Can Cover Cropping & No-till Work in Northwest Wisconsin?

The Horse Creek Area Farmer-Led Watershed Council Has Some Answers

Project Summary

The Horse Creek Area Farmer-Led Watershed Council has operated a no-till and cover crop test plot for the past 10 growing seasons. Treatments were designed to study how conservation practices impact agronomic productivity. The study was implemented in 2015, and treatments have been repeated annually in a corn grain-soybean rotation.

Treatments include:

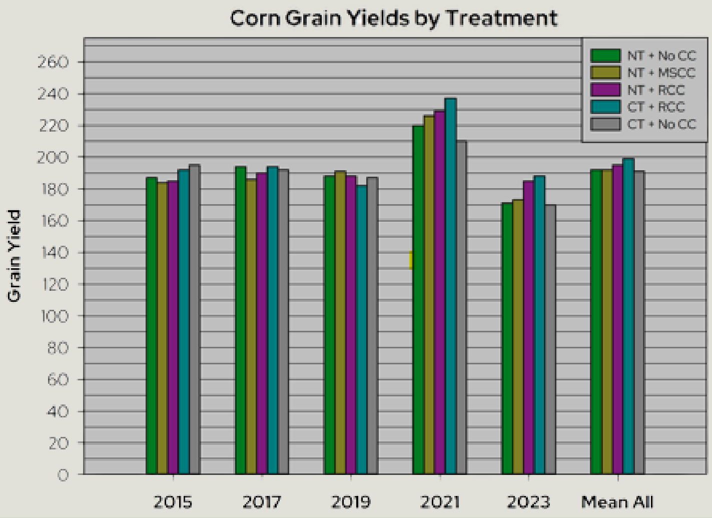
1. No-till + No Cover Crop (NT+NoCC)
2. No-till + Multi-species Cover Crop (NT+MSCC)
3. No-till + Cereal Rye Cover Crop (NT+RCC)
4. Conventional Till + Cereal Rye Cover Crop (CT+RCC)
5. Conventional Till + No Cover Crop (CT+NoCC)

Treatments 1-4 represent different levels of conservation management, while treatment 5 represents conventional management.

Objective: Does yield or economic return "drag" when implementing cover crops and/or no-till?

Corn Yield Results

Corn yield was statistically similar between conservation and conventional management in every growing season and when averaged across all growing seasons. When averaged across all growing seasons, treatments with a cereal rye cover crop resulted in the highest corn yield.



Key Corn Yield Takeaways

- No significant "Yield Drag" was observed when transitioning to no-till and/or cover crops.
- After 2-3 rotations, corn yield was generally greater where no-till and/or cover crops were implemented.
- After 3 rotations, stacking no-till with a cereal rye cover crop resulted in higher yield than no-till alone (purple vs. green).
- After 3 rotations, combining cereal rye cover crop with conventional till achieved higher yields than conventional till alone (teal vs. grey).
- In challenging weather years such as 2023, plots with conservation management yielded better than plots with conventional management.

Data analysis was provided by the University of Wisconsin-Madison Division of Extension in collaboration with the Horse Creek Area Farmer-Led Watershed Council and Polk County Land and Water Resources Department.

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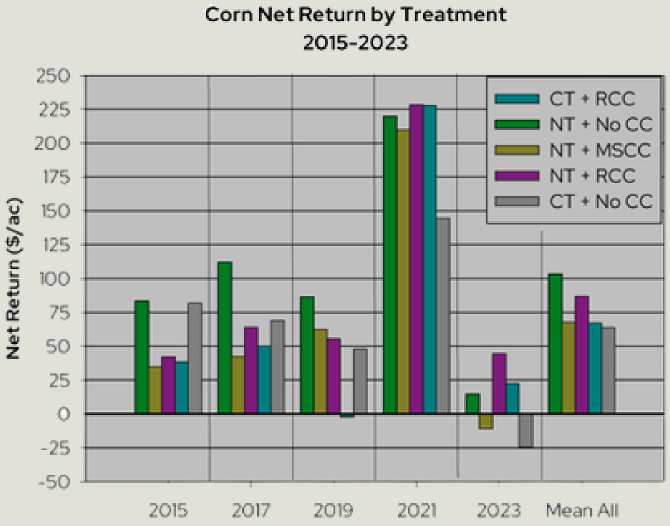
https://farmerledwatershed.org/horse-creek-watershed/

Corn Economics Results

Yield is great, but economic return is what pays the bills on the farm. The figure below displays the average net return ($/acre) for each of the five treatments in each corn year (i.e. 2015, 2017, etc.) and when averaged across all five corn years (i.e. Mean All).



Corn Economic Assumption

- Corn Value: $4.20/bu (10-year USDA average)
- Tillage Cost: Chisel $18.61/ac + Field Cultivation $14.94/ac = $33.55/ac
- Cover Crop Planting: $15/ac
- Cover Crop Seed Cost:
  - Cereal Rye Cost: Seed Cost: $10.25/bu @ Seed Rate 1.5 bu/ac = $15.38/ac
  - Multi-species Cost: Seed Cost: $1.40/lb @ Seed Rate 15 lb/ac = $21.00/ac
- All other Corn Production & Land Costs: $703/ac

Key Corn Economic Takeaways

- Starting in first corn year, NT+NoCC (green) was more profitable than CT+NoCC (grey) and remained more profitable over all five rotations.
- Over the first two rotations, plots with cover crops were less profitable than CT+NoCC (grey).
- After 3 rotations, all plots with conservation management were more profitable than CT+NoCC (grey).
- On average over 5 rotations, NT+NoCC (green) and NT+RCC (purple) were more profitable than conventional management (grey) by ~$39 and $23/ac, respectively.
- On average over 5 rotations, CT+RCC (teal) was more profitable than CT+NoCC (grey) by $4/ac.
- NT+MSCC (yellow) was the least profitable conservation management system due to higher cover crop seed cost and lower yield.
- YES, conservation practices can pay the bills in NW Wisconsin, even without incentive programs!

Analyzing the Corn-Soybean Rotation Together

When evaluating the economic outcomes of these different cropping systems on a 2-year rotation basis, average return over the rotation was highest in NT+NoCC (green) and NT+RCC (purple) with each providing $138/ac return. NT+MSCC (yellow) and CT+NoCC (grey) netted nearly the same return ($63 and $64/ac respectively), while CT+RCC (teal) provided the lowest return at -$1/ac.