

Wheat Response to PGRs & Effects on Management

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Presentation Overview

- **Manipulator overview & update**
- **Application timing**
- **Nutrient management implications**
- **Seeding rate implications**
- **Variety considerations**
- **Take-home messages**



Manipulator™ 620

- 620 g/L Chlormequat Chloride (solution)
- Anti-Gibberellin containing biochemical safeners & low temperature activators to increase product effectiveness at low temperatures
- Gibberellin is a naturally occurring plant hormone that stimulates cell elongation & division to give plants their height
- Anti-gibberellin PGR products reduce hormone production thereby reducing plant height & thickening stems

Other Growth Inhibiting PGR Products

- Trinexapac-ethyl (Moddus/Palisade - Syngenta) is another anti-gibberellin PGR which should be available in western Canada within a few years
- Ethephon (Ethrel – Bayer) is a registered ethrel releasing compound that can reduce height and thicken stems when applied within a narrow application window – limited use in western Canada

U.S. Maximum Residue Limit Update

ENGAGE AGRO

member of the Belchim Group



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November 10th 2017

MANIPULATOR® Plant Growth Regulator MRL update

Territories: Manitoba/Saskatchewan/Alberta

Engage Agro Corporation is pleased to announce that the establishment of the Manipulator Maximum Residue Limit (MRL) for the USA is expected in time for the 2018 growing season.

We have shared this information with the Western Grain Elevator Association to advise them of our communication to the retail sales channel. The key points of our messaging are as follows:

1. We expect the establishment of the chlormequat chloride tolerance in the USA by mid-May 2018. Chlormequat chloride is the active ingredient in Manipulator.
2. Engage Agro will be asking customers for forecasts in anticipation of the establishment of the MRL in the USA. We will also be providing Manipulator training sessions to agronomists, growers and retailers to ensure label compliance.
3. In the event the tolerance is not established in time for application, Engage Agro will not release additional product to the distribution channel.

We are excited to offer Manipulator to the Canadian market, and look forward to working with grain companies and retailers to re-introduce Manipulator plant growth regulator to Canadian growers.

2012: IHARF's 1st PGR Experience

- Received sample of Manipulator in the spring, treated 2/4 reps of a small unrelated trial being conducted for Engage Agro
- Hot & wet season - major issues with lodging & disease
- Not replicated, but observed an average:
 - 15 cm (14%) height reduction, dramatic reduction in lodging, and 19 bu/ac (57%) yield increase but 1.5% lower protein

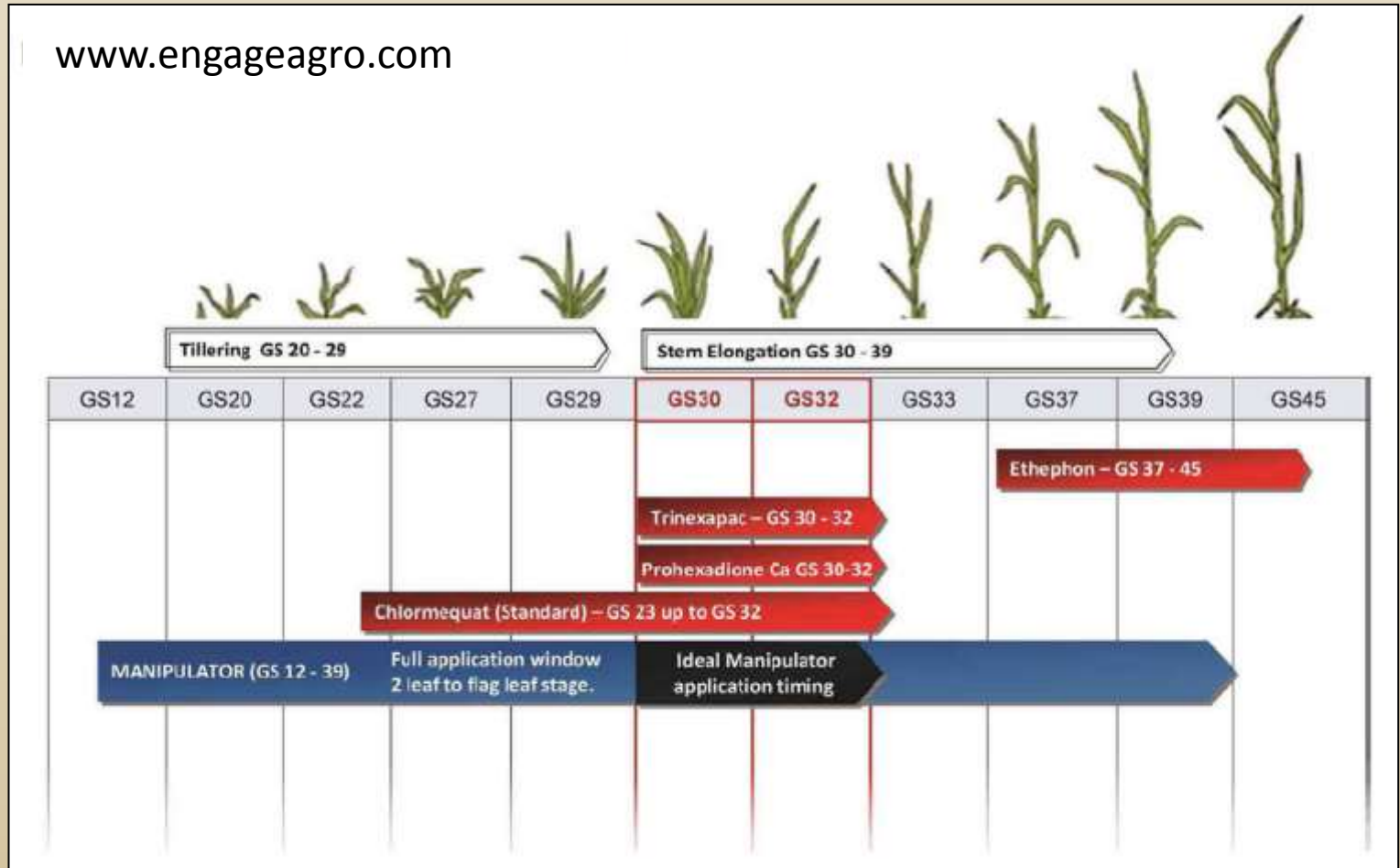
(var. Unity VB)

Untreated

Treated

PGR Application Timing

www.engageagro.com



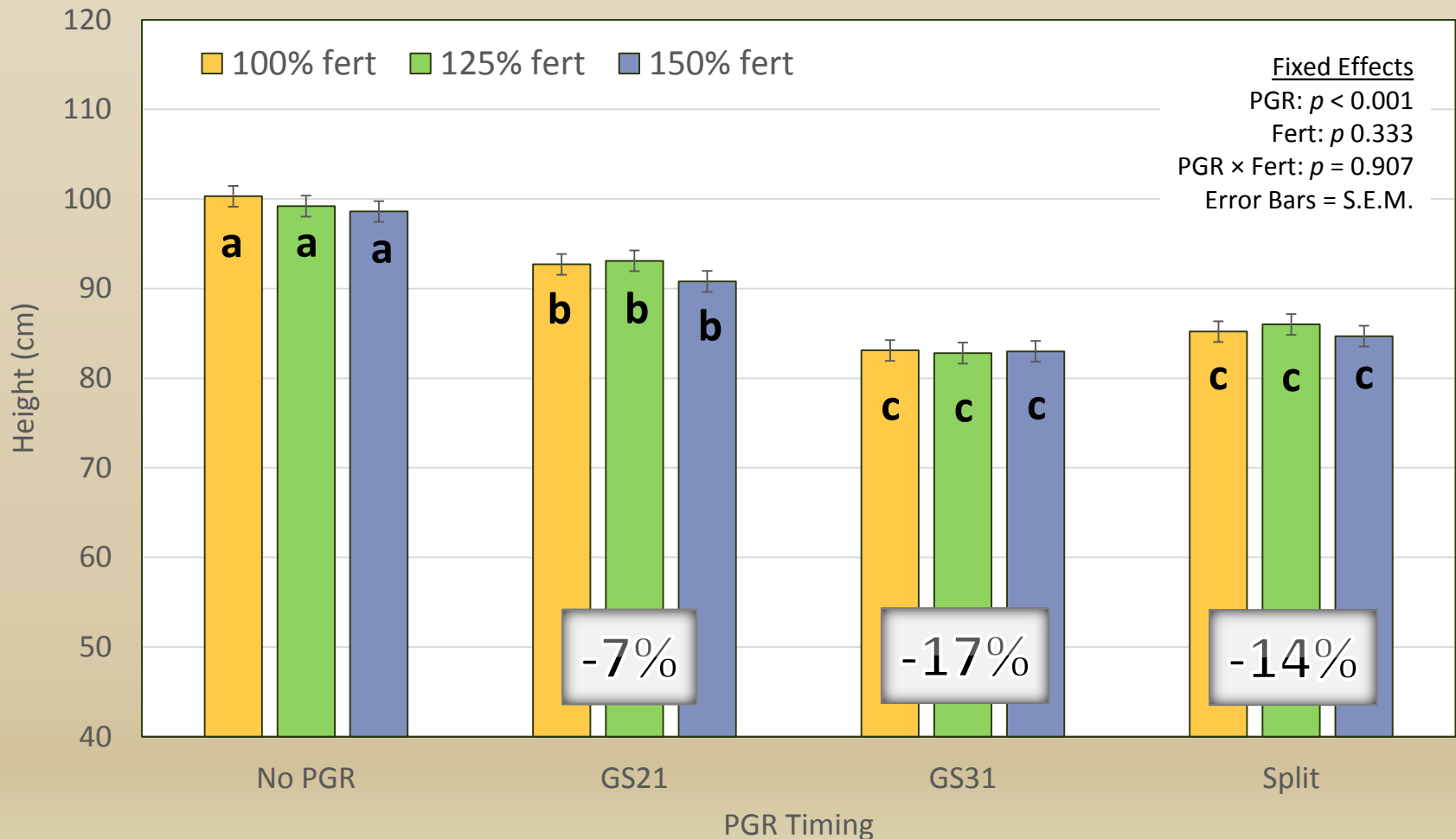
- Label window extends from 2-leaf (12) to early flag (39) with optimal application time during early stem elongation (30-32)

Application Time & Overall Fertility Effects on Wheat Response to PGR

- Field trials conducted in 2013, 2014, & 2015 at Indian Head
 - Similar trials at Melfort (NARF), Scott (WARC) & Yorkton (ECRF)
 - Variety was Unity VB with a 275 seeds/m² seeding rate
- **Fertilizer rates** were 100, 125 & 150% of a base rate of 112-34-14-17 kg/ha N-P₂O₅-K₂O-S
- **PGR Timing – 0.73 l/ac Manipulator applied at:**
 - None - control
 - Zadoks GS 21 – 1st tiller
 - Zadoks GS 31 – 1st node detectable
 - Split 21 + 31 – half rate each time (2013 only)
 - Zadoks 39 – early flag (2014 & 2015 only)

