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Investment Insight

Recent Research Results

Cover crops – four questions to answer to further equip and encourage farmers to adopt cover crops.

1. Do cover crops reduce the amount of fertilizer N loss through tile drainage?
2. Does N fertilizer application timing influence the effectiveness of cover crops to reduce N loss through tile drainage?
3. What percentage of cover crop scavenged N will be available to the following crop?
4. How does the timing of cover crop residue N release correlate with the N demand of corn and soybeans?

The answer to question one is “yes.”

We have a clear understanding of how cover crops reduce N loss. Dr. Shalamar Armstrong, who is heading this research, found that over a three-year period cover crops reduced N loss through the tile drainage by an average of 46% relative to the no cover crop control.

No is the answer to question two.

Dr. Armstrong has determined that N fertilizer application timing (fall or spring) does not hinder the effectiveness of cover crops to scavenge N. His data suggest that reductions in N loss via tile drainage by the cover crops were nearly equal whether N was applied in the fall (50% N loss reduction) or the spring (42% N loss reduction).

The answers to questions number three and four are getting closer to researchers – at least quantified answers to help farmers understand the timing and quantity of N release from the cover crop residue after termination.

Eventually farmers will have an estimate of how much cover crop N the cash crop uses, which could possibly lead to adjustments of their current N management systems for optimum yield and N

use efficiency. The figure below puts these research results into a visual illustration. The research was conducted at the at the Illinois State University Nitrogen Management Research Station.

What’s next for Dr. Armstrong and his team? Dr. Armstrong is taking a closer look at cover crop impact on N cycling in four phases of the N cycle – soil, plant, water, and the atmosphere – using labeled 15 N that he and collaborators will track through the systems. He is also evaluating the long and short-term economic benefits and risks of large-scale use of cover crops.

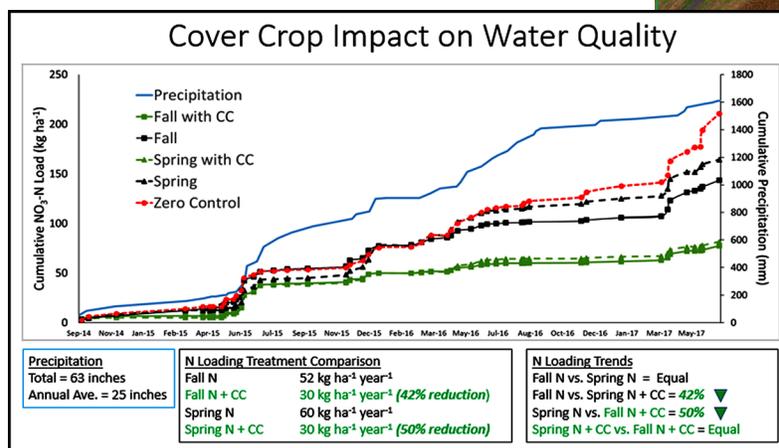
The Above studies have been conducted near Lexington, IL at the Illinois State University Nitrogen Management Research Station.

N in Groundwater. Dr. Armstrong of Purdue University is also working with a team of researchers from Illinois State University (ISU) on a paired experiment to learn the effects of cover crops on *surface* water quality in the Lake Bloomington watershed. The researchers are monitoring tile drains that are draining multiple fields. Dr. Catherine O’Reilly with the Hydrogeology Program at ISU is leading this research.

The water quality data indicates that cover cropping appears to be effective in reducing the amount of water and nutrients lost. Researchers found that cover crops reduce N load relative to a reference watershed. This reduction in N loss appears to be partly due to decreased discharge. In general, the cover cropped watershed also seems to be more effective at keeping N concentrations lower, although the tile water regularly exceeded 10 mg/l, which is the EPA drinking water limit. In contrast the impact of cover crops on P loading has been more difficult to quantify. The team is planning advanced investigation on phosphorous loading.



Above: The green area shows cover crop growth. The photo was shot a few weeks after harvest and cover crop germination by Schertz Aerial.



On a watershed scale (500 acres and multiple farmers), they have been successful in seeing cover crops aerially for the last three years, while allowing farmers to maintain their individual management strategies.

