



## FARM INSIGHT Featured Content

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**ProfitProAG will  
be at the Central  
Plains Dairy Expo  
March 29-31**

Booth #408-409

From better forage production to effective dairy manure management, success starts with the right biology. Are you putting beneficial microbes to work for you? If you'd like practical, proven options to control manure odor, protect water quality and grow

healthier crops, let's talk. We'll have a booth at the **Central Plains Dairy Expo** in Sioux Falls **March 29<sup>th</sup> - 31<sup>th</sup>** and look forward to seeing you there!

## Confused About Carbon? Five Things Every Farmer Must Know

There's a lot of talk today about reducing and removing carbon. But what about managing carbon effectively on the farm to get more from every acre, animal and gallon of manure?

"Carbon is the limiting nutrient in crop production," notes Dr. Jim Ladlie, founder and CEO of ProfitProAG. "It makes up 45% of the plants we grow, plus 19% of the earth's carbon is in plants. It's the energy that drives the whole system of crop production."

Carbon includes live and dead plant leaves, stems, roots, biomass, residue, the mulch layer, soil organic matter, manure, humus and humic acids. Soil carbon is the key to all physical, chemical and biological processes that improve soil health and lead to healthier, higher-yielding crops.

Here are five things every farmer must understand about carbon to produce healthier crops that provide more nutritious feed for livestock and supply more nutrient-dense food for people:

**1. Carbon is key to nutrient cycling in the soil.** All forms of carbon are important. When managed properly on the farm, carbon helps:

- Reduce soil erosion
- Enhance water infiltration for less runoff
- Protect water quality
- Decrease soil compaction
- Improve soil tilth and structure

## In Next Month's FARM INSIGHT

- \* Think like a corn plant

- Boost beneficial biological activity in the soil
- Reduce fertilizer inputs
- Increase soils' capacity to handle manure and other wastes

Proper carbon management also lends greater resiliency to soils, which helps crops better manage weather-related stresses like dry conditions. "Soil high in carbon is rich in organic matter that releases nutrients to crops," says Don Reicosky, a retired U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) soil scientist who has been a guest speaker at ProfitProAG meetings. "Soil organic matter also acts like a 'sponge' for water retention and release to plants. Carbon is our greatest water management tool."

## 2. Focusing on CASH farming pays off.

"**C**onservation **A**griculture **S**oil **H**ealth (CASH) farming supports soil organic carbon," Reicosky says. "True conservation is carbon management," adds Reicosky, who notes that CASH farming works when you have continuous residue cover, minimal soil disturbance and diverse crop rotations and/or cover crops. CASH farming follows four principles of soil health: 1.) Keep the soil covered at all times. 2.) Disturb the soil as little as possible. 3.) Incorporate as many different species of plants and animals as practical. 4.) Keep living roots in the soil as long as possible.

**3. You are not in control—nature is.** CASH farming is based on biological principles that let you farm in harmony with nature. Ladlie is concerned, however, that too many farmers are taking a less sustainable approach by working soil when it's too wet, planting too early and relying primarily on high salt fertilizers and fungicide chemicals to keep their crop healthy during the growing season, without focusing enough attention or effort on building soil health. "Then they wonder why their corn is dying prematurely in September and leaving test weight behind," he says. "If you want to farm sustainably, you need to understand carbon cycling and why it's the heart of building soil organic matter and improving soil health."

**4. Carbon management helps you grow high-yielding, nutrient-dense food.** When carbon cycling is working properly in your soils, you'll raise healthier crops with greater potential to produce higher test weights, stronger yields and more nutritious food. Want to know if you're managing carbon properly on your farm?

Try the Brix test, which measures the percent of dissolved sugars in plant sap. These sugar levels are correlated with the plant's food-producing efficiency (photosynthesis) and the nutrition contained in the plant, including protein, mineral content and more.

A Brix Test involves a simple, inexpensive tool called a refractometer to assess Brix levels in plants, right in the field. Brix levels are measured on a scale from 0 (poorest) to 32 (best). "Your goal is to produce crops with a Brix measurement of 12 or higher," Ladlie says. "Anything below eight is not worthy of reproducing or eating. In fact, it's nature's garbage. Unfortunately, many of the crops we test, including corn, soybeans and forage, have Brix levels of four to six." (Measuring Brix levels during the growing season is a key part of ProfitProAG's Farming the Controllables system, which we'll talk about more in a minute.)