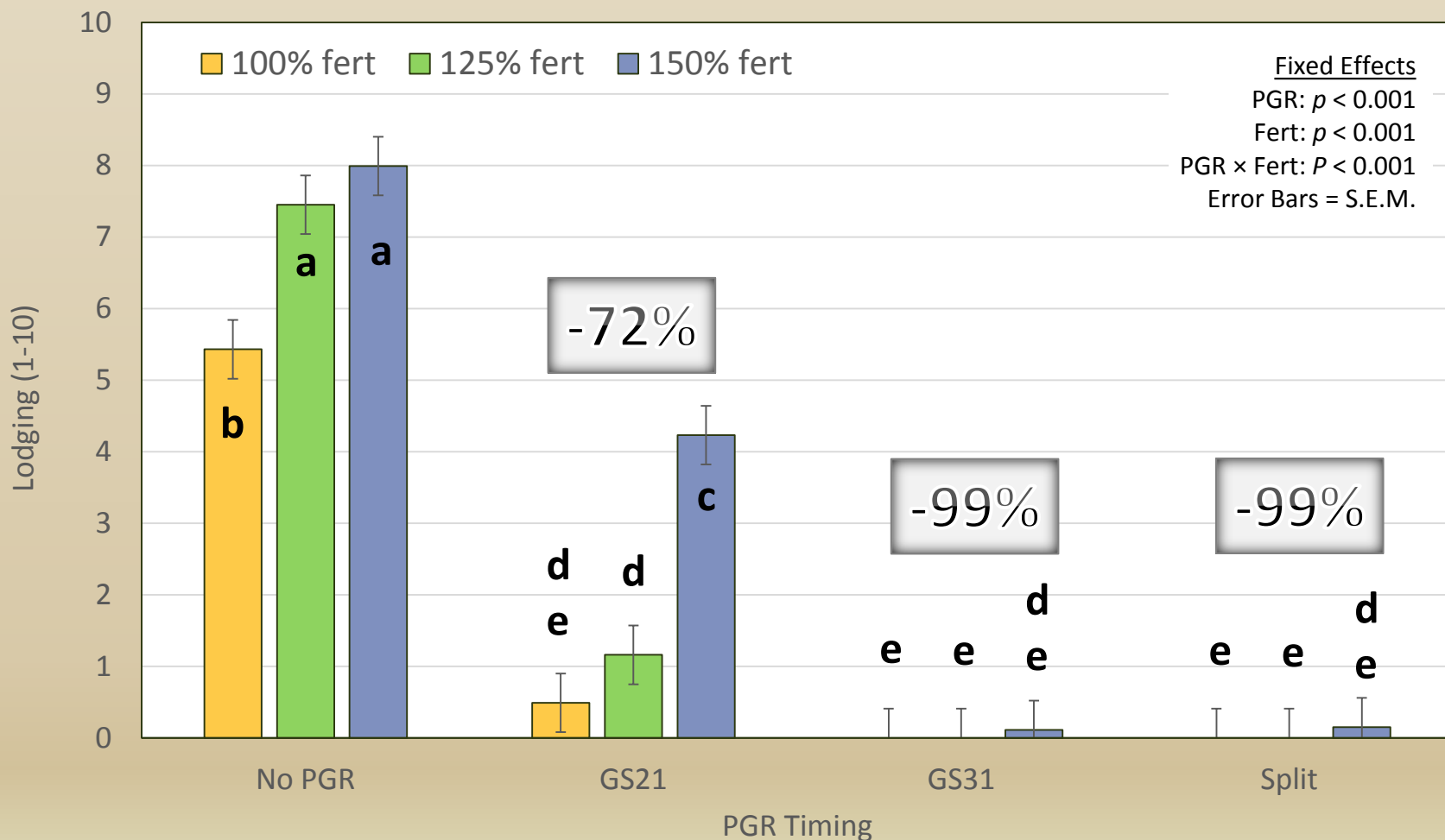
Indian Head 2013

PGR Timing & Fertility Effects on Height



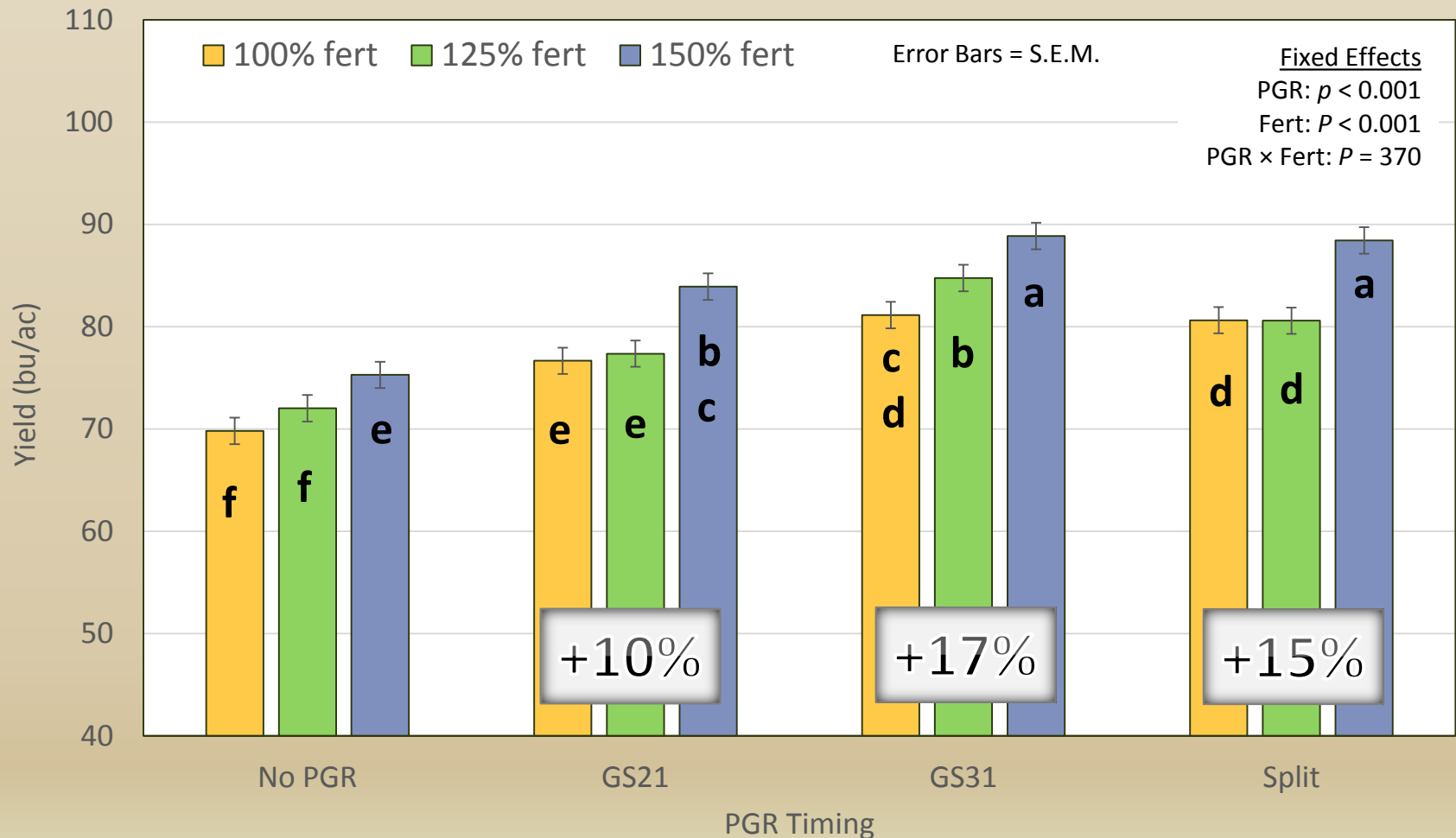
Indian Head 2013

PGR Timing & Fertility Effects on Lodging



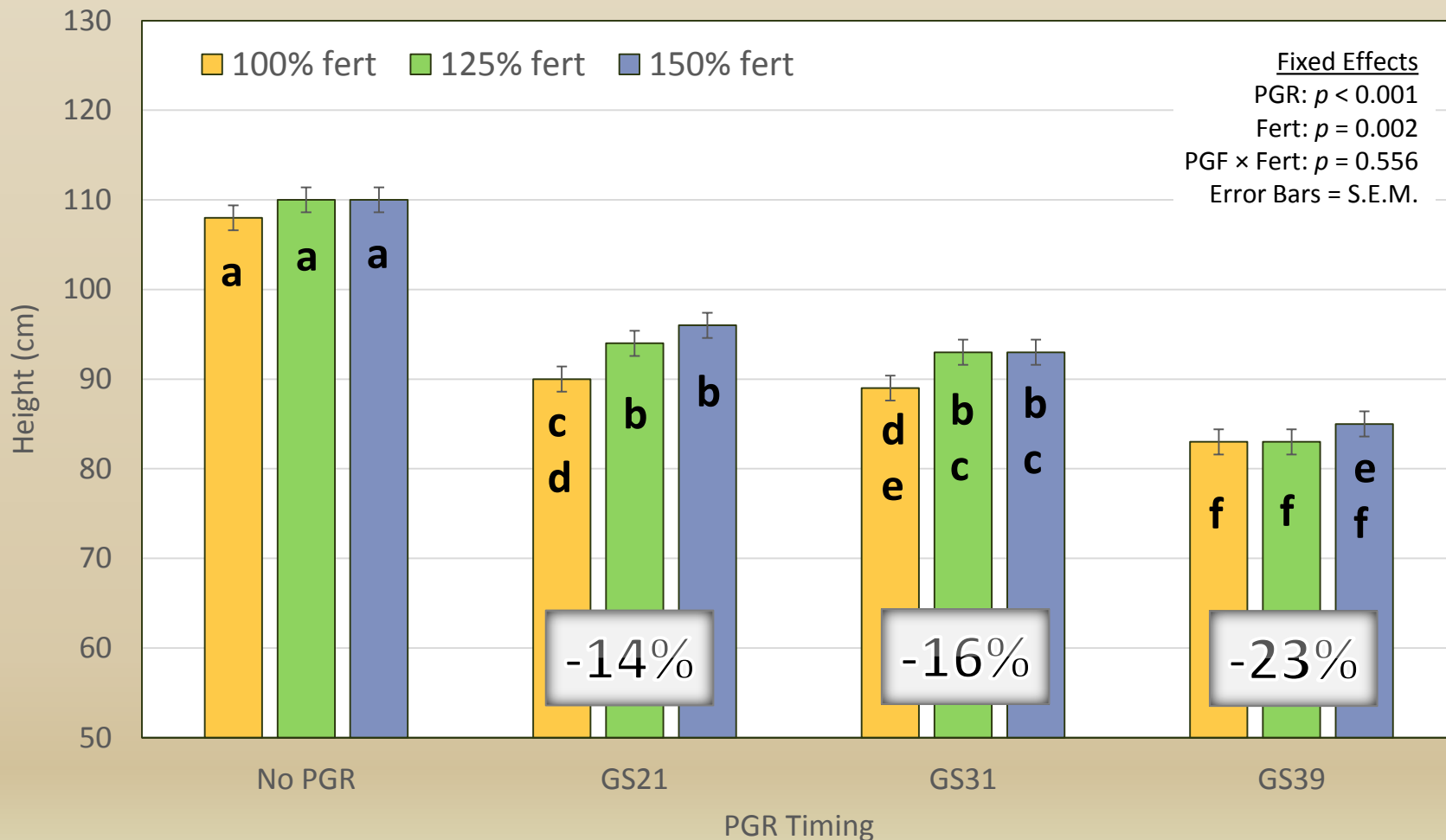
Indian Head 2013

PGR Timing & Fertility Effects on Yield



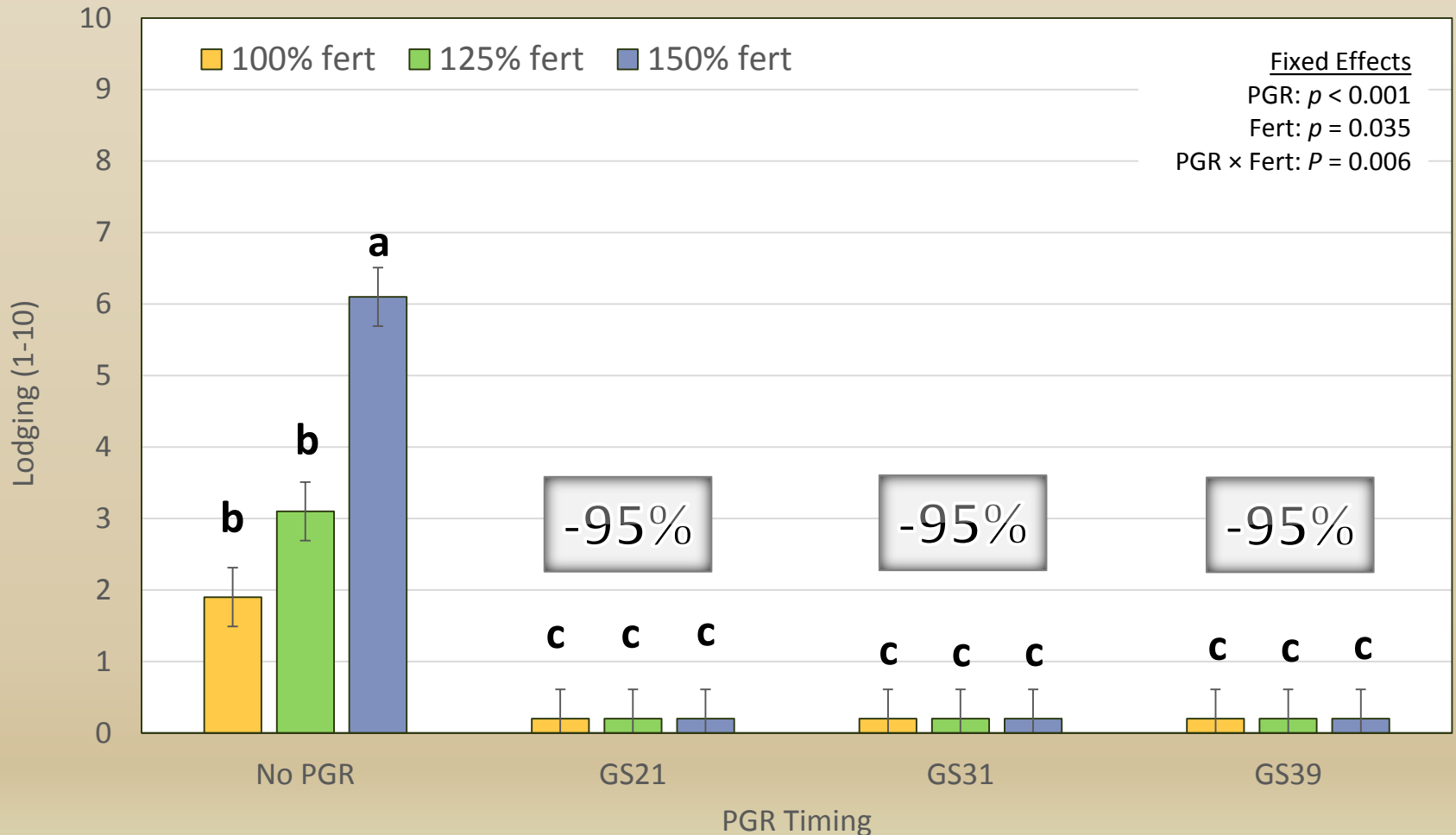
Indian Head 2014

PGR Timing & Fertility Effects on Height



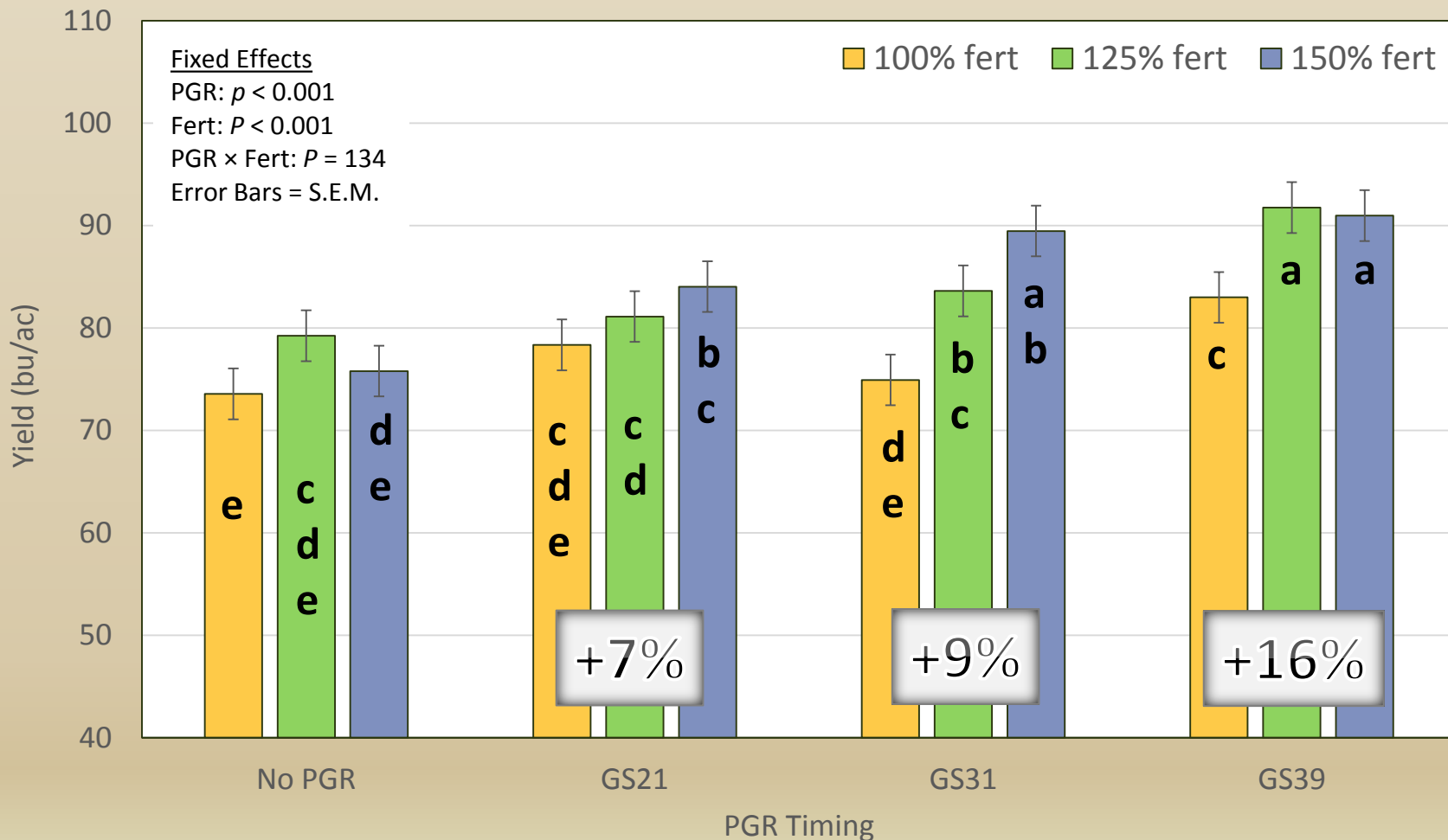
Indian Head 2014

PGR Timing & Fertility Effects on Lodging



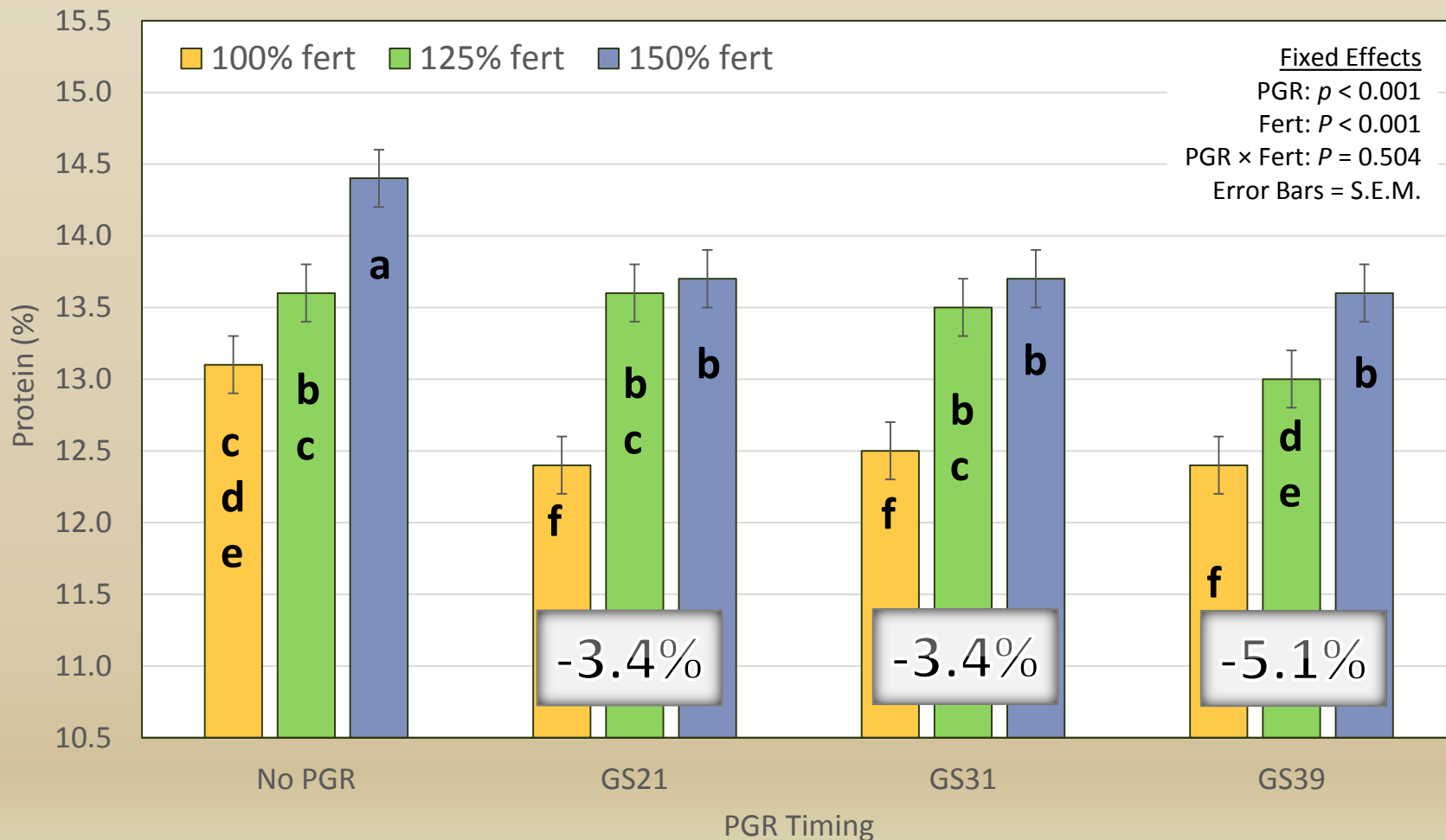
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PGR Timing & Fertility Effects on Yield



