

ROOT STRUCTURE TRIALS AT VERBINNEN'S NURSERY

Alex Verbinnen





DR. ED GILMAN



Landscape Plants

- ▶ **Trees**
Urban design | Site | Selection | Nursery | Planting | Pruning | Health | Species | Roots | Structure | Wood | Storms | Arborists | Plan | **See:** Power lines
- ▶ **Shrubs**
Selection | Production | Maintenance | Species | **See:** Planting
- ▶ **Groundcover**
Selection | Production | Maintenance
- ▶ **Palms**
- ▶ **PowerPoints**
- ▶ **Fact sheets**
- ▶ **Research papers**
- ▶ **Landscape designs**
- ▶ **Other resources**
- ▶ **Topic index**



NEW! PLANTING DETAILS AND SPECIFICATIONS

Includes dozens of editable details and specs for every imaginable situation (CAD-ready and PDF).

INSTRUCTIONAL VIDEOS

Module one: Tree mechanics and structure

Part 1 Definitions



SEE COMPLETE LIST OF VIDEOS

Trees and drought

[Treating trees in drought](#)

Storm damage

[What now?...](#)

Current research

[Research papers](#)

Tip of the year

Mulch or soil over the root ball can kill trees. [More...](#)

Storm preparation

Research shows pruning reduces damage. [More...](#)

DR. ED GILMAN

Florida State University

\$500,000 machine



3000hp portable wind tunnel

Output: 120 – 150km/h wind

WHAT'S THE PROBLEM?

Photos by Dr. Glen Lumis



WHAT IS GOOD ROOT STRUCTURE?

- Has lateral roots at right angles that are close to the surface of the soil
- Has deep roots as well
- Free of any poor imprints (circling roots etc.)

Dr. Ed Gilman, University of Florida, IFAS Extension.
Tree and Landscape Short Course 2010



SOMETHING TO REMEMBER



“Most of the main roots are set in the first 2 to 3 years of the tree’s life”
-Ed Gilman

GROWING WITHIN WALLS

Circling Roots



GROWING WITHIN WALLS Downward Directed Roots



“Lateral roots easily send roots downward (sinker roots), but when those laterals are deflected downward they are reluctant to send roots out sideways.”
-Ed Gilman

OUR GOAL

To establish growing systems for our **tree species** that allow for a natural root structure



OUR STANDARDS

We are looking for growing systems that:

- Inhibit root circling
- Inhibit re-directing roots
- System that is affordable for us and our customers



TAKE TIME TO LOOK!



TAKE THE TIME TO LOOK



Cornus florida

Asimina triloba

TAKE THE TIME TO LOOK



Cornus florida

Asimina triloba

PEAT POT



Cornus kousa – 2yr old plant. (1yr in peat pot)

