

**BONSAI INFORMATION AND FREQUENTLY ASKED QUESTIONS:** Practiced for centuries in China and Japan, bonsai is the reproduction of natural tree forms in miniature. Bonsai trees are living miniature trees which increase in beauty and value as they mature over the years.

How often should I water my bonsai tree?

Unlike a houseplant, bonsai trees use a "free draining" type of soil because their roots cannot tolerate "wet feet". In addition, they are grown in significantly less soil and, therefore require more watering. Factors such as tree location, temperature, lighting conditions, quantity of soil used, and the changing seasons will determine the frequency of watering. You can get to know when your tree needs to be watered by observing the foliage, testing the soil with your index finger just below the surface, or just by the weight of the pot. (The drier the tree, the lighter it will feel.) To take the guesswork out of watering, we recommend an inexpensive moisture meter which works very much like a thermometer. Insert it into the soil and the movement of the needle will tell you if it is time to water.

How often should I fertilize my bonsai tree?

Because bonsai trees are cultivated in limited amounts of soil, adequate feed is very important. As a general rule, a small amount of feed is given in the spring and a larger amount in the fall. Feed for bonsai should contain three principle ingredients; nitrogen, phosphoric acid, and potash. It is also a good idea to use a fertilizer containing "cheated" iron. Water before fertilizing your tree and then apply at half the strength recommended by the brand's manufacturer. We rotate the use of brands since different manufacturers add different amounts of trace elements and minerals. We also add Superthrive which is a vitamin supplement to our fertilizer mix. You may find it simpler and easier to use slow release fertilizer granules (placed over the soil) whose nutrients are released with each watering.

How often should I mist my bonsai tree?

All trees grow in more humid conditions than our homes, offices and dormitories. So what can we do to provide this essential humidity? Misting the tree is only beneficial for a short time, so what we recommend is to place the tree on a humidity tray and add water to the tray. As the water in the tray evaporates it creates a humid environment around the tree 24 hours a day. When the water in the tray is gone, add more water. It's a good idea to separate the pot from the water in the tray by adding some pebbles to the bottom of the tray. This will prevent any roots from sitting in the water.

How much sunlight is required for my bonsai tree?

Sunlight, especially the ultra-violet ray, affects the growth of trees. Therefore, except in special cases such as immediately after repotting, extensive trimming, etc, bonsai should be placed in a sunny location. Bright light will also work well but the tree should not be placed more than 12" away from the direct light source. An east, west or southern exposure works best. A northern exposure will require the use of "grow lights" which should remain on up to 16 hours each day and the lamp should not be more than 2 inches from the top of the tree. Incandescent light is too hot and will not provide the various spectrum of light that is required to maintain your bonsai tree. If you do not have a window or light source that provides an east, west or southern exposure, be sure to select a bonsai tree that does well in lower lighting conditions.

How is miniaturizing a tree possible?

No one single technique is adequate to make a tree small. The fact that the tree is grown in a container, the trimming, pruning, repotting and other care given the tree -- all contribute to the final result of limited growth. Dwarf trees are often found in a natural environment, but in bonsai this environment is provided artificially. Bonsai are grown in shallow containers the size of which determines the amount of soil the roots are able to grow in. This environment definitely restricts the growth of the roots and its functions.

How do I trim and prune my bonsai?

The main objective of trimming and pruning is to shape the bonsai into the desired form and to reduce growth above ground in order to maintain a balance with root growth. The process of shaping begins when the tree is very young and is on-going as it continues its growth. Trimming is accomplished by using a sharp scissors or shears. This traditional tool is called butterfly shears or bonsai shears and is used for removing foliage and light branches. When heavier branches are removed, we call it pruning and the tool to use is the concave cutter, for which there is no substitute. The concave cutter allows you to remove small, medium and even large branches without leaving any visible scars. Some trees such as the Juniper should be trimmed by using the thumb and index finger to remove new growth and to prevent browning and a "sheared" appearance.

How do I prevent diseases and insects from infecting my bonsai?

As living trees, bonsai are susceptible to insect attacks and disease. Preventive and corrective measures include (a) keeping your bonsai in good health, since insects and bacteria tend to attack weak trees, (b) giving your tree ample light, fresh air and ventilation, (c) keeping the soil free of spent blooms and fallen leaves etc. You may also use an insecticidal soap spray which is not harmful to humans or animals. This soap derivative, however, may require more than one application to control the insect population. It's also a good idea to use this spray weekly to prevent any attacks.

How do I train my bonsai?

Wiring, a relatively modern method of training bonsai trunks and branches into the desired forms, has become commonly accepted. It is often used in place of, or in conjunction with the traditional methods of long-term pruning and hemp-rope binding. Copper wire that has first been annealed in a low-temperature fire is preferred. After it has cooled, it is wrapped around the branches in the direction the branch is to be bent. The branch should be bent once into its final position so as not to harm the cambium layer under the bark. The wire should be wrapped taut, but not too tight, and should be removed just before it bites into the branch -- between 6 and 12 months. The wire is removed with a bonsai wire cutter by snipping the wire at each turn, thereby allowing the cut pieces to fall to the ground. Never unwind the wire or use pliers to cut the wire, since this will damage the branches.

What is bonsai soil and why is it used for bonsai?

As noted previously, potted trees do not do well in soil that is always wet. Potting soil and top soil are heavy soils that can remain wet for weeks. Bonsai soil is a mixture of ingredients which allows the water to drain freely and at the same time, retain moisture. In addition, the ingredients allow the roots to breathe air and prevent compaction. There are two basic types of bonsai soil -- a conifer mix and a tropical/sub/tropical mix. Before adding any soil mixture, be sure to cover the drainage hole(s) with screening to prevent the soil from washing out of the pot. When re-potting, it is always best to use the soil mixture in its dry state.

How often should I re-pot my bonsai tree?

All potted plants will eventually outgrow their containers. While houseplants need to be "up-potted", that is, placed in larger and larger containers, we maintain the miniaturization of a bonsai tree by keeping the roots confined to the small container. On average, repotting will be necessary every 3-5 years, but the tree should be removed from its container and its root system inspected once a year. If the roots form a circular ball around the perimeter of the pot, it is time to trim the roots and repot. When repotting remember to (a) use only bonsai soil (b) remove air pockets by working the soil down through the roots (c) do not remove more than 20% of the root system (d) repot during the appropriate repotting season (e) water well and keep out of the sun for a week or two.

GENERAL BONSAI USEFUL INFORMATION ALL ABOUT BONSAI

Bonsai is a personal experience and anyone who tells you differently has not had the "bonsai experience." However, through our decades of intense interest in and tremendous love of bonsai, we have discovered that

there is a remarkable amount of personal satisfaction to be gained from sharing our interest with others. The way we see it is that the more people who become interested in bonsai, the more opportunities that will arise for us to share our beloved interest. That is what this section of our website is all about: sharing our interest. So, if you are interested in bonsai, or know someone who is, we invite you, through the following articles and items, to share with our family - here at the Tree Nursery - in the bonsai experience.

## WATERING BONSAI

**How Often Should You Water?** – When people walk into our nursery, this is, without exception, the most asked question. Unfortunately, there is no simple answer. How often you should water a bonsai tree depends on several different variables: what type of tree it is, what time of year it is, where is your tree kept, where do you live, and more than a few others. Watering bonsai is a constant balance between too much and too little.

**How Should You Water?** – The “best” way to water is to first wet the soil a little, this will improve the soil’s ability to absorb a larger volume of water, and then you should water thoroughly until the soil is saturated. Make certain that the entire soil mass gets wet - every time - you water and wait for the excess to run out of the drainage holes to be sure.

**When Should You Water?** – The “best” time to water is arguably early in the morning, before your bonsai begins its day of photosynthetic activities. However, it is important to be vigilant about its watering needs throughout the day, especially during the summer. Bear in mind that bonsai trees do not grow when the soil is wet and they do not grow when the soil is dry: it is only during the in between periods that your bonsai tree takes in water and nutrients. You also need to be aware of the amount of light your new bonsai is getting, the temperature of the room your bonsai is located in and the humidity levels of that immediate area. You also need to be realistic about your other life responsibilities, not only for their sake, but also for the sake of your bonsai. Work out a watering schedule that is realistically feasible. It makes no sense to schedule watering late in the morning, if you know that five days a week you’re going to be out the door by 7 AM. Be practical or you and your bonsai will be sorry.

**What Kind Of Water Should You Use?** – Water your new bonsai with room temperature tap water, because cold water has the potential to shock its roots. If you have the ability and the time to collect rain to water, that is great, but it is unnecessary unless the water in your neighborhood is unfit to drink - and, if it is, you might consider moving yourself and your bonsai somewhere safer.