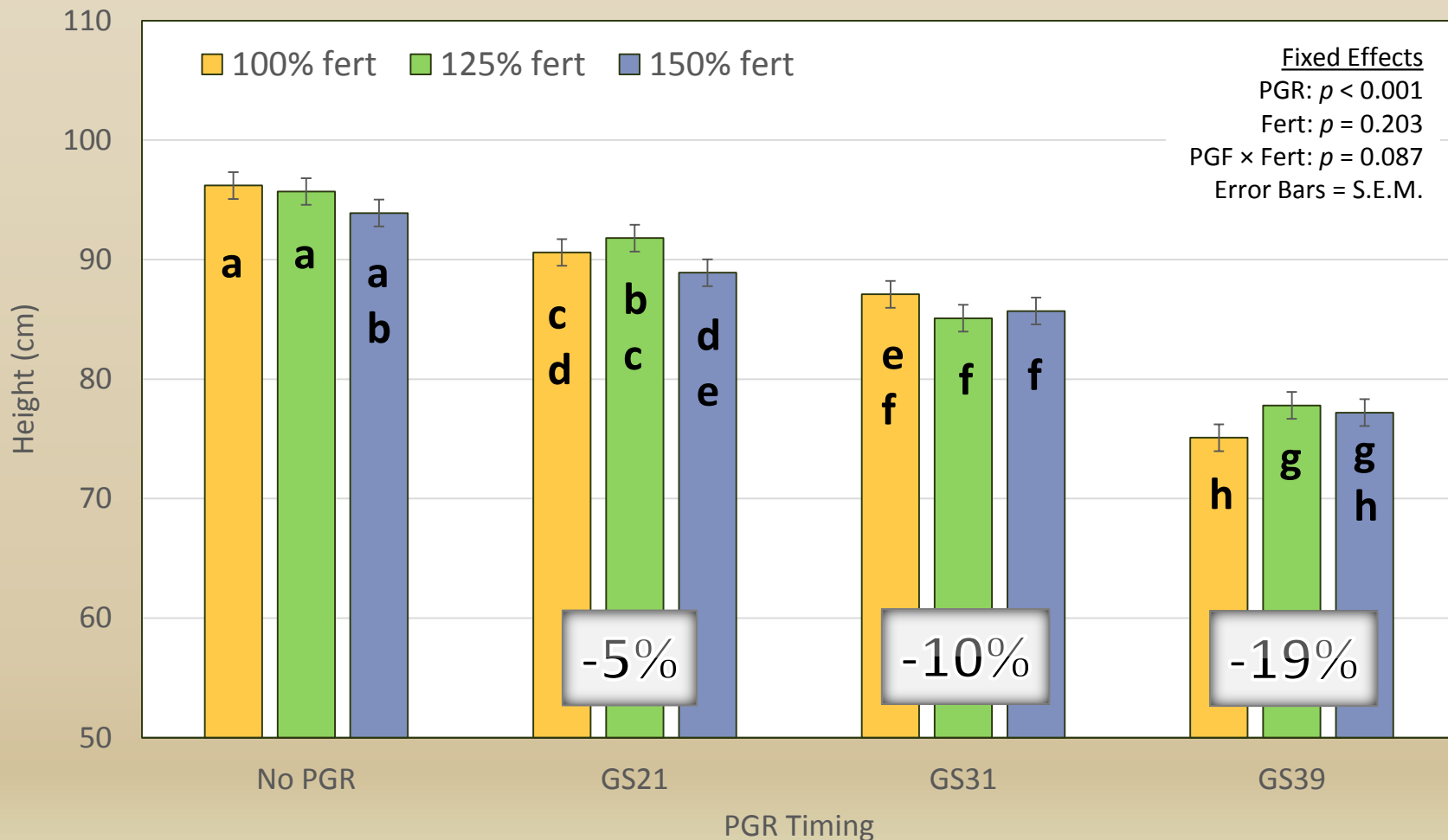
Indian Head 2014

PGR Timing & Fertility Effects on Protein



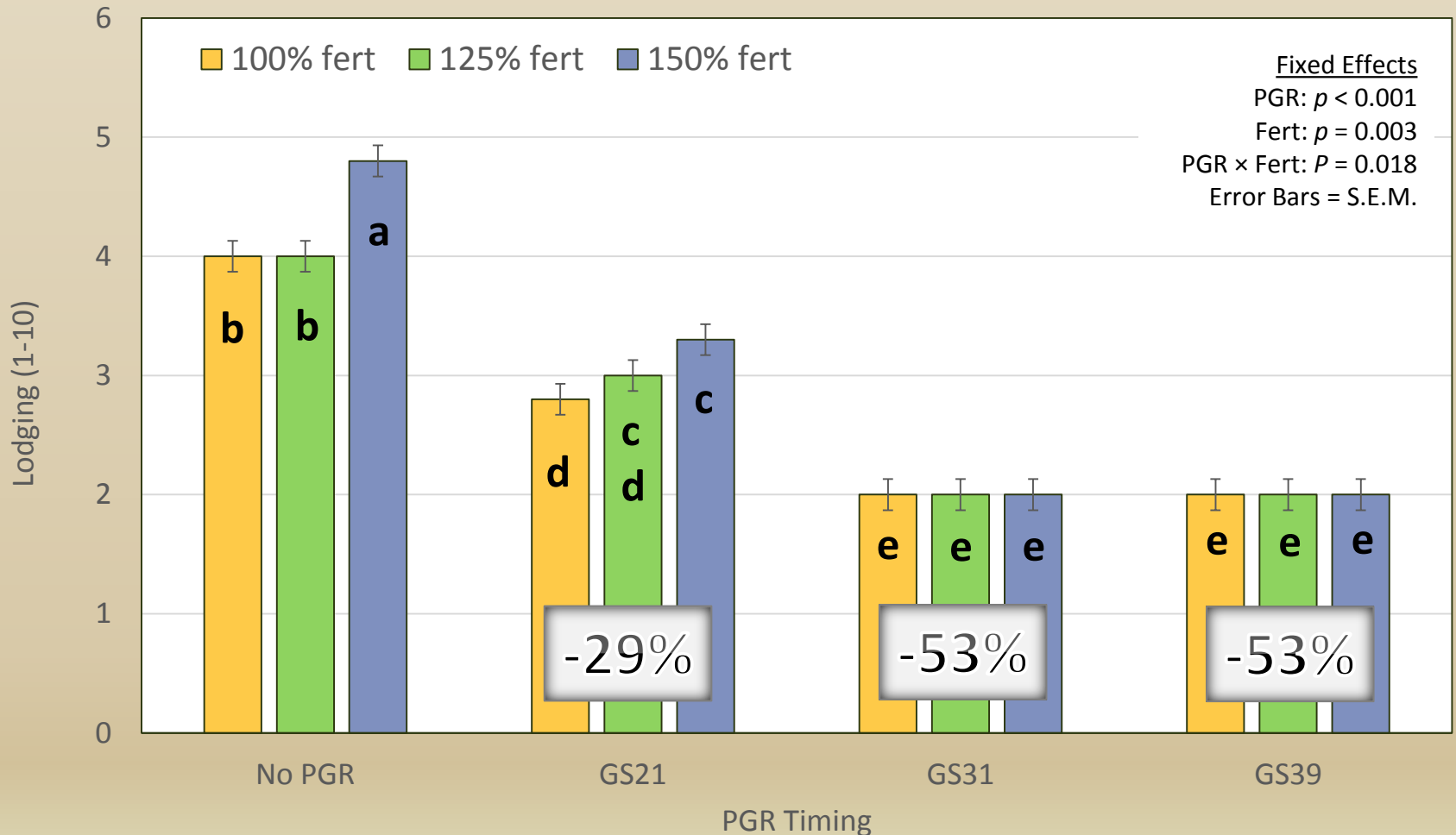
Indian Head 2015

PGR Timing & Fertility Effects on Height



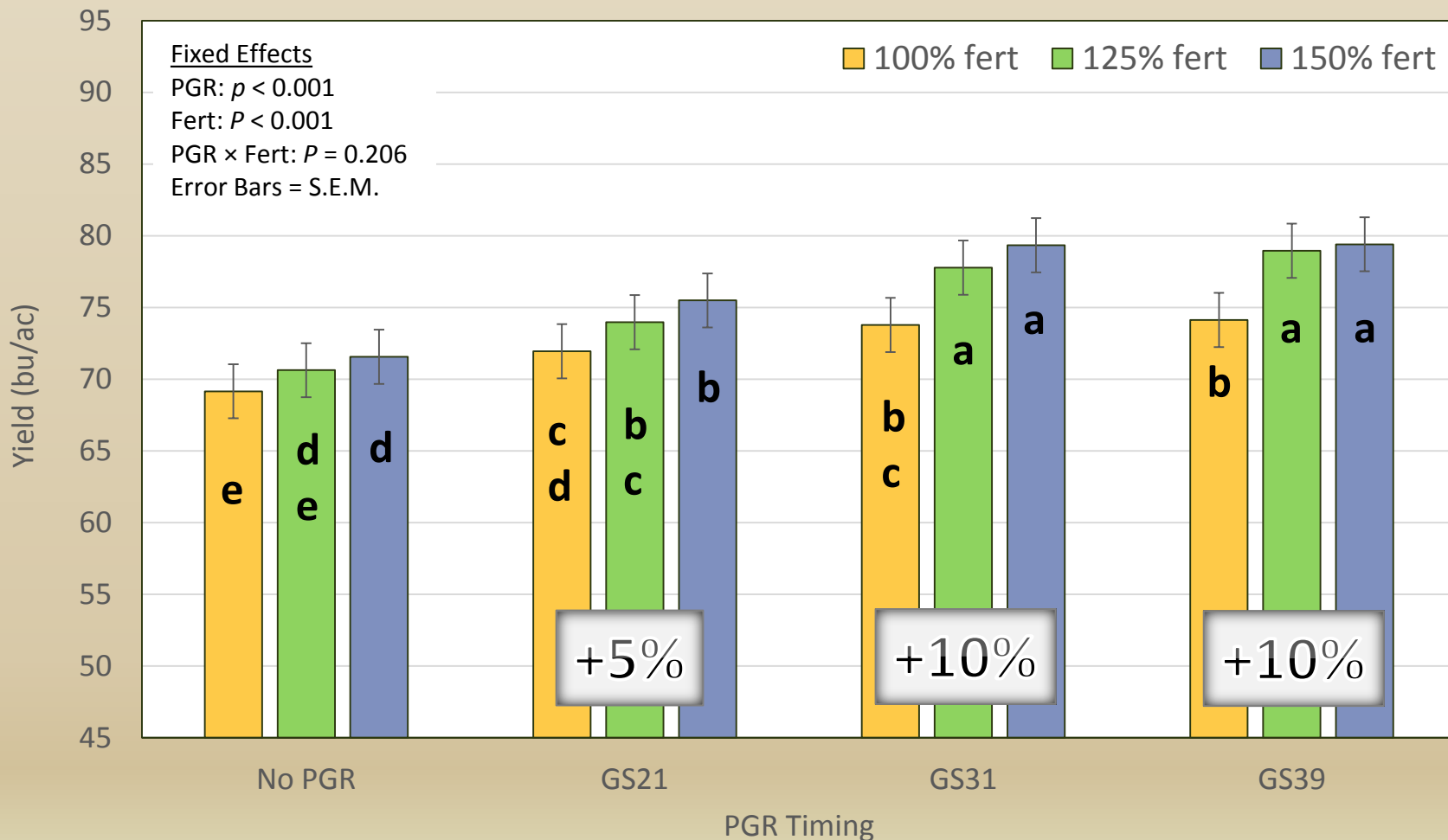
Indian Head 2015

PGR Timing & Fertility Effects on Lodging



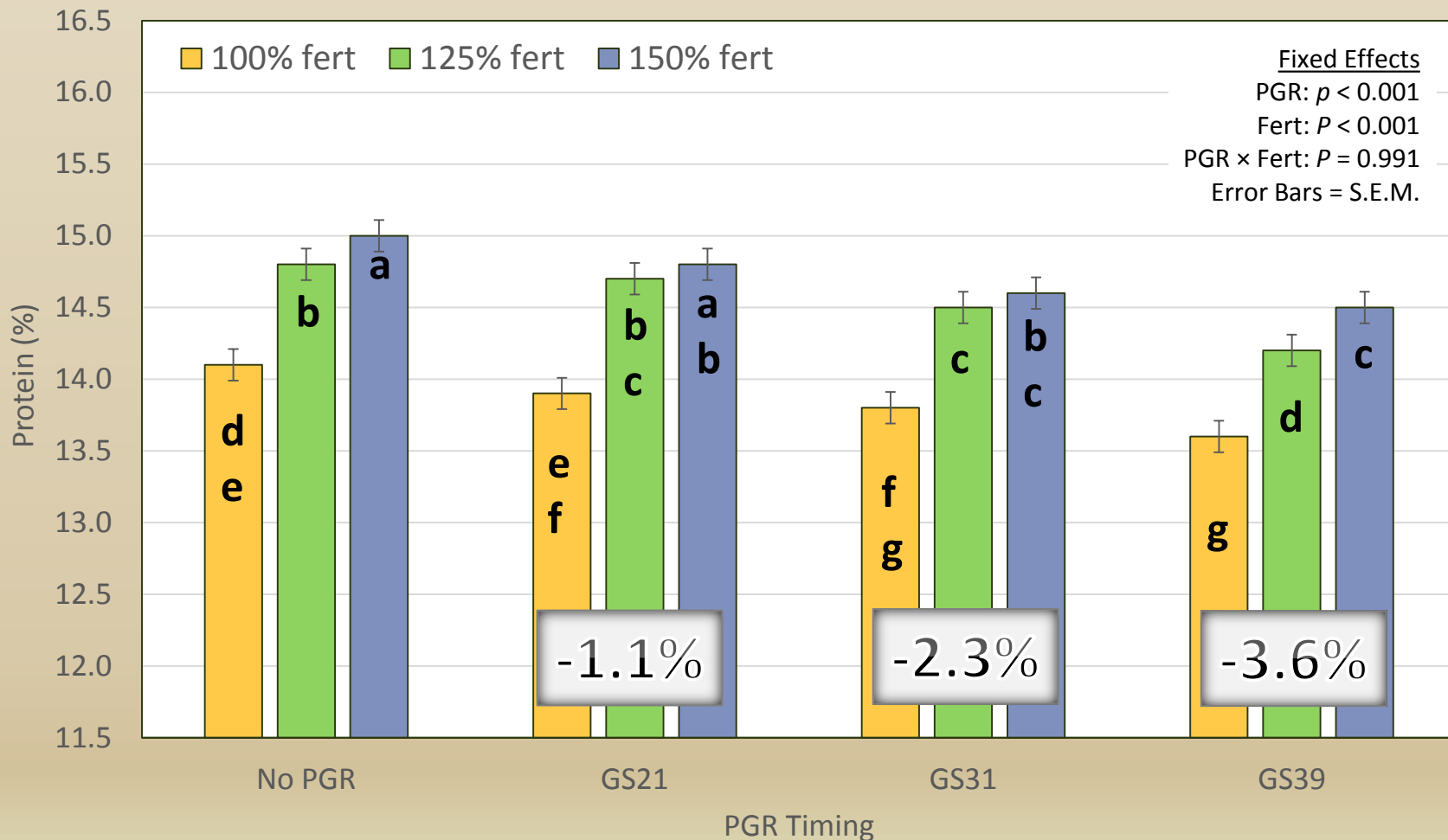
Indian Head 2015

PGR Timing & Fertility Effects on Yield



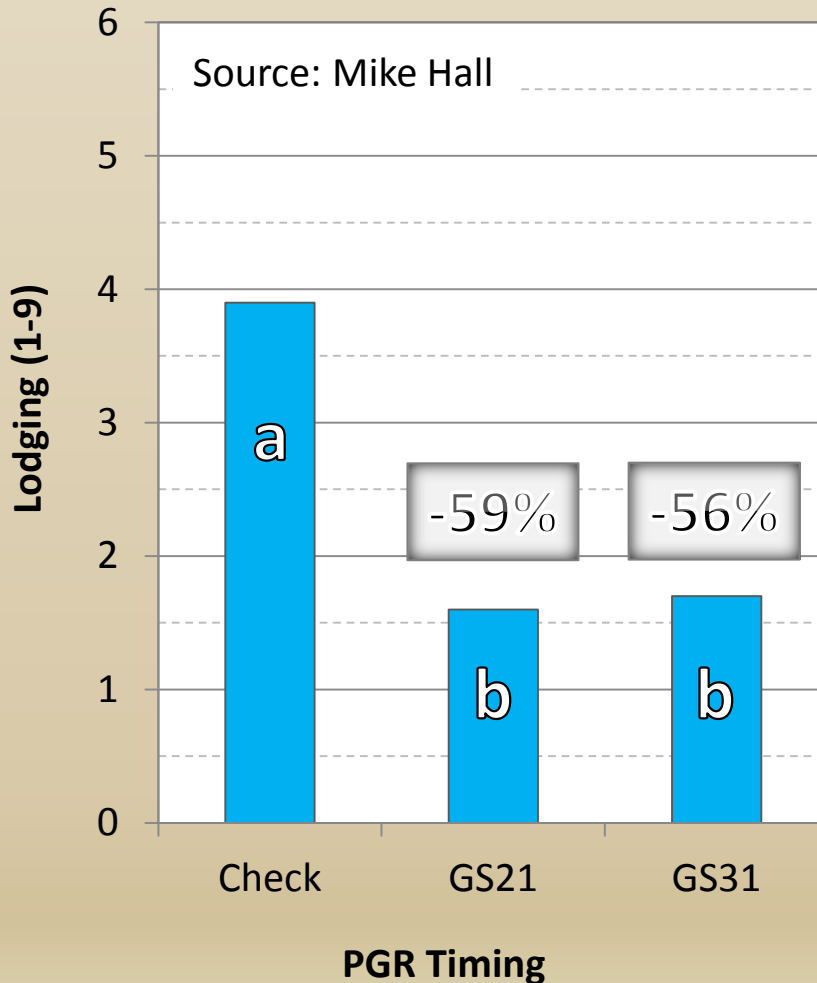
Indian Head 2015

PGR Timing & Fertility Effects on Protein

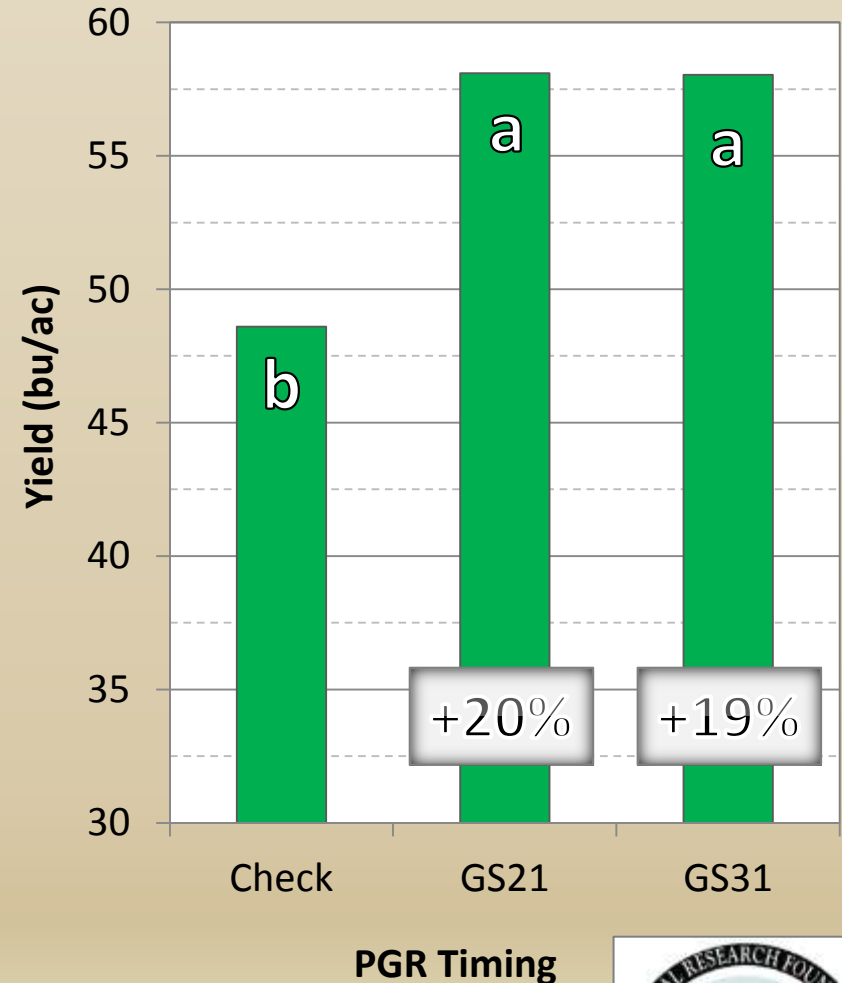


PGR Application Timing at Yorkton 2015

Effects on Lodging

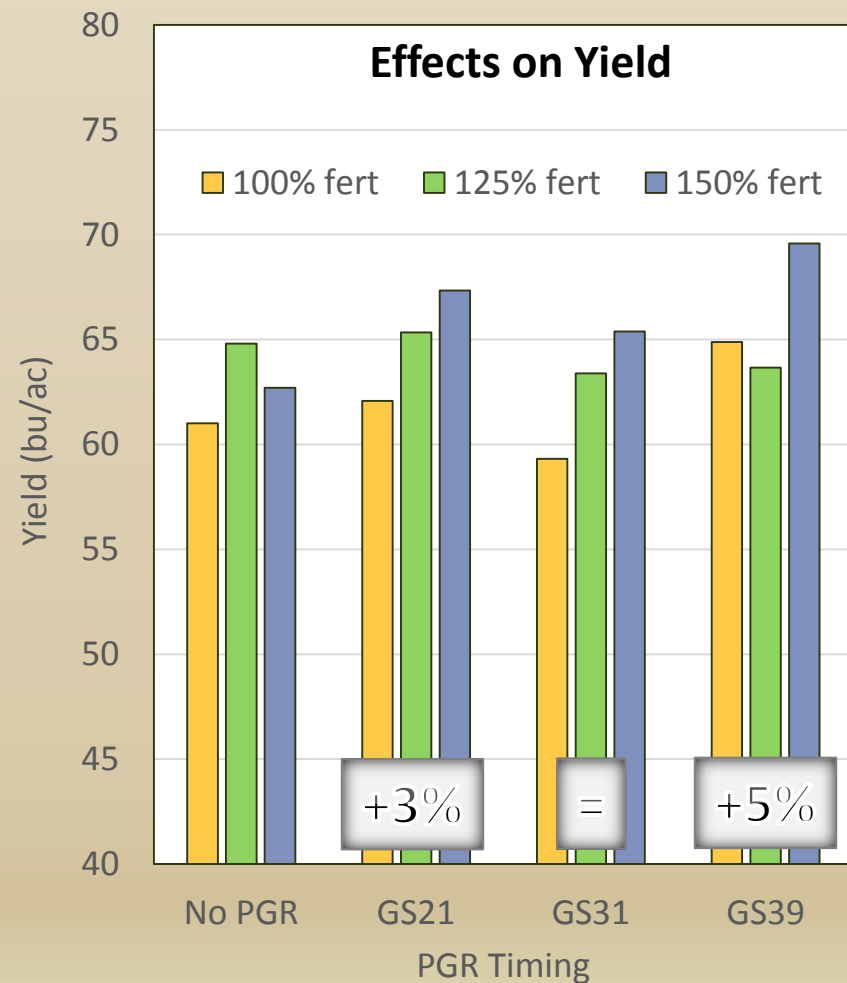


Effects on Grain Yield



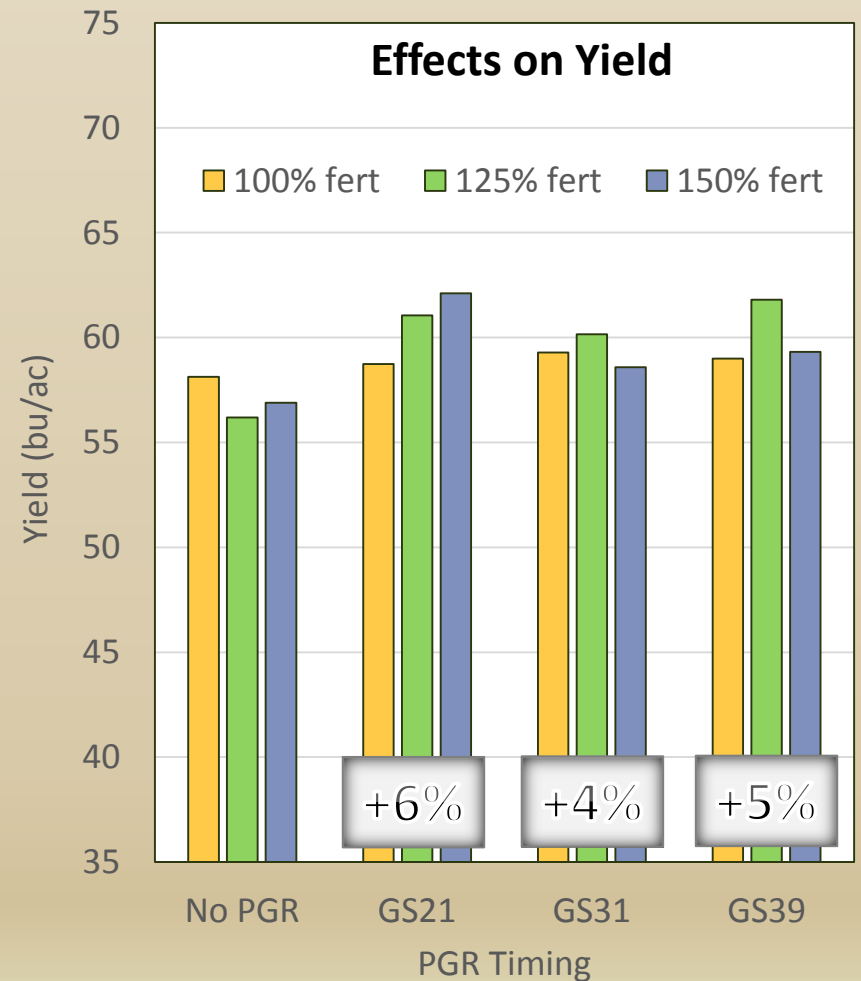
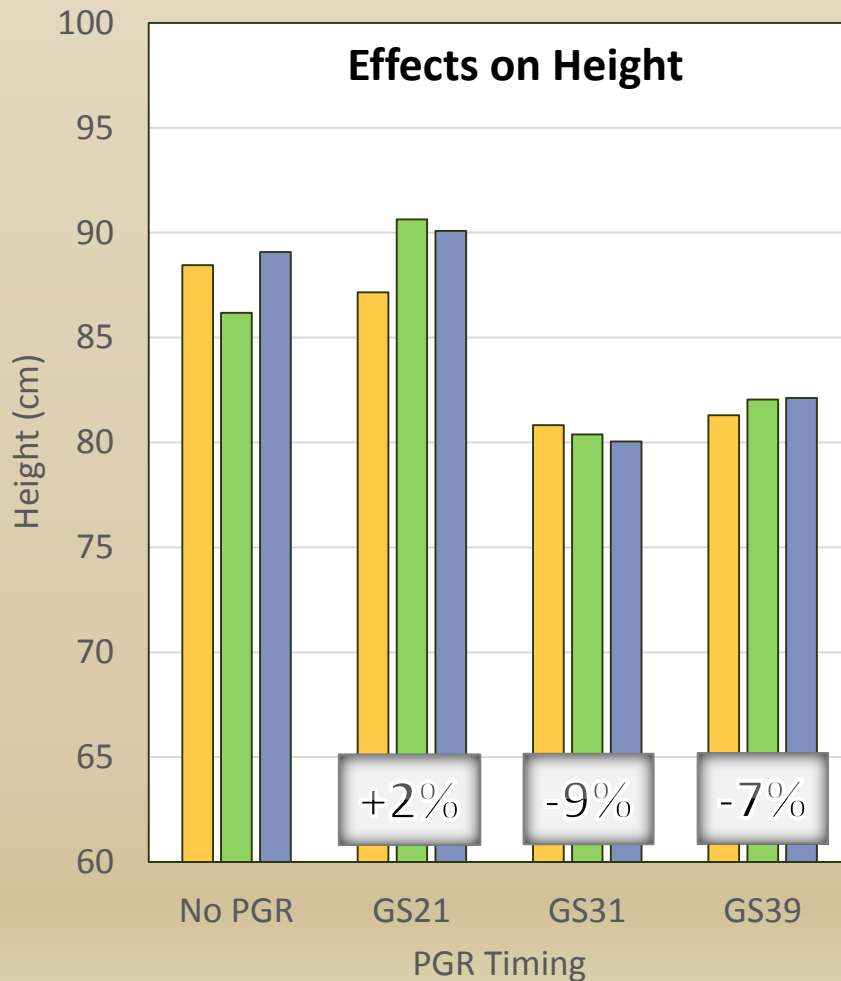
Melfort 2015 (Unity VB)

PGR Timing & Fertility



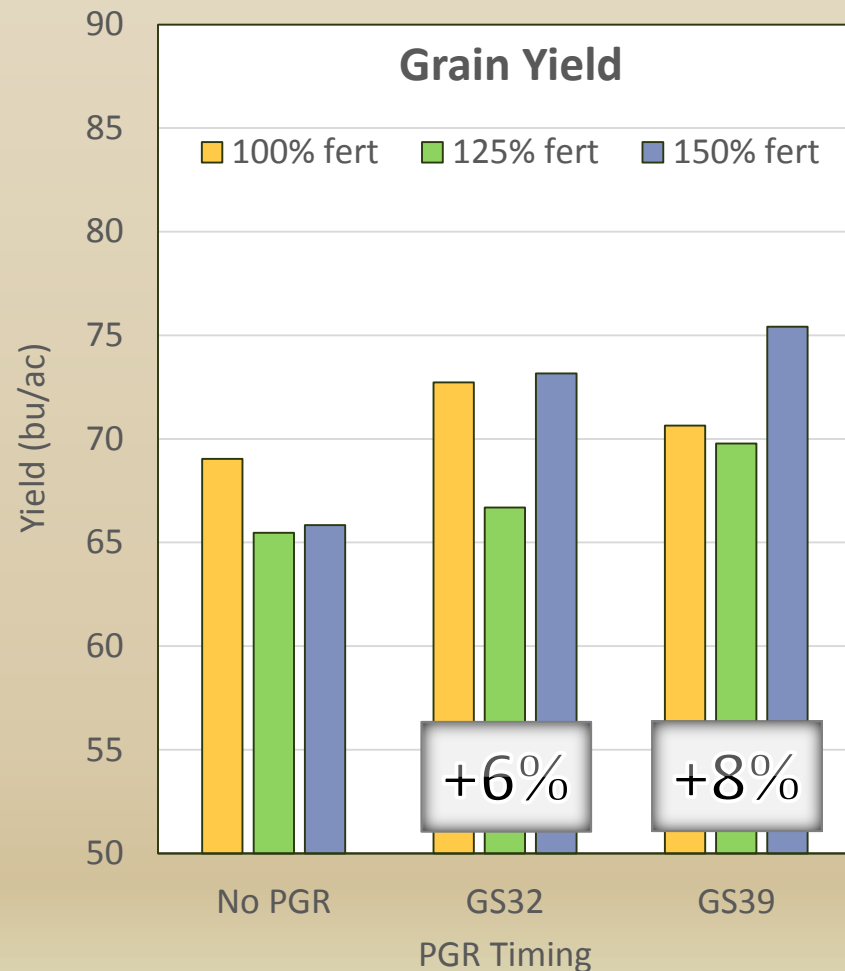
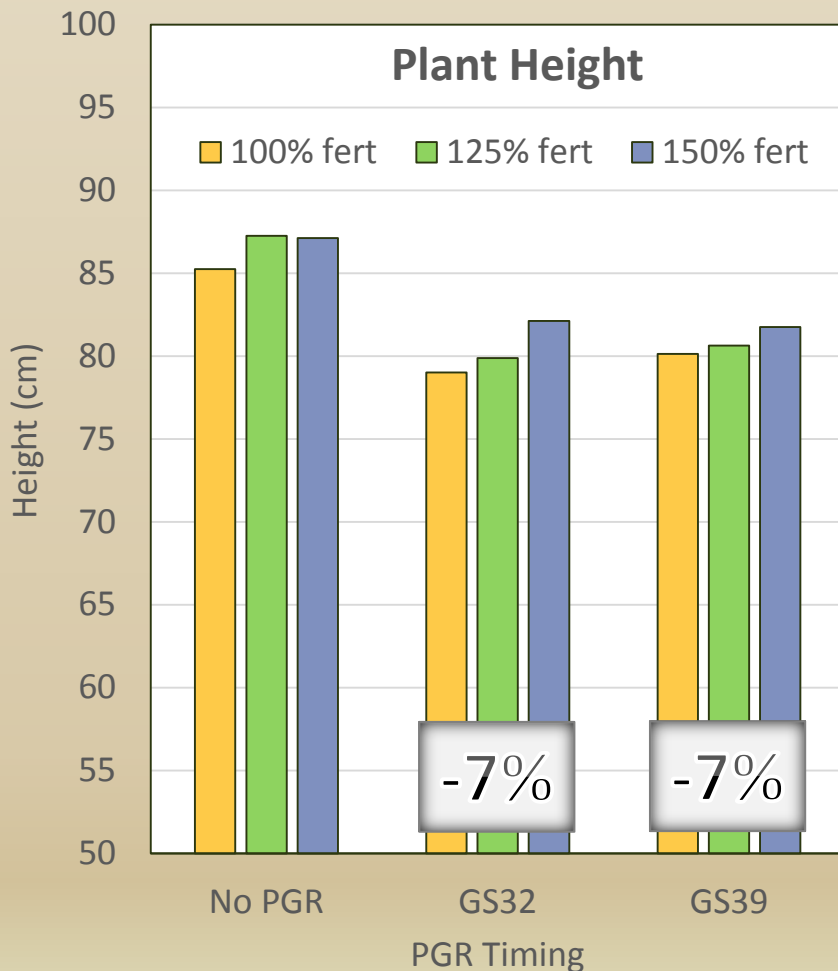
Scott 2015 (Shaw VB)

