



Soil Biology Testing:

Why test for soil microorganisms?

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Matt is President and Director of Earthfort, LLC in Corvallis, Oregon. Earthfort tests the biomass and activities of soil microorganisms in soils, composts and liquid soil amendments. Matt frequently answers the question, "Why test for soil biology?"

Measure it, manage it.

Here at Earthfort, we look at soil as an ecosystem for supporting plant life. If you go out to the forest this spring, ask yourself, "Who's fertilizing this forest? Who is spraying fungicides? Who's managing pests? How are weeds being controlled? Who's doing all that work?" This type of natural system is very well balanced and highly functional. The organic matter falling from dead and dying plants is processed by organisms on and in the soil. The microbes such as bacteria, fungi, protozoa, and nematodes are breaking these materials down, cycling nutrients and making water available to plants through interactions that allow these systems to be some of the most highly-productive systems in the world; yet, no one is fertilizing it, and no one is controlling for pests in this non-managed, natural ecosystem.

Can we mimic, copy, or utilize some of that knowledge? Earthfort looks at what is occurring in nature and applies these principles to man-managed systems. This is the core of what we do--apply natural microbial processes to landscapes and farms.

Different plants have preferred microbial communities.

Plant communities have certain microbial communities with whom they prefer to associate. Testing soil microbiology can measure this balance of organisms, so you will know if you have the right combination of players in the ground.

Earthfort webinars and workshops provide more information on this topic, but in a nutshell, succession is the idea that a given ecological community will become increasingly complex over time, unless and until it gets pushed backwards by some kind of disturbance (such as burning, flooding, tilling as well as through other natural or manmade events.) The buildup of complex communities occurs not only in the plants and animals above ground, but also in the micro-communities below ground. Any type of plant you are trying to grow has a certain balance of microorganisms with whom it likes to exchange nutrients and minerals for sugars. How do you know if your soil and plant communities are well matched? Testing reveals and the balance of microbes in your soils; and it is this balance you can shift to support the plants you are growing.

Weeds are simply early-successional plants whose job is to propagate themselves and build up bare soil. These colonizer traits often make them problematic in farming situations, as they thrive in disturbed, highly bacterial soils. As they build up the soil by reproducing and dying off (leaving their organic matter behind), things start to change in that soil, and the nutrient cycles start to shift. As the soil builds up organic matter, eventually, soil structure starts to build up – fungi will begin to proliferate and bacterial levels will even out or begin to decline slightly.

As the soil moves into a more pastoral systems, or "mid-successional species," we see perennial grasses, forbs and small shrubs increasing in number. Many of our flowering plants, food crops,



and landscape ornamentals have mid-successional traits. The organic matter in the soil continues to build, resulting in better soil structure, better air and water movement through the soil profile, which is largely due to the better balance between bacteria and fungi therein. Soil pH starts to shift more towards a neutral state. The biology are releasing the nutrients into the soil, and the nitrogen cycle shifts away from nitrite production to nitrate. Not surprisingly, most of our mid-successional plants want nitrate. The shift in available nutrients is a biochemical process that has to do with available oxygen and pH of the soil, which are influenced by the ratio of bacteria to fungi. Depending on the physical and chemical properties of the soil, there's a direct correlation between the balance of the biology present and the pH of the soil as to what kind of nutrients are being made available.

We know what soil successional environment each crop prefers and testing your soil gives us a picture of where your balance lies, (either bacterially or fungally dominated.) Working together, we can determine if your efforts are helping or hindering the particular plants you are trying to grow and what to do to improve your practices.

Testing addresses agricultural challenges & improves yield.

When you apply a chemical salt to your soil, the salt pulls the moisture away from the plant and then forces its way into the plant through a very interesting and complex process. The salts that are not used build up in the soil. If you're using a salt-based fertilizer, you are directly affecting the organisms in the soil in and making them inactive. The USDA just published a report last year that basically said 20% to 80% of all fertilizers we apply to the ground never make it to the plant. That's incredibly inefficient. As a business owner, that is unacceptable. It's like building 100 chairs, and 20 to 80 of them are defective, because of poor or broken materials. This system is very inefficient. Improving efficiency is what I work on every day-- trying to help people manage their soil's particular challenges, whether its salinity, compaction, low organic matter, or low water holding capacity. Can we reduce fertilizer inputs, make it more efficient? It's all about the balance of the microbiology, how well is it functioning, which we discover with each sample we test. Soil microorganisms are very easily disrupted by tillage, fertilizer, pesticide salts, and compaction, which disrupts the soil's natural process. Using Earthfort to test for biological activity helps you get back on track and get the organisms working for you again.

Tests are applicable to all growing and remediation situations.

Earthfort has tested a wide range of plant growing systems. We work with aquaponics, hydroponics, potted plants, large-scale and small-scale farms (conventional or organic), urban farming, landscapes and restoration efforts. We strive to create the ideal habitat in soil for the plants you're trying to grow. The foundation of creating the optimum habitat for what you want to grow, is to know what you have. So let's investigate your soil - send us a sample.

Look at earthfort.com for simple instructions and a submission form and send in your soil. We will analyze it, and in two weeks, you will have a much better idea of who's in your soil, what balance your crops have, and how we can manage those ratios to favor your crop. This information will help you manage your soil to optimize what you want to grow. Whether it be vegetables, grasses, fruits, native plants, or a new landscape, we have the tools you need to manage your soil habitat and improve your growing success!