Efficient Fluid Fertilizer Management for Corn Producers with Automatic Guidance Systems

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crop, soil, and environmental sciences

Acknowledgments

Funding:

Fluid Fertilizer Foundation (2006-2008)

Purdue University Mary S. Rice Farm Fund (2007-2008)

Foundation for Agronomic Research (PPI or INPI) 2006

John Deere & Co.

In-kind Laboratory Analysis:

Waters Agricultural Laboratories, GA

Servitech Inc., Dodge City, KS

Equipment:

John Deere Cropping Systems Unit

Case-DMI (Goodfield, IL)

Seed: Pioneer Hi-Bred, Int.

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RTK Automatic Guidance

RTK Guided Strip Tillage and N application

Source: Norm Larson, Elburn Co-op, IL

RTK + Pre-plant UAN Application 2006-2008

RTK Planting after Pre-plant UAN
(West Lafayette, 2006)

Treatment Description for RTK Guided Row Positions Relative to Pre-plant UAN

- UAN rates (0, 50, 100, 200 N per acre)
- Positions (0”, 5”, and 10” from UAN band)
- Two locations in 2006-2008: 1. Wanatah (loam), and 2. West Lafayette (silty clay loam)
- Third location in 2007-2008: Lafayette, IN (silt loam)
- Starter versus no starter split at West Lafayette and Lafayette: 10-34-0 at 220 pounds/acre.
- Starter at Wanatah: 19-17-0 at 125 pounds/acre
- All treatments received a total of 200 pounds of N as UAN (whether pre-plant and/or early sidedress)

RTK and Pre-plant UAN at Wanatah, IN

50 N at 0” versus 200 N at 0”

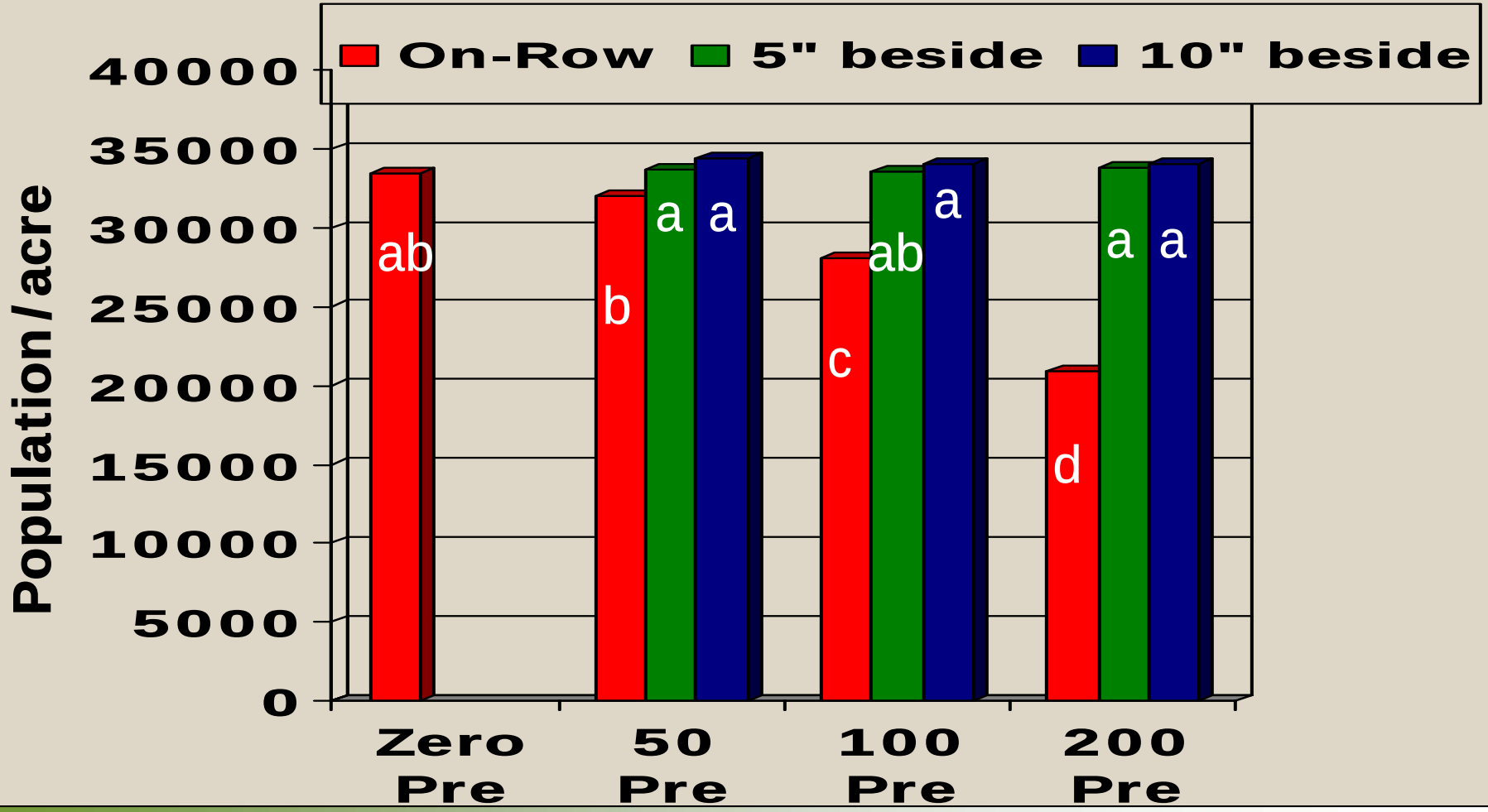
100 N at 0” versus 100 N at 10”

