

Sugarcane Fertility Update for 2023

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USDA/ARS, SRU



Fertilizer Costs

Product	2022	2023	Change
Anhydrous Ammonia	\$1,471	\$1,200	-18 %
Urea (Dry)	\$923	\$765	-17%
UAN (32%)	\$677	\$618	-9%
Potash	\$803	\$776	-3%

Des Moines, IA Jan 11, 2022, USDA Market News
Des Moines, IA Feb 7, 2023, USDA Market News

Soil Fertility priorities for 2023

- **Soil pH**
- **Nitrogen**
- **Potassium**
- **Sulfur**
- **Micronutrients (Zn, B)**
- **Phosphorus (at planting?)**

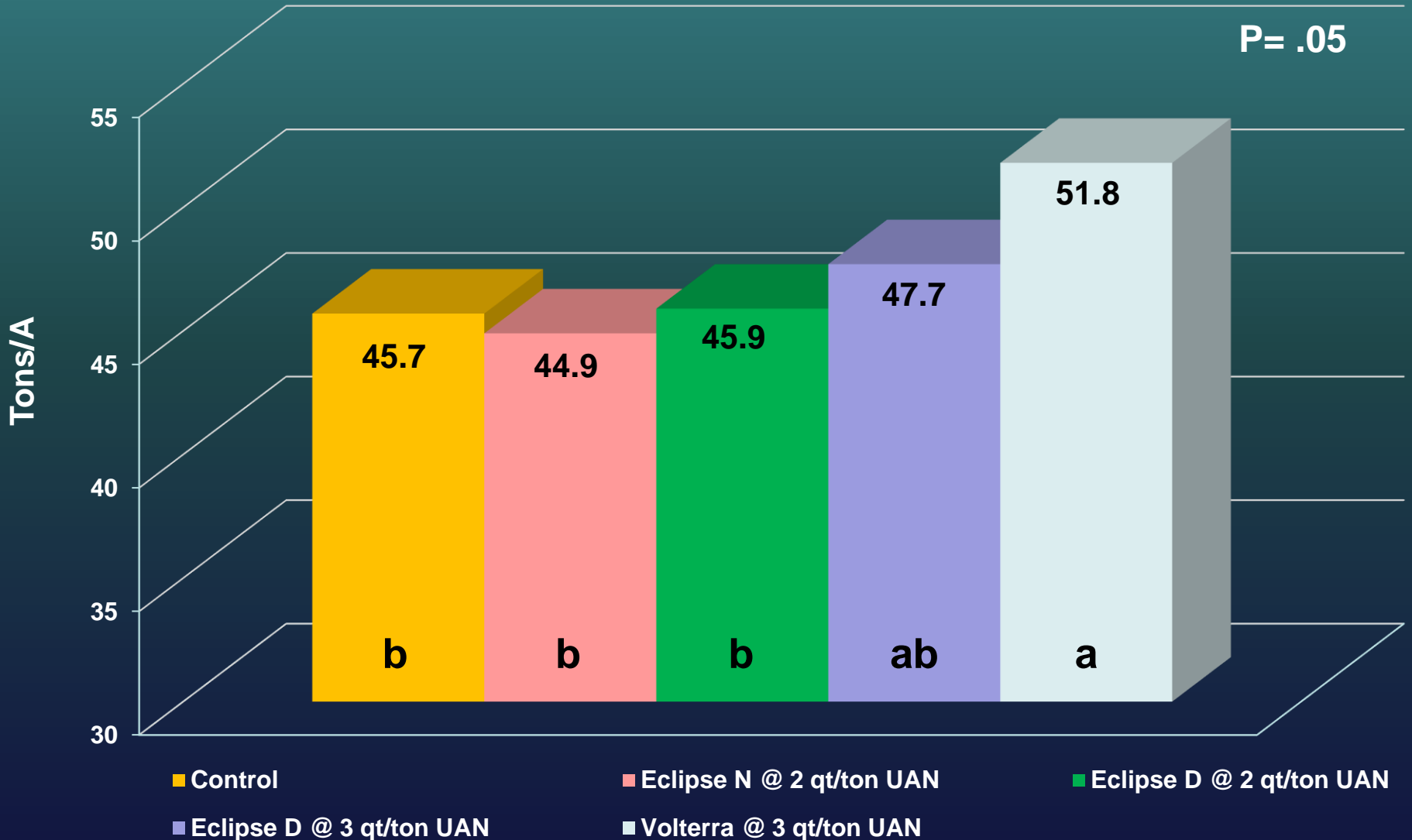
Nitrogen Stabilizers

- Urea \longrightarrow urease \longrightarrow NH_4^+
 - Urease inhibitor - N-(n-butyl) thiophosphoric triamide (NBPT)
- NH_4^+ \longrightarrow nitrosomonas, nitrobacter \longrightarrow NO_3^-
 - Nitrification inhibitor – Dicyandiamide (DCD)

Response to Nitrogen Stabilizers

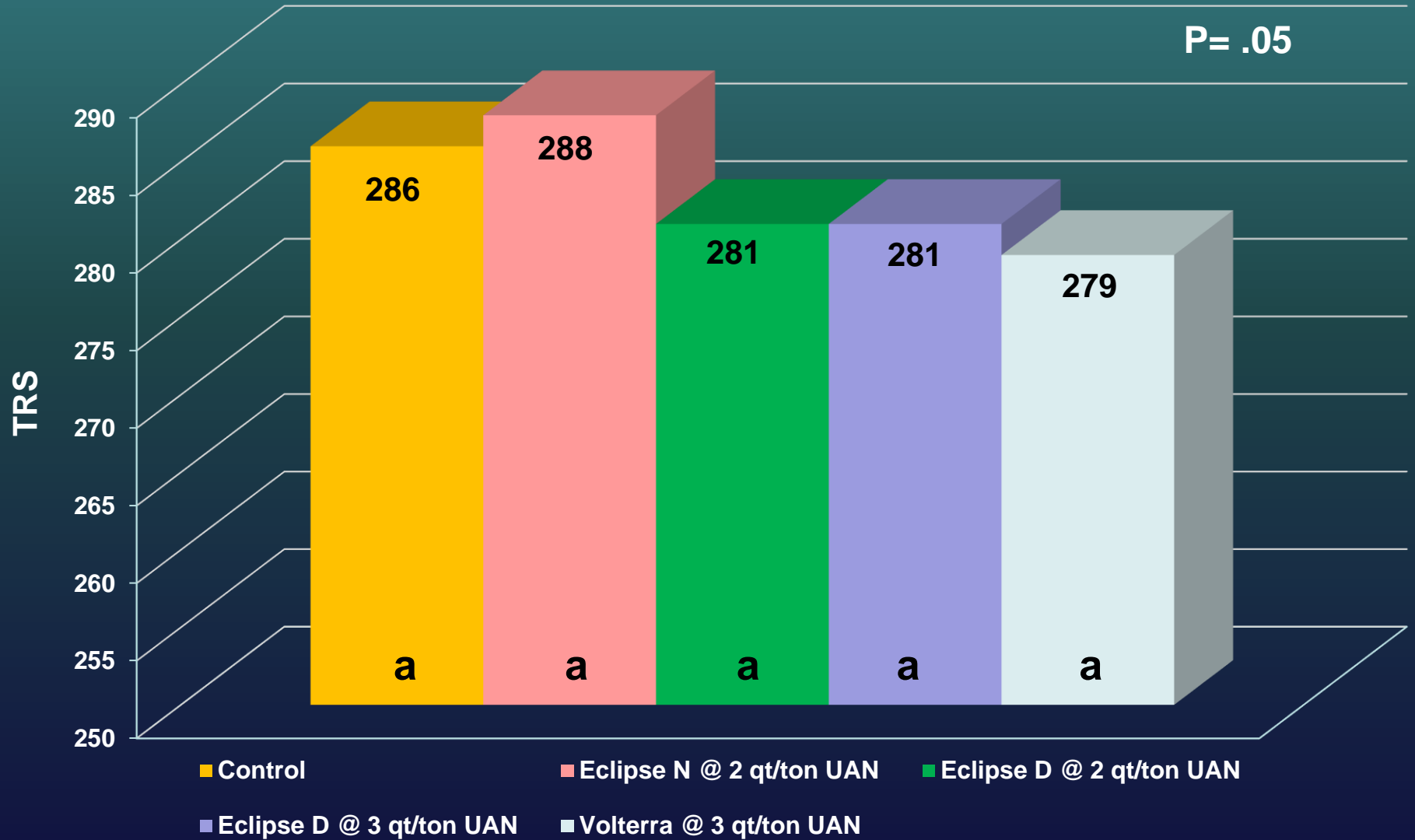
Ho 12-615, PC, Tons/A, Gravois, 2022

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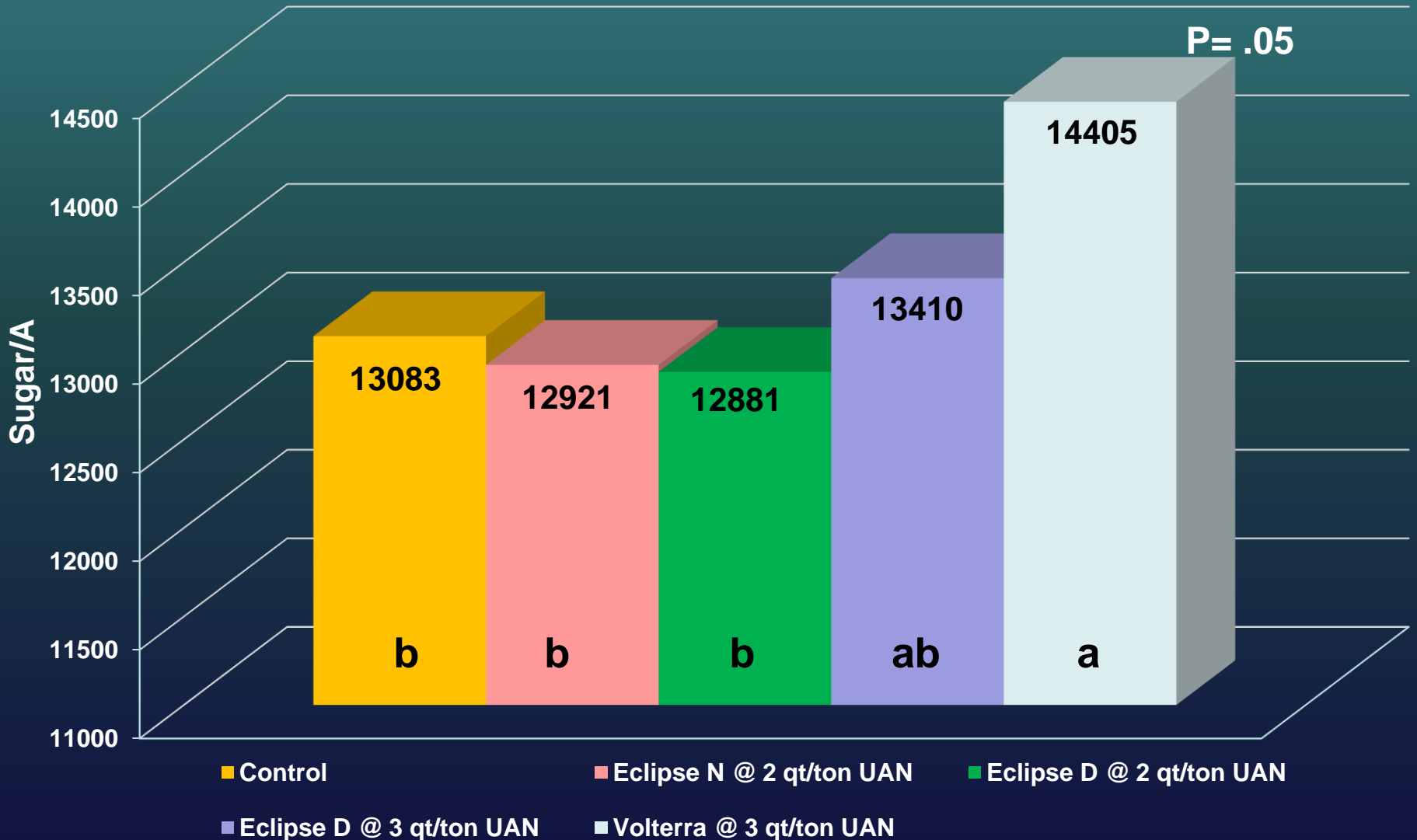
Response to Nitrogen Stabilizers

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Response to Nitrogen Stabilizers