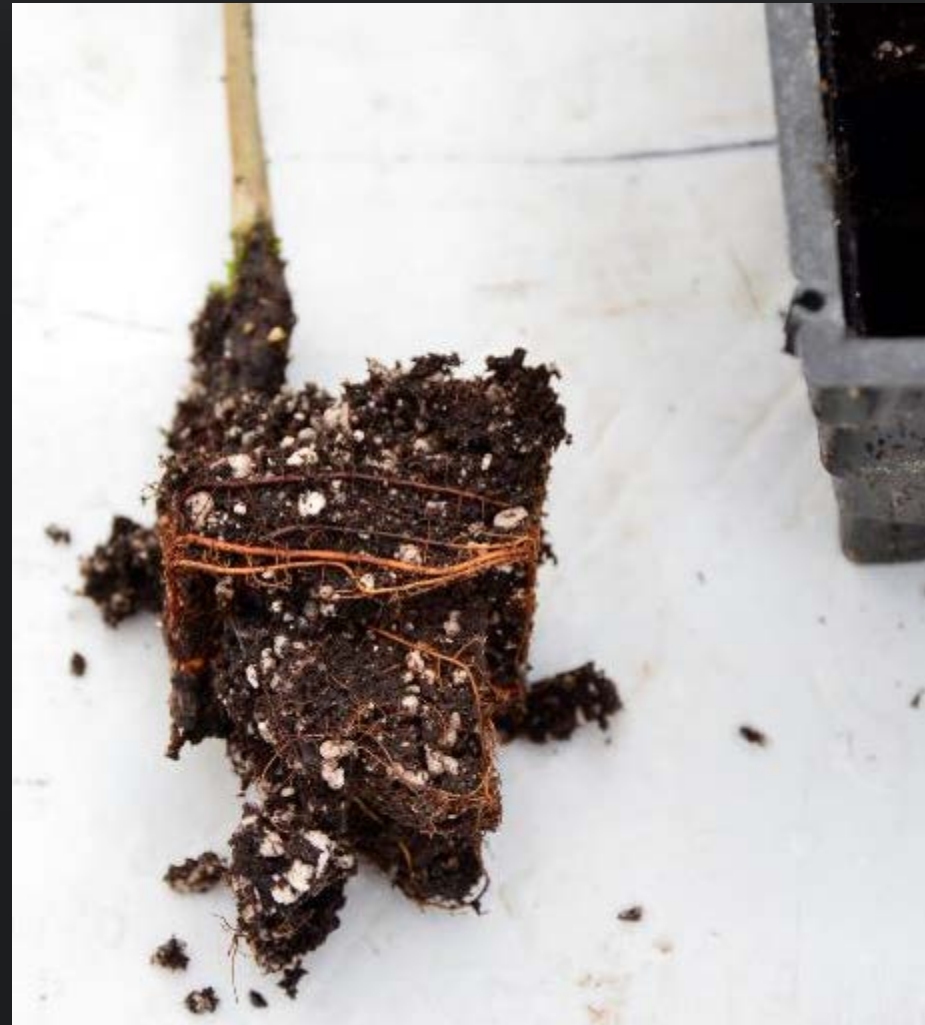
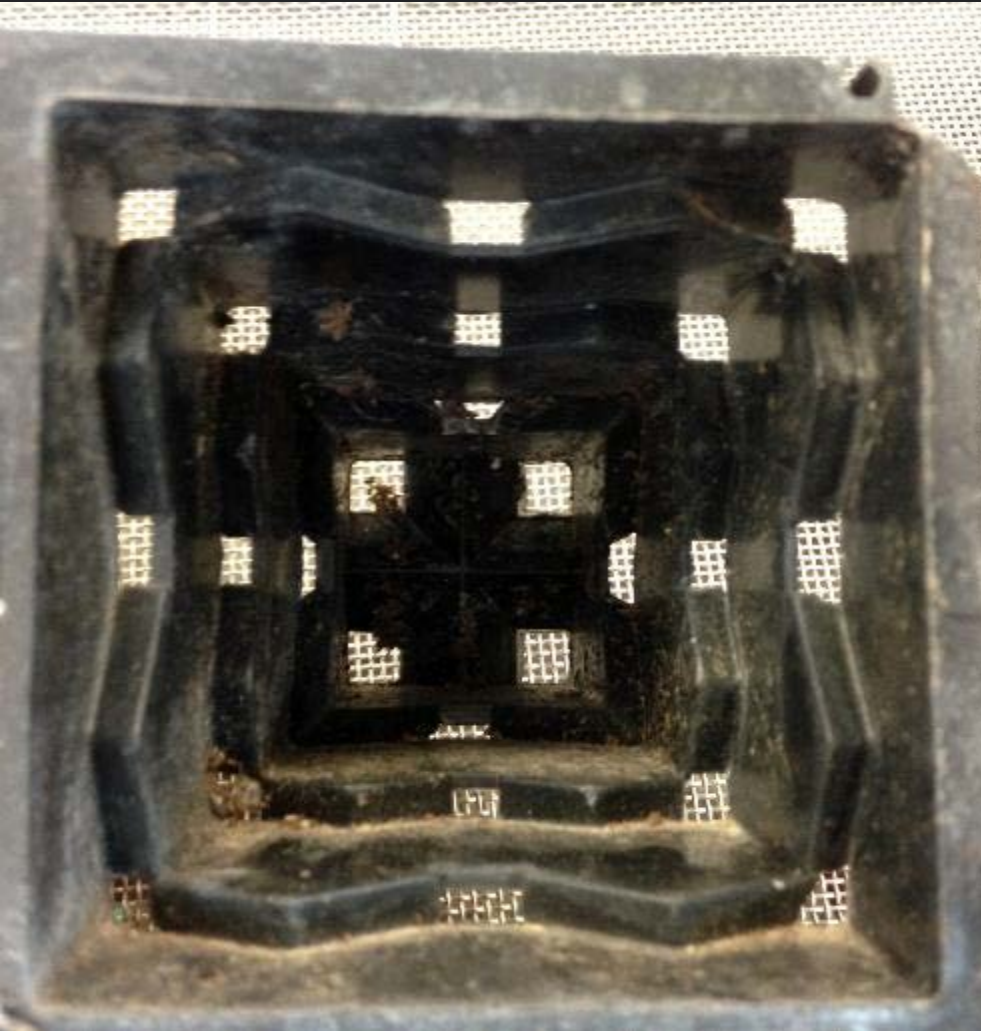
Propagation Trials

