How Much More?
Re Thinking Seed Treatments

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How do we stay innovative?

- Continue to gain knowledge
- Be global in your local endeavors
- Challenge your comfort level
- Test the ideas with-in the system
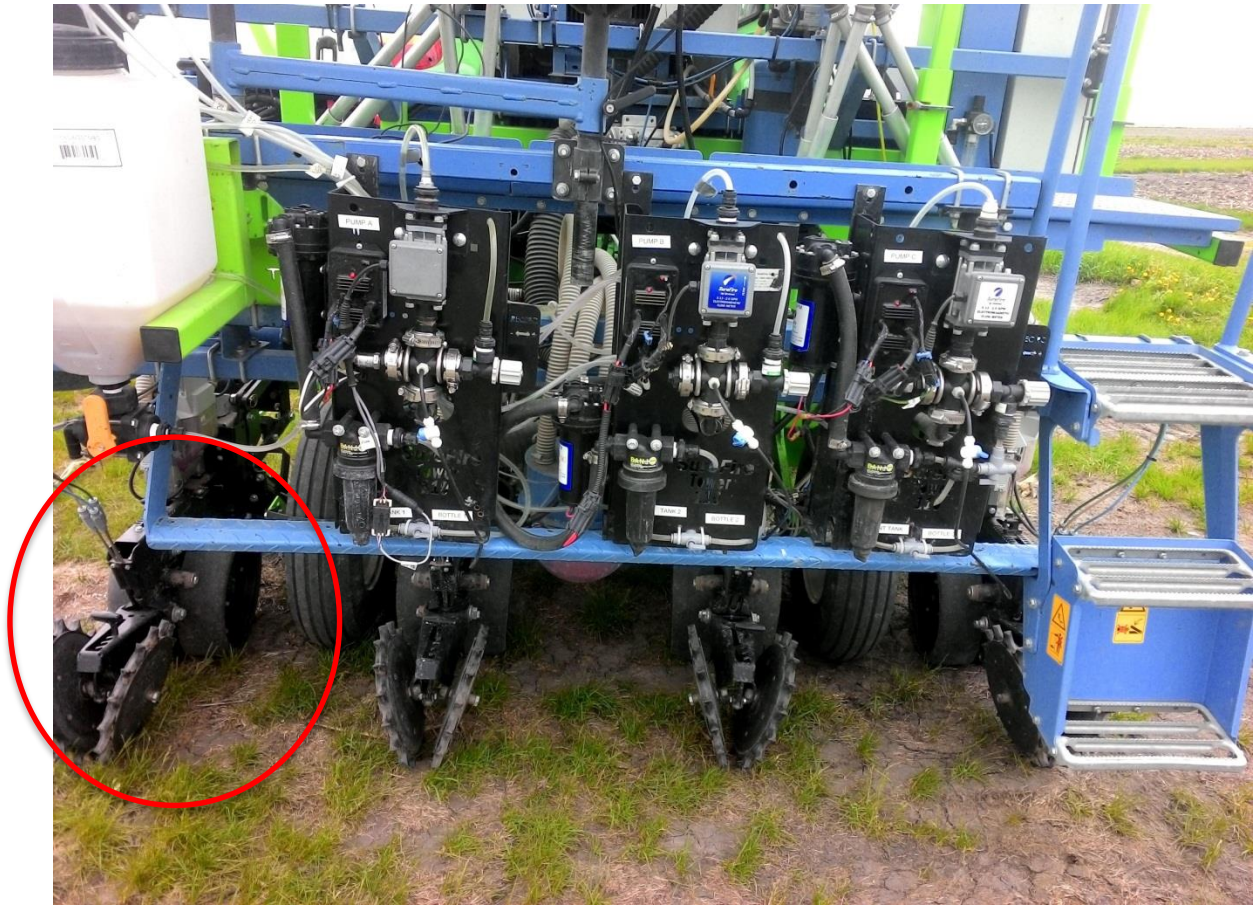- Be open to new technology and processes
- Be a student of the game

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State of Seed Treatments

- Common
  - Insecticide and Fungicide
  - Flow Adjuvants
- New
  - PGR
  - Bio stimulants
  - Nutrients
  - Biologicals

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Have We Reached Our Limits

- Dust Issues
- Stand Issues
  - Can the current planters handle more?
- Compatibility Issues
- Application Issues
  - Who
    - More Down Stream = Retailers
- Efficacy Issues
  - Nutrient x Biological Interactions
  - Long term stability
- Negative affect on germination
  - Carry over seed inventory

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Re Think

- What are we trying to accomplish
  - Less a.i. per acre
  - Secure sale/revenue
- Seed Coating on Broad Acre Crops?
  - Seed Load
  - Protect germ – Carry over inventory
  - Stands
  - Reduce Dust
- Is the Seed the Right Place?
  - In Furrow Seed Dressing
    - Agronomy
    - ROI
    - Efficacy
    - Dust
    - Sustainable

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In Furrow Seed Dressing

Corn – 30" rows, 15 lb/a P₂O₅
3.75 gallons/acre 10-34-0
0.87" between drops of fertilizer

Liquid Fertilizer Material

Corn – 30" rows, 20 lb/a P₂O₅
5.0 gallons/acre 10-34-0
0.65" between drops of fertilizer

Wheat – 7" rows, 15 lb/a P₂O₅
29 lb/a MAP fertilizer
2.5" between MAP particles

Dry Fertilizer Material

Wheat – 7" rows, 20 lb/a P₂O₅
38 lb/a MAP fertilizer
1.9" between MAP particles

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Effects of Zinc 10% and PGR with the Seed*

*CSU 2006

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Yield

Bushels per acre vs Treatment

Treatment	Yield (bu/acre)	Grouping
Acceleron 250	232.06	c
Acceleron 250 + AC ZN	237.56	bc
Acceleron 250 + AC ZN + AGM12037	244.14	ab
Acceleron 250 + AC ZN + 10-34-0	242.11	ab
Acceleron 250 + AC ZN + 10-34-0 + AGM12037	247.95	a

