

# Fertility Management Considerations for MidSouth Cropping Systems

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# Acknowledgements

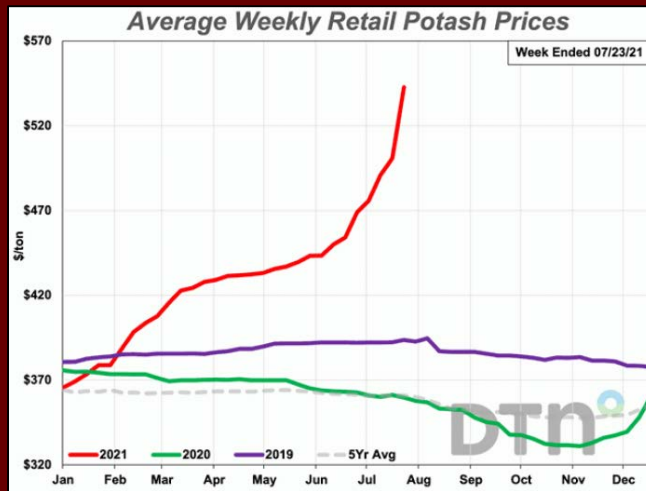
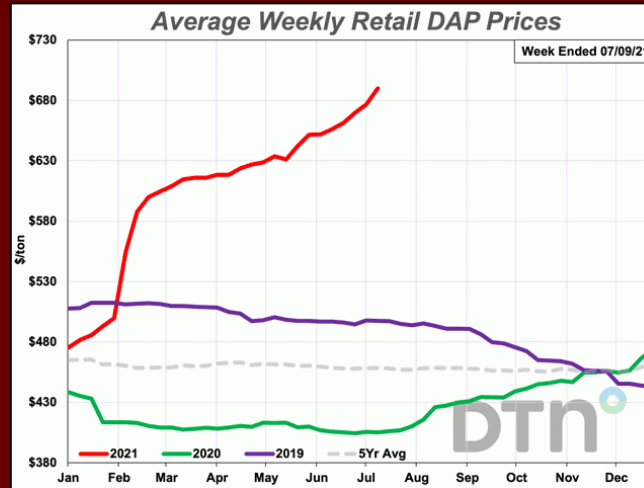
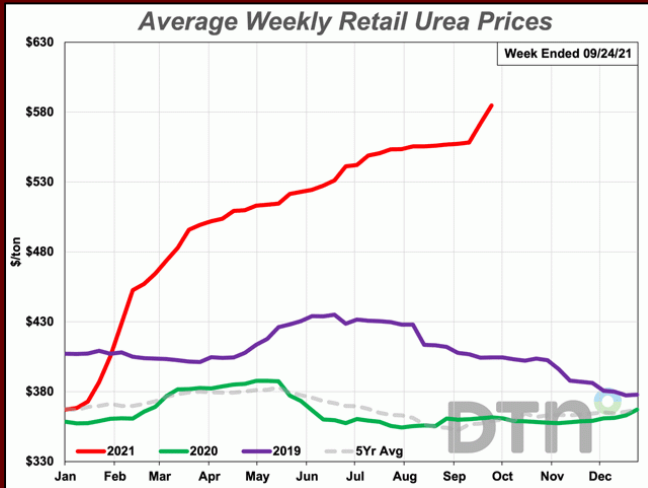


- Corteva Agriscience
- Bayer CropScience
- Syngenta Crop Protection
- Pursell Agri-Tech
- Nutrien Ag
- Stine Seed Company

- AgXplore International
- CHS inc.
- Innvictis Crop Care
- Progeny Ag
- U.S. Borax



# Fertilizer??



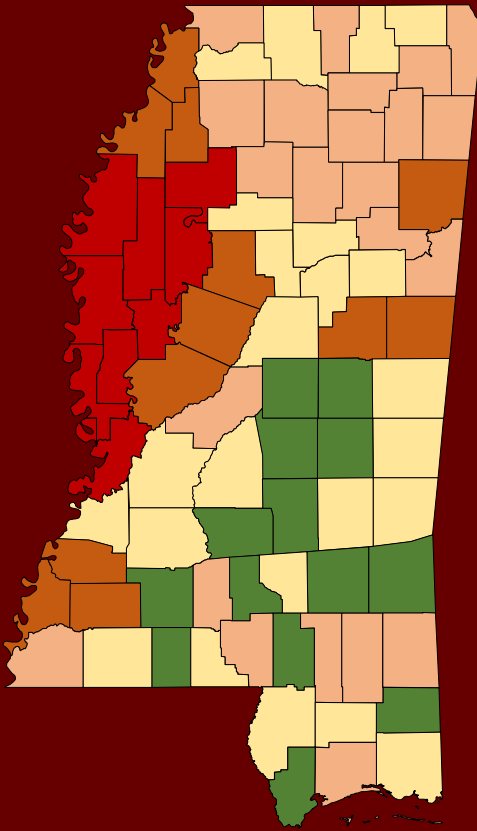
Adapted from: [DTN](https://www.dtn.com)



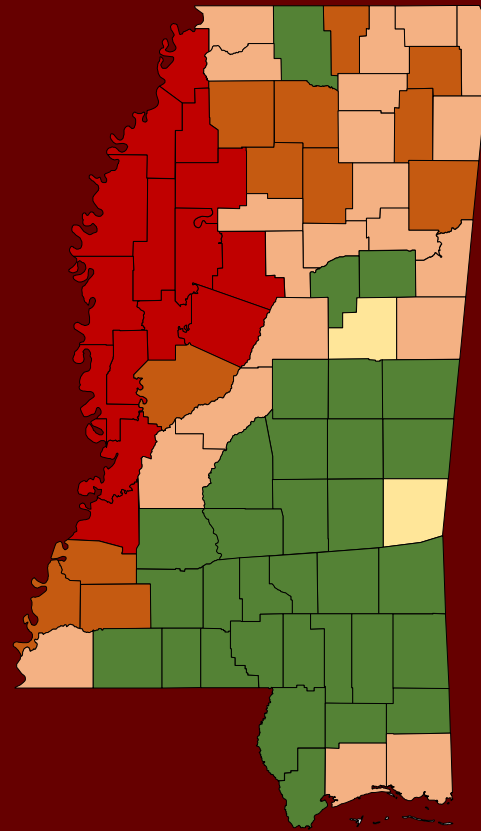
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# Fertilizer Use Trends in MS

**K<sub>2</sub>O**  
**-125,263**  
**-61 lb/a**



**P<sub>2</sub>O<sub>5</sub>**  
**-47,455**  
**-23 lb/a**



Adapted from: [IPNI NUGIS Data www.ipni.net/nugis](http://www.ipni.net/nugis)



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# What's in a Bushel?



