Fertilizer N Rate Recommendation Update for Corn

PI: Jason Clark, Soil Fertility Extension Specialist and Assistant Professor, SDSU, Department of Agronomy, Horticulture & Plant Science, jason.d.clark@sdstate.edu, (801) 644-4857
Co-PIs: Péter Kovács, Assistant Professor, Precision Ag Cropping Systems and Anthony Bly, SDSU, Soils Field Specialist

Summary
Corn is the leading crop in South Dakota (SD). Successful production heavily relies on N fertilizer application to maximize yields. Non-optimal N rate use can affect the farmer's profitability and the environment. The current N fertilizer guideline is more than 10 years old. Increased yield levels and newer genetics warrant completing studies aimed at updating the current guidelines. The overall goal of the research is to reevaluate and update (if necessary) the current corn fertilizer N rate recommendations through identifying and using recent research data and conducting N rate field trials throughout the state. At the end of the first 4 years of this project, the current fertilizer N rate recommendation will be updated. The project can help to improve farmer's profitability and lower environmental impact associated with over application of N fertilizer. The third year's budget is $76,581.

Goal and Objectives:
The goal of this project is to update the fertilizer N rate recommendation for corn in SD. The objectives of the project are i) to continue with field studies in 2020 to collect corn yield response to N rate application data and ii) to create a corn N fertilizer response database where data from past, current, and future N fertilizer rate studies can be combined and evaluated now and on-going into the future to be able to more easily evaluate the current N recommendation and update as needed.

Results:
- Study was established at 1 field site.
- Soil samples were collected for soil health and soil fertility prior to planting and fertilization.
- Fertilizer treatments of Nitrogen rates ranging from 0-200 lbs ac^{-1} were applied.

Impacts:
- Knowledge of the relationship between nitrogen and soil fertility and soil health measurements will be reevaluated to determine the need to update nitrogen 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	41,932.00	-	41,932.00
Benefits	10,149.00	-	10,149.00
Travel	5,000.00	0.00	5,000.00
Contractual	15,000.00	297.92	14,702.08
Supplies	4,500.00	1417.35	3,082.65
Total	**76,581.00**	**$1,715.27**	**$74,865.73**

Covid-19 Impacts:

- We had a goal of 10 research sites in South Dakota, but were only able to establish 1 research site.
- We were able to collect a minimal amount of samples for soil health and soil fertility analysis.
- Processing and analyzing of soil samples has been slowed down due to a minimal number of personnel collecting and processing samples.