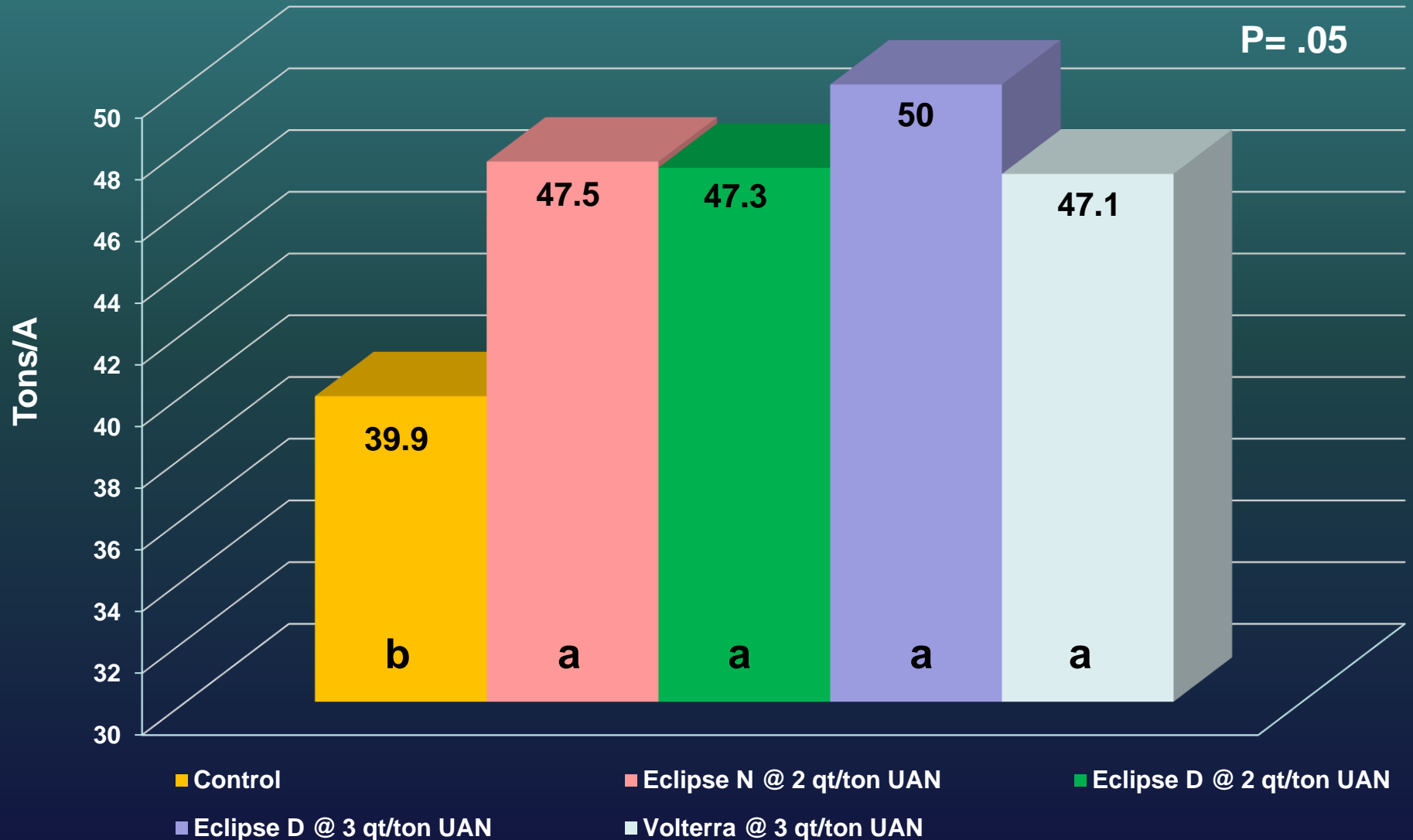
Ho 12-615, PC, Sugar/A, Gravois, 2022



Response to Nitrogen Stabilizers

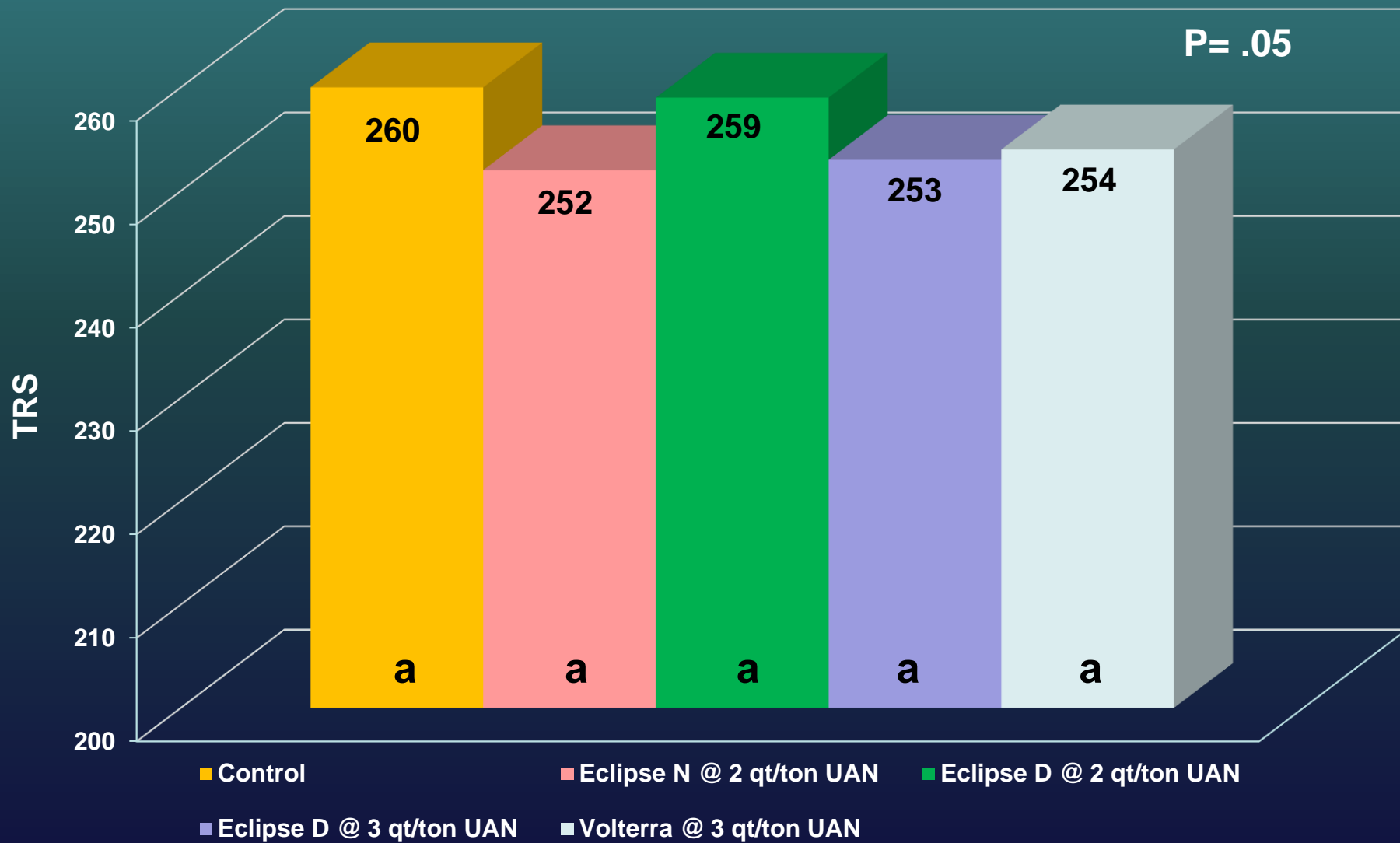
Ho 12-615, PC, Tons/A, Ellender, 2022

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Response to Nitrogen Stabilizers

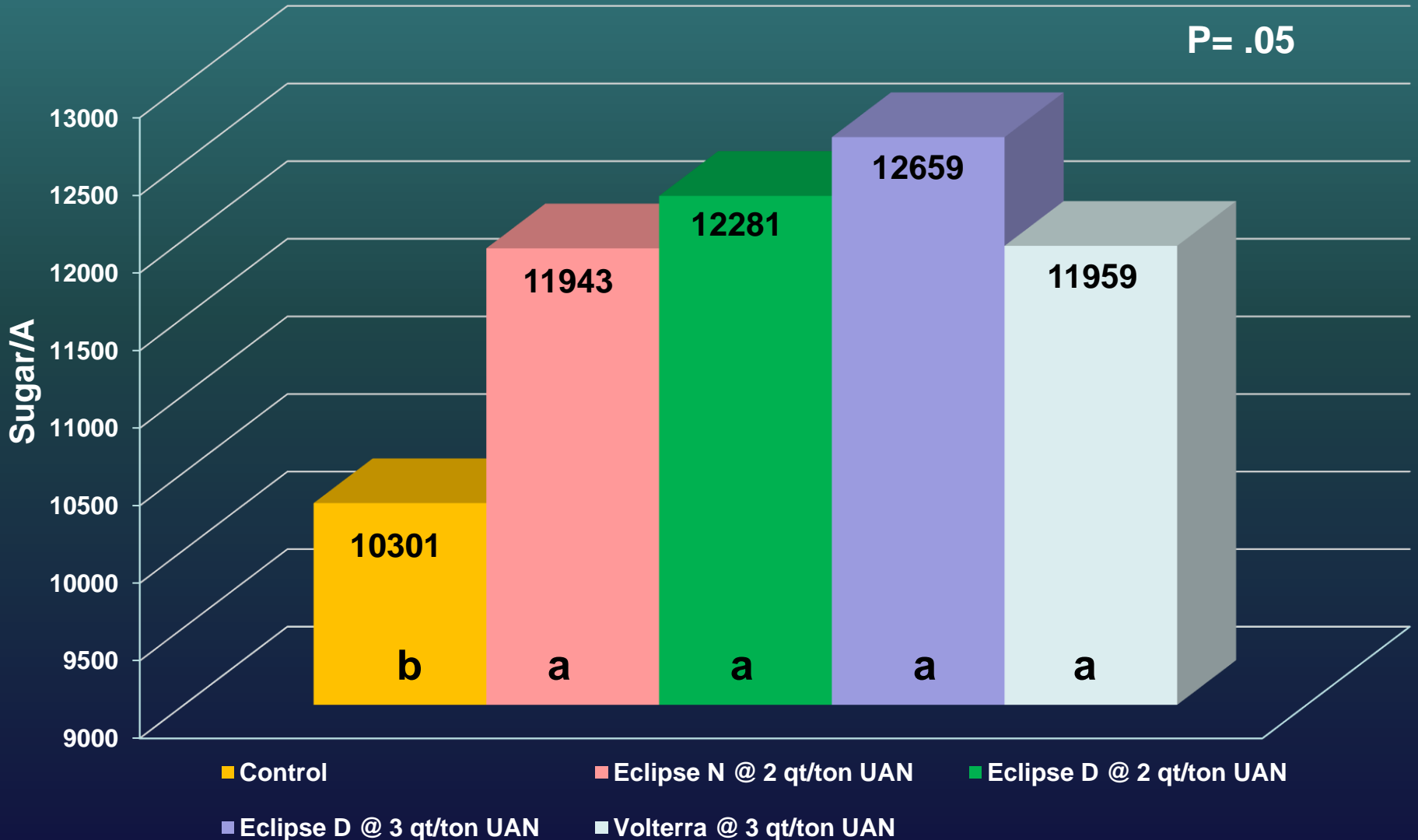
Ho 12-615, PC, TRS, Ellender, 2022



Response to Nitrogen Stabilizers

Ho 12-615, PC, Sugar/A, Ellender, 2022

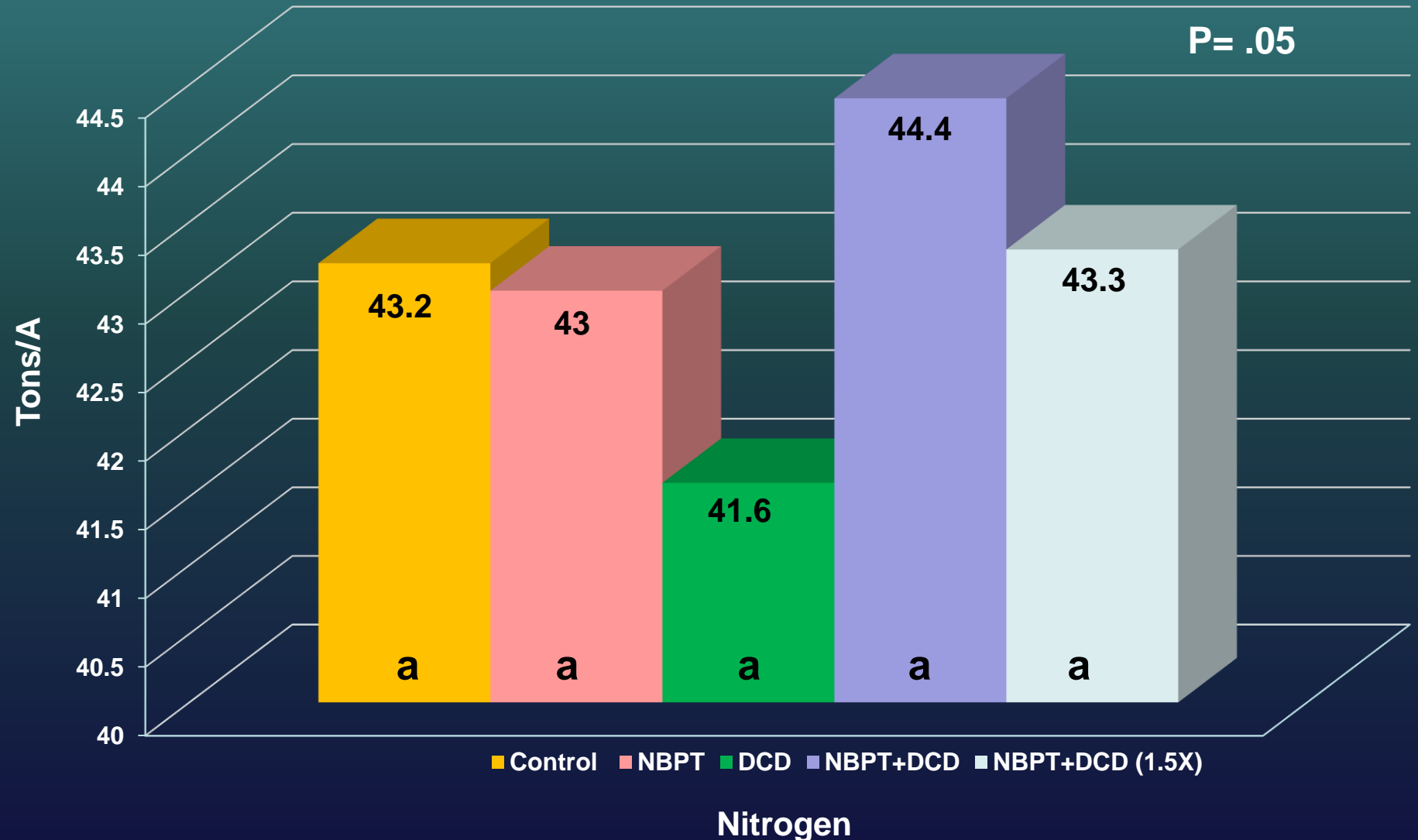
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Response to Nitrogen Stabilizers

