

Optimizing Sugarcane Production Efficiency Through Fertility Management and Precision Ag



Phosphorus Fertilizer Research

R. Johnson, H. Viator, C. Kennedy, J. Stevens

Phosphorus (P_2O_5)

- About 1 lb is removed per ton of cane
- Availability depends on pH and soil type
- Soil Test Recommendations:

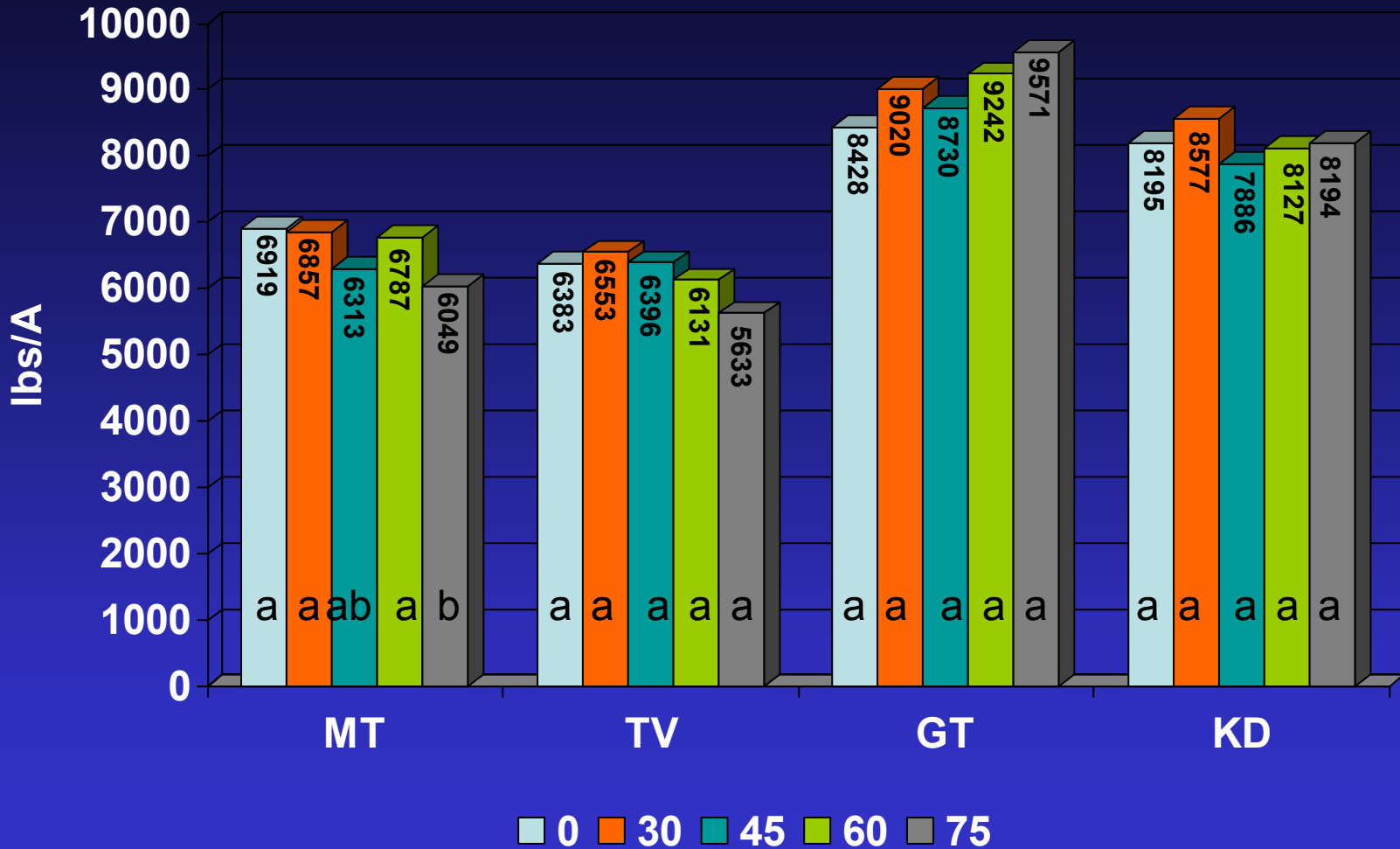
Soil Test	Plant	Stubble
Very Low	50	60
Low	45	50
Med.	40	40
High	0	0
Very High	0	0

Phosphorus Fertilizer Experiments - 2007

- Locations:
 - Mount Lawrence, Labadieville, LA
 - Triple V, Youngsville, LA
 - Gerald Thibodeaux, Plattenville, LA
 - Keith Dugas, Plattenville, LA
- Treatments:
 - 1st & 2nd stubble, LCP 85-384
 - All soils tested low for phosphorus, and had a acceptable soil pH.
 - 3 rows x 50-ft, 6 reps
 - 0, 15, 30, 45, 60, 75 lbs P₂O₅/A (TSP)

