

# MSU Short Course 2021

## Production Issues, Cotton Nutrient Management, and Variety Performance



*Brian Pieralisi*

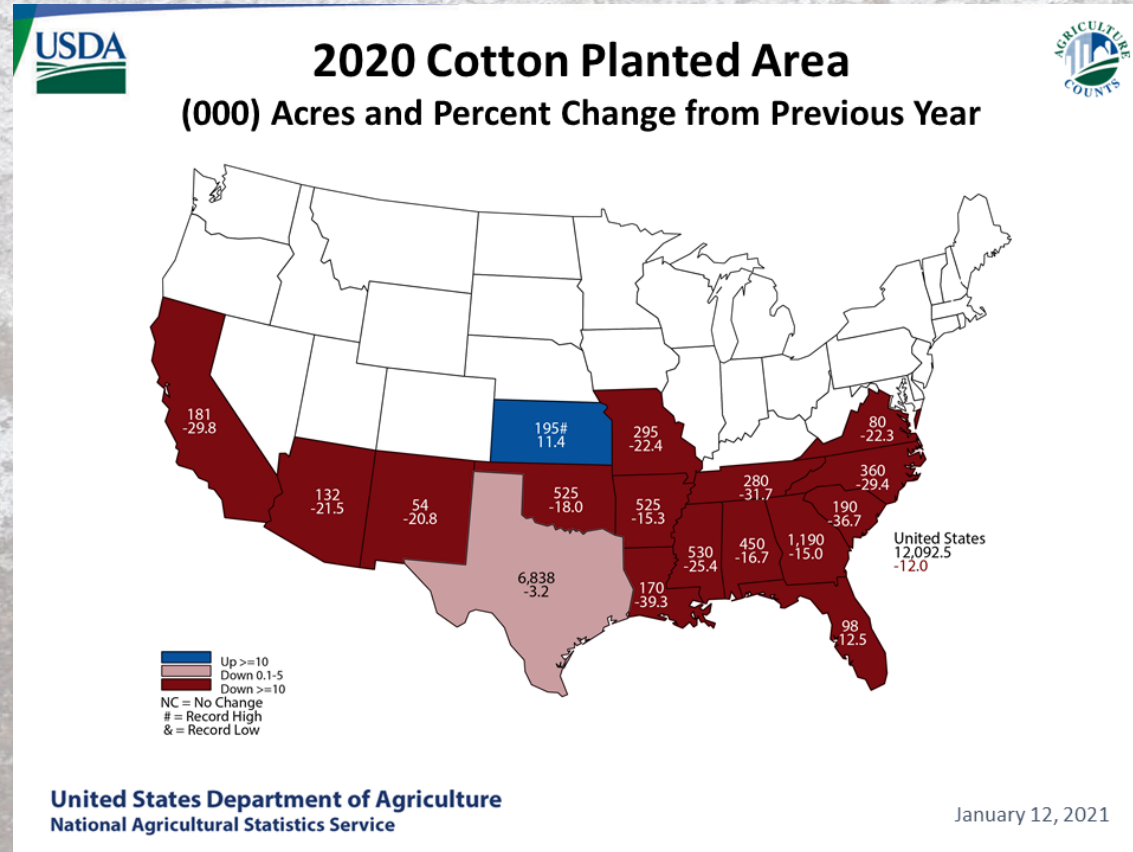




# Statewide Outlook

Mississippi 2020 525,000 acres  
Mississippi 2021  
Acres harvested: ~450,000  
(-15.3%)

Yield: 2020 1100 lbs/ A  
2021 – slightly below?





# Statewide Outlook

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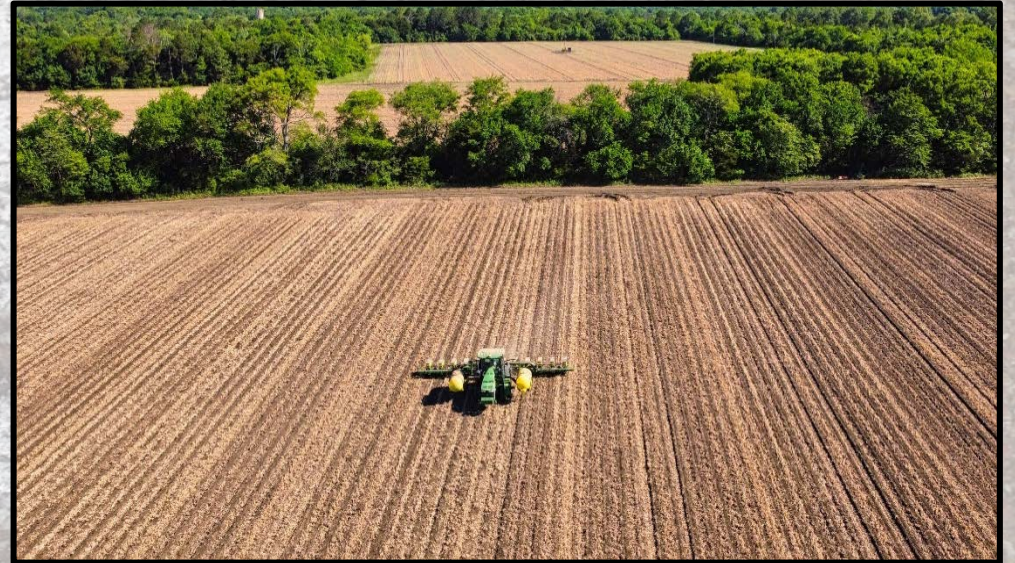
## Mississippi 2022

