PROJECT TITLE: Best management practices to integrate cover crops and manure

PROJECT NUMBER: 4151-19SP

REPORTING PERIOD: October 1 – December 31, 2019

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1.) PROJECT ACTIVITIES COMPLETED DURING THE REPORTING PERIOD. (Describe project progress specific to goals, objectives, and deliverables identified in the project workplan.)

This is the first season of this project. For Task 1 (mostly 1A and 1B), over-seeded cover crops have been planted in soybean (tasks 1A-1B) at SROC in Waseca, MN. After soybean harvest, occur in the last cover crop treatment was be drilled and manure applied. Two sets of 0-2’ soil samples were collected. For the sweet corn-corn rotation, all cover crops were drilled after sweet corn harvest. Three sets of 0-2’ soil samples were collected (part of task 1C) and both the ‘early manure’ and ‘late manure’ treatments were applied. Above-ground biomass samples were collected in late fall from both the soybean and sweetcorn studies. For task 2, our farmer cooperator, Mr. Krusemark, has drilled his cover crops in his field. Manure was applied with strip-tillage this fall. The first set of 0-2 ft soil samples were collected.

2.) IDENTIFY ANY SIGNIFICANT FINDINGS AND RESULTS OF THE PROJECT TO DATE.

Preliminary results from the soybean project are as follows:

- Cover crops had no effect on nitrate nor ammonium concentrations (P>0.05) in fall 2019
- Soil nitrate was significantly affected by manure treatment and soil depth (Figures 1 and 2), whereas soil ammonium was significantly influenced by the manure treatment and soil depth interaction (P<0.05; Figure 3). Note that soil ammonium concentrations are much higher than nitrate concentrations at this sampling date.
- Cover crop treatments had no significant effect on soybean yield (P>0.05)

![Soil Nitrate by Manure Treatment](image)

**Figure 1.** Impact of manure application on soil nitrate concentrations in the top 2 feet of soil. Bars with the same letter are not significantly different (P>0.05).
3.) CHALLENGES ENCOUNTERED. (Describe any challenges that you encountered related to project progress specific to goals, objectives, and deliverables identified in the project workplan.)

The challenging weather conditions this growing season have presented some challenges. Particularly for the on-farm experiments. Our farmer-cooperator was not able to interseed cover crops as planned due to extremely wet field conditions most of the summer, but was able to drill covers after harvest. This meant that the cover crops were smaller than anticipated. Luckily there was a window of opportunity to apply manure via strip-tillage.

We did not have enough finisher manure for our soybean small plots at SROC, so we switched to the nursery barn’s hog manure. It was applied at the maximum rate that we could physically apply with our equipment (~10,000 gal/acre) but this was still a low first-year available N rate (about 40 lbs N per acre). We will supplement with commercial fertilizers at pre-plant or planting next spring.

4.) FINANCIAL INFORMATION (Describe any budget challenges and provide specific reasons for deviations from the projected project spending.)

The financial information for this project has been forwarded. There have been no challenges with the budget at this time.
5.) EDUCATION AND OUTREACH ACTIVITIES. (Describe any conferences, workshops, field days, etc attended, number of contacts at each event, and/or publications developed to disseminate project results.)

This project has just begun, so we have not yet developed any materials or participated in any outreach activities yet. We are scheduled to present a poster at the MN Ag Expo in January 2020, though.