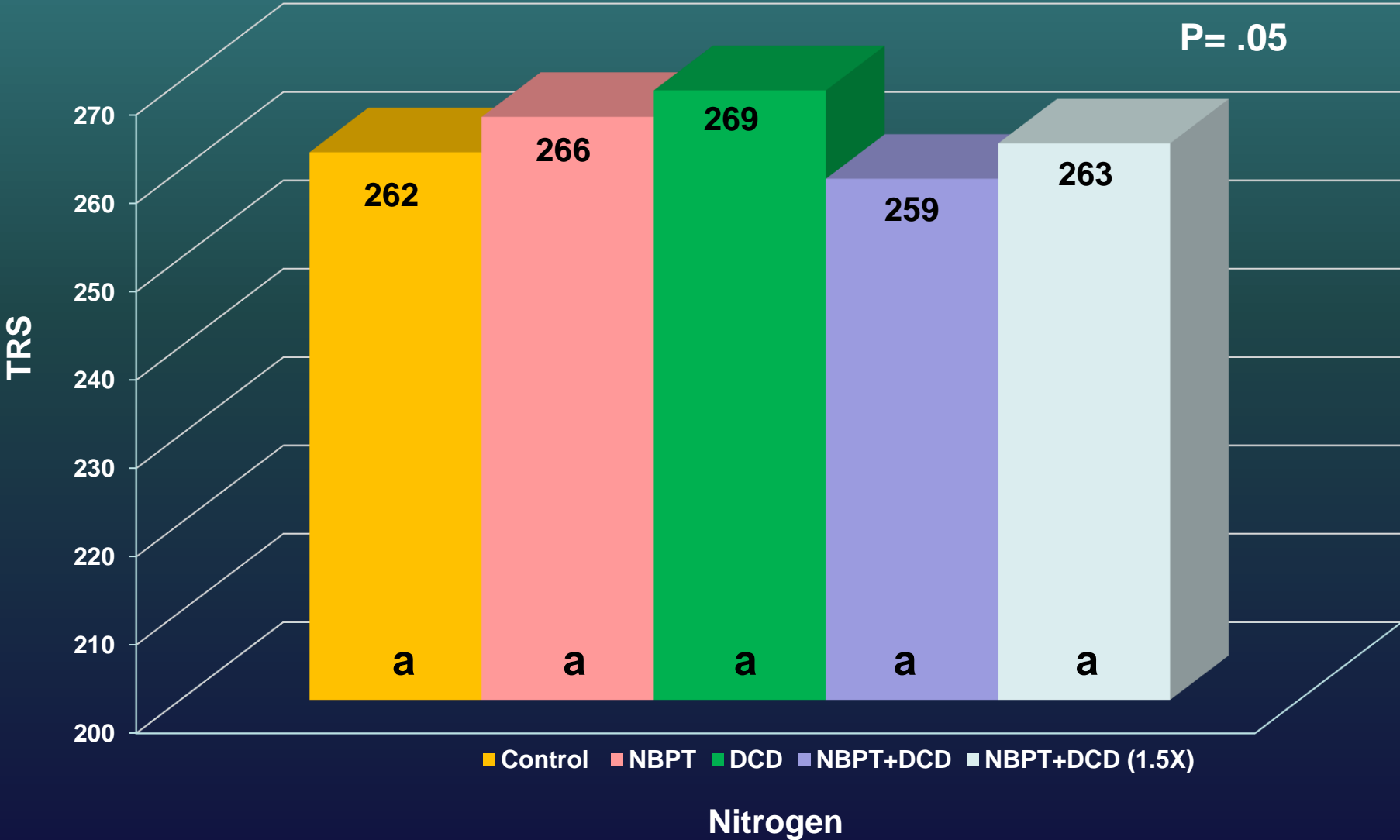
L01-299, 1st Stubble, Tons/A, Gravois, 2022

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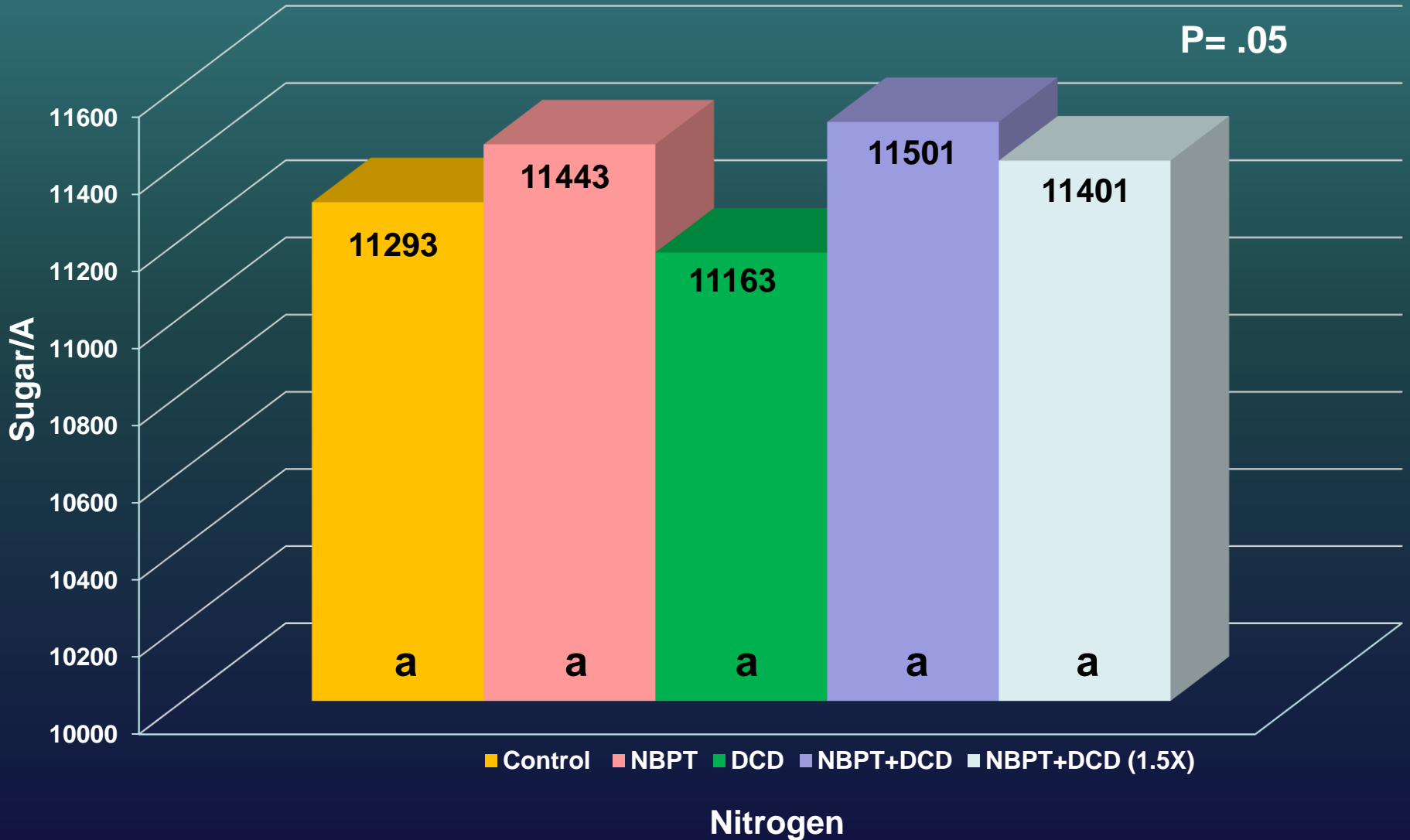
Response to Nitrogen Stabilizers

L01-299, 1st Stubble, TRS, Gravois, 2022



Response to Nitrogen Stabilizers

L01-299, 1st Stubble, Sugar/A, Gravois, 2022



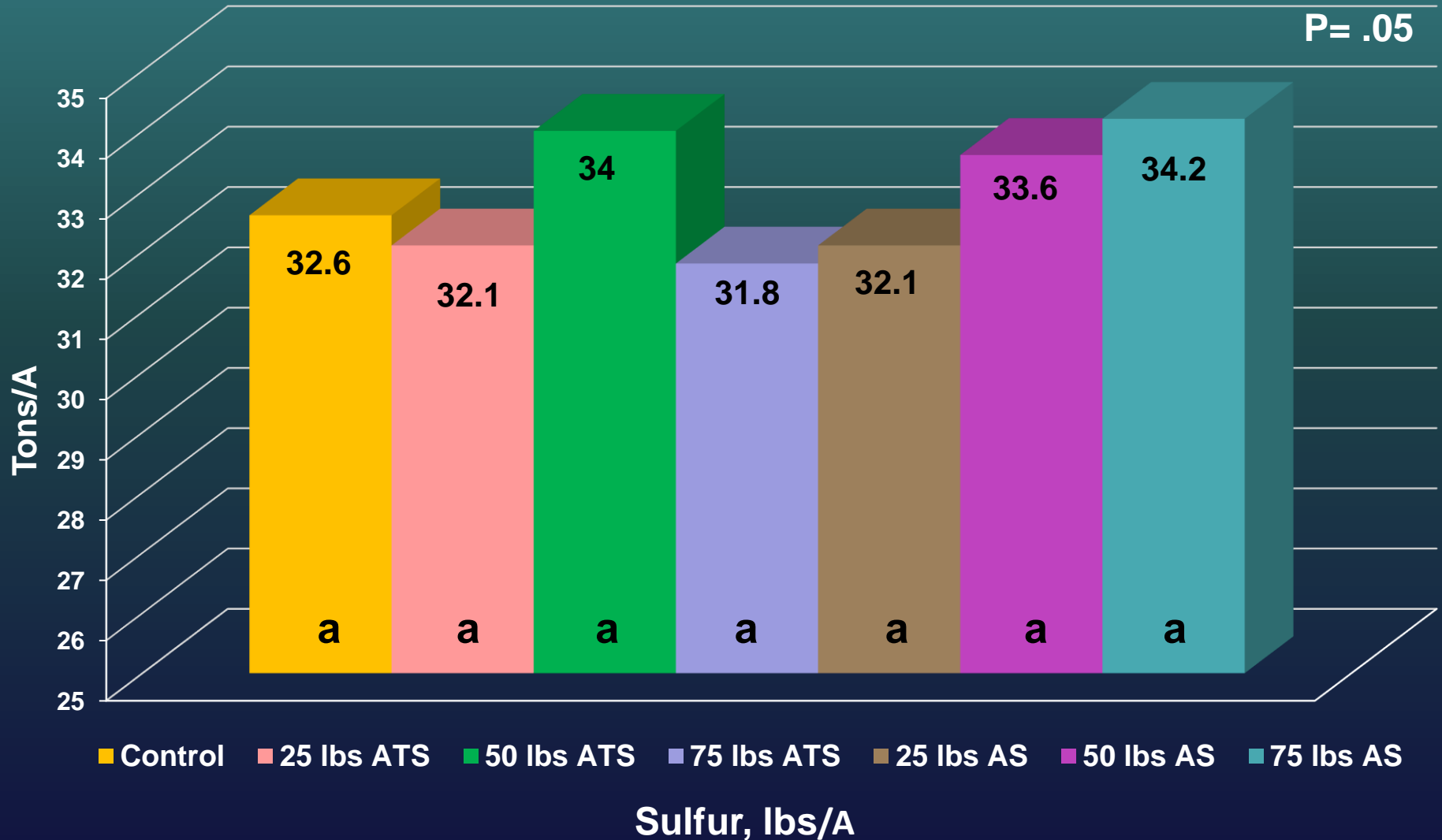
Sulfur (S)

