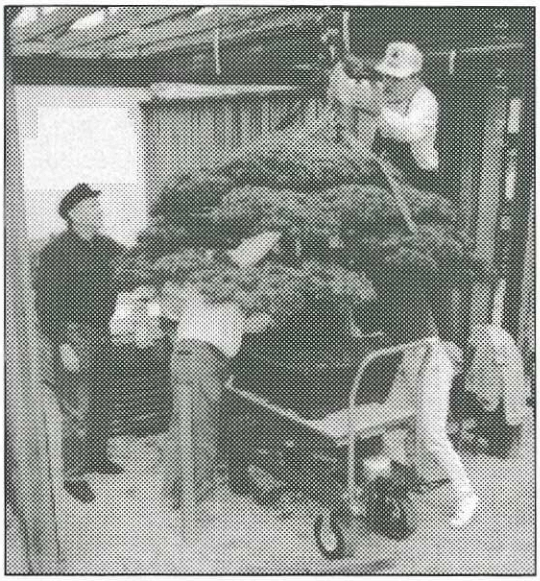
PBA Clippings
NEWSLETTER OF THE POTOMAC BONSAI ASSOCIATION
Volume 28 Number 8 • October, 1998



Dave Garvin, Warren Hill and Marci Hill working to remove the 372-year-old white pine from its container under supervision of Jack Wells and Bill Orsinger. (Donor: Mr. Masaru Yamaki)

Dan Chiplis, Jack Wells, Dave Garvin, Warren Hill and Jack Cardon after the old pine was root-pruned.

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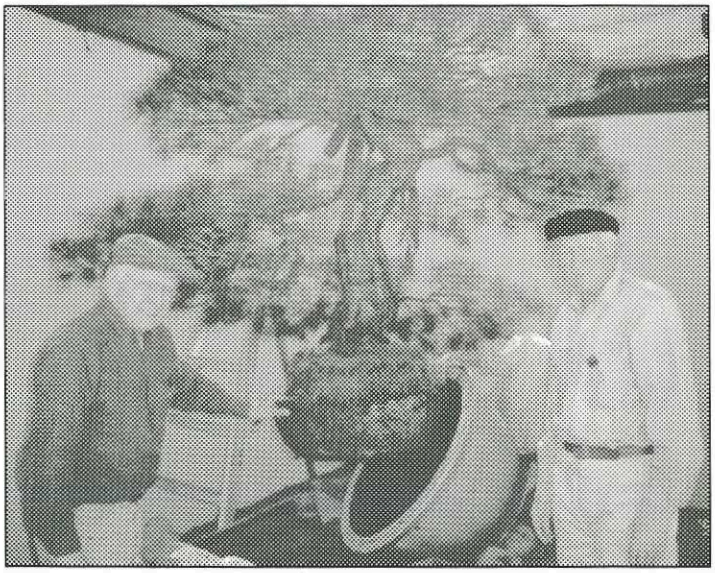

Bill Orsinger and Jack Cardon with the red pine donated by The Imperial Household.

REPOTTING GIANT BONSAI: from the Japanese Pavilion, National bonsai and Penjing Collection. After looking at these photos, one can recognize the advantage in keeping smaller bonsai, especially if one wants to be hernia free.

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EDITORIAL October '98

by Jules Koetsch

The last issue of *PBA Clippings* digressed from the subject of bonsai to cover the age-old pastime of collecting rocks. Remember it wasn't too long ago the "Pet Rock" craze struck many people around Christmas time? I vaguely remember that some mongol general carried his good-luck rock wherever he went a-conquering. The rock rode in a special covered wagon. The Japanese say that rocks are the bones of the earth. There is an ancient belief held by the Japanese and the American Indians that a stone, especially an unusual or attractive one, may have a spirit residing in it. One of my favorite books is "Secret Teachings in the Art of Japanese Gardens" by David A. Slawson, Kodansha Ltd, New York; 1987. The book relies in part on two Japanese manuscripts - one written in the 11th Century and the other in the 15th Century.

