

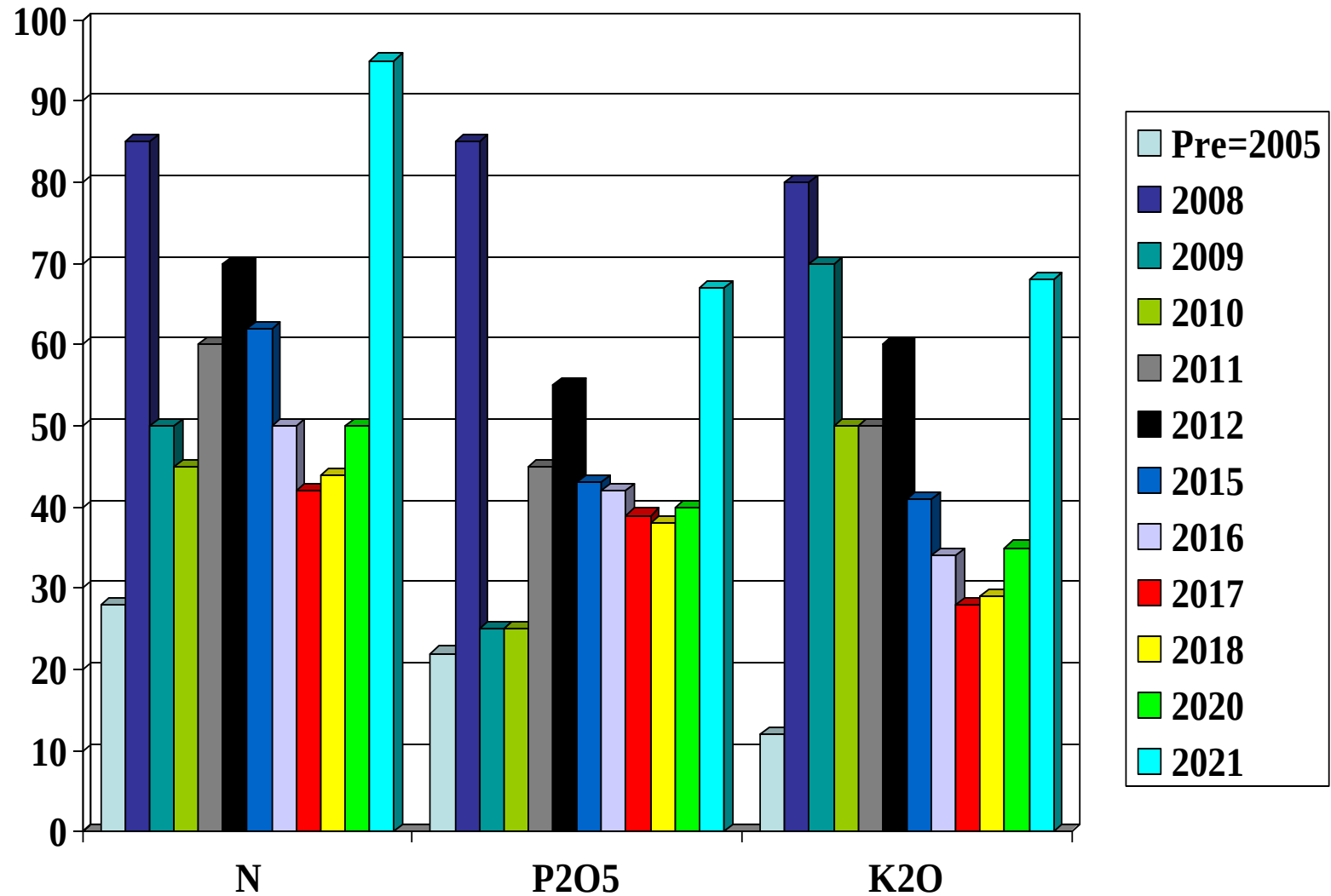
Dealing With High Fertilizer Prices...Again !

Glen Harris

**Extension Agronomist – Soils & Fertilizer
University of Georgia (Tifton)**



Fertilizer Price for N-P-K (cents/pound)



Which Crop Needs the Most Fertilizer ?

(If “Medium” Soil Test P and K)

Corn (300-150-190)

Cotton (90-50-50)

Soybeans (0-40-80)

Peanuts (0-0-0)

Wheat (100-40-40)

Wheat – Soybean (100-80-120)

Banding P&K
Legume Cover Crops for N
Chicken Litter
Other “By-Product” Fertilizers

There are no...



So what Can I “Cut Out” or “Cut Back” On ?

Snake Oils

“Unproven Products” –for example, Biologicals
Chasing the ‘Magnesium Deficiency Ghost on Corn

What Should I focus on ?

Good Soil Sampling and Recommendations

Liming and pH

N-P-K by Yield Goal (Corn and Cotton)

Micronutrients ? – Don’t Cut out Boron

Sulfur on Cotton and Corn

How Much Fertilizer Do I Need for 300 Bushel Corn ?

Soil Test Handbook of Georgia (aesl.ces.uga.edu)

Base (Irrigated) Yield Goal = 150 bu/a

For every 10 bushel increase → add 12-6-10

<u>Soil Test P/K</u>	<u>Yield Goal (bu/a)</u>			
	<u>150</u>	<u>200</u>	<u>250</u>	<u>300</u>
Low/Low	180-110-130	240-140-180	300-170-230	360-200-280
Med/Med	180-90-90	240-120-140	300-150-190	360-180-240
High/High	180-70-70	240-100-120	300-130-170	360-160-220

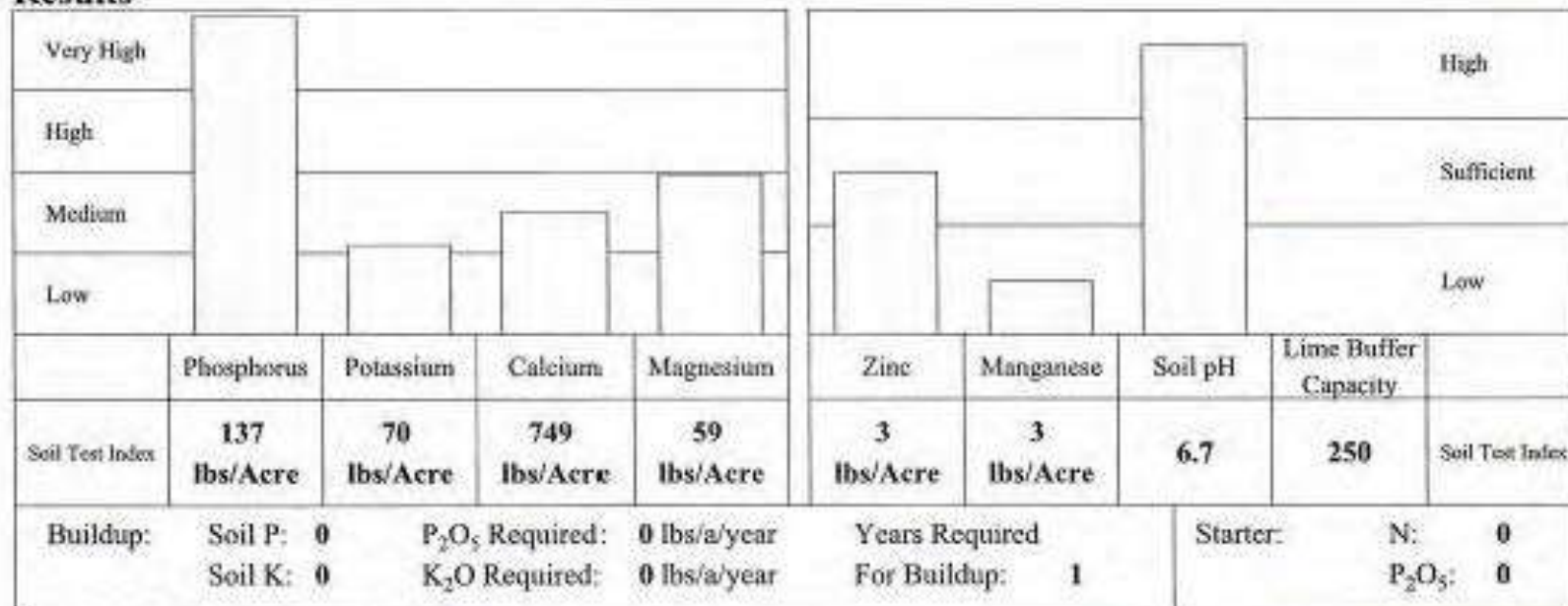
4Rs = Rate, Timing, Source and Placement

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EXTENSION

UGFertex-Based Nutrient Application Guidelines

Client:	GHH	Field ID:	Bowen-15
County:	Tift	Date:	1/2/2019
Soil Group:	Coastal Plain	Plow Depth:	8 inches
Crop:	Corn - Irrigated	Previous Crop:	Peanuts - Spanish & Runner Type
Yield Goal:	150 bushels	Irrigated:	Yes

Results



Lime and Nutrient Guidelines

Limestone	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Calcium (Ca)	Magnesium (Mg)	Sulfur (S)	Boron (B)	Manganese (Mn)	Zinc (Zn)
0 tons/Acre	150 lbs/Acre	0 lbs/Acre	110 lbs/Acre	0 lbs/Acre	0 lbs/Acre	10 lbs/Acre	0 lbs/Acre	0 lbs/Acre	0 lbs/Acre



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UGFertex-Based Nutrient Application Guidelines

Client:	GHH	Field ID:	Bowen-15
County:	Tift	Date:	1/2/2019
Soil Group:	Coastal Plain	Plow Depth:	8 inches
Crop:	Corn - Irrigated	Previous Crop:	Peanuts - Spanish & Runner Type
Yield Goal:	300 bushels	Irrigated:	Yes