LSD (0.05)=7.619

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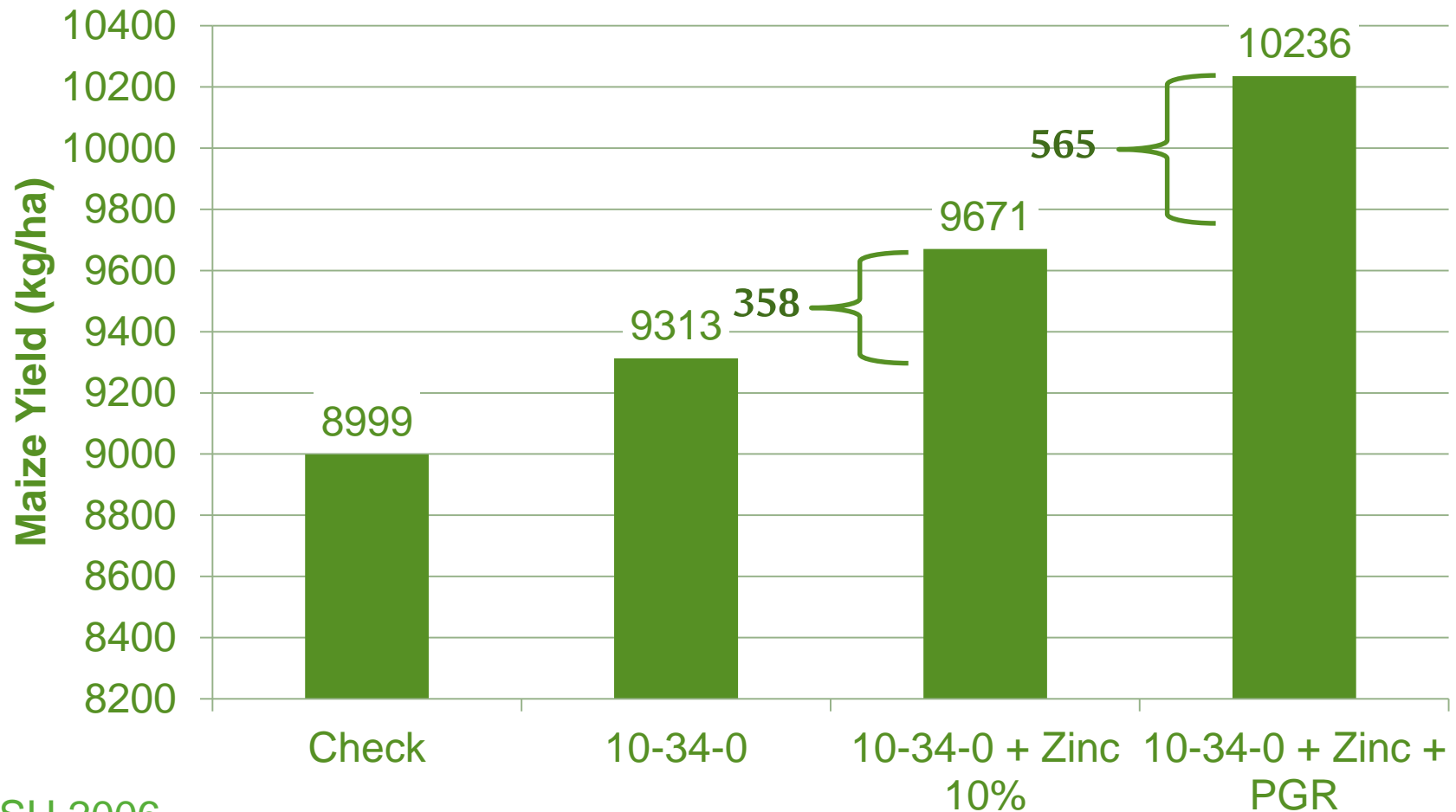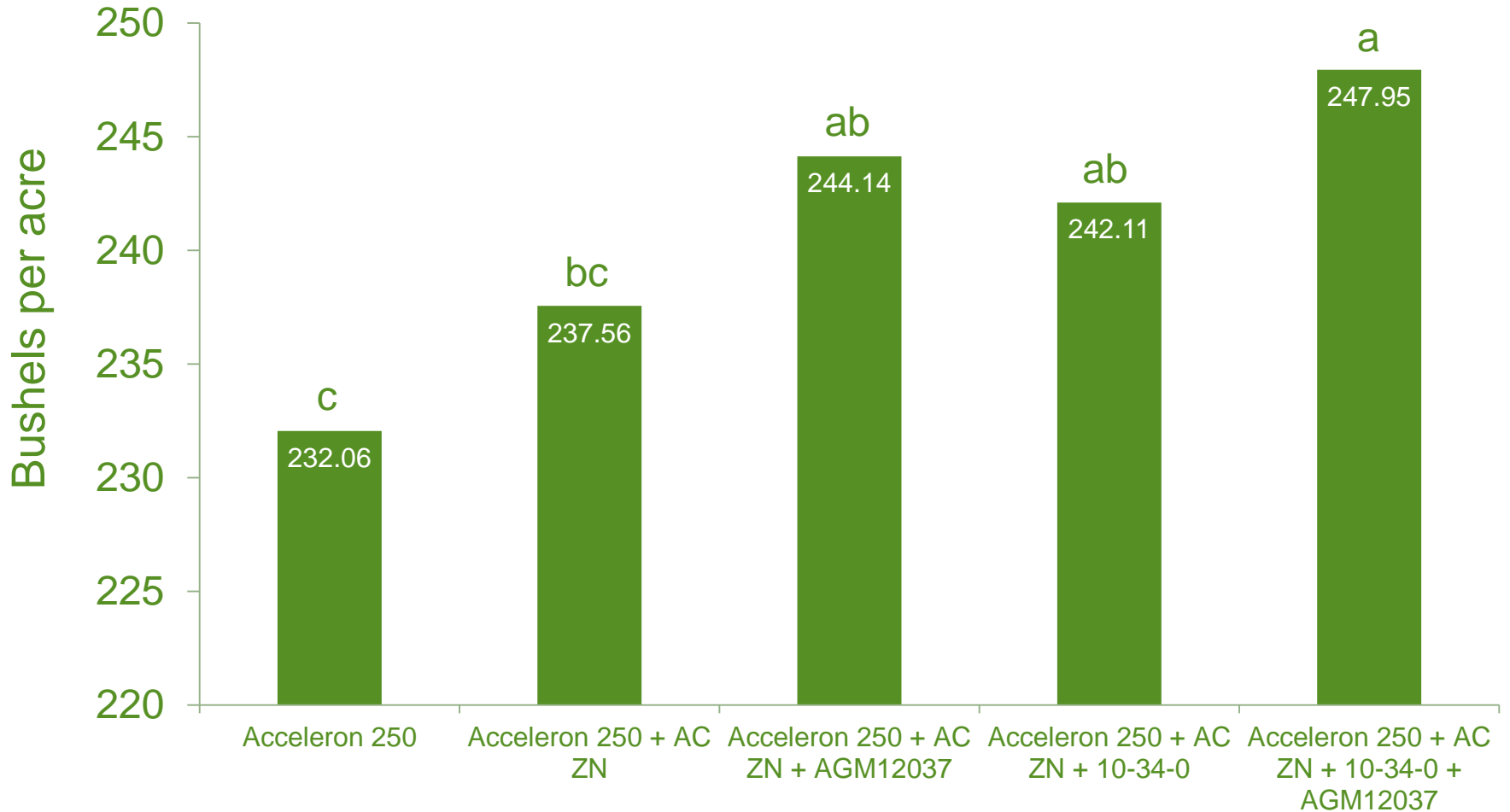
Why?

