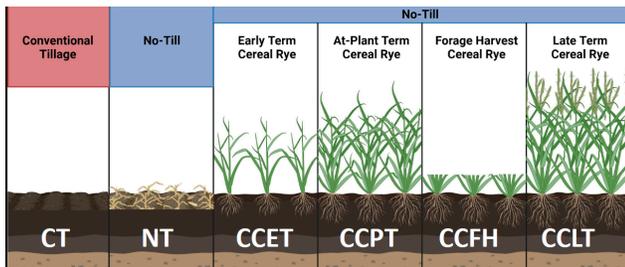




Improving Soil Health with No-Till and Cereal Rye Cover Crops

In this Issue



The above illustration identifies the six plot treatments that were assessed for soil health.

By: Dr. Chris Baxter, Professor of Soil & Crop Science, UW-Platteville, & Extension Specialist

In 2018, a team of UW researchers set out to answer several important questions for corn and soybean farmers. A long-term study was established at the Arlington and Lancaster, WI research stations to measure impacts on various agronomic and soil factors due to interactions of weed management, cover crops, and tillage. One important question they hoped to answer was how quickly can soil health improve when no-till and cereal rye cover crops are added to corn-soybean systems? The work has started to yield some interesting results, even after only five years.



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Insight into improving soil health with no-till and cover crops



Soiled Underwear Page 3

Well, not that kind of soiled - we're talking about actual soil here...



Liming? To till or not to till, that is the question Page 4

Preliminary results from a liming study



Farmer Nutrient Management Training Page 5

Get certified (or recertified) to balance your farms nutrients



Improving Soil Health with No-Till and Cereal Rye Cover Crops (continued from page 1)

Study Setup

The trials were planted on ground already in long-term no-till. Six different soil and cover crop management strategies were compared:

1. Conventional tillage (CT)
2. No-till without cover crop (NT)
3. No-till with cereal rye terminated about two weeks before planting (CCET)
4. No-till with rye chemically terminated at planting (CCPT)
5. No-till with rye harvested for forage at planting (CCFH)
6. No-till with rye terminated about two weeks after planting (CCLT)

Soil samples were taken in 2023 and tested for chemical, physical, and biological indicators of soil health.



Cover crops terminated before and after planting

Key Findings

A lower bulk density indicates more pore space and less compaction

Physical Soil Health

- Tillage decreased surface layer bulk density but also decreased aggregate stability.
- Cover crops—especially when terminated at or after planting—further improved the stability of larger soil aggregates (2–8 mm). More stable soil aggregates mean less crusting and erosion, and better water infiltration.

Chemical Soil Health

- Soil test phosphorus and potassium were not affected by tillage or cover crops.
- Total carbon and total nitrogen were higher in no-till and rye cover crop treatments than in tilled soil.

Chemical Soil Health (continued)

- Late-terminated rye (CCLT) had the greatest carbon and organic matter levels, suggesting that keeping rye growing longer before termination builds soil faster.
- The carbon-to-nitrogen (C:N) ratio was also higher in cover crop systems, which could have implications for nutrient cycling.

A higher C:N ratio can lead to nitrogen tie-up in the decaying cover crop plant material

Biological Soil Health

- Soil respiration (a measure of microbial activity) was not statistically different among treatments, but tended to be higher in no-till and cover crop plots, especially when termination was delayed.
- Organic matter levels were greater where rye was used, with the late-terminated rye plots again showing the biggest improvements.

Agronomics

- Corn yield reductions were only observed in late-terminated cover crop plots in 2022 at both Arlington and Lancaster, but in 2023 reductions were observed in all but early-terminated cover crop treatments.
- Cover crop termination strategy did not affect soybean yield in 2022, but yield reductions were observed in 2023, particularly in late-terminated plots.

What It Means for Farmers

This study shows that farmers don't need to wait decades to see benefits from no-till and cover crops. In just five years:

- Soil carbon and organic matter increased.
- Soil structure improved, making fields more resilient to heavy rains.
- Delaying rye termination—either at planting or two weeks after—gave the biggest soil health gains.

