

Improving corn yields and NUE with late N applications using high clearance equipment

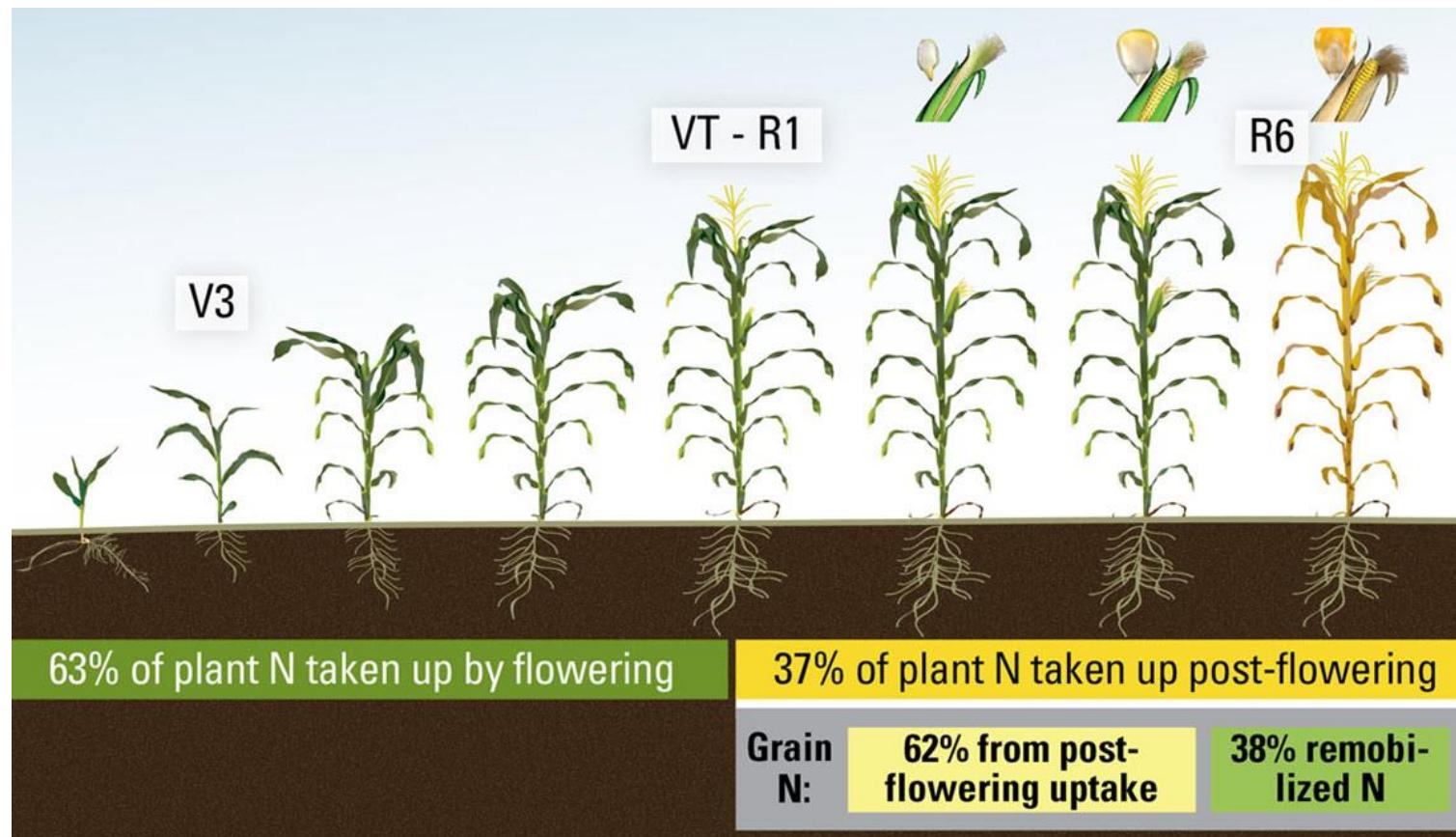
Dorivar Ruiz Diaz
Andrew Stammer

Dep. of Agronomy, Kansas State University



Background

- Previous studies showed significant amount of N uptake post-flowering.



