

# Sugarcane Fertility Research with Focus on Sulfur

Rich Johnson and Sonny Viator



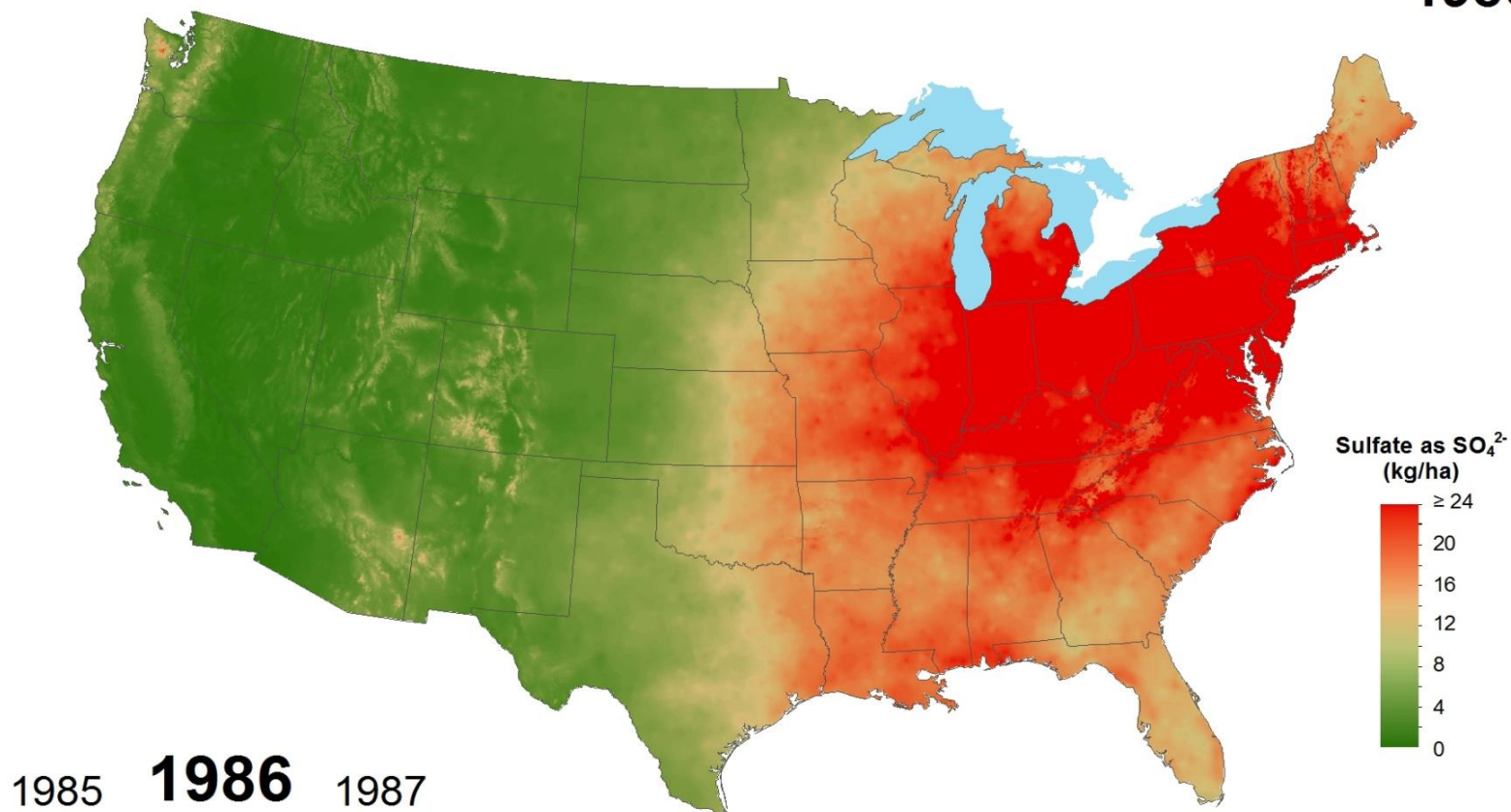
# Soil Fertility Priorities

1. Soil pH
2. Nitrogen
3. Potassium
4. Sulfur
5. Starter Fertilizer
6. Micronutrients (Zn, Cu, Ni, B, Mo, Co)
7. Phosphorus ??

# Sulfur Trial, Rebecca Plantation, 2014

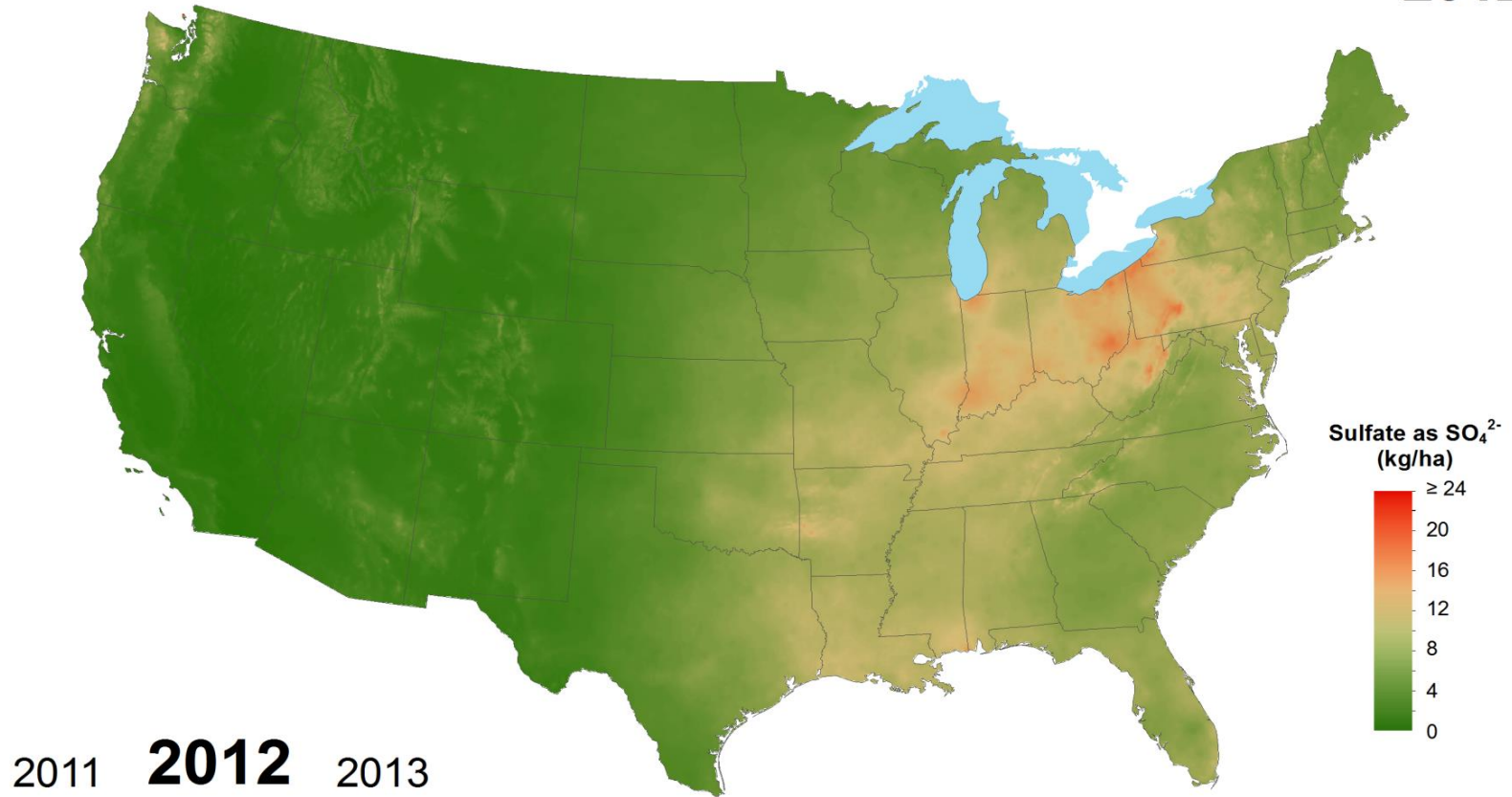
- Varieties: L01-299, HoCP 96-540
- Crop Age: PC, 1R, 2R
- All soils tested low or medium sulfur
- S rates: 0, 20, 40, 60, 80 lb S/A
- Sources: ATS (Liquid), Elemental S used in 1<sup>st</sup> stubble due to unavailability of ATS.
- Reps: 6
- Current recommendation: 24 lb S/A, if recommended by soil test. It may be necessary to revise this due to loss of atmospheric sulfur sources.

# Sulfate ion wet deposition 1986

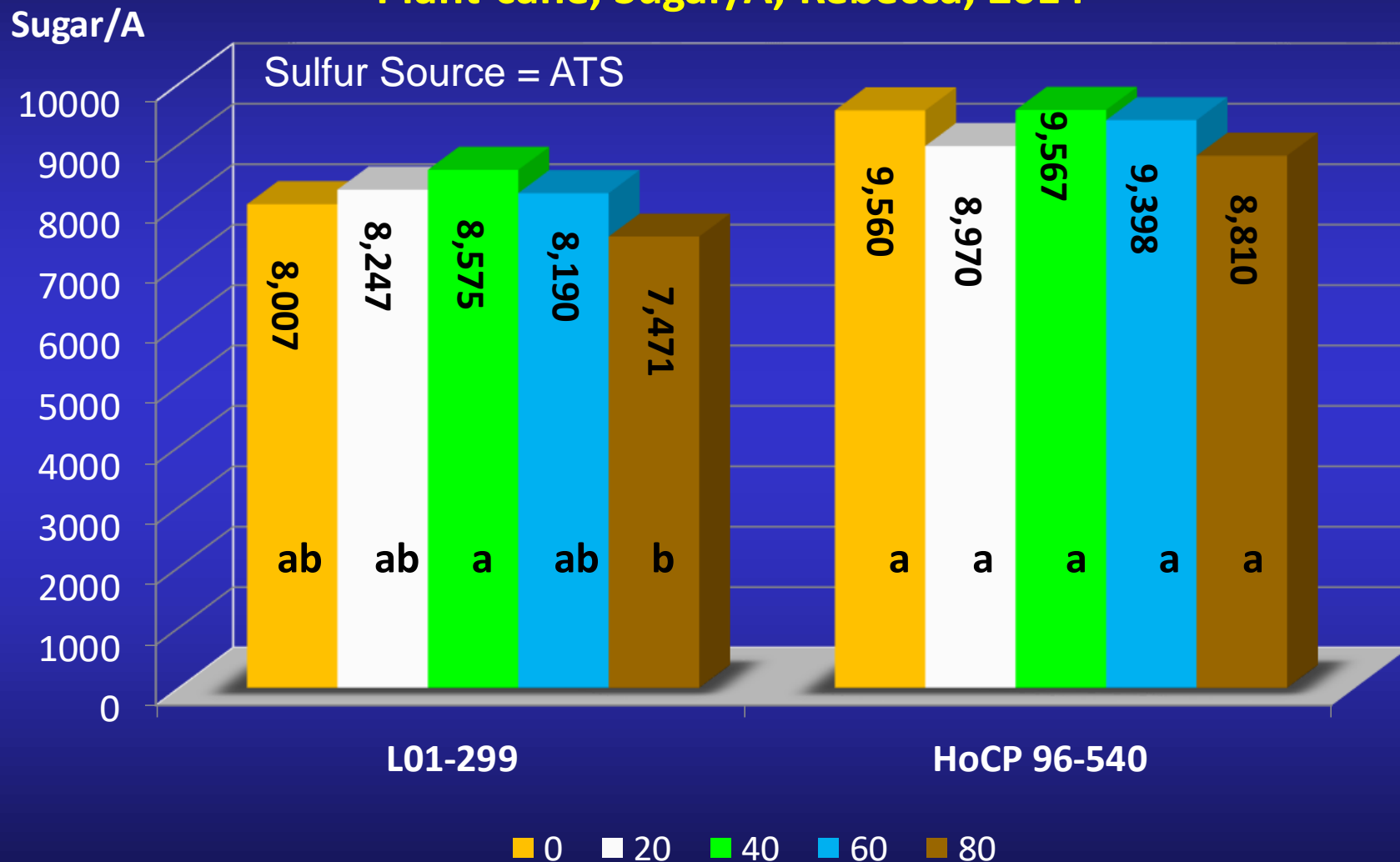


National Atmospheric Deposition Program/National Trends Network  
<http://nadp.isws.illinois.edu>