Acres approximately +/- 525,000

December cotton 2021 ~\$1.10

Anticipate input shortages

Anticipate input cost increases



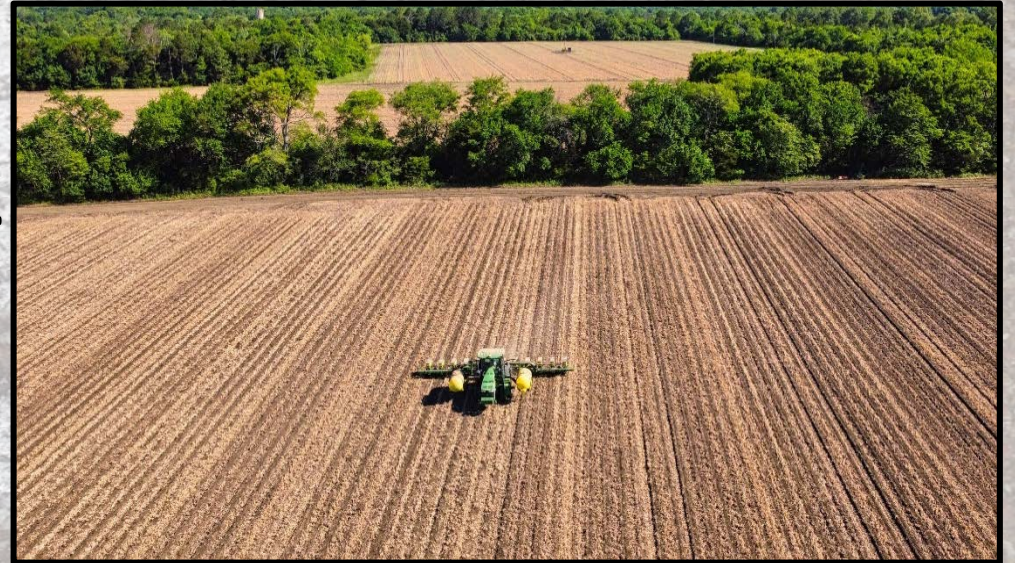


# Statewide Outlook

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## Considerations for 2022 crop

- Purchase next years inputs in 2021
- Fuel, fertilizer, chemicals
- Secure variety selection and acres







# Statewide Outlook

**Cotton Lint 1500lb X \$0.80 = \$1275.00**  
**Cotton Seed 2025lb X \$0.08 = \$162 .00**  
**Total Income = \$1437.00**  
**Expenses**  
**Total Direct = \$800.00**  
**Total Fixed= \$172.60**  
**Total Expenses \$972.60**  
**Net Return \$464.40**

**Cotton Lint 1500lb X \$1.10 = \$1650.00**  
**Cotton Seed 2025lb X \$0.08 = \$162 .00**  
**Total Income = \$1812.00**  
**Expenses**  
**Total Direct = \$800.00**  
**Total Fixed= \$172.60**  
**Total Expenses \$972.60**  
**Net Return \$840.00**







# Planting Struggles



CC termination delays  
Excessive vegetation







# Planting Struggles





# Flood Impacts





# Flood Impacts





# Late Season

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- Rain from Hurricane Ida
- Relatively dry fall
- Good defoliation early
- Some cool weather defoliation later
- Late harvest in general
- Most growers had adequate weather to establish rows for next year – a very good thing!





