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2019 Recipients

Robert Bevis, Lonoke, Ark.
Mike Brocksmith, Vincennes, Ind.
Jerry Peery, Clinton, Ky.

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Cover Crops Support No-Till Success in Sandy Soil

Arkansas no-tiller Robert Bevis shares successful management tools with other farmers in region with poor soil conditions.

By Laura Handke, Contributing Writer

The sandy loam soil on Robert Bevis' farm doesn't have an abundance of water holding capacity, requiring more water and management. "We have abused our soil for so long in this area that we don't have a lot of infiltration," says the Lonoke, Ark., producer. "About 90% of our operation is no-till with some rice ground requiring tillage from time to time."

Bevis shares that on average, producers in the area get good water infiltration the first time they till, but quickly begin to see a decrease. Many of those growers are currently seeing as little as only ½- inch of infiltration in some areas, he shares. "Water management in this area is huge," says Bevis. "It is the biggest expense for the average producer in Arkansas."

In the area around Bevis' farms, groundwater levels are critical, seeing declines in recent years due to agricultural practices, limiting some farms to rely on only surface water for irrigation.

"We got our soil to start cycling nutrients, and over the past two years we haven't put any P or K on our soybean acres…"
— Robert Bevis

"The biggest improvement in water management has been the introduction of cover crops into our rotation," Bevis says.

He shares that the first year he planted cover crops, he was able to irrigate longer with more of the irrigation water infiltrating the soil than before. Another benefit to the improved infiltration was that he could stretch the time between applications.

"The first year we used cover crops, we were irrigating every 5-7 days. The second year, we irrigated every 7-10 days, and this past summer we were able to stretch irrigation intervals to between 10 and 14 days," says Bevis.

No-tilling since the mid-1990s, Bevis says that making the transition to cover crops wasn't a huge hurdle for the operation because they were already used to managing residue. The cover crops allowed them to keep a heavier mat on the soil surface for a longer period of time.

For the corn to soybeans rotation, Bevis uses cereal rye, brassica and tillage radish. For corn following soybeans to corn, they use a different mix, including some type of legume such as a clover, hairy vetch and winter peas, to load up on nitrogen for the following corn crop.

"The first year, we used a ground rig spreader, but have drilled our cover crops since," says Bevis. "Spreading and flying on a cover crop works well with a single species, but when we're are using a diverse mix of seeds, we need to get all of those seeds into the soil."

Cycling Nutrients

"We got our soil to start cycling nutrients, and over the past two years we haven't put any phosphorus (P) or potassium (K) on our soybean acres," Bevis says. "On corn, we are applying around 180 units of nitrogen per acre, compared to 200-220 in the past."

Pulling a composite soil sample every year, Bevis can see the benefits of implementing cover crops. "I have seen organic matter increase since we started using cover crops. Everything we farm is now between 2 and 4%," Bevis says.

Bevis applies either 11-37-0 or 9-23-0 with sulfur, in-furrow, depending on what the soil test results indicate. "The only micronutrient we apply is a foliar zinc application," Bevis says. "Everything else we get from the cover crops."

Bevis is also working to cut the amount of urea that is being applied. "We want to reduce urea usage because of how hard urea is on soil biology," he says. "We are looking at going to ammonium sulfate and using less commercial potassium and phosphorus and changing up some of our seed treatments to try to stimulate better root growth."

Further protecting the soil biology, Bevis split-applies N with a stabilizer. "We use a nitrogen stabilizing product and apply 1/3 to ½ of the nitrogen between V2 and V3 corn stages and the other ½ or 2/3 between V5 and V6," says Bevis.

Bevis averages 200-bushel corn, 65-bushel soybeans and 205-bushel rice, compared to the Lonoke county averages of 188, 49 and 170, respectively for the same crops.

Bevis' next step in tillage reduction: rice cropping, with the hope of creating better soil health through the implementation of row rice. "If we can move away from continuous flooding to only flushing one or two times a week, we can create more of an aerobic environment and begin to rotate in some wet-tolerant cover crops," he says.

A founding member of the Arkansas Soil Health Alliance, Bevis is sharing the management tools he has learned with other producers and is dedicated to helping to reduce tillage in the state.

"We are really getting a lot of takers on these new soil health programs. We encourage them to start small — maybe 40 acres," he says. "What we see is those acres keep growing because they see the cost savings over tillage and that those savings more than offset the cost of cover crops."

Advocating for No-Till Practices Offers Dual Reward

With an eye on the future, Indiana no-tiller Mike Brocksmith stresses the importance of conservation and soil health with other farmers as well as a new generation of students.

