Oane Demo Farms

The official newsletter of the Dane Demonstration Farm Network

Volume 1, Issue 3



Soil Slake Test : Results in 30 Seconds

In this Issue:	
Preparing your Fields for Extreme	
Weather	1
Featured Case Study	2-3
A Word from NRCS	4-6
Demo Farms Across the County	7
Where is the Data?	7
Events	7
Listen to the Podcast	8
Program Contacts	8

Preparing your Fields for Extreme Weather

Farmers in Dane County have experienced a significant amount of rain this year, leading to a substantial amount of runoff. However, is there truly much that can be done to decrease runoff with such high levels of precipitation? Fortunately, there is, as evidenced in the photo above displaying a slake test. A slake test can showcase the soil's ability to resist runoff. But what is a slake test? It is a technique utilized to assess the durability of soil aggregates when they are exposed to sudden wetting, such as during intense rainfall.

Earlier this spring, soil samples were collected from a research project at the UW Arlington Agricultural Research Station. The samples were taken from a field that is in a long-term corn and soybean crop rotation, has consistent soil type, and is managed uniformly, except for variations in tillage practices. One half of the field is under a **long-term no-till system (left container above)**, while the other half is **conventionally tilled (right container above)**. The test illustrates how untilled soils exhibit greater stability and resilience when faced with excessive water. On the contrary, tilled soils can easily break apart when in contact with water due to weak soil aggregation and generally poor soil health. Results are apparent with a slake test within thirty seconds.

Soils that have strong aggregation are capable of withstanding excessively wet conditions, thus preventing soil erosion and crusting, while also retaining essential nutrients. Addressing problems related to soil aggregation can help prevent soil erosion and crusting during heavy rainfall events, thereby protecting local water quality. For more information on how you can improve soil aggregation on your farm, please refer to the article from the NRCS on page 4.





CASE STUDY

Endres Berryridge Farms, Waunakee No-Till Alfalfa Seeding into Winter Rye



Objectives

Endres Berryridge Farms tested no-till seeding alfalfa into winter rye and documented the impacts on both farm operations and the environment.



Storing the ryelage will take extra planning if the farm does not already use this forage.



The Endres' documented decreased herbicide use on newly seeded acres and demonstrated effective erosion control, even during significant spring storm events.

PRACTICE DETAILS

Fall: No-till plant winter rye after corn silage

- Reduce winter rye seeding rate to 20 lbs per acre
- Address any fertility needs
- Roll field if needed to manage stones

Spring: No-till plant alfalfa into winter rye

- Increase alfalfa seeding rate to 20 lbs per acre
- Plant at a slight angle from the rye
- Ensure the depth control is working well on the drill

Late Spring: Cut the winter rye

- Ensure the seedlings are 3" or less in height, adjust mower accordingly
- Time field activities with good soil conditions to prevent seedling damage
- Consider a sulfur application at this time

Early Summer: Take first cutting of alfalfa

• Cutting will include some rye regrowth



"I like the idea of being able to harvest rye, giving us feed for our heifers and youngstock, and then the ability to have, later in the year, good quality alfalfa for the milk cows"

JEFF ENDRES

Endres Berryridge Farms



PRACTICE PHOTOS



Alfalfa seeded into winter rye March 4, 2024



Alfalfa seedlings after rye harvest May 14, 2024



Average of 55 plants per sq. ft. July 3, 2024



Winter rye harvest May 14, 2024



Alfalfa and winter rye regrowth June 12, 2024

TO LEARN MORE



Listen to the podcast "No-Till Alfalfa Seeding into Winter Rye with Jeff Endres"

www.danedemofarmspodcast. buzzsprout.com

This project was conducted independently of Dane Demo Farms and was solely led by Endres Berryridge Farms.

About

Dane Demo Farms is a network of farmers that demonstrate and research leading edge conservation practices that improve water quality and soil health throughout Dane County. Their efforts help reduce nutrients and sediment from entering our waters and build healthy soil. https://demofarms.danecounty.gov/



A Word from NRCS

Building Soil Resiliency to Help Soils Weather the Storm

Jamie Patton, State Soil Health Coordinator

So far, the story of the 2024 growing season is simple...rain and lots of it. While the florescent yellow color, delayed growth, and staggering unevenness of fields catches everyone's eye, the more permanent and costly result of our torrential and seemingly never-ending rainfall is found a bit lower in the canopy...soil erosion.



While I don't have solid estimates, from my experiences crisscrossing the state, I can tell you soil losses this year are dramatic. From well-defined rill systems cutting up hillslopes to rich topsoil, once at the top of the hill, now smothering crop rows and clogging pore spaces on the lower landscape, the evidence of soil erosion is widespread across the Badger State.