It's also worth noting that cover crop biomass increased with later termination: about 330 lbs/acre when killed early, 1,100 lbs/acre at planting, and 4,000 lbs/acre when terminated two weeks after planting. More biomass likely drives the soil improvements observed. (cont. pg 3)

Improving Soil Health with No-Till and Cereal Rye Cover Crops (continued from page 2)

Bottom Line

Adding cereal rye cover crops into a no-till corn-soybean system can improve soil health in measurable ways within just a few years. The biggest gains come when rye is terminated later, providing more biomass to feed soil microbes and build organic matter. Farmers looking to boost soil resilience, reduce erosion, and improve long-term productivity can expect benefits relatively quickly from adopting these practices, however these benefits must be weighed against possible yield reductions from late-terminated cover crops, particularly in drought years.



Did you skim your way to this page? We've got a podcast covering the feature article. Listen to the **Dane Demo Farm Podcast** on all major streaming platforms.

Farmers soiled their underwear for science...



You might have it all wrong about farmers and their science experiments. When we say "soiled," we mean buried in the soil. What were you thinking? If you've never been to a Dane Demo Farm event, you might not know what's going on, so let us fill you in.

Basically, brand new, never-worn cotton underwear are buried about 6 inches underground in fields and left there for 30 days. When we dig them up, they look pretty raggedy—like some of the soiled underwear in the photo above. And here's the fun part: the more microbial activity there is in the soil, the more the underwear gets worn out! So, a raggedy pair is actually a sign of healthy, active soil. Those tiny microbes are busy breaking down organic matter and cycling nutrients, and they also munch on cotton.

Here are some different crop rotations and tillage practices along with what you see in the photo:

1. Soybean and corn grain rotation, fall chisel plow, no manure.
2. Continuous corn silage, spring vertical tillage, liquid manure.
3. Continuous corn silage with cover crops, spring field cultivation, liquid manure.
4. Alfalfa and corn silage rotation with cover crops, strip tillage, liquid manure.
5. Corn grain, soybean, and wheat rotation with cover crops, long-term no-till, manure history.
6. Rotationally grazed pasture for 7 years, grazed from spring through fall.

Pretty interesting way to learn about soil health. Life below the surface is just as important as the livestock and plants above it. One teaspoon of health soil has can contain more microbes than people on the planet. *What do you want your underwear to look like in 30 days?*

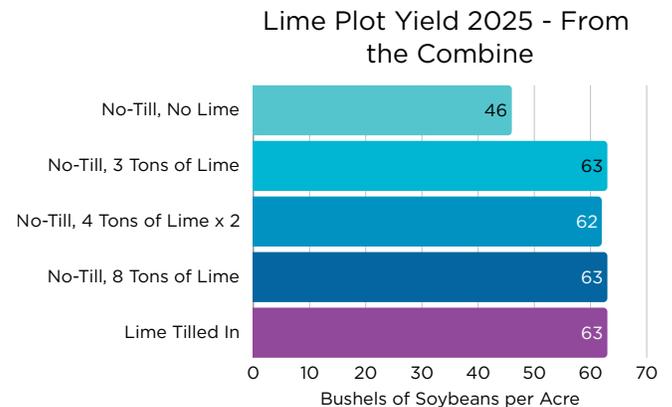
Lime Study: To Till or Not to Till, That is the Question

Each of the demo farms gets to choose a fun ‘pet’ project—something that helps them answer a specific agronomic question they have on their farm. The Sime’s switched their farm over to no-till a few years ago. Recently, they realized that a few of their fields could really benefit from some lime. So, the question came up—do they need to till it in to see the benefits? After all, some folks say that no-till can cause pH and nutrient stratification. Karl and Bruce thought that by building soil health with cover crops, the earth worms, microbes, and roots would naturally move the lime down without any tillage.

The project field had a pH 5.2 with a lime recommendation of 8 ton. The project treatments included:

- 1) No-till, no lime
- 2) No-till, 3 tons of lime in fall 2023 (their agronomist recommendation)
- 3) No-till, 4 tons of lime in fall 2023, and another 4 tons in fall 2024
- 4) No-till, 8 tons of lime in fall 2023
- 5) Lime tilled in, 8 tons of lime in fall 2023

All plots had cover crops except for the tilled one. The Simes harvested these plots as corn silage in fall 2024, at which point, there wasn’t much difference in yield. But fast forward to fall 2025 and soybean harvest, and that’s where things started to look interesting! As you can see, any amount of lime had a big impact on yield, regardless of lime incorporation or liming rate.