PGR Timing & Fertility



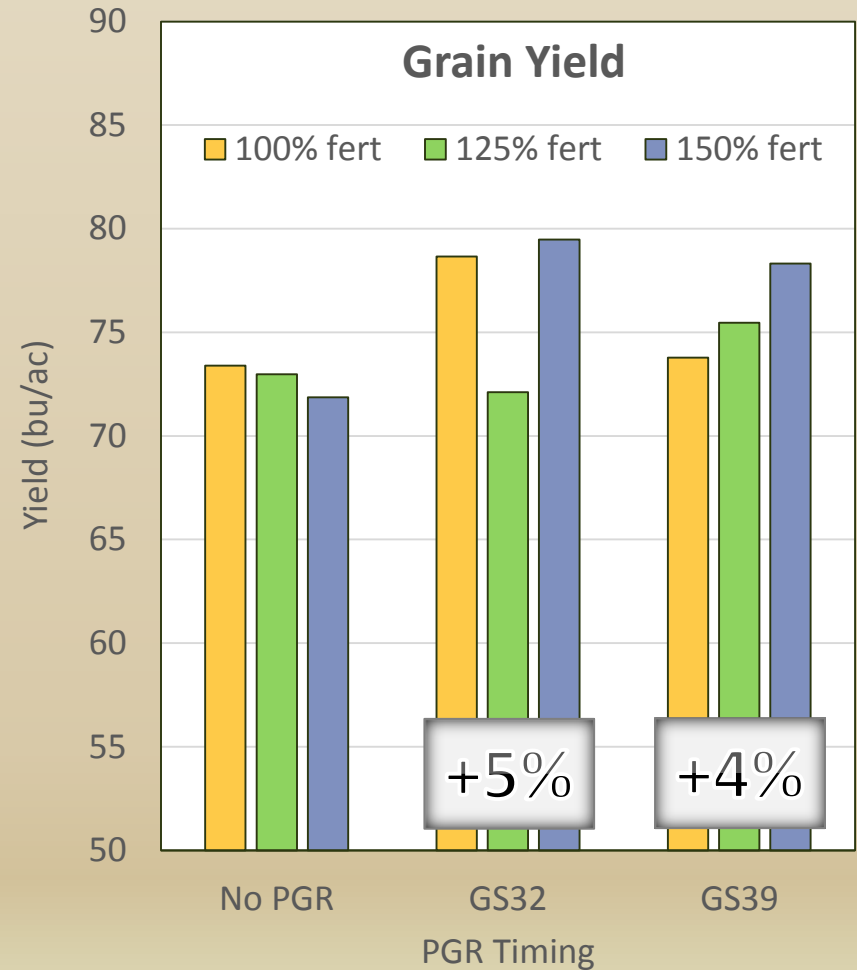
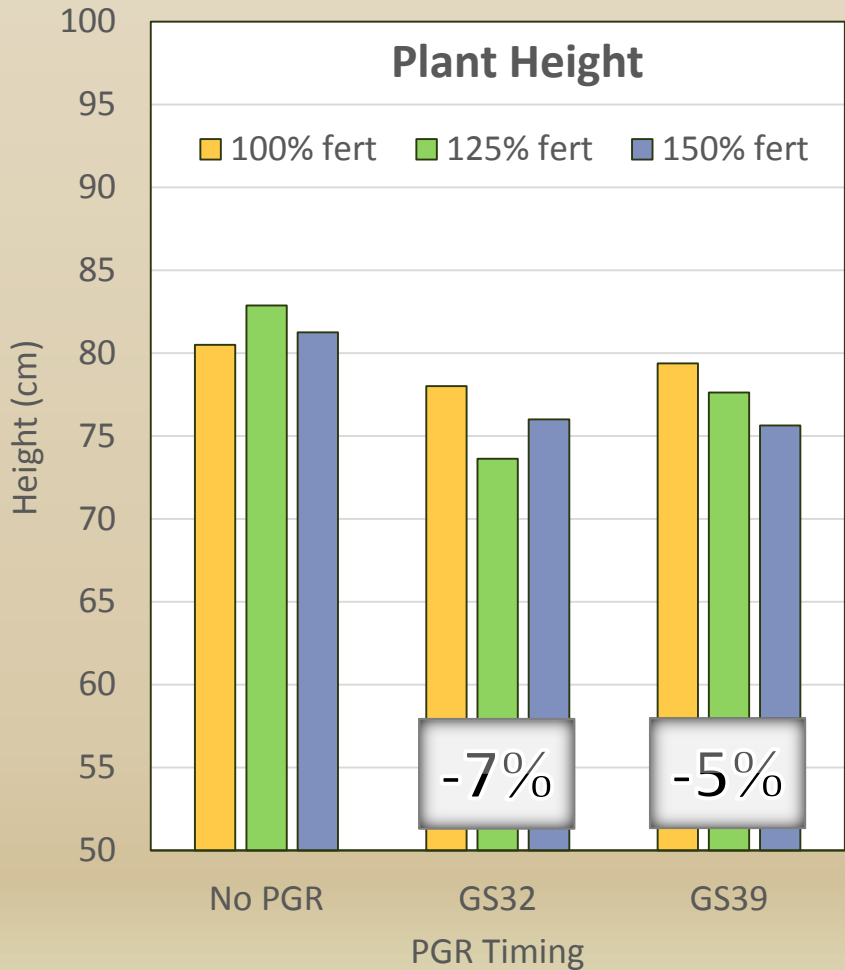
Outlook 2015 – Normal Irrigation (Unity VB)

PGR Timing & Fertility Effects on Height & Yield



Outlook 2015 – Intensive Irrigation (Unity VB)

PGR Timing & Fertility Effects on Height & Yield



2015 ADOPT Demos (Indian Head) PGR Response at Varying N & Seeding Rates

Objectives: To demonstrate the optimal N rates & seeding rates for wheat with & without PGR application

- Two separate replicated field trials
- Relatively dry season with shorter plants & little lodging but reasonably high yields
- Manipulator PGR applied at GS31-32

Nitrogen Rate Treatments

- 6, 45, 90, 134 or 178 lb N/ac

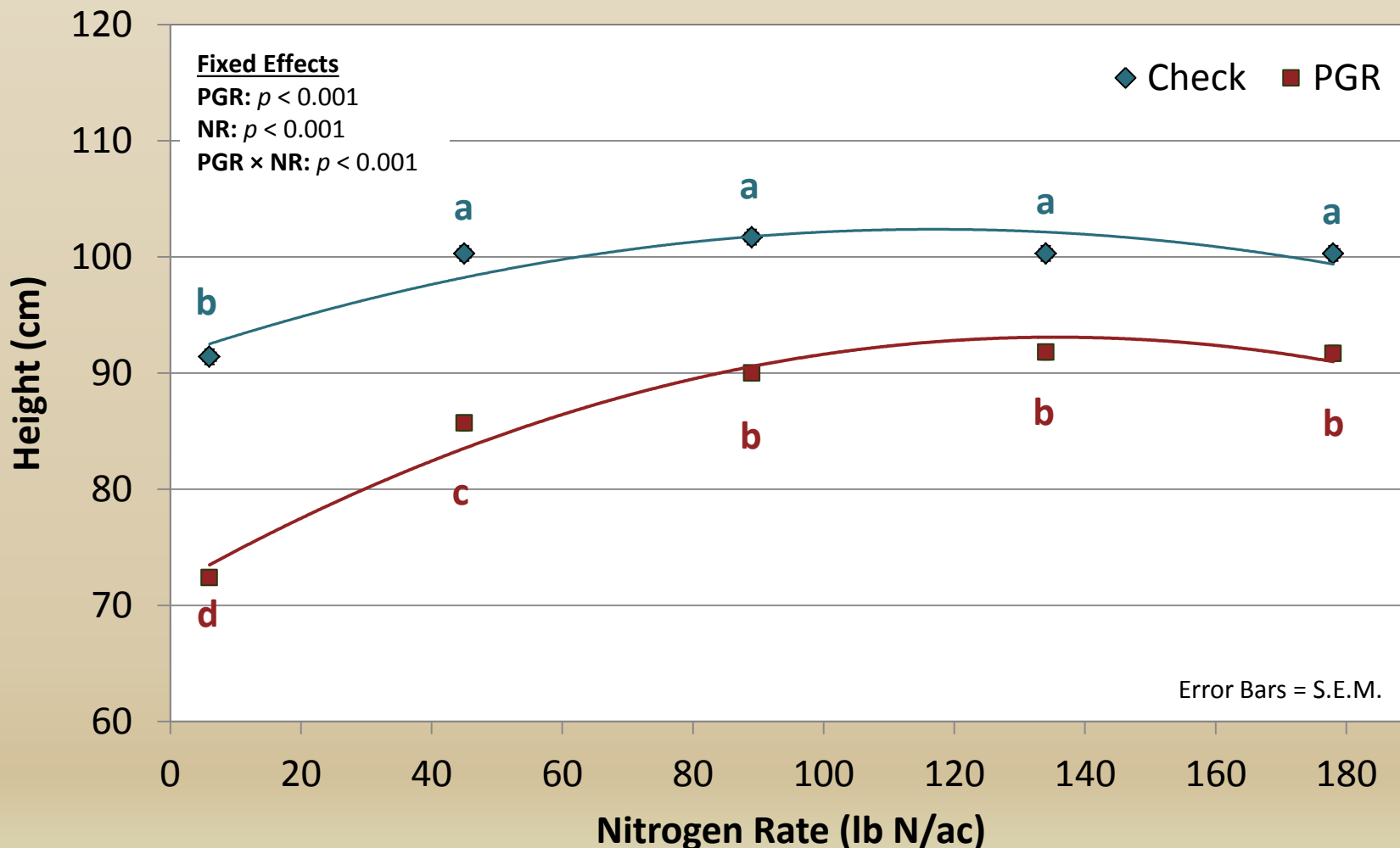
Seeding Rate Treatments

- 100, 200, 300, 400 & 500 seeds/m²

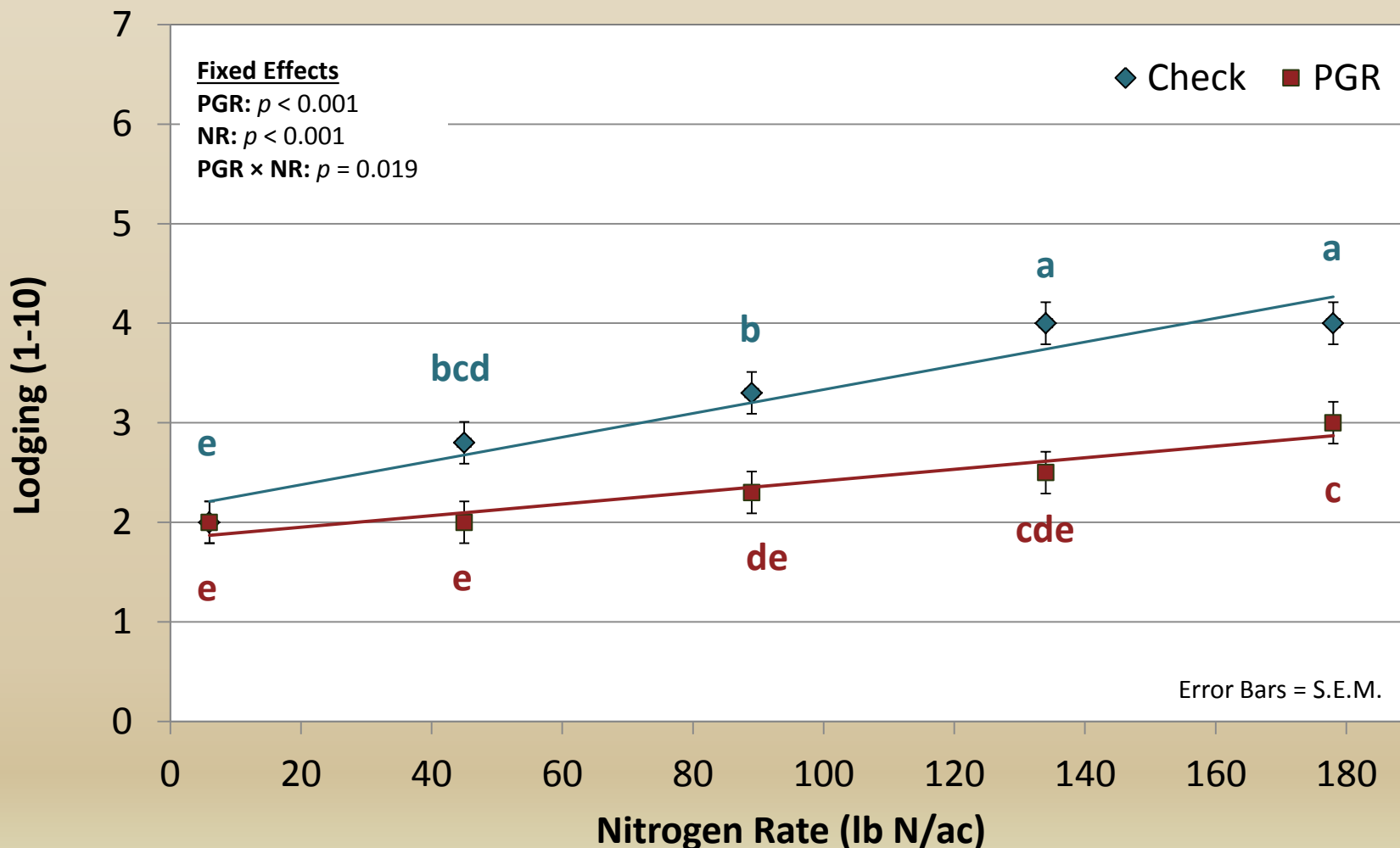


PGR x N Fertilizer Rate

Effects on Plant Height (IH 2015)