- 1 Bushel of Soybean Contains

- 2.51 lb N
- 0.52 lb P<sub>2</sub>O<sub>5</sub>
- 1.88 lb K<sub>2</sub>O
- 0.21 lb Mg
- 0.18 lb S

Yield Level	N needed	N removed	P <sub>2</sub> O <sub>5</sub> needed	P <sub>2</sub> O <sub>5</sub> removed	K <sub>2</sub> O needed	K <sub>2</sub> O removed
40	160	100	34	21	188	76
60	239	151	51	32	282	113
80	318	201	67	42	376	150

Adapted from: Pieralisi et al. unpublished



# What's in a Bushel?



- **1 Bushel of Corn Contains**

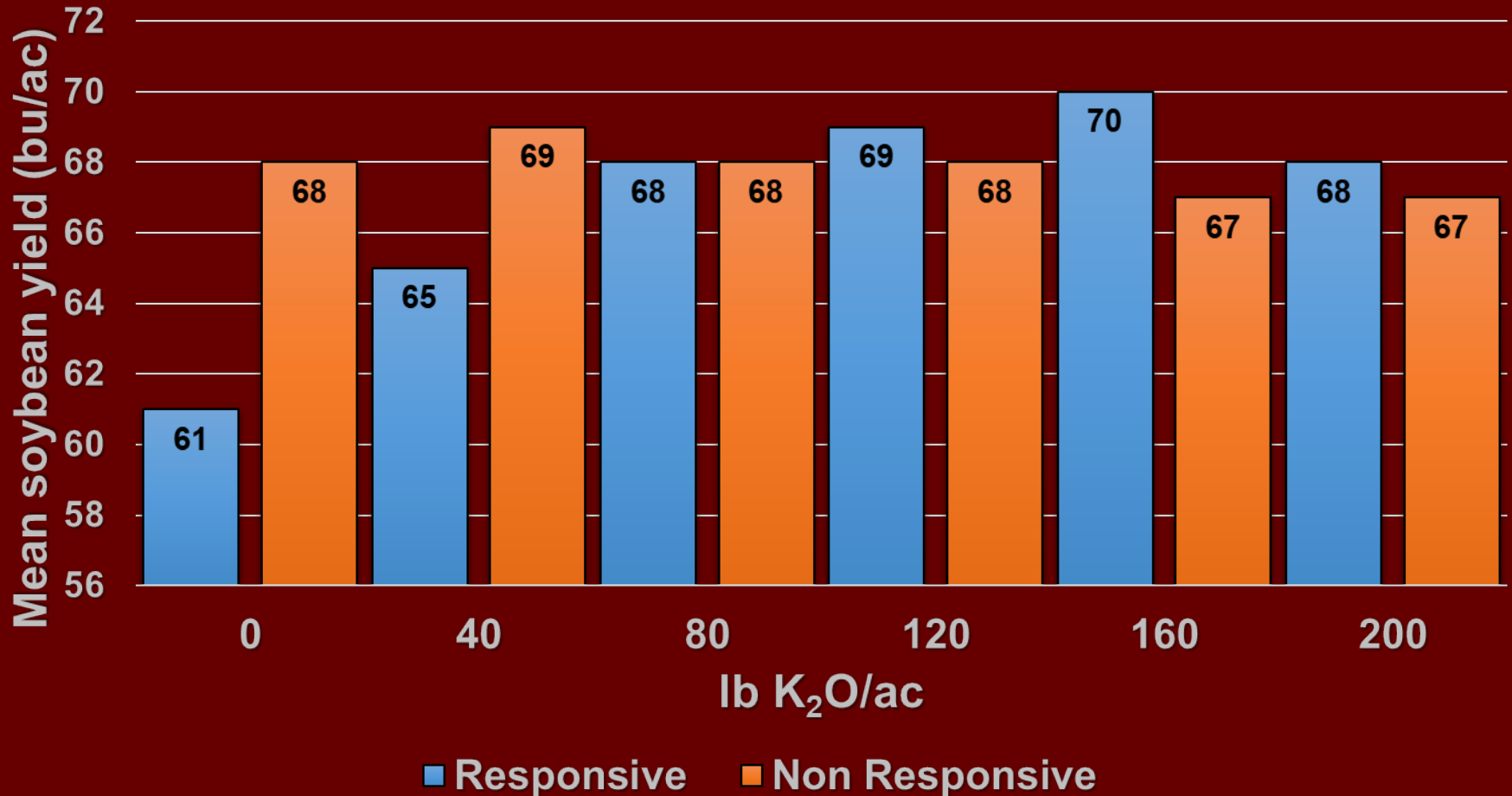
- **0.67 lb N**
- **0.35 lb P<sub>2</sub>O<sub>5</sub>**
- **0.25 lb K<sub>2</sub>O**
- **0.09 lb Mg**
- **0.08 lb S**

Yield Level	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Mg	S
150	101	53	38	14	12
180	121	63	45	16	14
210	141	74	53	19	17