The preliminary results show no benefit to tilling in the lime. This is a five-year project, and after seeing the results this year, we do wish we’d included a straight no-till treatment without cover crops for comparison. We’re also taking routine soil samples at 0-2” and 0-6” depths to keep an eye on how pH changes through the soil profile. We’re still waiting on the final results from fall 2025, but we’ll be sure to keep you updated as we learn more. Just a heads up—what we’ve shared here is preliminary; the experts haven’t even dug into the data yet, just the folks out in the field who are checking out the raw numbers. Stay tuned for more updates, and in the meantime—happy liming! ***If no-till and cover crops are part of your rotation and lime is applied - is tillage necessary?***



Farmer Nutrient Management Training Opportunity!

Are you currently working on your own nutrient management plan, or perhaps interested in creating one? With input costs staying high and many commodity prices staying low, optimizing your manure credits and fertilizer use can really help your bottom line. We have a few spots open for new participants, and plenty of opportunities for those wanting to update their existing plans. Thanks to funding from WI-DATCP, we're able to offer a stipend to farmers who take the time to attend a training and complete a nutrient management plan for 2026. *The training is completely free, but it does require a bit of your time to learn, plan, and get that plan finalized.* Dane County staff will also be available to provide follow-up support right at your farm or at the County office, making sure you've got all the help you need along the way.

Interested in this great opportunity? Reach out to your favorite Dane County land conservation team member, give us a call at 608-224-3730, or send an email to landcon@danecounty.gov. We're from the government—and yes, we're really here to help!

Training dates:

Tuesday, January 20, 2026, 10:30 am - 2:30 pm - Nutrient Management 101 and more

Tuesday, January 27, 2026, 10:30 am - 2:30 pm - SnapPlus training and introduction to SnapPlus 3

The training is hosted at the Dane County office, 5201 Fen Oak Drive, Madison. Lunch will be served at each training. Bring your laptop to the training if you have one, or let us know if you need one to use. RSVP is required!

Register online at
<https://lwr.danecounty.gov/Event/Detail/2592> or scan
here



Agronomist Meeting: Wednesday, January 21

Hey there, Agronomists! Let's come together and collaborate on all things nutrient management. By working as a team, we can come up with solutions that truly benefit Dane County farmers.

This is a great chance to connect—put faces to names, share your concerns and obstacles, and work together to find practical solutions. We both have expectations to meet, so let's collaborate to promote better nutrient balance while protecting farmers' long-term investment—their soil.

Here's what we'll talk about:

- 1) Updates on nutrient management, winter spreading, and how we handle the info you provide
- 2) Current cost-share opportunities, technical assistance, and additional resources for your clients
- 3) Open Q&A session

Can't wait to catch up with you all on **Wednesday, January 21, 2026, 10:30 am - 2:00 pm**. Dane County Office, 5201 Fen Oak Drive, Madison. Lunch will be served at noon, please RSVP, 608-445-1474.

Register online at
<https://lwr.danecounty.gov/Event/Detail/2582> or scan
here



NEW EMAIL for submitting nutrient management plans to Dane County
nmp@danecounty.gov

Prosser Field Day and Preliminary Yield Data



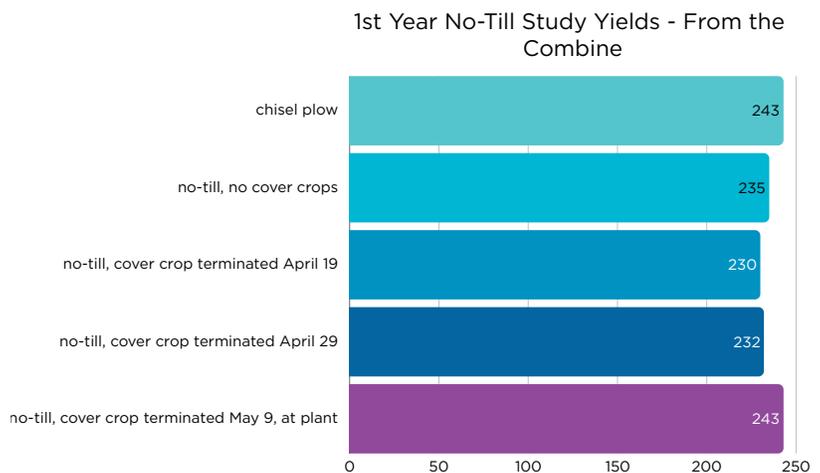
The above photo is of the Prosser winter rye cover crop on April 29th. The cover crop was planted on October 25, 2024. The cover crop biomass nearly tripled in amount from April 29 to May 9.