The 11th Century book advises the following: "Placing sideways a rock which originally stood upright, or setting upright a rock which originally lay sideways, is taboo. If this taboo is violated, the rock will most assuredly turn into a 'rock of revengeful spirits,' and will bring a curse." Also: "You are not to change the position of a rock from what it was in the mountains. Placing a rock so that the part which was underneath is on top is called 'reversing the rock,' and is to be avoided. To do this would anger the spirit of the rock and would bring bad luck."

Another caveat from the book is that in placing the stone, it should be set on some rice to make the spirit in the stone extremely happy.

I wonder how many of the viewing stones are mounted on their stand or dai where the above considerations have been followed.

However, it's not hard for anyone who gets involved with bonsai to get interested in collecting viewing stones. One's rock collection will not need the daily attention required by a bonsai; and it will not cause any deep remorse such as one feels when a bonsai gives up the ghost.

Furthermore, if one is into bonsai, one is certain to run across forms of Japanese poetry termed "haiku" and "tanka." For those who are not familiar with these terms - haiku has a poetic rhythm consisting of three lines containing precisely 5, 7 and 5 syllables in the Japanese language. Tanka is longer with 5 lines containing 5, 7, 5, 7, and 7 syllables. Doris Froning, when she was editing her publication "Mame Bonsai Growers of America," would put in a haiku with almost every issue. Many were originated by her readers. The interesting point concerning haiku is that every poem references some aspect of nature. Writing poetry in the Orient dates way back in time when scholars and nobility held poetry contests. Poems were written on fans, silk scarfs, and scrolls. I do not know how true it is that Emperor Hirohito wrote his edicts in haiku. The courtiers may have had to take time to decide what the emperor wanted, but at least the edicts were brief, not like our government laws. They would win Al Gore's award for brevity in writing but perhaps not for being readily understood.

Of all the haiku, there is one which is considered by many to be the

Continued on page 11

Meeting location and club contact number for additional information is as listed unless otherwise noted in calendar listing. A member of any one club is eligible to participate in any PBA or PBA member club event.

Baltimore Bonsai Club
Cylburn Arboretum, Baltimore, MD.
3rd Sunday, 1 PM
(410) 668-1868

Bowie Bonsai Club
Bowie Community Center, Bowie, MD
Last Monday, 7 PM
(301) 350-3586
(202) 667-1016

Brookside Bonsai Society
North Chevy Chase Recreation Center, Chevy Chase, MD
3rd Thursday, 7:30 PM
(301) 365-7621

Chesapeake Bonsai Society
Call for meeting time and location
(410) 263-2748

Kiyomizu Bonsai Club
Clearwater Nature Center, Clinton, MD
4th Sunday, 2 PM
(301) 839-2471

Lancaster Bonsai Society
Manheim Twp. Park, Stauffer Mansion
Lancaster, PA
2nd Thursday, 7 PM
(717) 872-5941

Mei-Hwa Penjing Society
(Chinese language spoken)
Bowie Community Center, Bowie, MD
2nd Sunday, 1 PM
(301) 390-6687

Northern Virginia Bonsai Society
Greenspring Horticultural Center, Annandale, VA
2nd Saturday, 10 AM
(703) 575-5616

Rappahanock Bonsai Society
Call for meeting time and location
(540) 775-4912

Richmond Bonsai Society
Imperial Plaza, 1717 Bellevue Ave., Richmond, VA
4th Monday, 7 PM
(804) 527-4000 Ext. 4621

Washington Bonsai Club
U. S. National Arboretum, Washington, D.C.
3rd Saturday, 2 PM
(301) 587-6898

Organizations sponsoring regular events of interest to PBA members:

U.S. Botanical Gardens
(202) 226-4082

U.S. National Arboretum
(202)245-2726

Calender of Events

OCTOBER

10 - 18 Visiting Bonsai Exhibit at the National Arboretum-NVBS

10 NVBS meets at Natl Wildlife Federation, Rt 7

15 7 p.m. – Brookside Bonsai monthly meeting. L. Courtland Lee from Boxlee Nursery in Glenn Dale, MD, will speak.