- **Varieties: L01-299, HoCP 96-540, Ho 12-615**
- **Crop Age: PC, 1R, 2R**
- **All soils tested low or medium for sulfur prior to treatment application.**
- **S rates: 0, 25, 50, 75 lb S/A**
- **Sources: ATS (Liquid), AS (ammonium sulfate)**
- **Reps: 6**
- **The current recommendation is 24 lb S/A, if recommended by soil test. It may be necessary to revise this due to loss of atmospheric sulfur sources.**

Response to Sulfur Fertilizer

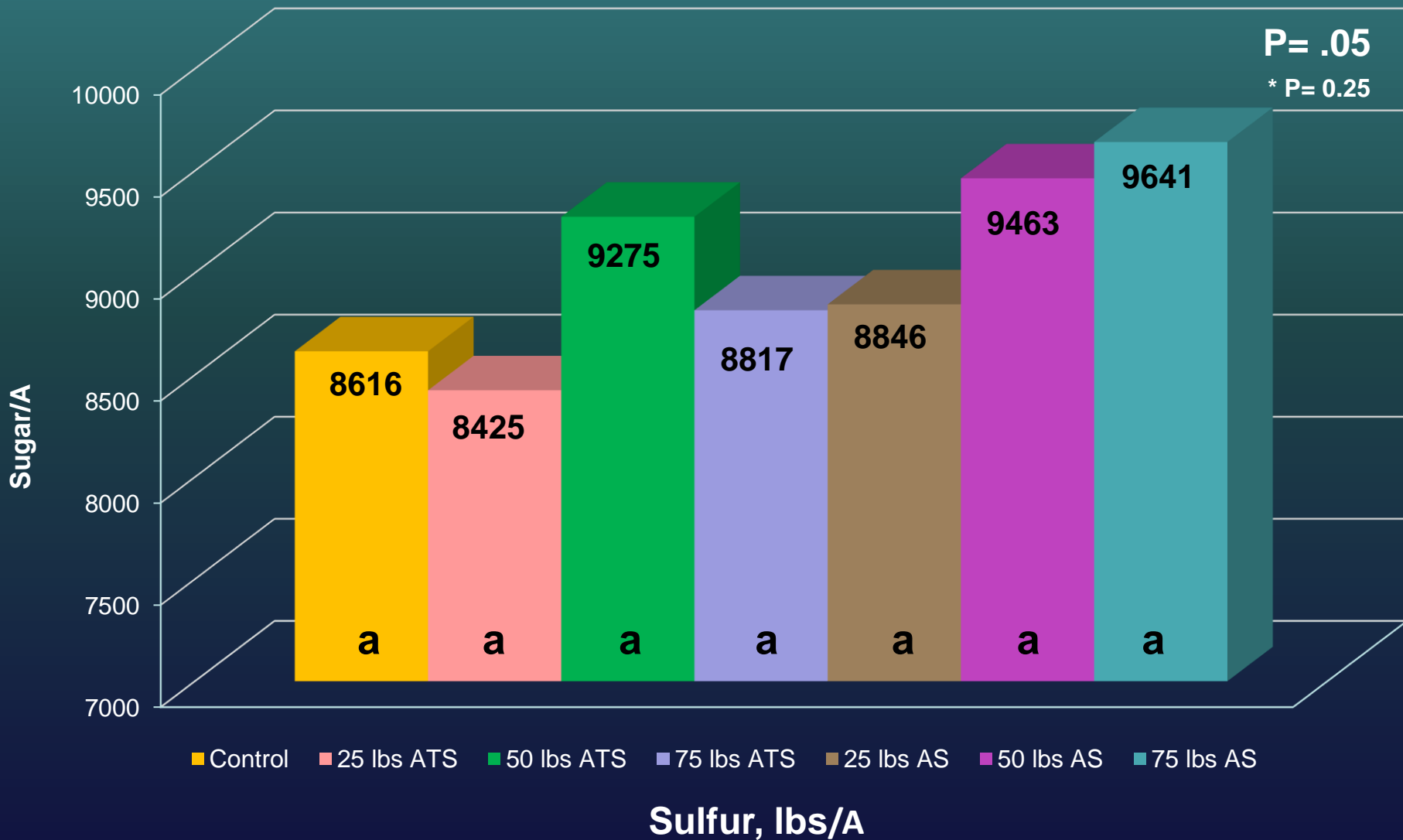
HoCP 96-540, 2nd Stubble, Tons/A, Gravois, 2022

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Response to Sulfur Fertilizer

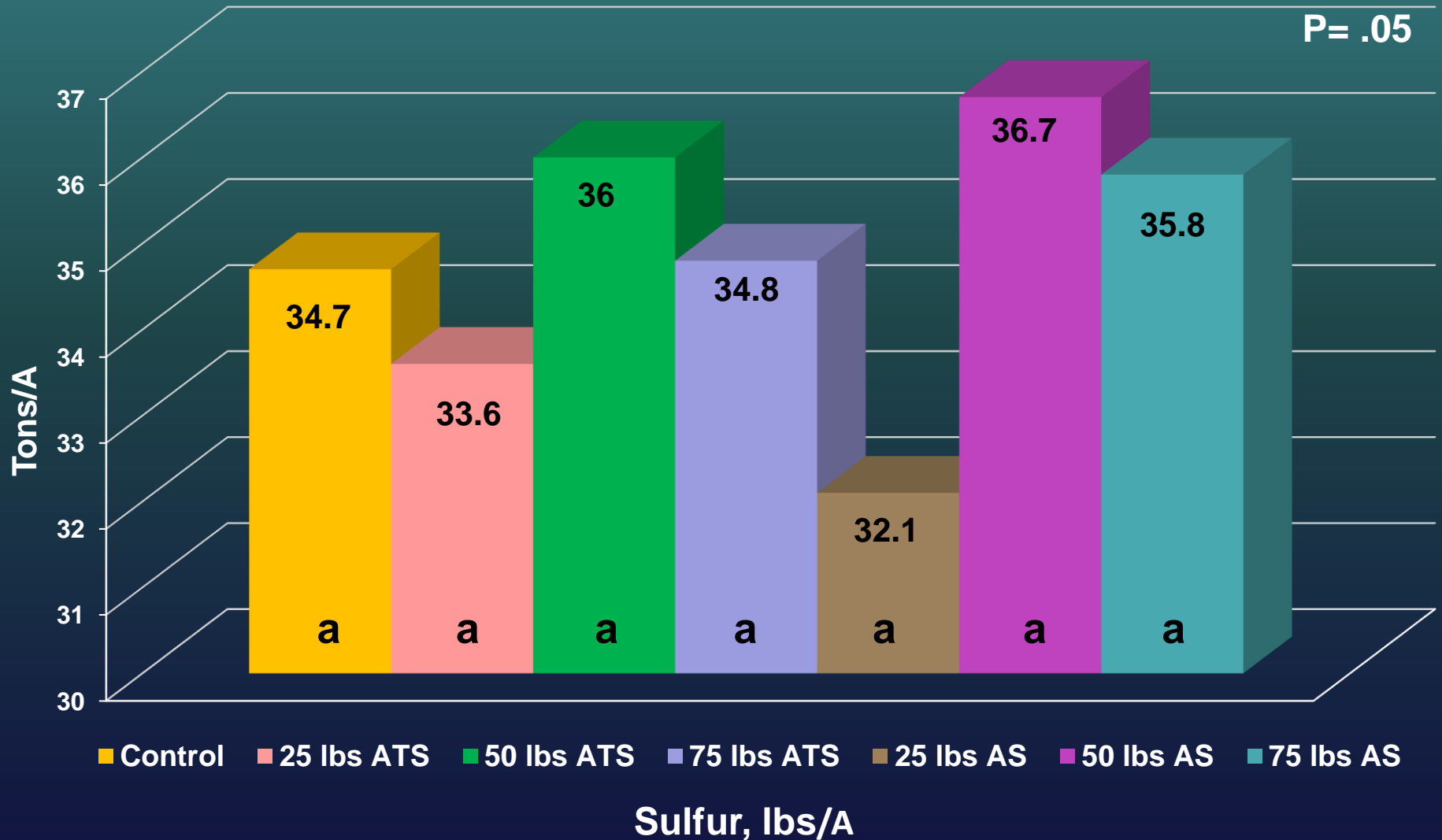
HoCP 96-540, 2nd Stubble, Sugar/A, Gravois, 2022



Response to Sulfur Fertilizer

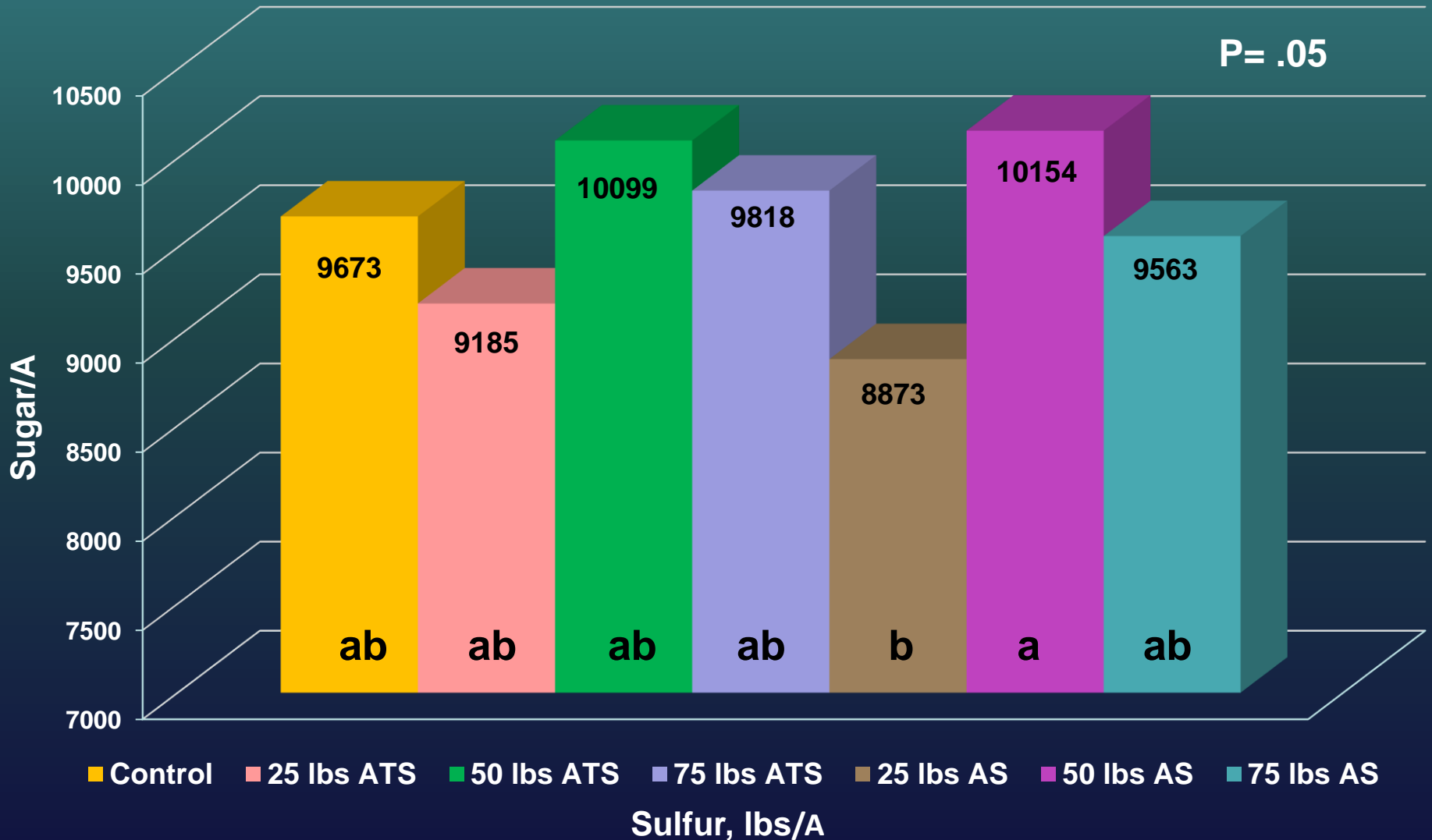
Ho 12-615, 1st Stubble, Tons/A, Gravois, 2022

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Response to Sulfur Fertilizer