While a little bit of soil movement doesn't seem alarming, we need to consider soil can take hundreds to thousands of years to form but can be lost in only a few seconds. Because of this difference in timescale, we often talk about soil erosion in the context of tolerable soil loss. Tolerable soil loss, referred to as "T", is defined as an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period.



Tolerable soil loss (T) values for Wisconsin soils range from one to five tons per acre per year. Soils shallow to bedrock or other root limiting layers are assigned lower T values, with many of our deeper, more uniform soils assigned T values of three to five tons per acre per year.

To put these T values in perspective, the top six inches of topsoil over an acre often weighs approximately 1,000 tons. This means one ton of soil spread evenly across an acre equates to approximately 0.006 inches...the same thickness as two human hairs or a single sheet of heavyweight copy paper.

Therefore, soils with the highest tolerable soils losses (T =

five tons per acre per year) can only lose a layer of soil up to half the thickness of a dime across the landscape annually to maintain long-term soil productivity. So, when we see rills, gullies, sheets of sediment, or muddy runoff water, it's likely soil is being lost at rates greater than the soil's assigned T value.

At an average soil loss of five tons per acre per year and estimated corn and soybean yields of 180 and 50 bushel respectively—there are approximately 1 pound of soil lost per pound of corn produced and 3.3 pounds of soil lost per pound of soybeans produced. As suggested from its definition, continued soil erosion above tolerable levels can significantly impact crop yields. In fact, researchers have found **moderate levels of soil erosion can result in <u>annual crop</u> yield losses upward of 5 to 10 percent**, particularly in soils shallow to restrictive layers such as gravels, bedrock, high water tables, etc. **Annual yield loss on severely eroded fields may top 20 percent or** What is a soil aggregate? Soil particles—sand, silt, and clay—do not exist in the soil as individual particles, rather as clumps held together by organic matter. Soil aggregation creates pores that allow for water infiltration and drainage, and retain water for plant growth.

more. And yield losses are just part of the story, as soil erosion also negatively impacts soil fertility and crop input requirements, soil carbon levels, soil water infiltration and storage, cropland values, surface water quality, aquatic habitat quality, and the list goes on and on...

Strategies to Reduce Soil Erosion

As wide fluctuations in rainfall amounts and intensities become more common, it is imperative we build resiliency to these stresses in both our farming systems and our soils themselves. We can do this by:

- Armoring the soil from raindrop impact with crop biomass or residue,
- Anchoring the soil in place with plant roots,
- Building and maintaining soil pore spaces to increased water infiltration and storage, and
- Building and stabilizing soil aggregates to better withstand the erosive energies of water.

Why such emphasis on soil aggregates and pores? After armoring and anchoring the soil with crop roots and residue, our next line of defense against soil erosion is getting water to infiltrate into the soil, thereby reducing the amount of runoff water and associated soil transport. Improving infiltration requires increasing soil aggregation, as soil aggregates are necessary to increase the number, size, and connectivity of pore channels, helping to move water into and throughout the soil profile.

Additionally to simply increasing their number, soil aggregates also need to be "water stable", meaning they stay intact during a wetting and drying cycle. Soil aggregates that fall apart when wet (a process often called slaking or slumping) creates loose sediment that filters into and clogs pore spaces at the soil surface creating soil crusts, thereby decreasing water infiltration, and increasing runoff and erosion. Additionally, loose soil

not associated with soil aggregates is more likely to be eroded by runoff waters than the aggregates themselves.

So, what does protecting and enhancing the health and resiliency of our soils look like from a farming standpoint? How do we build and protect stable soil aggregates?

1. Consider the long-term reduction or elimination of tillage where possible. Reducing or eliminating tillage not only maintains crop residues, plant root structures, and pore spaces, but also supports the biological processes promoting soil aggregate formation and stabilization.



Research shows soil erosion rates may be reduced by 70 percent or more on no-till fields versus conventionally tilled fields and potentially more so if reduced tillage is used in conjunction with cover crops. **2. Find ways to maintain living roots all year long**. Roots not only hold soil in place, but also along with their associated soil biology, are essential to enmeshing and glueing soil particles together to create water stable aggregates.

Maintaining roots is easier to accomplish on managed pastures, but it can also be achieved within cropping systems. For example,

If forage is needed on the farm, consider growing a short(er)-season forage crop, such as corn silage or warm season, annual grasses (e.g. sorghum-sudangrass or forage sorghum) to be followed immediately after harvest by:

- A winter cereal crop for spring forage harvest or late summer grain harvest,
- A multispecies cover crop mix for grazing or for soil building, ideally with an overwintering cover crop species, or
- Late-summer seeded alfalfa.

If forage isn't required, consider shorter season corn or soybeans, followed by a winter cereal for grain or an overwintering cover crop or cover crop mix. Alternatively, interseeding or overseeding cover crops into the standing cash grain crop can also be an option.

