

Urban Tree Success

Roles of Trees

Environmental Benefits

- Reduce surface water run-off.
- Reduce soil erosion.
- Absorb air pollutants.
- Sequester carbon.
- Reduce noise pollution.
- Cools as evapotranspirator.
- Provide habitat for urban wildlife.



Economical Benefits

- Increases property values.
- Serve as wind barriers thereby decreasing heat bills in the winter months.
- Studies have shown that trees decrease energy consumption in winter months by 25%.
- Shade from tree canopies decrease electrical bills in the summer.

Tree Survival

In a typical transplant project, as many as 20% of trees do not survive.

Causes of Newly Planted Urban Tree Mortality

- Water and nutrient stress (>50%)
- Poor atmospheric conditions
- Vandalism
- Natural disturbances
- Guard girdling & mechanical injury
- Soil compaction
 - Reduces total air-filled pore space & average pore size
 - Increases mechanical resistance to root penetration
 - Reduces oxygen and water holding capacities
 - Nutrient and water stress
 - Reduced root elongation growth
 - Reduced radial growth
 - Shallow rooting
 - Stunted whole tree form
 - Fewer symbionts / codependents (favors low oxygen-requiring organisms – not enough mycorrhizae fungi)



Transplant Shock

- Tree harvesting can reduce a large amount of root volume.
 - Roots travel 2.5x the tree height away from the trunk.
 - 85% of root growth occurs within 18" (46 cm) of the soil surface.
- Tree recovery takes time even with a consistent source of water and nutrients.
- Overwatering is very common and must be avoided.
 - Results in oxygen saturation and shallow root growth.
 - Ensure the margins of the transplant hole are loose.
 - Helps enable roots to move into adjacent soil.
- How do trees respond to water stress?
 - Reduced stem trunk and root growth.
 - Damage to branches and crown.
 - Sudden death.
 - Signs may not be immediately evident.

Tree Maintenance

Watering

- Proper watering for good turf grass growth can compliment healthy tree root growth.
- Deeper and less frequent watering can encourage healthier root growth for both turf grass and trees.
- Surface soak into root ball (vertical watering).
- Sprays or drip emitters into mulch area around trunk.
- Direct watering in root area including root ball and adjacent soil (horizontal watering).
- Emitters with root watering devices.



After Transplant

- Regular irrigation cycle ~ 3x weekly.
 - Applied to the root ball with 2-3 gallons of water for each caliper inch of tree.
 - Avoid over watering.
- Many environments allow for no artificial watering after year three.
- No pruning for the first year after planting.
 - Pruning can inhibit root establishment and growth.
 - Pruning should have taken place at the nursery.
- Maintain the mulch area around the root zone.
- Prevent grass or weeds close to the tree trunk.



Soil Compaction

- Heavy equipment passing on top soil can squeeze out up to 60% of the water by elongating roots.
- Other causes can be pedestrian traffic and material storage.
- Roots rarely recovers.
- Exaggerated in times of drought.
- Establish traffic free zone around the critical root zone.
- Minimize damage and maximize tree health.



Dealing with Soil Compaction

- Vertical mulching helps alleviate soil compaction.
 - 2" diameter hole, 12" deep, 8 feet from the tree trunk out to the edge of the critical root zone.
 - Holes are then back filled with pea gravel to allow water and oxygen to penetrate the soil.
- Apply a 3" to 4" layer of high quality organic soil over the critical root zone.
- Improves soil texture, moisture retention, increase soil fertility and weed control.
- Identify the critical root zone to prevent high traffic flow.
- Roots need to be drawn deep underground to avoid damage to hardscapes.



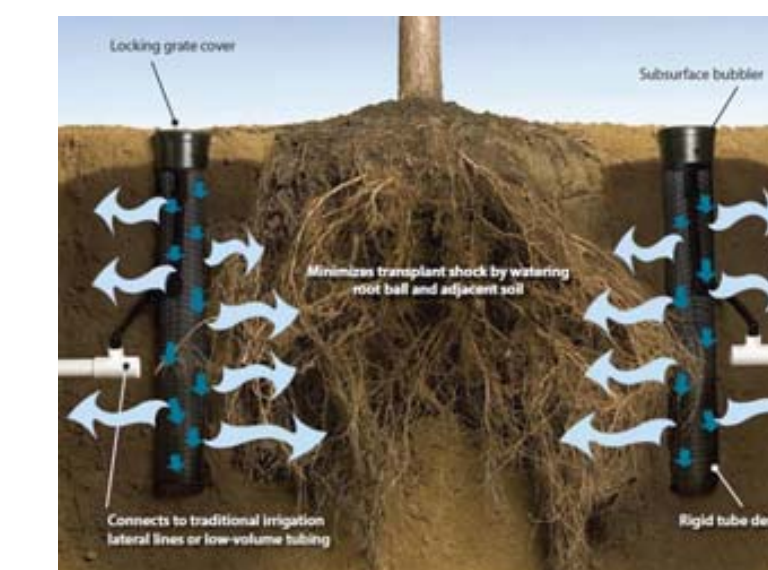
Cost of Not Managing Root Growth

- In California, as much as \$2 per capita is spent on expenses related to conflicts between tree roots and infrastructure.
 - Repairs (60%).
 - Legal remedies (40%).

Root Watering Series

Rain Bird's Root Watering Series (RWS) enables vital water, oxygen, and nutrients to bypass compacted soil and directly reach tree and shrub root systems.

Its patented basket weave canister allows ground installation to a depth of 36", 18" and 10". This system uses subsurface water dispensing devices such as bubblers or drip emitters.



Benefits

- Investment Protection.
 - Deep and broad roots yield transplantation survivability, stability in high winds, fast and healthy growth.
- Watering Efficiency.
 - Subsurface irrigation minimizes run-off and evaporation.
- Landscape Aesthetics.
 - Installs at grade and minimizes damage to hardscapes.

Features

- Minimizes transplant shock.
 - Directs water to root ball and adjacent soil.
 - Supplements top-down soaking.
- Deeper and broader roots.
 - Quicker tree and shrub growth.
 - Provide a stable foundation against high winds.
- Subsurface bubbler.
 - Reduces waste due to run-off.
 - Minimizes evaporation.
- Supports low-volume tubing.
 - Orderable without a swing assembly or fittings to support direct connection to a drip system.
 - Grate collar has an integrated clip for 1/4" tubing.
- Aesthetically pleasing appearance.
 - Installs at grade level.
 - Minimizes root damage to hardscapes.
- Rigid tube design.
 - Mesh material allows for horizontal movement of water and oxygen into root zone and surrounding areas.
 - Supports pea gravel fill to provide better top-to-bottom water dispersion and firmness against root compression.
- Connects to traditional irrigation lateral lines.
 - Integrated polyethylene swing assembly and spiral barb fittings connect to PVC and PE pipes.
 - Simplifies attachment to watering pipes.
- Self-contained and factory-assembled.
 - Comes in (3) pre-assembled sizes for design flexibility.
 - Saves time and money by being ready-to-install out of the box.
- Minimizes personal injury.
 - Reduces above ground risers and surface-level roots people can trip over.
- Options for RWS & RWS-M models.
 - Non-potable water covers identification.
 - Locking grate cover deters vandalism.
 - Sand sock prevents fine particles from penetrating tube.

