

Homegrown Horticulture

TIPS FOR SUCCESS IN YOUR OWN BACKYARD

The Component Parts of Soil

What they are and Why they matter

The soil (a.k.a. dirt) is the foundation upon which all gardening happens. There are good soils, there are bad soils, and there are many that are somewhere in the middle. Bad or poor soils might have too much or too little of some element, which might be corrected over time, or they might just be less suitable for growing some plants and can't be fixed.

Soils are made up of many different parts, each of which contributes to a healthy, productive soil. It is important to understand the different parts of a soil. Many of the different parts of a soil are most easily characterized by a soil test conducted in a lab. However, even if you don't have a lab report to work with, you can recognize features of a soil by the way it behaves, and even potentially make improvements to a soil.

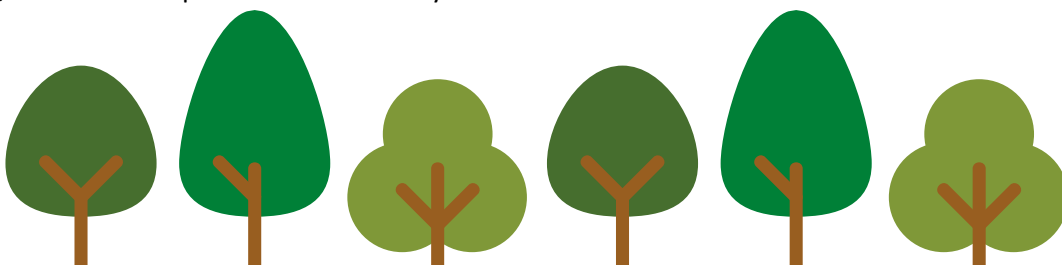
Soil Texture

Soil texture is the measure of the different small, mineral particles (less than 2mm) in the soil. The proportion of each sized particle determines the texture. Sand particles are the largest, ranging from 0.05-2mm in diameter. Silt particles range from 0.002-0.05mm in size. Clay particles are anything less than 0.002mm in size.

Soil texture affects that size of the pore spaces in the soil, which affects water and air balance in the soil. Soil texture also affects how well a soil holds water and nutrients. Light or coarse sandy soils have bigger pore spaces and drain quickly, hold less water, and warm more quickly. They also don't stick to roots and tubers. Clay soils are heavy or fine, with small pore spaces. They drain slowly and hold onto water and nutrients. Loam is a term used to describe soils that are a good mix of the two ends of the spectrum.

You can't really "change" soil texture since it would mean adding things. Adding sand to a clay soil doesn't produce good results, but rather makes concrete. To improve a soil, you should add organic matter.

Structure is a term that is often used with soils but isn't easily measured. Soil structure relates to how the smaller particles clump together, which is affected by various compounds in the soil. Structure changes as you work the soil. Good soils don't have hard layers, and roots can penetrate them easily.





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Organic Matter

Organic matter describes the carbon-based parts of the soil. It includes former plants and animals that are in different stages of breaking down. Higher organic matter affects the water and nutrient holding capacity of the soil. Soils with higher OM erode less easily. OM also affects soil structure. OM represents a long-term nutrient source, with nutrients released for plants to use as the soil microorganisms break them down.

Adding OM, in the form of soil amendments like compost, composted/well-rotted manure, and other plant material, helps to improve the soil by improving the “tilth”, which is how easily it is worked. It helps to keep particles from sticking too tightly together, forming hard layers, and encourages clumping into aggregates that allow easier drainage.

pH

pH is a measure of the acidity or basicity/alkalinity of a soil. A neutral soil has a value of 7. A higher pH (7 and above) is basic, while a lower pH (less than 7) is acidic.

The pH of a soil affects how available different nutrients are in the soil solution (specifically micronutrients – those nutrients required in very small amounts). It also affects how well plants grow in that soil. Most plants prefer a soil that is slightly acidic or neutral.

Changing pH is not a simple thing since soils resist change pretty well. Also, the pH scale isn't a straight slide one way or another. Each point is 10x more than the previous point. As such, it takes a major shift to change even a fraction of a point. Adding things like elemental sulfur or lime can shift things a little bit, but you have to add a lot to change pH a little.

Salinity

Salinity is also referred to as Electrical Conductivity (EC), and is a measure of how salty the soil is. Salts can occur naturally in a soil but can also be introduced through irrigation or other means. A soil that is too salty will not grow plants well, as it can either be toxic to them, or it can prevent water and nutrients from making their way into plant roots. Soils with high salts may have poor soil structure, depending on what element is causing the salinity.

Nutrient Content

This refers to the relative amounts of nutrient elements required by plants that are present in the soil. This includes elements that are required in large (or “macro”) amounts, such as nitrogen, phosphorus, potassium, or sulfur, or elements that are only needed in tiny (or “micro”) amounts, such as iron, zinc, boron, magnesium, etc. Having a good understanding of the nutrient content will help you manage what you add to give your plants the boost they need to maximize production.

