Fertility Studies/Variable Rate Studies/ N,P, & K Studies

Rich Johnson and Brenda Tubana

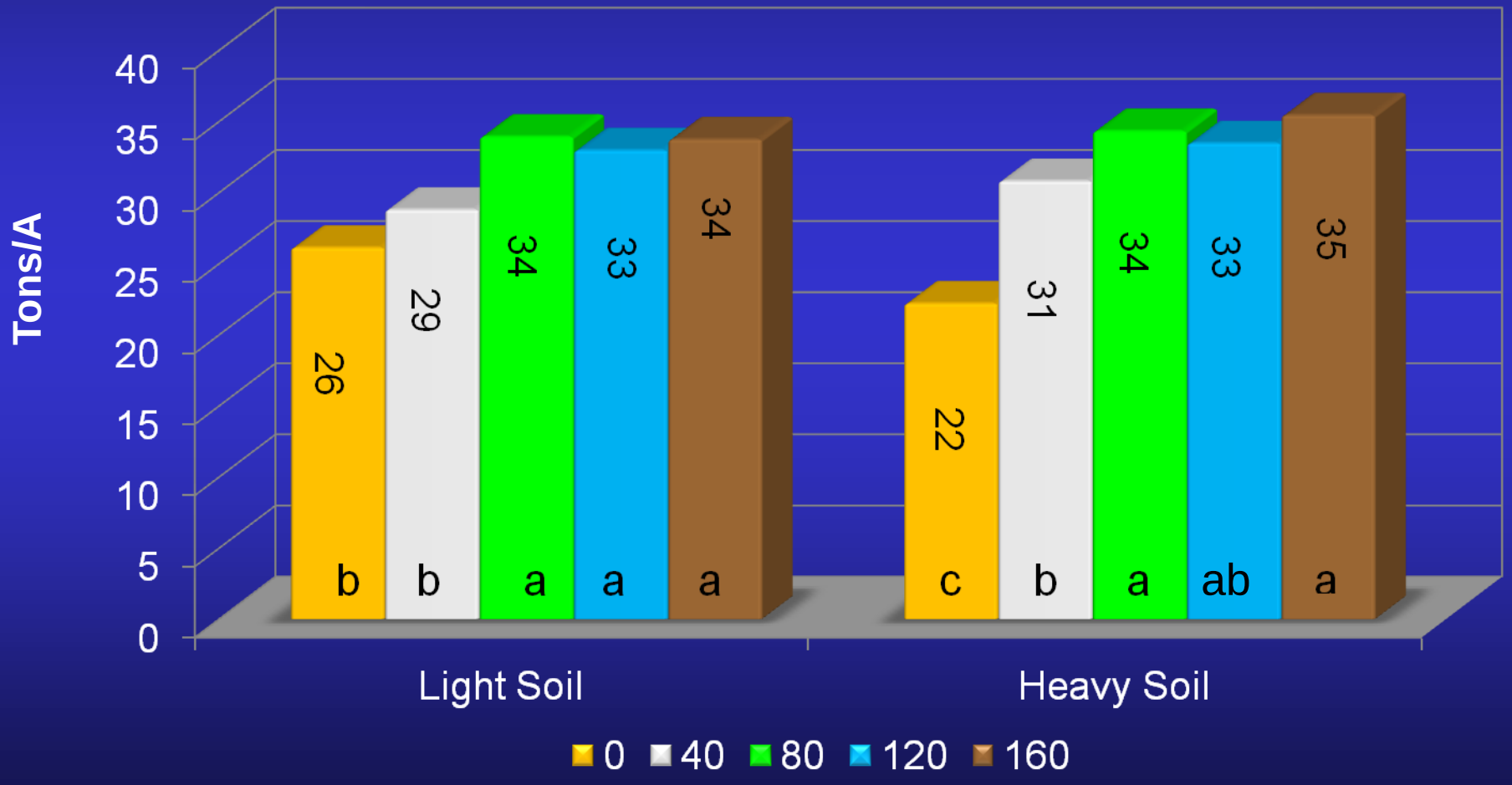
USDA ARS

LSU AgCenter Research & Extension

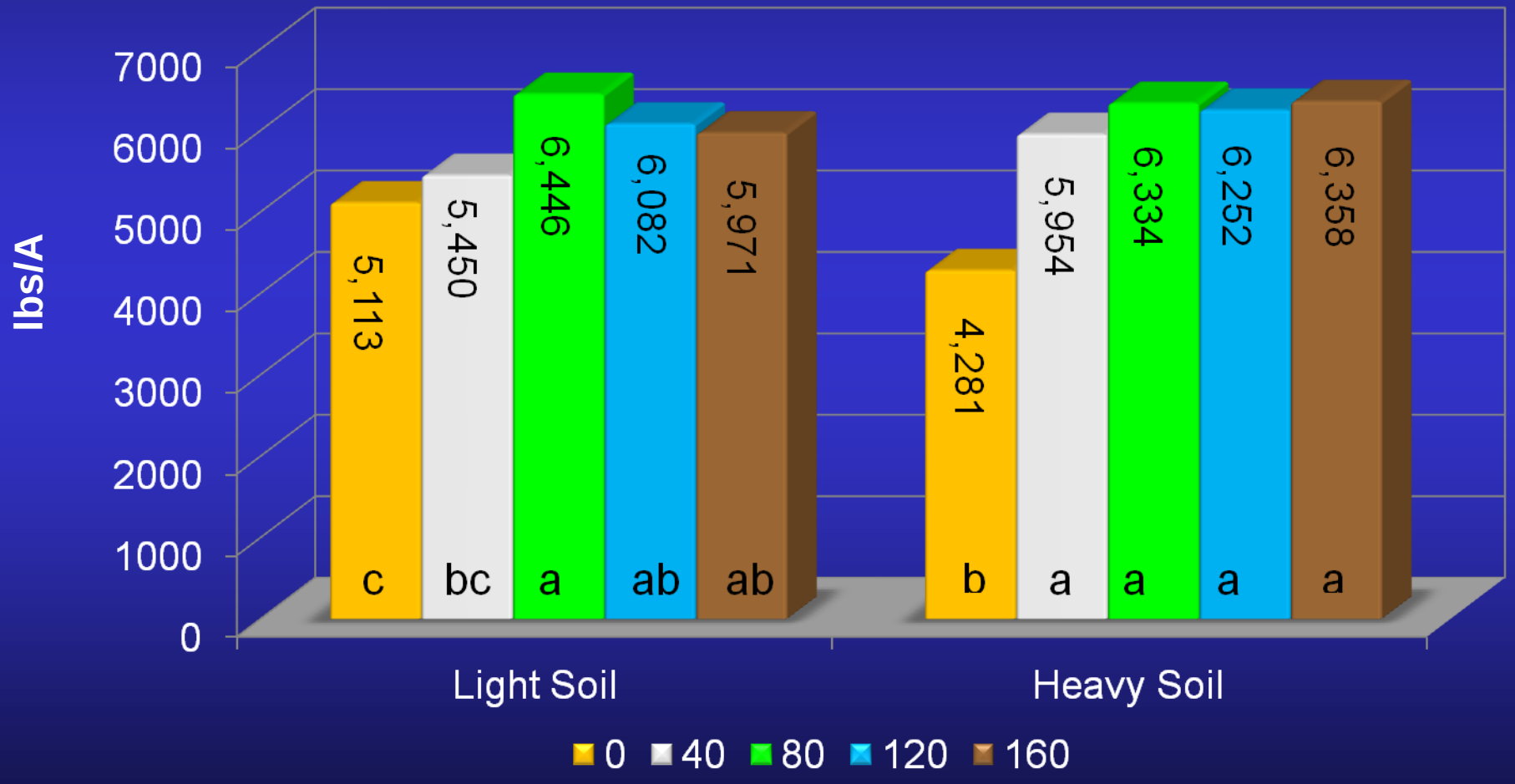
USDA & LSU Cooperative Nitrogen Fertilizer Experiments (2007-2013)

- Varieties: HoCP 96-540, L 97-128, Ho 95-988, CP 89-2143, L 99-226, Ho 00-950, L01-283, L 79-1002, L 01-299, L03-371, and HoCP 04-838.
- Crop Age: PC, 1R, 2R, 3R
- Soil Type: Light, Heavy
- N rates: 0, 40, 80, 120, 160 lbs N/A (32% UAN)
- A total of 74 studies