**5. Carbon is the future of farming—literally.** If you want to build greater resiliency, sustainability, consistency and profitability into your farming operation, you must make carbon management a priority. "Our future is tied to how much carbon we can keep in the soil," Reicosky says. "Our big job is capturing the carbon with plants and getting it into the soil to contribute to the soil organic matter build up, which enhances water holding capacity and nutrient cycling for subsequent crops."

## The "Recipe for Success" makes carbon management simple

Maybe you like what you're hearing, but you're feeling a bit overwhelmed, too. You want to manage carbon more effectively, but where do you start?

It's all about controlling the controllables, Ladlie says. That's why ProfitProAG has created the "Recipe for Success" program that is customized to each farm's needs. "The 'Recipe for Success' isn't a cookie-cutter plan," Ladlie says. "Each 'Recipe for Success' is tailored to your acres, whether you raise corn, soybeans, small grains, forages or cover crops."

Try the "Recipe for Success" if you want to:

- Build healthier soils, which produce healthier crops that nourish healthier livestock.
- Cut your fertilizer bill, by unlocking nutrients that are already in your crop residue and soil.
- Boost your crops' resilience and yield potential, no matter what Mother Nature brings.

The “Recipe for Success” is a three-phase plan that helps you control the controllables too manage carbon more effectively:

- **Phase I Residue Management.** Don't put your sprayer away too early in the season! Residue management is a “second harvest” in the fall focused on the efficient breakdown of crop residue to improve soil health and boost nutrient retention/availability, nitrogen fixation, water infiltration, and carbon release to feed the crop during the growing season. It also helps reduce residual insect and disease pressure. You start this important process when you spray our residue management product (which is packed with beneficial microbes) on your crop residue after harvest. The key benefit is improved nutrient cycling from the crop residue break down, which can help lower your fertilizer bill. You have valuable nutrients just sitting out there in your stover, which can take years to break down. Residue management makes this process more efficient and cost-effective.
- **Phase II At-Plant.** Jump start your yield, and get your crop off to a strong start with early-season plant health and vigor. Biological seed coatings and the right starter package supply key nutrients to seedlings and enhance plant health all season long. Establishing healthy plants below and above ground is critical to maximizing the crop's genetic yield potential.
- **Phase III In-Season.** Stay green to the finish! This phase helps mitigate plant stress, which is critical when the reproductive phase of yield development begins. Foliar application of nutrients, energy and stress-reducing technology builds resilience and uniformity in a crop-production system. The end result is increased seed numbers, weight and nutrient density in grains. Forages show improved nutrient content, energy, taste, storability and reduced mycotoxins. (Remember the Brix test we mentioned earlier in this article? This is where it comes in.)

The “Recipe for Success” isn't guesswork. We encourage growers to use the Haney soil health test to measure what's working. Like traditional soil tests, the Haney Test measures the key macro- and micronutrients needed for crop growth. The Haney Test differs from traditional soil tests, however, since it also evaluates various soil health indicators, such as soil respiration.

“If you want to grow higher-yielding crops with better grain quality, it's essential to understand proper carbon management and work with these natural cycles,” Ladlie says. “Carbon management provides the building blocks your crops need to succeed. Take a look at how the “Recipe for Success” can help you put these building blocks in place on your farm.”

To learn more about better carbon management and the “Recipe for Success,” call us at 507-373-2550.



## Want to Cut Your Fertilizer Bill? Try the Haney Test First

In these times of soaring crop input prices, what if you could reduce your fertilizer application, simply based on the soil test you use? It's possible with the Haney Test.

"I've been running the Haney Test since 2013, and this is the only soil test I know of that's designed to directly reduce fertilizer applications," says **Lance Gunderson, president and owner of Regen Ag Lab, LLC** in Pleasanton, Nebraska.

Like traditional soil tests, the Haney Test measures the key macro- and micronutrients needed for crop growth. The Haney Test differs from traditional soil tests, however, since it also evaluates various soil health indicators.

ProfitProAG is a proponent of the Haney Test, which is an important part of our "Recipe for Success" that we tailor to each farmer's specific needs. We recently caught up with Lance to ask him some questions about what makes the Haney Test unique—and why you should consider using it. This is what he said:

### **How is the Haney Test different from other soil tests?**

While there are 10 million soil tests run in the United States each year, less than 100,000 samples (roughly 1%) use the Haney Test. This doesn't mean the Haney Test isn't valuable. Quite the contrary! The Haney Test measures nutrients like phosphorus and potassium, plus it evaluates various soil health indicators, such as soil respiration, to analyze soil biological activity. The Haney Test also focuses on how much carbon (C) and nitrogen (N) are in the soil.

