



Soil Management Considerations for 2025

Brendan Zurweller
Extension Soil/Peanut Specialist
Phone: 662-769-9849

Presentation Outline

- Soil pH yield loss and liming
- Soil testing concepts
- Laboratory P and K fertilizer recommendations
- Micronutrient management trials



Yield Loss Associated with Low pH

- pH below 5.5 resulted in yield loss
- Relative yield loss of 10% at pH 5

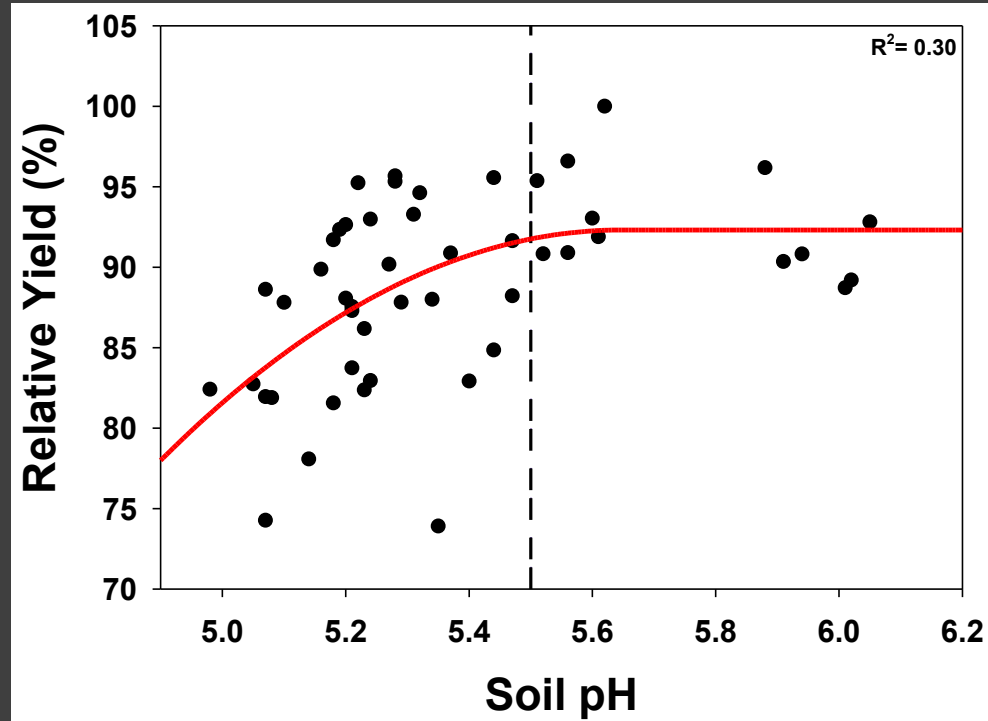
Cost of 10% yield loss (average yields):

