FRST Report from Mississippi State University for 2023

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Cotton K Project

Rationale

- Little recent K work conducted in MS Cotton, though recommendations have been increased in the past 5 years due to low soil test K coming through our lab (2018)
- All K recommendations at MSU are based on Lancaster Soil Extractant, but 95% of producers in the state are using a lab that uses Mehlich 3

Objectives

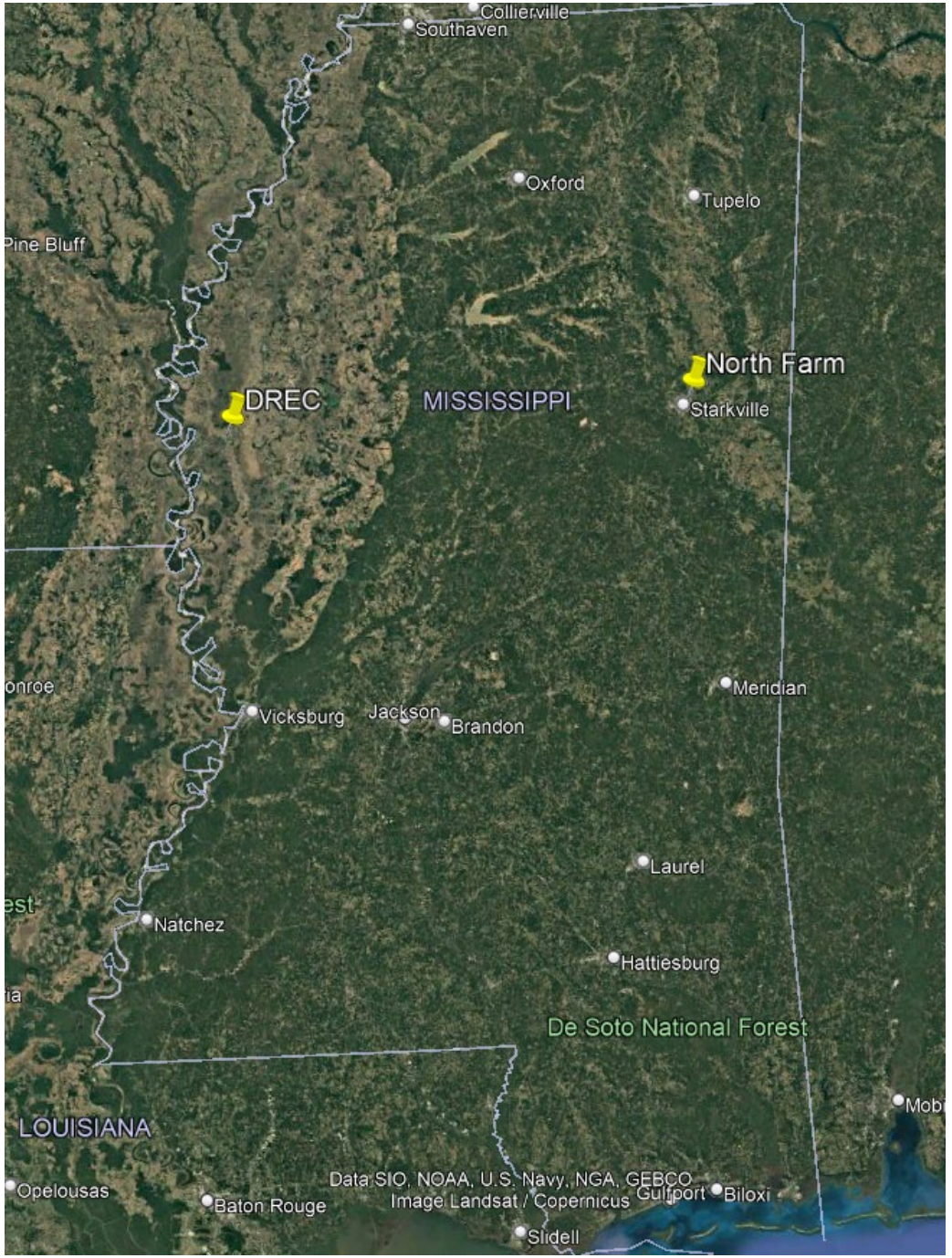
- Begin collecting Mehlich 3 Extractable Potassium data in a Cotton K response study to develop M3K fertilizer recommendations.

