Dealing With High Fertilizer Prices – 2 Years in a Row

Glen Harris – University of Georgia (Tifton)

Corn/Soybean Production Meetings – Winter 2023

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How Rough Are Fertilizer Prices ?

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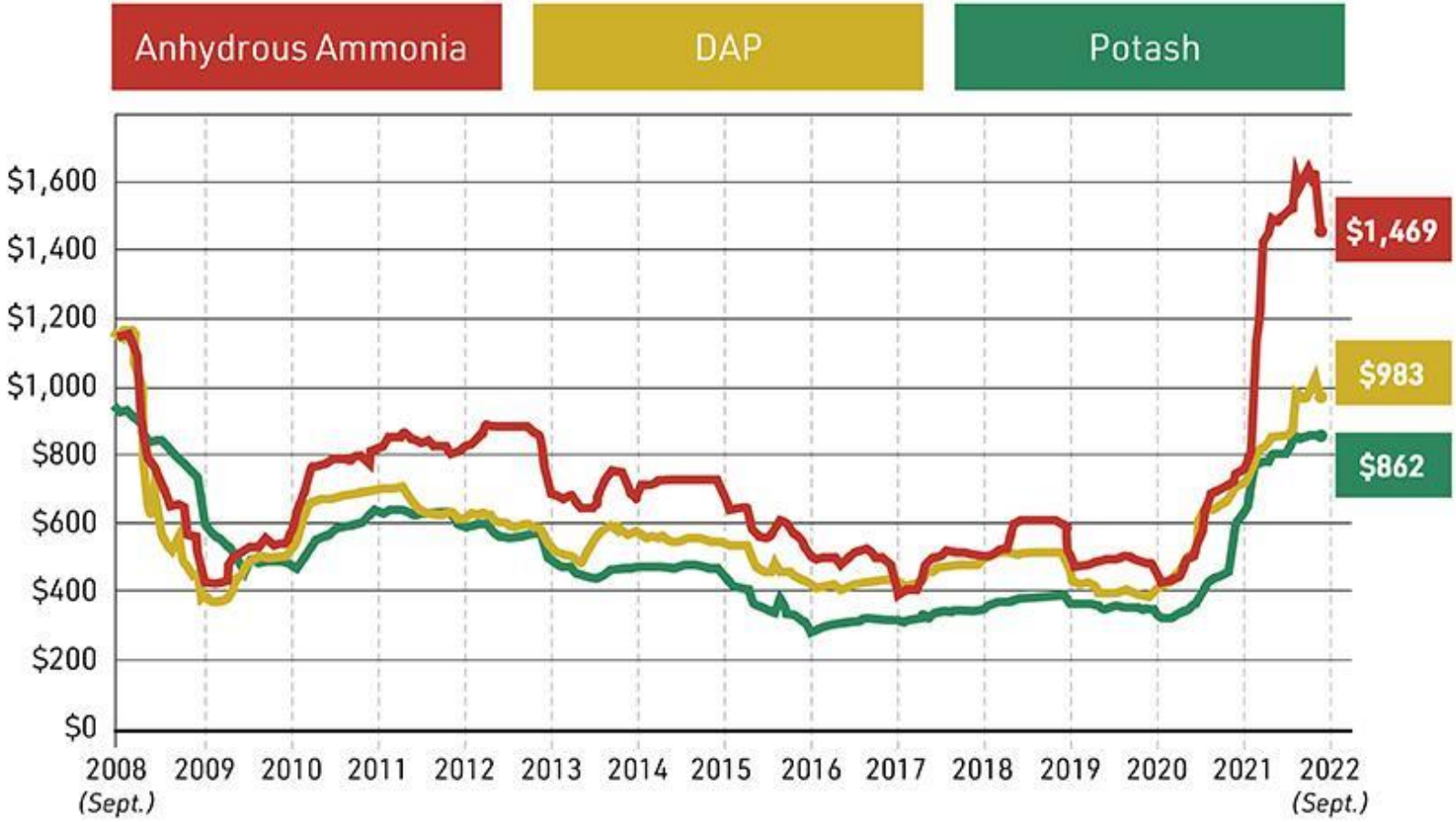
Fertilizer Prices Per Ton in Illinois



SOURCE: USDA, AGRICULTURAL MARKETING SERVICE; ILLUSTRATION: FARM JOURNAL

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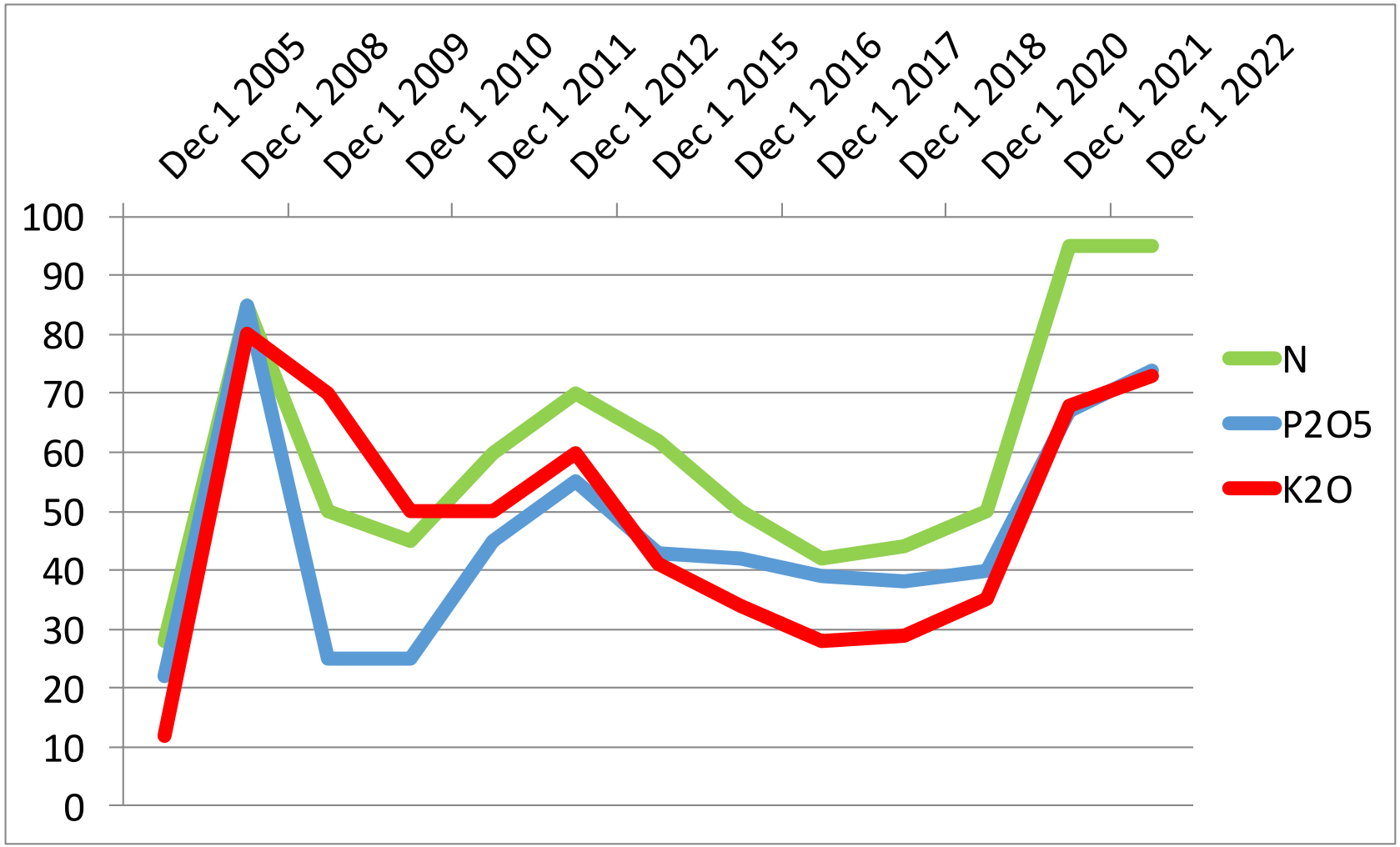
Fertilizer Prices (cents/lb N-P2O5-K2O)



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Which Crop Needs the Most Fertilizer ?

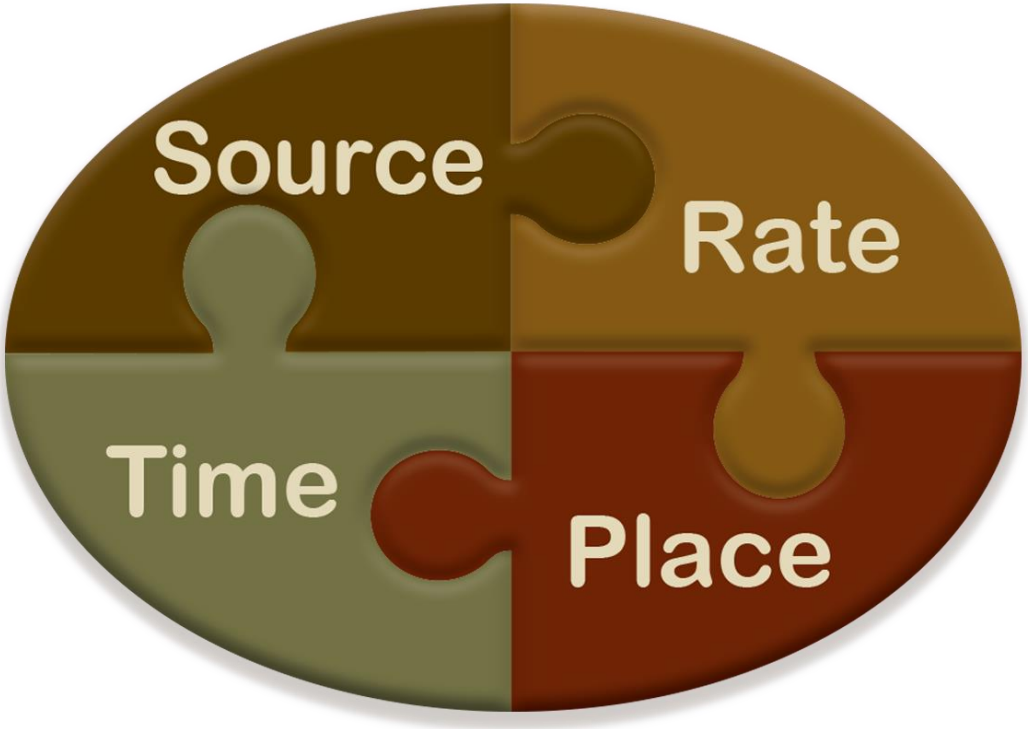
(If “Medium” Soil Test P and K)

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)

The 4 “R’s” of Fertilization

The Right Rate
The Right Source
The Right Timing
The Right Placement



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How Much Fertilizer Do I Need for 300 Bushel Corn ?