Soybean- \$60/ac

Corn- \$75/ac

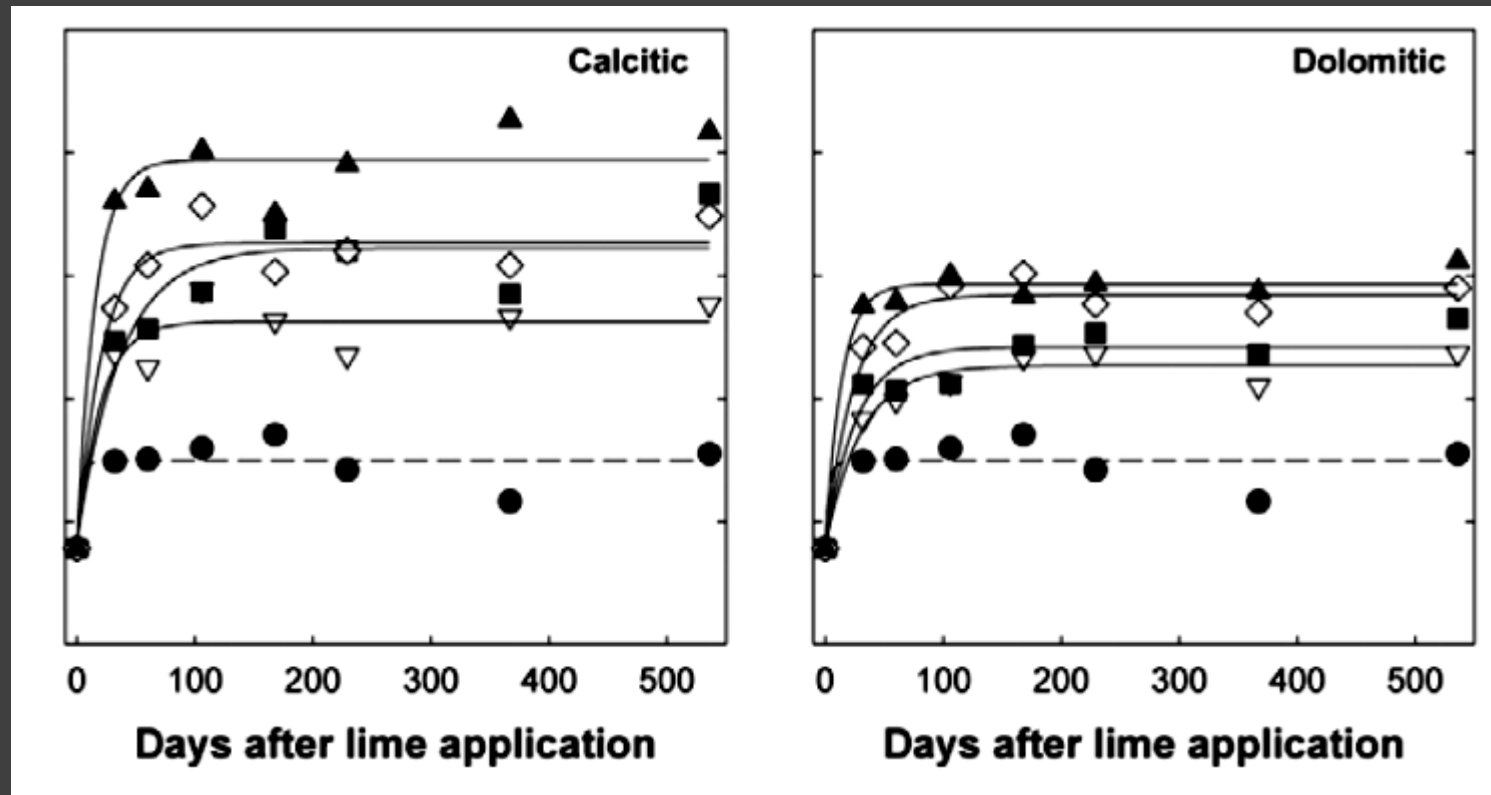
Cotton- \$84/ac

Peanut- \$100/ac



Time Needed for Lime Neutralization

- Average time to reach maximum pH was 105 days
- Onset of high nutrient demand for most row crops is at least 35 days
- Lime application at approximately 70 days before planting



Source: Pagani and Mallarino, 2012

ECC= calcium carbonate equivalent (CCE) x fineness factor (FF)

