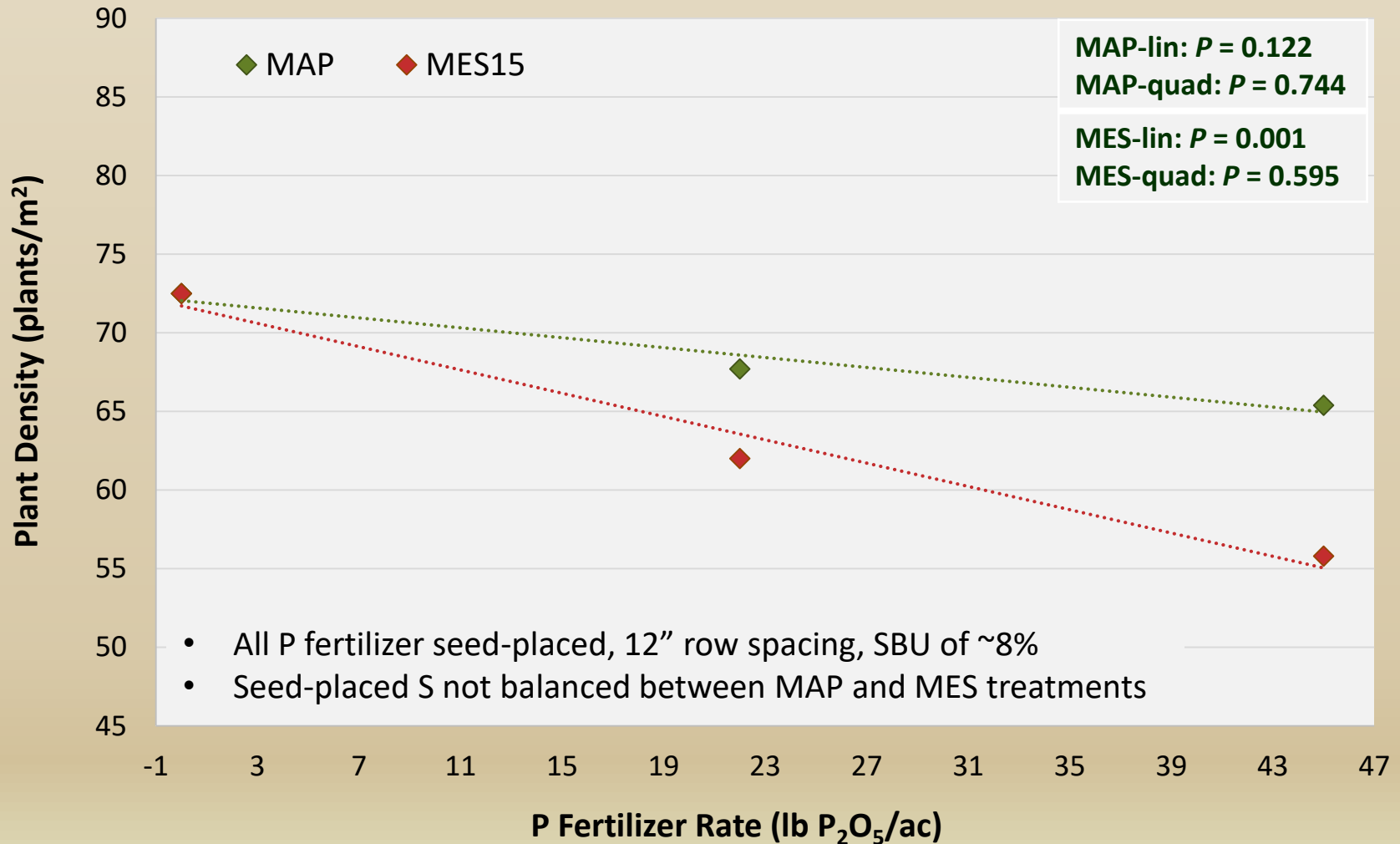
P Forms: MAP (11-52-0) or MES15 (13-33-0-15)

Inoculant: None vs label rate granular Jumpstart®

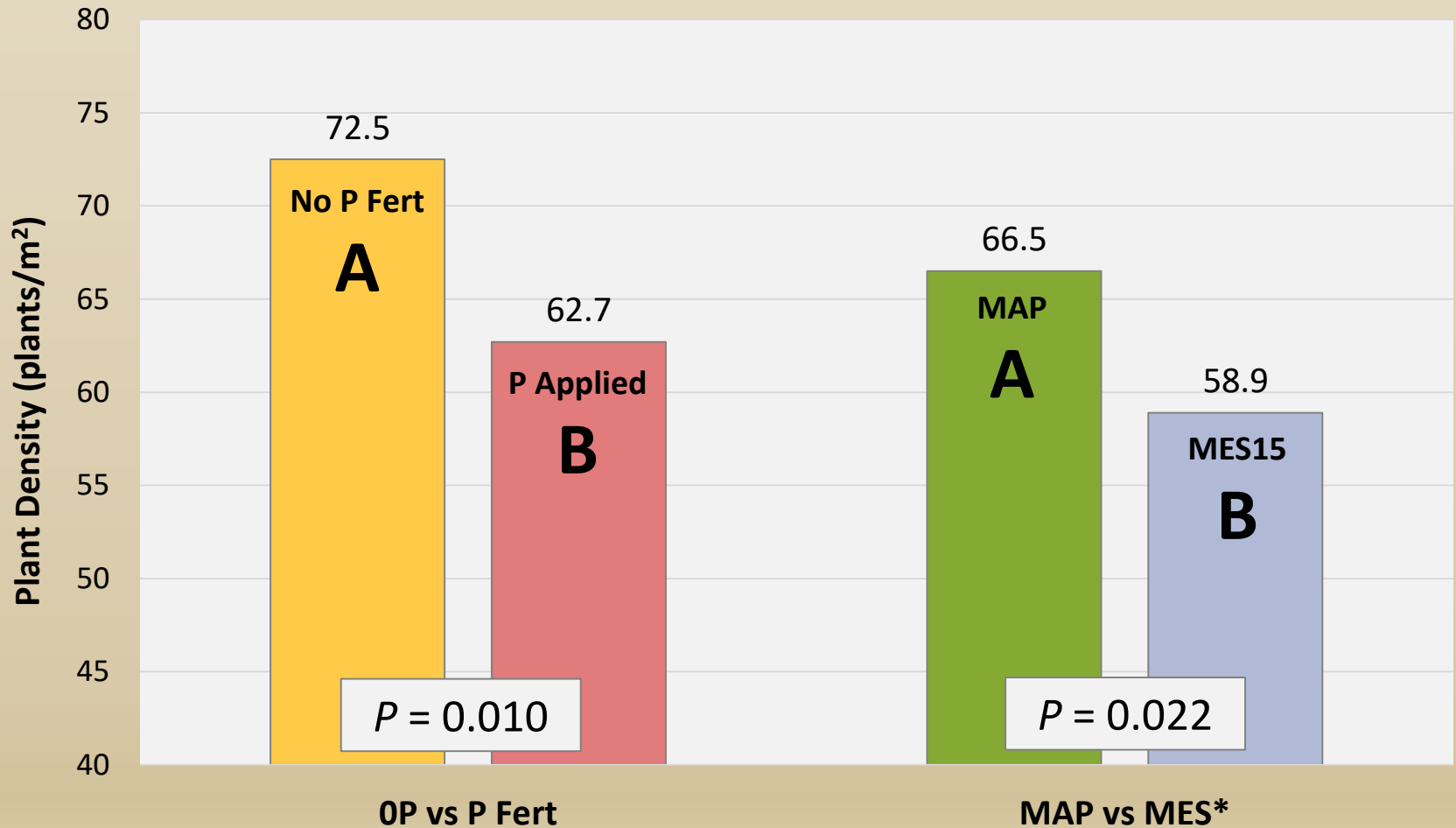
Notes: 7 ppm Olsen-P, pH 7.5, S.O.M. 5.9%; all P fertilizer seed-placed; broadcast K₂SO₄ across entire site before seeding (S rates not balanced across treatments but non-limiting in all)



P Rate x Form Effects on Canola Emergence (IH-18)

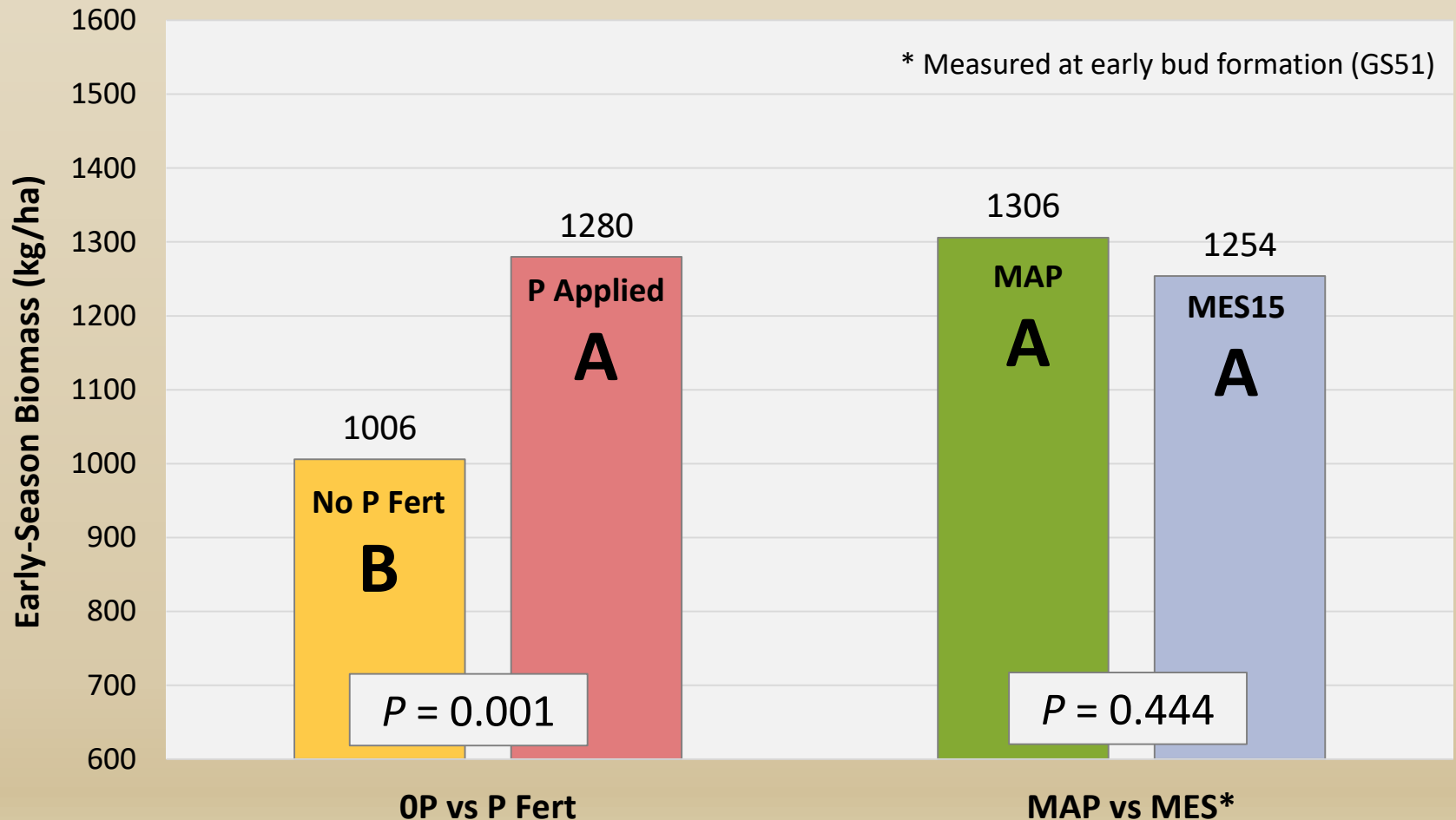


Group Comparisons: Seed-Placed P Effects on Canola Emergence (IH-18)

