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Factors that Influence Watering

by Brent Walston

Introduction

I like to check for dryness by lifting the pot. It takes some experience to develop the 'feel' of a dry bonsai, but it works quite well. It is amazing how much an adequate amount of water will increase the weight of the pot. Of course this is only possible for smaller plants. I don't go around lifting 5 gallon cans to see if they are dry, or the monster bonsai. But since about 25% of the volume of a proper soil mix is water at the saturation point, this is a significant increase in weight, and one needs only to pick up a pot when wet, and then when dry, to tell the marked difference. Dryness can also be tested with a chopstick inserted into the bonsai pot as a sort of dipstick. When the chopstick is pulled out and it is nearly dry, it is time to water. This is a method advocated by Michael Persiano. A third method, perhaps used by most people, is to dig half an inch under the soil surface. If it is dry down to this point, it is time to water.

There are several factors that affect 'drying time' and they are all interrelated. For example, *Malus* and *Prunus* can tolerate denser soils under optimum conditions because they grow so quickly that the roots soon colonize it. This rapid top growth quickly pulls the water out. I have to prune all the time of course, so when I cut them back to form a new trunk section, they are now too wet until the top grows back.

Here are some of the factors I have found that influence the drying time:

Soil Mixture

The primary components holding water are: organic and inorganic fines (very small particles), peat moss, vermiculite, and clay. If you increase the amount of any of these amendments to your soil mix, you will decrease drainage, and increase the water holding capacity of your soil, which will increase the interval between watering.

Increasing the percentage of these elements to the point that the soil will hold more than 25% of its volume as water is not recommended. Beyond this point you may begin having root rot problems form decreased aeration (poor drainage).

The components that increase drainage (aeration) and reduce water holding capacity are: inorganic and some organic (bark) large particles (greater than 1/8 inch). These include lava rock, coarse sand, perlite, turface and other stable fired clay products.

Plant Size and Pruning

Fast growing leafy species colonize rapidly, drying out the soil. Root bound or even properly root colonized plants will dry a pot very rapidly. This rapid drying of the soil is very healthy for the plant, if you manage to water often enough. Each time the plant dries out it pulls a fresh charge of air into the root zone. Likewise, each time the plant is watered and the excess water drains, another fresh charge of air follows the water to through the root zone. I consider the ideal watering interval during the growing season for outdoor plants to be one day. This makes watering easy to remember or schedule, and will almost assuredly prevent root rot problems. Cycles shorter than one day inevitably lead to dry or wilted

plants on occasion.

Plants that are well root colonized in the pot shorten the watering interval as the top grows and demands more water. After a plant is top pruned, transpiration is decreased and the watering interval is again increased. For plants that are very susceptible to root rot, it is important to pay close attention to this factor.

Fertilizer

By affecting how fast the plant will grow, fertilizer can accelerate the drying time. It can also speed the decomposition of the organic portions of the soil, causing premature soil collapse which increases drying time and slows growth. Soil collapse due to decomposition is a much overlooked factor in plant growth, and water intervals. It can be avoided by using a higher percentage of stable inorganic material and high quality organic material such as fir or pine bark. Decomposed wood fiber products other than bark decompose very quickly and are generally unsuitable for bonsai. The same is true of garden or other compost.

Disease

Root rot will decrease the ability of the plant to take up water and slow the drying time. The symptoms of root damage can be very misleading. There are several diseases that cause the blockage of the plant's vascular system, preventing it from taking up water. The outward symptom is the wilting of the leaves. The natural inclination is to water the plant, but the problem is not a lack of water, it is the inability of the roots to take it up. This leads to overwatering which severely exacerbates the fungal problem. The solution is to let the plant dry out, not to water it. Whenever a plant wilts, first make sure that the soil is dry before watering it. If it is not dry, this can be a symptom of a fungal infection of the roots.

Wind

Wind will increase transpiration and decrease the watering interval. Strong winds, under even moderate temperatures, can very quickly dry out a plant. Some plants are much more vulnerable than others. In general you should not place bonsai in an area that receives prevailing winds. This can even be a problem in winter when the soil is frozen around the plant's roots. The roots cannot absorb water under these conditions, but the foliage and stems continue to lose water. It is very important to protect plants from wind under these conditions, and to make sure your plants are thoroughly watered before the onset of cold drying winds.

Sunlight

Sunlight will heat the plant and the pot, increasing transpiration and evaporation, decreasing the watering interval.

Bonsai grown in the hottest and driest areas of the country need to be located where they will get morning sun and afternoon shade. The fastest growth will occur where there is bright light and optimum (moderate) temperatures, so there is little growth loss for most plants by placing them in the shade in the heat of the afternoon.

Optimum light levels will result in the fastest growth which will also decrease drying time by promoting increased foliage.

High Temperature

High temperature will increase transpiration even in the absence of sunlight and decrease drying time. Temperatures above 80F, with morning to full sun, and moderate to low humidity, will usually mean watering every day for most established container plants (and bonsai).

High Humidity

High humidity will decrease transpiration, and moderate high temperature, which will increase drying time. Increasing humidity can be a valuable part of extending the watering cycle in hot dry climates. In our area, I can avoid watering twice a day by giving the plants one or two short (several minute) bursts of fine spray during the heat of the afternoon when the temperature exceeds 100F.

Pot Size

An extra volume of soil increases the reservoir of water and increases the drying time. For very fast growing, water thirsty species such as *Salix* (Willow), this is a must.

And finally

Many of these factors may be manipulated to control the drying to suit our conditions. I feel that the ideal drying time is one to two days while the plants are actively growing.

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