By Laura Handke, Contributing Writer

"Preach what you practice" has become the motto of Vincennes, Ind., farmer, Mike Brocksmith. A long-time no-till advocate, Mike explains that the most rewarding aspect, aside from increased yields and soil health longevity, has been sharing what he has learned with other farmers.

"Every year, we get small groups of farmers together for a roundtable type discussion. We usually have around 20 farmers, with professionals and experts in the mix, too. The conversation is really informal and a good opportunity to exchange information and learn," says Brocksmith.

"Planting into the standing green rye creates a huge amount of biomass and that is the key to organic matter. We plant our soybeans 100% green…"
— Mike Brocksmith

Today, Brocksmith has refined — through knowledge, experience and a better selection of products — the no-till practices his dad and grandpa implemented in the late 1970s. In 1990, his decision to purchase Rawson coulters for the corn planter and use new herbicides came together to help him succeed with no-tilling.

"We farm highly erodible ground in southwest Indiana using no-till practices. The no-till saves top-soil, fuel and labor and has helped to create better soil structure," says Brocksmith.

Cover Crop Adoption

Brocksmith first began implementing cover crops in the 1990s, but struggled to find the most efficient incorporation into his no-till system. "When we began working with cover crops, there just wasn't any information available. I found myself reading organic information from the Rodale Institute to learn more about how to use them," Brocksmith shares.

For the past 10 years, Brocksmith has been 100% dedicated to cover crop implementation, planting every tillable acre in a cover crop rotation with the soybeans and corn. The combination of no-till and cover crops works because of the better herbicides and planting attachments, Brocksmith concedes.

Adapting soil health improvement practices has come from conversations with farmers, in which they exchange information on what is working for them in their operations. "There are minimal costs involved in implementing cover crops and no-till. In fact, the money that is saved from tillage offsets any costs," Brocksmith says.

Brocksmith is also an inaugural research farm member of the Conservation Cropping Systems Initiative. In year 6 of a long-term research project, Brocksmith has worked to compile data. The research Brocksmith and others are reviewing compares the use of cover crops in a no-till system to no-till systems that do not implement cover crops.

Research plots are managed through standard soil testing, tissue analysis and remote water sensing and data is shared. In the past, Brocksmith's personal cover crop management strategy has been to burn down the cereal rye cover crop 2 weeks before planting soybeans.

However, today he is seeing success with a different cover crop management approach. "In the past several years, we have planted our soybeans green into standing rye. When we plant, the rye could be between a foot tall up to 6 or 7 feet tall. Planting into the standing green rye creates a huge amount of biomass and that is the key to organic matter," Brocksmith says. "We plant our soybeans 100% green."

Balancing Nutrient Removal

Brocksmith has used variable-rate technology to apply nutrients based on each field's soil tests and yield maps. Since 1995, he has done soil testing on 2½-acre grids every 3 years.

"We apply nitrogen up to four different times, depending on what the corn looks like and when we can get in the field," says Brocksmith. For corn, Brocksmith uses Agrotain with 28% N as a carrier in conjunction with an herbicide for the burndown pass to kill the cereal rye.

Sulfur is also added to the N and applied at planting and also sidedressed. "For nitrogen, we can average over one bushel of corn yield per 0.7 pounds of nitrogen applied," explains Brocksmith.

Because the application rates of phosphorus (P), potassium (K), and lime can vary widely, Brocksmith relies on a soil test and crop removal calculation to gauge nutrient applications. "We use accepted estimated removal rates per bushel of yield, as determined by our yield monitor and soil test levels to determine application rates for each acre," says Brocksmith. "Our goal is to at least maintain our fertility levels, and in most cases, we build them, over time."

Brocksmith has reduced fertilizer slightly per unit of production, however, he is raising more bushels per acre. "At this point, I have been afraid of cutting nutrients too much. I don't ever want to take more from the soil than what I am putting in," he says. "I want to take care of the soil and build it, so I err on the side of caution and still use the appropriate amounts to match removal of yields."

The cover cropping and no-till successes Brocksmith is seeing are evident in the yields the operation is producing. The 5-year average corn and soybean yields for Knox County are 169 and 53. Comparatively, Brocksmith's 5-year averages on corn and soybeans are 207 and 65.

Sharing what they've learned has become more than a farmer to farmer conversation for Brocksmith and his wife, Susan, and they are excited to help the next generation learn about the benefits of no-till and cover cropping.

"We are working to share conservation with the younger generation, too," shares Brocksmith. "Every year, my wife, a Vincennes University instructor, and I host high school and college students on the farm, to share what we are doing and help them understand the importance of continuing to make our soils better."