- ## What Drives Maize Yield
  - Population
    - > Uniform Emergence
      - Maize Yield Starts at Germination
        - Only Get One Chance to Optimize Plant Population
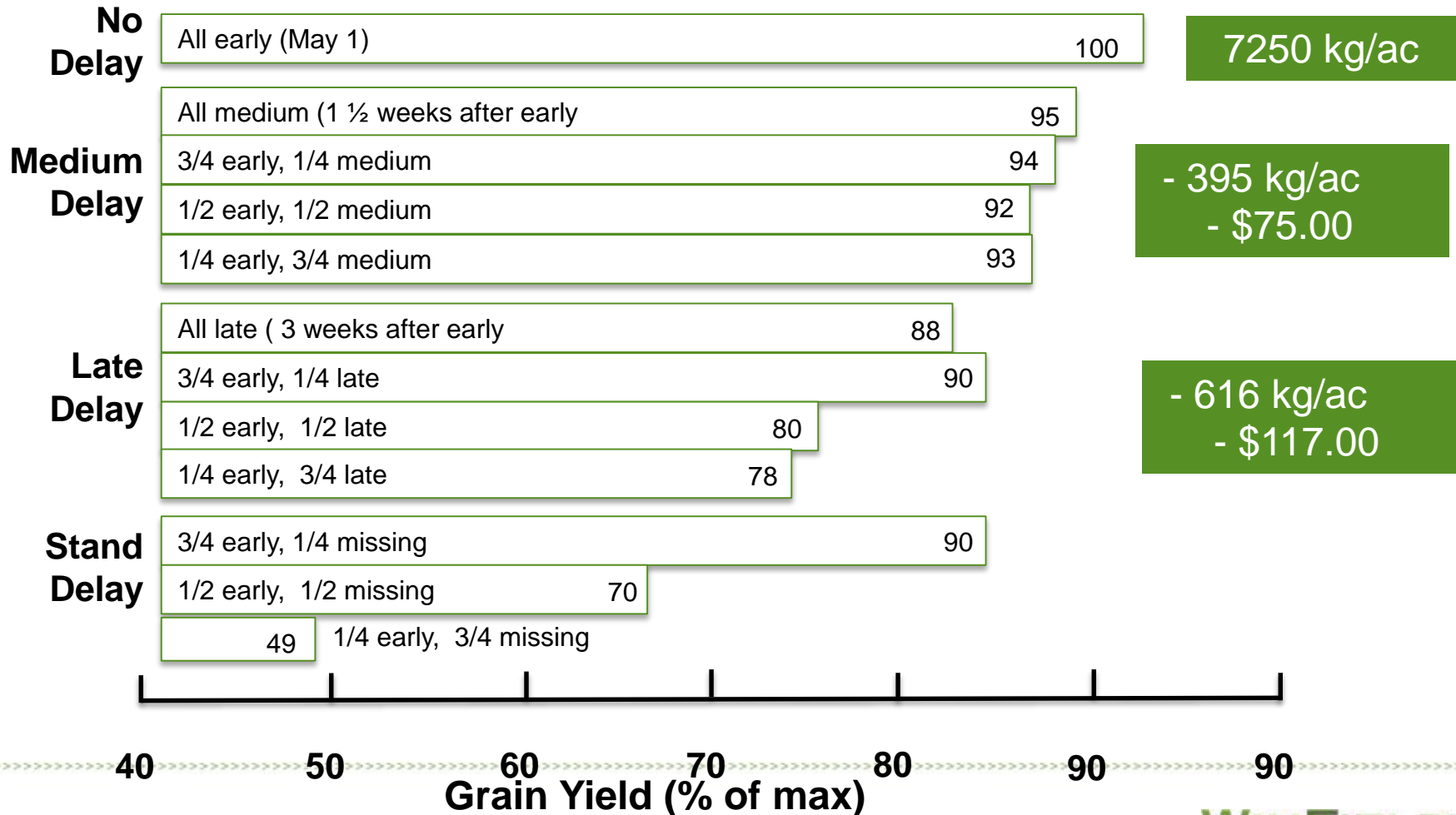   - > Vigorous
      - Establish Early Sink to Source Relationship.
- ## Rate of Nutrient Uptake
  - Establish Root Growth Early
    - > Sink Source
      - Roots Are A Early Season Management.

