

# Nitrogen Fertilizer Needs of Small Grains After Alfalfa

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# Three main ideas



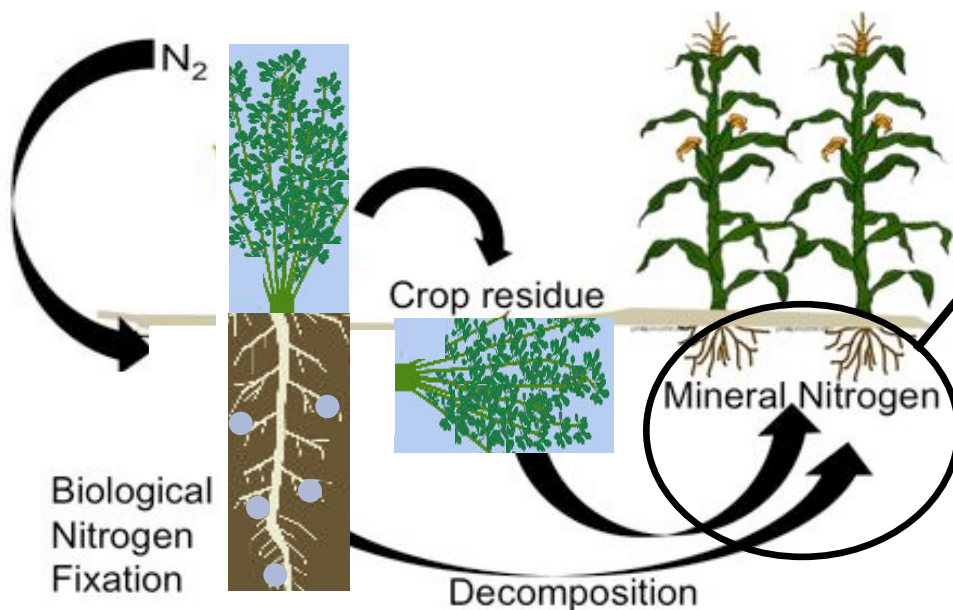
**PREDICTION:**

**BAD** ○

**GOOD** ○



# Alfalfa Nitrogen Credits

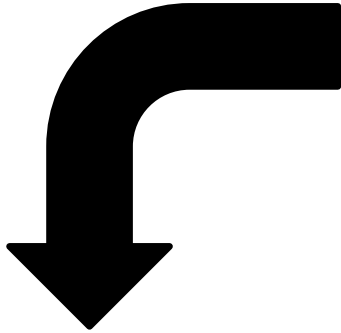


“N credit”

1. Alfalfa residue
2. N deposition
3. Soil quality improvements



Alfalfa



Corn

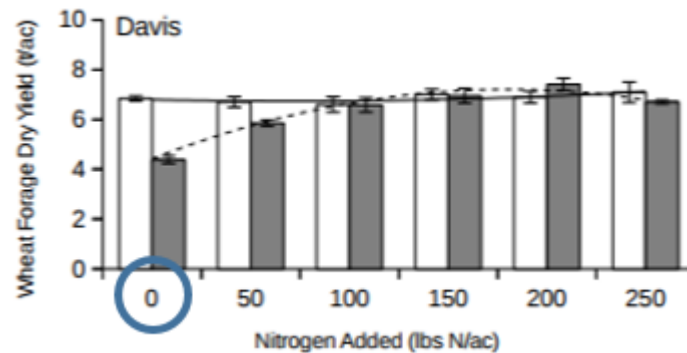
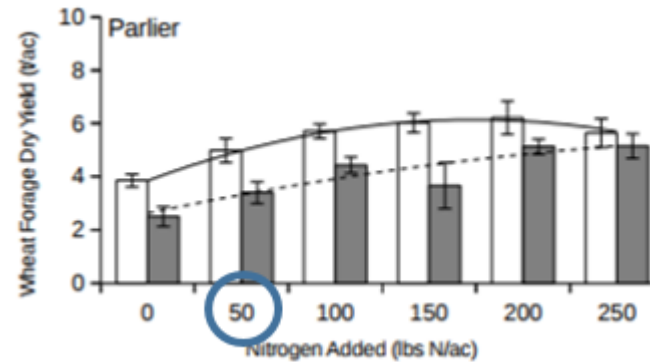
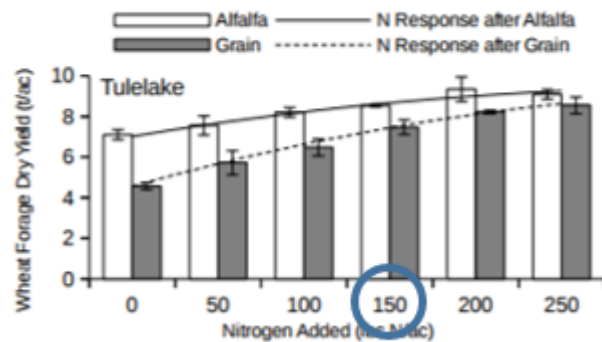


