



# Intensive Agronomy, Intercropping, and Everything in Between to Maximize Profits with Oats

Jessica Pratchler PAg, MSc  
Technical Consultant

Northeast Agriculture Research Foundation  
Melfort, SK

Brianne McInnes BSc., AAg  
Research Associate

Northeast Agriculture Research Foundation  
Melfort, SK

# Improved Integrated Disease Management for Oats in Saskatchewan

## Objectives:

1. Interaction between fungicide application and genetic resistance for foliar disease control.
2. Impact of increased plant population, reduced tillering/growth staging, and optimal fungicide timing
3. Determine if IDM strategies vary between soil and climatic zones in Saskatchewan.



# Improved Integrated Disease Management for Oats in Saskatchewan

- 3 X 4 Factorial = 12 treatments
  - Split Plot
  - Main Plot: Fungicide Application Timing
    - Untreated
    - Flag Leaf
    - Heading
  - Sub-plot: Variety & Seeding Rate
    - Camden @ 300 seeds/m<sup>2</sup>
    - Camden @ 450 seeds/m<sup>2</sup>
    - Summit @ 300 seeds/m<sup>2</sup>
    - Summit @ 450 seeds/m<sup>2</sup>



# Improved Integrated Disease Management for Oats in Saskatchewan

**Table 6:** Statistical summary of treatment effects on average disease severity (%) prior to fungicide application at heading for the Integrated Disease Management in Oats study at three locations in 2018.

Source	Indian Head (IH)	Redvers (RD)	Yorkton (YK)
Fungicide Timing (FT)	0.0068**	0.1112	0.0002**
Variety X Seeding Rate (VSR)	0.0010**	0.0031**	0.0397*
FT * VSR	0.9591	0.7055	0.0628
Grand Mean	1.7	1.2	2.1
CV (REP * FT)	8.4	17.4	34.9
CV (REP * FT * VSR)	11.5	18.7	47.7

\*\*\* p<0.001; \*\* p<0.05 to 0.01; \*p<0.05

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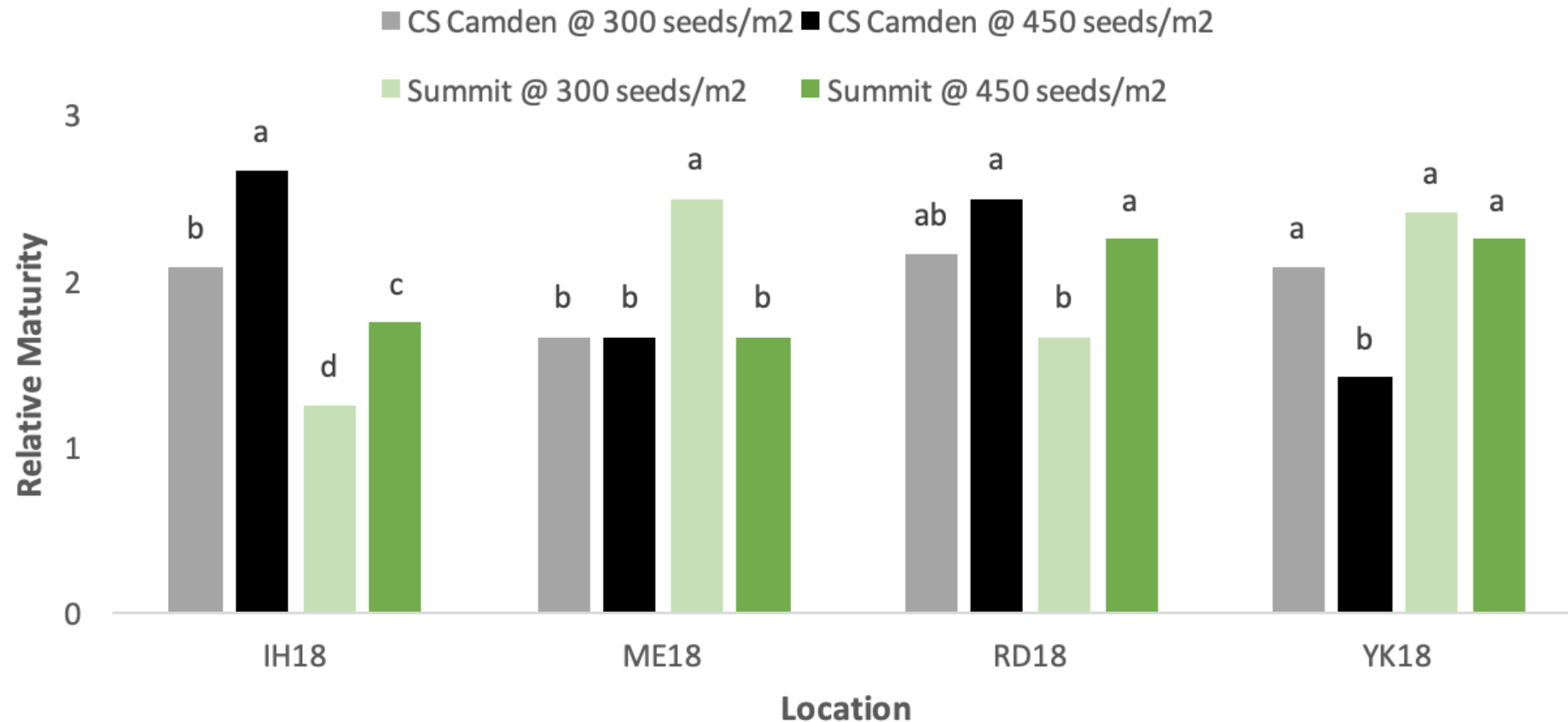
# Improved Integrated Disease Management for Oats in Saskatchewan

**Table 9:** Statistical summary of treatment effects on maturity for the Integrated Disease Management in Oats study at four locations in 2018.

Source	Indian Head (IH)	Melfort (ME)	Redvers (RD)	Yorkton (YK)
Fungicide Timing (FT)	0.4219	0.3033	0.5060	0.0893
Variety X Seeding Rate (VSR)	<0.0001***	0.0042**	0.0227*	0.0007**
FT * VSR	0.6881	0.9425	0.6050	0.3964
Grand Mean	1.9	1.9	2.1	2.0
CV (REP * FT)	12.9	29.1	27.7	31.4
CV (REP * FT * VSR)	11.9	32.7	29.2	26.9

\*\*\* p<0.001; \*\* p<0.05 to 0.01; \*p<0.05

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**Figure 5:** Variety X Seeding Rate effect on maturity (relative [1- advanced; 2-mean; 3-behind]) at four Eastern Saskatchewan locations in 2018.

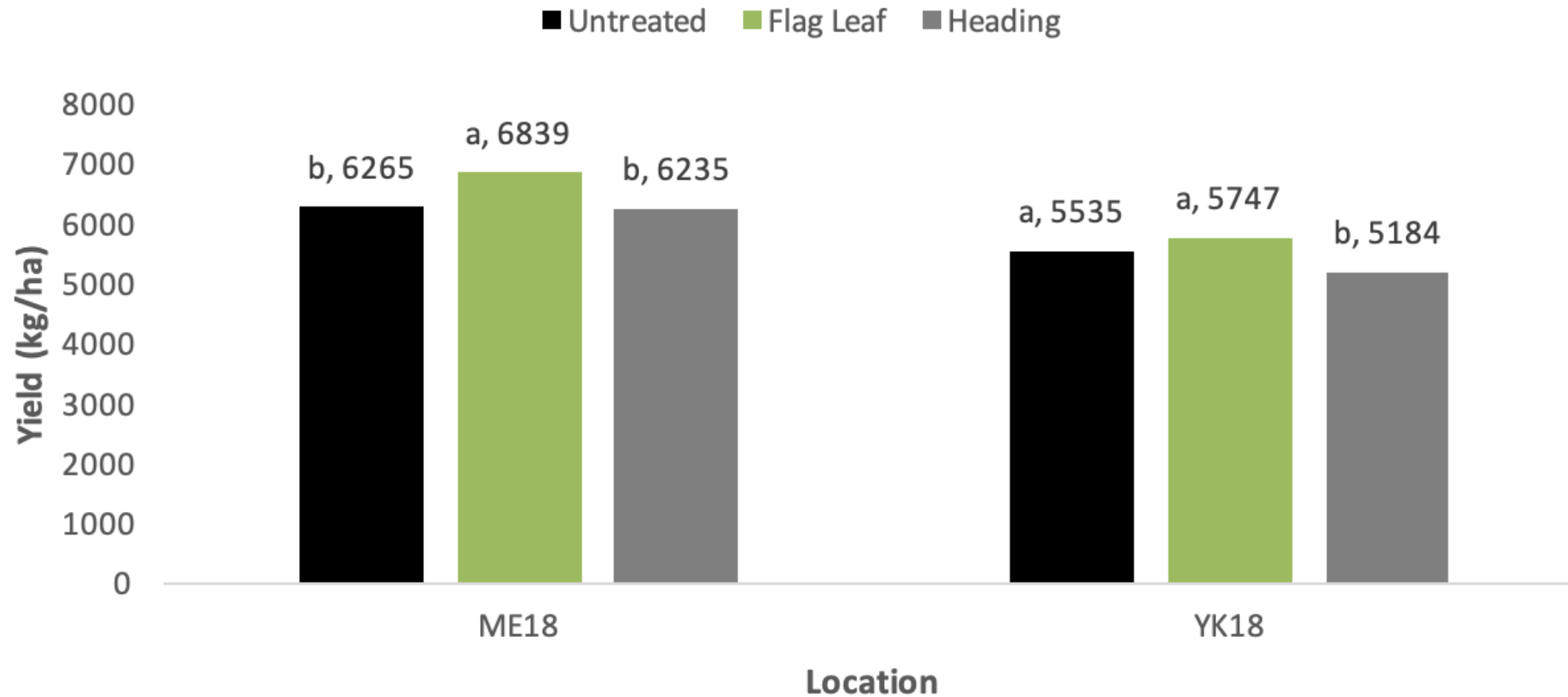
# Improved Integrated Disease Management for Oats in Saskatchewan

**Table 10:** Statistical summary of treatment effects on yield (kg/ha) for the Integrated Disease Management in Oats study at four locations in 2018.