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It's About Uniformity

Planting Time and Within-row Pattern

Category	Pattern	Grain Yield (% of max)	Summary
No Delay	All early (May 1)	100	**7250 kg/ac**
Medium Delay	All medium (1 ½ weeks after early	95	**- 395 kg/ac** **- $75.00**
	3/4 early, 1/4 medium	94	
	1/2 early, 1/2 medium	92	
	1/4 early, 3/4 medium	93	
Late Delay	All late (3 weeks after early	88	**- 616 kg/ac** **- $117.00**
	3/4 early, 1/4 late	90	
	1/2 early, 1/2 late	80	
	1/4 early, 3/4 late	78	
Stand Delay	3/4 early, 1/4 missing	90	
	1/2 early, 1/2 missing	70	
	1/4 early, 3/4 missing	49	

Grain Yield (% of max)

Axis: 40 — 50 — 60 — 70 — 80 — 90 — 90

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Additional Data

- Emergence delays of about 10 days scattered throughout the field
  - reduced yield 6 to 9% compared to full stands of normal emergence*

- Emergence delays of about 21 days
  - reduced yield 10 to 22% compared to a full stand of normal emergence, depending on the proportion of delayed emergers to normal emergers.*

*Purdue University, Emergence Study

Thought Process

- PGRs
  - Gibberellins
    - Germination
      - mRNA > Amylase > energy
  - Cytokines
    - Emergence
      - Coleoptile
      - LAI
      - Roots
  - Auxins
    - Emergence
      - LAI
      - Roots

- Nutritionals
  - Zn
    - Enzymatic and Amino Acid
  - Phosphorus
    - Phospholipids
    - Nucleotides
- Bio Stimulants
  - Stress
  - Nutrient Use Efficiency

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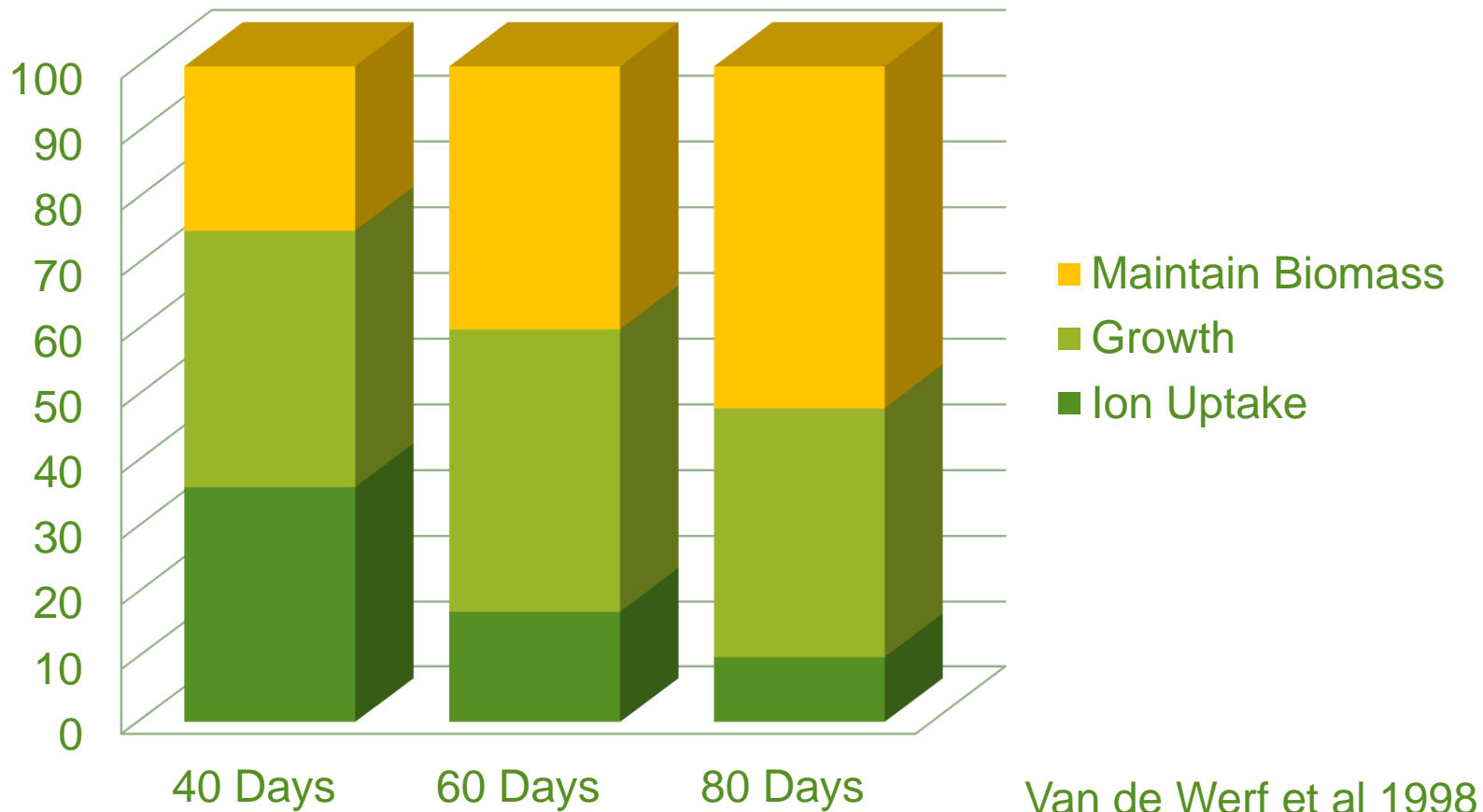Influence of Seed Zn Content on Growth of Bread Wheat on a Zinc-Deficient Soil in Central Anatolia

0.36 µg Zn seed^{-1}

0.80 µg Zn seed^{-1}

1.47 µg Zn seed^{-1}

Source: Ekiz et al., 1998, J. Plant Nutr.