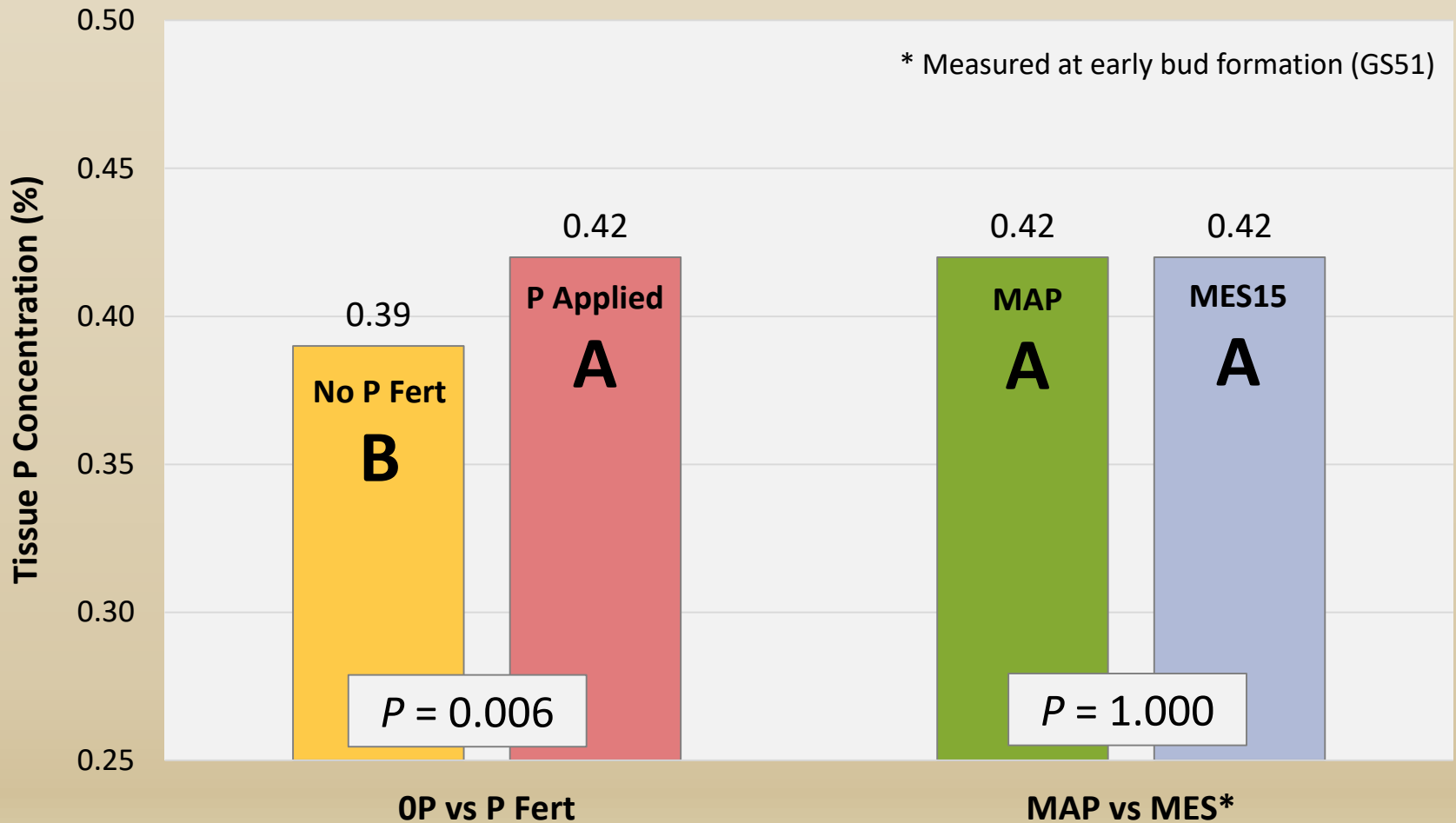


* Seed-placed S was not balanced between MAP & MES

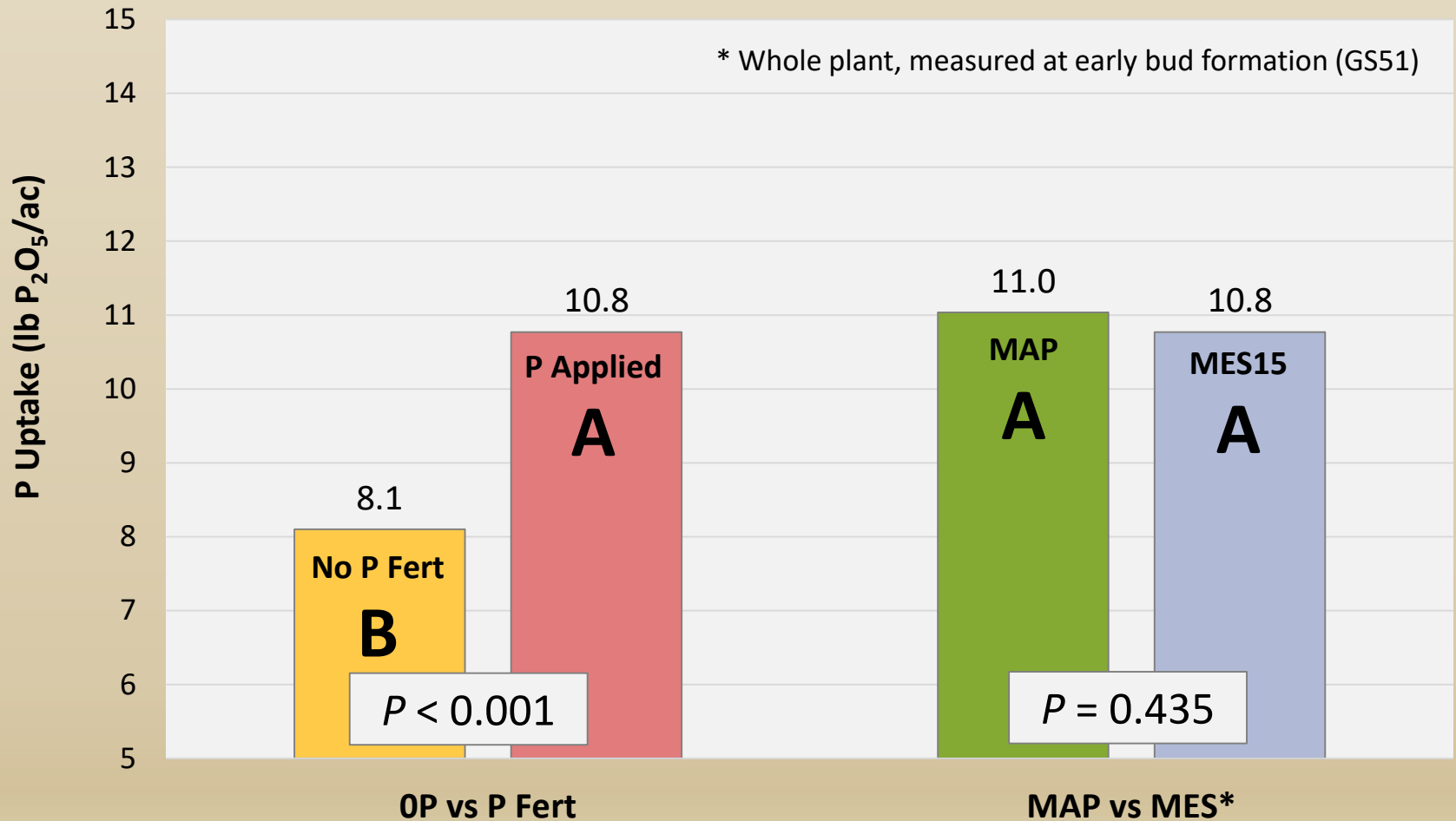
Group Comparisons: Seed-Placed P Effects on Canola Growth (IH-18)



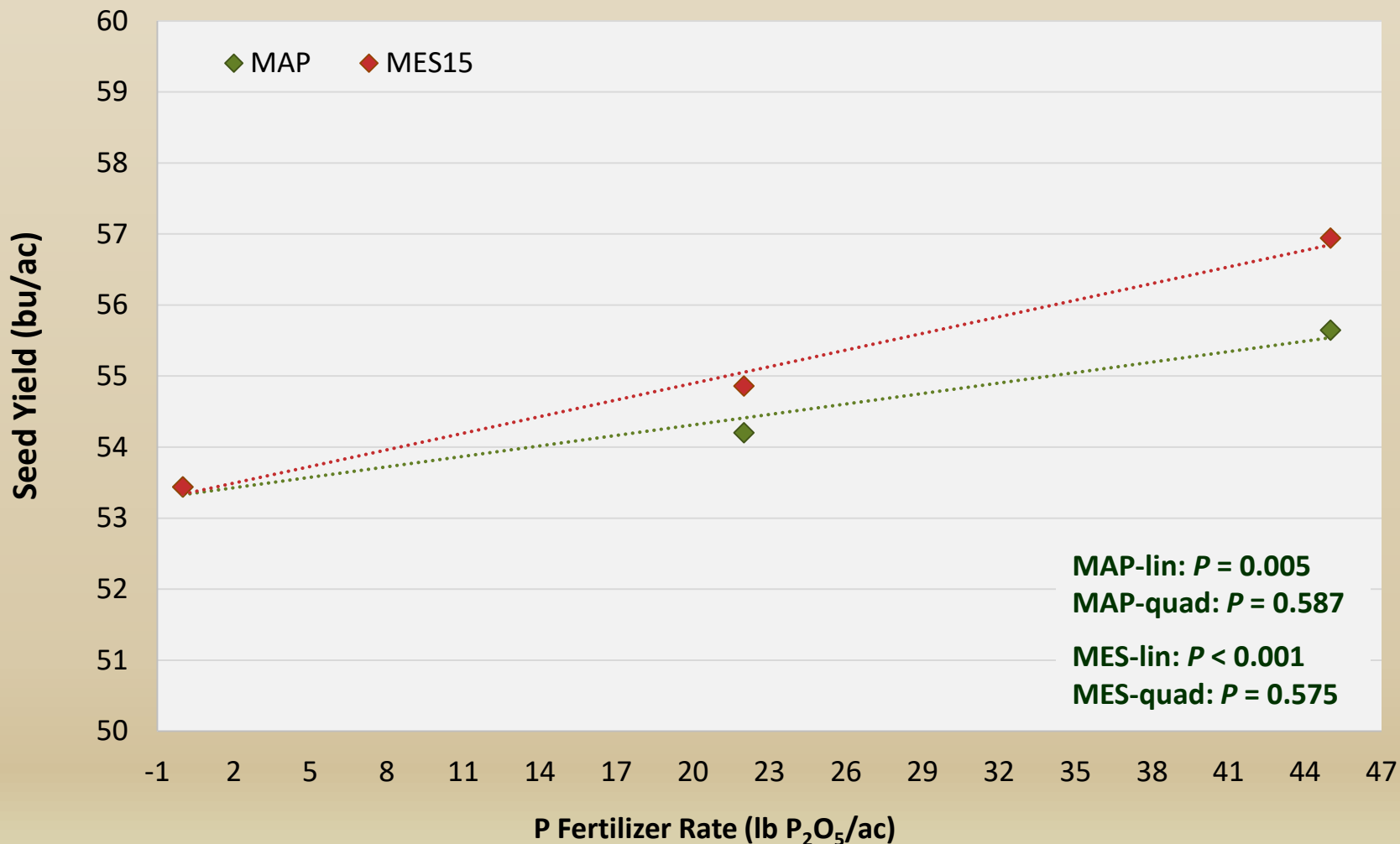
Group Comparisons: Seed-Placed P Effects on Canola Tissue P (IH-18)



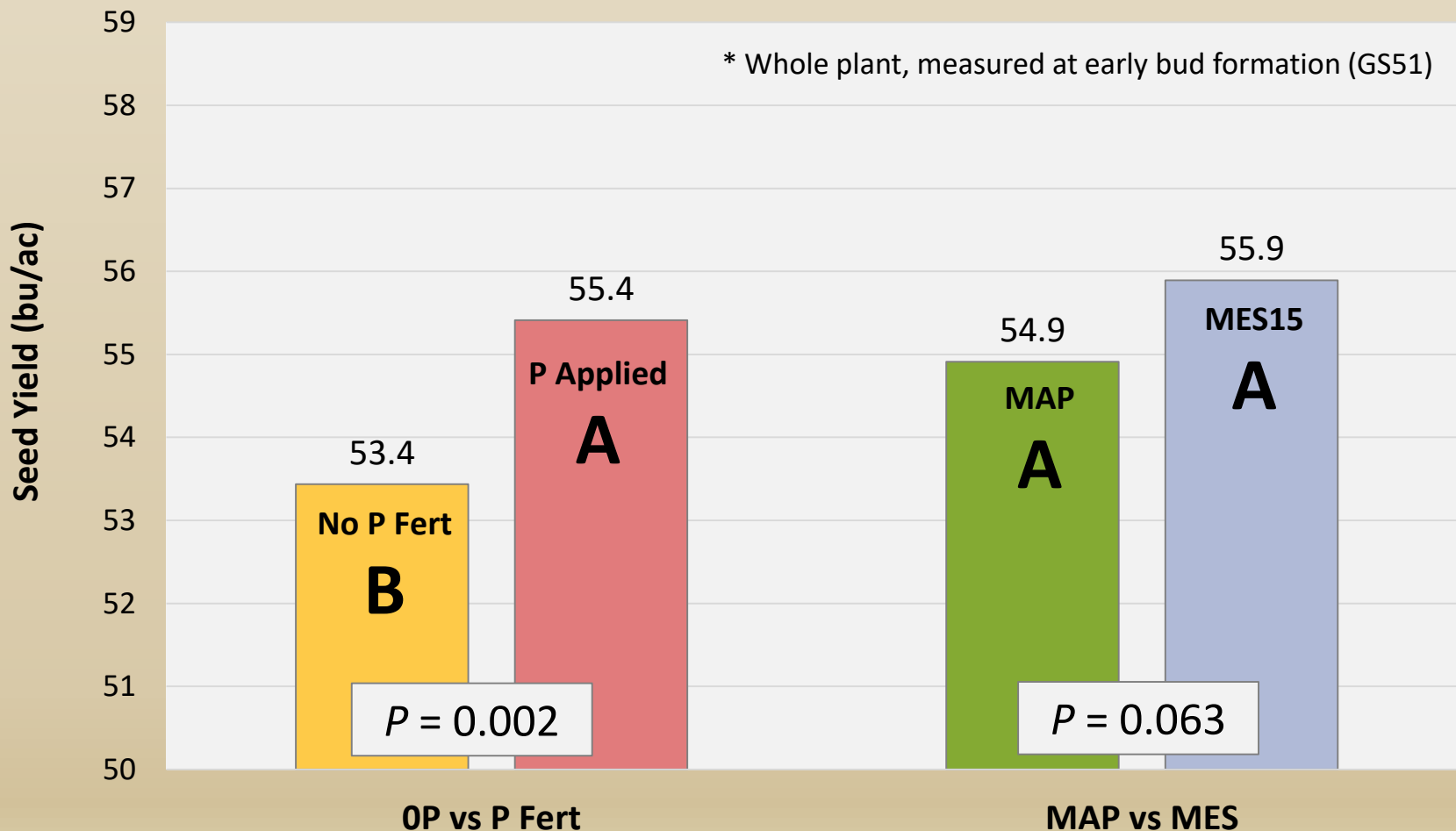
Group Comparisons: Seed-Placed P Effects on Canola P Uptake (IH-18)



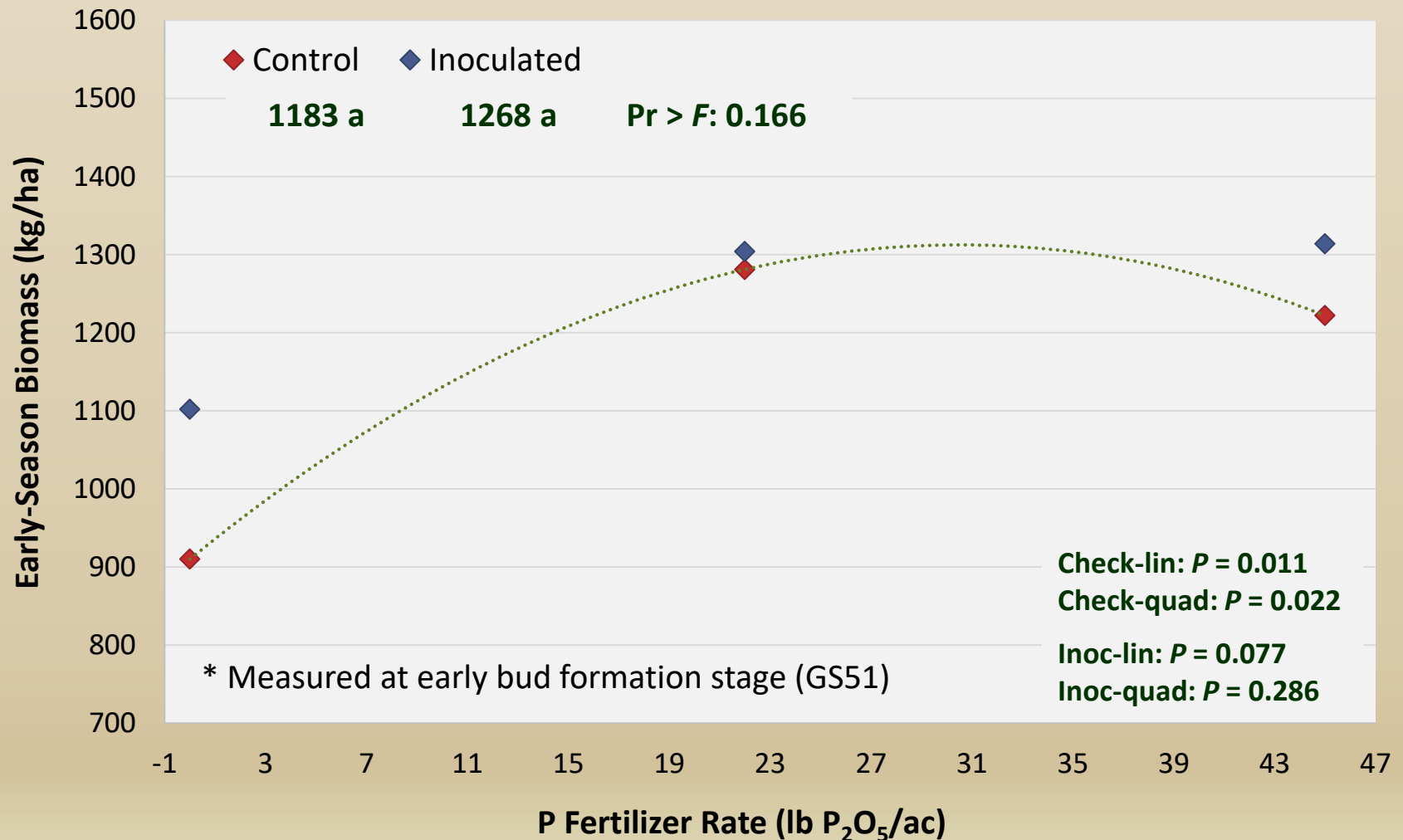
P Rate x Form Effects on Canola Seed Yield (IH-18)



