

Watering...part simple, part enigma

By Charlie Mosse, July 2020

<https://peterteabonsai.wordpress.com/2012/05/15/repotting-a-beast/>

An article on Jonas DuPuich's web site, bonsaitonight.com, just came out on his blog on July 10. It is an excellent article on watering, mainly conifers like Japanese Black Pines and Junipers. It is well worth the time.

Proper, effective watering is one of the most difficult things to teach and to learn in the plant arena and even more so in bonsai. It appears straight forward and up to a point it is.....just add water to the soil and all is good. Wrong answer. Even very experienced bonsaists have to stop and think at times about what they are doing when watering since many plants will have issue that needs to be

Many things affect the effectiveness of watering and must be taken together to fully understand the proper watering of bonsai and many years of experience. This article is based on the experience and input from many experienced bonsaists over many years, decades of experience, not hypothetical.

To cover/mitigate the short comings of different soil mix issues, bonsai containers should be watered at least 3 times per watering. Just because water comes streaming out of the bottom of the container does not mean the soil particles adequately absorbed enough water, especially very dry particles which can be so dry as to become hydrophobic. Old soil mix, old nursery soil left behind or field soil left behind can become so dry as to also repel water. No water, no roots. Sometimes these old soil pockets can also become too wet leading to rot. Either too dry or too wet equals no roots which means less tree vigor.

- Condition and age of the soil mix. Fresh soil drains fast, older and more compacted soil drains more slowly.
- New soil passes water through very quickly, so quickly that much of the water is not retained or absorbed by the soil particles
- Older soil can be so compacted that the water is absorbed so slowly that the tree needs to be watered several times
- Soil make up: types of components used to create your soil mix.
- Old soil left on the root ball for various reasons can cause those areas to be too dry or too wet.
- Water quality: pH, minerals/salts (hardness), treatment chemicals, seasonal quality variations.
- Fertilizers used: chemical or organic, liquid or dry.
- Water application method(s): bonsai nozzle, watering can, hose end, submersion, drip irrigation of different types.
- General weather conditions for your area.
- Micro-climate condition(s) in your yard where your trees are grown.
- Seasonality: long days vs short days, cooler nights vs warmer nights, lower sun angle vs higher sun angle. These make a significant difference in water usage and therefore watering frequency.
- Moss: moss density which varies by type, % of surface covered effects watering frequency and amount. Moss does help keep the soil cooler but then it does use some water too.

- Soil surface changes with time from very fast acceptance of water to gradually slowing the acceptance of water as surface organic/akadama components breakdown and salts accumulate.
- Interior soil has the same issues but breaks down and accumulates salt more slowly. Root mass increases replacing some of the soil mix reducing water and nutrient retention.

The weather is also important in your general area.

- Direction and speed of prevailing winds. Windy days will dry trees much faster.
- Direction and speed of Santana Ana winds. Some areas get pounded, some areas just get the low humidity without any or at most very little wind.
- Are you coastal, somewhat inland or inland...humidity can vary significantly.

The micro-climate(s) in your yard are just as important.

- How does shade vary during the year from trees, tall bushes and structures in your yard and maybe even your neighbors structures.
- If your bonsai are in different parts of the yard, how does wind and shade affect those areas differently? Bonsai in the same yard but on different sides of the house, literally around the corner, may need different watering schedules.
- Reflected heat from house walls, fences, block walls add to water needs. One may need to distance the bonsai further from a wall on the south side than the east side most of the year.
- Installing shade cloth will reduce watering needs by cooling and sometimes also interrupts wind flow.
- Are your trees on a grassy area, on bark or on gravel?

Container type is also a significant consideration.

- Plastic or mica pots help to retain moisture.
- Glazed ceramic also help to retain moisture. But not quite as good as plastic.
- Unglazed ceramic and good old clay pots loose the most moisture but are good for growing conifers.
- Wood can be like unglazed pots but can hold moisture longer within the wood better than clay pots do within the clay structure.
- One can also grow in a pot and then place the smaller pot into a larger pot surrounded by soil mix or just pumice or perlite. Let the tree root into the larger pot. This will reduce watering needs and add roots for faster growth.
- The dimensions of the pot are very important regardless of whether it is a container for growing, training or a true bonsai container. Is it shallow like for a forest or tray planting, is it deep like for a pine or semi-cascade, is it very deep like a cascade pot is it a slab is it a rock planting.

Watering by species of tree is very much dependent on soil mix and geographic location. Consideration of species requirements is important. As a general rule, when trees are actively growing, they require more water than when in summer "rest" or winter dormancy. Moisture use by a tree is directly dependent on many things but 4 of which are the most important: 1- growth rate, 2- climate conditions around the tree, 3- soil mix age and 4- soil mix components.