Results

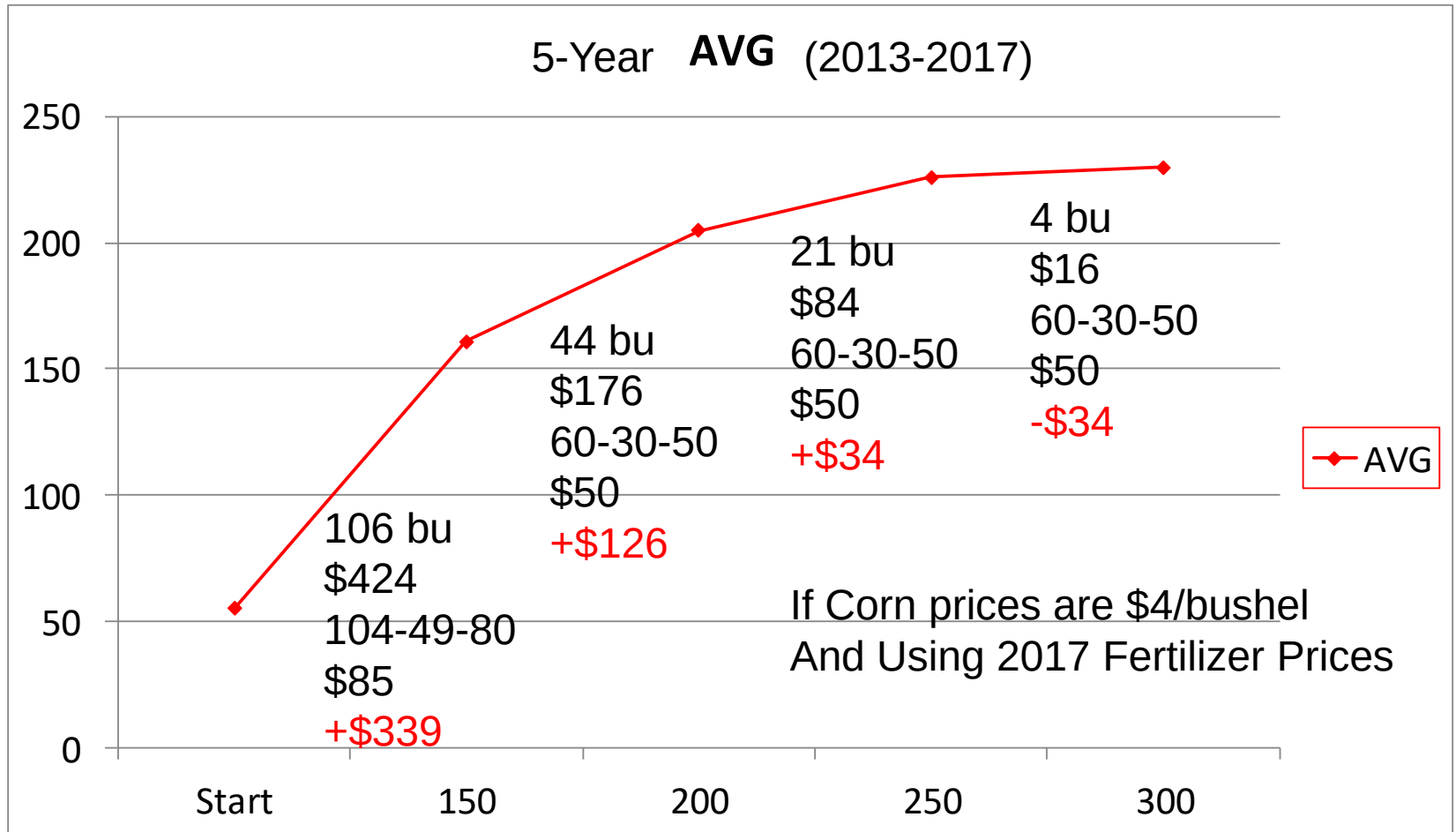
Very High High Medium Low					High Sufficient Low				
	Phosphorus	Potassium	Calcium	Magnesium	Zinc	Manganese	Soil pH	Lime Buffer Capacity	
Soil Test Index	137 lbs/Acre	70 lbs/Acre	749 lbs/Acre	59 lbs/Acre	3 lbs/Acre	3 lbs/Acre	6.7	250	Soil Test Index
Buildup:	Soil P: 0	P ₂ O ₅ Required: 0 lbs/a/year	Years Required		Starter:		N: 0		
	Soil K: 0	K ₂ O Required: 0 lbs/a/year	For Buildup: 1				P ₂ O ₅ : 0		

Lime and Nutrient Guidelines

Limestone	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Calcium (Ca)	Magnesium (Mg)	Sulfur (S)	Boron (B)	Manganese (Mn)	Zinc (Zn)
0 tons/Acre	330 lbs/Acre	0 lbs/Acre	260 lbs/Acre	0 lbs/Acre	0 lbs/Acre	10 lbs/Acre	0 lbs/Acre	0 lbs/Acre	0 lbs/Acre

Fertilizing Corn (N-P-K) By Yield Goal

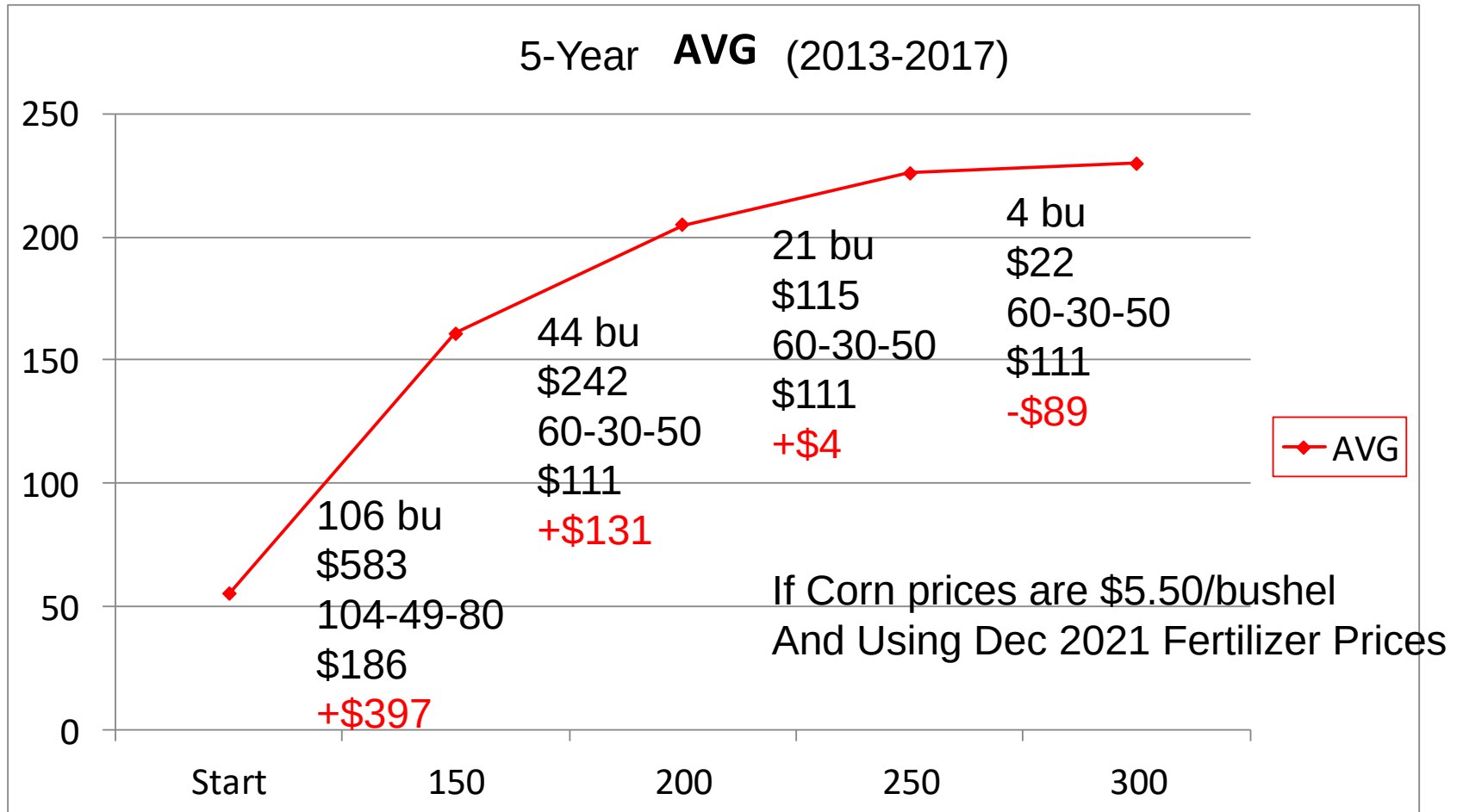
Actual Yield (bu/a)



Yield Goal (bu/a)

Fertilizing Corn (N-P-K) By Yield Goal

Actual Yield (bu/a)

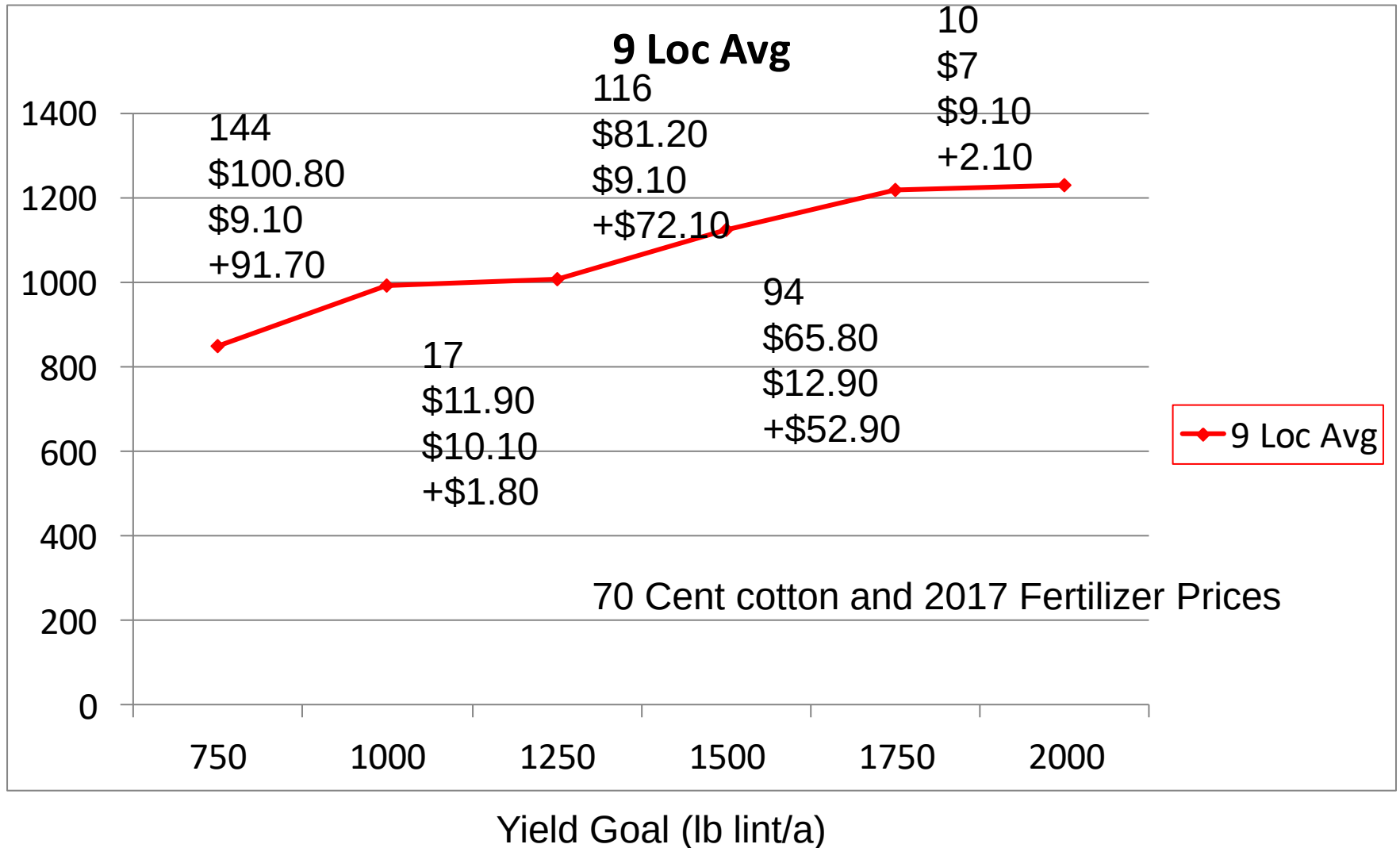


Yield Goal (bu/a)

Fertilizing Cotton (N-P-K) By Yield Goal – 2017+2018

Actual Yield (lb lint/a)