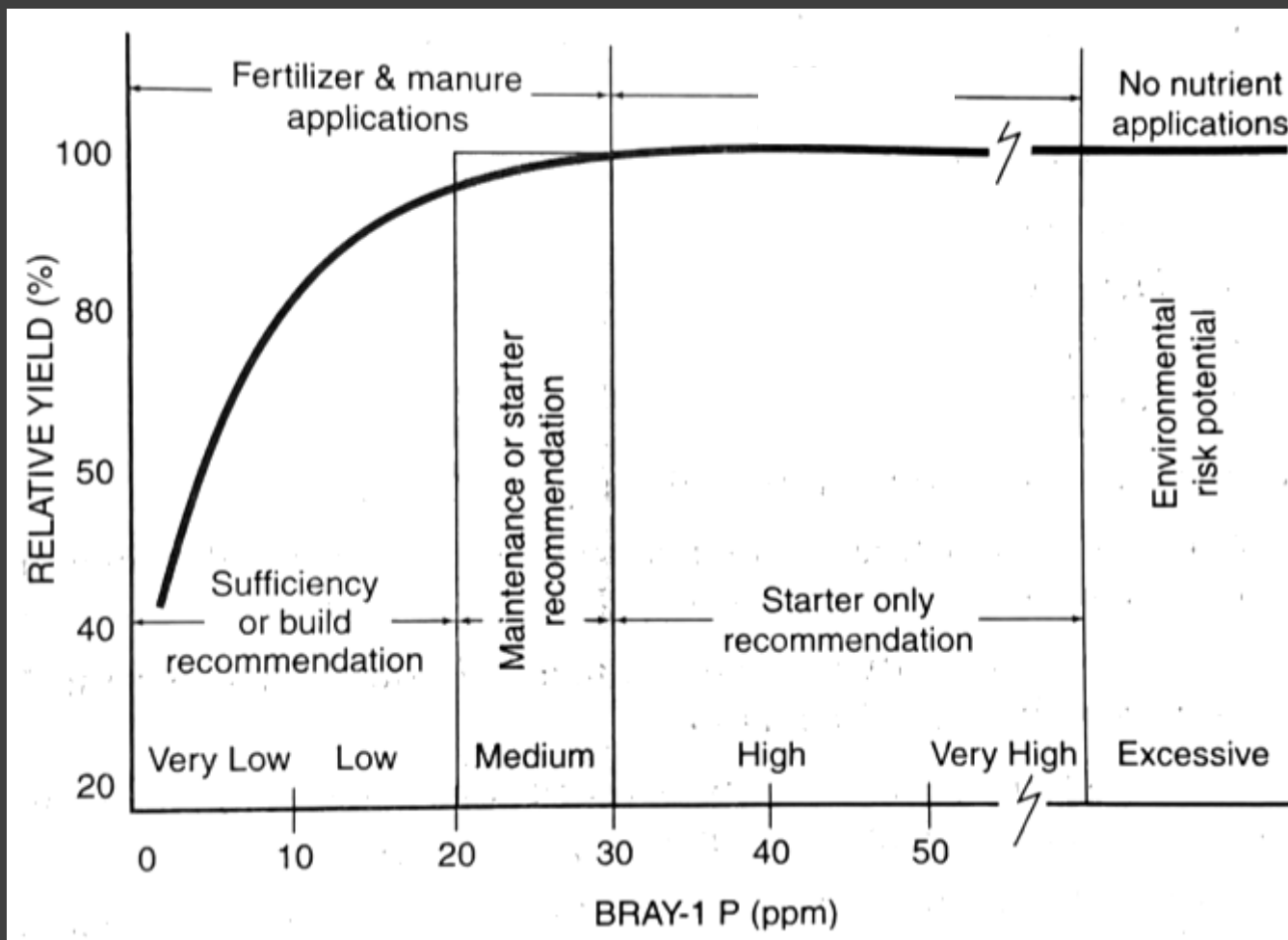
Soil Testing Overview

Table 1. Common Soil Test Extractant Use in the United States

Extractant	Additional Names	Soil Suitability	Appropriate for Testing
Mehlich-1*	Dilute Double Acid	Acid, weakly buffered soils	P, K, Ca, Mg
Mehlich-3		Acid to neutral soils	P, K, Ca, Mg, Zn, Mn
Mississippi*	Lancaster	Acid or alkaline clays	P, K, Ca, Mg
Bray P1	Weak Bray	Highly buffered, acid soils	P
Olsen	Sodium bicarbonate	Alkaline, calcareous soils	P
Morgan		Acidic soils	P, K, Ca, Mg
Ammonium Acetate	NH ₄ OAc	All soil types	K, Ca, Mg, Na (not P)
DTPA		All soil types	Zn, Cu, Mn, Fe
Hot water		All soil types	B

- Mehlich 3 best extraction for macronutrients on most soil types
- May have limitations on high pH calcareous soils

