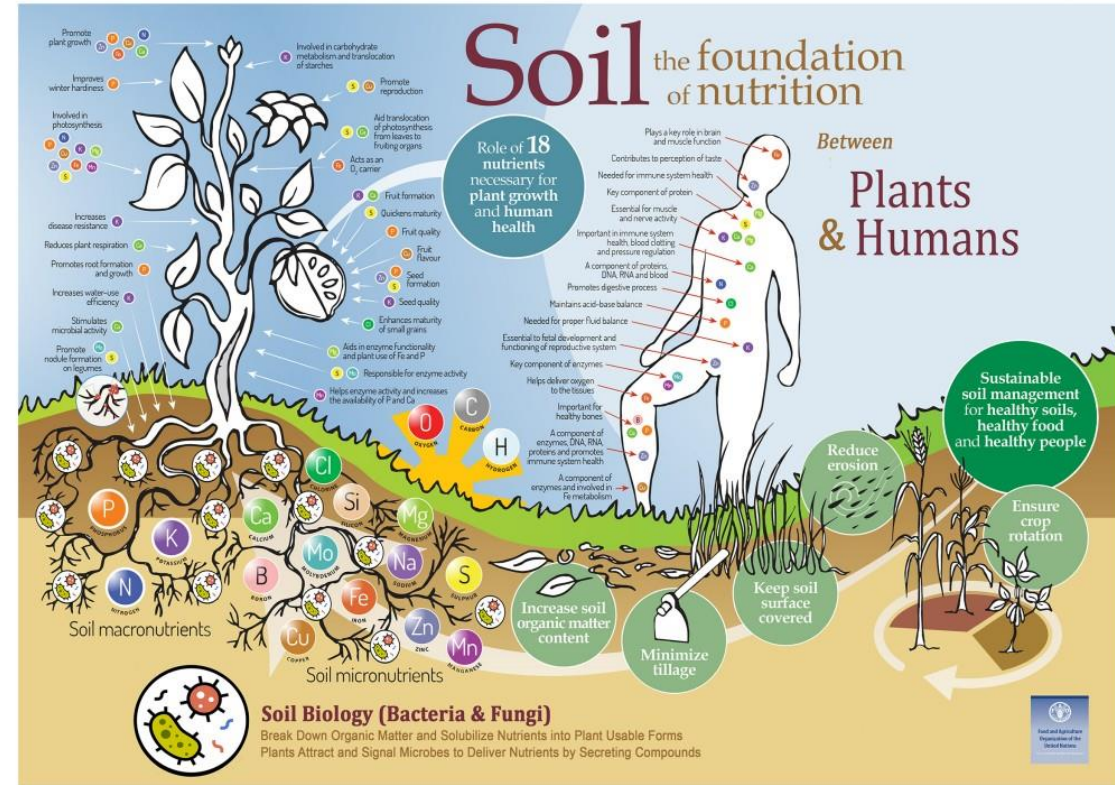




# Georgia Cotton Commission Annual Meeting

## Soil Health & Fertility Research Update

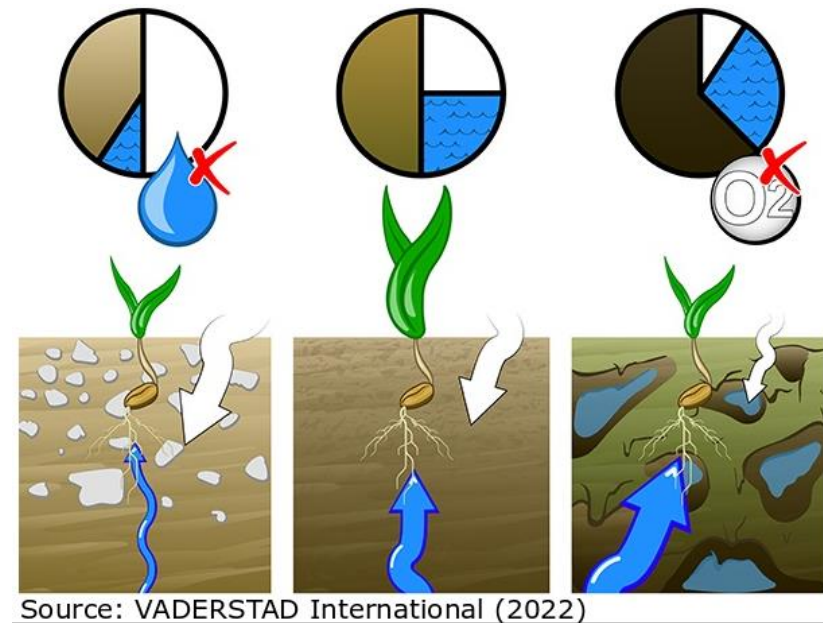
By: Henry Y. Sintim, Ph.D.  
January 25, 2023



