

State-Level FRST Soil Test and Calibration Trials: Views from Utah

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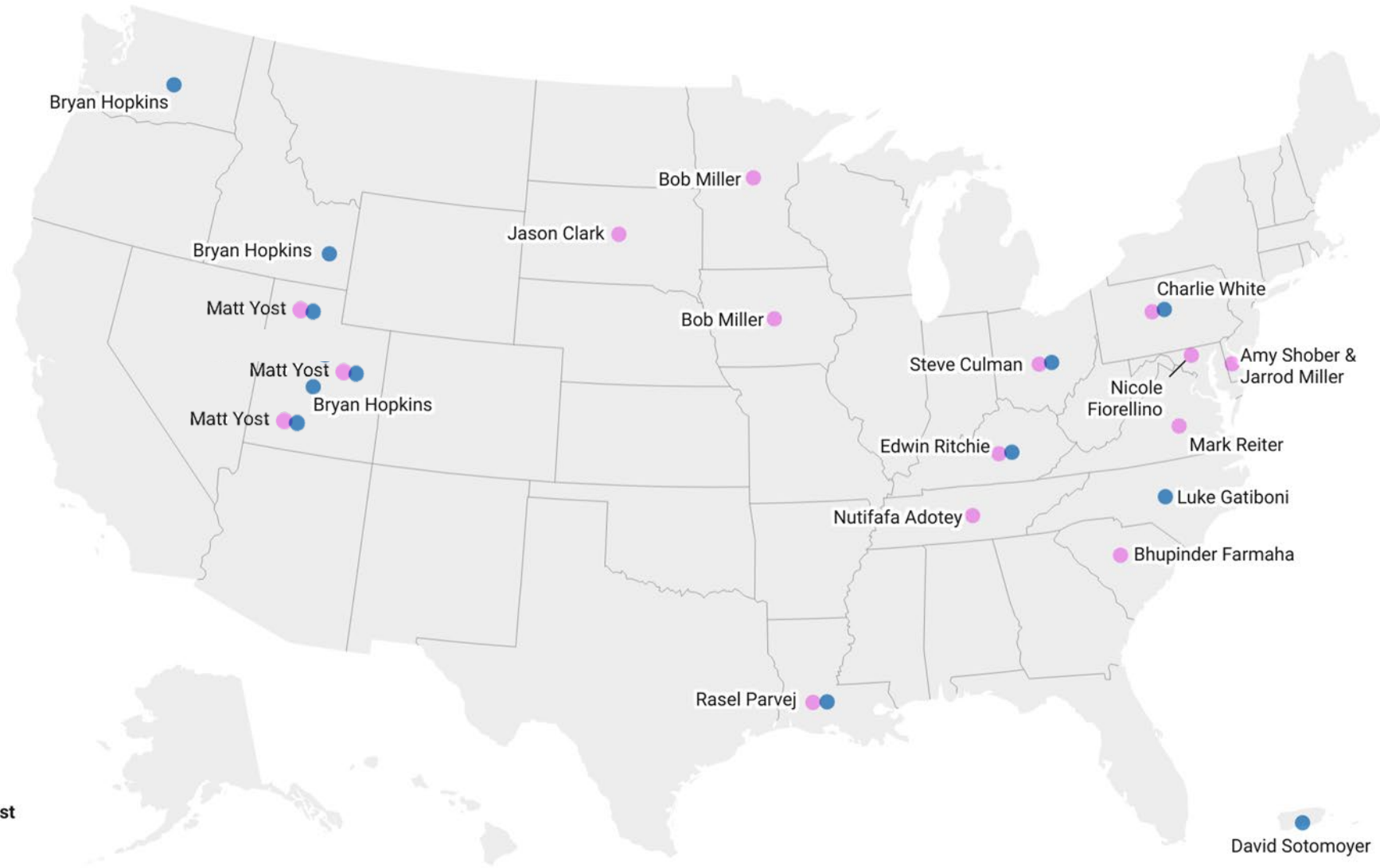
Utah State University

FRST Project: Step-wise

1. Survey of land grant faculty on current soil test practices
2. Define a minimum dataset requirement for soil test correlation
3. Collect legacy soil test correlation and calibration data
4. Determine the most appropriate relative yield definition for FRST
- 5. Collaborator soil test fertility trials**
6. Sampling depth study
7. Develop a user-friendly, searchable interface (decision tool)

