



Soil is Alive!

By Shilo Nielsen

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Soil – not just a dirty four-letter word: it is a living, breathing substrate. Or, it is full of living, breathing organisms necessary for the survival of life on our planet. One teaspoon of healthy soil can contain a billion bacteria, and several yards of fungal hyphae. This is the very beginning of what we know as the food chain -- in the case of soil, however, it is more of a web. Microscopic beings eat other microscopic beings, as well as being eaten by larger insects, which in turn eat and are eaten by a variety of critters, leading up to mammals, which eventually lead to us. While we may be at the top of the food chain, we are dependent on what is happening at the very bottom layers.

At the center of this food web are plants. Plants can actually control the food web for their own benefit: how amazing! Plant roots attract specific types of fungus and bacteria based on the plant's needs. They control this by secreting substances that attract specific microbes. While not understood exactly how they do this, studies indicate they produce different substances at different times of year, depending on their current nutrient needs.

Soil bacteria and fungi are little fertilizer bags for plants, retaining nitrogen and other nutrients they gain from organic matter. The next links in the web are the protozoa and nematodes, which act like fertilizer spreaders. They eat the bacteria and fungi, digest what they need, and excrete excess nutrients as waste. Plant health depends on the interplay of these many microbes.

The next life in the web is small animals called arthropods. These can be seen with the naked eye and include springtails, sow bugs, and other creepy crawlies. They in turn are food for snakes, birds, moles and other animals -- making soil like a fast food restaurant. During all this eating activity, members of the food web move about and have another impact on the soil, helping to create soil structure. One of these animals we can see is worms, who tunnel around and create breathing space needed by plant roots, as well as making openings for water drainage.

What does this all mean for us? “Feed the soil, and the plants take care of themselves!” Soil life produces soil nutrients. At the very root of it all is compost. Compost is organic matter, the building blocks of plant life. But without the microbes to break it into a form the plant can take up, it will be sterile and lifeless. If you see mushrooms popping up on your mulch or compost pile, rejoice! It is a sign of healthy fungal soil activity. There are more “good guys” than “bad guys” when it comes to microbes. In fact, there are many microbes that protect our plants against the bad microbes that cause disease. The more diversified your soil, the more life in it, and the healthier plants will be.

A word of caution: chemical fertilizers are detrimental to the soil’s life. While they can add some basic nutrients for plant life (nitrogen, phosphorus, potassium or N-P-K), which the plants absorb quickly based on what they immediately use, the rest of the fertilizer is washed away. Synthetic fertilizers are salts, and they suck the water out of the living microbes in the soil. The plants can become more and more dependent on the chemicals, as the natural bacterial and fungal fertilizer “bags” are killed off. Without the microbes, soil structure suffers, water and nutrients are not held, and gardening just becomes a lot more work, not to mention more expensive.

By using techniques that employ soil food web science as you garden, you can reduce and perhaps eliminate the need for manufactured fertilizers and pesticides (and extra work!). The pH (suitability for certain plants to grow) can be influenced by how many bacteria vs. fungi are in the soil. Vegetables, annuals, grasses, many flowers prefer more bacteria in the soil. Trees and shrubs prefer more fungus. And remember – Soil is life! Don’t treat it like dirt!

Come to this Saturday, June 29, 2013 free public education Master Gardener class on Soil, and learn more about caring for the garden’s soil. The class will discuss types of soil, what we find in the foothills, and how it affects everything that is grown. Mulches and fertilizers will also be covered. The three-hour class starts at 9:00 a.m. in the Veterans Memorial Building, 130 Placerville Dr, Placerville, CA.

Master Gardeners are available to answer home gardening questions Tuesday through Friday, 9 a.m. to noon, by calling [\(530\) 621-5512](tel:5306215512). Walk-ins are welcome at our office, located at 311 Fair Lane in Placerville. For more information about our public education classes and activities, go to our Master Gardener website at http://ucanr.edu/sites/EDC_Master_Gardeners/. Sign up to receive our online notices and e-newsletter at <http://ucanr.edu/mgenews/>. You can also find us on Facebook.