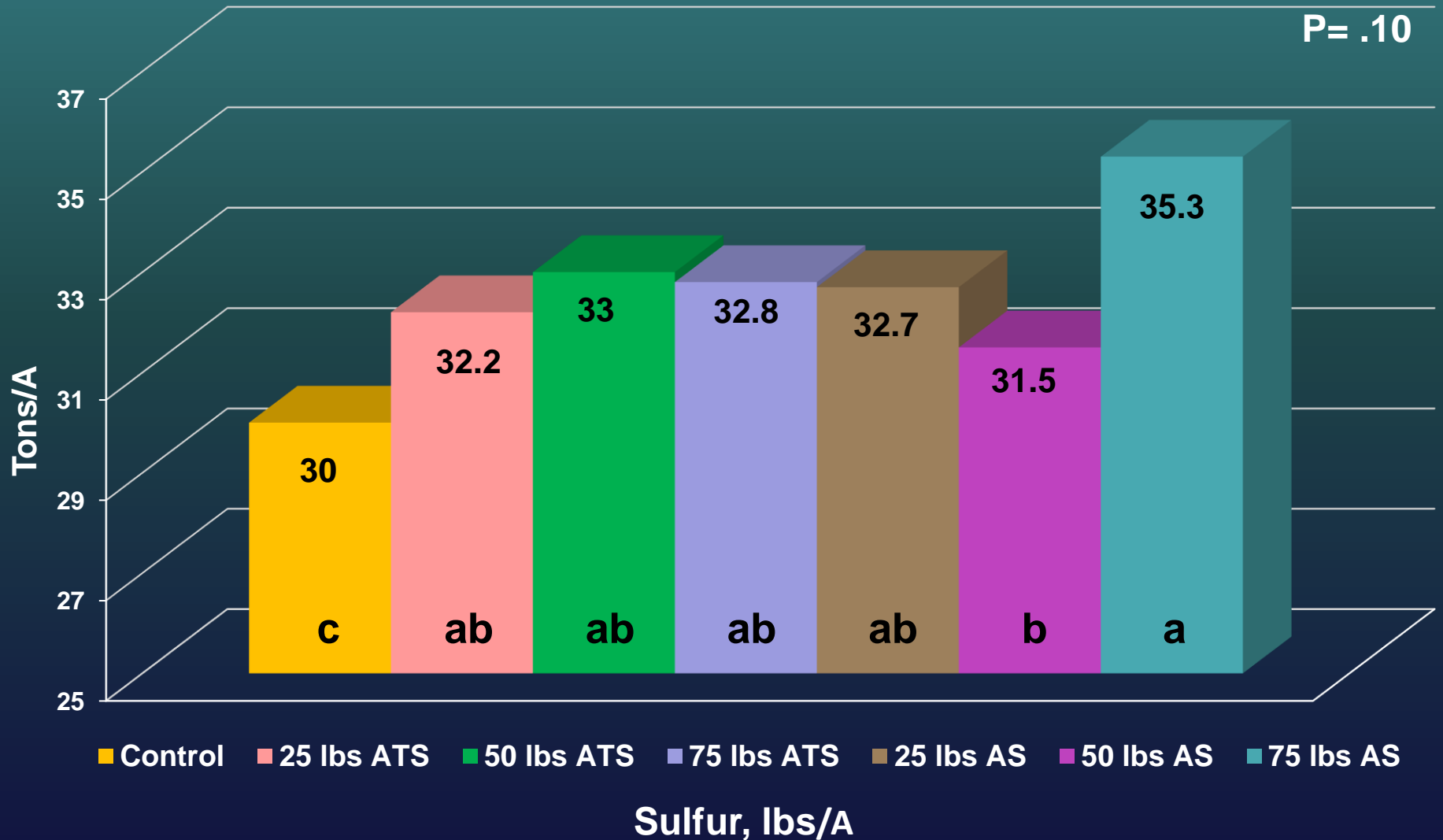
Ho 12-615, 1st Stubble, Sugar/A, Gravois, 2022



Response to Sulfur Fertilizer

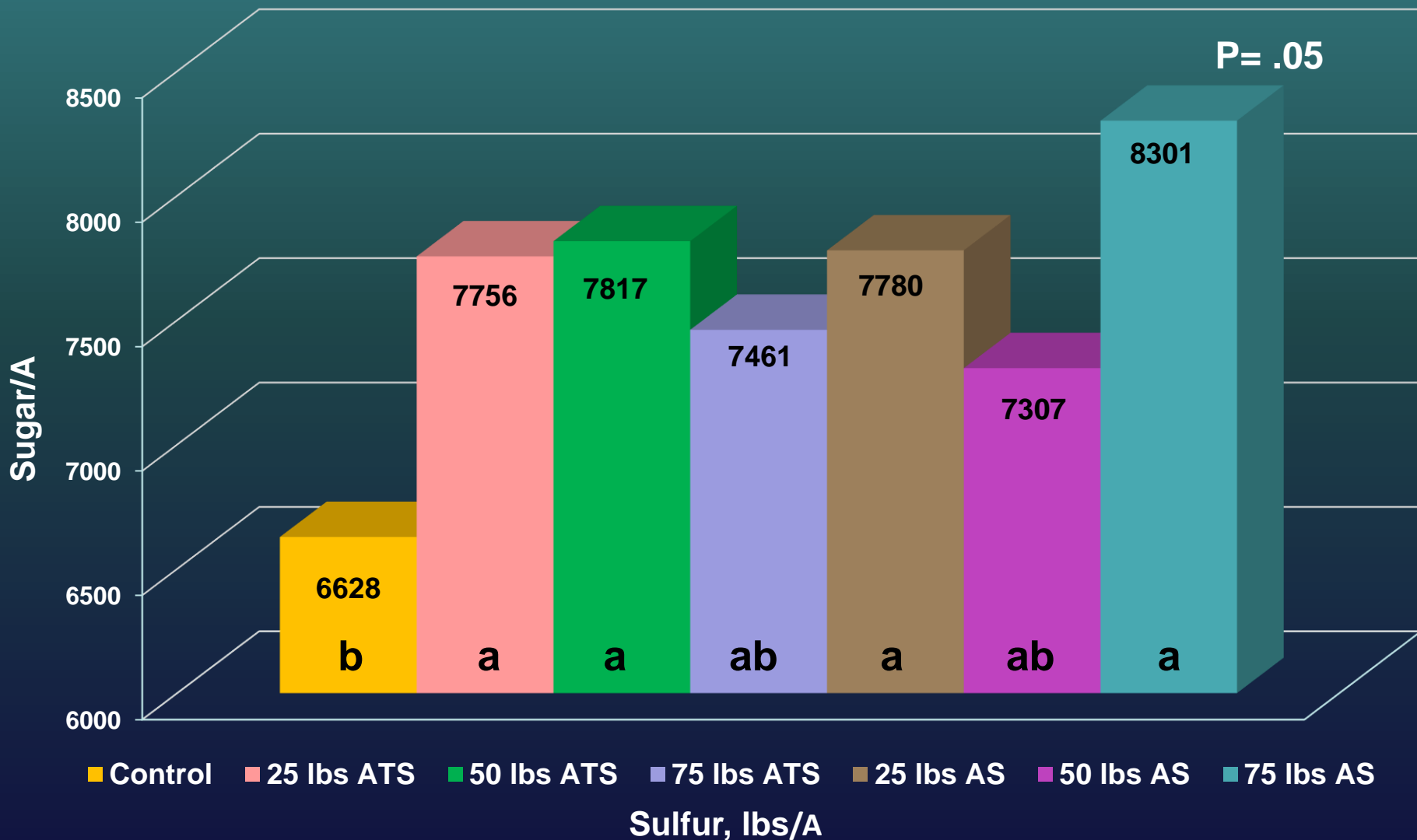
Ho 12-615, 1st Stubble, Tons/A, Gaubert, 2022

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Response to Sulfur Fertilizer

Ho 12-615, 1st Stubble, Sugar/A, Gaubert, 2022



Sulfur (S)

Summary

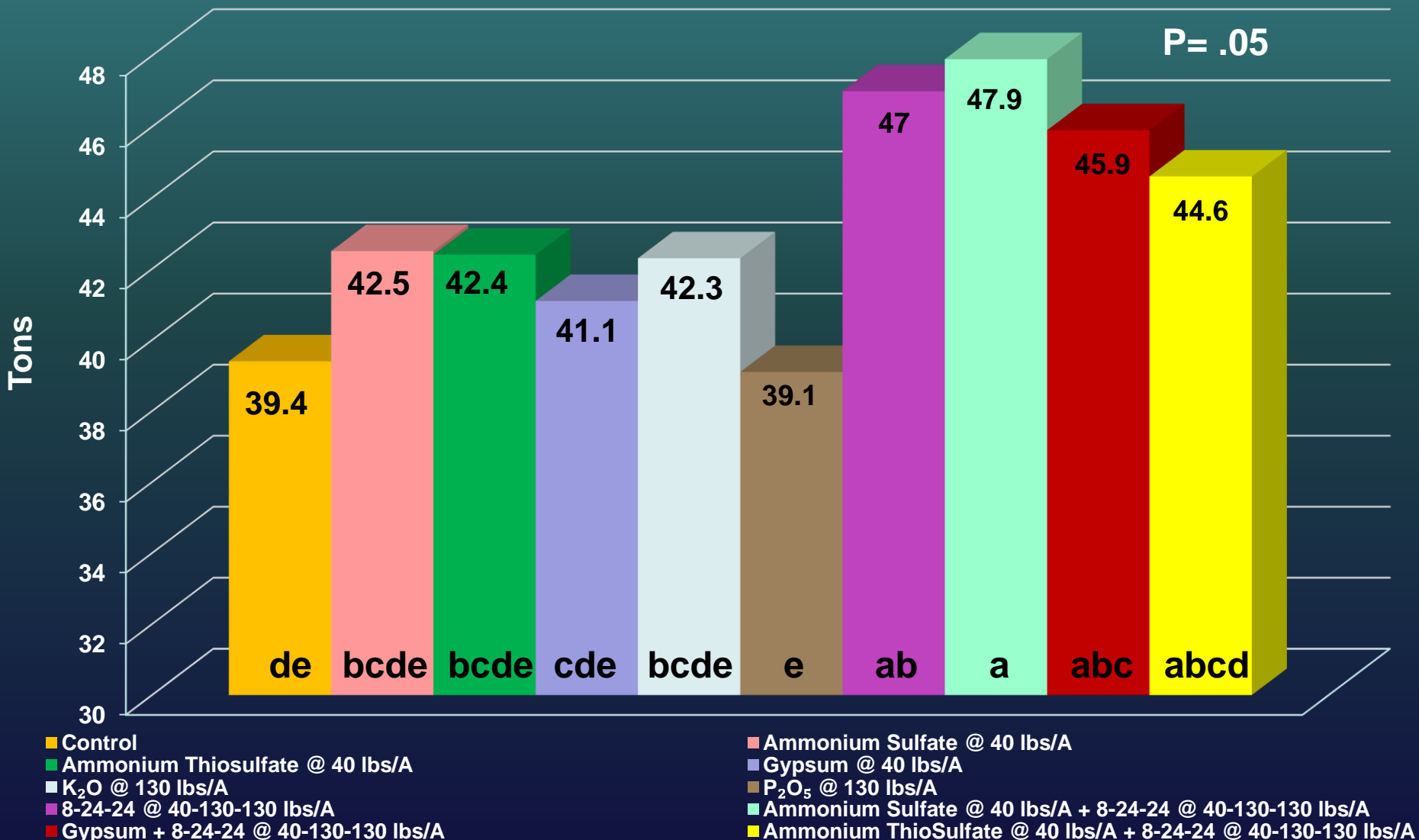
- **Consistent results have demonstrated a benefit to sulfur.**
- **The current recommendation of 24 lb S/A may be too low for optimum response to sulfur.**
- **Soil test levels for many locations continue to test low or very low even with the recommended application rate being applied.**
- **Positive, significant yield responses have been achieved with rates up to 75 lb S/A.**
- **Additional trials will be conducted in 2023 to study combinations of S sources - (Gypsum + Elemental S).**

Sugarcane Fertility Component Experiment

- Variety: L01-299, 6th stubble
- Treatments:
 - Control
 - Ammonium sulfate - 40 lb/A
 - Ammonium thiosulfate – 40 lb/A
 - Gypsum – 40 lb/A
 - K_2O – 130 lb/A
 - P_2O_5 – 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 Sulfur Fertilizer