Our conventional Tray



Propagation Trials

“Honeycomb Tray”



Propagation Trials



Propagation Trials



Quercus rubra

Propagation Trials



Quercus macrocarpa – 2yr



Propagation Trials



Populus tremuloides

Propagation Trials



Populus tremuloides

Propagation Trials

COIR POTS



Peat Pot

Coir pot

Acer rubrum

Propagation Trials

COIR POTS



Acer saccharum

Propagation Trials

COIR POTS



*Ostrya
virginiana*

*Prunus
virginiana*

Acer rubrum

Propagation Trials

COIR POTS

At planting



2 weeks after



Acer rubrum

Propagation Trials

COIR POTS



Acer saccharum – 2yr

Propagation Trials

CHALLENGES WITH GROWING IN COIR POTS



Coir Pots

Peat Pots

Prunus serotina

Propagation

We have decided to move forward using coir pots for propagation of all of our tree species

- Good root structure
- Suitable price (\$0.11 ea.)
- Allows us to fill with our own media and fertilizer



HOW DID THAT HAPPEN?



Dirca palustris



HOW DID THAT HAPPEN?



Ascending roots is the #1 cause for stem girdling roots
-Ed Gilman

CONTAINER ROOT TRIALS (2013)

- Trialing 4 different pot types
 - Influence on root structure
 - Influence on top growth
 - Ease of use
 - Price of the pot