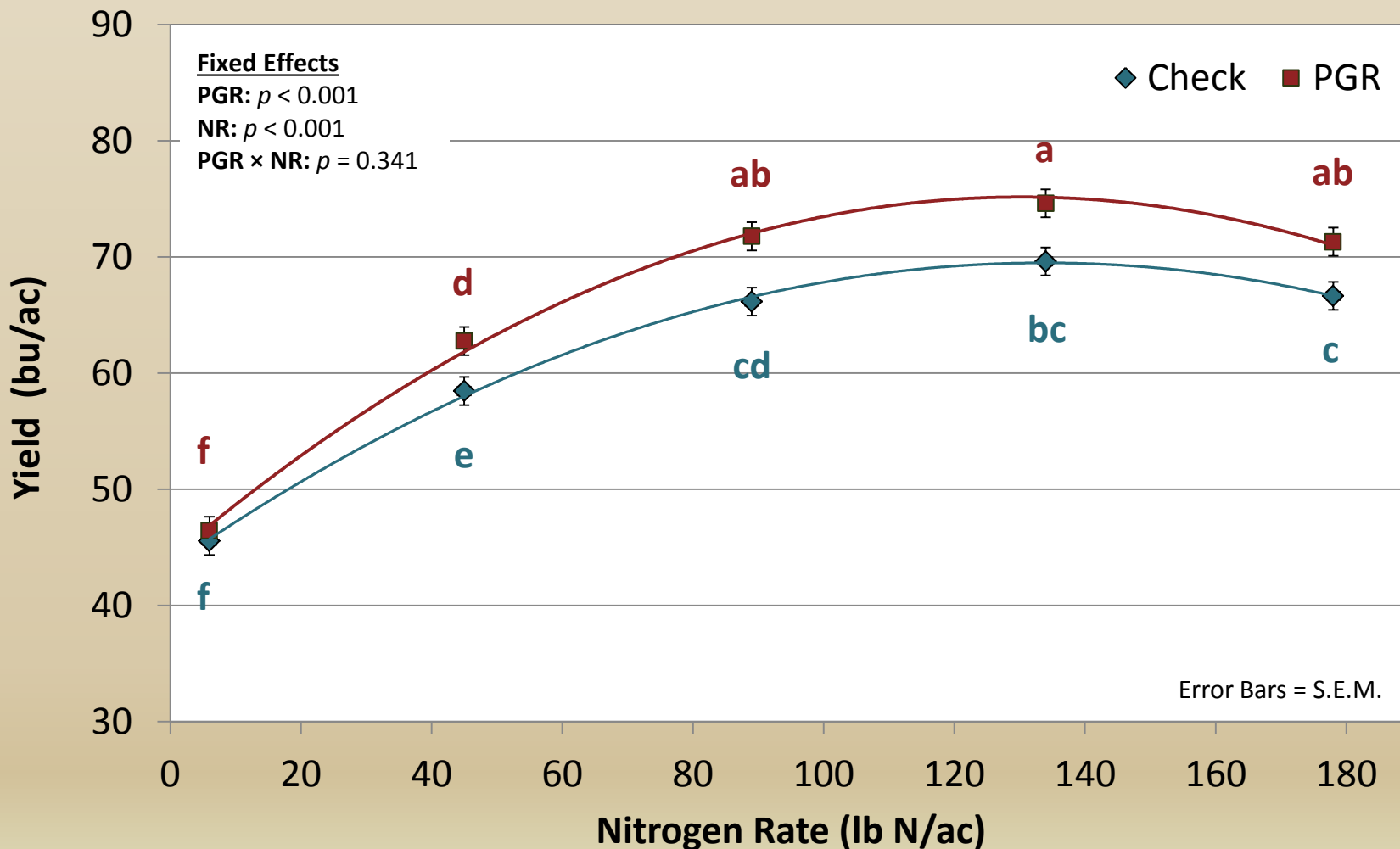


PGR x N Fertilizer Rate Effects on Lodging (IH 2015)



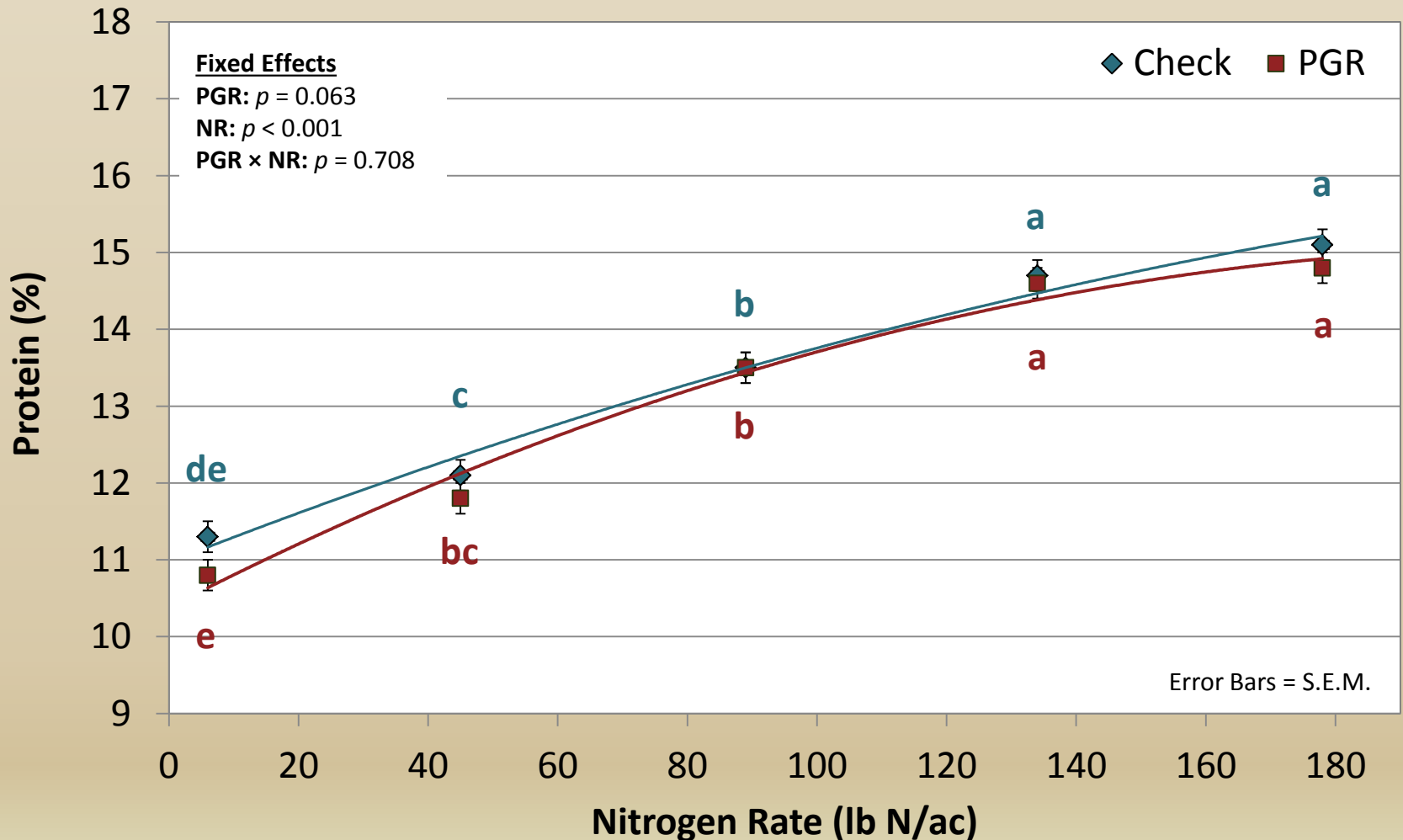
PGR x N Fertilizer Rate

Effects on Grain Yield (IH 2015)



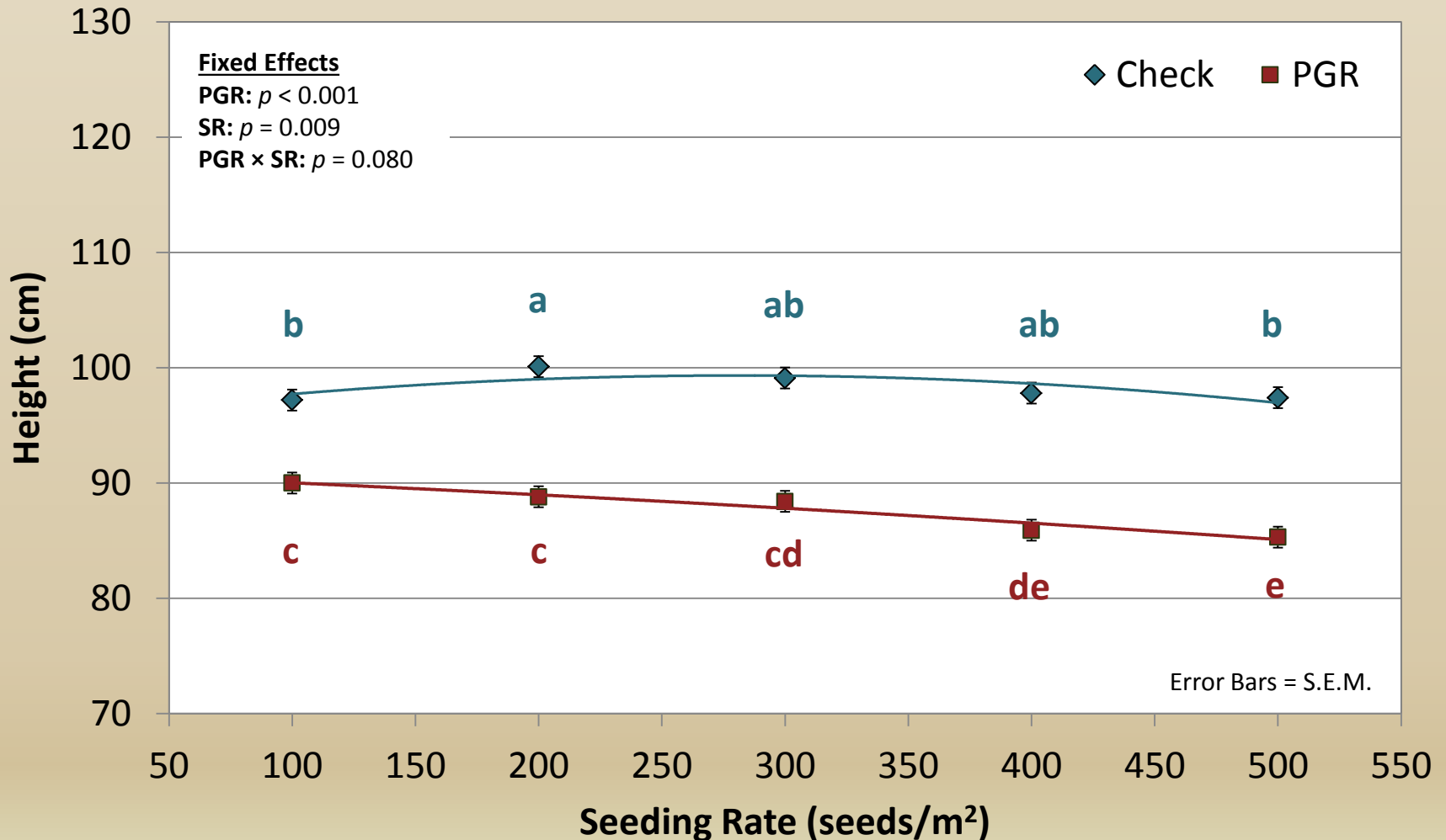
PGR x N Fertilizer Rate

Effects on Grain Protein (IH 2015)

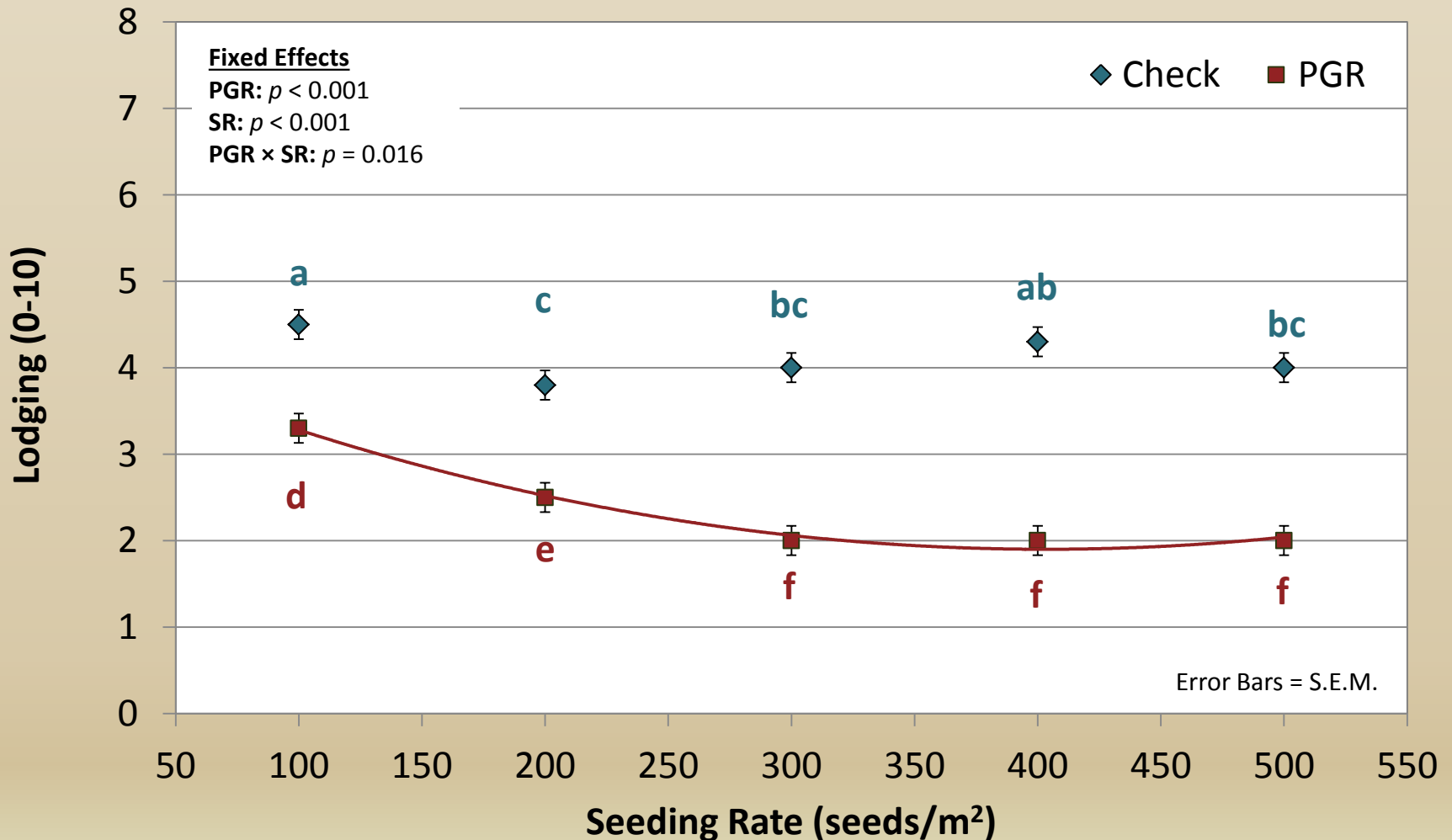


PGR x Seeding Rate

Effects on Plant Height (IH 2015)

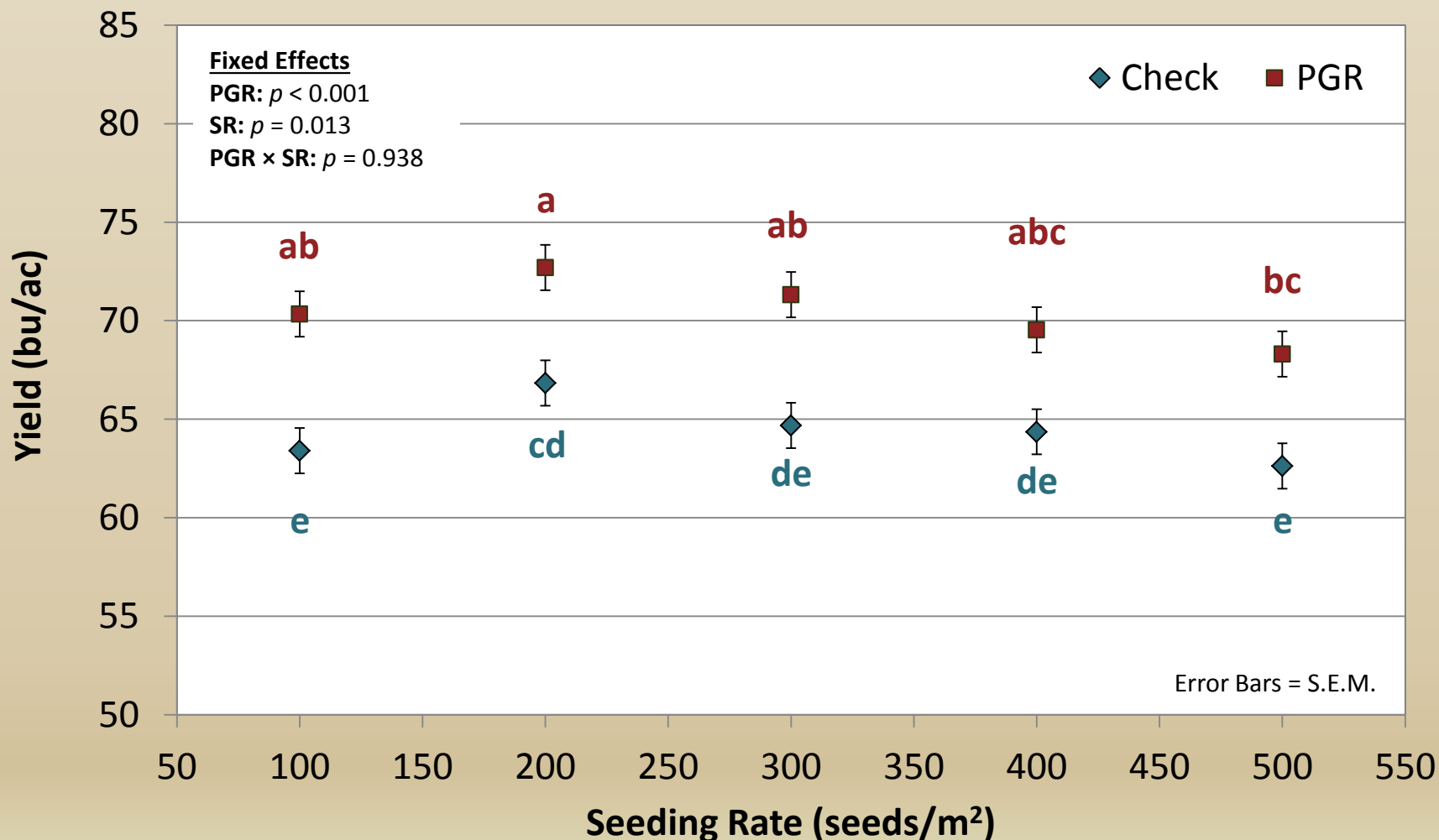


PGR x Seeding Rate Effects on Lodging (IH 2015)