Soil Heath Maintenance Practices Translate to Long-Term Gains for Kentucky No-Tiller

No-tilling since 1970, Jerry Peery's focus on soil testing and analysis have resulted in big yields and successful land stewardship.

By Laura Handke, Contributing Writer

For Clinton, Ky., farmer, Jerry Peery, stewardship and soil conservation aren't just production practices; they are insurance that he will be able to pass productive land to the next generation, just as it was passed to him.

No-till was first implemented into Peery's operation in 1970; after attending a few University of Kentucky field days, he believed in what he saw. "One of the positives of no-till in the 1960s, just like today, is controlling erosion. We are in rolling land, and every time we turn over and expose the soil, it is prone to erode tremendously. Holding soil in place was the main factor, and I could also see the potential benefits from fuel and labor savings," he says.

"By splitting the nitrogen applications we have been able to cut back on our total nitrogen application..." — Jerry Peery

Peery drilled soybeans into wheat stubble, producing his first no-till crop in 1970, followed by planting corn in a Kentucky 31 fescue pasture in 1973. "I wasn't the first [to implement no-till practices], but I was among the first. We didn't have the chemicals that we do now and all we had to control weeds was atrazine and 2,4-D," he shares.

Hurdles didn't stop Peery from experimenting with different approaches of no-till and by 1985, the operation had shifted all of its 1,600 acres to 100% no-till. Today, Peery still closely follows the research being done at the University of Kentucky to learn more about cover crops and their influence on the development of a healthy soil biome.

Soil Testing

"Every year, half of the acres are tested, alternating halves from year to year," says Peery. "We are learning a lot about soil and tissue tests." Testing biannually in the fall, Peery tests only those fields rotating into corn the following spring, which allows him to make fertilizer management decisions based on the test results.

The soil tests allow Peery to calculate his soils' cation exchange capacity (CEC), organic matter content and gain a better understanding of the micro- and macronutrient requirements.

"We have been working on micronutrients to get those built up, and we do use micronutrient material when we plant — a lot of poultry litter and some commercial fertilizer. The poultry litter helps us to build phosphorus," Peery shares. "I also apply a micronutrient solution of boron, copper, iron, manganese and zinc at one quart per acre."

Split N and Fertilizer Applications

Peery applies a balanced blend of micro- and macronutrients to every acre of corn he produces and utilizes variable-rate technology in the application of all fertilizers and nutrients, post planting.

Using split UAN (32-0-0) applications at planting, and again at the V3-V4 and V7-V8 corn stages, nitrogen (N) application directly corresponds to yield expectations.

"By splitting the nitrogen applications we have been able to cut back on our total nitrogen application," says Peery. "We try not to put on any more nitrogen than what it takes to accomplish the yield we need, and we have seen yields increase because of the split application."

The split UAN application also provides for a lower salt concentration in the soil solution by balancing the salt content throughout the growing season. The balance allows for better N uptake by the corn plant which, in turn, reduces the soil salinity and N leaching.

Peery also chooses UAN fertilizer because it is less harmful to the soil microbiology. Another key component of Peery's soil health program is the use of in-furrow starter fertilizer, which has greatly increased plant development and overall yield production.

Cover Crop Rotation

Through nematode testing and implementing cover crops, Peery is not only protecting the microbiological activity already present but also helping to increase the soil's microbial diversity.

"In the 1970s our soil organic matter was around 1% or less. Today, we're near 2.5%. That's pretty healthy, but we can continue to improve that percentage," says Peery.

Peery has been experimenting with different cover crop mixes following his cropping rotation. "From soybeans to corn, we use a mix of 10 pounds per acre of annual ryegrass and four pounds per acre of Dwarf Essex Rape seed. Going from corn to soybeans, we will use 65 pounds per acre of cereal rye and six pounds per acre of hairy vetch," he says. "We follow the combine with the drill, and in a good year, we are done planting cover crops at the same time we are done with harvest."

Tracking N Usage and Yield

As a member of the National Corn Growers Association's Precision Conservation Management program, Peery is tracking N usage on his farm, using the data to compile information about how the N being applied is utilized.

"We had one field that used 0.8 pounds of nitrogen per bushel yielded and another that used 1.17 pounds per bushel. We look at those numbers and try to figure out where we can make adjustments. We try to keep all of our application at about a pound or less per bushel," he says.

While the 2016 average corn and soybean yields in Hickman County, Ky., were 162 and 47 bushels per acre, Peery's yields topped 213 and 62 bushels per acre. Peery considers this a significant improvement in yield and credits the progress to the implementation of cover crop rotations, no-till and the soil health maintenance measures he has implemented.