RTK and Pre-plant UAN at Wanatah, IN, 2006

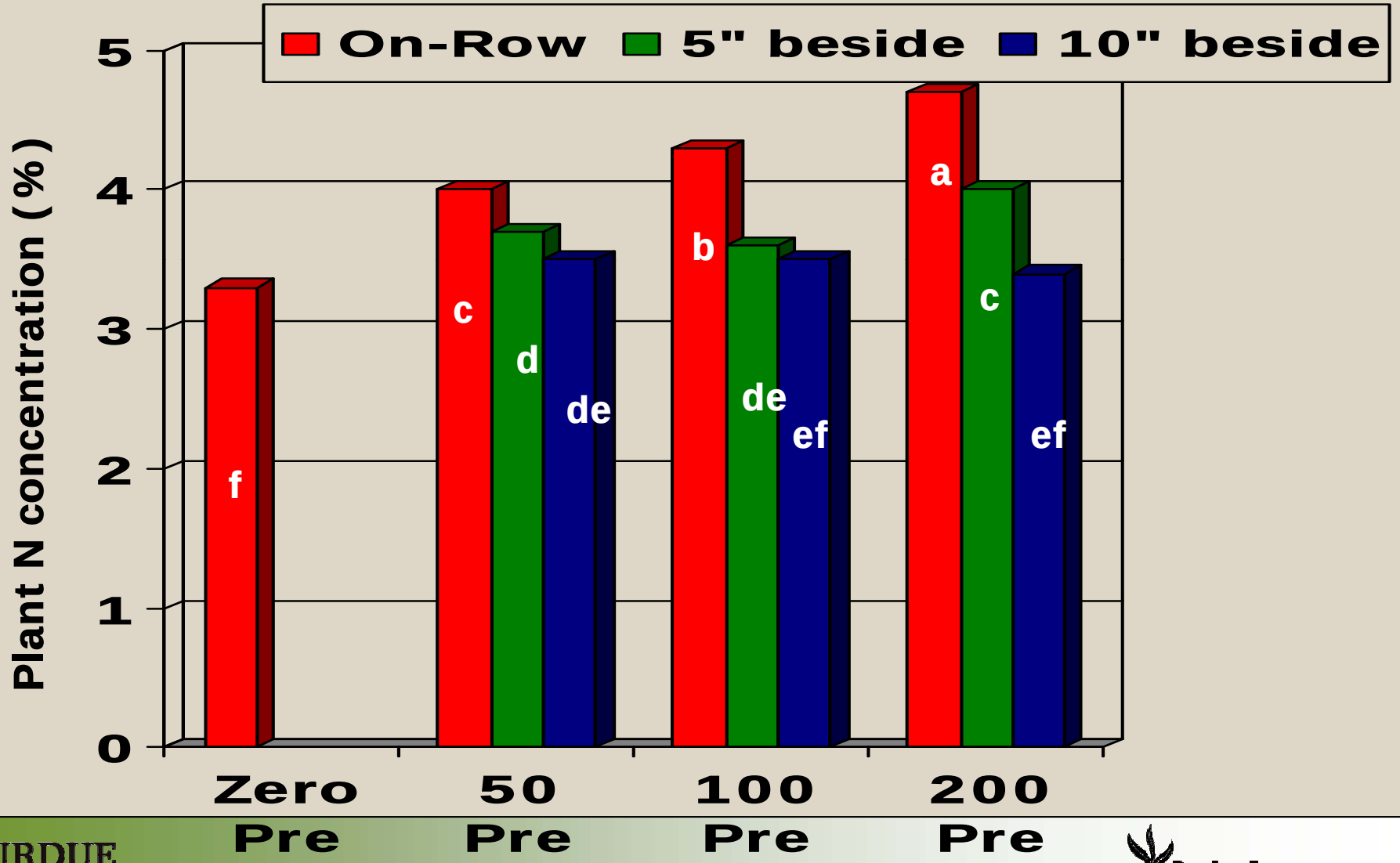
200 N at 5” versus 200 N at 0”