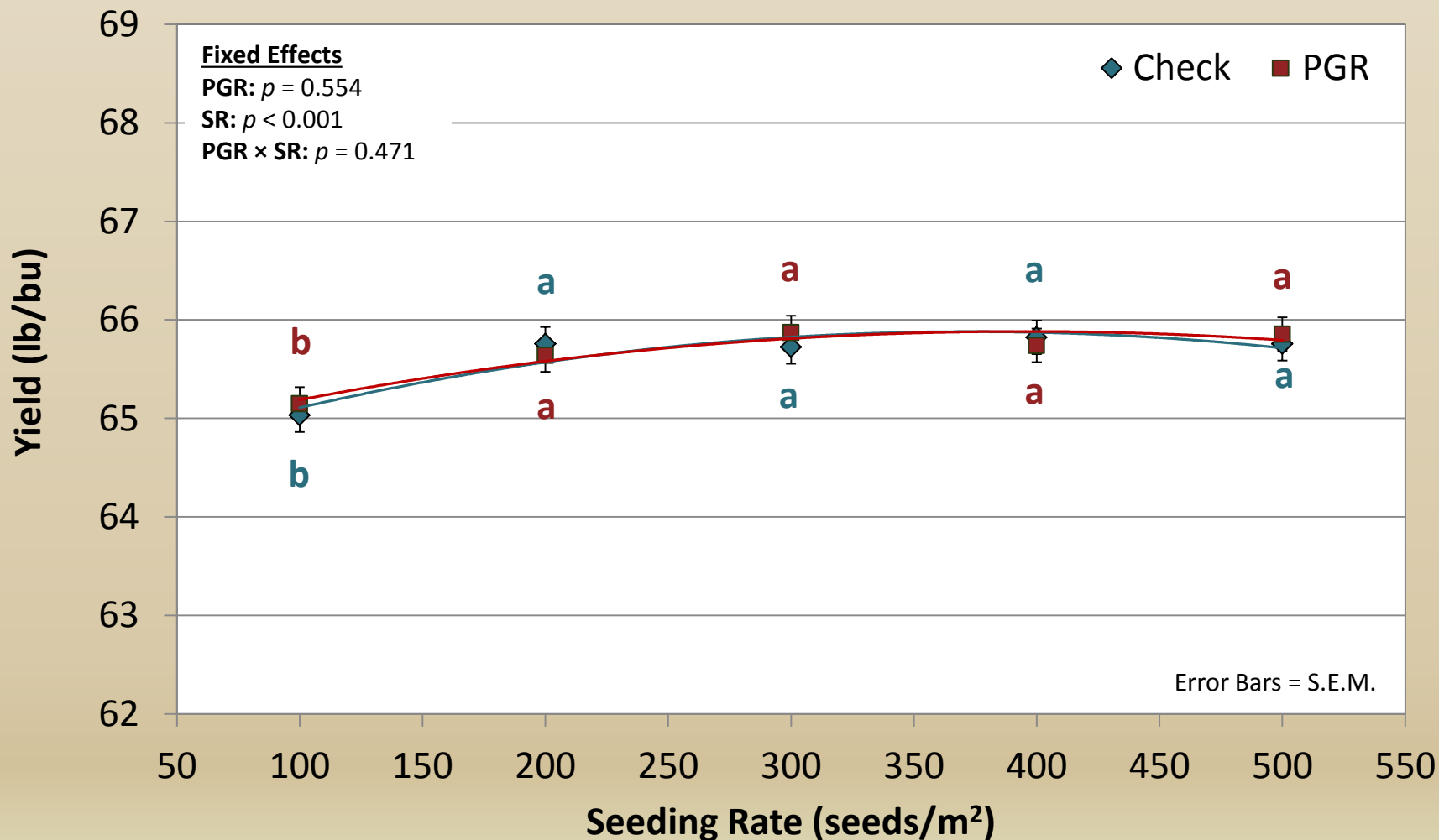
PGR x Seeding Rate

Effects on Grain Yield (IH 2015)



PGR x Seeding Rate

Effects on Test Weight (IH 2015)



PGR Effects Across Varieties & Classes Indian Head 2016-17

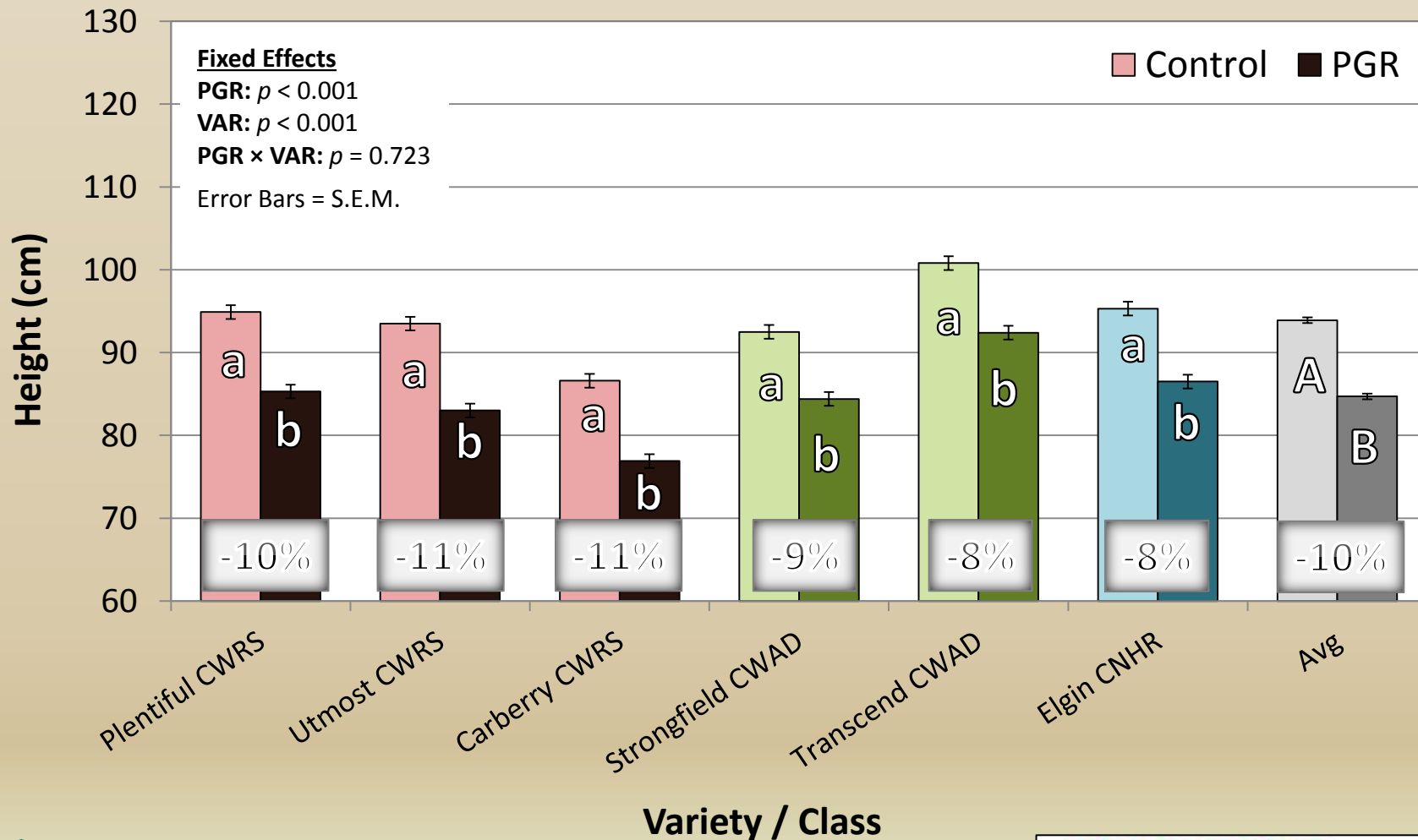
Objectives: To investigate differences amongst wheat varieties & classes in responsiveness to Manipulator

- 6 varieties across 3 classes (CWRS, CNHR & CWAD), varieties varied from year-to-year
- 350 seeds/m² seeding rate, 125-36-18-18 lb/ac N-P₂O₅-K₂O-S, fungicide applied at both T2 & T3
- Wet with heavy lodging & disease pressure in 2016, much drier in 2017 with very little lodging but high yield potential
- Targeted GS31-32 for treatment application



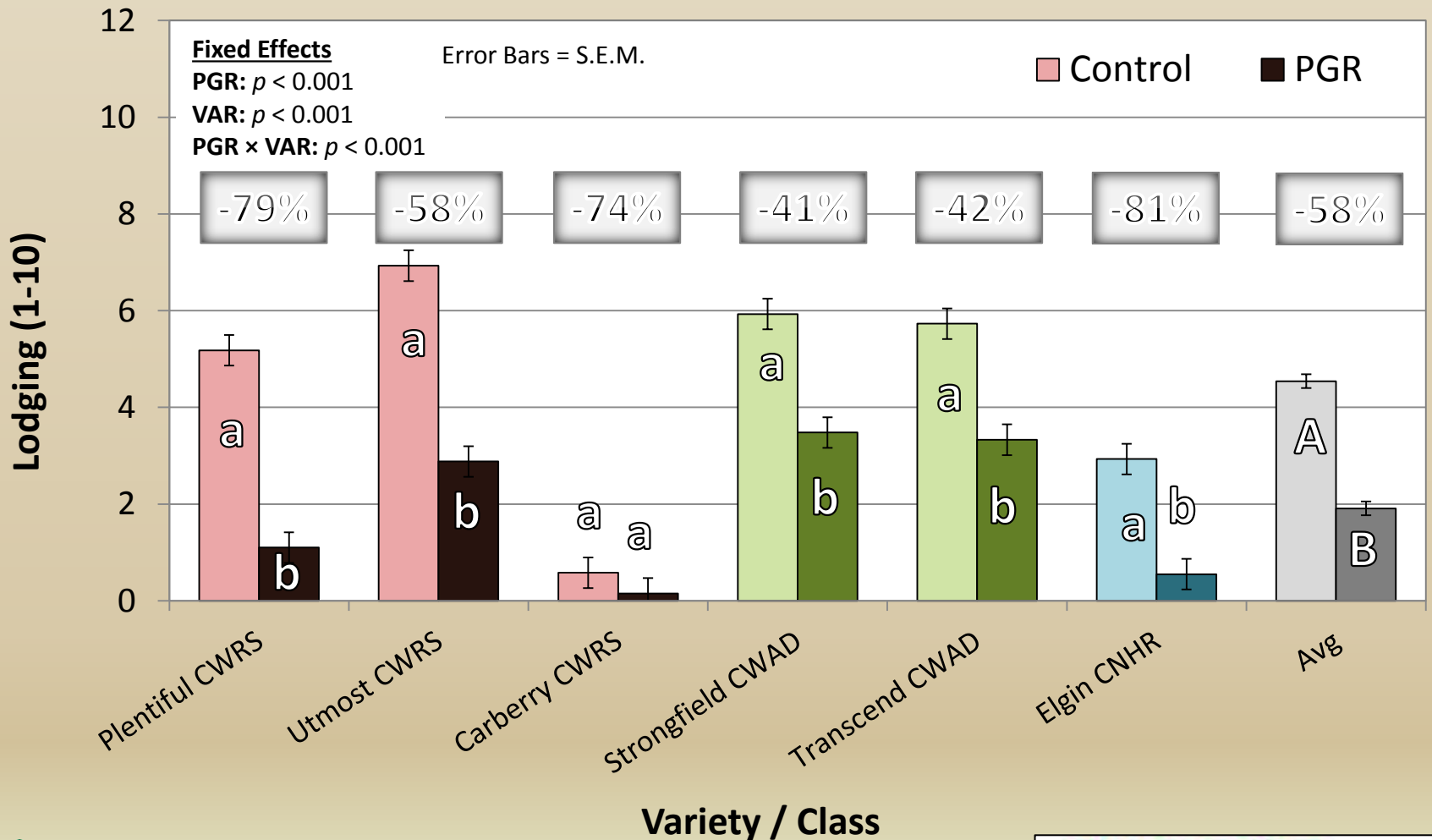
PGR x Variety – IH 2016 (wet)

Effects on Plant Height

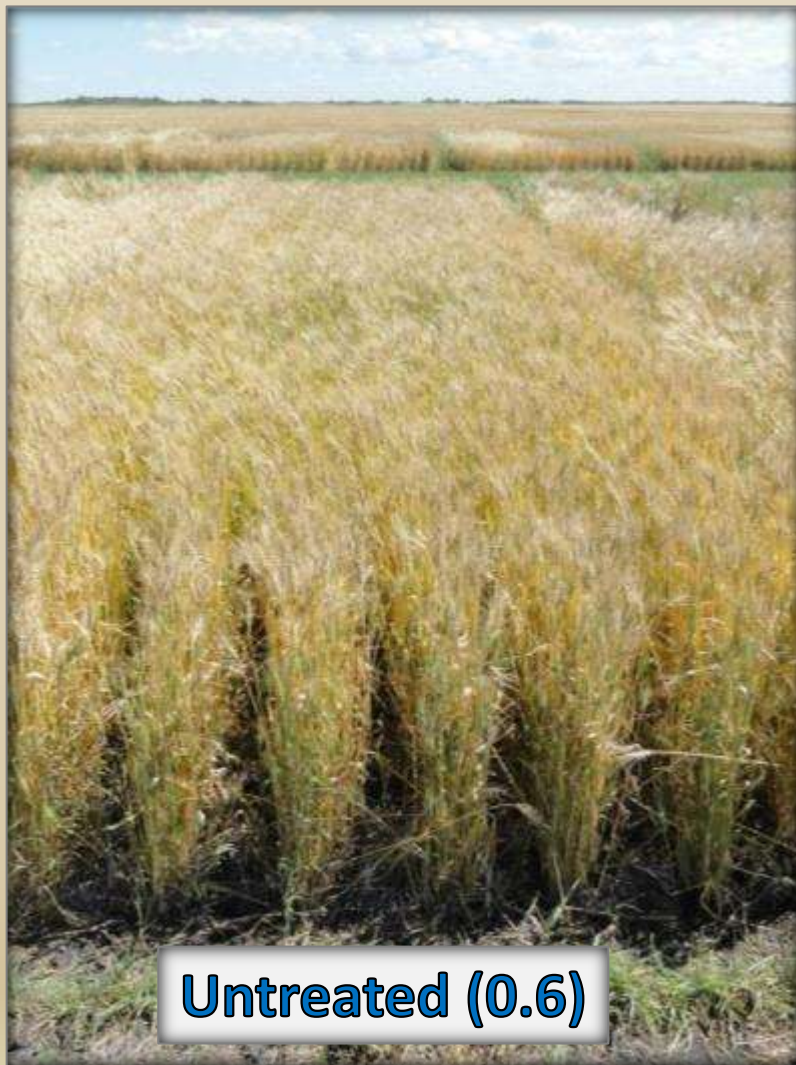


PGR x Variety – IH 2016 (wet)