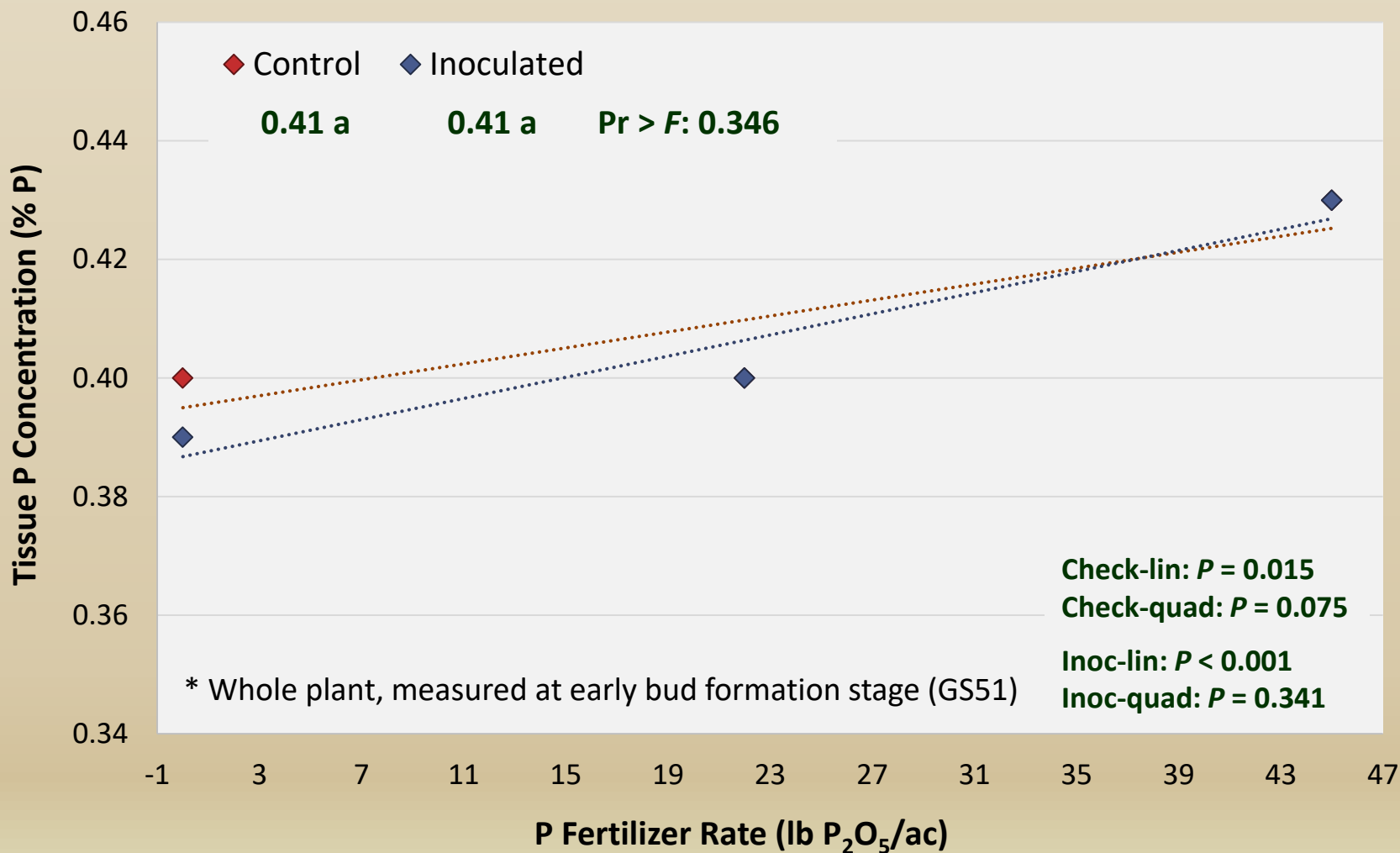
Group Comparisons: Seed-Placed P Effects on Canola Yield (IH-18)



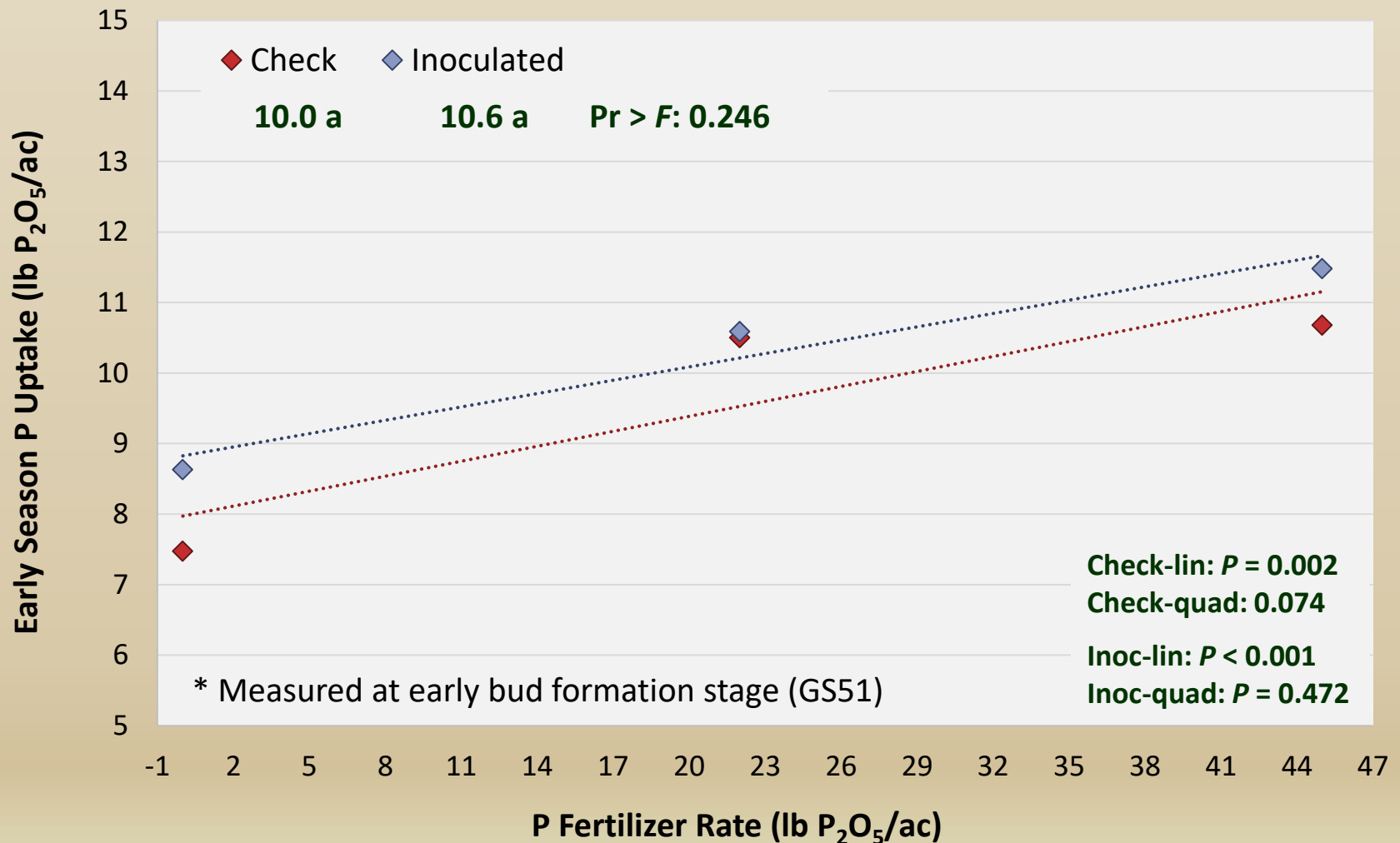
P Rate x *P. bilaii* Effects on Early-Season Canola Growth (IH-18)



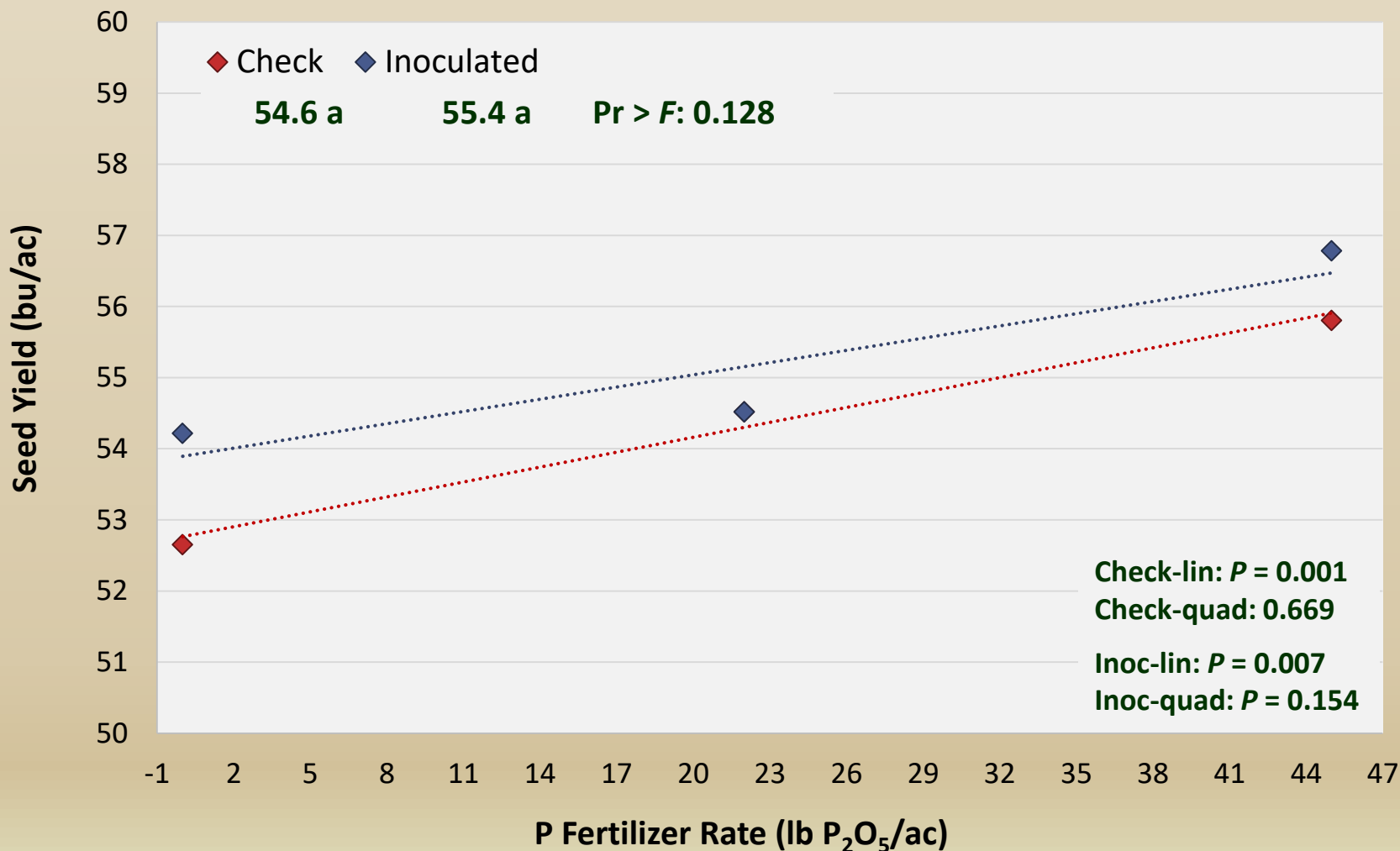
P Rate x *P. bilaii* Effects on Canola Tissue P Concentration (IH-18)



P Rate x *P. bilaii* Effects on Early-Season Canola P Uptake (IH-18)



P Rate x *P. bilaii* Effects on Canola Seed Yield (IH18)



Canola Response to P Form & *P. bilaii* Inoculant

Summary & Conclusions

- Single site-year, results not to be considered conclusive
- High rates (45 lb P₂O₅/ac) of MES15 cause greater stand reductions than MAP when considered as a P source alone
 - Compared to equivalent blend of MAP/AS, MES15 has generally been shown to be safer for seed-placement; however, there is no agronomic reason to seed-place S (i.e. any benefits are usually logistic)
- Responses to P fertilizer in general were small but consistently significant
 - Similar early-season growth, tissue P concentrations, and P uptake for MAP and MES15, marginally significant yield benefit to MES15 (2% or 1 bu/ac; *P* = 0.063)
- Inoculation with *P. bilaii* tended to increase early season biomass slightly in the absence of P fertilizer; however, there was no yield benefit and yield responses to P fertilization were similar regardless of inoculation



4R Nitrogen Fertilizer Management in Wheat & Canola (ADOPT)



