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Miniaturization

Over the past four years of writing articles on the art of bonsai for this magazine I have covered most of the basics like the various styles, some of the more technical issues like photosynthesis, xylem and phloem and a handful of our more popular South African bonsai species like the baobab, ficus and acacia. Through this exposure, and the efforts of various clubs nationwide, the art-form has gained a group of new and enthusiastic devotees. I receive emails on a daily basis asking a wide variety of questions, but it is often quite clear that many readers are still unaware how simple the process of creating a bonsai is.

Many people are still under the impression that there is a secret technique, a special muti or magic potion that bonsai growers spray on their trees to keep them small. There is no such thing, and despite what garden retailers and bonsai sellers would like you to think, there is not even a special fertilizer that will do the job any better than good old fashioned garden compost. The only special ingredient is time. Of course, there are good techniques and bad ones, and sometimes if overdone the good ones become bad, and sometimes even disasters can be beneficial. Four years ago I covered the basics of miniaturization, but many readers may not have read the article, so for the sake of revision, here is an updated version covering the basics of bonsai.

A tree will remain small if its root growth is restricted by a pot. This is the single most important factor in the creation of any bonsai. Natural bonsai are created when a tree grows in a soil-filled hollow in a rock. At the beginning of its life there is sufficient food and nutrients in the soil to allow the small sapling to develop in the same way as any other tree, but soon the small reservoir of soil becomes depleted of nutrients. The tree simply does not absorb enough raw growth material to grow much bigger. As the roots begin to press up against the boundaries of the pot or rock they will either be diverted, or the root tips will die off. When either occurs, they cause the roots to shoot new root tips along the length of the root creating a network of fine hair-roots. It is these hair-roots that are responsible for the intake of nutrients and water. If the soil is coarse, the root tips will often encounter small stones and obstructions that they have to pass around. This will increase the branching effect and create a healthier root system. If the soil is fine there will be nothing to divert the roots and they will be long and straight with relatively few hair-roots. Not so good.

The process is remarkably similar above the surface. All plants have an optimum surface area of leaves that when exposed to the sun will create energy using nutrients from the soil (photosynthesis). As the supply of nutrients diminishes, the tree will lose its larger leaves because they take too much food to sustain. Large leaves are fairly inefficient as far as the tree is concerned because a lot of water is lost through them via a process called transpiration. It is much more efficient for a tree to produce numerous smaller leaves to achieve that optimum surface area than a few larger ones. One can speed up the process by removing the larger leaves a few at a time.

Branching of the roots is caused by restricting their growth using a small pot, but there is nothing to restrict the growth of the branches and shoots. If left on their own the branches would grow wild and this is where the bonsai grower must apply a limited amount of technique to guide and shape the tree. Under natural conditions animals browse on the new shoots. We use tools like clippers and pruning shears to achieve the same result. Every time new shoots are pruned, a new set of shoots will grow from the nodes (the position where leaf stalks join branches), and the new set of shoots will have smaller leaves than the previous set of shoots. If the process is repeated continuously, before too long healthy compact leaf pads will result.

If the shoots are not regularly trimmed the new shoots will quickly grow too long and thick with a few large leaves. These new shoots will eventually consume all of the available food and water and rob the rest of the tree of these vital elements. The older parts of the tree will then wither and eventually die. So, instead of being cruel, the act of pruning a tree is very beneficial and is essential to the longevity of that tree.

Nipping the new buds of a tree is a very efficient way of controlling the growth of new shoots. Simply break or pinch the very end of new green shoots between one's thumb and forefinger. This is very similar to what the tree experiences when an animal browses on it.

Placing one's tree in full sunlight will also aid in reducing the size of leaves. If the tree is getting a lot of sun it needs a smaller leaf surface area to perform its required photosynthesis. It will then produce smaller leaves to reduce water loss. Sunlight also plays a roll in an important chemical process called Auxin Eradication. Auxins are growth hormones that are produced at the very ends of growing shoots. They control numerous growth processes in all plants but the most important one for us is that they make branches and shoots grow in length. Direct sunlight destroys auxins, so the side of a branch that faces the sun will not have auxins but the side in shade will have them. This will make the shady side grow faster than the sunny side resulting in the branch growing toward the sun. If the tree stands in full sunlight the auxins will be completely but temporarily eradicated from the tip of the shoot. For the period that there are no auxins present the shoots, branches and even the trunk will grow in width, which is exactly what is required for a good bonsai. Growth in width will also encourage new shoots to grow from the sides of the branches, each with a new auxin producing tip which should be nipped or pruned.

So, to recap, one's tree should be planted in a small container to restrict root growth. The soil must be coarse to aid in the development of a fine hair-root root system. The tree should be exposed to as much sun as it can handle without becoming sun burnt and the new shoots must be pruned or nipped as often as possible to eradicate auxins.

There you have it! No special tricks. No need to dance naked around one's trees on a moonlit night with broomstick in hand. The only magic involved is the magic of nature and we are confronted by this magic on a daily basis, but often we are too busy paying the rent to give it much thought.