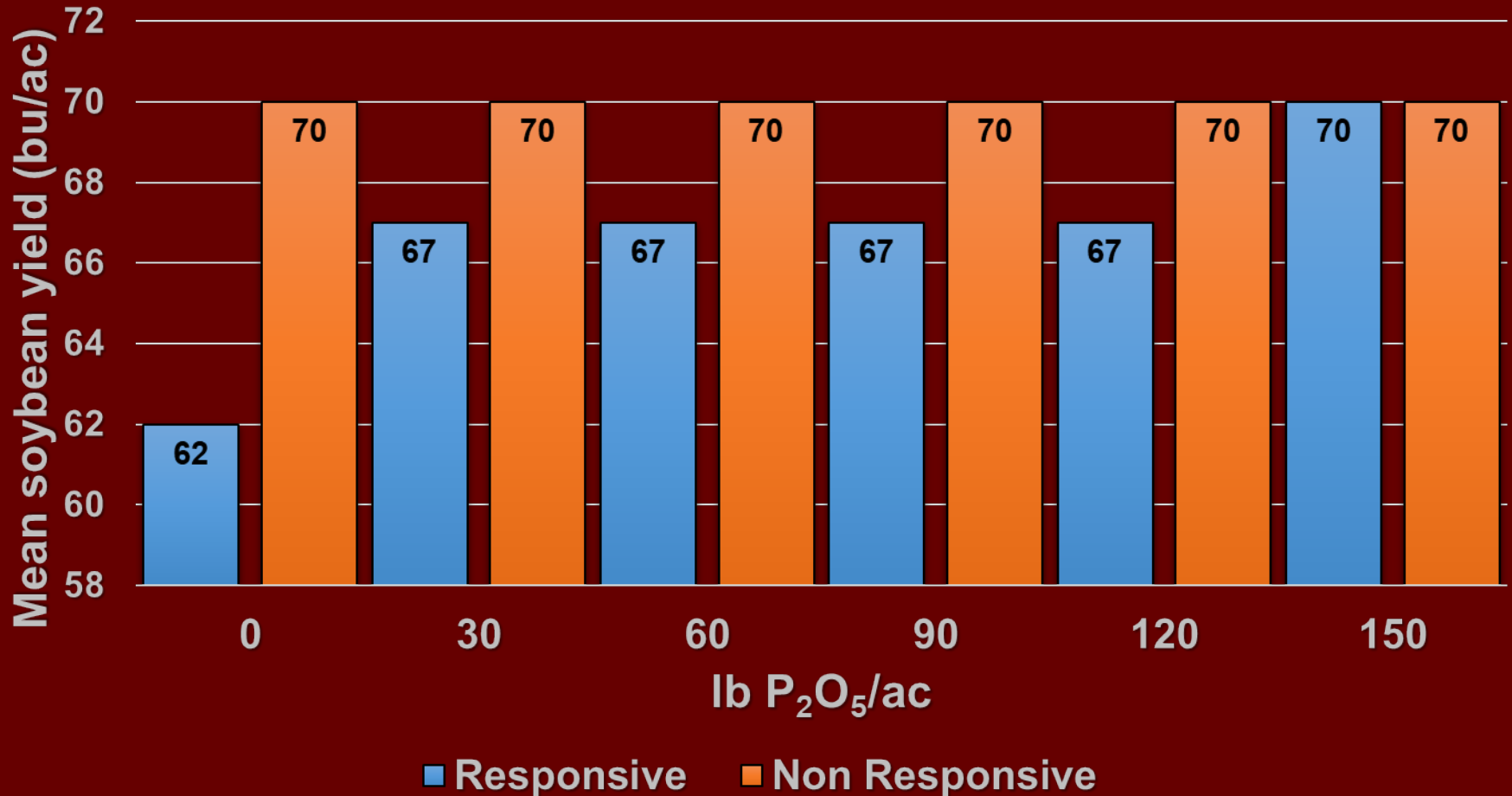
Adapted from: <http://www.ipni.net/article/IPNI-3296>



