



Sumptuous Soils: Turning Dirt into Gold
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Many of us who live in the Sierra Foothills like to hike and be in nature. As I explore our local trails, I often think about how miraculous it is that huge trees grow in what superficially appears to be the most pitiful dirt. In spring and summer, bright magenta flowers can bloom in almost ridiculous abundance from a simple crack in a granite rock. This awes me as a hiker, but as a gardener, it makes me think that plants must be pretty smart. They must have strategies for finding the nutrients they need, defending themselves from pests and predators, and surviving season over season.

To understand how they do this, we first need to understand how soil functions. On both a microscopic level and in organisms visible to the naked eye, soil is filled with active life forms. These range from minute bacteria and fungi, which drive very complex decomposition and nutrient availability processes for plants - to earthworms, insects, burrowing animals, and even the mammals that live above ground. Each player in the decomposition and nutrient delivery process plays a part. The interplay among these creatures is called the Soil Food Web.

In the Soil Food Web, different organisms tend to congregate in regions where they can find the food they need. Bacteria, for example, are plentiful in the space around roots, called the rhizosphere. Bacteria and fungi both form relationships with growing plant roots that enable the plant to receive water and nutrients, especially phosphorus, from the soil. In return, the plant provides carbohydrates to the microorganisms. The bacteria also feed on the dead plant cells as the roots transform and grow. Protozoa and nematodes feast on bacteria, so they live nearby. In the leaves and needles under trees, you might find more diverse fungal organisms, decomposing

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carbonous materials with the help of shredders like millipedes, worms, and other insects. Each organism performs a function that helps support others, in a food chain that perpetually decomposes materials and makes nutrients available.

Because these processes are essential for healthy soil and plant growth, we think of each as an ecosystem service, a function that serves to keep the broader ecosystem healthy. Plants help sequester carbon in the soil, essentially storing food for their bacterial and fungal friends. Roots filter contaminants in water and keep streams clean. Leaves help modulate carbon dioxide and climate. These functions are performed in nature without any human intervention.

Different types of plants attract different food web organisms. Shrubs in a desert will attract different organisms than those in a tropical rain forest. Even among our vegetables, the broccoli wants an ecosystem that's just a little different from that of our tomatoes, based on the native plant ancestors from which our cultivated varieties are derived.

So how does a gardener gain access to this powerhouse? The truth is, we are building our knowledge. Brilliant research is being done in the plant sciences departments of our universities. It is complex - and we need to be careful not to oversimplify, but we are sure of one thing: gardeners must rethink the whole concept of feeding fertilizers to plants, and instead, make sure we are feeding our soil critters so they can build a robust *soil food web*. Fortunately, to do this, we find ourselves using age-old techniques like composting, nutrient layering, mulching, and other methods that are the heart of true conservative gardening.

On November 14, the UCCE Master Gardeners of El Dorado County will be hosting a free public education class, "Turning Dirt into Gold" to help us understand these concepts in much greater detail. Please join us to learn how the ochre clay soil that keeps our oaks and pines happy can be remodeled into black gold that will make even a red pepper smile. Class will be at the Cameron Park Community Center, 2502 Country Club Drive, Cameron Park, 9:00 a.m. to noon.

UCCE Master Gardeners of El Dorado County are available to answer home gardening questions Tuesday through Friday, 9:00 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. Visit us at the Sherwood Demonstration Garden, located at 6699 Campus Drive in Placerville, behind Folsom Lake College – El Dorado Center. The garden is open on the second Saturday of each month, 9:00 a.m. to noon, November 2018 through April 2019.

For more information about our public education classes and activities, go to our UCCE Master Gardeners of El Dorado County website at <http://mgeldorado.ucanr.edu>. Sign up to receive our online notices and e-newsletter at http://ucanr.edu/master_gardener_e-news. You can also find us on Facebook.