Small Grains





# Literature

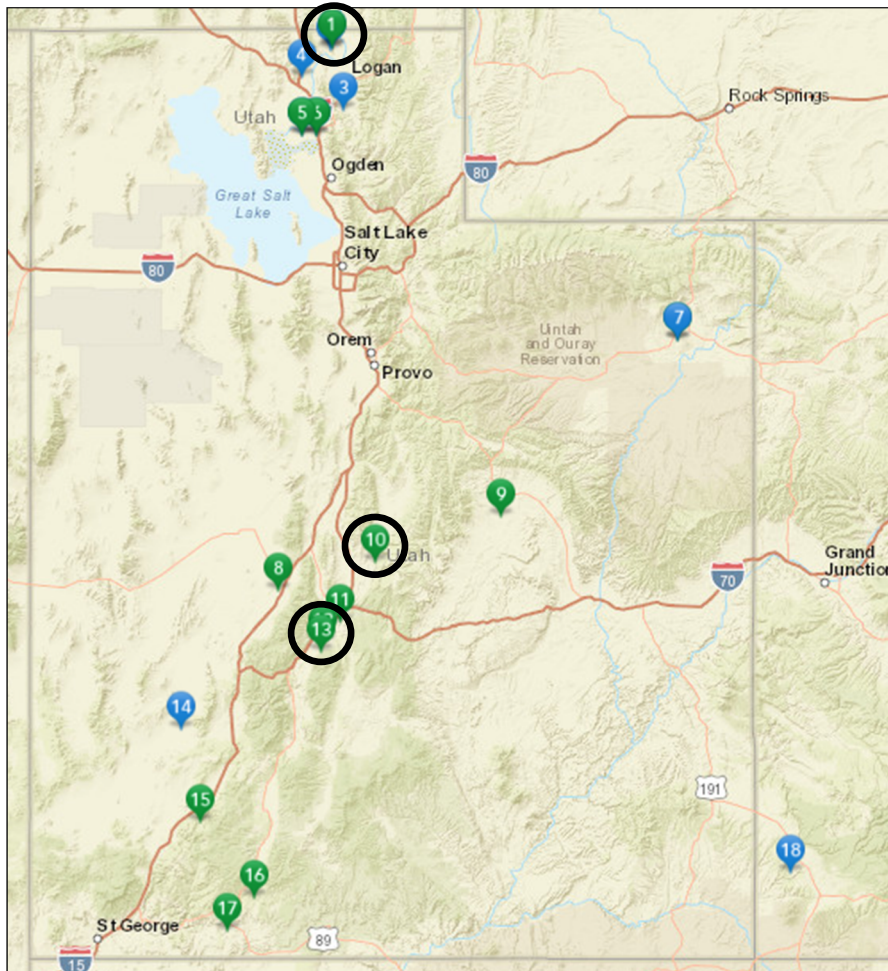


# Literature



- 2001, Kelling and Speth, Wisconsin - 50 lb N ac<sup>-1</sup>
- 1989, Badaruddin and Meyer, North Carolina - 130 lb N ac<sup>-1</sup>
- 1987, Bulman and Smith, Eastern Canada - 90 lb N ac<sup>-1</sup>

# 2018

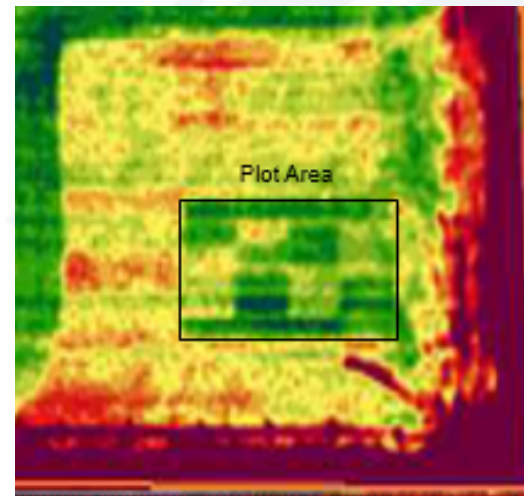


- ❧ 18 farms
- ❧ 13 forage - Green
- ❧ 9 grain - Blue
- ❧ Three 2<sup>nd</sup> year sites
- ❧ 15 1<sup>st</sup> year sites