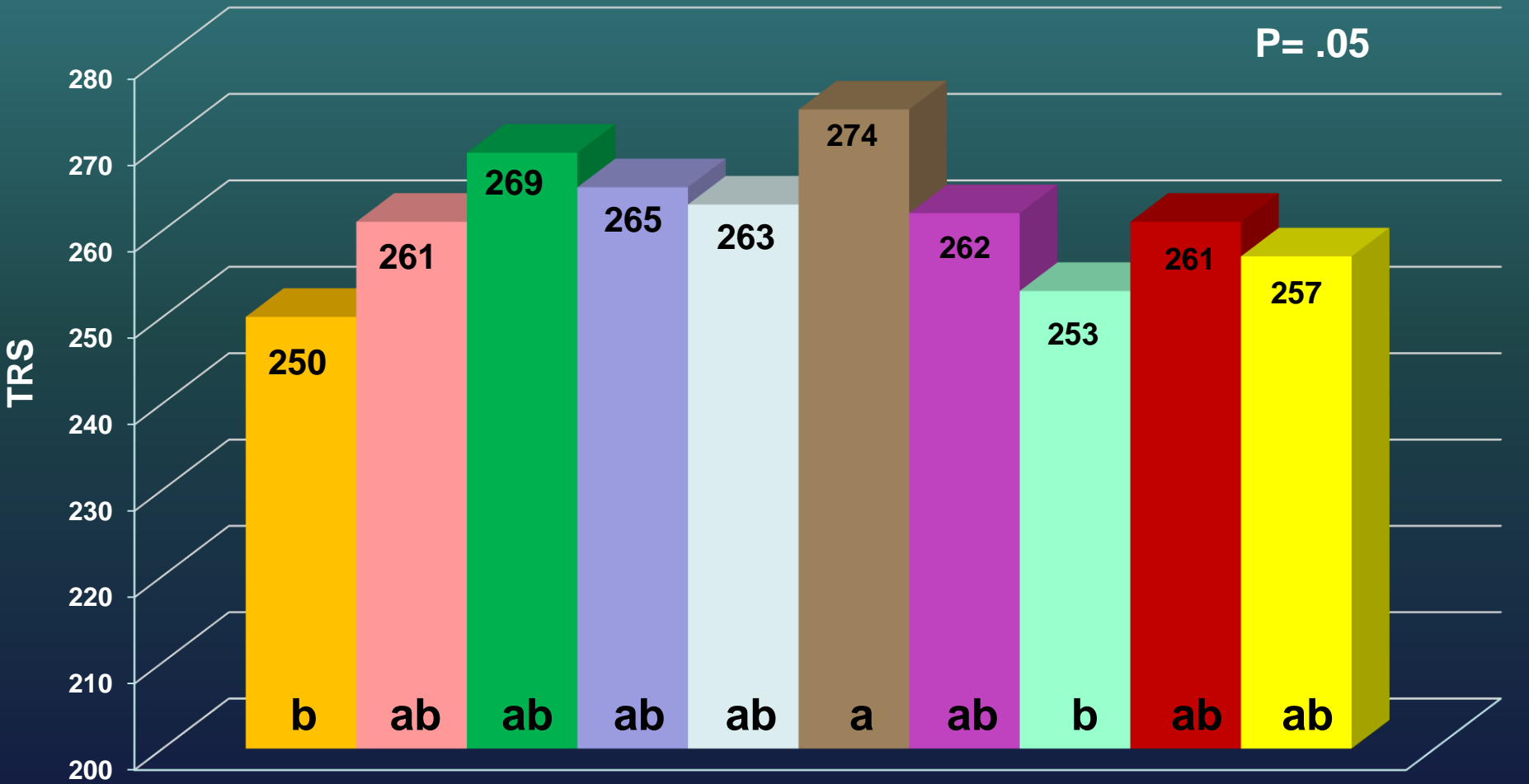
L 01-299, 6th Stubble, Tons/A, Gravois, 2022



Response to Sulfur Fertilizer

L 01-299, 6th Stubble, TRS, Gravois, 2022

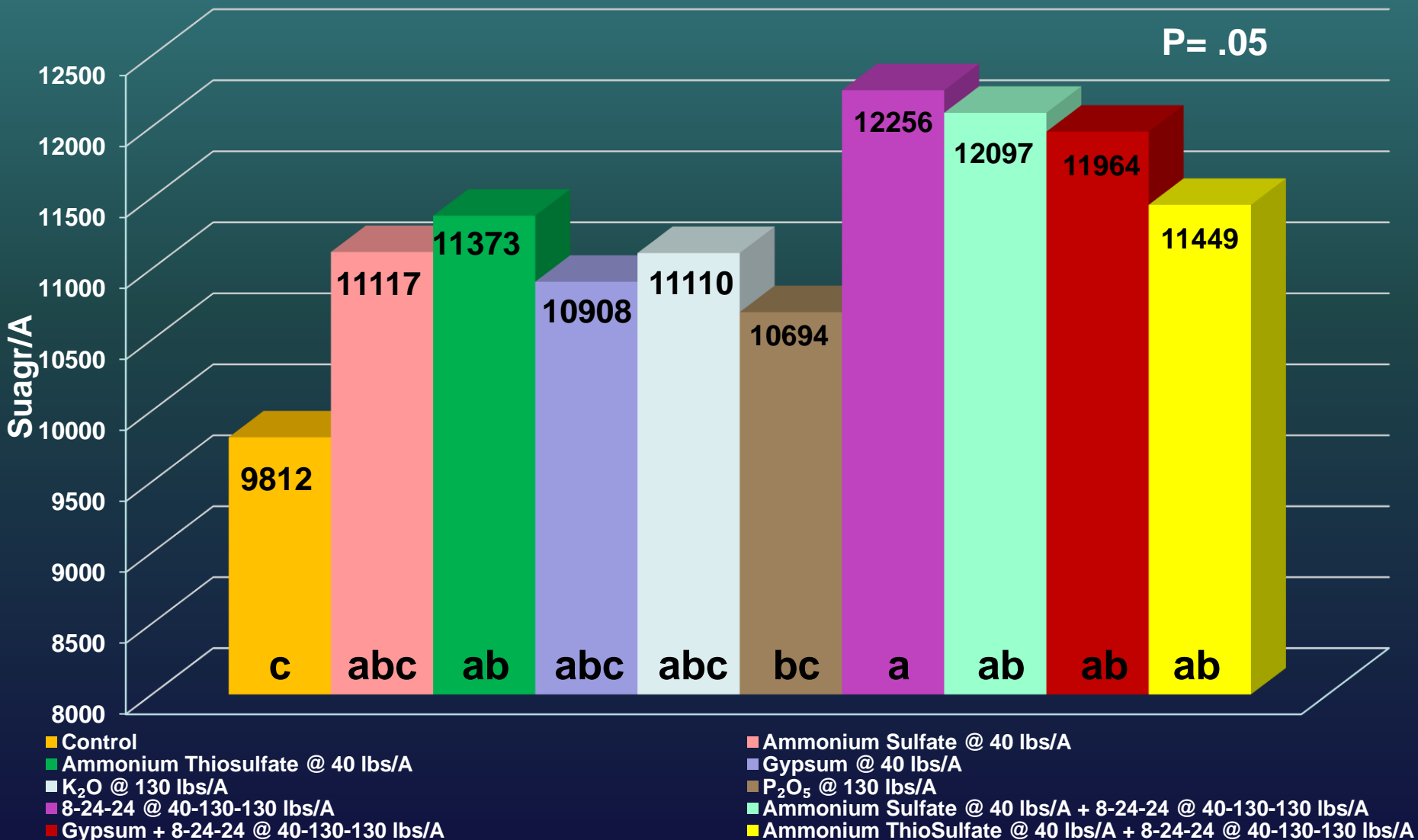
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- Control
- Ammonium Sulfate @ 40 lbs/A
- Ammonium Thiosulfate @ 40 lbs/A
- Gypsum @ 40 lbs/A
- K₂O @ 130 lbs/A
- P₂O₅ @ 130 lbs/A
- 8-24-24 @ 40-130-130 lbs/A
- Ammonium Sulfate @ 40 lbs/A + 8-24-24 @ 40-130-130 lbs/A
- Gypsum + 8-24-24 @ 40-130-130 lbs/A
- Ammonium ThioSulfate @ 40 lbs/A + 8-24-24 @ 40-130-130 lbs/A

Response to Sulfur Fertilizer

L 01-299, 6th Stubble, Sugar/A, Gravois, 2022



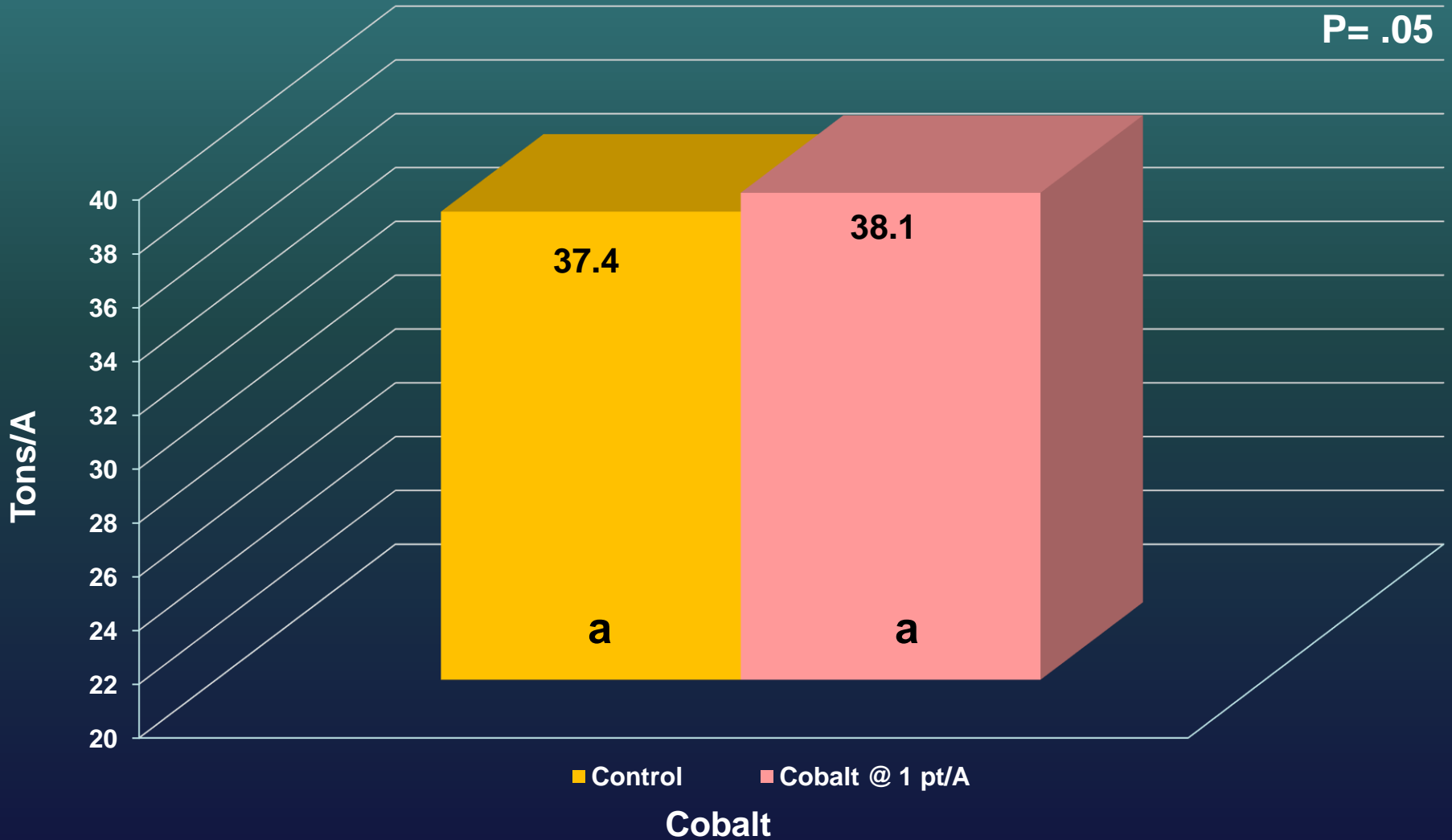
Cobalt (Co)

- **Varieties: L01-299**
- **Crop Age: 2R**
- **Co rate: 1 pt/A (soil applied)**
- **N Rate: 0, 40, 80, 120, 160 lb/A**
- **Reps: 4**
- **Can cobalt application stimulate sugarcane to fix-atmospheric nitrogen?**

Response to Cobalt

L 01-299, 2nd Stubble, Tons/A, Simmoneaux, 2022

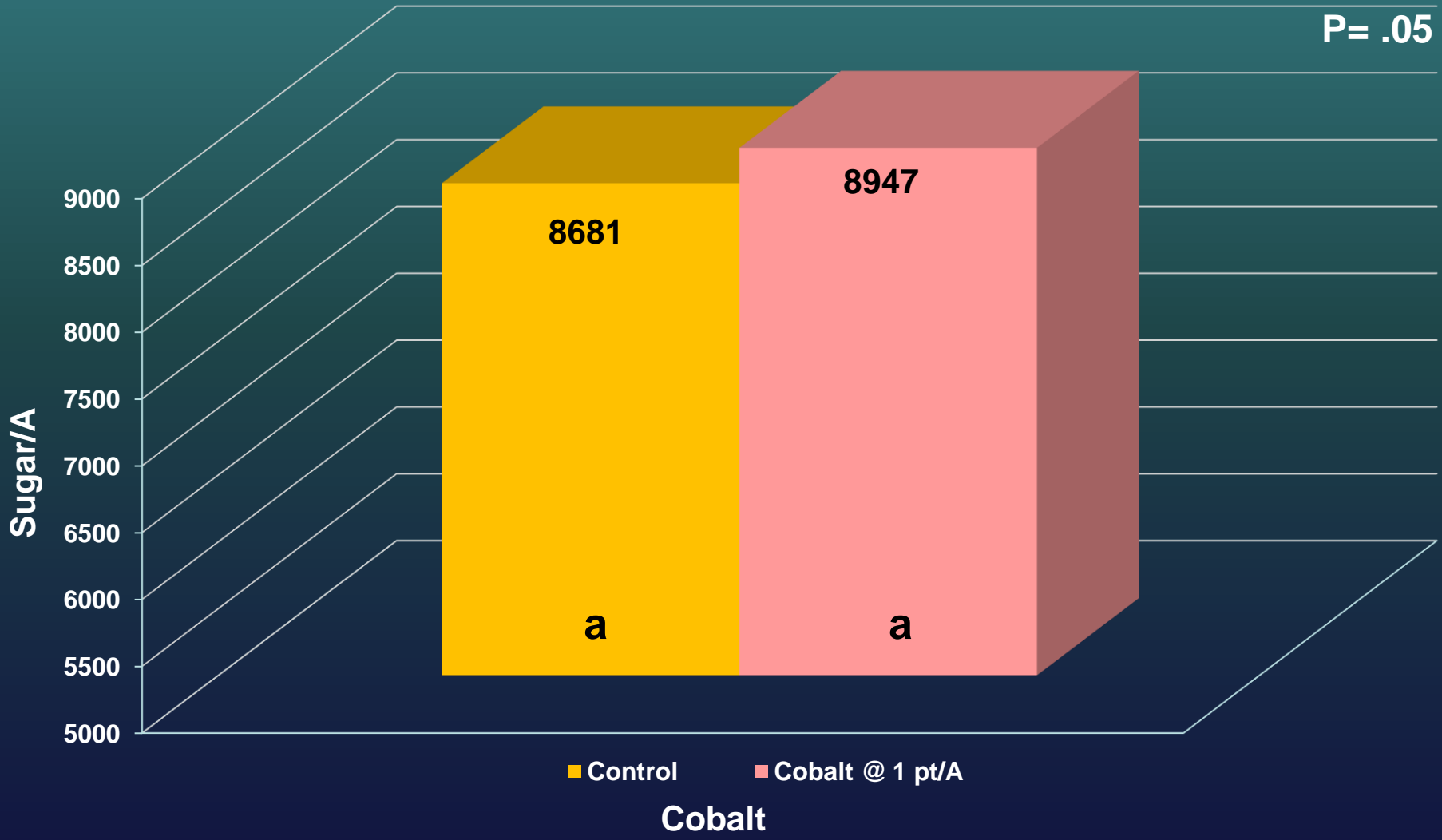
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Response to Cobalt