FRST Soil Test Trials with Collaborators

2021 Soil Test Correlation and Calibration Trials by FRST Collaborators

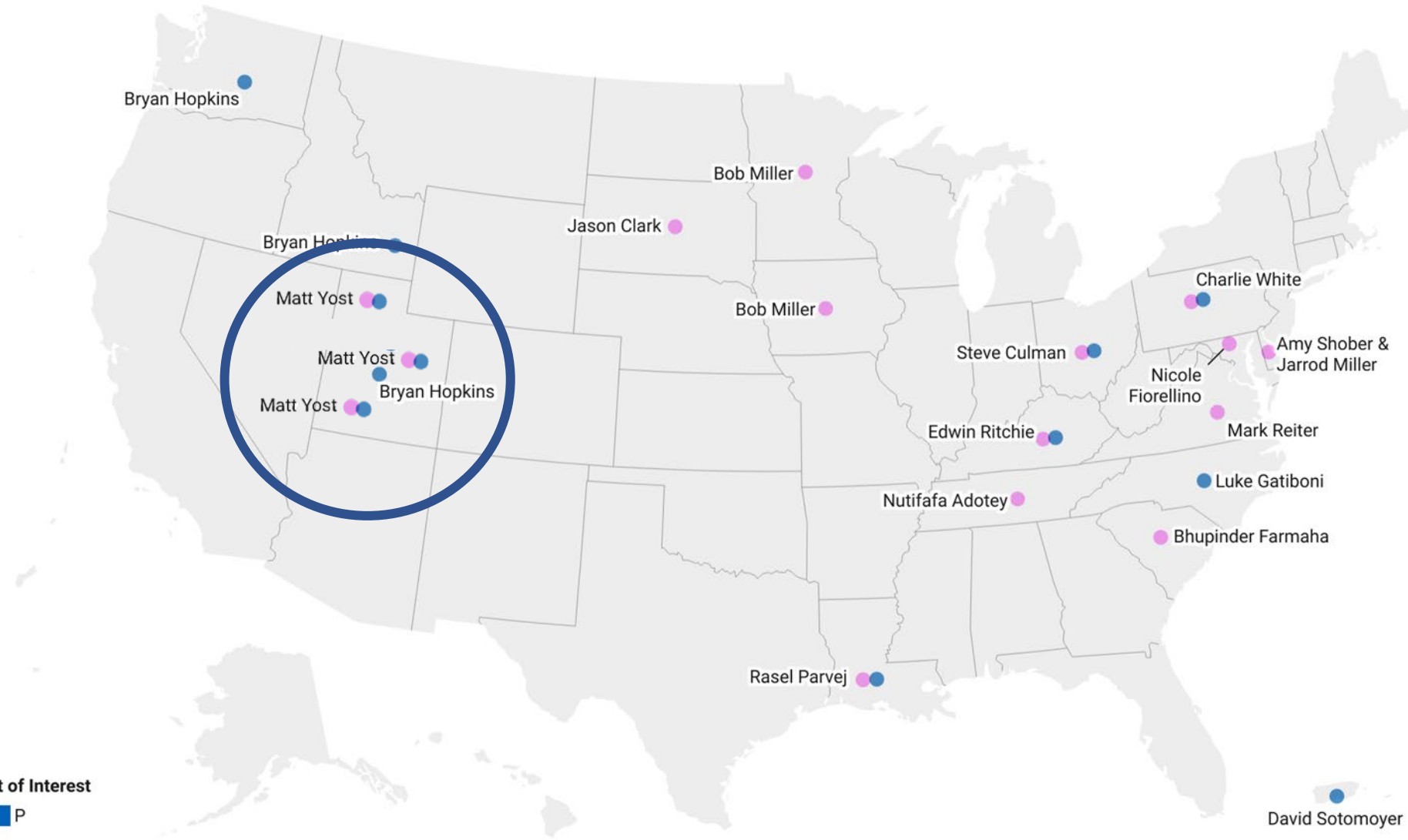


Nutrient of Interest

K P

FRST Soil Test Trials with Collaborators

2021 Soil Test Correlation and Calibration Trials by FRST Collaborators



Nutrient of Interest

K P

Utah K Fertilizer Recommendations

Table 3.5. K fertilizer recommendations for field crops in Utah (lbs K₂O per acre) based on STK.

STK ^a	Field Crops (alfalfa, corn, grain, etc.)	Potatoes
0-40	200	250
40-70	160	210
70-100	120	140
100-150	80	100
>150	0-50	0

^aSTK = NaHCO₃ extractable K (mg/kg). Fertilizer K recommendations may need to be changed by plus or minus 20 lbs in each category depending on local conditions.



Utah P Fertilizer Recommendations

Table 3.4. P fertilizer recommendations for field crops in Utah (lbs P₂O₅ per acre) based on soil test phosphorus.

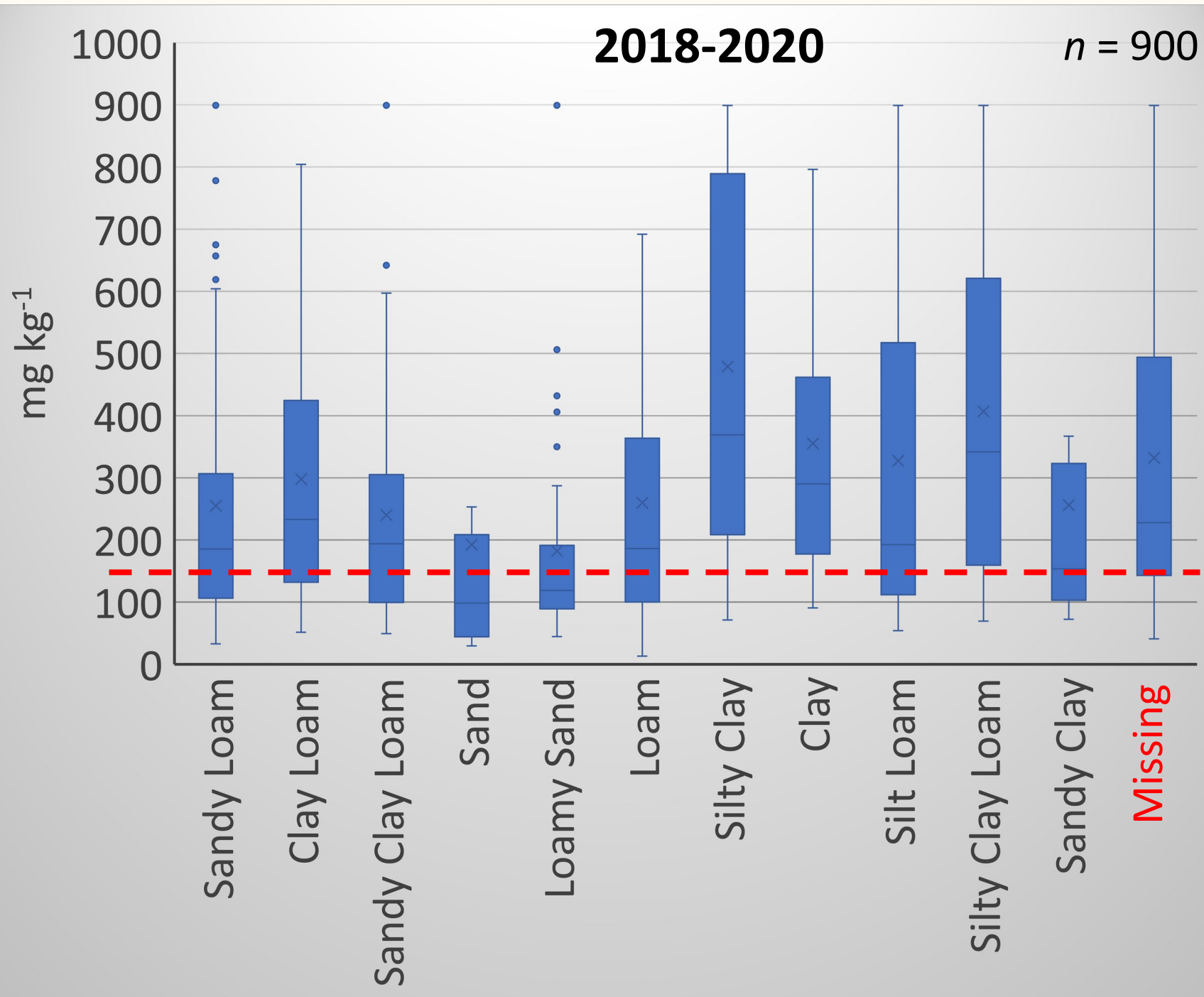
STP ^a	Field Crops	Grass hay and Turf	STP ^a	Potatoes	STP ^a	Dryland Grain
0-3	210	120	0-6	230	0-3	60
4-7	130	65	7-15	160	4-7	45
8-10	100	40	16-20	100	8-9	30
11-15	50	0-40	21-30	0-50	10-12	0-30
>15	0-50	0	>30	0	>12	0