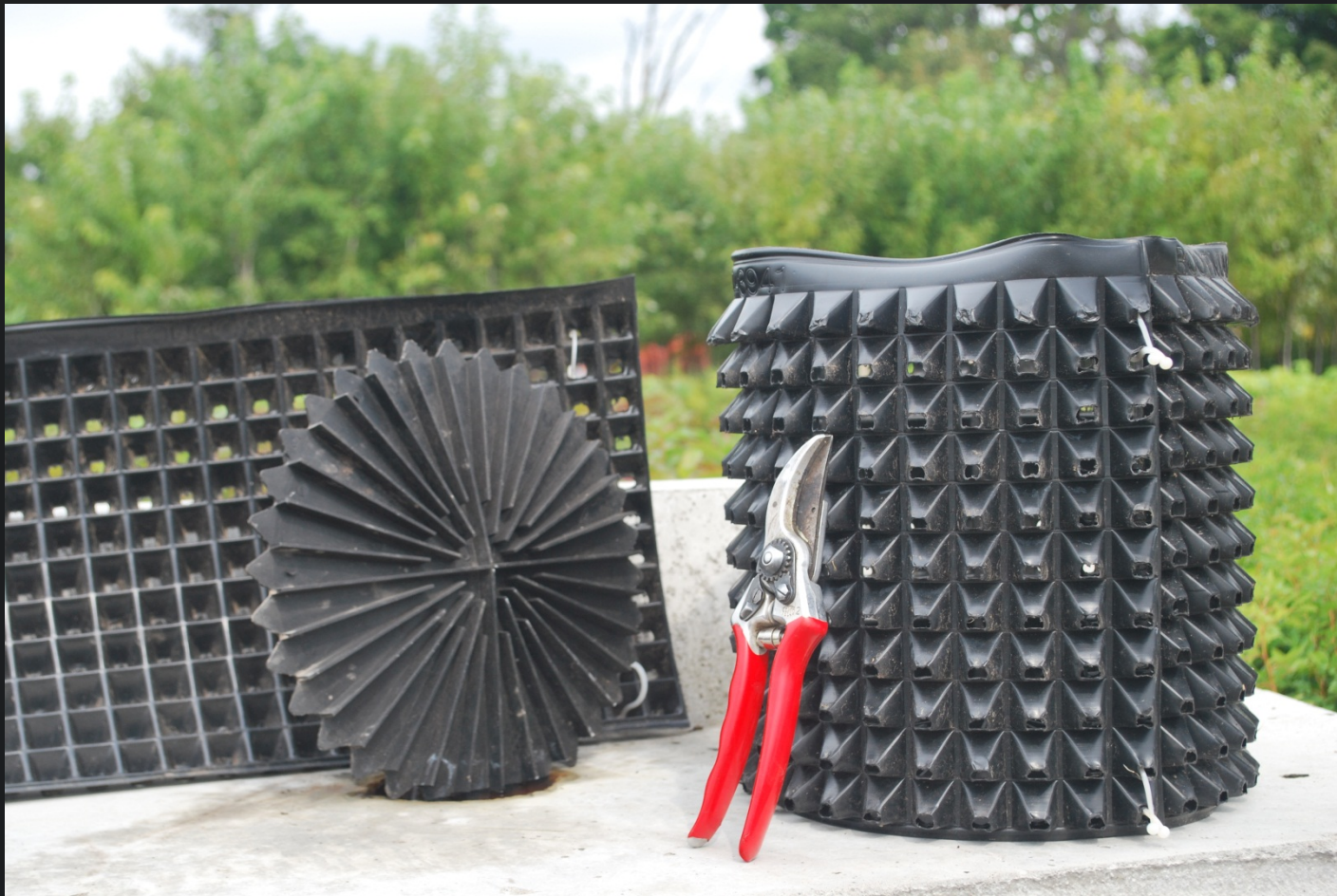
FABRIC POT LINER

- Made of 100% recycled materials
- Advertised as re-useable
- Traps the roots



PERFORATED POT

- Air Prune Roots
- Bottom of pot directs roots outwards



COCO FIBER POT

- Made from Coconut Fibre (Coir) and bonded with natural latex.
- 100% biodegradable



SMOOTH WALL PLASTIC POT



CONTAINER ROOT TRIALS

- Tested with 6 different species
 - *Quercus macrocarpa*
 - *Acer saccharum*
 - *Aesculus glabra*
 - *Carpinus caroliniana*
 - *Tilia americana*
 - *Ostrya virginiana*
- Root examination after 1 season









ROOT ASSESSMENT AFTER 1 GROWING SEASON



SMOOTH SIDED PLASTIC POT

- Beginnings of root circling evident in with most species.