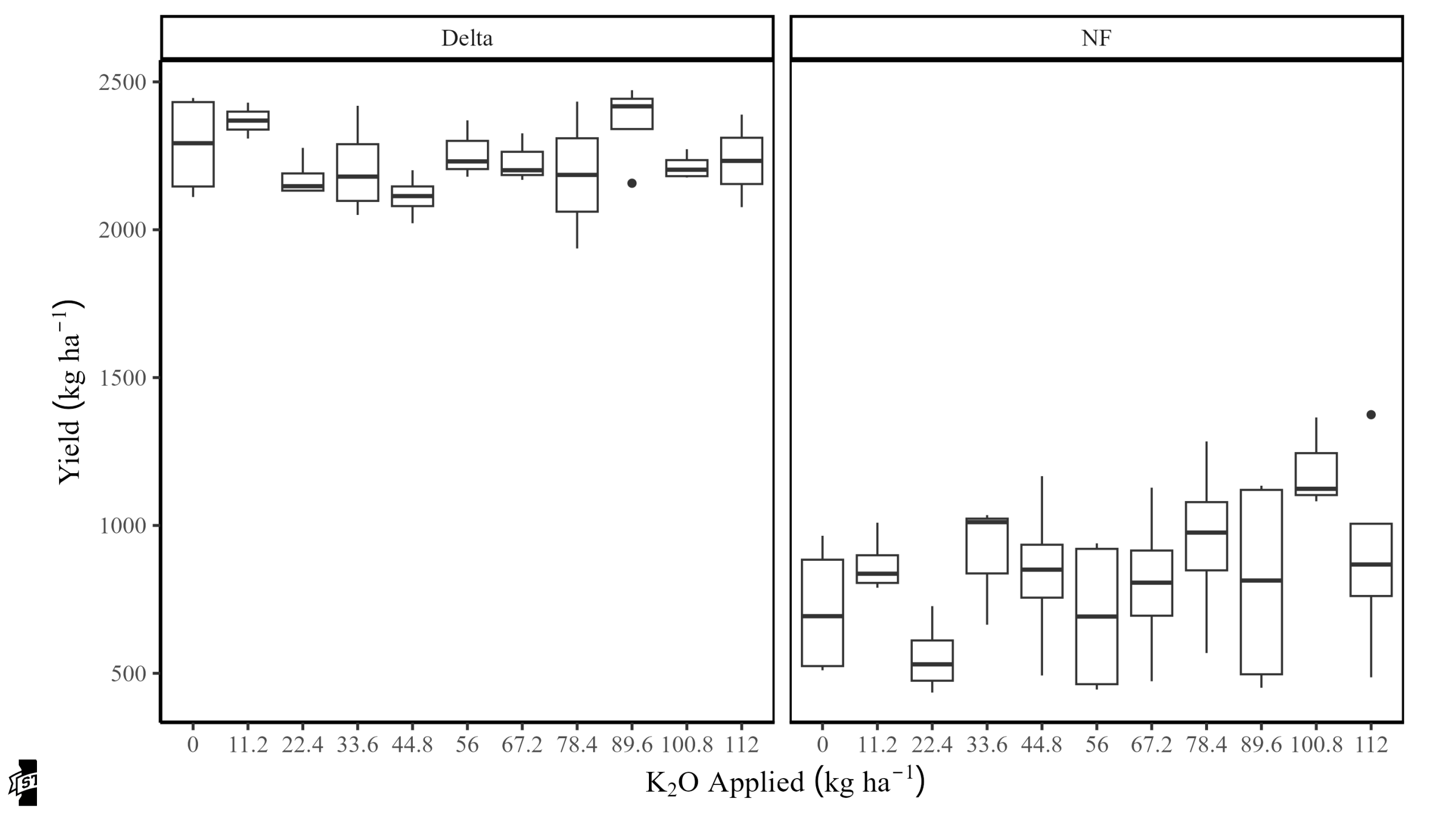
Methodology

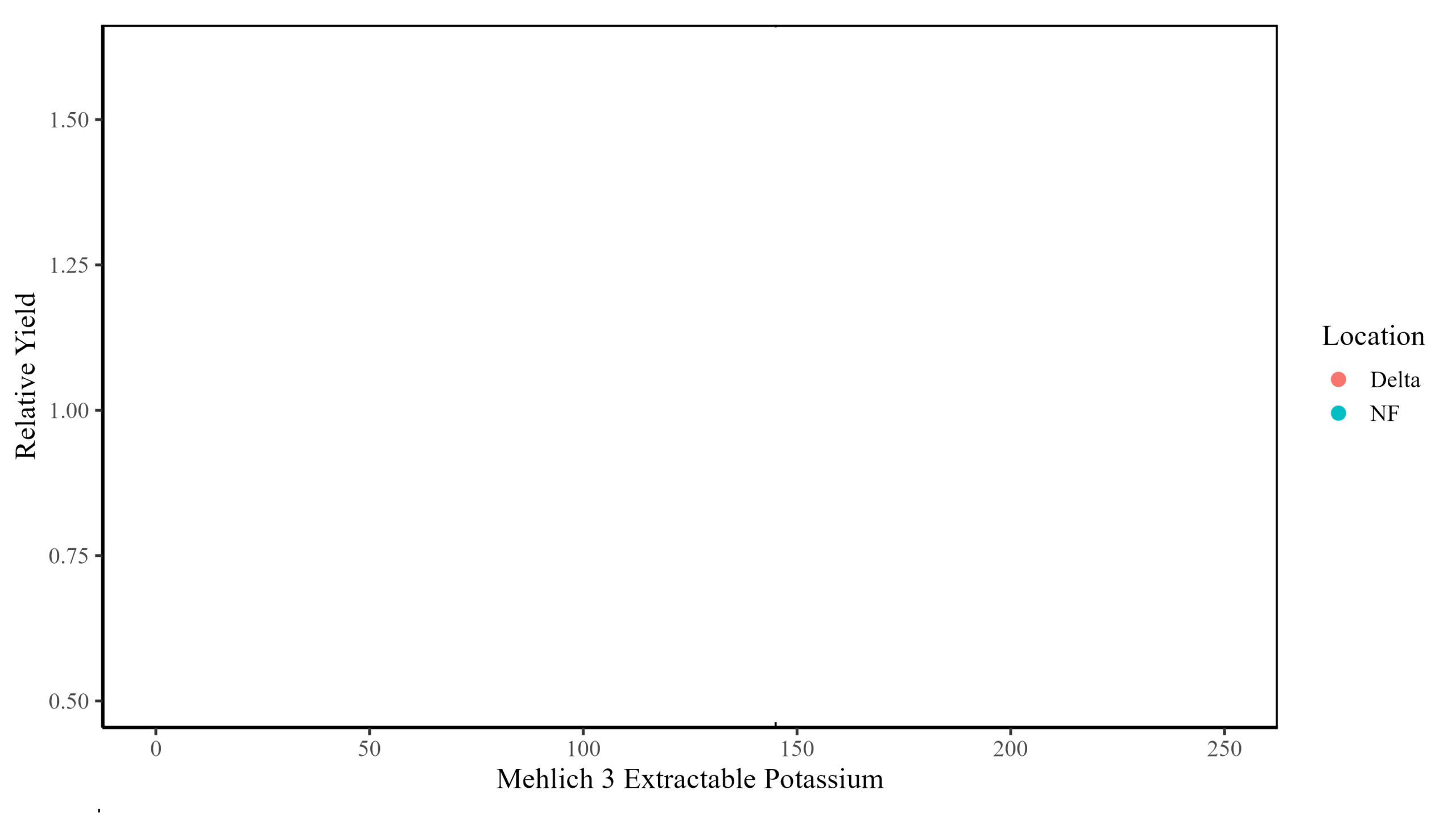
- Asked for “low to medium” soil test potassium sites
- O K Check, increasing by 11.2 kg K_2O ha^{-1} up to 11.2 kg ha^{-1}
- Replicated 4 times
- Applied as Muriate of Potash via broadcast
- N applied as UAN (28%) at 134 kg N ha^{-1}, split at planting and first pinhead square