A soil health score is calculated from a combination of these different soil health indicators. Depending on the results of a Haney Test, a farmer can potentially lower N application rates, since this test measures both organic N and inorganic N.

### **How can the Haney Test potentially help me save money on fertilizer?**

There's a direct economic impact that becomes clear when you run some numbers. An investment in the Haney Test costs \$50. This covers about 40 acres,

so it costs \$1.25 an acre. Most farmers who use the Haney Test find they can drop their N application by 20 pounds, on average. How much is that worth? You can figure at least \$1 per pound of N, although I've seen it as high as \$1.40 or \$1.65 lately, depending on the area. If a \$50 investment in a Haney Test can save you hundreds of dollars in N, would that be worth it to you?

### **How long has the Haney Test been around?**

The Haney Soil Health Test is named for Dr. Rick Haney, a U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) scientist who began developing this test in the late 1990s/early 2000s. Rick grew up around agriculture in Custer County, Oklahoma, and incorporated a lot of real-world farming expertise as he developed this test.

After earning his undergraduate degree, he farmed for a number of years before he went back to college to earn his Ph.D. in soil microbial ecology and chemistry from Texas A&M University. Many of the questions he and his fellow farmers had been asking about soils and crop production fueled his focus in the academic setting.

Rick has researched soil ecology and soil testing for more than 30 years. In August 2021, Rick became the lead scientist and data analyst for Regen Ag Lab. He works with our team to improve our understanding of soil test results related to crop production and profitability in regenerative farming systems.

### **Why should farmers consider using the Haney Test?**

Not only does it offer the potential to help you save money on fertilizer, but it can help you learn more about building healthy, resilient soils that produce healthier crops.

Let's review a little Ag history to see how this works. Traditional soil tests were developed in the 1950s and 1960s. Back then, many producers were farming land that was depleted, rather than a healthy, biologically-active system. These were dead soils, since decades of crop production had mined nutrient levels substantially. In a system like this, you need to "force feed" fertilizer to plants to raise decent

crops. Why? Microbes drive 90% of the nutrient uptake in crops. If you don't have a thriving, diverse community of beneficial microbes, you won't get that nutrient uptake without some intervention.

Compare this to jumper cables. If you hook up the cables to the dead battery, which is like adding a lot of fertilizer to a dead soil, you can jump start the system to grow crops. If you hook up the jumper cables to a strong battery, where the battery is like a healthy soil full of beneficial microbes, there's not much response. You already have effective nutrient uptake taking place, so there's no need to jump start it by adding a lot of extra fertilizer.

The calibrations for traditional soil tests that were developed nearly 70 years ago are still used today. They still work, if you have a dead soil system. These traditional soil tests don't focus on soil biology, however, like the Haney Test does. The Haney Test is basically a weak-acid test that uses a substance called H3A to mimic natural, organic acids that living plant roots exude into the soil to feed the microbes and other soil biology.

The Haney Test measures the nutrients that are not locked up in your soil and shows where you have a fertilizer "credit." This can help you trim your fertilizer bill, since you may not need to apply as much fertilizer as a traditional soil test indicates.

### **Can you give me any real-world examples of this?**

I think of Gabe Brown, a well-known soil health proponent who farms near Bismarck, North Dakota. One of Gabe's conventional soil tests said he needed 135 units of N. The Haney Test said he needed zero. Gabe followed the Haney Test and grew 135 bushel-per-acre corn on zero pounds of N. Also, consider that the county yield average in this area is 90 bushels per acre. Like any good farmer, Gabe knows that corn needs N to grow. His corn did have N. It just came from the soil, not a fertilizer application.

### **No fertilizer? How is that even possible?**

Farmers like Gabe know that they don't farm plants; they farm soil microbes. Then these beneficial microbes take care of the crops.

Too much tillage and too much fertilizer, however, can work against this system. Think of organic matter like wood in a wood-burning stove. Nitrogen is like lighter fluid, and tillage is like pumping air in the stove with a bellows.

Soil biology is a complex, integrated, living system, and carbon drives it all. It starts when plants extract carbon from the air. Did you know that up to 50% of this is leaked out through corn plants' roots to feed the soil microbes? It's closer to 60% with sorghum Sudan grass. This is not an accident or inefficiency.