# Plot design

30	120	120	150
0	150	60	0
90	60	90	30
120	90	120	150
0	30	90	60
150	60	0	30



# Soil Sampling



12 inch

6 inch



# Fertilizer application



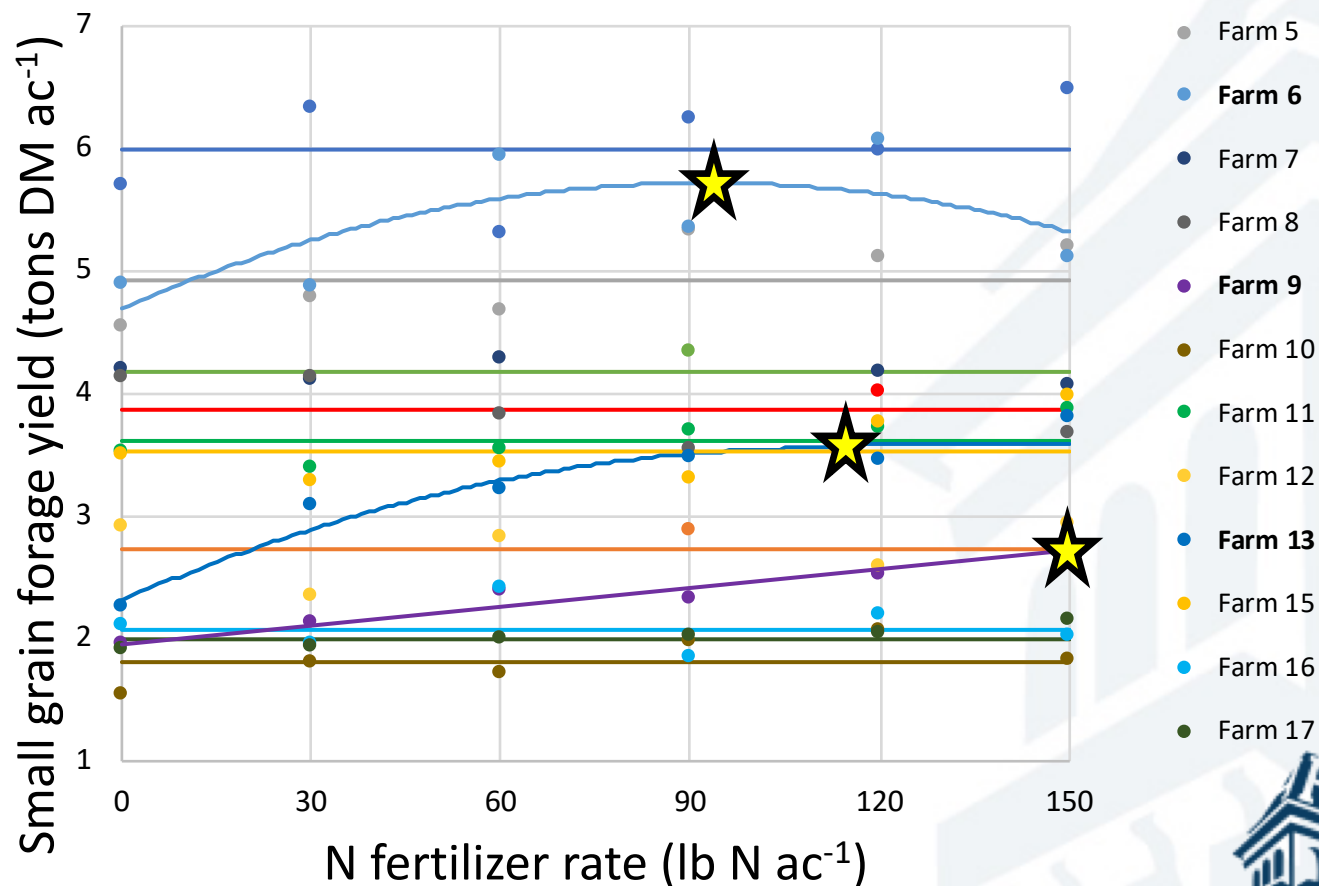