# Nitrogen



GO

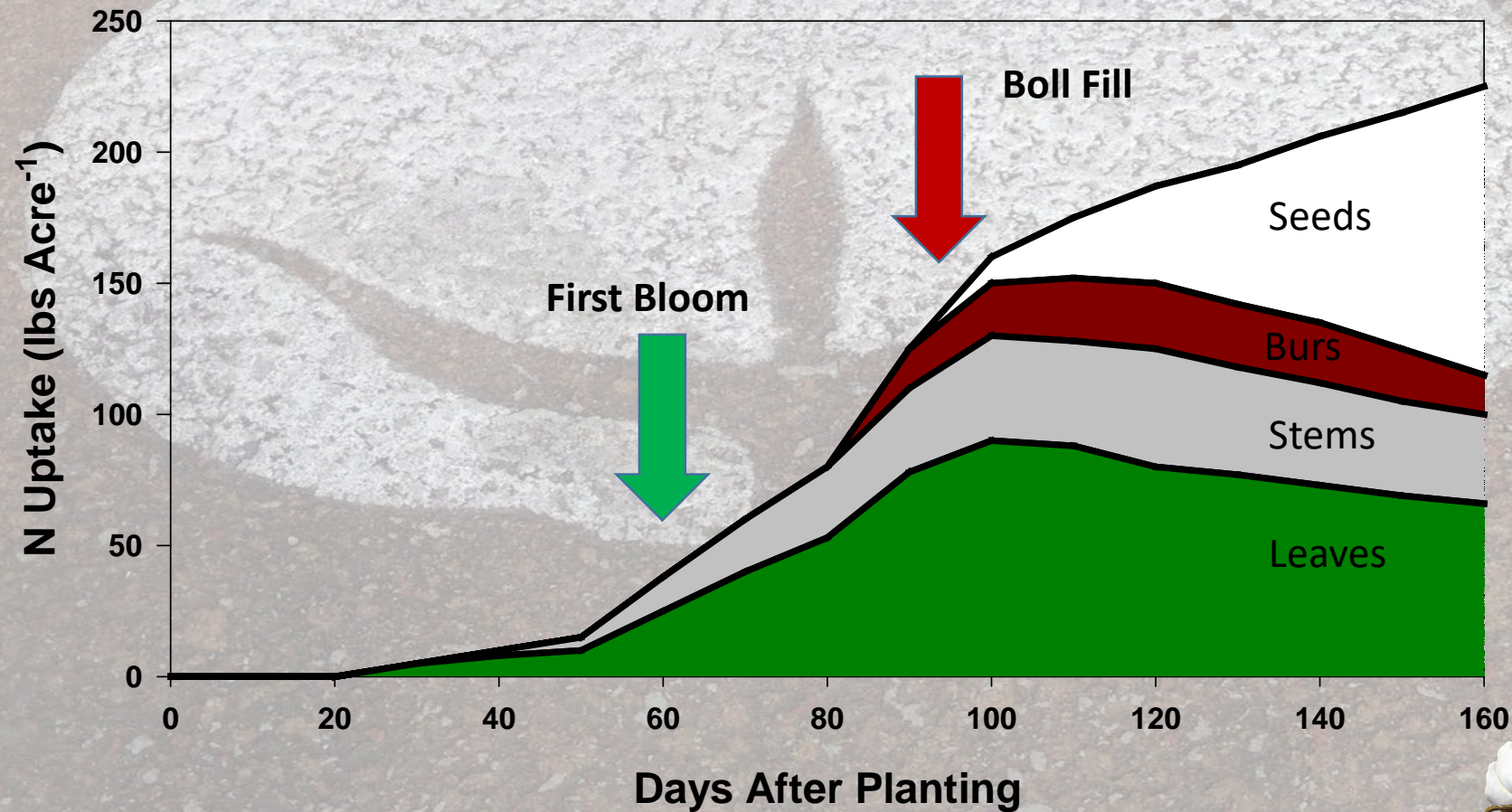


STOP





# Nitrogen Uptake and Partitioning in Cotton



Source: Univ. Arizona





# Nitrogen

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# Nitrogen

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- **Post Flood Nitrogen Effects**
- **How do we lose nitrogen?**
  - Leaching ✓
  - Denitrification ✓
  - Volatilization ✓
  - \* In some cases we experienced all 3\*





# Nitrogen

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- **Leaching**
  - $\text{NO}_3^-$  moves downward in soil profile with excessive rainfall
- **Denitrification**
  - Waterlogged soil
  - Bacterial breakdown nitrogen into nitrogen gas
- **Volatility**
  - Loss of nitrogen to the atmosphere
  - Rate of loss increase with temperature and soil pH