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

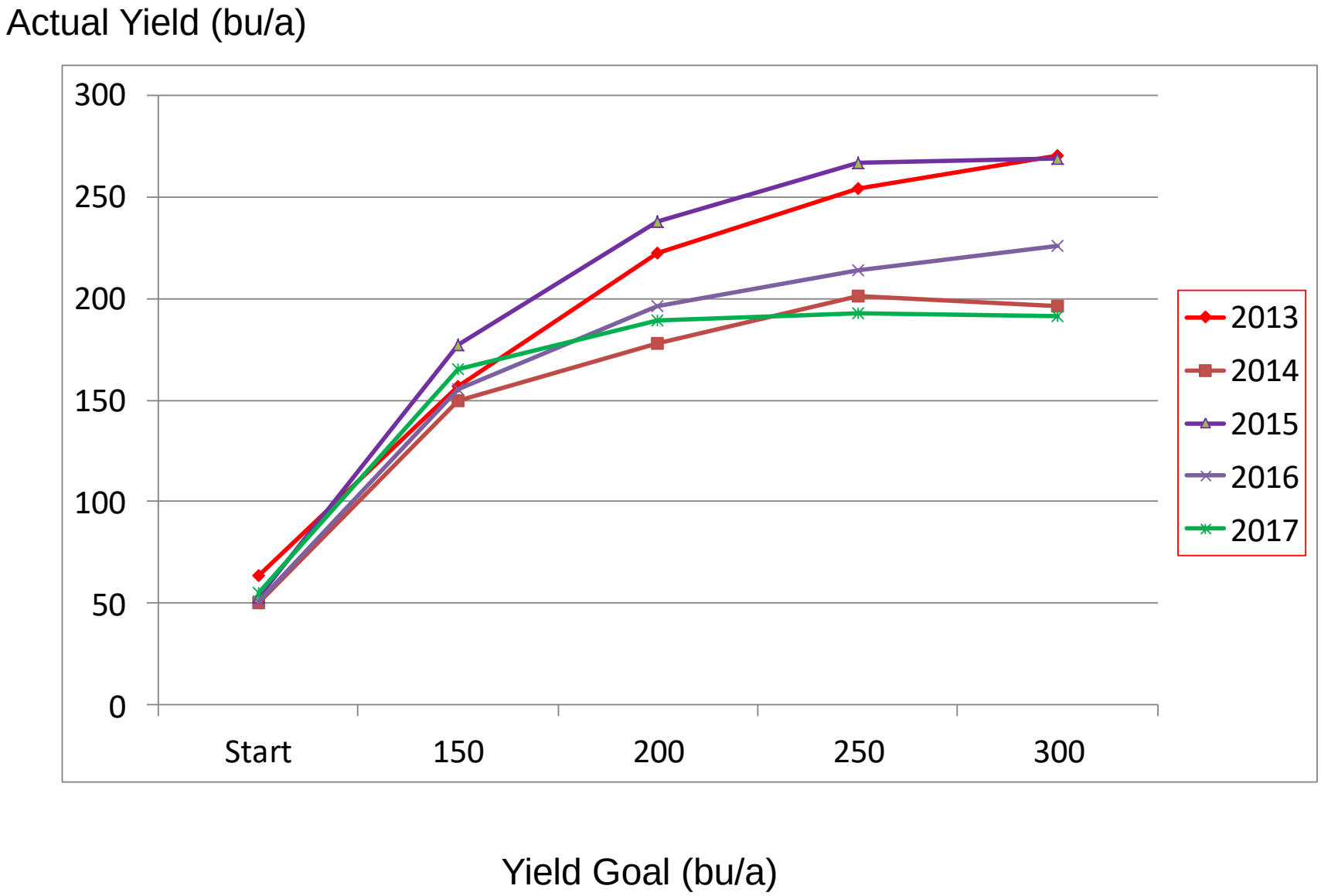
Base (Irrigated) Yield Goal = 150 bu/a

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

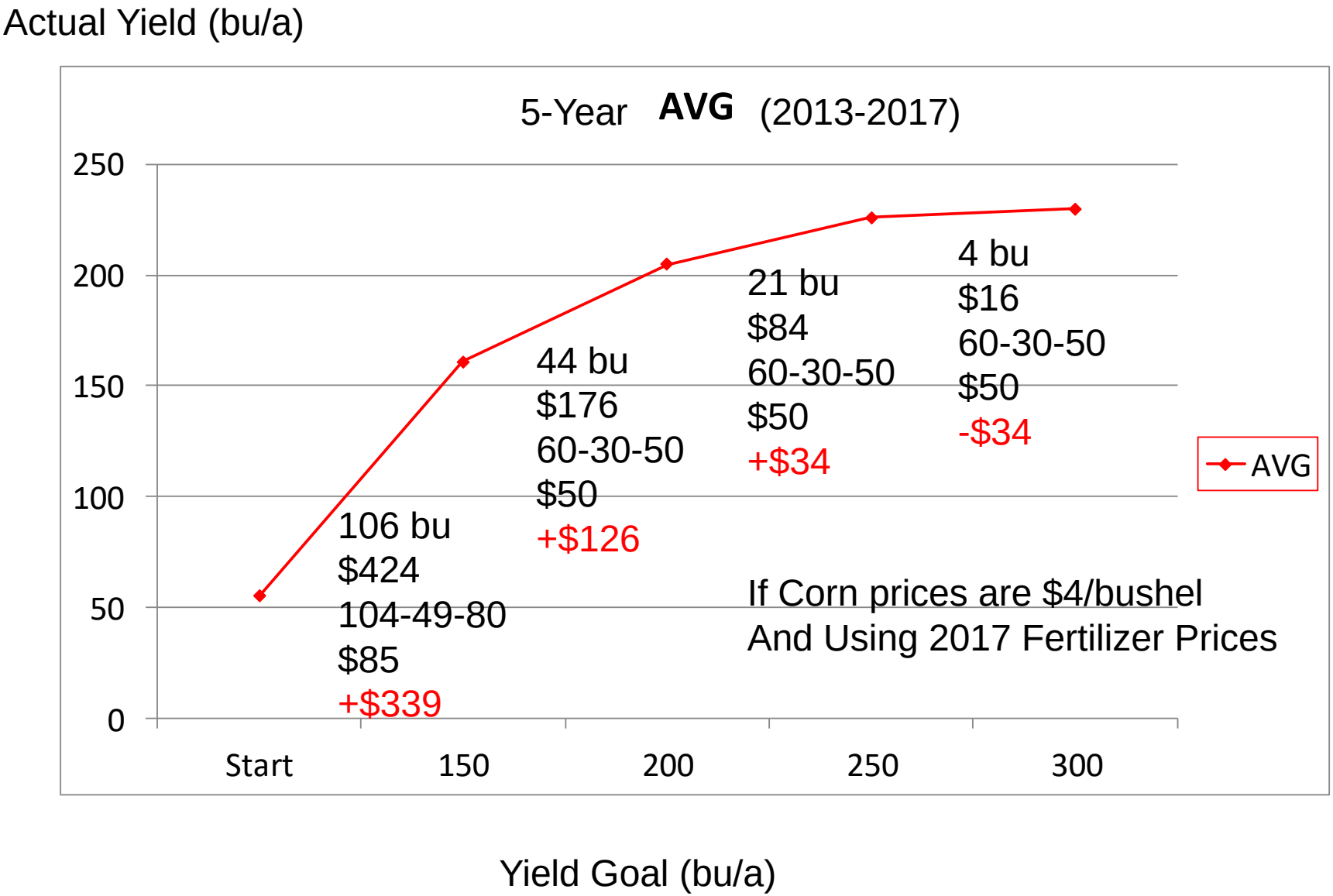
	Yield Goal (bu/a)			
Soil Test P/K	150	200	250	300
Low/Low	180-110-130	240-140-180	300-170-230	360-200-280
Med/Med	180-90-90	240-120-140	300-150-190	360-180-240
High/High	180-70-70	240-100-120	300-130-170	360-160-220