Acer saccharum

SMOOTH SIDED PLASTIC POT



SMOOTH SIDED PLASTIC POT

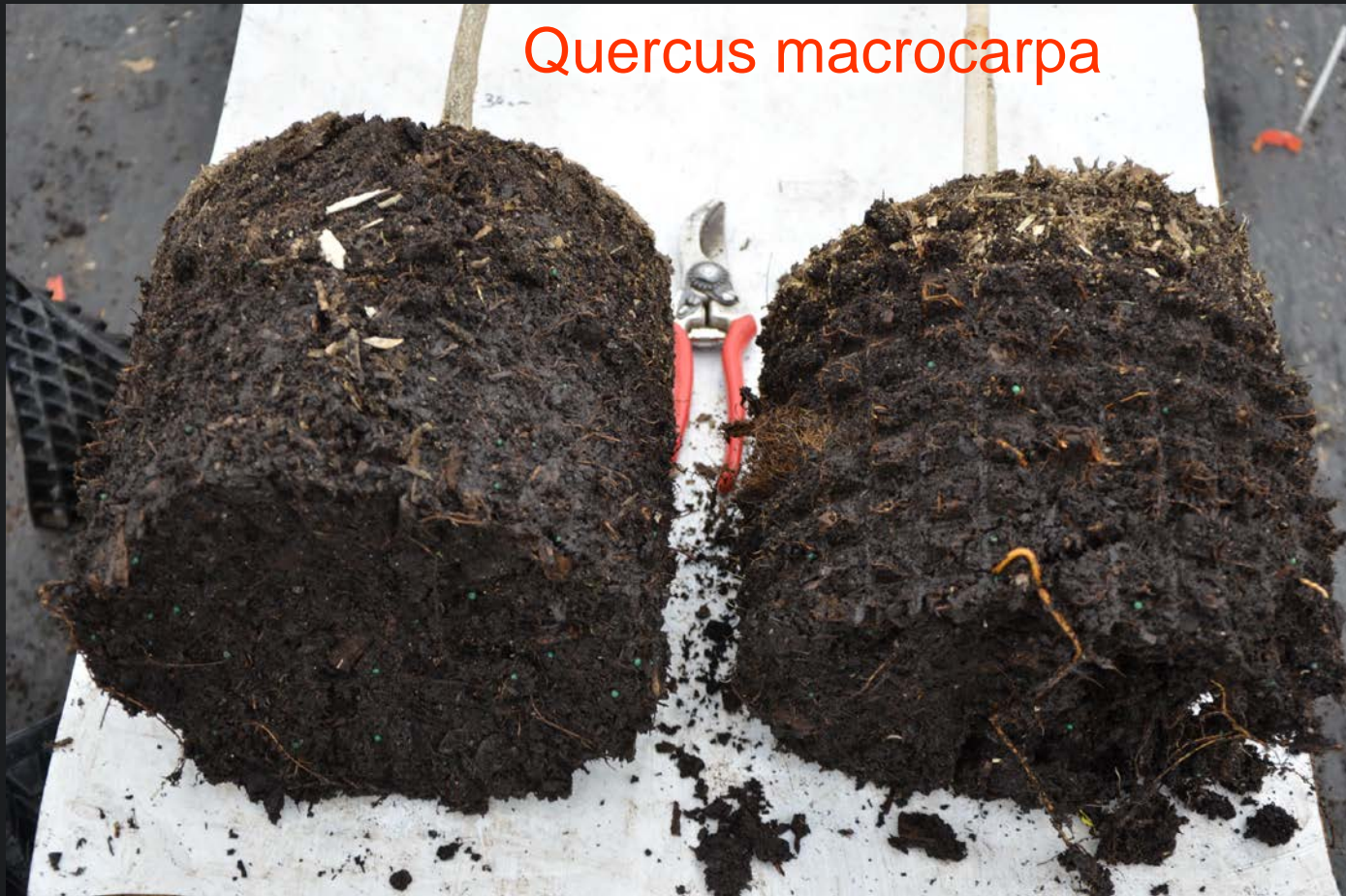
- Easiest system for use by grower and customer
- Price: 38¢ (3G)



PERFORATED POT

Root Structure:

- No evident root circling.



PERFORATED POT

Quantity of roots was variable



Acer saccharum

PERFORATED POT

Roots on the bottom were deflected outward

Carpinus caroliniana



PERFORATED POT

- Assembly time: 45 seconds/pot
- Shipping & Handling
- Price: \$3.20 (3G)



FABRIC POT LINER

- Occasional root circling beginning



FABRIC POT LINER

- Significant amount of directing downward.