Phosphorus Fertilizer Experiments

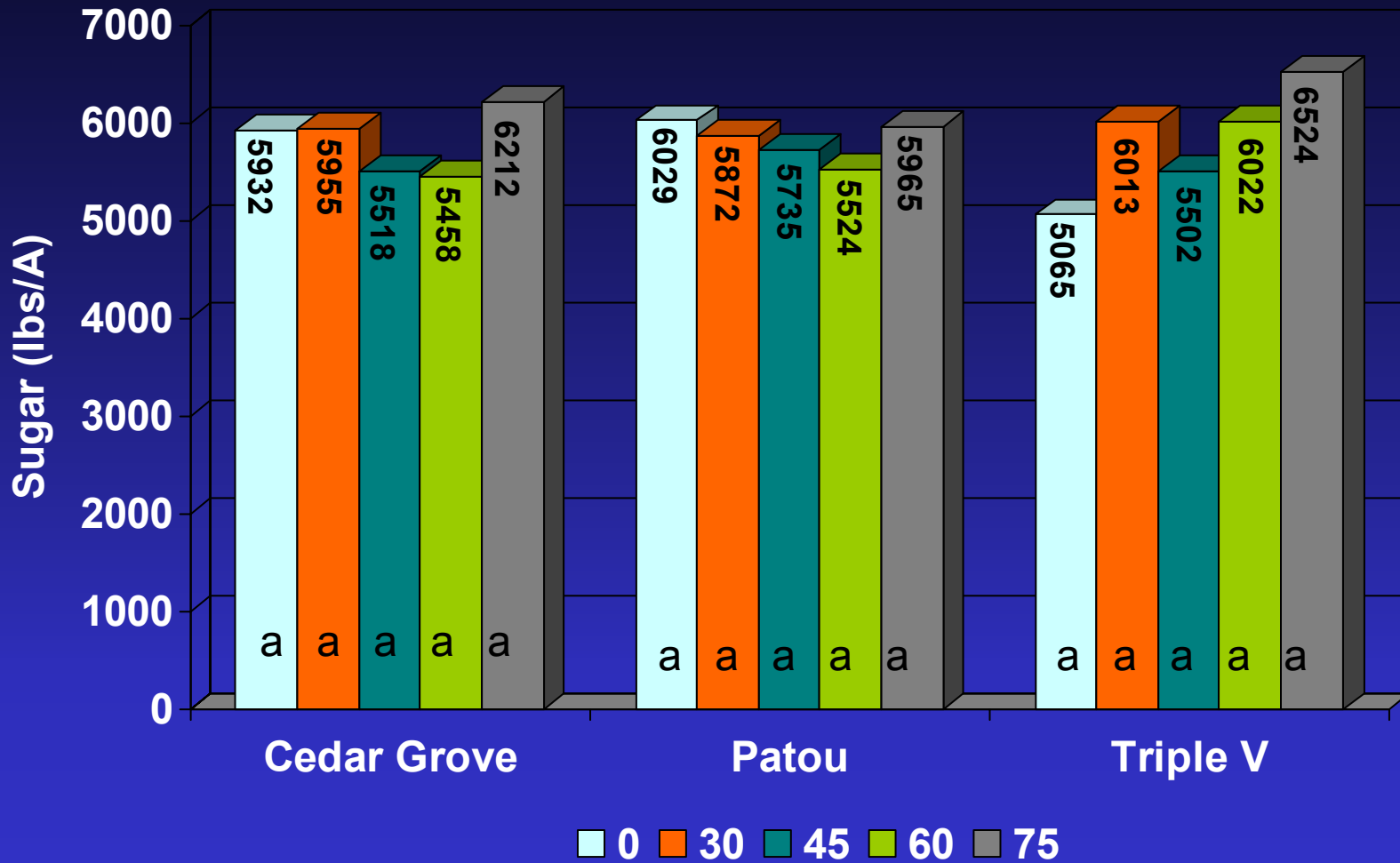
Sugar/A, 1st & 2nd Stubble, LCP 85-384



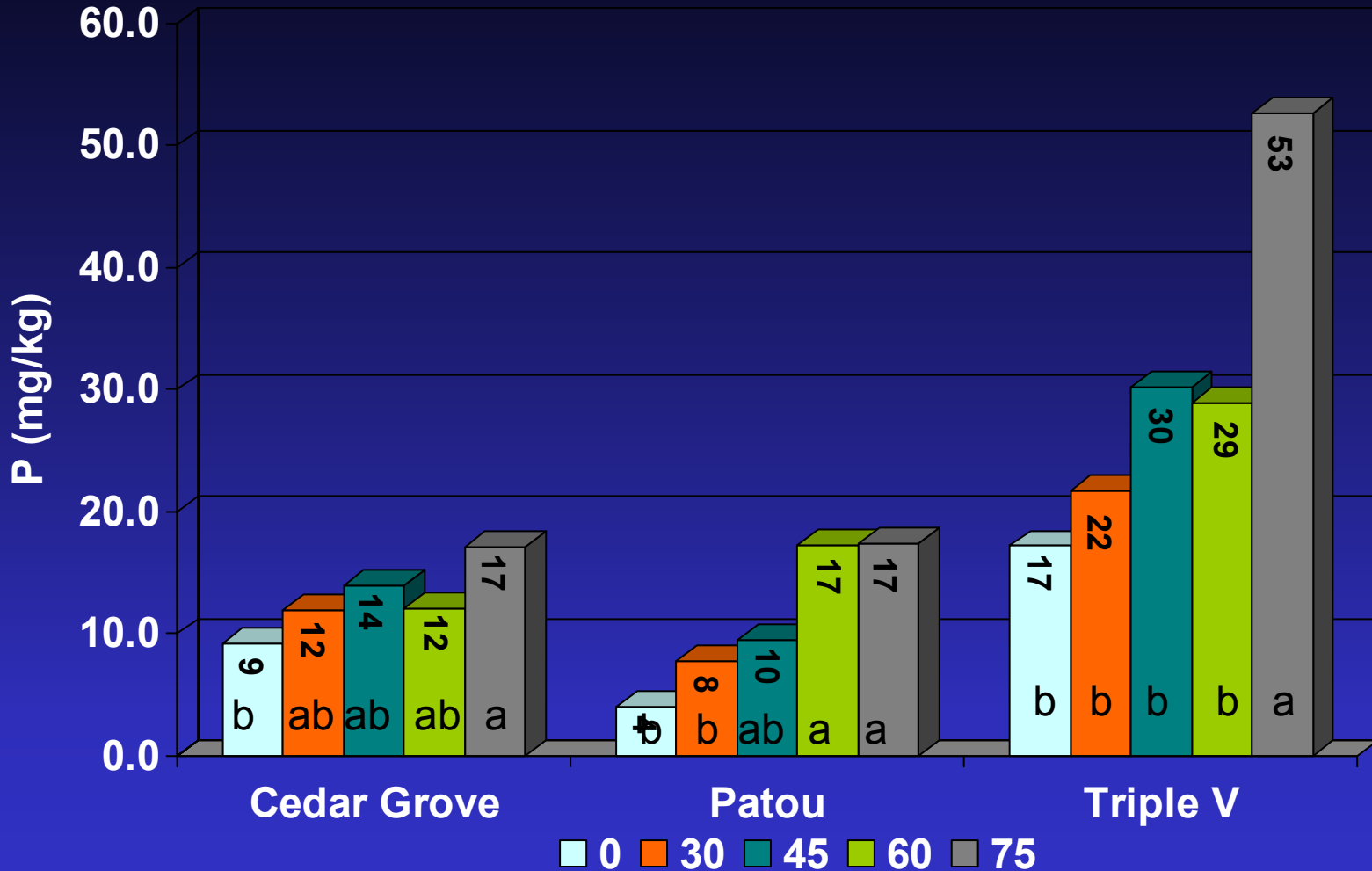
Phosphorus Fertilizer Experiments, 2005

- Locations:
 - Cedar Grove, Labadieville, LA, 3rd stubble, LCP 85-384, Commerce silt loam.
 - Patou Brothers, Lydia, LA, 3rd stubble LCP 85-384, Jeanerette silt loam.
 - Triple V, Youngsville, LA, 1st stubble LCP 85-384, Coteau/Frost silt loam.
- All soils tested low for phosphorus, and had a acceptable soil pH.
- Phosphorus rates: 0, 30, 45, 60, 75 lbs P₂O₅/A.
- Replications: 6

Phosphorus Fertilizer Tests, Sugar/A, 2nd & 3rd Stubble LCP 85-384

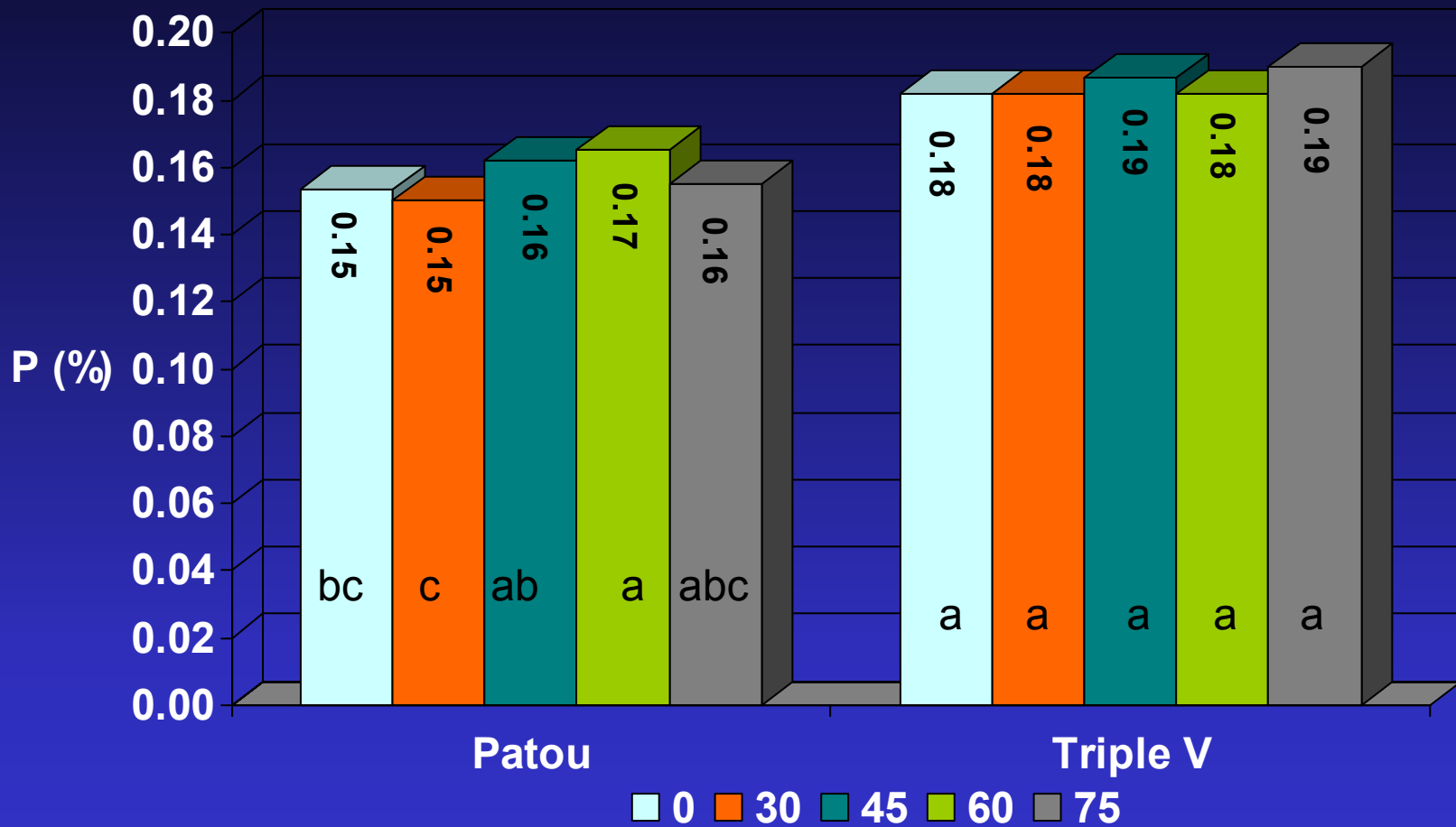


Phosphorus Fertilizer Tests, Post-harvest Soil P (0-6") , 2nd & 3rd Stubble LCP 85-384