4Rs = Rate, Timing, Source and Placement

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

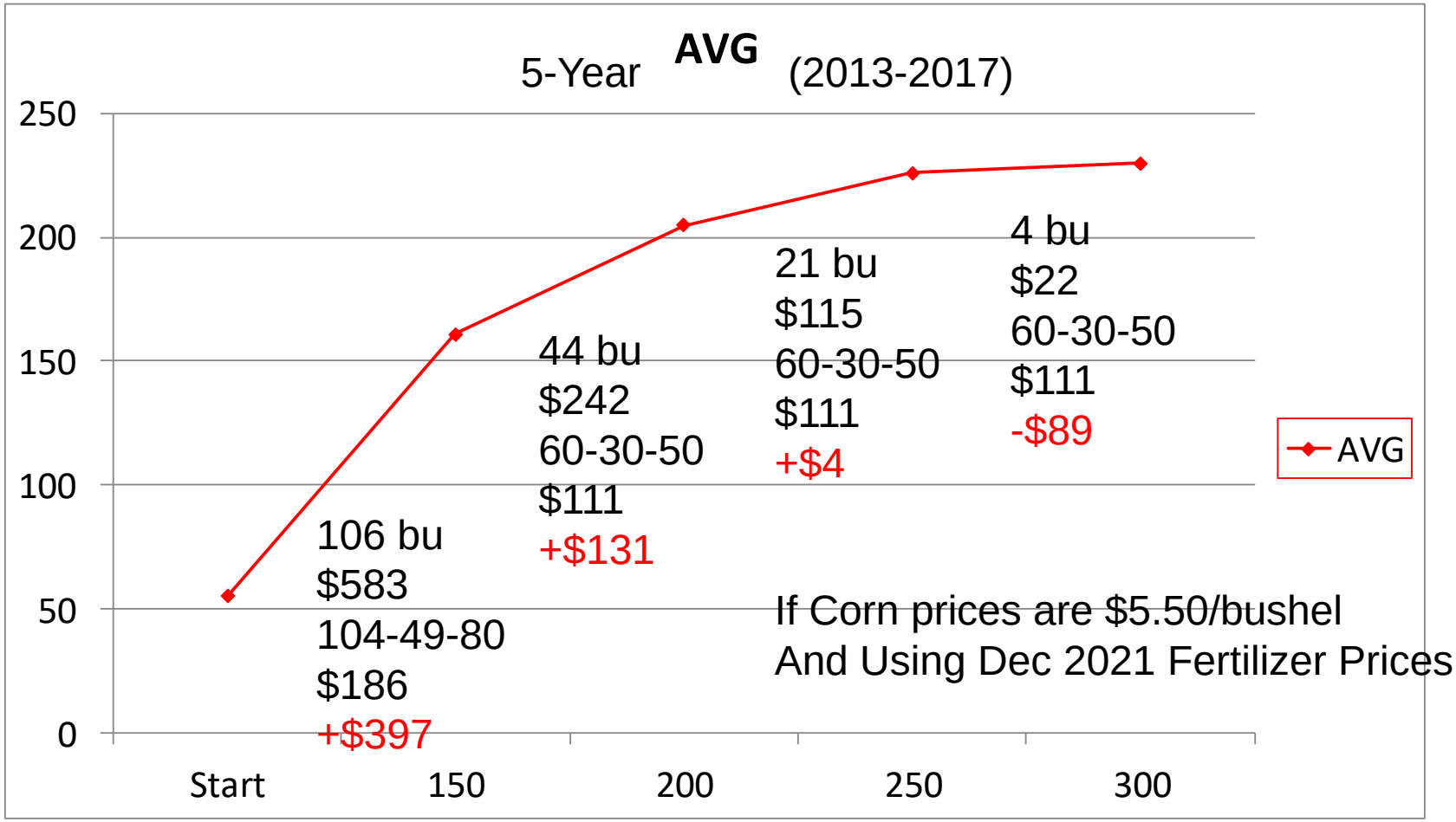


Fertilizing Corn (N-P-K) By Yield Goal



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

Actual Yield (bu/a)



Yield Goal (bu/a)

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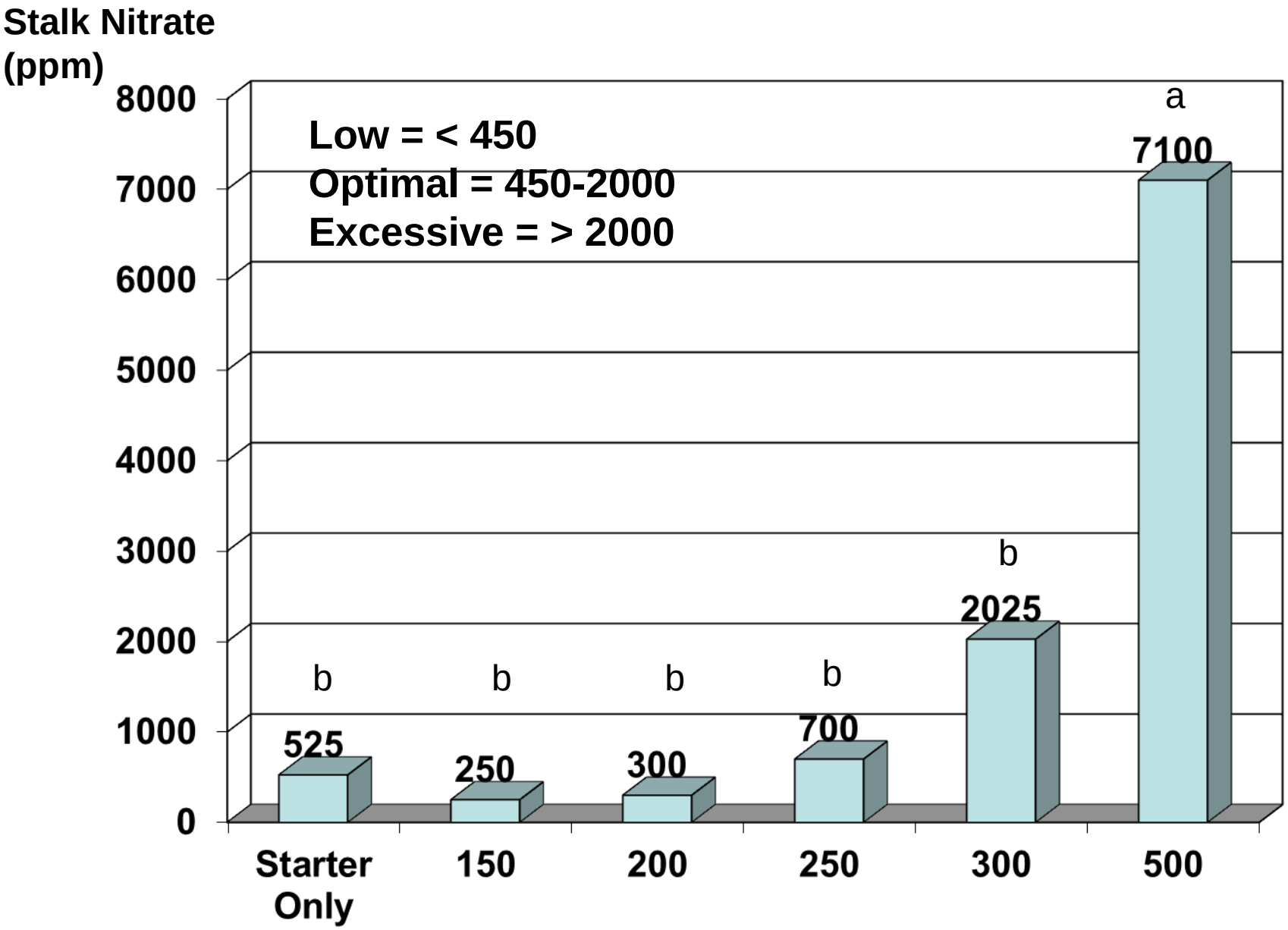
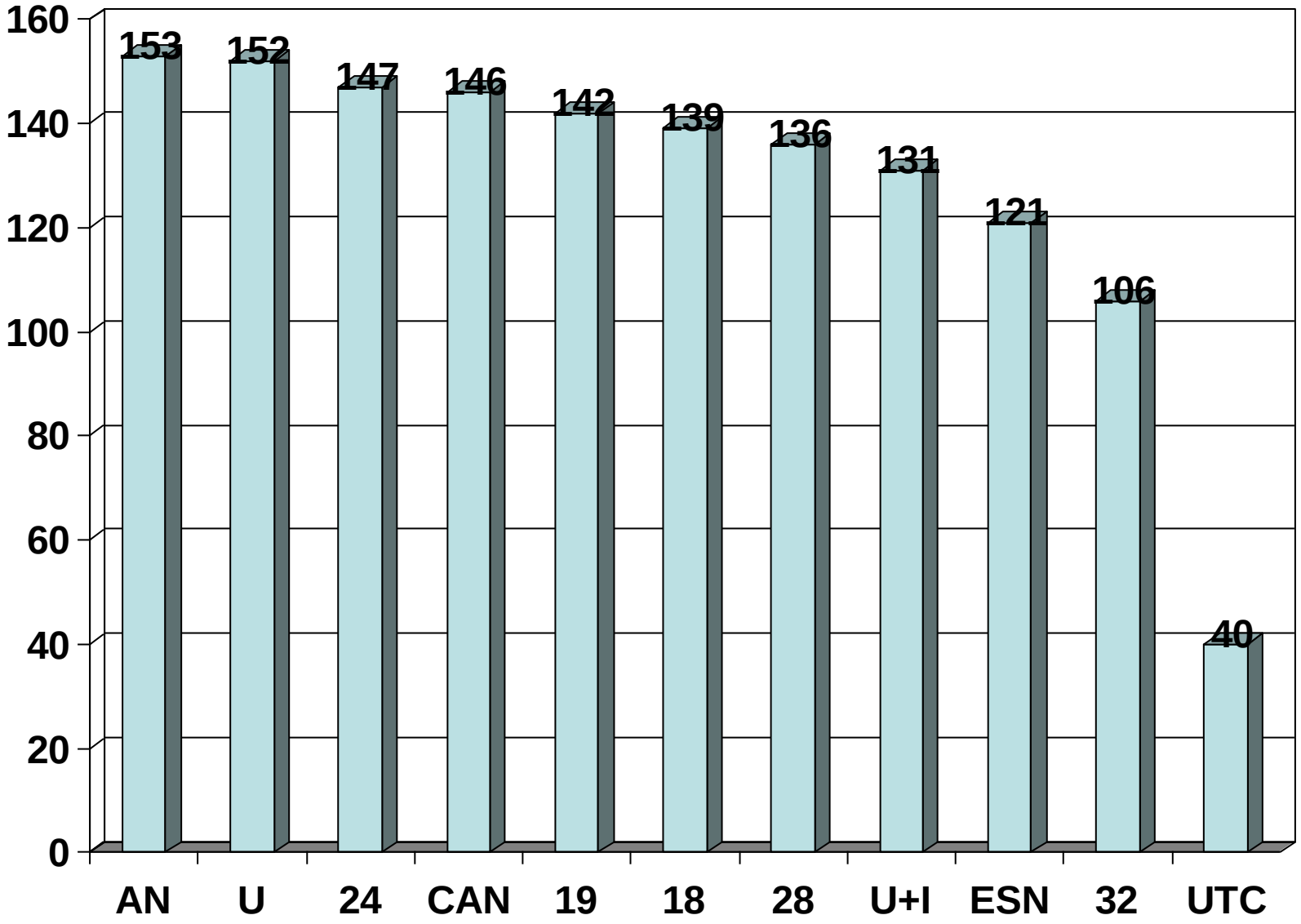
High Yield Corn – 2017 Bowen Farm