4R N Management in Canola & Wheat

Indian Head 2017

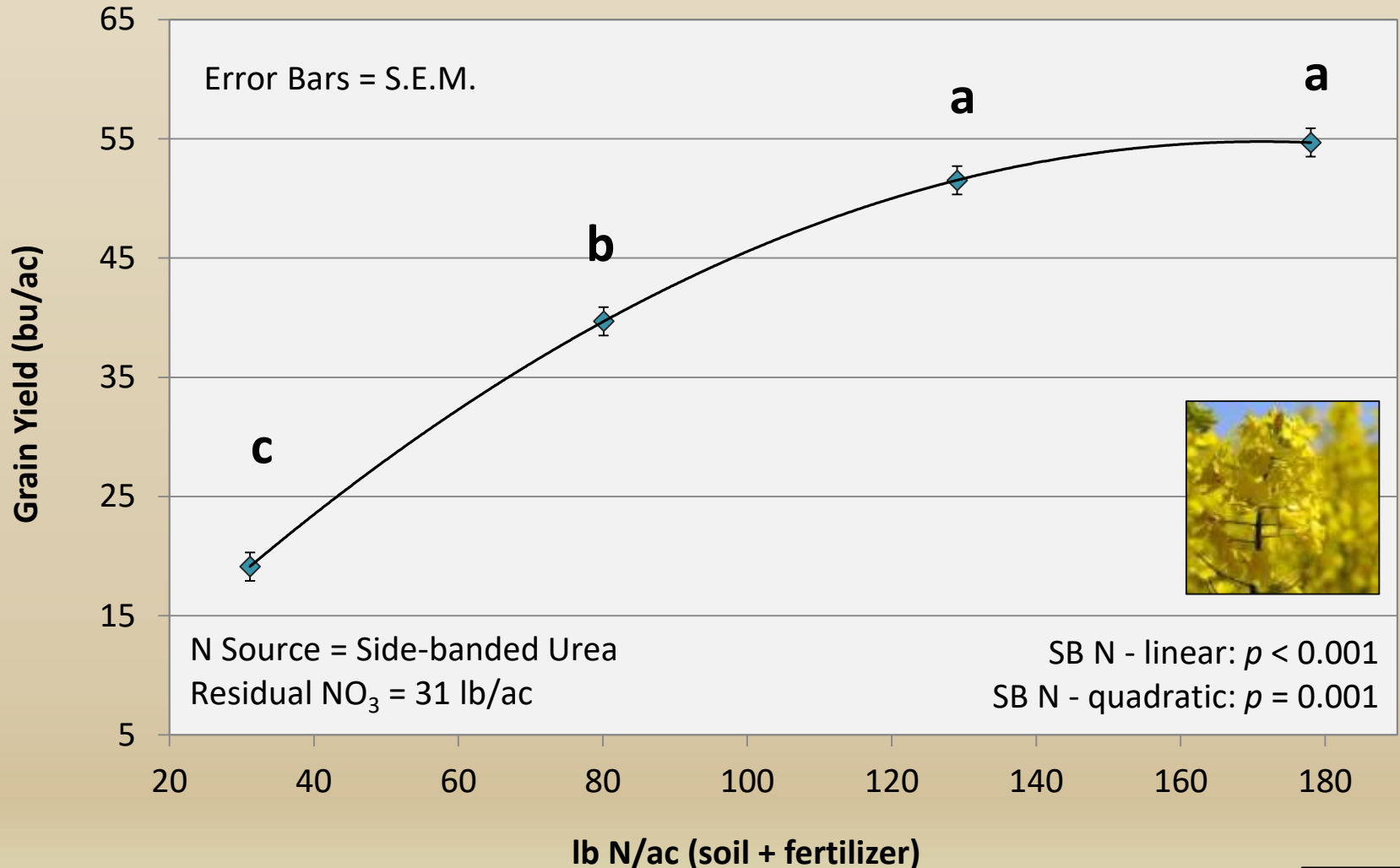
Objectives: To demonstrate crop response to varying rates of N along with different forms, timing & placement relative to side-banded, untreated urea

#	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 = 129 lb N/ac (soil + fertilizer) for canola & 116 lb/ac for wheat

