

Digging into OM debate

By JOSH FLINT

SOIL organic matter — it's a terrific thing to have.

However, this ancient component of Illinois' prairie soils is surrounded by a bit of controversy. On the one hand, conservation-minded farmers talk about building OM. On the other hand, some folks are reluctant to believe it can change one way or the other. It seems experts on both sides agree any sort of change will come slowly.

Dan Towery, a consultant with Ag Conservation Solutions based in Lafayette, Ind., firmly believes farmers have the power to increase the active portion of OM in the soil. The active portion is the readily digestible and easily decomposed portion of fresh organic matter, he explains.

"Those looking to do this need to take a systems approach," says Towery, who spent a good portion of his career at the



IT TAKES TIME: Ag Conservation Solutions' Dan Towery says continuous no-till paired with cover crops is the quickest way to build active organic matter in the soil. Still, at one-fifth of 1% per year, it will take some time.

Key Points

- Building organic matter with no-till and cover crops is a bit controversial.
- Many don't realize there are different types of organic matter.
- Even though both are high in carbon, don't confuse plant residue for OM.

Illinois Natural Resources Conservation Service. "Continuous no-till paired with cover crops is the fastest way to increase the active OM component. But it takes time."

As the active OM decomposes, it helps stabilize soil aggregates. It releases nutrients by mineralization. Finally, it provides food for microbial activity, which can lead to suppression of plant diseases and enhanced plant growth, Towery explains.

A traditional corn-soybean rotation with no-till can build the active OM at a rate of about one-tenth of 1% per year in the top 2 inches of soil, Towery notes. Add cover crops into the mix and the rate jumps to one-fifth of 1% in the top 6 inches.

The no-till part of the equation is key. Tillage stirs the topsoil, which reduces biological activity and allows a good portion of the would-be active OM to be released as carbon dioxide, Towery explains.

Seems pretty straightforward, right?

OM confusion

Not all organic matter is the same, says Roger Windhorn, a soil scientist with Illinois NRCS.

He's heard frequent comments from farmers that OM appears to be increasing, but the soil isn't getting any darker. And it won't. "We're not going to do that in our lifetime," he adds.

Dark prairie soil gets its color from humus. By definition, this is stable organic matter that won't decompose further. That doesn't mean it won't be lost to erosion.

clod hangs together.

"This is because the no-till has better aggregate stability due to the glomulin [glue-like substance] from soil microbes," Towery says. "Multiply that times a whole farm and that's a significant reduction in soil loss."

To improve soil health, Towery reminds farmers they need to follow four basic tenets:

1. Minimize soil disturbance.
2. Keep roots growing as often as possible.
3. Keep soil covered as long as possible.
4. Work as much diversity into the rotation as possible.

Going 100% no-till and cover crops on the entire farm will definitely hit all



OM DEFINITION: Illinois NRCS' Roger Windhorn says many folks confuse humus for active organic matter. Humus will not decompose further. But active OM can be lost after several years if stocks are not replenished.

But that's relocation, not decomposition.

So, what are no-till, cover-crop farmers actually building, if it's not humus?

Windhorn says the OM built by conservation practices is referred to as the active fraction, i.e., active OM. It does wonderful things in terms of water- and nutrient-holding capacity as it boosts the soil's cation-exchange capacity.

Unfortunately, active OM is not stable like humus. Windhorn says it will typically hang around for one to four years. So, if conservation practices cease on the farm, active OM will decompose and leave the soil in several years.

"Still, I always tell farmers that building this active fraction is a great thing," Windhorn adds. "Just don't confuse it for the stuff that is hundreds, if not thousands, of years old."

Plant residue vs. OM

So, if cover crops and no-till can build active OM, what about a continuous-corn operation with conventional tillage?

University of Illinois professor Emerson Nafziger says this approach will certainly add crop residue to the soil. Problem is, if it's still identifiable as crop residue, it's organic material, but not stable OM.

"We think that less than 1% of residue added back to the soil becomes organic matter. An acre of topsoil 6 to 7 inches deep weighs about 2 million pounds, so one percentage point of OM weighs 20,000 pounds. It also contains about 1,000 pounds of nitrogen, which has to come from somewhere," Nafziger notes. "This all means accumulation is a slow process."

That difference between plant matter and organic matter is a sticking point for Nafziger. In many instances, labs test for OM by measuring the carbon in the soil. However, plant material is also high in carbon. As a result, many labs count decomposing plant material as part of the overall OM.

Even if OM isn't being built at advertised rates, Nafziger says it's in no way a knock against conservation farming. "Keeping soil in place and using only the tillage we need is a sound farming practice."

Building better soil health, one step at a time

DAN Towery understands the struggle most farmers have with building better soil. The payback may be long term and isn't always readily apparent.

Stick with it long enough, and the payback will come, says Towery, a consultant with Ag Conservation Solutions based in Lafayette, Ind.

Some significant beneficial results come through compaction reduction, improved water-holding capability and reduced erosion. In Towery's speaking engagements, he often relies on the Slake Test to showcase these abilities.

He'll take a clod from a conventionally tilled field and a clod from a no-till field and drop them both in separate glasses of water. The conventional clod will dissolve quickly, while the no-till

four tenets. However, Roger Windhorn, a soil scientist with the Illinois Natural Resources Conservation Service, realizes many farmers are reluctant to take that sort of plunge.

Baby steps

Windhorn challenges hesitant growers to take "baby steps" toward better soil health.

"You could start out by reducing the number of passes over the field by one," Windhorn notes. "Maybe that's as simple as not chiseling your bean stubble in the fall."

He's also heard of folks lowering tire pressure to help reduce compaction in the fall. Over time, these steps will add up for a cumulative effect, he says.