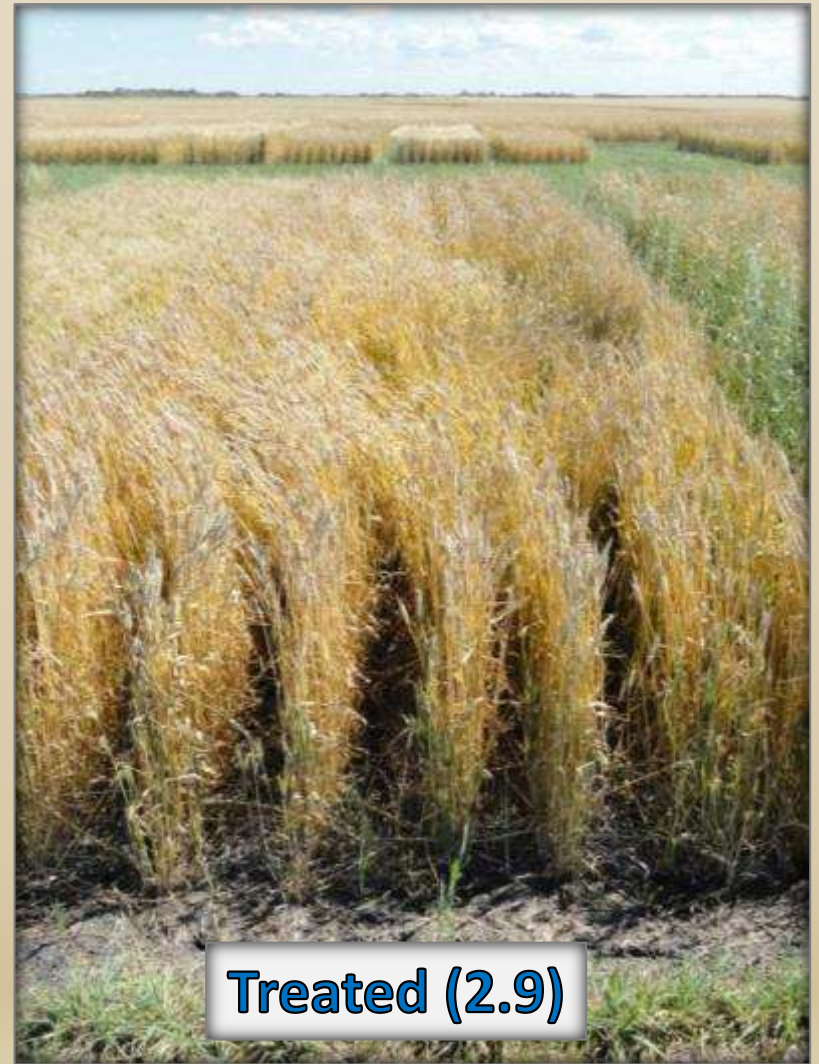
Effects on Lodging



AC Carberry – August 18, 2016

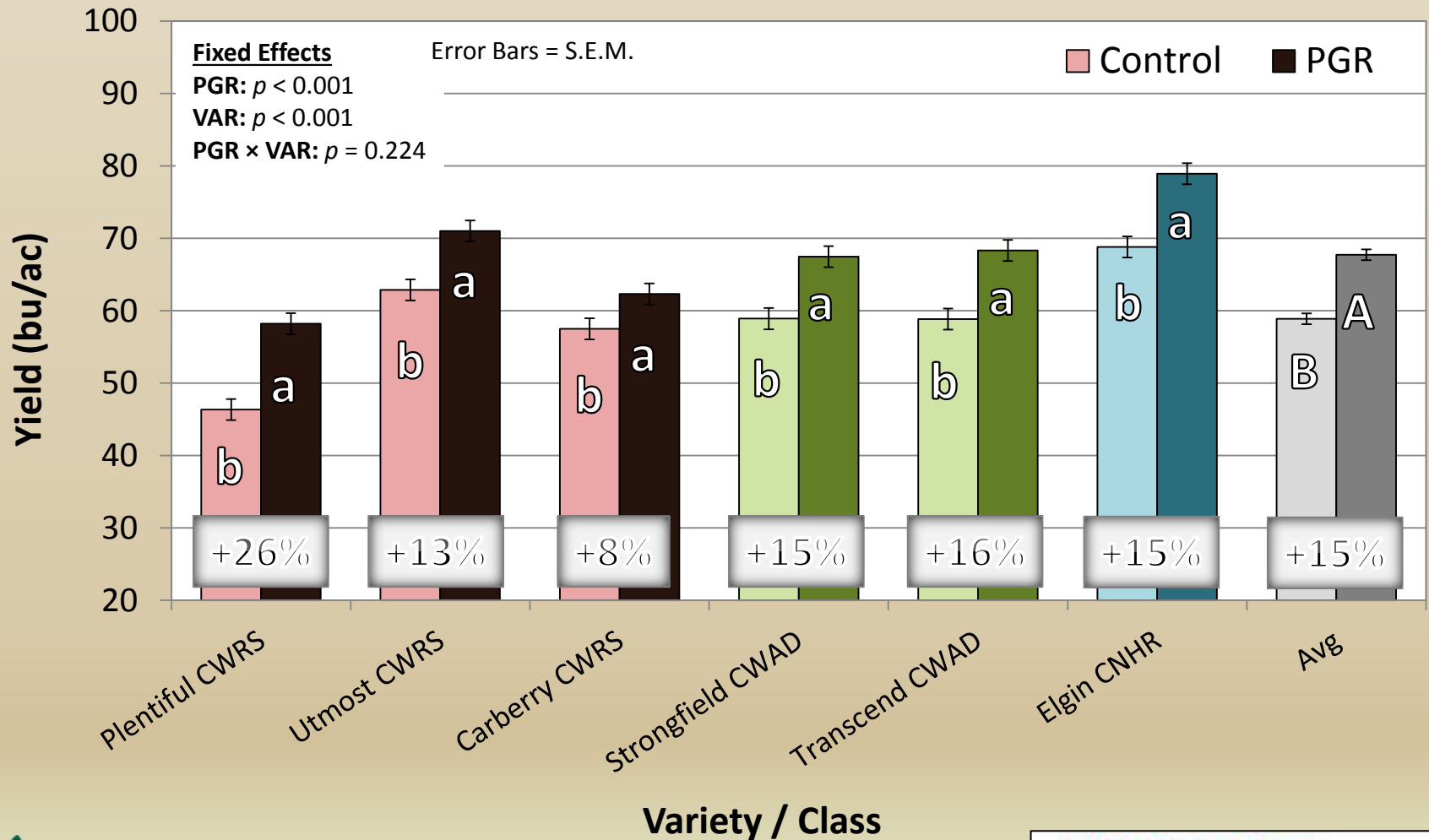


CDC Utmost VB – August 18, 2016



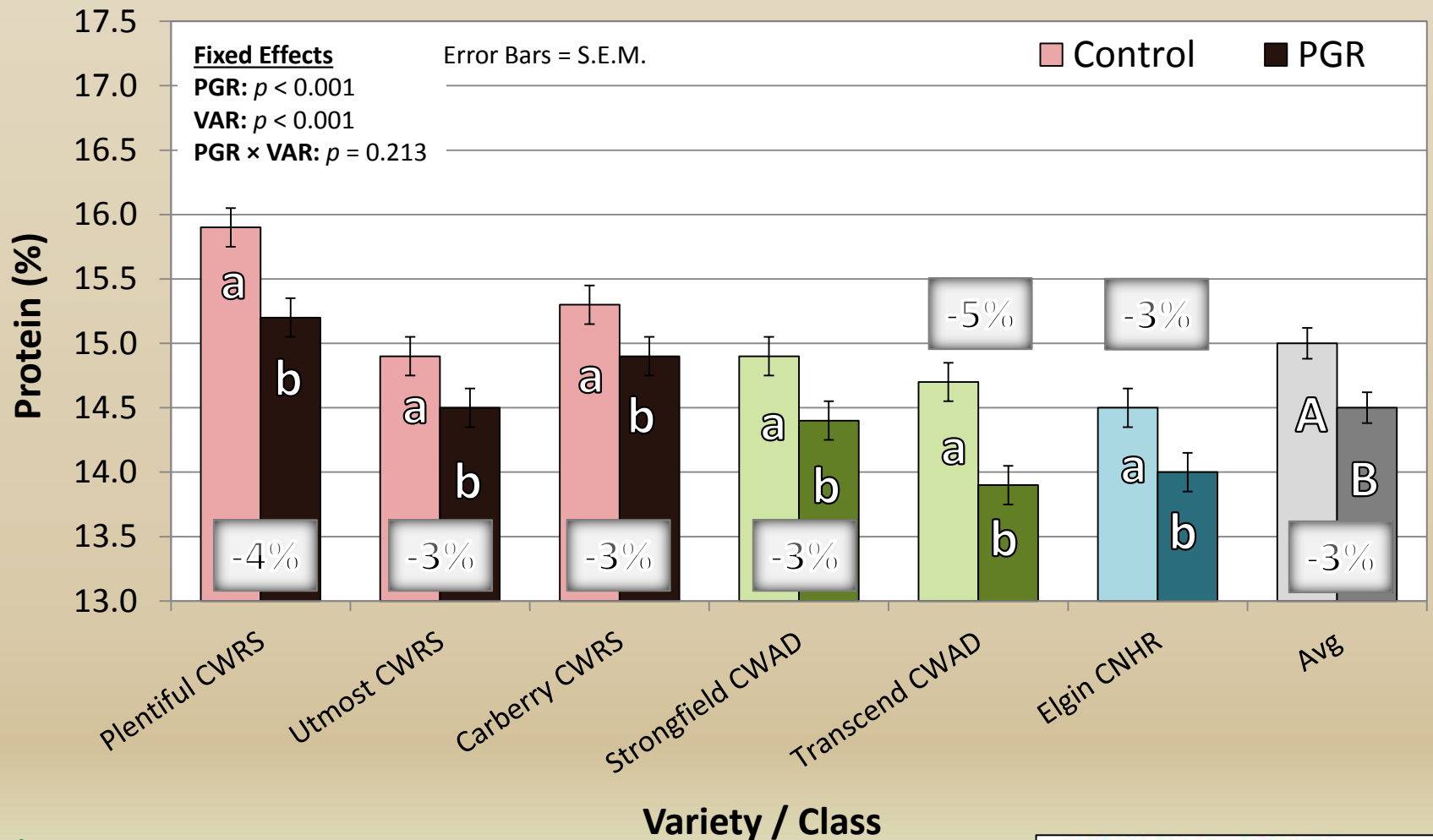
PGR x Variety – IH 2016 (wet)

Effects on Grain Yield



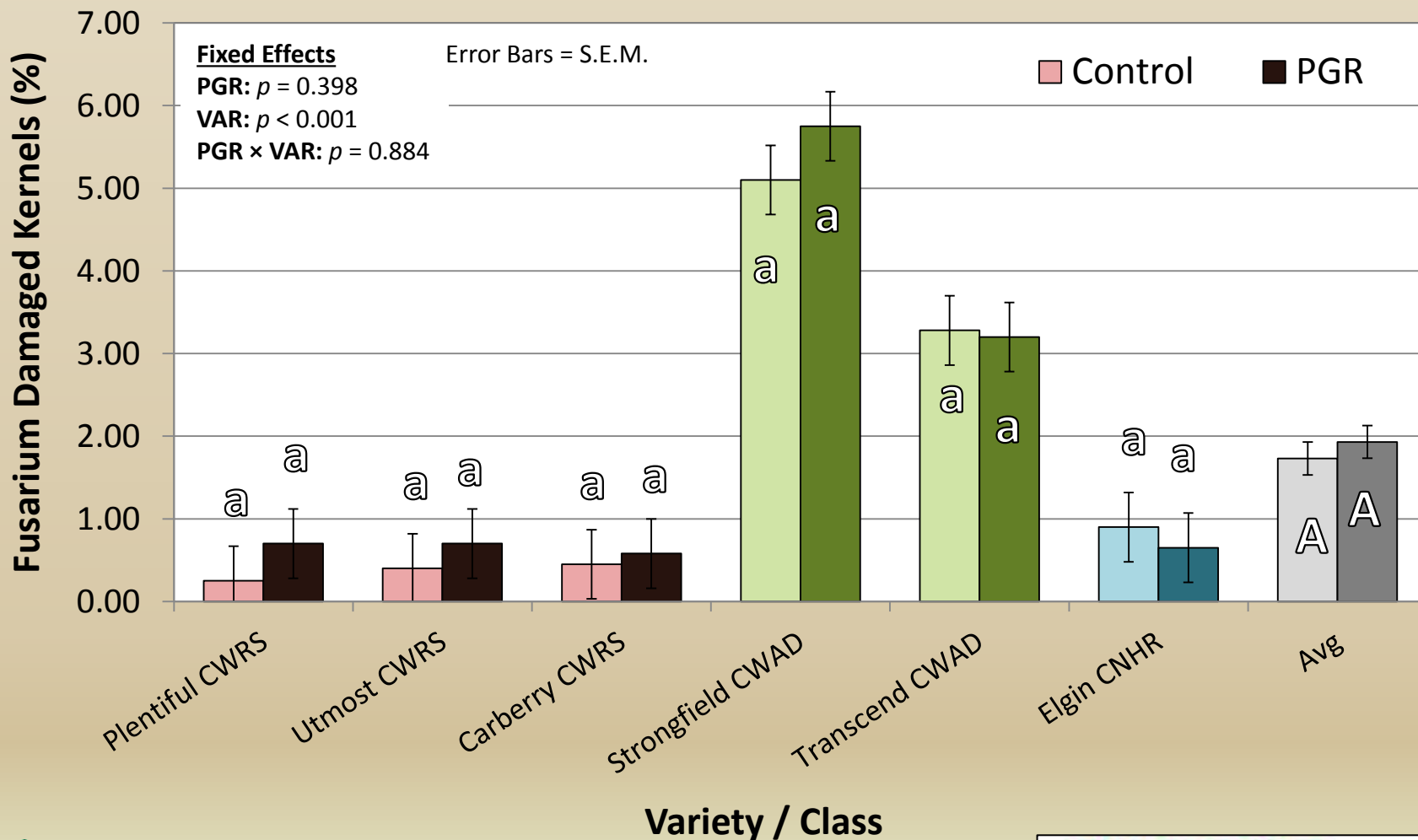
PGR x Variety – IH 2016 (wet)

Effects on Grain Protein



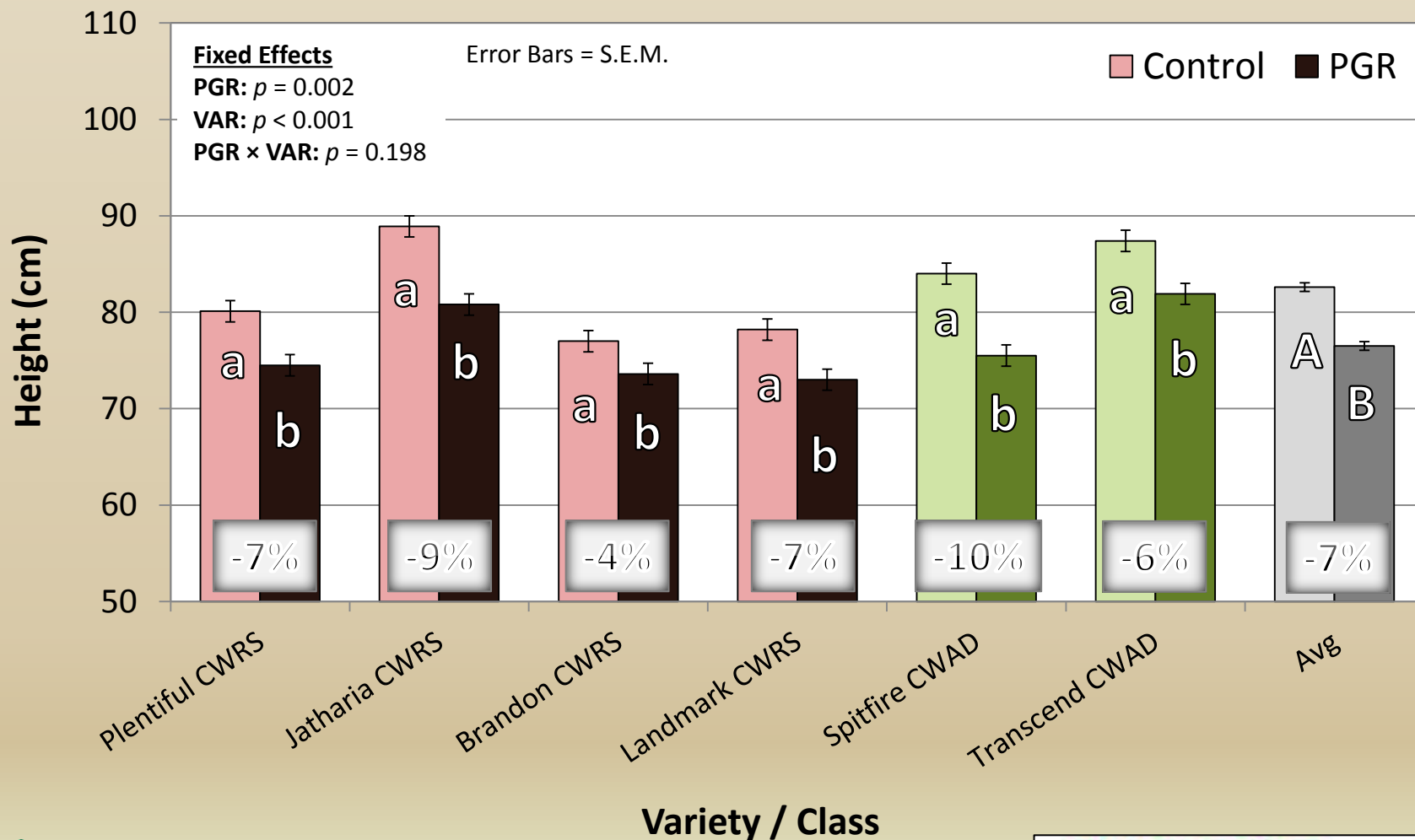
PGR x Variety – IH 2016 (wet)

Effects on Fusarium Damaged Kernels



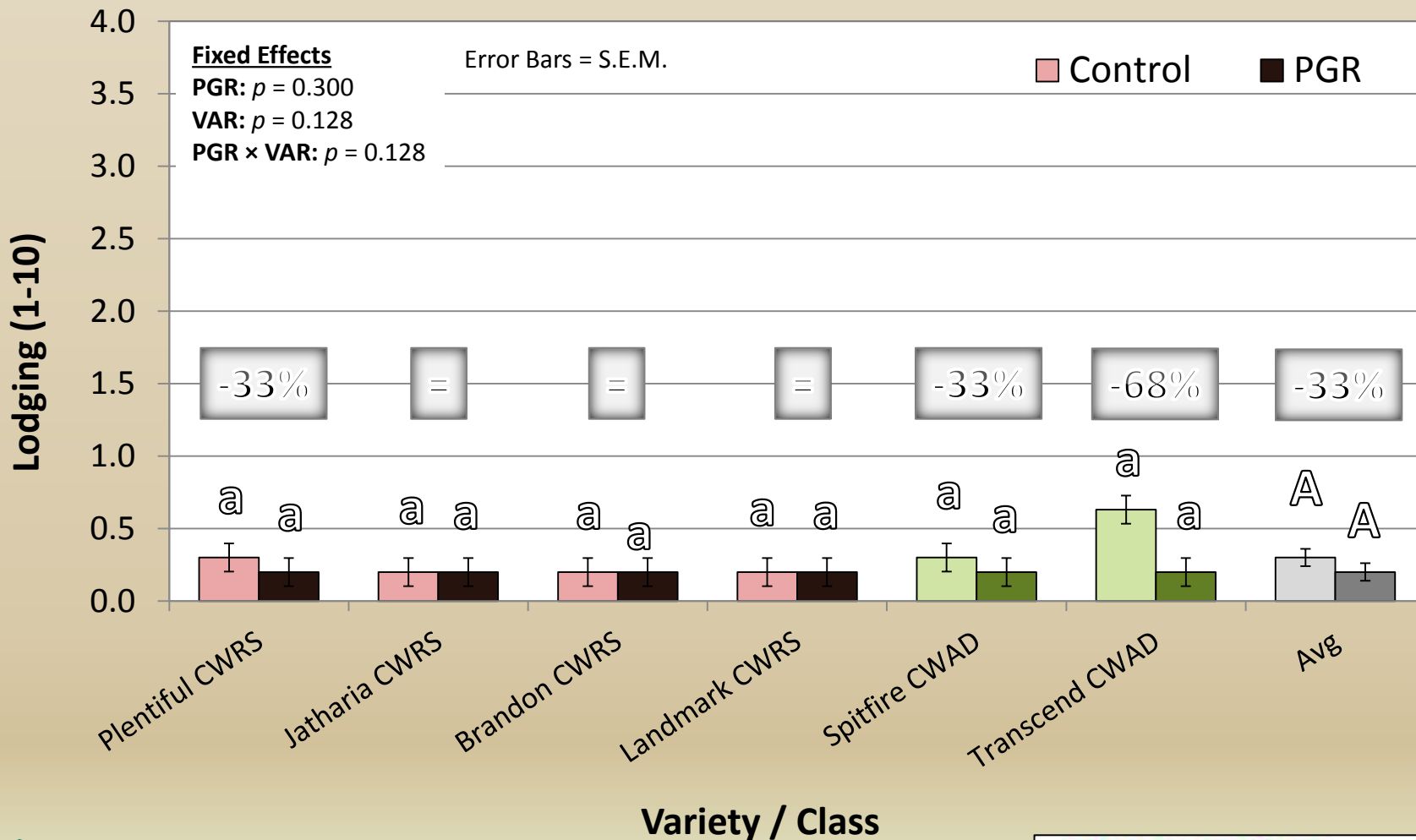
PGR x Variety – IH 2017 (dry)

