Summer Watering of trees

Summer is upon us, folks, so here's a quick message from your trees: *please water us!*

We started this growing season with dry soil.
The last significant rainfall was 0.3" on March 14. Total rainfall in March was about one inch; our average March rainfall is 3 inches. Total for April was 0.38", about ¼ of average for the month. With relatively mild temperatures through most of May, trees didn't show much stress until temperatures spiked late in the month.

Effects of drought on trees
We're already seeing samples of scorched leaves, leaf drop, reduced growth.
Tree roots won't grow into dry soil, so young trees won't establish well.
Older trees won't grow as much as they could or should.
Tree species vary as to their response to more severe drought. Some form a quick abscission layer at the base of the petiole (which attaches the leaf to the stem), so they just drop their leaves. Others wither along the edges or show direct sunburn on the more exposed parts of the leaves. Typically, this injury is worse on the west side of the tree.
Severe drought stress leads to twig and branch dieback.
If the leaf canopy gets significantly reduced, the tree trunk can sunburn, leading to borer infestation and death of the tree.
A tree without sufficient soil moisture will often abort new growth. For species such as crape myrtles, which bloom on new growth, that will reduce the summer flowering.

What's the best way to water a tree?
Whatever method you can use that provides moisture to a depth of at least 18 inches, applied to an area half-again wider than the tree's canopy.

Hand watering with a hose can be very effective if you stand there long enough. Make a basin around the tree and fill it up a few times. Put a shower nozzle on and water the area outside the basin as well. One of the most common mistakes I see is where young trees are planted and watered in a basin at their base, but they are surrounded by bare, unirrigated soil. Again: roots won't grow into dry soil. So that poor little tree can't get its roots outward.
Mulch with compost or plant a low ground cover to help shade the soil and reduce water loss.

Sprinklers can be used to irrigate trees, but most people don't (or can't) run them long enough. With denser soils, water won't penetrate quickly and if the water is applied too fast it puddles and runs off.
Measure the output. It will likely take one and a half to two inches, measured in a tuna can or rain gauge, to get the depth of watering needed. If your sprinkler system can't do that in one setting without water running off into the gutter, set your timer for multiple start times on the same day.

Lawns are rarely watered to a depth sufficient for tree roots. A deep soaking of the trees in your lawn is beneficial every two to four weeks through the summer here.

Drip irrigation systems are much more efficient. They put the water out slowly, which allows it to soak in, and puts it right where you want it. But most people don't run them anywhere near long enough to provide adequate depth of watering, and drip irrigation design often fails to account for the wide root distribution.
The most popular brand of drip irrigation has inline emitters every foot, but they only put out 0.4 gallons per hour. That means most drip systems need to run for at least three hours to water a tree to adequate depth. You really need to check the depth you've irrigated. Take an 18-inch screwdriver out the next day and push it into the soil. Where it penetrates easily, you've irrigated. When you encounter resistance, it's probably dry.

How much, how often?
A newly planted tree needs 10 to 15 gallons of water each week. A longer soaking every two weeks after the first summer may be sufficient, depending on the species.
Species known to be drought tolerant can go 3 weeks between irrigation cycles.
Truly xeric trees from desert regions may not need much irrigation at all, once established, but it's worth noting that these species often have thinner canopies and provide less shade value.
In all cases, it's important to water out past the canopy of the tree.

Related questions:
I want to solarize the soil to kill the weeds around my tree. Will that hurt the tree roots?
It might injure roots that have extended past the leaf canopy. If it gets hot enough to kill pathogens and weed seeds, then it's likely hot enough to damage the shallower roots of a tree.

How about smothering weeds with cardboard or plastic?
Those will both block water penetration and reduce gas exchange (oxygen and CO2), which is adverse to any plant species. I am very concerned about the common recommendation to install cardboard with several inches of wood chips for weed suppression underneath trees. Just use the wood chips and skip the cardboard. And never use plastic.

Wood chips aren't harmful to tree roots?
Nope! This is standard practice on tree plantings done by Tree Davis for the City of Davis. City workers provide piles of fresh wood chips, and volunteer crews spread them as much as a foot deep around newly planted trees.
This is one of the simplest things you can do to suppress weeds, retain moisture, and ultimately enrich the soil: spread arborist wood chips several inches deep beneath your trees, around your shrubs, and anywhere else in your garden. You can get them free from ChipDrop (getchipdrop.com). Bear in mind that you'll likely get about 15 cubic yards. That's about 90 wheelbarrow loads. Folks operating on a smaller scale often use a mix of compost and fine bark.

Should I only water in the morning? I heard it's bad to water during the middle of the day, and that you shouldn't get water on the leaves because the water will burn them.

Oh, this old myth just will not die.

Water droplets on a leaf do not 'magnify the sun's rays'. Water on the leaves does not cause leaf burn. We water our garden center plants during the daytime, wash off the leaves to prevent pest problems, and rinse everything off on hot days.

The city watering regulations about time of day are:

> "No landscape watering between 9:00 a.m. and 6:00 p.m. except with a hand-held container or hose with a shut-off nozzle, or for very short periods when adjusting a sprinkler system. Low volume irrigation systems (such as drip irrigation, soaker hoses and micro-irrigation) are exempt from this restriction."