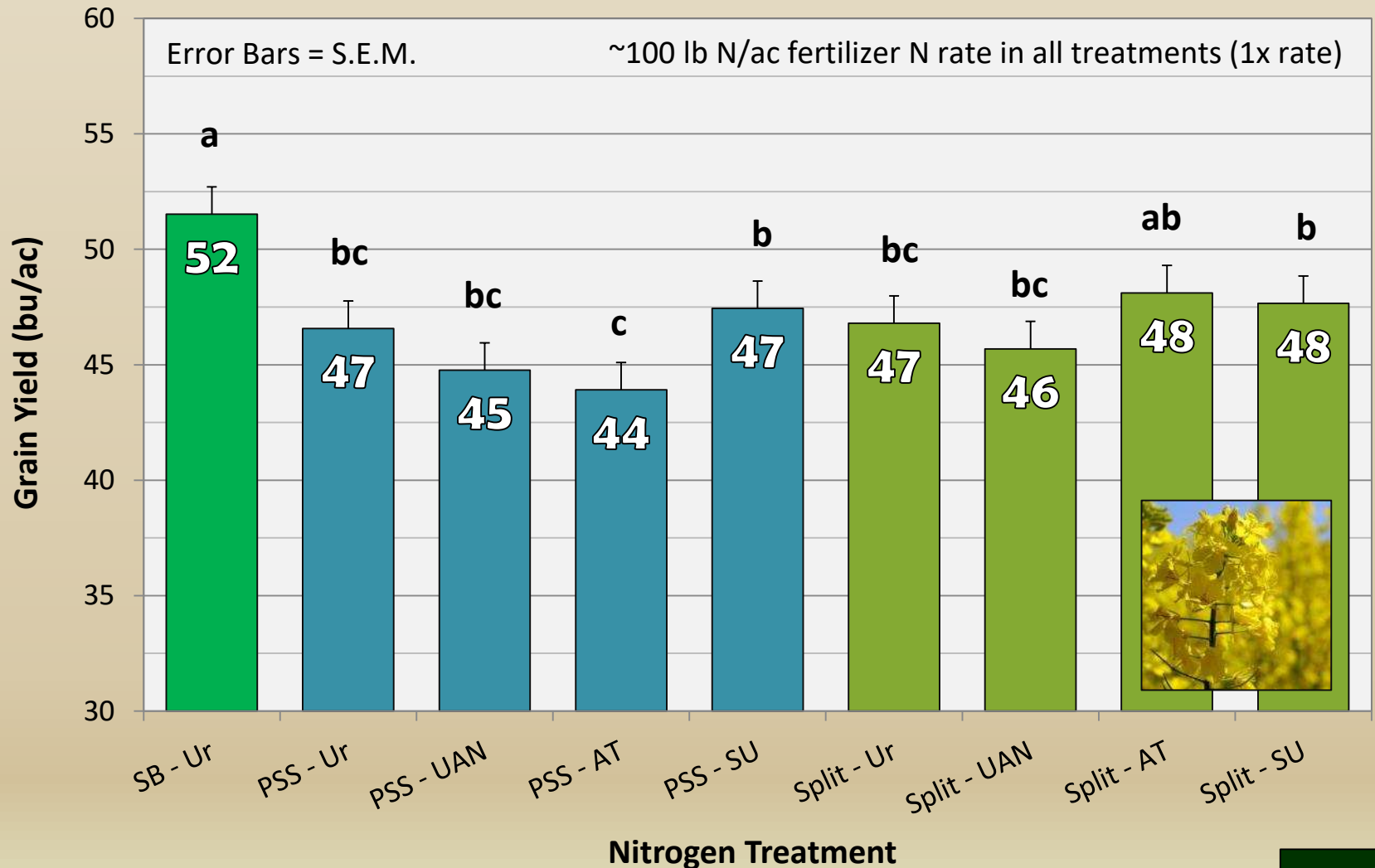
N Rate Effects on Canola Yield

Indian Head 2017



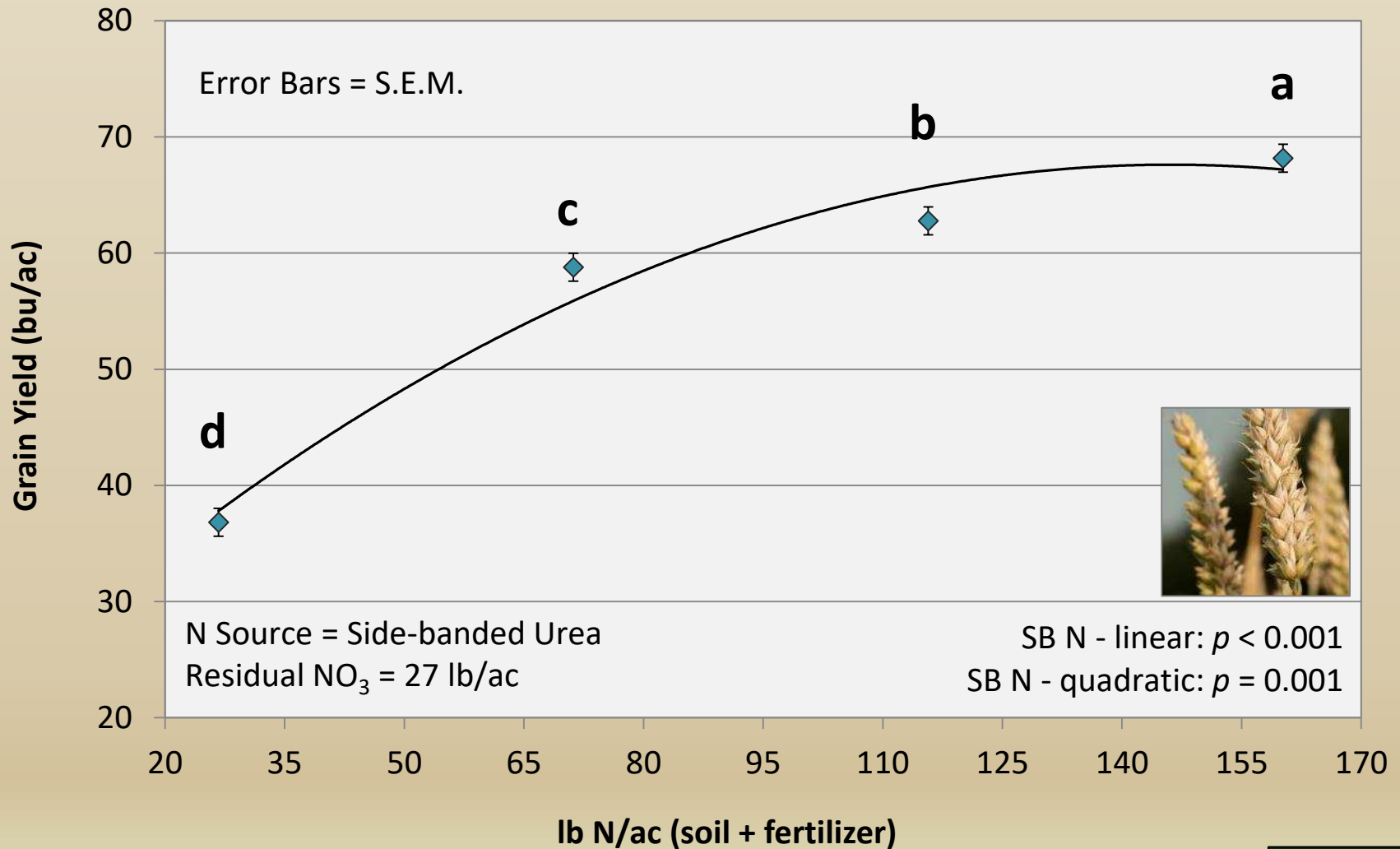
N Management Effects on Canola Yield

Indian Head 2017



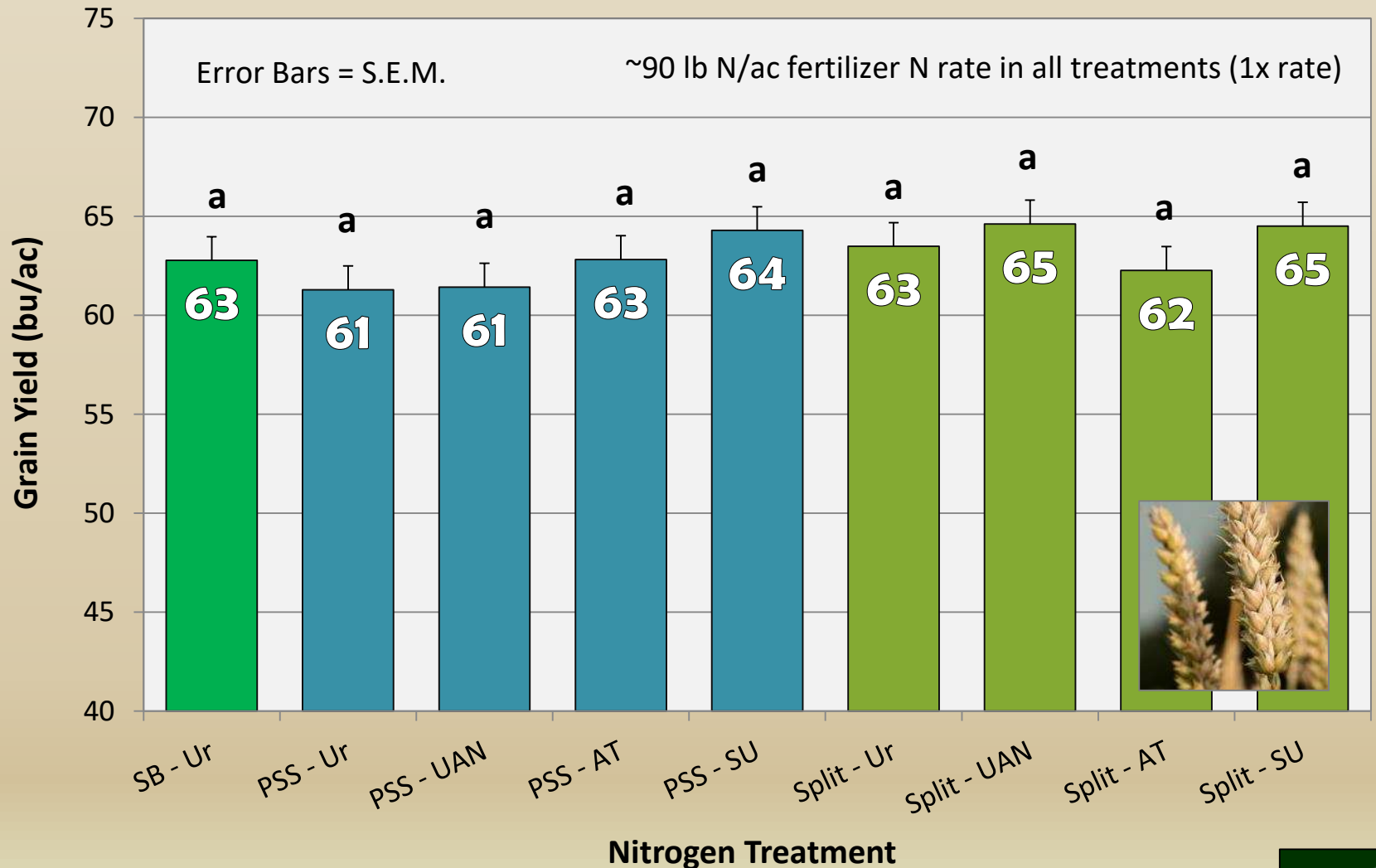
N Rate Effects on Wheat Yield

Indian Head 2017



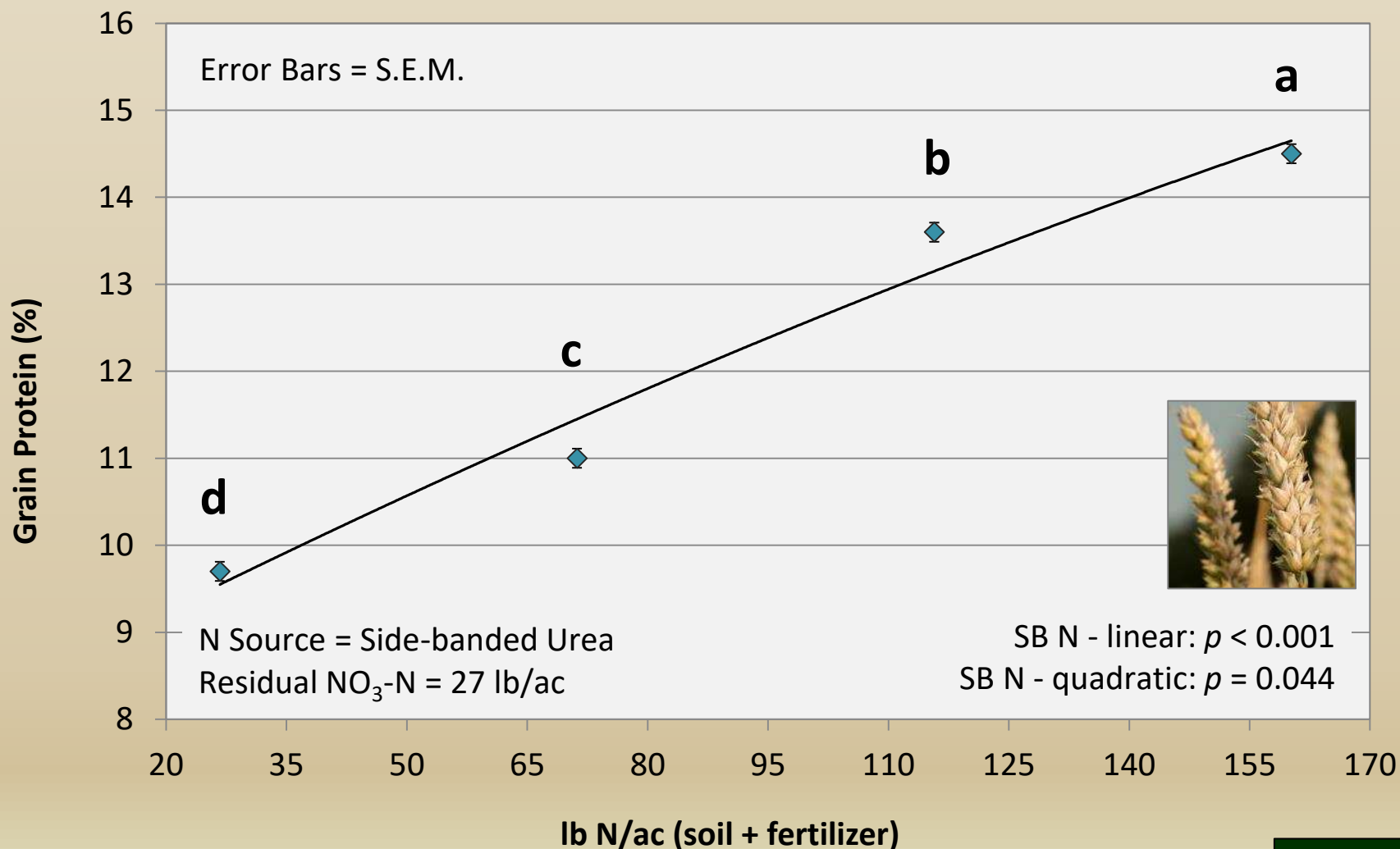
N Management Effects on Wheat Yield

Indian Head 2017



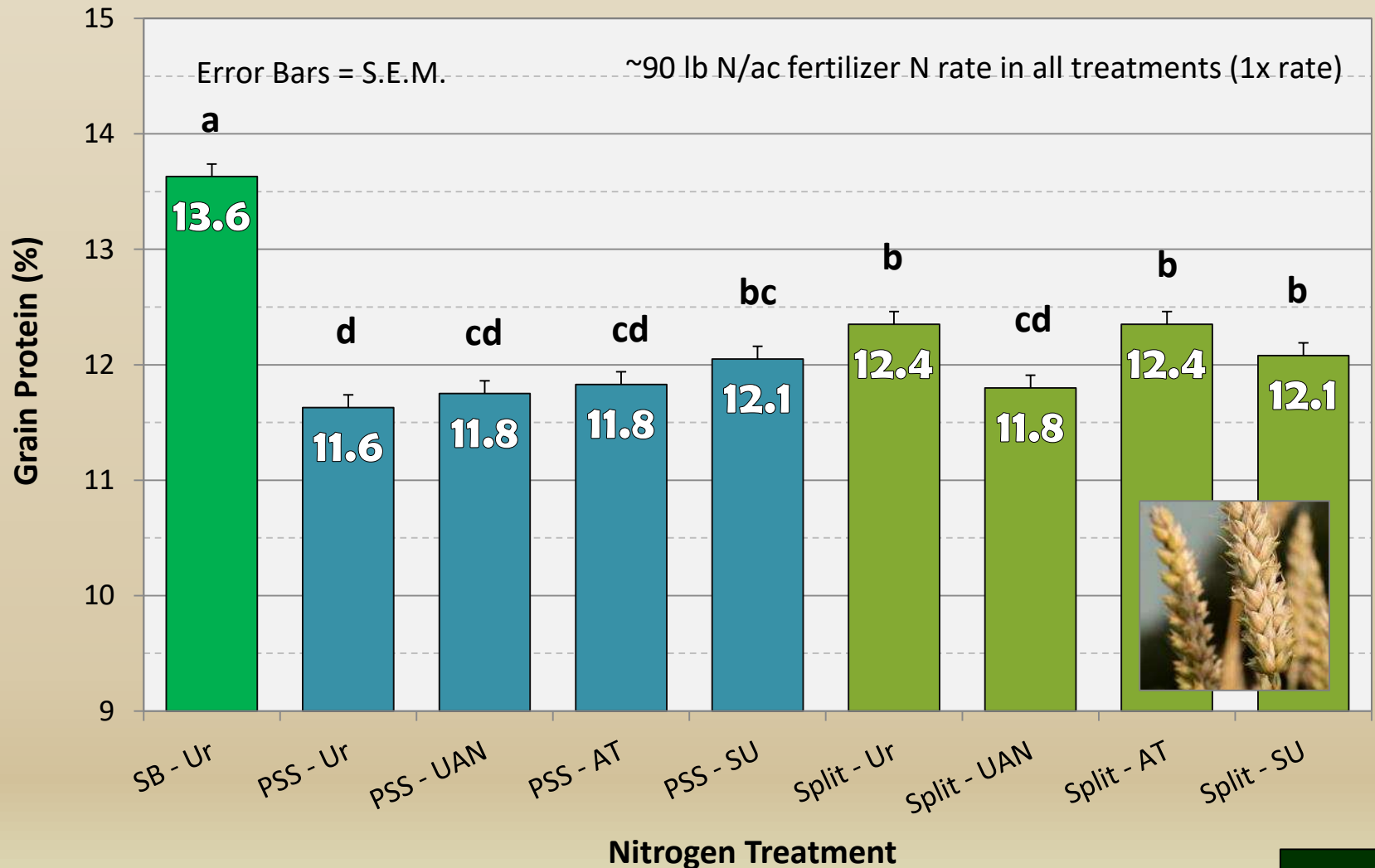
N Rate Effects on Wheat Grain Protein

Indian Head 2017



N Management Effects on Wheat Protein

Indian Head 2017



4R N Management in Canola & Wheat

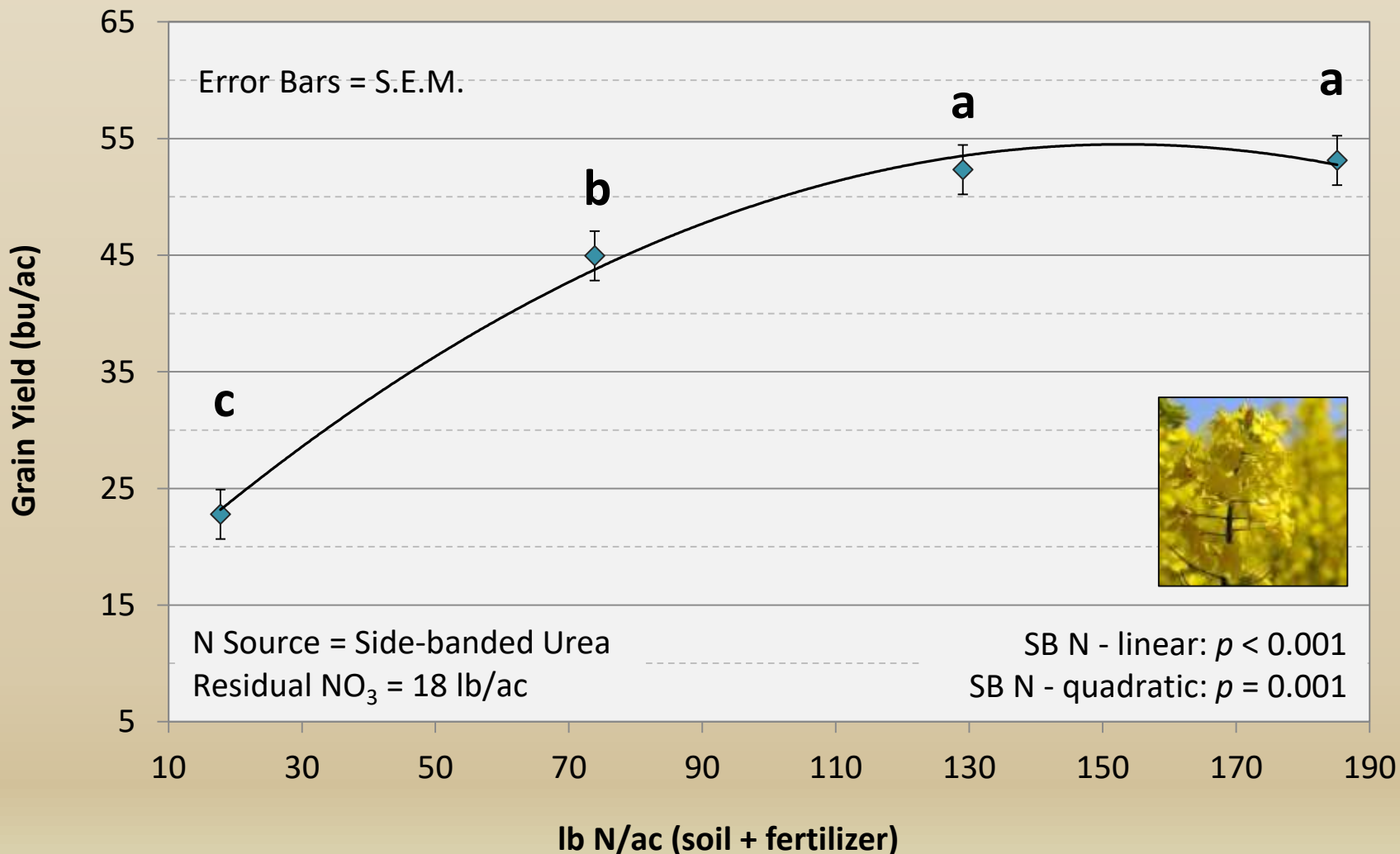
Indian Head 2018

#	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 = 129 lb N/ac (soil + fertilizer) for canola & 116 lb/ac for wheat