Objectives

- Assess the value of split N application with post-flowering application and emphasis on yield and NUE.
- Evaluate foliar N application using N sources with urea-formaldehyde/triazone with post-flowering application.
- Evaluate the benefit of fungicide applications on yield and NUE with late N applications.



Treatments

Treatments	Description
1	0 lbs N/acre (Control)
2	160 lbs N/acre at planting
3	200 lbs N/acre at planting
4	120 + 40 at tasseling
5	160 + 40 at tasseling
6	120 + 40 at tasseling + foliar N at tasseling
7	160 + 40 at tasseling + foliar N at tasseling

Treatments included with and without fungicide-
total of 14 treatments.



Materials and Methods

- 3 locations in 2016:
 - Neosho: rain feed
 - Rossville: irrigated
 - Scandia: irrigated
- 4 replications.
- Foliar N applied at 4.5 lbs N/acre (Triazone).
- Fungicide: Headline (pyraclostrobin).



Materials and Methods



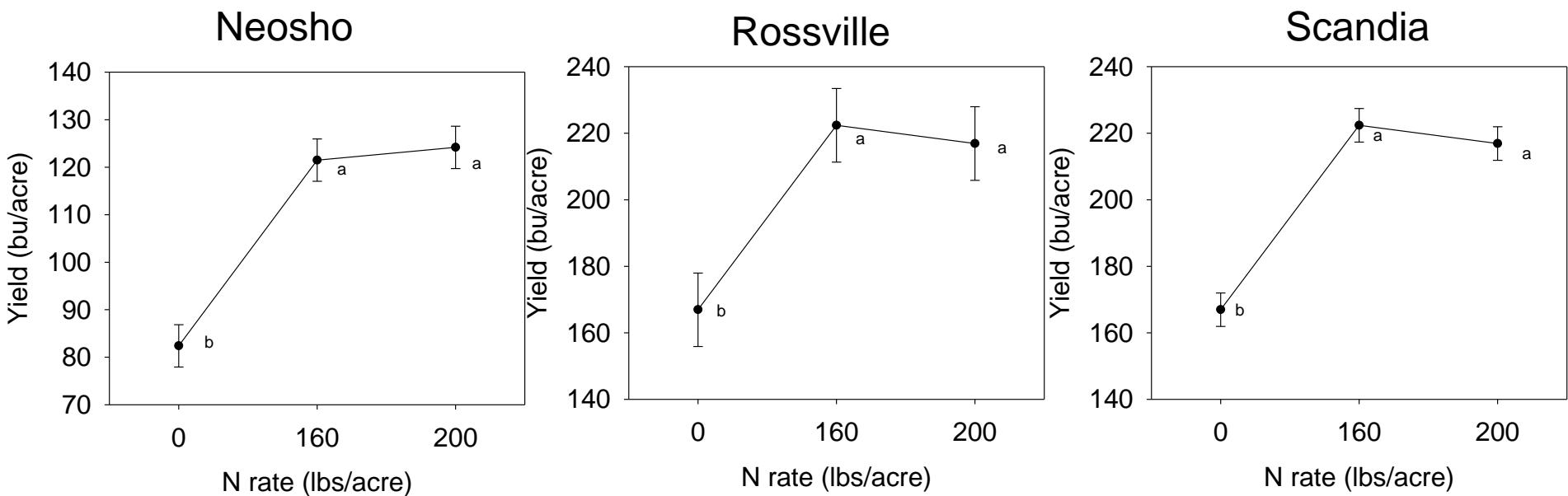
76 in clearance



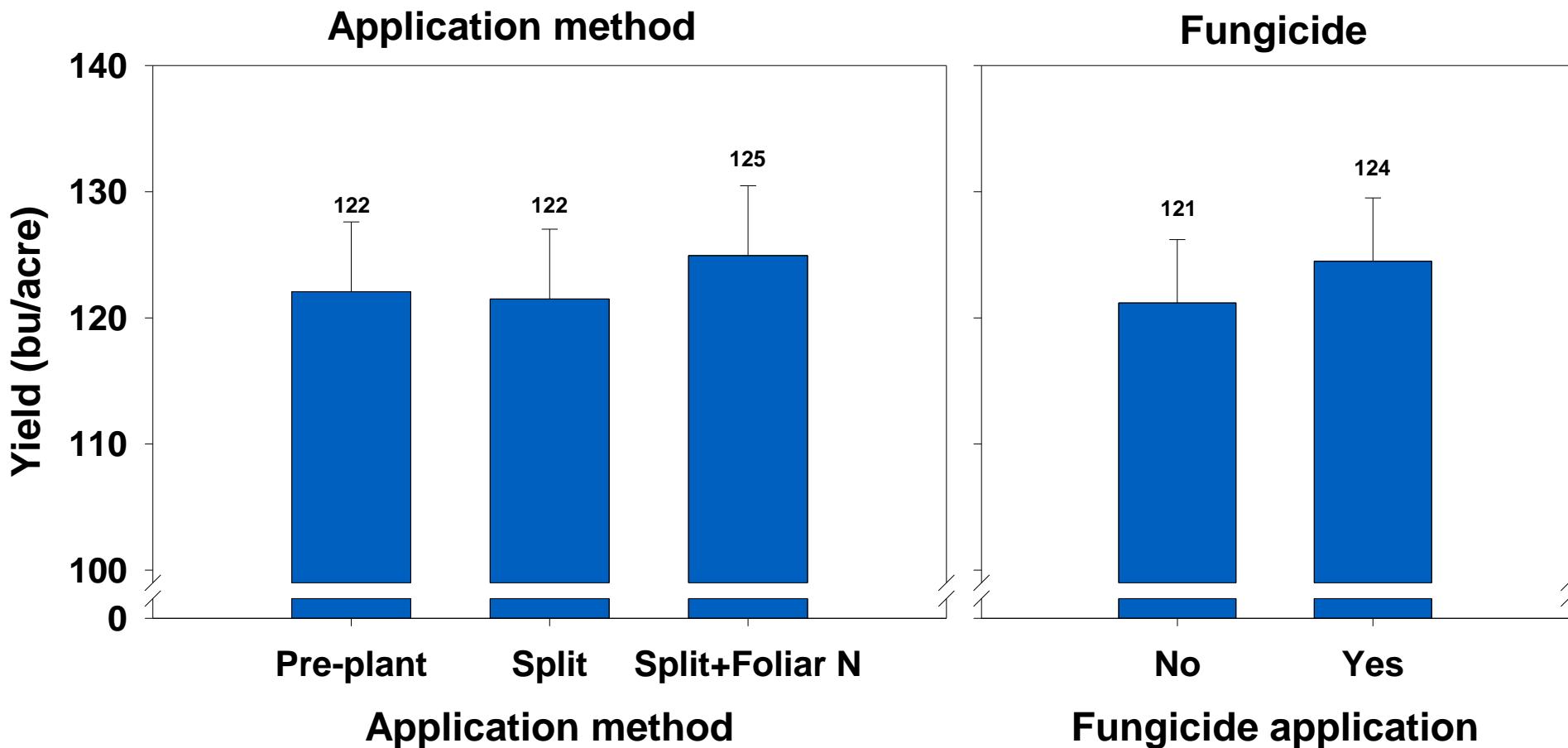
Materials and Methods



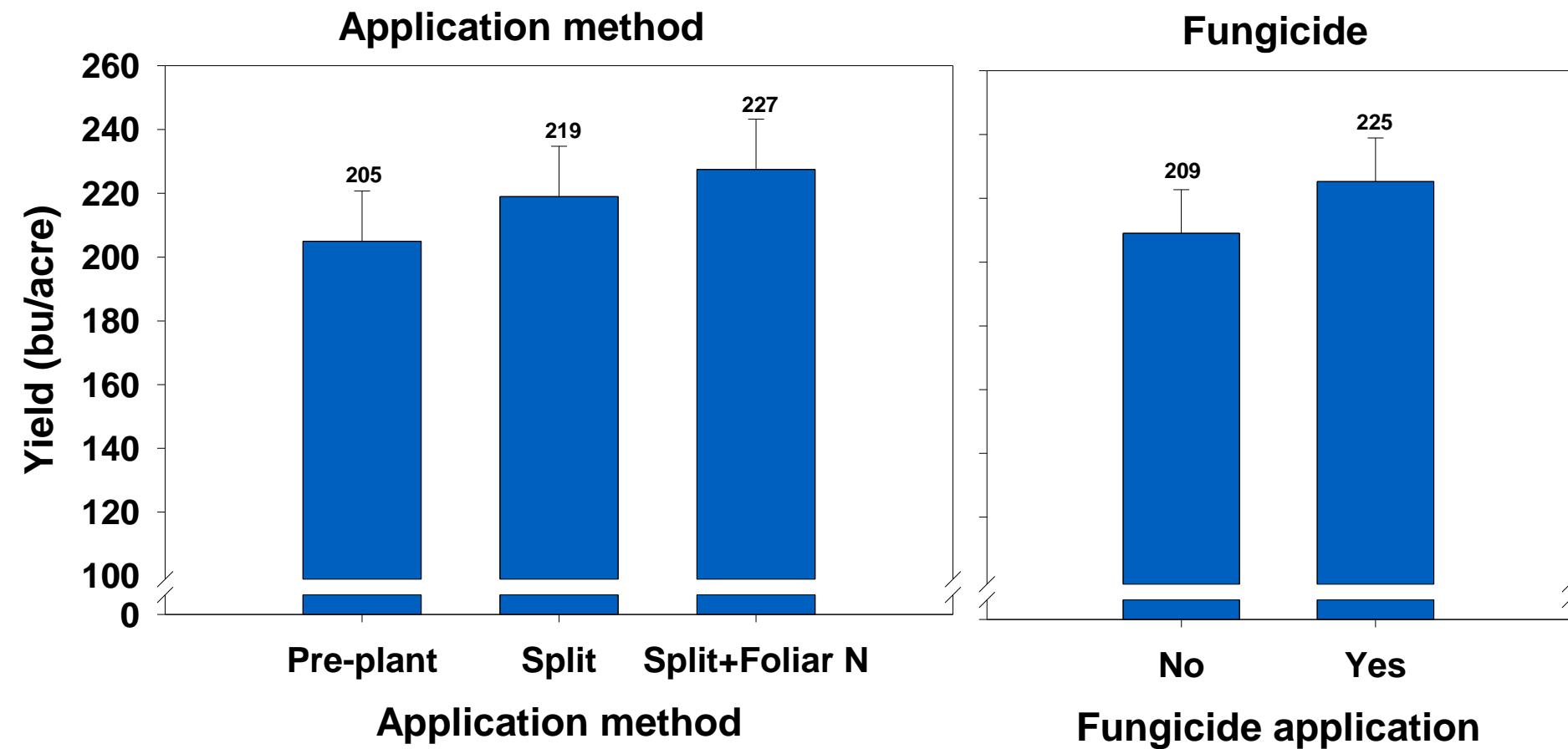
Corn yield response to the main effect of N rate