Cover crops alone have been shown to decrease soil erosion approximately 30 to 100 percent compared to non-cover cropped fields, particularly when high reside covers are planted early to achieve sufficient growth.

3. And lastly, even though it's easier said than done, **all field operations should only be completed when the soil is suitably dry using the smallest equipment and lightest axle loads possible**. Compaction is the destroyer of soil aggregates and results in increased erosion potential. Therefore, we must first protect the aggregates and pores we already have, as we continue to build soil health and function with enhanced cropping practices.



Soil Erosion—June 2024

As the last days of summer pass by, now is the time to begin thinking about continuing to armor, anchor, and build the health of our soil after the 2024 harvest. While we don't know what the future holds for us in terms of precipitation, we do know building soil health and resiliency can help us better weather whatever Mother Nature has in store for us... come drought, heavy rains, or something in between.

Resources:

Magdoff, F. and H. van Es. 2021. Building Soils for Better Crops – Ecological Management for Healthy Soils. Sustainable Agriculture Research and Education. <u>sare.org/wp-content/uploads/</u> <u>Building-Soils-for-Better-Crops.pdf</u>

Ruppert, S., J. Coppess, W. Fathauer, and M. Skidmore. "A Menace to National Welfare Reconsidered, Part 1: Reviewing the Costs of Erosion." farmdoc daily (14): 52, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, <u>https://farmdocdaily.illinois.edu/2024/3/a-menace-to-national-welfare-reconsidered-part-1-reviewing-the-costs-of-erosion.html</u>

Tellatin, S. and R. Meyers. "Cover Crops at Work: Covering the Soil to Prevent Erosion", Sustainable Agriculture Research and Education, <u>https://www.sare.org/wp-content/uploads/Cover-Crops</u>-at-Work-Covering-the-Soil-to-Prevent-Erosion.pdf

Dane Demo Farms Across the County

The Dane Demo Farm network consists of farms located throughout the county and encompasses a diverse range of farm types, sizes, soil types, and weather. The primary objective is to provide a wide array of farmer-driven research opportunities that are relevant to the various farming systems within the county.



Where is the Data?!?

We're still in the process of gathering all the data we need for the first cropping season of research. Our team has been hard at work collecting soil samples, tissue samples, and more since last fall. The real test will be the yield and associated economics, but obviously we won't have that information until the fall. On a brighter note, we have a new graduate student joining us at Dane Demo Farms in September who is a math whiz. So, keep an eye out for updates this winter! Exciting stuff coming your way!

Upcoming Events

Wednesday July 31: Biological Farmer Friends Field Day, 'Cover Crops, Bugs and Beer'

Hosted at 1080 Lake Kegonsa Rd, Stoughton from 6-8 pm. Pizza and beverages will be served. The event includes a cover crop equipment showcase including air seeders, VTs, and a drone, introduction to winter camelina, and information on army worms and cover crops. Questions contact Marie, 608-228-6359.

Tuesday August 6: Mastermind Dinner for Farm Women with Annaliese Wegner

Hosted at the Schumacher Farm, 5682 State Rd 19, Waunakee WI from 6-9 pm. Dinner is served at 6:15. Dinner speaker and mastermind leader Annaliese Wegner, Modern Day Farm Chick. Cost is \$20 per person, register online https://lwrd.danecounty.gov/Event/Detail/2012

Tuesday August 13: Yahara Pride Farms Twilight Meeting and Poker Run

Hosted by the Hellenbrands at 5666 US Highway 12, Waunakee. The event includes a Poker Run from 5-6 pm. Each stop includes a unique cropping practices or piece of equipment. Grab a card at each stop, best poker hand wins a cash prize. Dinner at 6:00, followed by a presentation on soil compaction. RSVP online at www.yaharapridefarms.org

Wednesday September 11th: Dane Demo Farms Field Day, Cover Crops and Soil Health

Tom Ripp of Ripp-Vale Farm will be hosting the event at his farm just outside of Black Earth. Stay tuned for more details!

Event information available on our website https://demofarms.danecounty.gov/Events

Dane County Land & Water Resources Department 5201 Fen Oak Drive, Room 208 Madison, WI 53718

Listen to the Podcast!

The <u>Dane Demo Farms Podcast</u> now available on your preferred streaming platform! This podcast aims to provide insightful discussions surrounding various aspects of Dane Demo Farms, including information on conservation minded cropping practices. The podcast can also be heard online at the Dane Demo Farms website https://demofarms.danecounty.gov/Podcast



Check out our website at: demofarms.danecounty.gov







Program Contact Information

Kim Meyer, Agronomist/Program Manager, 608-445-1474 meyer.kim@danecounty.gov Brooke Lerum, Resource Conservationist, 608-224-3750, ext

8518, brooke.lerum@usda.gov

Address: 5201 Fen Oak Drive, Rm 208, Madison WI 53718

USDA Natural Resources Conservation Service

∂ane Demo Farms