^aSTP = NaHCO₃ soil test procedure (mg/kg = ppm).

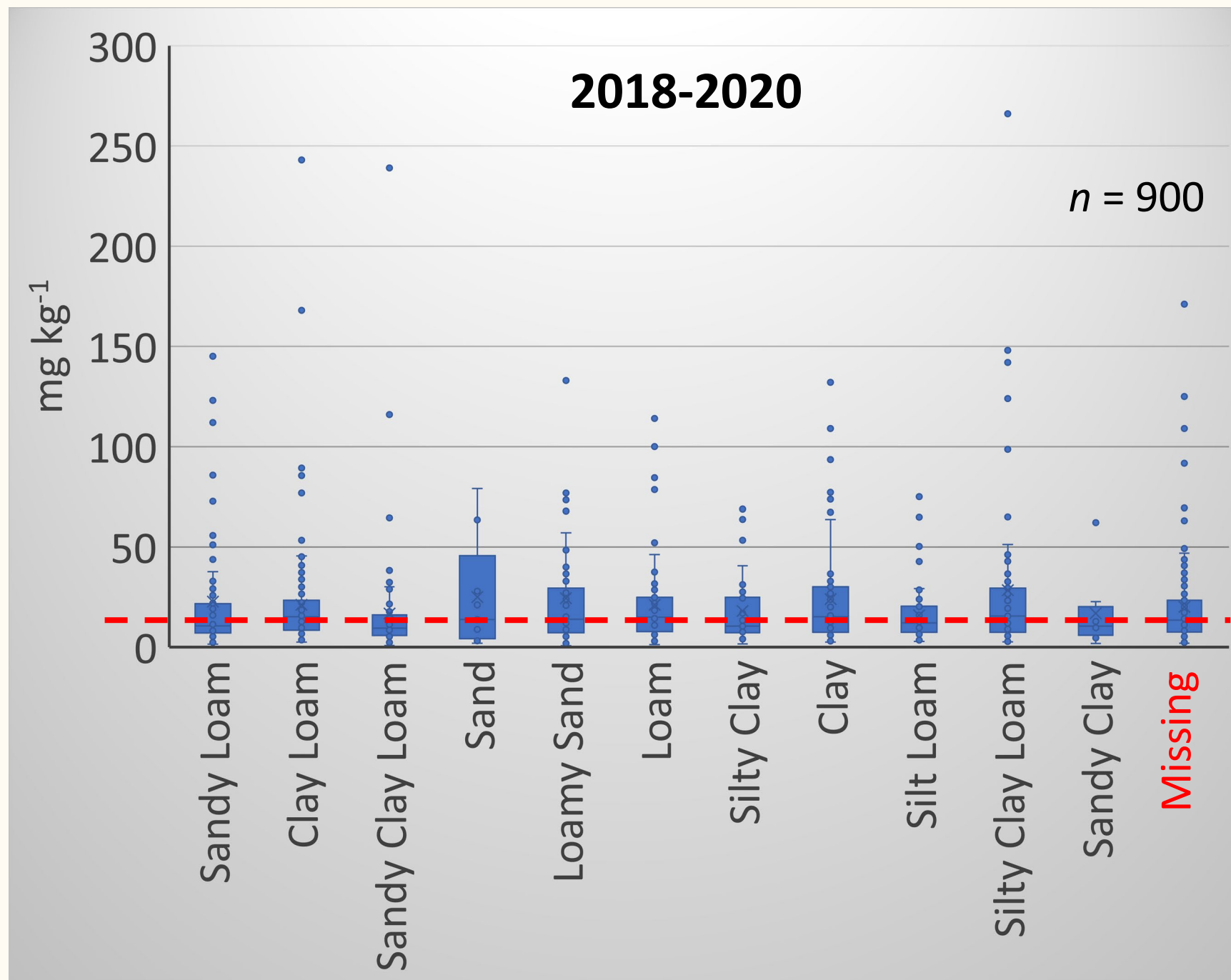
Fertilizer recommendations may need to be adjusted by $\pm$ 10 lbs/ac depending on local conditions.