Tim and John Prosser hosted a field day at their new plots this past August. Attendees had the opportunity to observe the recently established no-till plots and hear information from a number of UW folks.

The field day featured information on soil health, nitrogen cycling, and slugs and beneficial insects, all things that are being monitored at the Prosser plots. Data from the slug and beneficial insect trapping indicate that no-till practices generally support higher slug populations; however, plots with cover crops—particularly those maintained until planting—show a notable increase in beneficial insects that help regulate slug populations. *An indepth overview of the slug and beneficial insect monitoring is available on the **Dane Demo Farms Podcast**.*

Prior to establishment, all of the Prosser plots were in corn for grain, and three of the five plots were planted with winter rye cover crop in late October. Before winter, one of the plots was chisel plowed. In the spring, plots with cover crops were terminated at three different timings: 1) as early as possible in spring (April 19), 2) two weeks to ten days prior to planting (April 29), and 3) at the time of planting (May 9). Cover crop biomass levels across the plots were relatively low, reflecting the late fall establishment of the cover crops. All plots were planted to corn on May 9.

There's a lot of data to sort through yet this fall and winter, but what we can share is the raw data right from the combine. The chart on the right shows the different treatments and yield information, corrected to 15% moisture. The field was harvested October 22nd for high moisture corn. Note that even though Prosser's are a dairy farm, no manure was applied to this field in 2024 or 2025, which undoubtedly makes the transition to no-till a little easier.



Cost-Share Reminder

Thinking about planting **cover crops** or trying **no-till** but feeling a bit uncertain? You can sign up for cost-share assistance to help with your management transition. You can apply anytime, and it's first come, first served. If you have any questions or need more info, feel free to reach out to the land conservation staff at 608-224-3730 or drop them an email at landcon@danecounty.gov.

Have you heard of the County's **Soil Health Equipment Program** (SHEP)? Each farm across Dane County is eligible for a 70% cost share for up to \$30,000 to help with the purchase of equipment that helps you reach your soil health goals. Equipment that has been cost-shared in the past include no-till drills, planter attachments such as closing wheels and row-cleaners, compost turner, roller crimper for cover crops, and more. Reach out to the county land conservation staff for more information on eligibility and funding availability.

Summer 2025 Field Day Recap



Field days took place all across the county, focusing on great topics like soil health, cover crops, and no-till farming. Attendees got to learn about some of the challenges these practices can bring, such as dealing with slugs, moisture issues, and yields. These events aren't just about looking at farming techniques—they're a fantastic chance to connect with other farmers, see how they're making things work on their farms, and share ideas. More specifics of each event are available on our Facebook page, and some topics discussed are covered by the Dane Demo Farm podcast.



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<https://demofarms.danecounty.gov/>

Find us on Facebook and listen to the Dane Demo Farms Podcast

Upcoming Events

Wisconsin Water and Soil Health Conference (WWASH), Tuesday December 16, 9:00 am - 5:30 pm, and Wednesday December 17, 7:30 am - 2:00 pm Kalahari Resort & Convention Center, Wisconsin Dells, register at www.go.wisc.edu/WWASH, email agwater@extension.edu with questions.

Dane Demo Farms Annual Winter Event, Topic TBD, Wednesday, February 11, 10:30 am - 3:00 pm UW Arlington Agriculture Research Station, N633 Hopkins Rd, Arlington, hosted in cooperation with the Biological Farmer Friends, Farmers for the Upper Sugar River, and Yahara Pride Farms farmer-led watershed groups. Mark your calendar, more information will be shared closer to the event date,

There's a bunch of great information waiting for you in the pages of this newsletter—be sure to check it out!

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Dane Demo Farms
Podcast



Dane Demo Farms
148 followers • 19 following



The **Dane Demo Farm Podcast** is available on all major streaming platforms

<https://demofarms.danecounty.gov/>



USDA is an equal opportunity provider, employer, and lender. Dane Demo Farms is funded by an agreement with the USDA Natural Resources Conservation Service.



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