# **Integrated soil health management**

# Study overview

- Tillage affects soil tilth, including the proportion of solid, water, and air components
- Conventional and conservation tillage practices have their benefits and limitations
- Can the integration of cover crops and organic amendment mitigate the limitations of both tillage systems?



# Study approach

- Experimental treatments

- *Conventional tillage system (CT)*
- *Conventional tillage integrated with cover crop and organic amendment (CT+Int)*
- *Conservation tillage system (ST)*
- *Conservation tillage integrated with cover crop and organic amendment (ST+Int)*

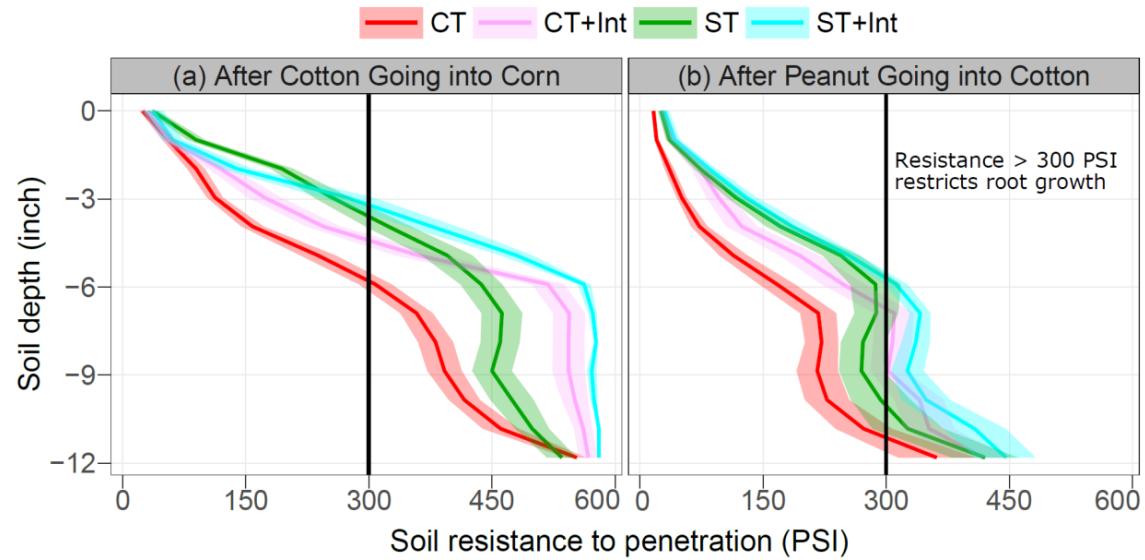
- Field management

- *Conservation tillage (strip tillage)*
- *Cover crop (Cereal rye seeded at 90 lb/a)*
- *Organic amendment (poultry litter and biochar rate at 1 ton/a each)*



