2020 IHARF Agronomy Update

(2/2)

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Wheat Response to Various Inputs Alone & in Combination (ADOPT 2018-20)

ADOPT Wheat Input Demonstration

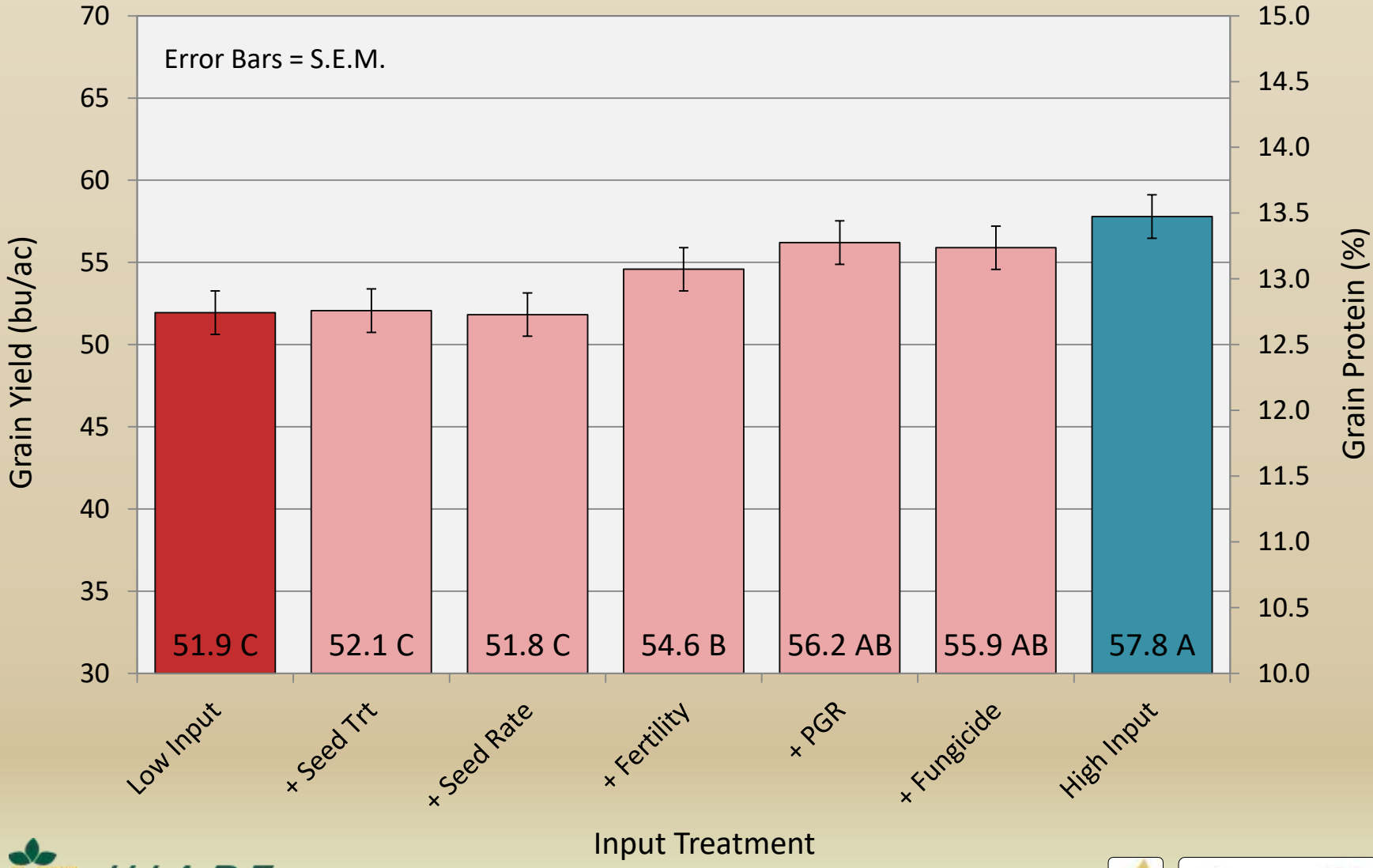
Indian Head 2018

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_2O_5-K_2O-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