Why do plants feed the microbes this way? Are plants just really nice? Do they feel bad for the microbes? No, it's a sophisticated trading system. The microbes can turn rocks into fertilizer, releasing nutrients that plants can absorb through their roots, but the microbes need energy to mineralize those nutrients in the first place. Since the plant requires these nutrients to live and grow, it's like they say, "Okay, we've got a deal, microbes, and they begin to trade."

Essentially this living soil is "breathing." Dirt doesn't breathe, because it has no life. Biologically active soil does breathe. The Haney Test includes a respiration score that measures the way your soil breathes in optimal conditions. We can quantify this, because microbes eat carbon as they decompose soil organic matter. In the process, they give off carbon dioxide (CO<sub>2</sub>). The more CO<sub>2</sub> that's respired, the higher the microbial activity.

A measure of 71 to 100 parts per million (ppm) for soil respiration is above average, and most soils won't register 20 ppm. Think of it like cheering sports fans in a stadium. The fans are like the biomass in your soil, and their cheers are like microbial activity. The louder the fans cheer, the more active they are. The higher your soil respiration score in the Haney Test, the more active your soil microbes are.

### **Does this mean I should stop using fertilizer or tillage?**

Let's take a step back and look at the big picture first. There are three things that every farmer I've ever met agrees on. 1.) They want higher yields and higher grain prices. 2.) The weather is never perfect in their area. 3.) They never want to lose organic matter in the soil.

No, I'm not telling you to quit tilling or stop using fertilizer. These can be effective management tools, when they are used appropriately in the right situation. Think of it like antibiotics. If you take an antibiotic routinely just to stay healthy, the antibiotic can become ineffective and even detrimental if you

over-use it. It's much wiser to eat right, exercise and get enough sleep to keep your immune system strong. But if you get sick, despite your good lifestyle choices and you need an antibiotic to get well, then by all means use it.

As humans, we tend to go to extremes of all or nothing. There was a time years ago when essentially all farmers were organic producers. Things weren't perfect, either, because there were challenges with adequate production. Then came modern technology, including synthetic fertilizers, and many farmers went to the other extreme, with total reliance on technology and little interest or understanding of the importance of natural, biological systems.

I learned a long time ago that there are two main reasons why farmers change their production practices, including 1.) Economic pressure and 2.) Societal pressure. From skyrocketing inflation to ongoing concerns about Ag fertilizer and water quality issues, we're seeing both pressures today. Both are big reasons why the Haney Test is a good investment. It can help you manage the controllables in your farming operation, without going to extremes.

### **I've heard the Haney Test is pretty complex. How do I make sense of the results?**

Understand that soil health is like yield potential. Just as yield potential varies by geography, climate and other factors, so does soil health potential. The Haney Test measures 50+ different data points related to soil health and more, so it's a fairly complex test. That doesn't mean you need to be an expert in them all.

Keep it simple. With the soil health score, you want a minimum of seven. I have seen scores of 25 and 30.

If your soil health score isn't where you want it to be, that doesn't mean you need to go buy a bunch of products. Improving soil health usually doesn't require a product approach. Sometimes you do need a product(s) to fix a soil health issue, but not always. Improving soil health requires a holistic system that takes the needs of beneficial soil microbes into account. Remember, microbes run this planet. We just live here.

### **Anything else you'd like to add about the Haney Test?**

The Haney Test isn't a silver bullet, and it doesn't mean that other soil tests are inadequate. We still run plenty of conventional soil tests at Regen Ag Lab. When it comes to soil tests, a lot depends on your goals for your farming operation. You need to use the right tool for a specific job. If you need a thorough soil-health evaluation, the Haney Test is the right tool.

### **ProfitProAG can get you started with a Haney Test**

Interested in what you're hearing? We are, too. That's why the Haney Test is a key component of ProfitProAG's Farming the Controllables "Recipe for Success" system. We don't make cookie-cutter recommendations here. Each "Recipe for Success" is tailored to your fields' specific needs, based on reliable data from sources like the Haney Test.

A number of farmers are already working with ProfitProAG to pull samples and run some Haney Tests. "These growers are evaluating a couple of their fields, usually a good-producing field and a poorer one, so they can compare test results," says Dennis Klockenga, a crops specialist with ProfitProAG. "Lance with Regen Ag Lab is a wealth of knowledge when it comes to understanding the Haney Test, and we're excited to work with his team to help our clients get more from every acre."

If you'd like to learn more about working with ProfitProAG on a Haney Test, contact Dennis Klockenga at 320-352-0147

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