## LIGHT

**How Much Light Does A Bonsai Require?** – Providing the correct amount of light for your bonsai is crucial to keeping it healthy. However, there are no simple answers as to how much light bonsai trees in general “require”. Light requirements are specific to the type of tree and are further dependent upon specific variations in the location they are kept -- namely your home. It is a good idea to speak to your local bonsai supplier or a fellow bonsai enthusiast that has experience growing bonsai in a setting very similar to your own.

**What Kind Of Light Is Best?** – Sunlight is by far the best type of light for bonsai trees and most other living creatures on earth. As such, the brightest window in your home is arguably the best spot for your indoor bonsai trees. However, the brightest window in your home may be located next to the fireplace. So, in a case like this you need to find an alternative and more practical location and use some type of artificial lighting system.

**What Kind Of Artificial Light Should You Provide?** – A grow light and timer are a simple solution for providing additional light. Set your timer for 12 to 16 hours of supplemental lighting and position your bonsai within 1 to 4 inches of your light source.

Again, speaking to a local bonsai supplier or enthusiast is invaluable. If possible, visit their homes to actually look

at their set up and ask questions.

## HUMIDITY

**Why Is Humidity Important For Bonsai?** - Although indoor bonsai slow their growth in winter and do not need as much water, they still do require sufficient humidity. Humidity helps to reduce water loss through the processes of transpiration. Transpiration will have a negative effect on your bonsai's ability to retain water and remain healthy.

**How Can Humidity Be Improved?** - The sometimes dry climate of a home or apartment can be altered to benefit your bonsai tree. Placing your bonsai on a "humidity tray" filled with decorative pebbles, that should be kept wet at all times, will help increase humidity levels. Another solution is regular misting. Misting is the most common humidifying method. It has the additional benefit of removing dust from your bonsai, which blocks sunlight and interferes with the exchange of oxygen and carbon dioxide. Be sure to mist using room temperature water to avoid shock.

**What Else Is Helpful To Prevent Dry Conditions?** - Keep your indoor bonsai trees away from breezy doors, windows and heating sources, such as vents, radiators, and fireplaces; to avoid quickly drying them out. While more sunlight is desirable, it may dry out your bonsai. So, maintaining a watering schedule during winter is just as important as during summer.

## FEEDING

**Why Do Bonsai Need Fertilizer?** - Bonsai containers are a man-made environment. As such, they require you, in order to maintain the health and development of your bonsai, to provide, in addition to frequent watering, a regular dose of fertilizer to the soil or growing medium.

**What Type Of Fertilizer Should You Use?** - Feed your bonsai with a balanced fertilizer, 20-20-20, at quarter strength, every other week. The numbers 20-20-20 are the percentage, by weight, of the N-P-K (nitrogen, phosphorus, and potassium) contained in that fertilizer. These elements, in addition to minor or trace elements, are necessary for cell division and enzyme processes that allow photosynthesis and the resulting growth to take place.

**What Does N-P-K Stand For & What Does It Do?** - N - Nitrogen is responsible for the size and amount of new growth and, to some extent, the green color of the leaves. Nitrogen is required for cell division and, also, protein manufacturing. P - Phosphorus is also necessary for cell division and is associated with good root growth and flowering. K - Potassium activates cell enzymes and is related with overall healthy cell activity.

**Bonsai Fertilizer Notes** - Always water your bonsai thoroughly before fertilizing and never use fertilizer on a dry tree. Never fertilize a sick tree, as fertilizer is not medicine. When you have finished a bottle of fertilizer, it is a good idea to purchase a different brand, as they all contain different amounts of trace elements and minerals. Exposing your bonsai to different amounts of these important trace elements and minerals is very beneficial. If you are not sure how much fertilizer to use, follow the directions on the label and never use more than recommended. Fertilizer is a good thing, but too much is a bad thing.

## TEMPERATURE

**Why Is Temperature Important For Bonsai?** - During winter months it is vital that you keep your new indoor bonsai warm -- Not hot -- but warm, somewhere between 50 and 70 degrees Fahrenheit. Where your bonsai falls on this guideline depends on where your bonsai is from "originally" and by this I mean where in the world your bonsai is indigenous... the warmer the native climate, the warmer the area in your home it should be located.

**How Can Temperature Be Monitored?** - The thermostat on the wall is a good place to start. However, a small thermometer can better monitor the actual temperature of the microenvironment that your bonsai tree is located in. Most garden centers will have small thermometers available for a reasonable price and purchasing a couple is a worthwhile investment, especially if your indoor bonsai are located in a couple different areas of your home.

**What Is Helpful To Avoid Temperature Fluctuation?** - Doors, windows, fans, heating systems and breezy hallways will all affect the actual temperature of a particular area. It is important for the health of your bonsai to be maintained at stable temperature. A sudden drop in temperature, as well as, a sudden spike in temperature can injure your indoor bonsai trees. Indoor bonsai should not be kept near a door that is frequently opened during winter months to avoid harmful cold drafts. It is important that you read the care guide that comes with your bonsai to help establish the best environment to maintain a healthy and thriving bonsai.

## AIR CIRCULATION

**Why Is Air Circulation Important?** - A location with adequate air circulation is very important for the long-term health of your new bonsai. The life sustaining process of photosynthesis requires an unrestricted exchange of fresh air and stagnate environmental conditions could compromise your bonsai's ability to continue its photosynthetic processes, by clogging the pores or stomata, located on the bottom of leaves, which bonsai trees use for this vital air exchange, through dust and debris accumulation.

**What Else Is Air Circulation Responsible For?** - A closed or confined space is the perfect environment for pests and disease, two of the most terrible enemies of bonsai trees. The regular movement of fresh air helps prevent pests, like spider mites, from establishing their webs and infesting and damaging your bonsai trees. Air circulation also assists your trees in the transportation of essential fluids from the roots to the leaves, by osmosis, which is a vital process. Air also prevents possible root rot conditions, from soil saturation, by assisting in water evaporation.

**How Can Air Circulation Be Improved?** - If your bonsai is kept indoors or inside a greenhouse, you might consider leaving a door open, or cracked, and a fan, or fans, running. Spraying and misting your bonsai off regularly will help to remove all dust and debris from the bottoms and tops of leaves, allowing your bonsai to "breathe" freely and to continue its photosynthetic processes.

**BE CONSCIENTIOUS** - If you are having trouble breathing in a confined area, so is your bonsai.

## PESTS & DISEASE

**How Can I Prevent Pests & Disease?** – When working to prevent the possible injury or death of your beloved bonsai, the best defense is a strong offense: be vigilant by keeping your bonsai clean, dust and debris free and cleared of fallen leaves and flowers; be sure sufficient lighting is supplied, as well as, good ventilation and lots of fresh air. A healthy bonsai is without a doubt the most important preventative of pests and disease.

**How Can I Treat Pests & Disease?** – Unfortunately, even the most observant bonsai enthusiast is likely to encounter some type of pests or disease during their endeavors. It is healthier for your bonsai to be treated for pests and diseases in incremental steps of increasing toxicity. The first thing to try to change is your bonsai's current environment. This technique is the simplest and safest. Quite often a change of location can help an ailing bonsai and if it does not, at the very least, you know that your bonsai's problem is probably not environmental.

The second incremental step would be to try, if possible, to introduce biological controls such as ladybugs. Ladybugs are of no danger to your bonsai and they will eat nearly all pests that are. Of course, this technique is limited to outdoor locations. The third incremental step would be to use chemicals, also in levels of increasing toxicity. To start, you can try spraying a very mild solution of warm water and liquid dish soap on your trees. This technique is an excellent way to prevent a wide variety of diseases and helps in discouraging many types of

pests. Multiple applications may be required to achieve and maintain a healthy bonsai, but the rewards will far outweigh the efforts.

The fourth incremental step would be to try using a mild insecticidal soap such as the brand name: Safer. This multi-purpose soap derivative offers effective control over most pests. This type of insecticide is one of the mildest and safest, for humans, animals and bonsai - something of a vital importance, especially if you have children and pets. The incremental step of "last resort" would be to use an actual "chemical" spray, such as: Schultz's insecticide. It should be handled carefully and used as per manufacturer's recommendations.

An Additional Note about Pests & Disease? – When and if you find yourself staring at an unwanted visitor to your bonsai, remain calm and then picked up the phone and call your local bonsai supplier or a local bonsai enthusiast and ask for experienced advice. Your visitors will leave sooner and your bonsai will live longer.