# Sulfate ion wet deposition 2012

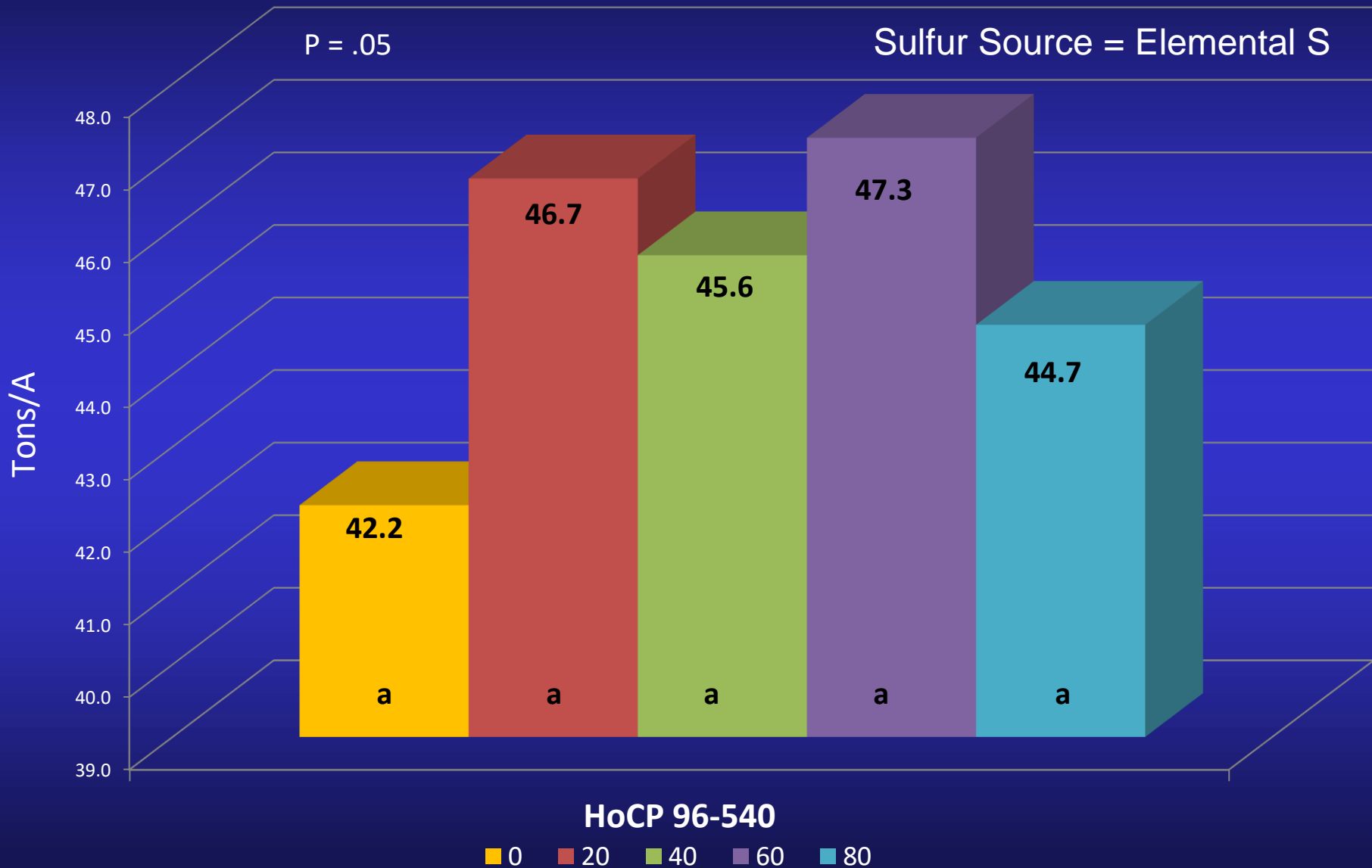


## Response to Sulfur Fertilizer, L01-299 and HoCP 96-540, Plant-cane, Sugar/A, Rebecca, 2014



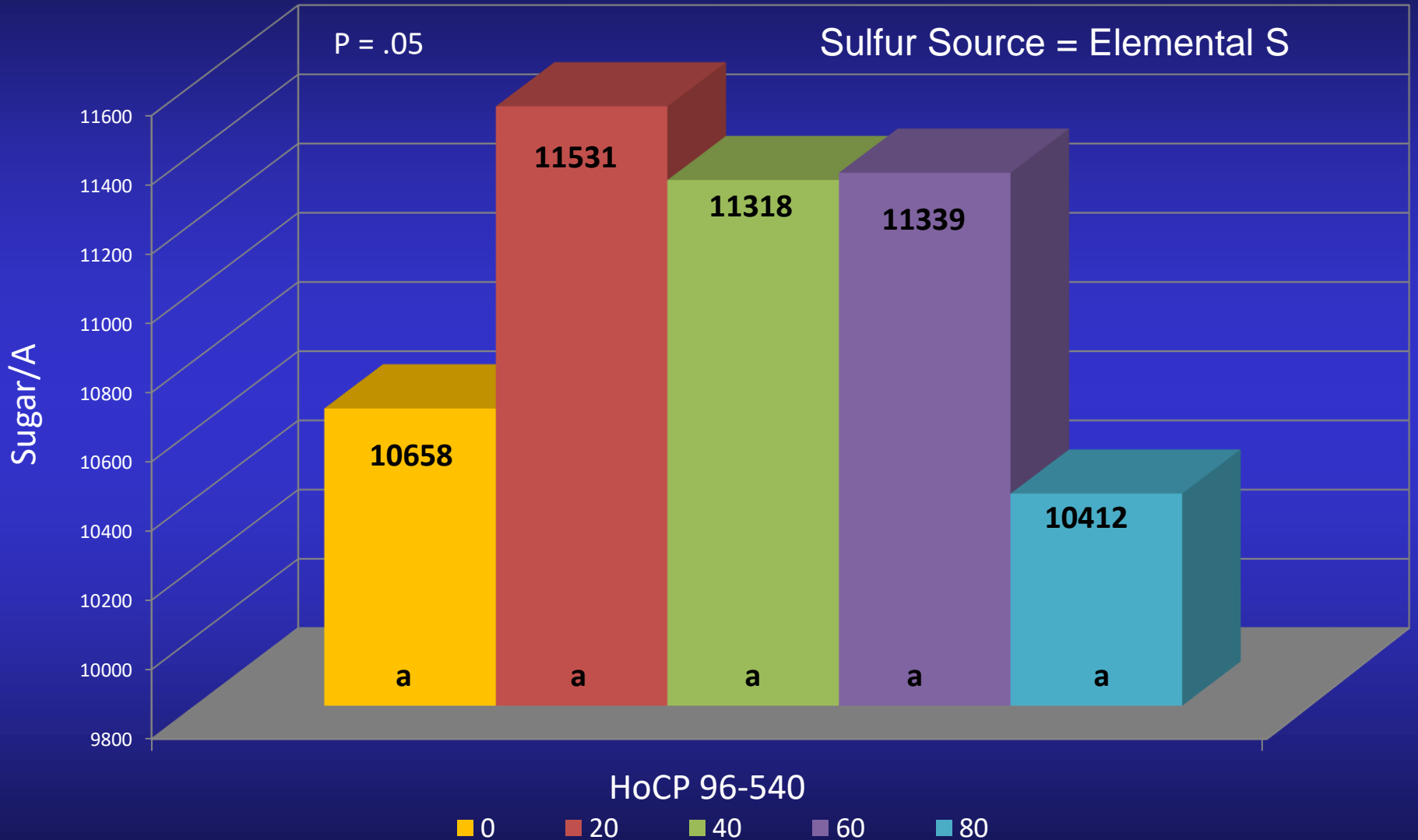
# Response to Sulfur Fertilizer

## HoCP 96-540, 1<sup>st</sup> Stubble, Tons/A, Rebecca, 2015



# Response to Sulfur Fertilizer

## HoCp 96-540, 1<sup>st</sup> Stubble, Sugar/A, Rebecca, 2015



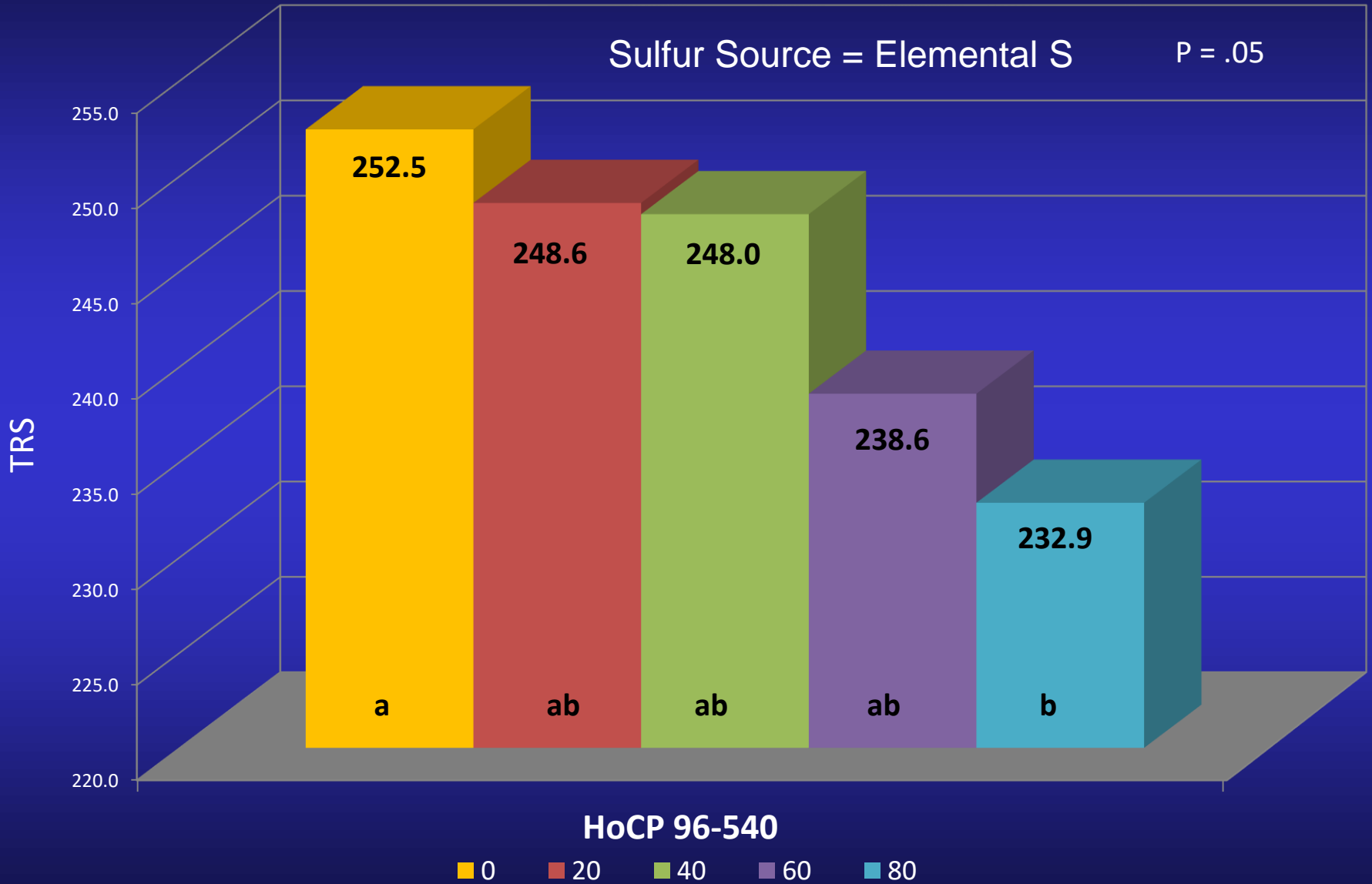


# Response to Sulfur Fertilizer

## HoCP 96-540, 1<sup>st</sup> Stubble, TRS, Rebecca, 2015

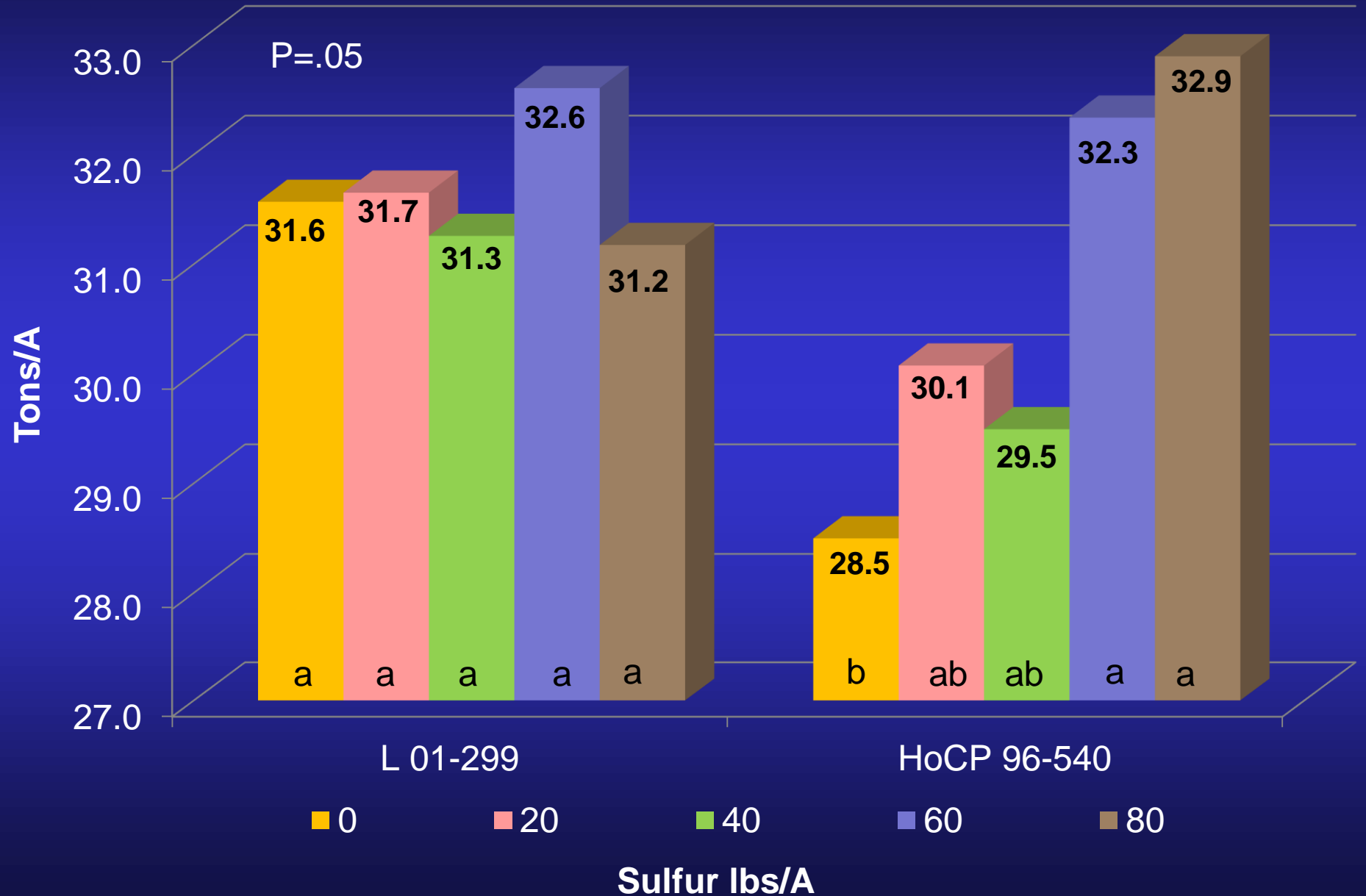