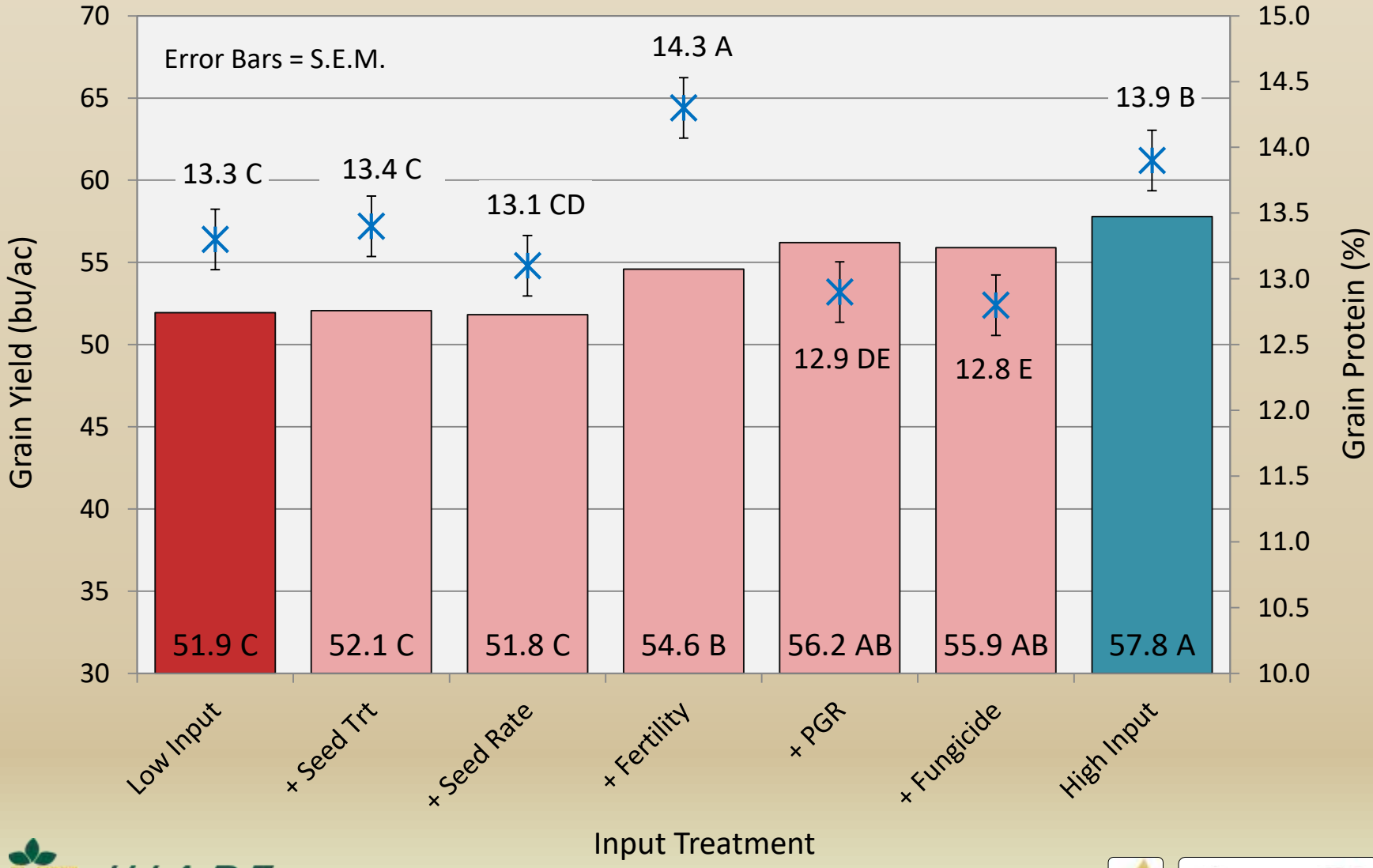
Input Effects on Wheat Yield & Protein

Indian Head 2018



Input Effects on Wheat Yield & Protein

Indian Head 2018



ADOPT Wheat Input Demonstration

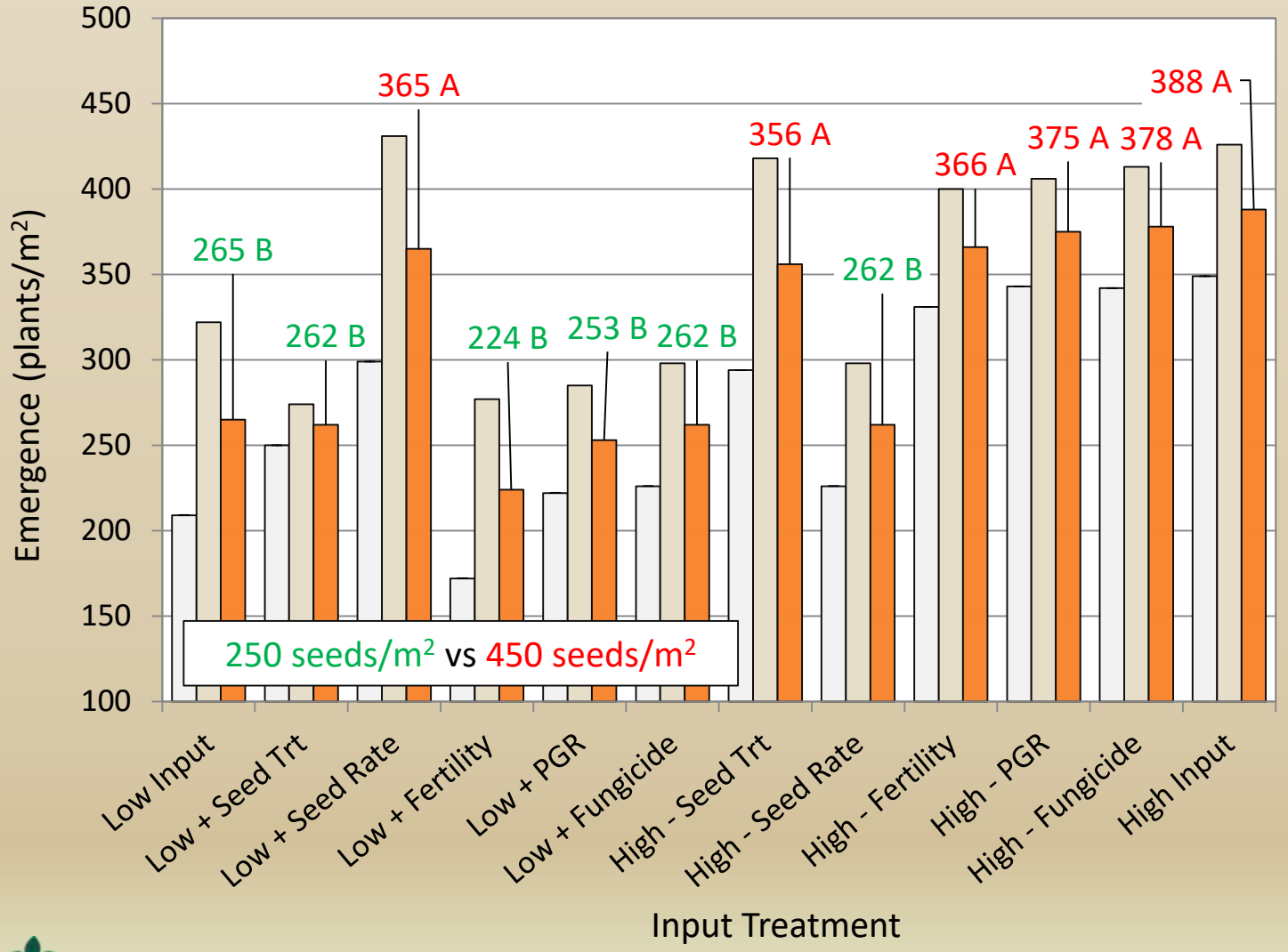
Indian Head 2019 & 2020

Objectives: To build upon the results from the 2018 demonstration

#	Name	Seed Trt (no/yes)	Seed Rate (seeds/m^2)	Fertility (lb/ac N-P_2O_5-K_2O-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	- Seed Trt	No	400	120-36-18-18	Yes	Yes
8	- Seed Rate	Yes	250	120-36-18-18	Yes	Yes
9	- Fertility	Yes	400	80-18-9-9	Yes	Yes
10	- PGR	Yes	400	120-36-18-18	No	Yes
11	- Fungicide	Yes	400	120-36-18-18	Yes	No
12	High Input	Yes	400	120-36-18-18	Yes	Yes