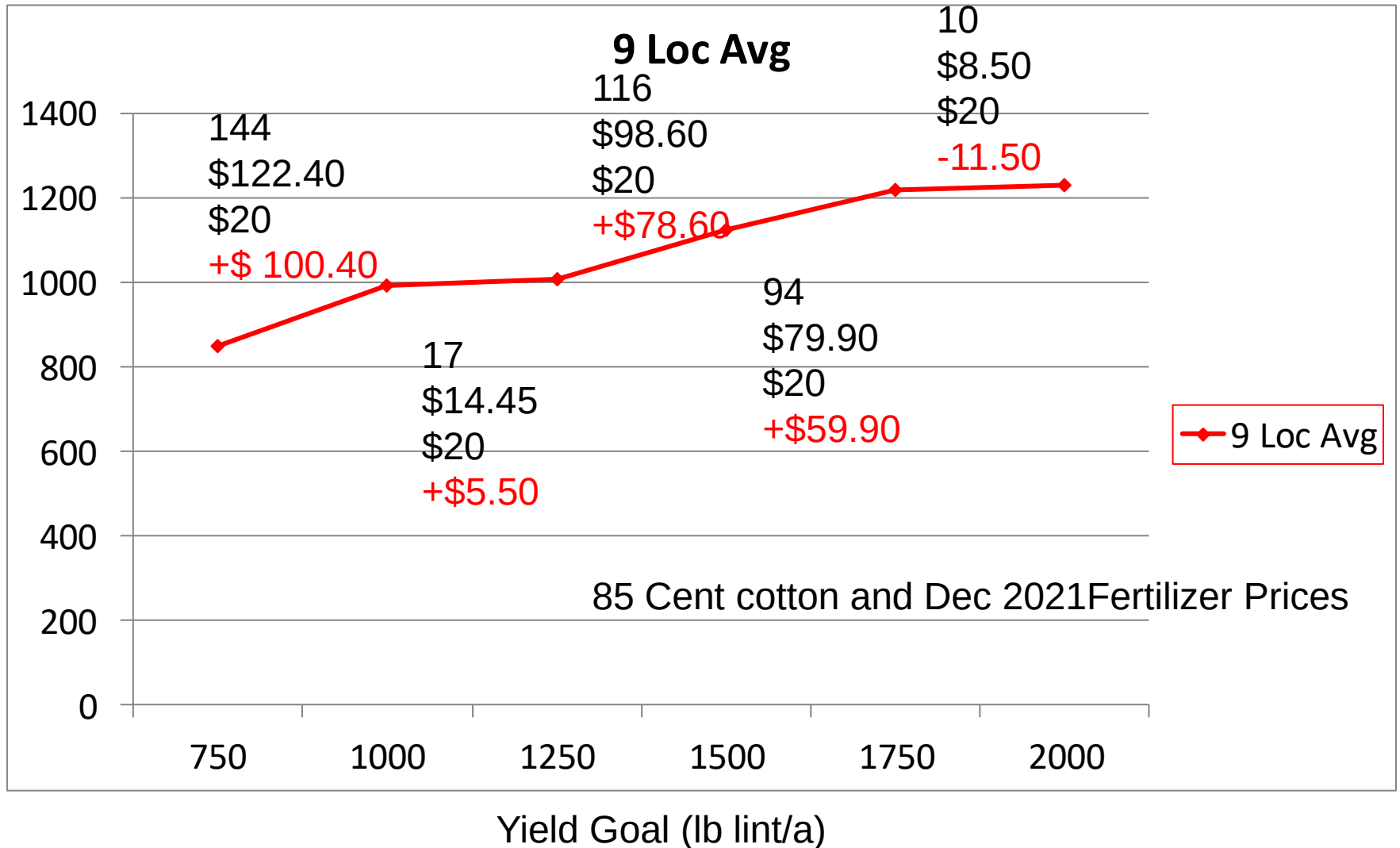
Variety = DP 1646



Fertilizing Cotton (N-P-K) By Yield Goal – 2017+2018

Actual Yield (lb lint/a)

Variety = DP 1646



You've probably **heard...**

“If you band apply your P & K fertilizer at planting you can reduce the rate (by $\frac{1}{4}$ to $\frac{1}{3}$)”

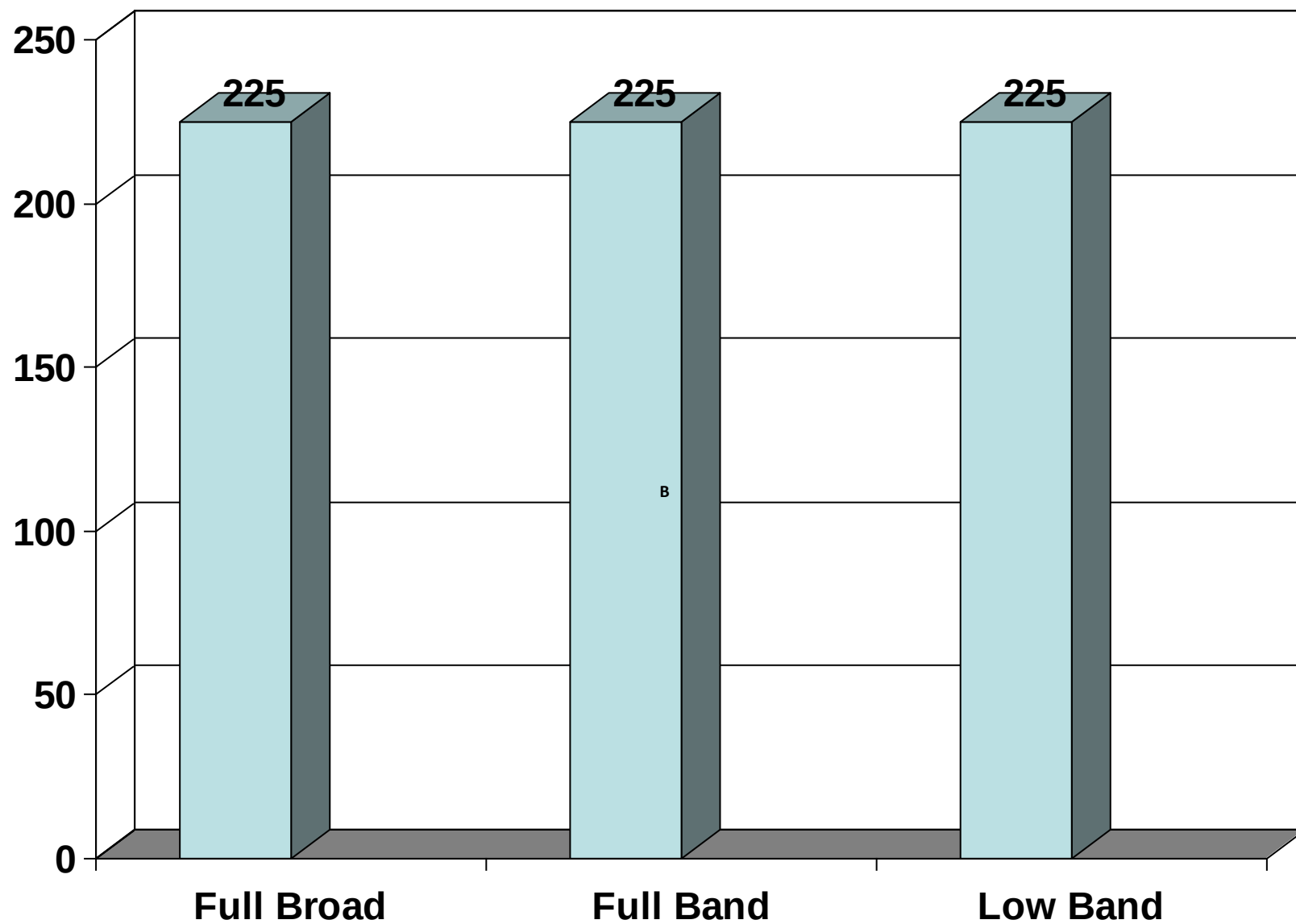
But the ...

Official UGA Stance =

If your soil test P and K levels are medium or higher,
There is no advantage to band applications

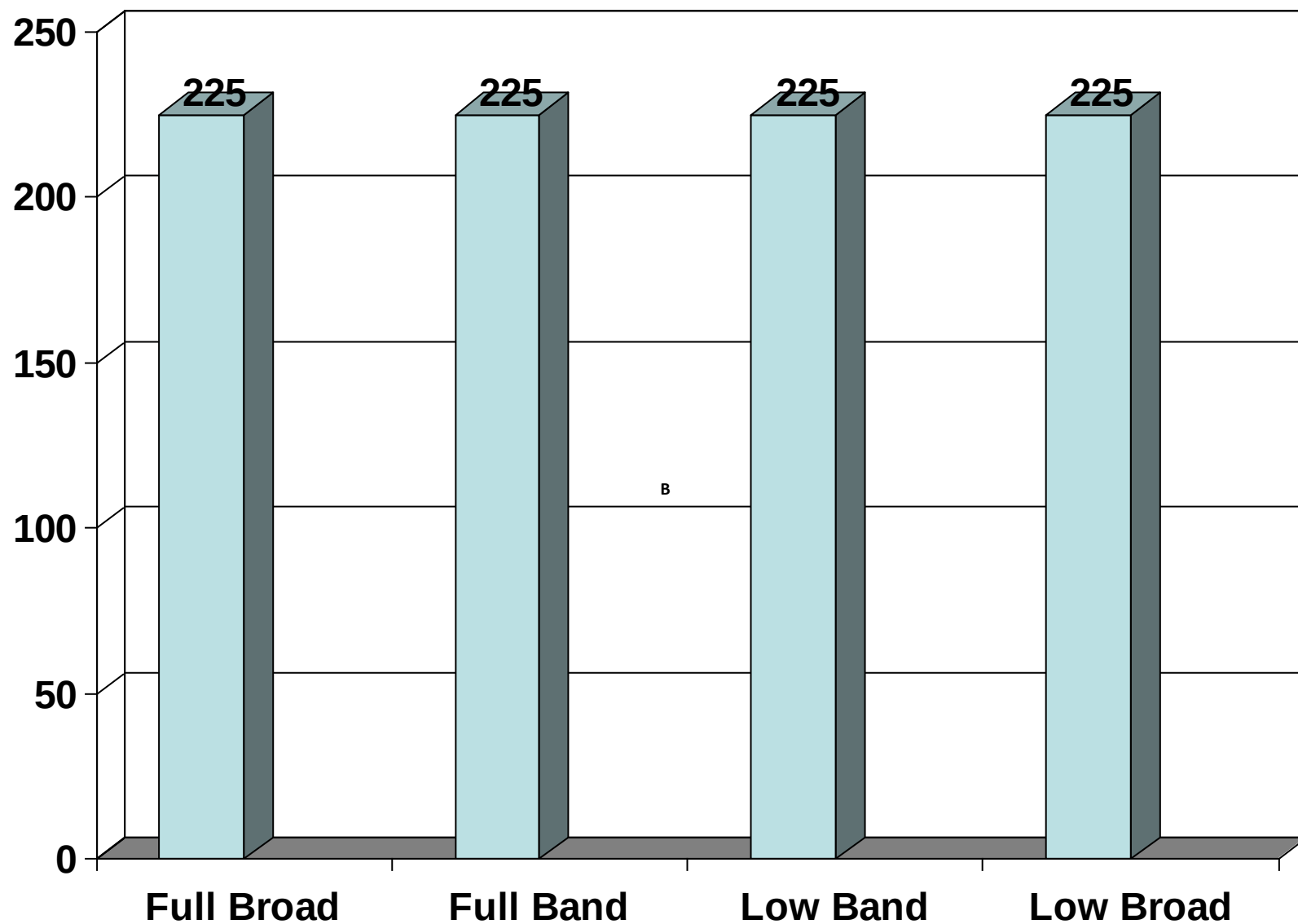
Corn Yield (bu/a)

