

Soil Health By Cathy Scott

Plant health is often top-of-mind for gardeners. We look for clues and tell-tale signs to determine if our garden inhabitants are healthy or unhealthy and pursue solutions with vigor. Insecticides? Better water management? Too little or too much sun? Fertilizers? We spend a lot of energy thinking about and pursuing plant health.



But...what about the health of your soil? Soil is sometimes overlooked by gardeners. It is often seen as a static entity that is only considered when it is time to fertilize or till at certain times of the year. Change is afoot, though, and the soil beneath our feet is increasingly receiving the consideration and respect it deserves for the complex, living entity that it is. The Natural Resources Conservation Service (NRCS), a federal agency under the United States Department of Agriculture (USDA), has launched an initiative aimed at focusing attention on soil as a complex system upon which many processes depend. This initiative is termed "Soil Health". The word "health" is usually applied only to living systems, and it is appropriately used here. Soil is increasingly recognized as a dynamic system that includes living components (bacteria, fungi, protozoans, nematodes, arthropods, and earthworms) and other organic matter, as well as the commonly-thought-of inert constituents like inorganic soil particles (sand, silt, and clay), minerals, and rock fragments.

The creatures living in the soil are critical to soil health. They help to build that much sought-after "crumbly" structure that gardeners dream of. This healthy soil structure reduces soil erosion while increasing plant water availability. Soil organisms provide nutrients to plants through the process of decomposition, thus helping to protect plants from pests and disease. One teaspoon of rich garden topsoil can hold up to one billion bacteria, several yards of fungal filaments, several thousand protozoa, and dozens of nematodes.

The NRCS recommends four important activities to maintain and improve the health of the soil:

- 1. Manage More by Disturbing Soil Less.** Soil disturbance can result from tillage, leveling, grazing, or otherwise manipulating the natural physical arrangement of soil. This often results in bare soil and compaction, which in turn is harmful to soil organisms and can disrupt the delicate balance between fungi, plant roots, and soil microbes. Good garden stewardship should include minimizing soil disturbance whenever possible.
- 2. Diversify Soil Biota with Plant Diversity.** It is important to the health of the soil to maintain a diversity of plant species, as this results in a diverse population of soil microbes. Lack of plant diversity results in increased pest and disease problems. It is fun, esthetically pleasing, and beneficial to maintain a variety of native and ornamental plants in our outdoor spaces. For vegetable gardens, diversity can be achieved through companion planting, crop rotation, and the use of cover crops such as legumes (clover,

vetch, beans) and cereals (oats, barley). Cover crops also help to increase soil organic matter and plant-available nitrogen.

- 3. Keep a Living Root Growing Throughout the Year.** Plant roots are surrounded by a rhizosphere, a thin zone of increased and concentrated microbial activity (akin to the earth's atmosphere; very thin, but very essential). This is where a lot of the action takes place in the plant/soil/microbe relationships. Plant roots release food for microbes. These microbes then provide nutrients and other compounds to the plant. Vegetable gardeners can nurture and maintain this healthy soil environment by growing long-season crops, or planting cover crops between short-season crops. All gardeners can improve the food sources for soil microbes by adding organic matter in the form of humus, compost, and other plant debris and crop residue.
- 4. Keep the Soil Covered as Much as Possible.** Gardeners can make a positive impact on their soil's health by maintaining a cover of mulch or other organic matter on the soil surface. This serves many functions: it provides a refuge and habitat for beneficial insects and arthropods, conserves soil moisture, keeps the soil cooler in hot summer months, intercepts raindrops during rainy periods (to reduce soil compaction and erosion), and suppresses weed growth. Many materials may be used for mulch - straw, leaves, aged wood chips, grass clippings, newspaper and cardboard, evergreen needles, bark, and many other natural materials. There are advantages and disadvantages to each, and a little research will help you decide what is best for your situation.

Plants may be the "stars" of our gardens, but they are a part of a complex, living ensemble. Soil is an essential player in the orchestra, and there is much that gardeners can do to nurture and improve the health of this vital resource.

Learn more about soils and soil health by visiting:

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>.

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