Nitrogen Sidedress “Sources”

Corn Yield (bu/a)

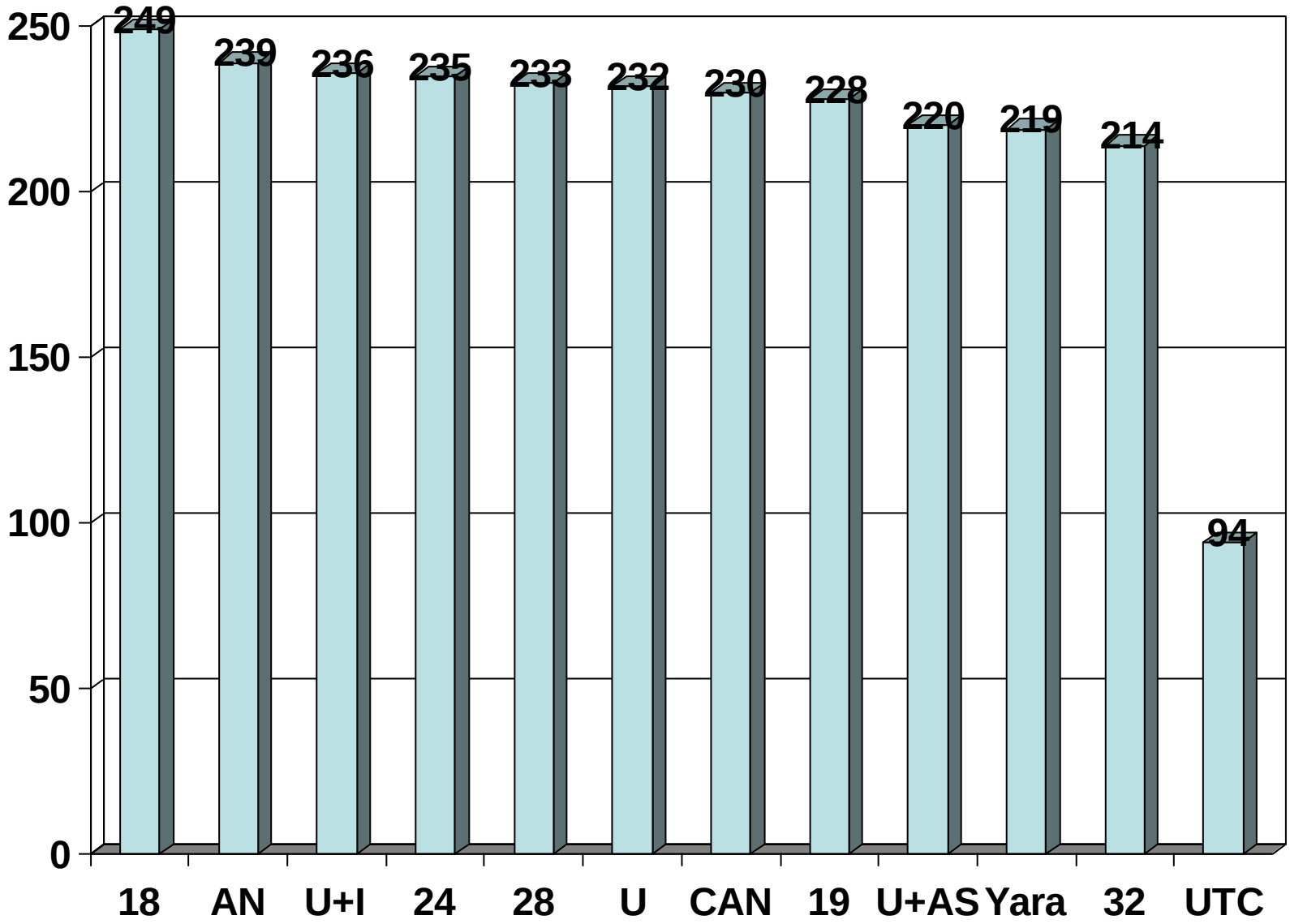
Lang Farm N Source Study - 2014



N Rate = 150 lb/a

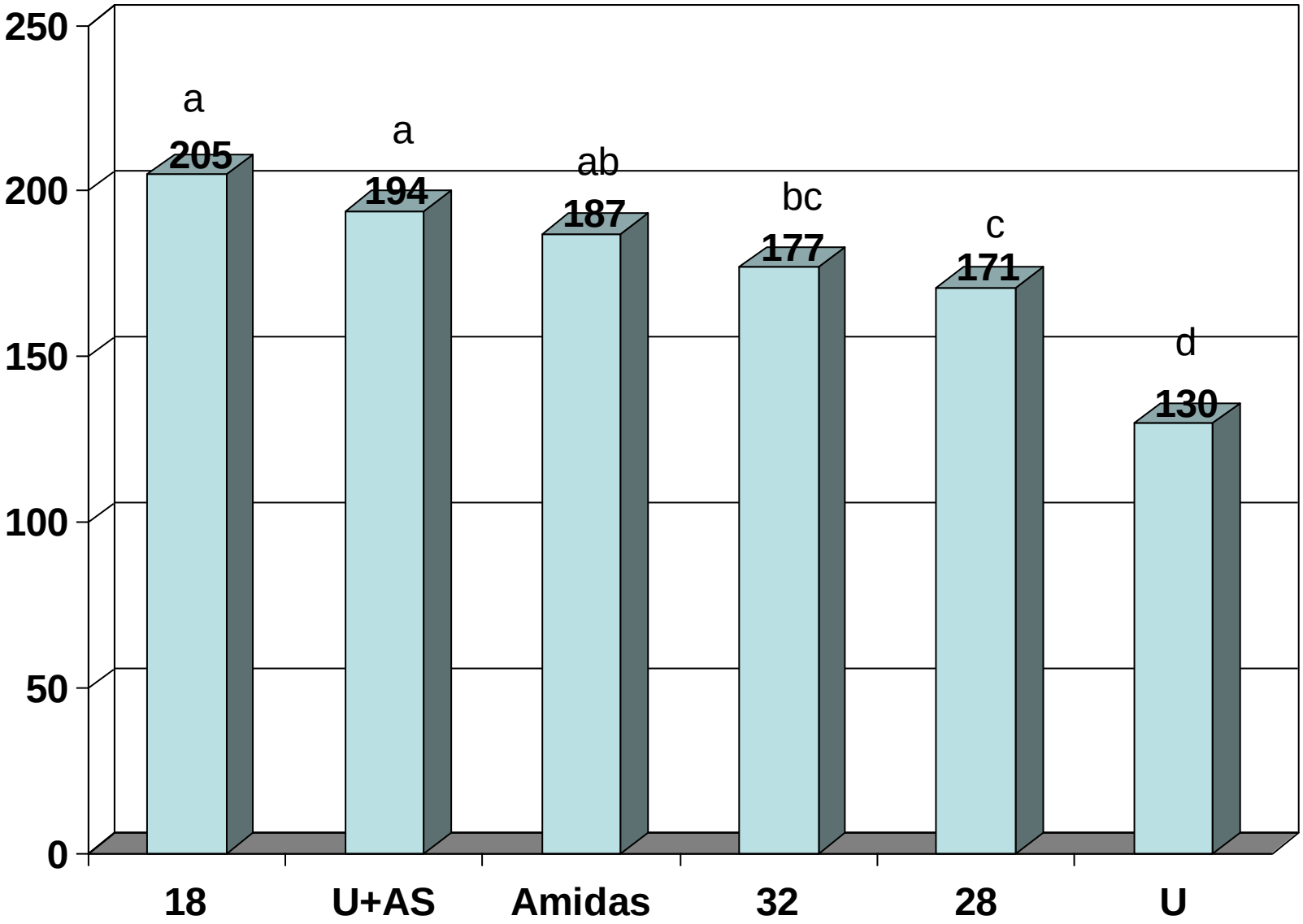
Corn Yield (bu/a)

