

Make Soil Health Choices With the Future in Sight

Planning for 2014 and beyond

In the past, Mother Nature had control over a lot of factors in farming, including soil health. Fortunately, today's producers have ways to take back some of that control.

In an article called "[Build a Robust Soil-Plant Future Farm](#)" published by *Corn & Soybean Digest*, Joe Nestor, a former fertilizer plant manager who works one-on-one with producers to improve soil management systems, said, "Efficient recovery of nutrients and keeping them in the field is the No. 1 thing we need to raise better crops. A healthy soil lets larger root systems proliferate, which captures a higher percent of the nutrients in the field. You need fewer applied nutrients. With poorer soil structure, you need to saturate the soil with nutrients, as the plant will find a smaller percentage of nutrients."¹

It's clear that thinking regarding soil health is evolving. Farmers who take an approach to soil management that looks beyond the following year's crop and aims for soil health for the future reap benefits in terms of improved yields and reduced input costs. In this issue of the *Leading Edge*, we will focus on several soil health factors: soil compaction, soil biology and soil testing, and fertilizer.

Soil compaction: take control of traffic

There are many negative effects of soil compaction. Poor root penetration and function, stunted above-ground growth with increased likelihood of nutrient deficiency and drought stress, poor infiltration and increased runoff and ponding, and reduced internal soil drainage and lack of soil aeration are some of the interrelated problems that can occur.

Vehicle traffic is one of the main causes of soil compaction. Some of the best ways to prevent soil compaction are controlled traffic patterns and fewer trips across the field, especially when soil is moist. Also, if a tillage pass is necessary in the fall, consider using shallow vertical tillage that disrupts only the top 2-4 inches of soil.



Facilitate controlled-traffic farming with strip-till: strips are created in the fall and utilized for the following year's crop, minimizing passes through the field.

An article in the March 27, 2013, issue of *Corn & Soybean Digest* titled, "[How to Avoid Soil Compaction: True, False Q&A](#)" helps to debunk some of the myths surrounding soil compaction. For example, contrary to what some may believe, "Clay soils are no more vulnerable to compaction from traffic than lighter soils."² This article includes a quiz to help you assess your understanding of soil compaction. It also discusses issues about which experts are on both sides of the fence, such as whether using implements and vehicles with tracks lowers soil compaction.

Dr. Joel Gruver, assistant professor of soil science and sustainable agriculture at Western Illinois University, shared his opinion on the subject of tracks versus tires in a phone interview.³ He said that in general, tracks cause less soil compaction because they "tend to have a lower contact pressure." Dr. Gruver added that tracks also help to prevent slippage by providing better traction.

Controlled traffic patterns are a good way to control compaction. Dr. Gruver said about 70 percent of compaction occurs during the first pass across a field, so unrestricted traffic results in far more compaction than controlled traffic. Much of the draft power required for tillage is directly associated with undoing the compactive effects of wheel traffic.

One of the main causes of compaction, according to Dr. Gruver, is excessive loads during harvest. Full grain carts can carry 20 tons per axle, so he recommends minimizing traffic when hauling grain out of the field.

Looking for another compaction-preventing method?



Help alleviate soil compaction with the effective tillage radish.

Dr. Gruver recommends cover crops as a viable option for preventing and alleviating soil compaction—annual rye-grass and radishes are some of the best. However, he cautioned it may take multiple years of cover cropping to see any results.

Soil testing: the foundation for soil health planning

Soil testing is essential in today's agriculture—it lets you know what your soil lacks, what it has in abundance, and can help you use fertilizer more efficiently.

Testing soil pH levels can be as valuable as evaluating nutrient levels. Soil pH affects chemical reactions as well as biological activity in your soil. It takes time for lime to react with soil acidity. As a result, lime applications in the fall are more beneficial for the next crop than spring applications.

Another factor to monitor is soil organic matter. Organic matter is very important to overall soil health. Strip-till and no-till methods are ways to increase near-surface organic matter levels because these methods leave more residue cover on the surface of the soil.

Cover crops are another method that can be used to



Cover crops at work in a strip-till operation. Cover crops help increase organic matter and loosen soil, which helps alleviate compaction. Strip-till only works the soil in the seed zone, also helping to control equipment traffic zones. Interest in combining these practices is increasing as a means of improving soil health.

increase organic matter. Especially for those maximizing economics and eliminating a legume rotation, or those looking to improve their conservation tillage operations, cover crops can work wonders. "No-till has made good improvements in soil quality and soil health, but cover crops go beyond no-till alone, keeping something alive and growing throughout the year," said Alan Sundermeier, extension educator, Ohio State University, in the article "[Build a Robust Soil-Plant Future Farm](#)." Sundermeier continued, "We are seeing substantial bushel increases on healthier soils with cover crops and no-till."⁴

All three of these options—no-till, strip-till, and cover crops—help to reduce erosion and nutrient runoff.

Fertilizer: tried and true

We all know fertilizer management choices have huge potential to impact soil health and therefore yields. Fertilizer can also be one of the biggest investments in your agriculture operation. The right fertilizer plan takes into consideration soil test results, historical data, and many other factors such as nutrients left behind by cover crops and intended crop for the season.

To ensure your budget stretches to cover all your fertilizer needs, experts recommend buying early this year as prices have been backpedaling. Kevin Van Trump, who produces the award-winning and world-recognized daily agriculture industry wire called *The Van Trump Report* and is chairman of [Farm Direction](#), believes that producers need to lock in their 2014 needs soon to take advantage of lower input prices. Van Trump said in a [September blog post](#) for *Corn & Soybean Digest*, "The question most producers are asking is how much lower will fertilizer prices go? In my opinion, there is still some room to the downside, but upside risk seems much more dangerous than downside potential."⁵

Soil health: take the long view

This is by no means a full list of ways to improve your soil health; however, preventing and alleviating soil compaction, testing your soil to ensure that you have the information needed to use fertilizer efficiently, putting cover crops to work, and getting your fertilizer planned early to take advantage of low pricing can all help you get on the right track for healthier soils in 2014.

Endnotes

- 1 <http://cornandsoybeandigest.com/conservation/build-robust-soil-plant-future-farm?page=1>
- 2 <http://cornandsoybeandigest.com/conservation/how-avoid-soil-compaction-true-false-qa>
- 3 Gruver, J. (2013, September 26). Telephone interview by K. Head.
- 4 <http://cornandsoybeandigest.com/conservation/build-robust-soil-plant-future-farm?page=2>
- 5 <http://cornandsoybeandigest.com/blog/are-you-thinking-about-2014-fertilizer>

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