Sulfur Source = Elemental S

P = .05



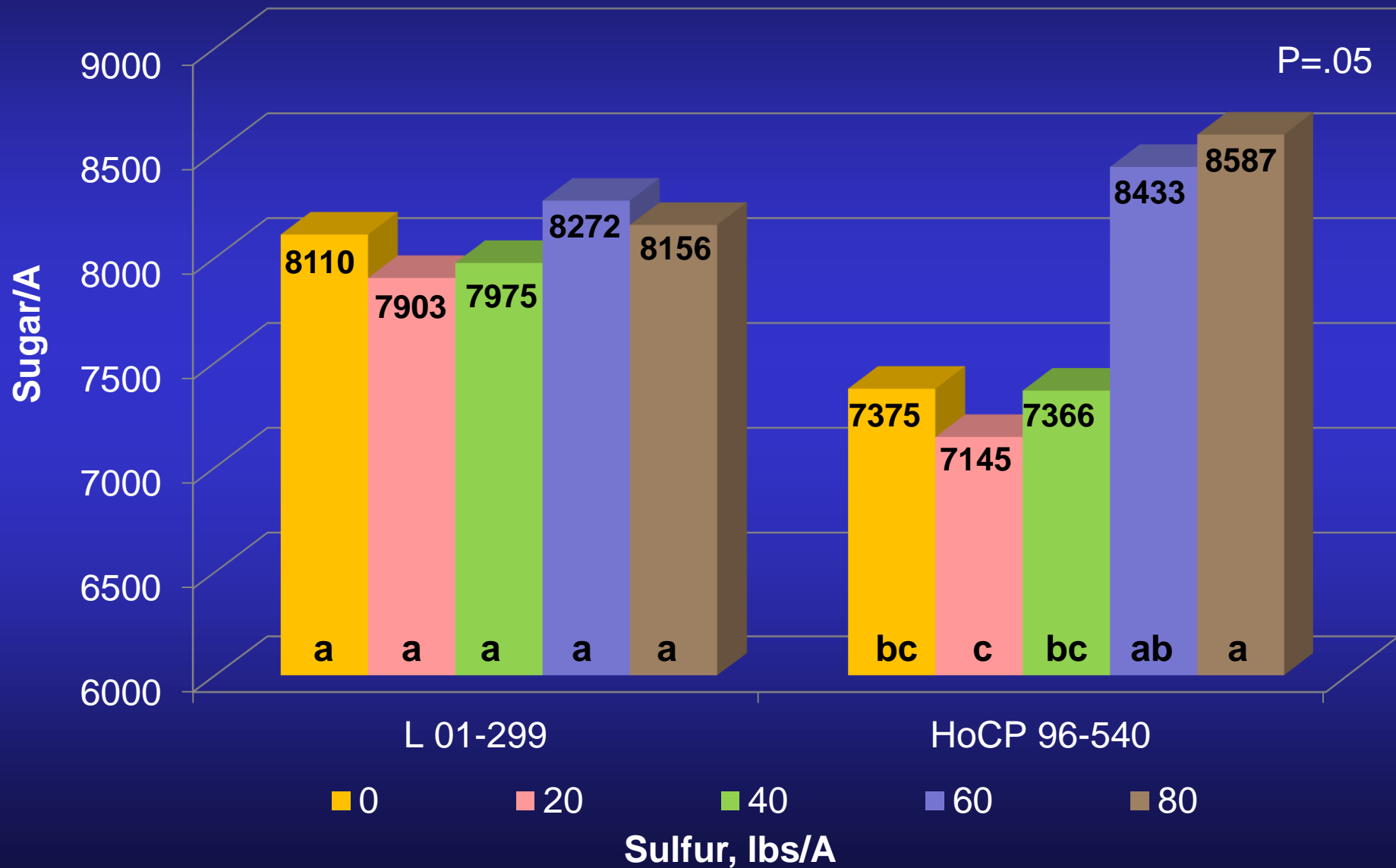
# Varietal Response to Sulfur Fertilizer

## L01-299 and HoCP96-540, 2<sup>nd</sup> Stubble, Rebecca, 2016



# Varietal Response to Sulfur Fertilizer

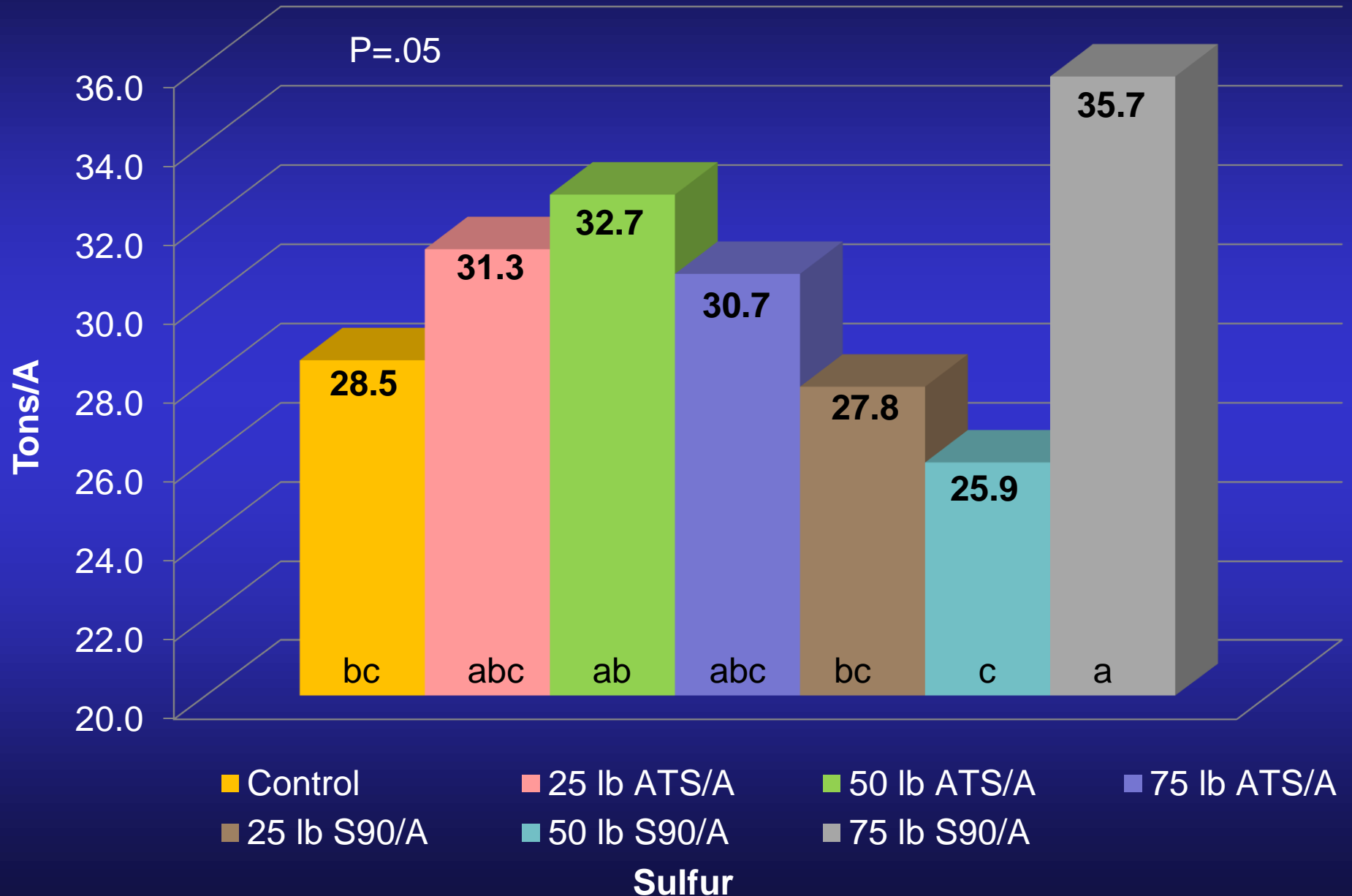
## L01-299 and HoCP 96-540, 2<sup>nd</sup> Stubble, Rebecca, 2016



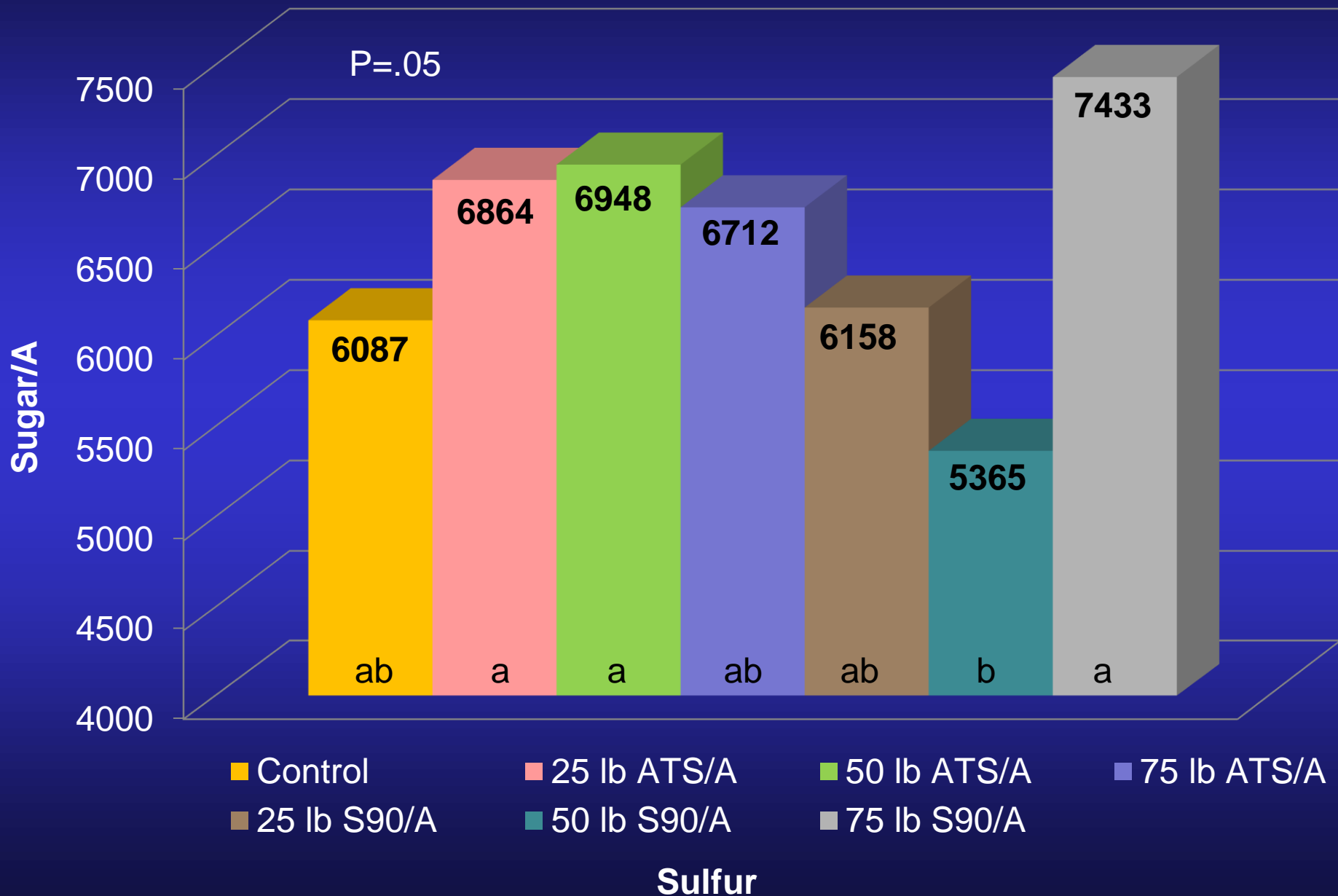
# Sulfur Trials, 2016-2018

- Varieties: L01-299, HoCP 96-540
- Crop Age: PC, 1R, 2R
- All soils tested low or medium sulfur
- S rates: 0, 25, 50, 75 lb S/A
- Sources: ATS (Liquid), S90 (Granular)
- Reps: 6

