



Commonly Asked Questions

Aside from providing a tree with water, what are the other functions of roots? Is there more than one type of root? What factors guide root growth?

Roots provide three basic functions to a tree:

- 1) Physical anchoring the above ground portions of the tree;
- 2) Absorbing and transporting water and mineral nutrients;
- 3) Storing of starches, sugars and other food reserves.

In addition to these three basic functions, roots synthesize important bio-chemicals (hormones) that regulate how the above-ground parts of the tree grow and function.

There are many different types of roots. Depending on the species, trees typically have one or two basic types. Tap roots are deep probing roots that serve to anchor trees and gain access to deep water resources. Tap roots may extend several meters directly below the trunk of a tree. The bur oak (*Quercus macrocarpa*) is the classic example of a tap rooted species. This deep root will be accompanied by many shallower fibrous roots and enable bur oaks to resist drought. Tap roots normally die off as they are choked by the growth of the surrounding lateral roots. These lateral roots eventually take over the important role of providing the tree

with moisture. Tap roots are the exception in the world of trees; fibrous roots are much more common.

Trees like the white spruce (*Picea glauca*), white cedar (*Thuja occidentalis*) and Manitoba maple (*Acer negundo*) are good examples of fibrous rooted trees. Large numbers of smaller, shallow branched roots extend laterally from the base of fibrous rooted trees. It is this type of root system that we typically depict trees as having.

Other tree species have a mixture of deep and shallow roots. Sugar maple (*Acer saccharum*) is a good example of a species with lateral roots which enlarge as they grow downwards. Such roots are called heart roots. Some tree species have primarily horizontal roots near the surface and sinker roots that grow vertically from the horizontal ones. One such species is White pine (*Pinus strobus*). Sinker roots usually occur near the tree trunk, adding stability to the tree and increasing the volume of soil available to the tree.

Large tree roots mainly serve to anchor the tree and do not absorb substantial amounts of water or nutrients. The smallest roots (or 'root hairs') are the water absorbing roots. They also uptake mineral nutrients, in the form of soil particles, which are dissolved in water. These small roots are typically short-lived and grow and die in response to seasonal changes in the soil climate. Deep

winter frosts, drought or prolonged periods of water-saturated soil will result in the loss of many of these roots. As a result, what we do above ground often has a negative impact on these roots. Soil compaction from vehicle traffic, increases or decreases to soil grade, installing turf instead of composted mulch, over-watering from in-ground irrigation systems, etc. are some of the most common impacts.

In general, root systems are much closer to the surface of the soil than is commonly thought. This is especially true if the soil surface is protected by a mulch or forest litter layer. The majority of root hairs are found within the top 15 cm of the soil. This is because all three essential elements for root growth are typically found there: oxygen, from gaseous exchange with the atmosphere, mineral nutrients and water.

The final, and most interesting, type of roots are mycorrhizal roots. These are root structures created when young roots are infected by specific fungi that form a symbiotic association to the advantage of each. These root-fungus associations can increase the moisture and nutrient absorption capacity of a root by a hundred times or more. Trees with such associations are known to grow more vigorously and remain healthier under stressful growing conditions than other non-infected trees. In particular, trees in dry or nutrient-poor soils will benefit from such roots.

Did you know... roots of trees grown in the open often extend two or three times the radius of the crown? (source: Arboriculture, 2nd ed., Richard W. Harris)



Integrated Forestree Services Inc. is a full-service

*forestry firm offering consulting and contracting services in urban forestry and forest management. **Integrated Forestree Services Inc. is fully Canadian owned and operated.***

Integrated Forestree Services Inc. is the only tree care firm in Ottawa with a degreeed (B.Sc.F.) Registered Professional Forester on staff. Also, we guarantee that all of our working arborists are graduates of college-level arboricultural and/or forestry programs.

Integrated Forestree Services Inc.: About Our Services

Trees on residential and commercial properties, together with those on public lands, make up the City of Ottawa's urban forest. Just as with trees in forests, those in our urban forest provide many benefits including producing the oxygen we breath. However, because of their proximity to buildings, roads, sidewalks and the property of others, trees in urban areas need to be carefully maintained to ensure that they don't cause conflicts, or worse, catastrophes. This is where **Integrated Forestree Services Inc.** can help. We provide complete tree maintenance and management ser-

vices for both residential and commercial properties.

Tree Maintenance Services

- ✓ Tree and stump removal
- ✓ Tree pruning
- ✓ Cabling, bracing and propping (including storm damage repairs)
- ✓ Deep-root fertilizing
- ✓ Installation of root barriers
- ✓ Disease and insect control
- ✓ Systemic injections and organic spraying
- ✓ Vertical mulching
- ✓ Tree planting
- ✓ Delivery of composted woodchip mulch

Tree Management Programs

- ✓ Tree evaluation and hazard assessment (including use of a Resistograph Decay Detector)
- ✓ Assessment of treescapes
- ✓ Soil testing (for macro and micro nutrients, pH, texture, etc.)
- ✓ Disease and insect diagnostic services
- ✓ Tree valuation to International Society of Arboriculture Standards
- ✓ Species-to-site compatibility (prior to tree planting)
- ✓ Tree surveys - soil subsidence, etc.

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We are members of the following associations:



New for 2008...

We've purchased a new 4x4 dump truck and dump trailer for use in 2008. Although they are for general, all-purpose duty, both will be put to particular use for clients who request mulch and firewood deliveries. Composted mulch deliveries are an increasingly frequent service for clients who take our advice to replace turf surrounding trees with mulch.

This, as discussed on the opposite side of this newsletter, has an important impact on root growth and development and, therefore, on tree vigour and health. Also, having had our other two-wheel drive trucks stuck several times in the past (and incurring the cost of a tow truck), it's nice to know that we'll now be able to pull ourselves out!