Source	Indian Head (IH)	Melfort (ME)	Redvers (RD)	Yorkton (YK)
Fungicide Timing (FT)	0.8081	0.0076**	0.4309	0.0080**
Variety X Seeding Rate (VSR)	0.0112*	0.0153*	0.0030**	0.1727
FT * VSR	0.9612	0.9999	0.2403	0.6360
Grand Mean	4437.9	6446.3	5961.2	5488.9
CV (REP * FT)	7.4	6.0	8.6	6.0
CV (REP * FT * VSR)	2.7	9.9	5.0	10.4

\*\*\* p<0.001; \*\* p<0.05 to 0.01; \*p<0.05

# Improved Integrated Disease Management for Oats in Saskatchewan



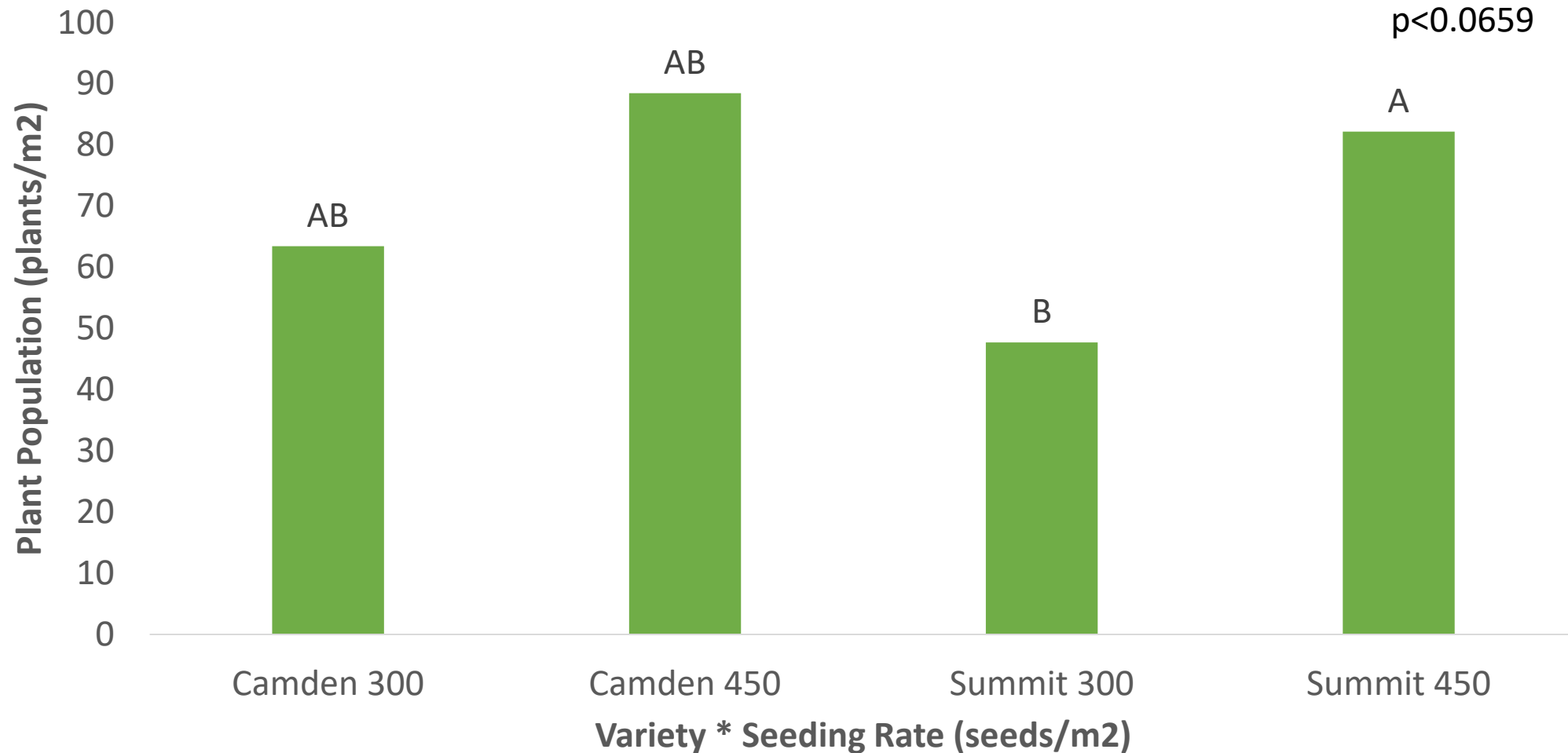


# Improved Integrated Disease Management for Oats in Saskatchewan

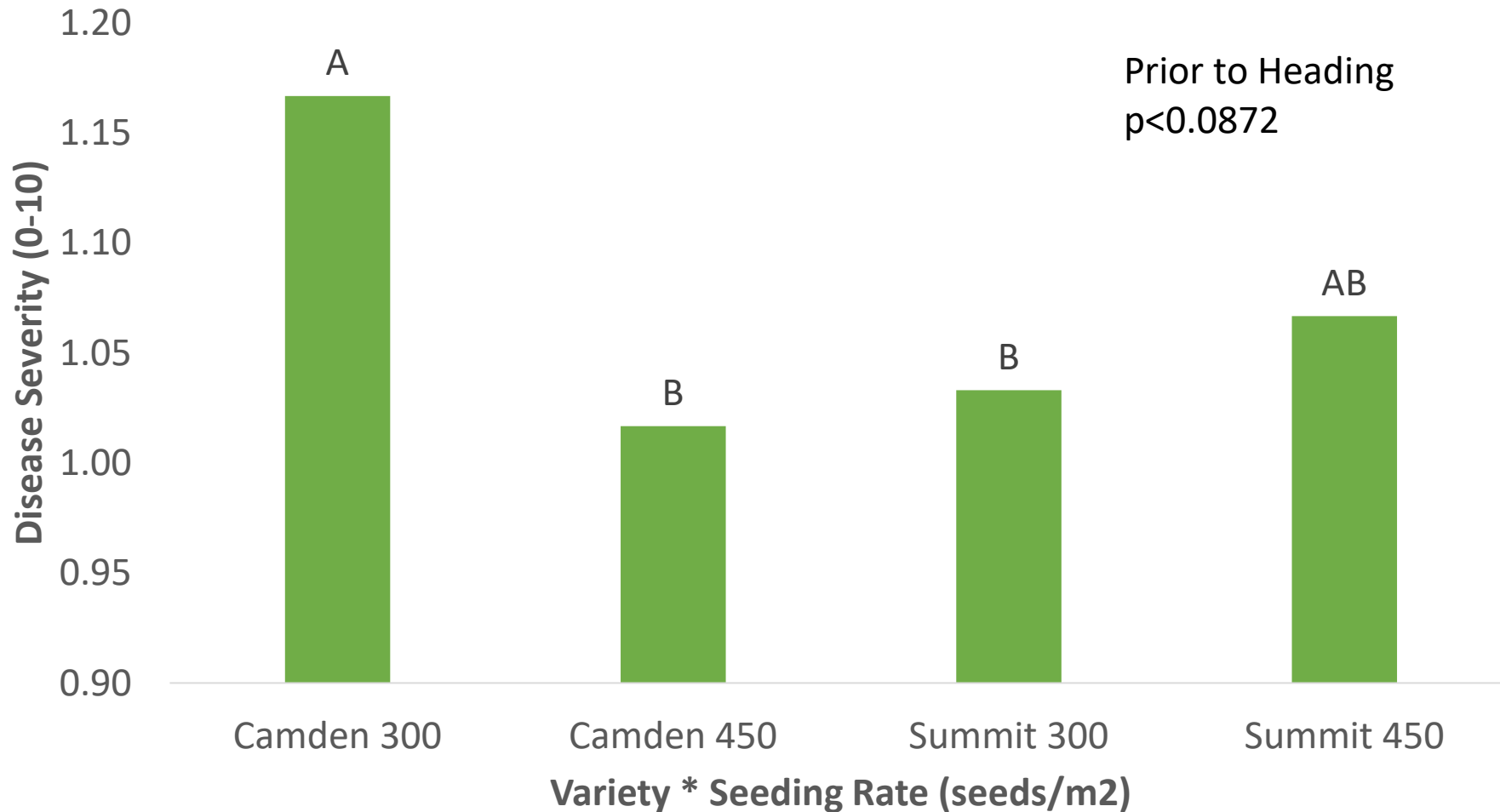
- Year 1 Results:
- Fungicide efficacy did not significantly differ between the two varieties
  - Any differences are due to genetics and the environment.
- Seeding rate did not significantly affect tillering
  - Dry conditions in spring?
  - Need to look at the effect on heading rates?
  - Fungicide was applied on the same date for main plots, with variation in growth staging
- After 1 year, no new potential changes to integrated disease management in Oats has been found.