# Harvest



# Forage yield results

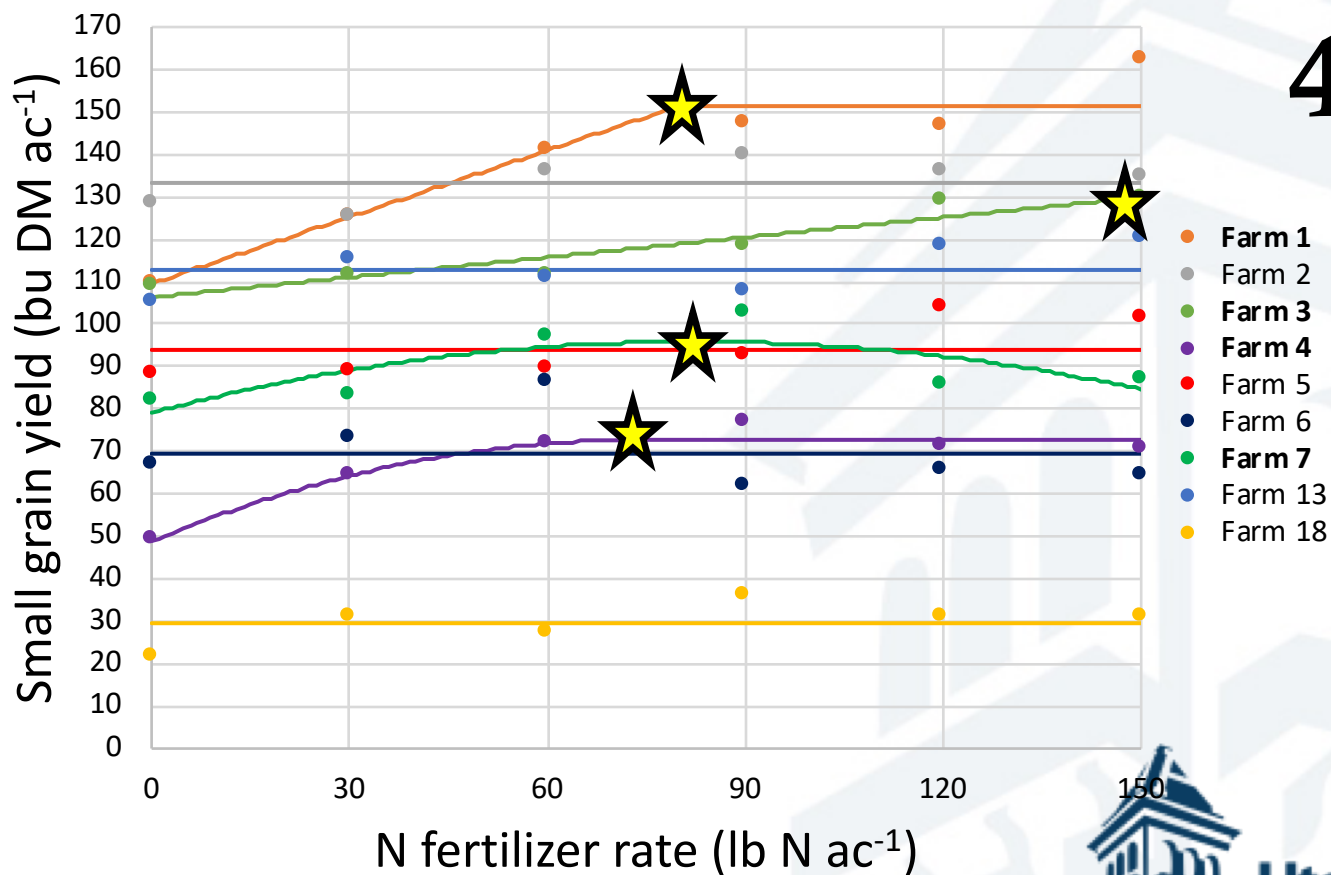
## Forage yield



23%

# Grain yield results

## Grain Yield





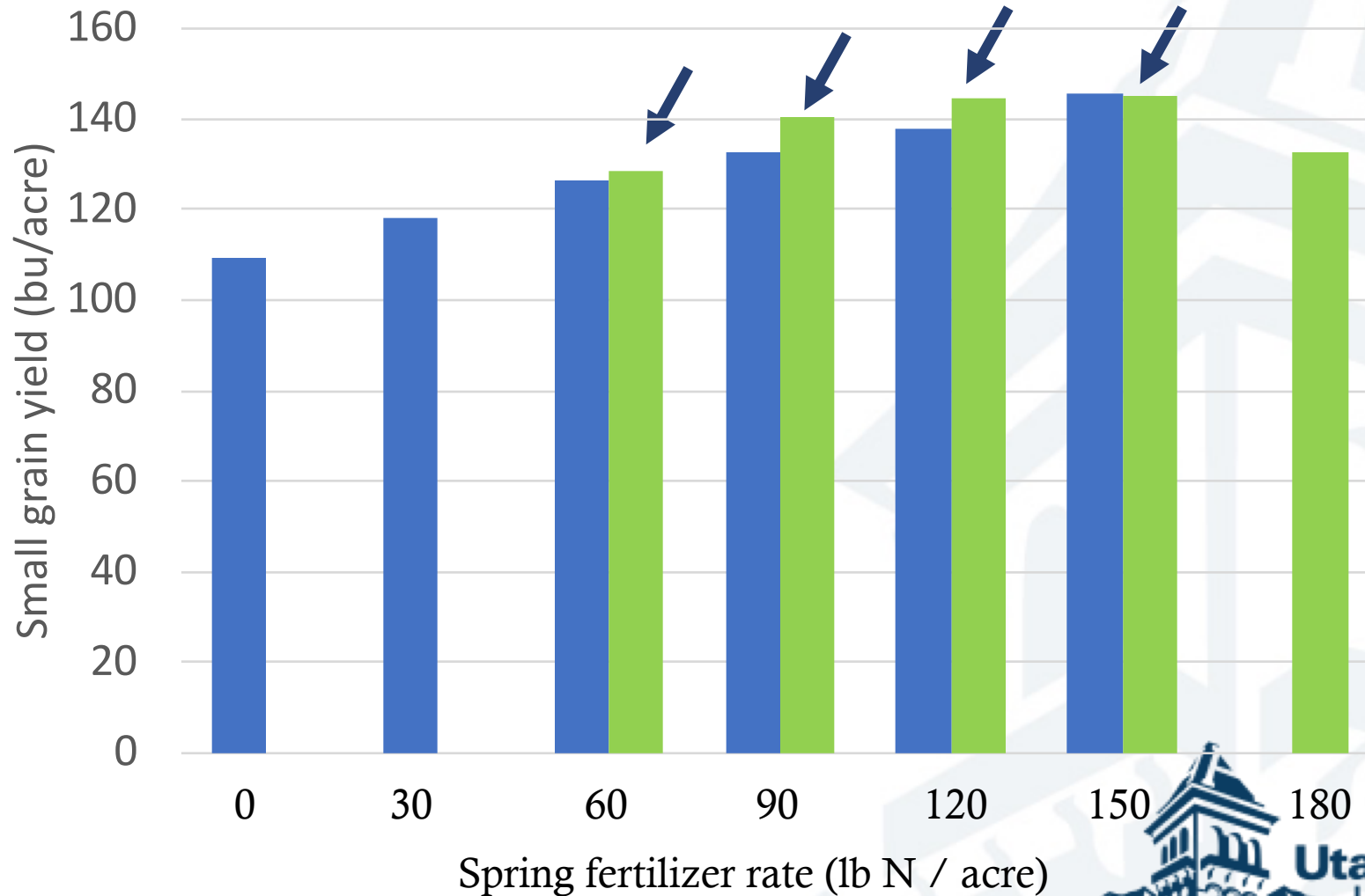
# Application timing

Spring

