Jeff Edgar
Silver Creek Nurseries

TREE Fund Supporter
Tour des Trees Rider
We support scientific discovery and dissemination of new knowledge in the fields of arboriculture and urban forestry by awarding:

- Grants for new research
- Scholarships for aspiring tree care professionals
- Support for arboriculture education
TREE FUND RESEARCH PRIORITIES

We listen to you!
TREE Fund’s 2019 ISA Conference Survey Results:

WINNER! ROOT AND SOIL MANAGEMENT
THE LANDSCAPE ARCHITECT IN THE NURSERY: TAGGING TREES AND ENFORCING SPECIFICATIONS

Jim Urban, FASLA
Urban Trees + Soil

Paul Josey, ASLA
Wolf Josey Landscape Architects
Key points of webinar

Role of the Landscape Architect
- What needs to change!
- Specifications
- Nursery inspections and tagging
- Project site reviews

Root Packages / Seasonal Impacts

B&B Trees and Shrubs
- Above the soil line
- Below the soil line

Container Trees and Shrubs
Role of the Landscape Architect

What needs to change!

The end of the warranty should NOT be the end or our responsibility.

We should be sure that we are passing on a tree for future generations!

Responsibility for the tree is passed on to some one else. Our job is done! Or is it?

The warranty wall

Warranty Period
One to two years
Both of these failures were the result of defects in the tree, several decades earlier at the time of planting, that could have (should have) been corrected by the Landscape Architect if they had understood tree defects!

Co-dominant stems at time of planting

Stem girdling roots at time of planting

Role of the Landscape Architect
Role of the Landscape Architect

- Specifications
- Nursery inspections and tagging
- Project site reviews
Specifications

MS Word Specifications and dwg Details

Urban Tree Foundation
700 East Murray
Visalia, CA  93292

559.713.0631

www.urbanantree.org
Nursery inspections and tagging
Above AND below the ground
Asthenic AND technical requirements
Project site reviews

Does the plant quality including the root ball meet the specifications and any required modification at the time of planting!
Balled and Burlapped Trees & Shrubs
Root Package Types

Various types of Root Packages

Field grown / Bare root
Field grown / Balled and Burlap twine or wire basket
Field Grown / Spade Harvested and Transplanted
Field grown / Containerized

Root Safe Container grown
Fabric Grow Bag
Wood Box grown
Container grown

Each type needs its own specification and has different nursery inspection methods and planting requirements!
Seasonal considerations

It’s the time of digging NOT the time of planting!
For trees planted after bud break, pre-dig before bud break.

* Root growth begins once soils warms up

Credit: After Coder
Best time to dig trees vs. Fall transplant hazard

Is fall planting hazard a myth?

* Root growth begins once soils warms up
Best time to dig trees vs. Fall transplant hazard

*Is fall planting hazard a myth?*

**Critical the tree is dormant before digging.**
*Ex. Oaks typically go dormant very late in the fall.*

<table>
<thead>
<tr>
<th>Species Presumed to be Fall Hazards</th>
<th>Common Fall Hazard Traits</th>
<th>Minimize Moisture Loss</th>
<th>Thin Barked Trees</th>
<th>Harvest Time</th>
<th>Trees with Coarse Roots</th>
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<tbody>
<tr>
<td>Acer rubrum</td>
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</table>

Chart by Matt Stephens, Director of Street Tree Planting for NYC Parks

“The fall-planted [swamp white oaks] even put out typically twice as much growth for us the following spring than do the spring-planted ones.”
– Matthew Erb, Pittsburgh Director of Urban Forestry

Image credit: Michelle Sutton
Transplant response

For every 1” caliper = 1 year of deferred root growth in the middle latitudes of the US.
More deferred growth as you move further north and less as you move south.

Examples:
2” cal. = 2 yrs. deferred growth
6” cal. = 6 yrs. deferred growth

This is why small caliper trees generally grow to be larger and healthier after 10 years than larger caliper trees.
Above the Soil Line:
Co-dominant Leaders

Reject tree with two or more main stems coming from the same location. These are the result of the nursery topping the tree to make a “full” crown.
Above the Soil Line:
Included bark, tight crotch angles, branch collars

Strong branch connection, developing branch collar

Weak branch connection, no branch collar. Reject!

Included bark

Bark ridge

Developing branch collars
Above the Soil Line:
Included bark, tight crotch angles, branch collars
You can fix these problems in the nursery or during installation!

Go to Ed Gilman’s U of Florida website for pruning Module 8, 9 and 10
https://hort.ifas.ufl.edu/woody/instructional-videos.shtml
Pruning in the Nursery

**Before Pruning**
- Central leader
- Co-dominant leaders headed back or removed
- Maintain lower branches

**After Pruning**
- Evenly spaced branch attachments

Pruning in the Nursery
Above the Soil Line:
Bark deformities, cracking, fungus, etc.