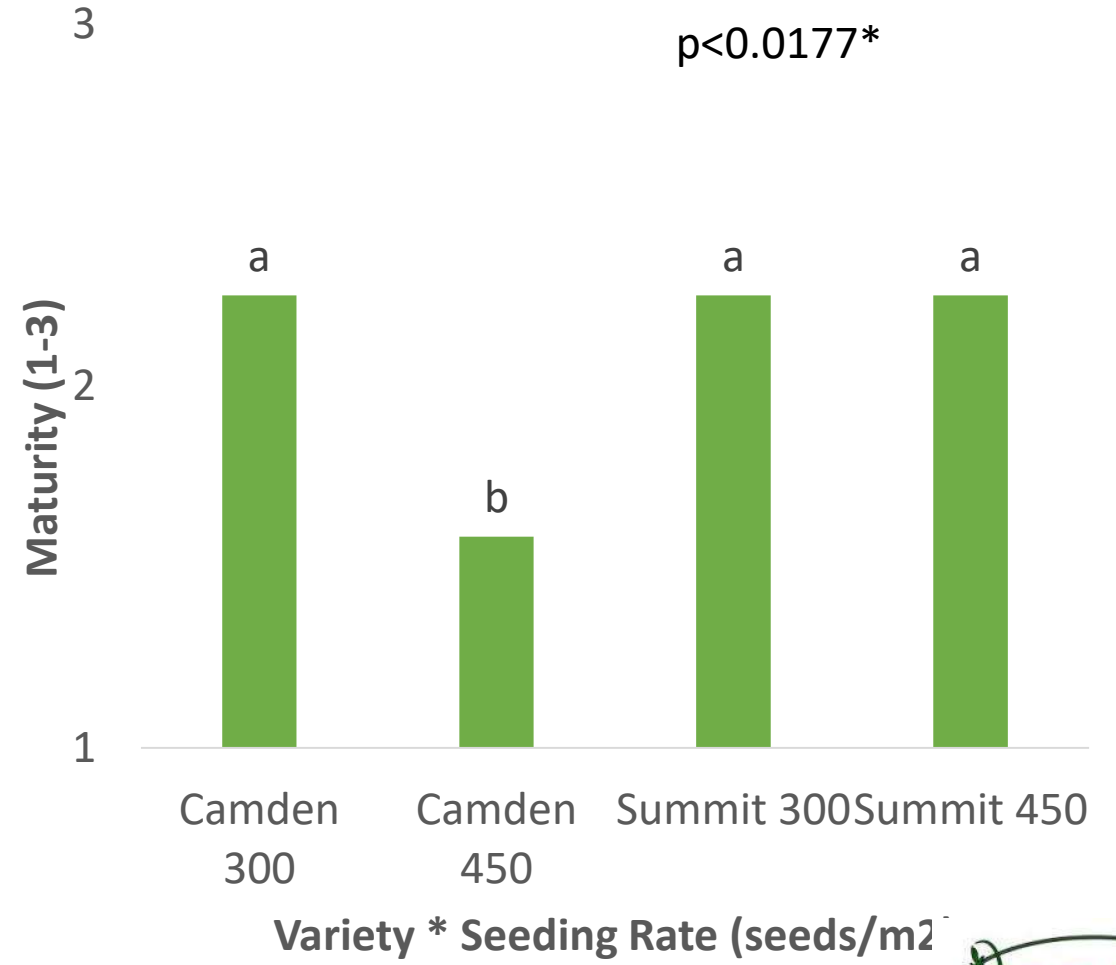
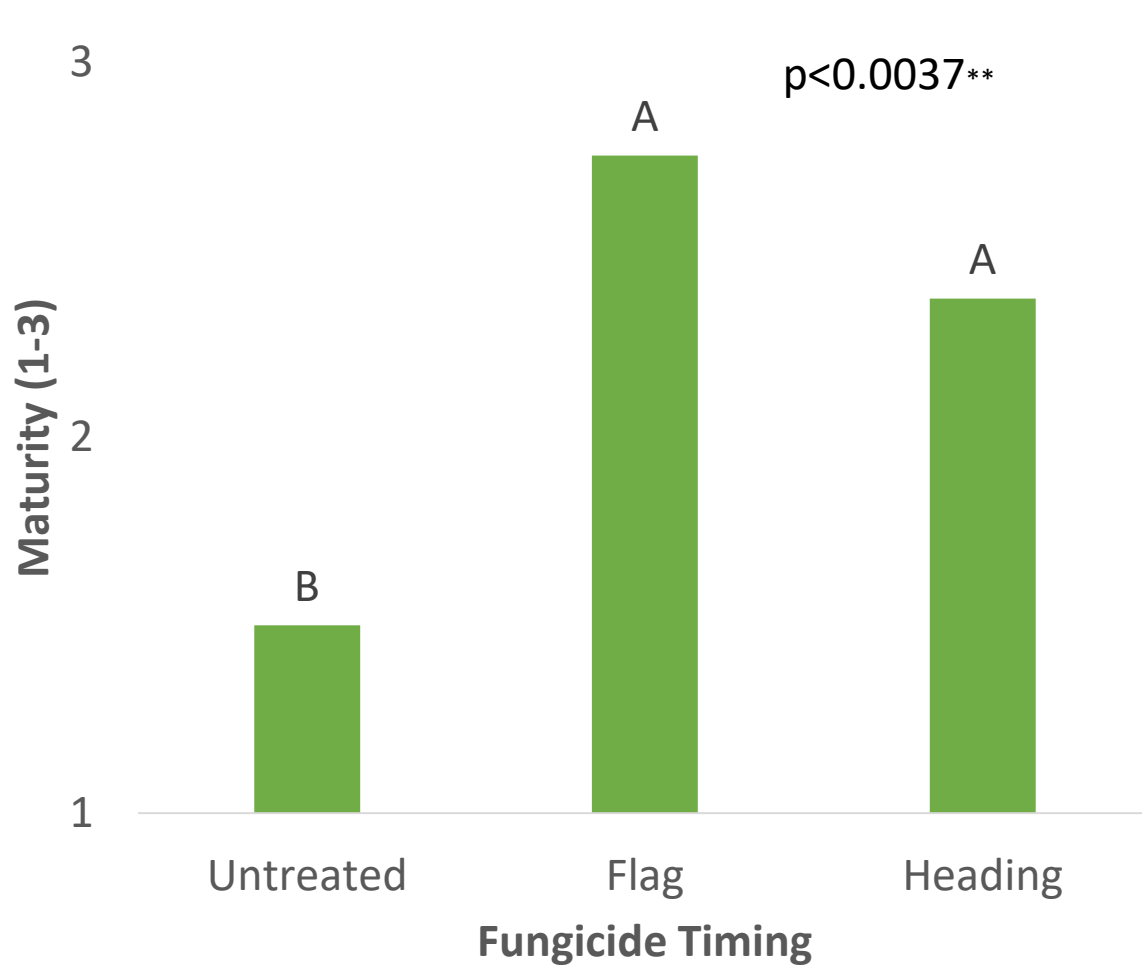
# Improved Integrated Disease Management for Oats in Saskatchewan



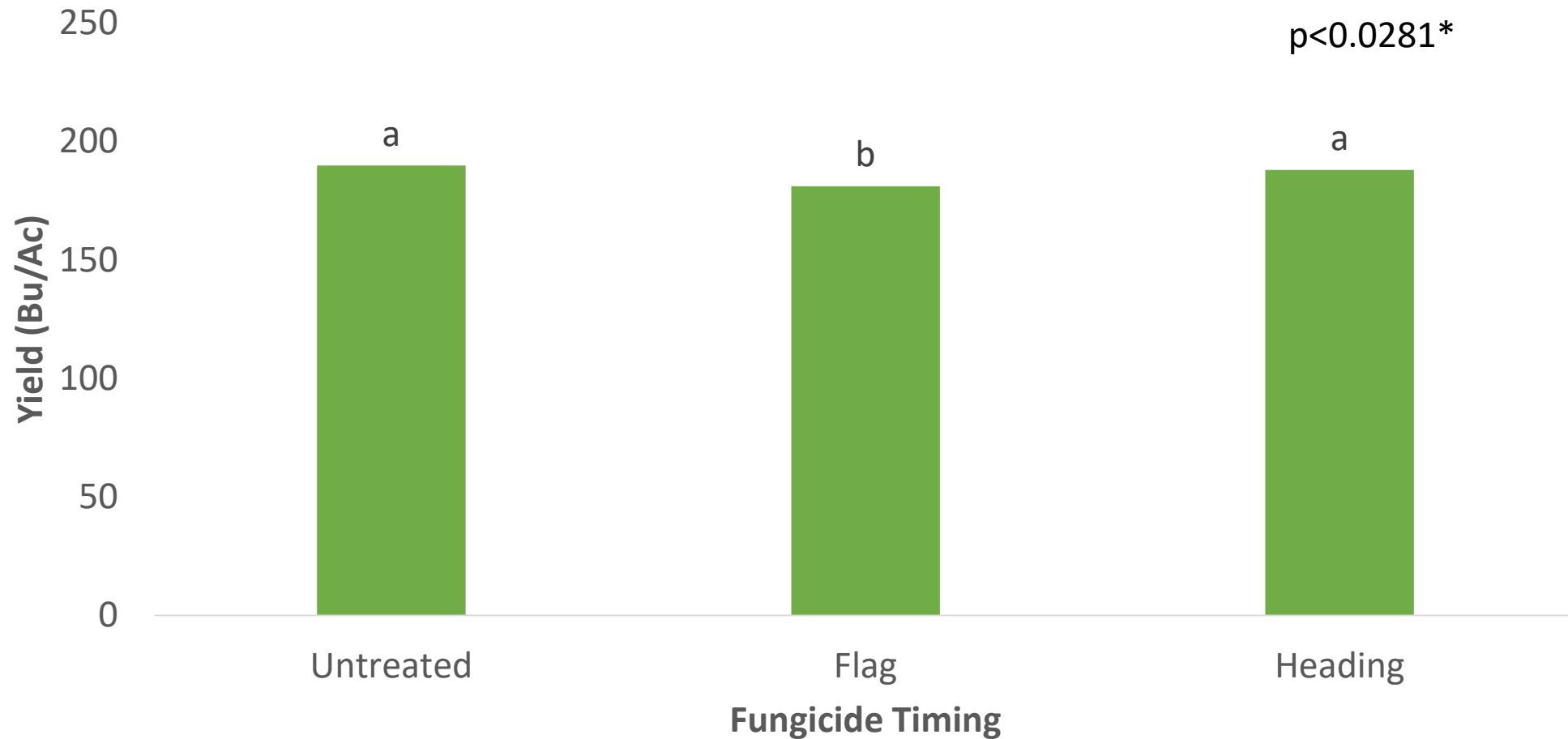
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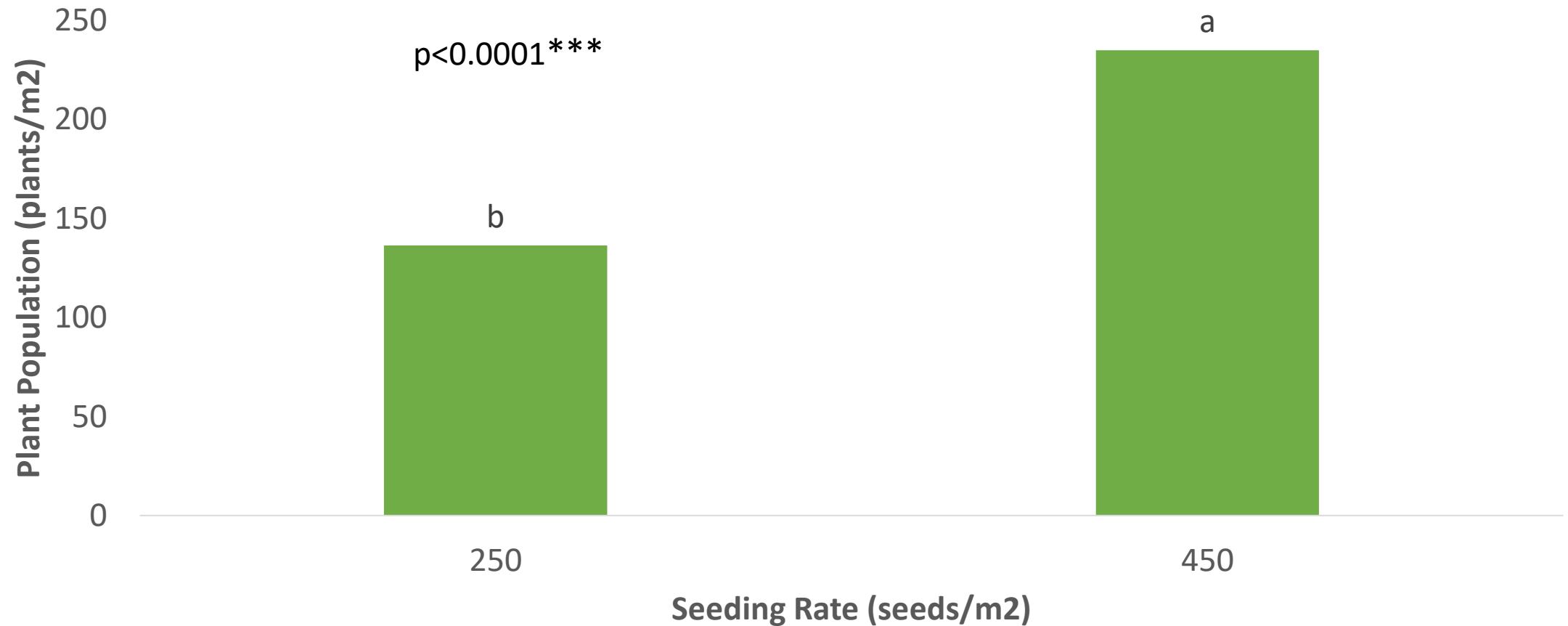