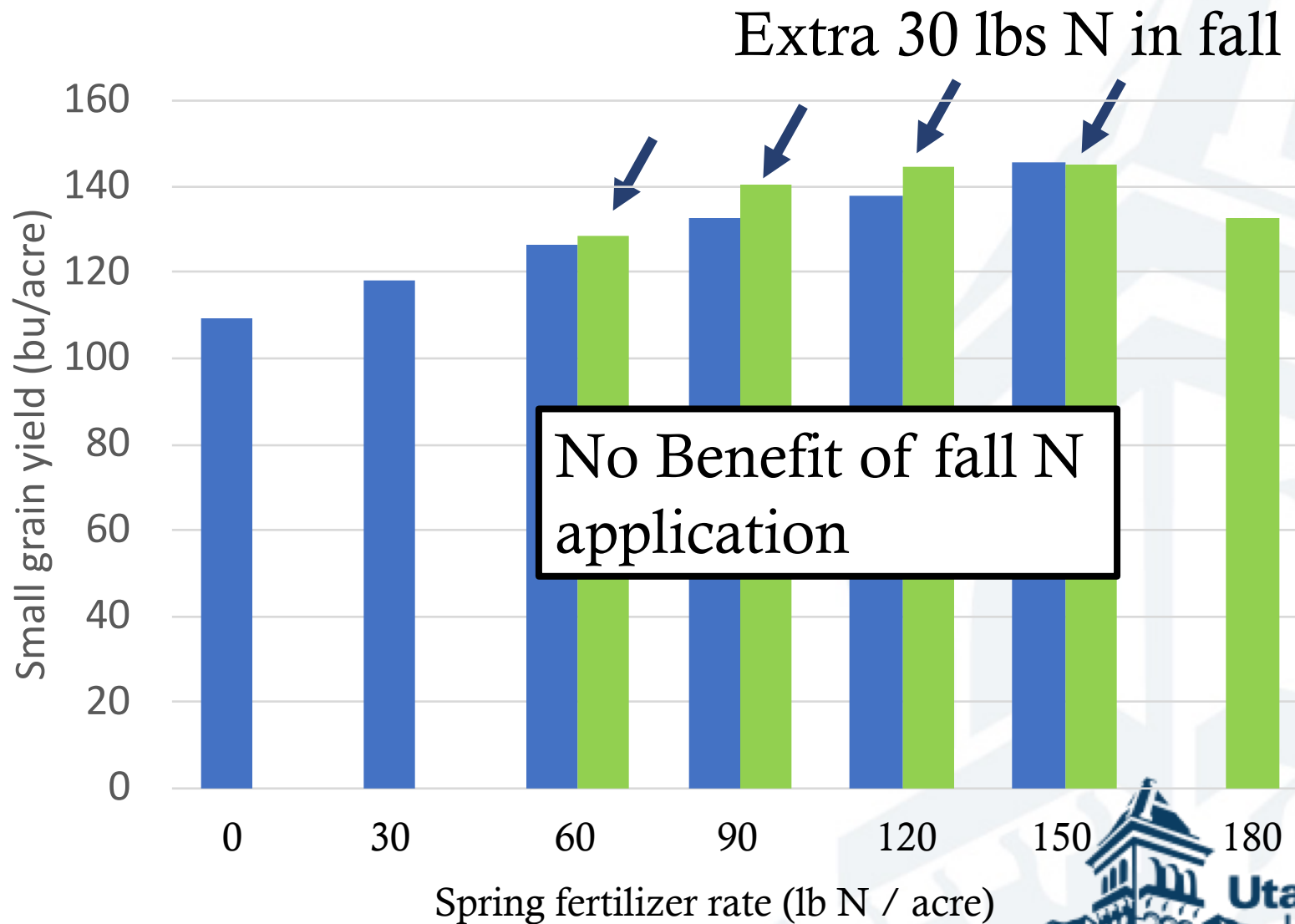


# Is split N worth it?

Extra 30 lbs N in fall

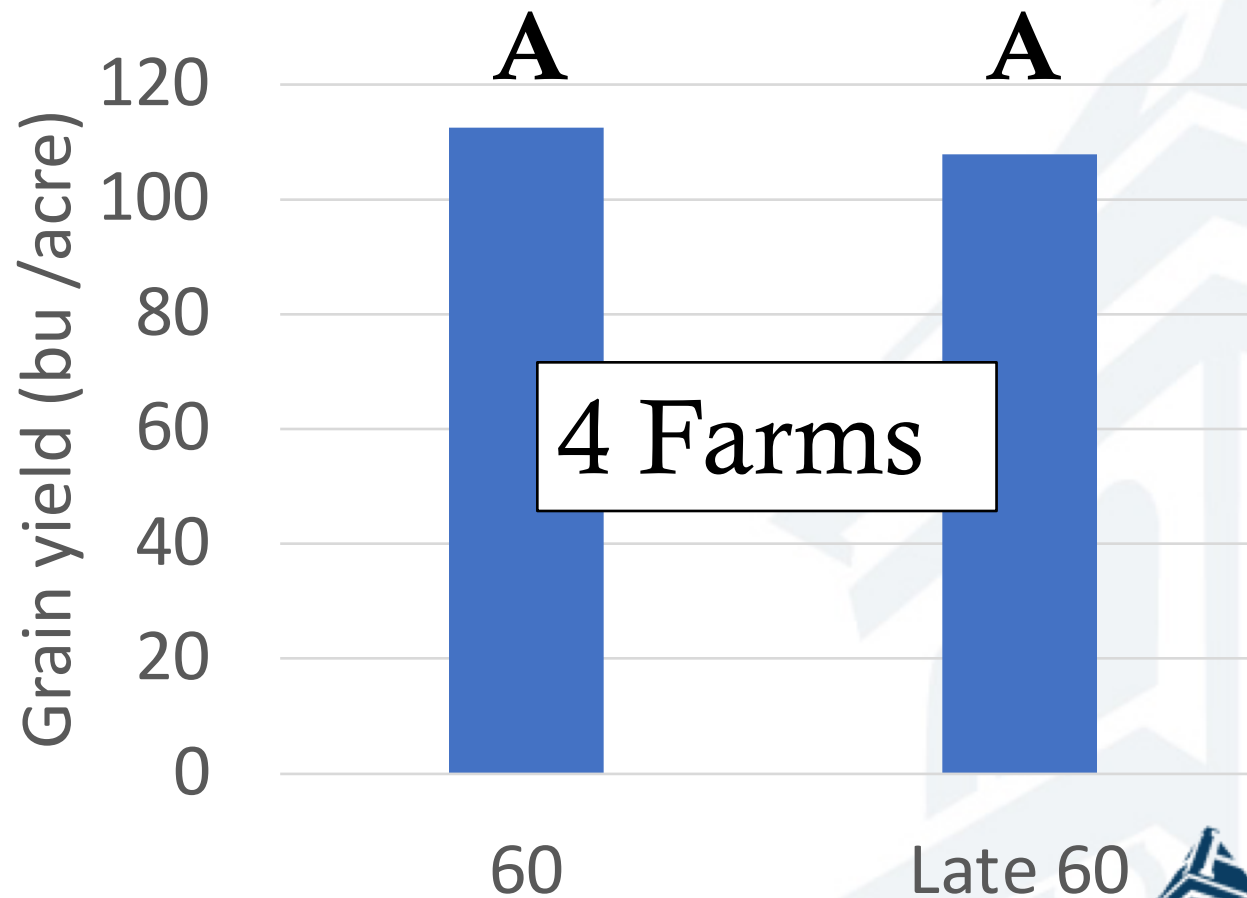


# Is split N worth it?



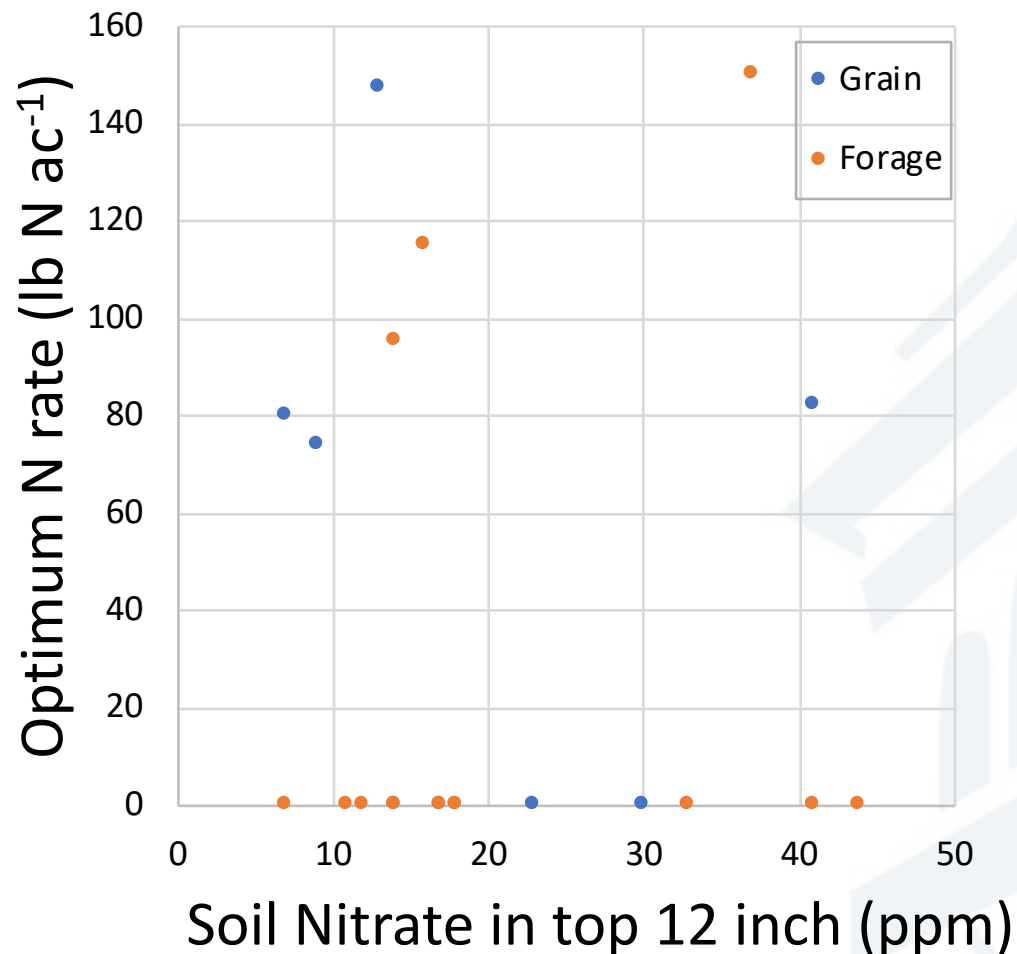