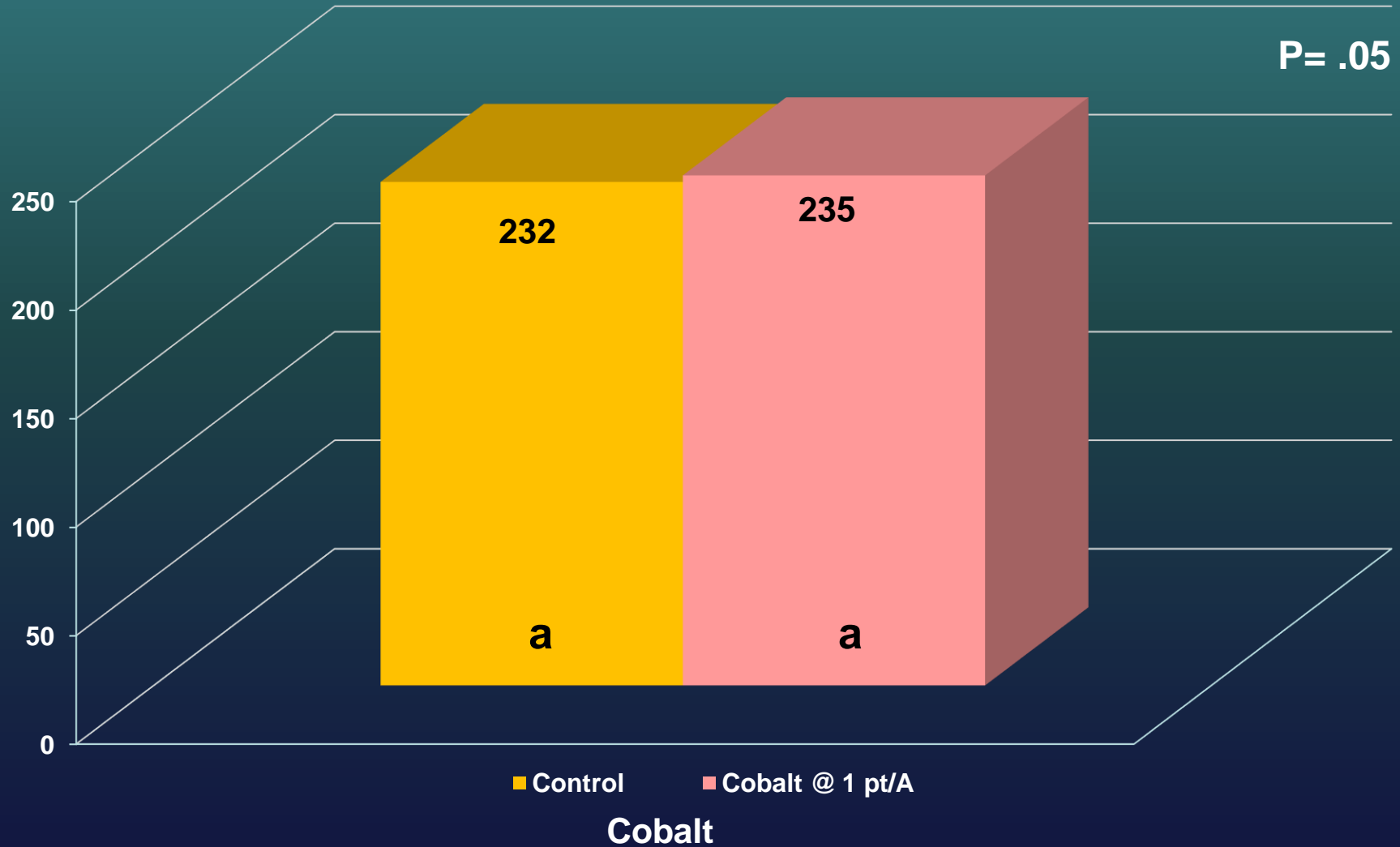
L 01-299, 2nd Stubble, Sugar/A, Simmoneaux, 2022

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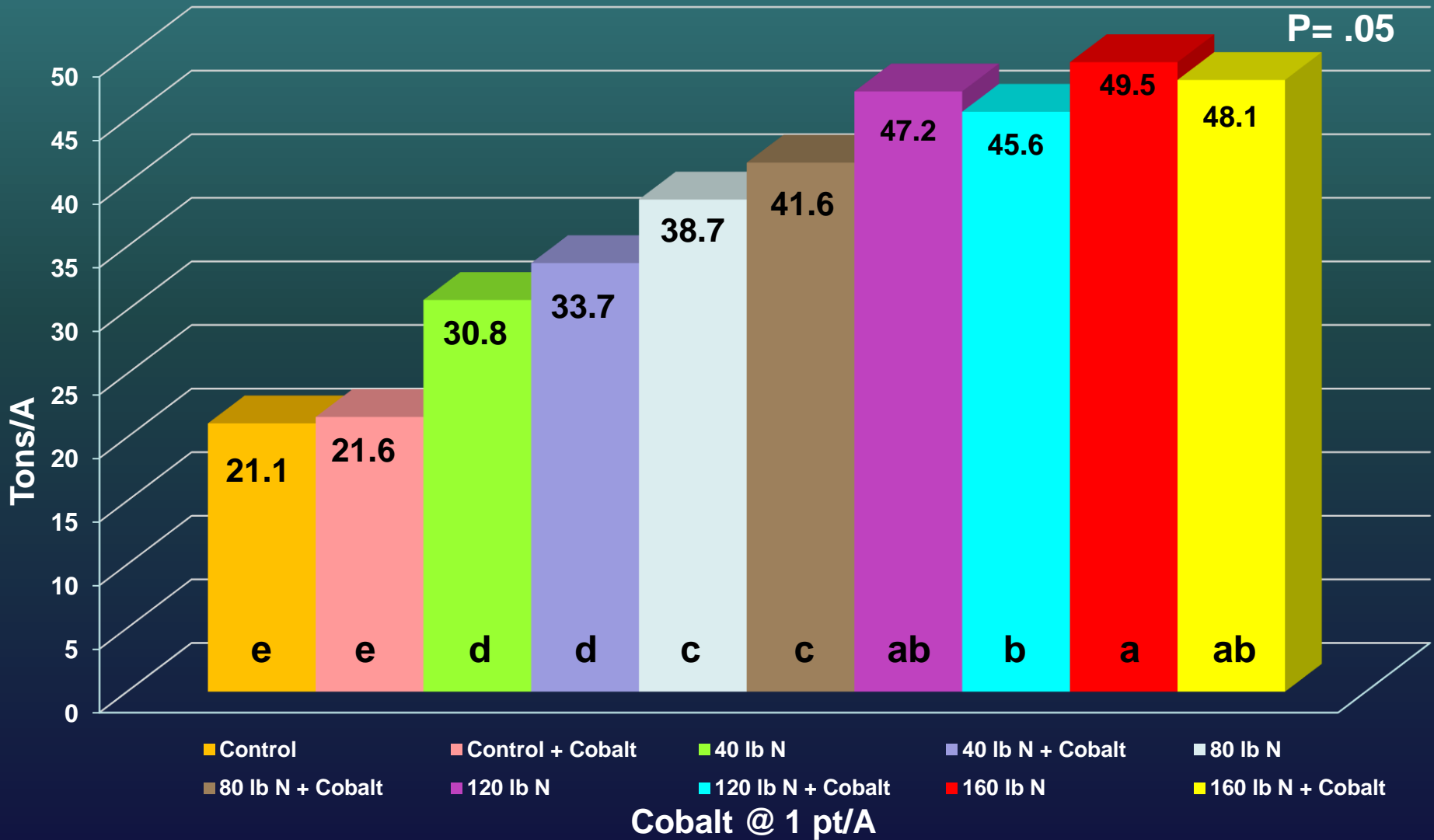
Response to Cobalt

