



The world beneath our feet is very much alive. We are told that in a single teaspoon of soil, there is an estimated one billion microbes including bacteria, fungi, nematodes, protists and micro-animals. All of these microbes serve a purpose in the complex ecosystem underfoot. If we are to maintain and build a healthy living soil then we need to work with Nature to keep a balanced system.

Take nematodes for instance. The "good" nematodes eat bacteria and make nitrogen available to plants. Mycorrhizal fungi, has a mutualistic relationship with most plant species. In exchange for sugar, mycorrhizae provide plants with nutrients and water.

So what causes the imbalance in the soil and how do we know our soils are degraded?

The first step is to work with nature and understand how she solves these problems on her own.

There are 5 general soil health principles that mimic nature's processes.

1. Minimize soil disturbance including chemical and physical disturbance. Chemical disturbance such as synthetic fertilizer inputs and herbicides upset the natural nutrient cycles and have a big impact on microbes. When plants are supplied with synthetic fertilizers, they no longer need nutrients from mycorrhizae, so the plants no longer send sugar to the mycorrhizae. This harms the mycorrhizae and later in the summer when plants need more water and nutrients, the mycorrhizae don't deliver. Mechanical disturbance such as tillage breaks up soil structure and creates an inhospitable habitat for microbes by increasing soil temperatures.
2. Keep armor on the soil. Whenever we create bare soil, mother nature puts a bandage on the problem in the form of weeds. This is nature's way of moderating soil temperatures for microbes, decreasing evaporation, reducing compaction from rainfall and providing food for microbes.
3. Keep a living root in the soil for as long as possible - for example, using cover crops or growing perennial crops. Living roots in the soil are crucial for feeding the microbial critters year long.
4. Incorporate livestock into the system. Grazing animals help cycle nutrients. Utilize animals in a way that does not cause more harm than good. It's not about stocking rate, it's all about timing; how long you graze and how long the plants have to recover.
5. Diversity. Nature does not believe in monocultures, that is a human invention. Diversity includes plants, livestock, microbes, wildlife and insects, as all of these critters interact in the ecosystem. Diversity helps increase yields by decreasing pests and improves the health of the ecosystem.

It's time we remember this soil as something we are a part of and something we nurture. As with anything, these changes can't happen overnight but it's time we start taking those steps.

In her book, Nicole Masters discusses the functions of healthy soil; one of the most important being water infiltration. Would you believe that a biologically healthy soil can absorb over 18 inches of rainfall in one hour; in contrast, average soils absorb only 1/2 inch of rainfall per hour? What does water infiltration have to do with biology in the soil? Those microbes in the soil create a special substance that allows soil particles to form aggregates. This creates that crumbly, cake-like structure that allows soil to absorb water like a sponge and take in gases like carbon dioxide.

If the problem really is our soil, how do we start to treat it?

***Farming Secrets says: It all starts with a step. Maybe that step will be implementing cover crops, decreasing herbicides or planting a pollinator plot.***

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