

ROOTS – the hidden tree (fact sheet)

Tree roots do not form a mirror image of the rest of the tree; rather a tree looks more like a wine glass with the roots forming a wide but shallow base.

The two main functions of roots are to take up water and minerals, and to hold the tree up.

Roots normally account for 20-30% of a tree's mass. The crown and the roots come out roughly around the same mass.

Too few roots and the canopy suffers from lack of water. Too few leaves and the roots get insufficient food. There has to be a balance.

In temperate climates the total root spread away from the trunk is usually 1.5 – 2.5 times the radius of the crown, and even up to four times the radius on dry sandy soils. The relationship between crown spread and roots varies according to the species and the conditions.

Root hairs are outgrowths of root cells and greatly increase the root's intimate contact with the soil.

A mycorrhiza is an association between a root and a fungus which works to the benefit of both (symbiosis). Usually the tree gets hard-to-get nutrients (particularly phosphorus), and perhaps gets some protection from fungal diseases and soil toxins such as heavy metal pollution. In return the fungus gets carbohydrates and other products from the tree. Such fungi may also help the tree to cope better in situations of stress.

Most tree species have an indefinite (indeterminate) growth pattern, producing new shoots, roots and radial increments of wood and bark throughout their lives (Lonsdale, 2004).

Soil compaction (e.g. by machinery or livestock) is harmful for roots because it makes the soil too dense for healthy root growth and squeezes out the air spaces in the soil, thus depriving the existing roots of the gas exchange that they need in order to function and survive.

The Root Protection Area (RPA) should ideally extend in all directions from the tree stem to a distance equal to 15 times its diameter, or five metres beyond the canopy, whichever is the greater (Read, 2000).

Sources

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