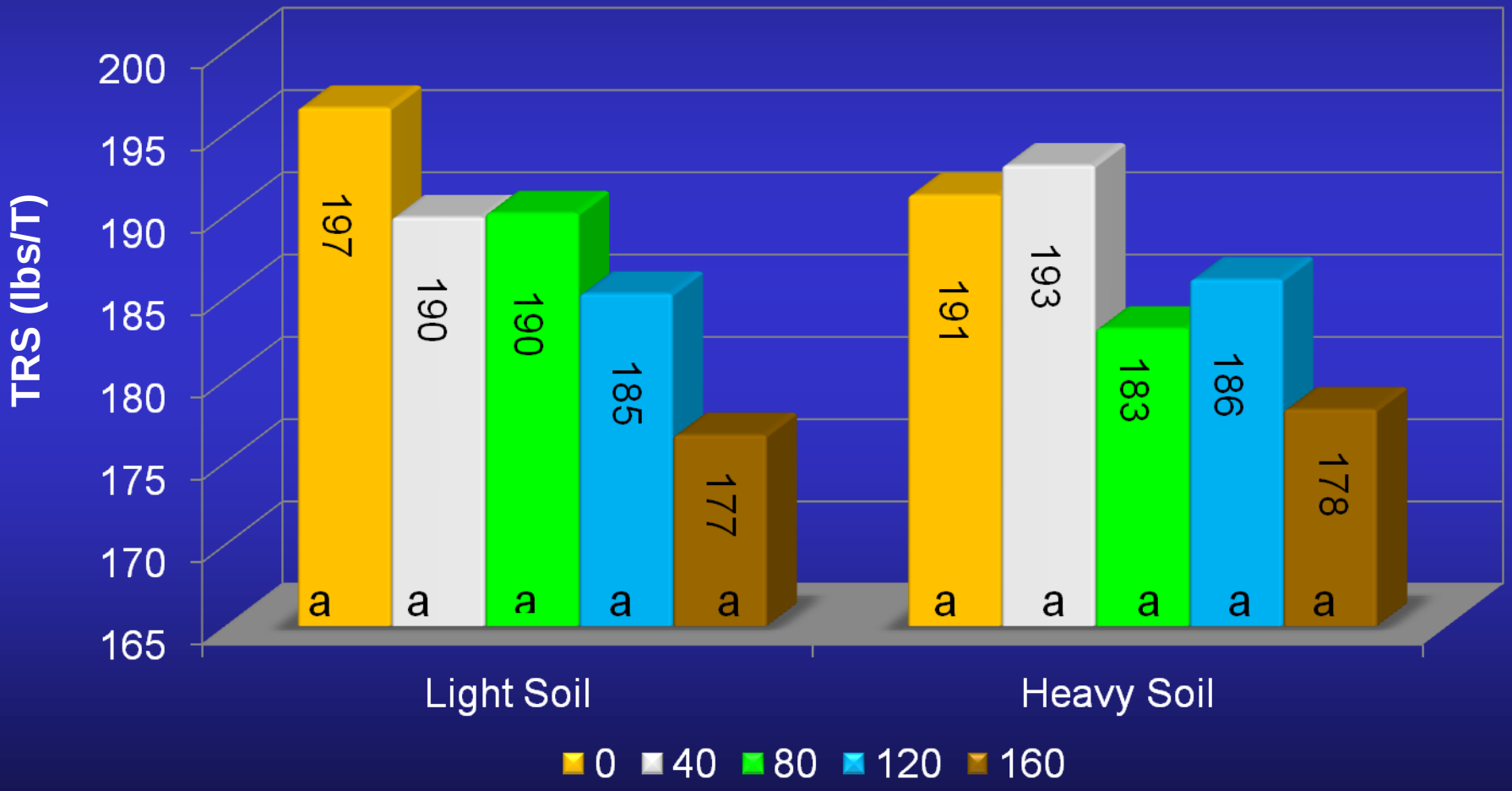
Varietal Response to Nitrogen Fertilizer, HoCP 96-540, 2nd Stubble, Light and Heavy Soils, USDA, 2013



Varietal Response to Nitrogen Fertilizer, HoCP 96-540, 2nd Stubble, Light and Heavy Soils, USDA, 2013



Varietal Response to Nitrogen Fertilizer, HoCP 96-540, 2nd Stubble, Light and Heavy Soils, USDA, 2013



Summary of Nitrogen Studies (2007-2013)

- **PC -** 59% did not show a response to nitrogen, 19% - 40 lbs optimum, 15% - 80 lbs opt., and, 7% - 120 opt.
- **1st stubble** – 52% - 40 lbs opt. 28%, 80 lbs opt. and, 16% 120 lbs opt.
- **2nd stubble** – 37% - 40 lbs opt., 26% - 80 lbs opt., 26% 120 lbs opt. and, 5% 160 opt.
- Yields were generally higher on light soils and N requirements were higher for some heavy soils.

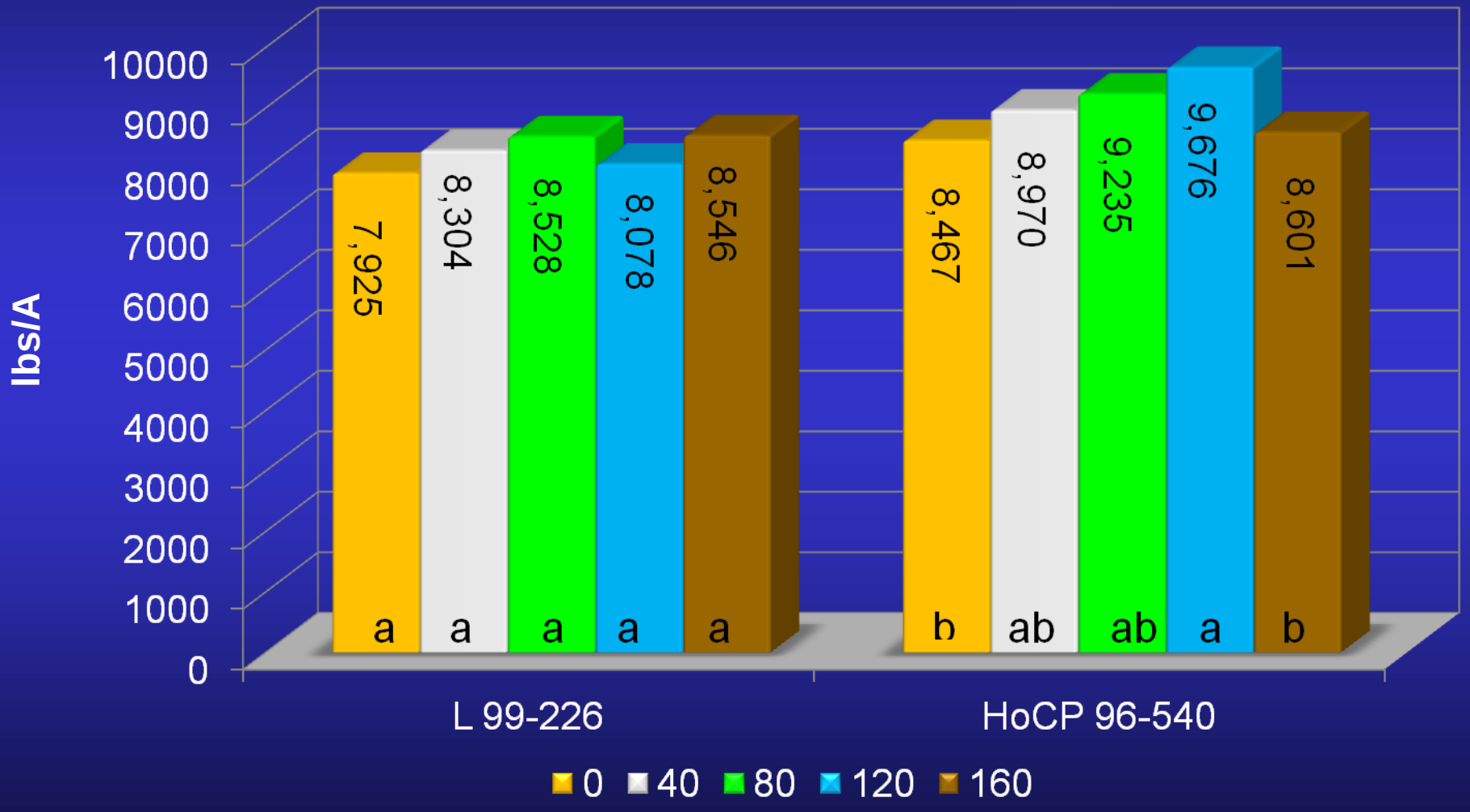
Nitrogen Fertilizer Recommendations for 2014

- **Plant cane:** light soils: 60-80 lb N/A
- **Plant cane:** heavy soils: 80-100 lb N/A
- **Stubble cane:** light soils: 80-100 lb N/A
- **Stubble cane:** heavy soils: 100-120 lb N/A
- Recommendations take into account data from multiple years and soil types.
- Note that these recommendations assume a proper soil pH and an application date of April 1 - 30.

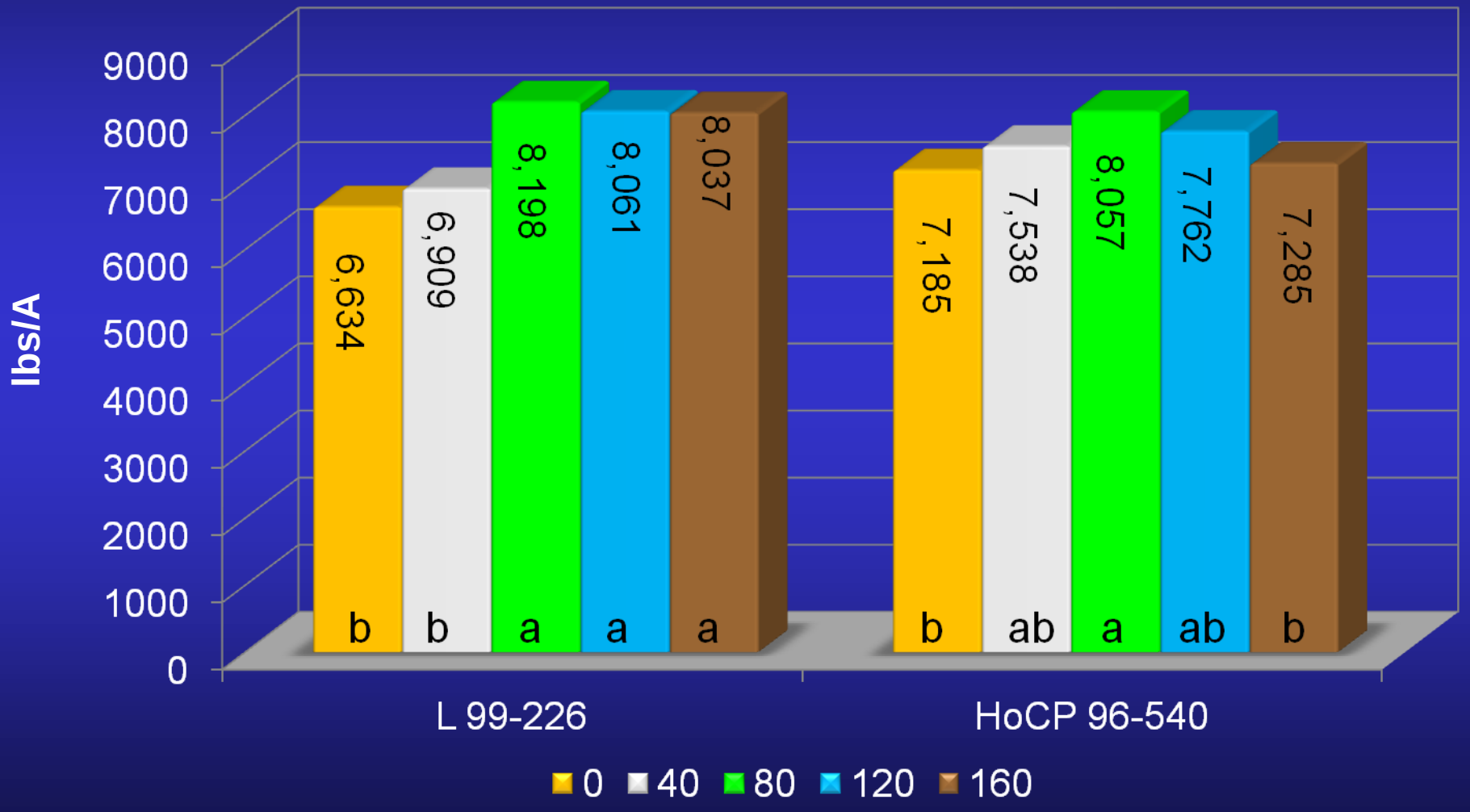
USDA Potassium Fertilizer Studies, 2011-2013