# Base P and K Fertility

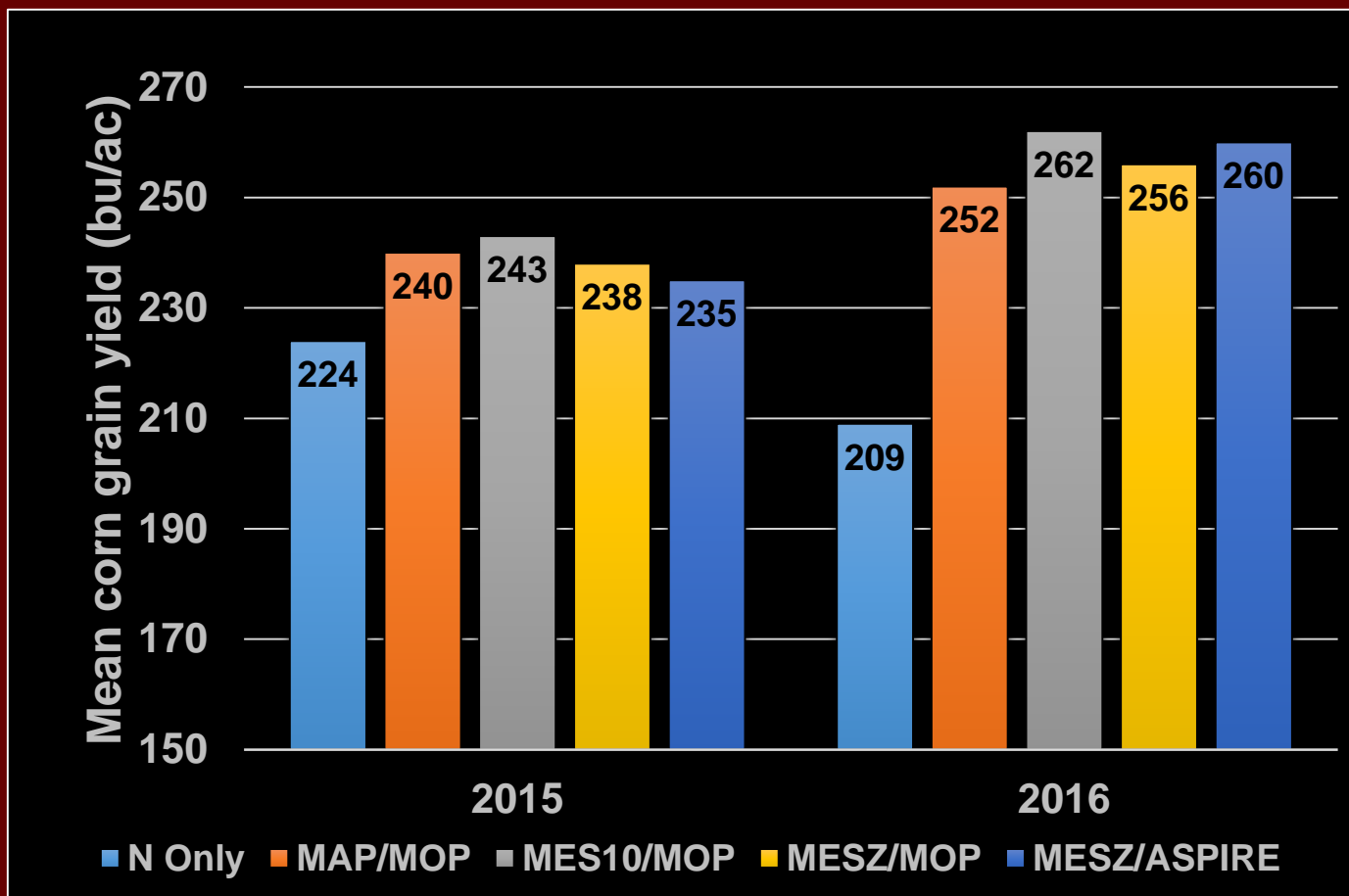


# Base P and K Fertility



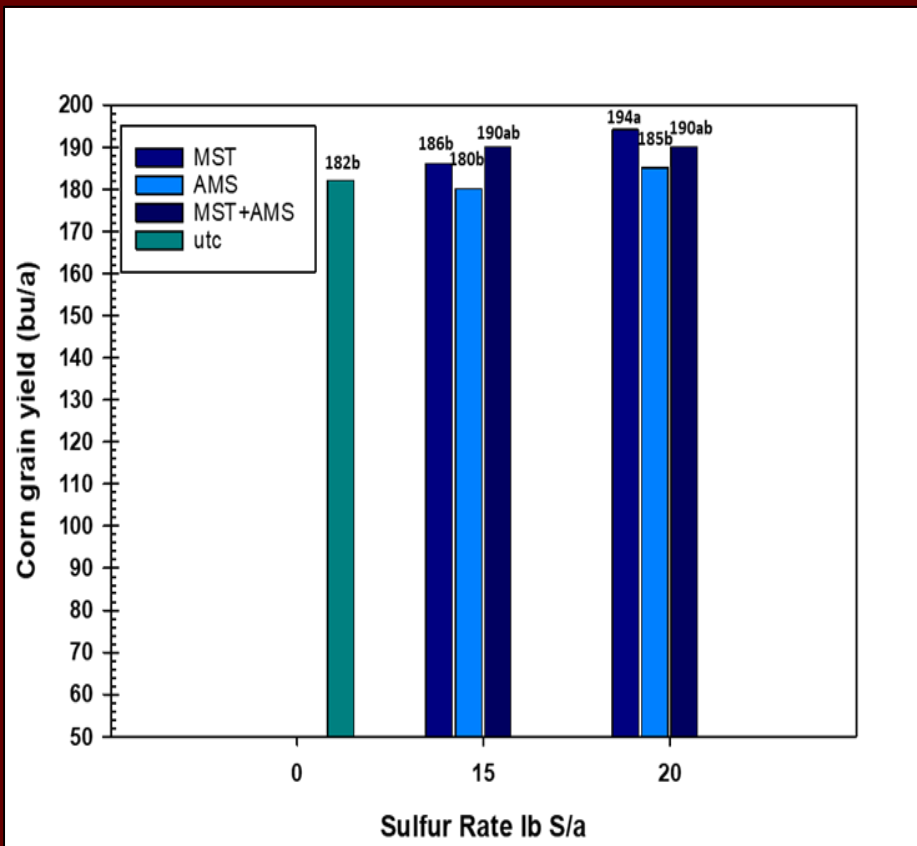


# Base P and K Fertility

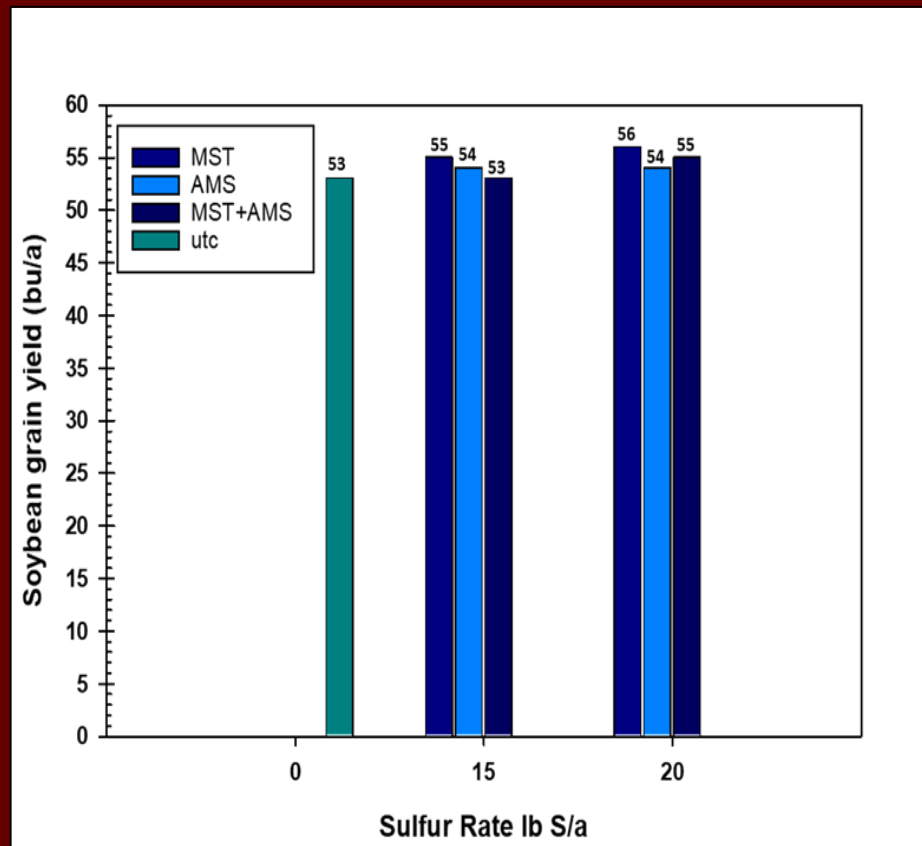


# Sulfur Fertility

## Corn



## Soybean

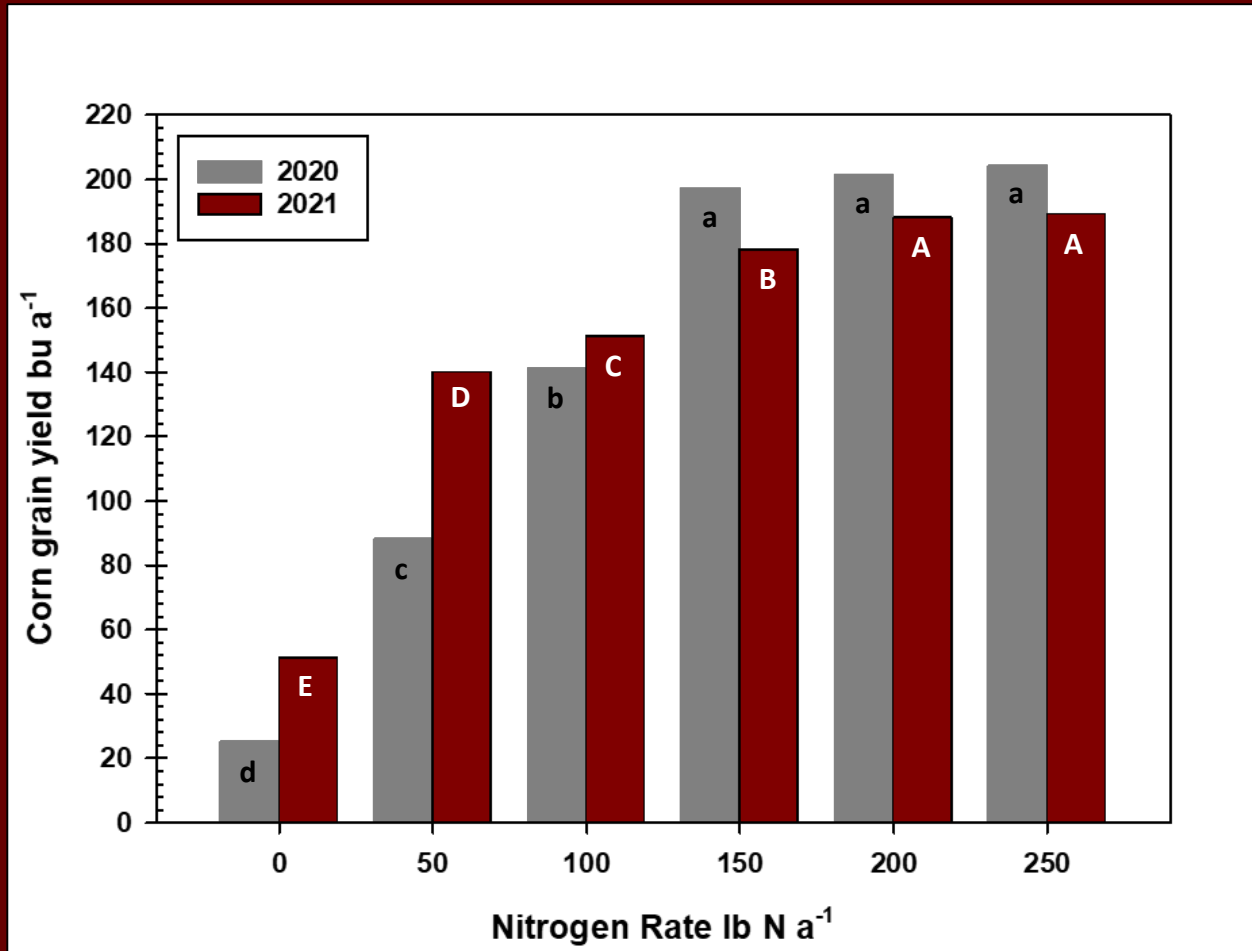


# Nitrogen Management

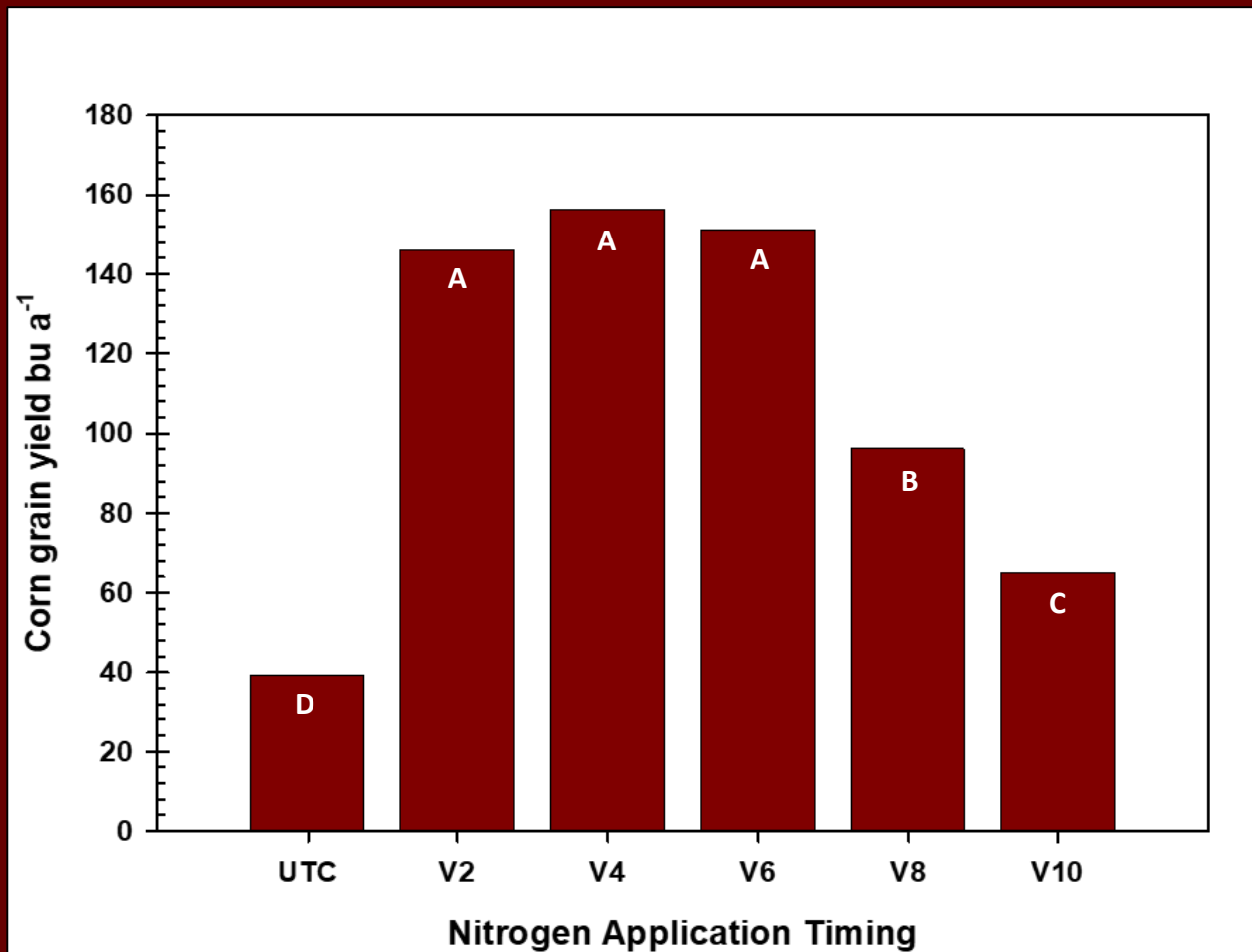


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# Nitrogen Management



# Nitrogen Management Reclamation Study

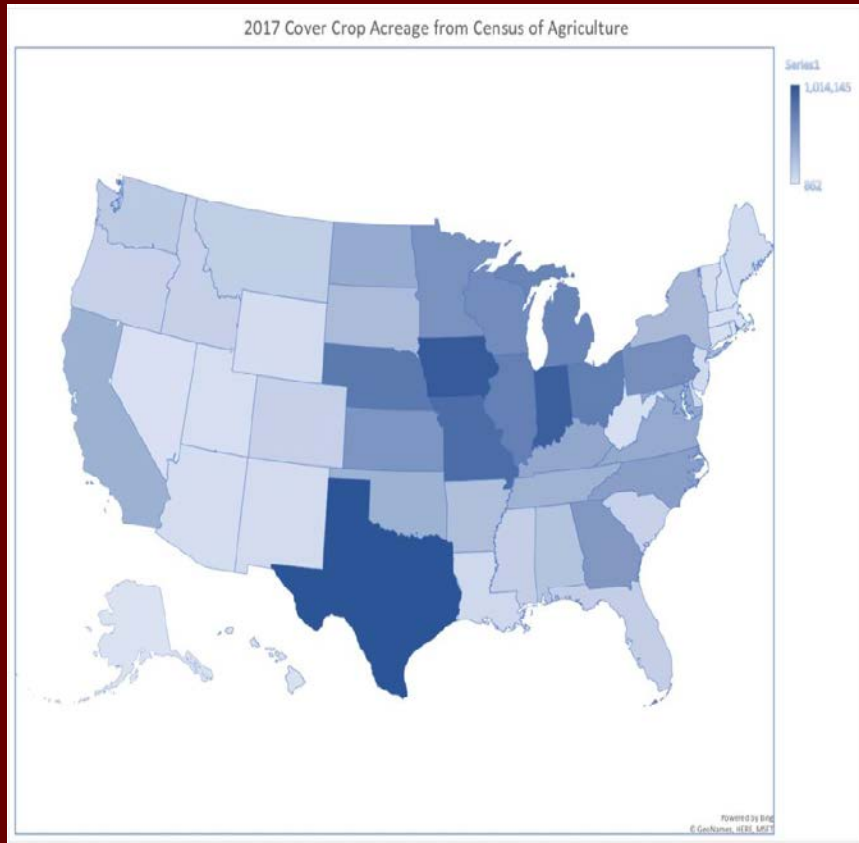


# Fertilizer and Cover Crops

- Carvalho et al. (2011) suggests that mineralization of nutrients from cover crop residues were able to maintain corn yields in Brazil.
- Hutchinson et al. (1995) reported that 34% more N was needed by a cotton crop in Alabama following a winter wheat cover crop when compared to a fallow field.