18 Bonsai Demo at the National Arboretum Yoshimura Center by a member of NVBS

24 - 25 9 a.m. - 4 p.m. – PBA Symposium at the National Arboretum

24 Kiyomizu Bonsai Club will have home visits. Locations to be determined.

NOVEMBER

14 NVBS meets at Natl Wildlife Federation, Rt 7

19 7 p.m. – Brookside Bonsai monthly meeting. Video featuring Yuji Yoshimura.

23 7 p.m. – Richmond Bonsai Society monthly meeting. (Check out their web page, www.erols.com/kwmab/rbs.htm.)

NEXT PBA CLIPPINGS will address fertilizers.

Do you have any favorite fertilizer recipes or procedures you would like to share?

Come to your PBA Symposium October 24th and 25th.

pH: Its Role in Plant Growth and Bonsai Culture

By Ed Mulholland, BSGNY

PH. It's a term frequently used by gardeners and bonsai enthusiasts, but very few of us know exactly what pH means. It is an abbreviation for potential hydrogen. Whenever the letter h is used as a symbol for hydrogen, it is capitalized. That's why the p is lower case and the h is upper case.

pH is a chemical measurement of hydrogen ion (H+) concentrations, which cause an acid reaction, and hydroxyl ions (OH-), which cause an alkaline reaction. The pH scale reads from 1 to 14, 7 being neutral, neither acid nor alkaline. Any value under 7 is considered acid, or "sour", and any over 7 is alkaline or "sweet": low = acid; high = alkaline.

1 2 3 4 5 6 7 8 9 10 11 12 13 14
very acid, acid alkaline

The pH is a negative logarithm of the hydrogen ion (H+) concentration. Therefore, a pH value of 5 is ten times more acid than the value of 6 and one hundred times (10 x 10) more acid than a value of 7.

There is, probably, an optimum pH value for each particular plant, but most grow well in soils with a fairly wide range of values. Even plants of different species of the same genus can be markedly different in soil needs. The exact pH required by each species has never been clearly defined, and opinions do differ. Trust me, I've checked!

Ericaceous plants, such as Rhododendrons, Andromedas and Blueberries, and most evergreens and conifers prefer acid soil. Juniper, Lilac, Atlas Cedar and some of our native western pines, on the other hand, prefer a sweeter, less acid planting medium.

In bonsai, we try to create an artistic interpretation of a mature tree or other natural setting. For our bonsai to be healthy as well, we must re-create the tree's culture or growing conditions. Rhododendrons and Blueberries, for example, are woodland plants. They usually grow in the understory of a forest in a soil that is high in organic matter, a naturally acid soil. On the other hand, the Atlas Cedar is indigenous to the Atlas Mountains in North Africa that have an alkaline limestone based soil. Most of the soil in the western half of the United States is also alkaline. This is why some lime incorporated into your soil mix might be beneficial for pines native to the western states.

It is not easy to change the pH of a planting medium, whether it is in the bonsai container or the ground. One advantage of bonsai is that you have total control of the planting medium right from the start. The first considerations concerning your soil mix are good structure and drainage.

If you have a plant like a Juniper or Cedar (Cedrus) and you want to raise the pH of the planting medium, use ground limestone for the best results. It lasts longer and will not burn your plants as easily as other forms of lime. Ground limestone is in the form of CaCO3, calcium carbonate. CaCO3 reacts with hydrogen ions (H+) and by lessening their concentration raises the pH value:

$$CaCO_3+2H^+ \rightarrow Ca^{2+}+CO_2+H_2O$$

It is preferable to incorporate the ground lime into your planting medium rather than applying it afterwards on the surface. This is because lime has slow horizontal and vertical movement in soil. The more evenly dispersed it is the better it can react with the hydrogen ions.

But how much lime should be added? A sandy soil mixture, such as used in bonsai, needs less lime to change the pH value than does the heavier soil in your garden. In a bonsai soil mixture, one ounce of ground limestone per bushel of planting medium should be enough to satisfy plants which prefer a sweeter soil mix. If you are mixing less soil, 1/2 teaspoon of lime per 6-inch pot will also be sufficient.