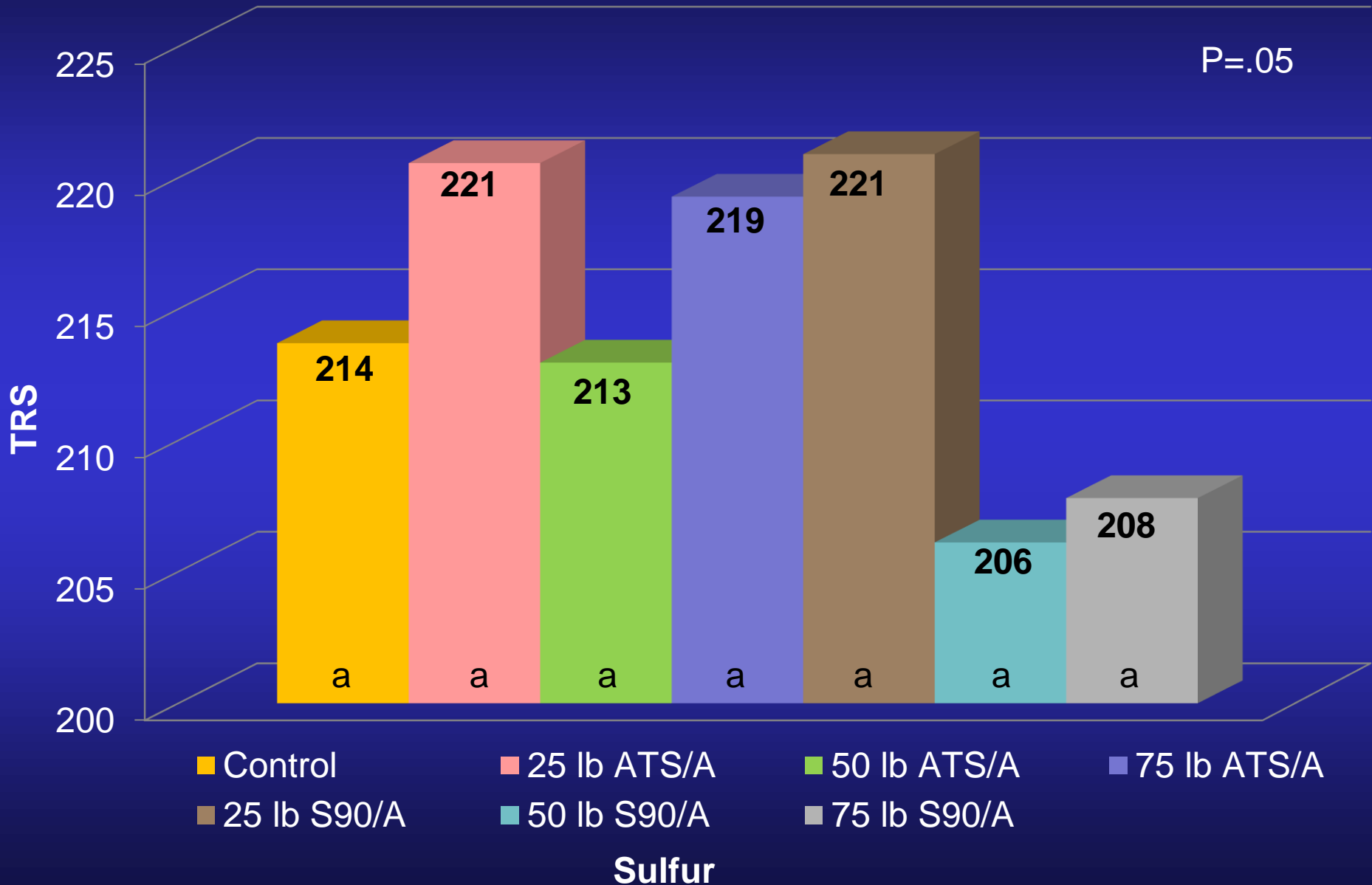
# New Iberia Research Station Sulfur Rate and Source Trial, L 01-299, 1<sup>st</sup> Stubble, 2016



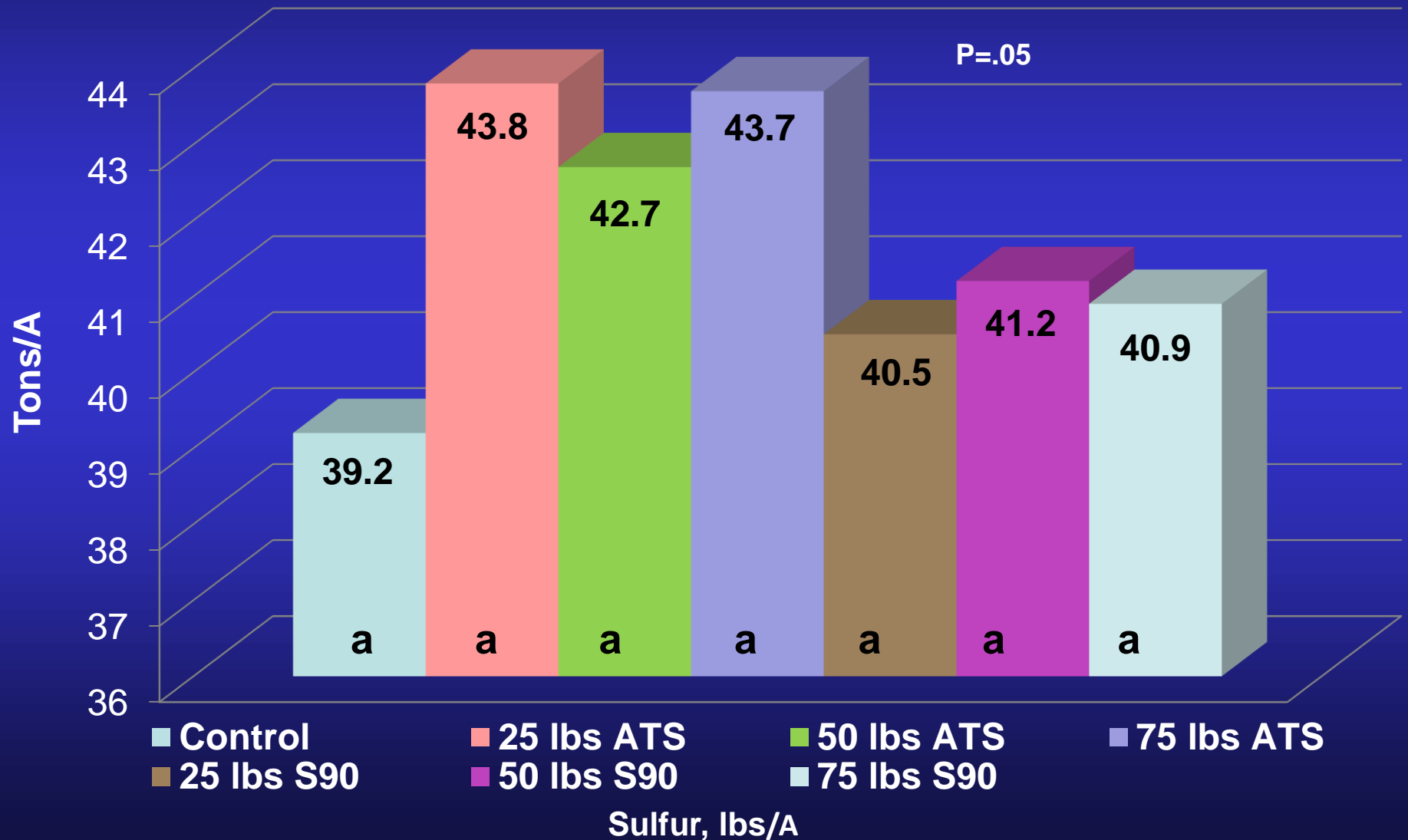
# New Iberia Research Station Sulfur Rate and Source Trial, L 01-299, 1<sup>st</sup> Stubble, 2016



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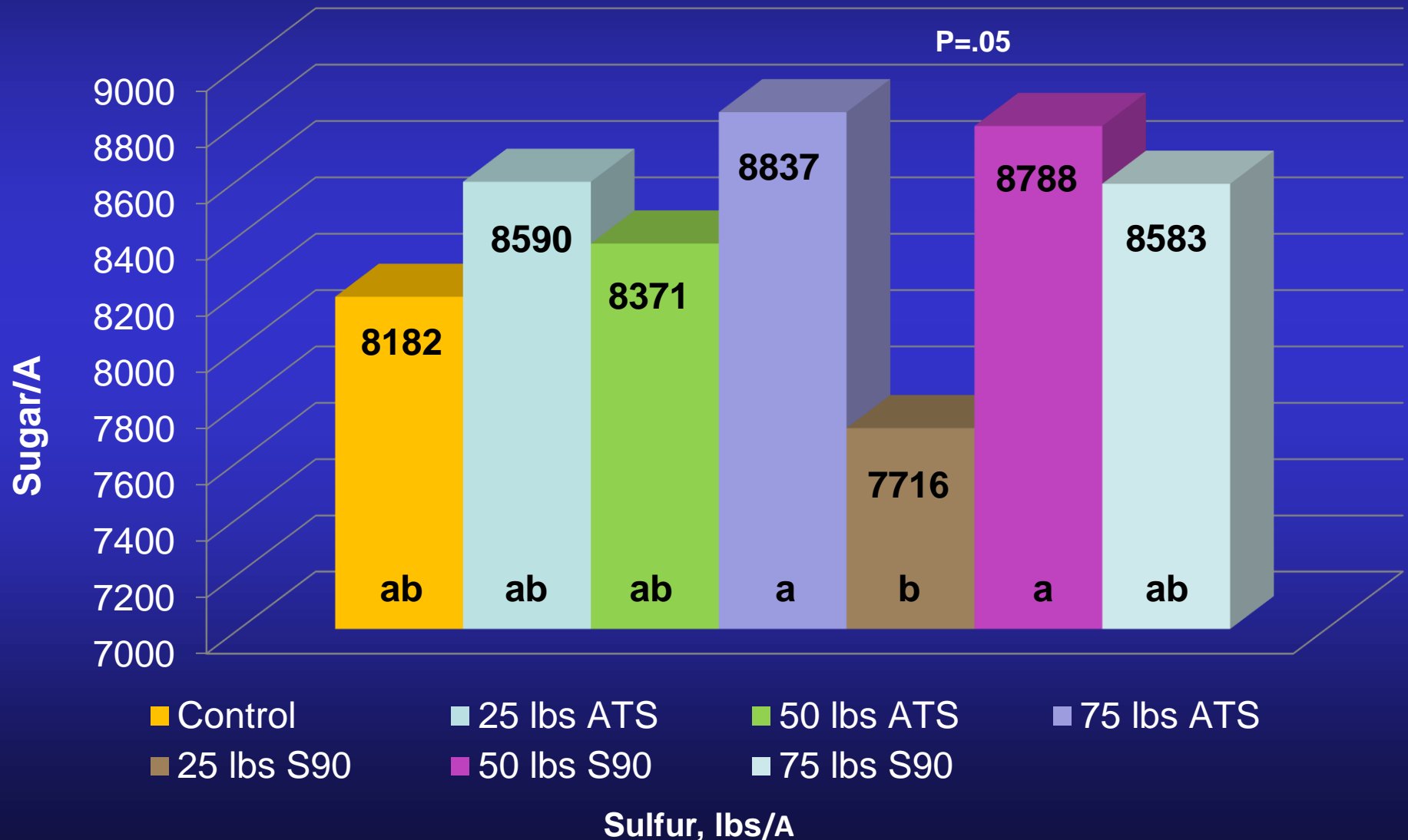


