EVERGREEN

Building Healthy Soil I

Tips and Tricks

- Compost made of the plant you're trying to grow will often have the correct nutrient balance to build the soil bed you want to grow in.
- Separate compost piles for different gardens can be an efficient way of getting the appropriate nutrients you need for specific plants.
- Mulch will not only add organic matter over time, but will reduce watering needs and reduce maintenance.
- See Evergreen's fact sheet, Building Healthy Soil II: Techniques for more tips and tricks.

Soil and Soil Fertility

Soil is a vital part of our natural environment and the source of most of our food. It is a non-renewable resource that influences plant distribution and provides habitat for a wide range of organisms. When soils are nutrient-poor, the plants that grow within will be nutrient-poor as well. Modern building techniques scrape away the topsoil before digging for foundations, leaving many urban centres with poor soils. By understanding its composition and feeding the soil, we create better conditions for plants.

What is Soil?

Soils are composed of four major components: minerals, water, air and organic matter. Life forms within soil, such as bacteria, fungi, insects and earthworms, transform organic matter into humus—spongy, dark, mature compost. Humus improves soil by providing microbial habitat, long-term nutrient storage, accessible nutrients for plants and it increases the capacity for soils to store water. Humus is a key to healthy and sustainable soil and points to abundant life happening within the soil.

The proportion of sand, silt and clay in soil is referred to as soil texture, and it can have a dramatic influence on what plants are able to take root. Sandy soils won't hold nutrients or water well, while silty soils are able to a good job of holding both. Clay soils can be incredibly dense, holding too much water and not allowing nutrients to be accessed by plants.

Soil Fertility

Soil fertility refers to the balance of nutrients (nitrogen, potassium and phosphorus), minerals, organic matter, soil life, pH and soil structure. Depending on landscape and the plants you're trying to grow, your specific soil fertility can look very different from other sites.

Soil depletion occurs when elements that make up soil fertility are used or removed and not replaced. In urban centres this can happen in the construction process through removing the building site's topsoil, or in everyday practices, such as discarding organics rather than composting them at home.

Most soil fertility issues can be solved by adding organic matter to your garden. The make-up of the organic matter you add should be determined by the issue you're trying to fix. The first step is usually observation: look at your plants closely for signs of stress. Use the adjoining chart (fertility troubleshooting) to help identify some possible symptoms and treatments.

Terms

Organic Matter is biological material in the process of decomposing.

Humus is organic matter that has been broken down by bacteria, soil insects, fungi and earthworms to a point where it will break down no further.

Nitrogen (N) forms new cells and is essential to total plant development. It is important to the making compost, it aids in the breaking down old plants.

Phosphorus (P) produces vigorous seed and root development.

Potassium (K) helps produce strong and sturdy stems. Also called potash, it advances root growth and helps plants resist disease and cold weather.

Soil Structure describes how soil particles clump together and the spaces they leave in between. It influences how water moves and roots grow.

pH is a measure of acidity or alkalinity on a scale of 0 to 14, with 6-7 being ideal for gardening. Soil pH affects micro-organism activity, nutrient availability and uptake.

Mulch is a layer of organic material (wood chips, straw, etc.) placed over a soil surface to conserve soil moisture, reduce weed growth, and build soil fertility.

For More Information

How to Amend your Soil- Canadian Gardening:

canadiangardening.com/how-to/gardening-basics/how-to-amend-your-soil/a/21601

Fertility Troubleshooting

Symptom	Diagnosis	Treatment
Halted plant growth, yellowish-brown colour along the veins and tips of leaves, pale colour on older leaves.	Nitrogen Shortage	Add compost, blood meal, cottonseed meal, fish meal, soybean meal, manure from herbivores (except for horse), or tea grinds.
Tall, spindly plants that easily topple over. Look for a strong red tint to the leaves.	Excessive Nitrogen	Plant squash, cabbage, broccoli and corn. Use mulch (high in carbon) to remove excess nitrogen in soil.
Spindly plants with purple streaks in the stems. Stunted growth and late maturity.	Phosphorus Shortage	Adding compost, bone meal, rock phosphate, or colloidal phosphate to the soil makes the phosphorus that is present available to the plants.
Excess phosphorus can limit plants ability to take up nutrients. Yellowing between leaf veins is a sign of low iron or zinc. Wilting in new leaves can indicate low copper.	Excessive Phosphorus	Add blood meal (as a nitrogen source) or pine bark mulch.
Stunted and weak stems. Yellowing of leaf edges and in the leaves.	Potassium Shortage	Add compost, cow manure, granite meal, greens and wood ashes.
Fan leaves will show a light or dark-yellow to whitish colour in between the veins. May be a sign that magnesium, manganese, zinc and iron, and calcium are not being absorbed.	Excessive Potassium	Add crushed eggshells, crushed seashells, wood ash or soft rock phosphate to the soil to add calcium. Add compost to balance soil.

This project was undertaken with the financial support of:

Environment Canada Environnement Canada