- Pines like drier soil in general but will do well with more moisture when growing new candles/needles.
- Junipers like drier soil but not quite as dry as pines. They like more moisture than pines but not quite as much as evergreens and deciduous conifers.
- Evergreens like Privet, Eugenia, like water but do not need quite as much as deciduous and semi-evergreen.
- Deciduous and semi-deciduous like water but it varies greatly between spring/early summer growth vs dormancy.
- Redwoods like water and can take up a lot of water through the foliage as they do in nature from fog and dew,
- Tropical types can take and do like lots of water. Some can live on normal amounts of water like many Ficus species like we grow here in SoCal...Microcarpa varieties like 'Melon Seed', Tiger Bark, Burt-Davyi, Microcarpa, edible figs and macrophyllas like the 'Moreton Bay' fig. Benjamina and its variants like 'Too Little' and 'Contorta' prefer a little more water. Other tropical types can be seen on wigertsbonsai.com and adamaskwhy.com.
- Succulent types like Jade, miniature Jade and Dwarf Jade/Elephants Food (Portulcaria) prefer life on the dry side.

It is better to discuss their needs on a case by case basis due to differences in geographics, soil mixes, containers and micro-climates effect on individual trees.

The micro-climate in the pot can be changed to reduce watering needs and keep the pot cooler to varying degrees.

- Add bark or gravel to the soil surface. One needs to move the cover away a bit to check for soil moisture but it will effectively reduce water needs by blocking direct sunlight and reduce the effects of the wind.
- Placing sphagnum moss into the surface soil will reduce water evaporation by brunting the effects of the wind and sun. Soil erosion is also reduced. Thickness of the layer determines the degree of effect.
- Installing drainage screen or gutter screen on top of the soil reduces moisture loss, soil erosion, can enhance moss growth under the screen, definitely helps to keep the sphagnum moss in place and lastly helps keep organic fertilizer cakes/chunks like BioGold in place and from being taken by animals.
- Wrap the pot with white frost protection cloth which is capable of allowing water and fertilizer through the material. The entire tree and pot can be covered with this material on really hot days if you cannot get the tree into some additional shade.
- Wrap the pot with aluminum foil but leave it open enough, or at least openable, to allow for watering. This has been seen at Tak Shimazu's working very effectively.
- Styrofoam is an effective cover for sun and water as many have seen at Roy Nagatoshi's nursery.

So, lots of factors to consider when thinking about watering and moisture loss from soil. Most of these things become second nature but at first can seem overwhelming and confusing. But then, so was learning to drive a car. Both watering and driving as car become routine but, does require some situational thinking.

When growing plants in containers, bonsai soils work differently when watering than does garden soil and nursery soil mixes. The principles of good percolation, good drainage, aeration, water retention and nutrient retention are universal...but so very importantly, the execution in achieving these goals is very different.

Bonsai soil's absorption, retention and drainage characteristics are superior to dirt and nursery soils for growing bonsai. But, like any container soil, even bonsai soil characteristics change as the soil mix ages. Note that depending on the components of a soil mix, one mix can age differently than another over time as they break down at different rates in different ways. As the soil mix ages, the roots replace much of the soil greatly increasing the density of the root ball. This all can lead to the common problem of compaction. Now we must add in one's own local water chemical makeup. Is it alkaline, neutral or acidic and how much mineral/salt? Local water utility analysis is available from your utility. Lastly what kind of fertilizer is being used. Is the fertilizer chemical or organic, is it dry or liquid, is it slow release granule or membrane, if organic does it contain much organic "debris" that does not breakdown on the surface. Is it granule, or dry powder-ish, mealy, liquid or solid like fertilizer cakes.

So, what does the above have to do with watering? Basic watering techniques and results of watering are affected by these factors; these factors will change and nuance how one waters over time. Soil component breakdown as with akadama, the accumulation of fertilizer salts, organic debris build up on the surface/top layer of soil from bark and many of the organic fertilizers, minerals and salts in the water, water pH (note that alkalinity and acidity is a different concept than water hardness/minerality).

Any soil mix does not dry at the same rate over time. There are two time frames to consider. One is the daily time frame we experience every day. The other time frame is the much longer time frame of the soil aging, breaking down and accumulating organic debris. One needs to become familiar with their soils and how it reacts to watering.

As a soil mix becomes drier, it dries even faster since the evaporative cooling is reduced and the temperature rises in the soil. This means a tree that is moist on the surface in the morning may not need water until mid to late afternoon or the next day, but the same tree that is dry on the surface in the morning will need water in just a few hours. Timing will also be affected by temperature and wind.