# New Iberia Research Station Sulfur Rate and Source Trial, L 01-299, 2<sup>nd</sup> Stubble, 2017



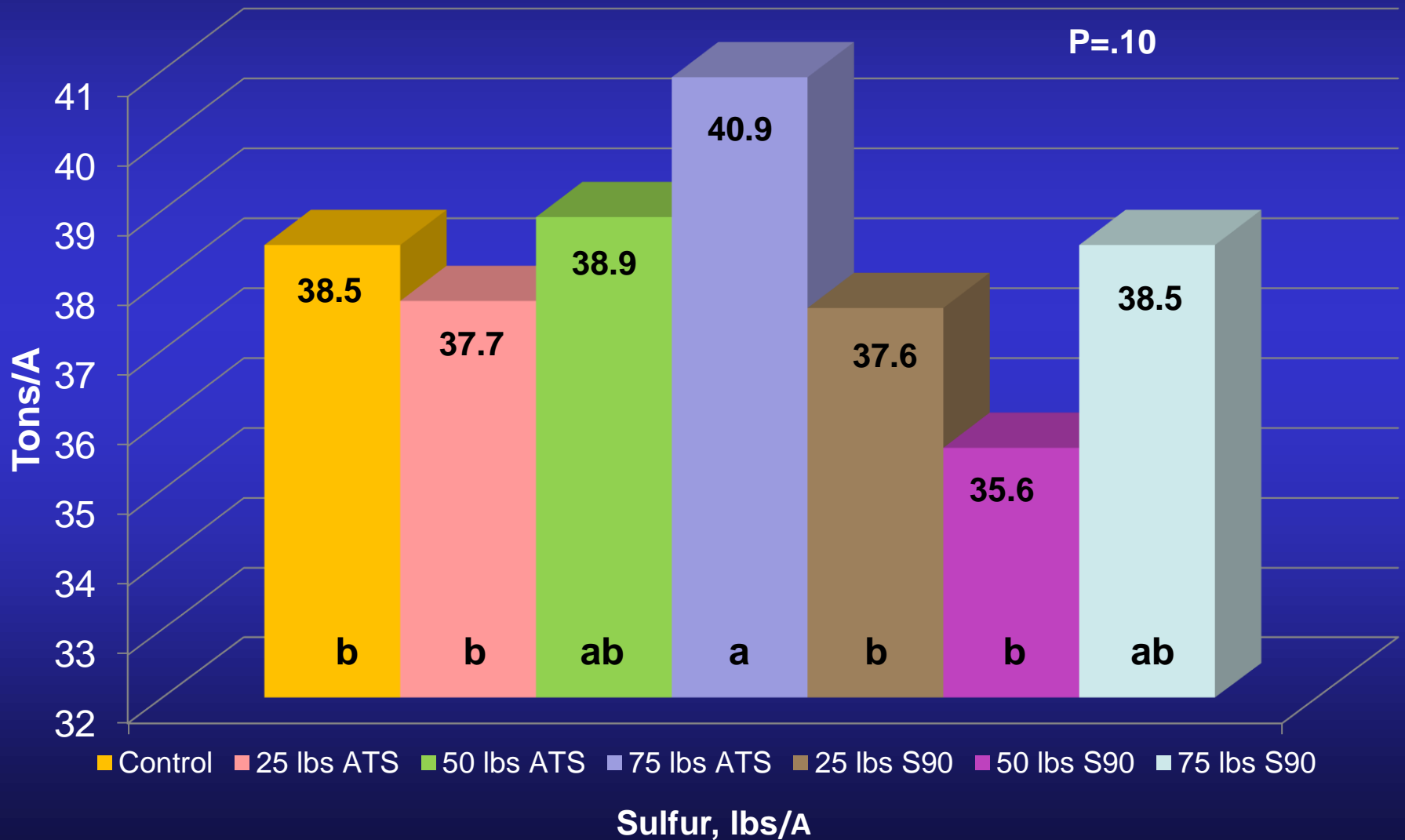


# New Iberia Research Station Sulfur Rate and Source Trial, L 01-299, 2<sup>nd</sup> Stubble, 2017



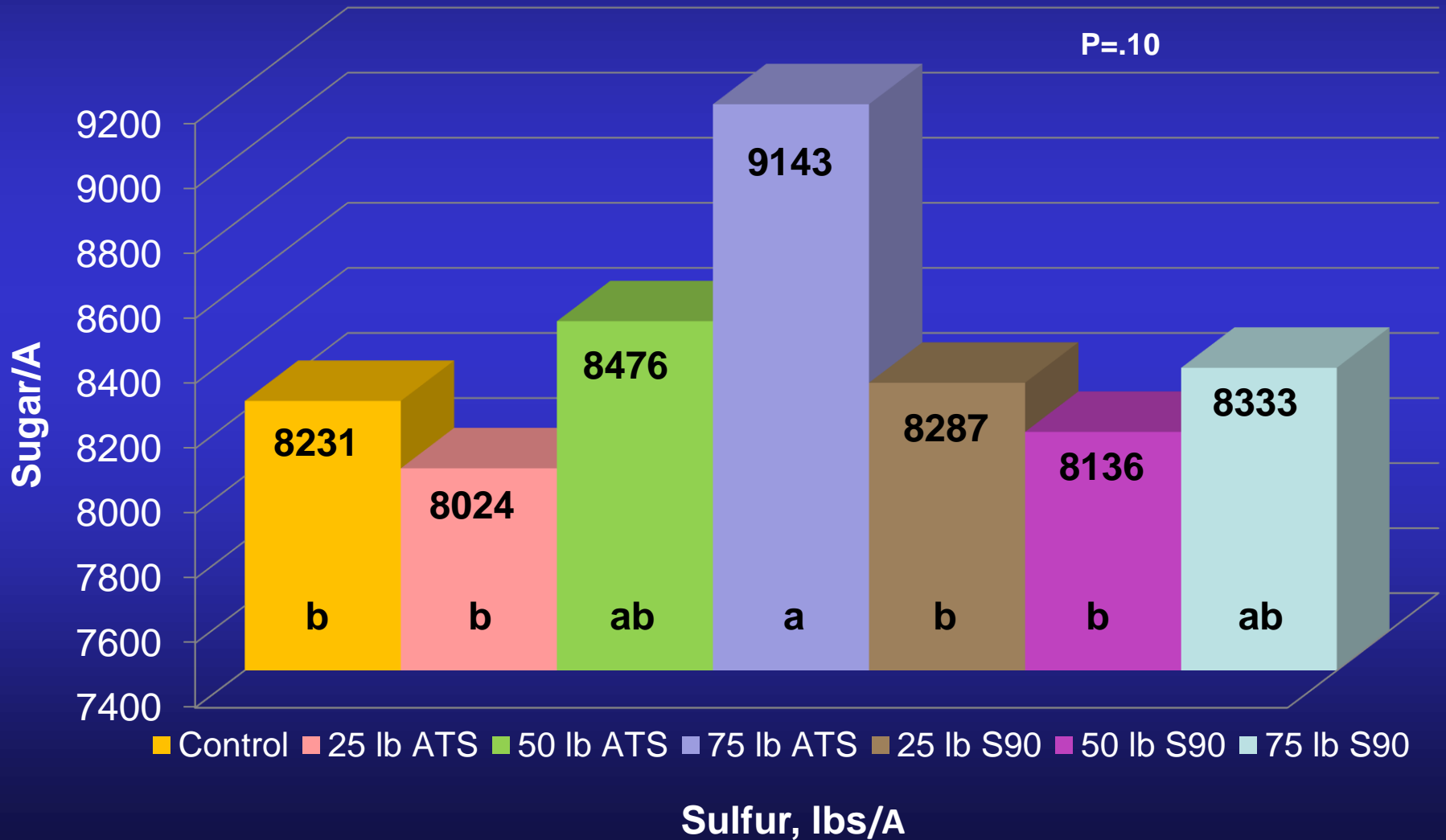
# Response to Sulfur Fertilizer

## L01-299, Plant Cane, Tons/A, Richard, 2017



# Response to Sulfur Fertilizer

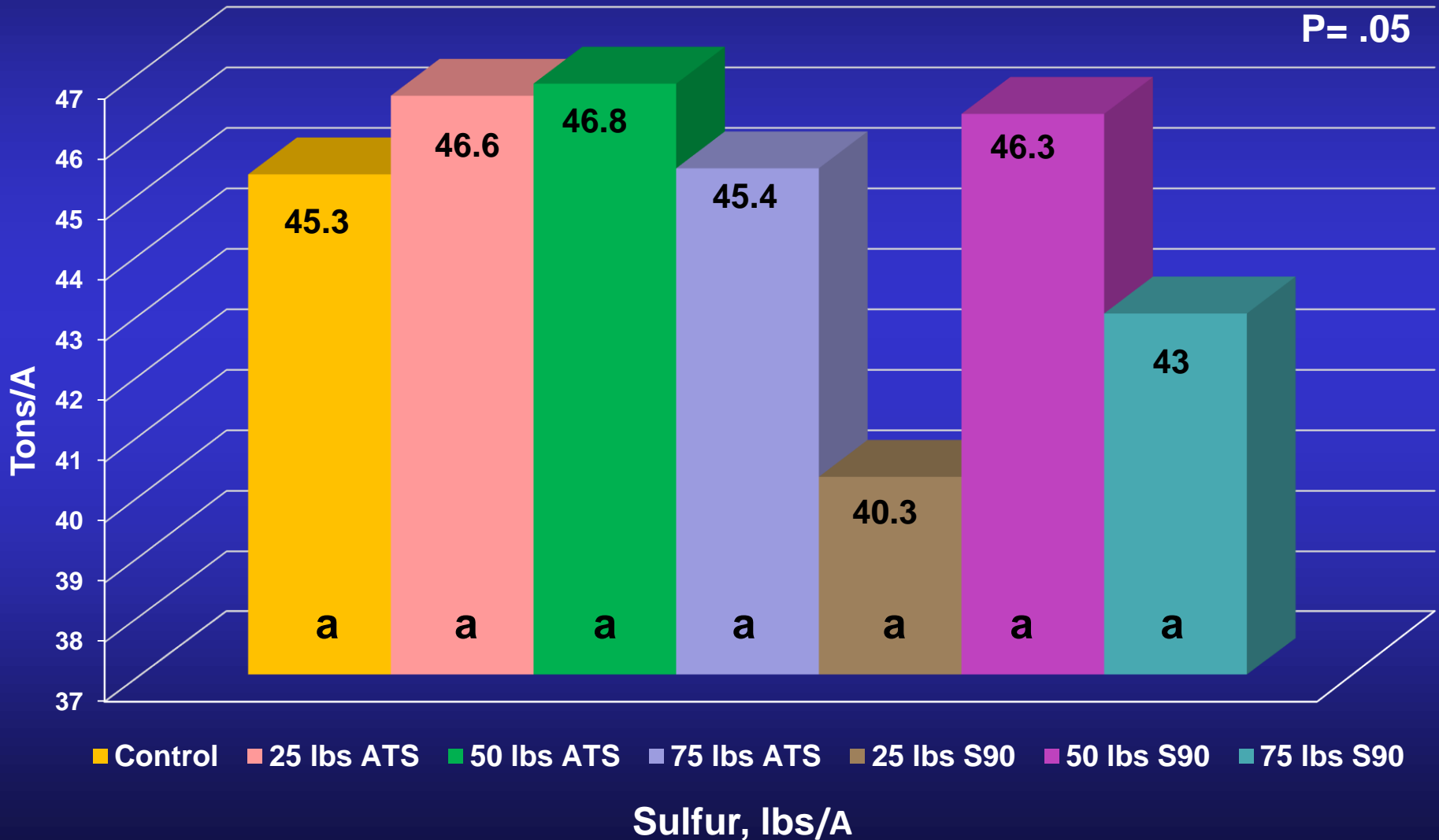
## L01-299, Plant Cane, Sugar/A, Richard, 2017



# Response to Sulfur Fertilizer

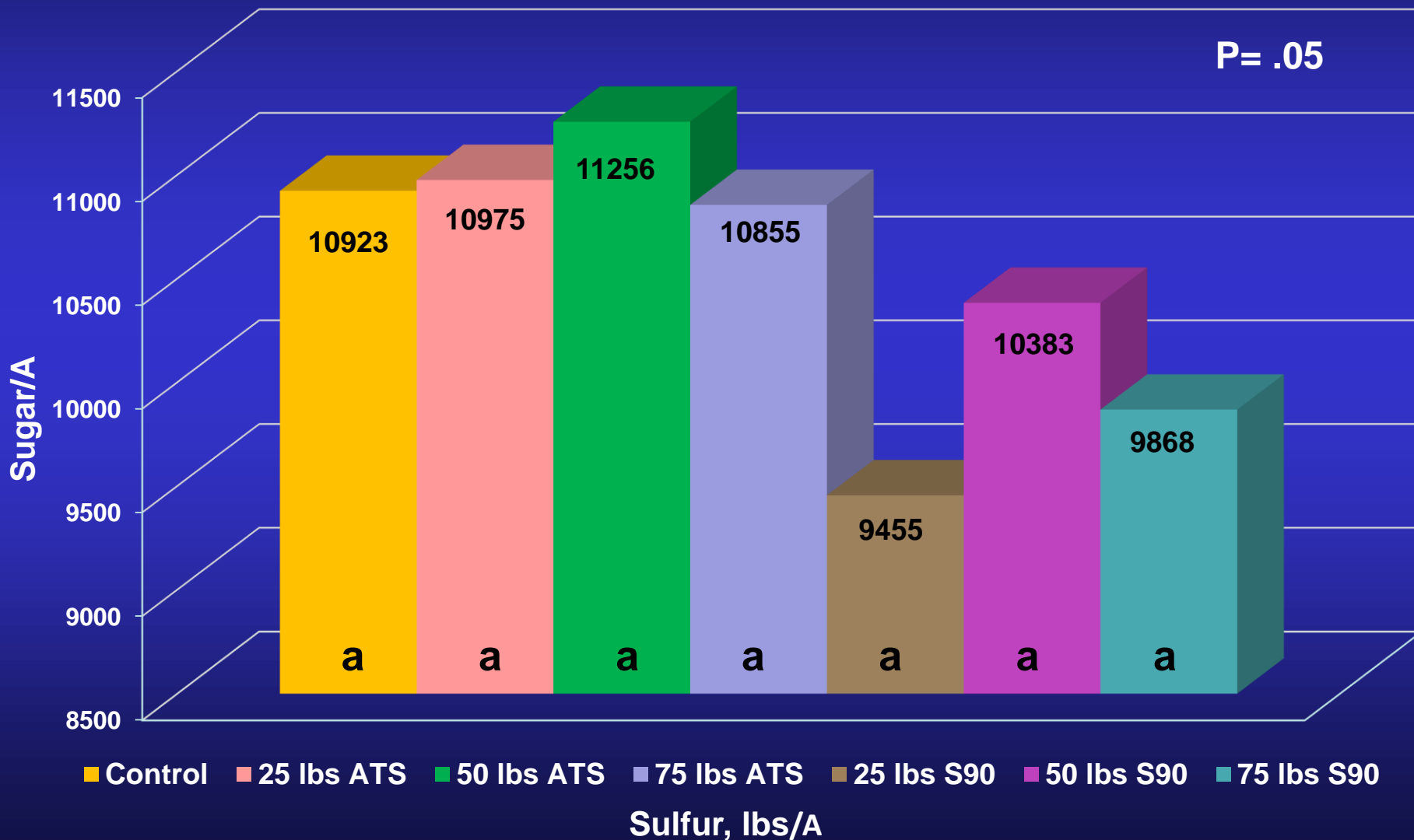
## HoCP 96-540, Plant Cane, Tons/A, Rodrigue, 2018