Hypothetical P&K Banding Trial



Corn Yield (bu/a)

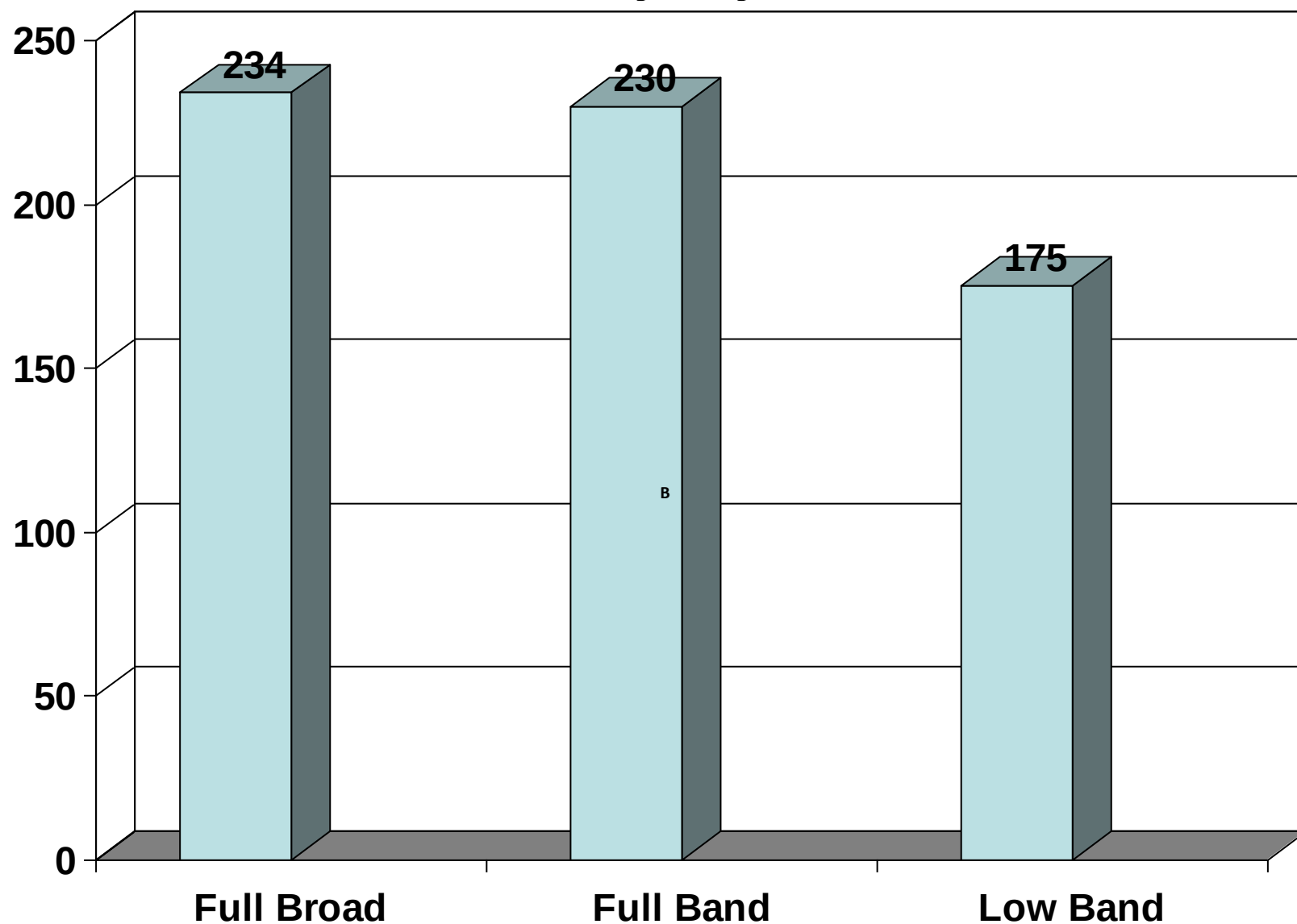
Hypothetical P&K Banding Trial



Corn Yield (bu/a)

P & K Placement Trial – 2021

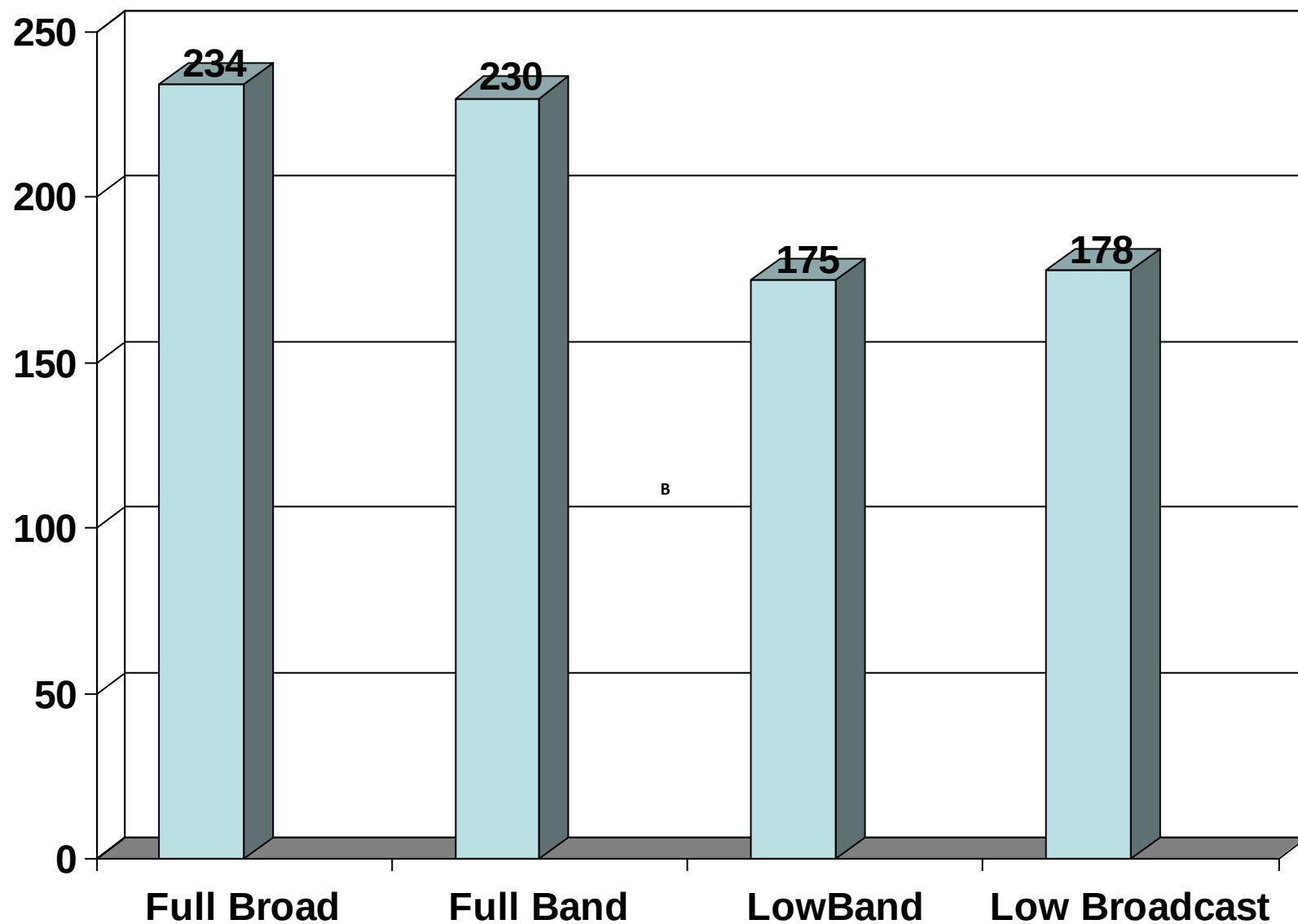
Corey Bryant and Simer Virk



Corn Yield (bu/a)

P & K Placement Trial – 2021

Corey Bryant and Simer Virk



Legume Cover Crops for Nitrogen



Cover Crops

From “Managing Cover Crops Profitably”:

**Crimson Clover – “Nitrogen Contribution
of 70-150 lb N/a**

**Hairy Vetch – “Partially Replace Nitrogen Fertilizer
on corn...hairy vetch with no fertilizer was
the preferred option for “risk-averse” no-till
farmers in Georgia”**

Realistically....50 lb N/a “N Credit” ???

The Value of Litter

- Pre 2005 Prices

- 60# N x .28 x .6 = 10.08
- 60 # P₂O₅ x .22 x .8 = 10.56
- 40 # K₂O x .12 x .8 = 3.84
- » Total = **\$24.48**

- 2008 Prices

- 60#N x .85 x .6 = 30.60
- 60#P₂O₅ x .85 x .8 = 40.80
- 40#K₂O x .80 x .8 = 25.60
- » Total = **\$97.00**

- » 2020 Prices

- 60#N x .50 x .6 = 18.00
- 60#P₂O₅ x .40 x .8 = 19.20
- 60#K₂O x .35 x .8 = 16.80
- » Total = **\$54.00**



Other Nutrients ?
Organic Matter ?
Liming ?
Nematode Suppression ?

The Value of Litter

- Pre 2005 Prices

- 60# N x .28 x .6 = 10.08
- 60 # P2O5 x .22 x .8 = 10.56
- 40 # K2O x .12 x .8 = 3.84
- » Total = **\$24.48**

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- 60#K2O x .35 x .8 = 16.80
- » Total = **\$54.00**



Current (Nov 2021)

- 60#N x .95 x .6 = 34.20
- 60#P2O5 x .67 x .8 = 32.16
- 60#K2O x .68 x .8 = 32.64
- » Total = **\$99.00**

How Much Fertilizer Value is Removed in Vines? (Based on 2020 Fertilizer Prices)

50-10-60 (lbs N-P₂O₅-K₂O/a)

50-40-35 (cents N-P₂O₅-K₂O/a)

