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### **Did you know?**

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*Soils in natural conditions have many layers – each layer has different chemical and physical properties that have distinct roles in the soil's function.*

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*The top two layers are the most important for trees as they contain the nutrients, water, organic matter, and air spaces that roots need to grow.*

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*In nature, soils are continually replenished by leaf litter – the decomposing of fallen leaves, and other plant parts. Worms and a variety of insects and bacteria break down these leaves and return the nutrients to the soil for the trees and other vegetation to take up again.*

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*When we rake up and remove grass clippings, leaves that fall in autumn and other plant parts that die back in winter, we stop the cycle of natural regeneration.*

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*Large trees take a great deal of nutrients from the soil and when their leaves are raked up each autumn, the soil in which they are growing becomes nutrient poor, dry and difficult to grow in.*

## **Healthy Soil: The Key to Healthy Trees**

*Healthy soils provide a good environment for roots to grow and allow trees to get the water and nutrients they need. Urban soils are often compacted and nutrient deficient. The key to developing and keeping healthy soil is to mimic natural systems.*

### **Signs of healthy soil:**

- a layer of organic matter present – the top layer of soil is darker in colour
- water soaks in rather than running off
- There are small air pockets
- It's easy to dig in
- There are a lot of worms visible when you dig

### **Signs of disturbed soil:**

- Compacted and hard to dig in
- Little or no organic matter
- Very thin or no dark layer near top
- Hard, clay-like texture with few air pockets
- Water runs off hard surface, rather than soaking in

### **Construction wreaks havoc on soil**

If you live in a newly constructed home, chances are your soil is in need of help. Typical construction practices remove two to three feet of native topsoil, often leaving only hard clay remaining. The clay is then covered with a few inches of soil and sod. When heavy trucks and machinery drive over the soil, air pockets become compressed and compacted. The soil underneath the topsoil is so compacted that it essentially acts like concrete and plants must struggle to survive.

### **How to Improve Your Soil**

If you would like to improve the soil in your yard, the best thing to do is to mimic natural soil regeneration.

### **If you have not started to landscape or lay sod yet...**

You can give your soil an overhaul by mixing in plenty of compost or other organic matter. This process needs to be done before tree and shrub planting, since digging can seriously damage roots. Use a shovel or digging fork to mix the amendments into the top 10-12 inches of soil. You will need to do this over large planting areas, such as your whole lawn (before sod is laid) or in a large planting bed.

### **Leave your leaves and grass clippings**

Organic matter is made up of decomposing plant residue, and is the key to soil fertility and structure. Leaving the leaves that fall from your tree and the clippings from your lawn is a simple way to get organic matter and nutrients into your soil. Enriching the soil with organic matter also improves the structure of the soil, which in turn improves its capacity to hold water and nutrients and to release them to tree roots as needed.



*Factsheets in the series:*



*The Three "P"s of Healthy Trees*



*Top 10 Things To Do for Your Trees*



*Selecting a Tree Care Company*



*Inventories: The Place to Start*



*Improving the Urban Forest in your Neighbourhood*



*Protecting Our Trees: City of Toronto Bylaws and Policies*



*Fundraising for Your Urban Forest Project*



*Made in the Shade: Shade Trees for Sun Safety*



*Volunteer Opportunities in Urban Forestry*



*Trees: The Key to Cleaner Air*



*Tree Protection during Construction or Landscaping*

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### **Mimic a forest floor**

Applying a layer of mulch is one of the best things you can do for your tree's health. Mulch keeps the soil at the base of your tree moist, adds organic matter to the soil and reduces competition from grass and weeds. Spread a 3 inch layer as far out as possible under the tree. Be sure to keep the mulch away from the base of the trunk.

### **Say NO to chemical fertilizers**

Chemical fertilizers do not improve soil quality. When you apply chemical fertilizers, you bypass natural cycles and throw the soil out of balance. Chemical fertilizers readily dissolve in rain and can run off or leach through the soil, polluting ground and surface water. These fertilizers can also reduce populations of worms and soil microorganisms needed for a healthy soil cycle.

### **Avoid rich planting holes**

Mixing amendments into the planting hole at the time of planting will not help the trees and may even cause restricted growth and premature death. The small "pots" of rich soil created by amending a small area will encourage the tree roots to stay within the amended area and not grow into the surrounding soil. This will restrict the growth of your new tree and affect its health.

### **Don't lower the grade**

Do not disturb the soil around existing trees by digging up the soil. This can cause severe root damage and even death of the tree. Where tree roots exist soil improvement should be done gradually. It is better to leave the soil in place than try to remove it and replace it with rich top soil.

### **Don't raise the grade**

Roots grow where water, nutrients and oxygen are most concentrated – in the top 12 to 18 inches of soil. Even small changes in the soil level, such as the addition of only 4-6 inches of soil for grass seeding, can smother an existing tree's fine roots and limit the tree's ability to take up water and nutrients. In some cases this can lead to the death of the tree.

Some trees, such as Norway maples, do not allow grass and other plants to grow at their base. Adding a thick layer of soil to plant new grass or flowers will only enable a short period of growth for new plants. It is best to simply distribute a layer of mulch at the base of these trees, rather than risk the health of the tree for a short-lived lawn or garden.

### **Learn about your soil**

There are several simple tests you can do yourself to learn about the conditions of your soil. For tests you can do yourself, visit the Canadian Mortgage and Housing Corporation's 'Get to Know Your Soil' [www.cmhc-schl.gc.ca/en/co/maho/la/la\\_001.cfm](http://www.cmhc-schl.gc.ca/en/co/maho/la/la_001.cfm) or check Rodale's Chemical-Free Yard & Garden (1991, Random House Publishing).

If you suspect your soil has nutrient imbalances, it's best to have samples analyzed by a soil testing laboratory. For more details, including a listing of accredited soil testing facilities in Ontario, visit [www.omafra.gov.on.ca/english/crops/source/soillabs.htm](http://www.omafra.gov.on.ca/english/crops/source/soillabs.htm)