Phosphorus Fertilizer Tests

Plant P , 2nd & 3rd Stubble LCP 85-384



Summary

- Phosphorus fertilizer did not result in a significant increase in tonnage or sugar yield.
 - Soil phosphorus levels were significantly increased.
 - Soil pH levels were not limiting.
 - Are soil levels still too low for response?
 - Why are plant tissue levels still low?
- It appears that the P requirements of LCP 85-384 are lower than previously released varieties.
- New Varieties will be evaluated in 2008-2009.

Nitrogen Fertilizer Research

R. Johnson, H.Viator, C. Kennedy, A. Arceneaux

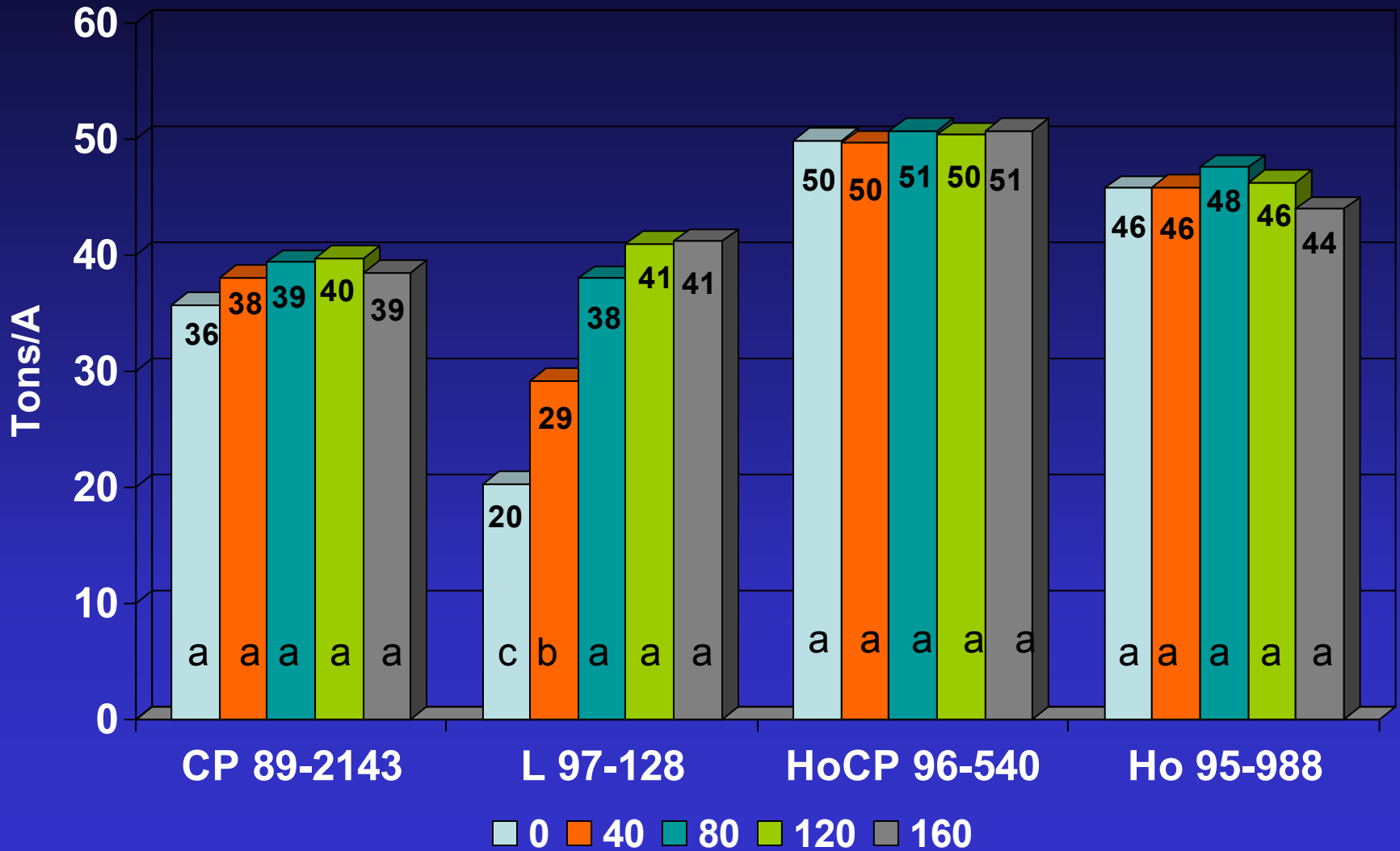
USDA, Nitrogen Fertilizer Experiments - 2007

- Locations:
 - Rosedale Plantation – L97-128 - November 6, 2007
 - Naquin Farms – HoCP 96-540 - November 26, 2007
 - Laurel Valley – Ho 95-988 - December 4, 2007
 - St. Louis Planting - CP 89-2143 - December 6, 2007
- Treatments:
 - Plant cane, 1st stubble
 - 3 rows x 50-ft, 6 reps
 - 0, 40, 60, 80, 120, 160 lbs N/A (32% UAN)