P = .05



# Response to Sulfur Fertilizer

## HoCP 96-540, Plant Cane, Sugar/A, Rodrigue, 2018



# Summary of Sulfur Trial Results

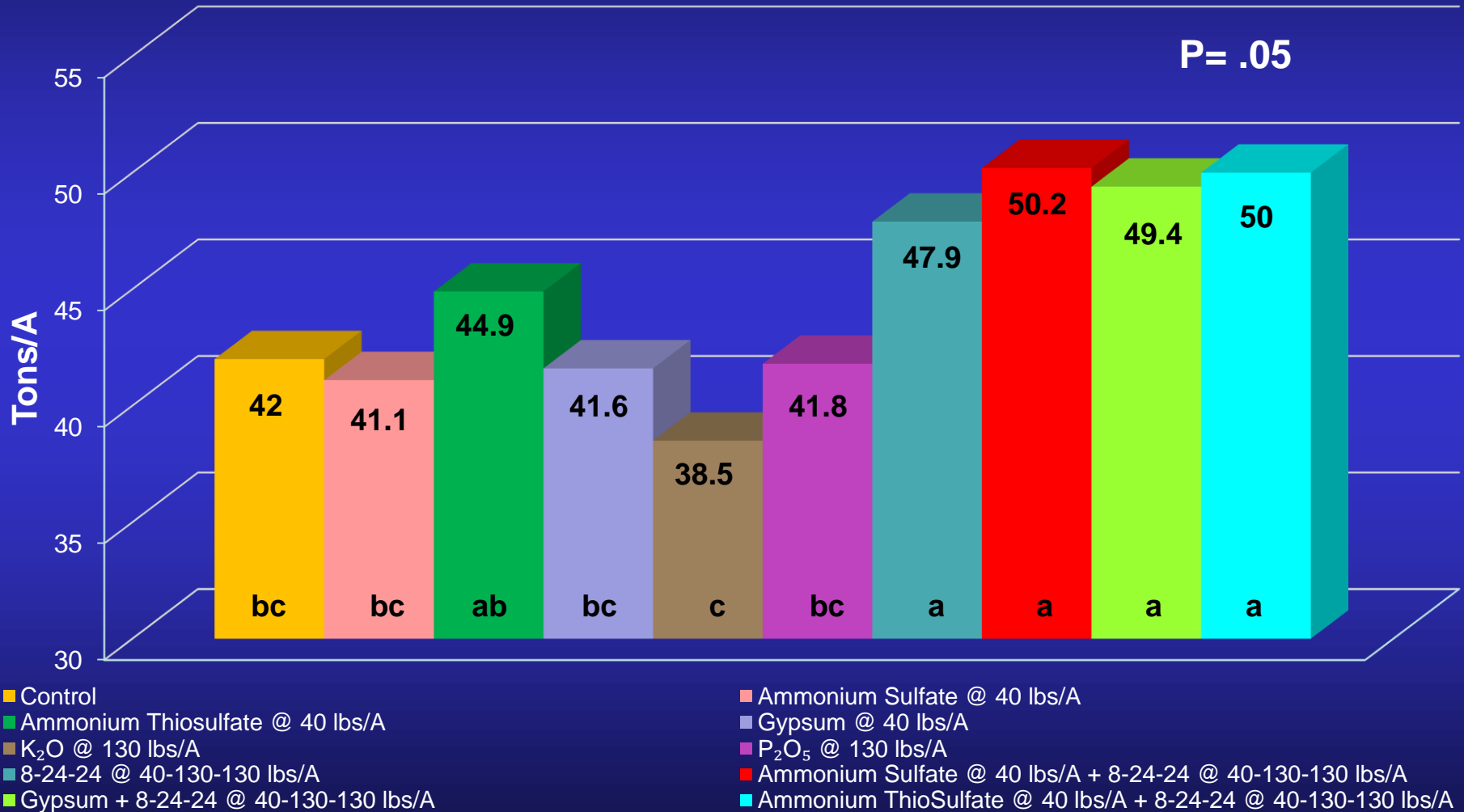
- Significant increases in both cane and sugar yields were obtained with supplemental sulfur at rates greater than current recommendations.
- More positive responses were obtained in stubble cane than plant-cane.
- More positive responses were obtained with sulfate sulfur sources than elemental sources.

# Sugarcane Fertility Component Experiment

- Variety: L01-299, 2<sup>nd</sup> stubble
- Treatments:
  - Control
  - Ammonium sulfate - 40 lb/A
  - Ammonium thiosulfate – 40 lb/A
  - Gypsum – 40 lb/A
  - K<sub>2</sub>O – 130 lb/A
  - P<sub>2</sub>O<sub>5</sub> – 130 lb/A
  - 8-24-24 @ 40-130-130 lbs/A
  - Ammonium Sulfate @ 40 lbs/A + 8-24-24 @ 40-130-130 lbs/A
  - Gypsum @ 40 lbs/A + 8-24-24 @ 40-130-130 lbs/A
  - Ammonium Thiosulfate @ 40 lbs/A + 8-24-24 @ 40-130-130 lbs/A
- Reps - 6

# Response to Fertilizer

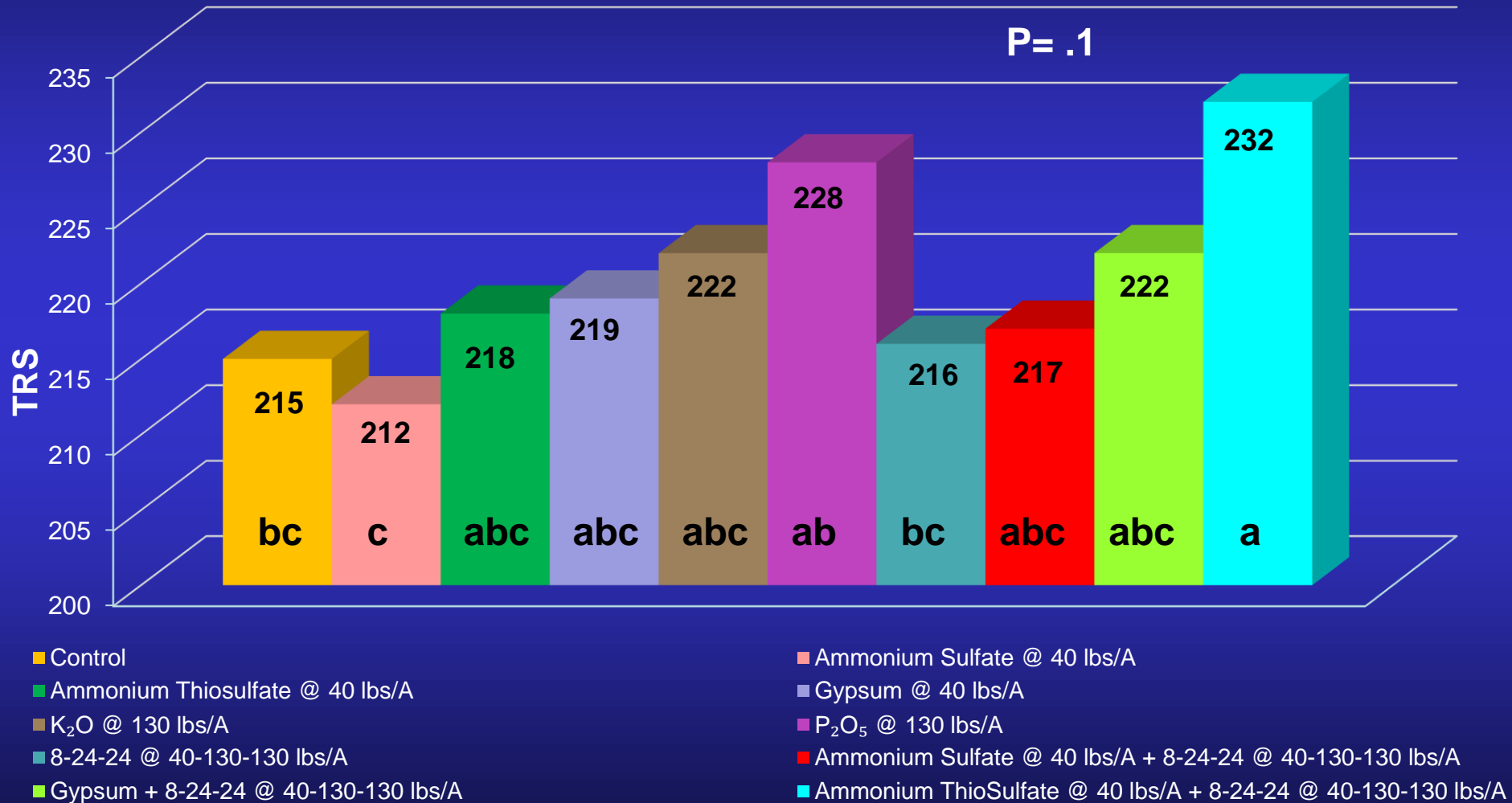
## L 01-299, 2<sup>nd</sup> Stubble, Tons/A, Gravois, 2018