Proportion Of Total ATP (energy) Demand Required

Van de Werf et al 1998

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PGR/Nutrient Seed Dressing
Improves Germination Timing and Consistency

Hybrid: 5757 VT3 w/ CZ 250, AC Zinc, and Ascend

May 11th, 2010

Ceresco, NE
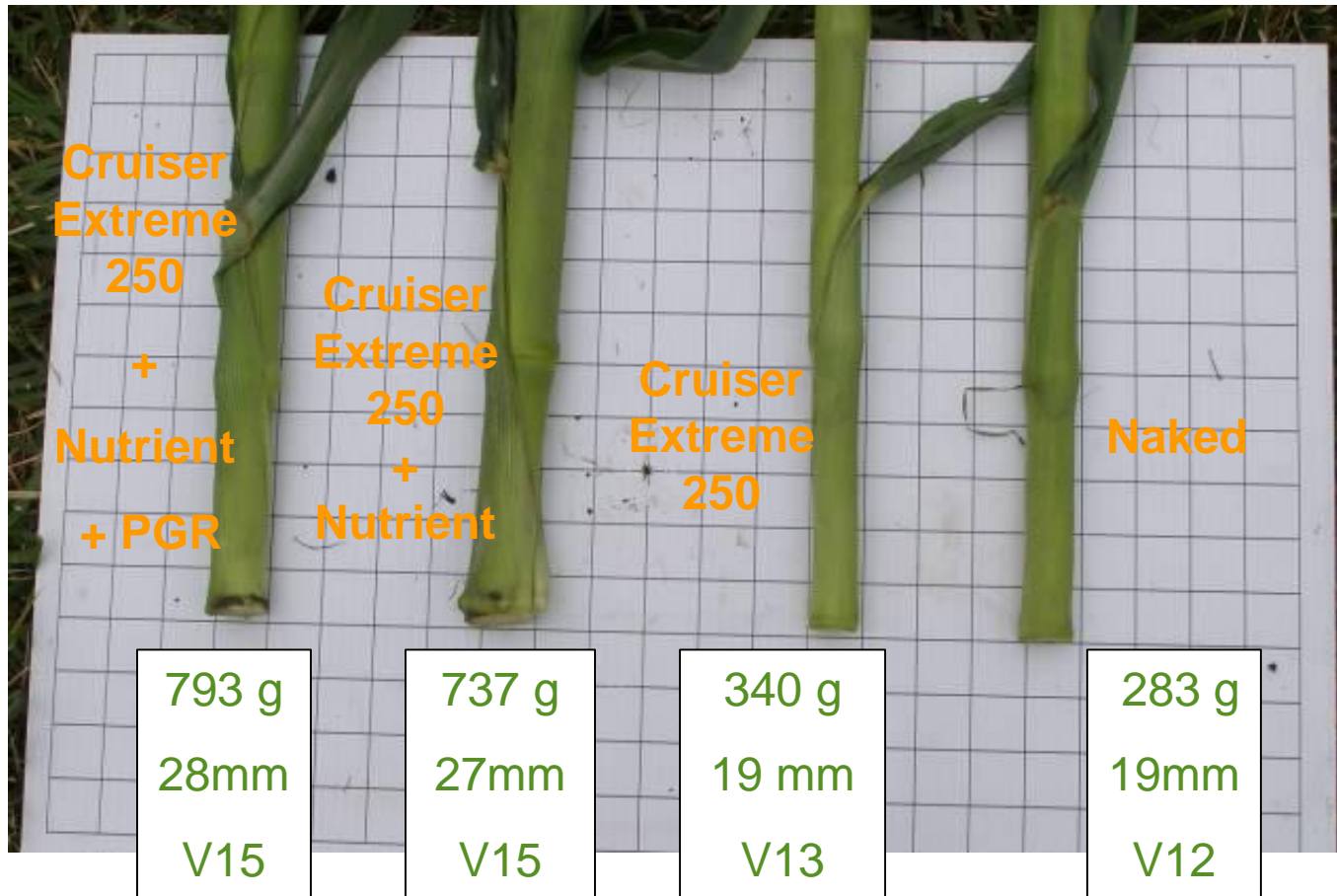
Answer Plot®

Hybrid: 5757 VT3 Check

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Lincoln, IL Answer Plot

Fresh weight of CG 6725 (HY.ur.x N.w.) cut at 6th node
Diameter of stalk at narrowest point between 6th & 7th node

Stage of Growth DOP 5/11 photo 7/18 68 days after planting

Cruiser Extreme 250 + Nutrient + PGR

Cruiser Extreme 250 + Nutrient

Cruiser Extreme 250

Naked

793 g	737 g	340 g	283 g
28mm	27mm	19 mm	19mm
V15	V15	V13	V12

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Early Sink to Source has Season Long Benefits Santiago Answer Plot