200 N at 5” (background) vs. 200 N at 0” (foreground)

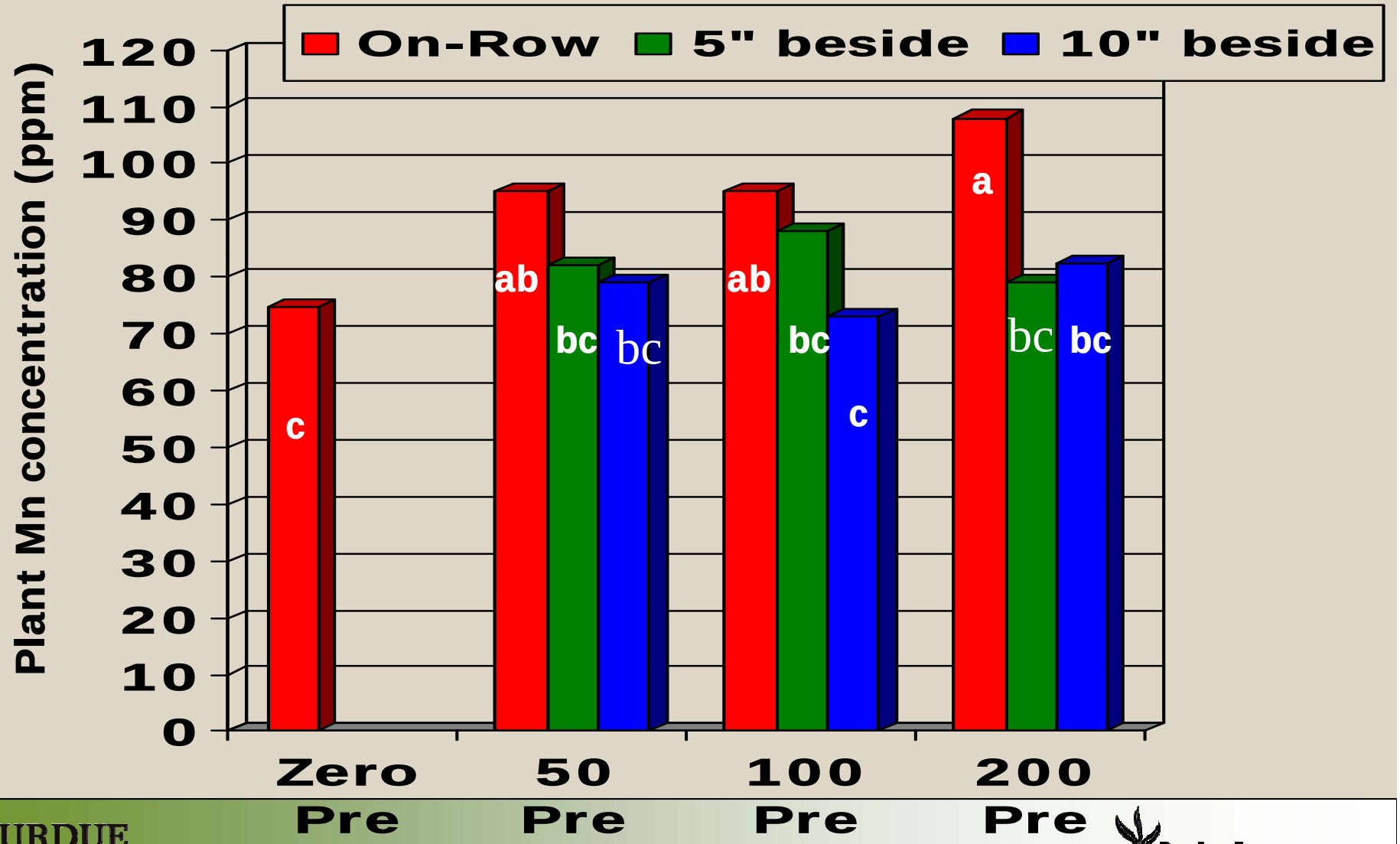
RTK Row Position Effects on Plant Population Response to Pre-Plant UAN Rates Wanatah, IN, 2006-2008



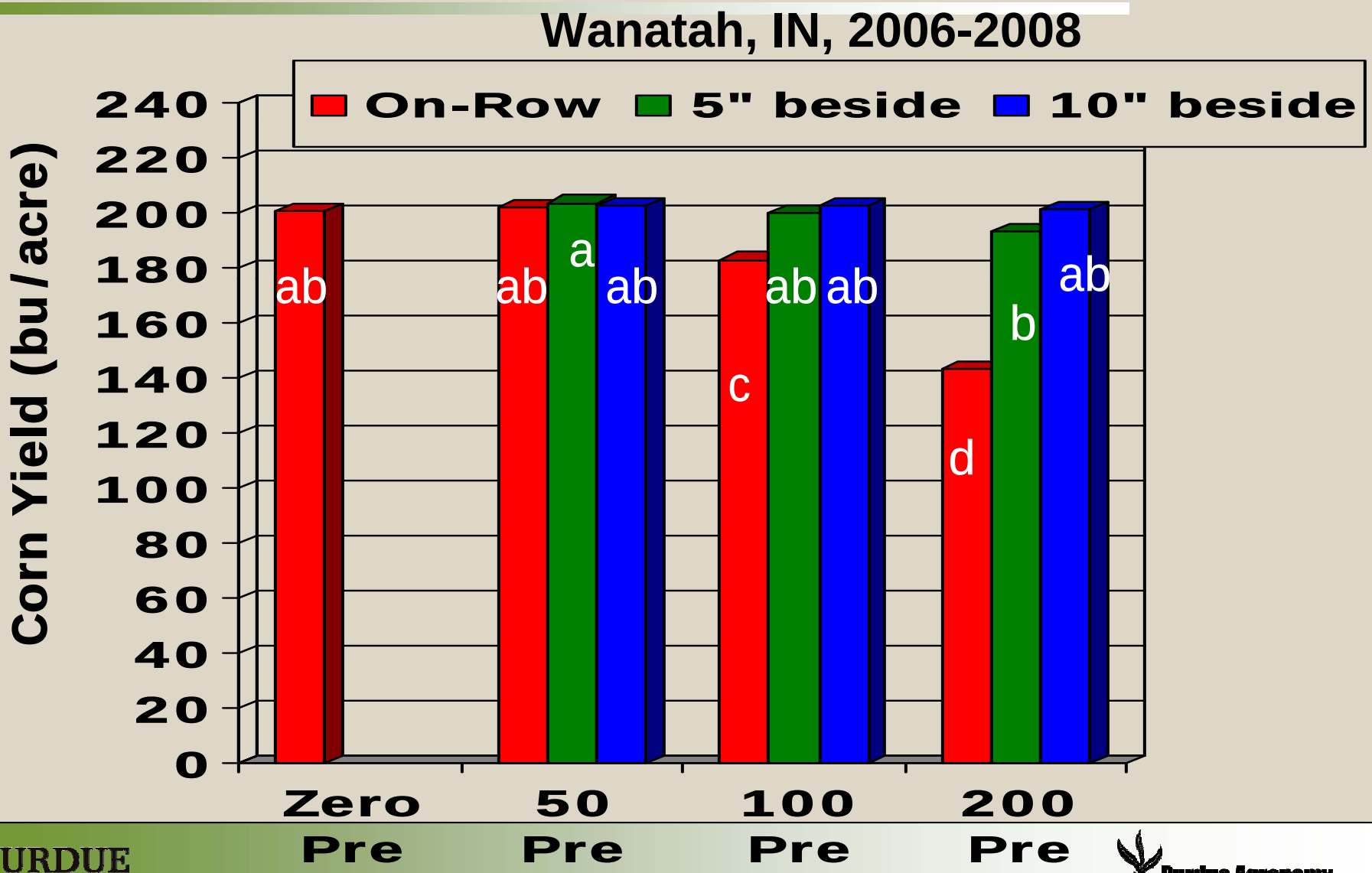
RTK Row Position & V8 Plant N Concentration (%) Response to Pre-Plant UAN Rates Wanatah, IN, 2006-2008