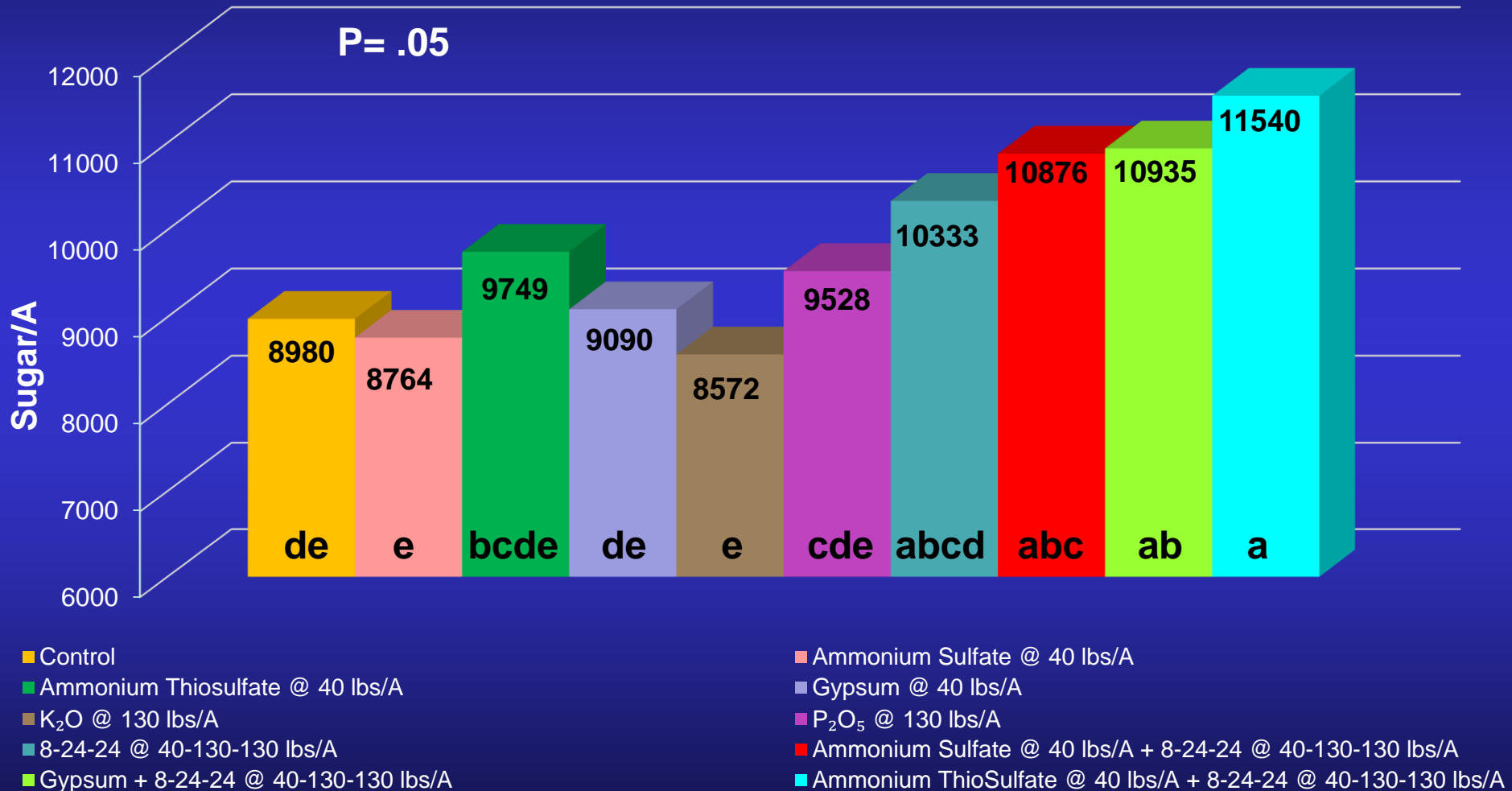
# Response to Sulfur Fertilizer

## L 01-299, 2<sup>nd</sup> Stubble, TRS, Gravois, 2018



# Response to Fertilizer

## L 01-299, 2<sup>nd</sup> Stubble, Sugar/A, Gravois, 2018

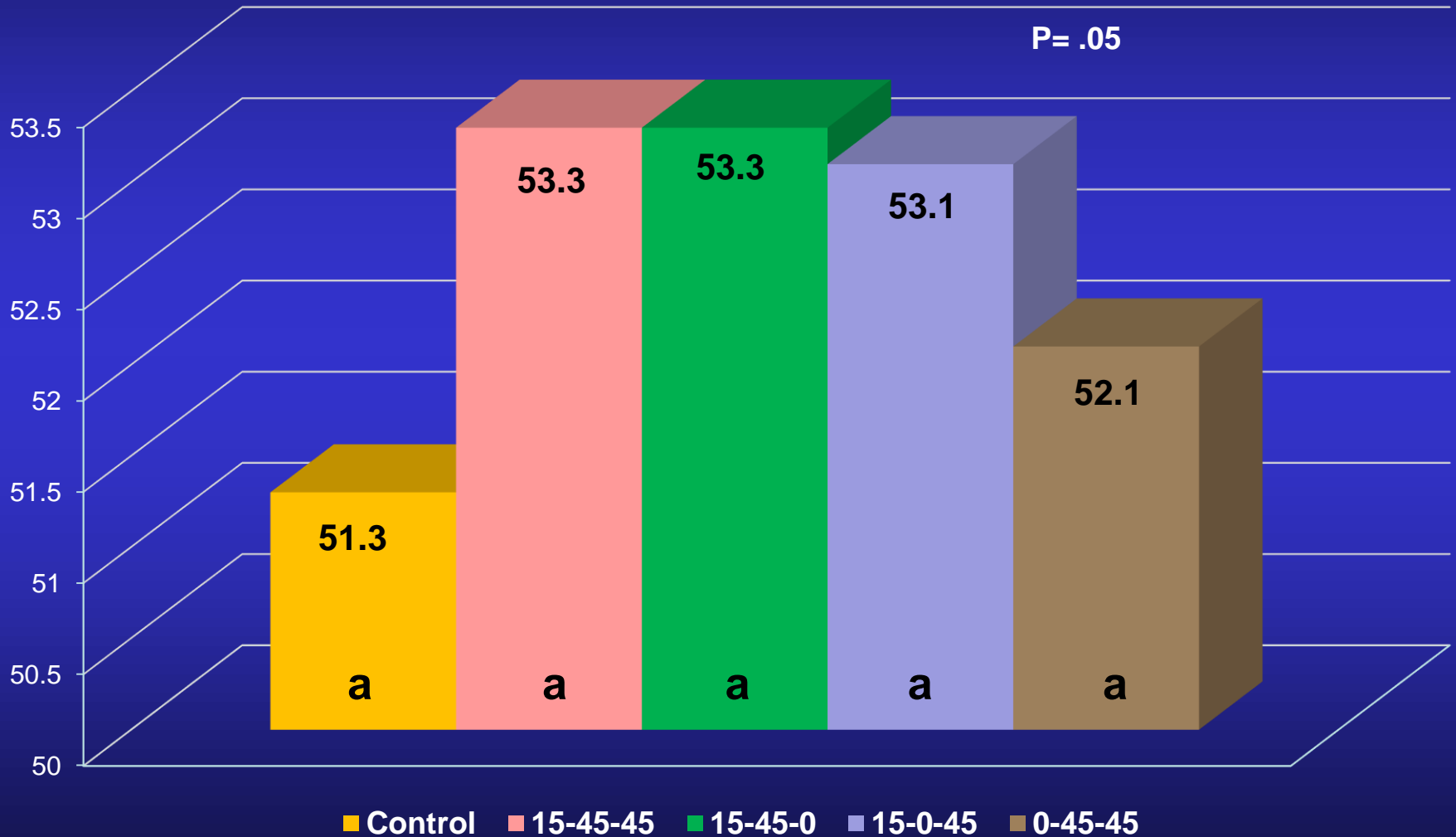


# Starter Fertilizer

- Varieties: L01-299, HoCP 96-540
- Crop Age: PC
- Treatments:
  - No starter
  - 0-45-45
  - 15-0-45
  - 15-45-0
  - 15-45-45
- Reps: 6
- No interaction between varieties and starter fertilizer, so data averaged over variety.

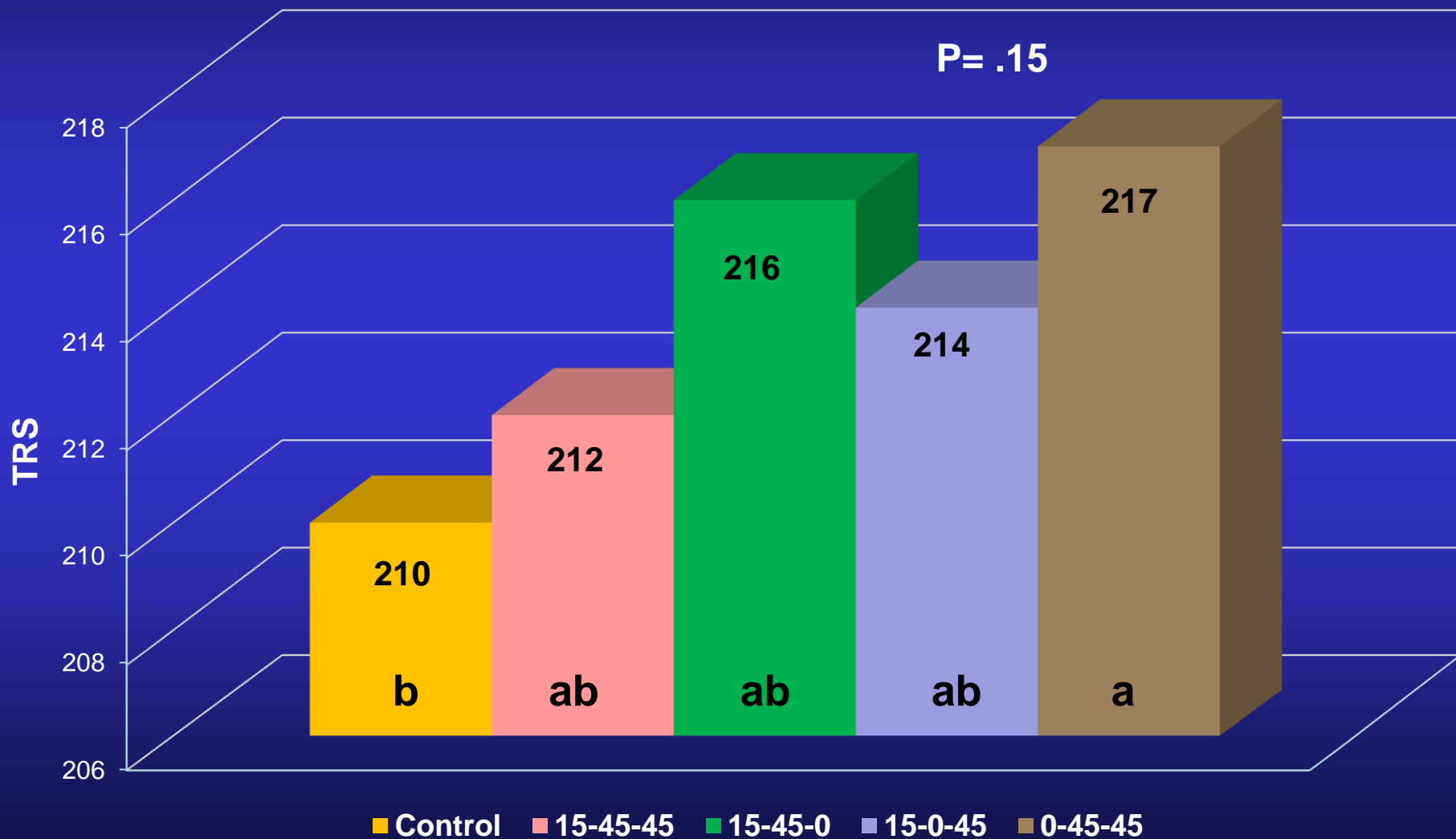
# Response to Starter Fertilizer

## Averaged Over Varieties, Plant Cane, Tons/A, AF, 2018



# Response to Starter Fertilizer

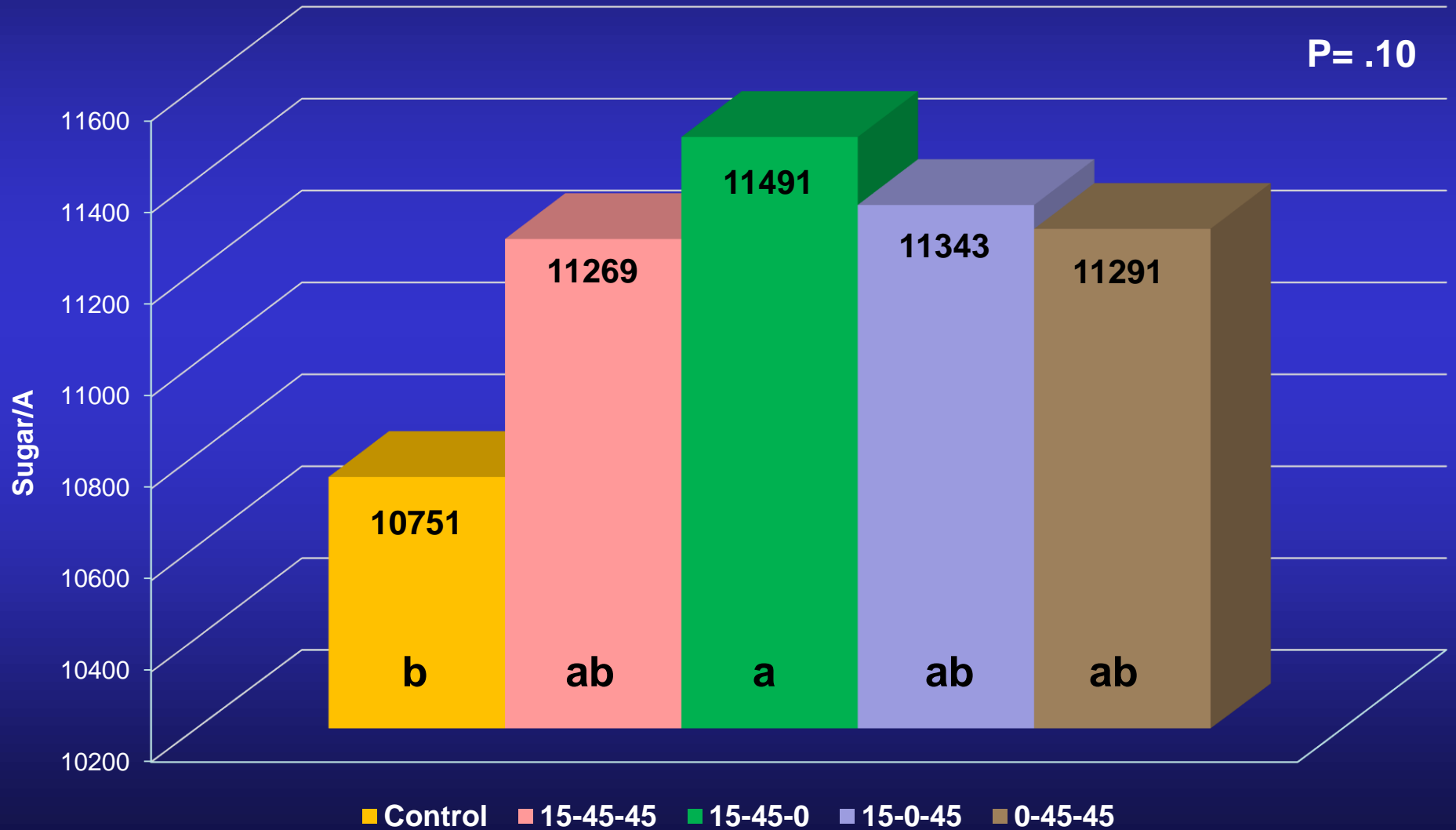
## Averaged Over Varieties, Plant Cane, TRS, AF, 2018