Bowen N Source Study - 2015



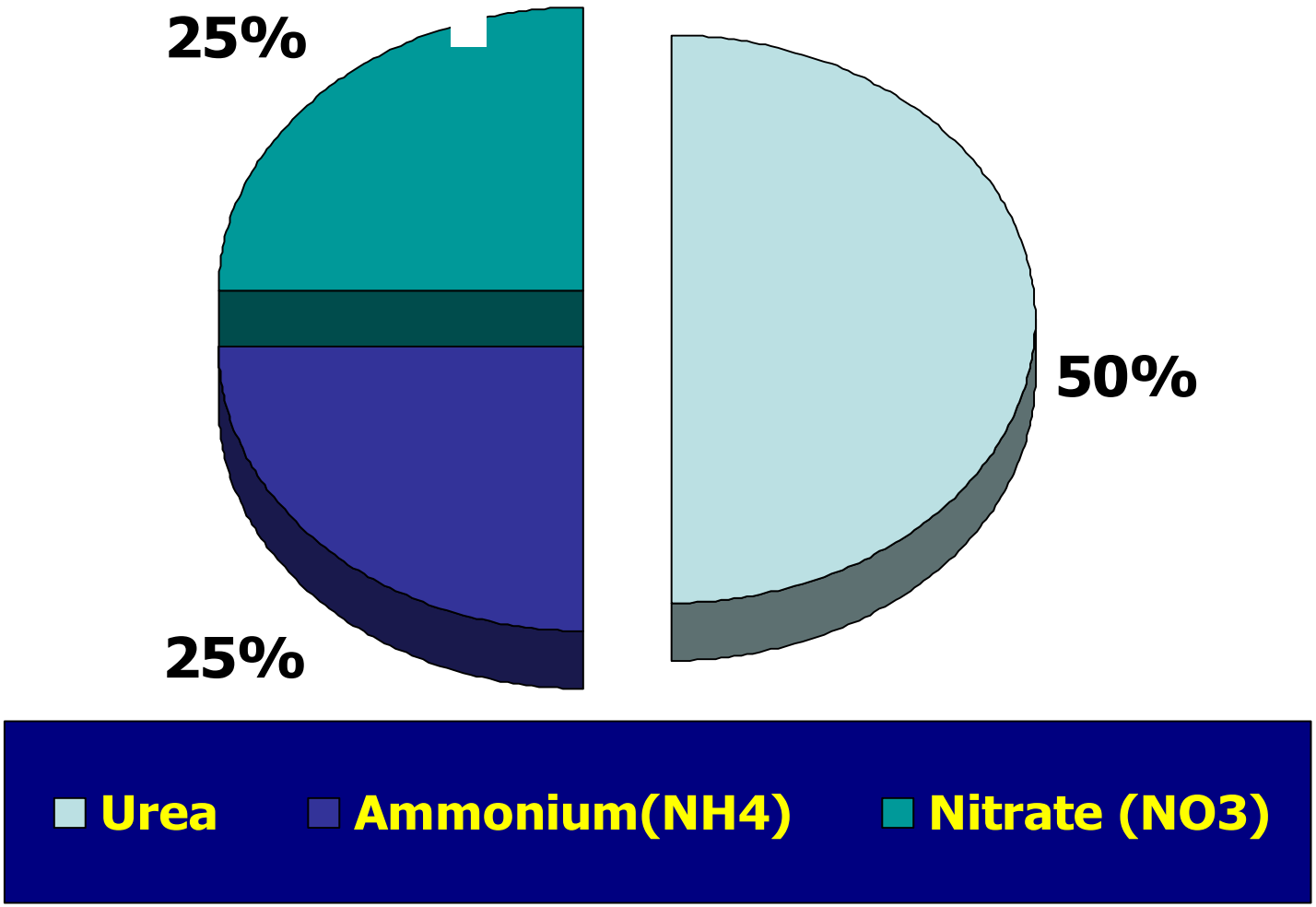
N Rate = 150 lb/a

Corn Yield (bu/a) **Bowen N Source Study - 2016**



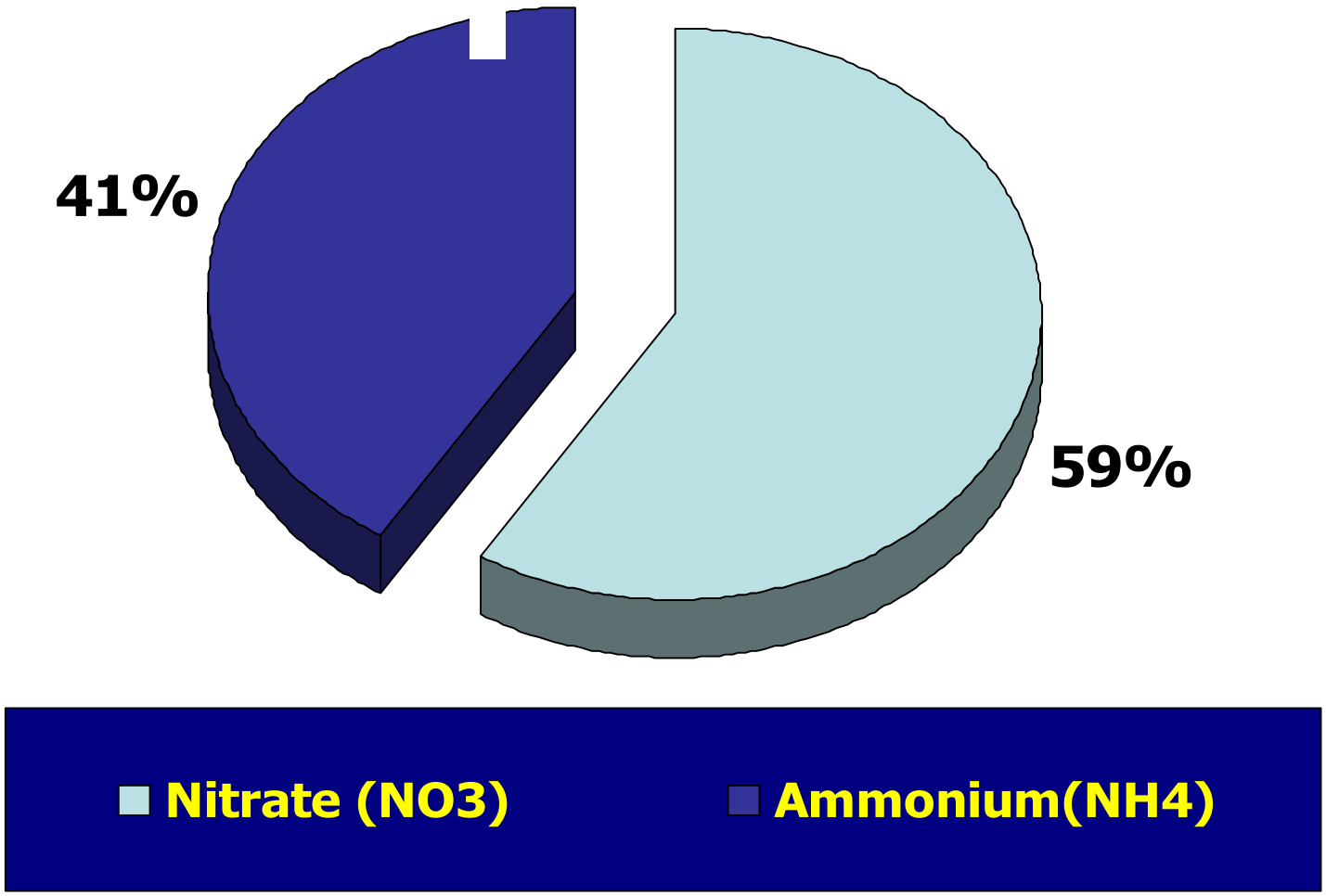
N Rate = 150 lb/a

Composition of UAN (32% N)
(urea + ammonium nitrate)



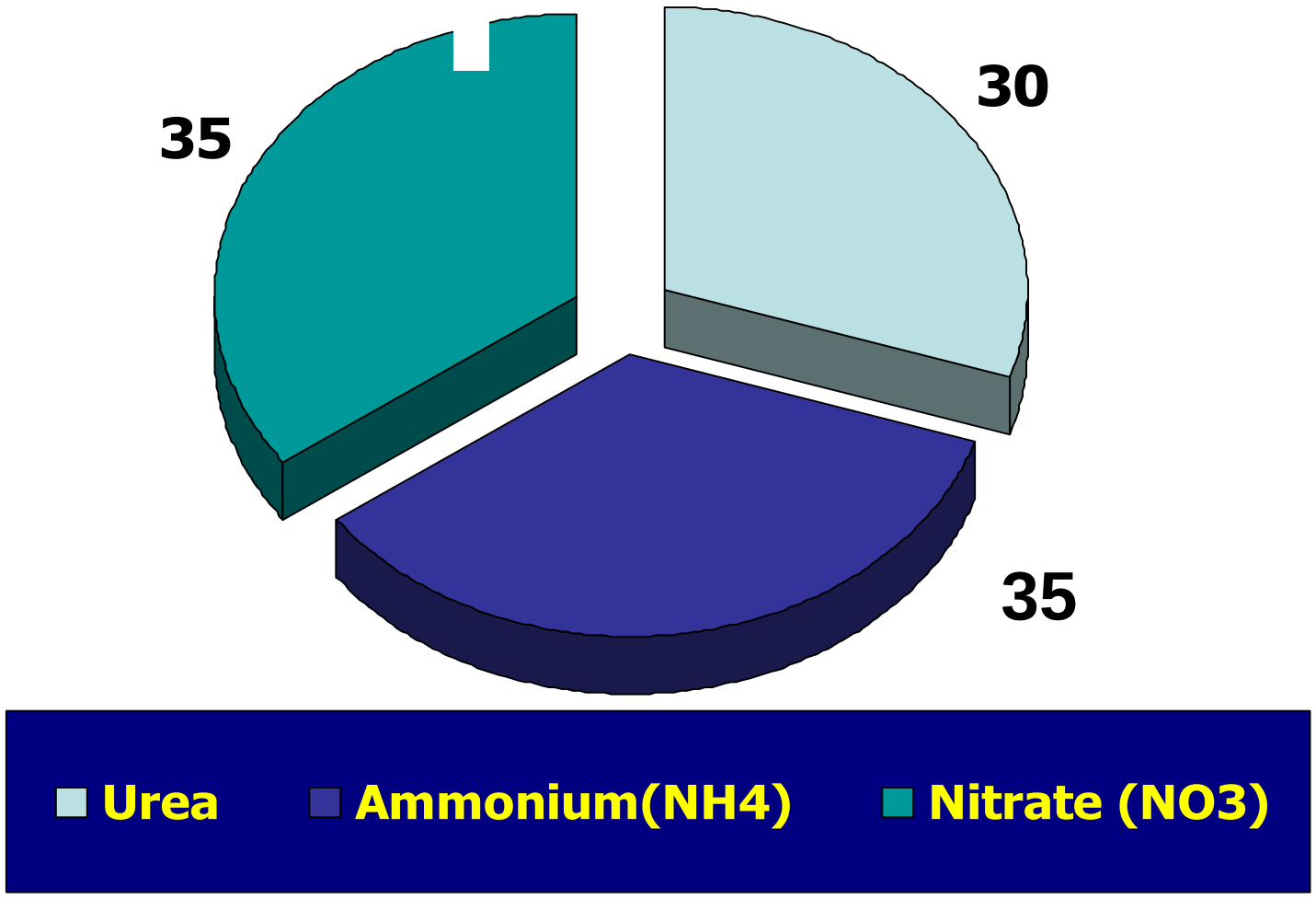
*** Add ATS to make 28-0-0-5(S)**

Composition of “19-E” (19%N)
(ammonium nitrate + sodium nitrate)



*** Add ATS to make 18-0-0-3(S)**

Composition of “24% N”
(urea + ammonium nitrate + sodium nitrate)



*** Add ATS to make 24-0-0-3(S)**

Agricultural By-Products

Chicken Litter
Gin Trash
Mushroom Compost
Chicken Processing Plant Effluent

"Poultash"
Pet Food Processing Effluent
Beef Packing Effluent
Biochar (?)