Effects on Plant Height



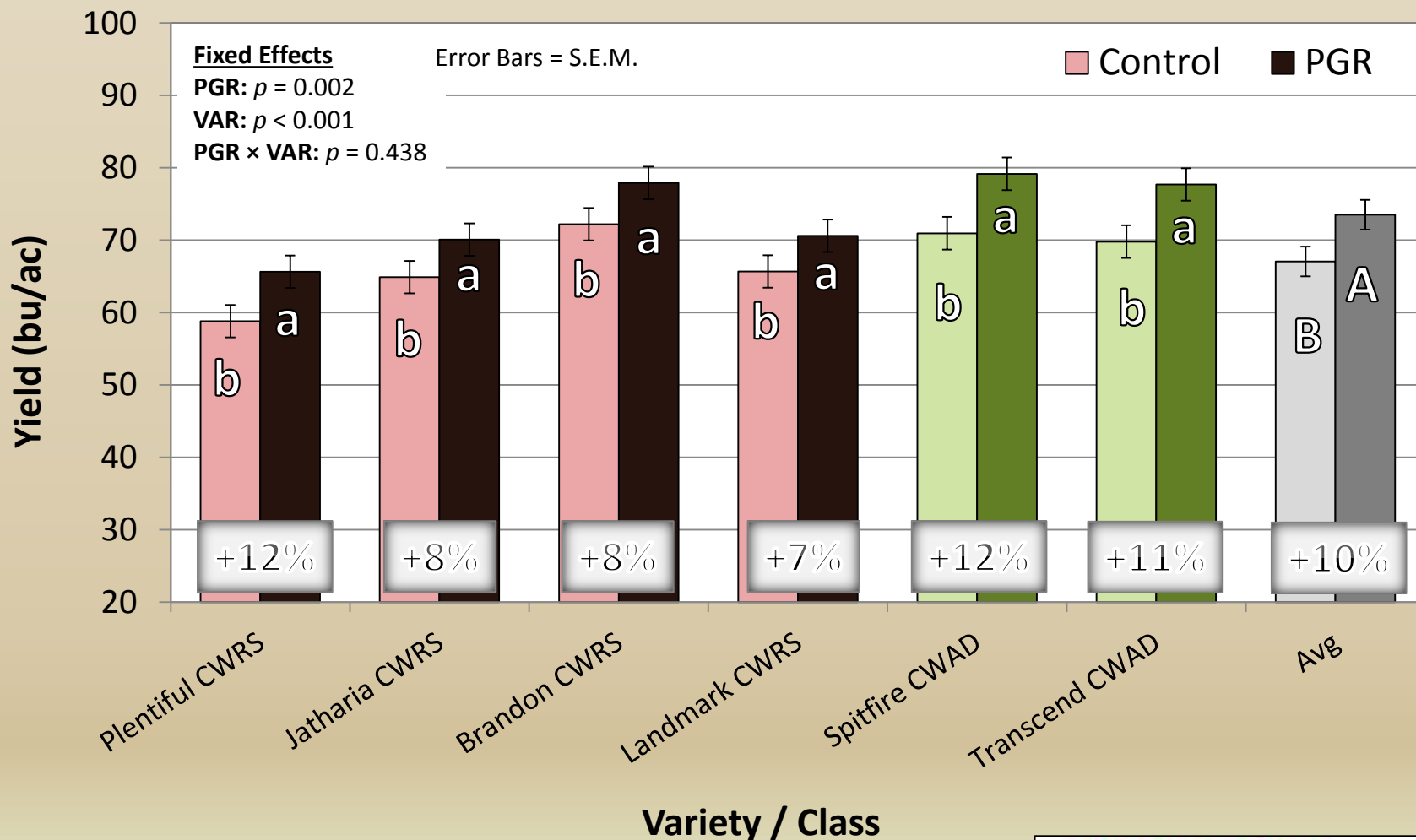
PGR x Variety – IH 2017 (dry)

Effects on Lodging



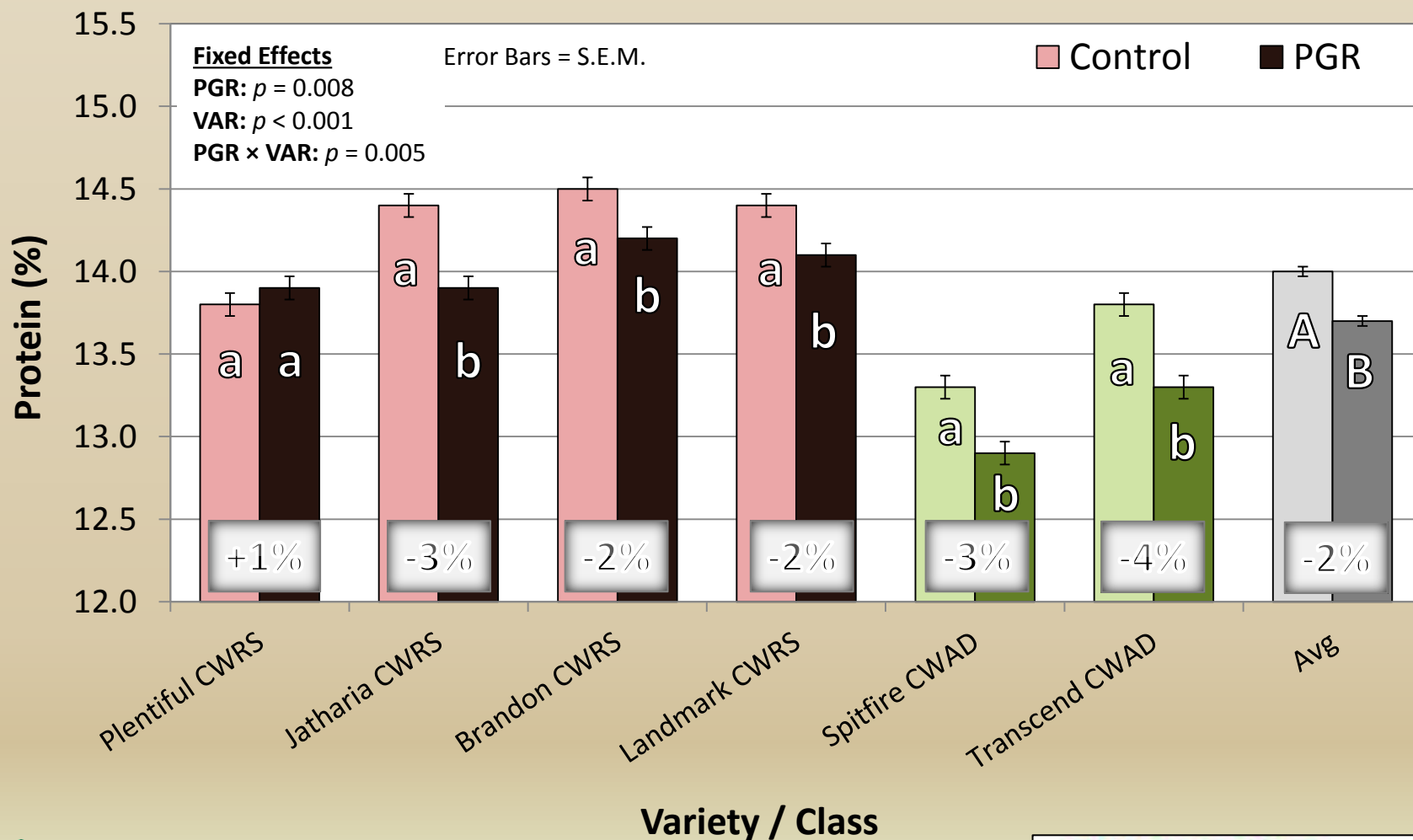
PGR x Variety – IH 2017 (dry)

Effects on Grain Yield



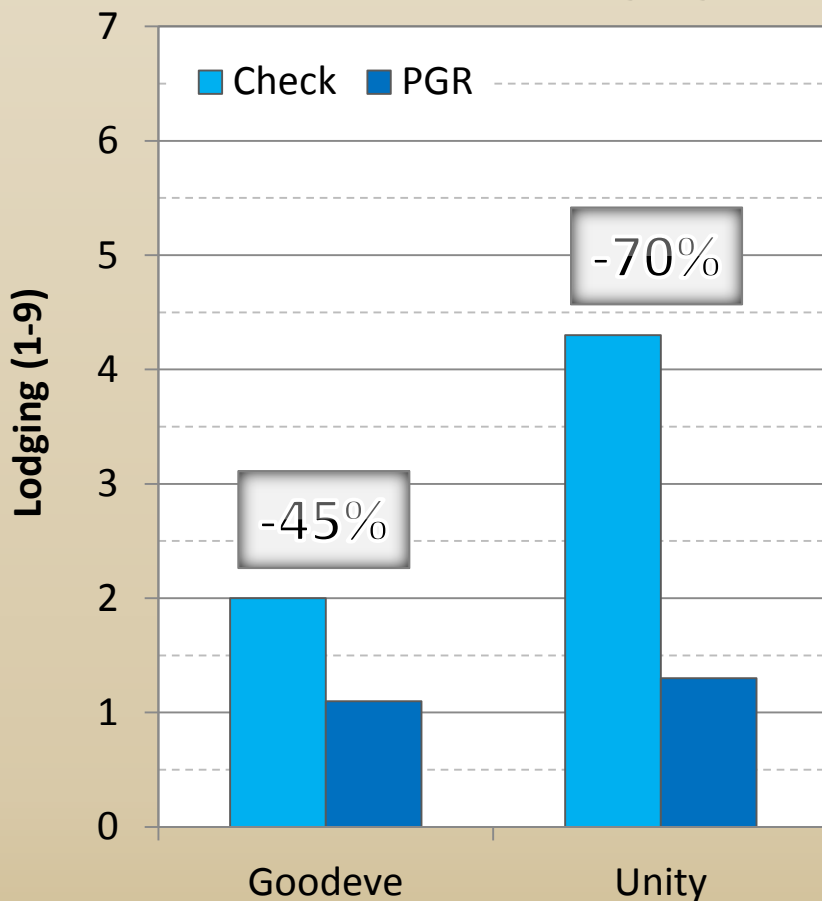
PGR x Variety – IH 2017 (dry)

Effects on Grain Protein



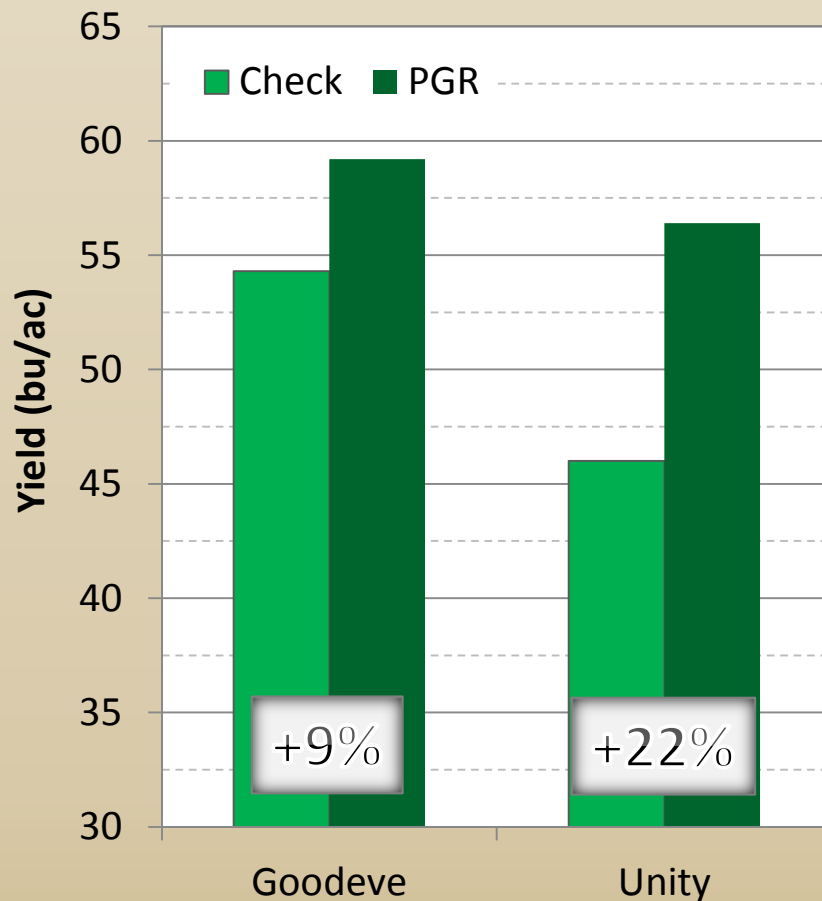
PGR × Variety at Yorkton 2015

Effects on Lodging



PGR Timing

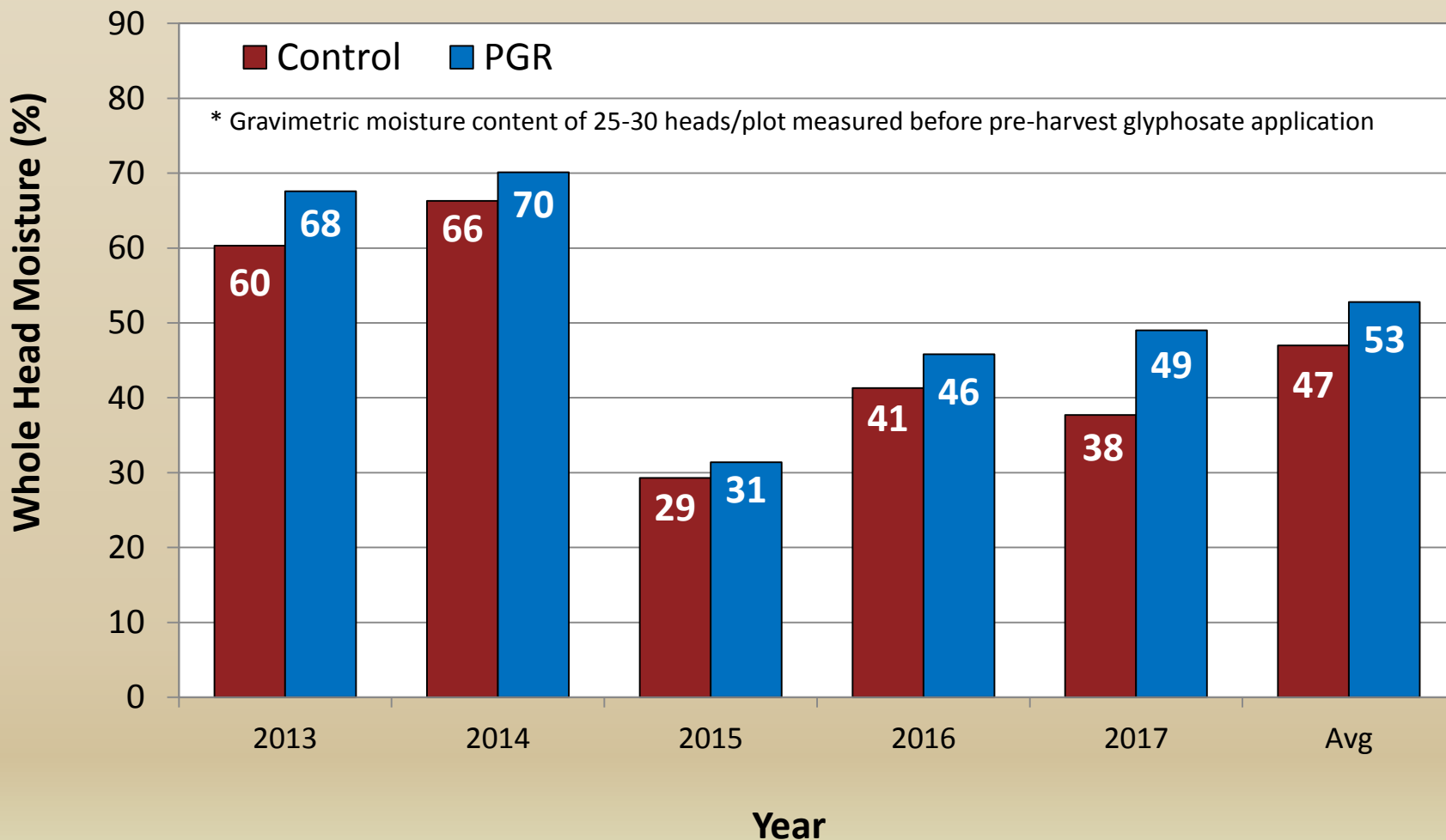
Effects on Grain Yield



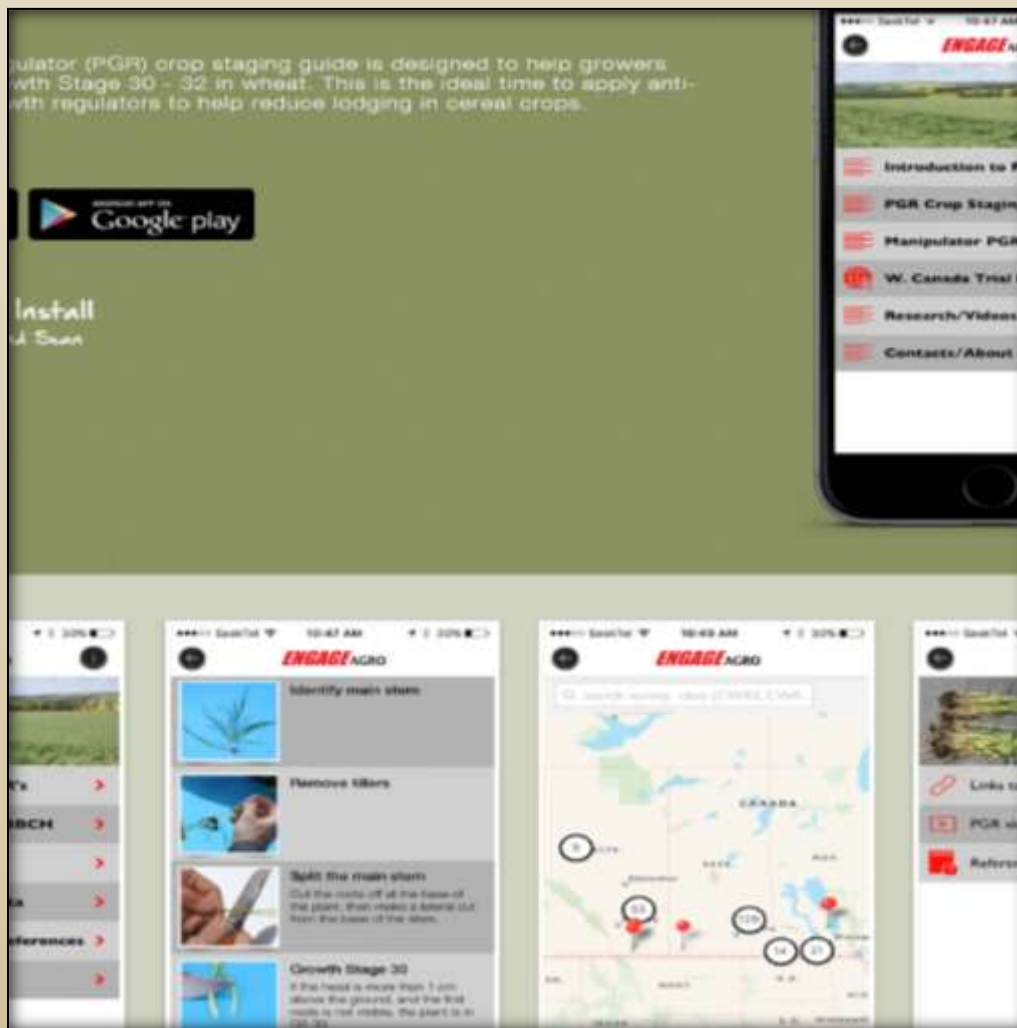
PGR Timing

Manipulator PGR Effects on Maturity*

Indian Head 2013-2017



New Mobile App – PGR Crop Staging Guide



<https://apps.appmachine.com/pgrcropstagingguide>

Take-Home Messages

- Manipulator PGR has performed consistently well for wheat under field conditions in SK – reductions in height observed in nearly all trials & yield increases in most cases
- Responses have been quite reliable across entire application window but GS30-32 is optimal for consistency & to buffer against variable crop stages
 - Tank mix opportunities with late herbicide or early fungicide applications may occasionally exist but in most cases a separate application likely optimal
- In general, greatest benefits likely in higher input systems & under good (wet) growing conditions where lodging is likely to occur & potentially limit yields & reduce harvest efficiency
 - Interactions with fertility & seeding rates uncommon (for yield in particular) but high N and high seeding rates commonly increase the risk of lodging which can be mitigated by PGR
- Responses observed across a wide range of varieties & classes but expect greater overall benefits when combined with varieties that are susceptible to lodging
 - Yield increases can occur even in the absence of lodging but they are smaller when compared to varieties or years where lodging is more severe
 - With PGR option some growers may choose to grow varieties that are higher yielding but have been avoided due to past issues with lodging

THANK YOU

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IHARF Winter Seminar & AGM
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