## BONSAI CONTAINERS

What Kind of Container Should You Use? - The answer to this question depends upon the function of the container itself. Fundamentally, there are two kinds of bonsai pots: training pots and display pots. If your bonsai is in the training stage, then the pot you need to use is a functional training pot. Training pots are available made of plastic, mica, and even wood. Mica training pots are my personal favorite, as they are available in very large sizes at very reasonable prices. Nevertheless, there are many options and here at Bonsai Boy Nursery we have them all here for you to choose from. At this critical stage in the development of your bonsai, the most important thing is that you use a pot that is practical. It must reasonably and safely hold all of the soil or growing media that is required to provide the space for a healthy and stable root system to develop, good branching and the desired trunk thickness. It is essential that any bonsai pot have large drainage holes to insure no water gets trapped at the bottom of the pot, because waterlogged roots will rot and be fatal for your bonsai. Your bonsai will never really be ready for a display pot without all of these vital development stages having already taken place in a training pot.

What Types Of Containers Are Most Appropriate? - If your bonsai is fully developed to your complete satisfaction and you are preparing to show it, then it is definitely time to choose a display pot. Display pots are usually ceramic, because they must be frost proof, and are available with either a glaze or an unglazed finish. The most suitable display pot is one that enhances and not overshadows the beauty of your prized bonsai.

The most appropriate type of pot is an aesthetic, as well as, an able consideration and depends largely on the type of bonsai you are displaying and its horticultural requirements. The beauty of a deciduous or flowering bonsai is greatly enhanced when matched with a glazed pot of a soft, attractive color, such as: light blue, cream, or green. Conifer and evergreen bonsai when paired with an unglazed pot of an austere color, such as: brown, gray or reddish clay, are perceived in a way that reflects the severe environment of their natural habitat. The length of your bonsai pot should be in direct relation to the height of your bonsai. A tall bonsai, in general, requires a long pot. In conjunction, the depth of your pot should be relative to the thickness of your bonsai's trunk. A thick trunk usually commands a deeper pot. Of course, size guidelines are just that - guidelines. The needs of your specific variety of bonsai will dictate, for the most part, the size of the display pot you can safely utilize.

How Are Pots Pertinent? - The most pertinent feature of pots is that their form must follow their function. If a pot cannot sustain your bonsai, then it really doesn't matter how good it looks, because it will soon be empty.

## DID YOU KNOW? ...

... That the bark of a tree has three very important and practical functions: It is waterproof, so it prevents leaking from the phloem; It also houses small structures, called lenticels, that allow the tree to breathe; and the bark's third function is to protect the phloem from all kinds of impacts, abrasions and attacks from pests; including: insects and fungi.

... Those wounds on bonsai trees do not heal in the same manner as the wounds of humans and/or animals. That is to say, trees are not able to repair damaged tissue; instead they continue to manufacture a new layer of cells with each year's growth, until the wound is entirely covered over. The length of time this 'healing' process takes depends upon the size of the wound and the overall size of each new annual growth ring.

... That if you look at a cross-section of a tree trunk you will see rings and each of these rings indicates a full year's worth of life and growth. Scientists can tell by the thickness or thinness of a ring in which year more rain and more subsequent growth took place. Accordingly, a thick ring indicates a year with more rain and more growth and a thin ring indicates a year with less rain and less growth. This analysis is one method that curators of arboreta can use to tell when an injury occurred to an imported bonsai that is of an unknown age and approximately how many years it took for that injury to 'heal' or be completely calloused over. Scientific researchers and meteorologists can also use this method in their study of weather patterns from hundreds of years ago.

... Those mature trees, both bonsai and those on the front lawn, develop what is known as a 'collar' around the base of the largest branches. This swelling takes years to develop and is caused by the up and down, forward and backward, motion of the largest and heaviest branches as they are pushed to and fro by the whims of Mother Nature. These collars are important to those of us practicing bonsai cultivation, because they help to quicken the bonsai's healing processes by enabling wounds - specifically those wounds that are left after the pruning of large branches - to heal more rapidly.

**Tools for Bonsai What Kind Of Bonsai Tools Work Best?** – There is a specific bonsai tool for every specific bonsai activity and using the correct tool is the "best" tool and the best way to get the correct results. Tools for the practice of bonsai have been around for as long as bonsai itself - thousands of years. So, it is not necessary, nor practical, for a bonsai beginner to purchase a complete set of bonsai tools. As your interest in bonsai cultivation grows, so should your collection of bonsai tools. With each new bonsai endeavor you undertake, you will inevitably purchase the tool necessary to properly perform that endeavor – trust me.

**What Kind Of Tool Should You Purchase First?** – Consider a pair of shears as your first bonsai tool. They will enable you to keep your new bonsai neatly trimmed and styled. Bonsai shears are available in many quality grades and even a mid-level grade is relatively inexpensive and very easy to put to use.

**What Kind Of Tool Should You Purchase Next?** – As your interest in bonsai intensifies, and it undoubtedly will, you should seriously consider purchasing a concave branch cutter next. The concave branch cutter, much like shears - and the majority of all bonsai tools - is available here at Bonsai Boy- in a number of quality grades and a couple different sizes. The main function or use of a concave branch cutter is to remove branches. As its name suggests, the shape of the cut mark left on the trunk or branch is concave. When used properly, the concave branch cutter leaves a wound that is somewhat taller than it is wider and slightly concave; and this promotes the rapid and even healing of the wound, with very little scarring. The concave branch cutter is indispensable to bonsai and a great "next" tool.

**Other Tools You Should & Will Consider?** – A pair of bud scissors, soil sieves, knob cutters, wire cutters, a root hook, and trunk bender will all soon be tools you need and want. The Art of bonsai is one that grows with you, literally and figuratively. As your bonsai interest grows, so too, will your knowledge, skill level and tool collection.

## Botanical Terms

**Botanical Name** - All plants have a name that is unique to them and this is often called the Botanical name, although some people prefer to use the term: Latin name or Scientific name, instead. Plant names are based on

the Latin language, which was considered the universal language during the 18th century when a vast majority of the "naming" of newly discovered plants was taking place. Botanical names are descriptive. They describe many characteristics specific to that plant such as: the place of origin, color, growth habit, leaf size, bark texture, etc. Botanical names all have two main parts: a genus (generic) name and a species (specific) name:

**Genus** - The genus or plant family. Plants in the same genus are closely related (family). Plants in the same Genus have similar characteristics, so when you see the same genus name you'll automatically know something about the plant. Plants in the same genus may interbreed with each other and if they do the resulting plant is a hybrid (see below). Example: Acer - maple

**Species** - A species is those plants that are the same and will produce viable offspring. Plants in the same species always interbreed with each other. This certainty makes a species a species. Plants within a species can, because of their environment, climate and soil differences, vary in some small ways, such as: different leaf color, size, shape etc., so, as a result, within species you can have: sub-species, varieties, cultivars and hybrids. Example: Acer Palmatum – Japanese maple

**Sub-species** - A subspecies is a variety within a species that shows identifiable characteristics different from other subspecies. It is usually geographically separate from other subspecies. These are still able to produce viable offspring when two subspecies within the same plant species are brought together. Example: Acer palmatum ssp. amoenum – Japanese red maple "Oshio Beni"

**Hybrid** - A hybrid is a blending of two different species, usually breeding desirable traits into the new plant. When different species within a family or different families produce offspring, the new plants are called hybrids. Example: Acer x conspicuum 'Silver Vein' – Snake-bark maple

**Cultivars** - cultivars are plants that have features desirable to the person "cultivating" them. These desirable characteristics have been deliberately selected and can be reliably reproduced in plants under controlled cultivation. Many cultivars are the result of careful breeding, producing hybrids that have desirable leaves, flowers or growth habits. To continue the desired attribute, grafting, layering or cuttings are used to propagate the cultivars. Cultivars are valued, because they insure that a plant will be exactly like the named plant sought. Example: Acer Palmatum Dissectum – Lace leaf weeping Japanese maple

The descriptive information inherent in Botanical Terms is important for learning about and locating a specific plant.

## BONSAI TERMS

Having a working familiarity with bonsai terminology will enable you to effectively express all facets of your bonsai activities to others, both more and less skilled than yourself, in the bonsai community. The following list of words and definitions will help you on your way to becoming fluent in the unique language of bonsai:

1. Accent Plant – a small plant that is put on view in conjunction with a bonsai; usually when a bonsai is being formally displayed at a show or exhibition; also called a companion plant.
2. Air Layer – a method for propagating trees through the removal of a large branch or section of trunk from an existing tree, or bonsai, to create a new tree.
3. Akadama – a traditional Japanese bonsai soil that is comprised of the red volcanic matter of Japan; used for thousands of years by bonsai artists on most types of deciduous bonsai trees.

