Focus on Organic Matter “Right Track” for Hetland

If it wasn’t for the heavy yellow clay underlying the topsoil in Paul Hetland’s fields, his approach to farming might be quite different.

As it is, Paul knows his crop production skills will be challenged each year as he searches for ways to ensure rainfall soaks into his soil profile and is there when crops need it.

“Clay can hold water, but it doesn’t take water on quickly. It doesn’t let go of it quickly, either,” Paul says. “We can lose a crop here when there’s still moisture in the ground, but plants can’t get at it. If we have a two to three-inch rain, about half of that will soak into the soil. The rest is likely to runoff and end up in the creek.”

Since returning to his father’s farm in the 1990s, Paul has observed firsthand that the percentage of organic matter (OM) in his soil plays a significant role in enhancing soil infiltration and moisture retention. To aid the increase of organic matter and increase infiltration, he makes use of cover crops, swine manure and no-till practices.

Hetland’s cover crops serve several purposes, including resolving soil compaction, improving water infiltration and adding nitrogen to the soil.
profiles in soil health

“When we started soil testing in the late 1990s, our OM was in the low to mid two-percent range,” Paul says. “We didn’t document specific sites we initially sampled. However, now we’re taking samples from those same general areas and seeing increases of a couple tenths of percentage and in some cases as much as half a point. In farming different tracts of land, I’ve seen huge yield differences just between the range of two percent and three percent OM.”

Paul has seen soil with low OM percentage produce significant crops in years with favorable weather conditions.

“Where difference shows up is in dry years, like 2012,” he says. “Then you’ll see huge disparity in yield between fields with different OM levels.”

When he started using cover crops in 2008 to aid the increase of OM, Paul was concerned about losing moisture to the short-term crop. What he learned is that most covers are high moisture plants and return moisture to the soil as they break down.

“We started using covers because we felt microbial activity in our soils was dying back in late summer and fall, which had a negative effect on the organic matter,” Paul says. “We also heard about farmers successfully using covers to fix nitrogen. Some of our fall covers didn’t come up because it was too dry. But overall we believe the long-term benefit is worth the annual investment.”

Significant residue cover and swine manure injection are other ways Paul promotes soil health.

“We believe nutrients from animal manure are superior to commercial fertilizer, so we built two 2,400-head swine facilities we lease in return for the manure,” Paul says. “The Shank on our manure injector targets a soil depth of five to six inches. The knife that places manure in the soil provides a lateral fracture, spreading manure laterally. There’s no manure on the surface. It’s all tucked into the soil profile.”

No-till practices aid in building soil structure and help Paul and his brother Mark manage the labor.

Why do this?

Paul Hetland’s heavy clay soils transport water by capillary action from deep layers, but the rate is slow, which means heavy rains infiltrate slowly and are highly susceptible to run off. In spite of clay soil’s high water-holding capacity, most of the water is tightly bound and not available to plants.

In a conventional tillage system, if clay soils aren’t tilled at the correct water content, they’re not easily cultivated. If conditions are dry, clay soils clod. If they’re wet, the soil smears and is highly susceptible to compaction. No-till practices virtually eliminate clay soil tillage issues.

Alan Armstrong, Soil Conservationist with the Natural Resources Conservation Service (NRCS), Tyndall, SD, says Hetland has seen improved yield and plant quality after several years of using conservation practices.
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Cover crop roots, reaching deeply into the soil, can help improve clay soils by reducing compaction and unlocking nutrients and moisture, converting them to more available forms.

Both Hetland’s cover crops and nutrients from manure contribute to increased soil organic matter (SOM) that consists of a variety of components, including raw plant residues and micro-organisms.

Raw plant residues on soil surface help reduce surface wind speed, raindrop impact and water runoff. Active and some resistant SOM components, together with micro-organisms, are involved in binding small soil particles into larger aggregates, which is important for good soil structure, aeration, water infiltration and resistance to erosion and crusting. Higher levels of soil organic matter also create an environment that makes water and nutrients more available to plants.

Since SOM is derived mainly from plant residues, it contains all the essential plant nutrients and is, therefore, a storehouse of plant nutrients. Upon decomposition, the nutrients are released in plant-available form.

As if they hadn’t already done enough, cover crops catch nutrients before they can leach out of the soil profile. Cover crop legumes add nitrogen to soil and, in years with ample moisture, covers can extend the grazing season for livestock owners.

“We’re still on a learning curve with improving our soil,” Paul says. “But in using all these different elements, we believe we’re on the right track.”

Background

At a young age, Paul Hetland knew he wanted to follow in his father’s footsteps and remain on the farm following high school graduation. However, those plans were altered when the economic realities of farming at that time made it unfeasible for him to take a role on the family farm. Plan B led him to finish an accounting degree at the University of South Dakota, Vermillion. Job availability drew him to Denver, CO, where he worked with an accounting firm and began raising a family. When his father became ill in the 1990s, Paul had the opportunity to come back to the family farm. He currently farms with his brother Mark. He is a member of the National Corn Growers Association, South Dakota Corn Growers Association and American Soybean Association. He also sits on the Davison County Conservation District Board.

A 2,400-head swine facility provides most of the nutrients Hetland applies to his fields. He says nutrients from manure provide the necessary fertilizer for crops at the same time that they add to the increase of soil organic matter.

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