For acid-loving plants, incorporate peat moss or shredded pine bark into your bonsai planting medium, as they have an acidic effect. Also, many fertilizers are formulated for acidic plants. Those with aluminum (Al), sulfur (S) or ammoniacal nitrogen (NH4) will acidify the soil.

Many fertilizers for acid plants will contain iron. This is because if the pH level of the planting medium is not low enough (acidic enough), iron will form compounds with other elements and become chemically unavailable for plant absorption. Though commonly referred to as iron deficiency, the iron is not deficient, it's simply unusable. Plants that naturally grow in acid soils (pH 4-5.5) suffer from the lack of available iron at high pH levels.

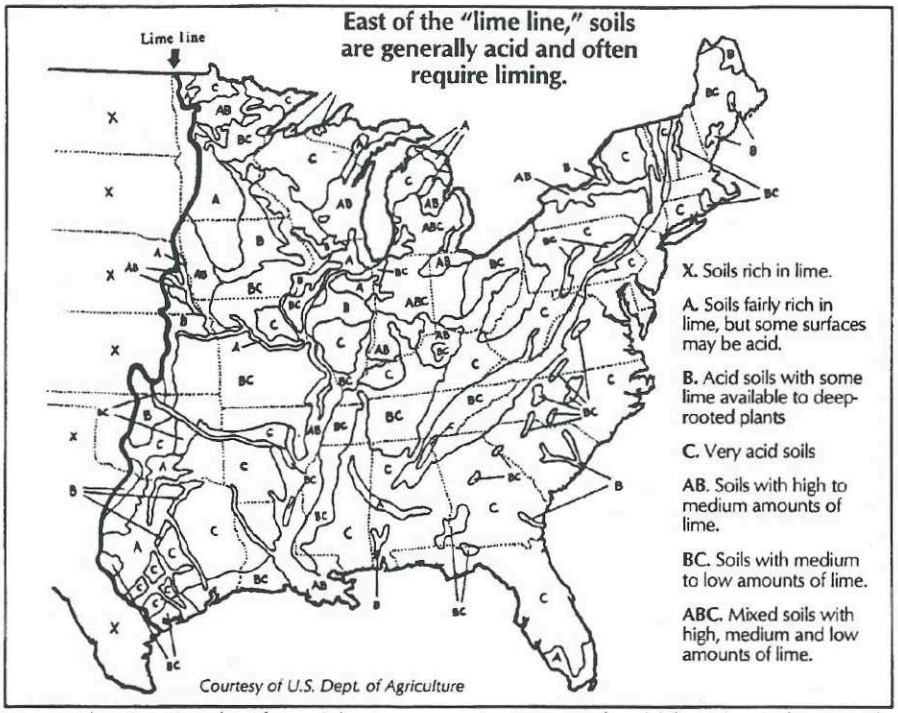
Iron deficiency may cause interveinal chlorosis or yellowing of the new leaves on a plant. Rhododendrons and Gardenias may exhibit these symptoms. I have even seen it on Burning Bush. Using fertilizer with iron in your regular fertilizing program will help prevent or

Optimum pH Range for Plants

African Violet	6-7	Ilex sp. Winterberry	acid
Alder	acid	Juniper	6-7
Almond	6-7	Larch, European	5-6.5
Apple	5-6.5	Laurel, Mountain	4-5.5
Andromeda	acid	Leucothoe	4.5-6
Ash, White	6-7.5	Lilac	6-7.5
Aspen	4-5.5	Linden	5.5-7.3
Arborvitae	4.5-5.5	Maple, Sugar	6-7.5
Azalea	4-5	Magnolia	5-6
Barberry, Japanese	6-7.5	Oak, black	6-7
Beech	5-6.7	Oak, Pin	5-6.5
Blueberry	4-5.5	Oak, white	5-6.5
Boston Ivy	6-8	Peach	6-7.5
Burning bush	5.5-7.5	Pear	6-7.5
Camellia	acid	Pecan	5.5-7.3
Chamaecyparis	acid	Pine, Eastern White	5-6
Chrysanthemum	6-7.5	Pine, Jack	4.8-5.5
Citrus	6-7	Pine, Red	5-6
Cranberry	4-5	Pine, Scots	4.8-5.5
Dogwood	6.5-7.5	Quince	6-7
English Ivy	6-8	Rhododendron	4-5.5
Enkianthus	acid	Sphagnum moss	4-5
Fir, Balsalm	5-6	Spruce, Black	4-5
Fir, Douglas	5-6.5	Spruce, Colorado	6-7
Gardenia	5-6	Spruce, White	5-6
Hazel	acid	Sycamore	6-7.5
Hemlock	4.5-5.5	Tamarack	4-5.5
Holly, American	5-6	Texas Elm	alkaline
Holly, English	acid	Wisteria	6.5
Honeysuckle	alkaline	Yew,Taxus	acid