Carpinus caroliniana

FABRIC POT LINER

- Smaller roots were “trapped”
- Occasionally more fibrous roots than other pots



Acer saccharum

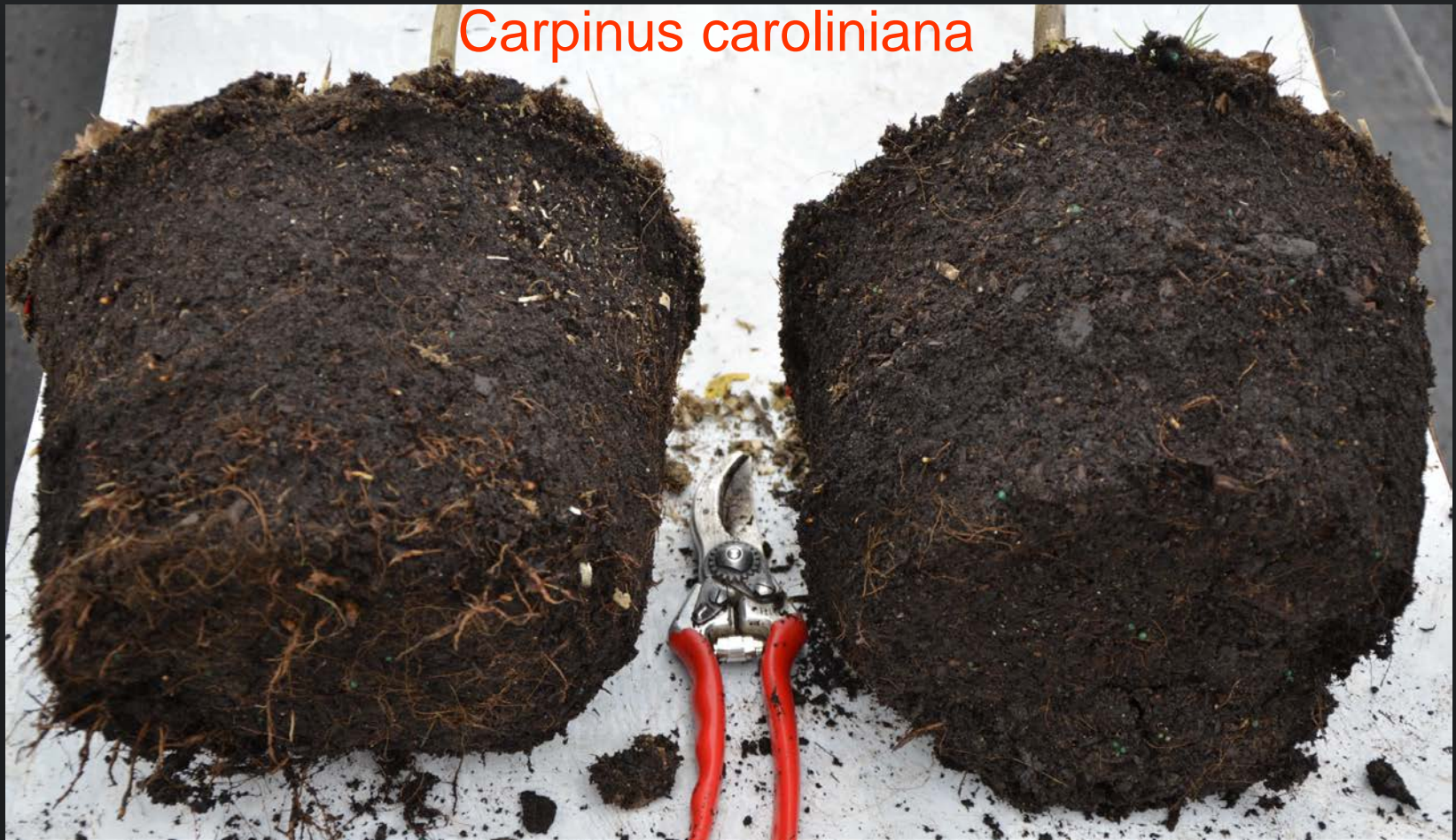
FABRIC POT LINER

- Drainage Influence
- Shipping and Handling
- Price: \$1.35 (3G)



COCO COIR POT

- No evident root circling on the sides.
- Some redirected roots on the bottom



COCO COIR POT

- Occasionally more fibrous roots



COCO COIR POT

- Larger containers may not offer air pruning
- Better drainage / Faster drying + Edge drying
- Not reusable / 1 – 2yrs on yard
- Biodegradable
- Shipping/Handling
- Price: \$1.50 (3G)



OBSERVATIONS

- There was no obvious top growth difference between any of the pot types.



OBSERVATIONS

- There was clear influence from the root imprint of the previous liner.