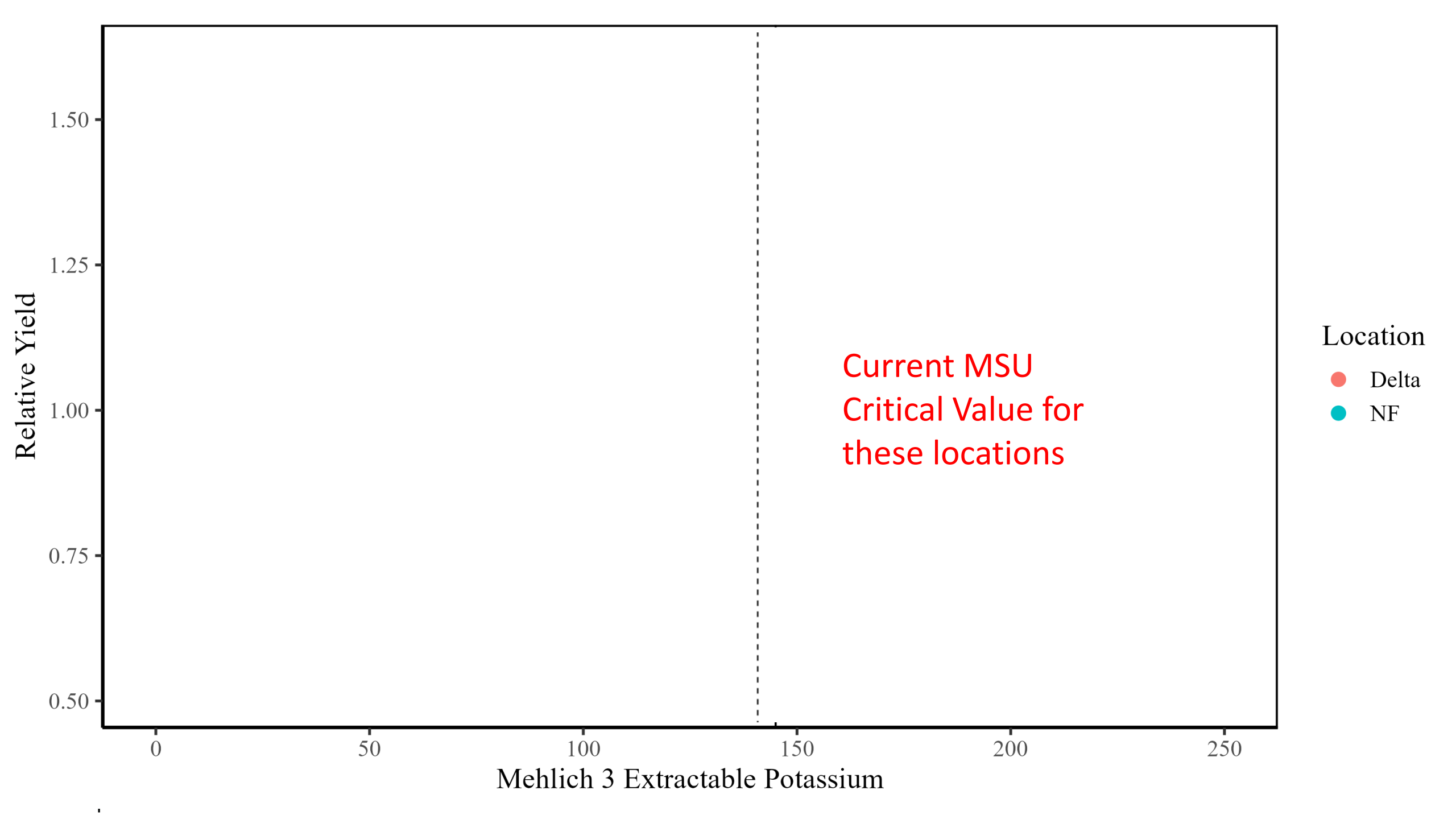
Site Locations

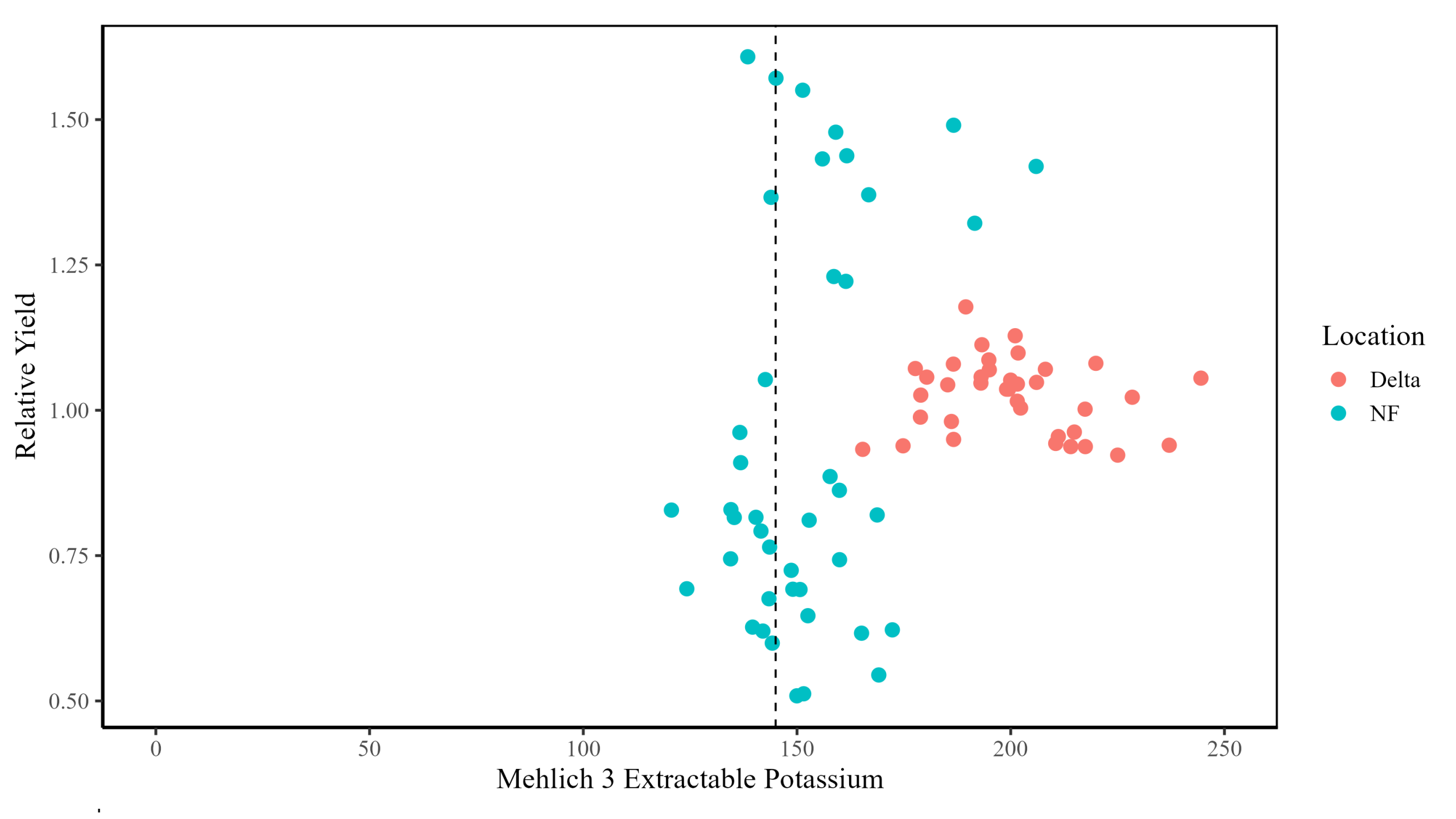
- DREC
  - Bosket Very Fine Sandy Loam (9 CEC)
- North Farm
  - Leeper Silty Clay Loam (19 CEC)




Delta
NF
2500
2000
1500
1000
500
Yield (kg ha^{-1})
0
11.2
22.4
33.6
44.8
56
67.2
78.4
89.6
100.8
112
K_2O Applied (kg ha^{-1})


1.50
1.25
1.00
0.75
0.50
Relative Yield
0
50
100
150
200
250
Mehlich 3 Extractable Potassium
Location
Delta
NF


1.50
1.25
1.00
0.75
0.50
Relative Yield
0
50
100
150
200
250
Mehlich 3 Extractable Potassium
Current MSU
Critical Value for
these locations
Location
Delta
NF


Relative Yield
1.50
1.25
1.00
0.75
0.50
0
50
100
150
200
250
Mehlich 3 Extractable Potassium
Location
Delta
NF

Takeaways

- 2 site-years is NOT enough to produce new recommendations
- Must have more of a range of locations (more importantly, good differences) to determine differences
- Was able to leverage this data to Cotton Inc., where we have been funded for this year and the next coming year for data collection
- Have continued to collecte M3 and Lancaster data together for comparison, and understanding of limitations of different extractions at different locations

