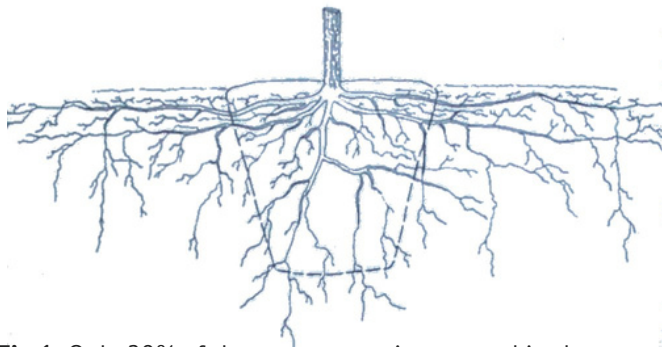


# Watering Newly Planted Trees and Shrubs

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## Introduction

Transplanting trees and shrubs is not a natural process. Trees in the wild do not grow with dense root systems waiting to be dug. Nurseries work very hard to create a plant which will survive the difficult and stressful process of transplanting. But with even the best nursery practice, only 10-30% of the tree's existing root system is captured in the rootball that comes with the tree.



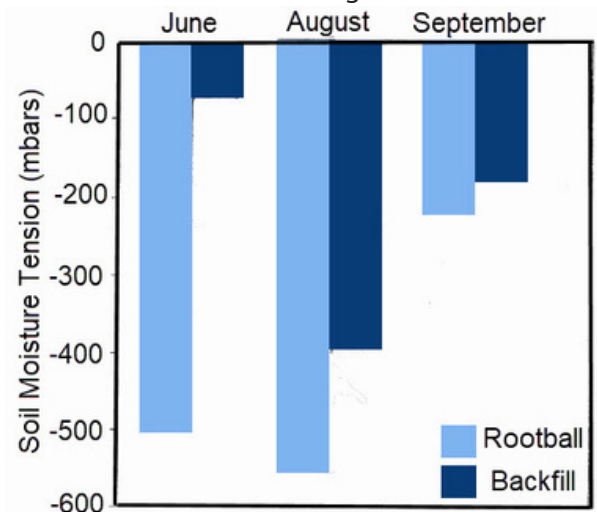
**Fig 1.** Only 20% of the root system is captured in the rootball with the tree is properly dug.

The time it takes to regenerate these lost roots depends on the size of the tree that was transplanted. Studies have shown that trees here in Ohio take about one year for every inch caliper to regrow lost roots. That means a two-inch tree will have to survive on a reduced root system for two years and a 6-inch tree for 6 years. During this reestablishment time, the tree's growth will be drastically reduced. Cases have been reported that a 2-inch tree at planting was larger than a 6-inch tree at planting 5 years after planting. Bigger is not always better.

## Need for Water

Water is the lifeblood of the tree. The nutrients it carries are crucial to carry on photosynthesis which in turn produces carbohydrates to re-grow the roots lost during transplanting. This water is extracted from the soil around the roots. Newly planted trees must get 100% of its water from 20% of its original root area. The soil in the rootball is heavily "mined" for water during the reestablishment

stage and can dry out long before the surrounding soil does. Routine watering is essential for newly planted trees even if established trees are doing fine.



**Fig 2.** Transplanted trees rely almost entirely on rootball moisture for much of the first growing season. Rootball soils dry out more rapidly (more negative indicates drier soil) while backfill remains moist.

## Long Term Effects of No Water

The tree's trunk, branches, and roots are made of long cells. These cells form tubes that reach from the roots to the leaves. When these tubes are formed by the cambium, they are full of water. As water evaporates from the leaves, water is sucked up the tree. When water is pushed into the roots through osmosis, water is pushed up the tree in these columns. When there is no water in the soil to be pushed into the roots, the leaves keep sucking on the columns of water. Wind and low humidity cause the leaves to suck harder and the tension on the column of water increases. Like a rubber band, the water column can only be pulled so hard before it snaps. **Once broken, the water column will never form again.**

Trees live on water columns which were formed in the past two to three growing seasons (spring and early summer.) Loss of these columns through a careless watering schedule can affect the tree's health and reestablishment by reducing its ability to move water. Forgetting to water once can have a significant effect for the next three years of it does not kill the tree outright.

## Water

### How Often

Trees should be watered elementally after planting or within 4-6 hours of planting. Even if it is raining during planting, the tree still needs additional water. **Rootballs dry out very quickly while above ground.**

Trees should be watered once a week from the time they are planted until they lose their leaves in the fall and the pull of water is gone. Water may be skipped in a given week if the tree received 1-inch of rainfall or more that week. Rainfall credit cannot accumulate. If the tree received 3 inches of rain one week, you still need to water the next two weeks of no rain fell.

In some cases such as sandy soil or bare root trees, biweekly watering may be beneficial.

### How Much

The quantity of water needed each week depends on the size of the tree. As a guideline a tree needs 5 gallons of water for each inch caliper plus 5 gallons. For example, a 2-inch caliper tree needs 15 gallons of water per week. (5 gallons x 2 inches) + 5 gallons = 15 gallons total.

Size of Tree	Quantity Water/Week
1-inch	10 gallons
2-inch	15 gallons
3-inch	20 gallons
4-inch	25 gallons
5-inch	30 gallons

Too much water can kill a tree. Saturated soils have little oxygen and the roots literally drown.

## Speed of Application

The single greatest mistake made in watering is putting the right amount of water on too fast. Water must be given time to soak into the soil. If applied too fast, not enough gets into the rootball. Water must be applied at a rate of less than 2-3 gallons per minute. In some cases the water may still run off the surface of the rootball and the rate must be reduced. Water should be applied to the surface of the soil.

Deep root waters can put the water too deep and leave critical surface roots dry.

Five-gallon buckets with two or three 1/8 inch holes drilled in the bottom can deliver accurate amounts of water to the tree. There are also high and low profile watering bags that you may fill weekly. High profile bags should be removed from the tree a few times during the growing season and during all of dormancy so the trunk tissue can dry out.

A slow trickle from a garden hose can also be effective. Calibration of the flow is well worth the effort. Too much water can wash mulch away, cost extra money in water bills, and kill the tree. Using a known volume container, open the valve on the garden hose a known amount like 1/8 of a turn. Measure the time it takes to fill the container. If a small volume is used, i.e. less than 1-gallon, make several measurements to account for changes in water pressure. Using these measurements calculate the time needed to apply the right amount of water for the tree and use that time for watering each tree.

## Mulch

A 2-4 inch deep mulch layer as wide as you can will greatly benefit the establishment of a new tree. Leave a hand's width mulch-free around the trunk. Trees in mulch beds have 4 times as many roots and 3 times the trunk caliper of their counterparts in grass after 2 years.