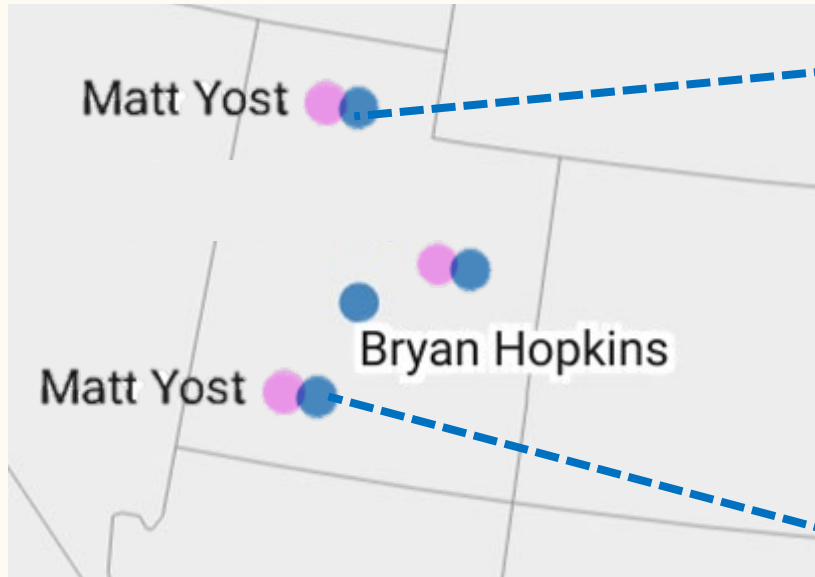
K Trends



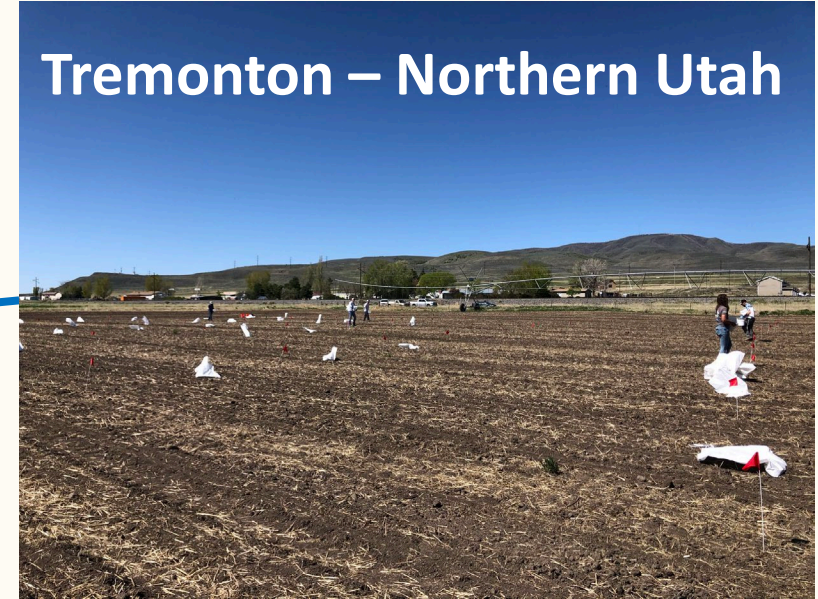
P Trends



Experimental Sites