25.00-4.00-21.00 = \$50/a

Nov 2021 = \$95



Gin Trash

2 - 1 - 1

Good Soil Amendment



Biosolids



Wood Ash



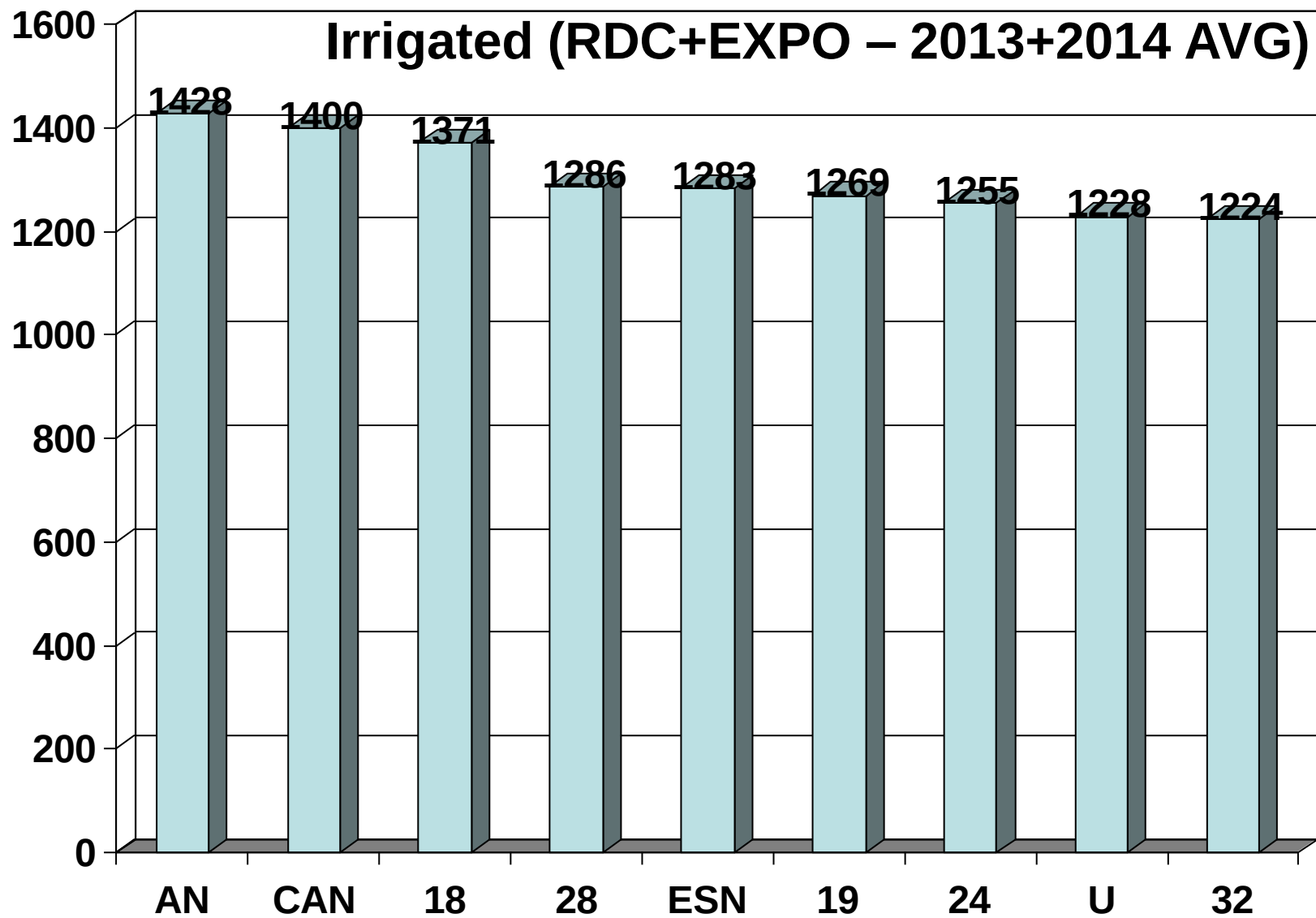
Good for Raising pH and Providing Potassium



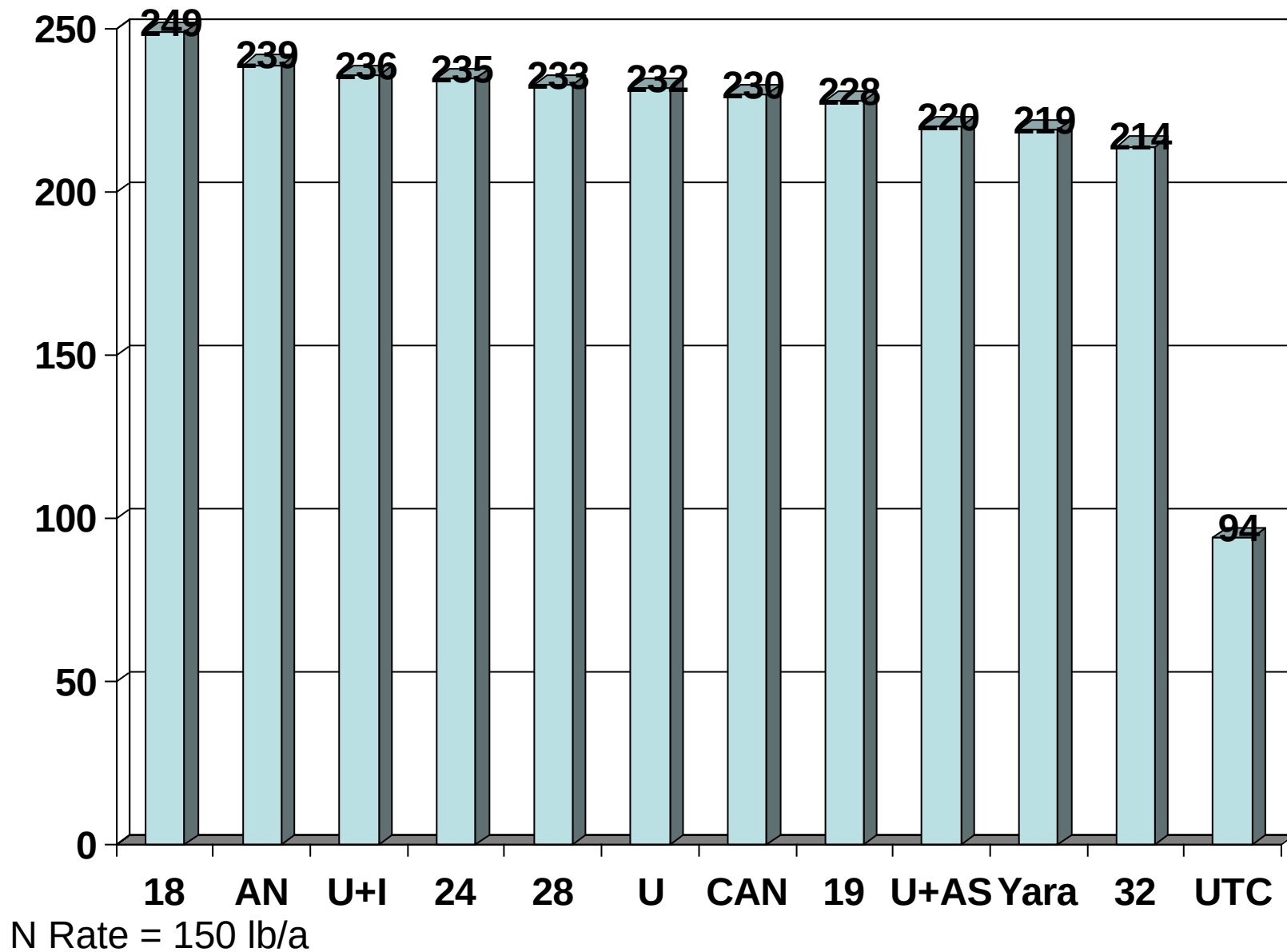
BIGN

ANHYDROUS AMMONIA

Cotton Yield (lbs lint/a)



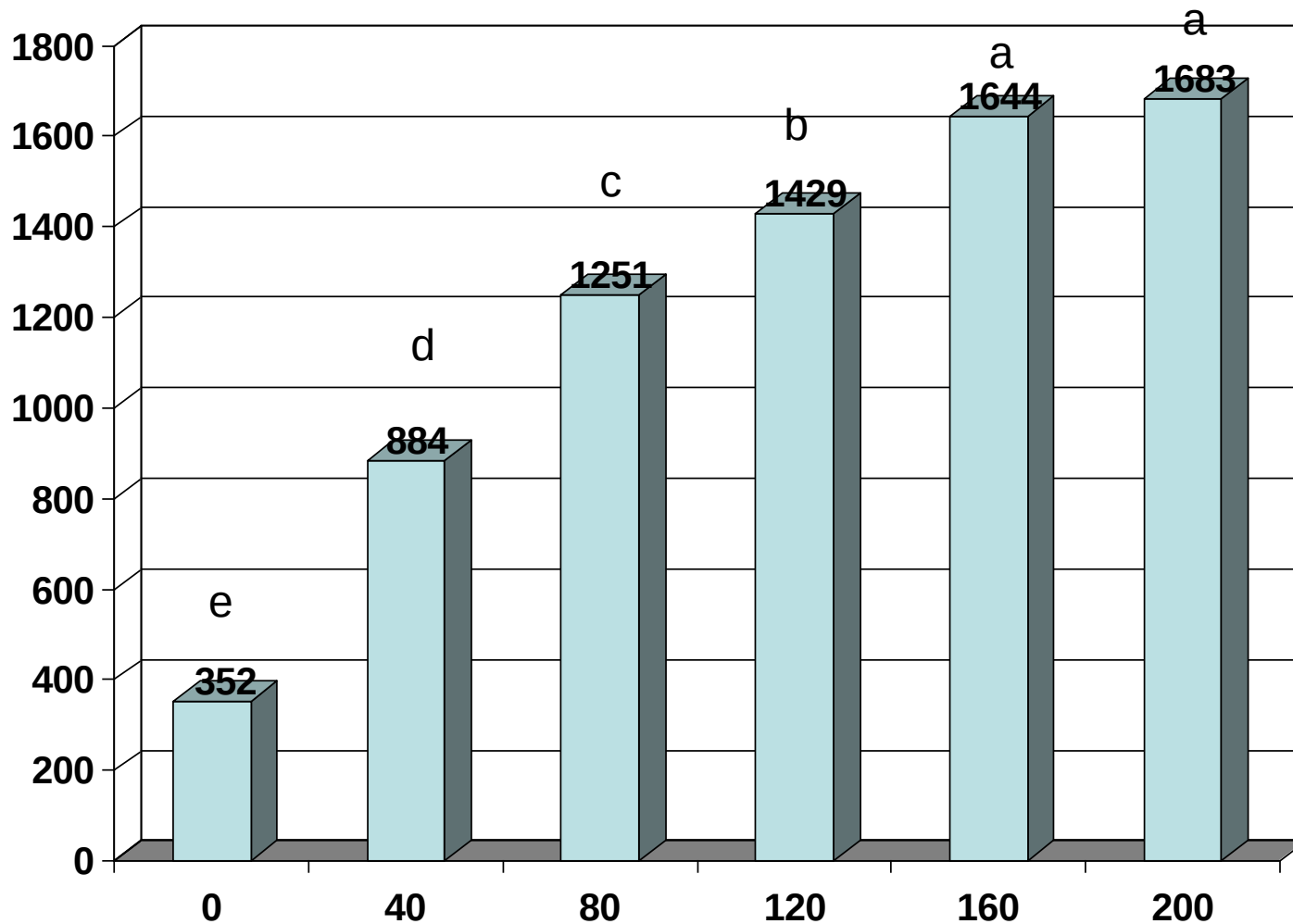
Corn Yield (bu/a) **Bowen N Source Study - 2015**