4. Apex - the very top or highest point of a bonsai tree.
5. Back budding – a process of encouraging new growth on a branch where growth is currently non-existent.
6. Broadleaved - trees, mainly deciduous, with broad, flat leaves; non-conifer trees.
7. Bunjin – a traditional Japanese bonsai style; also called literati. This is a tree that has a tall, slender trunk with foliage growing only near the top; illustrating maturity and the casting off of material things.
8. Buttress - the area of a tree trunk where the roots meet the soil surface; usually styled to convey strength.
9. Callus – the scar tissue that forms over a wound where a branch has been pruned off of a tree; it is part of the tree's healing process.
10. Cambium – the thin layer of green colored cell tissue growing between the bark and the wood of a living tree.
11. Canopy – all of the upper-most branches that form the top of a tree.
12. Chokkan - a traditional Japanese bonsai style; also called a formal upright. This is a tree that has a very straight trunk with symmetrical branching; illustrating strength and order.
13. Collected tree - finding and taking a tree from its natural habitat; a tree that has been shaped by the forces of nature alone.
14. Conifer – a tree that bears cones; mainly evergreen trees such as: pines, cedars, spruces and junipers.
15. Cross – a hybrid resulting from cross-fertilization between species or varieties.
16. Crown – the upper section of a bonsai where the branches spread out from the trunk.
17. Cultivars - cultivars are plants that have features desirable to the person “cultivating” them. These desirable characteristics have been deliberately selected and can be reliably reproduced in plants under controlled cultivation.
18. Cut-leaved – a bonsai that has leaves which are shaped in very distinct segments.
19. Deciduous - a tree that has a seasonal growth cycle where new foliage is produced in the spring, then grows throughout the summer, turns colors in autumn, and drops in the winter, leaving buds on the branches for next spring's new foliage.
20. Defoliation – the practice of removing all leaves to encourage new shoots and potentially smaller leaves.
21. Dieback - the death of the tips of branches, or whole branches, due to extreme weather or possibly one of several diseases.
22. Divided leaf – a leaf formed of separate sections that emerge from a common base.
23. Division – a method of propagating shrubs by carefully dividing the root ball and replanting the separated sections.

24. Dormant – the period of the year when little or no growth occurs; usually late autumn and throughout the winter months.
25. Dwarf – a variety or cultivar that is smaller than the species tree, but retains all of the characteristics of a full size species tree.
26. Evergreen – a tree or shrub that retains its leaves throughout the year.
27. Fertilizer – is “food” for trees, shrubs and plants; usually comprised of NPK: Nitrogen for the foliage, Phosphorous for the roots, and Potassium for the flowers.
28. Foliage pad – a mass of foliage on a branch; sometimes referred to as a cloud.
29. Fruit – the part of a plant that carries the seeds; usually berries or fleshy or pod like.
30. Fukinagashi - a traditional Japanese bonsai style; also called windswept. This is a tree that has its trunk and branches swept back in one direction; illustrating a tree exposed to very forceful winds.
31. Genus – a unit of classification for a group of closely related plants.
32. Germination – the moment a seed starts into growth, developing roots and shoots.
33. Girth - the circumference of the trunk of a tree, measured at just above the root base.
34. Grafting – is a commonly used method for propagating trees, when propagation by seeds or cuttings is impractical or impossible.
35. Han-Kengai - a traditional Japanese bonsai style; also called semi-cascade. Where the branches and trunk of a tree are swept down to one side, but not below the top lip of the container; illustrating a tree subject to violent winds and weather.
36. Hardy – a term used to describe trees capable a withstanding winter frost.
37. Hokidachi - a traditional Japanese bonsai style; also called broom. Where the trunk is straight with symmetrical branches and has its foliage arranged in a semi-circular dome or broom shape.
38. Humidity – the amount or degree of moisture in the air.
39. Internodal distance – the length of stem between two nodes or leaf joints.
40. Ikadabuki - a traditional Japanese bonsai style; also called raft. Where the tree is laid on its side and its branches are trained vertically and arranged in a group formation.
41. Ishitsuki - a traditional Japanese bonsai style; also called root over rock. Where the tree has its roots arranged so they have grown over and in the crevices of a rock.
42. Jin – is a branch, which has been stripped of its bark and cambium to represent a dead branch; illustrating great age or harsh conditions.

43. Juvenile foliage - the young leaves of a tree that produces two distinct shapes of leaves; the second type being mature foliage.
44. Kabudachi - a traditional Japanese bonsai style; also called clump. Where the trees' trunks all grow from the same point on the root mass and are more crowded in appearance than a regular group planting.
45. Kengai - a traditional Japanese bonsai style; also called cascade. Where the branches and trunk of the tree are swept to one side and hang below the container; illustrating a tree on the edge of a mountain cliff subjected to fierce winds.
46. Leader - the main shoot at the top of a tree, usually indicating the uppermost continuation of the trunk.
47. Lime Sulphur – a chemical used to whiten or bleach a section of stripped branch or trunk in order to preserve a jin or shari.
48. Loam – a soil mixture comprised of clay, sand and organic matter. 49. Mame - a term used in size classification of bonsai trees; this being a small bonsai.
50. Moyogi - a traditional Japanese bonsai style; also called informal upright. Where the trunk curves through its taper up to the apex.
51. Nebari – the exposed surface roots of a bonsai.
52. Needle – a type of leaf that is narrow and usually of a stiff texture, like those found on a black pine tree.
53. New wood – a stem or twig on a bonsai that originated during the current season's growth.
54. Nitrogen – an essential element of plant nutrition; identified by the chemical symbol N; aids in growth of stems and leaves.
55. Node – the point on a trunk or branch where the leaf buds emerge.
56. Old wood - a stem or twig on a bonsai that originated during the previous season's growth or at an earlier time.
57. Peat – partly decomposed organic matter; when it is used as an ingredient of potting soil it assists in moisture retention.
58. Perlite – a form of volcanic rock that is heat treated to develop a lightweight, coarse granule that when used as a component of potting soil has advantageous ventilation and water retention properties.
59. Phosphorous - another essential element of plant nutrition; identified by the chemical symbol P; aids in development of roots, ripening of fruits and seeds.
60. Pinching – is a technique used in bonsai cultivation of controlling and shaping the growth of foliage by pulling off soft new shoots with the finger and thumb in a pinching motion.
61. Potassium – the third essential element of plant nutrition; identified by the chemical symbol K; it encourages

strong new growth, development of flower buds and fruit formation.

62. Pot-bound – the adverse state of a container grown plant where the root growth has filled the container to the extent of eliminating all vital air spaces.

63. Prostrate – the characteristic growth habit of a plant that naturally tends to grow along the ground instead of upright.

64. Pruning – the process of controlling the shape and growth rate of a tree by cutting back the shoots, stems and branches.

65. Raceme – a type of elongated flower that is composed of individual stalks all growing from a central stem; ex. Flower type found on wisteria trees.

66. Ramification - the dense branching structure of a bonsai that only develops after years of repeated pruning of the branches.

67. Repotting – the practice of replanting a bonsai tree at regular intervals to perform health maintaining tasks such as: root washing, inspecting, pruning, soil refreshing, and potting in a different or larger pot; all imperative to the health of a bonsai.

68. Rootball – the large mass of roots and soil visible when a tree is taken out of its pot or pulled from the ground.

69. Root pruning – the practice of cutting back the roots of bonsai in order to make room in the container for fresh soil and to encourage new root growth.

70. Rootstock – is the root system and main stem to be used as the base of a new tree when propagating through grafting.

71. Scion – is a small section of a tree, which contains all of the desirable characteristics of the parent tree that will be propagated into a new tree through grafting on top of the rootstock.

72. Shakan - a traditional Japanese bonsai style; also called slanting. Where the trees' trunk, appears similar to the formal upright style, but the trunk is slanting to one side.

73. Shari – an area where the bark and cambium have been removed from the trunk to suggest the struggle against fierce weather such as: wind, lightning, snow and ice.

74. Species – the unit of classification for a plant with identifiable characteristics.

75. Suiseki - stones that appear to look like large boulders or mountains and represent the spirit or essence of each; sometime used in a formal bonsai display.

76. Taproot – the large root of a tree that grows vertically downward, anchoring it into the ground; it is usually referred to in bonsai, because of its need to be pruned shorter or removed for container cultivation.

77. Tokonoma - a Japanese tradition of creating a specific area in the home where bonsai, accessory plants, Suiseki, and scrolls are displayed together in harmony.

78. Wound sealant – a number of compounds formulated to seal cuts made on branches or the trunk of bonsai to prevent the loss of moisture and promote healing.

79. Yamadori - trees collected from the wild, which have been shaped by nature alone and have been collected to be developed into bonsai.

80. Yose-ue - a traditional Japanese bonsai style; also called a group or forest. Where the trees are arranged in a container to resemble a group or forest of trees.

### Tree Physiology

Photosynthesis – Bonsai trees and plants in general, use light energy from the sun to convert carbon dioxide and water into glucose and oxygen. This process is called photosynthesis and without “it” there would be no “us”, so in a very real sense, bonsai is life! Photosynthesis takes place in the green parts of trees and plants, the leaves. The green color of leaves comes from the chlorophyll molecules in the chloroplasts.