Nutrient + PGR Pollinating

Untreated

Not tasseled

Treatments

1. Untreated Check
2. Warden Cereals (5 floz/cwt)
3. Warden Cereals (5 floz/cwt) + Ascend (4 floz/cwt)
4. Warden Cereals HR (5 floz/cwt)
5. Warden Cereals HR (5 floz/cwt) + Ascend (4 floz/cwt)
6. Treatment 5 + ZMC (5 floz/cwt)
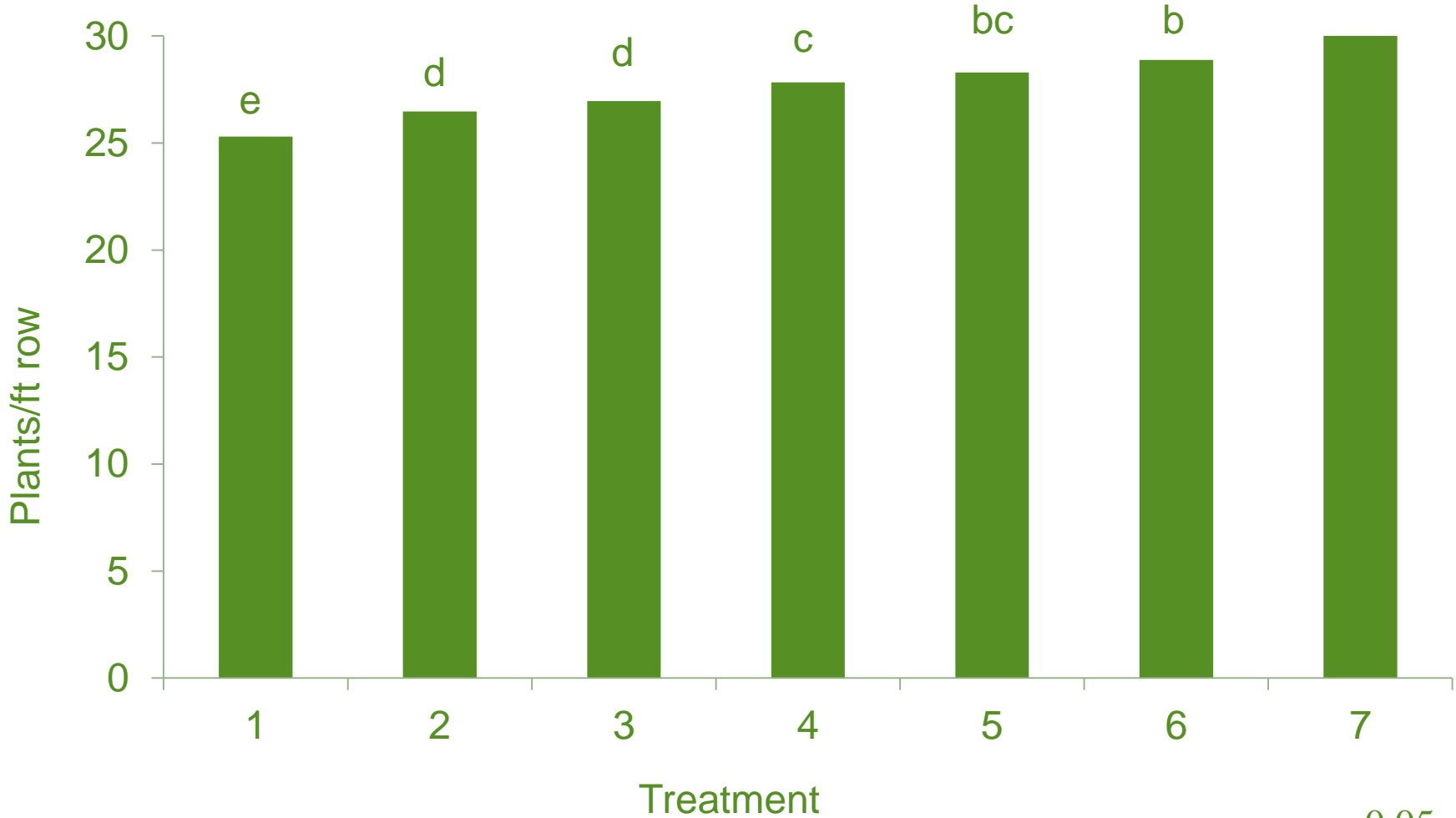7. Treatment 5 + ZMC (5 floz/cwt) + Winfield Experimental Biostimulant (5 floz/cwt)

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Emergence (14DAP)
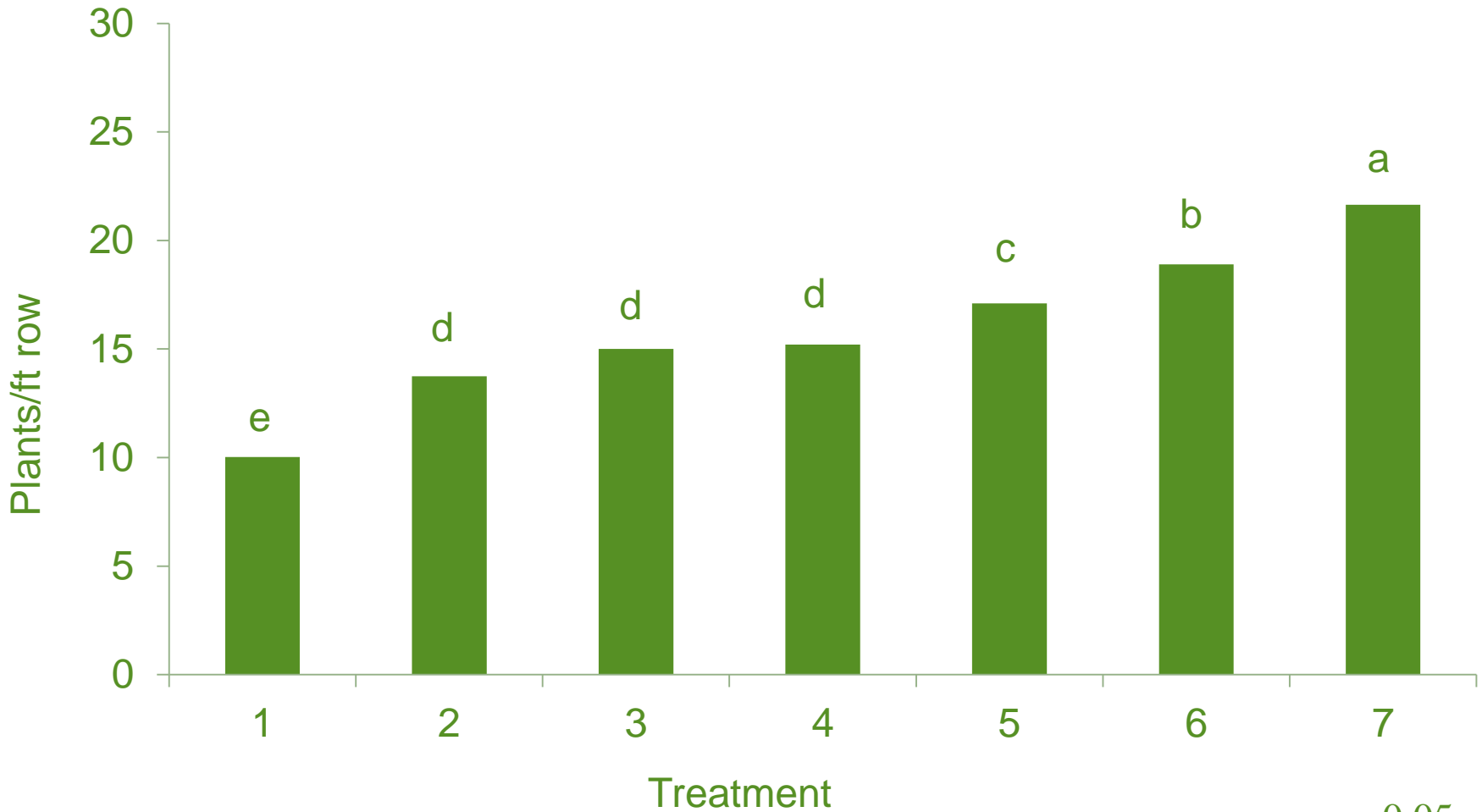
Emergence (28DAP)

*Data presented is a subset from a larger trial.