Input Effects on Wheat Emergence

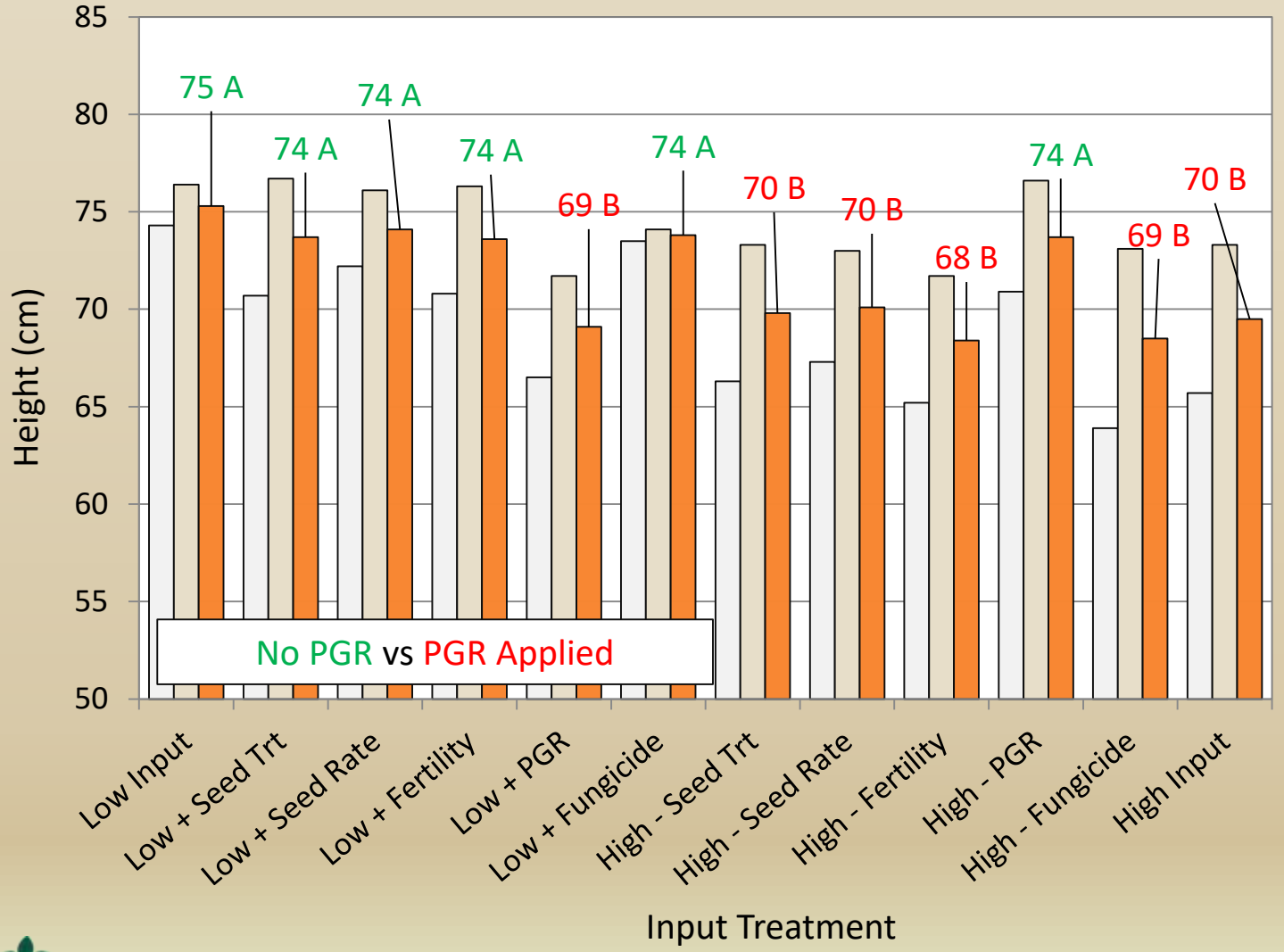
Indian Head 2019-20



Source	Pr > F
Year	<0.001
Trt	<0.001
Yr x Trt	0.093

Input Effects on Wheat Height

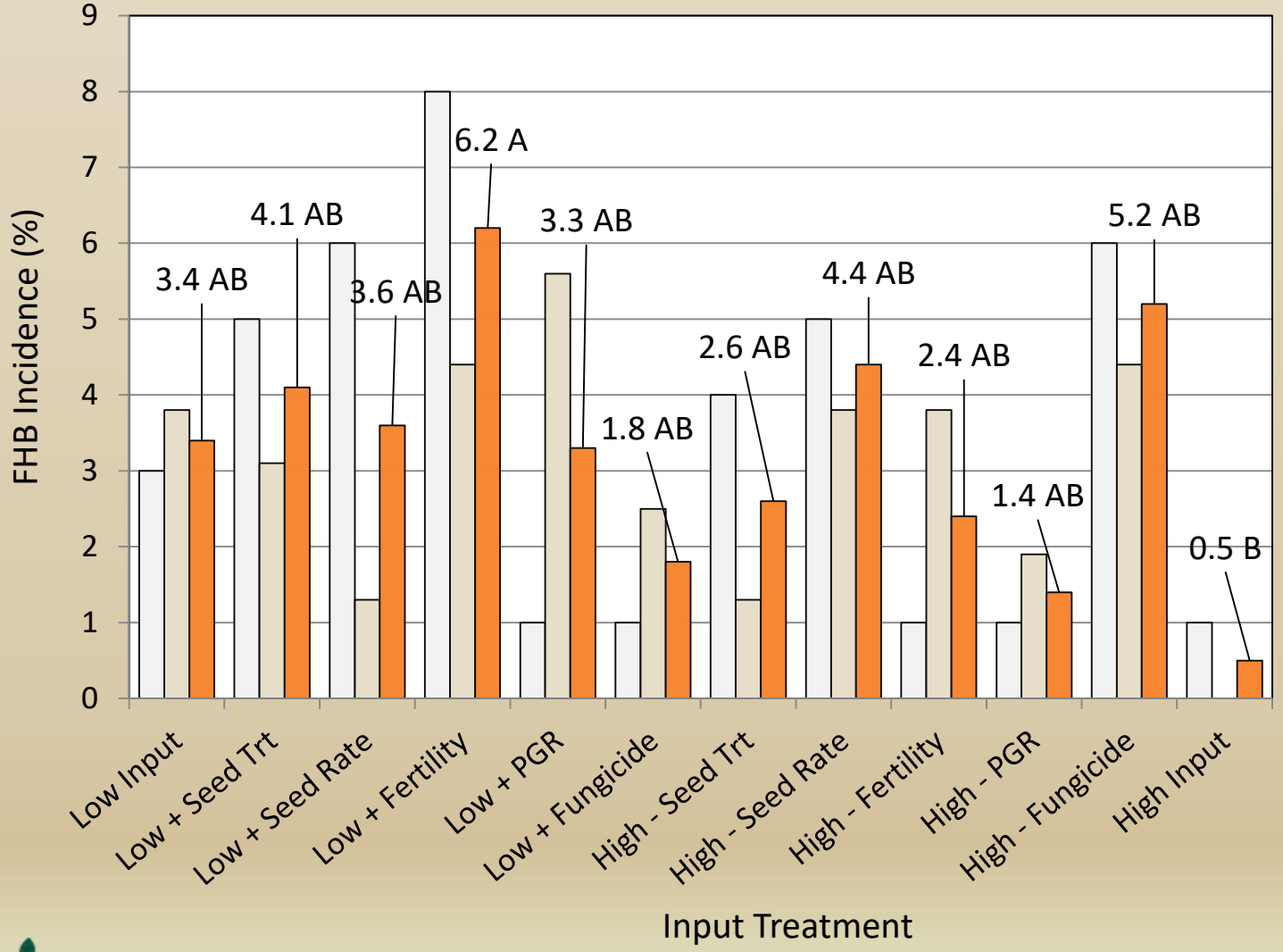
Indian Head 2019-20



Source	Pr > F
Year	<0.001
Trt	<0.001
Yr x Trt	<0.001

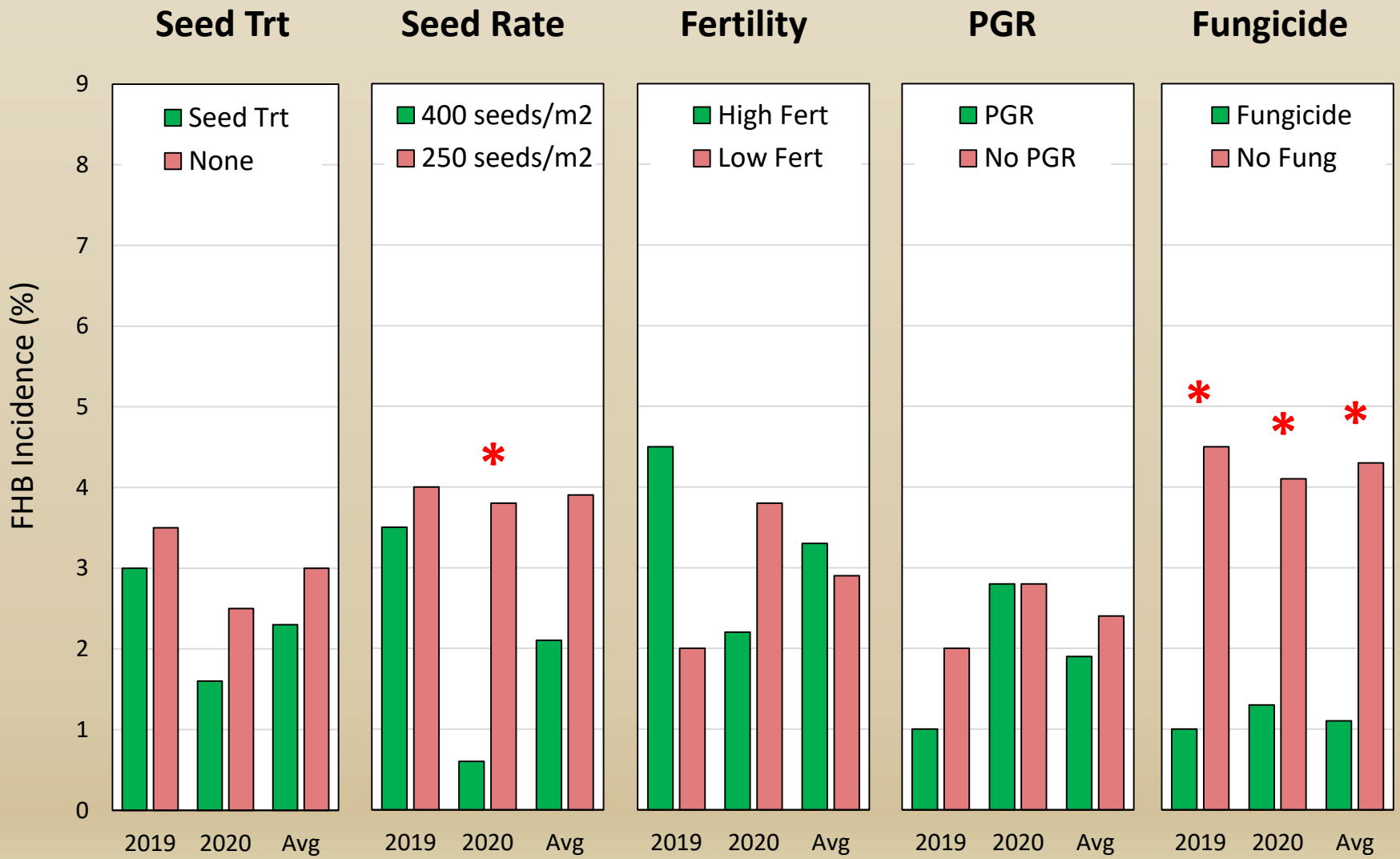
Input Effects on Wheat FHB Incidence

Indian Head 2019-20



Source	Pr > F
Year	0.501
Trt	0.011
Yr x Trt	0.080

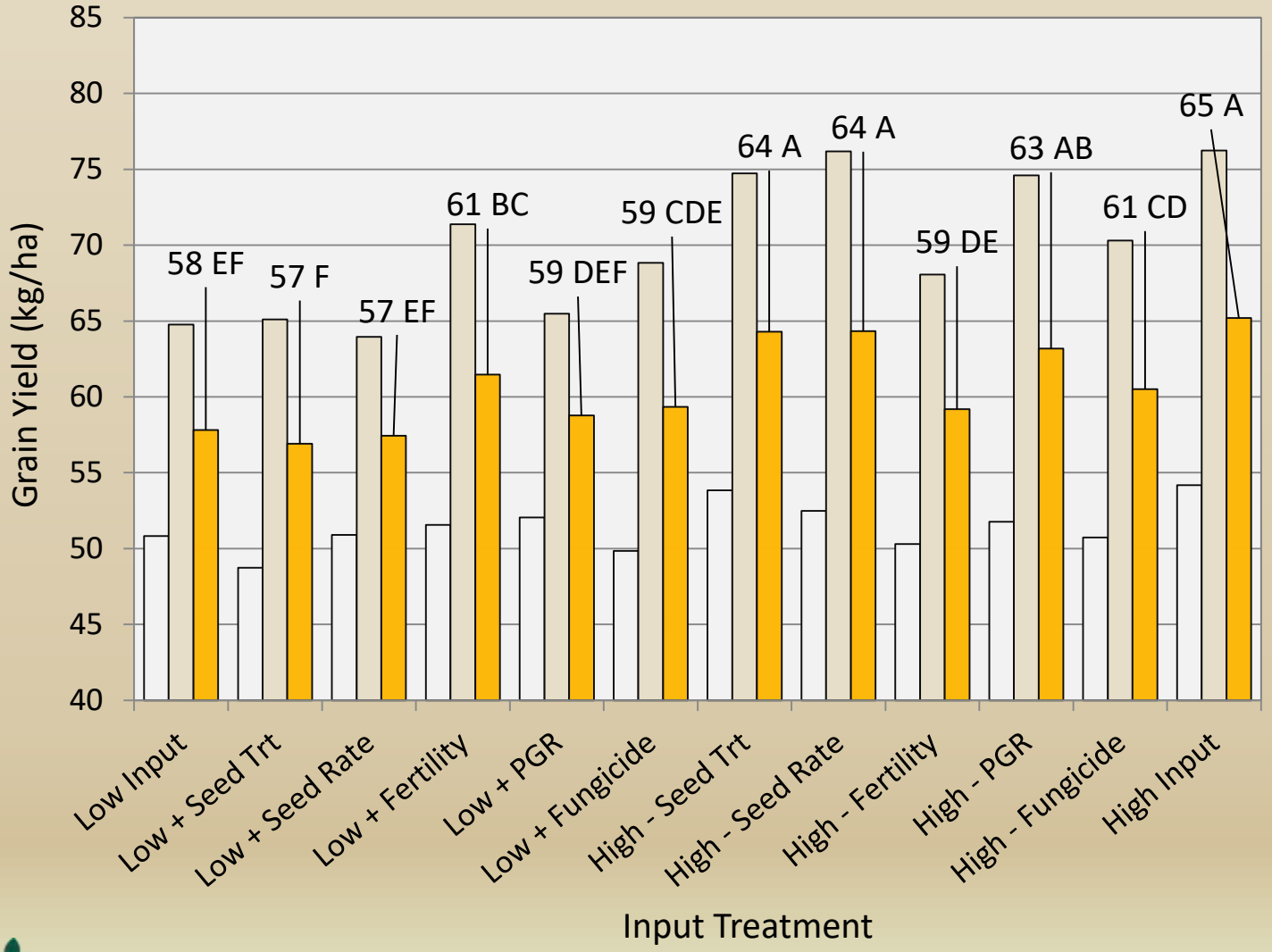
Average Input Effects on FHB Incidence



* significant at P ≤ 0.05

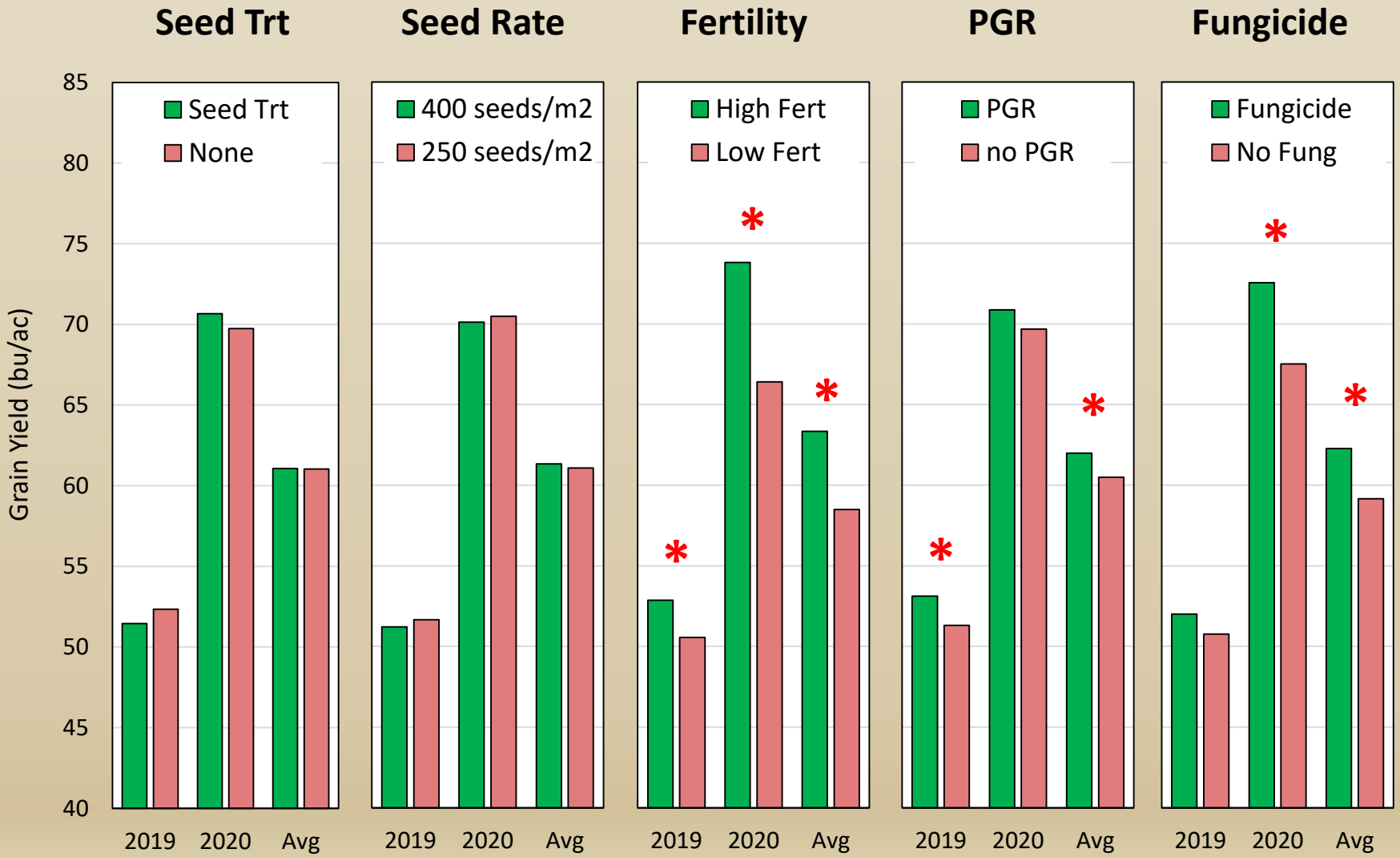
Input Effects on Wheat Grain Yield

Indian Head 2019-20



Source	Pr > F
Year	<0.001
Trt	<0.001
Yr x Trt	<0.001

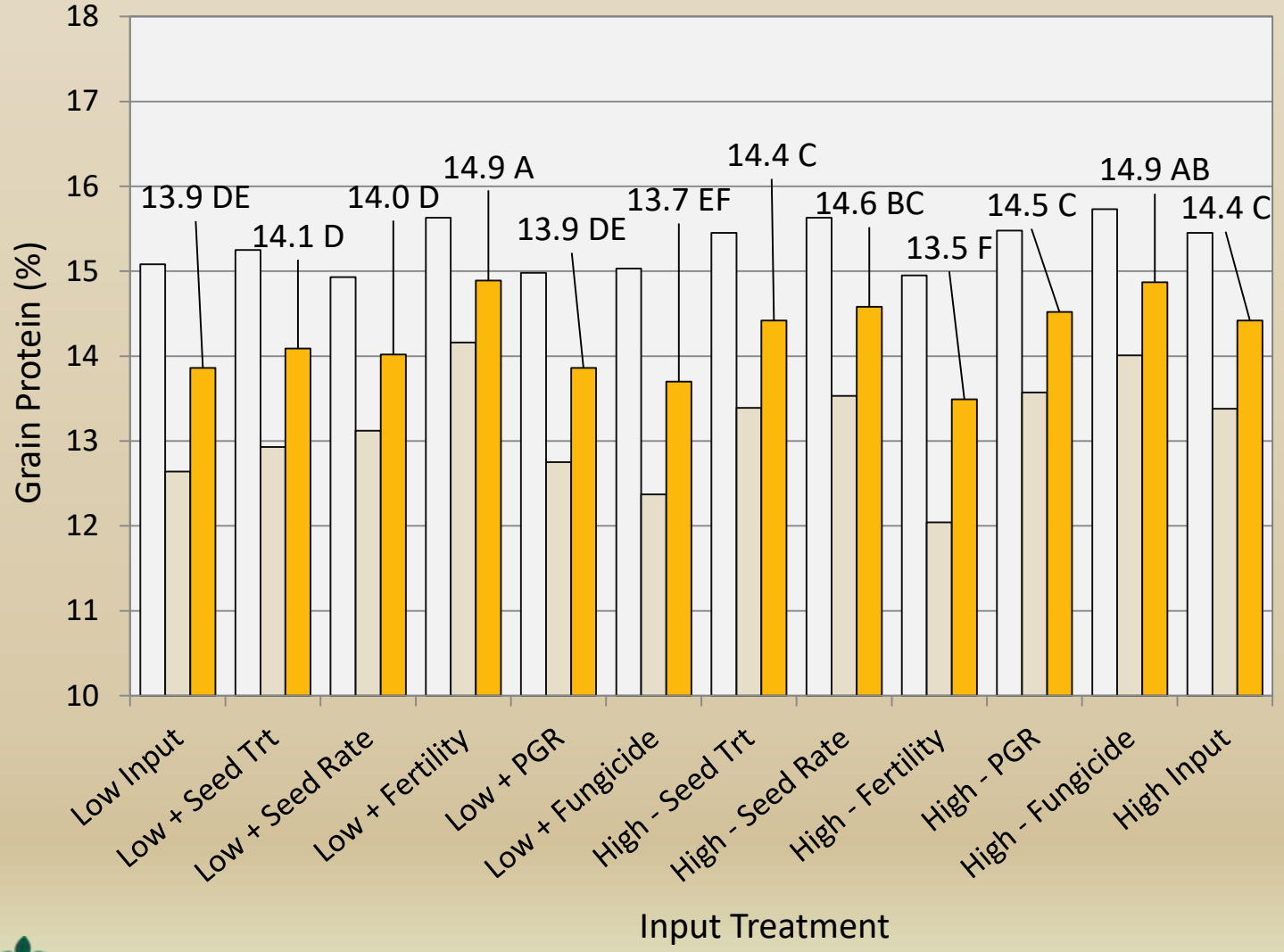
Average Input Effects on Wheat Yield



* significant at P ≤ 0.05

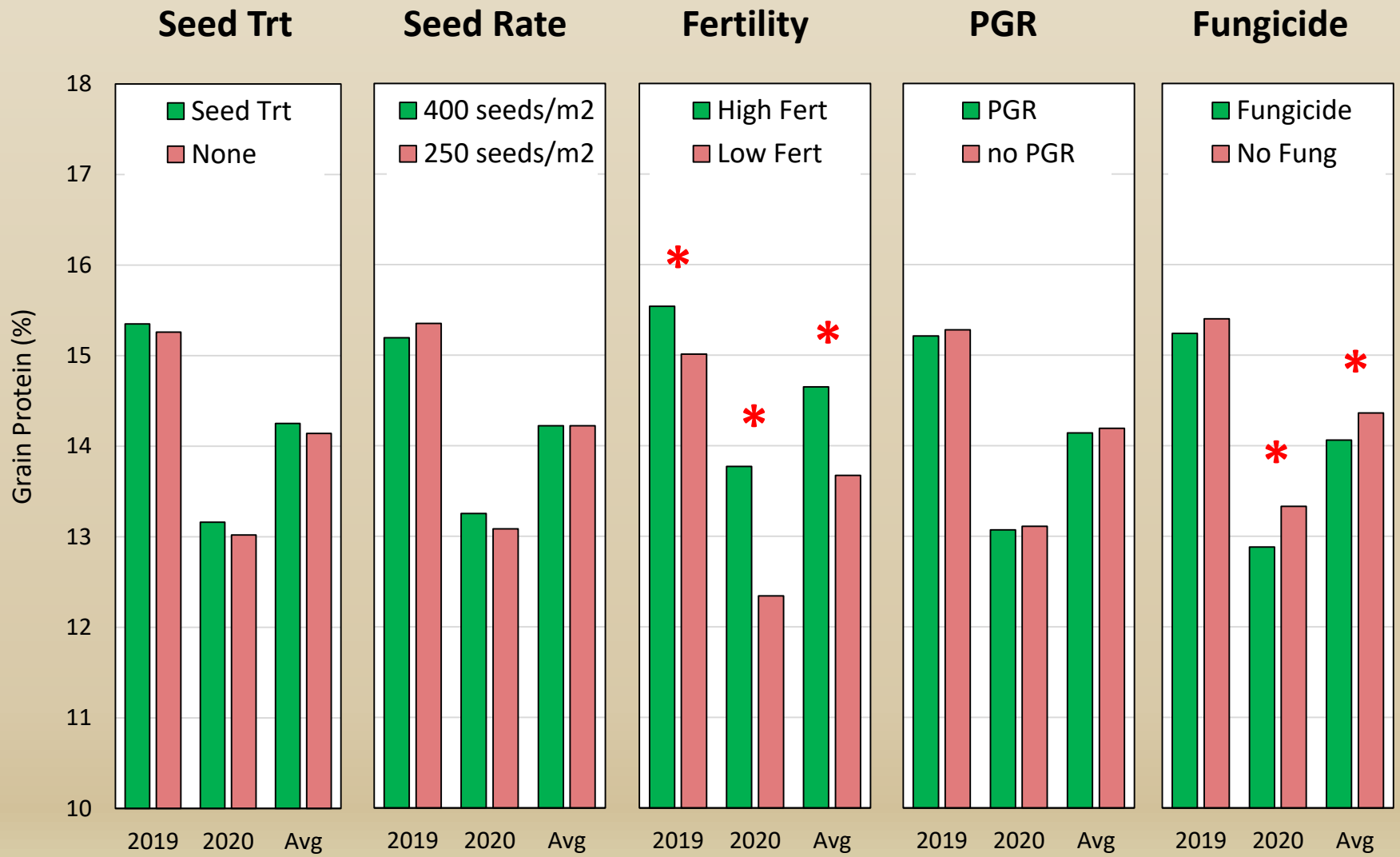
Input Effects on Wheat Grain Protein

Indian Head 2019-20



Source	Pr > F
Year	<0.001
Trt	<0.001
Yr x Trt	<0.001

Average Input Effects on Wheat Protein



* significant at $P \leq 0.05$

Wheat Input Treatments – Economics

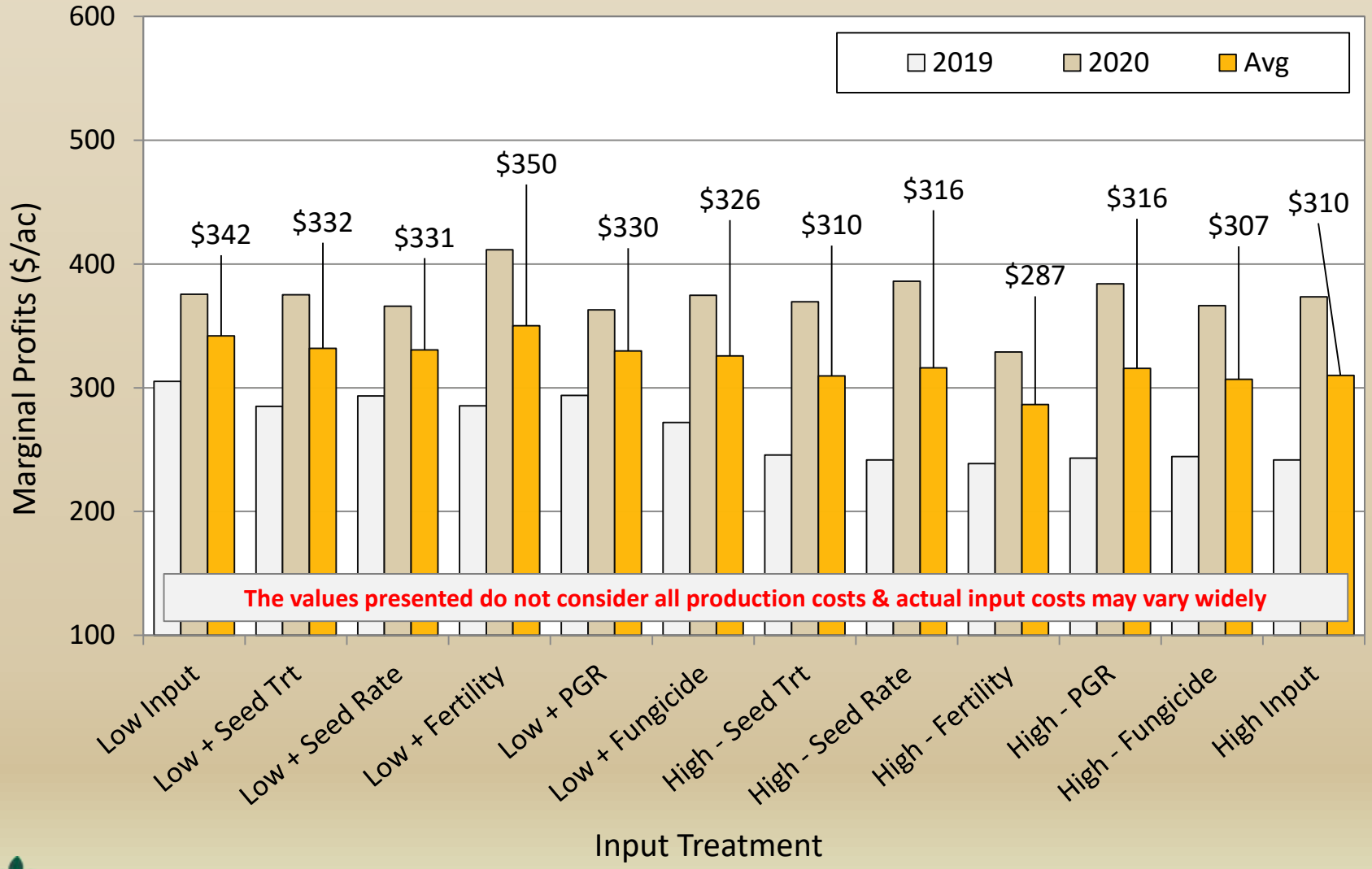
Assumptions Used for Marginal Profit Calculations

Treatment	Seed Trt[Z]	Seed[Y]	Fertility[X]	PGR[W]	Fungicide[W]	Revenue[V]
