Objectives

1. Determine to what extent a rye cover crop changes the nitrogen efficiency of a corn cropping system without statistical reduction in crop performance.

2. Predict an optimal nitrogen rate for this system.

Experimental Design

This cover cropping system offers significant financial savings for the grower and reductions in environmental impact.

<table>
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<th>N-Rate (lbs/acre)</th>
<th>Cost ($/acre)</th>
<th>Savings ($/acre)</th>
<th>Reduction in Urea (lbs/acre)</th>
<th>Carbon Emissions (lbs/acre)</th>
<th>Emissions Reductions (lbs/acre)</th>
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Table 1 – Financial and environmental benefits by potential nitrogen application rates for this system. Monetary figures based on urea cost of $326.16 per ton on May 1, 2017 according to Farm Futures. Carbon emissions figures based on urea production data from IFDC.

Conclusion

Rye cover crops show the potential to decrease nitrogen demands for a corn-cropping system up to 75 pounds per acre leading to significant financial and environmental benefits.

Future Work

1. Obtain residue samples late in the season to determine C/N content, density of residue, and extent of decomposition in order to evaluate nitrogen cycling.

2. Analyze yield data versus nitrogen application rate to find an optimal nitrogen rate and compare to in-season predictions to determine the optimal nitrogen rate for this system.

3. Repeat the study to control for environmental factors, including a non-cover crop control in the experimental design.