# Oat Varietal Response to Seeding Rate & Nitrogen Rate to Hasten Maturity without Lodging

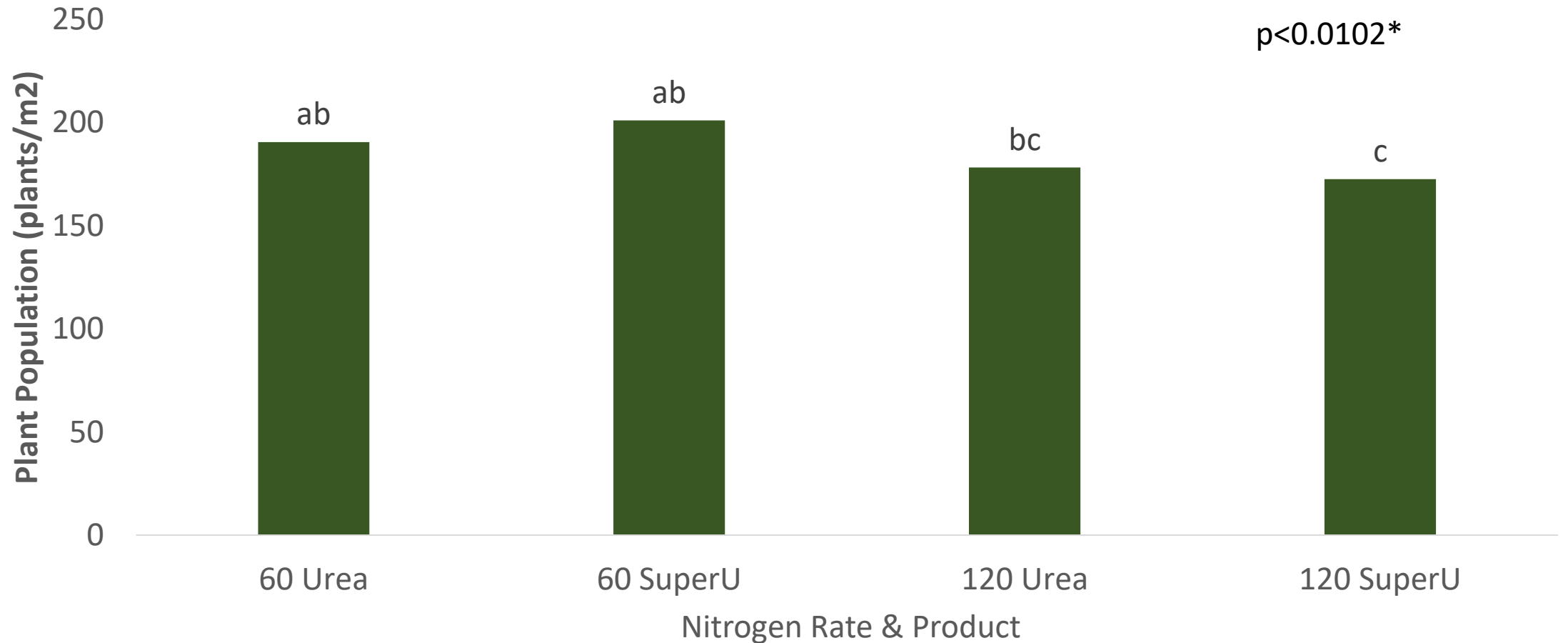
- 2 X 2 X 4 factorial – 16 treatments
  - Variety: CS Camden, CDC Dancer
  - Seeding Rate: 250 or 450 seeds/m<sup>2</sup>
  - Nitrogen Rate/Product: 60 or 120 lb N/ac or either Urea or 50:50 split SuperU



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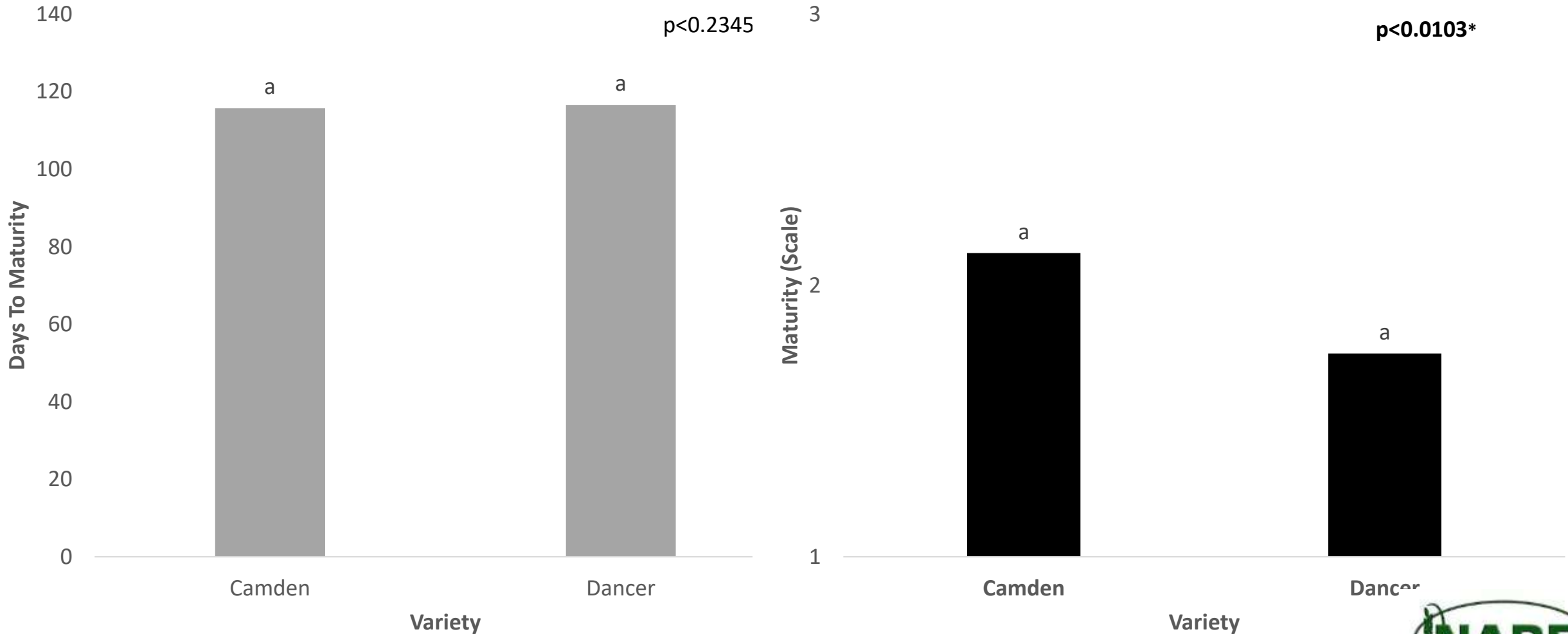