	---------- $/ac ----------					
Low Input	$6.32	$16.41	$51.01	$0.00	$0.00	$358.56
Low + Seed Trt	$0.00	$26.84	$51.01	$0.00	$0.00	$371.51
Low + Seed Rate	$0.00	$16.41	$81.69	$0.00	$0.00	$383.25
Low + Fertility	$0.00	$16.41	$51.01	$19.00	$0.00	$380.41
Low + PGR	$0.00	$16.41	$51.01	$0.00	$25.23	$364.63
Low + Fungicide	$0.00	$26.84	$81.69	$19.00	$25.23	$398.62
High - Seed Trt	$6.32	$16.41	$81.69	$19.00	$25.23	$390.13
High - Seed Rate	$6.32	$26.84	$51.01	$19.00	$25.23	$367.06
High - Fertility	$6.32	$26.84	$81.69	$0.00	$25.23	$383.25
High - PGR	$6.32	$26.84	$81.69	$19.00	$0.00	$378.39
High - Fungicide	$6.32	$26.84	$81.69	$19.00	$25.23	$401.05
High Input	$6.32	$16.41	$51.01	$0.00	$0.00	$358.56

[Z] Not adjusted for differences in seeding rate; [Y] Assumes certified seed price of $0.478/kg; [X] Assumes $725/tonne for MAP and $525/tonne for urea – K and S costs were excluded as these nutrients were not limiting; [W] Includes SRP of products plus $12.36/ha application cost; [V] Based on actual yields & protein with a CWRS wheat price of $257/Mt ($7/bu) & a $0.73/Mt premium/discount for every 0.1% above/below 13.5% protein

Wheat Input Treatments – Relative Profits

Indian Head 2019-20



Wheat Response to Various Inputs Alone & in Combination: Conclusions

- Seed treatment improved establishment 1/2 years but had no other impacts
- PGR consistently reduced plant height – while it wasn't a problem under the dry conditions, experience has shown that lodging can be worse with high seed rates & fertility but largely eliminated with PGR applications
- Disease pressure was low, but fungicide had the greatest & most consistent impact on FHB. Higher seed rates reduced FHB 1/2 years & combining higher seed rates & fungicide tended to result in the lowest FHB incidence
- Extra fertility had the greatest impact on yield & was the only input to increase protein, fungicide & PGR both increased yield in 1/2 years
- While all the inputs evaluated have merit, the most intensively managed treatments were not the most profitable; thus, inputs should be chosen carefully based on previous observations, soil tests, & frequent crop scouting throughout the season in order to optimize yields & maximize returns

Pre-Harvest Options for Improved Stem & Seed Drydown in Flax (ADOPT-SFDC)

Pre-Harvest Options for Flax Locations, Treatments, & Data Collection

Locations: Indian Head, Yorkton, and Swift Current (2020 only)