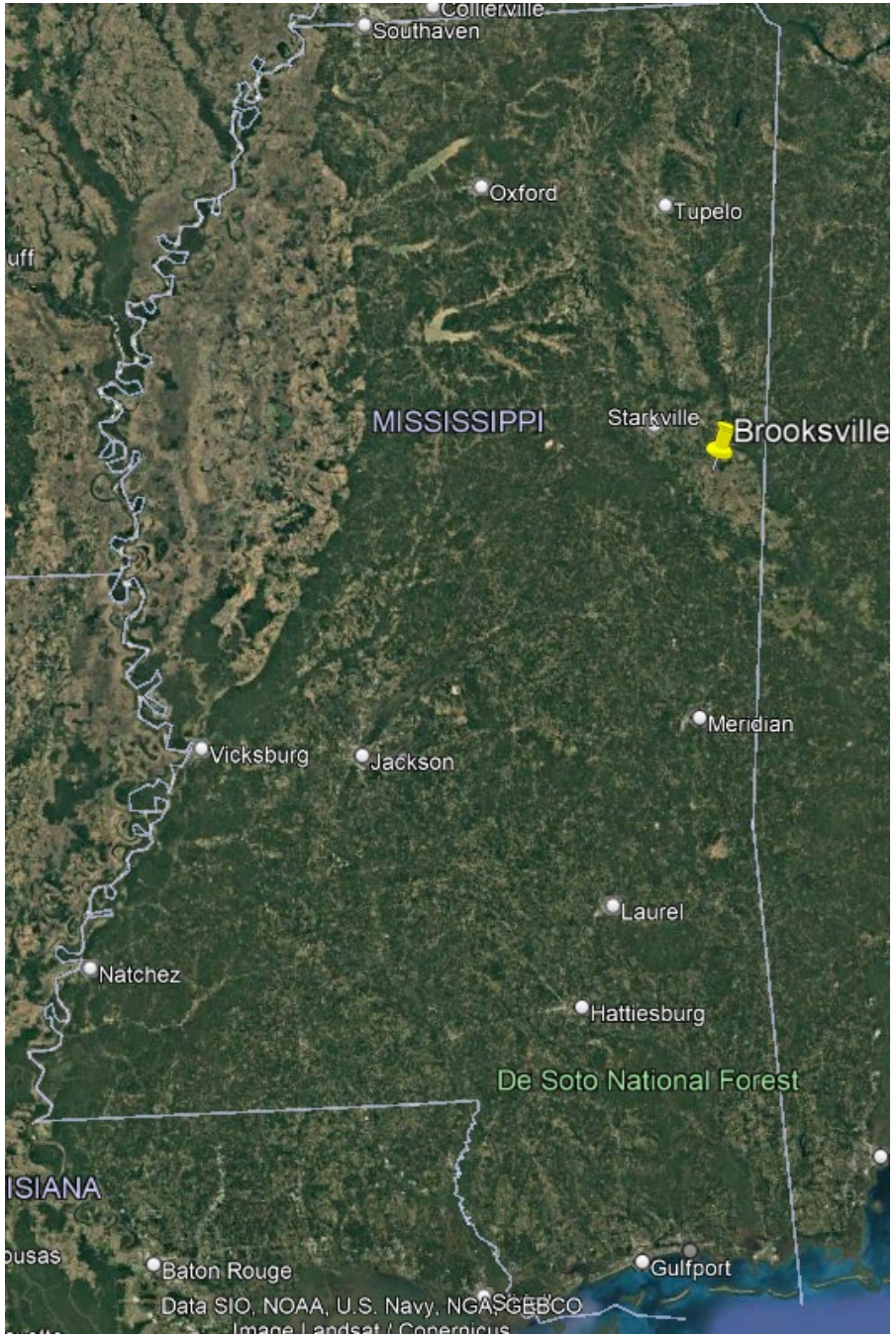
OCP North America – 2023 Study

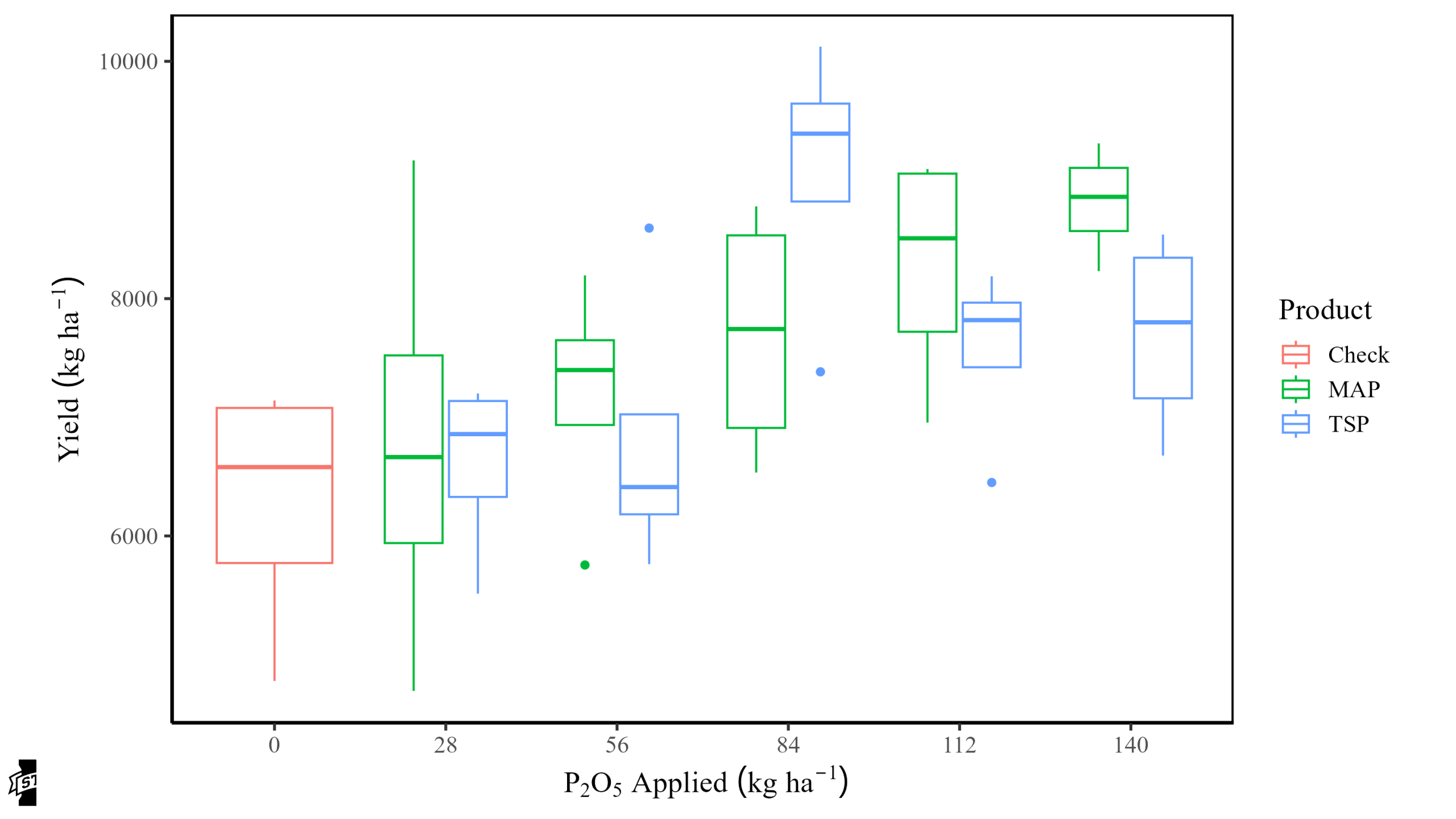
Objectives

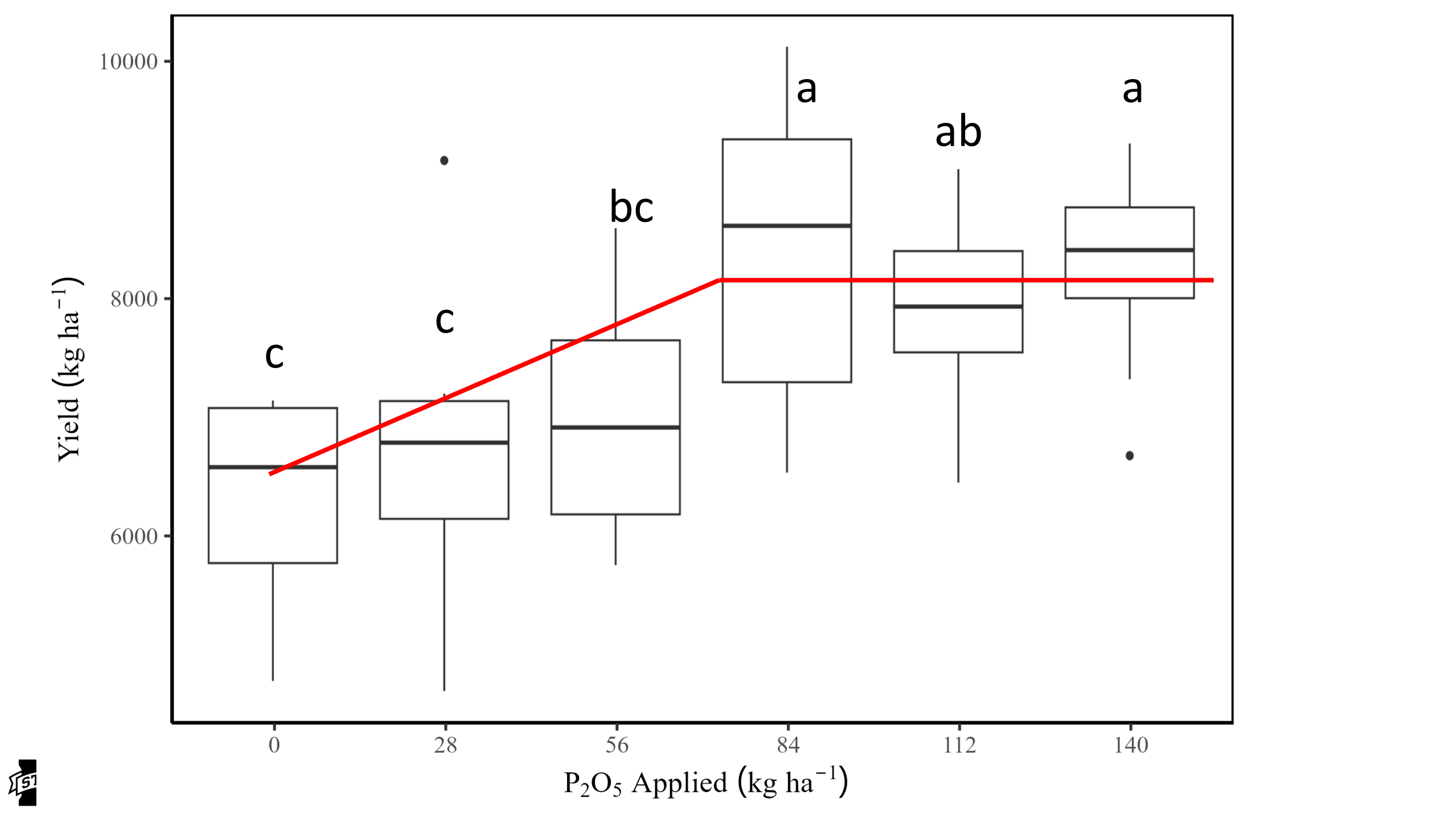
- OCP is interested in increasing popularity of TSP as an alternative to ammoniated P containing fertilizers
- Objective was to determine if there would be a yield/grain response to differences in source of P fertilizer

Methodology

- Brooksville, MS
  - Griffith silty clay (CEC 29,
  - 5.5 pH
  - 8 ppm Mehlich 3
  - 25 ppm Lancaster
- 5 rates P_2O_5 : (28, 56, 84, 112, 140 kg ha^{-1})
- 2 products (MAP, TSP)
- Nitrogen was applied at 270 kg ha^{-1}, at a non-yield limiting rate, so N from MAP was not an issue
- 0 P Check
- Replicated 4 times




10000
8000
6000
Yield (kg ha^{-1})
0
28
56
84
112
140
P_2O_5 Applied (kg ha^{-1})
Product
Check
MAP
TSP


10000
8000
6000
Yield (kg ha^{-1})
c
c
bc
a
ab
a
0
28
56
84
112
140
P_2O_5 Applied (kg ha^{-1})

Takeaways

- We found no difference between products (MAP, TSP) in either grain yield or grain concentration
- MSU recommendations would have included an application of 112 kg P_2O_5 ha^{-1} on this location, which would have maximized yield

Questions?

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