N Rate on Cotton

Bowen Farm 2021 DPL 1646

Lb lint/a

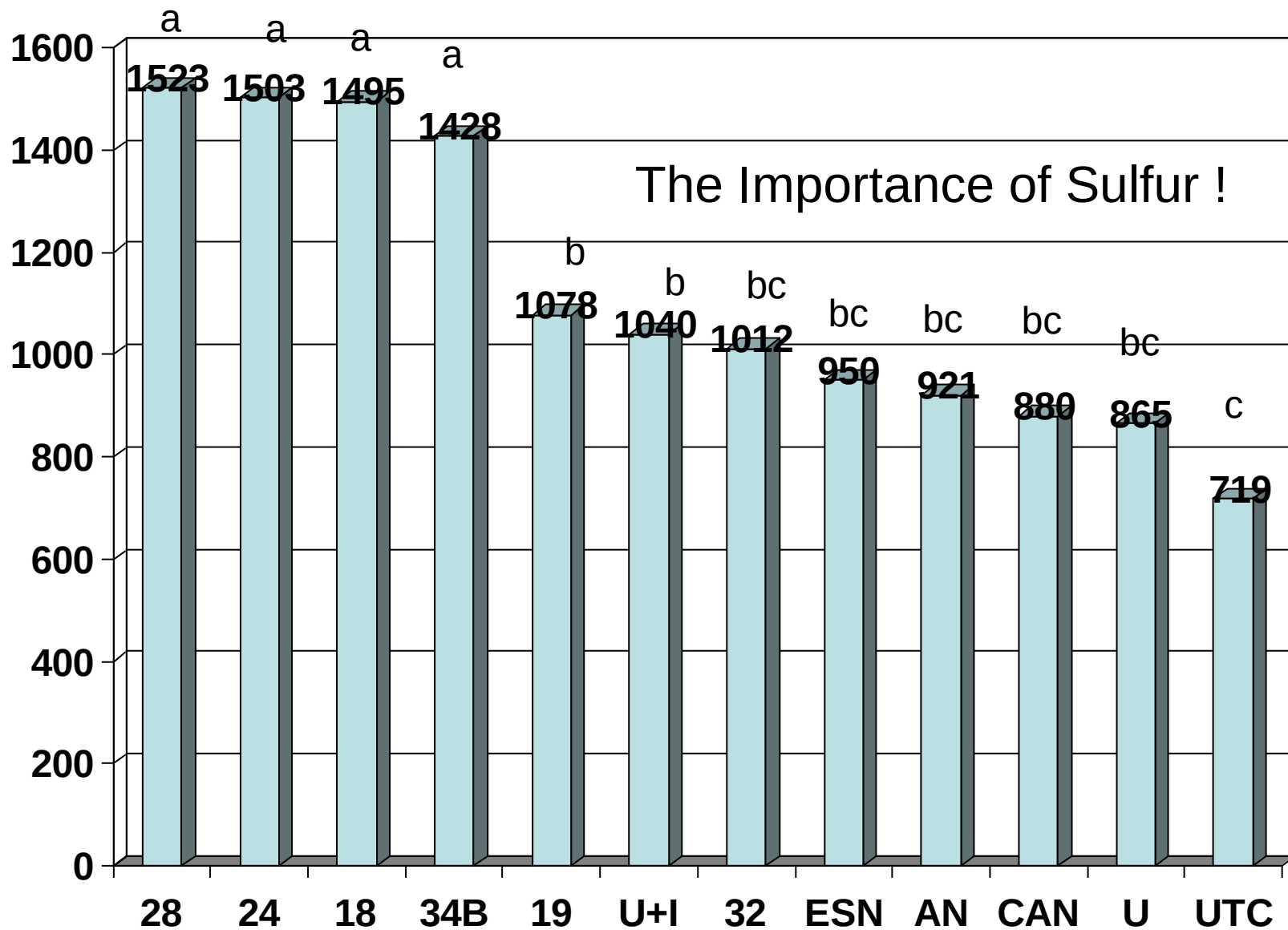


CV=10 P=.0001)



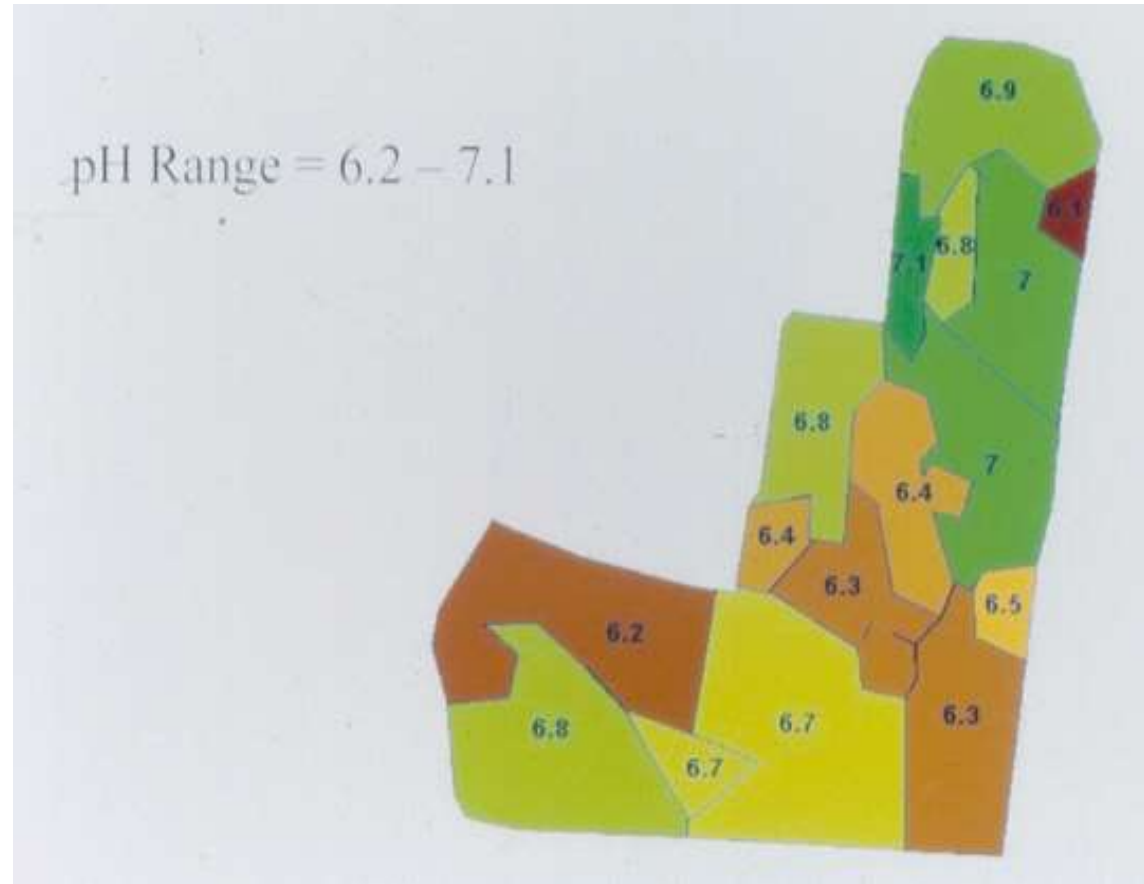


Cotton Yield (lbs lint/a) Stripling N Source Study - 2014



Soil Sampling

- Precision Ag:
Grid vs. Zone?
- Size of Grids?
- Grid Every Year?



Putting Fertilizer in The Furrow...

Yes, you can lower the rate to be safe...or use a safer (but usually more expensive product)...

But.... All inorganic fertilizers are basically salts that can burn...

So...compared to giving yourself a good shot of starter in a “2x2” (or “2 x 0”....

The Risk Outweigh the Benefits !!!!!

My official recommendation =

No starter fertilizer in furrow on any crop (especially on peanut !!)

Stick to the “2 x 2” or “2 x 0” placement !