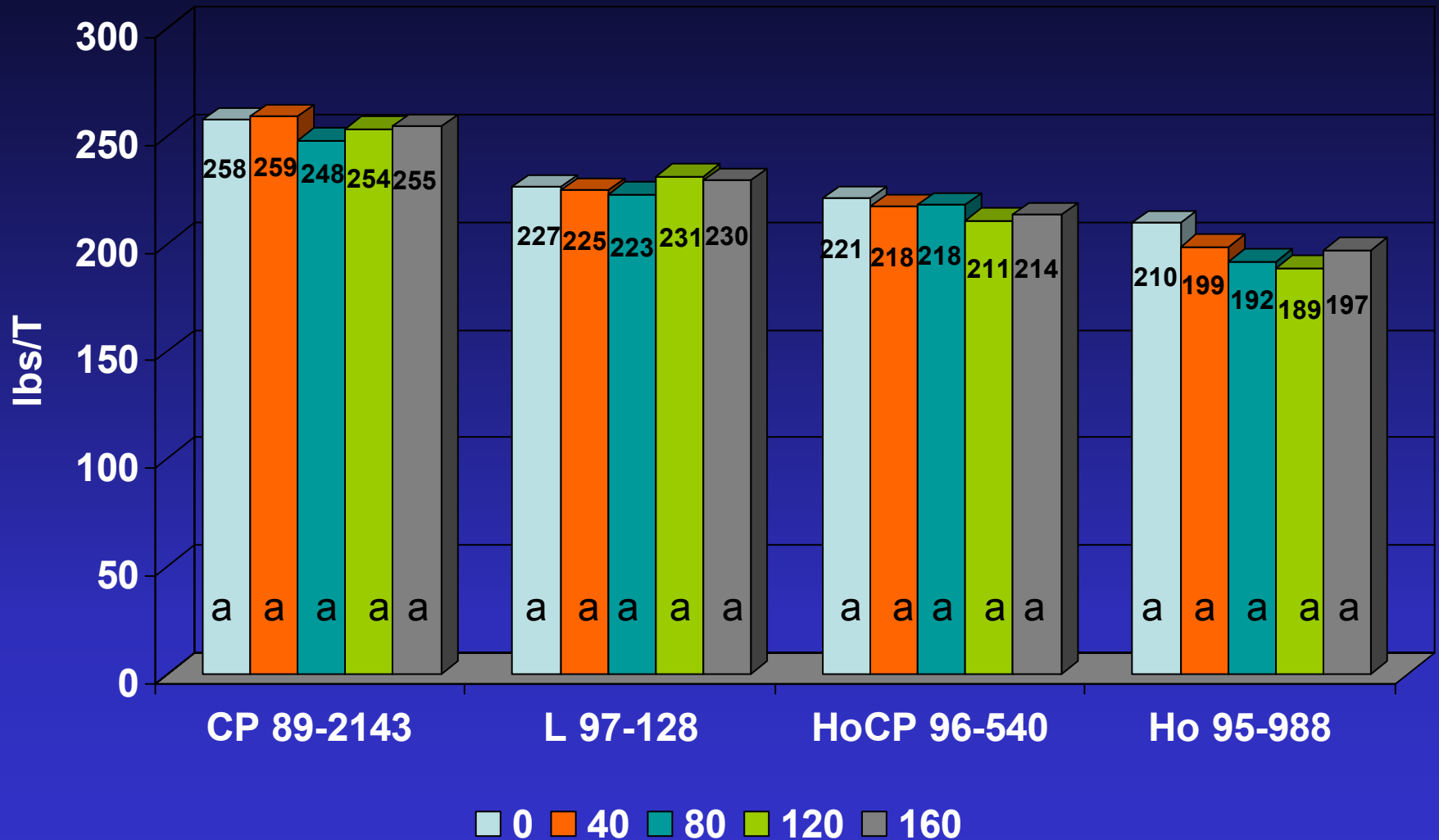
LSU Nitrogen Fertilizer Experiments

- Ronald Hebert, Jr., Patoutville, LA
 - L 99-226, L 99-233, - 1st stubble.
 - 3 rows x 30-ft, 6 reps tonnage
 - 40, 80, 160, 240 lbs N/A (32% UAN)
- LSU, St. Gabriel, LA
 - LCP 85-384, Ho 95-988, L 97-128, - Plant-cane, 1st Stubble, 2nd stubble (Harvest November 8, 2007)
 - L 99-226, HoCP 96-540, LCP 85-384, - Plant-cane (Harvest November 19, 2007)
 - 4 rows x 46-ft, (2 center rows for harvest), 4 reps
 - 0, 40, 80, 120 lbs N/A (32% UAN)

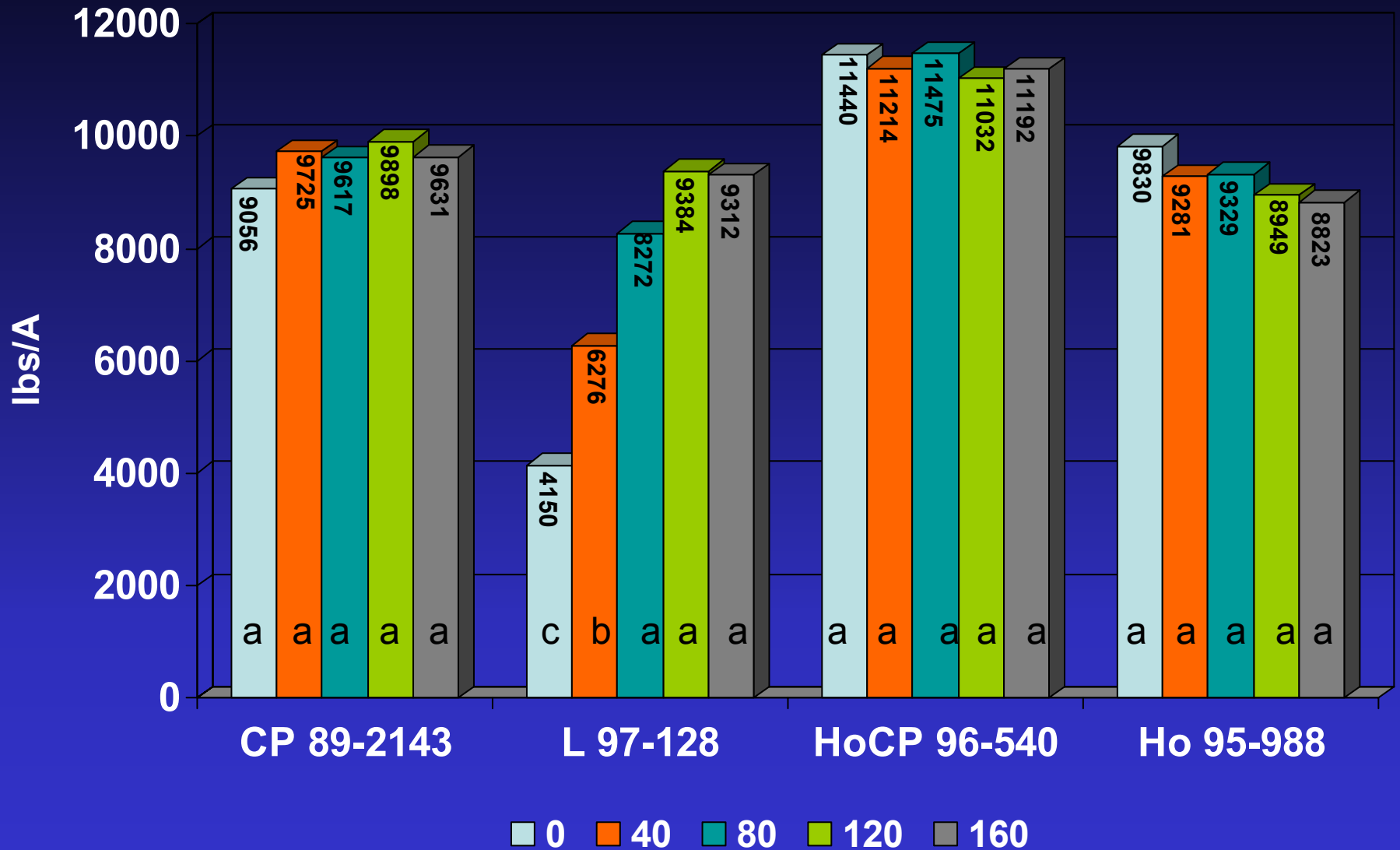
Varietal Response to Nitrogen Fertilizer (Tonnage) Plant Cane



