



13th Annual Responsible Nutrient Management Practitioners Program

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2021 Recipients

Jim Hershey, Elizabethtown, Pa.

Josh Hiemstra, Brandon, Wis.

Jason Wiegel, South Wayne, Wis.

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Finding Success With 30 Years of No-Till

From time management to improved soil infiltration, one Pennsylvania farmer finds many benefits come from implementing no-till practices.

By Laura Handke, Contributing Writer

For Elizabethtown, Pa., farmer Jim Hershey, no-tilling has been a way of life for more than 30 years. Hershey concedes that while the drivers behind converting his acres to no-till weren't initially conservation focused, the many benefits of no-till farming have become clear.

"The main reason I started no-till farming was time. My wife and I were running the farming operation by ourselves and we also had a dairy operation. Time was very valuable," Hershey says. "We didn't talk about conservation as much 30 years ago. Now we talk about conversation, no-till and cover



crops and there are groups who share information to promote no-till. When I started I had to learn by doing."

Today, the multi-generational farming operation is no longer a dairy but has diversified in other ways, growing corn, wheat and soybeans and finishing 1.7 million organic broiler chickens along with finishing 6,500 head of hogs.

No-Till Success. The corn, soybean and wheat rotation Hershey implements on his 600-acre operation is on a 3-year cycle — a common rotation. What isn't common is the progressive approach Hershey takes to fertilizer management and soil health.

Hershey implements no-till practices on every acre he farms and plants green through a 6- or 7-way mix of cereals, brassicas and legumes.

"Any deep rooted brassicas, such as

radish, are planted no later than October, along with legumes and cereal grain mixes," he says. "Some might say that what we are using isn't a 'fancy' enough blend, but what we have been seeing here, as we have been cover cropping extensively for over 15 years, is an improved soil profile with infiltration rates of approximately 2 inches per hour."

The operation is also seeing value and improved management opportunities from planting green.

"When I say that we are planting green, I'm not talking about 8-10 inches of cover crop with a burndown," Hershey says, "We have a Dawn ZRX roller mounted on our corn planter — I like to tell people that the more biomass we have in a field at planting time, the happier I am."

Hershey says that planting both corn and soybeans into heavy biomass makes for more resilient crops.

"We saw better crop performance in our soybeans than our neighbors did in 2020 when it was extremely dry. We didn't see crop stress like others in our area did," he says.

Fertilizer Management. To manage the waste from the animals the operation feeds and finishes, the family institutes a nutrient management plan on their crop acres.

"Because we are considered a Confined Animal Feeding Operation (CAFO), we must adhere to Pennsylvania's ACT 38 Nutrient Management Plan requirements," he says. "Manure applications are based on phosphorus (P) levels in the soil, and because poultry manure is high in P, we do export all broiler manure. We can meet most of our nutrient needs with the hog manure."

Through the use of cover crops and no-till practices, commercial fertilizers has also been greatly reduced.

Today, depending on the weather, Hershey applies hog manure to the living crop in either spring or fall, applying between 2,500 and 9,000 gallons per acre to supply around 100 pounds of nitrogen (N) per acre. He also applies a 6-24-6 starter in-furrow at a rate of 5 gallons per acre with an additional 40 units of 28%

UAN dribbled on top of the furrow with the planter. He uses a Pre-Sidedress Soil Nitrate Test (PSNT) to establish a base rate for sidedressed N application. Other macro and micronutrients are also applied judiciously and based on soil test results.

Hershey also uses little to no insecticide. "We started pulling that (insecticide) from our program several years ago. We do whatever we can do to protect our microbial activity in the soil; we realized that we were being too hard on our beneficial insects," he says. "We have less insecticide damage now."

Giving Back. What started as a time management opportunity for the Hersheys has evolved into a soil health initiative.

"Our soils are working the way they should," Hershey says. "We are managing manure more efficiently, and we have seen

"We can meet most of our nutrient needs with the hog manure..."

— Jim Hershey

our P levels decreasing every year. Our present P level is approximately 300 ppm, and we have seen that level slowly drop. Our target is 100 ppm."

Hershey also shares the information that he continues to learn with no-till, conservation and regenerative groups through his work with the Pennsylvania No-Till Alliance, where he serves as president. All of the 13 board members of the Alliance are owners or operators of a working farm, making the group a valuable resource to those seeking information on no-till practices.

"What we have all (the Alliance board members) found over the years is that the best support and information almost always came from another farmer. We take pride in the farmer-to-farmer approach, and like meeting directly with farmers to promote no-till," he says. "Our goals are to promote no-till, cover crops and soil health, and I think that a lot of farmers feel more comfortable talking with us and adopting what we share with them because of that." 🌻

Managing Inputs with No-Till and Cover Crops

For one Wisconsin operation, using the best interest and profitability of the dairy as a driver for soil health practices has offered far-reaching benefits in every aspect of production.