Tremonton – Northern Utah



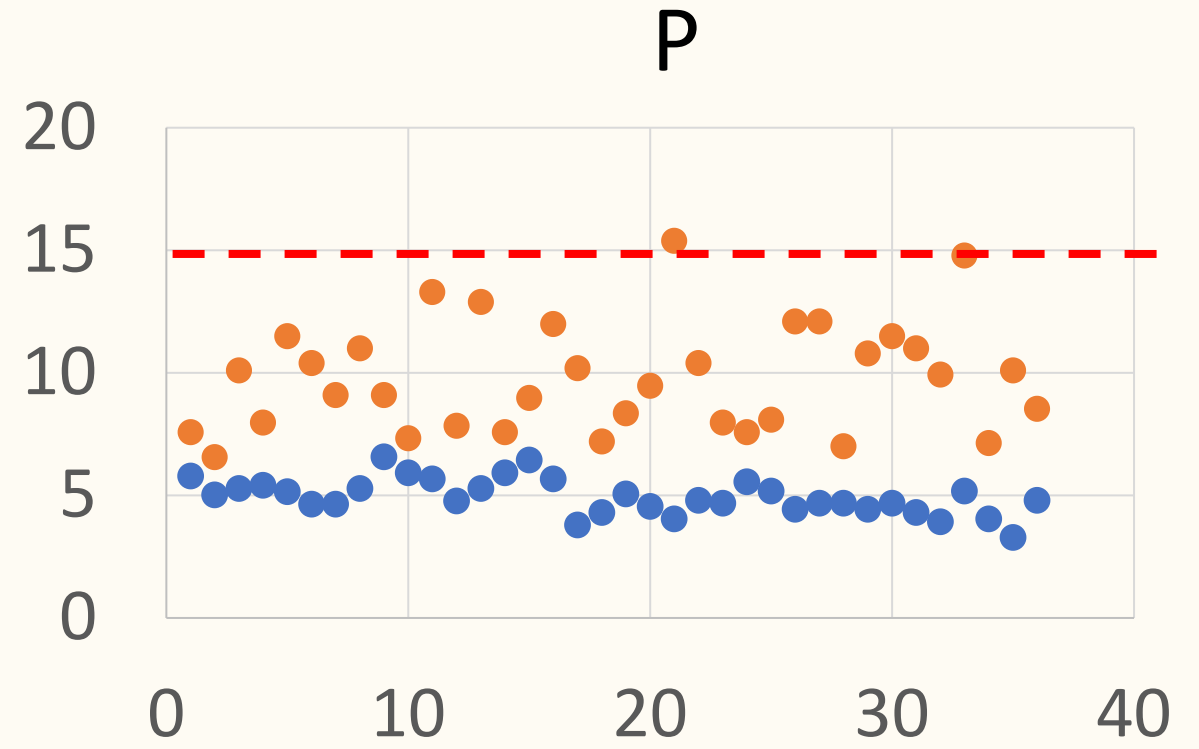
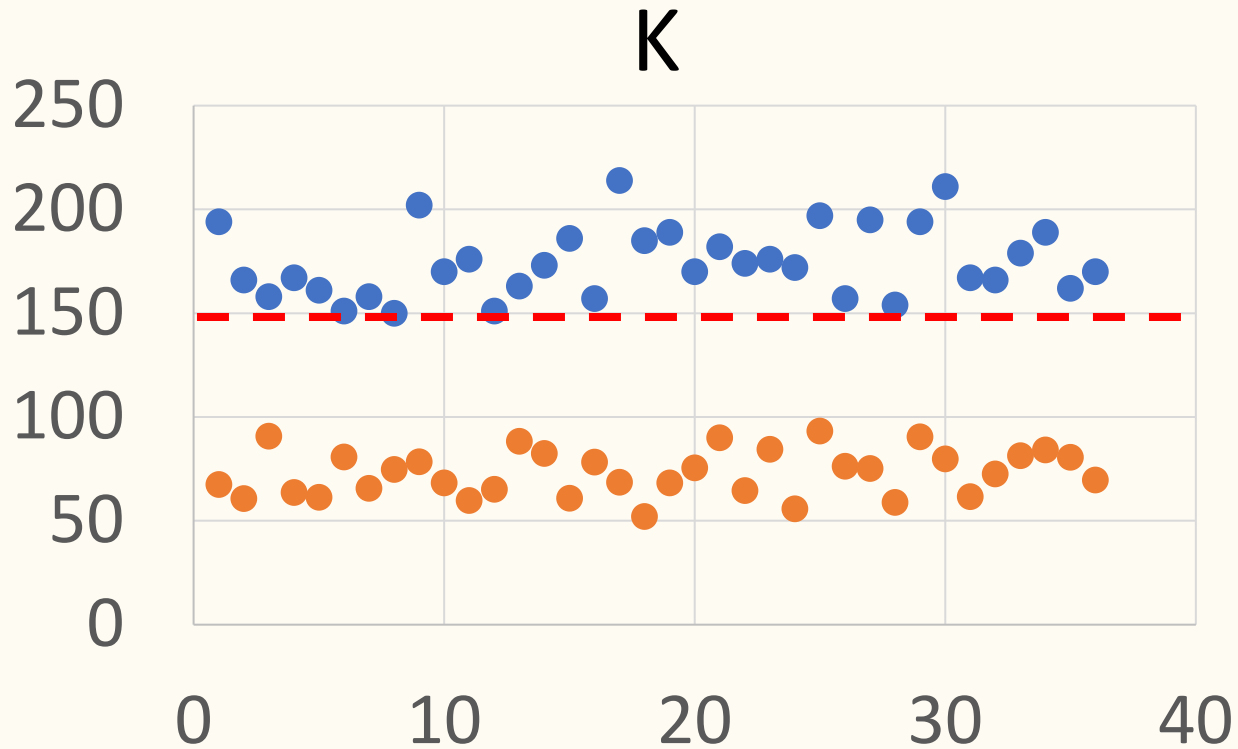
Parowan – Southern Utah