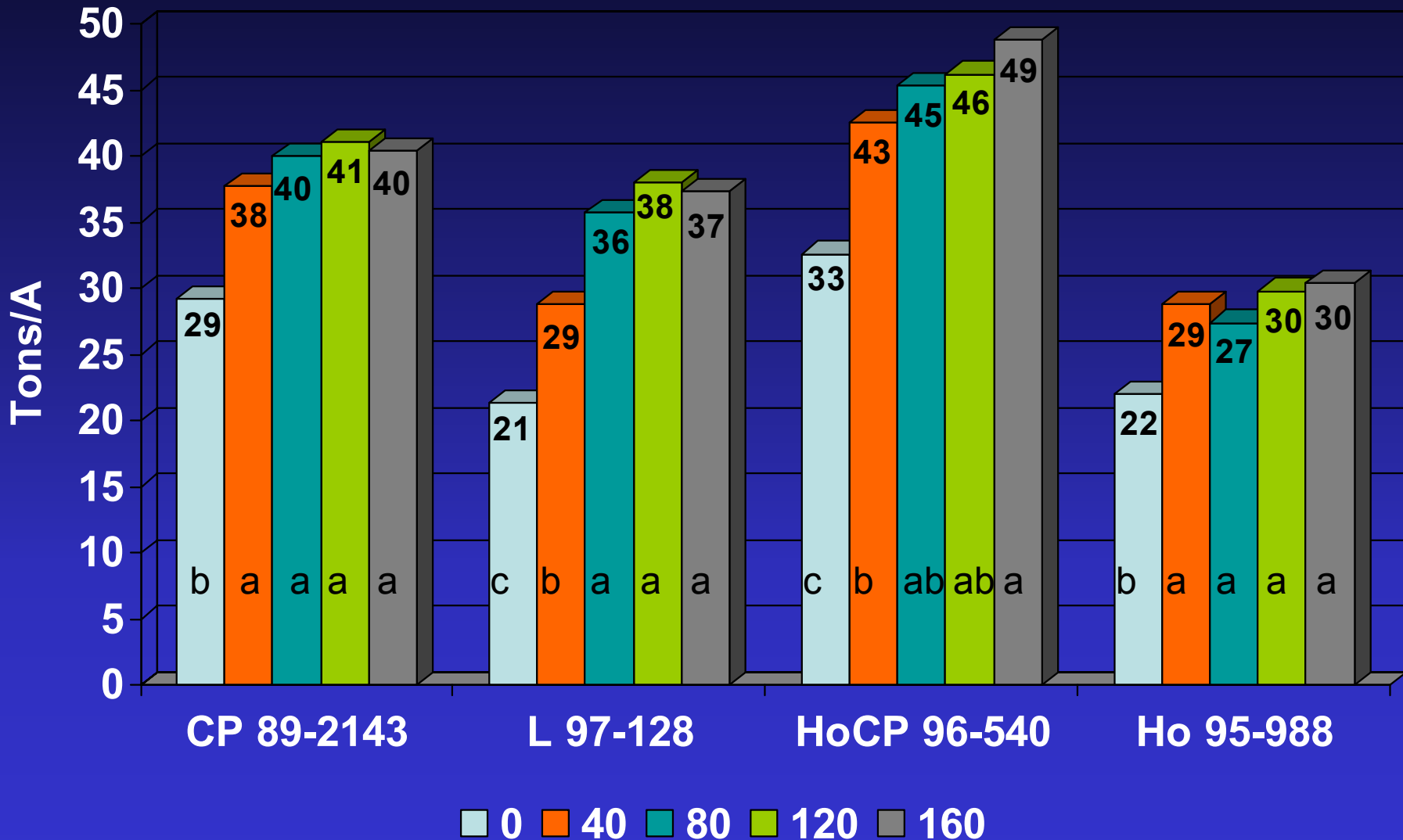
Varietal Response to Nitrogen Fertilizer (TRS) Plant Cane



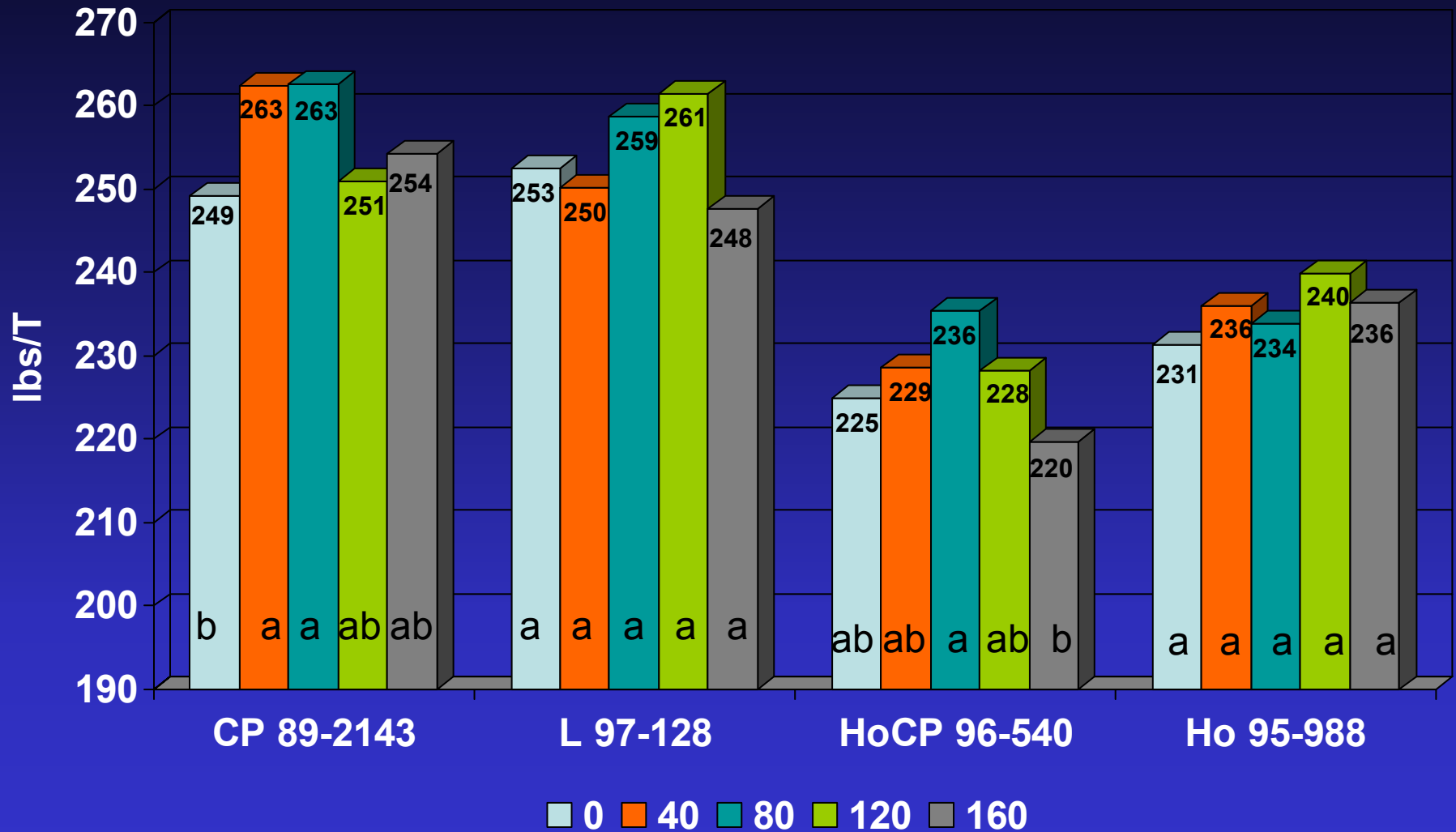
Varietal Response to Nitrogen Fertilizer (Sugar/A) Plant Cane