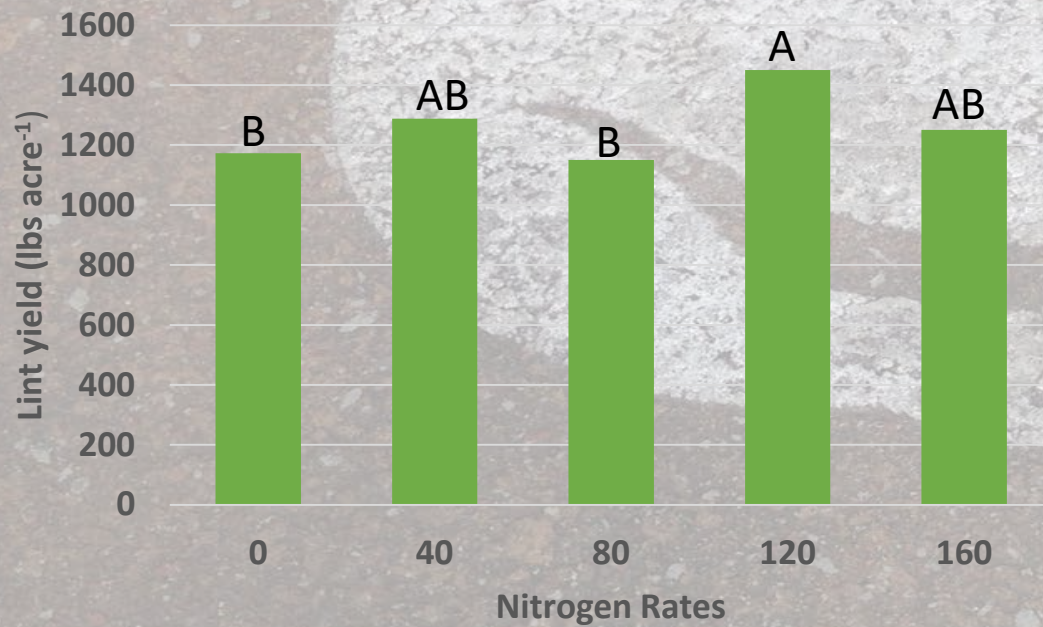


# Nitrogen

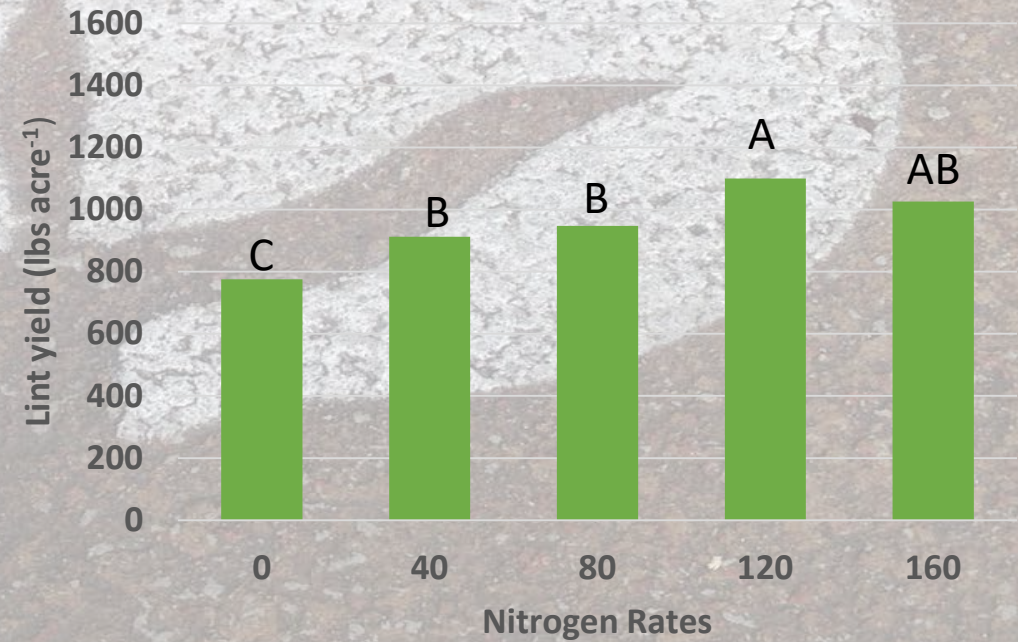
2020

2021

Cotton Yield x Nitrogen Rate

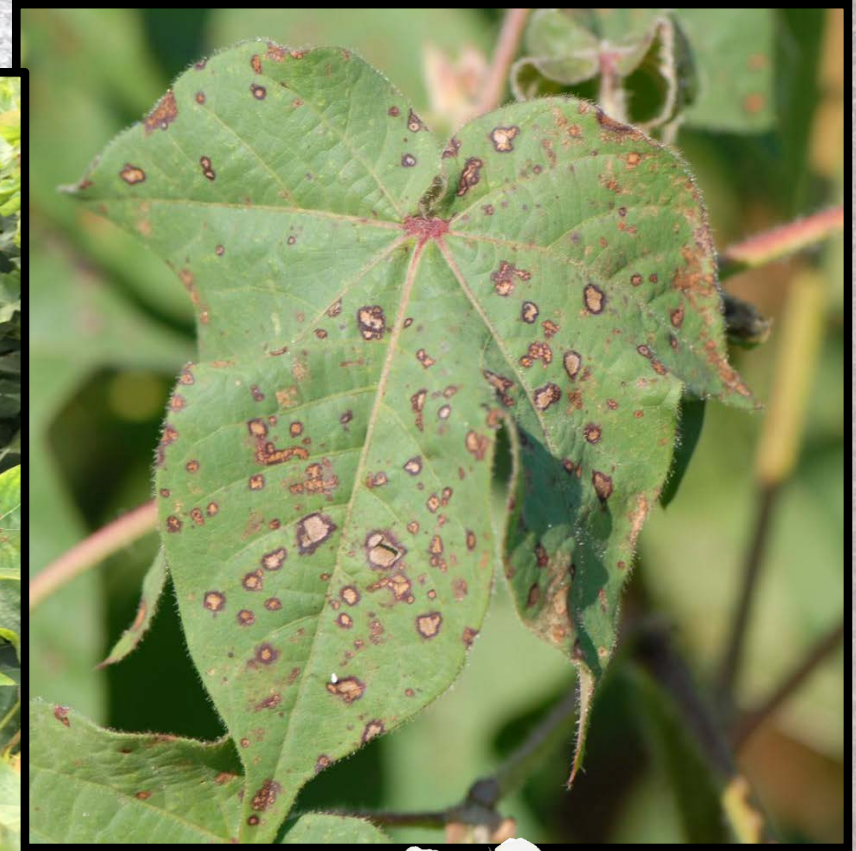


Cotton Yield x Nitrogen Rate





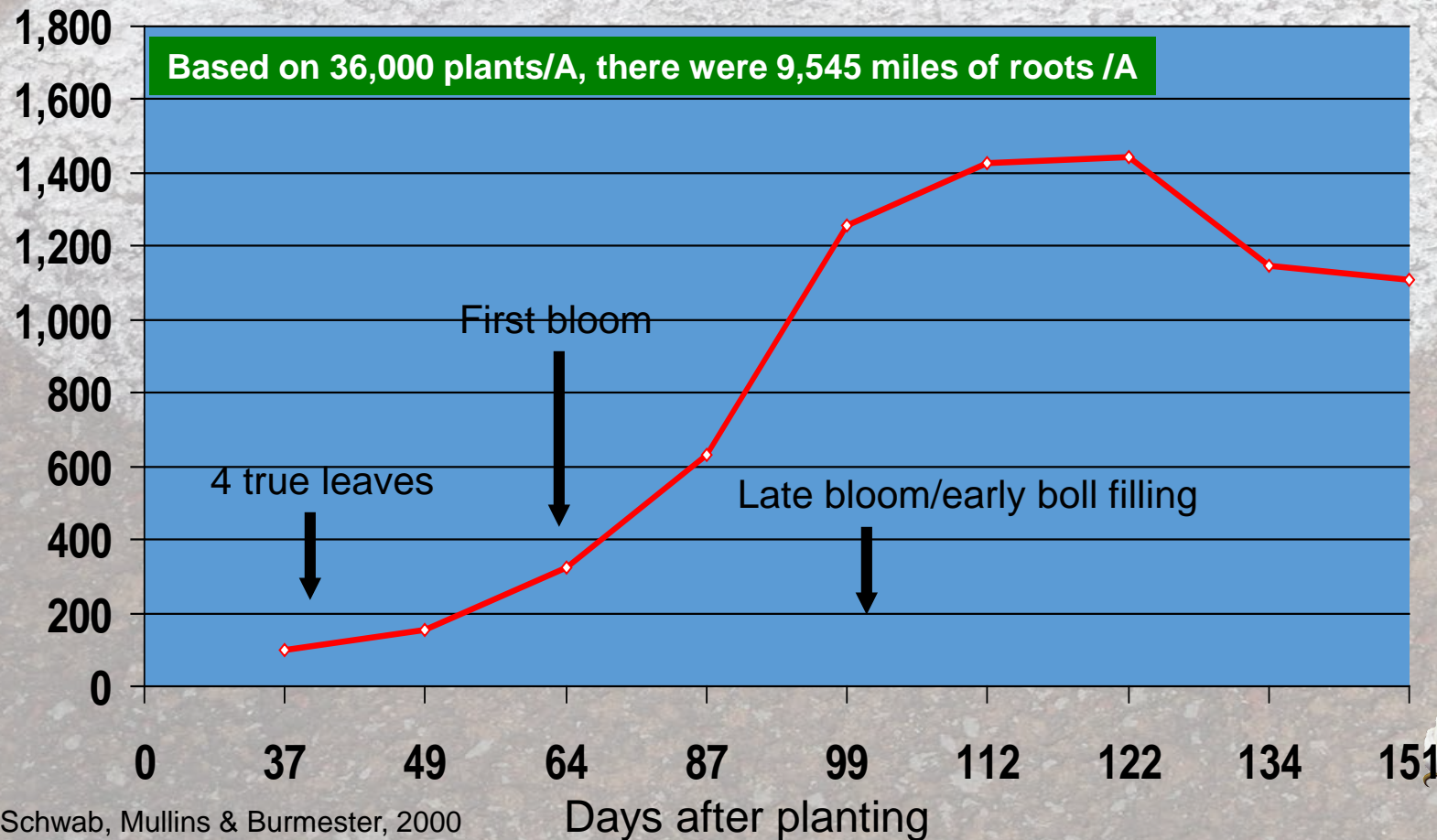
# Potassium





# Potassium

Roots, ft/plant