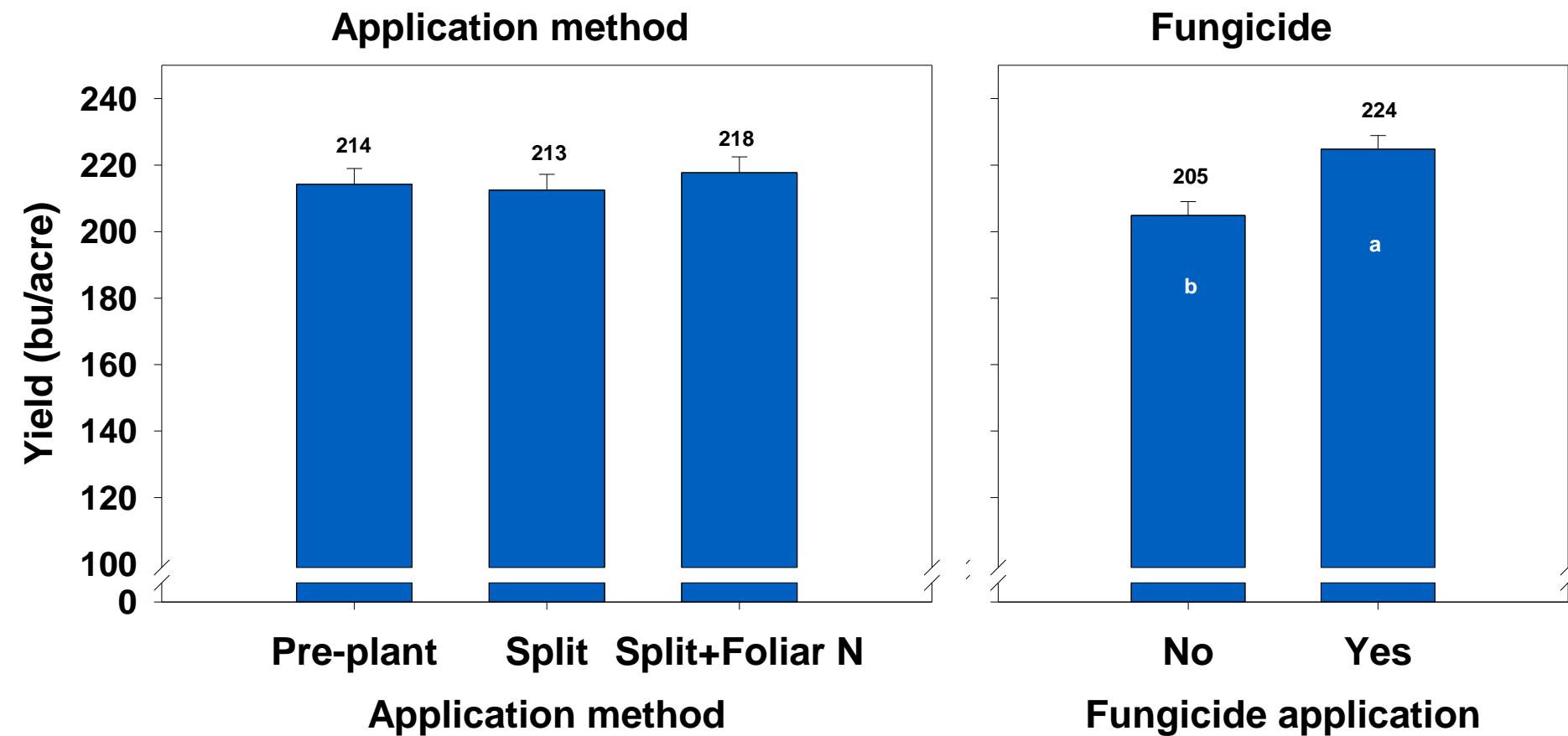
Main effect of N application method and fungicide – Neosho



