

**Minnesota Department of Agriculture
Agricultural Fertilizer Research and Education Council
Written Project Update**

PROJECT DESCRIPTION: Updating nitrogen and phosphorus credits from manure to maximize fertilizer use efficiency in row crops

REPORT DUE DATE: December 7, 2018

PRINCIPAL INVESTIGATOR: Melissa L. Wilson

Objectives:

Our goal is to verify and/or update N and P credit recommendations from manure so that farmers are able to make better decisions when purchasing and applying commercial fertilizers in following years.

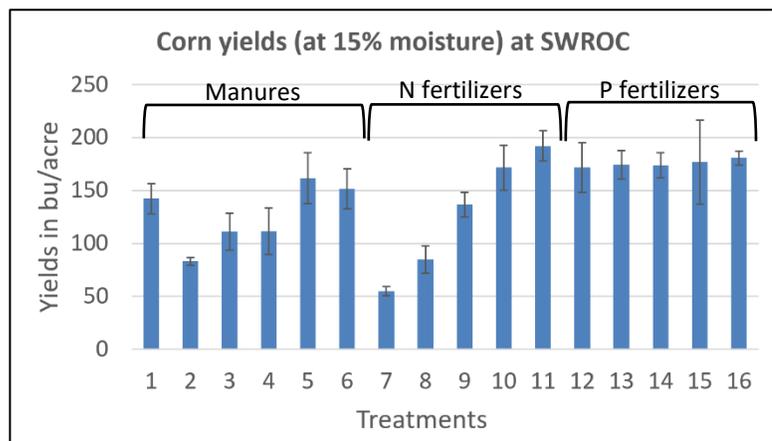
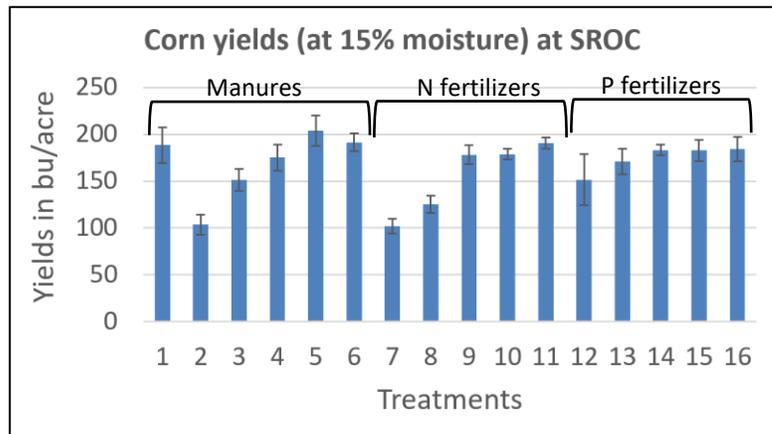
The objectives of this study are to use laboratory and field studies to: 1) estimate N and P mineralization from a variety of manures and soil types and 2) determine the best calculation for plant available N (PAN) and plant available P (PAP).

Current Research Findings:

We have completed the first year of the field study at two locations. In-season soil samples, plant samples at corn growth stage R6, yield, and final soil samples were collected. The soil samples have been partially analyzed and plant samples have been prepped for analysis. Our yield data can be seen in the two graphs to the left.

The treatments were as follows (all manures were applied to supply 140 lbs N):

1. Swine finishing manure
2. Bedded beef pack manure
3. Dairy manure (raw, untreated)
4. Dairy manure, liquid-separated
5. Composted chicken manure pellets
6. Turkey litter
7. Fertilizer: 0 lb/A N (full P, K)
8. Fertilizer: 42 lb/A N (full P, K)
9. Fertilizer: 84 lb/A N (full P, K)
10. Fertilizer: 126 lb/A N (full P, K)
11. Fertilizer: 168 lb/A N (full P, K)
12. Fertilizer: 0 lb/A P (full N, K)
13. Fertilizer: 30 lb/A P (full N, K)
14. Fertilizer: 60 lb/A P (full N, K)
15. Fertilizer: 90 lb/A P (full N, K)
16. Fertilizer: 120 lb/A P (full N, K)



Based on our yield results across sites, the swine, turkey litter, and composted chicken layer manure performed about as expected as a nutrient source. The dairy and bedded beef pack manure did not perform as well as expected. Our in-season soil samples and plant samples taken at R6 should shed some more light on why this may have happened. Those samples will be analyzed over the winter into next spring.

Project Schedule and Budget:

The field study portion of the project is on track. The lab study has been delayed from the original plan due to the time it took to collect and dry the amount of soils needed.

Additionally, we decided to wait until fall to collect manure since farmers were more likely to be agitating and mixing their manures in preparation for field application. We thought we would be more likely to get a good, representative sample at that time. The study has begun, however, and we will likely have it completed by April.

The budget is currently on track as well, except that we will need to shift money around in some categories. As an example, we were unable to find a commercial manure hauler to locate and transport 6 different types of manure for us in the spring, so we decided to carry out that task on our own. The money that was budgeted for this will be used for the added travel and labor costs on our part.

Potential Project Results:

The main goal of this project is to determine if the University of Minnesota's current recommendations for manure N and P credits are still applicable. Our first year of data showed that we may need to make adjustments to beef bedded pack and possibly dairy manure, but further years of data are needed. In the end, if we are able to provide better recommendations for manure use, then farmers will be able to better maximize their commercial fertilizer purchases, increasing profitability.

Will the project request funding in the 2019 grant cycle?

Yes, we will ask for funding for 2019 to continue the field study portion of this project. The fields that we started this past year will continue to be monitored and commercial fertilizers will be applied to treatments 7-16. The in-season soil sampling will not be as intense in these fields. We will also start the experiment again in new fields at each location, with intense in-season sampling for this first year. The study in 2019 will likely be the busiest year of this project.