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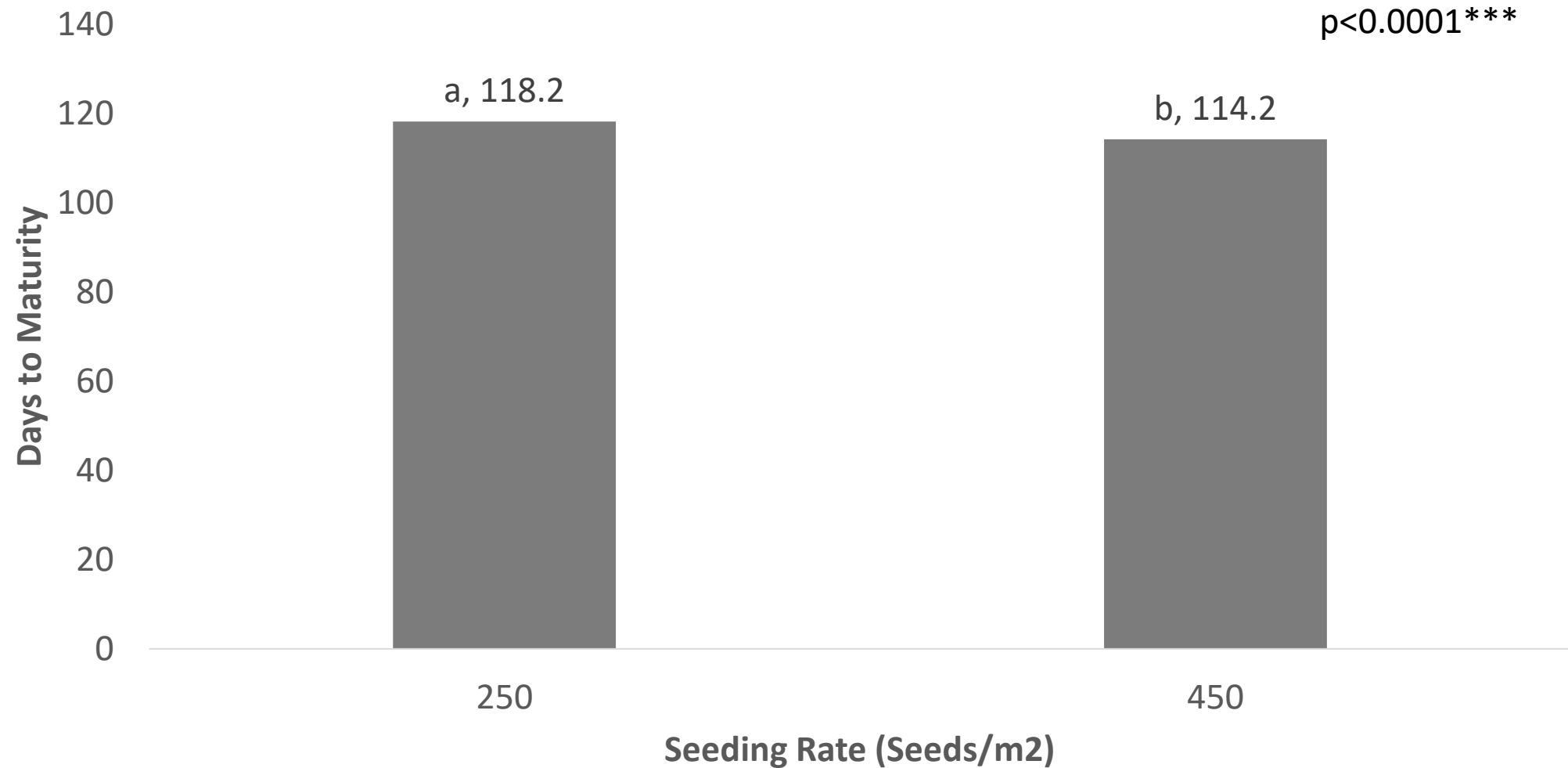




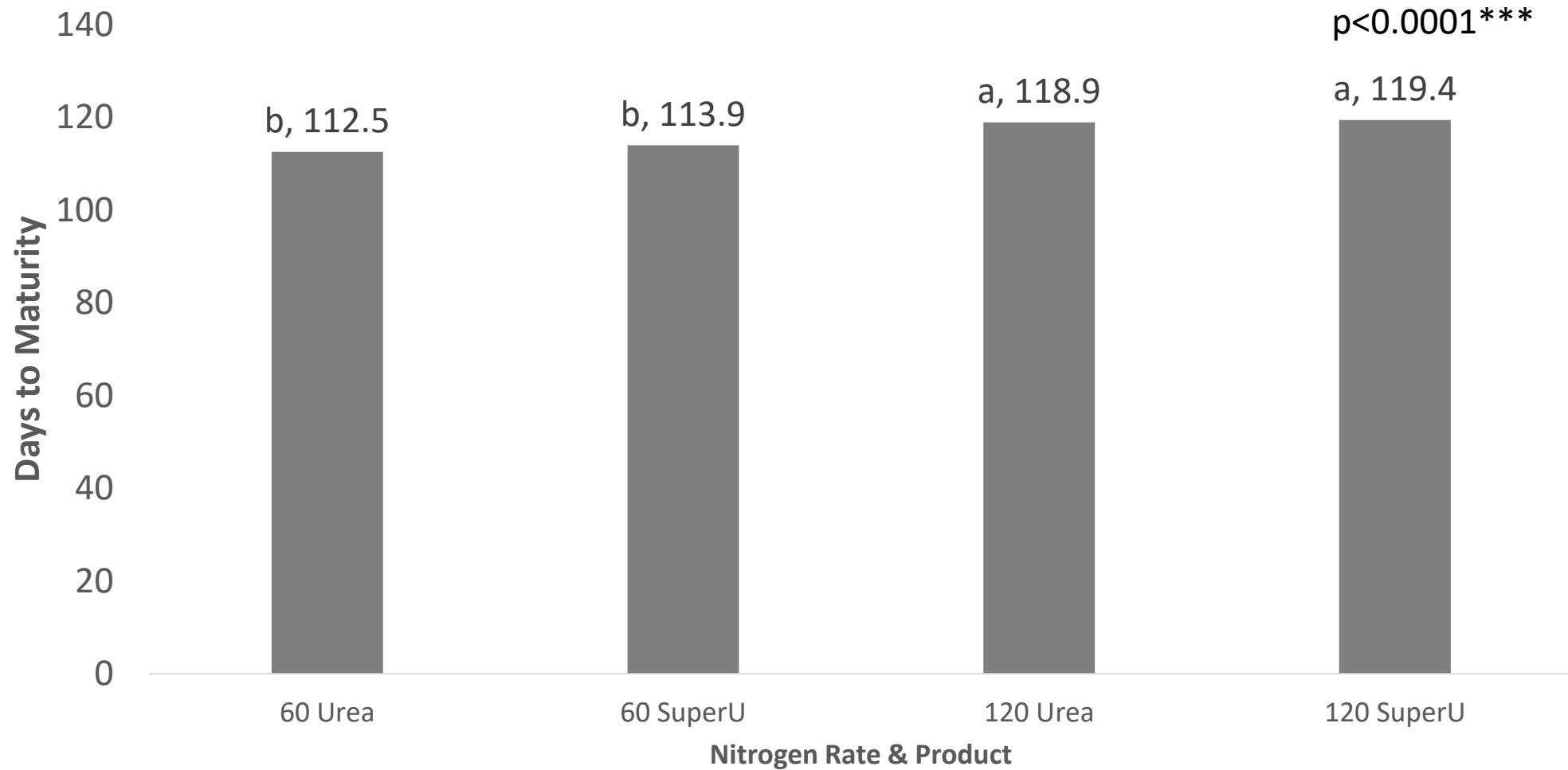
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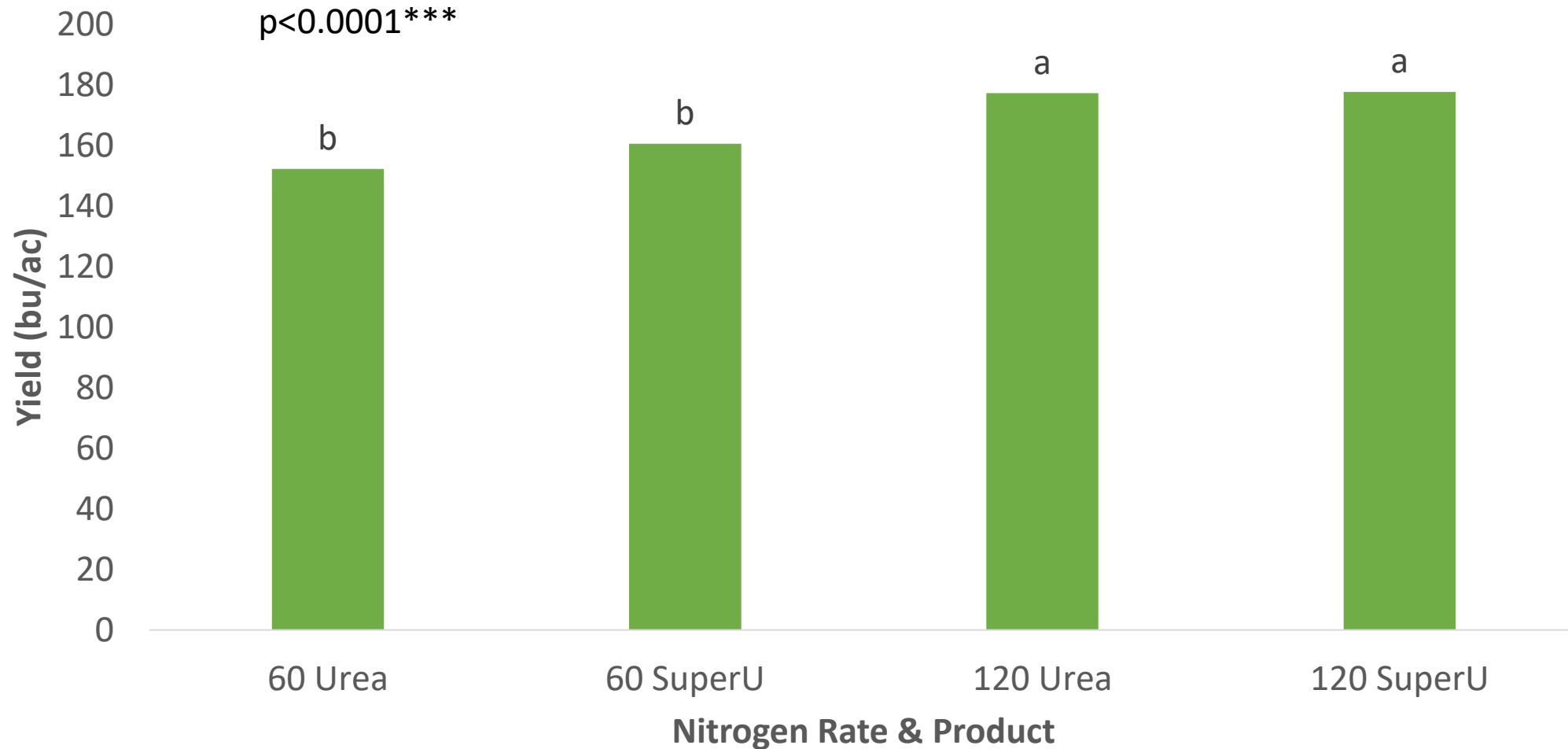
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# Maintaining Acceptable Test weights for Milling Oats