- Cover Crop system and species effect on fertility needs?



# Cover Crop Use Trends



Rank	State	Percent Increase
1	Iowa	156.3%
2	Arizona	123.2%
3	Illinois	122.2%
4	Missouri	115.9%
5	Mississippi	111.4%
6	Nebraska	109.3%
7	Vermont	101.6%
8	Ohio	100.9%
9	North Dakota	89.1%
10	Maine	88.8%
11	South Dakota	88.5%
12	Tennessee	85.4%
13	Arkansas	82.9%
14	Kansas	72.6%
15	New Hampshire	65.7%
16	Indiana	57.1%
17	Michigan	54.0%
18	South Carolina	53.1%
19	Oklahoma	50.6%
20	Georgia	43.4%
21	Minnesota	41.9%
22	New York	37.2%
23	Virginia	35.7%
24	West Virginia	33.9%
25	Pennsylvania	33.4%
26	Nevada	33.0%
27	Oregon	29.7%
28	Delaware	25.7%
29	Maryland	25.4%
30	New Jersey	25.0%
31	Idaho	24.6%
32	North Carolina	22.9%
33	Louisiana	22.7%
34	Montana	18.2%
35	Kentucky	17.9%
36	Alabama	15.0%
37	Texas	11.3%
38	Wisconsin	10.5%
39	Connecticut	7.6%
40	Hawaii	7.3%
41	Utah	6.6%
42	Florida	2.9%
43	California	2.9%
44	Colorado	2.8%
45	Massachusetts	1.8%
46	Washington	-1.4%
47	Rhode Island	-9.0%
48	Wyoming	-12.0%
49	New Mexico	-25.8%
50	Alaska	-74.1%

**Mississippi: 140,000 acres of cover crops (4.2%).**



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# Nitrogen requirements following cover crops

## Nitrogen Trial

**Cash Crop:** Corn

**Factor A:**

No cover, Cereal Mix, Clover Mix

**Factor B:**

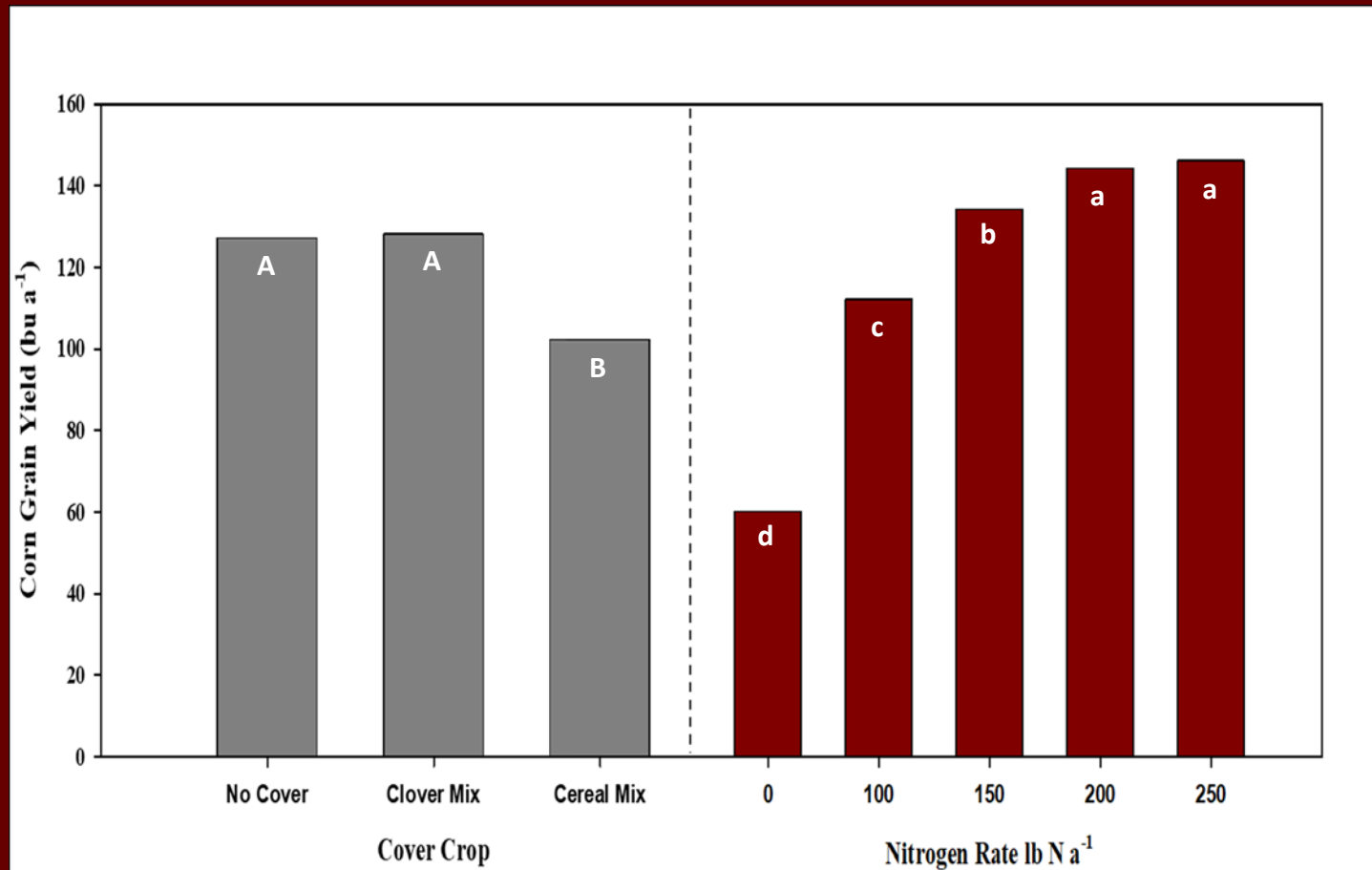
0, 100, 150, 200, 250 lb ai/a N

Data was subjected to ANOVA  
using the PROC MIXED procedure  
in SAS v. 9.4 and analyzed at ( $p < 0.10$ ).