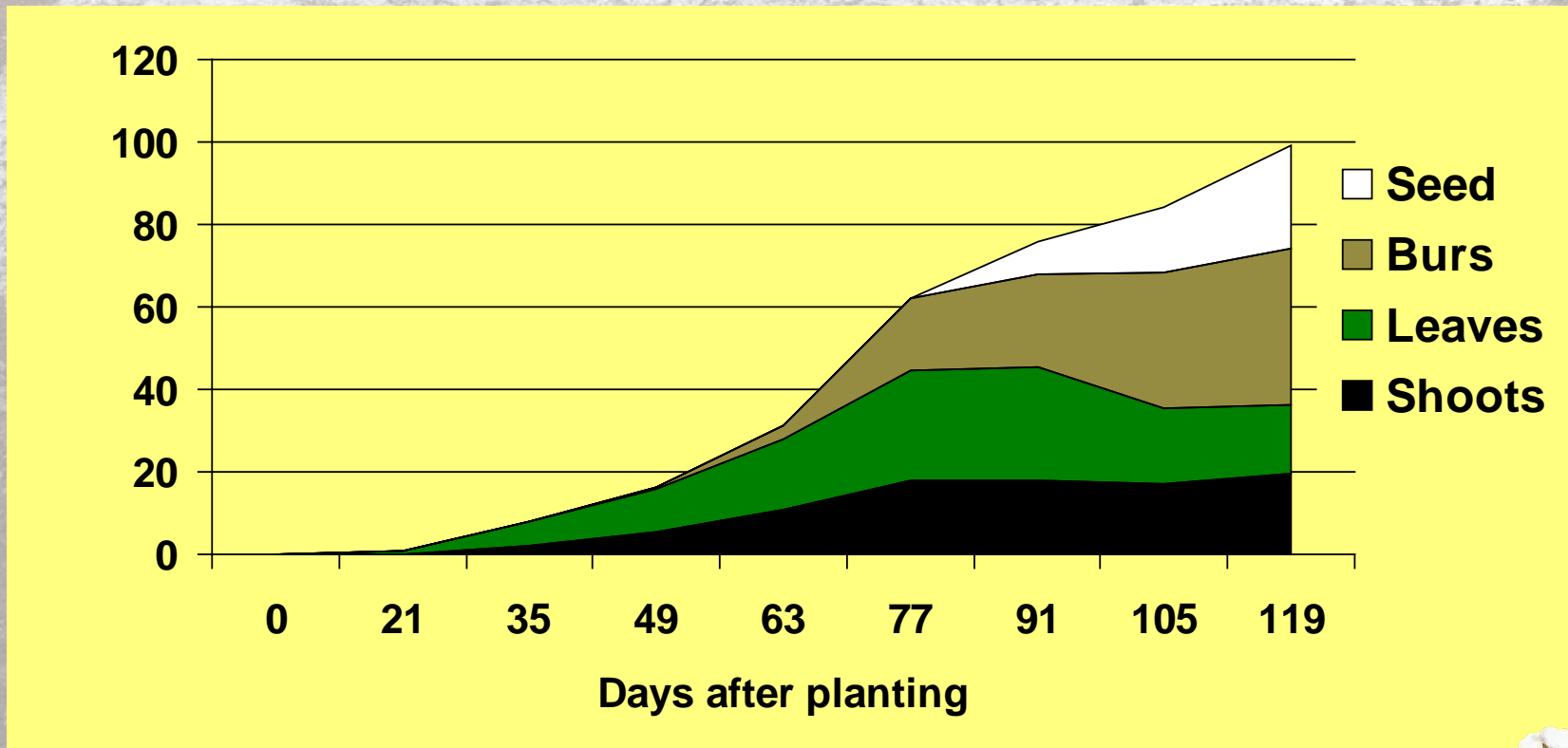


Source: Schwab, Mullins & Burmester, 2000





# Potassium



~ 25% of total uptake is removed at harvest





# Potassium

Graduate student Eli Hobbs project:  
Cover crop x Potash fertilizer timing

Locations:

- North Farm, MSU
