

LEGACY-TREES

Diversity & Stewardship

TREE ROOT PHYSIOLOGY GUIDE

FROM LEGACY-TREES

- **Root System Spread** – Tree roots follow the surface of the soil five times the height of the tree in all directions OR MORE as they seek resources.
- **Root System Depth** – Tree root depth is determined by the three critical resources it seeks for tree growth. Nutrients (elements) from the soil, Water Vapor (Not Water), and OXYGEN which ultimately limits the depth of the root system. We call this the ‘**Goldilocks Zone**’ where all three critical requirements are met.
 - Oxygen is highest in the atmosphere where it comprises 21% of the air we breathe. Once we enter the soil surface it drops to 15%.
 - 15% - 8% Oxygen = Grow New Roots
 - 8% - 4% = Roots Can Survive But NOT Grow
 - Under 4% = Root Death with a full belly – cannot metabolize stored energy
 - This zone is typically found in the top 8 inches of soil!
- **Root Flare** – This is the bell-shaped area above the soil line at the base of the tree trunk. Most urban trees do not have the Root Flare visible due to deep planting.
- **Zone of Rapid Taper (ZRT)** – These are the surface roots radiating from the root flare in all directions. The tree gets 95% of its structural support in this Root Plate area within 6 to 10 feet from the base of the tree. The tree selects 3 to 12 of these ZRT Roots before the trunk is more than one inch in diameter!
- **Root Plate** – This is the Root Flare and the ZRT which forms due to Eccentric Growth where the tree puts on a thicker growth ring on top of the ZRT and a very thin layer on the bottom of the roots.
- **Road Map Analogy** - To visualize this think of a road map – that is what the root system looks like.
- **Tree Transplanting** – This process is not part of the Tree’s physiology. It is catastrophic wounding of the root plate.
- **Deep Planting** – Since World War II most trees planted globally have been planted too deep in the ground. This is due to how we produce trees which favors a convenient root package for shipping over proper root development. This results in the trunk tissue being placed below the soil line. This leads to early mortality due to **Stem Girdling Roots** crushing the trunk tissue and **Trunk Rot**.

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- **Defensive Dieback** – This is when the top of the tree begins to die due to a loss of root system below ground due to rot cutting off sugar getting to the root system.
- **NEVER, EVER PLACE TRUNK TISSUE BELOW GROUND**
- **Better Find the FLARE at planting time**
- **Traditional Tree Production and Planting Techniques** – Trees produced and planted with traditional nursery practices result in Root Deflection in the Root Plate that cannot be corrected. Up to 98% of the root system can also be lost at the time of harvesting and transplanting.
- **Legacy-Trees System** – Our **Tree Platform Production & Transplanting System** grows a root system that **Mimics Forest Root Systems** by limiting depth to 8 inches deep and air root prunes the ZRT Roots to hold them at the edge of the platform package to ensure they continue their pathway to radiate away from the tree trunk in all directions as it eliminates **Root Deflection** during the production and transplanting process.
- **United States Patent** – My life's work to create a system that produces tree root systems that grow naturally has been captured in being awarded a patent for this Revolutionary Tree Production System! The patent was issued in 2026 and there are two additional patents to follow.
- **Five-Year Warranty** – Trees have 2 to 3 years of stored energy in the ZRT Roots at the time of transplanting. We wanted our warranty to outlast the stored energy to ensure the tree is **Thriving** on your site!
- **Take Us For a Test Drive** – **Don Mueller** and **Amy Harnish** have joined me in this crusade to bring new technology in Tree Production & Transplanting. Contact information below.

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