- Varieties: HoCP 96-540, L 99-226
- Crop Age: PC, 1R, 2R
- All soils tested low for potassium
- K rates: 0, 40, 80, 120, 160 lbs K_2O/A (KCl)
- Reps: 6

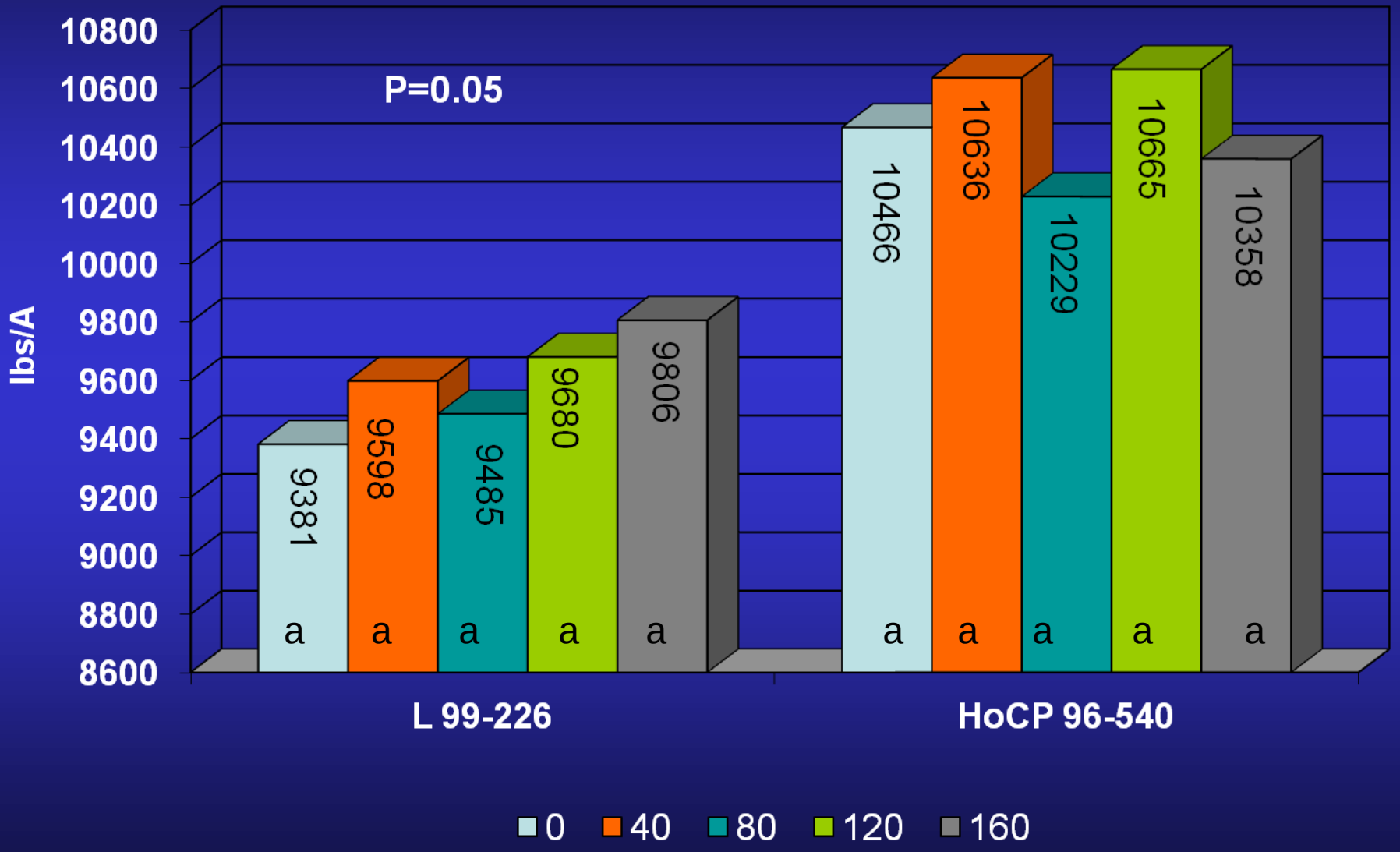
Varietal Response to Potassium Fertilizer, 1st Stubble, Sugar/A, USDA, 2013



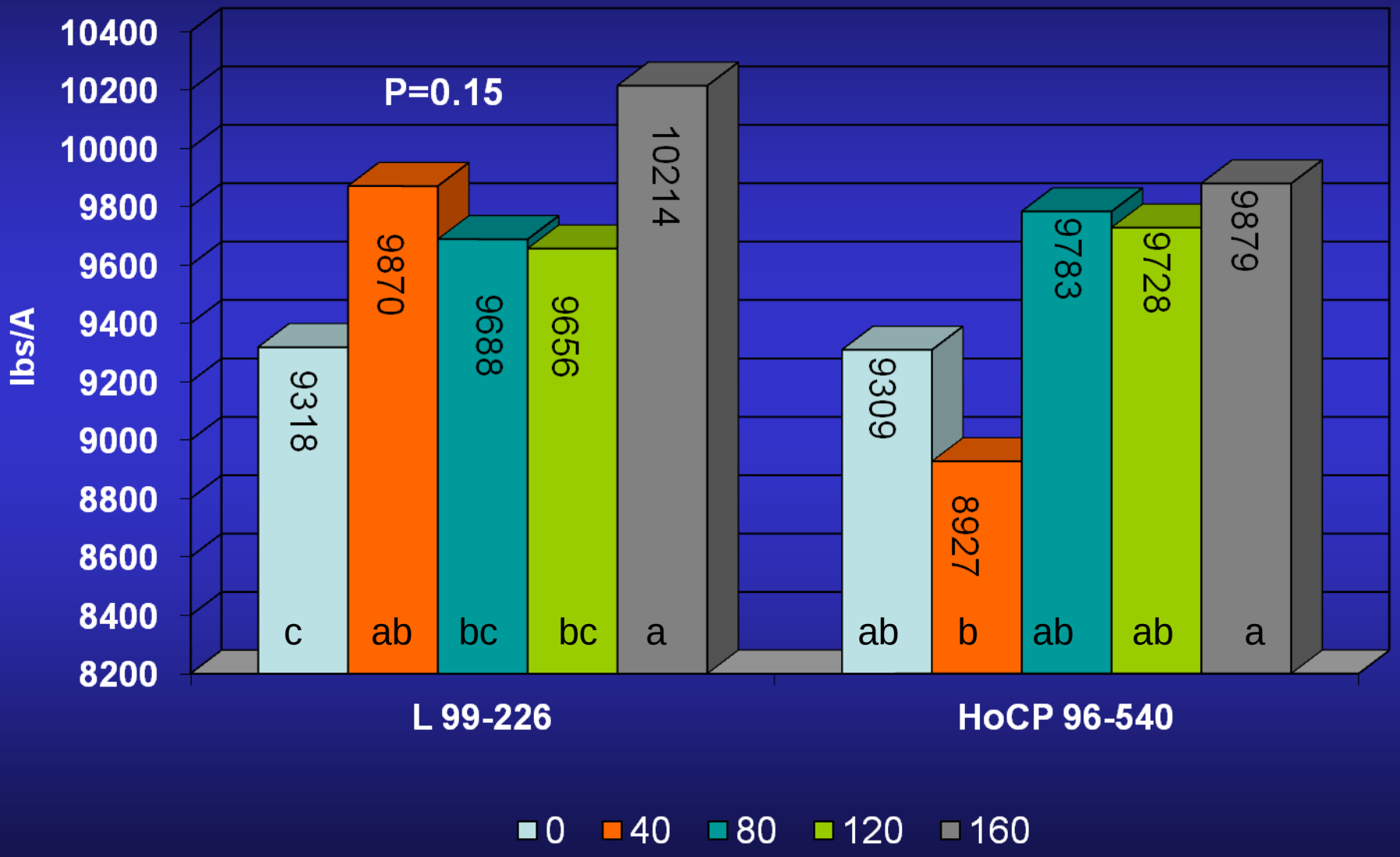
Varietal Response to Potassium Fertilizer, 2nd Stubble, Sugar/A, USDA, 2013