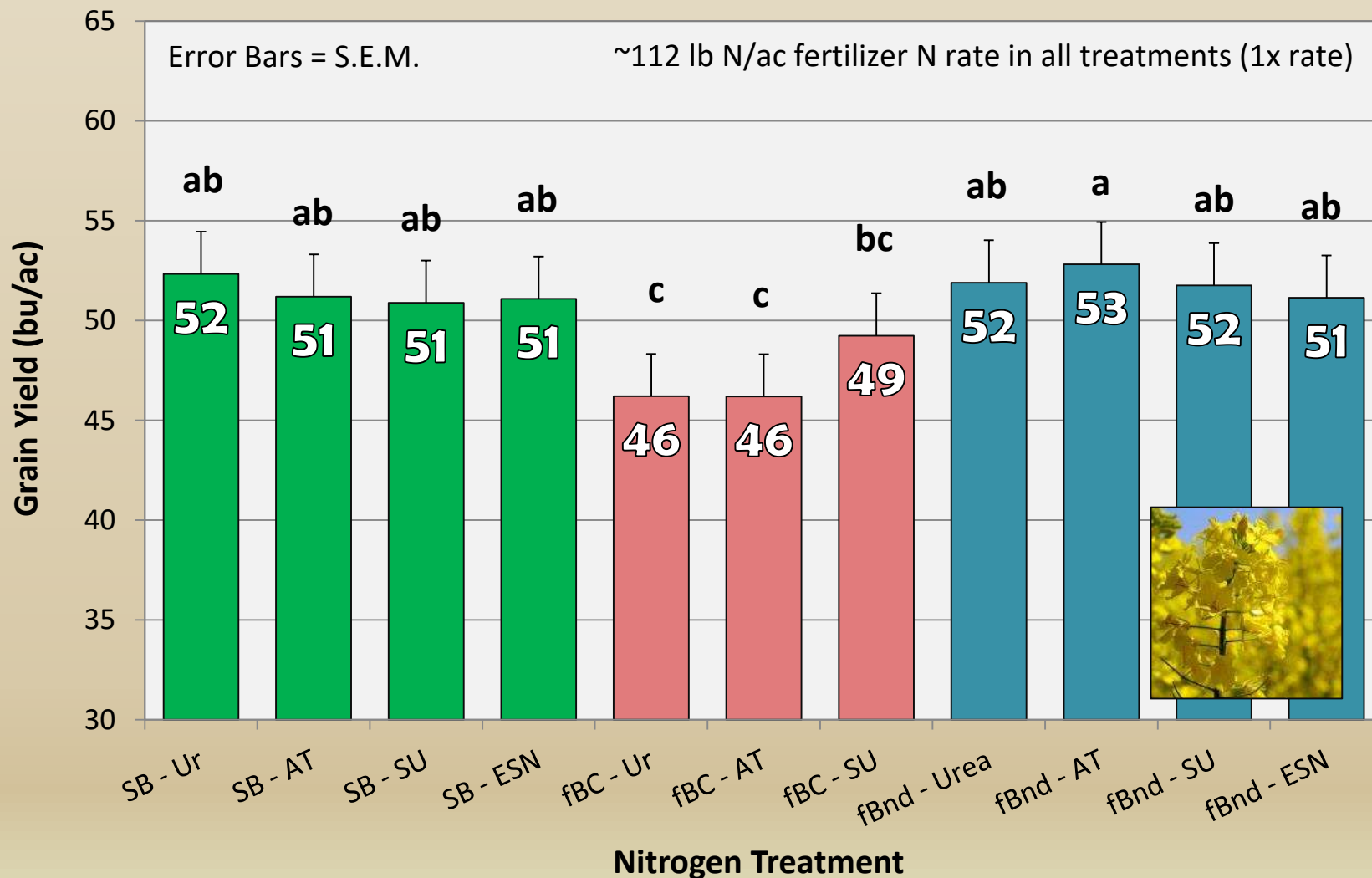
N Rate Effects on Canola Yield

Indian Head 2018



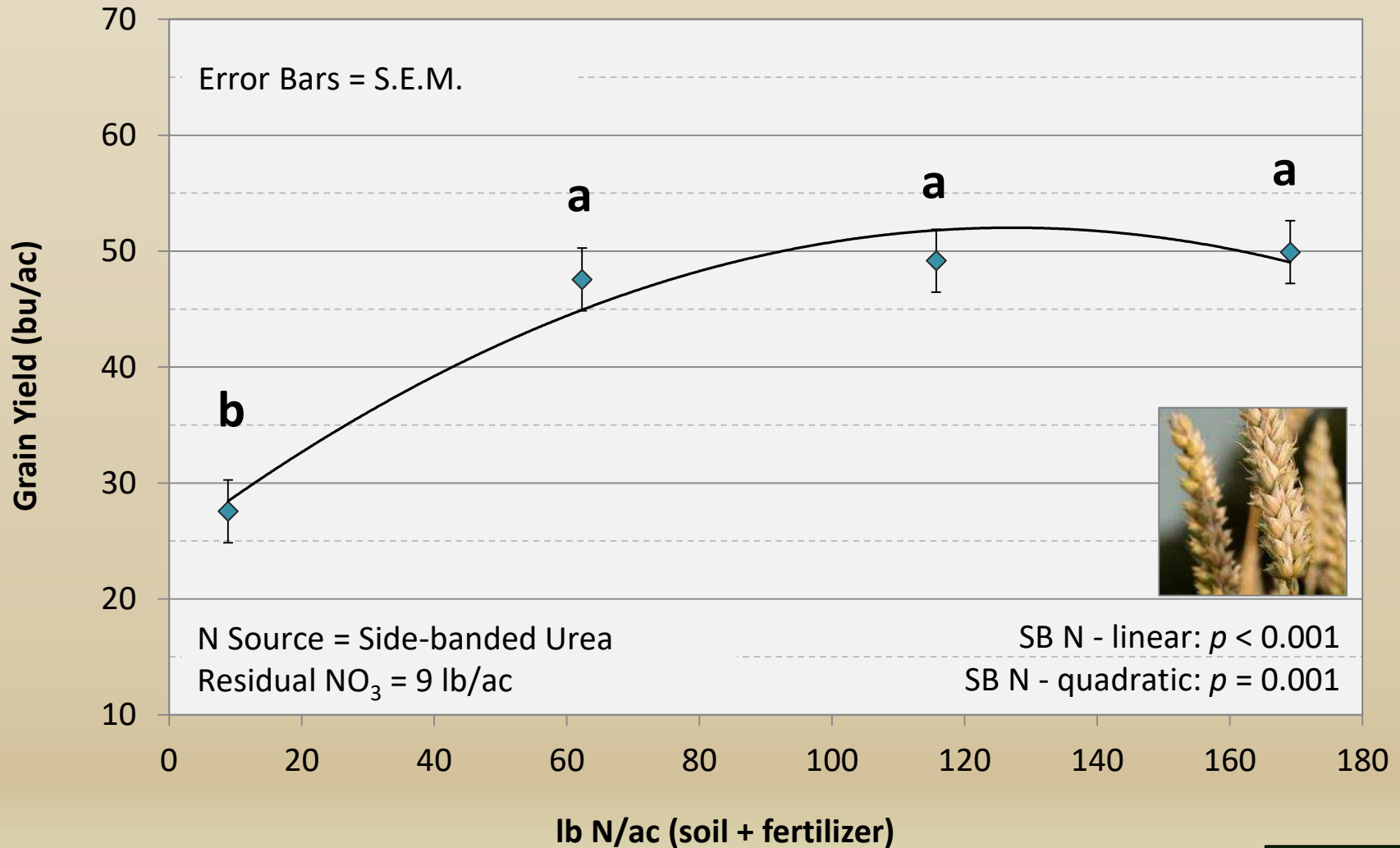
N Management Effects on Canola Yield

Indian Head 2018



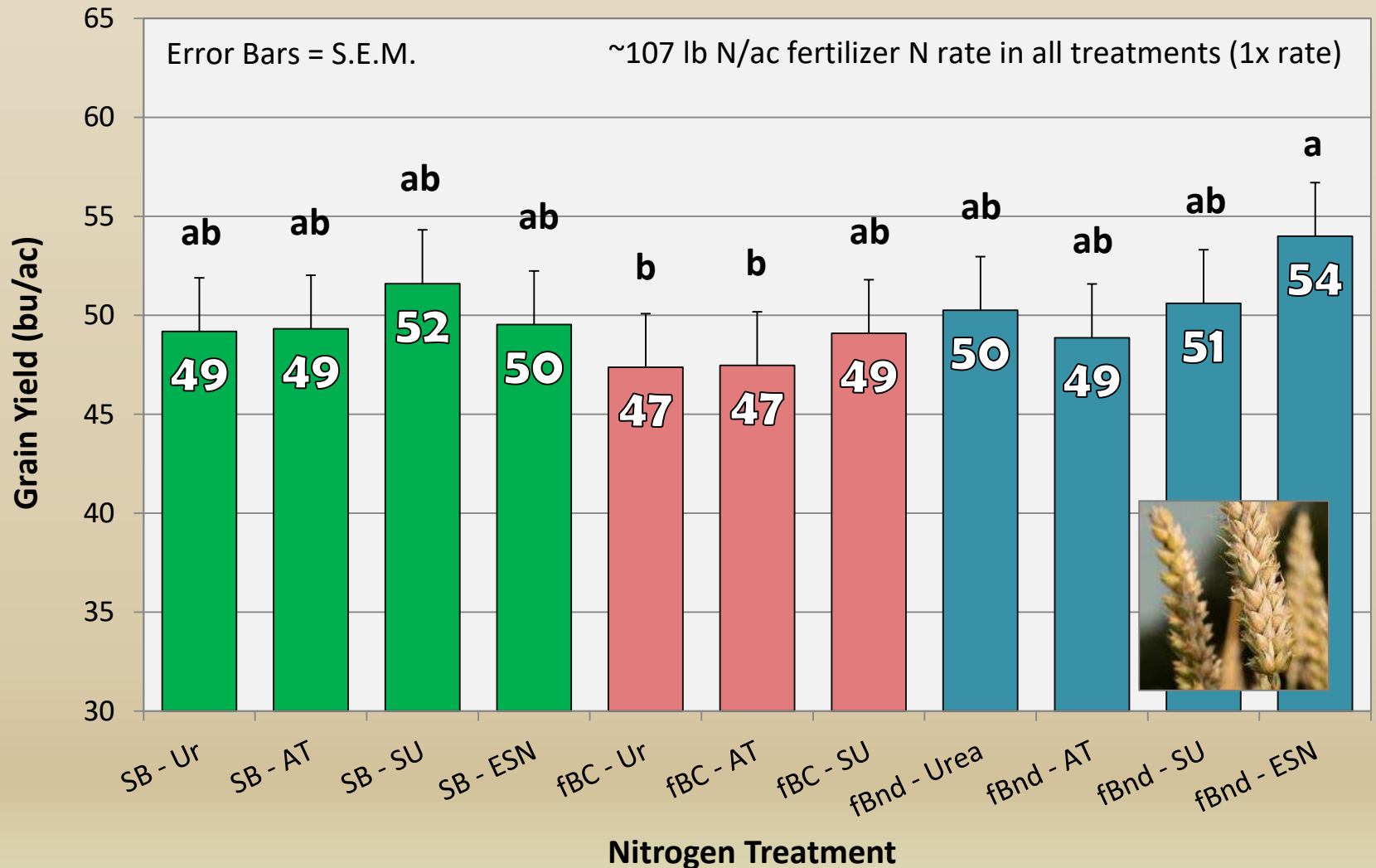
N Rate Effects on Wheat Yield

Indian Head 2018



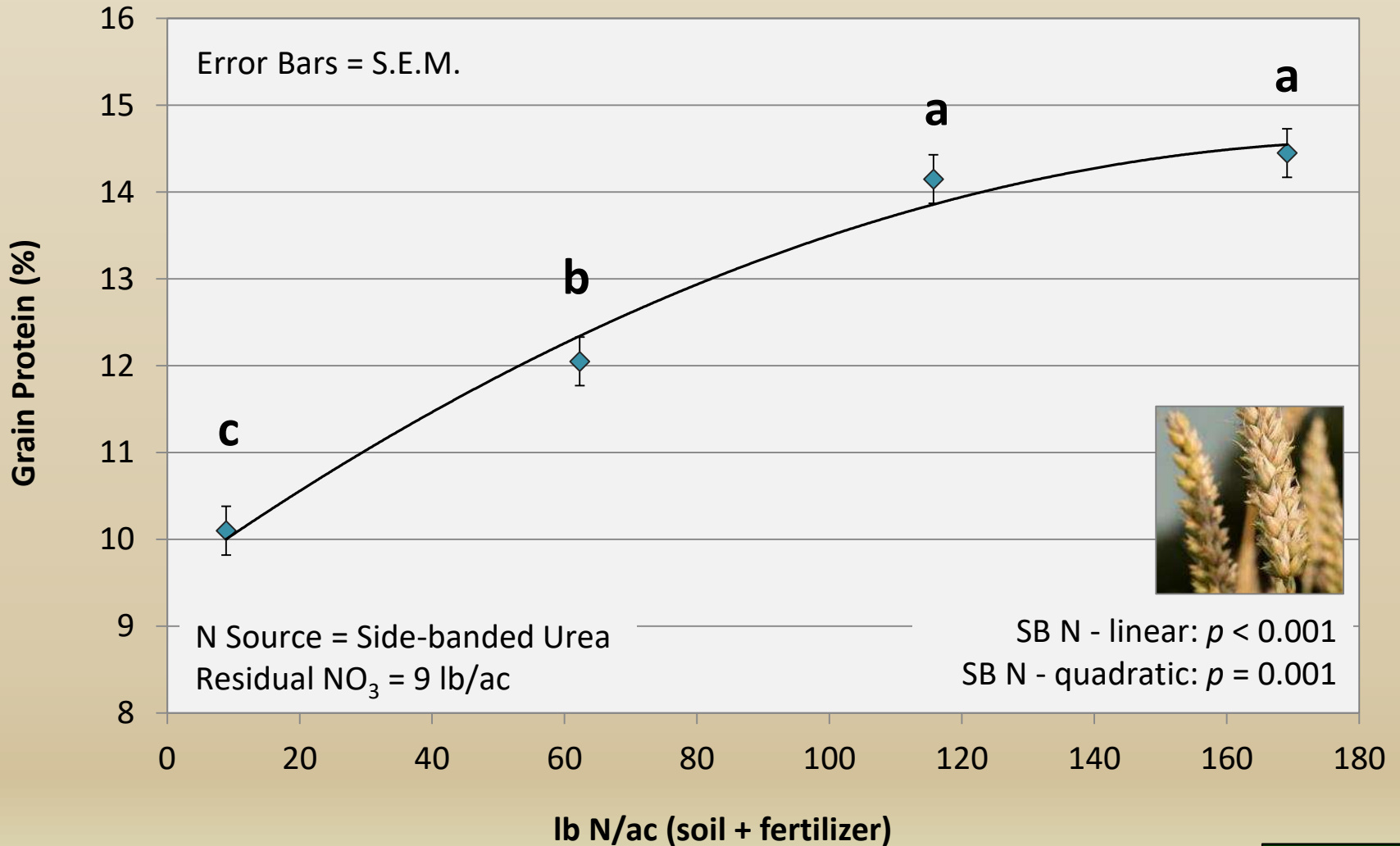
N Management Effects on Wheat Yield

Indian Head 2018

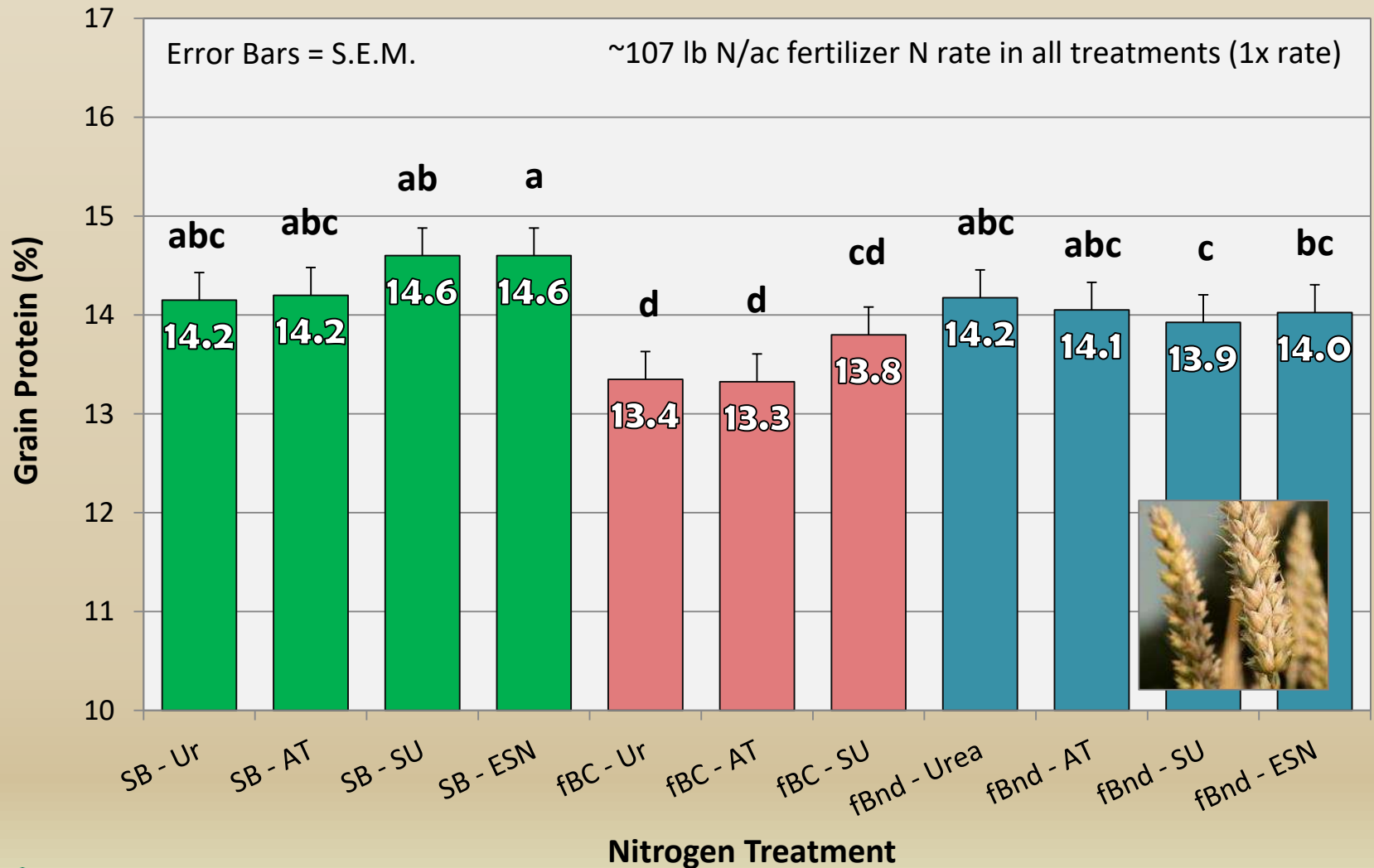


N Rate Effects on Wheat Grain Protein

Indian Head 2018



N Management Effects on Wheat Protein Indian Head 2018



4R N Management in Canola & Wheat

Summary & Conclusions

- From an agronomic perspective, it is difficult to improve upon side or mid-row banding a crop's entire N requirements during seeding under Prairie conditions
 - Incentives for considering alternative timing/placement options are usually logistic (i.e. limitations on amount of product that can be delivered through seeding implement; desire to handle less product during seeding, lower fertilizer prices in fall)
- Alternative timing/placement options can perform quite well but are usually more sensitive to environment than side or mid-row banding
 - Fall in-soil banding less susceptible to loss than surface broadcast applications, especially under dry conditions – in both cases fertilizer should not be applied until later in fall when soils have cooled as off much as possible
 - Split applications can work quite well provided that there is enough moisture to move N applied in-crop into the rooting zone but past research in western Canada has not generally shown any agronomic advantage over banding the entire amount during seeding
- EEF products do not always provide economic benefits but can reduce the risk of loss particularly when timing/placement options are not ideal
 - Choose a product that protects against the type of loss(es) that is/are most likely to occur