RTK Row Position & Plant Mn Concentration (ppm)
Response to Pre-Plant UAN Rates
Wanatah, IN, 2006-2008 (soil pH=5.5)



RTK Row Position Effects on Corn Yield Response to Pre-Plant UAN Rates



RTK after Pre-Plant UAN at West Lafayette

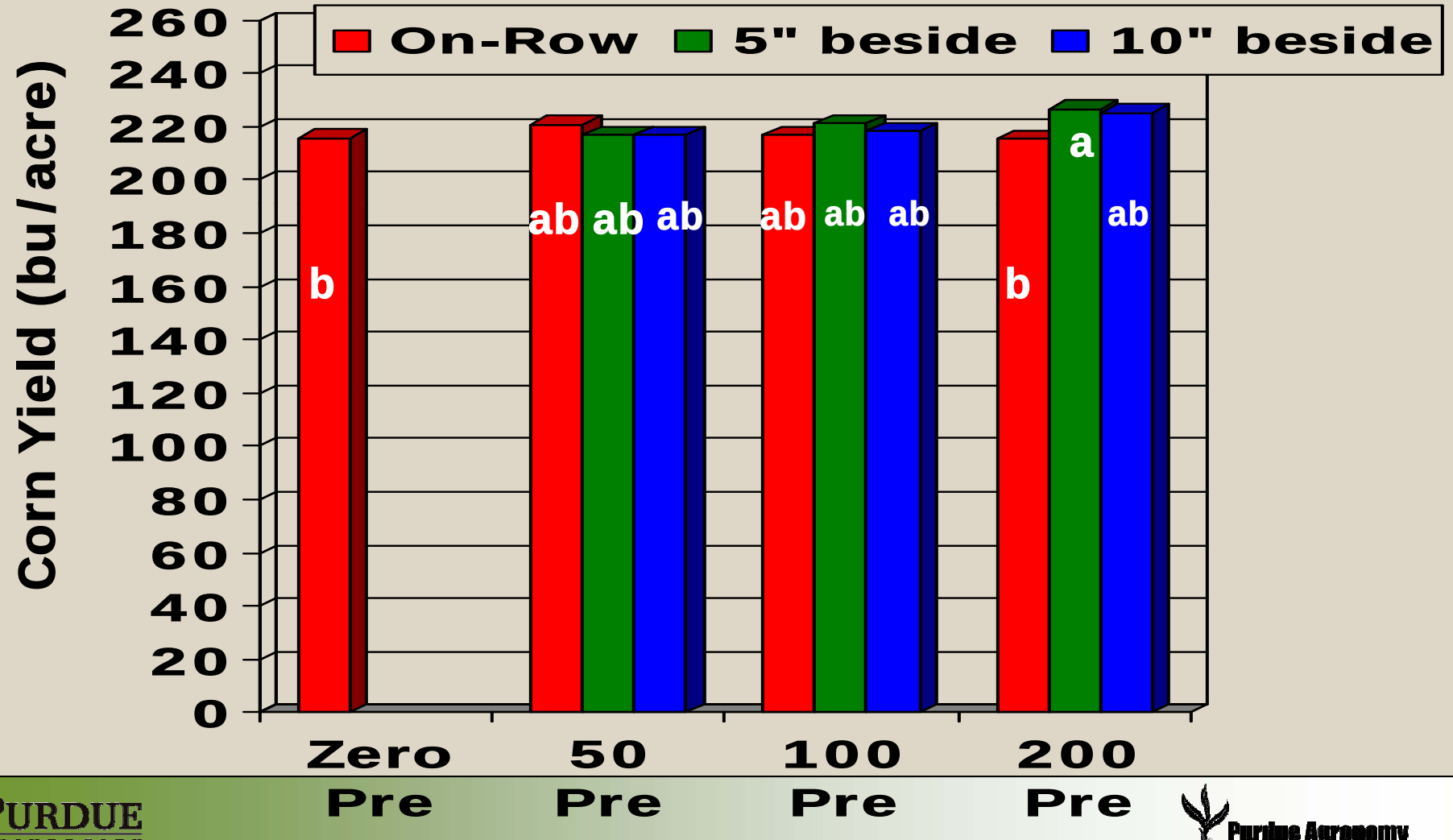
200 N @ O” w/o & w Starter

200 N @ 0”

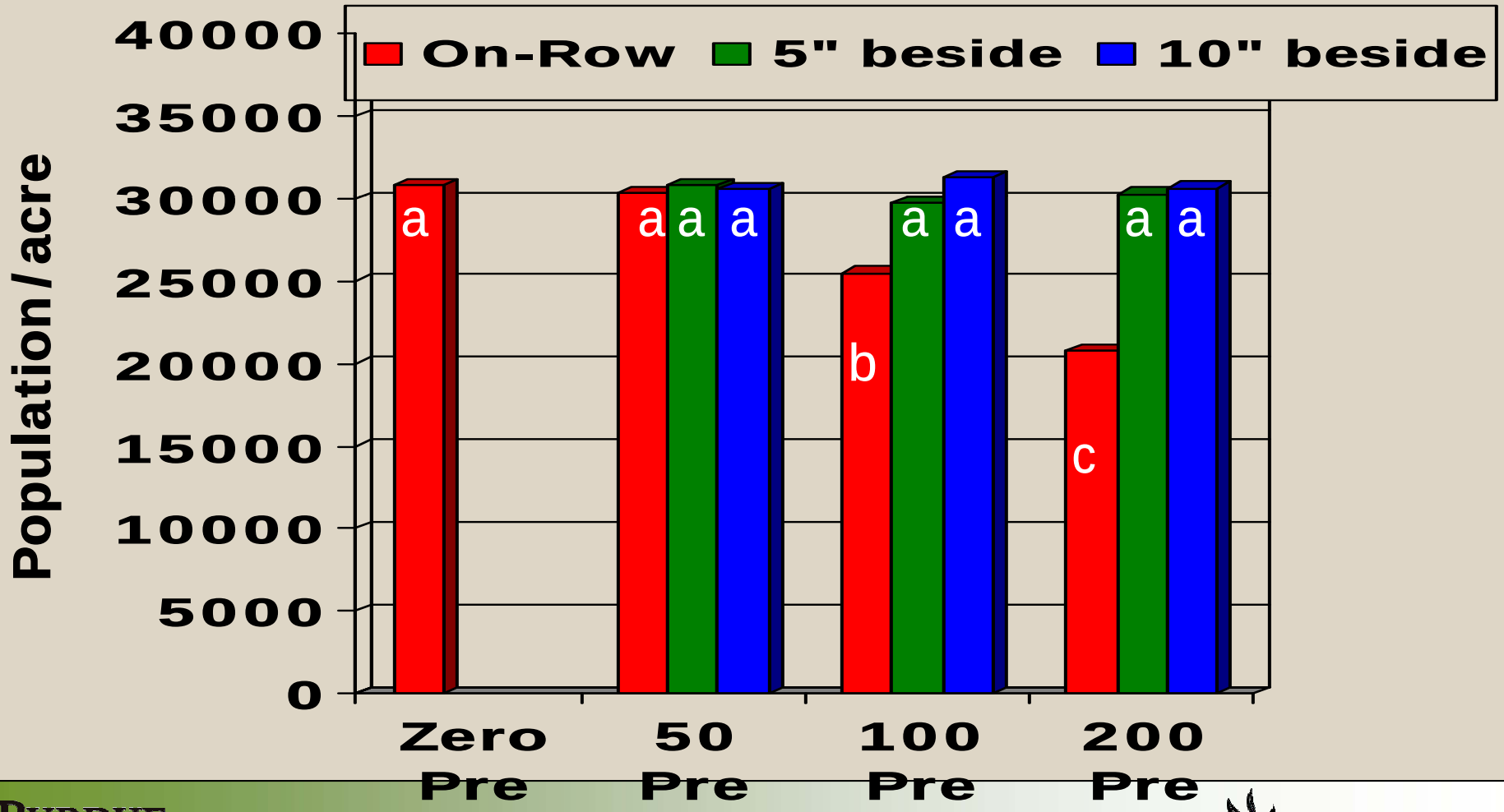
200 N @ 10”

RTK Row Position Effects on Corn Yield Response to Pre-Plant UAN Rates (With Starter, Soil-test P=34)