Chloroplasts - Chloroplasts contain the essential life-giving photosynthetic pigments. Each chloroplast is like a tiny carbohydrate factory and out of this little factory comes the food for the plant, or bonsai tree, and practically every other living thing on earth - including you and me. Carbohydrates create more than is needed to perform the photosynthesis process and this "excess" carbohydrate material gets converted into starch. (An important carbohydrate is sugar or glucose - a basic fuel and building material for much of life.)

Starch – Trees and plants turn this "excess" carbohydrate material into starch and store it for later use. The peak of starch content, in plants, usually occurs around the middle of the afternoon. By using enzymes the plant slowly turns the insoluble starch back into sugar or glucose, which is then dissolved and passes into the phloem to be moved throughout the plant by osmosis (the loss of water molecules from the leaves of a plant, Transpiration, creates an osmotic gradient, which produces tension that pulls water upward from the roots and throughout the tree). These vital processes continue right on through the night, making room in the leaf for the next day's life-giving photosynthetic process.

Xylem - The xylem is the principal water-conducting tissue of vascular trees and plants. The xylem also takes part in food storage and the conduction of vital minerals to the leaves. Together the xylem and phloem form a continuous system of vascular tissue extending throughout the plant.

Phloem - The phloem is the portion of the vascular system in plants, consisting of living cells arranged into elongated tubes, that transports sugar and other organic nutrients throughout the plant. The phloem is the principal food-conducting tissue of vascular plants.

Transpiration - Transpiration is the process of water loss from trees and plants through stomata. Transpiration occurs when stomata open in a humid surrounding and close when it is dry. Stomata - are small openings found on the underside of leaves and are connected to vascular plant tissues. Transpiration is a passive process, largely controlled by the humidity of the atmosphere and the moisture content of the soil. Transpiration also transports nutrients from the soil into the roots and carries them to the various cells of the plant.

Is Bonsai, Really, Interconnected To Life? – In all seriousness, without trees and plants there would be no life on the planet Earth. For me, bonsai makes living on this chaotic and frenzied planet of ours more peaceful and enjoyable. So, yes, Virginia, bonsai is life....

## DID YOU KNOW? ...

... That the oldest bonsai in the national collection is over 300 years old. The bonsai is a White Pine that is affectionately known as the Yamaki Pine, in honor of its donor, Masaru Yamaki. The Yamaki began its life in the 1600s and, despite being less than five miles away from the impact site, it survived the atomic bomb blast at Hiroshima, Japan, in 1945.

... That several of the bonsai in the national collection were given as gifts to various Presidents of the United States. In fact, in 1998, the Japanese Prime Minister, Mr. Obuchi, gave President William Jefferson Clinton an 80-year-old Ezo Spruce. The gift was truly significant to the national bonsai collection for two reasons: the first and most obvious reason is the fact that it is a masterpiece and the second, and lesser-known reason, is that the gift of an Ezo Spruce - any Ezo Spruce - to an American president is significant, because the United States maintains a long standing ban on the importation of all Ezo Spruce and, as a result, the national collection has been without an Ezo Spruce specimen.

... That for many species of deciduous bonsai trees the size of the leaf is directly related to the type and amount of sunlight the tree is cultivated in. A bonsai that is grown in partial shade or in full shade will have longer and larger leaves, because the tree is trying to maximize the amount of sunlight it can absorb to enable it to continue its photosynthetic processes - a larger leaf has more surface area with which to gather sunlight. In contrast, a bonsai tree that is grown in direct sun, all or most of the time, will have smaller and more compact leaves, because it is receiving all of the sunlight it needs. As a result, it can devote its energy to growing. This is important for all trees, but more important for trees cultivated for bonsai, as smaller leaves are proportionate to the smaller scale of a bonsai tree; smaller leaves are, therefore, a positive trait, both aesthetically and from a horticultural perspective, because a tree is healthiest when it has access to all of the energy it needs to develop.

... That an evergreen tree, such as a pine (black, white, red, scots pine, etc....) does not keep its needles for-ever. In fact, while evergreen trees do not shed their needles in a blaze of autumn splendor, along with the deciduous trees, every fall, they do replace their needles in two or three year cycles. Accordingly, evergreen trees remain for the most part, always green, because younger needles remain on the branch, as more mature needles are replaced.

## YOUR BONSAI CAN OUTLIVE YOU - THEORETICALLY

Can A Bonsai Tree Live Forever? Trees, in general, can and will outlive all of us - many times over. The giant redwood trees, indigenous to the West Coast of the United States, are some of the oldest living creatures on the planet. It is understandably difficult for some people to equate or associate a 200 ft. tall redwood tree with a 12 in. tall bonsai tree, but nevertheless they are both trees. In the case of bonsai trees, the simple fact that they are "trees" genetically, and "bonsai" trees by way of human intervention, gives them the innate capability, under favorable circumstances, to live for several centuries - at least and forever - theoretically.

Of course, there are scores of circumstances and variables, some controllable and many others not, that all have the potential to enable or to prevent a tree, be it a bonsai or not, from living for very long.

A tree in nature and growing under what we will assume are "perfect" conditions, will grow until it reaches the natural predetermined height for that species. Once this height has been realized, the tree commences its natural habit of growing or, to put it another way, spreading sideways, enabling the tree to support as much foliage as possible. After centuries of this continued growth pattern, what happens is that the distance between the active and effective roots at the edge of the trees root system and the now massive amount of foliage at the incalculable number of branch tips is just too vast. As a result of this natural process, the tree starts to weaken and will eventually die.... Why? Because the foliage has grown too far away from the active roots – its leaves are now receiving inadequate amounts of life giving water and nutrients and, in turn, the leaves are unable to supply

sufficient sugars to the root system. In due course, this course being centuries long, the heartwood will rot and the tree will collapse.

**How Can A Bonsai Live Forever?** The main difference between a bonsai tree and a tree growing naturally in the wild, as mentioned above, is human intervention. A tree in nature, growing in perfect conditions, will grow until it reaches the maximum dimensions for that species, with consideration given to the specific environmental conditions that it is exposed to, and inevitably it will die. Conversely, a bonsai tree, which it is not a "species" of tree, but rather a traditional set of techniques and styles for growing and caring for a tree - almost any kind of tree can be trained as a "bonsai" tree - is prevented from ever reaching its maximum dimensions through regularly pruning of both the root system and branch structure. A non-bonsai example of this pruning technique extending the life of a tree is that of trees that are grown as hedge. Hedges live much longer than their full-size counterparts growing in their natural habitat, because they are never allowed to reach their maximum dimensions. My Aunt Agnes still lives in the home that her father built and the hedges that separate their property lines were planted by her grandfather before the war - World War Two! While the practice of trimming hedges is not exactly like the practices of branch and root pruning in a traditional bonsai sense, it is a good "Western" gardening style example of how the life of a tree can be extended through regular and careful human intervention.

**So, Then, How Does One Keep A Bonsai Alive Forever?** Trees that are being: grown, nurtured, trained, and developed using traditional bonsai techniques have the very real potential of living forever. The reason this potential exists is because a bonsai grown by a professional (and so must yours for the same incredible results to be possible) is cared for very precisely and very meticulously. On a daily basis the every need of the bonsai are met, starting with the essentials of proper watering and sunlight exposure. And on a seasonal basis, the bonsai's health is monitored and maintained through the observation and pruning of the trees root system. This enables potential problems to be seen and addressed before they can jeopardize the health of the bonsai and the pruning encourages the development of healthy new roots. The branch structure is also monitored and maintained on a regular basis, allowing branches to be removed if they are deemed as possibly dangerous to the tree and beneficial new shoots are allowed to grow so that they may benefit the future health of the tree.

This careful and calculated care management keeps the bonsai in a constant state of growth, because the bonsai, just like its full-size cousin on the front lawn, is genetically programmed to achieve maturity. The essential difference is: by preventing the bonsai from reaching maturity, you are preventing it from ever reaching old age and falling victim to the troubles that inevitably go along with aging process. A bonsai tree - your bonsai tree - if given the proper and essential care, will always remain healthy, growing, and youthful. And, if everyone that is responsible for its care, after you become mulch, continues to care for it properly, it will and should out live them, as well!

**Why Do Leaves Change Color?**

**Have You Ever Wondered Why Leaves Change Color?** The answer to that perplexing query begins with this question: what are leaves? Leaves have been dubbed as: nature's food factories. During the spring and summer leaves serve as factories where a large amount of the foods necessary for the tree to grow are manufactured. The process that trees utilize to turn water and carbon dioxide into sugar is called - photosynthesis. A chemical called - chlorophyll - enables photosynthesis to take place. Chlorophyll is what gives leaves their green color. Along with the green pigment of chlorophyll, there are also yellow and orange pigments - carotenes and xanthophylls - that, for example, give the orange color to carrots. However, most of the year these colors are masked by the large amounts of green coloring from the very busy chlorophyll.