Wheat Response to Various Inputs Alone and in Combination (ADOPT)



ADOPT Wheat Input Demonstration

Indian Head 2018

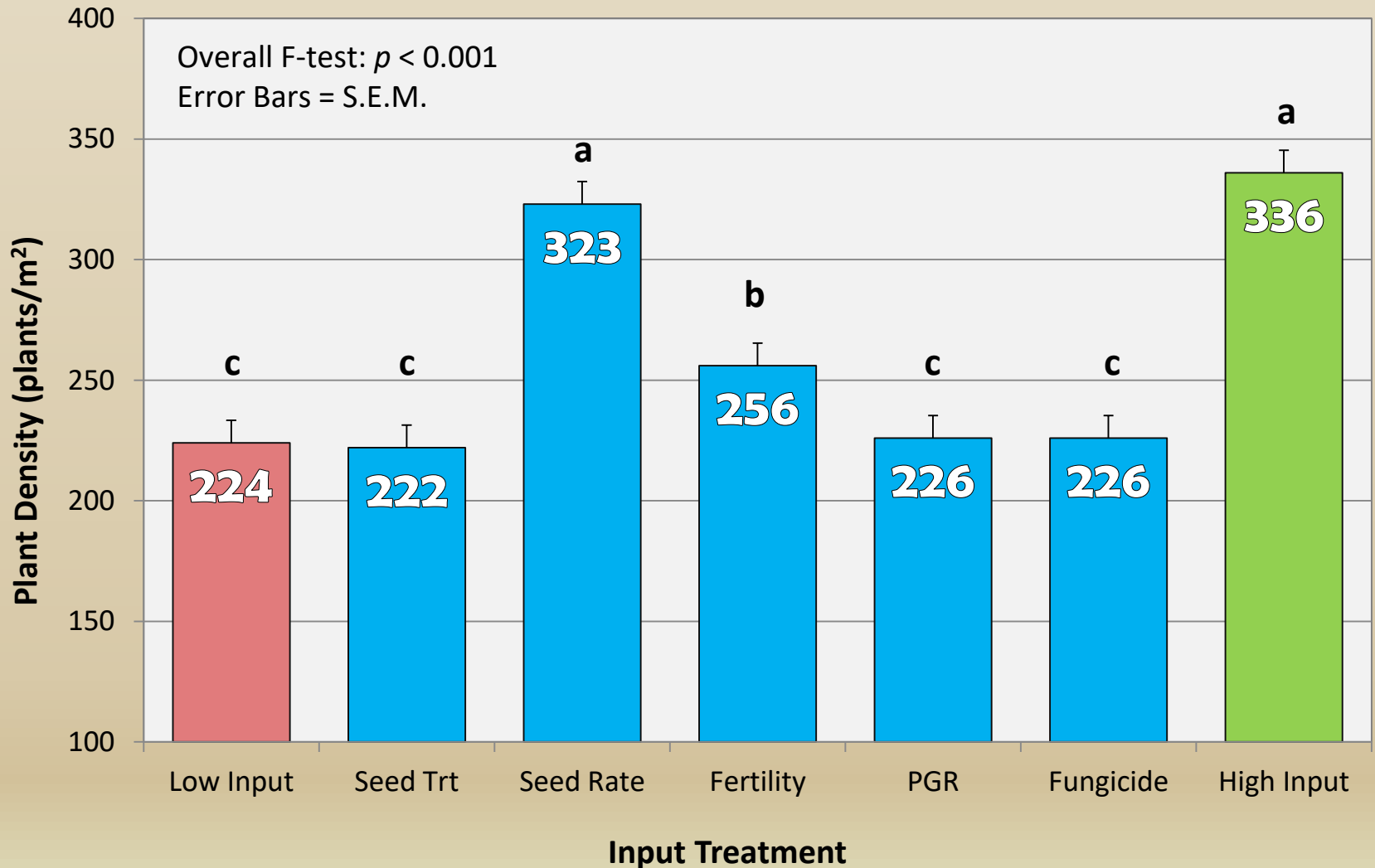
Objectives: To demonstrate agronomic and economic responses of CWRS wheat to various crop inputs both individually and collectively

#	Name	Seed Trt (no/yes)	Seed Rate (seeds/m ²)	Fertility (lb/ac N-P ₂ O ₅ -K ₂ O-S)	PGR (no/yes)	Fungicide (no/yes)
1	Low Input	No	250	80-18-9-9	No	No
2	Seed-Trt	Yes	250	80-18-9-9	No	No
3	Seed Rate	No	400	80-18-9-9	No	No
4	Fertility	No	250	120-36-18-18	No	No
5	PGR	No	250	80-18-9-9	Yes	No
6	Fungicide	No	250	80-18-9-9	No	Yes
7	High Input	Yes	400	120-36-18-18	Yes	Yes

Data Collected: plants/m², heads/m², height, lodging, biomass/harvest index, yield, seed size, test weight, protein, fus. damaged kernels