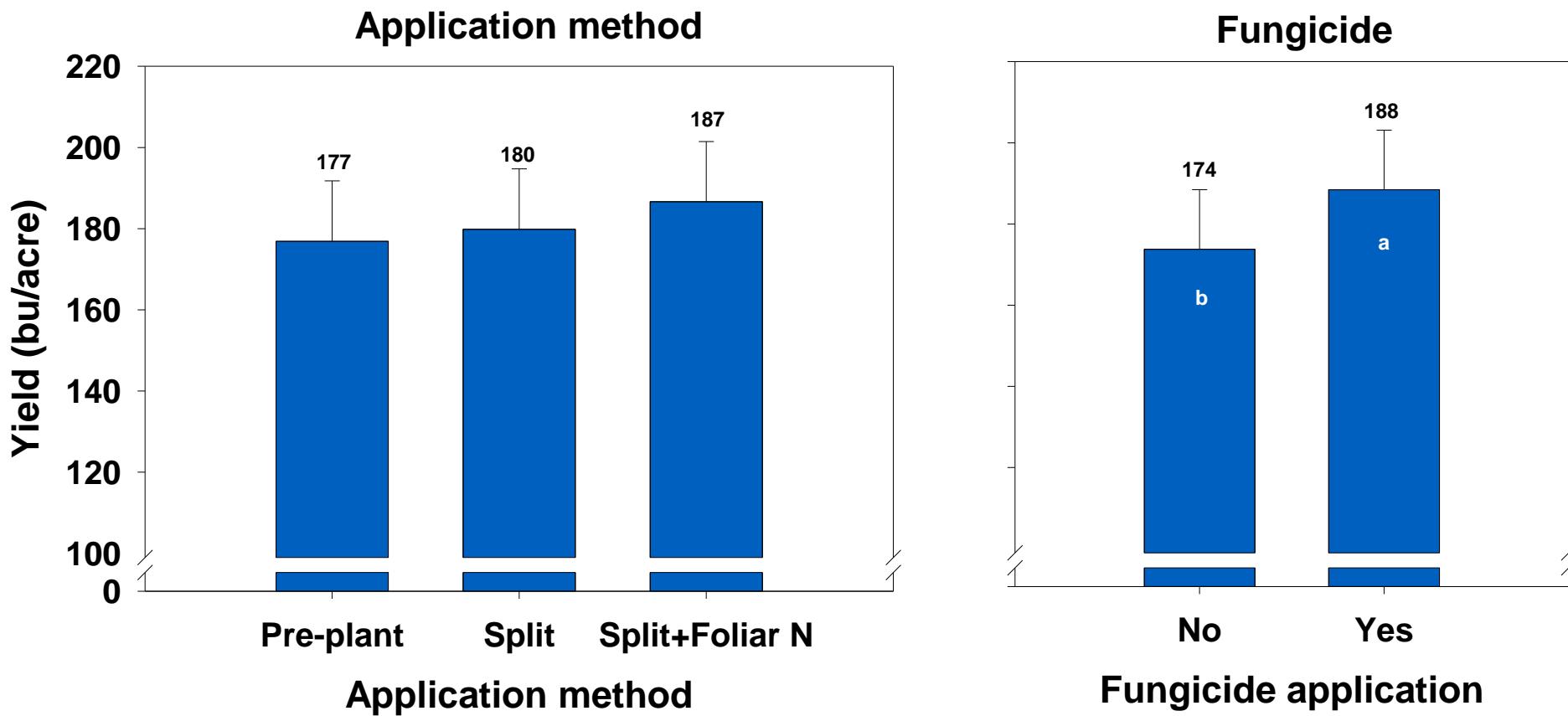
Main effect of N application method and fungicide – Rossville