Municpal By-Products

Biosolids
Solid Waste Compost
Yard Waste+Biosolids Compost
Symtrex
Sus-Terra

Industrial By-Products

FGD Gypsum
Wood Ash
Boiler Ash(?)

Wallboard
RecycLime

Brewery Effluent
Textile Mill Waste
Carpet Lime

“Tire-Char”

Possible Disadvantages of By-Products Compared To Commercial Products

- Low Analysis, Bulky, Hard To Spread
- Cost of Hauling
- Less Predictable Nutrient Availability
- Set Nutrient Ratios
- Pollution Potential
- Odor

Timing – Split Applications of Nitrogen on Corn

Official UGA Recommendation = "¼ to 1/3 of Total at prior to or at planting and remainder as sidedress when corn is 18-24 inches tall"

Too late ?
By V4 ?
Two "Splits" ?

Thru Pivot ?

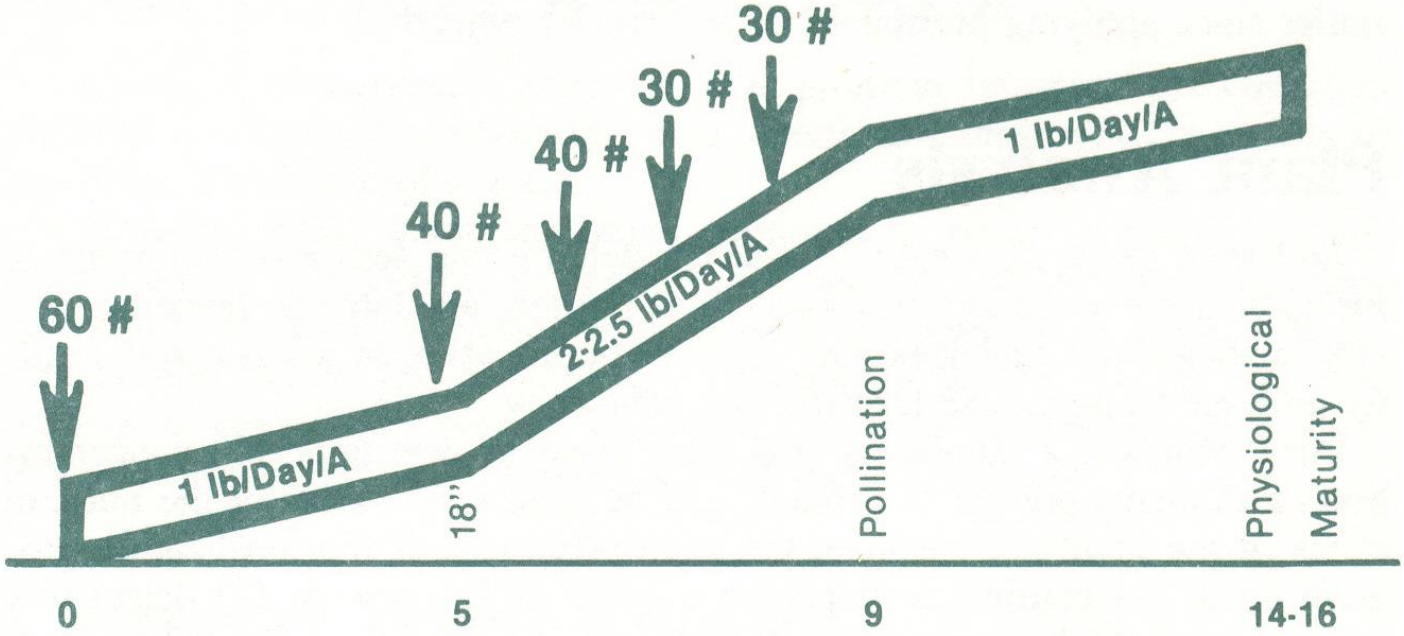


Figure 5. Nitrogen Fertigation Scheme (150 Bu/A Yield Goal) and Daily Nitrogen Requirement of Corn

UGA Recommendations for Starter Fertilizer on Corn

- Yes…(not on cotton, peanut or soybean)
- Include N and P (since not sure which or both needed)
- No advantage to adding K to starter
- “2 x 2” is preferred placement
- In-furrow – Risk often outweighs the benefits

  Or by the time you lower the rate,

  You lose the starter effect

Should I Use a Starter Fertilizer and Put it In Furrow ?

10 gal/a 10-34-0 + 10 gal/a 28-0-05 + Micros….In Furrow

How Much Sulfur Should I Use ?

Sulfur Deficiency

UGA Recommendations for Sulfur on Corn

- 15 lb S/a (for 150 bu/a Yield Goal)
  - **20 for 200 bu/a**
  - **25 for 250 bu/a**
  - **30 for 300 bu/a**
  - Apply at least 10 lb S/a at planting
- Apply additional S with sidedress
- Check N:S ratio in tissue samples, especially if suspect problem
- Sources tested in 2020 include AS, ATS, KMag and Polysulfate

Magnesium Issues in Corn

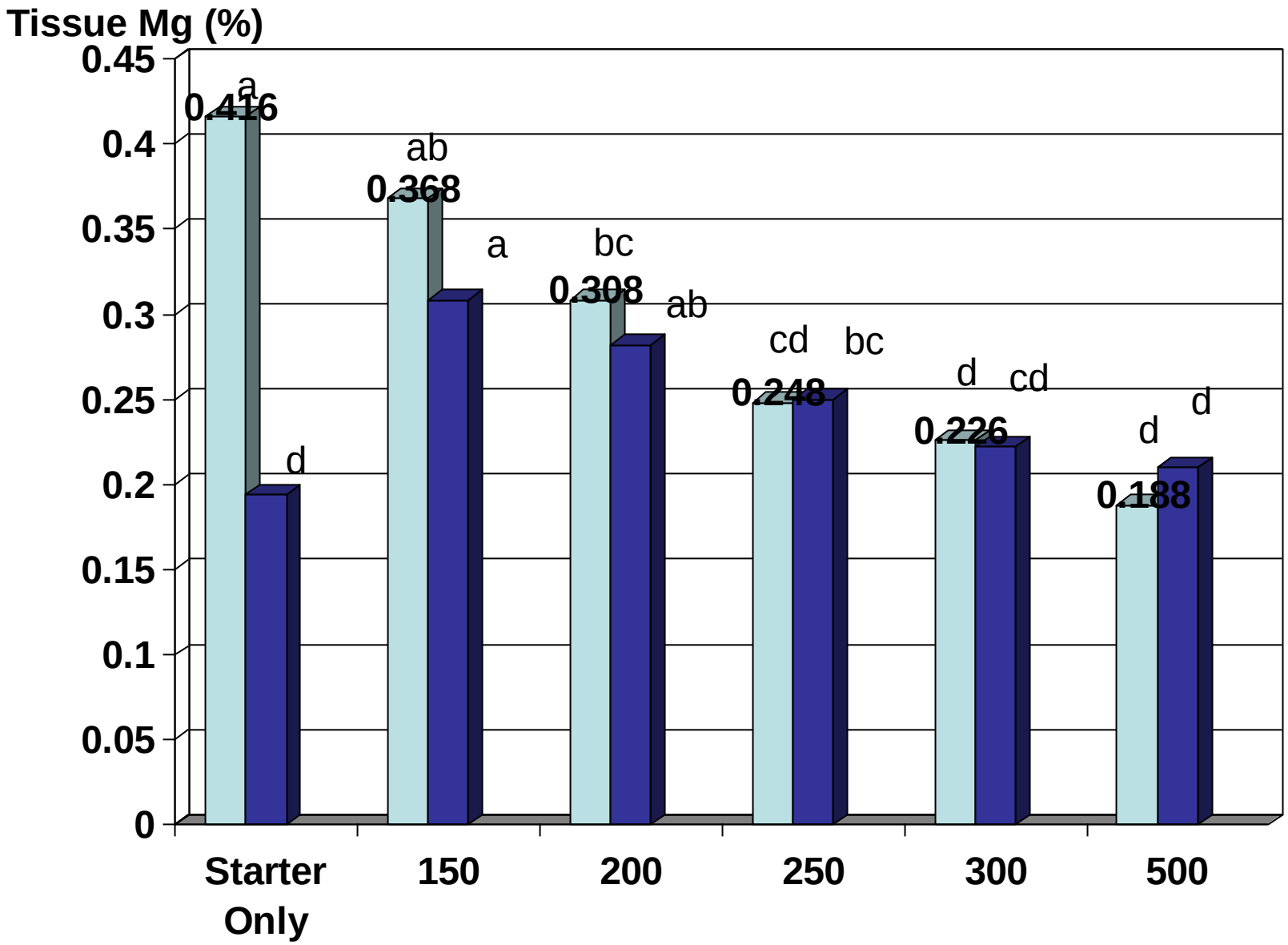
2 Possible Explanations:

1) True deficiency – shows symptoms
a) Low soil test Mg/No Mg applied
b) High Rates of N and K/Outcompeted

Recommendation: If Before Tassel:
a) 5 lb Mg/a Thru Pivot
b) or, 0.5 lb Mg/a Foliar (Preferred)