Watering in the morning is most efficient for sprinklers because it reduces evaporation loss as they spray water. Drip systems and bubblers water at ground level and the water soaks right in. When watering by hand, you control the flow and prevent runoff.

When using drip, or watering with a hose, you can water whenever the plants need water and when you can do it right.

What about overwatering? I've heard that's a problem in our area.

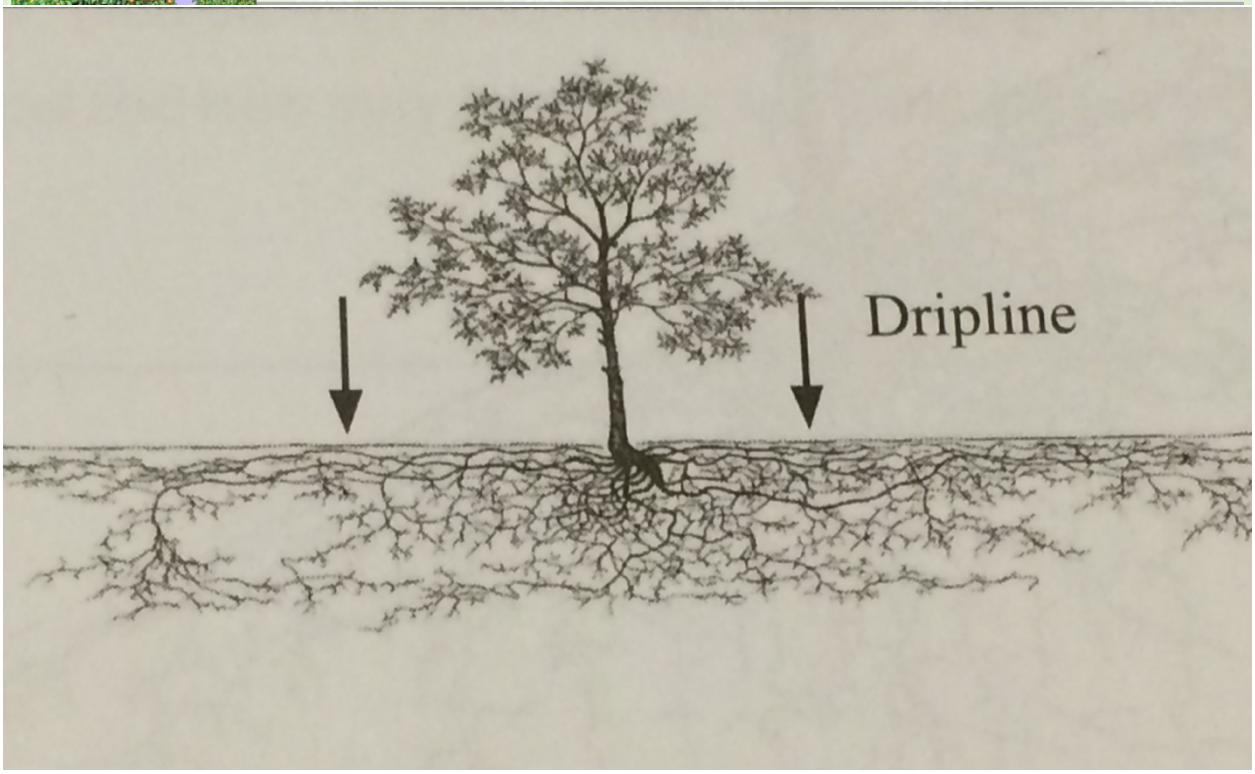
This is a very imprecise term as it leads many people to think that it means 'too many gallons'. Overwatering refers to watering <u>too often</u>.

Why would that be a problem?

If you keep the soil moist next to the tree trunk for several days in a row during high temperatures, the pathogen that causes crown and root rot (*Phytophthora cinnamomi*) can infect through the bark and spread into the cambium, eventually leading to death of the plant. So "overwatering" means creating conditions that lead to crown or root infection. The likeliest scenario is daily watering right next to the trunk during hot spells.

Water slowly and deeply, and allow some surface drying between irrigation cycles, and you won't likely have a problem with crown rot.

Whether it's a fruit tree for food, flowering tree for beauty, or shade tree for comfort, proper irrigation is your most important landscape practice in our hot valley climate.



Contrary to popular belief, tree root systems are generally shallow and spread widely. Root excavation studies, shown here from Robert Kourik's outstanding book Understanding Roots, shows the more typical pattern. Roots are mostly in the top foot or two of soil and spread well past the canopy.

Scorched leaves are a consequence of inadequate irrigation on this citrus tree. Trees that have thick leaves have a waxy coating that protects them from sunburn, but that gets thinner when the tree is under-watered. Direct sun at the hottest time of day will lead to sunburned leaves, mostly on the west side as afternoon is when the temperatures are highest.

Crape myrtle trees bloom July through August here, but the flower buds are forming right now. Since they bloom on new growth, trees that stop growing due to drought stress fail to blossom or have reduced flowering. A deep soaking every two weeks will keep the tree growing and flowering well. Variety shown: Muskogee.

Planted, staked, mulched, now all you need to do is water!