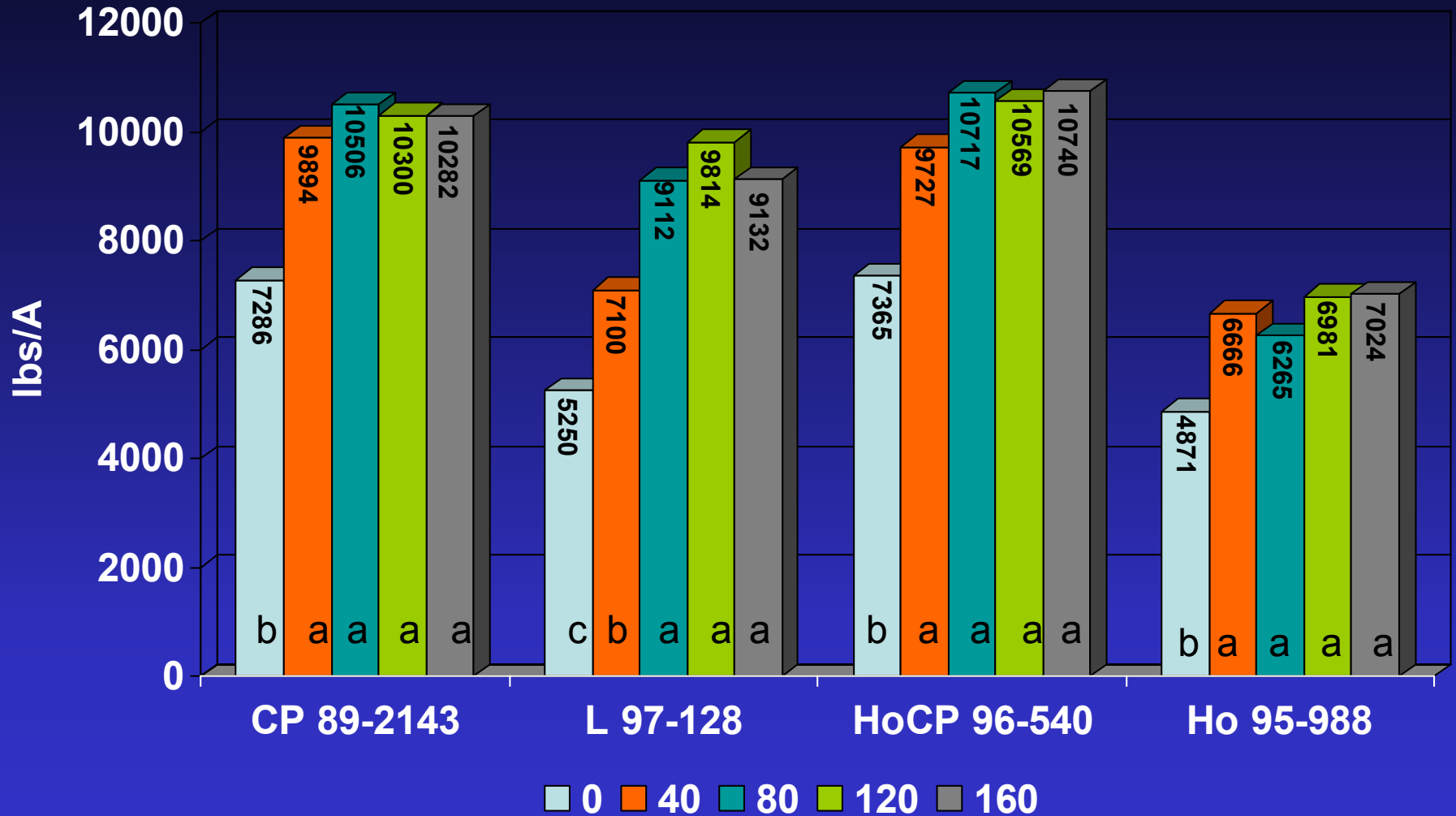
Varietal Response to Nitrogen Fertilizer (Tonnage) 1st Stubble



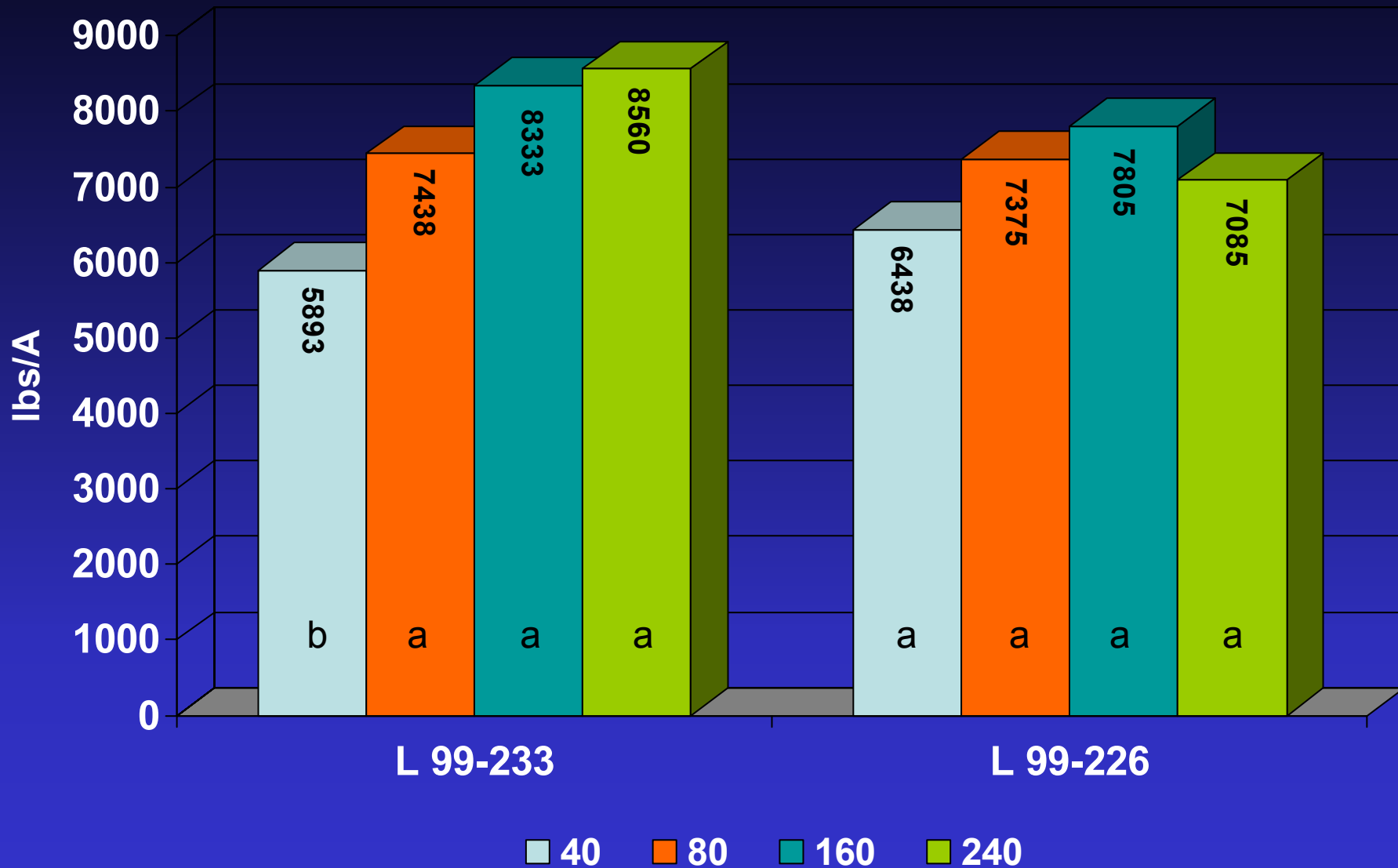
Varietal Response to Nitrogen Fertilizer (TRS) 1st Stubble



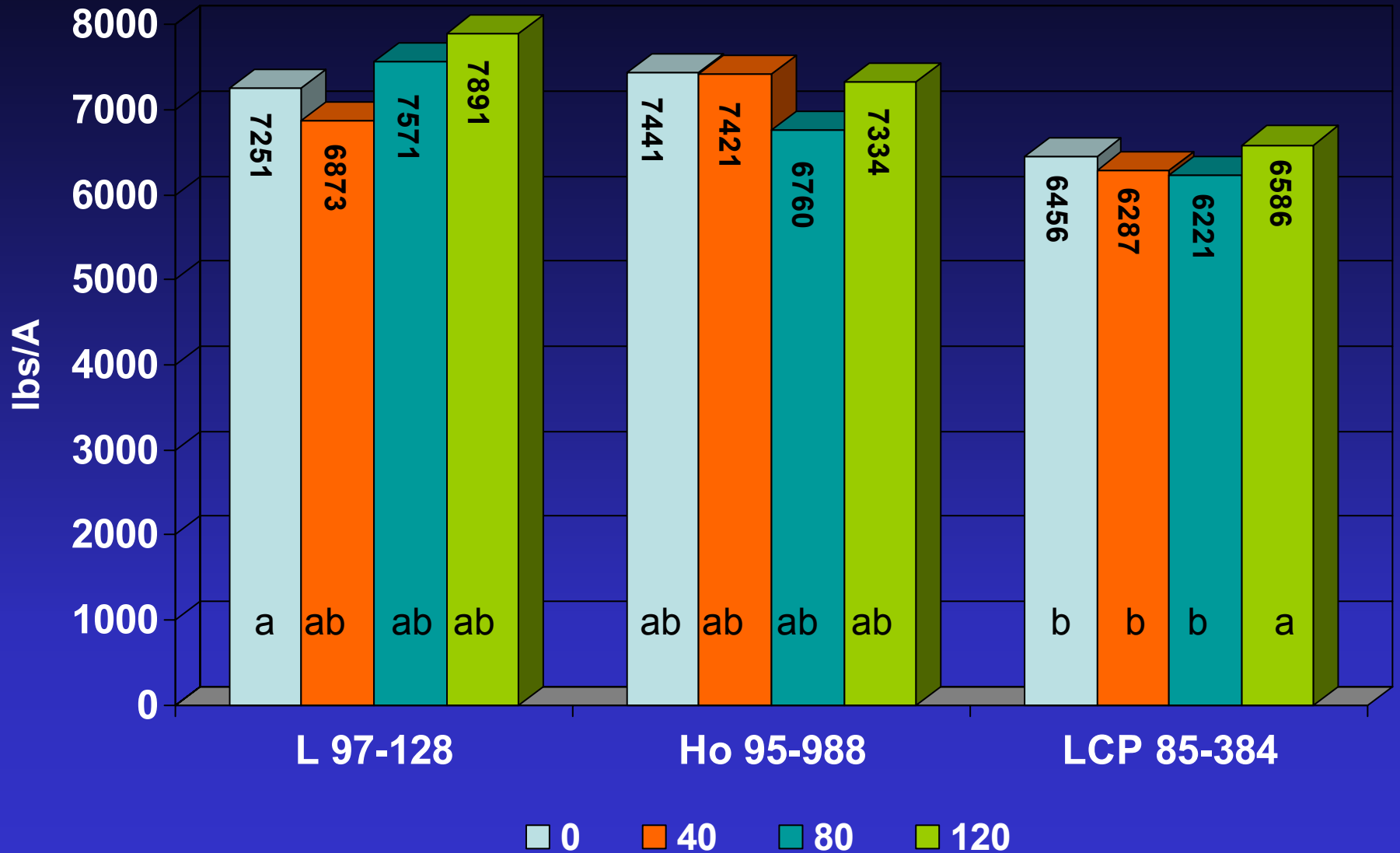
Varietal Response to Nitrogen Fertilizer (Sugar/A) 1st Stubble