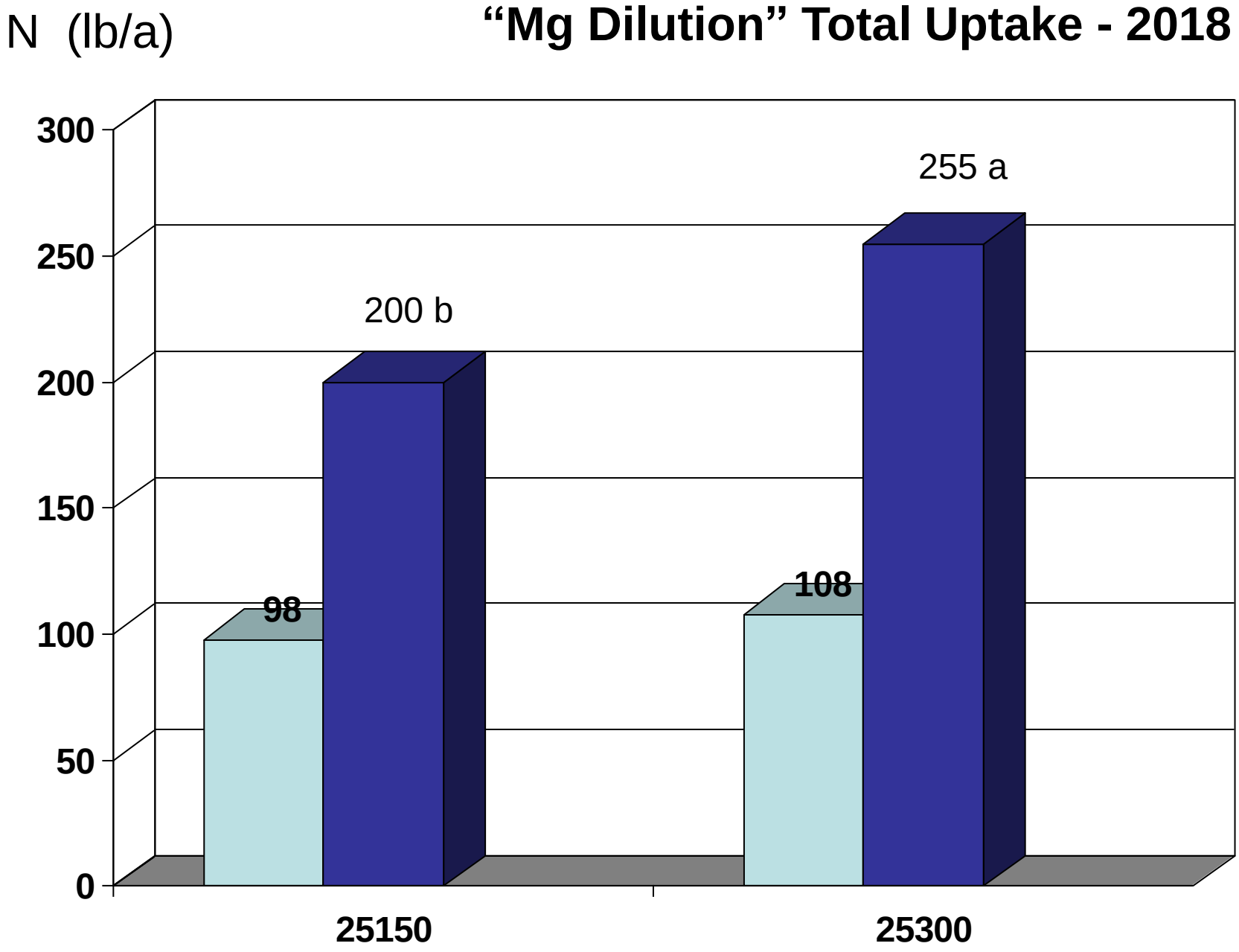
2) No symptoms – “False Low”
High Yield N and K Rates?
(Competition on CEC would show deficiency symptoms)
Dilution – Tissue is %
Total Mg Uptake?
Recommendation: a) Do nothing
b) or 0.5 lb Mg/a Foliar as “Insurance”

High Yield Corn – 2016 Bowen Farm



TEXAS
TRONG

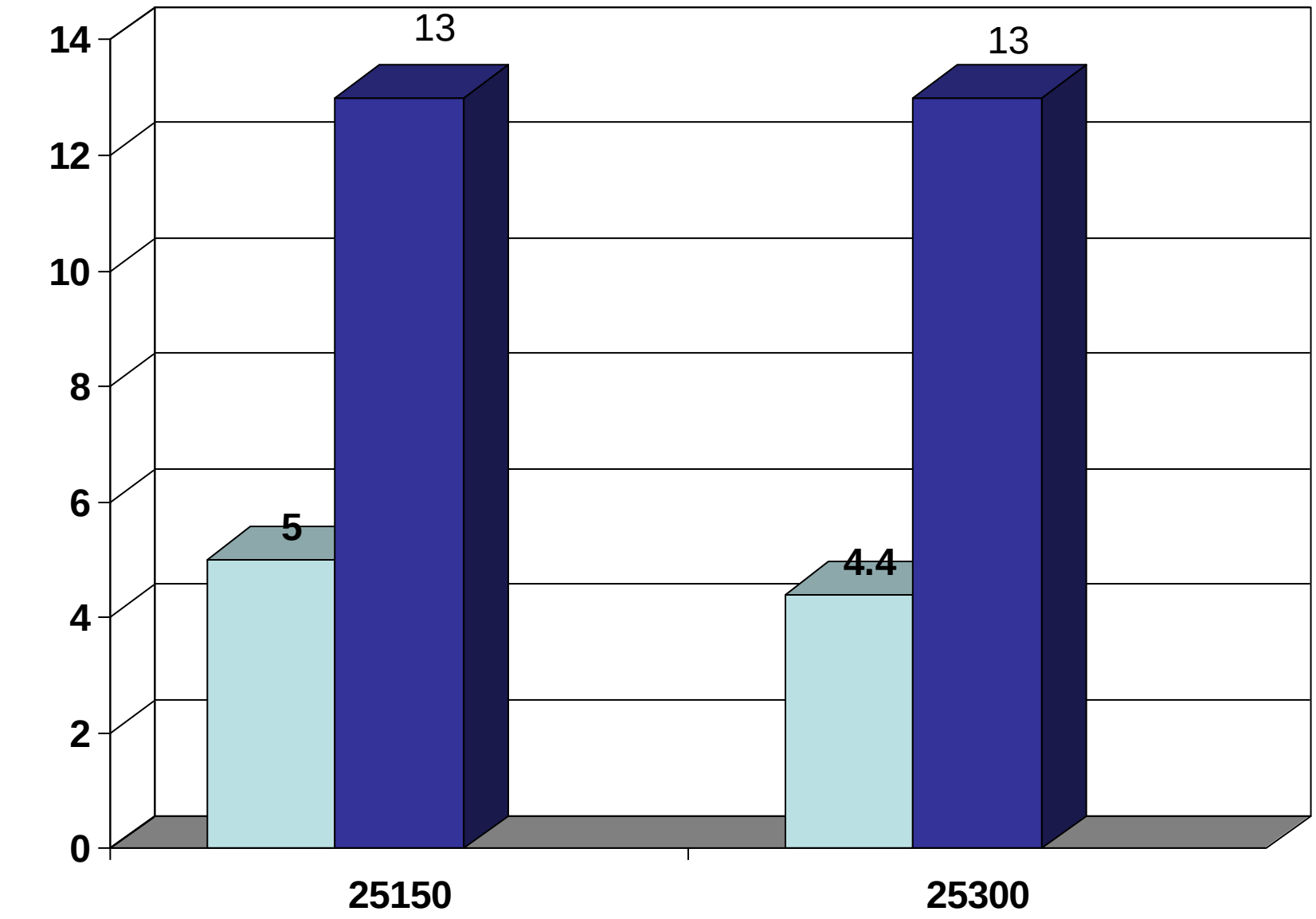
“Mg Dilution” Total Uptake - 2018



May 17, Jun 8

P= 0.0005 CV = 13 %

“Mg Dilution” Total Uptake - 2018

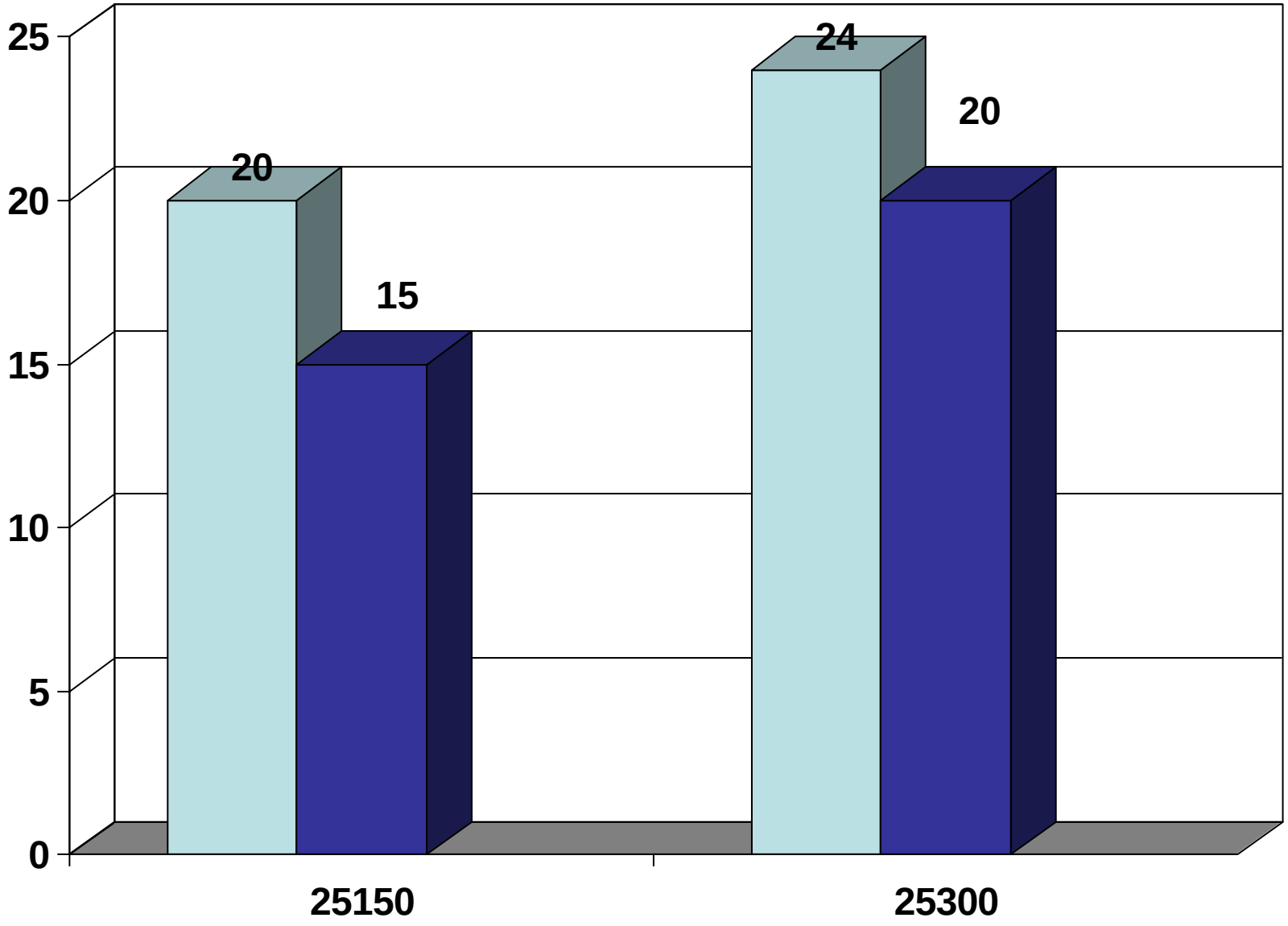


May 17, Jun 8

P= 0.0005 CV = 13 %

N:Mg (lb/lb)

