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Bonsai soil mix has always been a debatable matter. Some think that bonsai soil mix is just a matter of preference. Each master has his own opinion which has worked and has been proven for a long time. The bonsai soil mix will depend on what kind of tree, the type of soil where it was found in the wild, and the conditions of the place where you will grow your bonsai. There are so many factors to consider. Here are the basic components of a bonsai soil mix as I have read in books and websites.

Organics

Shagnum moss peat

wood chips

leaf mold

Granite Grit

Loam

Sand

Perlite

Vermiculite

Acadama

These components are mixed in different ratios depending on your bonsai. There are a lot of advises in books on how to mix. This is a very complicated matter and has not been perfected as a science.

For a beginner, the best way is to find a bonsai soil mix for general use that can sustain bonsai. Is there a magic bonsai soil mix that works for all? We'll see as we go on.

In my experience, using organics such as moss, peat, leaf mold, and wood chips are not good because these things rot and then decomposes and leave air pockets within the soil. This is bad as insects will dwell within it. Organics also decompose into very fine particles that produces dead zones or block your drain entirely. However, for beginners who do not apply fertilizers on a regular basis, using organics will help a lot. Mastering the use of fertilizers is one of the best ways to achieve control on the growth of your bonsai, and to avoid insect infestations.

Using Perlite or vermiculite is difficult because these are light materials that float to the surface during watering. It stratifies the soil in the pot wherein the lighter materials go to the top. It is also goes with the water as it overflows over the rim of the pot when watering. In time, you will lose your potting media and endanger some roots that will be exposed. Perlite and vermiclite are very light materials. It is not capable of holding the bonsai upright. When using this material it is imperative to tie your bonsai securely to the pot.

In the wild, trees grow anywhere regardless of soil condition. How is this possible? In the wild water flows only in specific path ways and water only exists in specific locations. That is where the fine roots are. It is not like in bonsai where the roots are spread evenly around the base. Some times there is only one long structural root running several meters far from the tree to a water reservoir deep below or far away. Roots always grow towards the source of water. A bonsai can not do this if it is confined to a pot. It can not search for water. It has to depend on you to water all the roots evenly. In the wild, when there is no access to water, there is no tree. In a field the best way to look for water or the best place to dig a well is beside a tree. If there is a tree, then there is definitely a near water source.

There are three primary things to consider in your bonsai soil mix.

1. Humidity

2. Porosity

3. Acidity and Alkalinity

Humidity

A bonsai soil mix has to maintain close to 100% humidity for the fine roots to survive. To achieve this, a bonsai soil mix must have the ability to retain moisture. However too much moisture can lead to bacterial growth, decay, molding or rotting over time. Most components of a soil mix such as acadama, perlite, and sand absorbs moisture inside the particles themselves. While synthetic media retains moisture in between particles. In order to reduce humidity the bonsai soil mix must be porous enough. If you want to increase humidity, a finer bonsai soil mix must be used.

Porosity

Porosity is a measure of the amount of void or empty space within the bonsai soil mix. Porosity is higher when there is a bigger empty space in your bonsai soil mix. The empty space space is not a big cavity, but rather the sum of all the many small spaces in between the particles distributed all over the bonsai soil mix. Porosity is important because this is where air could get in to supply oxygen to the roots. This is also where the water passes through to reach the roots and finally drain to the bottom of the pot. A compacted soil has no porosity. While a fast draining soil is porous.

Alkalinity and Acidity

It is difficult to know the requirement of each plant specie, however there is a rule of thumb for this. If the natural habitat of your bonsai came from rocky mountain ridges or rocky cliffs it needs an Alkaline bonsai soil mix. If it came from jungle, forrest, or lowlands, it needs and acidic bonsai soil mix. To adjust Acidity up, just put in more humus and organic matter in your bonsai soil mix. If you want alkalinity, use a cement pot or mix lime stone in your soil mix or put the lime stone in the gravel drainage layer at the bottom of the pot.

In my opinion all plants have the ability to survive in many types of environment. if there is no competition from other plants, such as in a pot. Any kind of bonsai will survive on a neutral soil. A plant can adopt to many kinds of soil as long as you have good porosity in your soil mix and ample humidity around the roots. Except for calcifuges.

Sand

Sand is by far the best bonsai soil mix that I have used for several years. I have spent so much time and killed a lot of bonsai in my search for the perfect bonsai soil mix. There are three things to remember when using sand as your growing medium. First, put the sand in a basin, and wash it thoroughly with water. Mix the sand with your hand or a small shovel while washing it away with running water, much like the way gold panners do. This will remove the fine materials and excess alkalinity in the sand. Use river sand as much as possible because this has been washed and neutralized by water for many centuries.When using volcanic dust sand, lahar, or granite grit wash it thoroughly. Second use a sieve to remove the small particles and the big particles. The sieve size should be 1 mm to remove the smaller particles less than 1mm, and 5mm sieve to remove the bigger particles. Third, use half concentration of fertilzer every week or every day depending on your bonsai. This is important because you have no organics in your soil mix.

In my experience the following are the advantage of using sand.

1. No insect infestation.

2. The soil doesn't dry up fast. It is more forgiving on watering schedule.

3. The roots will not rot even if you over water.