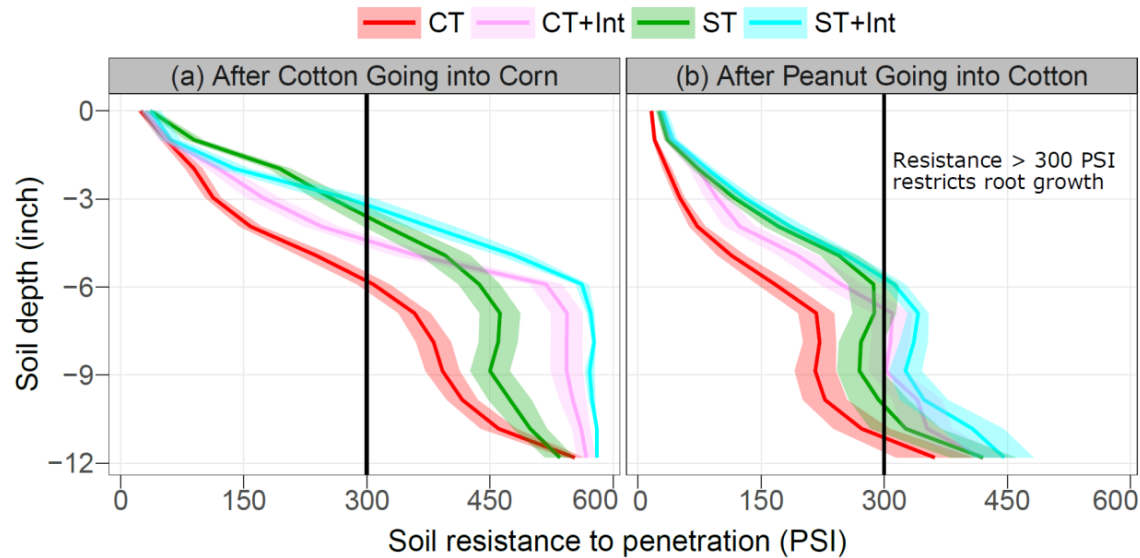
# Findings

- Impact on soil resistance to penetration

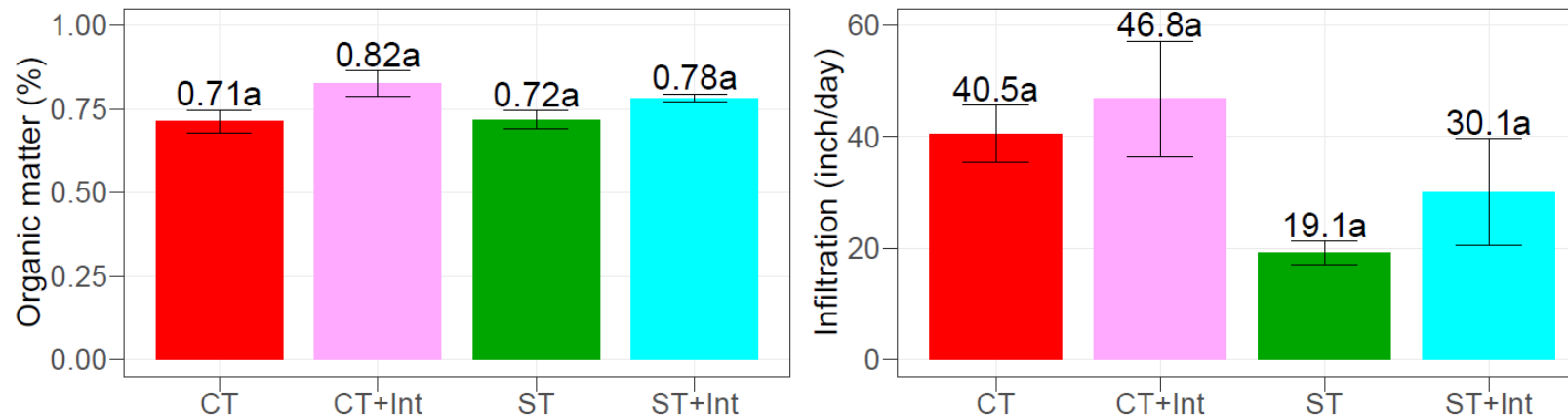