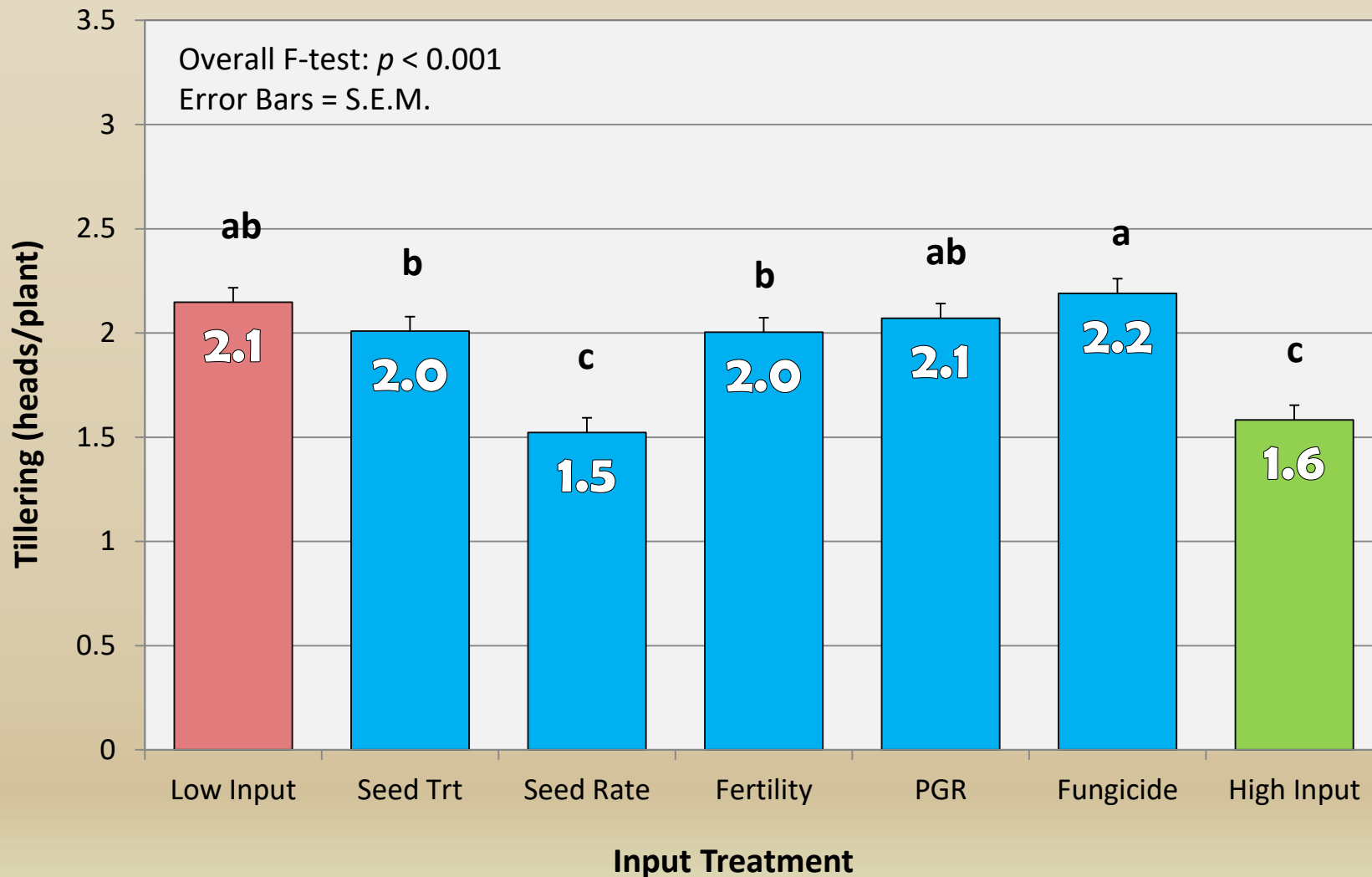
Input Effects on Wheat Plant Density

Indian Head 2018



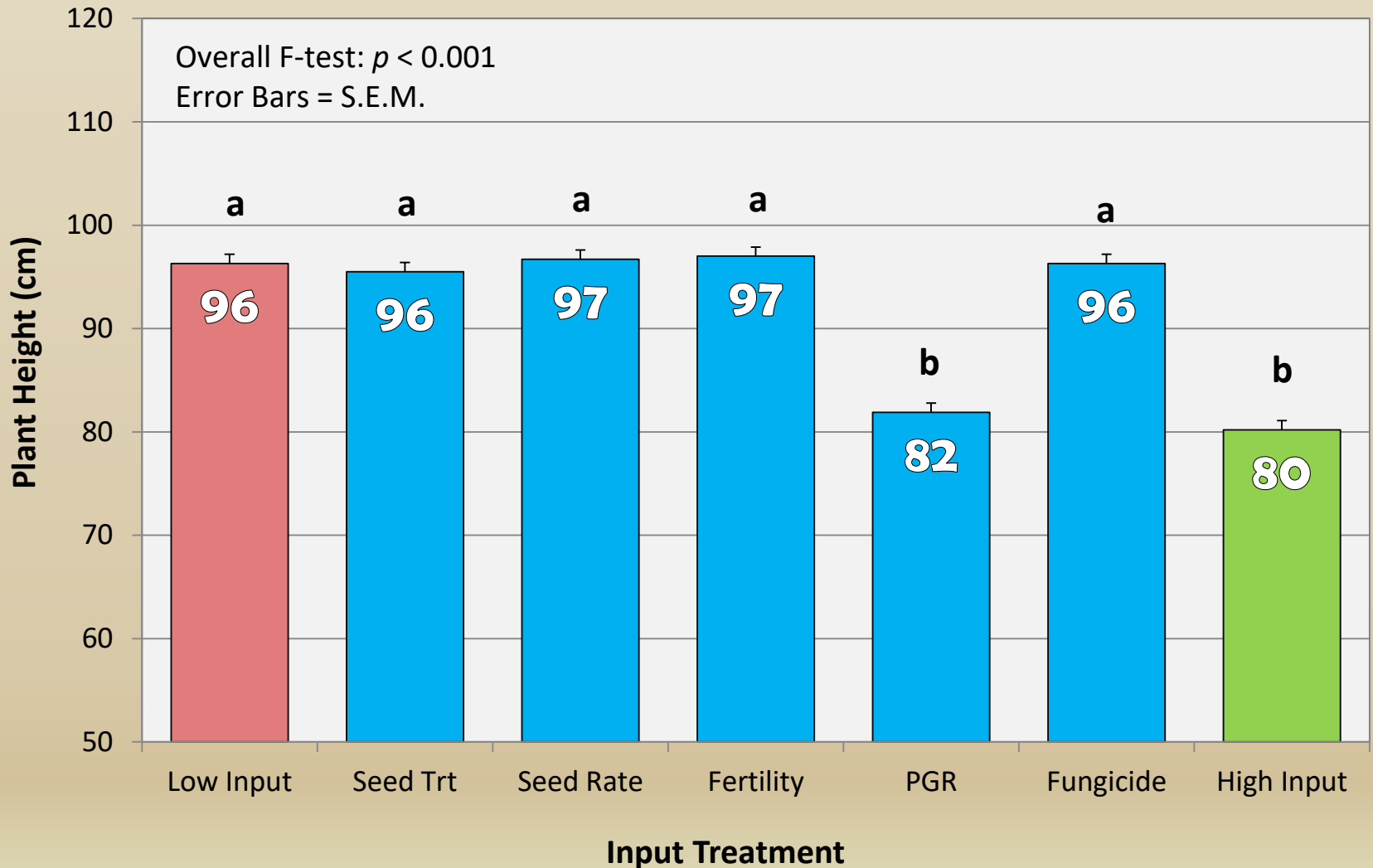
Input Effects on Wheat Tillering

Indian Head 2018



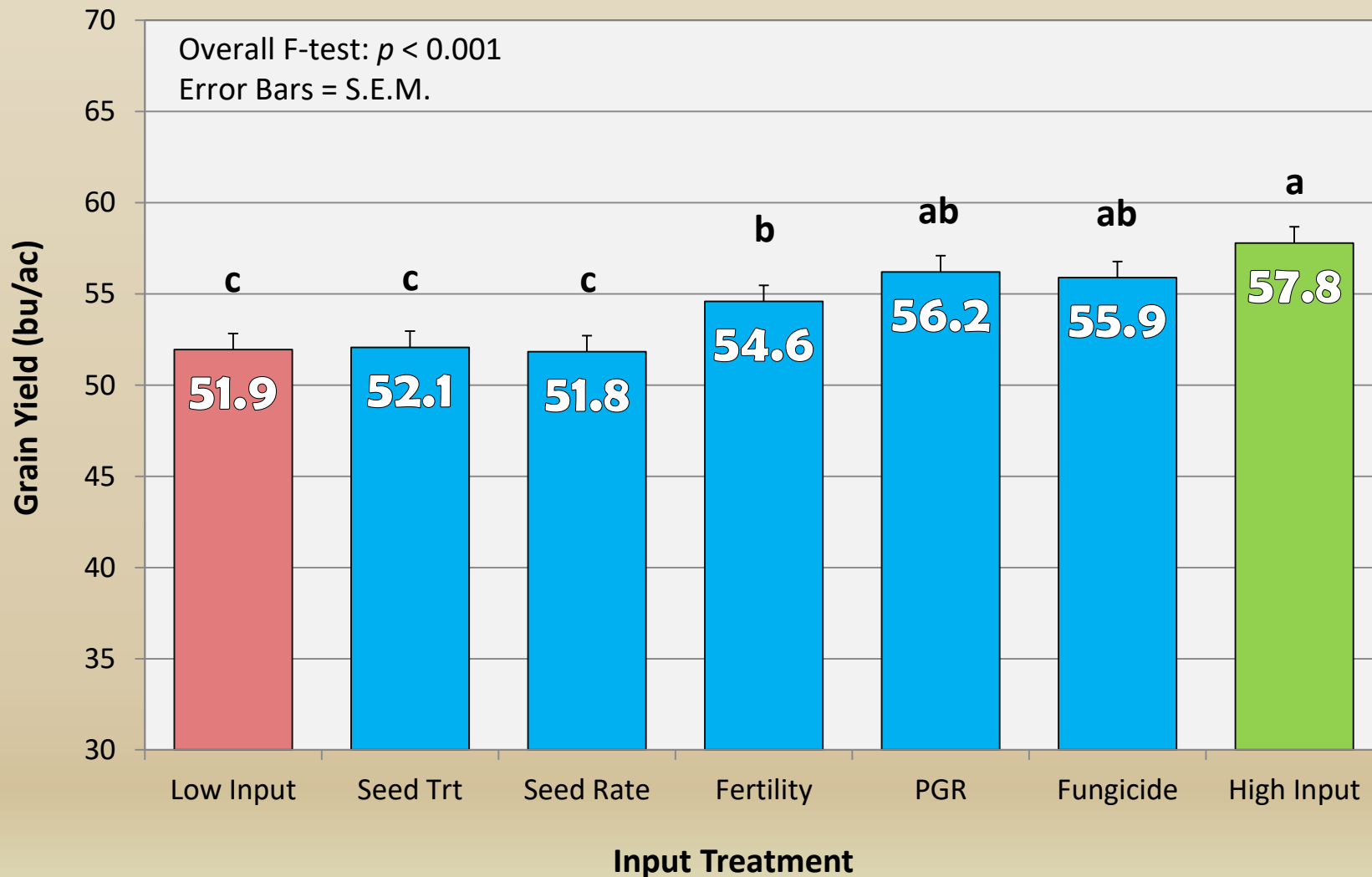
Input Effects on Wheat Height

Indian Head 2018



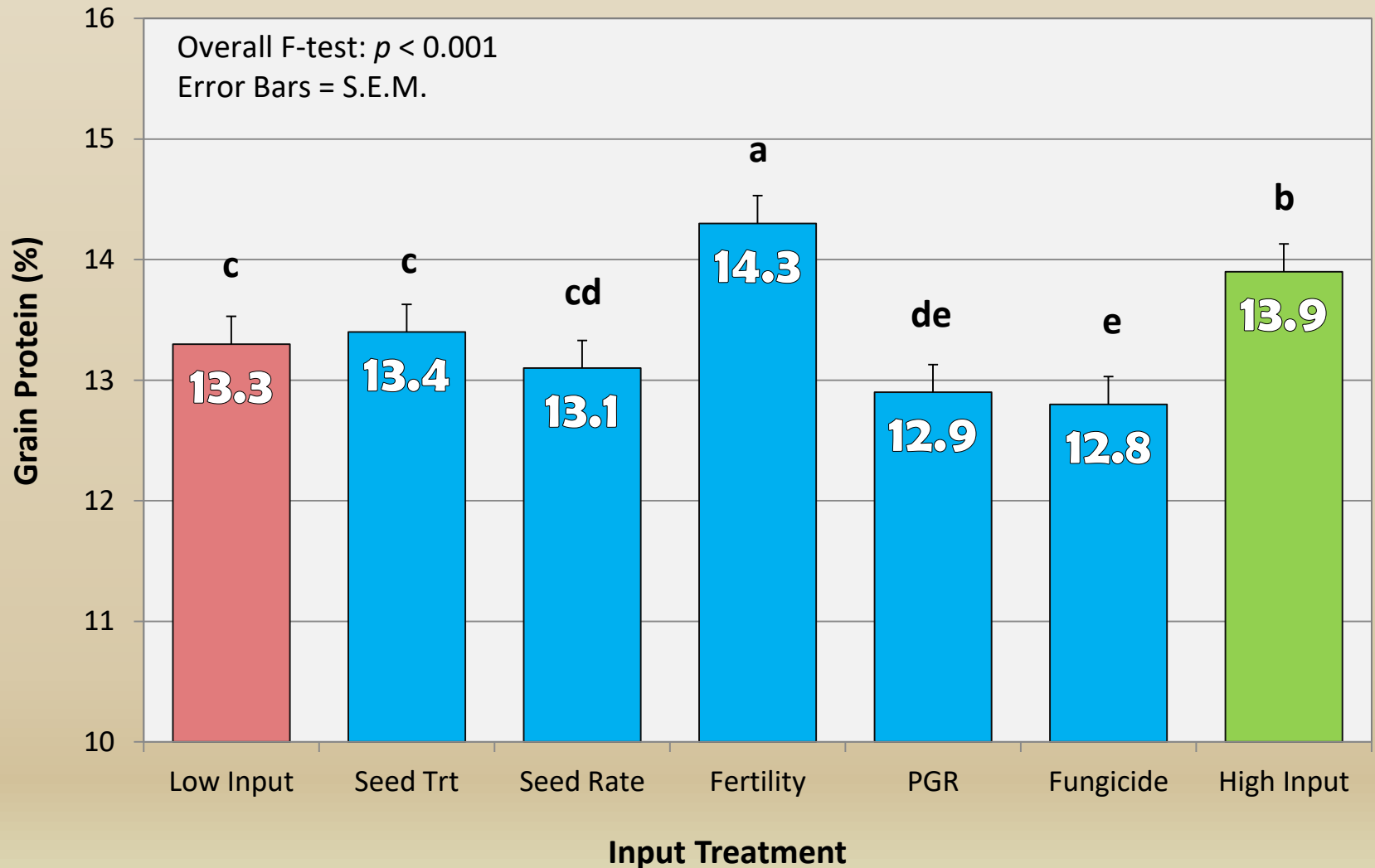
Input Effects on Wheat Yield

Indian Head 2018



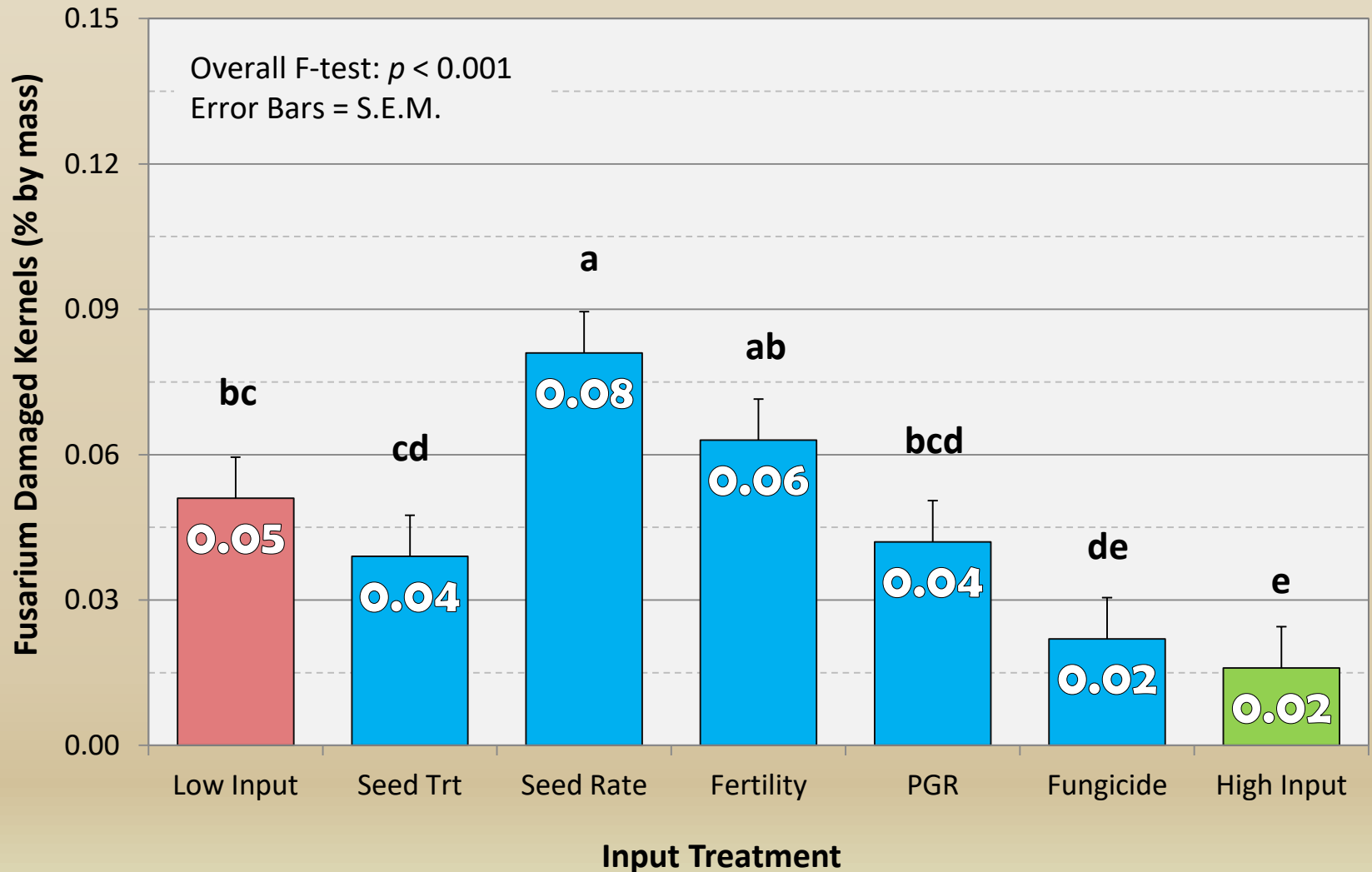
Input Effects on Wheat Protein

Indian Head 2018



Input Effects on FDK in Wheat

Indian Head 2018



Wheat Input Demo: Marginal Profits

Indian Head 2018

Trt #	Seed Trt ^Z	Seed Rate ^Y	Fertility ^X	PGR ^W	Fungicide ^W	Revenue ^V	Profit ^U
	----- \$/ac -----						
Low Input	\$0.00	\$16.41	\$51.01	\$0.00	\$0.00	\$364.26	\$296.84
Seed Trt	\$6.32	\$16.41	\$51.01	\$0.00	\$0.00	\$365.06	\$291.32
Seed Rate	\$0.00	\$26.84	\$51.01	\$0.00	\$0.00	\$363.44	\$285.59
Fertility	\$0.00	\$16.41	\$81.69	\$0.00	\$0.00	\$382.71	\$284.61
PGR	\$0.00	\$16.41	\$51.01	\$19.00	\$0.00	\$394.07	\$307.65
Fungicide	\$0.00	\$16.41	\$51.01	\$0.00	\$25.23	\$391.95	\$299.30
High Input	\$6.32	\$26.84	\$81.69	\$19.00	\$25.23	\$405.21	\$246.13

^Z Not adjusted for differences in seeding rate between Trt. 2 and 7

^Y Assumes certified seed price of \$0.478/kg (\$478/tonne)

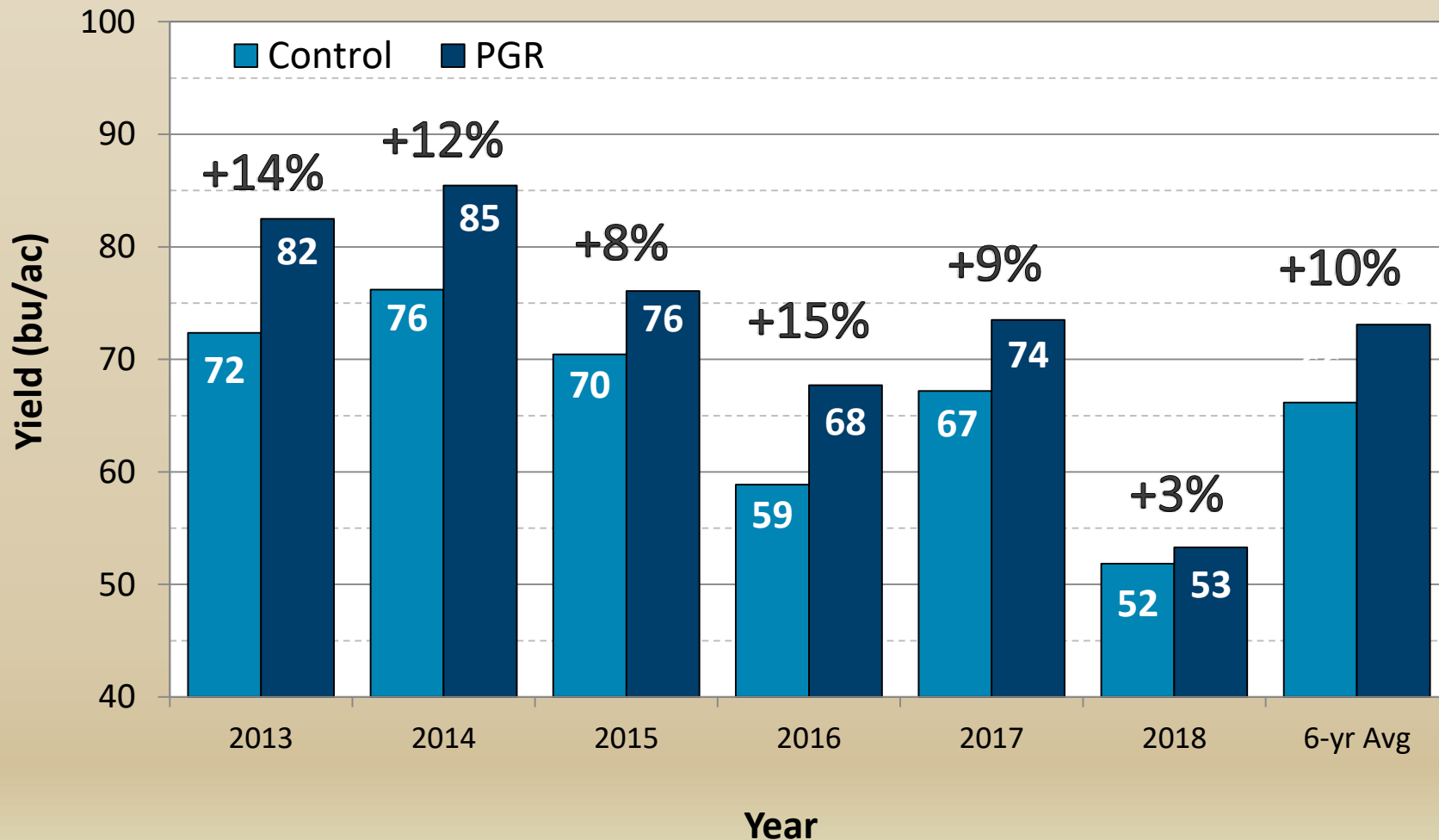
^X Assumes \$725/tonne for MAP and \$525/tonne for urea – K and S costs excluded

^W Includes SRP of products plus \$5/ac application cost

^V Based on actual yields and a CWRS wheat price of \$257/Mt (\$7/bu) regardless of quality

^U Values do not take into account all production costs and are only estimates – actual expenses/revenues may vary

Average PGR Effects on Wheat Yield Indian Head 2013-2017



THANK YOU

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