Fall vs. Spring Applied Phosphates in Cover Crop/Corn System in MS

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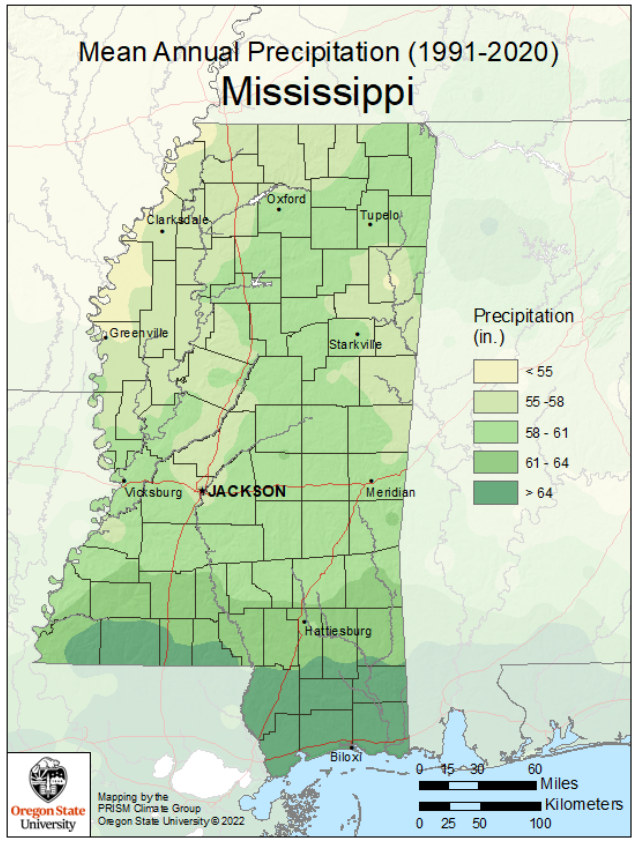