# Is late N application beneficial?

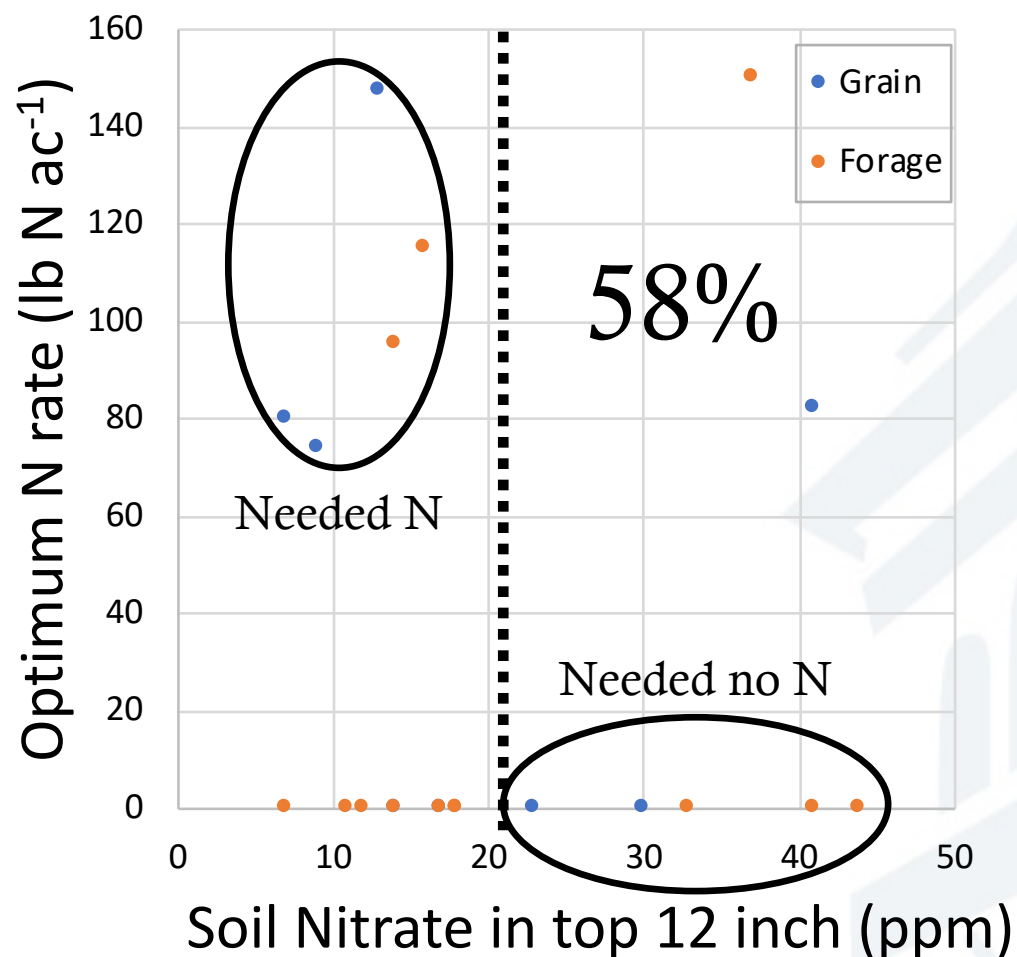


# Predicting response to N

# Soil nitrate levels (top 12 inch)

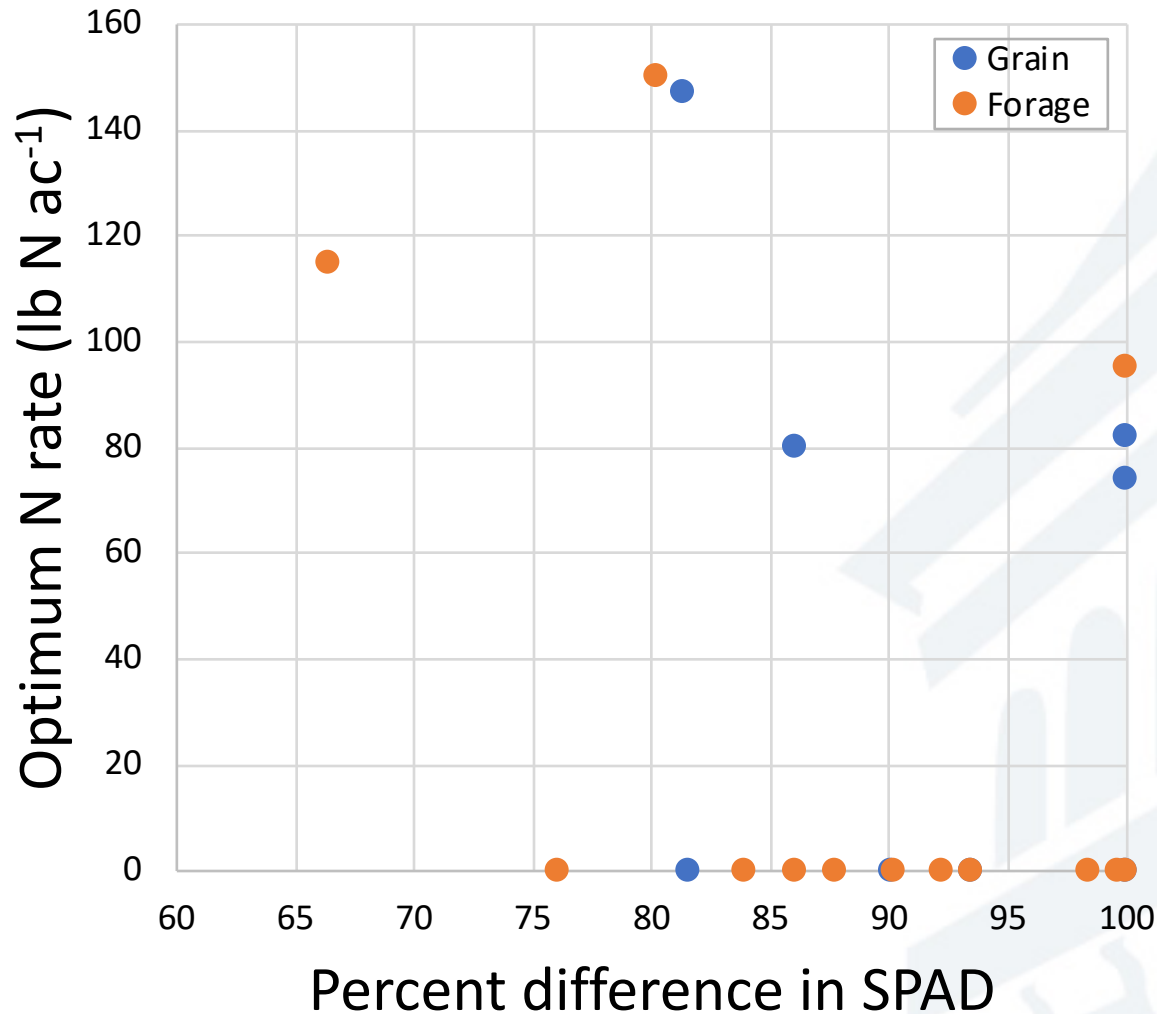


