

## Prevent Girdling Roots At Transplant

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Girdling roots are a common but preventable cause the decline and death of trees and shrubs in landscapes. Girdling roots start out as roots that grow around the trunk and/or other roots. Over time these circling roots grow in diameter and can girdle or strangle the plant. Girdling roots inhibit normal water and nutrient flow thereby stressing the plant and leading to its decline. Trees stressed by girdling roots are more susceptible to disease and insect attack. Girdling roots compromise the tree's structural integrity making it more susceptible to blow-down by the wind. The presence of girdling roots often goes undetected because they remain underground and unseen while the affected tree or shrub slowly declines.



The effect of girdling roots on trees can be seen in this picture of a root-girdled trunk and the girdling root system from a 21-foot-tall tree. This tree was in a research plot at Puyallup, Washington, and blew over in an October wind-storm. We planted the tree 10 years earlier from a 2-gallon container like that shown in the picture. At the time of planting the roots were circling the container and we did not disturb (cut and spread) them. Nearly 10-years after the tree was planted in the landscape, the circling roots had grown in diameter until they girdled the trunk. Notice how the circumference of the donut shaped mass of girdling roots (see arrow 1) is very similar to that of

the 2-gallon container. The effect of girdling roots on trunk diameter growth is reflected in the following measurements: at 1 foot above ground the trunk diameter is 5 inches, at the flare just above the root girdle the trunk diameter is 9 inches, while trunk diameter is only  $\frac{1}{2}$  inch at the breaking point (see arrow 2) inside the root girdle.

Proper treatment of root systems at every transplanting is essential for long-term success of trees and shrubs. If the circling roots of container-grown trees are not eliminated at transplant, the life expectancy of the tree in the landscape is typically about 10 years. Root girdling can be prevented by straightening and/or removing circling roots while they are still small and flexible. This requires vigilance and attention to detail on the part of all persons involved with the production and planting of trees and shrubs. Nursery growers, landscapers and home gardeners must visually inspect the root system and disrupt circling and kinked roots each time the tree is transplanted to a larger container or into the landscape.

Whenever transplanting a tree or shrub from one container to another or from a container to the soil make sure that the root system is spread-out into the new growing medium. If the plant has flexible circling roots, loosen, and spread them with your fingers at transplant. If the circling roots are extensive or woody you may have to cut or slash them using an old knife or pruning

shears. To do this, make four to eight shallow vertical cuts into the root ball, slashing through the exterior woody roots. Use your fingers to loosen the cut roots and spread them away from the container medium. Some experts recommend shaving off the entire outer edge of root-bound masses by cutting roots at the point just before they dive deeper into the soil near the sides of the container (Gilman et al. 2009). If the circling roots had been corrected at transplant, the tree shown in the picture would be alive and healthy today.

Plant in a saucer-shaped planting hole dug no deeper than the root ball but deep enough so that the bottom of the root ball rests on the bottom of the hole when the top of the root mass is at or slightly (about 1 to 2 inches) above the soil line. The planting-hole diameter should be large enough to accommodate the root system. When possible, dig the hole two to three times the width of the root ball at the surface and the sides should slope toward the bottom of the root ball. Carefully spread the roots while backfilling using native soil. Be sure to keep the roots spread, as the hole is backfilled. For more information ‘Planting Trees and Shrubs in the Landscape’, Washington State University Extension Fact Sheet FS047E, is available at the following website: <http://cru.cahe.wsu.edu/CEPublications/FS047E/FS047E.pdf>.

To inspect for girdling roots in established trees, look at the tree trunk where it enters the ground. If the trunk exhibits the normal flare where it enters the ground, girdling roots are most likely not a problem. Girdling roots can be visible at the soil surface. Suspect underground problems if the tree trunk goes straight into the ground with no flare or is flat on one side. To detect girdling roots underground, carefully remove soil from around the trunk of the tree until the main roots are found. Girdling roots are not a problem if the main horizontal roots radiate out from the trunk and are unencumbered.

According to Harris et al. (1999), “Not as many nursery-grown trees with girdling roots become hazardous as one might expect, because the most seriously affected trees fail before they become very large.” This may be useful information for those concerned with potential liability damage but is of little comfort to anyone hoping to eventually enjoy the benefits of a mature, healthy tree.

Structurally sound, healthy root systems are essential to the success of trees and shrubs in the landscape. Girdling roots and the failures they cause are preventable if everyone involved with production and planting would straighten and spread the roots at each transplant.

## **References**

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