Mississippi Production Systems



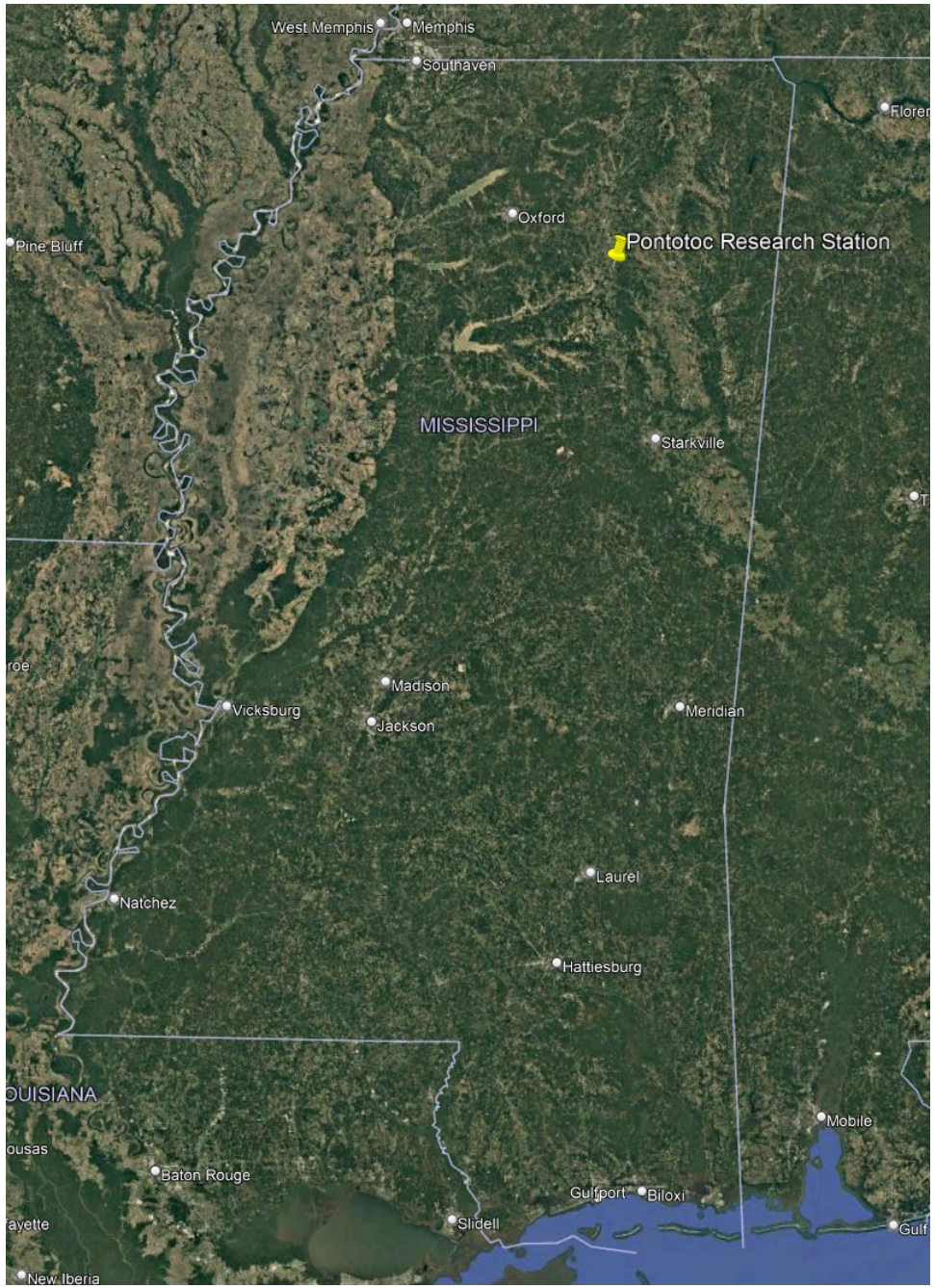
- Generally wet spring
- Lots of fall applied phosphates

