

Building Potassium Fertilizer Guidelines that Include Soil Classification Information

PI and Collaborators

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Summary

Soil potassium (K) levels are being increasingly reported below 160 ppm, the critical level where fertilizers become recommended to optimize corn yield. However, there is still a 30-60% chance of no yield increase when soil test K levels are between 41 and 160 ppm. To improve the accuracy of K recommendations in North Dakota they also included clay type information in their recommendation guidelines because clay type can influence K availability to crops. Improving our understanding of the influence clay mineralogy has on crop response to K also has the potential to improve K recommendations in South Dakota (SD). Clay mineralogy also influences the risk of sodium dispersion and its subsequent effect on erosion. The objective of this project is to create new soil specific K fertilizer recommendation guidelines. The data from this study will be used to update current K recommendations for corn in SD. The update will help growers optimize their crop yield and economic profit. The estimated annual budget of this three-year project is \$97,575.

Goal and Objectives

The goal and objective of this project is to create new soil specific K fertilizer recommendation guidelines for SD.

Results:

- Studies have been established at 7 field sites.
- Soil samples were collected for soil health and soil fertility prior to planting and fertilization.
- Fertilizer treatments of potassium rates ranging from 0-120 lbs ac⁻¹ were applied.
- Graduate student has been selected and will start in August.

Impacts:

- Knowledge of the relationship between potassium and soil fertility and soil health measurements will be reevaluated to determine the need to update potassium recommendations for South Dakota.
- Knowledge will be increased of the relationship between soil health measurements and agricultural management practices.
- Training of a graduate and several undergraduate students in soil fertility.

Budget:**Project Budget (As of June 1, 2020):**

Budget Category	Budget	Total Expenses	Available Balance
Salaries	42,454.00	-	42,454.00
Benefits	5,717.00	-	5717
Travel	8,000.00	-	8,000.00
Contractual	29,802.00	166.67	29,635.33
Supplies	4,000.00	1192.4	2,807.60
Tuition remission	7,602.00	-	7,602.00
Total	\$97,575.00	\$1,359.07	\$96,215.93

Covid-19 Impacts:

- We had a goal of 10 research sites in South Dakota, but were only able to establish 7 research sites.
- We were able to collect a minimal amount of samples for soil health and soil fertility analysis.
- We were not able to collect soil characterization samples needed for the mineralogy and saline soils work.
- Processing and analyzing of soil samples has been slowed down due to a minimal number of personnel collecting and processing samples.