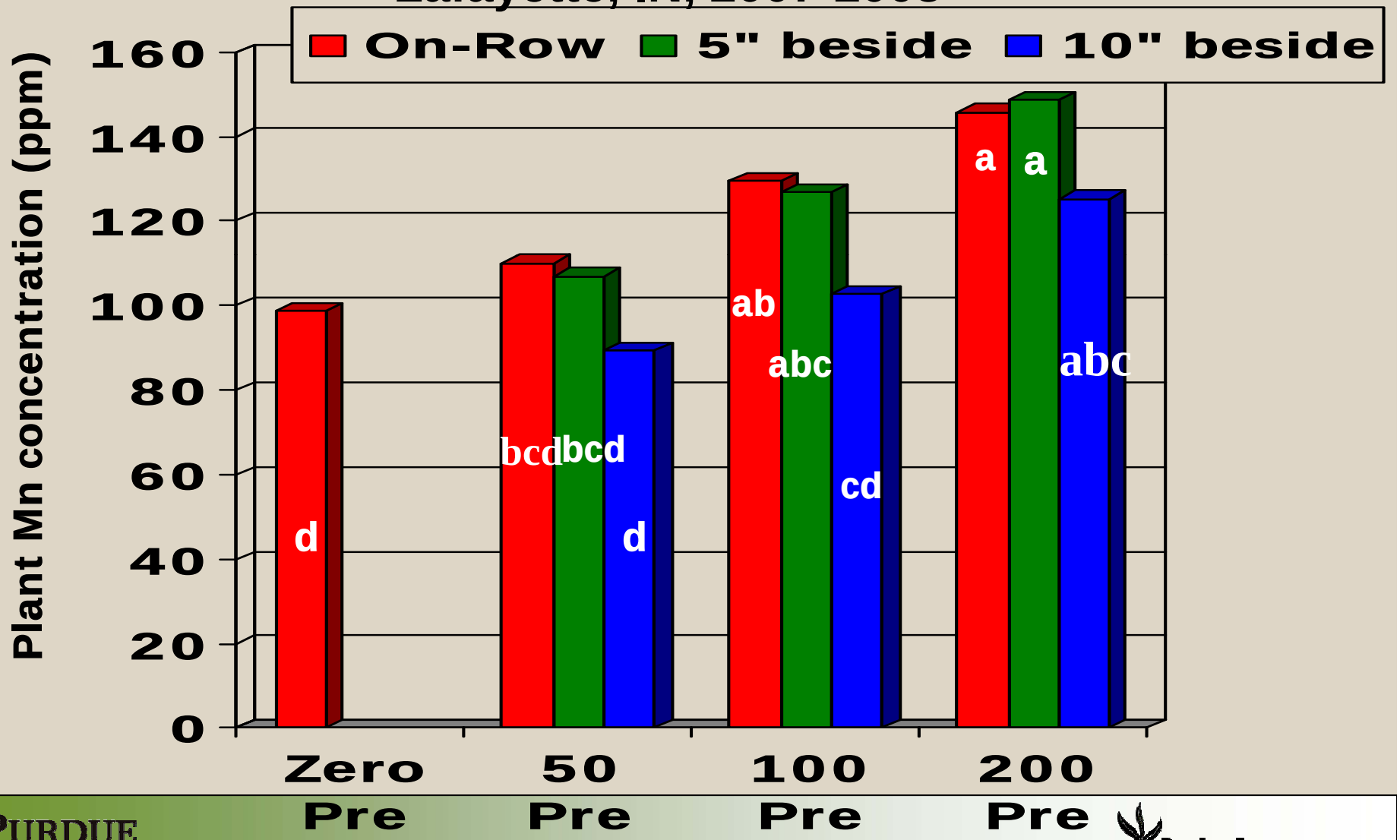
West Lafayette, IN, 2006-2008



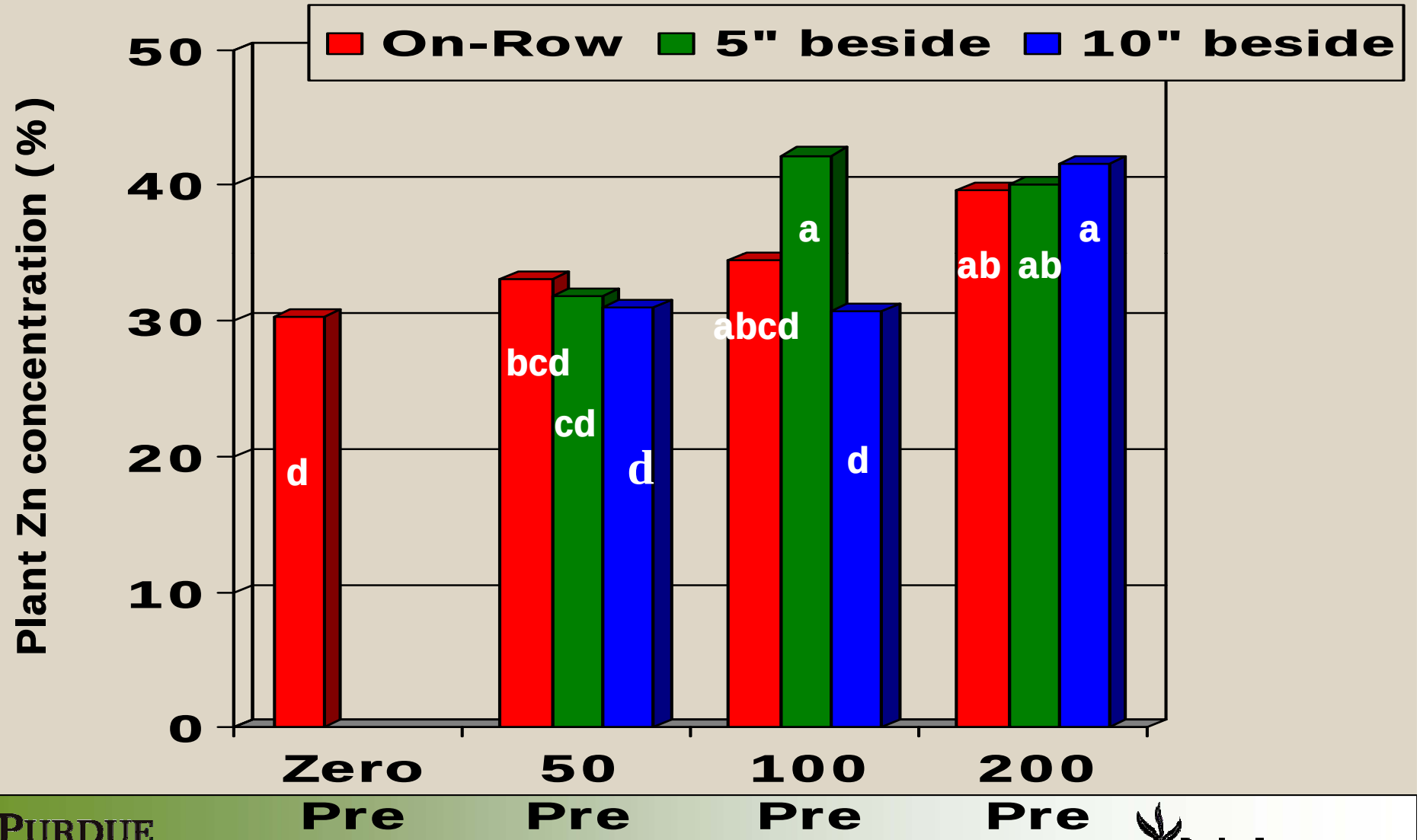
RTK Row Position Effects on Plant Population Response to Pre-Plant UAN Rates Lafayette, IN 2007-2008