e.g. Cotton - 10 gal/a 10-34-0

Cotton - #1 Nutrient Problem = Potassium Deficiency



Severe Potassium Deficiency

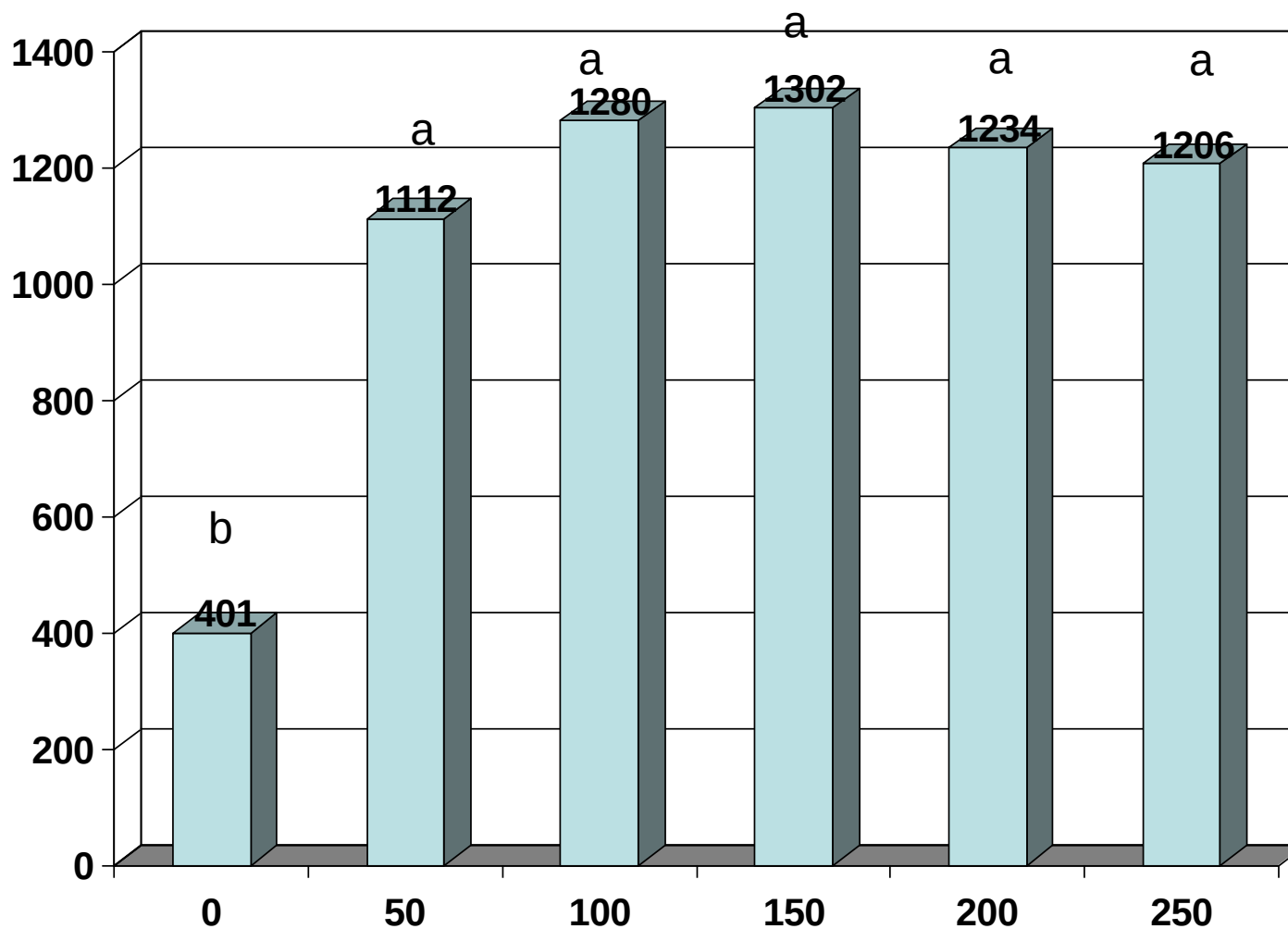




K Rate on Cotton

Bowen Farm 2021 DPL 1646

Lb lint/a



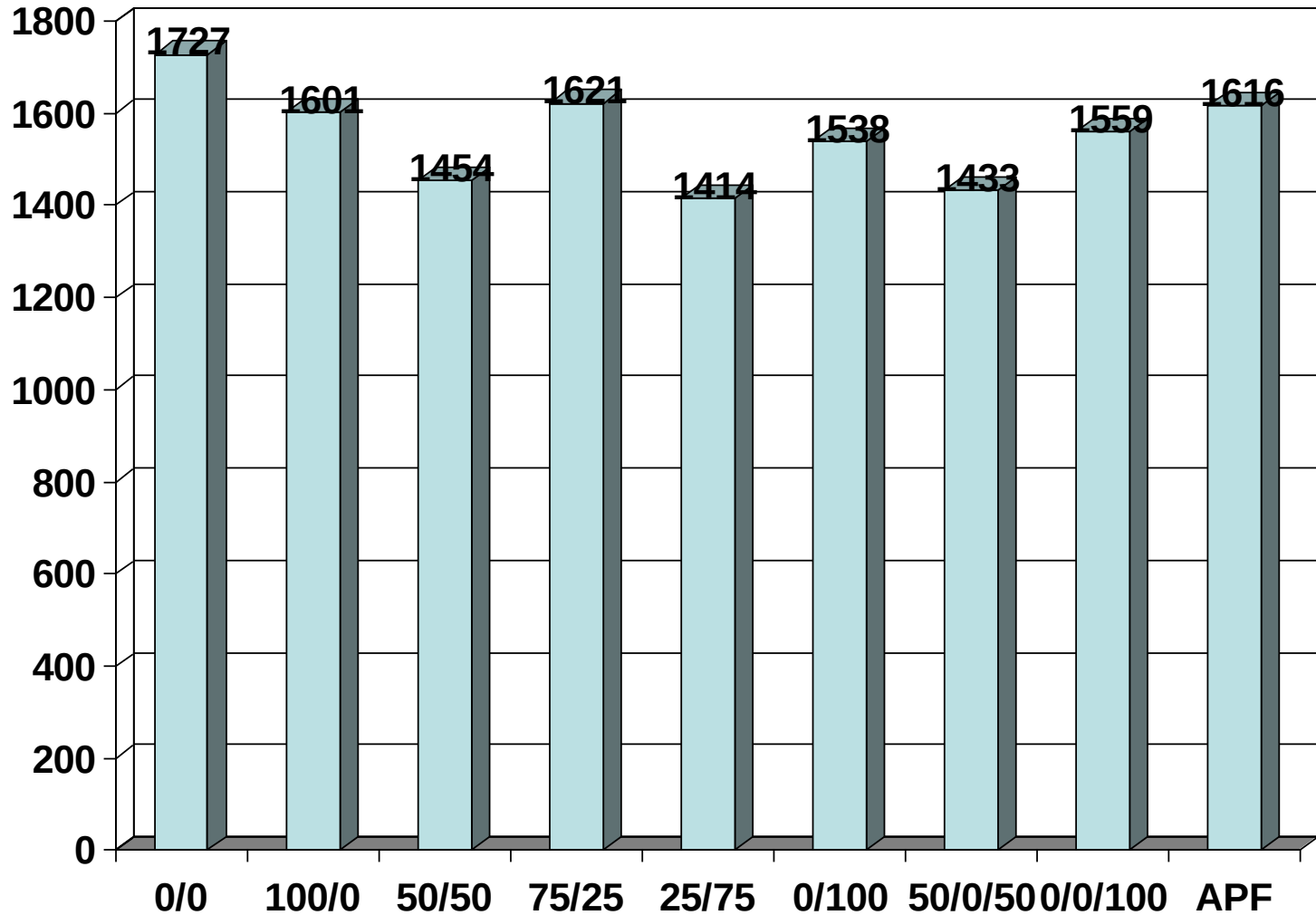
AP/SD

(CV=10 P=.0001)

Preliminary K Timing on Cotton

RDC Pivot 2021 DPL 1646

Lb lint/a



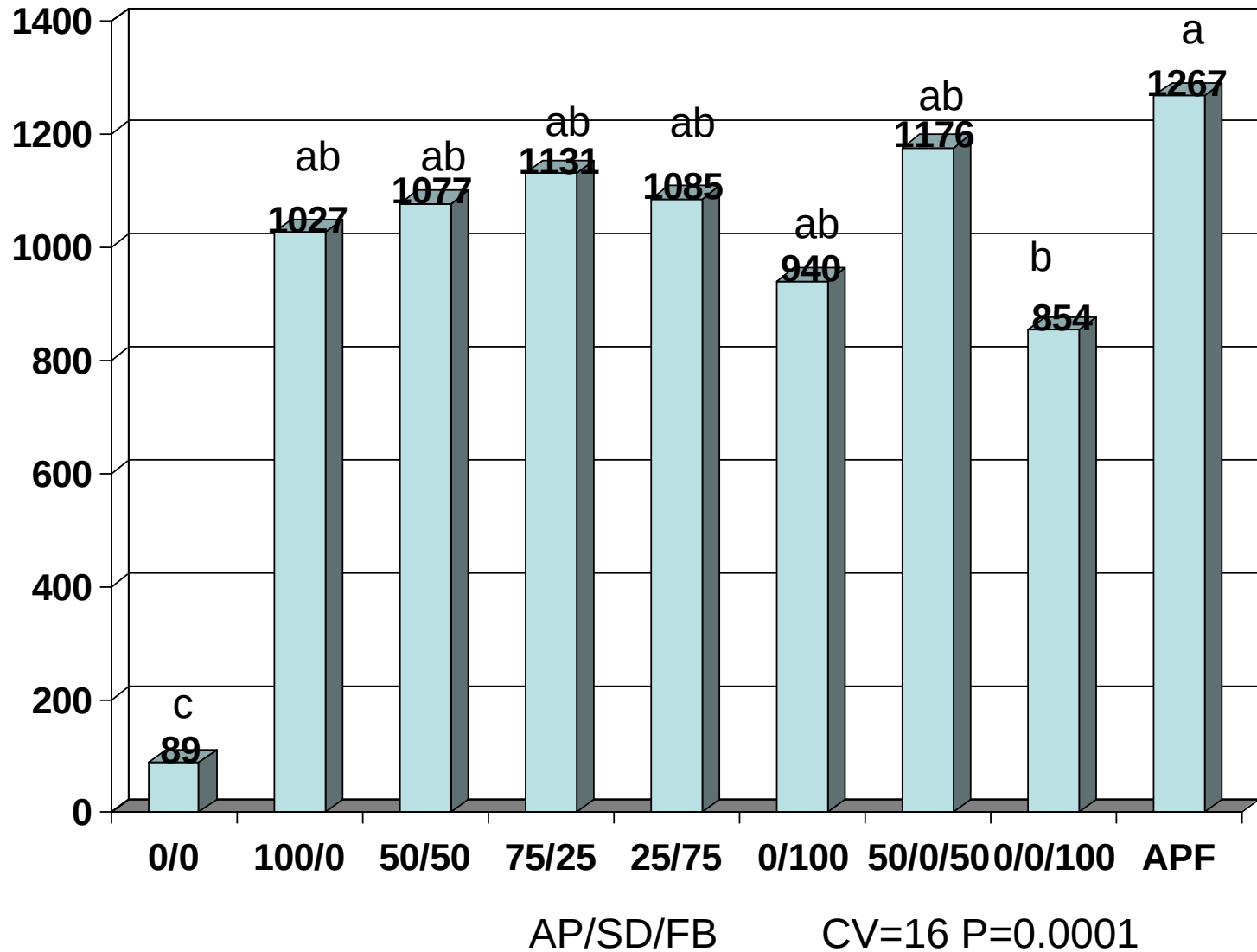
AP/SD/FB

Assume 40 % TO for all plots

Preliminary K Timing on Cotton

Bowen 2021 DPL 1646

Lb lint/a







High yields with less fertilizer?

**Don't hold
your breath.**

P & K

Peanuts

	<u>Low</u>	<u>Med</u>	<u>High</u>	<u>Very High</u>
P	0-15	16-30	31-60	61+
K	0-30	31-60	61-150	151+

All Agronomic Crops (Except Peanuts)

	<u>Low</u>	<u>Med</u>	<u>High</u>	<u>Very High</u>
P	0-30	31-60	61-100	101+
K	0-60	61-150	151-250	251+

P – Under – Never seen in 24 years

Over – Wont hurt the crop – just hurts your wallet

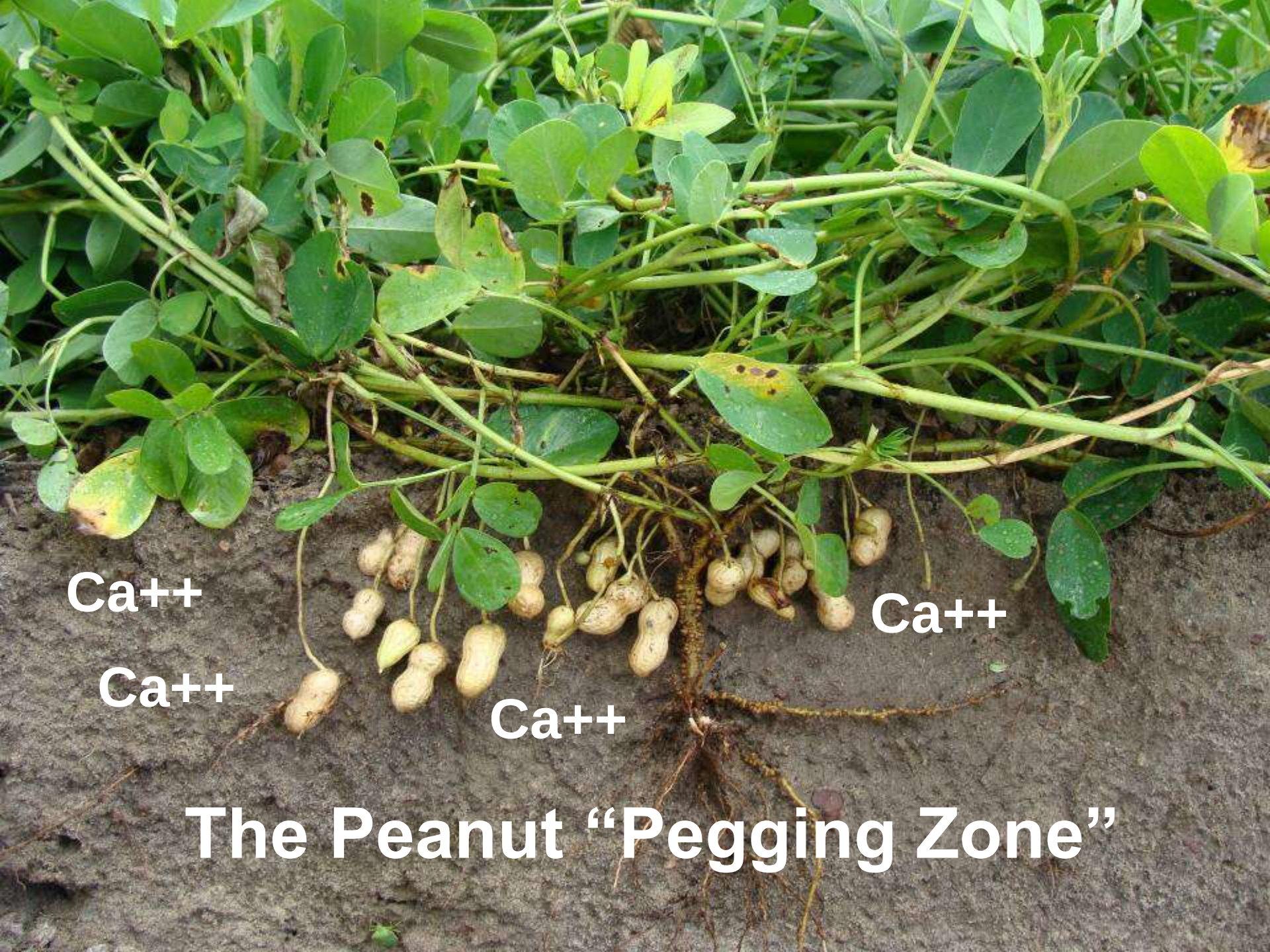
K – Under – Started seeing just a few years ago...short rotations?