Objective

- Determine how much fall applied DAP N can be credited (if any) to a subsequent crop
- Determine potential movement of soil nitrate in a fall applied in a cover crop system
- Investigate responsiveness to P fertilizer in fall vs. spring

Methodology

- Pontotoc, MS
  - Atwood Silt Loam (CEC 8)
  - pH 6.0
  - M3P 18 mg kg^{-1} (60 lb ac^{-1} rec. in Arkansas)
  - Non-Irrigated
- 2x4x2 Factorial
  - 2 products (DAP, TSP)
  - 4 rates (33.6, 67.2, 100.8, 134.4 kg ha^{-1})
  - 2 Timings (Fall, Spring)
- 0 P Check



Methodology

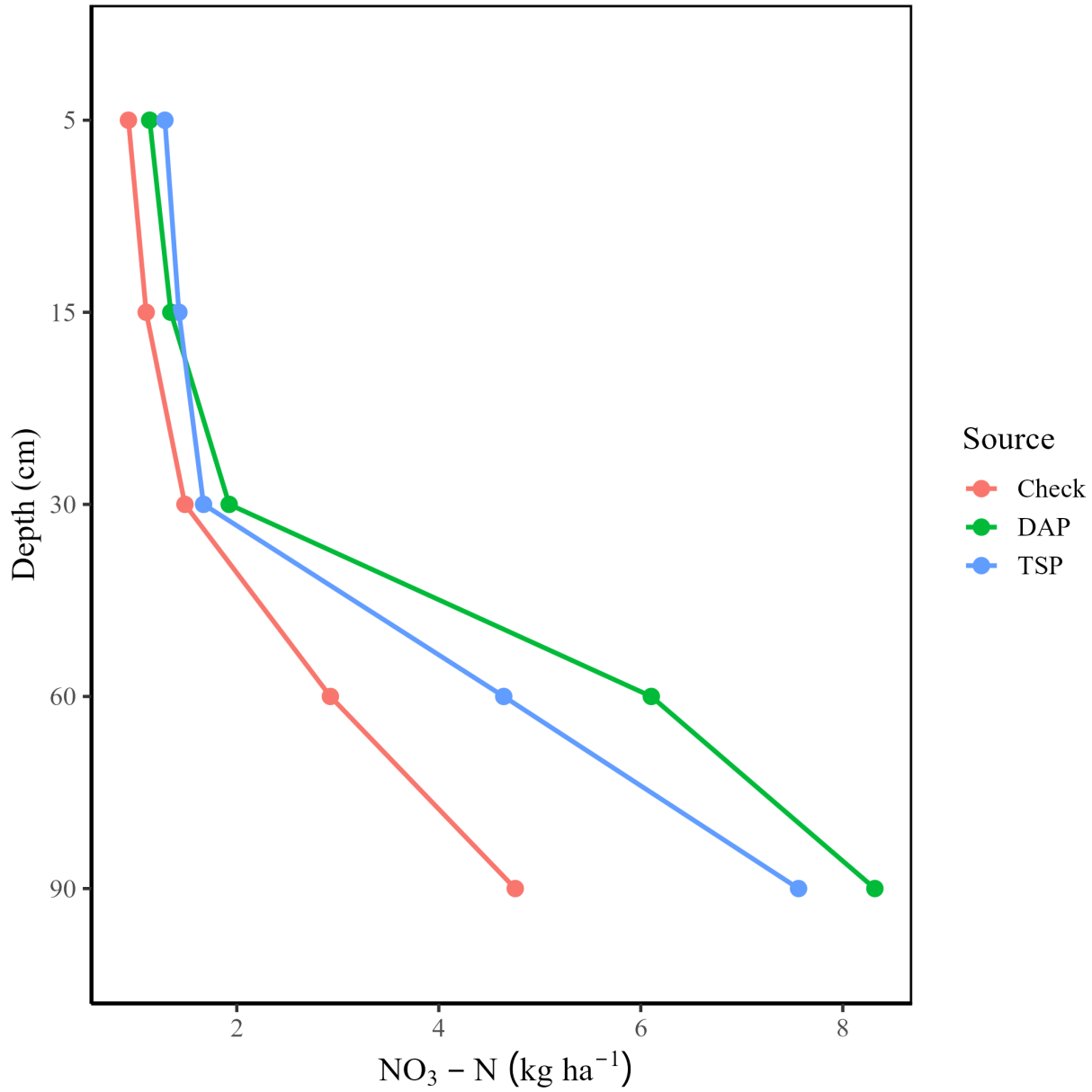
- 0-15 cm Soil Samples
- Deep Core samples for Nitrate Analysis
  - 0-5 cm
  - 5-15 cm
  - 15-30 cm
  - 30-60 cm
  - 60-90 cm
- Resin Lysimeter
  - 60 cm depth

Methodology

- Winter Wheat Cover Crop
  - Desiccated ~3 weeks prior to corn planting
- Lysimeters collected
- Deep core samples prior to desiccation
- Nitrogen Supplied at a non-limiting rate for corn crop

Deep Core Soil Test Data

At Trial Establishment (Fall 2023)	
Depth (cm)	Nitrate (kg ha^{-1})
0-5	20
5-15	8
15-30	6
30-60	7
60-90	8



