

Potential soil health improvement through the integration of cover crops and manure in the upper Midwest

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Background

Little is known about the effects that integrating liquid injected manure and cover crops have on silage yield. This is especially the case in the upper Midwest where cover crop adoption is low compared to the northeast, midsouth, and southeast US. Growers are hesitant to use cover crops due various concerns:

- Short cover crop growing season
- Potential impacts on subsequent crop yields
- Limited information about the BMPs of integrating manure and cover crops



Cover crops overseeded near corn's fifth leaf collar (V5) growth stage.

Study Objectives

The intent of this study is to determine the best management practices for integrating cover crops and manure and how that impacts yield. Measurements pertain to:

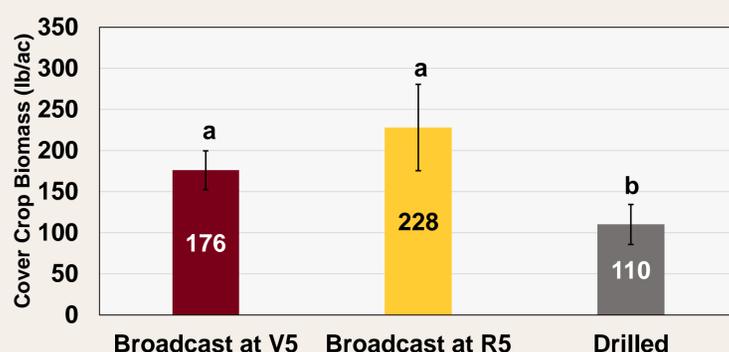
- Impact of cover crops on silage yield
- Response of nutrient source on silage yield

Methods

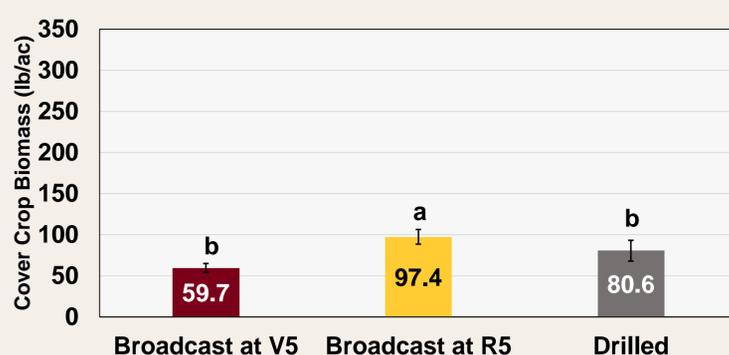
- We tested different cover crop seeding techniques and nutrient source/application timing treatments in a continuous silage corn rotation system.
- Liquid dairy manure was sweep-injected to minimize soil disturbance in early and late fall, when soil temperatures were above and below 10°C (50°F), respectively.
- Non-manured plots received urea in the spring. We aimed to apply the same plant available nitrogen rates across all treatments.
- Cover crop mixtures of cereal rye and annual ryegrass were overseeded near corn's fifth leaf collar (V5) growth stage, physiological maturity (R5 to R6 growth stage), or drilled after corn harvest.
- Plots with no cover crop planted in the fall followed by urea application in the spring served as the control.

Preliminary Results

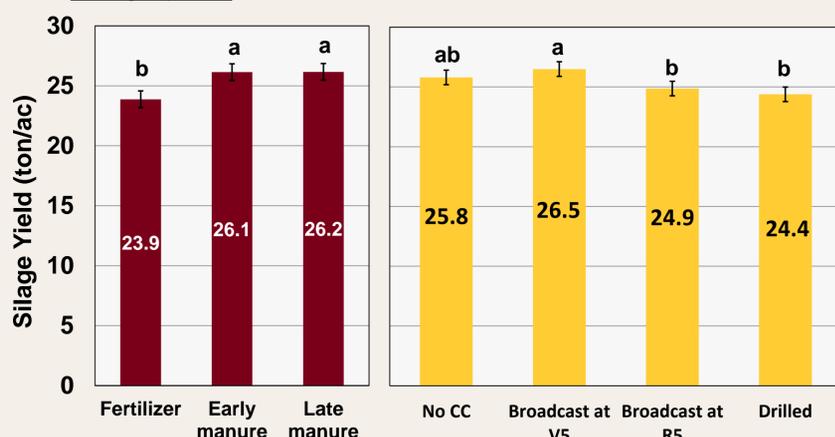
Fall cover crop yield



Spring cover crop yield



Silage yield



*Dissimilar letters indicate significant differences among treatments

Lessons learned

- Overseeding near plant senescence is a more optimal time to plant cover crops than drilling after harvest or planting near early crop development.
- Manure, either applied in the early or late fall, improved silage yield compared to spring applied urea.
- Increased cover crop biomass production may inhibit silage yield to a certain extent.
- Ongoing research measuring various soil health parameters and nutrient uptake, among other criteria, is underway.



Sweep injecting liquid dairy manure into a stand of growing cover crops.

Acknowledgments

- This work was supported by the Conservation Innovation Grants program at the Natural Resources Conservation Service of the U.S. Department of Agriculture, under grant number 2020-68008-31410, Minnesota Corn Research and Promotion Council, and the Foundation for Food and Agriculture Research.
- Special thanks to personnel at the West Central Research and Outreach Center and Wilson Lab for field access and assistance with field work.