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Progress Report

2022 South Dakota Nutrient Research and Education Council Invited Proposals

Progress Report Title:	Interim Report - Due July 1, 2022
Applicant Name:	Jason Clark
Application Title:	Building Potassium Fertilizer Guidelines to Include Soil Classification Information: Year 3
Application ID:	1822
Review Deadline:	07/1/2022 11:59 PM

Interim Report - Due July 1, 2022

Project

	Start Date	End Date
Start and End Dates of Funding:	01/1/2022	12/31/2022
Title of Project:	Building Potassium Fertilizer Guidelines to Include Soil Classification Information:	
Project Description:	<p>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.</p>	

Publications

Publication Title:	NA
Publication Date:	06/30/2022
Status:	NA
Publication Description:	NA

Building Potassium Fertilizer Guidelines that Include Soil Classification Information

PI and Collaborators

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Kris Osterloh and Doug Malo, SDSU Soil Pedology; David Clay, SDSU, Soil Biogeochemistry

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.

Goal and Objectives

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

2022 Results:

- Studies have been established at 5 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.
- Potassium fertilizer rates to achieve 4% and 7% K base saturation were applied at planting.
- V6 plant samples were taken and are currently being processed in preparation for analyzing for nutrient analysis.

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.

Products:

- One Abstract and poster presentation of study results at the ASA/CSSA/SSSA annual International Conference
- Proceedings paper and poster presentation at the North Central Soil Fertility and Extension Conference in Des Moines, IA

- Extension article regarding the potassium deficiency during a drought.
- Two Research reports published in the annual Southeast Research Farm’s annual research report.

Budget:
Project Budget (As of June 1, 2022):

Budget Category	Budget	Total Expenses	Available
Salaries	\$37,361.00	\$9,067.12	\$28,293.88
Benefits	\$5,682.00	\$529.00	\$5,153.00
Travel	\$4,500.00	\$0.00	\$4,500.00
Contractual	\$48,000.00	\$0.00	\$48,000.00
Supplies	\$4,500.00	\$394.90	\$4,105.10
Tuition remission	\$7,678.00	\$3,359.00	\$4,319.00
Capital Equipment	\$0.00	\$0.00	\$0.00
Non-Capital Equipment	\$0.00	\$303.92	-\$303.92
F&A (Indirect) Charges	\$0.00	\$0.00	\$0.00
Total	\$107,721.00	\$13,653.94	\$94,067.06