# Findings

- Impact on soil resistance to penetration



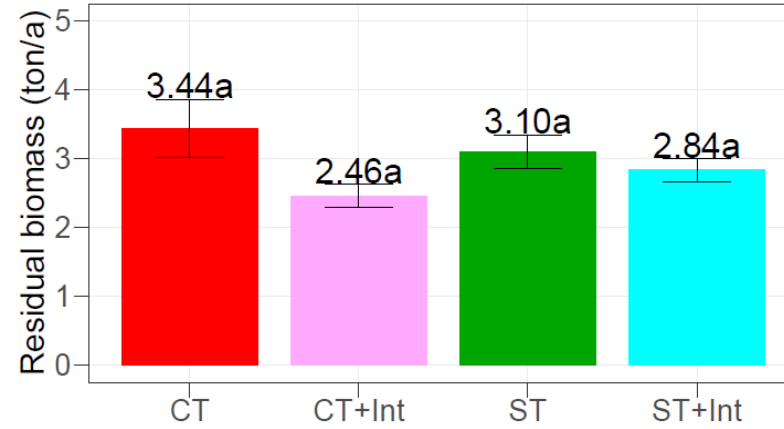
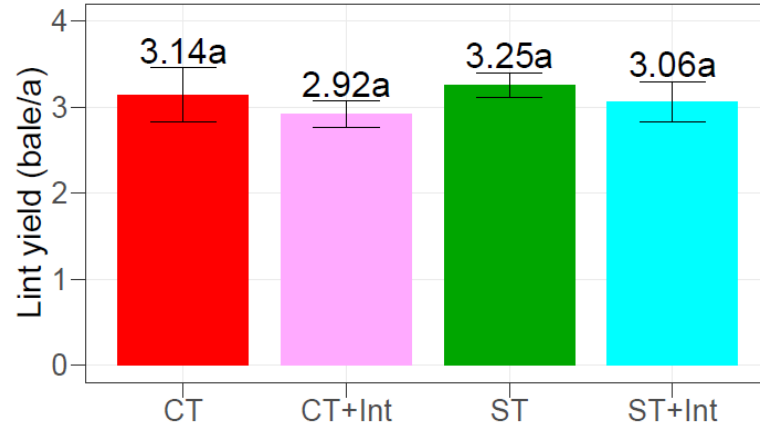
- Impact on organic matter and infiltration