**Why Does this Change Occur?** As summer ends and autumn begins the days progressively become shorter and the amount of light that trees receive is reduced. Along with the changes in daylight hours, overall temperatures become cooler. It is these two principal changes that "tell" trees the time to begin getting ready for winter has

arrived. Trees start preparing for their winter dormancy by shutting down their food-making factories, their leaves. The reason they do this every year at the same time, is because there are not enough hours of daylight for photosynthesis to take place. When the leaves stop their food-making processes, the chlorophyll begins to diminish. The prominent green color of the leaves dwindles, as the yellow and orange colors permeate the leaves, giving them their celebrated fall grandeur.

**Do Other Changes Occur At This Time?** As the traditional fall colors emerge, additional chemical changes occur, resulting in the development of anthocyanin pigments. These pigments produce a bonus number of brilliant colors ranging from red to purple. Cool temperatures - above freezing - favor the formation of anthocyanin, thus producing bright red leaves on maples and deep purple leaves on dogwoods and sumac trees. Temperature, light, and water supply all have an influence on the degree and duration of the colors of autumn. Rainy and overcast days have a tendency to amplify the intensity of fall colors and an early frost can weaken the brilliant colors of fall.

It is the combination of all these things that create the striking colors we enjoy so much every fall. The mixtures of yellow, orange, red, and purple are the result of chemical processes that take place inside the tree as, outside, the seasons change from summer to autumn and then to winter. One of my favorite ways to enjoy the awesome colors of autumn is with a big bag of candy and my favorite Halloween costume.... Trick-or-Treat!

## THE PRACTICE OF DISPLAYING BONSAI

**What Elements Are Utilized In The Display Of Bonsai?** Displaying bonsai is an art unto itself and whether you display your bonsai formally in a show or informally in your home or in your backyard, a creative and compelling display will give you and everyone who views it a completely new appreciation for bonsai. An awareness of the traditional elements associated with the display of bonsai is advantageous to the success of your display and having a keen awareness will enhance your understanding of and appreciation for the art of bonsai display.

The traditional elements of bonsai display include: a bonsai tree, a display table or stand, an accent item, and a scroll. Each of these elements plays a vital role in the display by constructing, generating, and producing an emotional and intellectual panorama. The bonsai tree is and always should be the most important component of every display. An exceptionally intriguing bonsai that is truly inspiring can conjure up an entire panorama by itself and, therefore, may be used in a display alone; though this is rarely the case, do not let that stop you from working to create such a masterful bonsai.

If it is necessary to give more hints or evidence of the setting you are trying to suggest, then an accent item should be added to the display. If still more "information" is required, then a scroll can really provide a desirable impact and can help to complete the impression being made by your display. When presented harmoniously, these elements will enable you to successfully produce, in the mind of the viewer: a landscape, a season, or a secret mystical spot – a panorama of the mind, if you will.

**What Is The Purpose Of The Display Table or Stand?** The purpose of the display table or stand is to raise the bonsai tree up to the ideal viewing height. This viewing height is traditionally considered to be halfway up the trunk of your bonsai. This height enables the viewer to distinguish, and more easily follow the main trunk line of your bonsai. By directing the viewer's attention to this focal point, the displayer can influence what the viewer perceives and determines as noteworthy. The bonsai and the accent item should both be positioned on a table or stand to raise them from the bench. However, it is important to remember that the dominant element of your display, the bonsai, should be placed on a higher table or stand than the accent item - ensuring that it is unmistakably regarded as more significant.

On a practical level, the table or stand you utilize can be: antique, modern, a slab of wood, or a bamboo mat - but you must use a stand in your display. A table or stand that is more versatile is one that looks appropriate with

several different types of trees and is, therefore, much easier to work with. This versatility is something to take into consideration when choosing a table or stand to purchase. The legs of the display table should look sturdy enough to support your bonsai tree, but not appear overpowering. Dark woods, such as Rosewood and Mahogany, are preferable for use with most kinds of bonsai, but a light colored wood, such as bamboo, may be used with a flowering bonsai, such as an azalea, or with a flowering accent item, such as a miniature host.

**What Is The Traditional Purpose Of The Accent Item?** The purpose of the accent item is an important one and an appropriately selected Accent item will enhance the overall display. An accent item can be almost any "item" that helps to evoke in the mind of the viewer a notion of a landscape, a season, a secret mystical spot or whichever natural phenomenon that the displayer is presenting to them. When selecting an accent item there are a couple of things to keep in mind: always remember that the bonsai tree is the dominant and most significant element in the display and that the accent item is there to enhance and not overpower it. Also, remember that it is important for the overall harmonizing effect of your display to select an item that inhabits the same region as the bonsai being displayed. It would be an incongruity to have a bonsai tree that is indigenous to a warm climate presented alongside a small plant or animal from a cold mountainous area. This type of circumstance would actually detract, instead of contribute, to your display. Accent items should not be randomly chosen elements that are scattered throughout the display to brighten it with color or draw chaotic attention. Accent items should be elements that bring to the display a semblance of something natural or in nature: by adding a few pebbles you can depict a babbling brook, bringing a sense of sound and movement to your display; a quail or some geese resting can signify the coming of autumn, bringing a sense of time to your display; a crane or a young boy catching fish will suggest thoughts of summertime and youth....

**What Is The Purpose Of A Scroll And Its Selection?** The purpose of the scroll element is as important as the accent item and selecting a suitable scroll will augment the overall effect of the display. Original silk scrolls are exceptionally expensive and in Japan a serious art collector will pay millions of dollars to own the work of a particular artist who is famous for their scroll paintings. Of course, you do not have to spend millions of dollars to purchase a Japanese scroll in order to effectively present your display. Any store or shop that specializes in Asian Décor will certainly have a selection of reasonably priced scrolls for you to choose from. The important thing to keep in mind when selecting a scroll to purchase is that it, just like the accent item, lends itself to the overall feeling of your display. A scroll can be a painting that portrays anything that will help bring to mind, for the viewer, an impression of a landscape, a season, or a secret mystical place that the display is offering to the viewer's imagination. For example: a mountain vista promotes the sense of a mountainous area where a pine tree would obviously be indigenous to, a seagull evokes thoughts of the coast, and a scroll painting of a snow-covered hill connotes winter.

All of these traditional elements when displayed in faultless accord assemble, produce, and bring into being an emotional and intellectual panorama - taking bonsai to the next level. As stated above, this panorama resides in the mind of the viewer and as each viewer has different powers of perception, the panorama they perceive, and their reaction to it, will be unique to them. A perceptive viewer and a compelling display will result in a successful collaboration, leaving one to ponder one of the fundamental conundrums of our time: "Does life create art, or does art create life?"

**Are There Cultural Differences Regarding The Display Of Bonsai?** One of the cultural differences concerning the display of bonsai trees is, very basically, that traditional Japanese homes are architecturally and characteristically designed so as to contain within the structure itself a Tokonoma or – a place of honor – where bonsai are arranged and displayed on a seasonal and celebratory basis throughout the year; while in a typical Western style home, a bonsai display would, more likely than not, be arranged outside or in an outside setting, because bonsai – and the practice of displaying bonsai - is not culturally traditional in the West (...yet!).

## Methods of Tree Propagation

Why Is Tree Propagation So Significant? - Trees that are sought-after for use as bonsai material have several characteristics that make them appropriate for the smaller design arrangements of bonsai. These characteristics assist in the persuasive reproduction of nature from a miniature perspective. The range of characteristics desirable for use as bonsai material include: form, color, branch and trunk structure, bark texture, a wide range of leaf shapes, sizes, and textures, and for pines - a wide range of needle shapes, sizes, colors, and textures. The ability to faithfully reproduce trees that contain these desirable characteristics, through the use of different methods of propagation, is essential to the future of these valuable varieties of trees, and by extension, to the future of bonsai, itself.

Growing Bonsai from Seed - There are two very advantageous features to growing bonsai trees from seed - for both beginning and experienced bonsai enthusiasts. The first advantage is that you can grow "hard to find" species of bonsai trees for a relatively small price. A pack of bonsai seeds can be purchased, on average, for under \$5. The second, and most important, advantage is that once your seeds have successfully germinated and your trees begin to grow, you can control every aspect of your tree, at every stage of its development into a quality bonsai. The size, shape and style of your trees are yours to control from the very beginning.

Cuttings - Cuttings are one of the most popular methods to propagate quality bonsai material. Cuttings are an excellent propagation method, because they will create numerous trees that are genetically identical to the "parent" tree or bonsai. By taking cuttings, you can create new trees from a tree that contains the characteristics you consider to be important and suitable for a bonsai tree to have. An additional reason that makes cuttings one of the more popular ways to propagate bonsai material is that it is faster than starting bonsai trees from seed. Some species of trees will produce a rooted, growing tree - from a cutting - before the seeds of another tree can even sprout! Saving you tons of time and, quite often, weeks of worry.