- Demonstrate that test weights and quality for milling oats tend to worsen with delayed seeding and increased nitrogen rates
  - Test weight can vary between varieties, so seeding early and managing nitrogen is critical for low-test weight varieties.
- 2 X 2 X 3 Factorial = 12 treatments
  - Seeding date: Early May & Early June
  - Variety: CS Camden & Summit
  - Nitrogen Rate: 40, 80, 120 kg N/ha

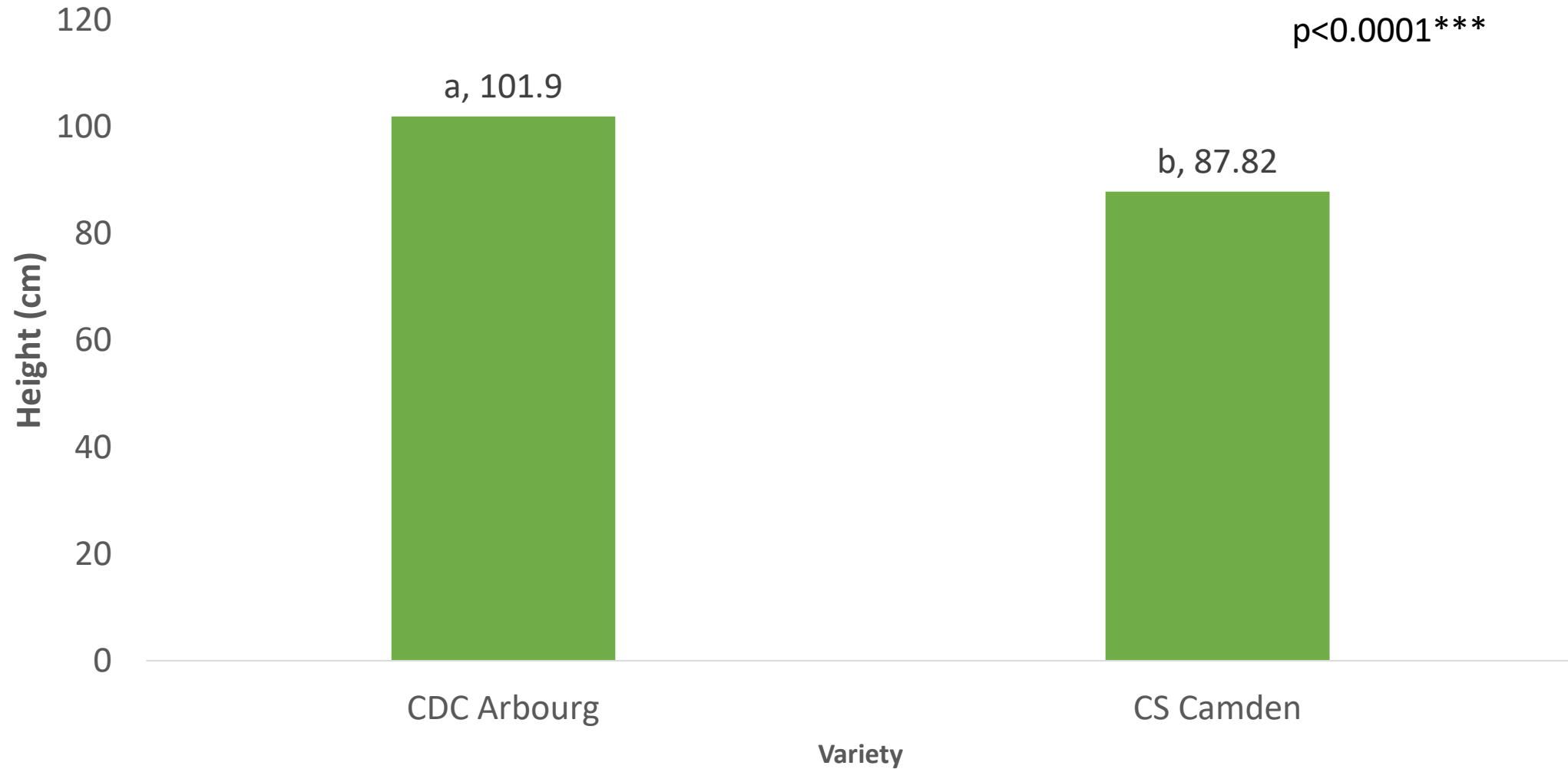


# PGR Application in Oats

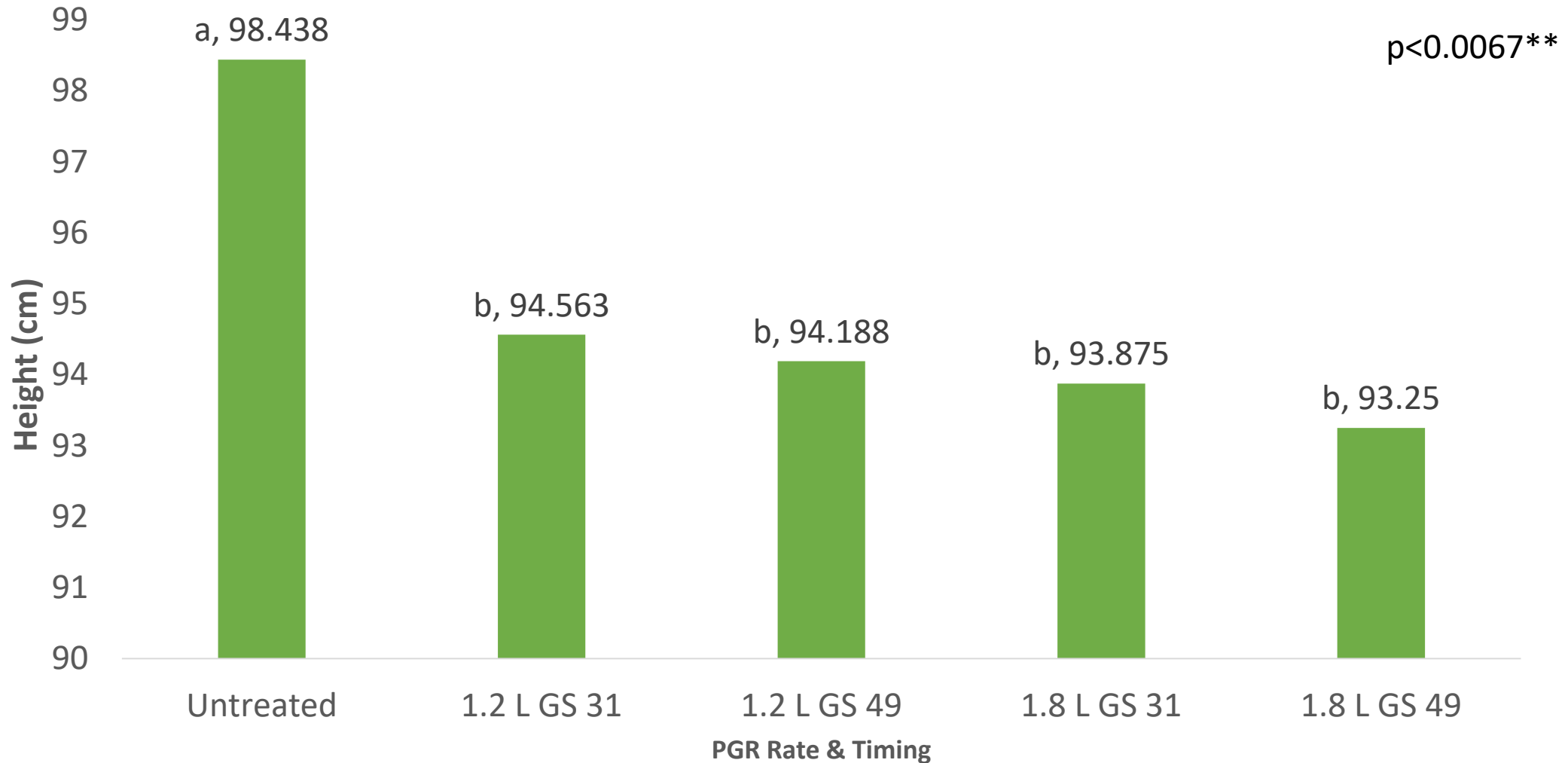
- Illustrate the response of oats to Manipulator application at different rates and timings and continue to build varietal response data.