# Response to Starter Fertilizer

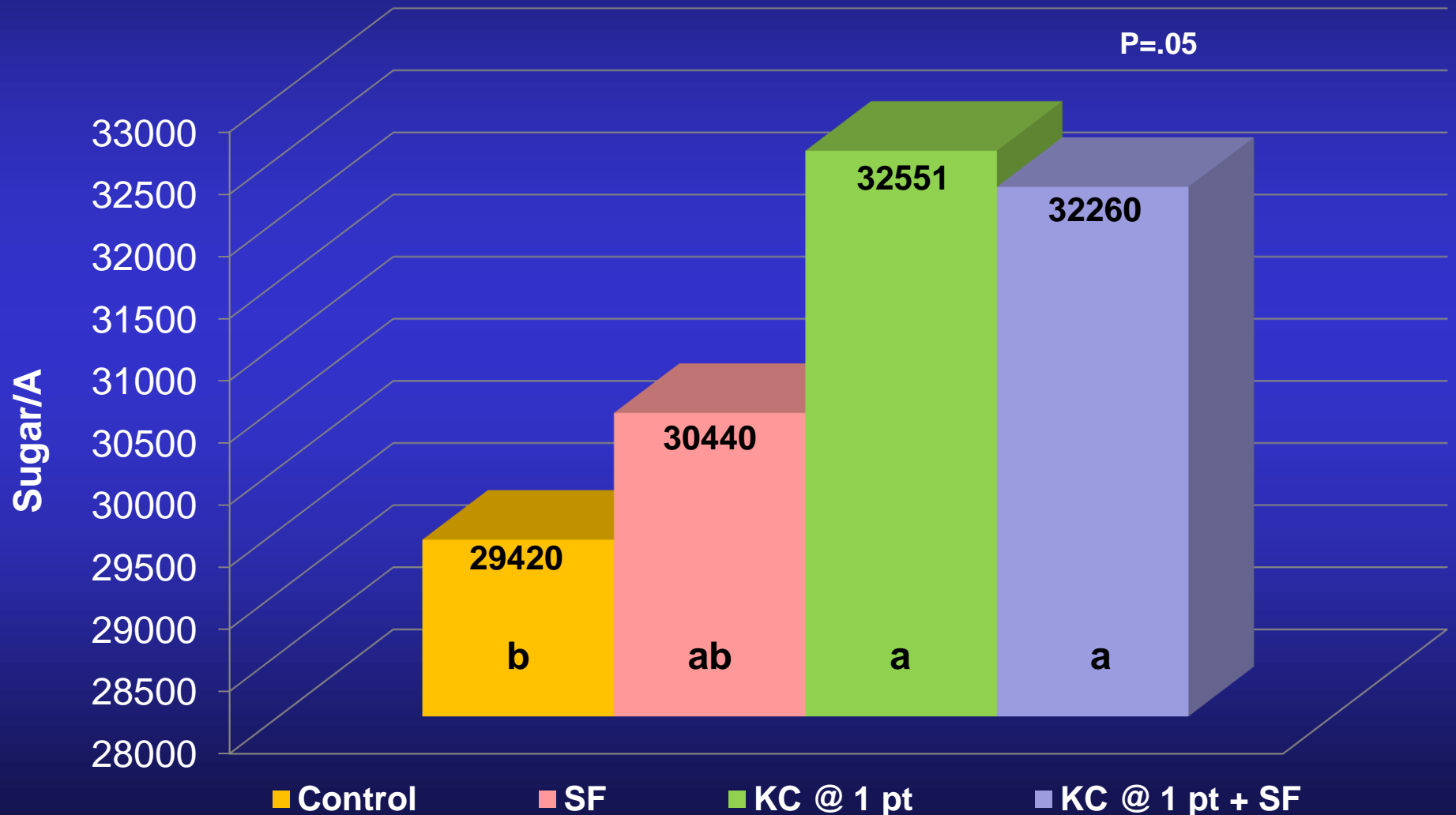
## Averaged Over Varieties, Plant Cane, Sugar/A, AF, 2018

P= .10



# **Micronutrient Trials**

# Stoller Cobalt I, Combined (PC – 3R) HoCP 04-838 (2014-2017)





# Stoller Cobalt III

**Variety:** L 01-299, Plant-cane, 6 replications

## **Treatments:**

1= Control

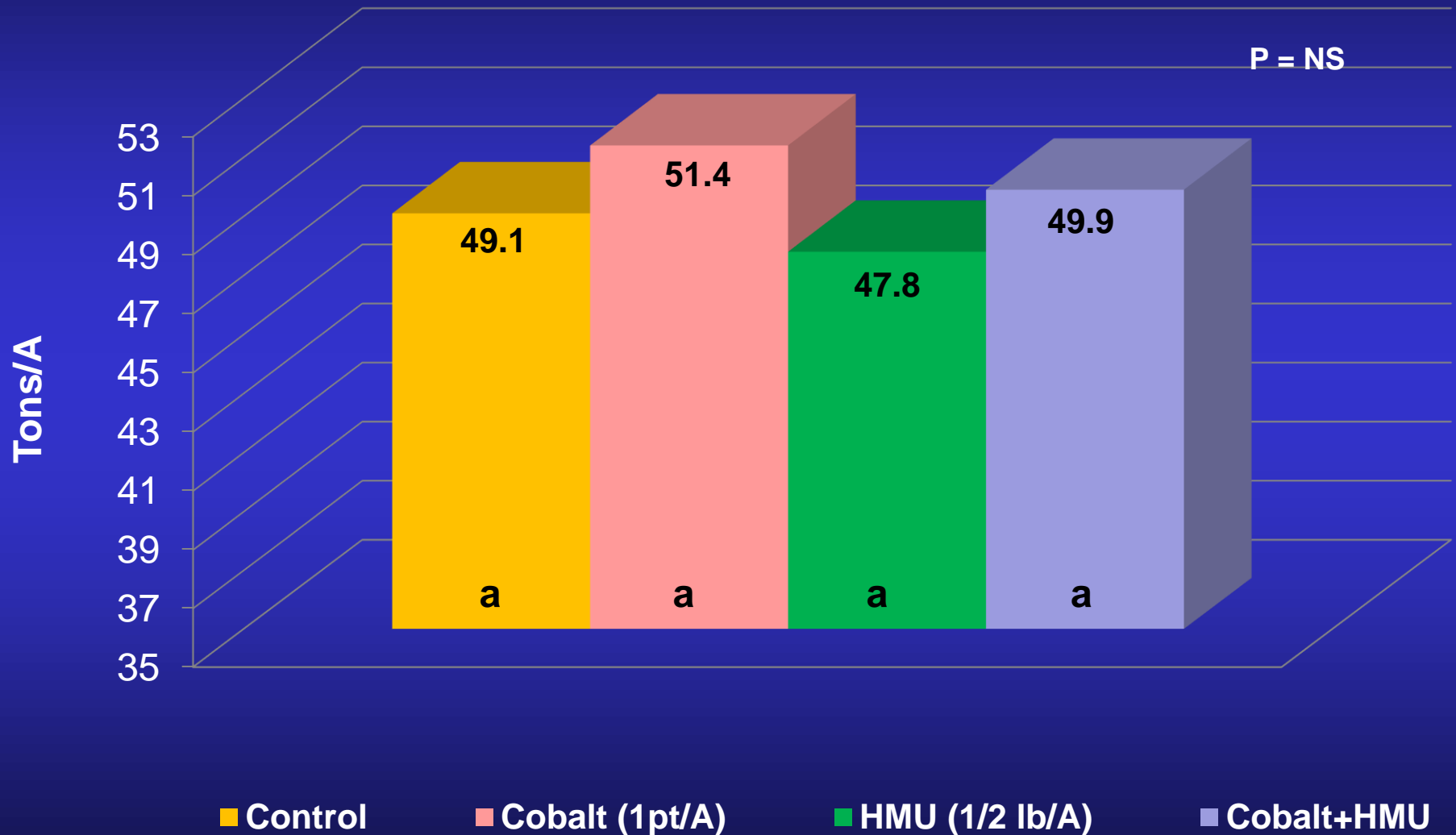
2= Keylate Cobalt @ 1pt/A

3 = Harvest More Ureamate @ ½ lb/A

4 = Keylate Cobalt @ 1 pt/A + Harvest More Ureamate @ ½ lb/A

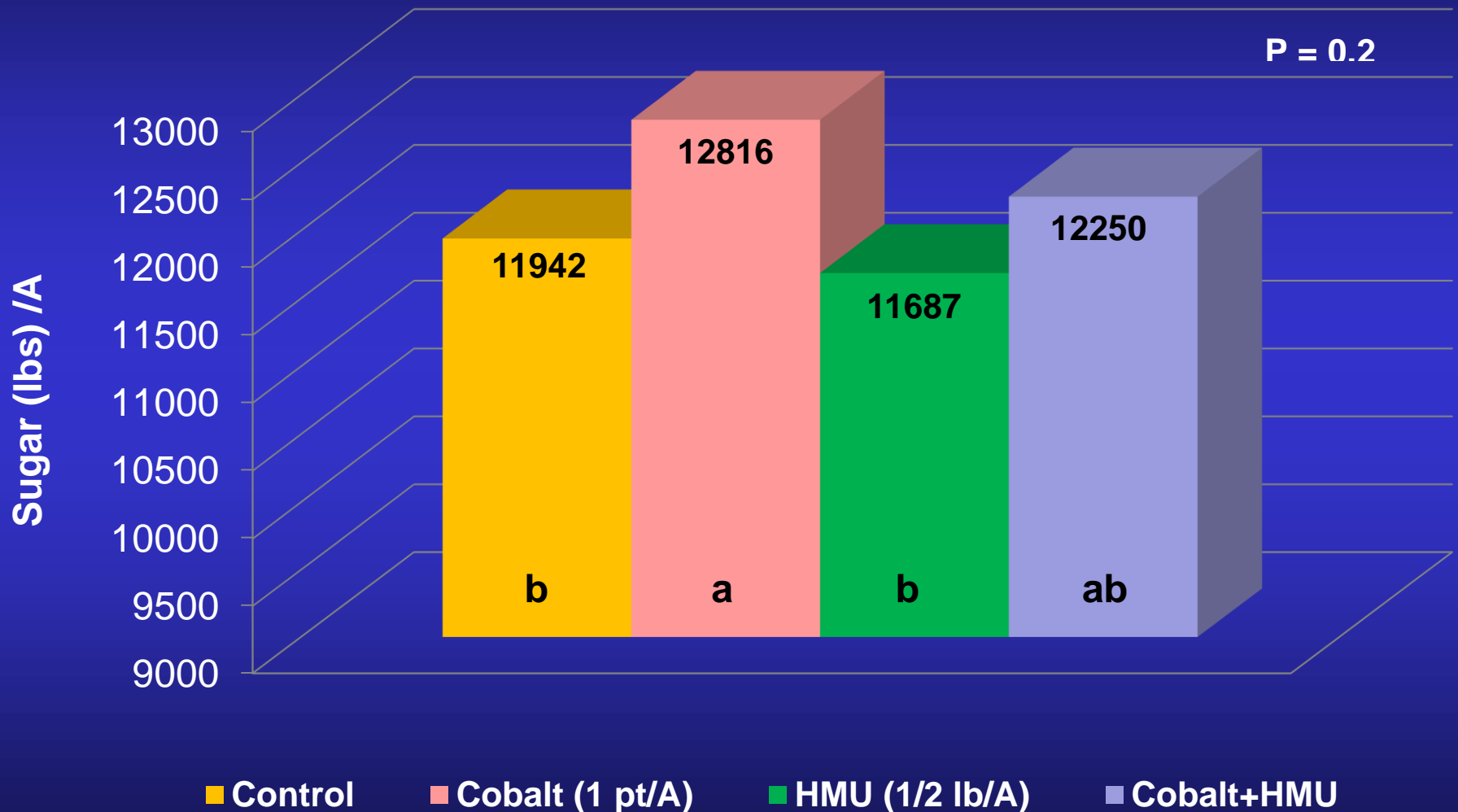
# Stoller Cobalt III

## L 01-299, Plant-cane, Tons/A, 2018



# Stoller Cobalt III

## L 01-299, Plant-cane, Sugar/A, 2018



# Future Research

- Starter fertilizer work will continue.
- Sulfur source and rate research will continue.
- Effects of foliar and soil applied boron on cane and sugar yields.
- Effects of foliar micronutrient application on incidence and severity of brown stripe and brown rust.
- Effect of cobalt and glyphosate as ripeners.



**Questions?**