Air layering - Air layering is a method for propagating trees through the removal a large branch or section of the trunk to create a new tree. One of the main attractions to propagating bonsai material through air layering is that you can create a sizable new tree with in one growing season, as opposed to the other methods - except collecting - which all involve several seasons of development. Removing a branch from a desirable tree or bonsai requires the removal of the bark, cambium, and phloem. This prevents carbohydrates and photosynthesis from flowing down the trunk, past the removal site, but still allows water and mineral nutrients to flow upward to the leaves through the xylem. The removal site should be 1" wide all the way around the branch. It must then be protected with sphagnum moss, peat moss or other water retaining media, wrapped to in dark poly or tin foil and allowed to root. When there are enough roots to sustain the branch independently (approximately between 3 to 6 months depending on species) the branch is cut off of the "parent" tree and then the new bonsai is planted in the ground or a large, deep pot.

Grafting - Grafting is a commonly used method for propagating trees, when propagation by seeds or by cuttings is impractical or impossible. Grafting techniques are often applied at nurseries for reproducing large numbers of a desirable species for use as bonsai material. The species of tree to be grafted it is called the "scion" and the tree to which it will be attached is called the "root-stock." Customarily, the "scion" is of a fine or unusual species and the "root-stock" tree is usually a common version of the same species.

Collecting - Creating a new bonsai tree by "collecting" wild plant material is certainly the most thrilling method of bonsai propagation. Finding a tree in its natural habitat that has been shaped by the forces of nature alone is tremendously exciting. It is one of those few phenomena that defies description and must be experienced to fully appreciate. Collecting a tree from the wild is best done in early spring and with the explicit permission of the landowner. When collecting a tree it is important that you dig up a large amount of soil surrounding it, in order to avoid shocking your the tree and then immediately transplant it into your growing garden or a large, deep training

box. Collected trees usually require a couple of seasons to recover, so don't attempt collecting your first tree, until you feel you are skilled enough to care for it during this extended time of rehabilitation. Collected trees hold a special place in the world of bonsai and are, by virtue of their unadulterated form, highly venerated.

#### DID YOU KNOW? ...

... That autumn is the most favorable season of the year to prune a majority of deciduous bonsai. There are at least two good reasons for this: first, the fact that all of the leaves have dropped off of your bonsai is a good sign that it has entered dormancy and, therefore, will not 'bleed' or lose sap when it is pruned (although it is still advisable to apply 'cut-paste' or 'wound sealant' to all sizable cuts); and second, now that the bonsai is bare you can see and reach undesirable and/or dead branches that had been covered and made unnoticeable and/or inaccessible by the trees seasonal foliage.

... That bonsai trees, as well as, other trees and plants, are capable of absorbing synthetic nutrients through their foliage - oftentimes more readily than through their roots. When foliar feeding, be sure to carefully follow all of the manufacturers' instructions and never foliar feed in direct sunlight, as leaves can burn quickly. While applying synthetic nutrient, use a spray to mist the foliage and be sure to check the undersides of the leaves, as there might be 'pests' hiding. This is also an ideal time to check the wires and make sure that they are not digging into the bark.

... That it is important to use both round and sharp shaped particles when mixing the components for your bonsai soil. The reason for this is that round components, which do not compact, provide good aeration, however, they allow a tree's root tips to grow unobstructed and this encourages upright and very strong top growth – an unwanted characteristic for bonsai culture. On the other hand, sharp shaped components, which do have a tendency to compact, interrupt the passage of a tree's new root tips, forcing them to divide, thus resulting in varied shoot growth and more sideways top growth, which is a positive growth characteristic for bonsai culture.

... That the two jumbo jets that very carefully carried the very generous Japanese gift of 53 bonsai trees and 6 viewing stones for our country's bicentennial celebration were insured for over 5 million dollars and that after their safe arrival the bonsai were kept in quarantine for an entire year before they were put on display.

#### SOIL BASICS

**What Is Bonsai Soil?** - Bonsai "soil" is a mixture of organic and inorganic compounds that provide a suitable growing media for the cultivation of bonsai trees within the confines of a bonsai container. A bonsai container or pot is an unnatural and restrictive environment that, consequentially, requires a very well draining soil mix to maintain a healthy bonsai tree. Bonsai soils that work well in a specific set of environmental conditions, may or may not, work well in the specific microenvironment of your backyard. So, it is recommended that you to speak with your bonsai supplier or another local bonsai enthusiast that has experience growing bonsai in your locale.

**What Kinds Of Bonsai Soil Are Available?** - There are many kinds of bonsai soils available for sale from your local bonsai supplier, but the Japanese soils are, in my humble opinion, of the highest quality and consistency. They are composed of clay granules that have been heated at extremely high temperatures, so that they will resist compacting and will maintain their structural integrity for long periods of time. The Japanese soils include: Akadama – general purpose bonsai soil that is suitable for most deciduous trees; Kanuma – a yellow colored Japanese soil from the Kanuma region of Japan that is great for azaleas & acid loving bonsai; Kureyu – a soil that is suitable for most conifers.

**What Type Of A Soil "Mix" Should I Use?** - There are no "absolutes" in bonsai and soil mixes are no exception. There are, however, some general soil guidelines that work well for certain types of bonsai trees. All of these mixes contain some combination of the same three major components: grit, organic, and loam. Grit, also called

aggregate and sand provides vital drainage for the soil mix. Organic, which is peat moss, pine bark, and leaf mold, provides water retention qualities for the soil mix. Loam, is a combination of sand, organic and clay, sometimes added by portion to augment the specific needs for a soil mix.

Is Using The Proper Soil Important? - Yes. All things in regards to bonsai are interrelated: environmental conditions, water, the time of year, fertilizer use, pruning practice, light, shade and soil. So, using the proper soil is important for growing healthy bonsai trees.

Deciduous bonsai soil mixes should be “approximately” 60 % organic material to 40 % grit and an alternative soil for deciduous trees is the Japanese Akadama. Azaleas and rhododendrons bonsai soil mixes should be “approximately” 50 % organic to 50 % grit and an alternative soil for acid-loving trees is the Japanese Kanuma. Conifers bonsai soil mixes should be “approximately” 30 % organic to 70 % grit and an alternative soil for conifers trees is the Japanese Kureyu. Indoor or Tropical bonsai soil mixes should be “approximately” comprised of 70 % organic to 30 % grit.

REMEMBER - local climactic conditions will help dictate what type of soil mix you should use for successful bonsai in your particular locale, so be an informed enthusiast.

## GRAFTING

Why Do We Graft? - Grafting is a commonly used method for propagating trees, when propagation by seeds or cuttings is impractical or impossible. The species of tree to be grafted it is called the “scion” and the tree to which it will be attached is called the “root-stock.” More often than not, the “scion” is of a fine or unusual species and the “root-stock” tree is, to some extent, a common version of the same species.

The “root-stock” tree should be of the same species as the “scion” tree in order for a successful grafting to take place and a healthy tree be produced. A frequent match for bonsai grafting is: a five-needle pine “scion” grafted onto a Japanese black pine “root-stock.”

Why Is It More Desirable? - Grafting techniques are often applied at bonsai nurseries for reproducing large numbers of a desirable species. Trees that are desirable for use in bonsai have characteristics suitable for smaller design arrangements, which will persuasively reproduce nature in a miniature perspective. A range of desirable characteristics for use in bonsai include: form, color, branch and trunk structure, bark texture, a wide range of leaf shapes, sizes, and textures, and a wide range of needle shapes, sizes, and textures - for pines.

Why Is It More Expensive? - Grafted trees are expensive for two reasons: The first being grafting itself is a horticultural challenge that requires years of dedication – depending on species, only 10% to 80% of grafts will take; a comprehensive education – instruction of the many and varied grafting techniques is essential for success; and an artistic sense – as unsightly scars and uneven trunk tapers are detrimental to a tree’s value.

Secondly, a masterfully grafted tree will contain several desirable characteristics, which do not occur naturally, making it an excellent candidate for use in bonsai. Examples Of Grafted Trees That We Offer For Sale Include: Lace leaf Maples green and red they are great looking trees and make wonderful bonsai.

## WITCHES' BROOM

What Are Witches' Brooms? - A Witches' Broom is a localized area on a tree that has, as a result of disease, insect infestation or adverse environmental conditions, developed an abnormally high branch, or tuft of branches, with unusually small stem elongations making it exceedingly dense, especially in comparison to the rest of the tree. This tall and very dense growth of branches loosely resembles an upside-down witch's broom.