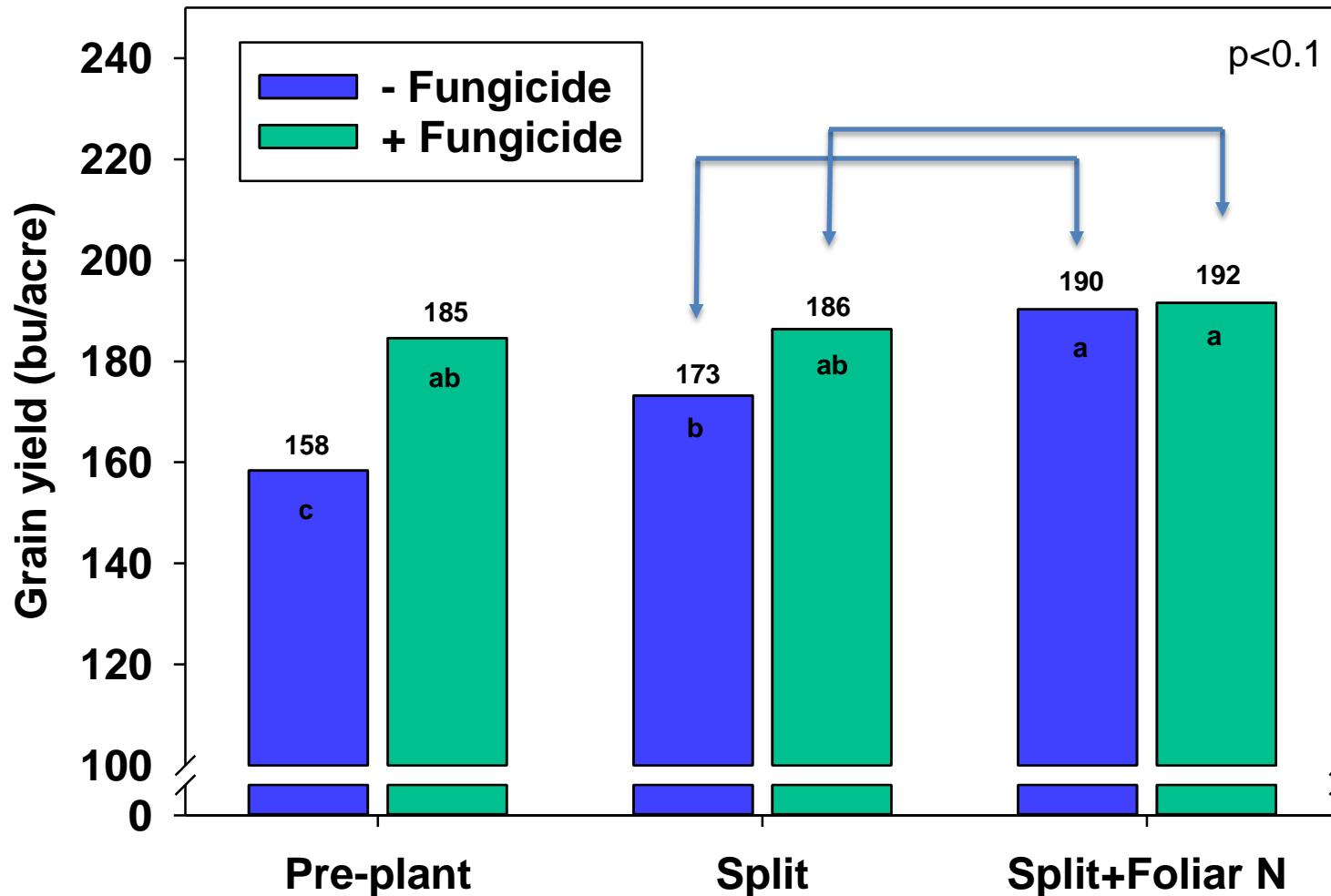
Main effect of N application method and fungicide – Scandia