# Findings

- Impact on yield and biomass



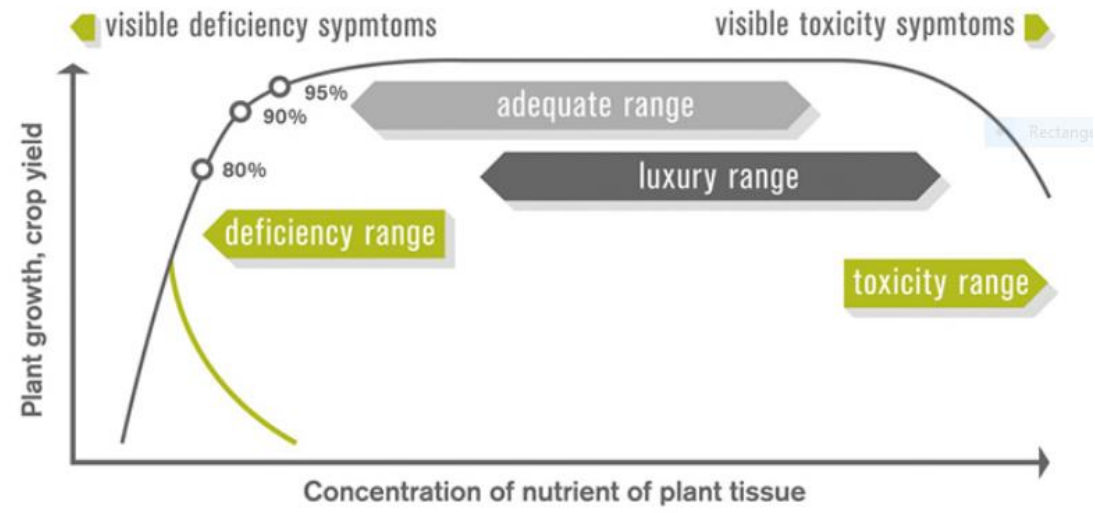


# **Adaptive Nutrition Study**



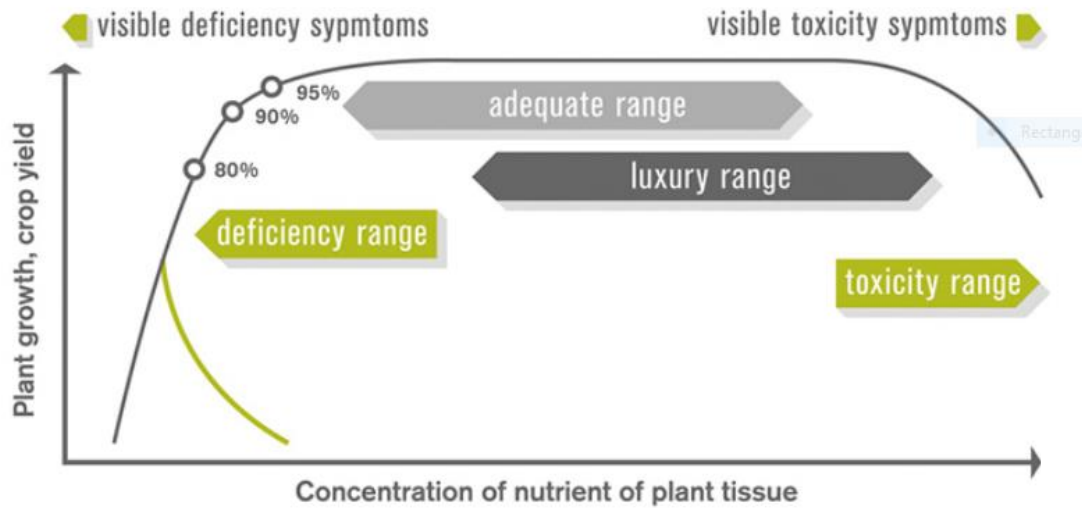