Over – In theory can interfere with Calcium in the pegging zone

Soil Test Interpretation For P and K*

All Agronomic Crops – Including Peanuts !

Soil Test Rating	Chance of Yield Response to Applied Fertilizer (%)
Low	80
Medium	50
High	10
Very High	Near Zero



Ca++

Ca++

Ca++

Ca++

The Peanut "Pegging Zone"

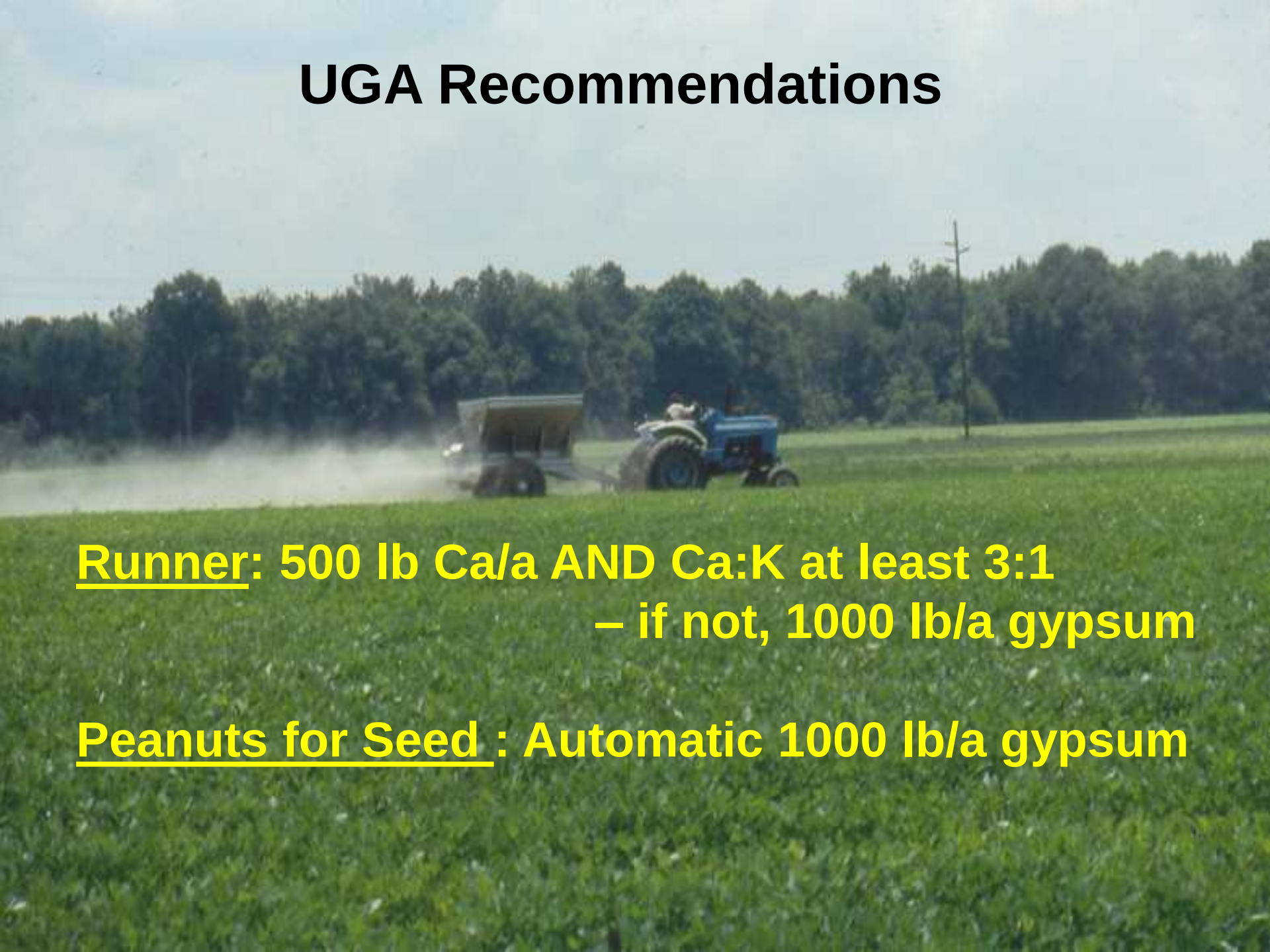
Calcium Deficiency

Symptoms

- ✓ “Pops”
- ✓ Pod Rot
- ✓ Black Heart
- ✓ Poor Germination



UGA Recommendations

A blue tractor is pulling a spreader through a lush green field. The spreader is releasing a cloud of white dust or fertilizer behind it. In the background, there is a dense line of trees and a utility pole under a clear sky.

Runner: 500 lb Ca/a AND Ca:K at least 3:1
– if not, 1000 lb/a gypsum

Peanuts for Seed : Automatic 1000 lb/a gypsum

Calcium Sources

Gypsum/Landplaster/CaSO₄

Granular (mined) - Ex. USG 500

Wet Bulk - Exs. PCS Phosphogypsum

AgriCal (FGD/Smokestack/Synthetic)

Gypsoil (Citric Acid)

Wallboard

Lime (Ca/MgCO₃)

Dolomitic and Calcitic (“Hi-Cal” ?)

Regular Ground and Fine (Ex. “LimePlaster”)

Aragonite

By-Product Lime eg “RecycLime”

“Liquid Calcium”

CaCl and CaTS – Through Pivot

Liquid Lime and Liquid Gypsum

“TigerCal 30” – “Chelated Calcium Carbonate”

Foliar (“1 qt/a”) – Not Effective !

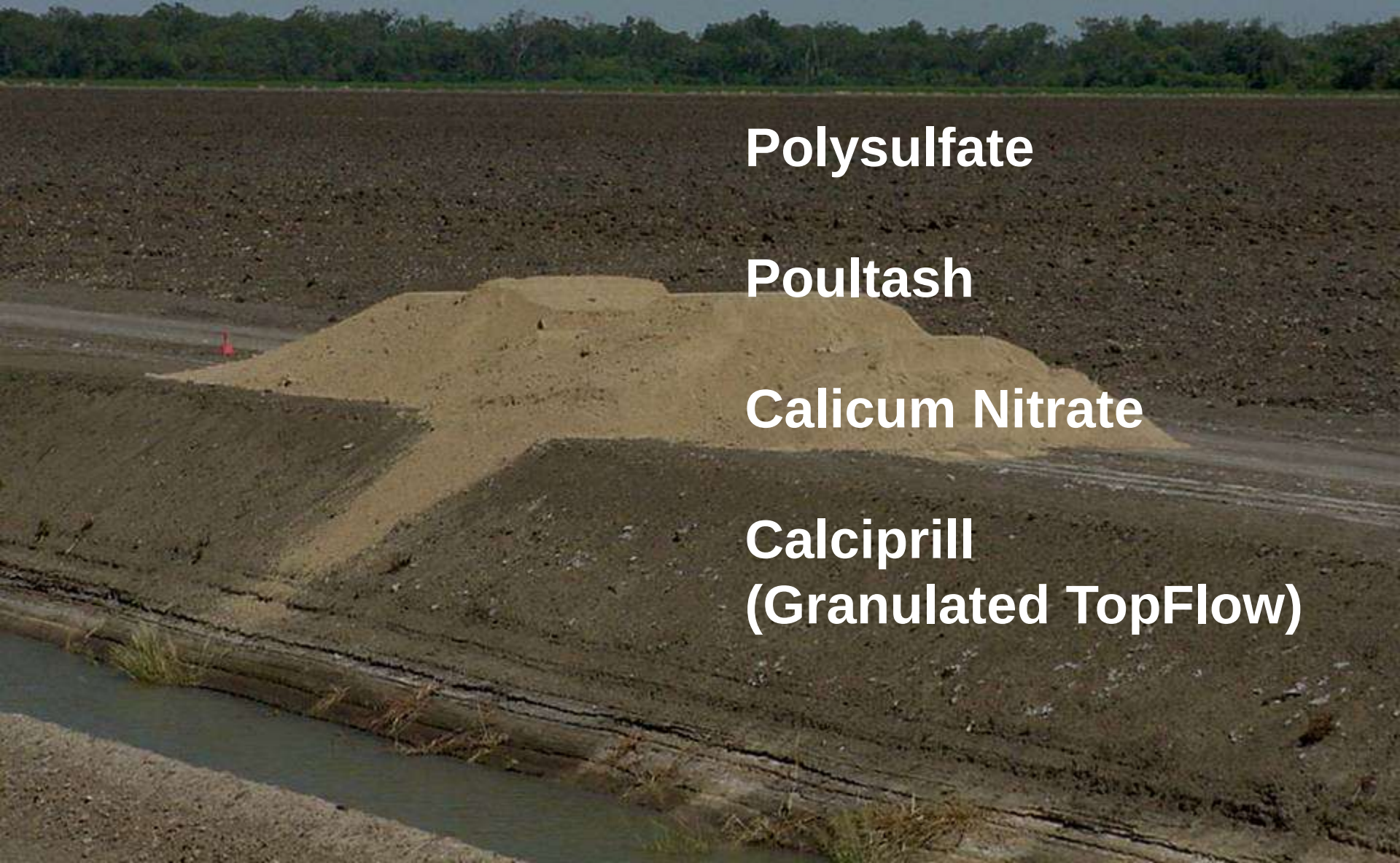
“New “ Calcium Sources (for Peanut)

Polysulfate

Poultash

Calicum Nitrate

**Calciprill
(Granulated TopFlow)**



What About Grid Sampling And Variable Rate Gypsum ?

Great idea.....

But does it pay ?

Use UGA “all or nothing” ?

Or private lab rate scheme ?

Can spreader trucks variable rate gypsum accurately ?

And again...does it pay ?

“New” Way to Recommend Gypsum on Peanut ??

Pegging Zone Samples

Soil Level	Ca:K	Ratios	Ca:Mg		Rec
ABOVE 800	6:1	both above	4:1		0
800-	3:1	either or both below	2:1		60
600-800	6:1	both above	4:1		100
600-800	6:1	either below	4:1		120
600-800	6:1	both below	4:1		140
500-600	6:1	both above	4:1		160
500-600	6:1	either or both below	4:1		180
500-600	6:1	both below	4:1		200
BELOW 500		regardless of ratio			250