Variety	PGR Rate	PGR Timing
CS Camden/CDC Arbourg	Untreated	None
	1.24 L/ha	1-2 nodes
	1.8 L/ha	1-2 nodes
	1.24 L/ha	Flag Leaf
	1.8 L/ha	Flag Leaf

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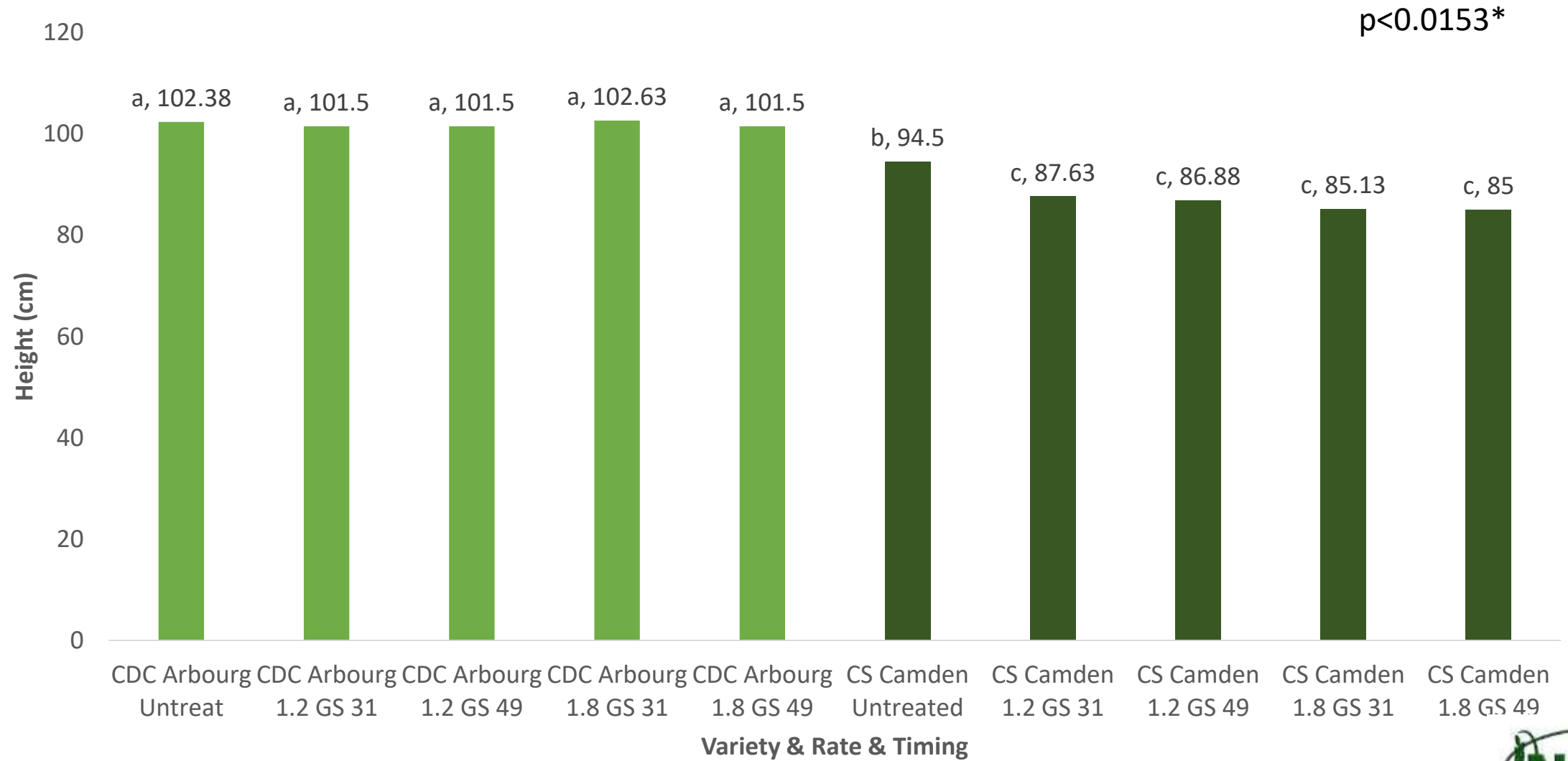


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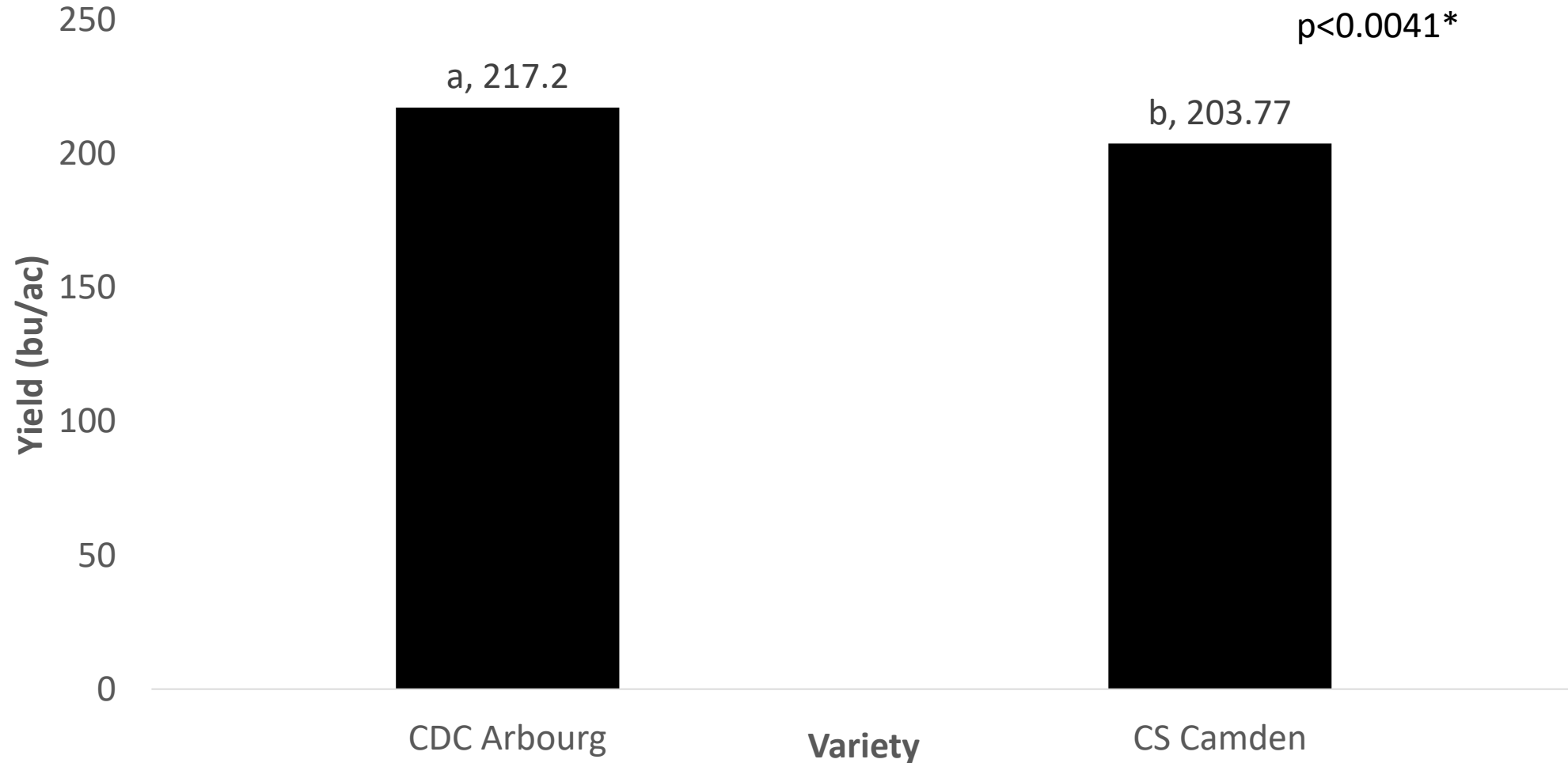