Soil Test Calibration Overview



Lancaster P and K Soil Test Ranges

<u>Index Level</u>	<u>Soil Test Amount (lbs P/acre)</u>
Very low	0-18
Low	19-36
Medium	37-72
High	73-144
Very High	>144

<u>Index</u>	<u>CEC < 7</u>	<u>CEC 7-14</u>	<u>CEC 15-25</u>	<u>CEC > 25</u>
Very low	0-40	0-50	0-60	0-70
Low	41-80	51-110	61-130	71-150
Medium	81-120	111-160	131-180	151-200
High	121-210	161-280	181-315	201-350
Very High	> 210	> 280	> 315	> 350

**Nutrient Management
Guidelines for Agronomic
Crops Grown in Mississippi**

Larry Oldham, Ph.D.

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Extension Soils Specialist
Department of Plant and Soil Sciences
Mississippi State University



Soil Testing Lab Fertilizer Recommendations (P and K)

Sample 1-Soybean (70 bu)	Ext. P (lbs/ac)	Ext. K (lbs/ac)	Rec. P ₂ O ₅ (lbs/ac)	Rec. K ₂ O (lbs/ac)
MSU-Lancaster	171 VH	192 L	0	90
Lab 1-Mehlich 3	148 A	296 A	40*	110
Lab 2-Mehlich 3	150 VH	246 L	52	150
<u>Sample 2- Cotton (3 bale)</u>				
MSU-Lancaster	135 H	83 L	0	90/145
Lab 1-Mehlich 3	139 A	91 L	40*	240
Lab 2-Mehlich 3	150 VH	83 VL	57	152

- Laboratory differences occur for critical values
- Maintenance phosphate fertilizer applications are similar between labs
- MSU potash fertilizer recommendations are lower for soybeans

Research Objectives/Treatments

- The objective of this research is to compare soil fertility build up and yield responses of both peanut and cotton in rotation to fertility amendments

Experimental treatments in each crop (started with cotton in 2022):

- 1) A negative control (only N on cotton consisting of 100 lbs N/ac split at emergence and first square)
- 2) Poultry litter applied to cotton and peanut each year at 2 tons/ac (PLPC).
- 3) Poultry litter only applied to cotton at 2 tons/ac (PLC)
- 4) Inorganic fertilizer applied to cotton and peanut each year matching the N-P-K amounts in the poultry litter applied (CFPC)
- 5) Inorganic fertilizer only applied to cotton each year matching the N-P-K amounts in poultry litter applied (CFC).



Poultry Litter Analysis and Initial Soil Properties

Mapped soil series	pH (1:2 Soil:H ₂ O)	Extractable soil nutrients				CEC meq 100 g ⁻¹
		P	K	Ca	Mg	
	-----lbs ac ⁻¹ -----					
Myatt loam	6.1	89 H	110 M	1,509	84	5.4

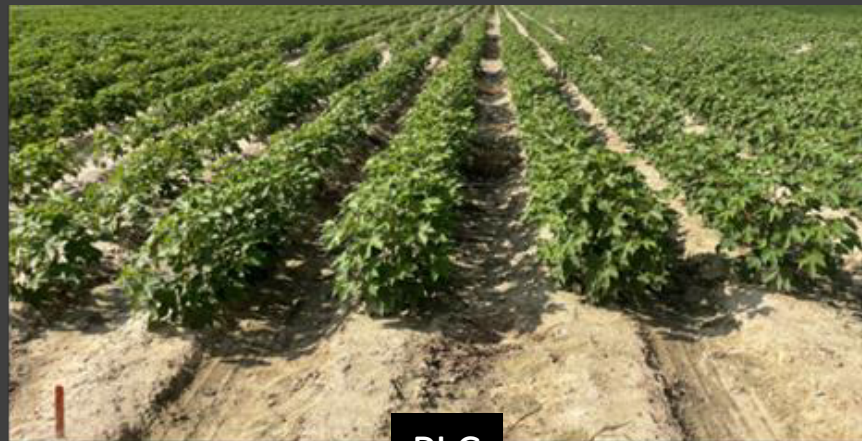


Year	pH (1:2 Soil:H ₂ O)	Extractable soil nutrients		
		N	P ₂ O ₅	K ₂ O
	-----lbs ton ⁻¹ -----			
2022	6.8	47	59	64
2023	6.7	71	55	74
2024	6.8	55	48	69