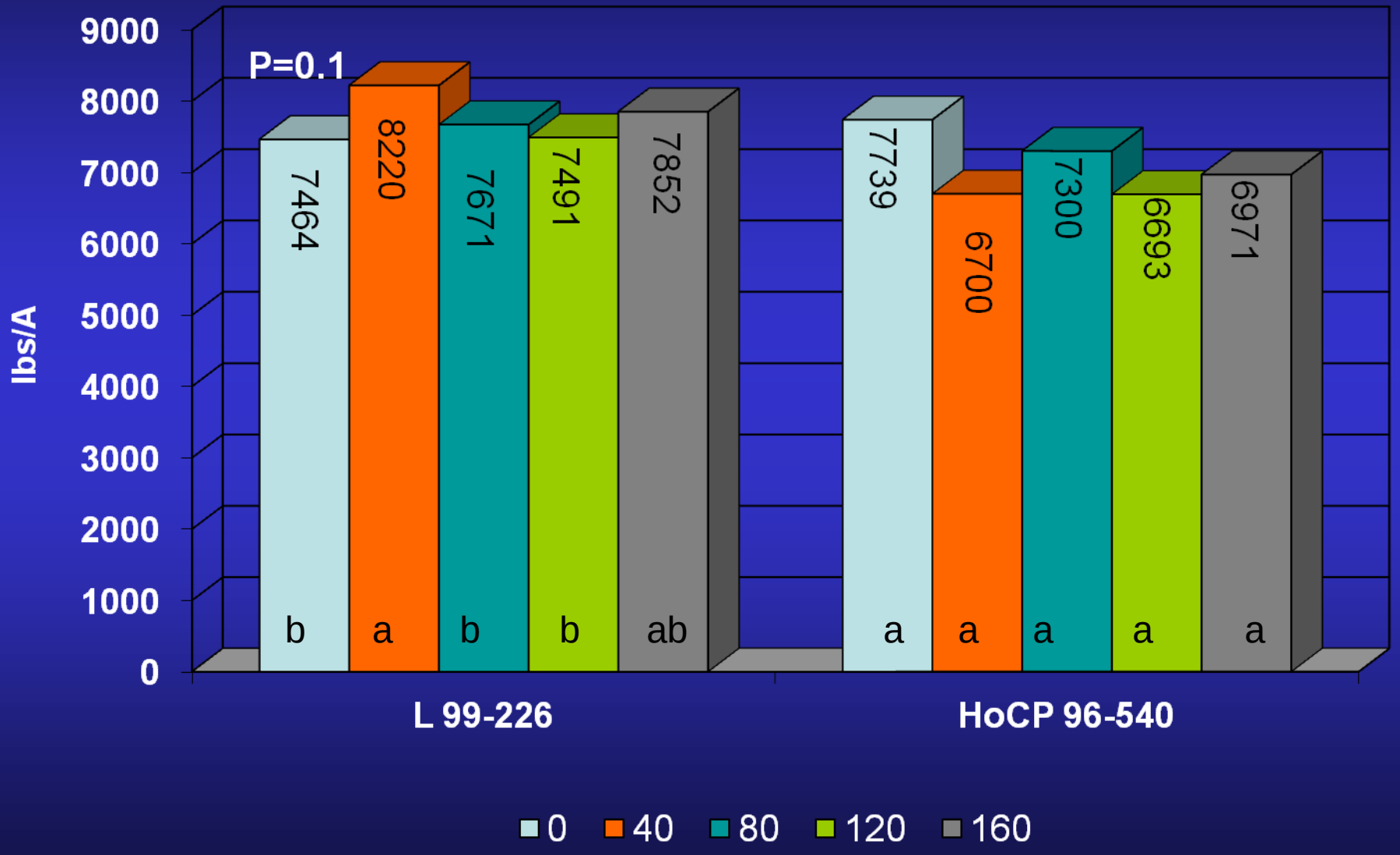
Varietal Response to Potassium Fertilizer
Sugar/A, Plant cane, USDA, 2012



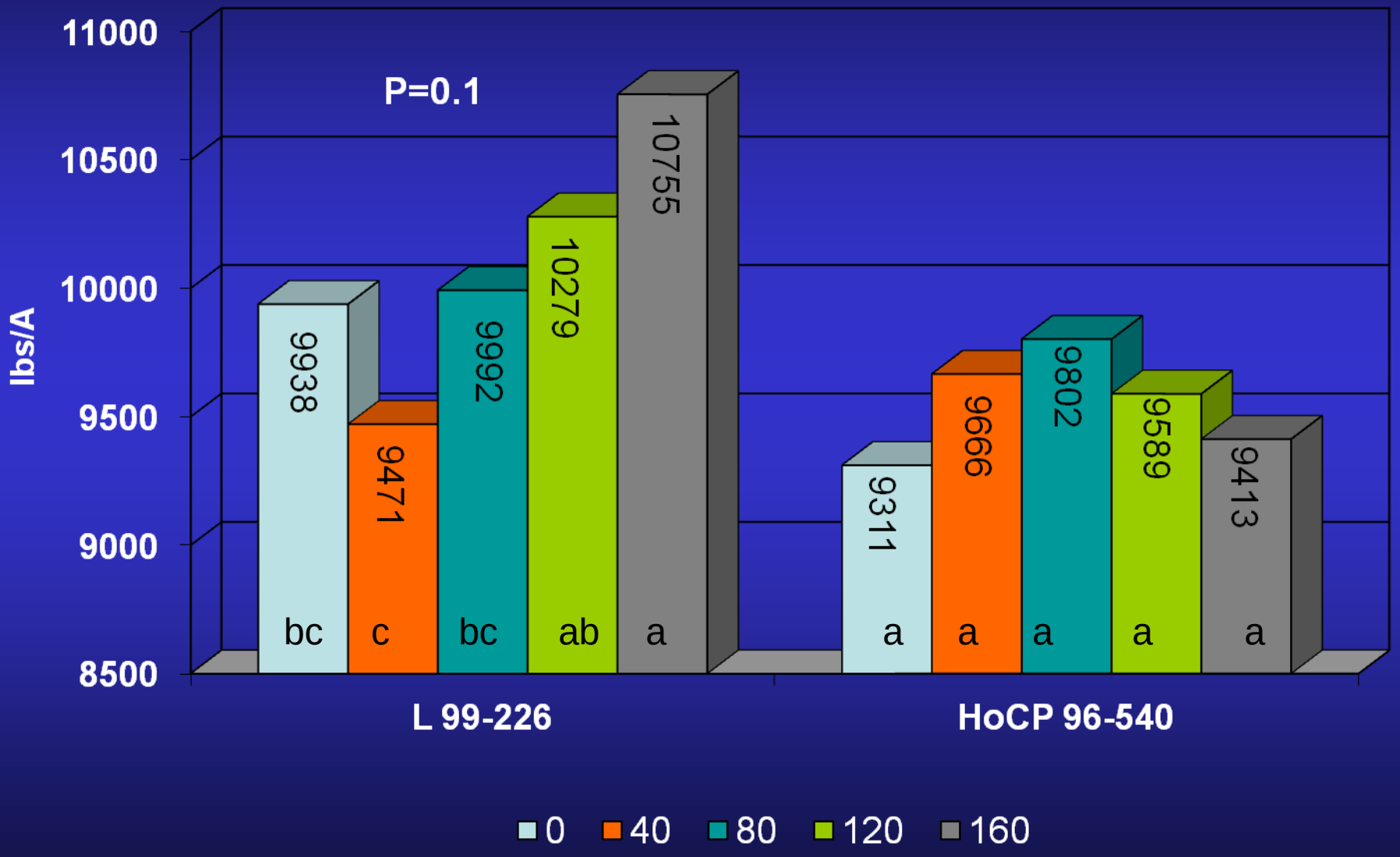
Varietal Response to Potassium Fertilizer
Sugar/A, 1st stubble, USDA, 2012



Varietal Response to Potassium Fertilizer
Sugar/A, 2nd stubble, USDA, 2012



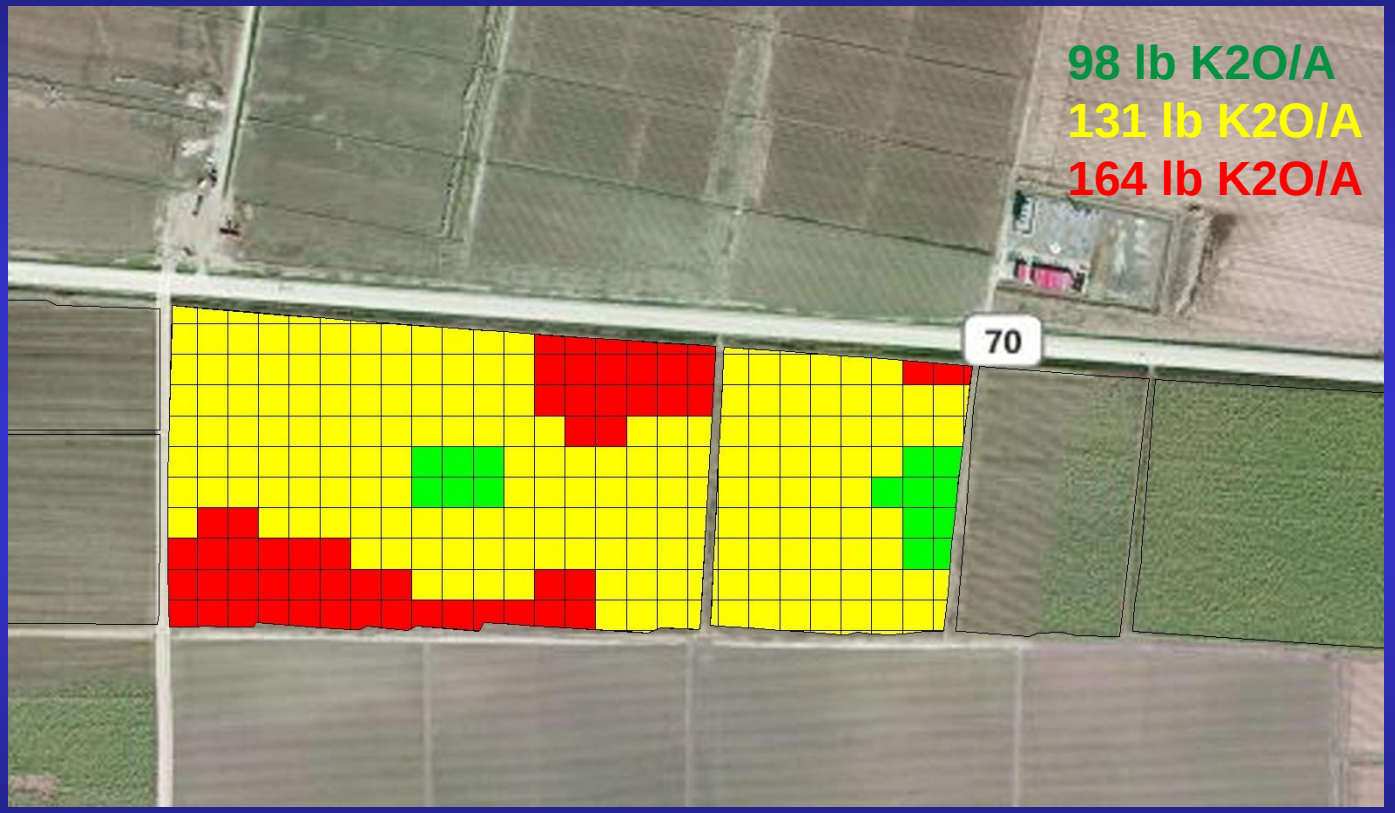
Varietal Response to Potassium Fertilizer
Sugar/A, Plant cane, USDA, 2011