- Verona, MS
- Brooksville, MS

Cover crop treatments

- No cover crop
- Cereal rye
- Crimson clover
- Blend

Fertilizer treatments

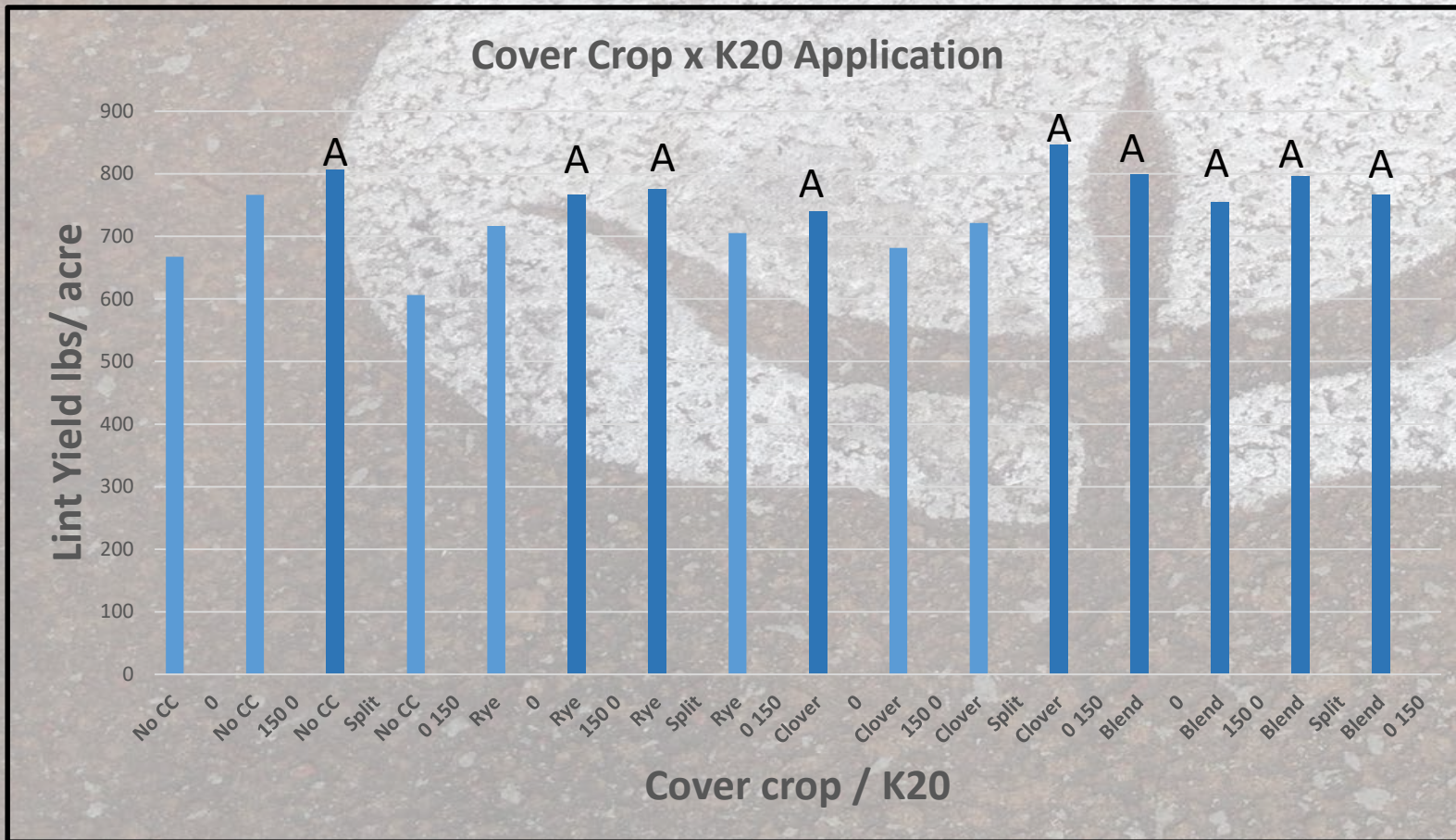
- No fertilizer
- 150lbs/acre at planting
- 150lbs/acre at pin head square
- 50/50 applied at planting/pinhead square





