



# Soil – The Living Organism - It's more than Dirt

by Charlene Harris -

**Soil, its more than just dirt!** Good Soil composition is the first step to gardening. A generous nutrient program will reward you for many years to come. Both are easiest done before planting begins; remember many gardens outlive their creators.

**Soil condition = Sand, Silt, or clay.** This refers to the size of the soil particles; sand having the largest particles, silt medium and clay the smallest. Loam is the best soil composition and contains 10% clay, 50% silt and 40% sand. I recommend a depth of 2-ft loamy soil for the best conditions.

To change soil composition, clay or sandy soils, add organic matter. For every inch of clay or sand you wish to change add triple the amount of organic matter. It will lighten clay soils and add moisture retention and nutrients to sandy soils. Do not add sand only to clay, it creates cement like soil.

## Understanding pH

pH = the amount of acidity or alkalinity. pH is measured on a scale from 0-14 acid to alkaline, with seven being neutral. Most plants do well in a pH of 6.5-7. Soil pH directly affects the health of plants because it affects the availability of *all* plant nutrients. If the pH is too high (9 plus) nutrients may become *tied up* and unavailable to the plant (*too alkaline*). And if the pH is too low, (below 5) concentrations of some elements may reach toxic levels and be too available (*too acid*).

**Fertilizers: ABC's of N P K -** The numbers on the bags such as 5-10-10, indicate the percentage of available nutrients. They are in order 5% nitrogen, 10% phosphate and 10% potassium. N = Nitrogen, P = Phosphate, K = Potassium

**Nitrogen** is needed for green foliage, it is water-soluble. Too much nitrogen will cause excessive leaf growth and weak stems. Blood meal, alfalfa and cottonseed meal is good sources. Also cover crops may be grown and tilled into the soil, as *green manure*. Too much Nitrogen will cause excessive leaf growth at the expense of fruit and flowers.

**Note:** *Green Manure is one of the best ways of adding humus to the soil. Quick growing succulent crops like Buckwheat, Winter Rye and Clover. When it is between 1/2 grown and while it is still succulent, plow it under to rot.*

**Phosphorous** promotes fruit, flowers, and strong root growth and disease resistance. Sources include bonemeal, rock or colloidal phosphate, fishmeal, and cottonseed meal. Depending on what is used it can last up to 15 yrs. The smaller the particle size the sooner it breaks down.

**Potassium (Potash)** promotes strong sturdy plants with thick cell walls and general plant vigor. It increases the plants' resistance to disease, heat, and cold. The lack of it is apparent in the yellowing of leaves (chlorosis). Greensand and Granite dust are good sources.

**Trace Minerals** are vital to healthy plants and are often lacking in the soil. Minerals promote fruit, flower and resistance to diseases and cold. Greensand and seaweed products are good sources.

**Composted Manure** provides both nutrient and organic materials. Rabbit and poultry are best, followed by sheep and horse, with pig and cow having the least nitrogen.

**Greensand** is an iron potassium silicate; it imparts a green color to the minerals in which it occurs. It is an ocean deposit developed by shells and organic materials deposited millions of years ago. It contains 5-8% potash, iron, phosphorous, and as many as 30 trace minerals. It is good for trees, vegetable or flower gardens, berry bushes, and lawns. It improves the soil by a slow steady release of minerals and may be applied at any time of year.

**Colloidal Phosphate** is a soft untreated clay formation created over 20 million yrs. ago. It provides ample amounts of phosphorous and calcium as well as trace minerals. It will not leach out as many chemical super-phosphates do and it does not burn plants. Colloidal phosphate is best used in combination with manure, compost, kelp, or other

nitrogen sources. The organic acids will help speed up the release of the phosphate. It is good for vegetable and flower gardens, and as an additive to compost piles.