Summary of Potassium Studies (2011-2013)

- **Optimum K Rate - 0-160 lb N/A, HoCP 96-540, L 99-226, Plant cane, 1st and 2nd stubble.**
- **Responses to potassium were observed in all crop stages.**
- **Additional research needed and all studies will be continued through 2nd stubble, new studies will be initiated in PC and stubble fields HoCP 96-540 and L01-299.**

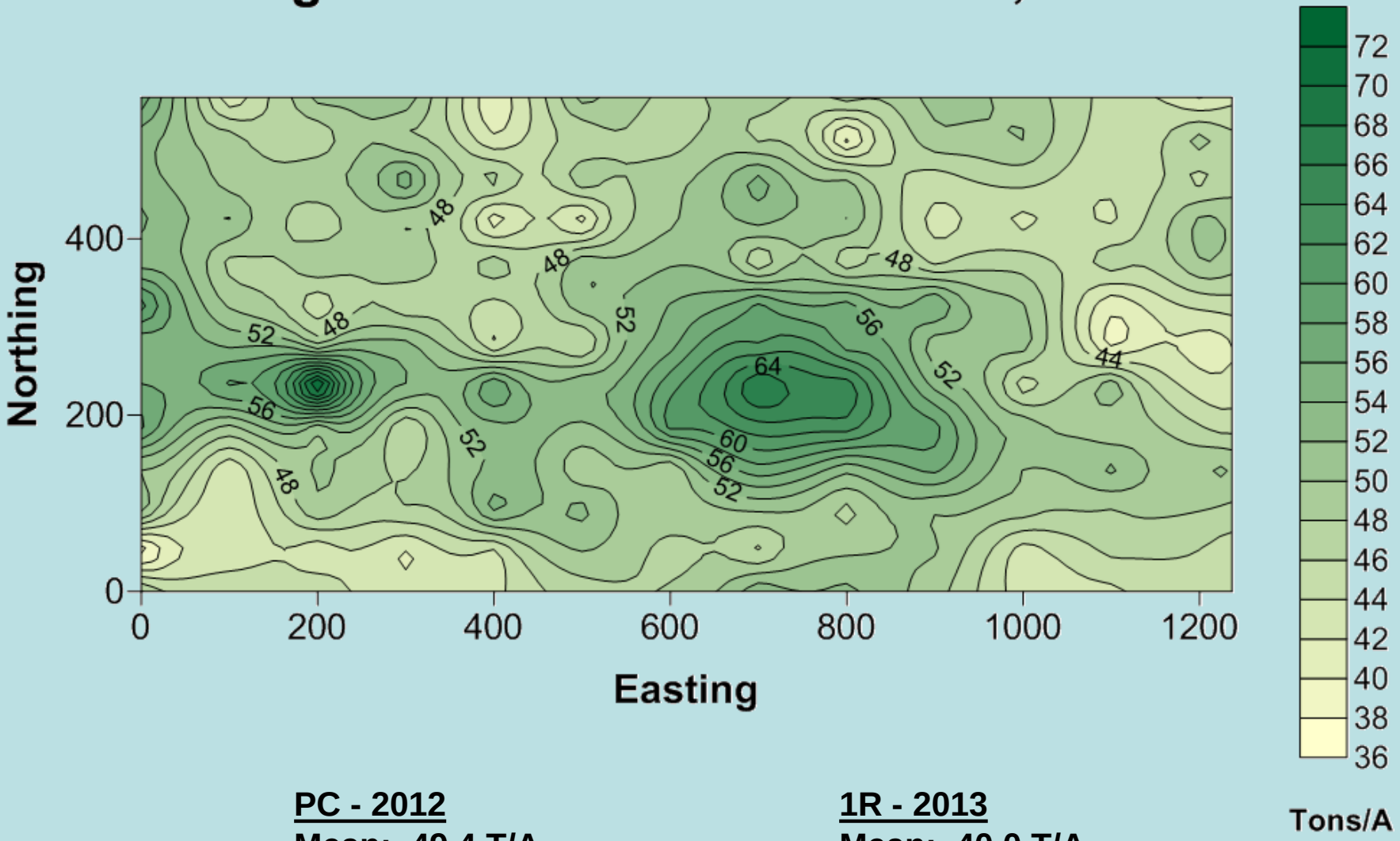
VR Potash Study Armelise Plantation, 2012-2013, HoCP 96-540, PC, 1R



Management zones based on soil grid sampling.