Soil Reactions to Fertilizers and Soil Conditioners

Aluminum Sulfate	acid	Manure, Poultry	alkaline
Ashes	alkaline	Oak Leaves	acid
Bat Guano	acid	Osmocote 14-14-14	acid
Bone Meal	alkaline	Peat Moss	acid
Coffee Grounds	acid	Perlite	neutral
Cottonseed Meal	acid	Schultz	acid
Dried blood	acid	Sewerage Sludge	acid
Fish Emulsion	acid	Super Phosphate	acid
Granite Dust	neutral	Tea Leaves	acid
Greensand	neutral	Vermiculite	neutral
Horn & Hoof Meal	neutral	Water, Municipal	alkaline
Manure, Cow	acid	Water, Rainfall	acid
Manure, Horse	acid		



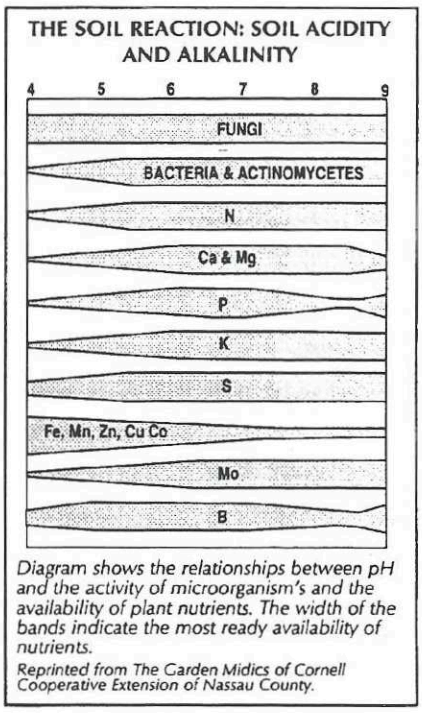


Diagram shows the relationships between pH and the activity of microorganism's and the availability of plant nutrients. The width of the bands indicate the most ready availability of nutrients.

Reprinted from The Garden Midics of Cornell Cooperative Extension of Nassau County.

correct the situation, but for quicker results, use a fertilizer with chelated iron. It resists forming compounds and stays chemically available to plants.

Needless to say, read and follow directions on all fertilizers. The line between deficiency and toxicity is very fine, especially with trace elements. Too much is often worse that too little. Most plants will not suffer from a deficiency of a trace element if natural soil is a component of the planting medium. Peat- and bark-based mixes also contain small amounts of micro nutrients. If you use a totally soilless planting medium, however, more attention should be paid to possible nutrient deficiencies.

How do you find out the pH of your soil? Test kits are available from most nurseries and garden centers, or you can mail a sample to your county agricultural agent. Test kits are not as accurate but are the more popular method, especially for testing the soil in many pots.

Fertilizers and the salts they contain can temporarily lower the pH reading without affecting any permanent change in the pH of your soil sample. And kits all need water or dampness to conduct pH tests. The pH of the water used to conduct the test can also influence the reading so you should first check the pH of your water. This should not surprise us. After all, if you combine a hydrogen ion and a hydroxyl ion we get HOH:

$H^+ + OH^- = HOH$ better known as H_2O!

