

Vigorous Plant Growth Depends on Well-Developed Roots

A strong healthy root system is vital to a strong healthy plant. Plants with poor or marginal root systems are more susceptible to draught stress and secondary attacks by disease and insect pests. To promote vigorous root growth, you need an understanding of how and where roots grow.

Soil must provide a good environment for root growth, not just anchorage for the plant. In most soils, root systems are much more shallow and widespread than often believed. True taproots are rare in nature. Subsoils are usually not suitable for root growth, so there is little reason for a taproot to develop.

Most of the large anchoring roots of trees are located in the top two to three feet of soil. The fine roots, which are the primary site of water and mineral absorption, are usually located within the top four or eight inches of soil—the areas most conducive to root growth. The lateral spread of the root system is usually many times that of the branches. The commonly held belief that the root system mirrors the above ground portion of the plant is unfounded. This can easily be seen on trees that have been excavated by construction activity or blown over by high winds.

Root systems are dynamic. The fine roots are continually growing, dying and being replaced by other fine roots. A few of these succulent fine roots persist to eventually become woody structural roots. In nearly all plants, the fine roots form symbiotic associations with common soil fungi called mycorrhizae. These mycorrhizae roots often do not appear to be any different to the untrained eye, but are very important for nourishment of the plant. Simply stated, the mycorrhizae act as extensions of the root system and aid in absorption of nutrients from the soil, especially in infertile soils. Plants with mycorrhizae usually grow slower than those with mycorrhizae growing on the same site.

When field-grown plants are transplanted, often up to 95 percent of the root system is left behind. In other words, five percent of the root system must support 100 percent of the tree until new roots regenerate. In soils with normal drainage, this can lead to severe draught to severe draught stress, which in turn can reduce root regeneration. In this situation, regular watering is imperative. In soils with poor drainage, regular watering is imperative. In soils with poor drainage or a heavily compacted layer below the surface, the planting hole will often fill up with water from normal rainfall. Methods of removing the excess water may have to be devised and additional watering may only aggravate the situation.

When roots are cut during the transplanting process, new rootlets originate from the end of the severed roots at the edge of the root ball. In light of this, root pruning is of questionable value. It has been shown that transplanting during the period of early shoot development in the spring reduces overall root regeneration. At this time, the roots are competing with the shoots for common source of carbohydrate reserves. If transplanting is delayed until the leaves begin to expand, the leaves will be producing carbohydrates through photosynthesis, and competition for existing reserves is reduced, resulting in better root growth.

After large trees are removed, it is common to observe a long period of slow growth, often lasting many years. This extended period of reduced vigor often results in concern for the survival of the tree. To the contrary, this period of slow growth

should be expected since the plant is being supported by such a limited root system. Not until the root system is once again in balance with the above ground portion of the plant will vigorous growth resume. The length of time required is closely related to the size of the plant, and is directly dependent on the original lateral root spread. Roots grow radially from the trunk in a linear fashion and at a similar rate, independent of the size of the plant. The longer the linear distance that must be covered to replace the original root system, the longer the period of slow top growth. Calculations show that the root system of a 4-inch tree would probably take four to five years, while that of a 10-inch tree could take as long as 13 years under the same growing conditions. It is important to remember that a plant is only as good as its root system. Care should be taken to provide adequate soil conditions for good root development. After transplanting, there is a period of slow growth while the root system catches up with the above ground growth of the plant.

—CREDIT: OGA Notes

How Our Turfgrass Industry Helps Others In a Variety of Ways

Turfgrass has a direct effect on the way many people live. It provides the medium for play on many recreational facilities; it modifies our environment to make life easier and more pleasant; it provides opportunity for a pleasing and functional home landscape; and, in turn, the turfgrass industry has a significant direct economic impact on our tourist economy.

Many recreational facilities depend on a uniform, vigorously growing and recuperating, well-maintained turf sward for many activities. Common examples include soccer, baseball and school grounds. Turfgrasses provide uses and also provide a safety cushion that is especially beneficial in contact and intensely physical sports.

Because many people now live in urban and suburban centers where glass, steel, concrete, asphalt, buildings and cars prevail, turfgrasses directly influence our immediate environment in many positive ways. As examples, actively growing turfgrasses have been shown to reduce high summer surface temperatures because of transpirational cooling.

Turfgrasses, often with trees, shrubs and ground-covers, reduce discomforting glare and traffic noise. Soil erosion is reduced from surfaces covered with turfgrass, dust is stabilized, and fire opportunity is reduced or eliminated. Turfgrasses increase infiltration of water into the soil profile and also increase the water quality when this water moves below the turfgrass system.

Turfgrasses are used extensively in most home landscapes. In many settings, they provide the functional cover for child and adult activities and household pets. A well-landscaped home adds to the economic value of the property with the recovery value at, or exceeding 100%.

Lastly, the turfgrass industry has a sizable direct economic activity for individuals and organizations involved in the design, installation, maintenance and support services for the industry.