By Laura Handke, Contributing Writer

For Josh Hiemstra, co-owner and operator of Hiemstra Dairy, based in Brandon, Wis., no-tilling began as an opportunity to manage the manure generated by the livestock on the operation.

“We’re in the Rock River Watershed, and we’re required to meet nutrient management standards on 5-acre grids, but we’ve been able to lower it to 2½-acre grids,” Hiemstra says. “No-till and cover crops make it a lot easier to manage manure. Our goal is to get manure on every acre every year, rather than spotting it in.”

Hiemstra says that everything that’s done on the farm is done with the dairy in mind, and

“Once we learned where our issues were coming from, we limited potash to one application in the spring...”

— Josh Hiemstra

that mentality has created a different approach to soil conservation and nutrient management.

A Different Approach. The 790-acre operation doesn’t utilize a set crop rotation but does rely heavily on silage and high-quality legumes, with 3 out of 4 acres of corn devoted to silage that will be used by both Hiemstra’s and neighboring dairies. Following corn, the acres are rotated to soybeans and followed by winter wheat, with a portion of acres planted to alfalfa.

“We plant alfalfa with the expectation of a 3-year stand. For a nurse crop, we plant peas and triticale at a rate of 65 pounds per acre with a couple of pounds of timothy and rye grass. We mix that with 150 pounds of gypsum and 200 pounds of potash, all mixed and airflowed on,” says Hiemstra. “Getting diversity with grasses and alfalfa and preventing the erosion that can happen early in the year when alfalfa is young is important to us and the soil health benefits (from the diverse forage mix) are huge.”

Hiemstra terminates an alfalfa stand one of two ways: Either the alfalfa is burned down at the end of the 3-year stand and followed by no-tilled wheat, or the stand is left until the following spring, vertically tilled and planted, with burndown occurring after planting.

On corn, Hiemstra uses two products: Pro-Germinator (9-24-3) in furrow with 1 quart of chelated zinc, at a rate of 2-3 gallons per acre and 7 gallons of High NRG-N (27-0-0-1) applied 2 inches deep and ¾ of an inch from the seed.

“Our yield goals are 250 bushels per acre or 11 tons of dry matter yield per acre of corn silage,” Hiemstra says. “We assume that it takes 1.1 pounds of nitrogen to grow a bushel of corn, including the stalk and roots. So we target nitrogen efficiency of 0.7 pounds of nitrogen per acre.”

Hiemstra also keeps an eye on nutrient levels in the corn and corn silage he grows.

“Normally, with spring manure applied pre-planting, we don’t need any more nitrogen. On fields with fall-applied manure, we usually need to apply an additional 15 gallons of High NRG-N or 75 pounds of nitrogen. We will then use the stalk nitrate test to see if we were long or short on nitrogen during the season,” he says.

Hiemstra says that he began monitoring high salt fertilizer use several years ago when the dairy was experiencing reproductive issues within the cow herd. He learned that the issues were a result of high chloride levels in the forage.

“Once we learned where our issues were coming from, we limited potash to one application in the spring, and in the summer we switched to foliar feeding the alfalfa,” he says.

Alfalfa foliar applications are applied after the second cutting and consist of 2 gallons each of Pro-Germinator (9-24-3) and Sure-K (2-1-6), along with liquid boron.

Implementing Cover Crops. Hiemstra has now been using cover crops for more than 10 years, and says that his initial endeavor included planting a monoculture cover crop of rye for the express purpose of generating more forage for the dairy. When he learned that mixes were able to hold more

manure, he incorporated radishes, brassicas, legumes and grasses.

“We see such great results from the mixes; the first thing we noticed after planting the mixes was just how mellow the soil was and how many nutrients were sequestered and produced,” he says. “It used to be that after wheat, the following year’s corn was my worst corn. Now it’s the best corn I grow and I only need a starter.

“I’m achieving this by following wheat with a diverse cover crop mix in the fall and



figure nitrogen at 75 pounds of manure plus 35 pounds applied at planting for a total of 110 pounds of nitrogen needed to get my 275 bushel yield. So if you figure 110 divided by 275, you get 0.4, which means that the soil is providing the rest, or 0.6 x 275 — 165 pounds of nitrogen — while holding that 75 pounds for essentially 10 months. For perspective, we used to apply 1 pound of nitrogen for every bushel.”

Aside from the ability of the soil to cycle nutrients, one of the things that Hiemstra has learned on his no-till journey is that soil health results don’t always come in the form of numbers on a soil test.

“We don’t have high organic matter, but the soil is nice to stick a shovel in,” Hiemstra says of the benefits seen from the implementation of no-till practices. “We are seeing more worms, evidence of mycorrhizae — especially in the legumes, we have so much more nodulation. We are seeing life and our soil is starting to come alive. I’m really excited about going down this path to try to get more out of our land while putting less in.”