Treatments: 2 varieties x 4 pre-harvest treatments

Varieties (2)	Pre-harvest Treatments (4)
1) CDC Bethune	1) Unsprayed Control
2) CDC Glas	2) 894 g glyphosate/ha (0.67 l/ac Roundup Transorb HC)
	3) 894 g glyphosate/ha + 50 g saflufenacil/ha (0.67 l/ac Roundup Transorb HC + 59 ml/ac Heat LQ[Z])
	4) 400 g diquat/ha (0.81 l/ac Reglone Ion)

[Z] BASF has not fully established import tolerances (maximum residue limits (MRLs)) for flax for all markets around the world and does not recommend the use of Heat LQ as a harvest aid on flax for the 2020 season

Data Collected: Visual stem dry-down ratings, stem and seed moisture at time of harvest, & yield

NOTE: Only Indian Head results presented at this time

Pre-Harvest Options for Flax
Stem Dry-Down Rating Scale (SFDC)

1 – Almost all stems grass green

2 – 50% mixture of grass green & green stems

3 – Mostly green stems

4 – 50% mixture of green & pale green stems

5 – Mostly pale green stems

6 – 50% mixture of pale green & yellow stems

7 – Mostly yellow stems

8 – 50% mixture of yellow & brown stems or mostly light brown stems

9 – Almost all stems medium or dark brown (very dry)