The basic concept of using organic fertilizers is to feed the soil (earthworms and the billions of beneficial microorganisms). This biomass will enrich, aerate and create a living soil. Organic products are best cultivated into the soil or at least covered with mulch. Avoid chemical buildup in your garden soil; it kills the beneficial microorganisms, as well as entering your skin when you are working in the soil

### **Charlene Harris' Fertilizing Formula (per 100 sq. ft)**

**Fall or Early Spring** Rock or Colloidal Phosphate (2.5-3 lb.) & Granite dust or Greensand (2.5-3 lb.)

**Late Spring:** Composted Manure, dried chicken or sheep 10 lb. or aged cow or horse 40 LB, or Cottonseed Meal 10 lb. (these are primarily for nitrogen). Cottonseed meal, Rock Phosphate & Granite Dust is a good blend of available sources of N-P-K.

### **Use Organic Mulch to Renew Nutrients and create a living Soil**

Mulching is nature's way of conserving the soil reserves that are built up over years by decaying matter. Along with a bit of help from some small critters, the decomposition process renews the nutrients in the soil and provides a natural enrichment to the soil as well as a place for the microorganisms to live.

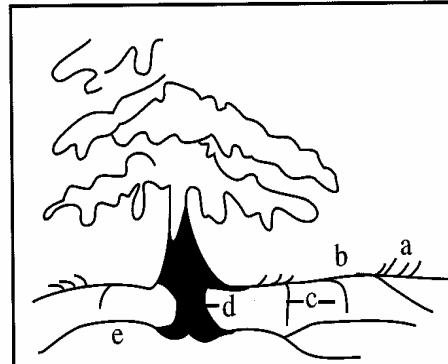
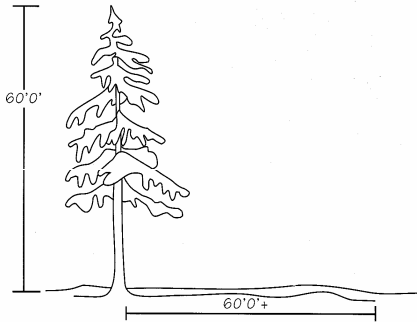
Mulching maintains even temperatures through the seasons, conserves moisture, and cuts down on everyone's favorite garden chore, weeding. Keeping the grass and weeds away from your plants cuts out competition for water and nutrients.

For large deciduous trees mulch at least 1/2 of the area from the trunk to the drip line. Mulched areas receive less foot traffic and therefore soil compaction is minimized. Plants need both air and water, and soil compaction reduces the air spaces in the soil. The air spaces also provide channels for water to reach the roots.

Air and Water are essential for normal plant growth. Air and Water provide carbon, hydrogen and oxygen. This is diminished greatly with soil compaction. Keep mulches away from the trunk of trees, and away from the stem of plants to avoid rot. Organic mulches are attractive and beneficial.

**Inorganic mulches:** Plants need air, moisture and nutrients to grow well. Inorganic mulches contribute none of these. The use of black plastic or landscape fabrics under mulches has a smothering effect and if it is non-porous hinders irrigation, fertilization, and cuts off the air supply. Most seeds do not germinate beneath a few inches of mulch. Weeds are limited to those seeds that drift or are carried by the wind. The landscape fabrics become a particular nuisance as drifted weed seeds penetrate the weave and root into the soil. Instead of simply pulling the weed, you now have to lift the fabric, mulch and all.

The root system of a tree typically extends a distance equal to or greater than the height of the tree. The root system of older trees may be 1.5 – 2 times further from the trunk than the tree is tall.



**Representation of a pine root system in well-drained soil, showing:**

- a) upward growing feeder roots
- b) transport roots
- c) vertical striker roots
- d) tap root
- e) secondary root system growing above layer of low oxygen

**Root Facts** Most new cells are produced at the end of the root system, behind the root cap. The root cap is the end of the root, which pushes it's way through the soil. The growth is concentrated in about 1/4 inch of the tip. The root hairs, which absorb water and nutrients, are directly behind the root tip.

When planning a garden area look around you. Root systems of large trees can transpire hundreds of gallons of water an hour in hot summer weather making it very difficult to develop a garden area within the root system area.