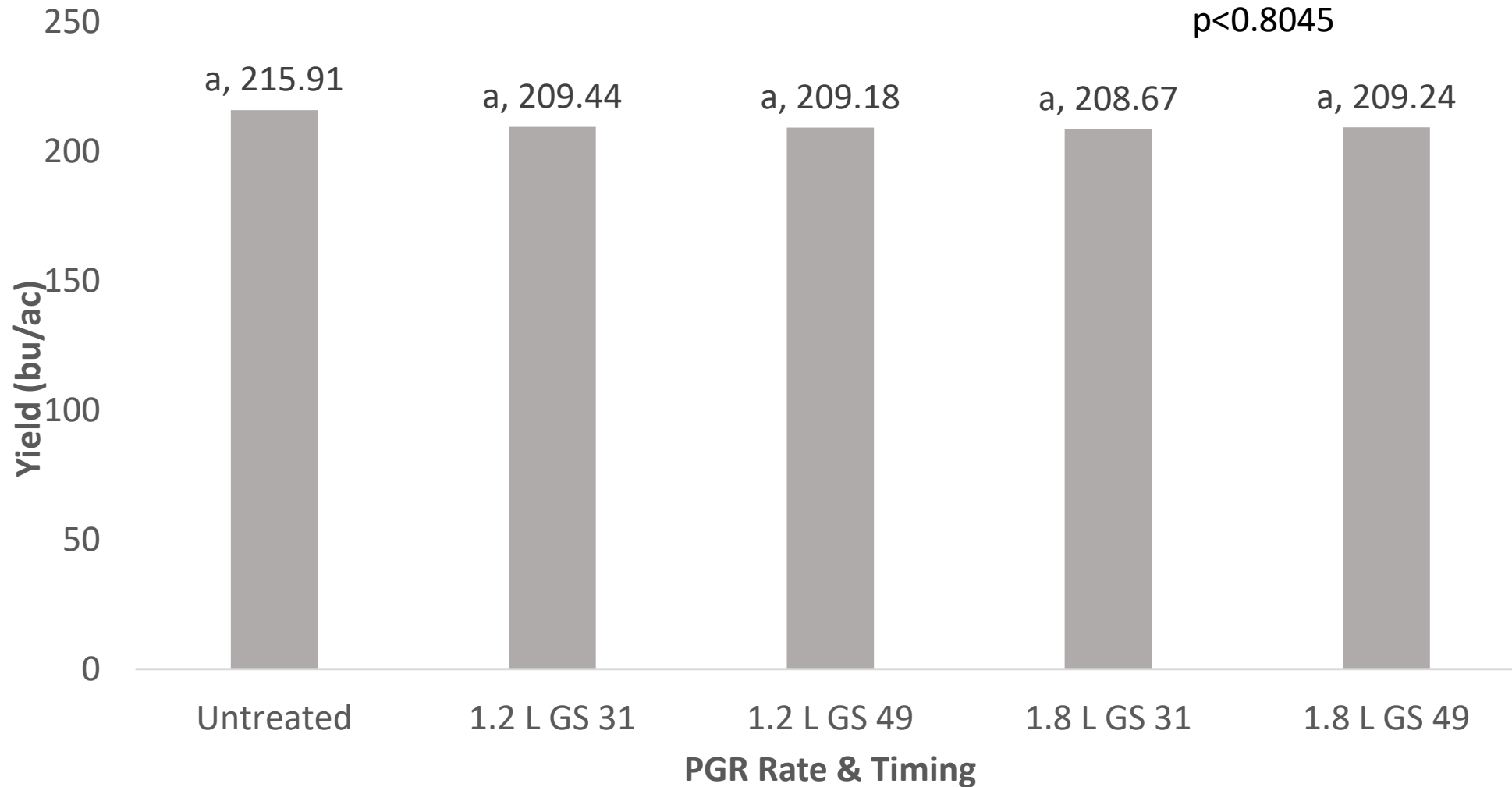
# PGR Application in Oats



# PGR Application in Oats



# PGR Application in Oats



# Oat Pea Intercropping

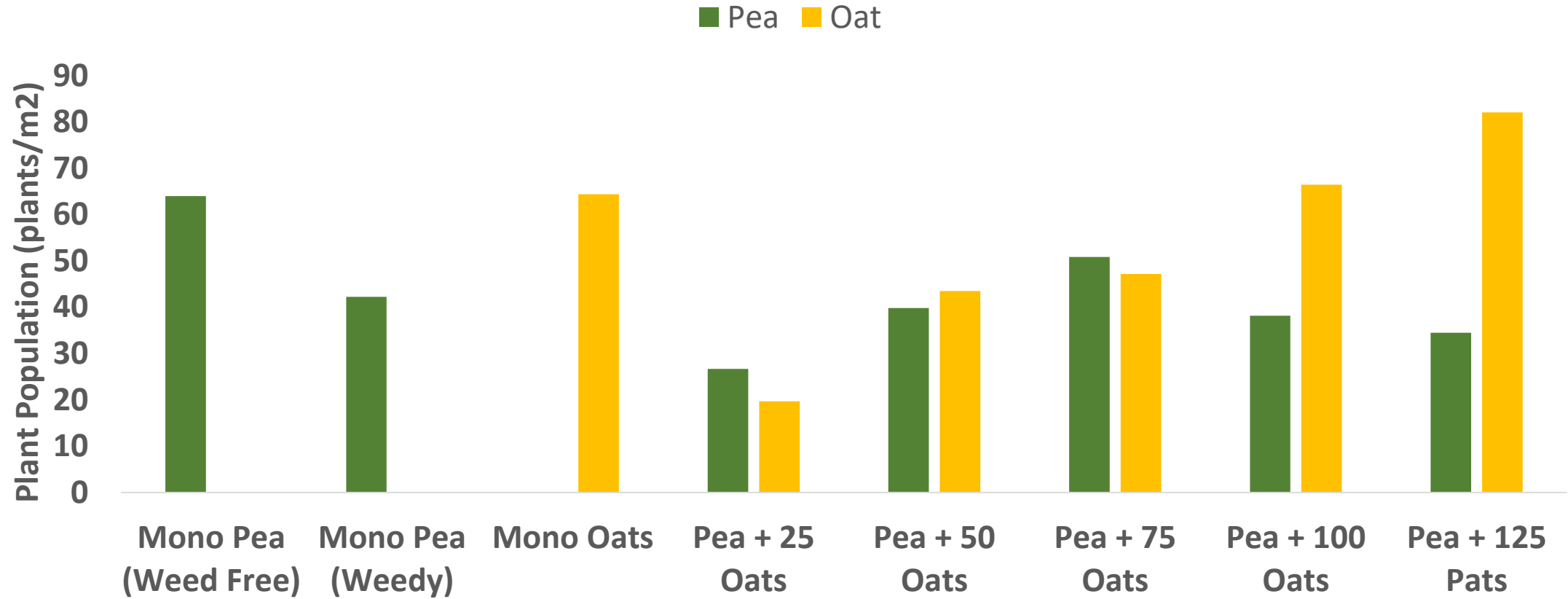
Combination	Pea Seeding Rate	Oat Seeding Rate
Intercrop	80	25
Intercrop	80	50
Intercrop	80	75
Intercrop	80	100
Intercrop	80	125
Monocrop (oat)	0	200
Monocrop (pea-weed free)	80	0
Monocrop (pea- weedy check)	80	0



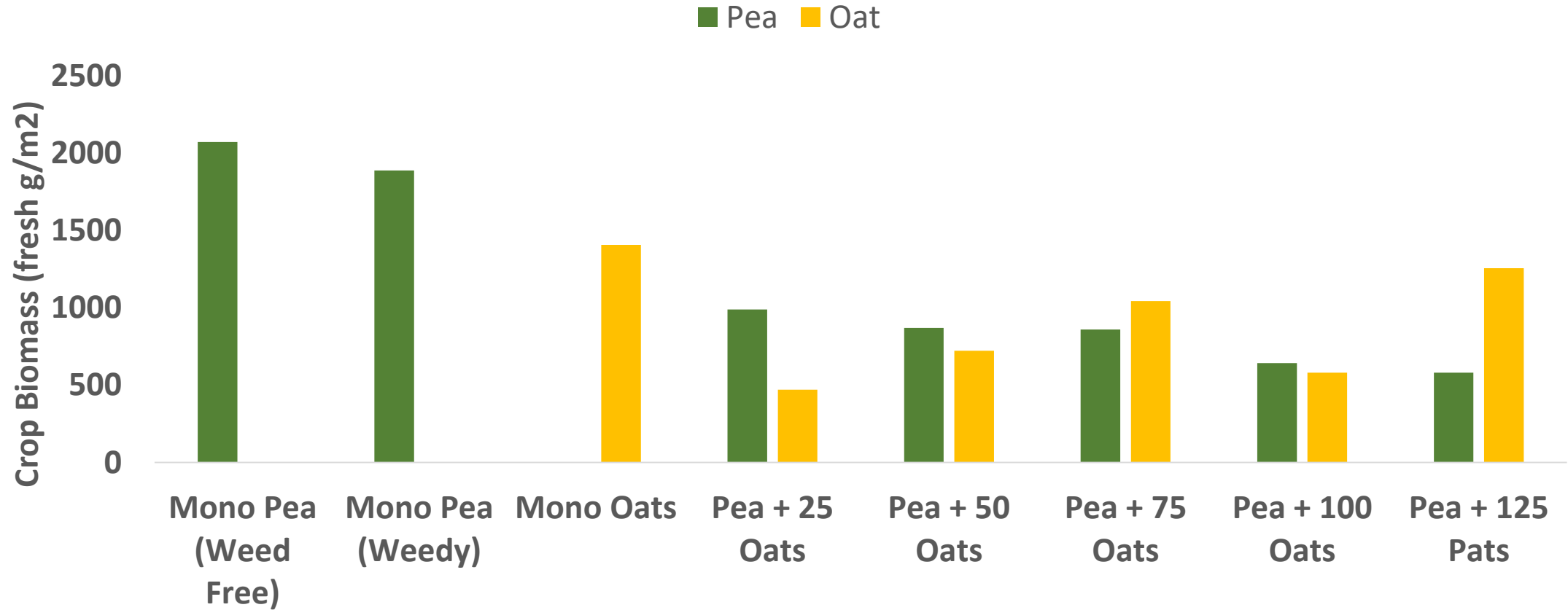
# Oat Pea Intercropping

- Plant density, weed biomass, crop biomass, crop height, weed control, quality
- Lodging: had significant issues in Melfort, peas dragged down the oats, instead of the oats keeping the peas upright
  - Change in optimal density of pea rather than oats?

# Oat Pea Intercropping



# Oat Pea Intercropping



# Oat Pea Intercropping

- Maturity: gap in maturity can be a deal breaker!
  - Over a month at Melfort, half a month at Redvers
  - Peas rotted or pods shattered in intercrop mixtures prior to oat maturity
  - Okay if doing as a silage mixture, maybe not so for grain production in high moisture environments
- Of the 6 sites, 3 went to yield.
  - Outlook: Marrowfat peas were out-competed by oats.
  - Prince Albert: deer enjoyed the tasty combination
  - Melfort: eager swather operator
  - Redvers: birds would sit on the peas and eat the oats = lower oat yields than expected
  - Yield data pending



# Thank You!

- For more information:
- Neag.ca
- Agriarm.ca
- Oat Scoop Magazine