$\alpha = 0.05$
LSD=0.839

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Yield of Winter wheat (both studies)
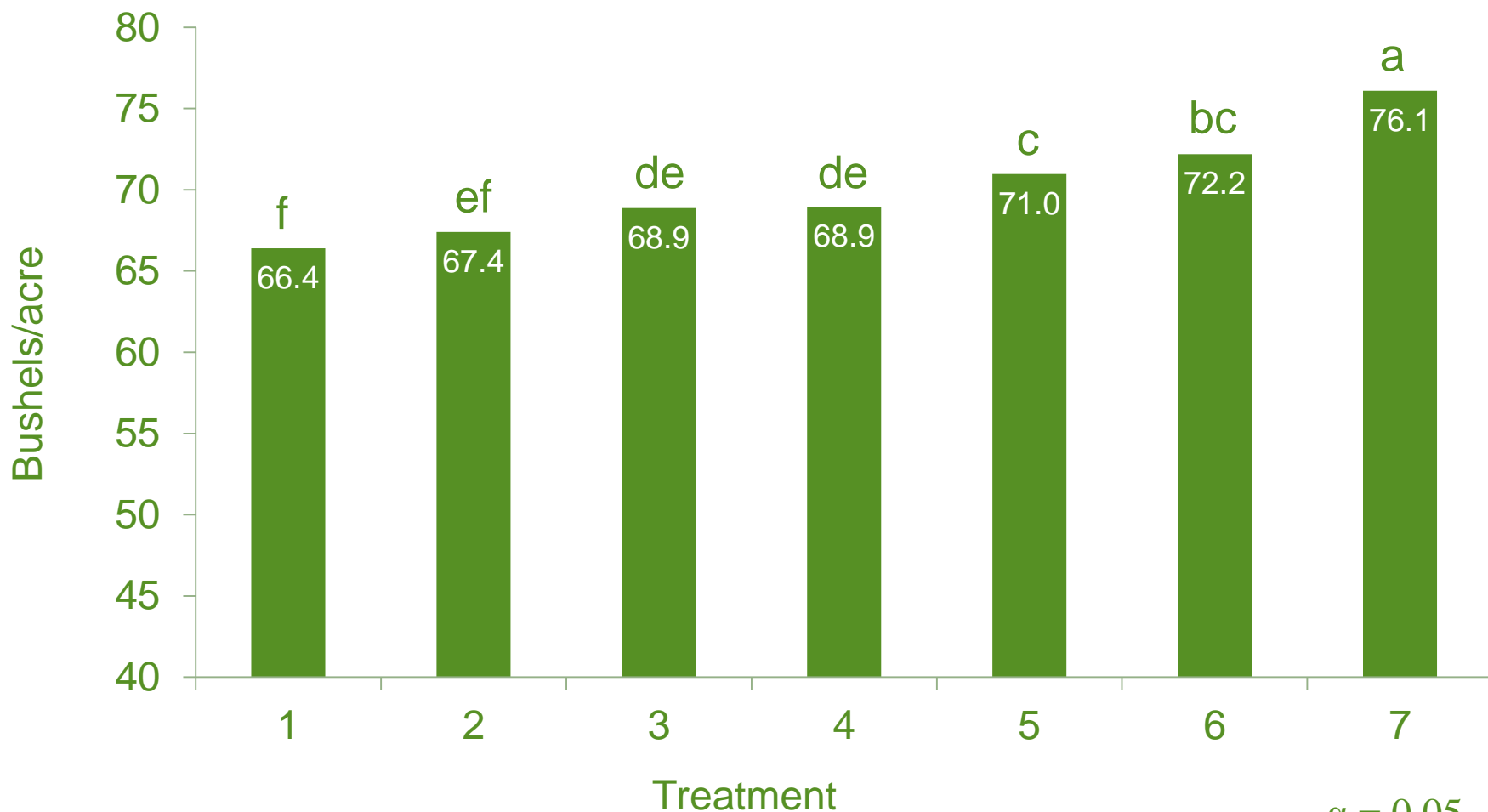
α = 0.05
LSD=1.9

*Data presented is an average from two studies and is a subset from a larger trial.

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PGR Affect on Early Crop Vigor -
Seeded Sept 10, 2011
Kittson County MN

PGR

No treatment

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Zinc Study*

Maize Yield (kg/ha)