# Potassium

Cover Crop x Timing interaction pooled across location



## Greatest yields achieved:

- Cover crop blend regardless of timing
- Clover full amount applied pinhead square
- Cereal rye applied at planting or split
- No cover crop applied at planting





# Potassium

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- **Considerations**
- **Potassium demand is great a boll set**
- **Low CEC soils**
  - **Apply  $K_2O$  in the spring**
  - **Make split applications**
  - **Know soil test levels based on field/ soil texture**
- **Crop mix**





# Sulfur



- Symptoms in upper canopy
- Becoming more common
- Coarse textured soils
- Low organic matter content
- Ammonium or potassium sulfate





# Boron



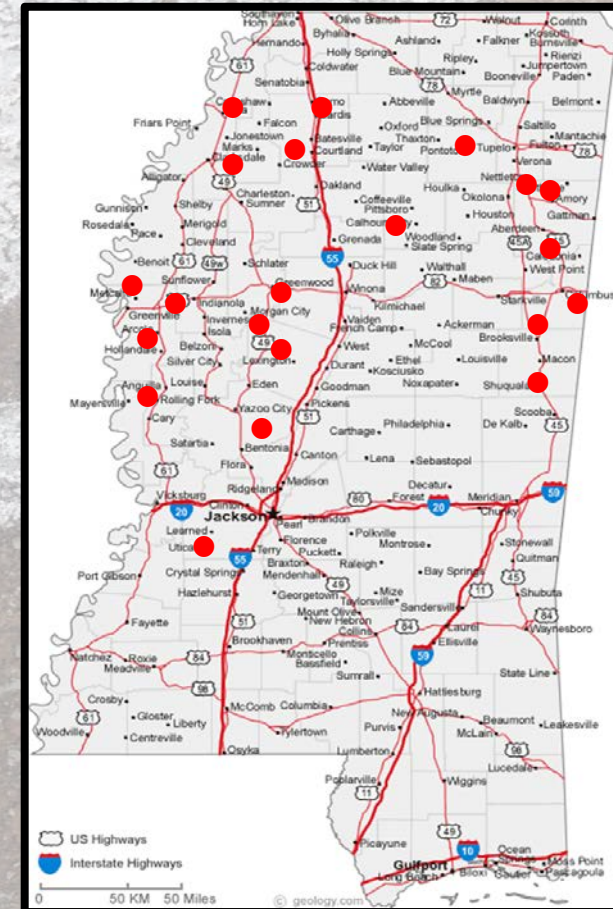
- Short, thick petioles
- Pretty rare
- Usually found in coarse texture soils/low OM
- Particularly after liming
- 1/3 to 1/2 lb acre-1
- Likely no yield increase on finer textured soils with > 1.5% OM





# 2021 Cotton Variety Testing

- Mississippi on-farm county demonstration (14)
- Mississippi Official Variety Trials (7)





