

Relearning New Tree Planting Water Management

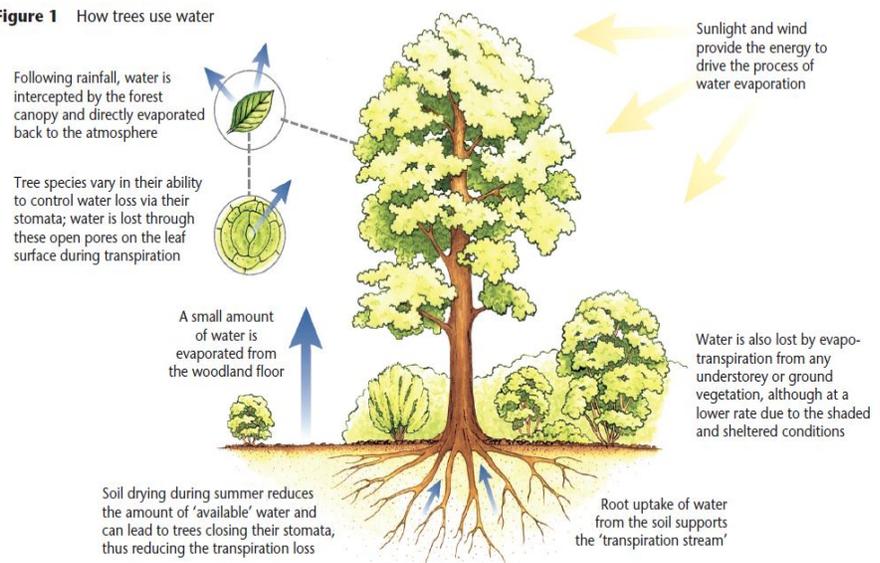
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When we see trees, we see large plants and transplant our knowledge of watering a garden, a tree farm, or a plant in a container to watering a newly planted tree. This is actually not correct. When we plant a tree in ground, we are really trying to make sure it integrates with the environment and grow into a big and self-sustained life. We want to make a bed 12 inches deep and twice the diameter of the root ball of consistently moist soil so that new tree roots can grow to secure the tree onto the ground and absorb nutrients and water from that soil. Trees rely on having soil that is moist to be able to establish its root system. If a tree consistently has access to moisture in the soil, it's able to utilize that water to feed through its root system and into its branches and leaves before transpiration sends that moisture into the atmosphere. Trees also grow roots toward the direction where there is moisture and nutrients. The first three years are where trees need the most attention and nurturing. To nurture a newly planted tree takes some understanding, and to do it efficiently needs the right tools as well as system to ensure tree survival while minimizing water usage, labor and money in doing so.

1) Water Management Challenges

Water Management is difficult as different species of trees use more water and manage themselves better by controlling how much water escapes through evaporation in the transpiration process. The variety of climates across the U.S. alone means there's no one-size-fits-all guide to tree care¹. Under watering is logical, knowing all plants need water is something we all understand. Over watering is a concern as well as too much water can restrict oxygen flow in the soil and lead to root rot².

Figure 1 How trees use water



Credit – Forestry Commission – “Water Use by Trees”

2) Evaporation and Runoff

When it rains or when we water trees, we use a good amount of water to ensure the soil moisture level around the tree root system has a healthy level after a natural process of evaporation and runoff occurs. It is easy to prescribe the water amount or watering time length for a tree of certain caliper, but it is very difficult to know how much evaporates and how much runs off before it is used by the tree. Controlling this is difficult unless there is a system in place to better manage the water to use small

amounts to keep soil moisture at a comfortable level without having the water runoff which occurs when the soil can't absorb any more water³.

3) Competition and Temperature Fluctuation

Reducing plant and weed competition is ideal for newly planted trees that would also be using the soil moisture and nutrients themselves⁴. Extreme temperature conditions impact the trees in several ways. In addition, extreme hot temperatures cause the soil temperature to rise, which increases evaporation. When the soil dries out from evaporation, it puts a strain on the tree. A literature search revealed that 5-30°C is the optimal temperature range for root growth for most plants on this planet.⁶⁻¹⁰ It can hinder root growth, especially when the soil temperature is below 40°⁵ or above 90°.

4) Healthy Tree Root Growth

Nowadays, most trees, shrubs and other plants are container grown (for convenience and for availability). Container-grown seedlings have circular roots in the root ball, which is all these trees relied on for water and nutrients before they are planted in the ground. By dumping water right into the root ball like the watering bags, it simulates the same growth environment as they were in the container on a nursery/farm. And the newly planted plants have no incentive to grow roots outward to the surrounding environment (often it is compacted soil by construction equipment). It slows down the integration of the plants with the new environment. The circular root also is unhealthy.