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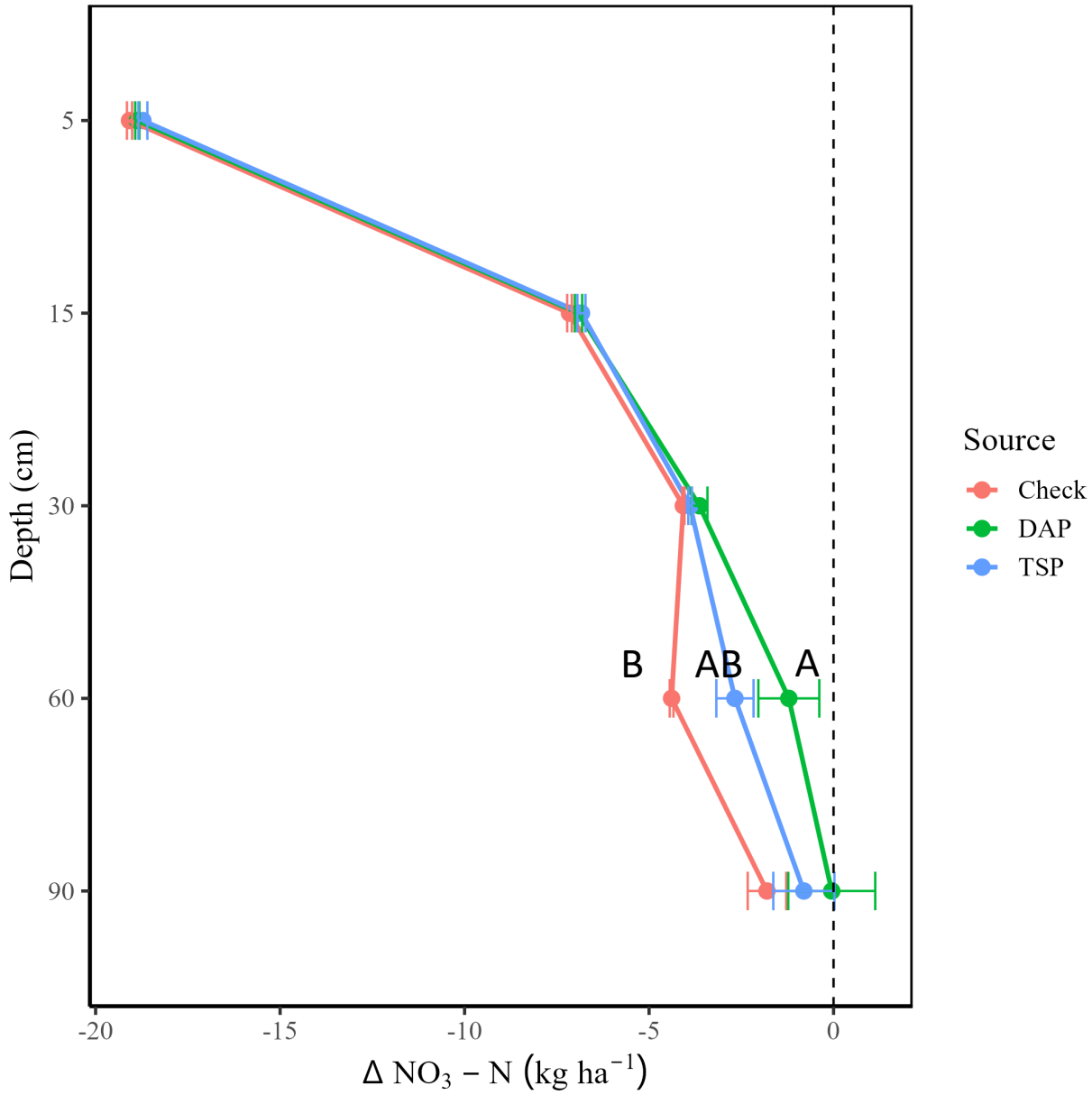
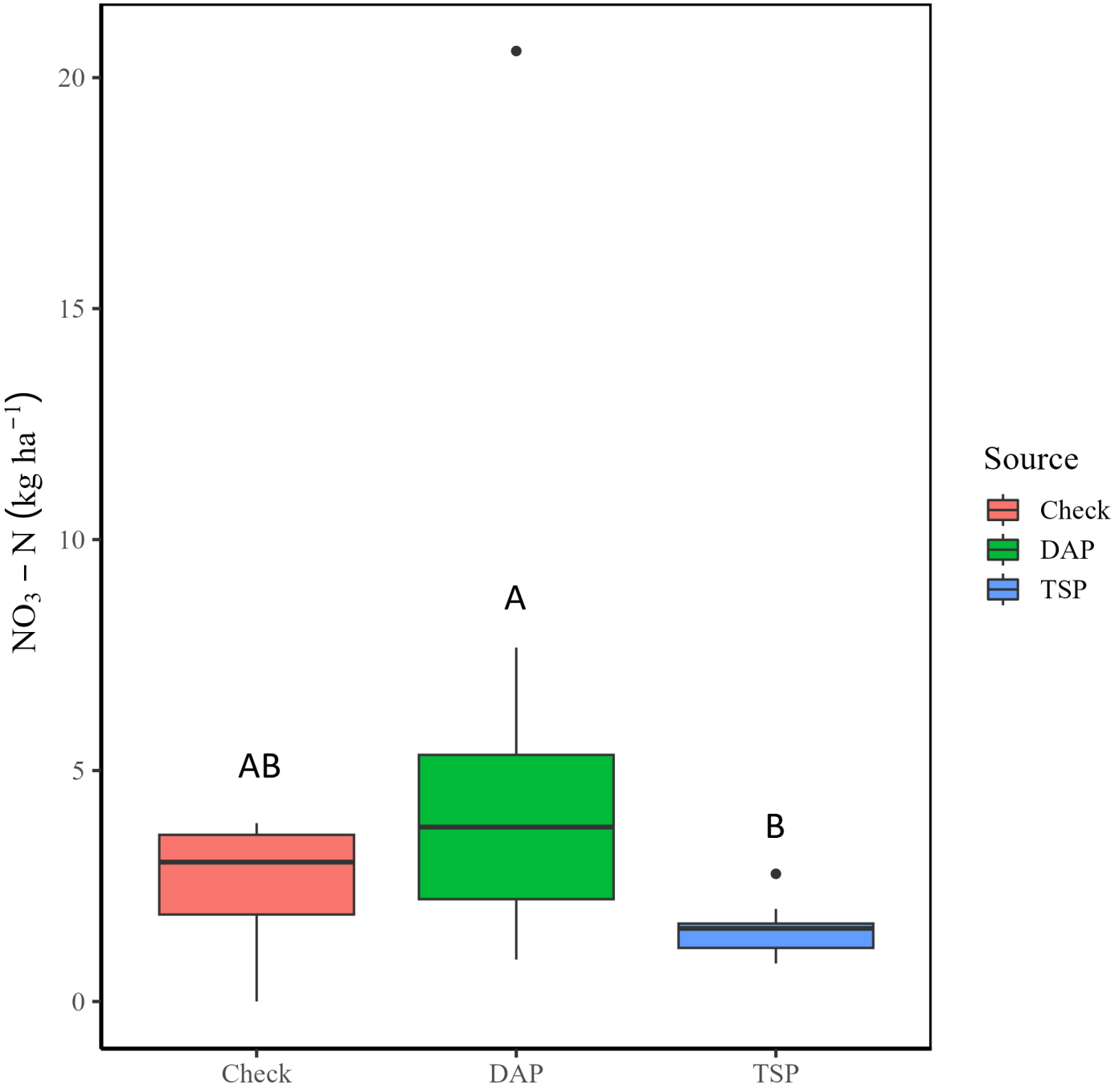