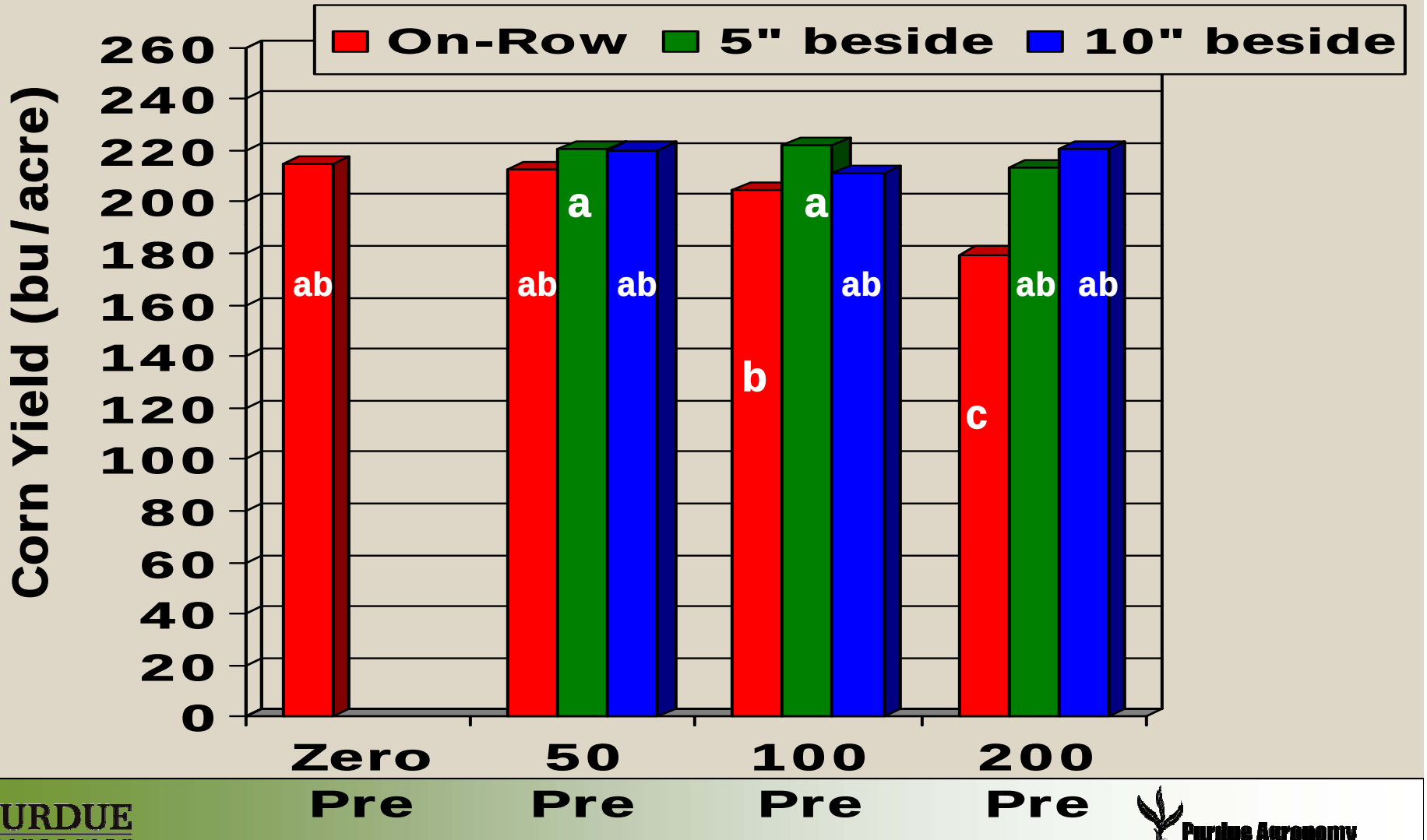
RTK Row Position & V8 Plant Mn Concentration Response to Pre-Plant UAN Rates Lafayette, IN, 2007-2008