- Blaine Viator

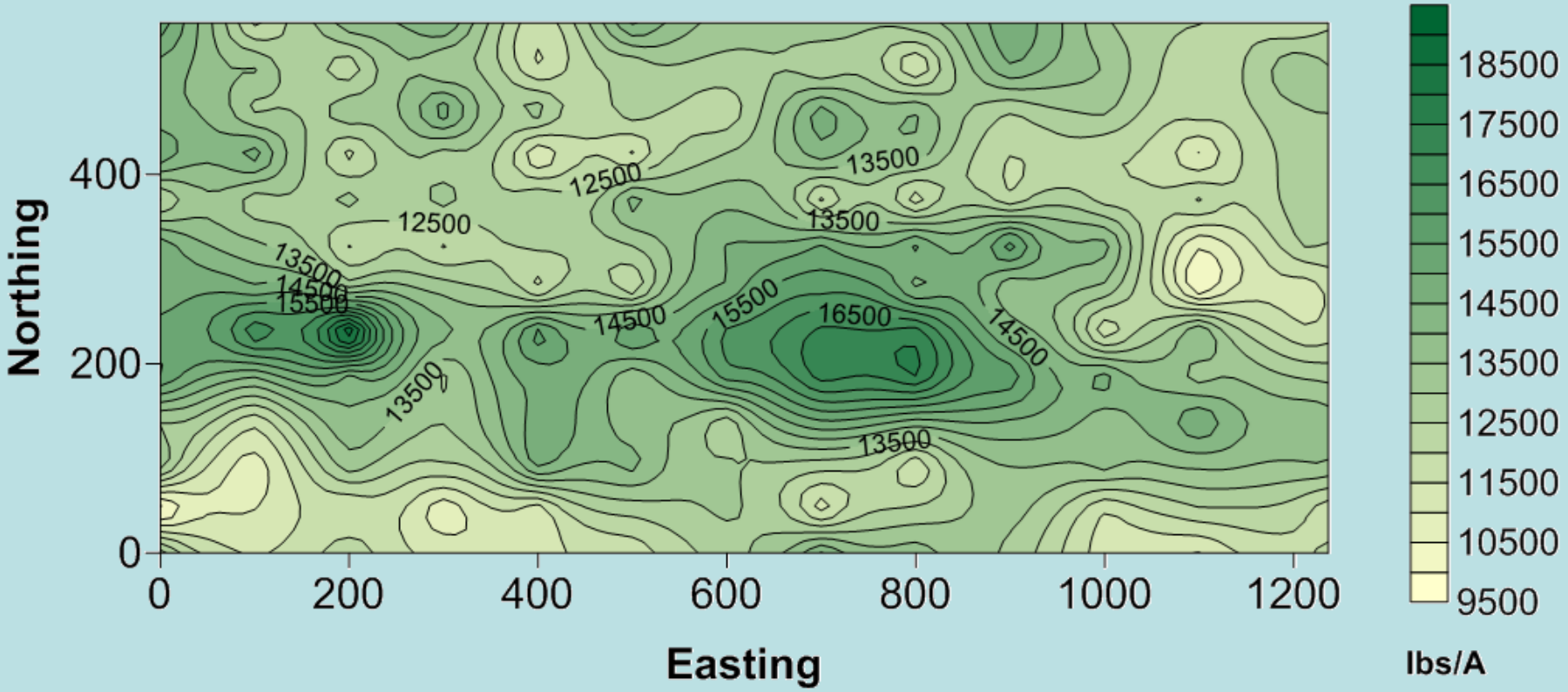
Dugas VR Potash HoCP 96-540, Tons



PC - 2012
Mean: 49.4 T/A
Range: 35.1 – 69.7 T/A

1R - 2013
Mean: 40.0 T/A
Range: 30.6 – 49.3 T/A

Dugas VR Potash HoCP 96-540, Sugar



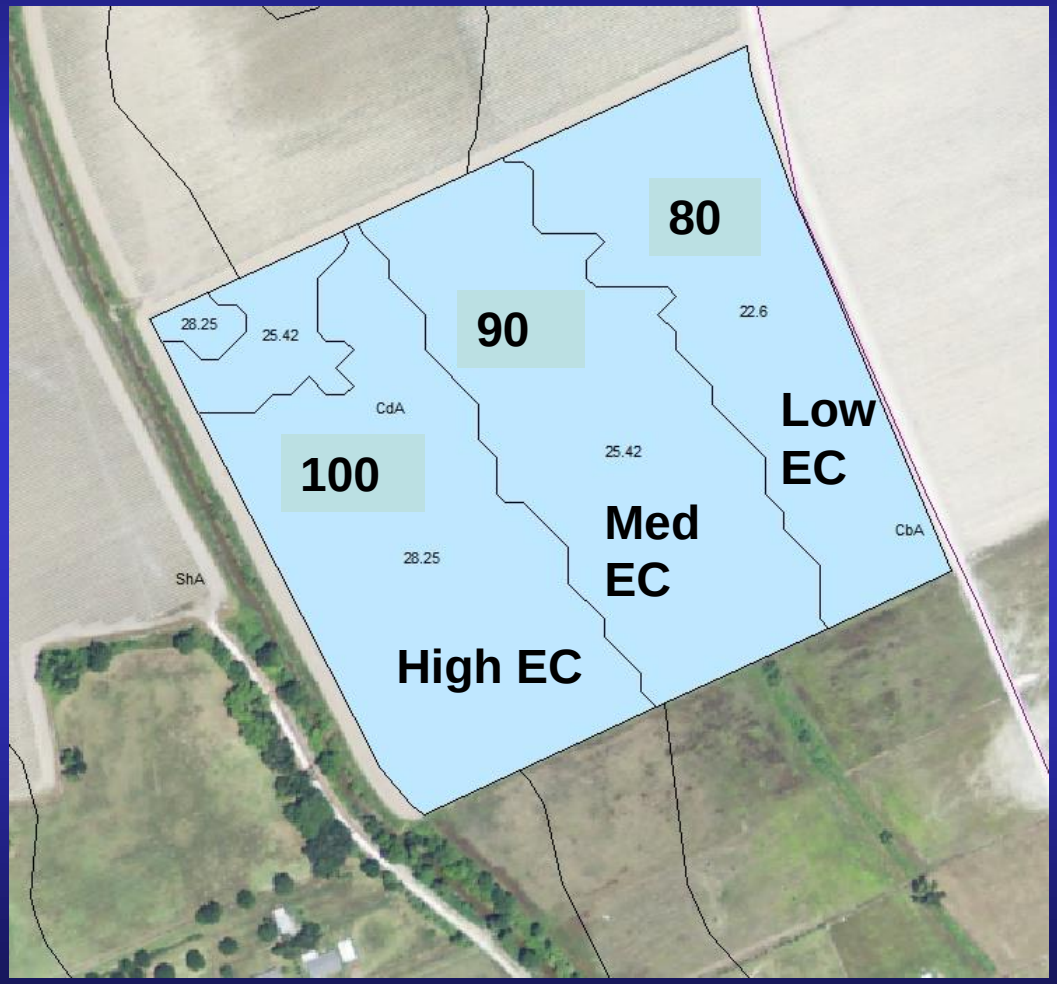
PC - 2012
Mean: 268 lb/T
Range: 231 – 295 lb/T