Pure water, the common solvent to all soils, has the same quantities of hydroxyl ions as hydrogen ions, so it would have a pH value of 7— neutral—as does distilled water. I doubt that the water used in pH test kits, or to irrigate your bonsai , is anything close to pure.

Rainfall, especially in the New York area, can be very acidic, hence the term "acid rain". Sulfur emissions into the atmosphere from automobiles and industry are the principle causes.. In some areas, these emissions can be bad enough to injure or kill plant life. Acid rain has killed all plant and , consequently all marine life, in thousands of bodies of fresh water in our region. The pH of rain water in the New York area can be 5 and even less at times.

Hardy bonsai usually receive natural rainfall supplemented or superseded by tap water. Water from your tap differs markedly from rain water. Tap water in most areas is sweet or alkaline, primarily because of the addition of calcium and other minerals.

If your bonsai are tropical or indoor plants, they will receive most, if not all, of their water from the tap. In some areas, the water contains such a large amount of suspended minerals that they will start to accumulate on your container and in your planting medium. If this is the case, try to use water that has stood for at least 24 hours to allow some mineral ions to dissipate or volatolize.

Another way to try to counteract this mineral buildup, and its alkaline effect, is to add one teaspoon of vinegar to one gallon of water, and soak your bonsai in it. This should be done once per month.

Little has been published on the specific effects on bonsai of water and soil pH. Information from readers on the results of any tests or on pH problems they have experienced or solved, would be welcomed.

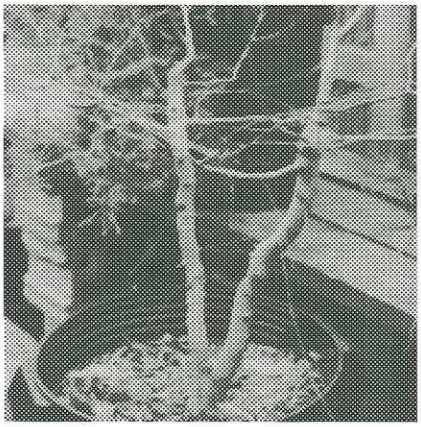
(Editor's note: We hope readers of the Bonsai Bulletin will respond. We noted that a reader of American Horticulturist, Nov. 1989, found that his municipal water was kept at a pH of 8.3 to prevent corrosion in the mains. He set up an automatic watering system that adds two cups of vinegar per 90 gallons of water with "outstanding " results in terms of the color and vigor of his bonsai. The editor commented that he had come up with an excellent and cheap method of controlling the pH of his bonsai soil. We calculated this to equal 1 tsp./gal. and apply it when a lot of watering is needed due to lack of rain. LW)

A Day with Pete "Air Layer" Jones

By Sally Griffin, NVBS

Air layering is a technique used to create new plants from existing mature plants. After four years in bonsai, I still consider myself a novice and am eager to learn. When Pete offered me the chance to learn to air layer under his guidance, I jumped at the chance to learn from someone who has been very successful at it. And the best part was I got to keep the trees once roots had developed.

I like zelkova because I've seen pictures of them as beautiful bonsai. Finding good zelkova trees for bonsai at a reasonable cost has not been an easy task. Although they are used for street plantings in our area, nurseries don't stock small zelkova trees suitable for bonsai.



In discussing zelkova with Pete, he told me they are very fast growers with vigorous root systems. He suggested that I may wish to propagate them from seeds or cuttings.

I have one collected from the Virginia Arboretum in the Fall of '95 which is still in a training pot. My fellow club members and I were all ravaging the vast, rolling landscape for seedlings of the usual fare ... maple, quince, hawthorn, dogwood and boxwood. Pete had set up the trip and was walking around mostly pointing out choice specimens for others to collect. So I followed him when I wasn't digging and listened. He pointed out this 12-foot-tall tree he called a zelkova. I figured it would take some work, but it could be trained as a formal upright and it would be worth collecting. The parent tree was a good, healthy specimen. So Pete "Air Layer" Jones was responsible for my first zelkova, too.

