



THE “DIRT” ON “DIRT”

First Commandment of Gardening
“Know Thy Soil”
Mark Cullen (1999)

Soils differ as do plants differ in their soil requirements. The key to successful gardening is matching the plants to their preferred soil.

Types of Soil

Canadian Encyclopedia of Gardening (2004) identifies characteristics for five main soil types.

Loam soils: Have ideal balance of mineral particle sizes, with between 8-25 % clay, resulting in good drainage and water retention, combined with high fertility.

Clay soils: Heavy with slow drainage, being slow to warm up in the spring, but often highly fertile. Easily compacted however, baking hard in summer sun.

Sandy and silt soils: Have a lower portion of clay particles giving them a lower water retention quality than clay. Sandy soils are light and drain freely, needing frequent irrigation and fertilization. They warm up quickly in the spring and easily improved with organic matter. The silt soil type is more retentive and fertile than the sandy variety but tends to compact more easily.

Muck or organic soils are generally wet and acidic but provide excellent plant growth if supported with drainage, fertilization and lime as required. Alkaline soils are shallow with moderate fertility and free drainage.

Soil Organisms

To maintain soil fertility certain soil organisms are essential. These beneficial organisms and fungi prefer soil that is well aerated and tolerate a wide range of soil pH, with some fungi having a preference for acidic conditions.

Beneficial organisms range from Devil’s Coach-Horse Beetle, Ground Beetles and the more familiar Earthworms and Centipedes that assist by aerating the soil and break down of organic matter.

(Canadian Encyclopedia of Gardening: 2004)

Acidity and Alkalinity

Soil pH is a measurement of acidity or alkalinity with a scale ranging from 1 to 14. Neutral soil has a pH of 7. Acidic soil is indicated with a pH below 7 with alkaline soil having a pH higher than 7.

The pH of soil is usually controlled by the amount of calcium it has, an alkaline element that soil will lose through leaching (washed through the soil by water). Soils found over limestone which is rich in calcium are usually unaffected with other soils such as sands and sandy loams gradually turning more acidic. Soils may be amended to correct alkalinity by the addition of lime or lime rich materials such as mushroom compost.

The pH of the soil affects the solubility of the soil minerals and their availability to the actual plants. Acidic soils may be deficient in phosphorus with an excess of manganese and aluminum. Alkaline soils may lack manganese, boron and phosphorus. Also affected by the pH is the number and type of beneficial soil organisms, pests and diseases.

Target pH is 5.5 to 7.5 with optimum pH of 6.5 depending on the plants to be grown. Muck soils optimum pH would be 5.8. Highest vegetable yields are sourced from neutral soils with ornamentals tolerating a wider pH range.
(Canadian Encyclopedia of Gardening: 2004).

Ask about soil testing at your local garden center.

Drainage

Plants are dependant on water to survive, even more so than soil. Water is obtained from three sources: rain, dew and the water table. The water table is somewhat like an underground lake resting below the level of the earth's surface. Variation in the location of this water table occurs with some resting too far above or below it, while others may have underground streams feeding into it. With each scenario drainage of the soil will be an issue.

With excessive drainage water sinks down to the water table depriving the plants of moisture. In situations of inadequate drainage the plants will be placed in bog-like conditions with soil being anaerobic as it lacks adequate oxygen.

Remedies are available for each situation through soil amendment. For poorly drained soil sand can be added. The addition of top soil will assist in conditions in which the soil is too well drained. For situations in which the area is water-logged, you may have to dig a trench between the high and low portions of the area to encourage run off. In severe situations a combination of trenching and drainage pipes may be required. They can be paired with dry wells of gravel and sand to collect the water.

Gardeners may also choose the option of raised beds to circumvent these issues. Others may choose to go with the current environment and select specimens that can thrive in the current conditions.

(Mark Cullen: The New Greener Thumb: 1999)

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