Mean 13,175 lb/A
Range 9,340 – 17,845 lb/A

1R - 2013
Mean: 250 lb/T
Range 222 – 275 lb/T

Mean: 10,022 lb/A
Range: 7,590 – 12,217 lb/A

VR Nitrogen Study, Acadia Plantation 2012-2013, HoCP 96-540, PC, 1R



Management zones by Veris soil EC

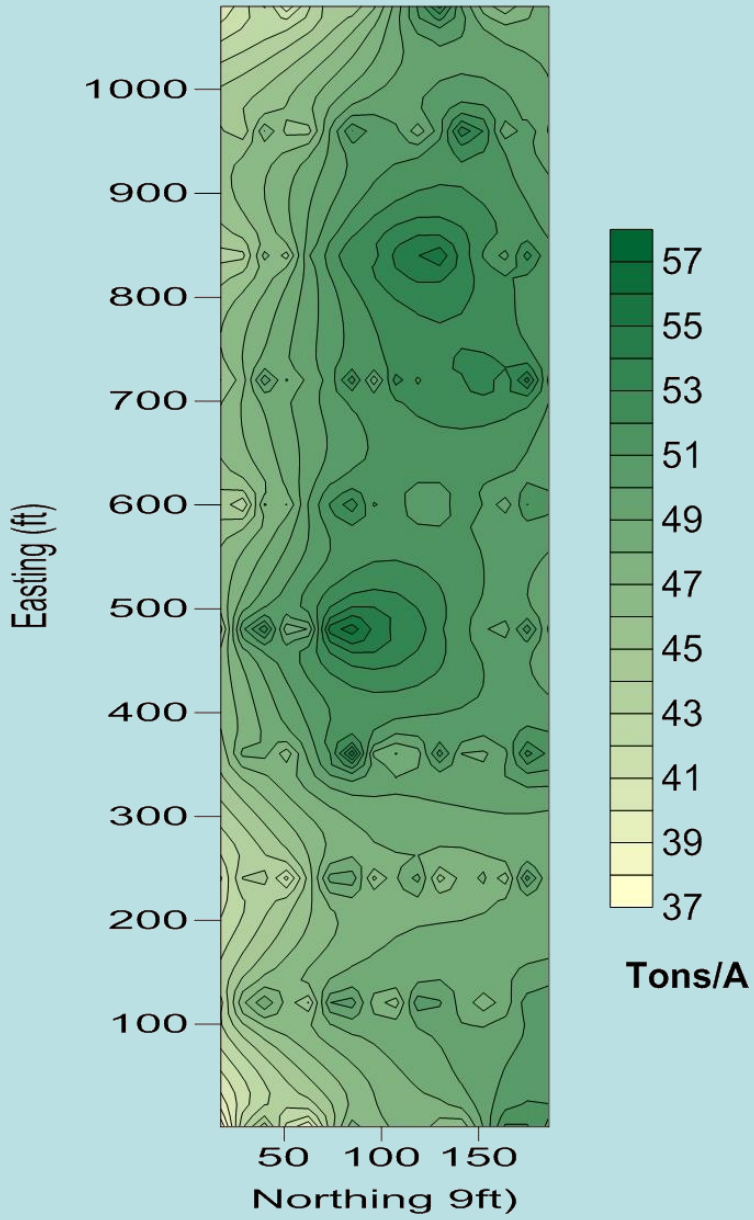
Uniform N Rate: 90 lb N/A

VR N Rate: 80, 90, 100 lb N/A

Plots: 6 rows x 1,200 ft

4 replications

Acadia VR N Experiment 2012
HoCP 96-540, PC, Tons/A



PC -2012
Mean: 49.3 T/A
Range: 35.3 – 60.7 T/A

Uniform N Rate: 49.4 a

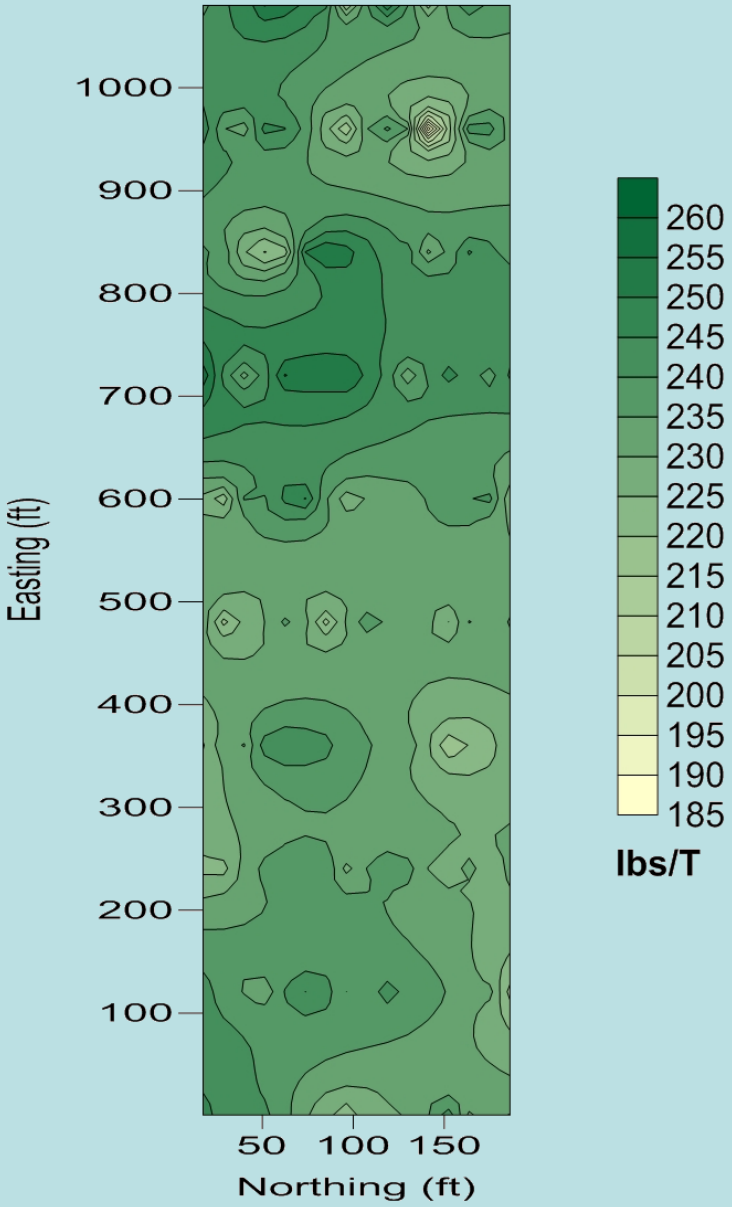
VR N Rate: 49.2 a

1R – 2013
Mean: 36.5 T/A
Range: 27.2 – 63.5

Uniform Rate: 42.2 a

VR N Rate: 41.1 a

Acadia VR N Experiment 2012
HoCP 96-540, PC, TRS



PC - 2012
Mean: 236 lb/T
Range: 202-264 lb/T

Uniform N Rate: 235.8 a

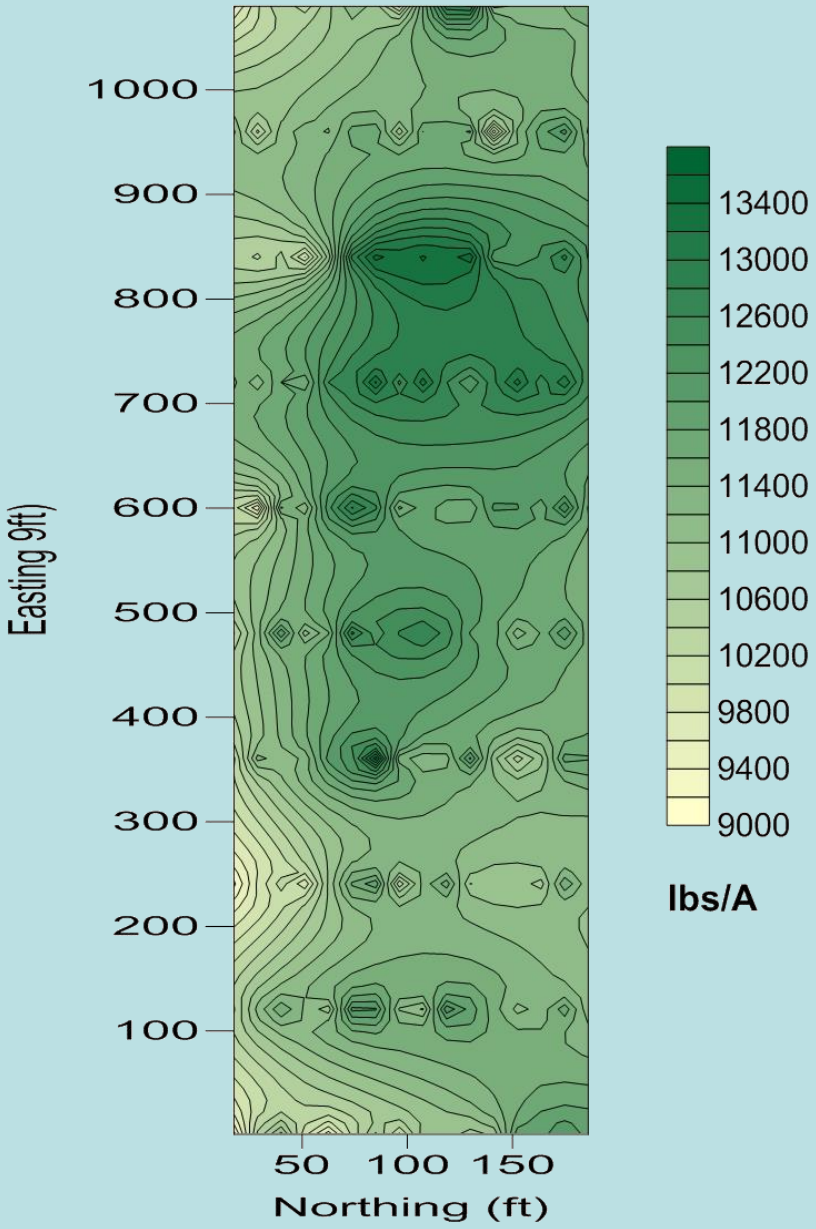
VR N Rate: 235.7 a

1R – 2013
Mean: 210 lb/T
Range: 159-233 lb/T

Uniform N Rate: 209 a

VR N Rate: 209 a

Acadia VR N Experiment 2012
HoCP 96-540, PC, Sugar/A



PC - 2012
Mean: 11,610 lb/A
Range: 7,965-14,880 lb/A

Uniform N Rate: 11,638 a

VR N Rate: 11,579 a

1R – 2013
Mean: 7684 lb /A
Range: 5,614-14,450 lb/A

Uniform N Rate: 7,711 a

VR N Rate: 7,476 a


Questions ?

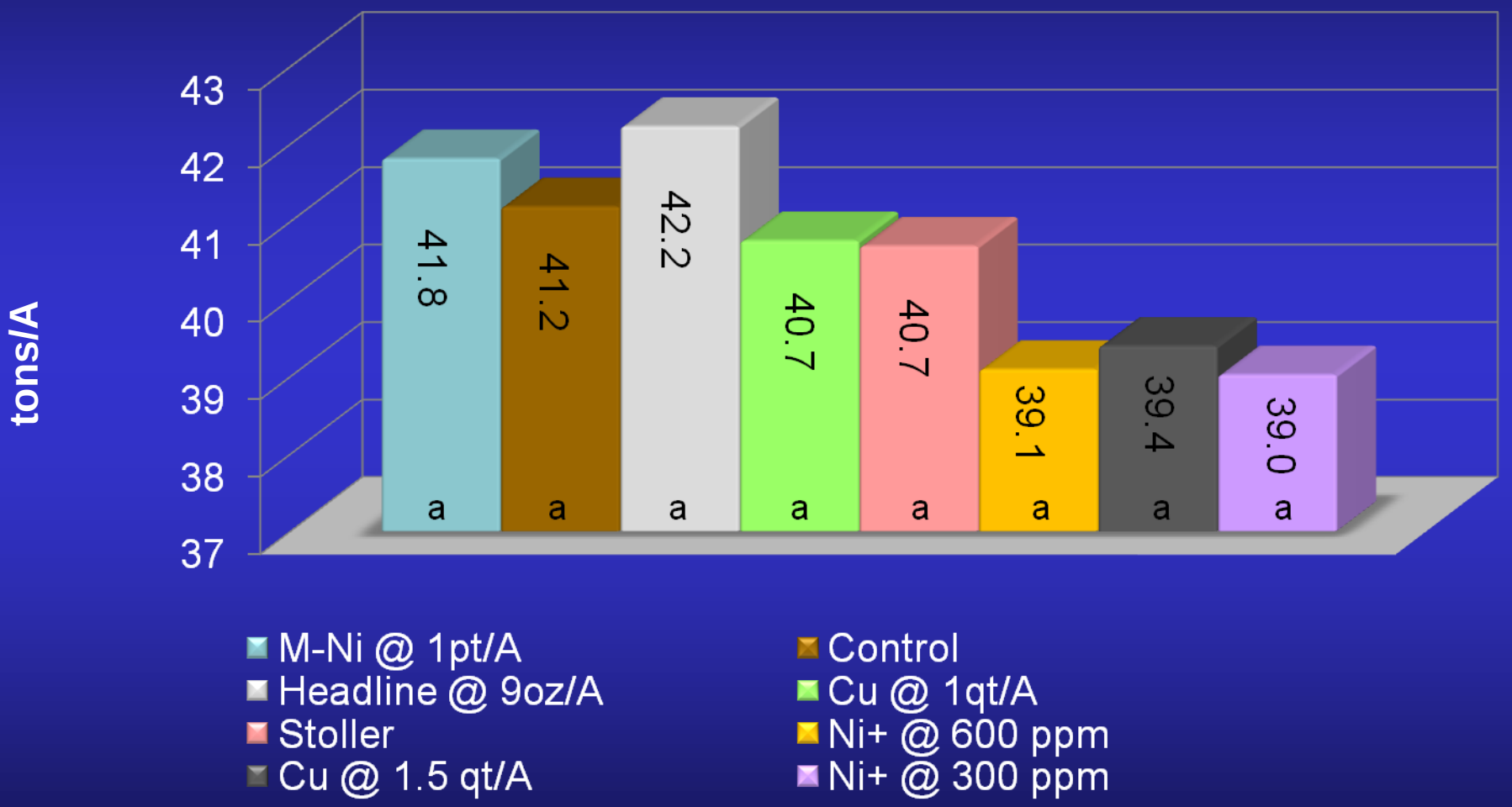
Copper and Nickel Fertilizers

- May help with plant disease resistance.
- Important in metabolism of nitrogen.
- Important in photosynthesis and respiration.

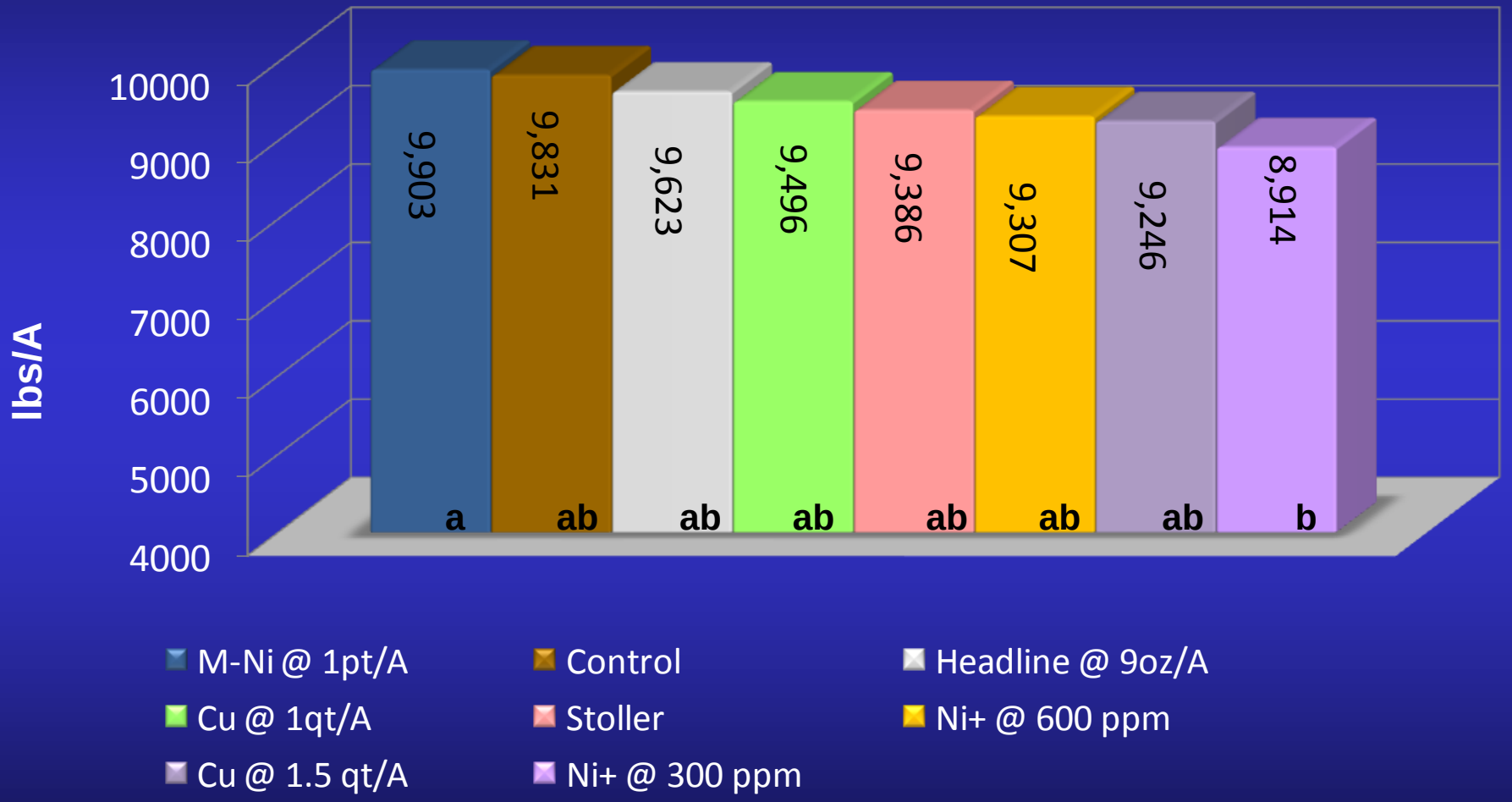
- Foliar applied: 2x in April and May
  - Keylate Copper: 1, 1.5 qt/A,
  - Nickel Plus: 300, 600 ppm
  - Manniplex Nickel: 1 pt/A
  - Stoller (Cu, Mn, Zn, B, Mo)
  - Headline: 9 oz/A