# Cotton Variety Selection

2021 MSU On-Farm Variety Trial Data (Pieralisi et al., 2021)			
MSU OVT (All Locations)		MS On-Farm Variety Trials (All Locations)	
Variety	Yield (lbs ac <sup>-1</sup> )	Variety	Yield (lbs ac <sup>-1</sup> )
<b>PHY Px 4B08 W3FE</b>	<b>1181</b>	<b>PHY Px 4B08 W3FE</b>	<b>1188</b>
<b>DP 2127 B3XF</b>	<b>1154</b>	PHY 443	1110
<b>DP 2115 B3XF</b>	<b>1123</b>	DP 2127 B3XF	1101
<b>PHY 400 W3FE</b>	<b>1118</b>	DP 2012 B3XF	1097
<b>20R744 B3XF</b>	<b>1111</b>	PHY 332 W3FE	1094
<b>NG 3195 B3XF</b>	<b>1111</b>	ST 5091 B3XF	1068
<b>BX 2295 B3XF</b>	<b>1109</b>	DP 1646 B2XF	1105
<b>PHY 443 W3FE</b>	<b>1100</b>	DG 3535 B3XF	1052
PHY 390 W3FE	1084	NG 4936 B2XF	1013
DG 3456 B3XF	1084	NG 5150 B3XF	993

LSD (0.05) 87 lbs/A

LSD (0.05) 64 lbs/A





# Cotton Variety Selection

2021 MSU On-Farm Variety Trial Data (Pieralisi et al., 2021)			
MSU OVT ( <b>Delta</b> )		MS On-Farm Variety Trials ( <b>Delta</b> )	
Variety	Yield (lbs ac <sup>-1</sup> )	Variety	Yield (lbs ac <sup>-1</sup> )
<b>PHY Px 4B08 W3FE</b>	<b>1556</b>	<b>PHY 443 W3FE</b>	<b>1380</b>
<b>NG 3195 B3XF</b>	<b>1550</b>	<b>PHY 332 W3FE</b>	<b>1358</b>
<b>NG 5150 B3XF</b>	<b>1447</b>	<b>PHY Px 4B08 W3FE</b>	<b>1282</b>
DP 2127 B3XF	1440	<b>DP 2127 B3XF</b>	<b>1273</b>
PHY 390 W3FE	1419	DP 2012 B3XF	1209
Armor 9371 B3XF	1412	ST 5091 B3XF	1192
PHY 443 W3FE	1389	DG 3535 B3XF	1185
DP 2115 B2XF	1377	DP 1646 B2XF	1143
NG 4190 B3XF	1377	NG 4936 B3XF	1143
Px 1140A383 W3FE	1370	NG 5150 B3XF	1093

LSD (0.05) 111 lbs/A

LSD (0.05) 113 lbs/A





# Cotton Variety Selection

2021 MSU On-Farm Variety Trial Data (Pieralisi et al., 2021)			
MS OVT (Hills)		MS On-Farm Variety Trials (Hills)	
Variety	Yield (lbs ac <sup>-1</sup> )	Variety	Yield (lbs ac <sup>-1</sup> )
<b>BX 2297 B3XF</b>	<b>819</b>	<b>PHY Px 4B08 W3FE</b>	<b>1107</b>
<b>DP 1646 B3XF</b>	<b>799</b>	DP 2012 B3XF	1016
<b>BX 2295 B3XF</b>	<b>799</b>	DP 1646 B2XF	1001
<b>DP 2127 B3XF</b>	<b>790</b>	PHY 443 W3FE	991
<b>Px1130A329 W3FE</b>	<b>786</b>	ST 5091 B3XF	978
<b>ST 5091 B3XF</b>	<b>784</b>	DP 2127 B3XF	978
<b>DP 2115 B3XF</b>	<b>783</b>	PHY 332 W3FE	977
<b>20R744 B3XF</b>	<b>770</b>	DG 3535 B3XF	956
<b>Armor 9608 B3XF</b>	<b>768</b>	NG 5150 B3XF	921
<b>BX 2298 B3XF</b>	<b>760</b>	NG 4936 B3XF	920

LSD (0.05) 136 lbs/A

LSD (0.05) 79 lbs/A





# Cotton Variety Selection

2021 MSU On-Farm Variety Trial Data (Pieralisi et al., 2021)			
Irrigated Locations		Dryland Locations	
Variety	Yield (lbs ac <sup>-1</sup> )	Variety	Yield (lbs ac <sup>-1</sup> )
<b>DP 2127 B3XF</b>	<b>1147</b>	<b>PHY Px 4B08</b>	<b>1206</b>
<b>PHY Px 4B08 W3FE</b>	<b>1145</b>	PHY 443 W3FE	1111
<b>PHY 332</b>	<b>1120</b>	DP 1646 B2XF	1074
<b>DP 2012 B3XF</b>	<b>1098</b>	DP 2012 B3XF	1062
<b>PHY 443 W3FE</b>	<b>1082</b>	DG 3535 B3XF	1052
ST 5091 B3XF	1057	ST 5091 B3XF	1049
DG 3535 B3XF	1027	PHY 332 W3FE	1034
DP 1646 B3XF	1024	DP 2127 B3XF	1010
NG 4936 B3XF	999	NG 4936 B3XF	1000
NG 5150 B3XF	978	NG 5150 B3XF	979

LSD (0.05) 87 lbs/A

LSD (0.05) 90 lbs/A





# Thank You



## Acknowledgements:

- Bradley Norris
- Will Rutland
- Eli Hobbs
- Tyler Soignier
- Student workers

