527 Farming with Soil Life

#RealisticRegenAg | I was taught to kill the life in the soil. After all, we wanted to grow crops and we needed to get rid of the pests. That view is shifting, and books like “Farming with Soil Life” help move the needle on this important topic. Join me in this episode where I review this new resource put out by the Xerces Society through the SARE publishing program.

Welcome to Plants Dig Soil. My name is Scott Gillespie and I’m an agronomist specializing in climate-smart agriculture. I discuss scientifically proven practices that benefit both the planet and, just as importantly, farmers' economic sustainability. Be sure to visit my website, www.plantsdigsoil.com, for resources and information about the services I offer.

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https://www.plantsdigsoil.com/podcast/farming-with-soil-life

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Farming with Soil Life starts with a discussion on soil. It covers the geological origin of soil and how chemical and biological factors contribute to its development. Understanding the formation of soil sets the stage for comprehending what constitutes a healthy soil.

The book touches on the usual definitions, but at the end of the day, a healthy soil is one that does what we want it to do. A healthy soil on a farm grows crops well, while a healthy soil in a forest supports a complex ecosystem. In both cases, a healthy soil is one that remains in place and can support future generations.

Assessing the health of a soil can be done by observing its inhabitants. The problem is that it's challenging to observe these creatures without destroying their homes. Added to that problem: many of them are active only at night. It's already difficult for us to see at night, let alone search for soil creatures during that time.

The book mentions a couple of ways to identify soil inhabitants. One way is to set up pitfall traps. These traps are placed when the creatures are expected to be active, left for a specific period, and then checked to see who's been caught. Another method involves collecting soil and using light and heat to force the critters to move out of the soil. They eventually fall out of the container holding the soil as they go deeper in search of a darker environment.

While this method works for larger insects, the tiniest of organisms require a microscope to be observed. It takes a truly dedicated person to go to that level of detail. (And for the record: I'm not one of those types of people.)

The book briefly touches on soil health tests, and I agree with their assessment. Many tests are still being developed, but there's no standout option yet. Although many people try to correlate cover crops or practices with soil health test results, it's currently not possible, at least in their assessment. I tend to agree with this viewpoint.

The third approach mentioned in the book is the one I prefer. It involves observing what is actually happening to the soil and how the plants are responding. Numbers can be deceiving without actually looking at the soil. I plan to delve deeper into this approach next week when I discuss the methodology I use to assess soil health.

As a quick aside, last year I was able to attend a field tour with Dr. Abby Wick when she made a tour through Alberta. We went to a couple sites and assessed the soils by digging and observing. Once we came up with a concensus we checked the soil health tests. While they had their merits, the field that we all thought was the healthiest ranked the lowest on the tests while the field that had some problems (in the group's opinion) ranked higher.

One aspect of the book that I find questionable is the argument for switching to manures and compost. I agree that these are beneficial for the soil, but we still need synthetic inputs to grow the crops that feed the livestock and produce manure. When the manure is applied to land that did not grow the crops, the nutrients are simply being transferred. The field receiving the manure benefits, but the one that originally grew the crops doesn't receive the nutrients back and will slowly degrade over time.

The book also relies on one study to show the benefits of incorporating alfalfa into crop rotations compared to conventional synthetic-based methods. While it's definitely a way to improve soil health, not everyone can afford to take land out of annual production for 3 years every 3-6 years. It would be ideal, but the current economics of farming don't allow for such practices.

In my opinion, the way forward is to use cover crops to grow more nitrogen and prevent its loss. Cover crops can also make nutrient cycles more efficient. However, until we establish a circular economy where sewage and food waste return to the land, synthetic inputs will still be necessary.

But let's get back to the book.

One part I did agree with is the argument for reducing pesticide use. I've heard about the concept of sub-lethal doses before. It's when a low dose of a pesticide doesn't immediately show signs of harm but actually hurts the organism. There can also be additive sub-lethal doses, where the effects of multiple chemicals in the soil harm life in ways that aren't apparent when looking at them in isolation.

I reviewed a book called "Cow Patty Critters" last month, which showcased the work of an author who demonstrated how a common medicine in cattle can affect the creatures visiting cow patties for weeks or even months after its application. I think the pesticides we are using are doing more harm than we see.

I’ve noticed this after many years working with quinoa. It is related to lambsquarters and many of the herbicides we use kill lambsquarters. The most successful quinoa crop I’ve seen is on organic land. I’ve also seen many unexplained issues establishing the crop. It’s annedotal, but it’s been happening more often than just being explained by poor seedbed preparation.

Beyond reducing synthetic inputs like fertilizers and pesticides, the book discusses what we can do to help soil organisms. One way is to minimize or only use tillage when necessary. The most significant way to assist them is by leaving areas for them. Since the 1970s, farmers have been encouraged to maximize their planting areas, considering any unplanted spaces as wasted land. However, these areas are actually valuable and should be encouraged.

I've talked about this on my podcast before. There are areas in every field that never yield profits and cost more to farm than they generate. These are the areas I target for returning to nature. Many times, the predators of our agricultural pests need a small drink of nectar from flowers before they go out and hunt their prey. These landscape features have value in supporting those predators.

Similar to "Cow Patty Critters," this book is primarily a reference book. The majority of its content consists of detailed descriptions of the life that inhabits the soil and their roles. I don't have much knowledge about what lives under the ground, except for what I've seen in occasional presentations. I get overwhelmed by detailed information about organisms. I'm not a taxonomist. I'm someone who appreciates the overall ecosystem without getting lost in the details. To me, it's about taking in the whole picture. You could say I enjoy the prairie without getting lost in the grasses.

However, I do want to learn more about these critters. I know my crops and the pests that attack them, but I've made it a goal to learn about a new soil creature every week. Once I've gone through them all, I'll start again until I know them all. I might even study all the cow patty critters. I think getting to know them will help me appreciate them more in the context of the whole ecosystem. Perhaps when I'm digging in my vegetable garden, I'll even start recognizing the critters I come across.

If you're interested in this book the PDF download is free. Check the link in the description. If you are in the United States, you can order a copy to be shipped to you.

Thank you for listening, and I'll talk to you again next week.