Check	Seed 4 oz	Seed 8 oz	10% Starter	ZnSO4
8,415	8,917	10,048	10,110	10,048
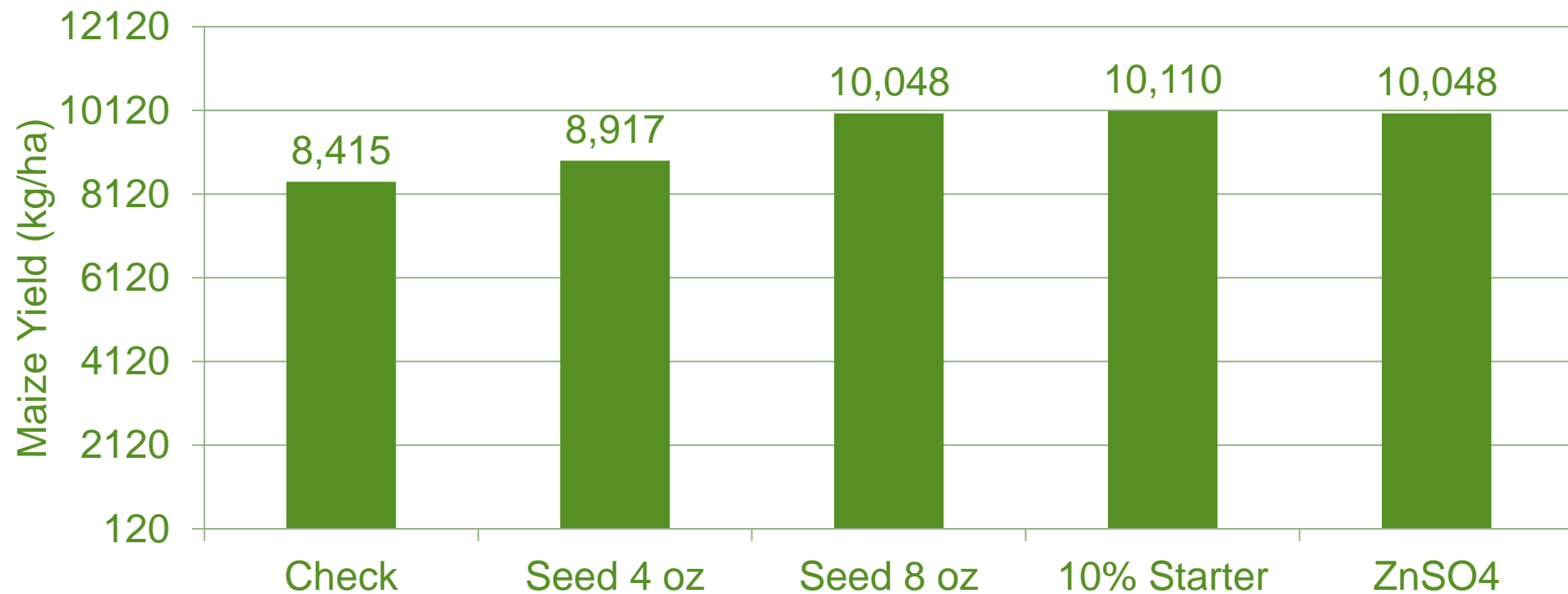
*Rehm, University of MN, 2005   DTPA Zn = 1.1

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2008 Zinc Study - SDSU

Maize Yield (kg/ha)

- Control: 8019 c
- Zinc (10%) 1 qt/A: 8402 b
- Zinc 2 1 qt/A: 8396 b
- Nutrient + PGR 4 oz/A: 8553 ab
- Nutrient + PGR 6 oz/A: 8754 a
- AGM 6023 at 2 qts/A: 8597 ab
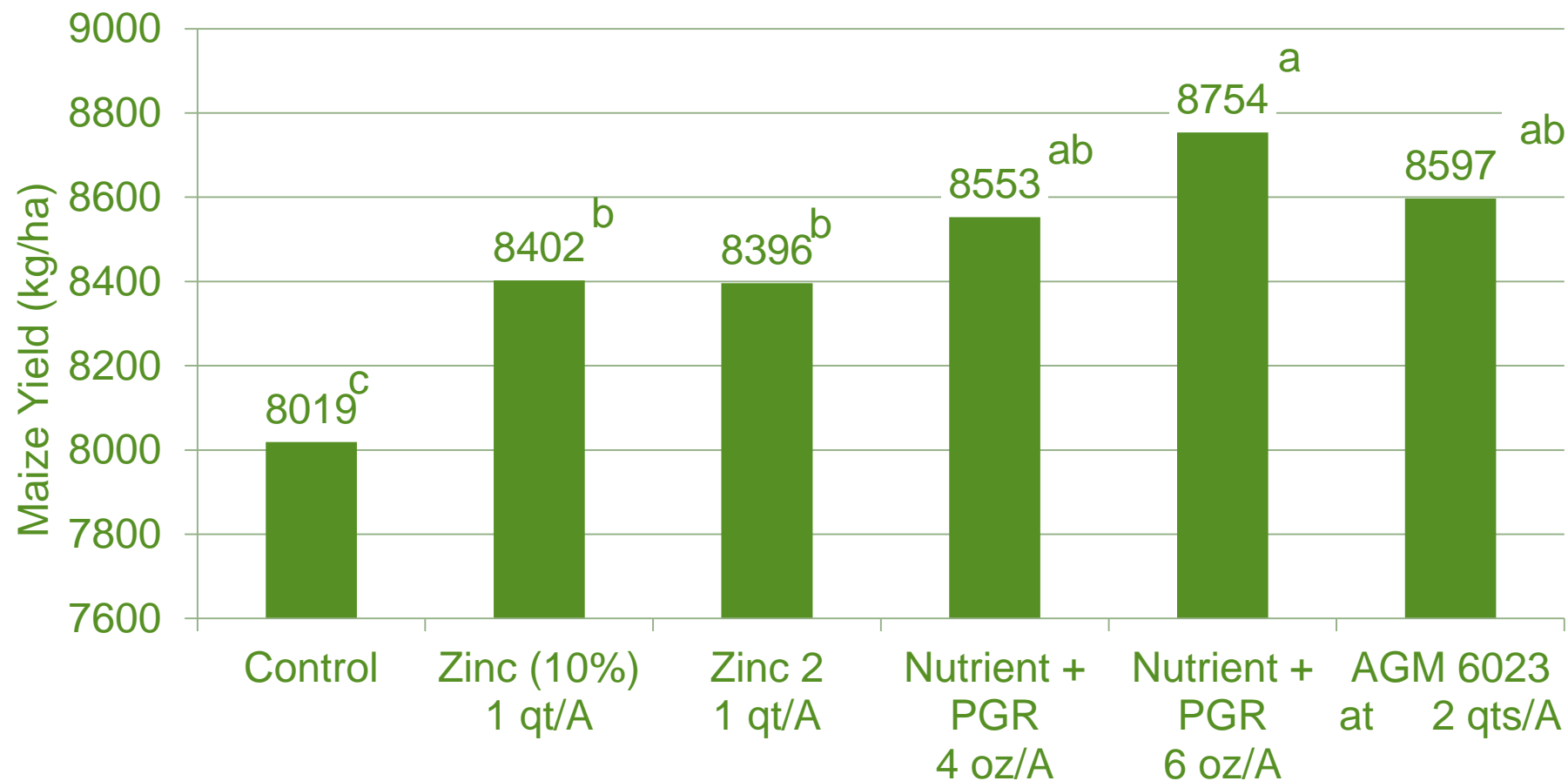
Applied with 5 gallons 10-34-0

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Summary

- Rethink the WHY?

- Precision Low Dose In Furrow Seed Dressing

- Seed Coatings

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Thank You

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