# Soil nitrate levels (top 12 inch)

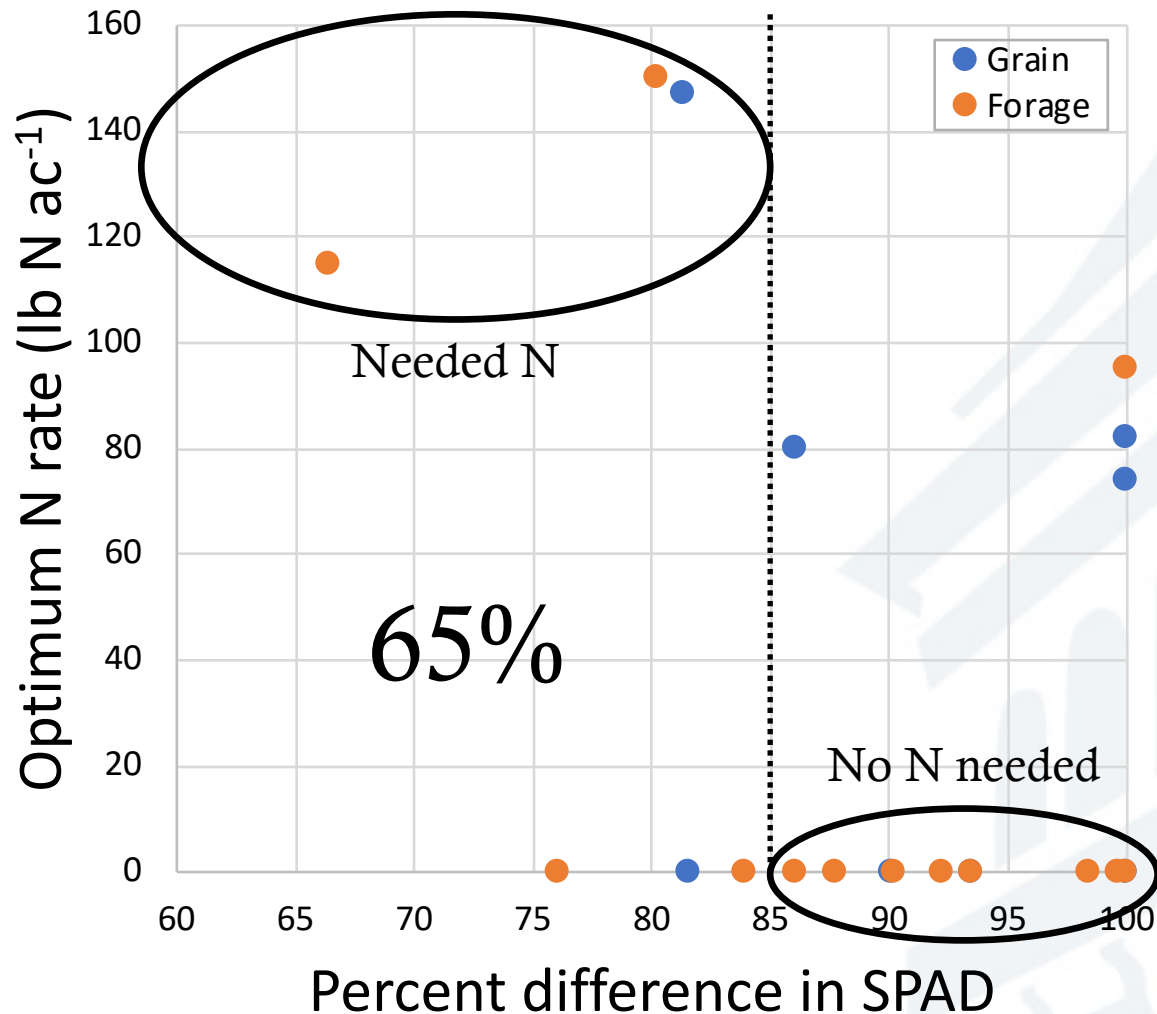




# Leaf Chlorophyll data



# Leaf Chlorophyll data



# Preliminary Conculusions

1<sup>st</sup> year

~~Added  
Nitrogen~~

Soil Nitrate  