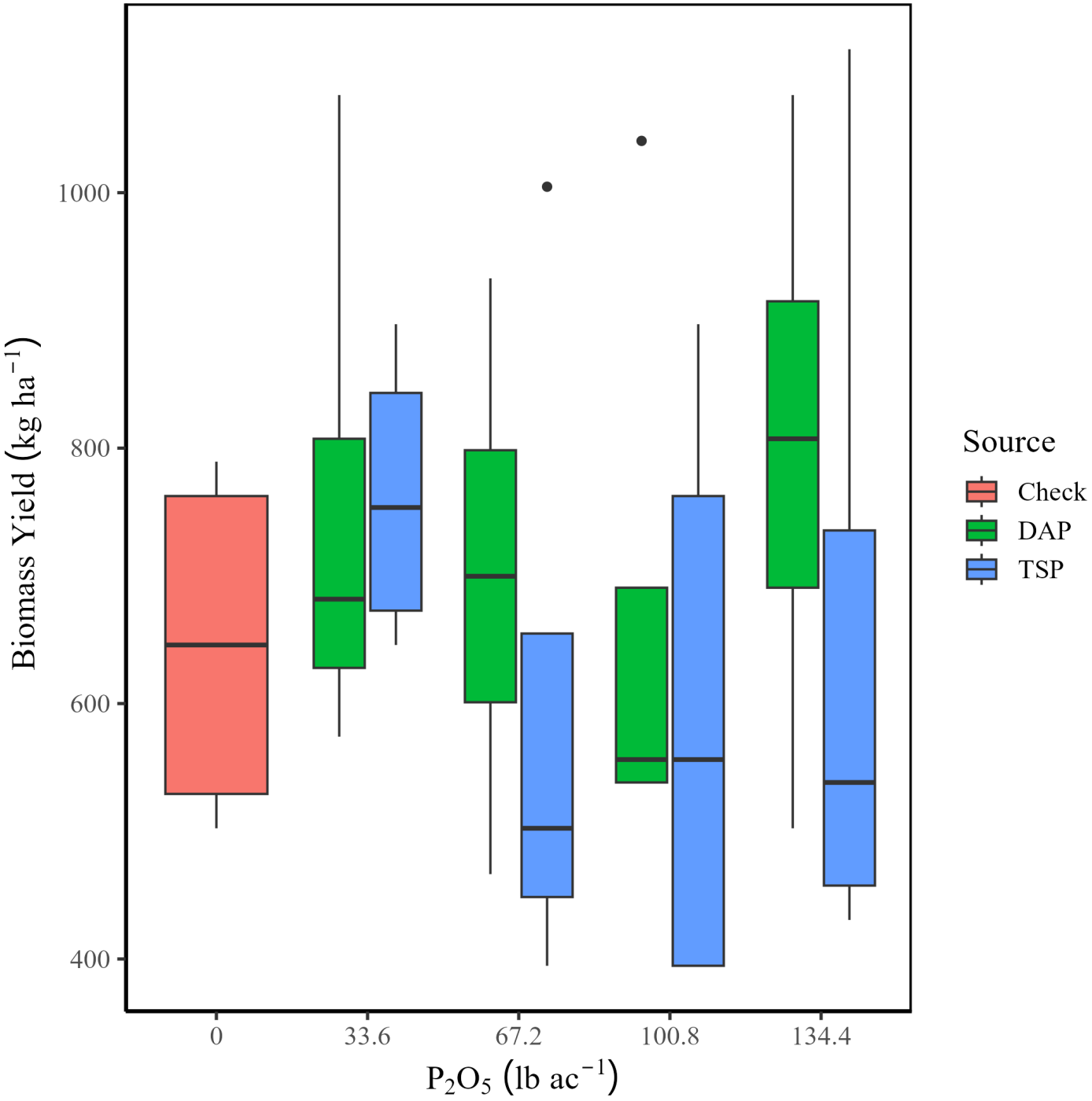
Lysimeter

- Buried at establishment (Nov 15) from fall applied plots and check
- Pulled prior to cover termination (March 14)