# Plant essential nutrients for cotton



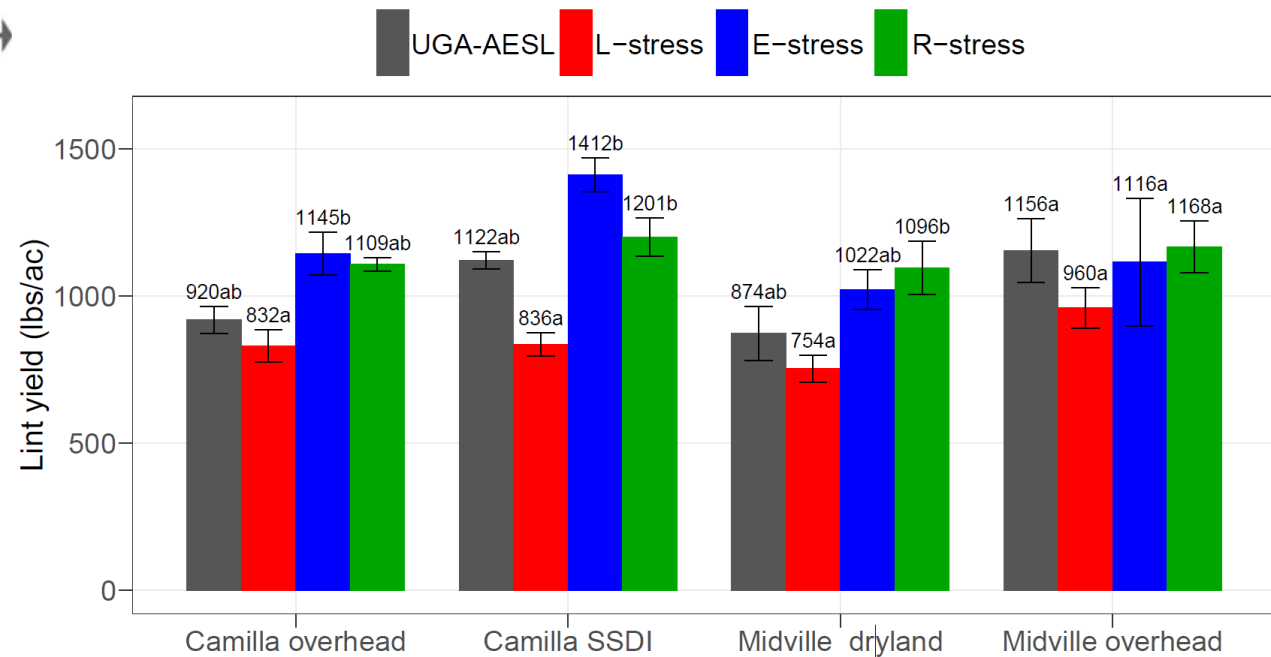
<https://www.cropnutrition.com/>

# Plant essential nutrients for