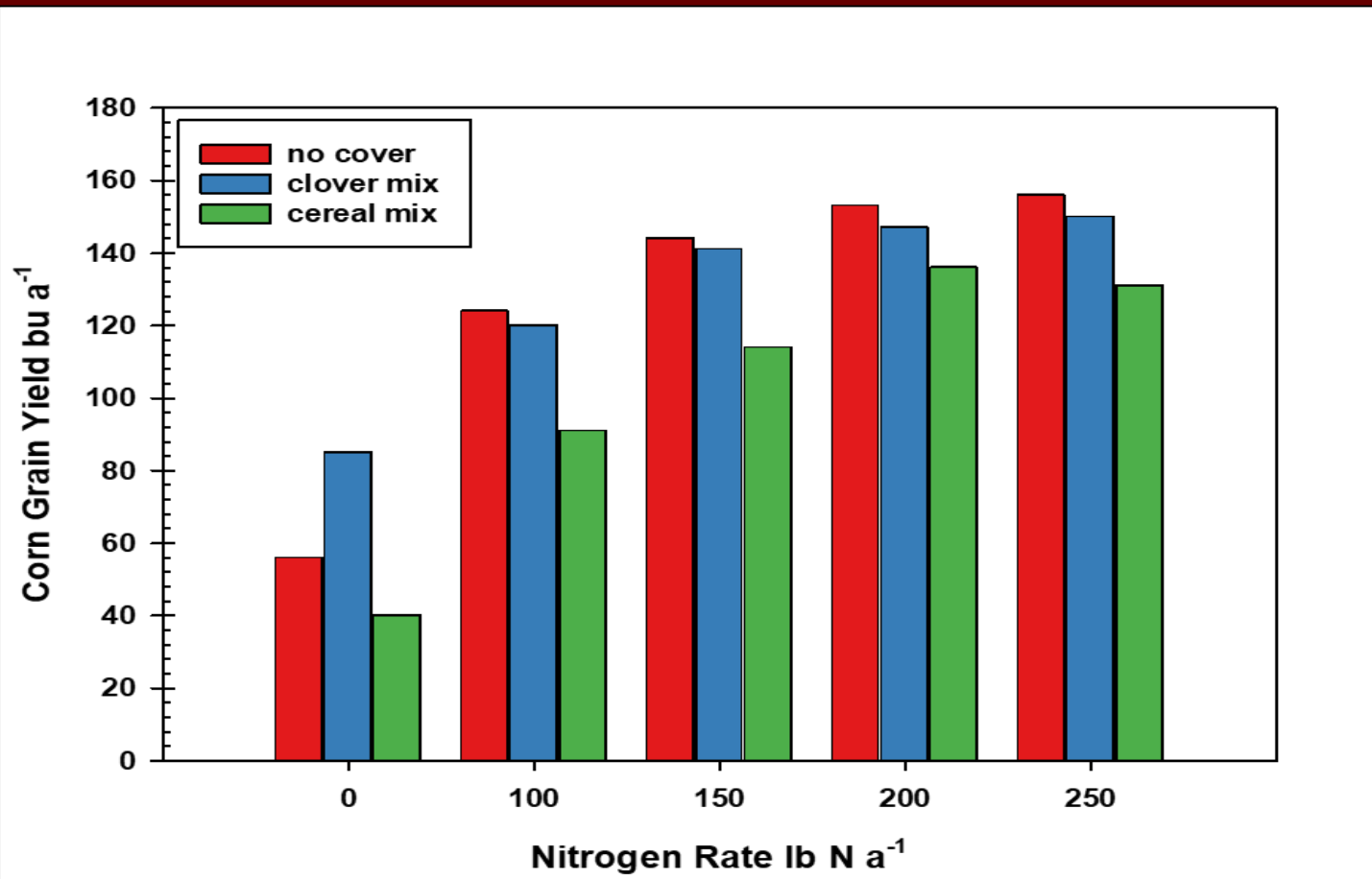




# Nitrogen requirements following cover crops



# Nitrogen requirements following cover crops



# P and K availability following cover crops

## Phosphorus Trial

**Cash Crop:** Soybean

**Factor A:**

No cover, Cereal Rye, Winter Wheat,  
Crimson Clover, Tillage Radish

**Factor B:**

No Fertilizer, 46 lb ai/a  $P_2O_5$  - Fall applied

## Potassium Trial

**Cash Crop:** Soybean

**Factor A:**

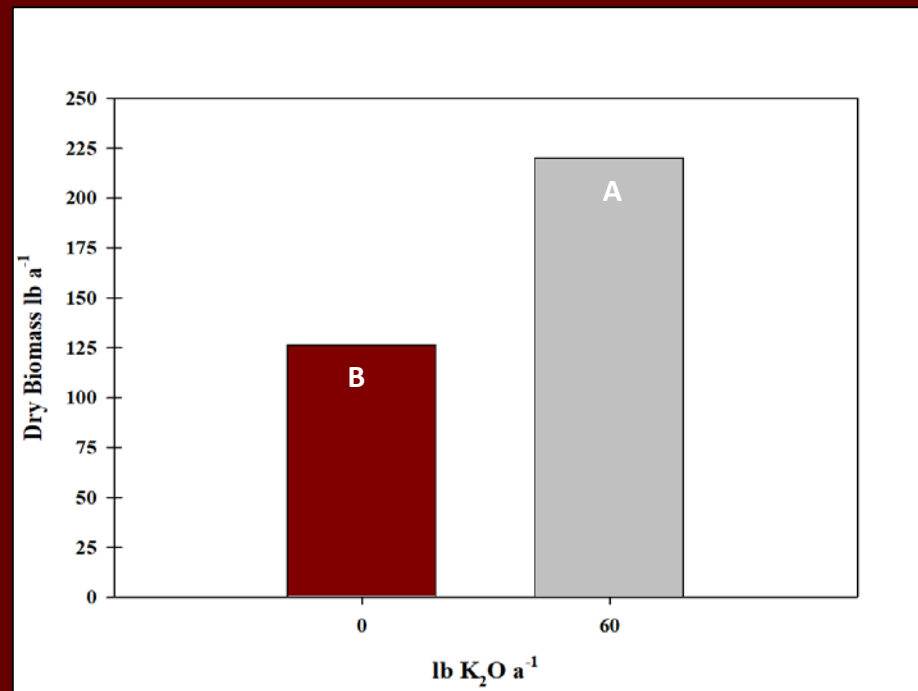
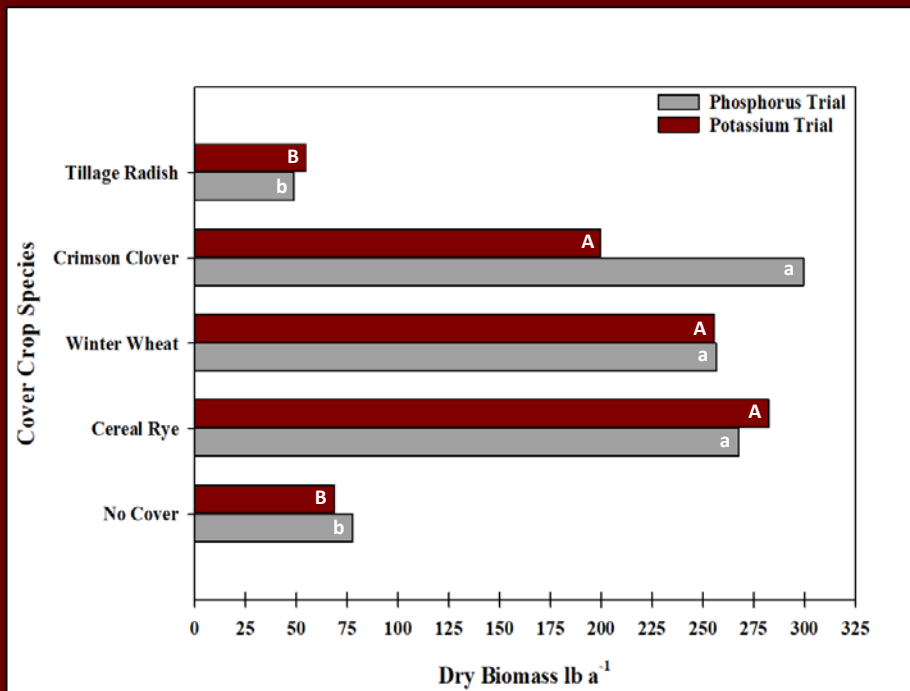
No cover, Cereal Rye, Winter Wheat,  
Crimson Clover, Tillage Radish