SPAD

Limited accuracy

# Additional analysis

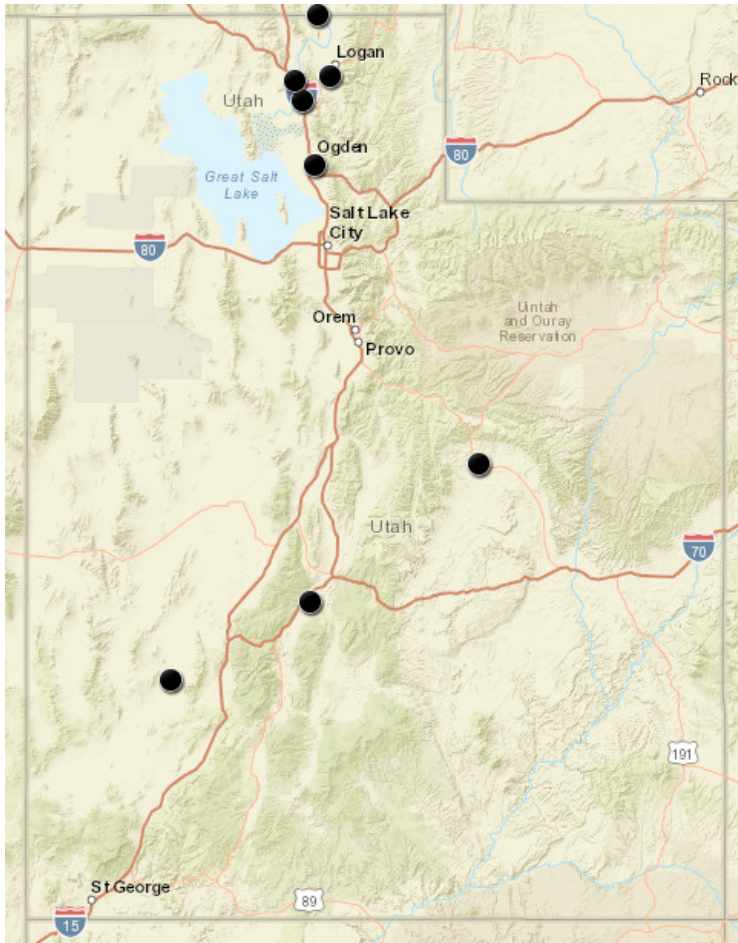


Protein





# Next step



- 15 fall sites set up for 2019
- At least 8 spring sites
- 2020

Thank you

Questions?