cotton



<https://www.cropnutrition.com/>

## Cotton nutrient stress study

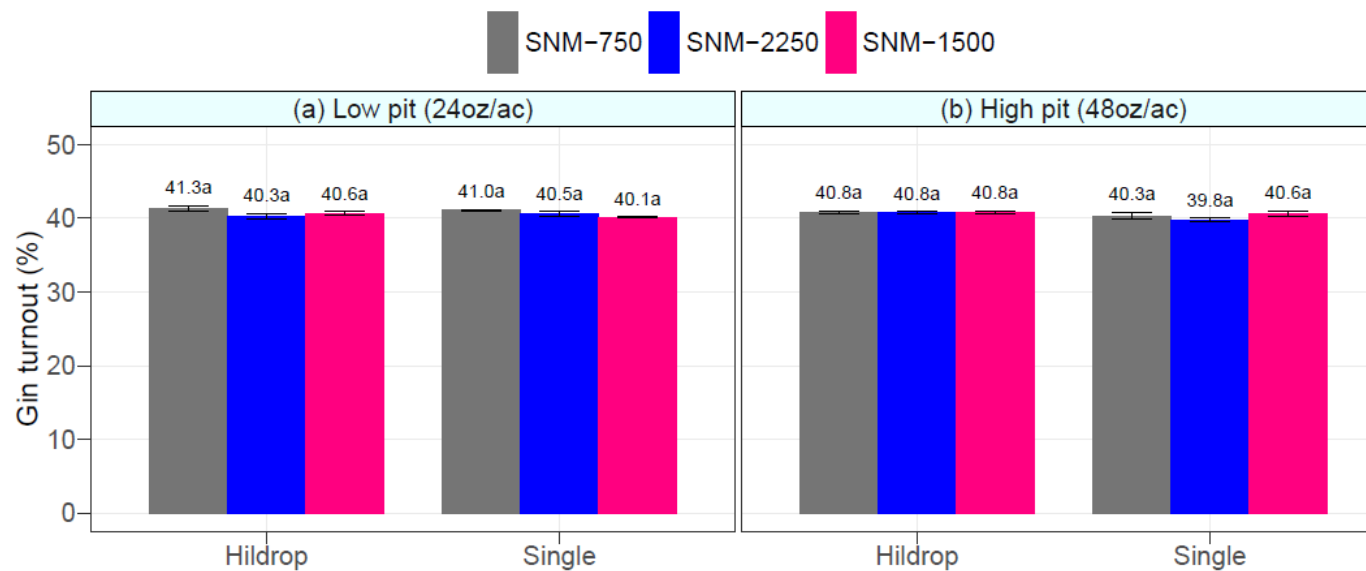
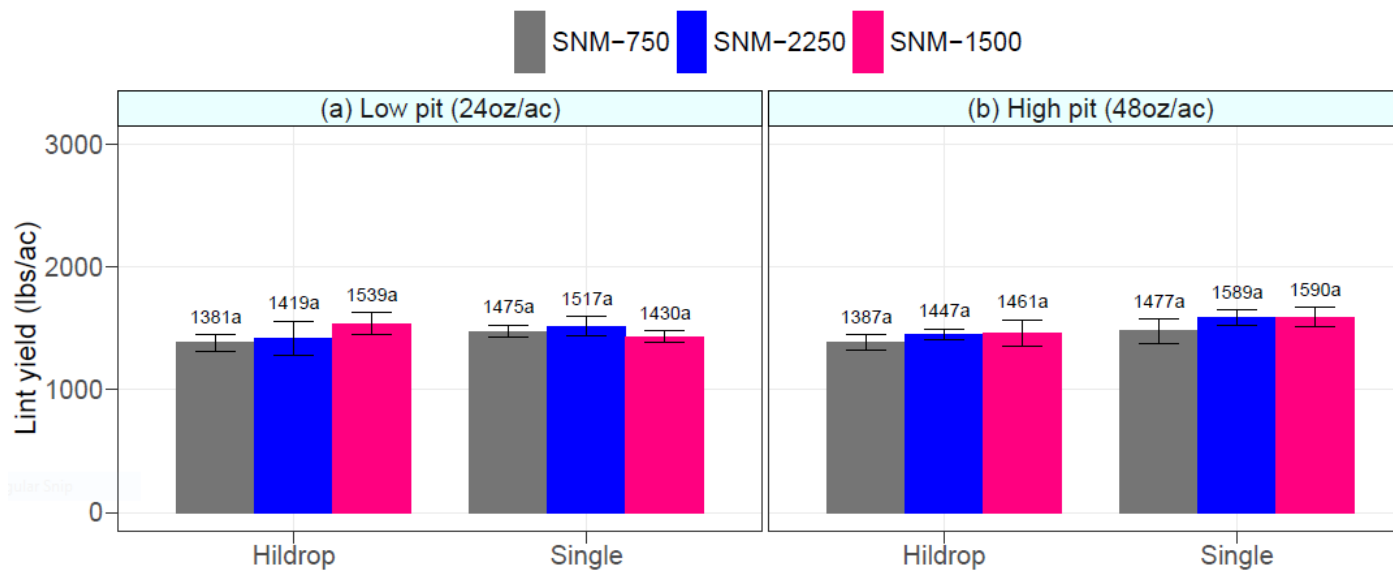