**Factor B:**

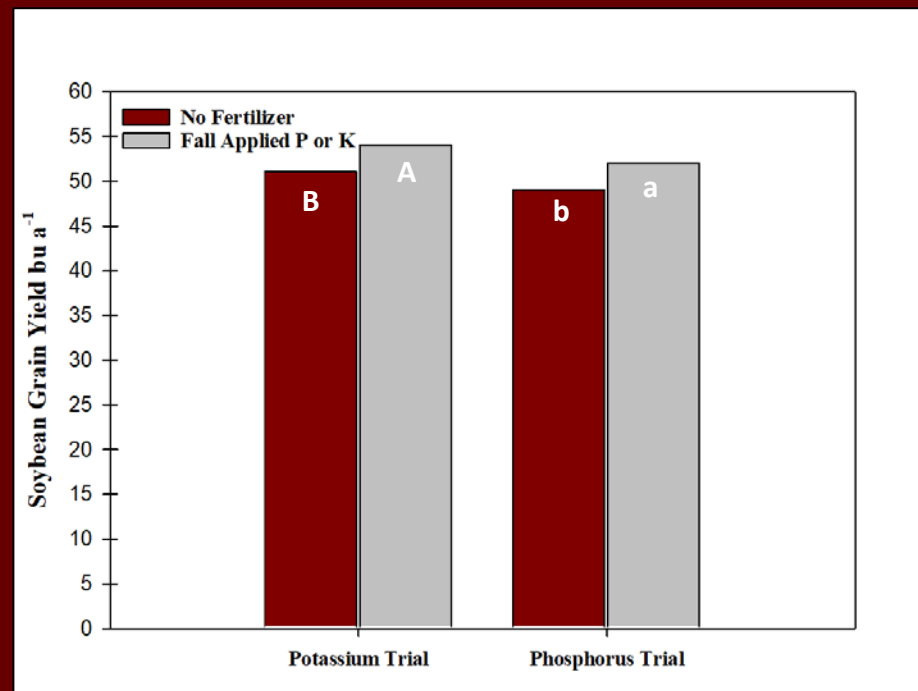
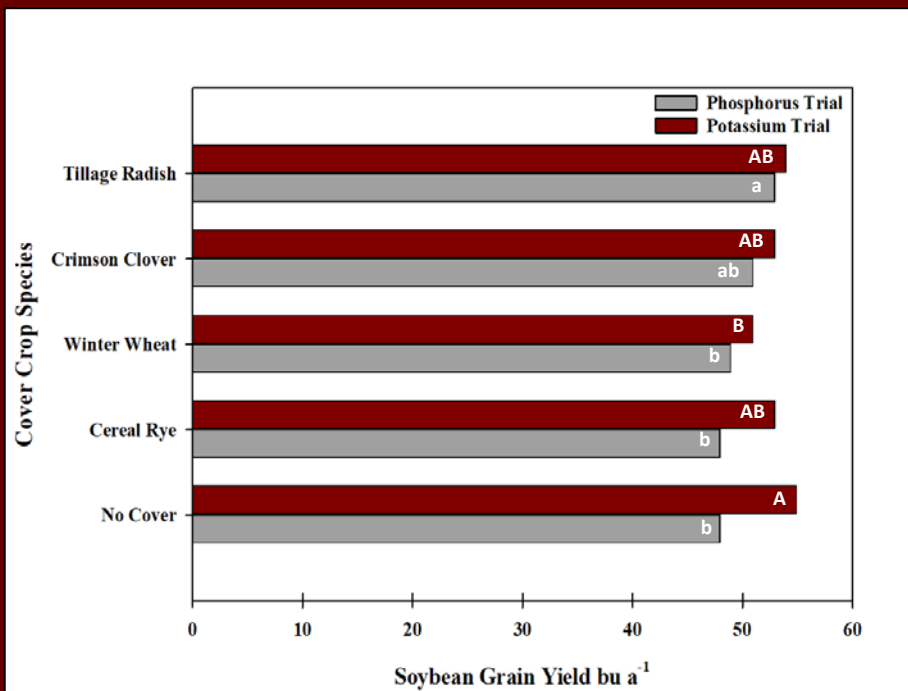
No Fertilizer, 60 lb ai/a  $K_2O$  - Fall applied



# P and K availability following cover crops



# P and K availability following cover crops



# Conclusions

- Base fertility is key to Corn and Soybean yields in Mississippi.
- Don't forget to manage your nitrogen.
- How will cover crops effect your fertility program?
- Economics will drive cover crop and fertility decisions.



# Questions?

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Photo: McCoy



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