Indian Head 2020
Aug 21
Day 0


Aug 28
Day 7


Harvest Date
Aug 28
Day 14

0 DAA | 4 DAA | 7 DAA | 14 DAA

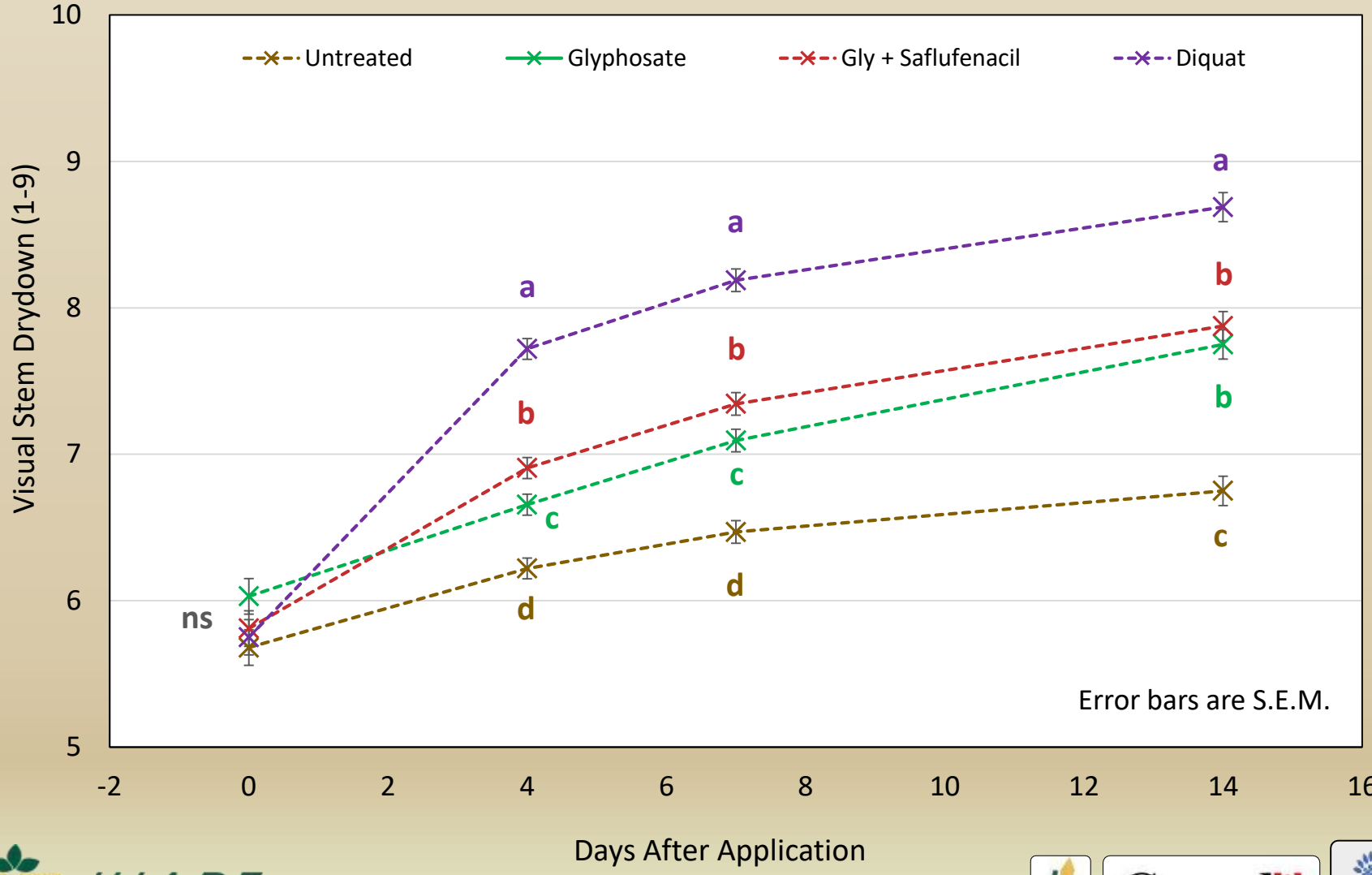



CDC Glas - Untreated

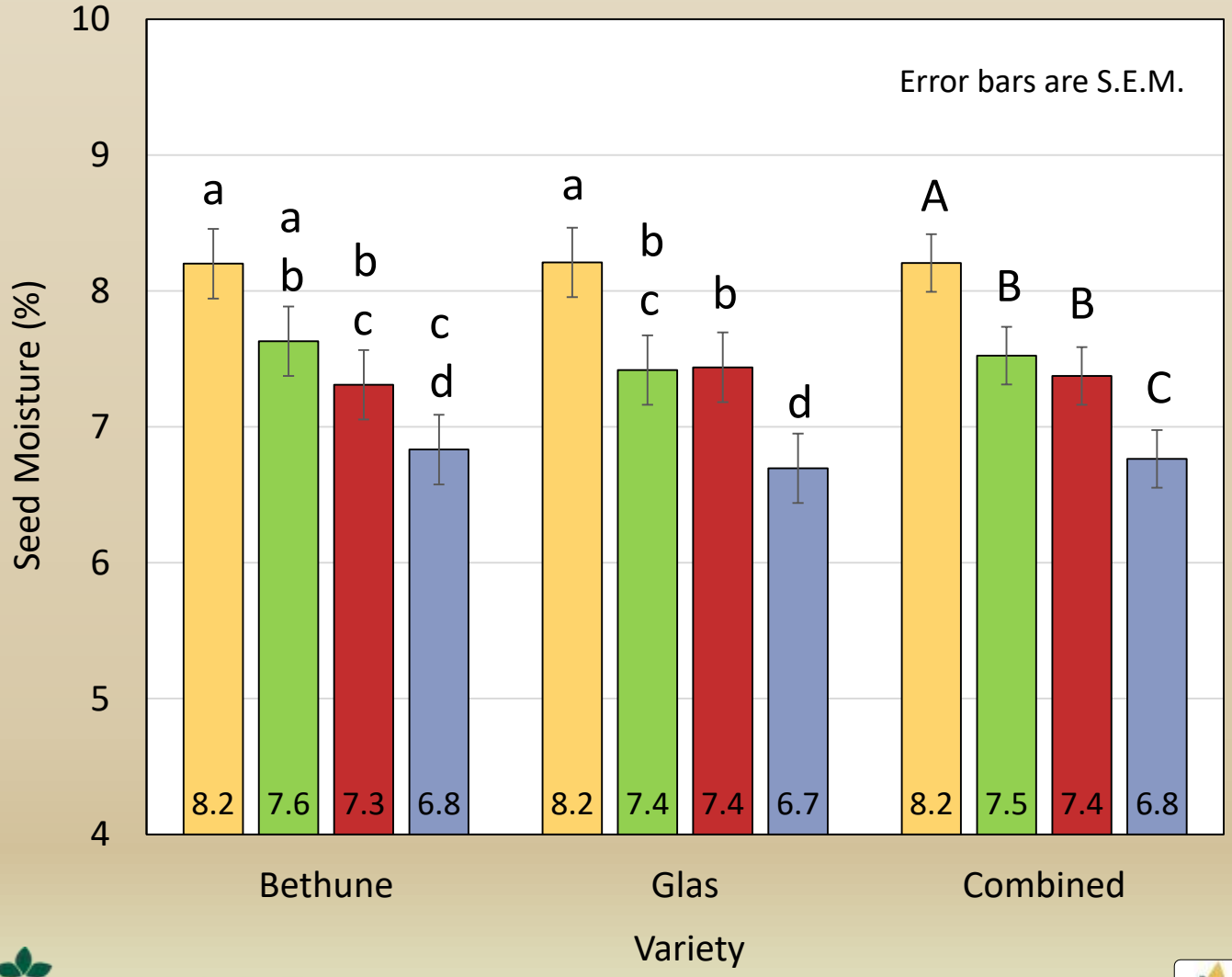



CDC Glas - Diquat

Pre-Harvest Treatment Effects on Flax Visual Stem Drydown at Indian Head 2020



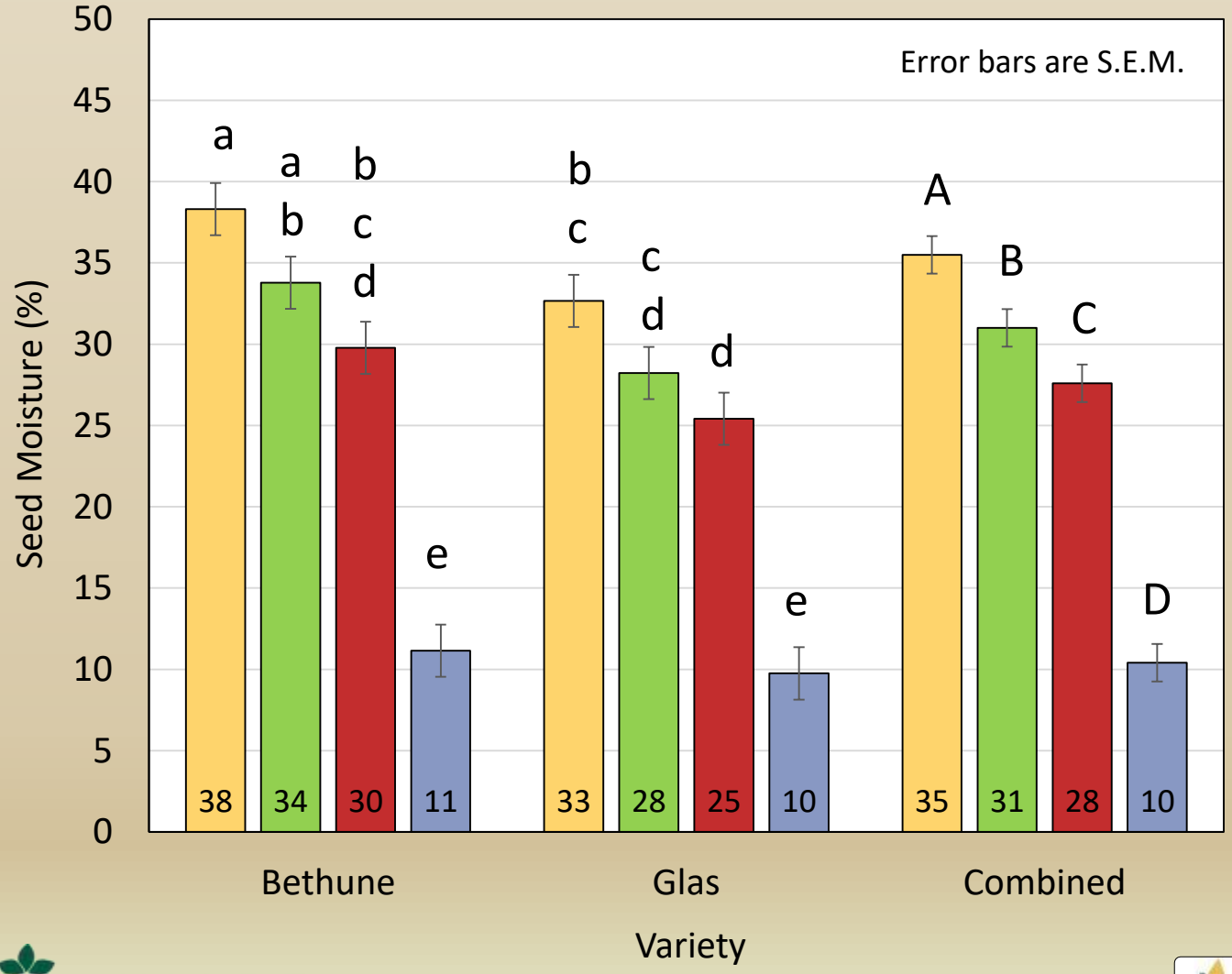
Pre-Harvest Treatment Effects on Flax Seed Moisture at Indian Head 2020



Source	Pr > F
VAR	0.713
TRT	<0.001
VAR x TRT	0.836
Check vs Rest	<0.001

- Untreated
- Glyphosate
- Gly + Saflufenacil
- Diquat

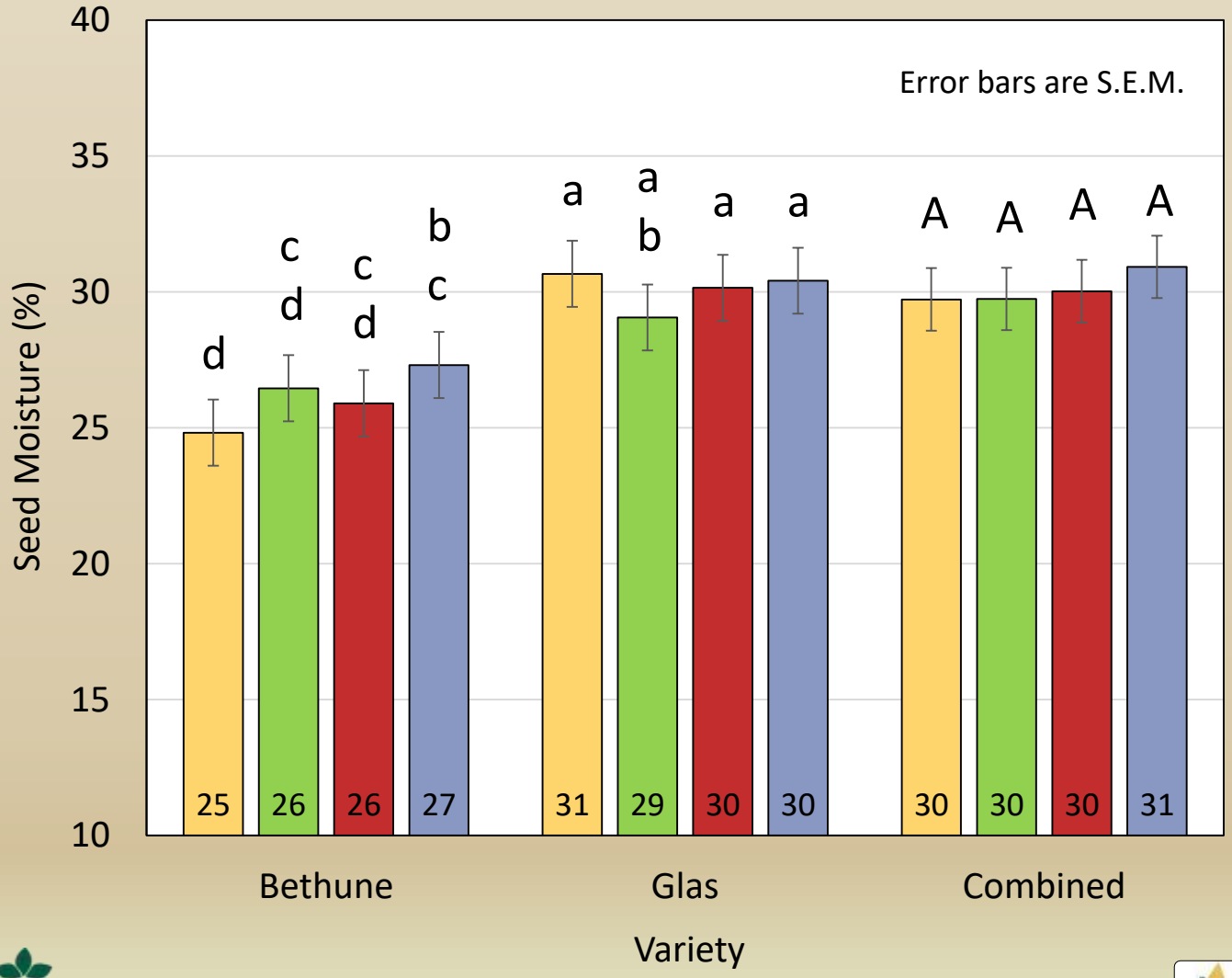
Pre-Harvest Treatment Effects on Flax Stem Moisture at Indian Head 2020



Source	Pr > F
VAR	0.001
TRT	<0.001
VAR x TRT	0.514
Check vs Rest	<0.001

- Untreated
- Glyphosate
- Gly + Saflufenacil
- Diquat

Pre-Harvest Treatment Effects on Flax Seed Yield at Indian Head 2020



Source	Pr > F
VAR	<0.001
TRT	0.483
VAR x TRT	0.223
Check vs Rest	0.482

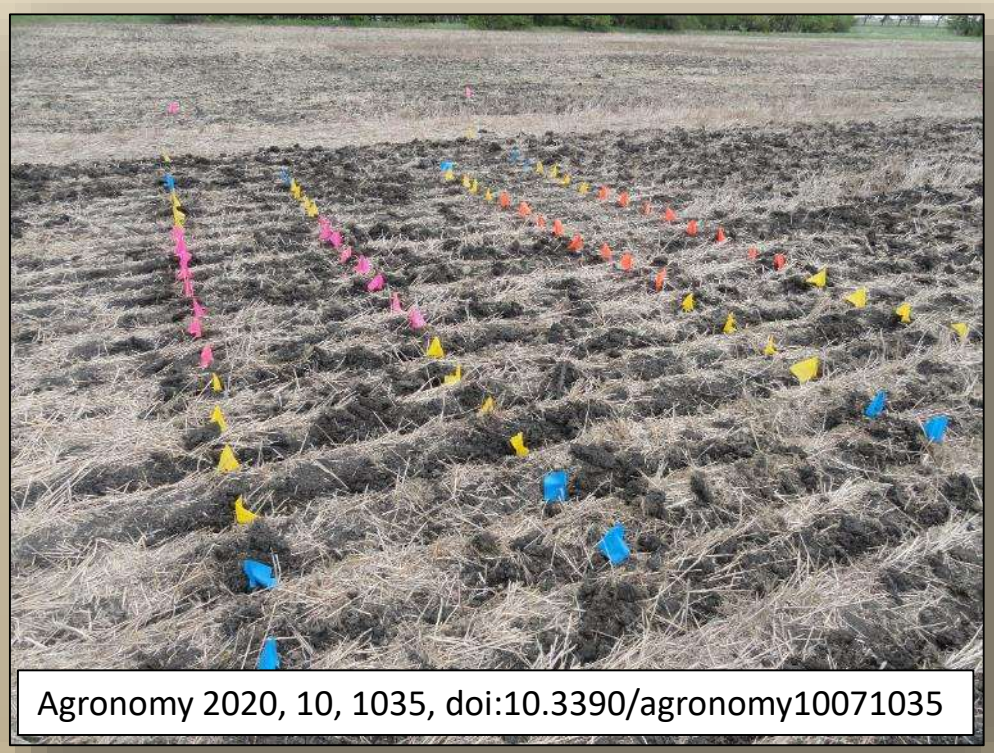
- Untreated
- Glyphosate
- Gly + Saflufenacil
- Diquat