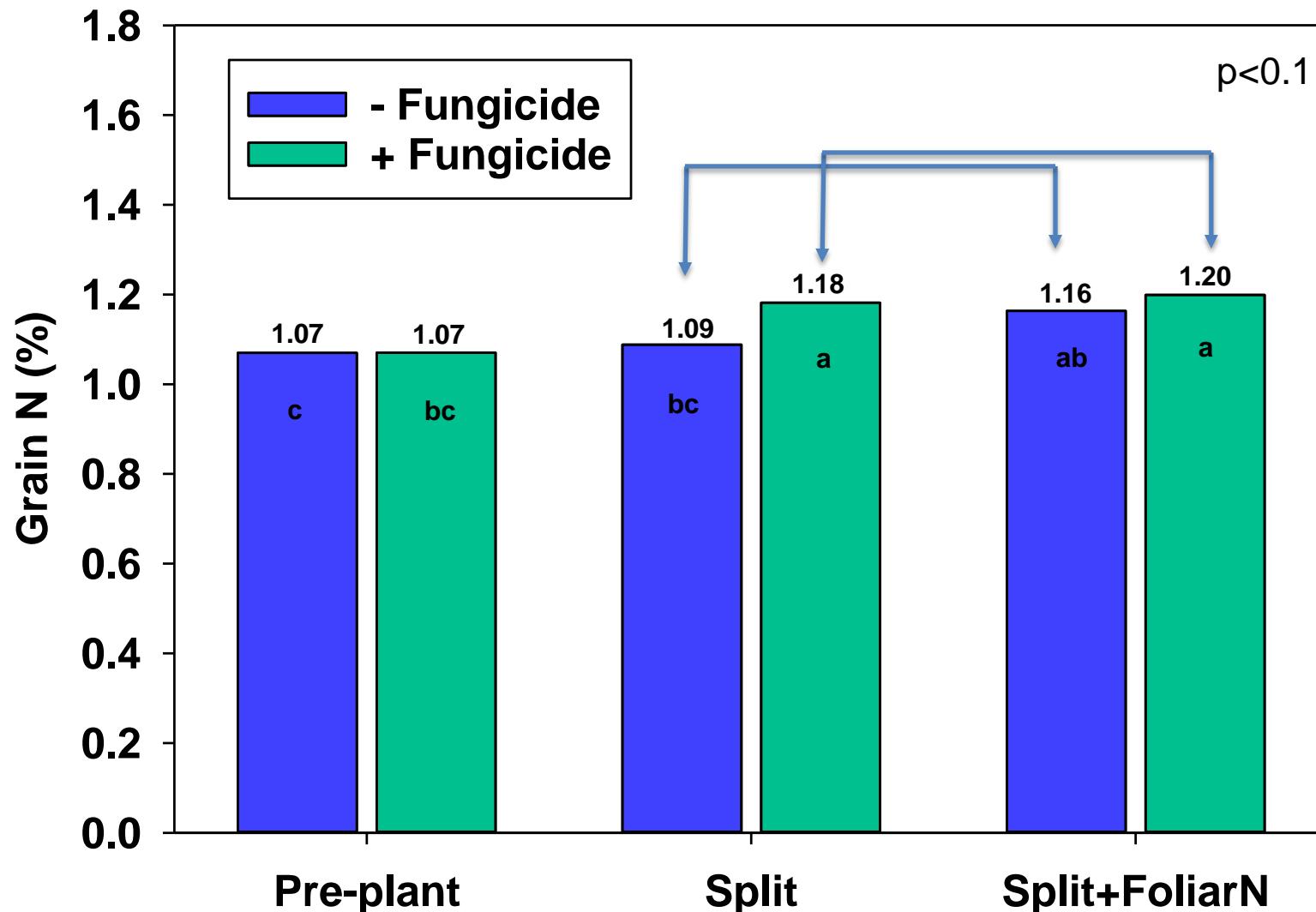
Main effect of N application method and fungicide – All locations



Foliar N and fungicide application with the 200 lbs N/a rate across locations



Foliar N and fungicide application with the 200 lbs N/a rate across locations



Additional measurements

- Total plant N uptake.
- Nitrogen Use Efficiency (lb/lb)
 - Grain weight / N supplied.
- Utilization Efficiency (lb/lb)
 - Grain weight / Total N in plant.
- Uptake Efficiency (%)
 - $(\text{Total N in plant} / \text{N supplied}) \times 100$.
- Nitrogen Recovery (%)
 - $[\text{N uptake (fertilized plot)} - \text{N uptake (0-N plot)}] / [\text{N applied}] \times 100$.
- Nitrogen Harvest Index (%)
 - $(\text{Grain N content} / \text{N total in plant}) \times 100$.



Summary – Year 1

- Preliminary results showed soil-applied N post-flowering can provide N for corn uptake.
- Consistent response to fungicide application for all locations in 2016.
- Triazole-based foliar N showed positive results in 2016 (minimized when fungicides are used).



Summary – Year 1

- High yielding irrigated as well as rain-feed conditions may benefit from late N application.
- N movement to the root zone for uptake can be a limitation under dryland?
- Evaluation of nitrogen use efficiency under different management systems.



Thank you! Questions?

@SoilFertilityKS

ruizdiaz@ksu.edu
785-532-6183



www.agronomy.ksu.edu/extension/

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