ROOT SHAVING

Root Ball Shaving Improves Root Systems on Seven Tree Species in Containers¹

Edward F. Gilman, Maria Paz, and Chris Harchick²

*Environmental Horticulture Department
University of Florida, Gainesville, FL 32611*

“Shaving did not affect trunk caliper or tree height on the seven species tested under the conditions of this study.”

ROOT SHAVING TRIAL (2016)

TILIA AMERICANA 3GAL POTTING TO 7GAL



ULMUS AMERICANA
BETULA ALLEGHANIENSIS
PRUNUS SEROTINA

1 gal potted to 3 gal.



ROOT SHAVING



Not Shaved

Shaved

Betula alleghaniensis

ROOT SHAVING



Not Shaved

Shaved

Ulmus americana

ROOT SHAVING



Not Shaved

Shaved

Ulmus americana

ROOT SHAVING



ROOT SHAVING

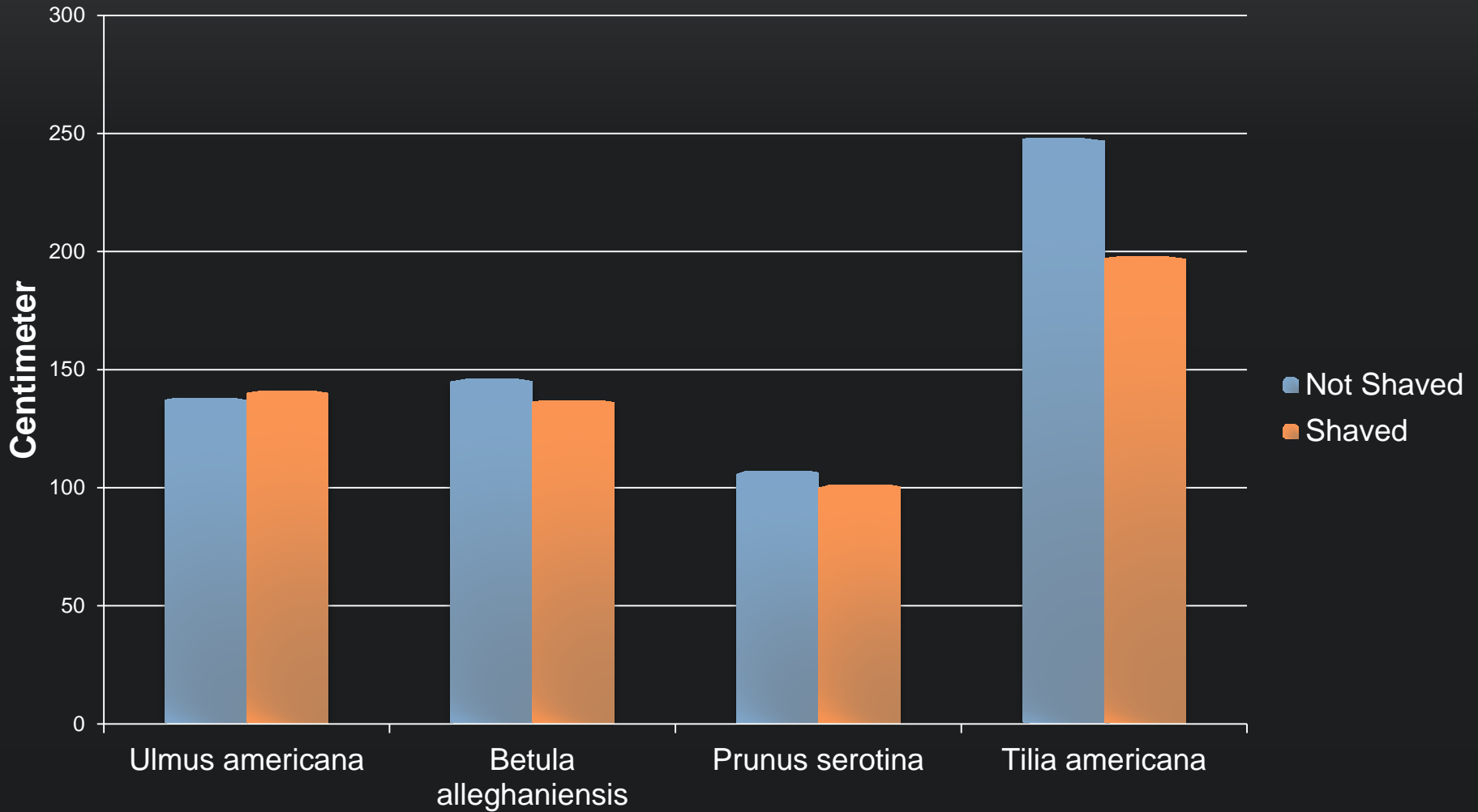


Not Shaved

Shaved

Tilia americana

The Effect of Shaving on Tree Height



ROOT SHAVING

2016-2017 Root Shaving Trials with Quercus



Container Trials

At this point:

- Using coir for some species
- After testing our market, we realize that most of our customers don't want to pay more for better root structure in pots

Moving Forward:

- Still looking for other systems and methods

Field Trials

Considering a trial with Root Bags



Photos from **Root Pouch**

ROOT MANAGEMENT CUE CARD

Root Management Cue Card

Consistent root management in the nursery promotes structurally stable and healthy trees in the landscape. Improperly managed root balls can form permanent defects, such as circles and bends on the periphery. Follow these guidelines for managing roots to reduce defects on young trees.

The root ball should be inspected at each shift to a larger container starting with the liner (the young tree in its original container, Fig. 1A). Root pruning on the periphery and bottom of liner root ball removes most defects (Fig. 1B).

Cut a root back to the point just behind the bend (Fig. 2A) to remove the bend. Cutting the root at a point after the bend (Fig. 2B) is less effective because the bend remains. Roots that grow down and around the sides of the liner root ball become woody as they enlarge in diameter (Fig. 3, right). These woody roots retain their original deflected orientation, which can cause health and stability problems for the tree.