Poultry Litter and Soil Micronutrient Trial



PLPC



PLC

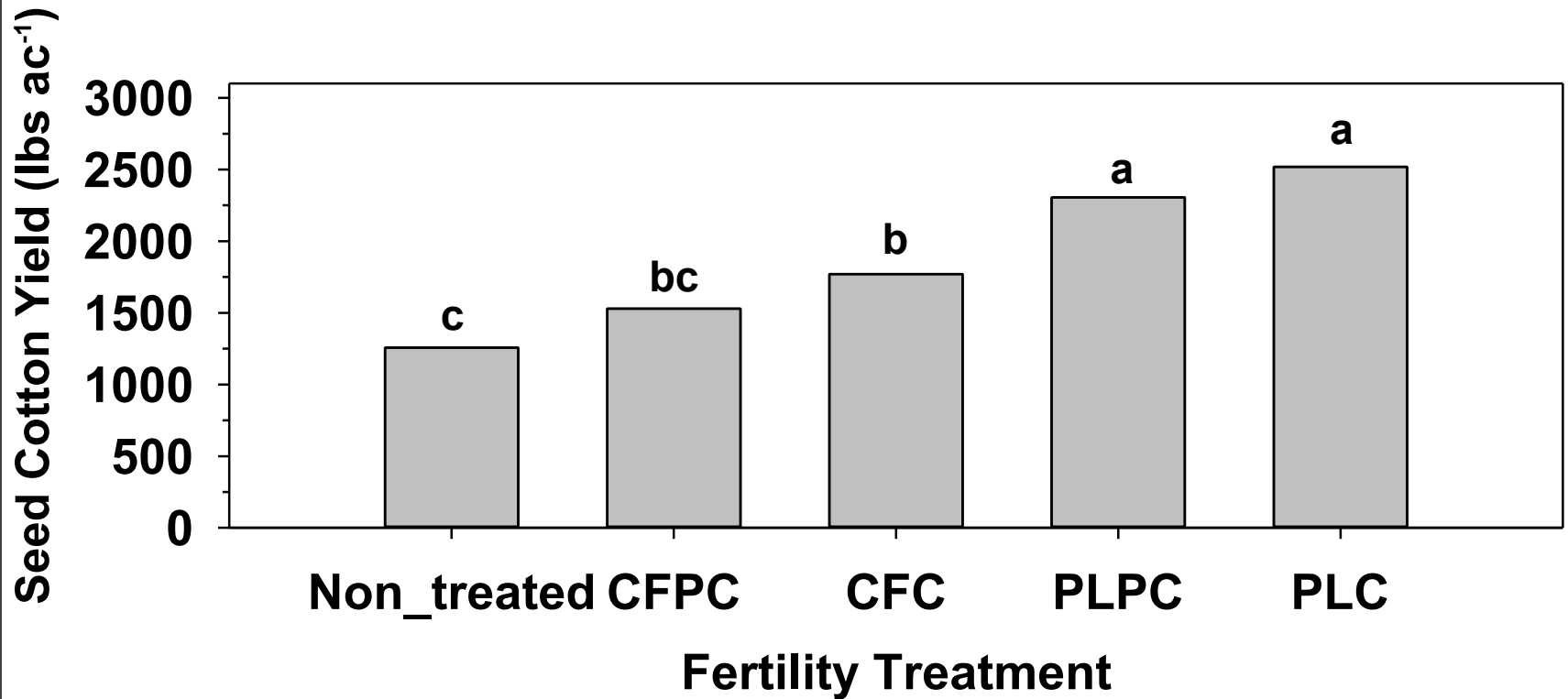


CFPC

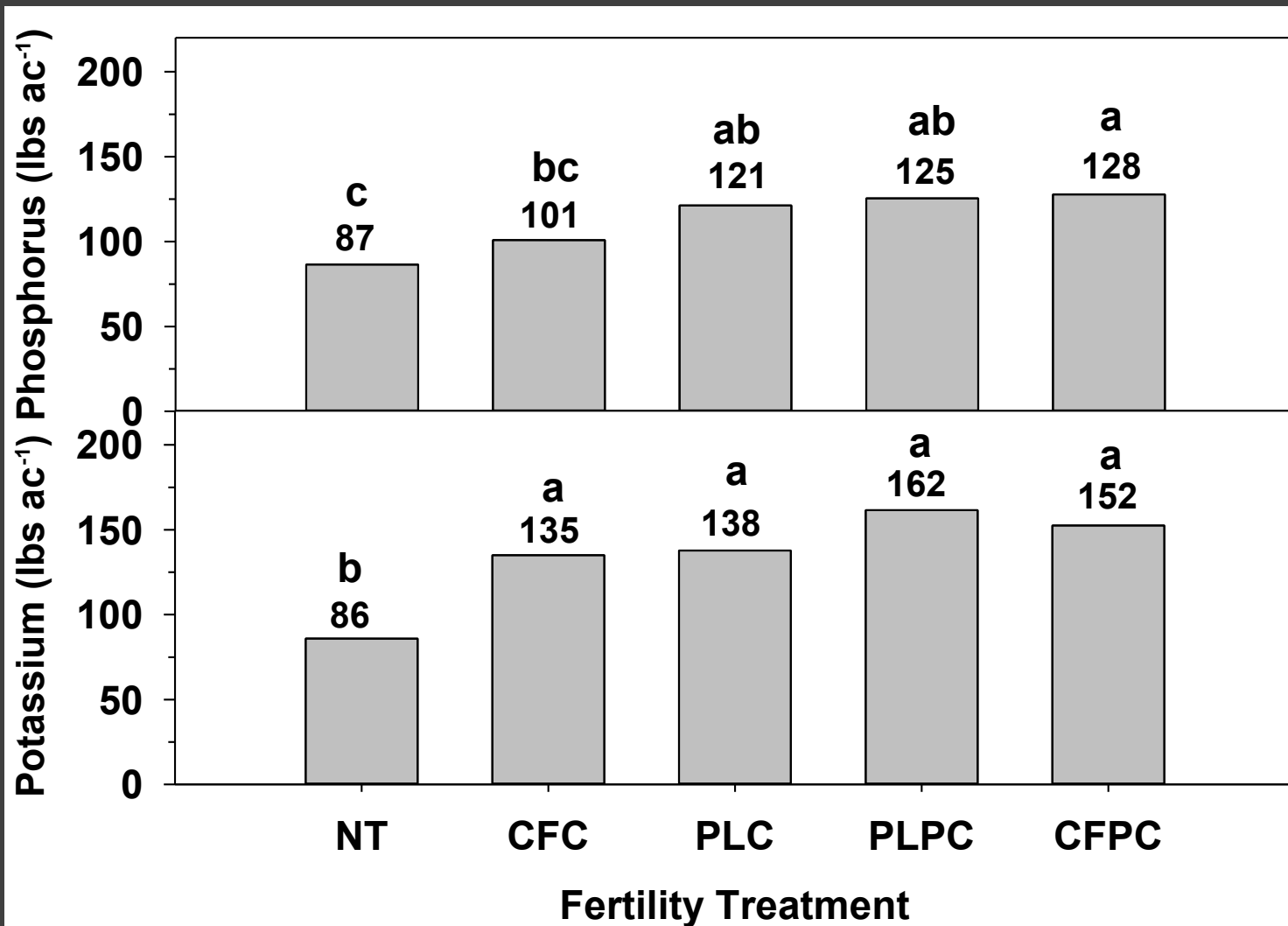


CFC

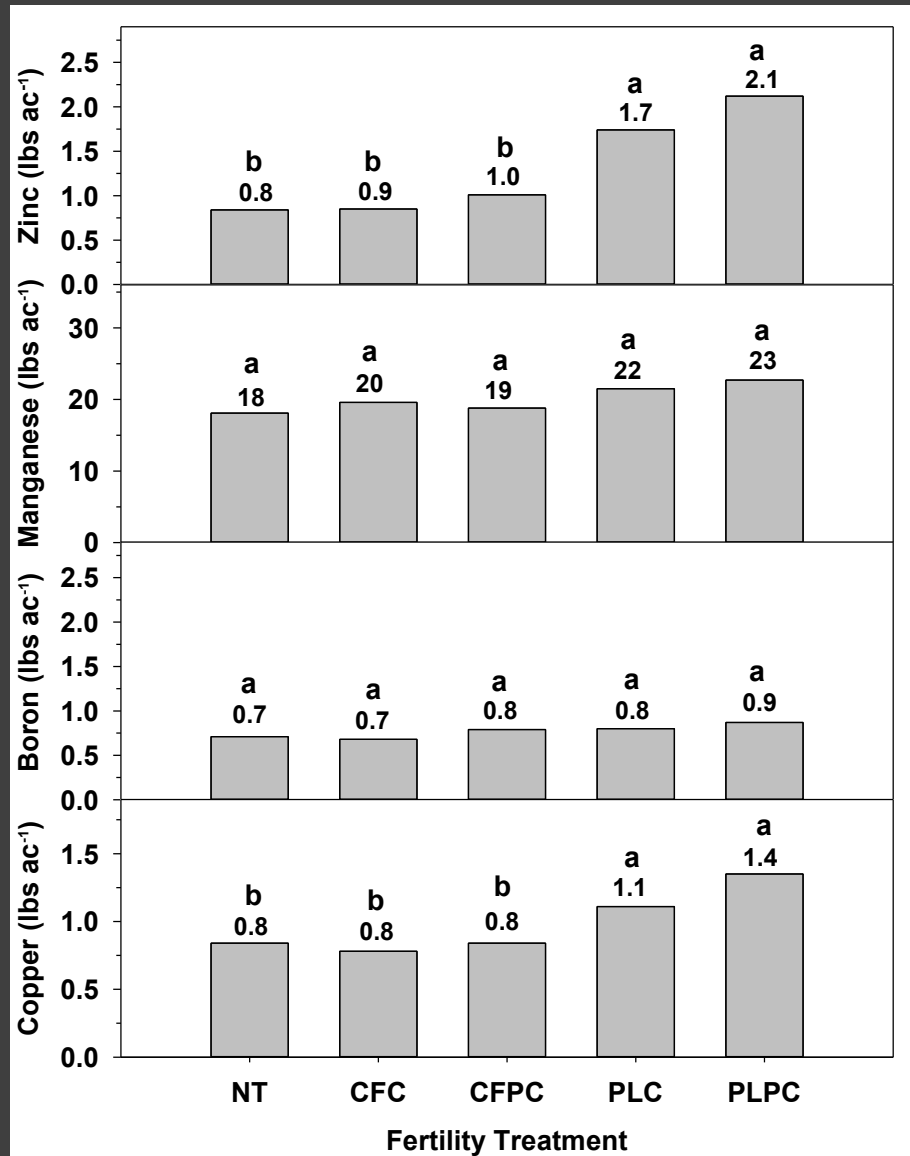
Seed Cotton Yields (two years)



Post Harvest P and K (two years)



Post Harvest Micronutrients



Foliar and Seed Treatment Micro's in Peanut

TRT.	Products	Rate	App. Time. (DAP)
1	Check		
2	Symvado SC	2 fl oz/ac	In-furrow
3	SuperSede Soybean ST	2 fl oz/100 lbs	Seed Treatment
4	Transit Foliar	10fl oz/ac	40, 55 DAP
5	Symvado SC	2 fl oz/ac	In-furrow
5	SuperSede Soybean ST	2 fl oz/100 lbs	Seed Treatment
5	Transit Foliar	10fl oz/ac	40, 55 DAP

- Symvado SC- Mycorrhizal Fungi
- SuperSede Soybean ST- B (0.2%), Co (0.05%), Mo (5.0%), Zn (0.5%)
- Transit Foliar- 0.5% chelated zinc

Preliminary Pod Yield Results (1-year)