ID	Treatments	N	P	K	Zn	SO4-S	B	Mn	Cu
1	Control	0	0	0	0	0	0	0	0
2	K	190	80	60	0	30	0	0	0
3	K	190	80	120	0	30	0	0	0
4	K	190	80	180	0	30	0	0	0
5	K	190	80	240	0	30	0	0	0
6	P	190	50	50	0	30	0	0	0
7	P	190	100	50	0	30	0	0	0
8	P	190	150	50	0	30	0	0	0
9	P	190	200	50	0	30	0	0	0
10	SO4-S	190	80	60	0	0	0	0	0
11	Zn SO4-S	190	80	60	5	30	0	0	0
12	Zn SO4-S	190	80	60	10	30	0	0	0
13	Zn Chelate	190	80	60	5	30	0	0	0
14	Mn	190	80	60	0	30	0	5	0
15	B	190	80	60	0	30	1	0	0
16	Cu	190	80	60	0	30	0	0	1
17	9-43-0-16	190	80	60	0	30	0	0	0
18	9-0-0-30	190	80	60	0	30	0	0	0

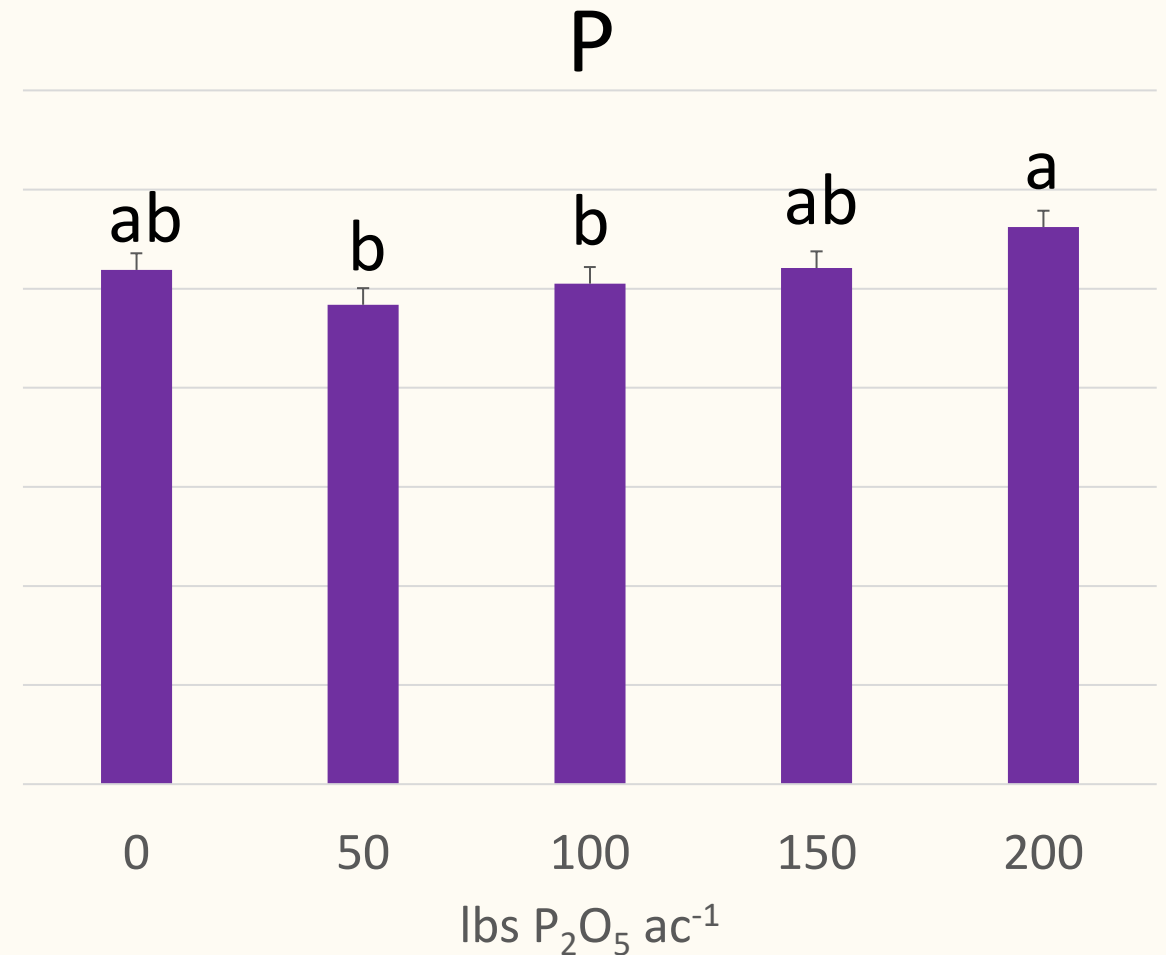
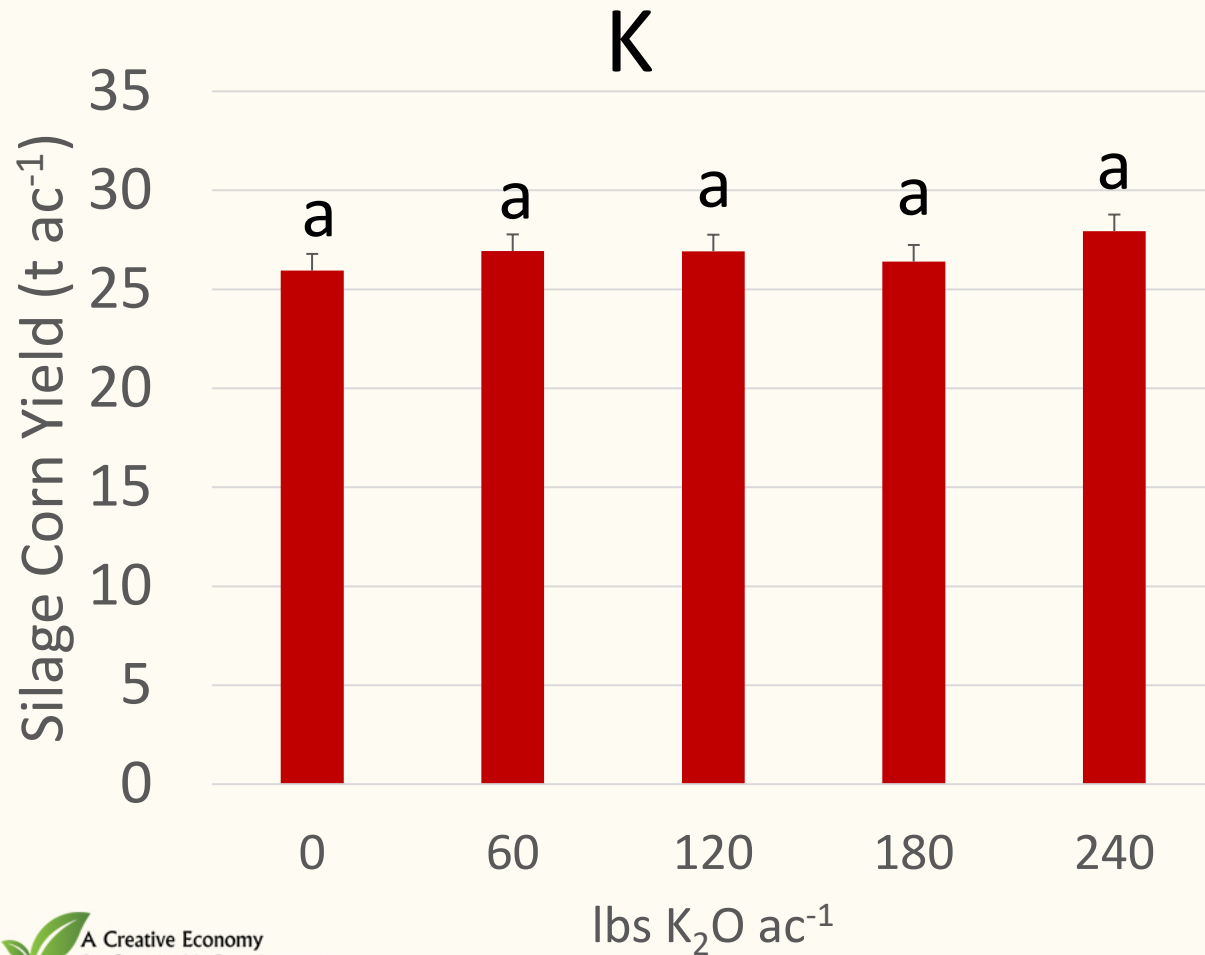
Baseline Fertility