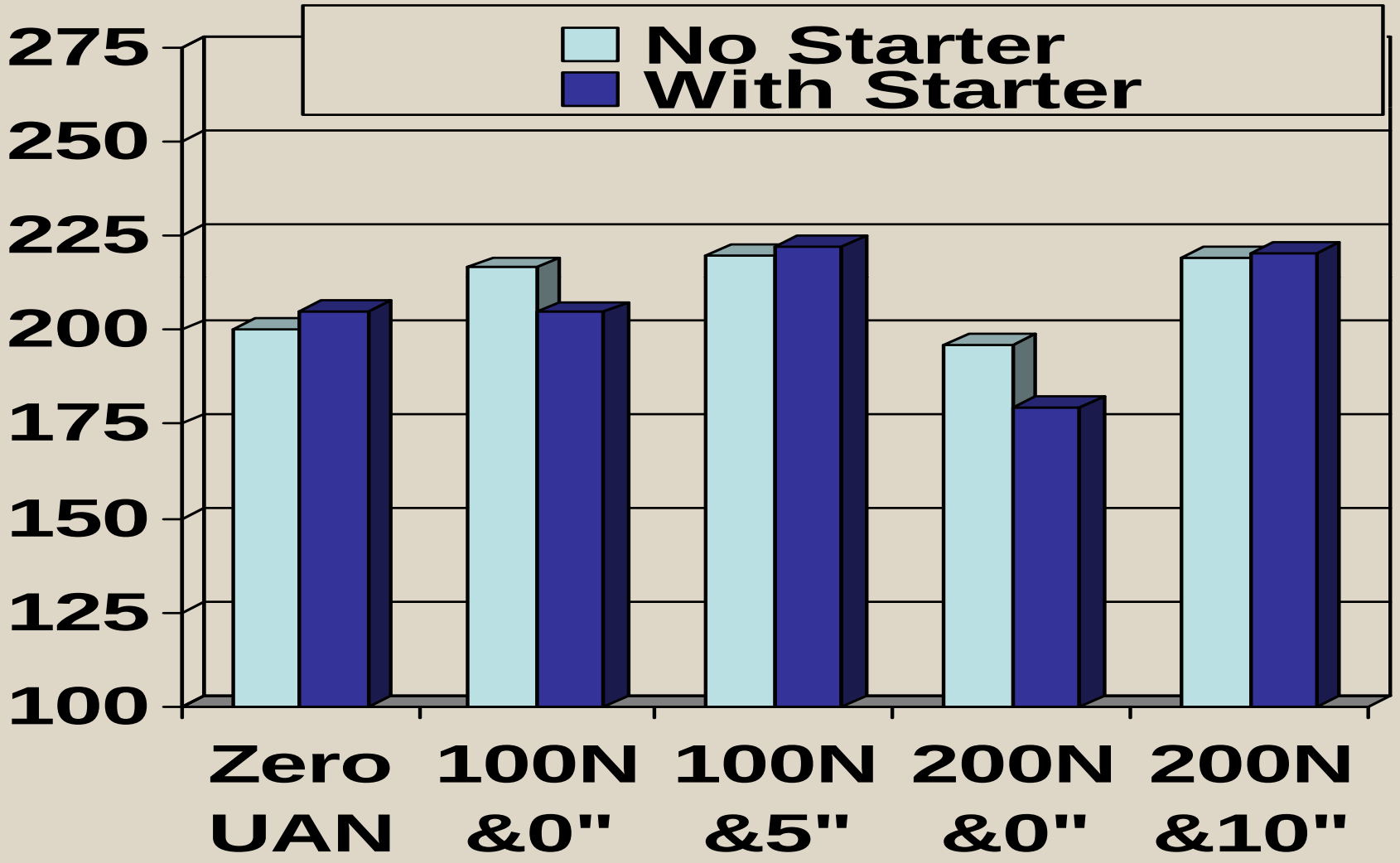
RTK Row Position & Plant Zn Concentration Response to Pre-Plant UAN Rates Lafayette, IN, 2007



RTK Row Position Effects on Corn Yield Response to Pre-Plant UAN Rates (With Starter) Lafayette, IN, 2007-2008



Starter Influence on Corn Yield Response to Row Position at 3 N Rates in 2007-2008 (Soil-test P=43)



Conclusions

1. **RTK precision offers advantages for corn planting after pre-plant UAN application (population, yield).**
2. **When pre-plant N rates in the form of UAN exceed 50 pounds/acre, corn rows 5” to the side are “safer” than those directly over the UAN band.**
3. **Corn yield response to row position relative to pre-plant UAN bands may also depend on starter formulation and rate.**
4. **UAN rate and RTK row position also affect micronutrient concentrations in young corn plants.**

Thanks!

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