No-Till Delivers Bottom-Line Results

South Wayne, Wisconsin's Wiegel Riverside Dairy, has committed to no-till practices for nearly a decade and continues to see results that improve soil health.

By Laura Handke, Contributing Writer

For the 650-acre operation that Jason Wiegel operates with his dad, Jack, and uncle, Larry, no-till farming practices have provided a return on investment that has come in many different forms. Wiegel raises corn, wheat, alfalfa, oats and cover crops and is 85% no-till, tilling only before seeding alfalfa. When the South Wayne, Wis., operation implemented no-till practices 8 years ago, controlling erosion was a main concern.

"We have fairly steep ground, and it's rocky," says Wiegel. "We were so tired of putting in all of the labor of tilling, and we weren't gaining anything because of all of

"Keeping something growing keeps nutrients cycling, holds the manure we apply and prevents erosion..."

— Jason Wiegel

the erosion. It took a year or two to make up our mind to do it (no-till), but once we did, we switched everything to no-till the same year."

Although, Wiegel wouldn't recommend such an abrupt transition for most operations, he shares that the benefits they have seen are encouraging.

"It takes a lot less labor and fuel to no-till," Wiegel says. "We aren't necessarily seeing a lot higher yields, but we are building organic matter, and when you factor in the reduced fuel and time, it's worth it."

Nutrient Management. Wiegel Riverside Dairy, the primary business and focus of Wiegel's farming operation, is home to 220 head of milking cows, along with about 200-220 replacement heifers and a feedlot where steers are finished. The cumulative manure is both a resource and a burden that Wiegel works to manage year-round.

"We surface-apply all of our manure. Instead of spreading it only on the silage ground at a heavy rate, like we used to, we work on covering all 650 acres at a lower rate of about 5,000-8,000 gallons per acre," Wiegel says of his approach to nutrient management.

"Where soil tests are poor, we'll try and bump it up to 9,000-10,000 gallons and if the tests are good, we'll reduce it. And we always apply it on a living crop, whether that be alfalfa or a rye cover crop, always into green."

Wiegel soil tests one-third of the total farmed acres every year on 2½-acre grids and adjusts manure and variable rate fertilizer applications accordingly.

When Wiegel reviews soil tests, his first assessment is potassium (K) levels.

"We're a dairy taking four aggressive cuttings of alfalfa a year and a fair amount of corn silage — we're removing a lot of nutrients," says Wiegel, sharing that the vast majority of acres in the area are deficient in K.

"It's tough because if you put out just what the plant needs, there's nothing left for the soil. It takes a tremendous amount of potash in our area to build levels and maintain soil health," he says.

Today, Wiegel applies 500 pounds of potash annually on his hay acres. The application is split-applied at a rate of 250 pounds after the first crop, with the remainder applied after the fourth crop.

"We were getting a little too much potassium and salt coming through in the feed for the cows. When we apply the majority after the fourth cutting, we have 7-8 months for those nutrients to cycle and breakdown so they aren't carried into the feed as much," he says.

Nitrogen (N) is also a consideration Wiegel monitors closely in the manure being applied from the dairy. The operation adds an N stabilizer and odor reducer to manure pits, and periodically pulls a manure sample to learn how many N credits per thousand gallons are available.

N supplied by the manure is supplemented with either urea or ammonium sulfate (AMS) to compensate for any N deficits. Applying a total of 200 units of N between the manure and the synthetics, Wiegel applies half of the supplement as AMS pre-plant and sidedresses the other half as urea at V5. The urea is mixed with Agrotain to protect against leaching or loss and broadcast applied along with micronutrients.

"Whether we are spreading on corn silage or hay, we always apply about 5-10 pounds

of boron, as well as about 5 pounds of zinc and some manganese as needed," Wiegel says, adding that the operation has also found value in applying gypsum.

"We've been using gypsum for about the last 12 years. It's very cost effective for us and we apply 500-1,000 pounds every year on our hay ground to meet the calcium demands of alfalfa," he says.

Successful Results. Wiegel concedes that his soil isn't building organic matter as fast as he had hoped. "We gain about ½-¾ of a percentage point of organic matter every 7-8 years. It's a slow process, but we are headed in the right direction."

What Wiegel is seeing work in his no-till operation is water infiltration and topsoil conservation, noting that he isn't seeing black dirt fill the grader ditches or washing into the creek during a rainfall event, an



accomplishment he attributes to using cover crops. Wiegel eased into adopting covers in 2008, seeding a small number of acres and gradually increased their use until he was using them on 100% of his acres in 2013.

Wiegel says that he tries to no-till a five-way mix of wheat, rye, clover, radish and turnips into corn silage acres in late August through early September. However, by the time September 10 arrives, the window for mixes has closed and if he hasn't seeded the cover crop yet, he will plant straight rye instead.

"We just try to keep everything covered and something growing all the time," he says. "Keeping something growing keeps nutrients cycling, holds the manure we apply and prevents erosion. It's hard to beat Mother Nature." 🌱