"**Restoring Soil Health in Troubled Fields**"

Webinar Q & A
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Questions submitted by live audience
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Presenter:
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Q: What works best or improving soil health; carbon products, enzymes or microbes?

A: As we discussed in our first webinar with *No-Till Farmer* in 2013, there are pros and cons to using all three of these types of biological additives. Based on our experience in working with biologicals since the late 1970's, I don't believe we can say that one of these product types works best all of the time. We really need to know some basic information about the history of your fields and their current soil chemistry before recommending a particular type of biological product to you. As well, biological additives may not be the best approach to resolving some types of problems.

Q: What is the first thing that you can do to start rejuvenating worn out fields? What is next after that?

A: The very first step to rejuvenating a field is to understand the source of the problem. For example, our test site had excessively high magnesium levels, which led to compaction and limited biological life. The steps we used to resolve this problem are different than the best practices we might use to resolve problems that stem from other types of problems with the soil chemistry. Also, we largely focused on biological approaches to improving soils during the webinar, but the problem may not be directly related to microbial life. Accordingly, there is no single fix that we can use to improve troubled soils, and we have to understand the source of the problem in order to determine the next steps in the rejuvenation process.

Q: Midwest soils are inherently higher in Soil Organic Matter than Southeast soils. How do SOM improvement possibilities compare between Midwest and Southeast soils?

A: Soils in warmer climates (including those in the Southeast US) tend to be lower in organic matter since they are older soils that are more heavily oxidized, and the warmer climate promotes faster degradation of active soil carbon. So, it is naturally more difficult to build SOM in southern soils, but people have shown that some improvements can be made. For example, Dr. William Albrecht wrote about this issue several years ago and noted that gains can be made regardless of climate. He recommended methods that are familiar to the current readers of No-Till Farmer, including residue management, use of legumes to build soil nitrogen, and applications of manure.

Q: In order to effectively build soil health, how low does your soil erosion need to be?

A: You can improve soil health in fields that are highly erosive, but it typically helps to use more than one approach to the problem. The established ways to reduce wind and water erosion (including cover crops and reduced tillage) will also build soil biological activity that supports colloid formation and improves water infiltration over time. Biological additives like Chandler Soil provide another set of tools that can be used to promote this process.

Q: How do you measure – absolutely – the progress of soil health? Not the feel … not more worms, etc. I mean absolutely measure?

A: In the past, farmers and agronomists have relied on tools that measure the observable outcomes from improved soil health (e.g., reduced compaction rates, higher earthworm counts, improved soil organic matter, etc.). As well, the new soil tests that measure CO2 respiration rates and other evidence of microbial activity will add to our understanding of soil health status. However, I don't believe we can develop a single absolute measure of soil health due to the complexity of the soil system. By analogy, there is no single absolute measure that medical professions use to measure human health.

Q: What is considered "high" mag, as far as base saturation? 10%? 15%? 20% +?

A: Our usual target for magnesium in the base saturation is about 12 to 15%, and the general rule-of-thumb indicates that magnesium values above this range are excessive if the sum of the calcium and magnesium base saturation numbers is higher than 80%. For example, our test site had initial magnesium base saturation of 29 to 37%, and the sum of the calcium and magnesium base saturations were 91 to 96%.

Q: How much does it cost to follow the program per year on an acre or ha?

A: The recommended application rate for broadcast treatments of Chandler Soil is 16 ounces per acre each year, which costs about $9.50 to $12 per acre (depending on our seasonal discounts as well as volume discounts for large container sizes). You can also apply Chandler Soil in the row with starter fertilizer (two-by-two or in-furrow) at a lower rate of 8 ounces per acre, which cuts the cost in half and may be more convenient.

Q: Are there advantages to applying the soil product in row at planting instead of broadcast over the whole field?

A: The in-row applications are less costly and may be more convenient for some farmers. Also, we have not seen a significant difference in yield between the broadcast and in-row applications of Chandler Soil. For example, we have conducted replicated plot comparisons of the broadcast and in-row applications to corn on the same farm and in the same row locations for the past two years. During 2013, the in-row application produced 1.5 bushels per acre more than the broadcast application, and the difference widened to 3.5 bushels per acre in 2014. Although these differences are not statistically significant, they may be economically significant, especially during the low part of the price cycle. If you can add a few more bushels of production while cutting costs by $5 per acre, you can add about $15 to your net returns per acre.

Q: You mentioned that gypsum would help with pH in the field in the study. How so?

A: As we flushed the excess magnesium from this field, the calcium and sulfur levels have dropped to the low end of the acceptable range, and the pH has declined a bit. As we continue this process over the next few years, we expect that we will eventually have to add some calcium and sulfur and to boost the pH. By itself, gypsum does not contain a source of carbonate and does not directly affect soil pH. However, we can use gypsum as the primary source of supplemental calcium and sulfur for this field. Then, we can adjust the pH with a smaller amount of low-magnesium lime, which is relatively expensive in our area.