Cracks and peeling bark

Wet splits and borer holes

Wounds and bark discoloration

Red bark

Bark wound
Above the Soil Line:
Different tree genetics in seed propagated trees

All the trees in this block are the same age but growing at different rates due to genetic differences.
Above the Soil Line:
Visual cues in leaf color, growth rates

Late spring leaf out, unusual leaf growth pattern

Early fall color
Below the Ground Line:
Buried Root Flare, Roots too Deep

- Top of root ball
- 9”

This.

Gets this result!
NO ROOT FLARE

Good Root Flare
Below the Ground Line:
Roots too deep / Tree harvested with buried root flare

Less roots in root ball.
Greater stem circling roots.
Slower root growth in the establishment period.

Area of roots lost due to digging tree with root flare too deep

Actual top of root ball
Correct top of root ball

No roots in this zone
If the tree does not have any root flare coming out of the ball, it’s a good bet that the root flare is too deep in the ball. Better check it!
Below the Ground Line: Circling Roots in B&B tree formerly in a container

B&B trees are sometimes started in a container then transplanted into the field without cutting the resulting circling roots.
Below the Ground Line:
Other root and root flare problems

- **J roots**
- **T roots** - Roots only on one axis
- **Auger hole roots**
- **Mistaking the graft for the flare**

*Dig till you find that root flare*
Elm
Oak
Maple

Roots are quite similar from species to species.

But propagation techniques can create a variety of root architecture.

Original ground line

Original ground line
Below the Ground Line:
Nursery inspection:
What tools to bring

- Small short shovel
- Hand fork
- Trowel
- Numbered seals
- Survey pin
- Black and white markers
Below the Ground Line:

Nursery inspection:
What to do and look for.

You can fix root problems in the nursery!
But you have to go there and inspect at least a sampling of the trees.

There is no substitute for Digging!

Remove adventitious roots above trunk flare

Required position of top of root ball when tree is harvested

Mark reference line

Soil line prior to digging

12”
At the Ground Line:

When are you looking at a root and when is it the trunk?

Root bark - circular ridges perpendicular to the root direction. Similar in almost all species!

Trunk bark - typical to the species

Transition zone
Root Ball measuring point for planting depth

May need to be worked out at the nursery based on their ball processing equipment.

The top of the root ball at the tree trunk is **never a good place** to set adjacent soil line.

For an extremely sloped root ball this may be the best place, but **where is the root flare** inside this ball?
Container
Trees & Shrubs
Container Trees & Shrubs

Problems below the soil line

*Note: Problems above the soil line are similar to B&B*
Container Trees & Shrubs

Does container type make a difference in rooting on the edge and circling and kinked roots?

*Not really!*
Container Trees & Shrubs

Promising alternative and emerging container technology

Grow bags
Jim Barborinas

Open mesh
Brian Kempf

Gravel Bed / Bare Root
Chris Starbuck

Poly fabric
Dan Struve
Kinked roots
Multiple container imprint
Buried trunk flare
Circling roots
Girdling roots
Soil on top of roots
Callused
Too large a root cut
Container Defects

So what’s the problem?
There are three root balls in this root system. Root balls 1 and 2 cannot be fixed.
Pin to find roots in a container

Three layer container
Get rid of A and C and only plant the roots in the middle layer B
Finding the trunk flare in a container tree can be hard work due to the dense matt of roots at the top of the ball.
Shaving container root balls

This fixes the outer circling roots BUT NOT the ones inside the root ball from previous containers.

Container Trees & Shrubs

Fix the circling roots
Roots keep growing in the alignment of the root just before the cut.

Root response to pruning

Right after pruning

Year 2 or 3

After pruning only one or two will develop into new structural roots
Container Trees & Shrubs
The Ultimate and Sustainable FIX- Bare Root and Bare Rooted

The goal is to see the entire root system at planting to assure a future root system.

Hydro-gel dip
Bare Root
Nina Bassuk

B&B to Bare Rooted
Jim Flott
Bonnie Appleton

Gravel Bed
Bare Root
Chris Starbuck
Source from a reliable nurseries that understand the tree/root issues

Urban Forest Nursery  
Washington

Select Trees  
Georgia

Halka Nursery  
New Jersey

NW Shade Trees  
Oregon

Cherry Lake Nursery  
Florida

Schichtel's Nursery  
New York

Ruppert Nursery  
Maryland

Quail Ridge Nursery  
Ohio

Kaneville Tree Farm  
Illinois

The above nurseries are a **REPRESENTATIVE** sample of growers who work hard too supply quality trees both above and below the ground. 
Get to know your local growers, find ones that understand the problems and will work with you to deliver trees that meet your specifications.
ISA BMP manuals and journals

Tree Planting
Second Edition

Up By Roots
Healthy Soils and Trees in the Built Environment
James Urban

by James Urban
Researchers

The following researchers have an interest and undertaken research into nursery issues, and have been funded by the Tree Fund.

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