“Mg Dilution” Total Uptake - 2018



May 17, Jun 8

P= 0.0005 CV = 13 %

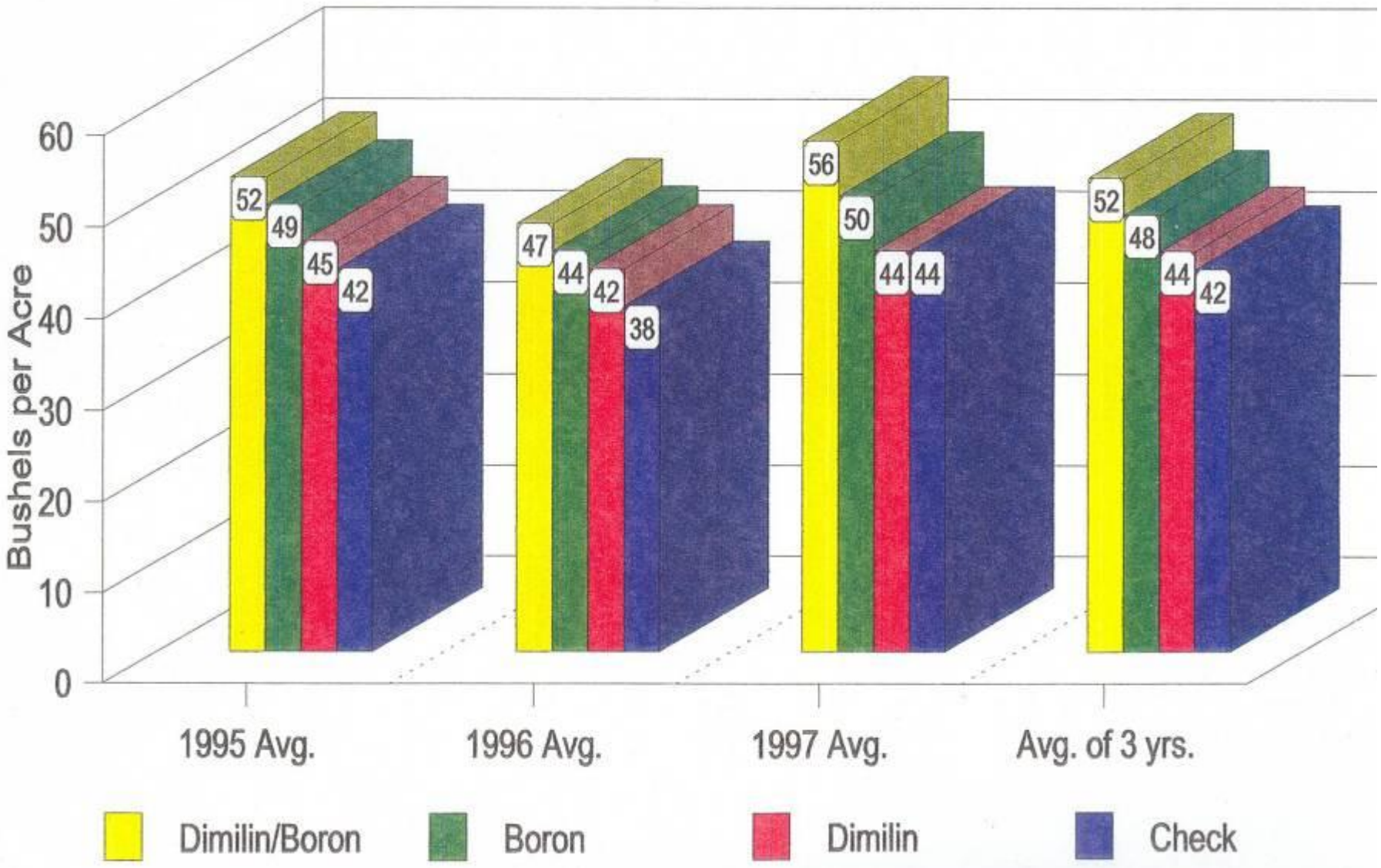
Yellow Flash and Manganese Deficiency in Georgia Soybeans

Blake McCranie, Glen Harris and Eric Prostko – UGA (Tifton)

Foliar Potassium on Soybeans ?

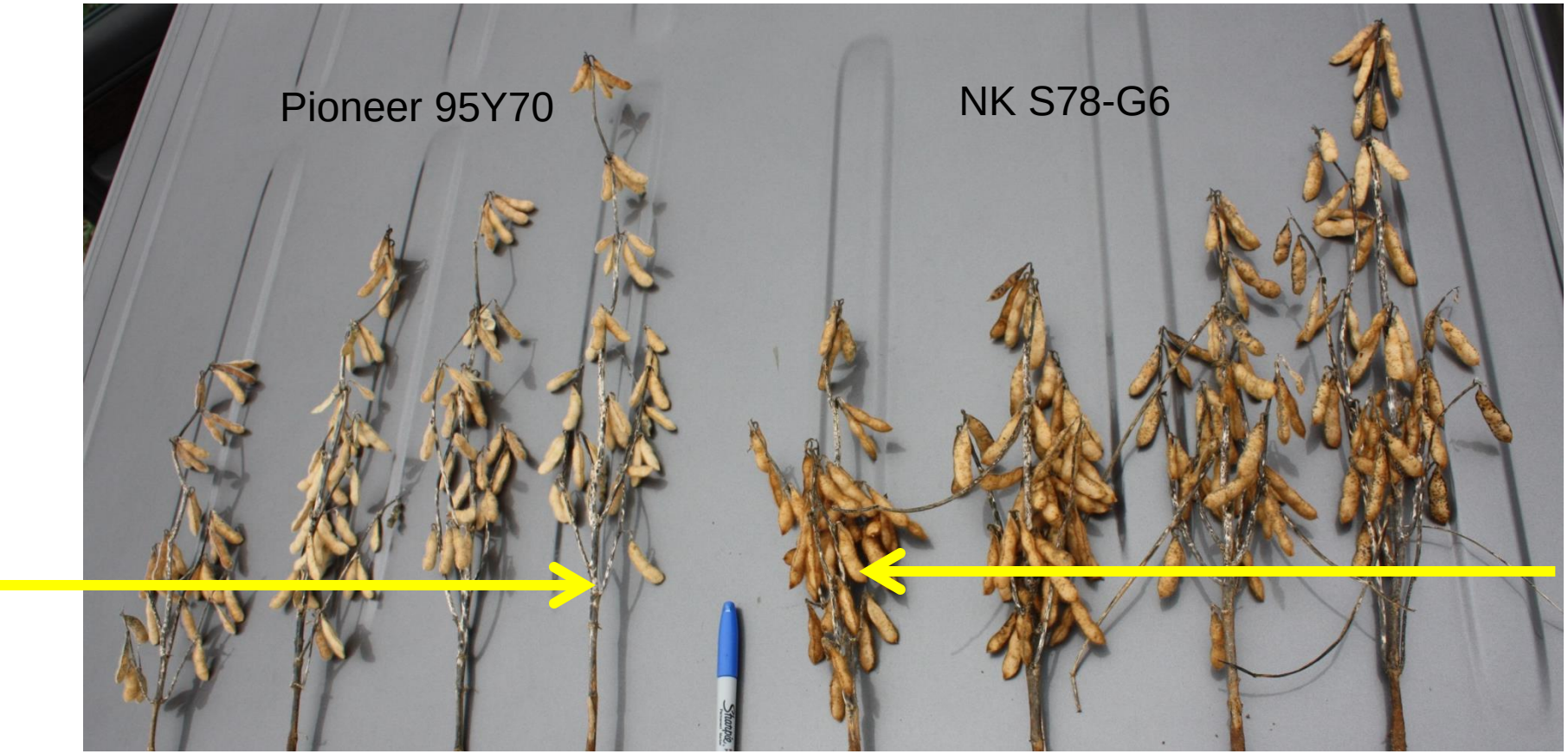
- Two years of Study at Sunbelt Expo
- No

Boron + Dimilin Treatment



Population and Nitrogen Effect on Soybean Height

(Midville 2013)



No N	30 units N	No N	30 units N	No N	30 units N	No N	30 units N
Low Pop		High Pop		Low Pop		High Pop	

So What Is the “Take-Home” Message ?

1. Fertilize N-P-K By Yield Goal
2. Low Mg in Tissue May be from Dilution
3. Starter Fertilizer in a “2x2” Placement is Preferred
4. Increase Sulfur Rate by Yield Goal
5. Apply Potassium at Planting Or Not Too Late

Corn Fertilization “Strategy”

1. Soil Test
2. Lime to pH of 6.0-6.5
3. Apply P, K (Mn and Zn?) at Planting
4. For “Early Planted Corn” Use a Starter
5. Adjust N-P-K for Yield Goal
6. Apply N in Split Applications
7. Apply at Least 10 lb Sulfur/a
8. Tissue Sample (Earlier the Better)
9. Foliar Feed ?
10. Boron?

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Questions ?
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