Pre-Harvest Options for Improved Stem & Seed Drydown in Flax: Conclusions

- Somewhat greener stems observed with CDC Bethune (probably due in part to poorer establishment) but the pre-harvest treatments performed similarly for both CDC Bethune & CDC Glas
- Diquat provided the most rapid visual results & resulted in the greatest reduction in seed & stem dry-down by a substantial margin
- Both glyphosate & saflufenacil + glyphosate also improved visual stem dry-down while reducing actual stem & seed moisture content relative to the control, but not to nearly the extent of diquat
- Tank-mixing glyphosate with saflufenacil resulted in more rapid visual dry-down & lower stem moisture content compared to glyphosate applied alone but seed moisture at harvest was similar for these two treatments
- <u>MRL values for saflufenacil have not yet been established for all flax export markets</u>

Crop Uptake of Sulfur from MAP Fortified with Sulfate & Elemental S (Degryse et al. 2020)

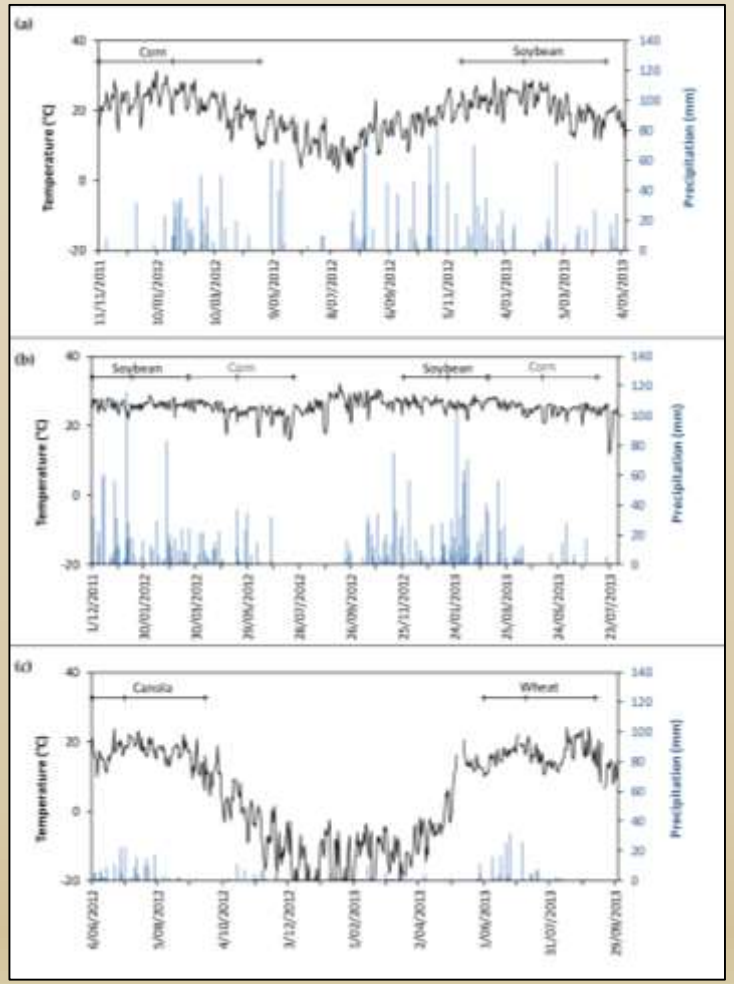
Argentina, Brazil, & Canada (2012-2013)



Agronomy 2020, 10, 1035, doi:10.3390/agronomy10071035

Objective: To assess how much S in crops was derived from S fortified MAP fertilizers under contrasting climate conditions over a two-year period

Crop Uptake of Sulfur from MAP Fortified with Sulfate & Elemental S (Degryse et al. 2020)



Argentina (Humid subtropical)

- Intermediate temperatures & precipitation
- Corn / Soybean
- MES10 (5% SO4-S, 5% ES)

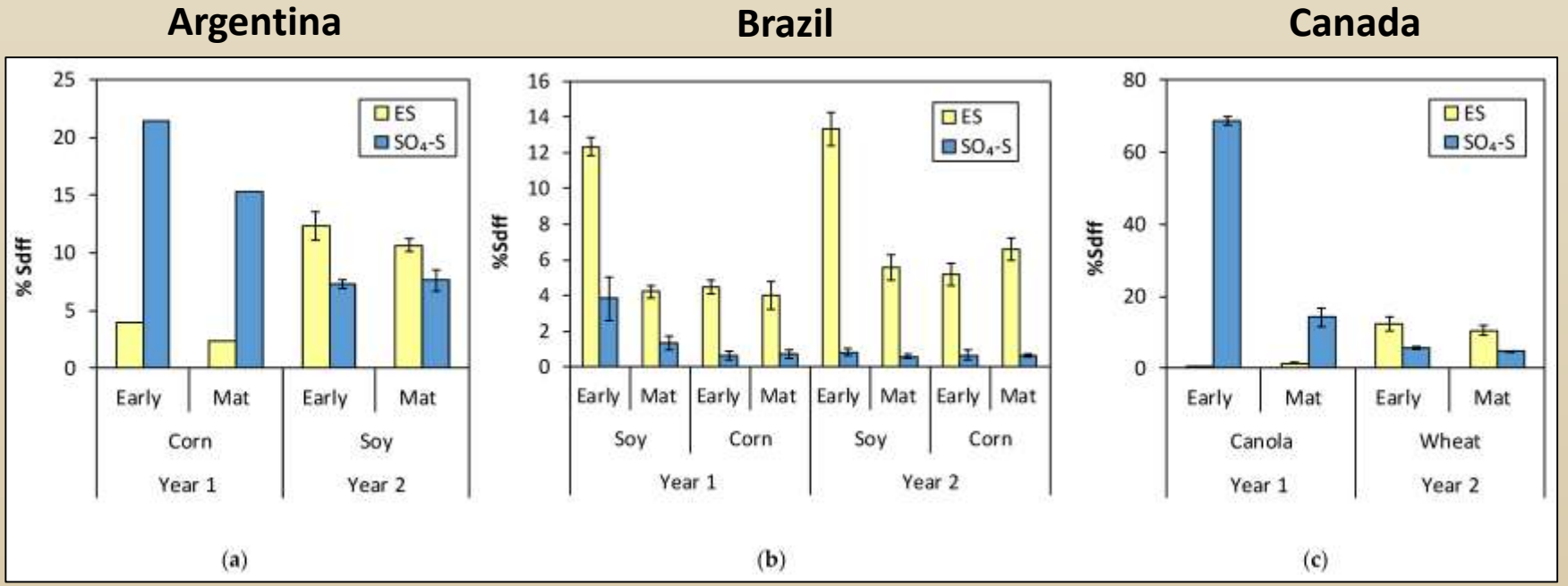
Brazil (Tropical)

- Warmest & wettest climate
- Soybean / Corn / Soybean / Corn
- MES9 (2% SO4-S, 7% ES)

Canada (Humid continental)

- Coolest & driest climate, short season
- Canola / Spring Wheat
- MES15 (7.5% SO4-S, 7.5% ES)

Crop Uptake of Sulfur from Fertilizer Fortified with Sulfate & Elemental S (Degryse et al. 2020)



Percentage of plant S plant derived from fertilizer SO_4-S vs ES at late vegetative stage & maturity

- By the end of the second season, cumulative recoveries of added S were > 65% for SO_4-S & 20-25% for ES in the Argentina & Canada sites but at Brazil recovery was less for SO_4-S (9%) than ES (16%)

Crop Uptake of Sulfate vs Elemental S from S fortified MAP: Concluding Remarks

- At Argentina and Canada, crop recovery ES was smaller than that of SO_4-S in the first year, while the opposite was true in the second year.
- At the Brazilian site, recovery of ES was similar that of SO_4-S in the first year, but higher in the second year
- Higher recovery of ES vs. SO_4-S in the Brazilian site was attributed to leaching of SO_4-S & relatively fast oxidation of ES in the warm, wet climate
- These results suggest that ES may be more suitable than SO_4-S as an S source in warm humid climates, but inclusion of SO_4-S in the fertilizer is recommended in colder climates where slow oxidation limits the initial availability of ES
- In colder, drier climates, ES likely has the most merit as a longer-term supply of S, well-suited for building up residual levels with low risk of loss or leaching below the rooting zone compared to high rates of SO_4

THANK YOU

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