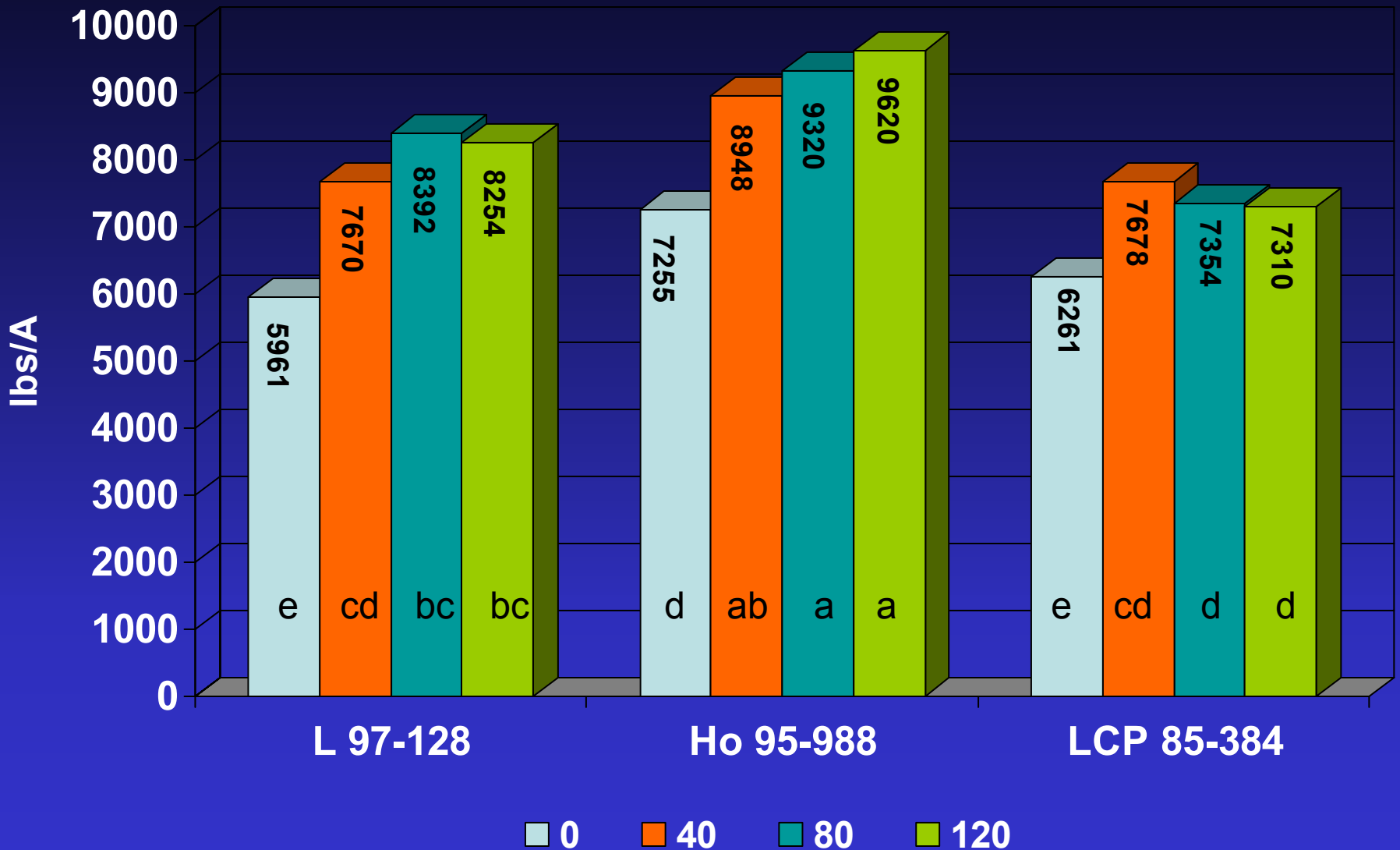
Varietal Response to Nitrogen Fertilizer (Sugar/A) 1st Stubble



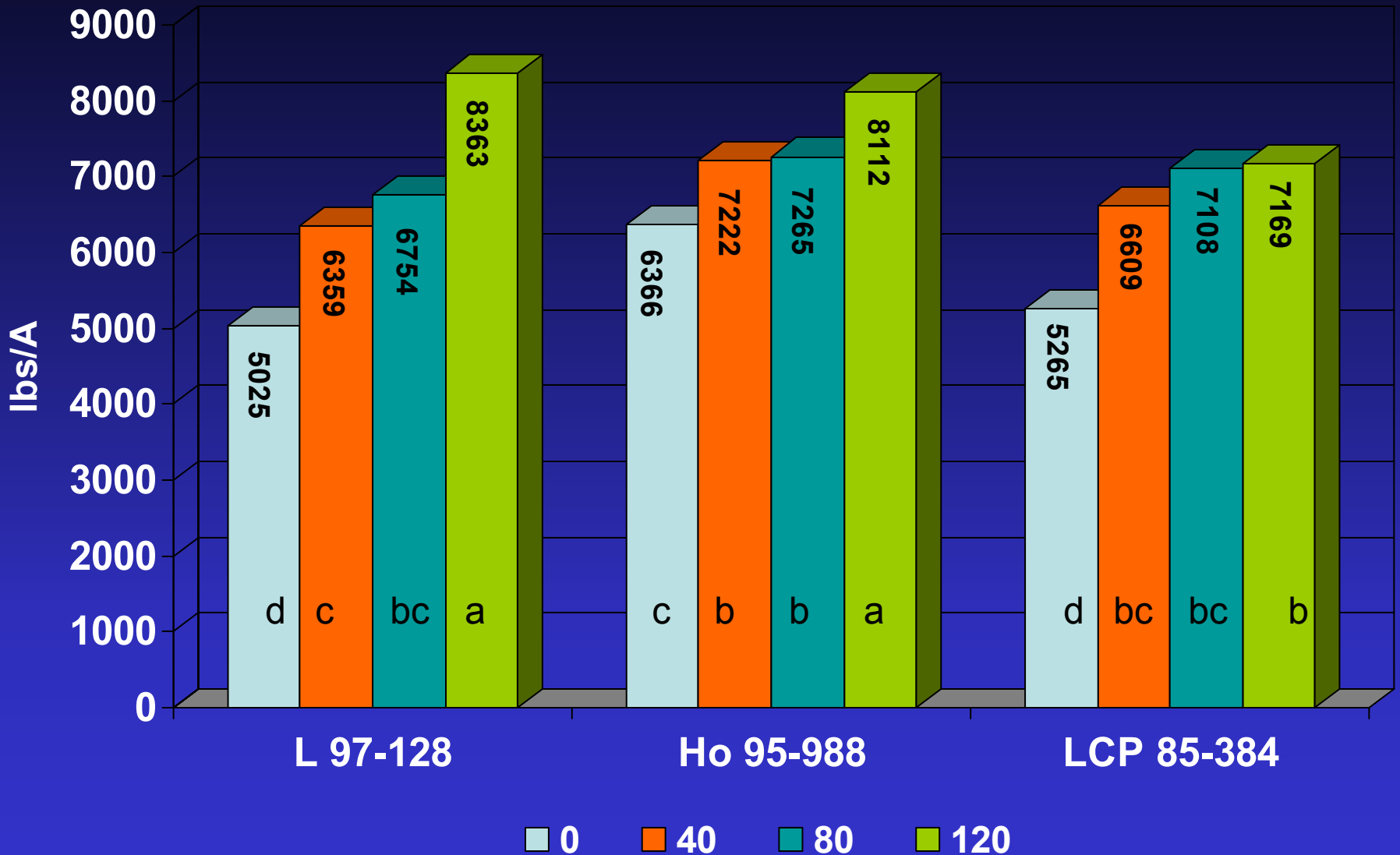
Varietal Response to Nitrogen Fertilizer (Sugar/A) Plant Cane