L 01-299, 2nd Stubble, TRS, Simmoneaux, 202



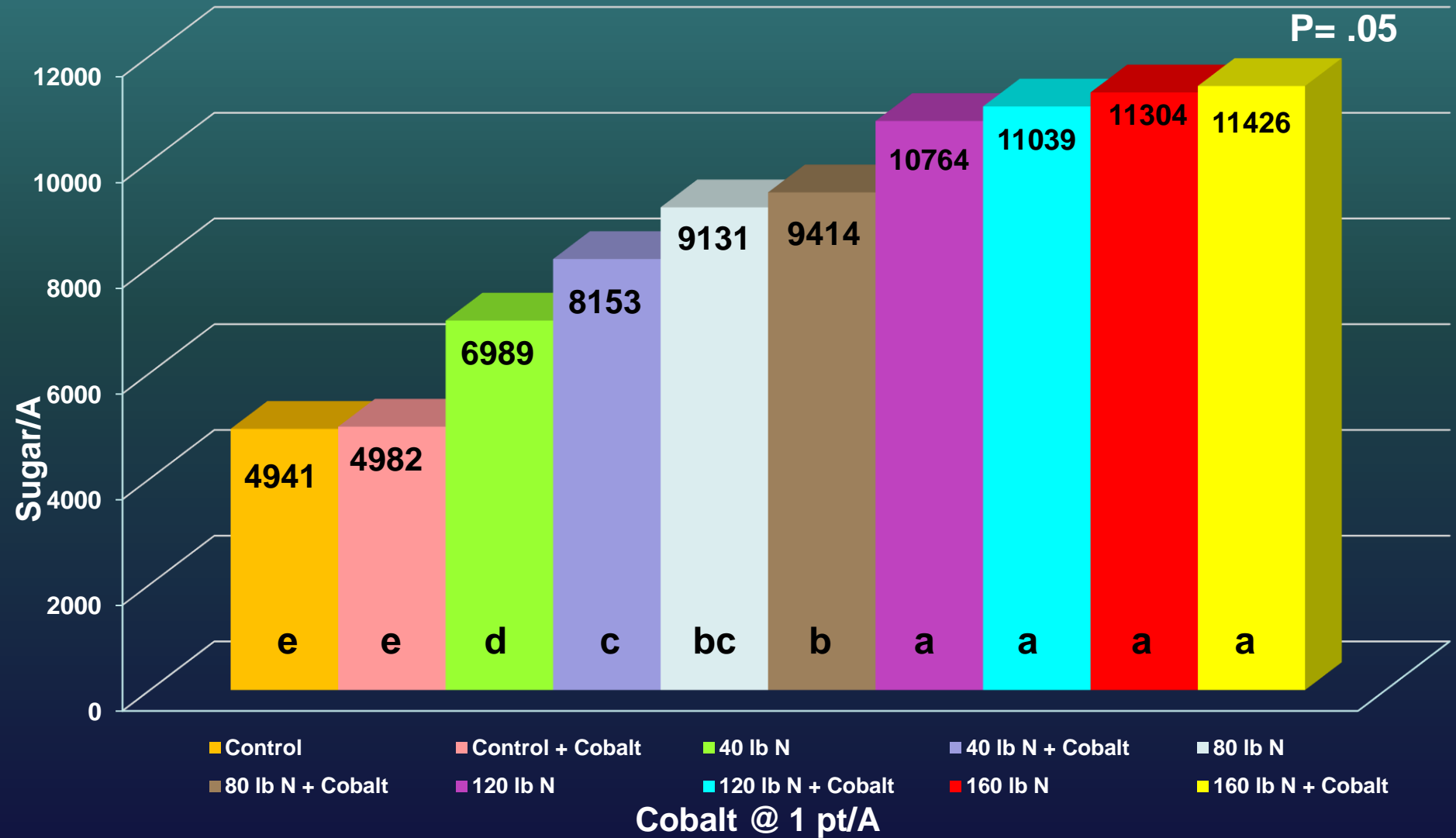
Response to Cobalt x Nitrogen

L 01-299, 2nd Stubble, Tons/A, Simmoneaux, 2022



Response to Cobalt x Nitrogen

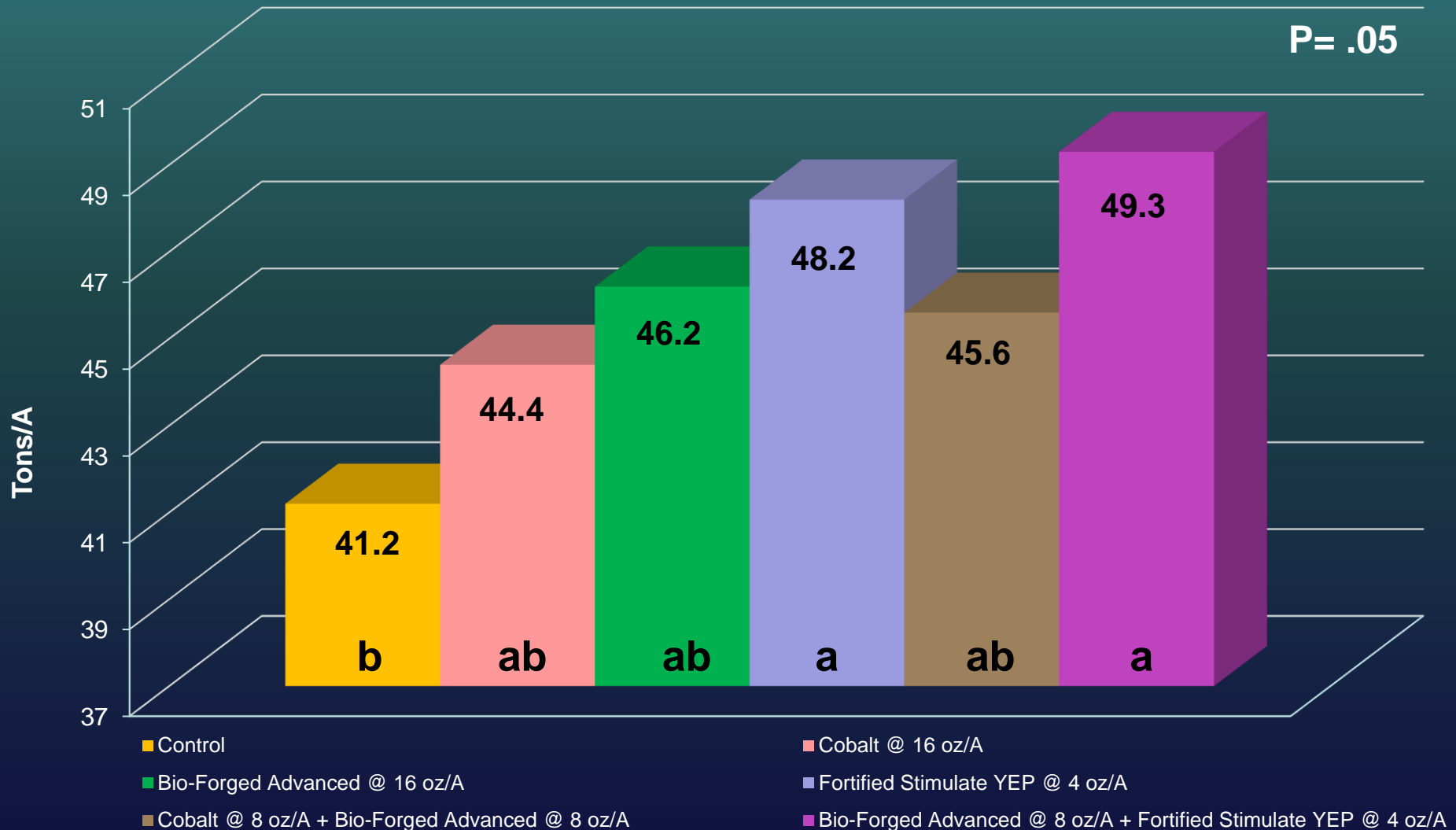
L 01-299, 2nd Stubble, Sugar/A, Simmoneaux, 2022



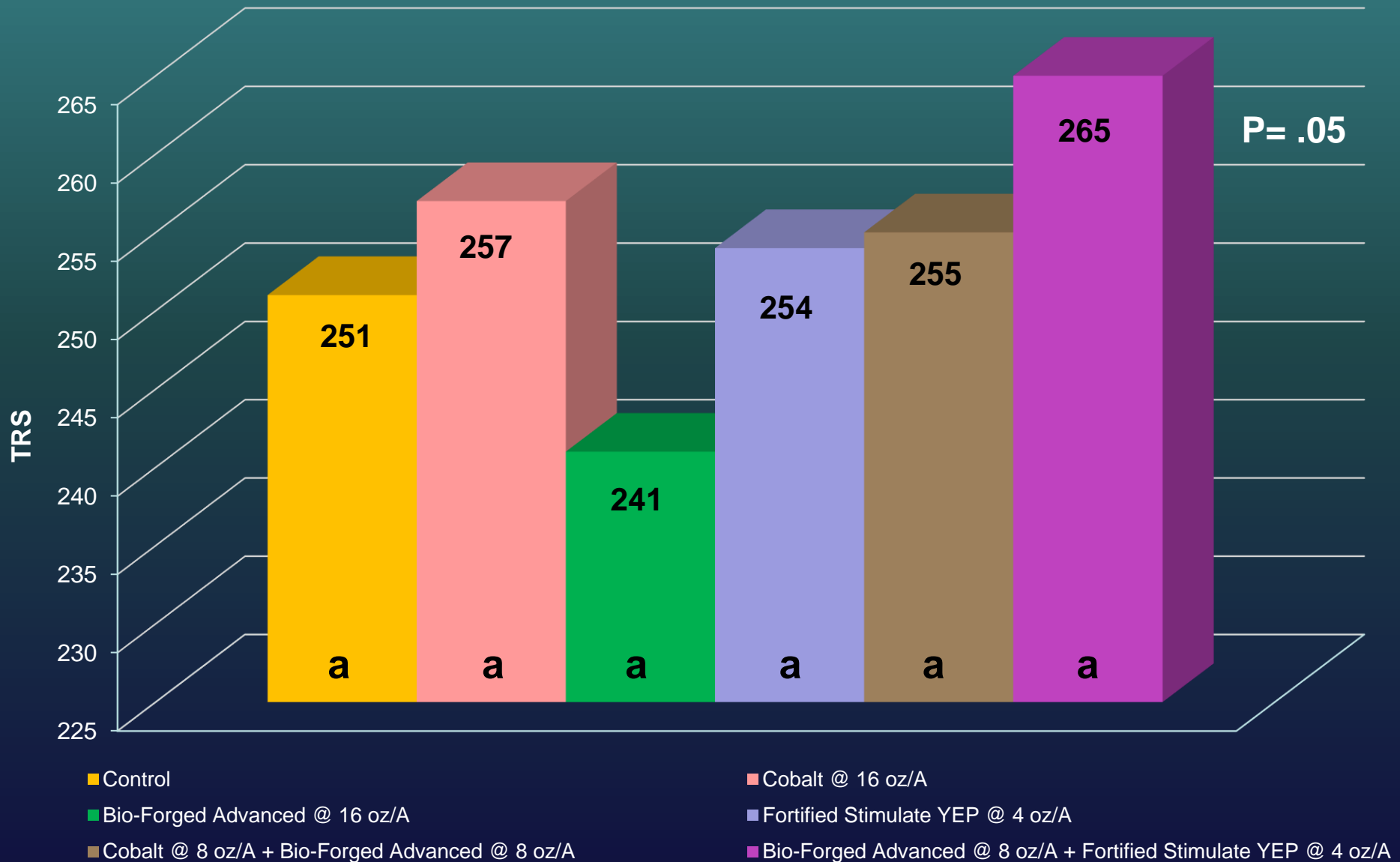
Adjuvants for Billet Planted Cane

- **Varieties: L01-299**
- **Crop Age: PC**
- **Treatments:**
 - **Control**
 - **Bioforge Advanced @ 1 pt/A (N, K, Co, Mo)**
 - **Cobalt @ 1 pt/A**
 - **Fortified Stimulate YEP @ 4 oz/A (Kinetin, GA, IBA, IAA)**
 - **Cobalt @ 8 oz/A + Bioforge @ 8 oz/A**
 - **Bioforge @ 8 oz/A + Fortified Stimulate @ 4 oz/A**
- **All treatments applied after billets planted with spray tractor @ 20 gal/A**
- **Reps: 4**

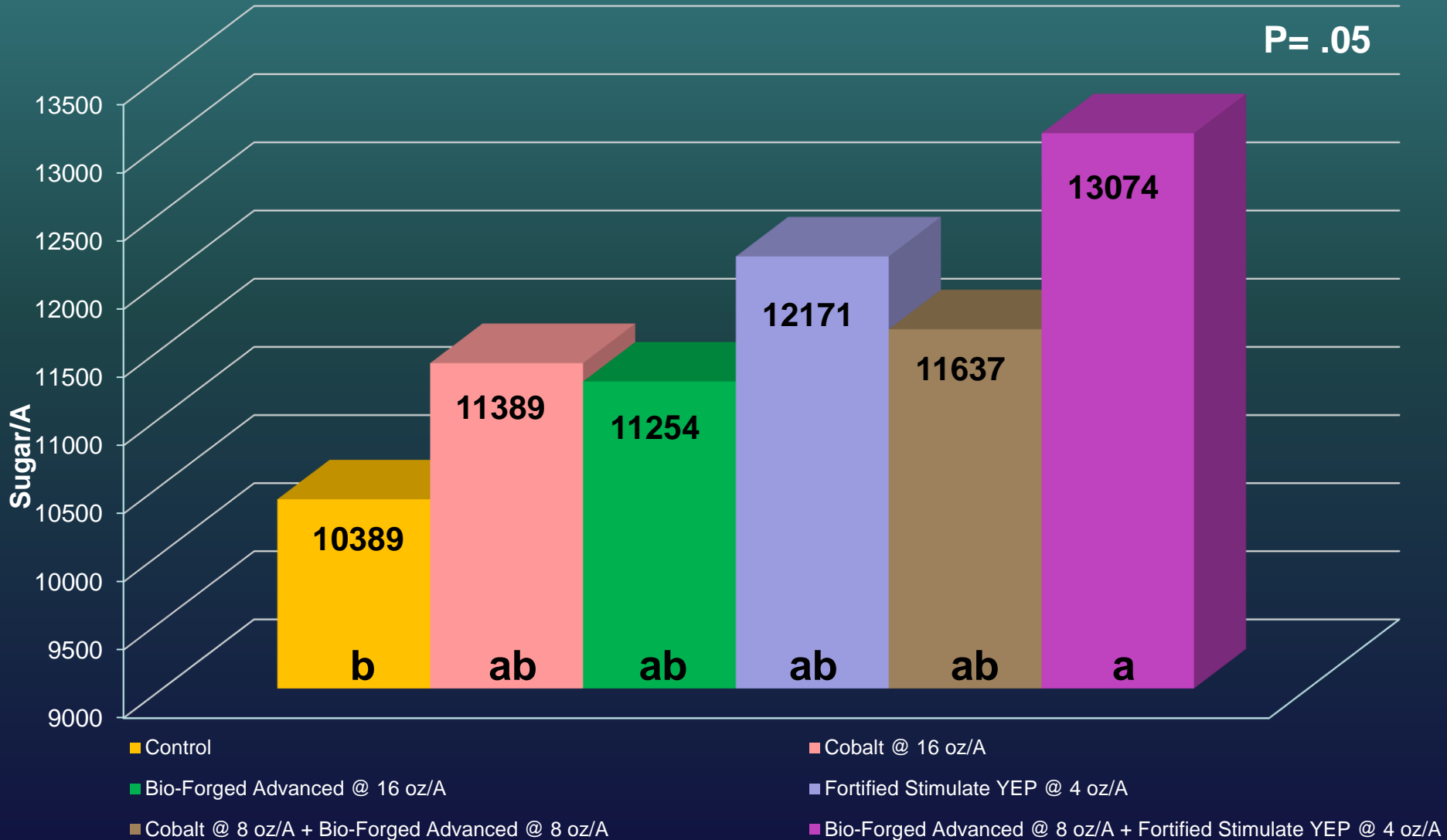
Response to Billet Treatments at Planting L 01-299, Plant Cane, Tons/A, Gravois, 2022



Response to Billet Treatments at Planting L 01-299, Plant Cane, TRS, Gravois, 2022



Response to Billet Treatments at Planting L 01-299, Plant Cane, Sugar/A, Gravois, 2022



Acknowledgements

- American Sugar Cane League
- Cultural Practices Staff: Katie Richard, Deise da Silva, Brenda King
- All cooperating growers



Questions?

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