Figure 3. A quality root system develops if the roots of liners (see Fig. 1) are properly pruned when the tree is shifted to a larger container (left). A poor root system develops when deformed roots are not pruned during shifting (right).



Figure 1A. Roots growing on the periphery of the liner.



Figure 1B. Pruning the liner to remove roots growing on the periphery.

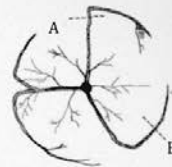


Figure 2. Cut roots at (A) to form new roots that grow away from the trunk (see Fig. 5). Do not cut roots at (B), since the defects can regrow.

Pruning a tree's roots when shifting it to a larger container or before planting it in the landscape improves the root system because it cuts roots back to straight, radial root segments attached to the trunk (Fig. 4). A pruned root ball will be smaller than it was before pruning. Certain types of containers reduce root growth on the periphery of the root ball, so less root pruning may be needed. In some instances, root defects develop further inside the root ball. In these cases, prune root balls deep enough to remove defects.

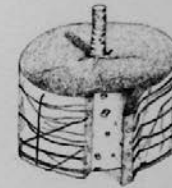


Figure 4. Pruning the roots on the periphery of a container root ball.

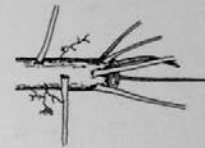


Figure 5. Roots growing from a cut root.

In the weeks and months following root pruning, new roots grow away from the cut ends in a fanlike manner (Fig. 5). These new roots provide greater stability and should not girdle the tree.

Whether root defects can be corrected depends on their location in the root ball, severity, tree species, water management, size of roots, and time of year. It is easier to cut defective roots when a tree is younger than when it is older (Fig. 6). Ideally, roots should be inspected and defective roots pruned at each shift to a larger container, reducing the need to heavily prune larger roots.

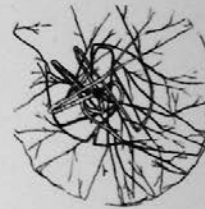


Figure 6. The liner, 5-gallon, and 15-gallon containers left an imprint on this root system. These root defects would be difficult to correct at this stage.

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TRY TO FIND SOMETHING THAT WORKS FOR YOU



THANK YOU!
MERCI!