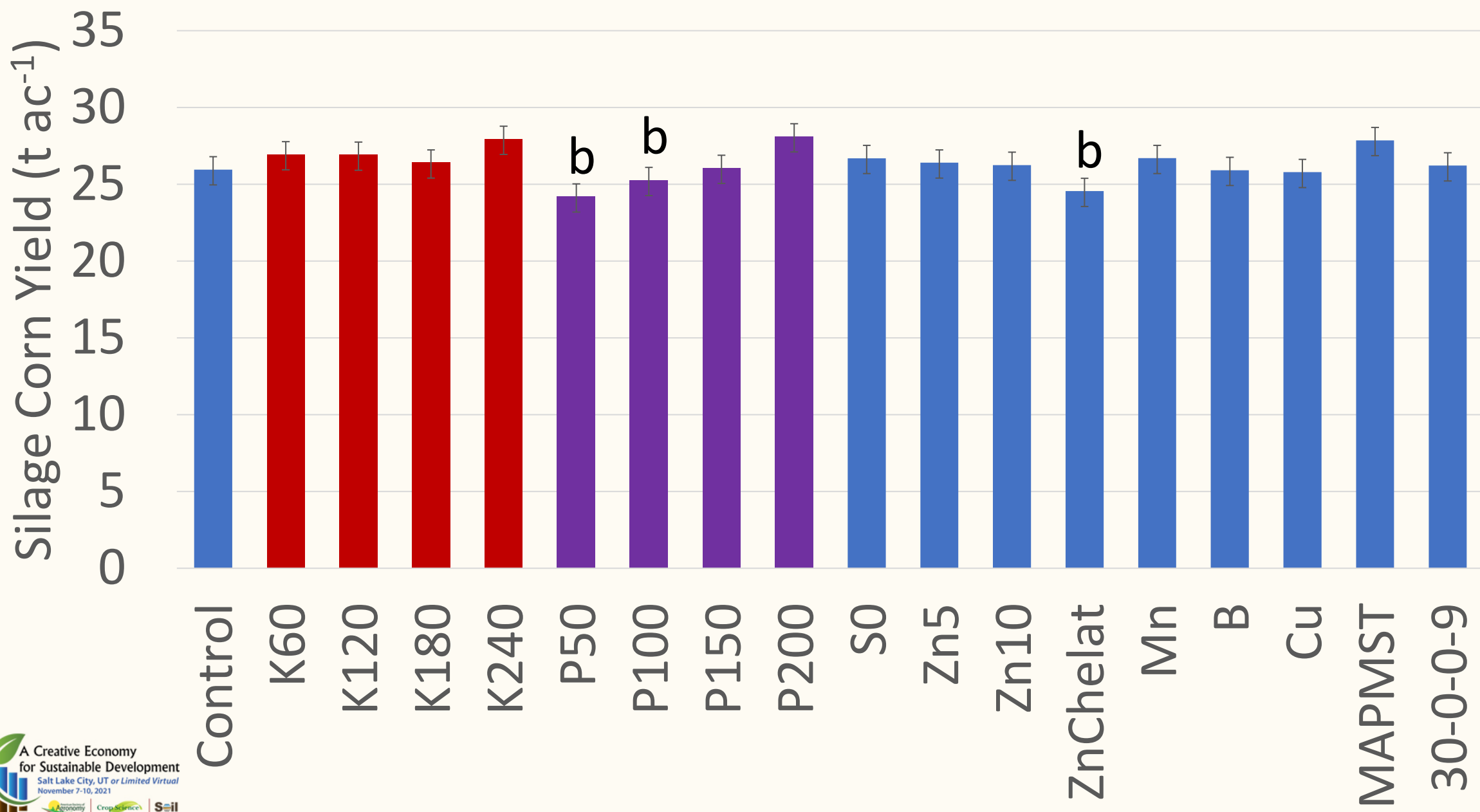
- Northern Utah
- Southern Utah

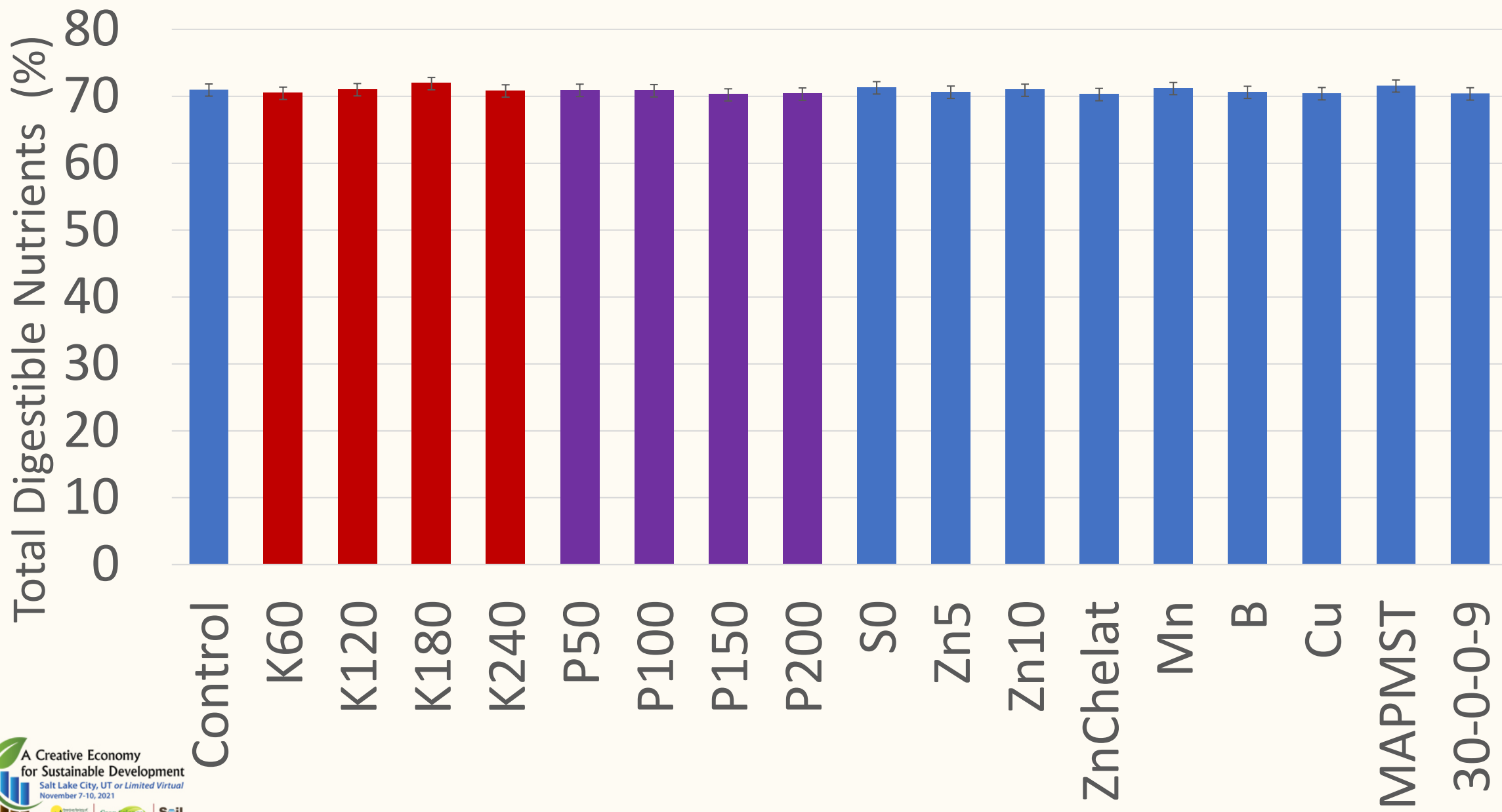


CV = 10-23%

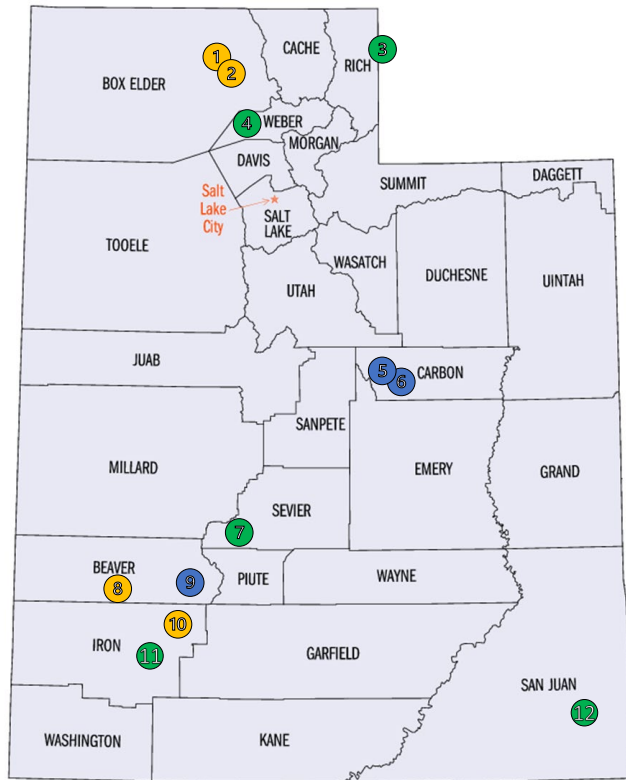
Silage corn yield results







2021 Fertilizer Recommendation Trials



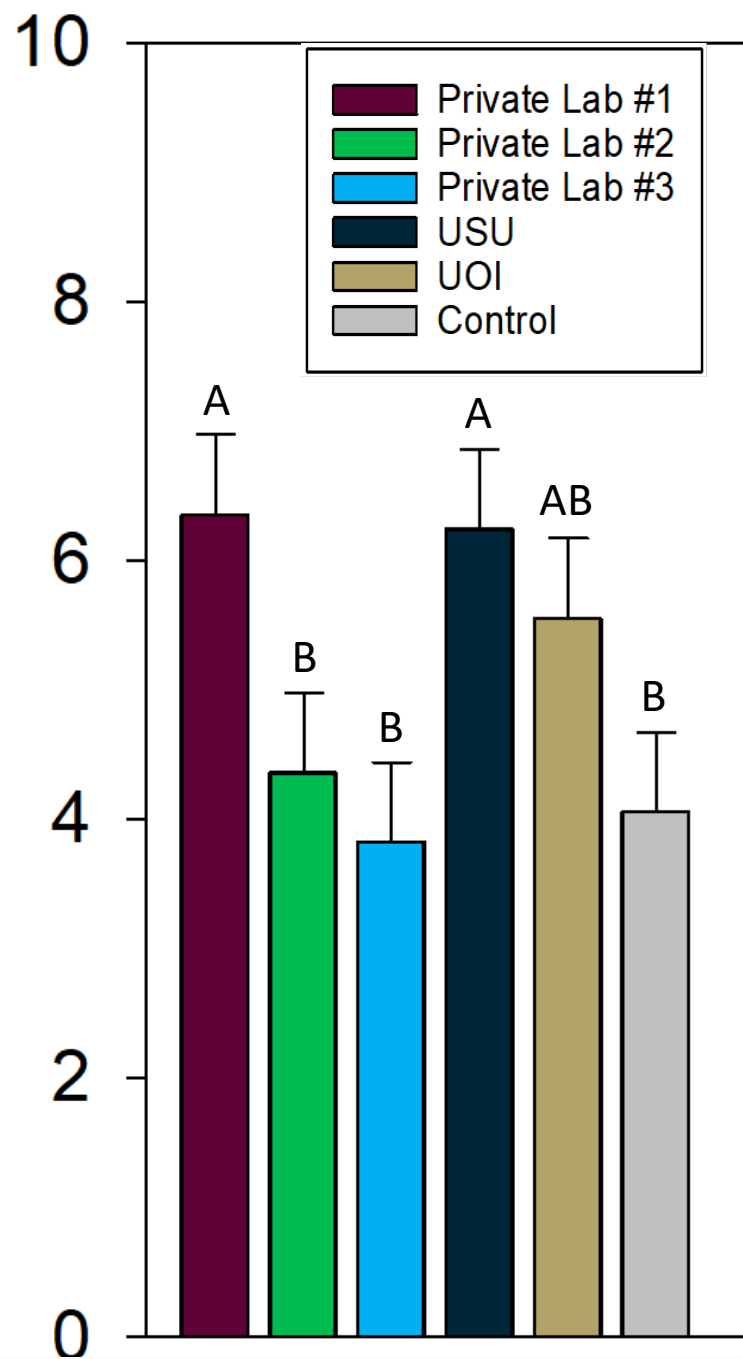
- Private Lab #1
- Private Lab #2
- Private Lab #3
- USU
- UOI
- Control



2021 Fertilizer Recommendation Trials

Field #	Crop	P	K	Difference in Fertilizer Costs
		ppm		\$/acre
1	Corn	10	608	564
2	Corn	6	450	704
3	Alfalfa	4	338	233
4	Alfalfa	14	99	791
5	Small Grains	8	196	224
6	Small Grains	8	182	201
7	Alfalfa	12	152	657
8	Corn	6	250	362
9	Small Grains	7	178	341
10	Corn	7	524	418
11	Alfalfa	18	137	540
12	Alfalfa	8	171	439

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Summary

- More opportunity to improve recommendations
- Little K response on medium & high testing soils
- P critical levels may need to be reduced.
- Need for coordination between public and private labs.

Thank You

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