- Variety: HoCP 96-540, L 99-226

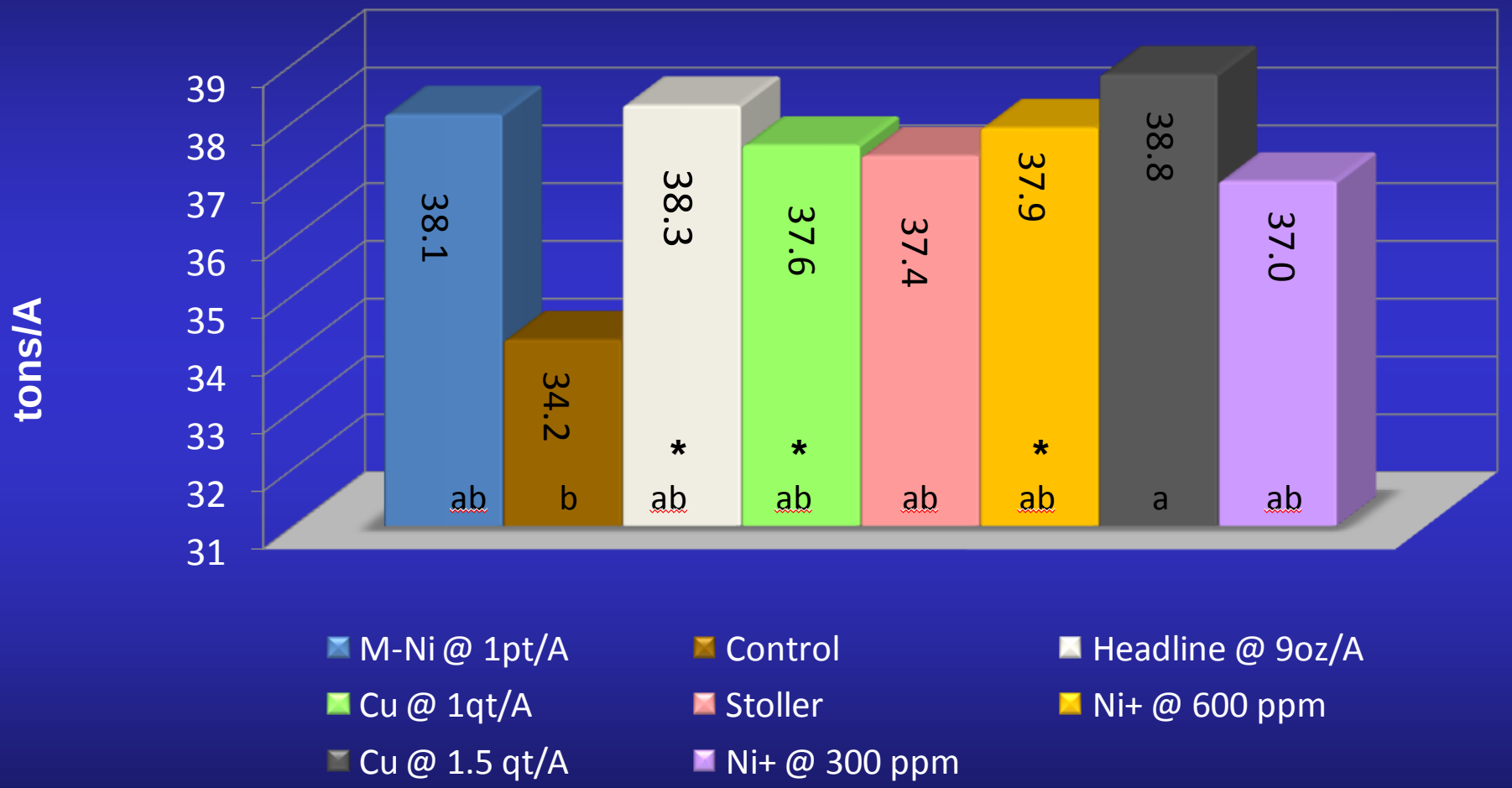
Response to Ni & Cu Fertilizer, Plant Cane, HoCP 96-540, Tons/A, USDA, 2013



Response to Ni & Cu Fertilizer, Plant Cane, HoCP 96-540, Sugar/A, 2013

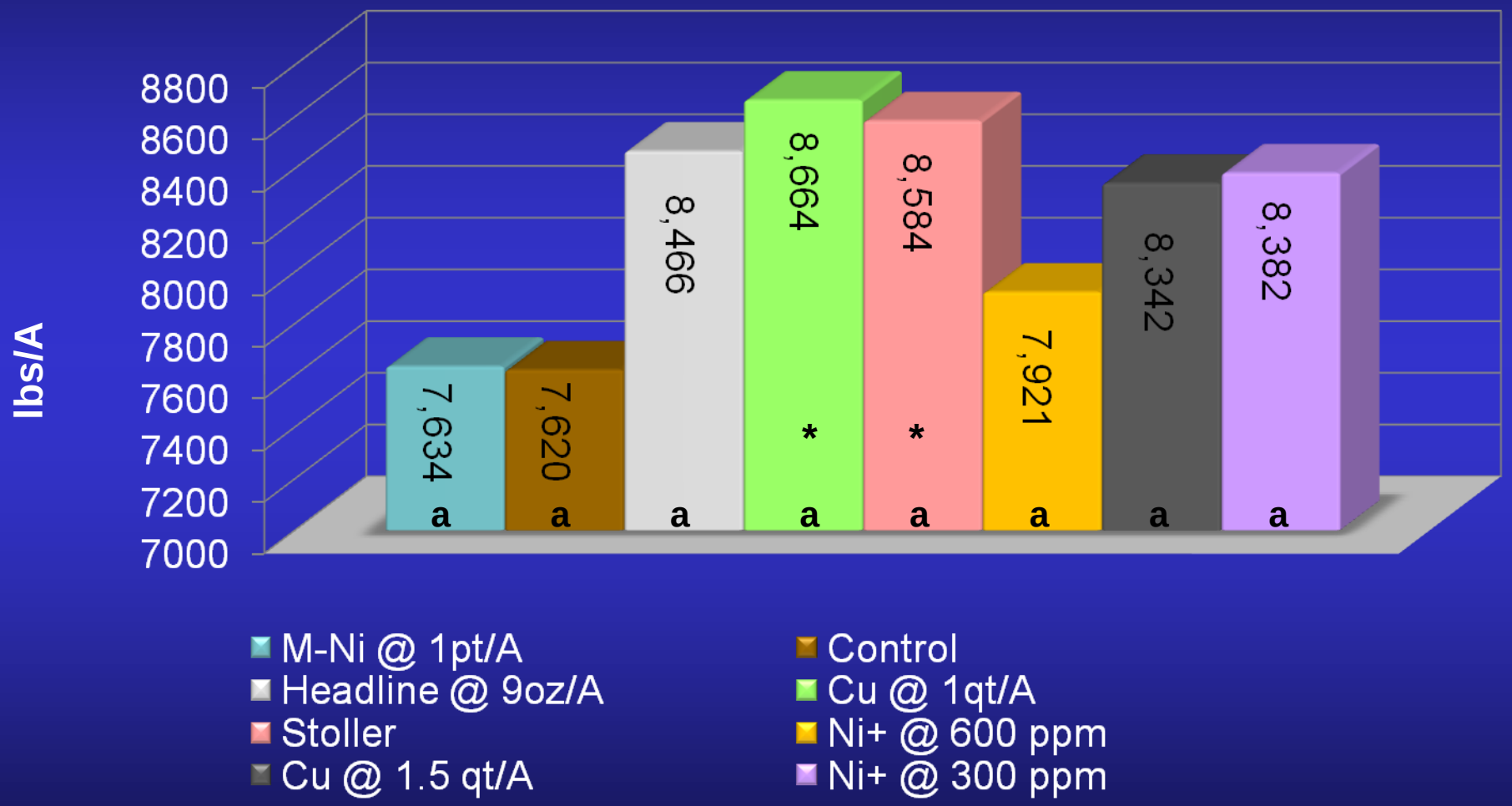


Response to Ni & Cu Fertilizer, Plant Cane, L 99-226, Tons/A, USDA, 2013



* P=0.1

Response to Ni & Cu Fertilizer, Plant Cane, L 99-226, Sugar/A, USDA, 2013



* P=0.1