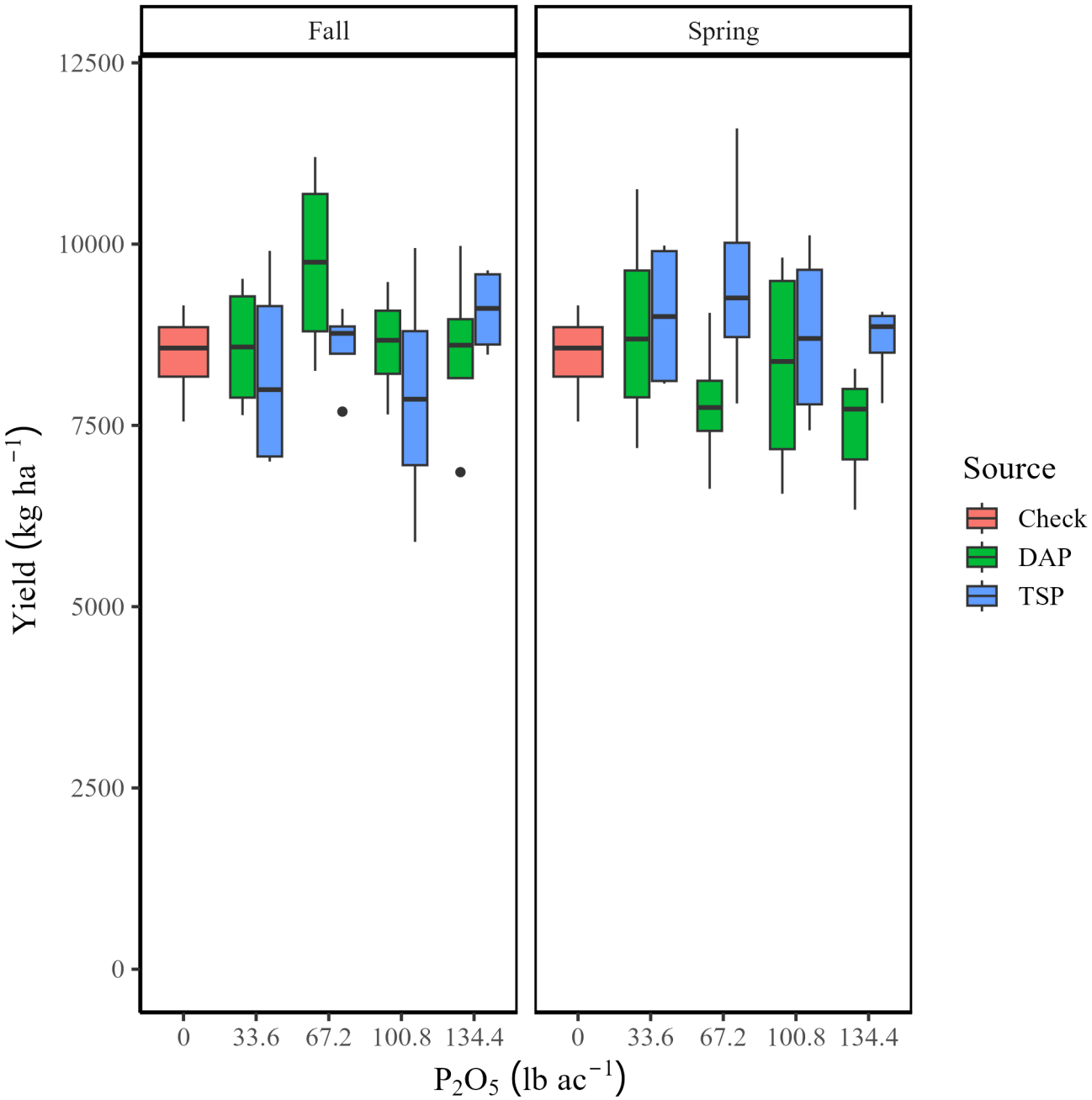
Cover Crop Biomass

- Planted Nov 16
- Desiccated March 15



Yield

- M3P 18 mg kg^{-1}
- Nitrogen Supplied at a non-limiting rate for corn crop
- Dry Season Starting late May



Takeaways

- BMP's for the region don't allow cover crops to reach much potential in the spring, therefore, not removing/retaining N in biomass
- Deep Core Data suggests nitrate movement, but no differences could be determined most likely to due movement up and down profile.
- Lysimeter data notes leaching potential over the season, though could not ascertain differences in the rates applied
- Poor growing conditions mid-season led to diminished yield responses, even in sub-optimal soil testing environments

Questions?

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