## Treatment factors (Midvile site)

- Fertility
  - *Standard fertility for 750 lb/a lint yield*
  - *Standard fertility for 1500 lb/a lint yield*
  - *Standard fertility for 2250 lb/a lint yield*
- Seeding method
  - *Hilldrop vs. Singles*
- Growth regulator
  - *24 oz/ac vs. 48 oz/ac*
- Variety was ST4550



# Yield & gin turnout

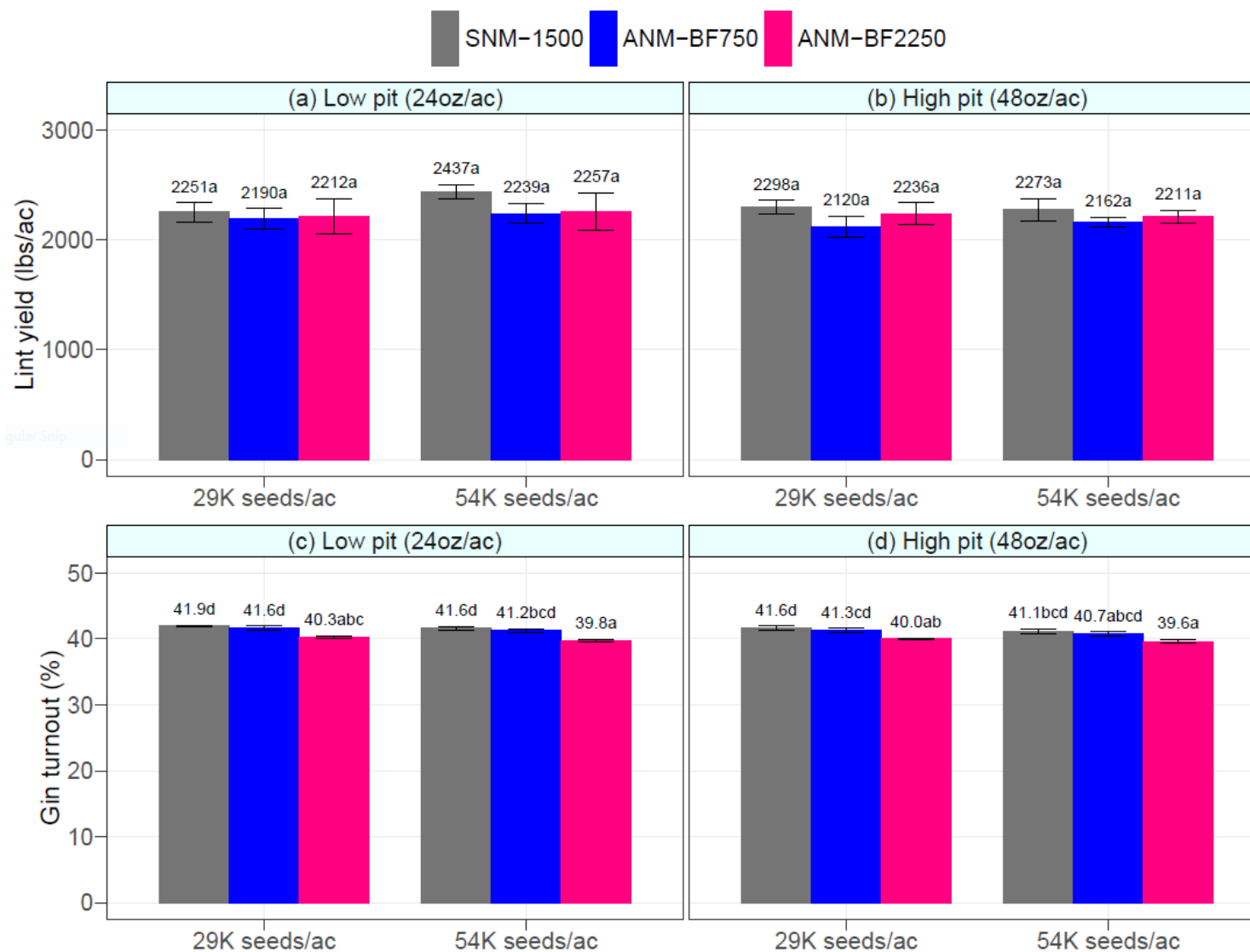


## Treatment factors (Tifton site)

- Fertility
  - *Standard fertility for 1500 lb/a lint yield*
  - *ANM-low baseline*
  - *ANM-high baseline*
- Seeding rate
  - *29K seeds/ac vs. 54K seeds/ac*
- Growth regulator
  - *24 oz/ac vs. 48 oz/ac*
- Variety was DG3615 B3XF



# Yield & gin turnout



# Inoculant assessment



# Inoculant assessment



	Lint yield (lbs/ac)
Inoculated	2315
None	1572



## Mission

Welcome to the H. SINTIM LAB at the University of Georgia.

The H. SINTIM LAB – directed by Dr. Henry Yabbey Sintim – is within the Crop and Soil Sciences Department and based at the University of Georgia Tifton Campus. The mission of the program is to **Optimize Plant Nutrition and Revitalize Soil Health**, especially under row crop production systems in Georgia.

The state of Georgia has a sub-tropical climate, characterized by hot and humid summers and cool to mild winters. Also, the soils are predominantly Ultisols, which are highly weathered and characterized as having a clay-enriched subsoil with relatively low native fertility or a base saturation of less than 35% in the subsoil. Under intensive weathering and poor soil management conditions, some areas in the state have lost the sandy topsoil layer. More importantly, both sand and kaolinite clay minerals have very low cation exchange capacity, making crop production systems in Georgia less resilient. A slight change in soil and environmental conditions can adversely impact crop performance.

The H. SINTIM LAB optimizes nutrient management strategies that increase row crop productivity, limit costs, and have a minimum adverse impact on the environment. The program also researches innovative soil health assessment strategies and regenerative agricultural frameworks that integrate seamlessly into existing farming systems, while minimizing soil disturbance and promoting the build-up of soil organic matter and biodiversity.

While the main focus of the H. SINTIM LAB is to serve the State of Georgia, we are also open to scientific collaborations that benefit the country and the world at large.



# Questions?