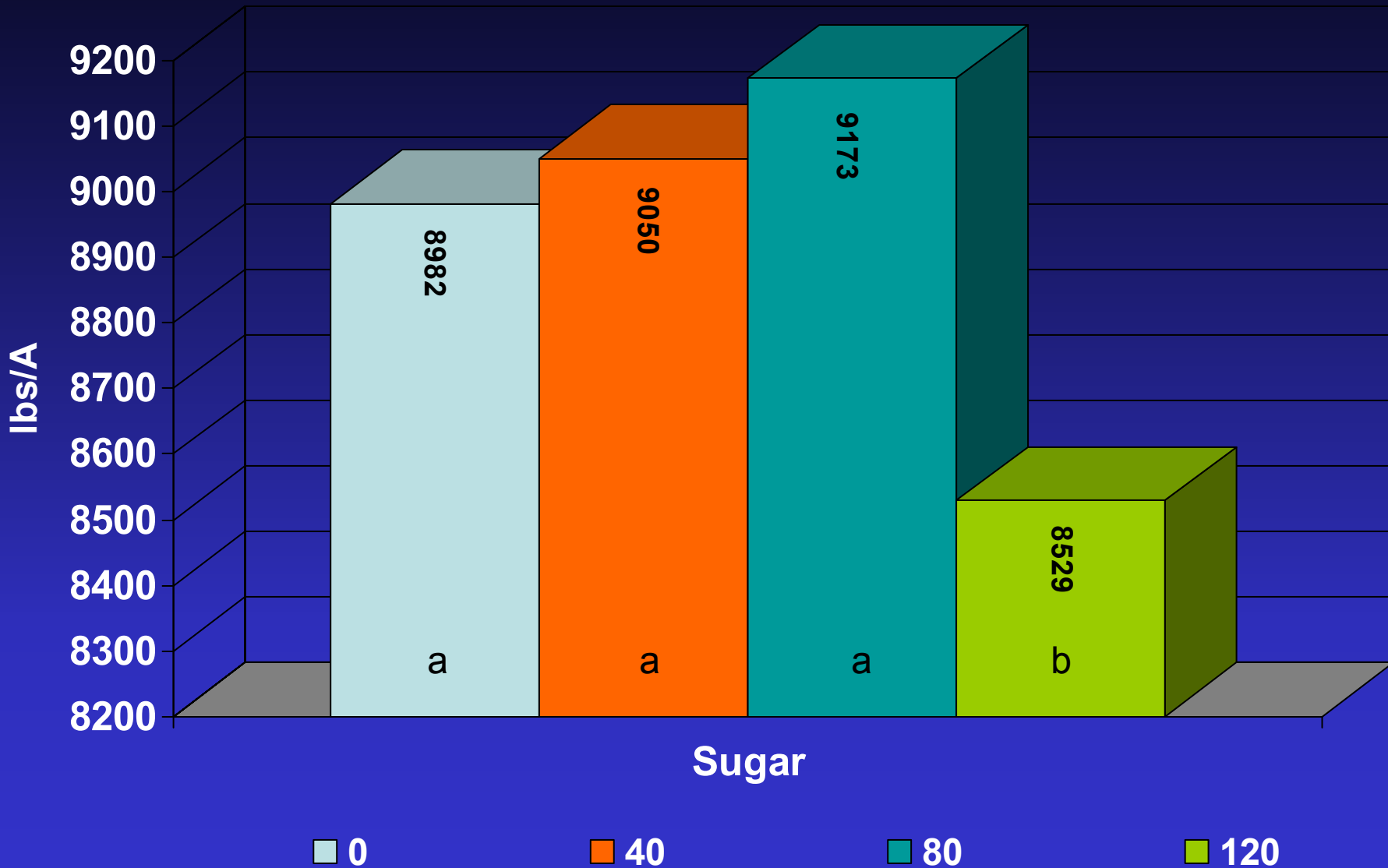
Varietal Response to Nitrogen Fertilizer (Sugar/A) 1st Stubble



Varietal Response to Nitrogen Fertilizer (Sugar/A) 2nd Stubble



Effect of Nitrogen Fertilizer on Sugar Yields Plant Cane



Nitrogen Recommendations

- It appears that there is little difference in nitrogen requirements for plant-cane and first-stubble crops; however, slightly more N might be required for the first-stubble crop.
- Additional nitrogen fertilizer is recommended for second and older stubble crops.
- Using more N fertilizer than recommended rates as 'insurance' may not be cost effective in the long term, especially with the high cost of N (\$225 vs. \$410/T, 35¢/lb vs. 64¢/lb).
- Higher than needed N rates can also contribute to excessive lodging and, perhaps, delayed maturity and lower cane quality.

Nitrogen Fertilizer Recommendations for 2008

- **Plant cane: light soils:**

Old	80-100 lb
New	60-80 lb N/A
- **Plant cane: heavy soils:**

Old	100-120 lb
New	80-100 lb N/A
- **Stubble cane: light soils:**

Old	120-140 lb N/A
New	80-100 lb N/A
- **Stubble cane: heavy soils:**

Old	140-160 lb N/A
New	100-120 lb N/A

- Old recommendations based on ~ 300 tests over 26 year period (1953-1979) when anhydrous ammonia was the primary nitrogen fertilizer used.

- New recommendations based on recent tests (~ 28) in which UAN 32% was the primary nitrogen fertilizer used.

- Note that these recommendations assume a proper soil pH and an application date of April 1 - 30.

Yield Monitors for the Louisiana Sugarcane Industry

- The adoption of Precision Agriculture by the Louisiana Sugarcane Industry has been slowed somewhat due to the unavailability of a working yield monitor for the sugarcane chopper harvester. Several were evaluated in Louisiana from 2002 to 2004, and also in 2007, but results continue to be inconsistent and are effected by harvesting conditions.
 - Load-cells on elevator.
 - Infra-red profile detector on elevator.
 - Ultra-sonic profile detector on elevator.
 - Dr. Randy Price (Kansas State University, Ag Engineering) developed a optical, duty-cycle, gross-cane yield monitor that we tested in 2007.

- If a yield monitor becomes available, it will be used to:
 - Estimate truck weights.
 - Yield maps to develop management zones.

New Precision Ag Research “On-the-Go”, soil pH Mapping Unit



- Veris MSP (multi-sensor platform).
 - 10 soil pH samples/acre @ 6 mph.
 - Continuous shallow and deep EC measurements.
 - Will be used to generate fertility and soil pH management zones.

New Precision Ag Research



- Plant density monitor and “skip detector”.
 - Developed by Dr. Randy Price, KSU, Ag Engineering.
 - Developed to detect 1 & 3 foot “skips”. Now testing the plant density function.

Questions ?