HOW DO YOU ADDRESS THESE CHALLENGES WHILE:

- 1) Minimizing the amount of water
- 2) Minimizing the amount of maintenance
- 3) Maintaining a healthy tree that survives the first two years

Having the proper tools and paying attention to the tree are two common sense and basic ways to ensure tree growth. Paying attention to the trees is easy because trees communicate their struggles visually through their leaves. When leaves start to turn yellow, red or brown, that means the tree is thirsty. When leaves are green but brittle and fall apart, that indicates overwatering may be occurring².

TreeDiaper® Advanced Hydration System is the tool for newly planted trees.

Tree Diaper® is a revolutionary new tree management system. It helps automatically nurture newly planted trees, while minimizing maintenance and the amount of water used to promote the growth of healthy trees. It will drastically reduce the time and money typically needed for this three-year process.



Tree Diaper® addresses the four main challenges for new tree plantings in this way:

1) **Water Management** – Tree Diaper® uses hydrogel technology to store water from drip irrigation or natural precipitation and release it super slowly into the soil above the root system. The hydrogels are separated from the soil to ensure they’re not stealing moisture from the soil with root systems. The agriculture-grade material on the underside helps capture the water during precipitation events, but the water is slowly released into the soil after the soil has dried. Water enjoys an equilibrium, meaning it wants to spread or flow to areas that have less water. This technology has been tested in a variety of climates that show how TreeDiaper® keeps soil moisture levels at an optimal level where the tree is never thirsty or straining for water. Super slow release of water prevents over watering issues and enables deep watering.

2) **Evaporation and Runoff** –

This is where a lot of the water gets lost in the attempts to water the tree. Textbooks and tree experts would tell you how much water to apply to a tree but would not tell you how much water actually transpired by a tree. While trying to achieve a consistent bed of moist soil for tree roots to thrive, we end up wasting a lot of water

using traditional means (a garden hose or even a tree watering bag). A TreeDiaper®, when installed, should be covered with mulch. Combined with the mulch, the TreeDiaper® greatly reduces evaporation. Due to the extreme slow release of the water from the hydrogels, there is essentially no runoff because the soil never reaches complete saturation. This means that water is being used as efficiently as possible requiring significantly less volumes of water to be used to properly maintain a healthy tree. TreeDiaper’s ability to reduce evaporation and runoff allow it use significantly less water than all of us are used to.

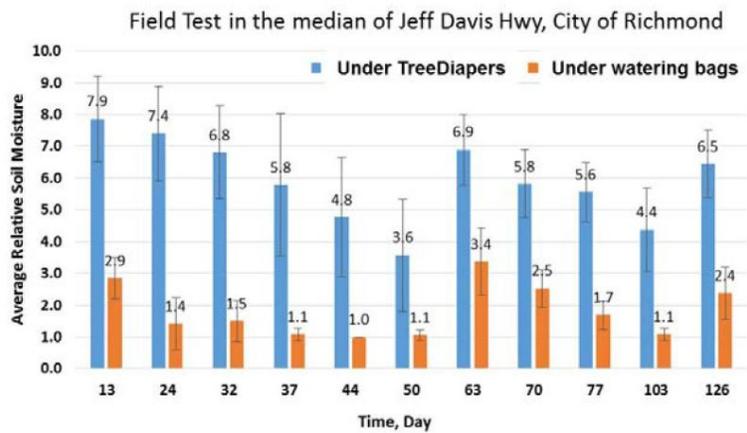


Figure 1. Soil moisture of TreeDiaper® mats compared to watering bags in the road median of Jefferson Davis Hwy, Richmond VA. (Data from Zynnovation LLC)

3) **Competition**

The top and bottom of the TreeDiaper® are weed barrier materials. The weight of the absorbed rain water helps to keep them on the ground in contact with soil. That allows the TreeDiaper® to be covered with mulch to help with the reduction of runoff and evaporation as stated previously but also eliminates weed growth in the soil beneath where the root system for the tree is present. This means, trees aren’t competing with other plant life and weeds for precious water

and nutrients in the soil. This accounts for less water needed to keep the soil moisture at an optimal level.

4) **Promotion of Healthy Root Growth**

TreeDiaper® technology does not dump water onto the root ball. Instead, it keeps part of the root ball moist while also watering the surrounding soil. Plants grow their roots into the surrounding soil to seek moisture and nutrients and leading to better integration with the environment. It increases the survival rate.

The TreeDiaper® is the tool for new tree plantings to help minimize water usage, labor and dollars to ensure their growth. New trees are an investment and TreeDiaper® is a great way to protect that investment by providing a multitude of features to help promote newly planted trees to live and thrive. Of course, using your eyes and paying attention to their level of health will never be completely eliminated, TreeDiaper® adds a layer of management to reduce the risk of new trees not lasting those first three difficult years of being planted. Fortunately, with TreeDiaper® and a simple system of checking the leaves of a newly planted tree, the amount of precious water as well as time to ensure their survival is greatly reduced, and more trees can thrive.

Endnotes:

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