Why Is Witches' Broom Material Sought After? - In a certain sense, a witches broom is like an untrained bonsai that just happens to be located in the canopy of a full-sized tree. This odd analogy will hopefully help you to appreciate why witches brooms are sought after for use as bonsai material. Contained within the tuft of branches in witches' brooms are characteristics complimentary to the endeavors of bonsai design and development. The dense branching and complete distinctive traits of the parent tree make witches brooms a more than suitable source of bonsai material.

How Do We Use Witches' Broom Material? - Through grafting and cuttings, witches' broom material is used in the propagation of many popular dwarf varieties of trees; such as: the Bird's Nest spruce and the Little Gem spruce. Both of these valued trees are dwarf varieties of the Norway spruce. A bonsai tree propagated from witches' broom material is trained as any other bonsai material would be and there is a good chance that one of the trees in your collection started its life as a witches' broom.

A Few Examples of Witches' Brooms: Witches' brooms developed for bonsai in Japan are called "Yatsubusa". This is the Japanese for "many budded", reflecting the dense characteristics of their branches. These dwarf varieties of trees are designated or described as such in the labeling of their name, for example: *Cryptomeria japonica* 'Tenzan Yatsubusa'; *Ulmus Parvifolia* "Yatsubusa"; and *Acer Buergerianum* "Yatsubusa".

## DWARF CONIFERS

What Is A Dwarf Conifer? - A dwarf conifer is often defined as a tree that fails to attain the size and stature of the parent plant. To be more precise, a "dwarf conifer" is simply a slower growing version of the parent plant (or species) and, as such, you could plausibly have a "dwarf conifer" that over a very long period of time grows to a height of 8-10 feet! The name conifer is derived from the Latin "conus", meaning cone and "ferre", meaning to bear, so conifers are those trees that are cone bearing.

Why Are Dwarf Conifer Desirable? - The typical landscape of your average home today is limited in scope, thus making size an important factor when selecting landscape plants. The compact, slow-growing characteristics of dwarf conifers make them an excellent choice when space is at a premium. Many commercial nurseries saw this need for smaller trees and propagated many of today's most popular dwarf conifers from witches' broom material. Their efforts have proven to be beneficial to the bonsai enthusiast, as compact size and slower growth rates, make dwarf conifers excellent candidates for container cultivation of bonsai.

How Can A Conifer Be Identified? - One method of identifying any conifer, dwarf or otherwise, is to look at its leaves. Conifers have linear, needle-like or scale-like leaves that are readily visible and very distinct from the wider and flatter leaves of deciduous trees. Pines, spruces, hemlocks and firs are all good examples of trees that are evergreen and bear cones. There are also several species of trees that are deciduous and bear cones, including: Larch, Dawn Redwood, Golden Larch and Bald Cypress.

## DID YOU KNOW? ...

... That the trunk of a bonsai tree contributes more to the illusion of age than any other design element. Accordingly, you should first focus on developing a well formed trunk that has - depending upon the style objectives you are working towards - good taper, smooth curves, uniform slant, etc. The other design elements of your bonsai, such as: branch location and foliage distribution, root spread, leaf reduction and overall scale can be established later on in the design process.

... That there is only one exception to the "rules" that govern the pruning of flowering bonsai - and that exception is azalea bonsai. Azaleas are highly prized by bonsai enthusiasts around the world for many of their traits; one of them being that their flowers come in a very wide range of remarkable, and even multiple, colors. However, azaleas produce their flowering buds at the tips of the previous year's growth, so pruning should not be done in

late summer, like the rest flowering bonsai should, they should be pruned shortly after flowering - or you will be pruning off the flowering buds and, as a result, you will have no flowers.

... That you can provide a dormancy period for your bonsai by keeping it in the refrigerator. Temperate climate bonsai trees need a dormancy period, of at least six weeks, in order to maintain their health and vigor. If you want to keep your bonsai tree indoors, it must be supplied with everything it needs survive, including: proper light, temperature conditions, water, air circulation, humidity, and a dormancy period, if that particular species requires.

... That many of the health concerns that trouble bonsai trees, regardless of which species they may be, are much like those that trouble humans - in that they are easier to prevent than they are to cure. Being neat, orderly and vigilant throughout your daily "care and cultivation" routine will be more beneficial to the long-term health your bonsai than a closet full of chemicals or a room full of specialists, by enabling you to spot a problem for it becomes a dilemma.

## CANDLES

What Are "Candles"? - A candle or candles (plural) is the descriptive term used for the soft new needle growth on your pine; and "candling" is the bonsai practice of "pruning" those new needles before they are fully elongated to create and shape a shorter and tighter foliar mass.

When Is The Proper Time To Candle? - The proper time to "candle" or "prune" pines is in the spring. It is a good idea to speak to your bonsai supplier or another bonsai enthusiast in your area to get an experienced opinion for the "most advantageous" time of the spring to candle in your particular locale.

How To Candle Your Pine? - Start to the candle your pine at the lowest branch. Be sure to use both hands and make sure the entire candle is not pulled or broken off. Remove about 50 percent of the candle by pinching it between your thumb and index finger (using your thumbnail). Leave all weak branches untouched and wait at least five days before moving up to the next branch level. After that, follow the same procedure upwards candling slowly and safely on your pine.

Some Candling Concerns? - It is vital that you candle in stages, from the bottom on to the top, because the stronger growth is at the top of the your pine and if you started to candle at the top, the pine would automatically use all of its energy to repair the top section and bypass the lower, weaker, sections. This could result in the loss of an important lower branch. If your bonsai is healthy and well established, you can remove up to 75 percent of the candle to maintain a tight, well-shaped bonsai. Be sure to carefully monitor weak sections, as well as, carefully reigning in the stronger ones. Candling done correctly will produce an attractive and compact bonsai.

## WIRE & WIRING

Why Do We Wire? - We wire because it allows us, the bonsai enthusiast, to train, to shape, to style, and ultimately, to create bonsai. Bonsai is a living art form. It is collaboration between nature and us. Nature provides the inspiration and we must provide the imagination. Wire provides us with our artistic license. That license gives us the freedom to place a branch where our imagination tells us one is needed. It allows us to give movement to the motionless. It provides us with the ability to supply stability where stability is required. Wire is an essential tool of the bonsai artist and wiring is an essential skill of the bonsai artist. So, it behooves anyone serious about bonsai to become proficient at and familiar with, wire and wiring.

Types of Wire? - There are two types or kinds of wire used in bonsai: copper and aluminum. Copper wire is stronger, but in my experience, is less forgiving. If it is not monitored very closely, it will invariably bite into your bonsai, scaring bark and branches alike. Aluminum wire, on the other hand, has one-quarter the strength of copper wire, but it is easier to apply and easier to remove. These two fundamental characteristics make aluminum

wire an advantage for the beginner and a blessing for the experienced.

**How Should You Wire?** - The rule of thumb for selecting the proper gauge wire is to use a wire that is roughly 1/3 the width of the section of your bonsai that you are planning to wire. Apply the wire at a 45-degree angle; making certain that it is wrapped neither too tight, nor too loose. Bending the trunk or branch, should be done using both hands. It is important to support the trunk or branch, as much as possible, as you proceed. Be sure to hold the wire from behind with your thumb, as you proceed forward, bend the wire and not the trunk or branch. If you are wiring the entire bonsai, it is best to begin with the trunk and then move on to the largest branch and then to the next largest branch and so on... Also, it is imperative that you wire in the direction of yourself. It is easier and safer, because you will be able to avoid wiring over any buds, leaves or twigs that may be hidden by your arms or hands; and on a pragmatic level, you will be able to cut off the excess wire as you reach the very end of the branch.

**When Should You Wire?** - You should always secure a bonsai that has just been repotted with a wire running up from the bottom of the pot through the drainage holes. In regards to what season is optimal to wire your bonsai for styling purposes, the answer is: it depends upon what type of bonsai you're styling. If you grow pines, it is often recommended that you wire in the late fall or early winter, when sap levels are low and trees are more flexible. If you grow deciduous trees, then early spring - before your bonsai leafs out - is a good choice, as a leafless tree allows you to see the entire branch structure clearly. As for when to remove the wire from your bonsai, the safest answer is: before it bites into the bark of the tree. If you are using copper wire, checking weekly is prudent. If you are using aluminum wire, checking bi-weekly is advisable. You should only remove wire with the use of wire cutters. Trying to unwind a wire usually results in a crack or split, which is followed immediately by inconsolable weeping.

**Wire & Wiring Concerns:** Only wire a healthy bonsai. The wiring process stresses your bonsai and if it is already weak, you may be hastening its journey to the pearly gates. Also, it is a good idea to allow your bonsai to dry out for a couple of days before wiring, because a slightly dehydrated bonsai is more flexible and less likely to split or crack while being wired.