

Box Cutting Containerized Root Systems

The Problem

Trees or shrubs that are grown in smooth plastic containers have a bad habit of producing roots that grow in a circular pattern within those containers. Often referred to as “pot-bound” root systems, they can end up shortening a plant’s life if not corrected at planting time.

How it Happens

When roots come in contact with the plastic, they turn and grow parallel to the containers’ inside walls in a circular pattern. If the roots are fine and light-colored, it’s usually not a big problem – they will quickly grow out into the landscape soil once they are correctly planted and watered. However, if encircling roots enlarge and become darker colored and



Pot-bound root system of a containerized Arborvitae.



Encircling roots of an Amur maple that died five years after planting.



Thin, light colored encircling roots of an oak... no problem.



Encircling woody roots near the end of the pointer. These birch roots have developed an encircling root pattern ‘memory’.

woody, they develop a “memory” for that growth habit. Even when they are planted in a good soil, those roots keep growing and enlarging in that circular fashion.

Sources

- 1) <https://extension.umn.edu/how/planting-and-transplanting-trees-and-shrubs>
- 2) <https://www.nurserymag.com/article/nm0712-containers-circling-roots/>

Box Cutting Containerized Root Systems, cont.

The Risk

Roots are meant to grow out and away from the tree or shrub stems, “mining” the landscape soil for water and minerals and creating a wide, stable root system. If they stay in a tight, circular pattern, they don’t have the chance to find and absorb water and minerals very well, and tend to become unstable since their root system is so small. Too often, these trees and shrubs die slowly within a few years.

The Fix: Box Cutting

Research at the University of Minnesota’s Urban Forestry, Outreach, Research and Extension nursery from 2005-2010 discovered a fail-safe technique for correcting the problem simply and quickly without harming the plants. Using hand saws, the outer one inch of each side of the



Box cutting pot bound birch by removing 1 inch of soil on each side with a pruning saw.



The same birch after a complete four-sided ‘boxing’ of the root system.



The same birch, eight weeks later. The new roots are growing out into the landscape soil instead of staying in an encircling pattern.

pot-bound root systems of 72 trees (maples, arborvitae and crabapples) were physically removed along with the encircling, woody roots -“boxing” the root system. At the end of the five-year study,

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none of the “boxed” trees were dead or had pot-bound roots. The control trees (no boxing) all had confined root systems, as well as the other trees where the root systems had only been sliced.

Since Then...

The procedure has been repeated literally hundreds of times with pot-bound trees at the University of Minnesota. Whether it was done in the spring, in the summer or in the autumn, there has yet to be a tree that has died from the procedure or from redeveloping an encircling root system. This 2-4 minute procedure does not kill trees, it saves them!

Gary Johnson, April 2019

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