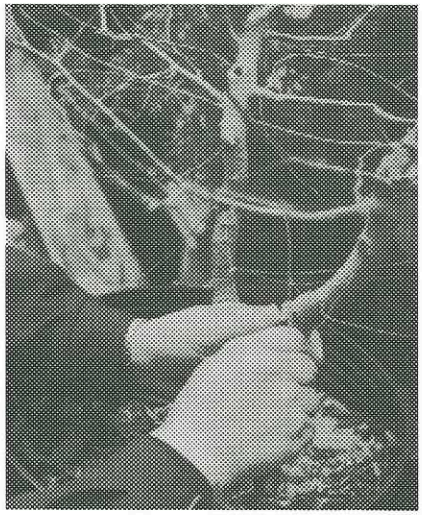
In discussing my air-layering project with Pete, he told me "My thing is, I help others to learn from my experience. That's why I do this." We of the NVBS club are lucky to have someone like Pete who is willing to help members.

I met Pete at his house in the afternoon of February 21. This was a full month ahead of our original date in March. But the mild, wet winter and early, warm weather was pushing sap up the trees early. You want to do your air layering when the trees come out of their winter 'slow or no-growth' period and begin 'pushing sap' as Pete says. Pete had a couple of zelkovas which he had "let go" for a few years potted in nursery pots (from air layering 15 years ago). We took them to a bench in the yard and went right to work. I ended up layering three trunks: one double-trunked tree and one single. All trunks were about an inch in diameter. Here are the steps I used to start the air-layering process.

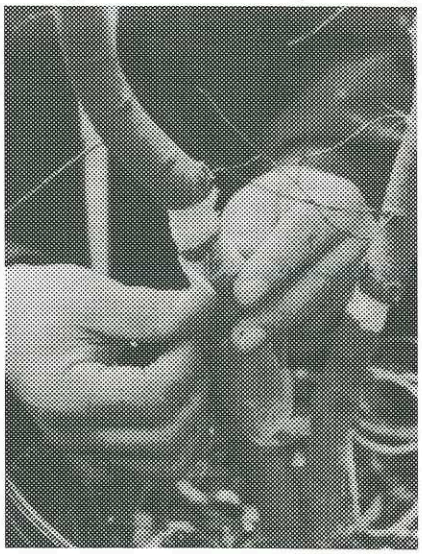
Step 1: Girdling

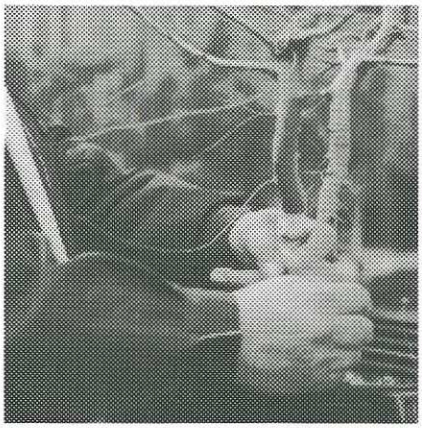
Girdling means creating an area all the way around a trunk or branch that is cleared of bark and cambium layer down to the hard wood. My first inclination was to take the knife and peal away the bark, but indeed you must work harder to slice through the soft layer of bark and cambium to expose the hardwood of the tree.

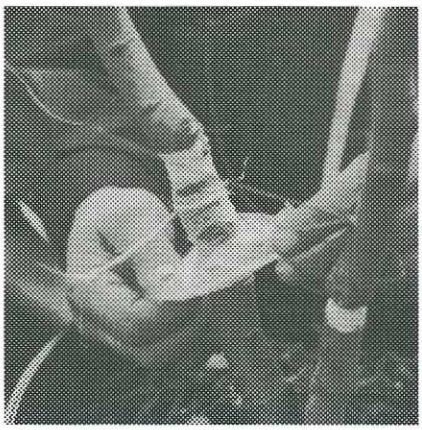
I used a sharp knife to create a one-inch wound which encircled



the trunk. I started by making a cut just below the future ground level, where I wished to have roots on the new tree. The initial cut needed to be straight, even, and clean. It will be used as a mark for the top of the wound or girdle. By



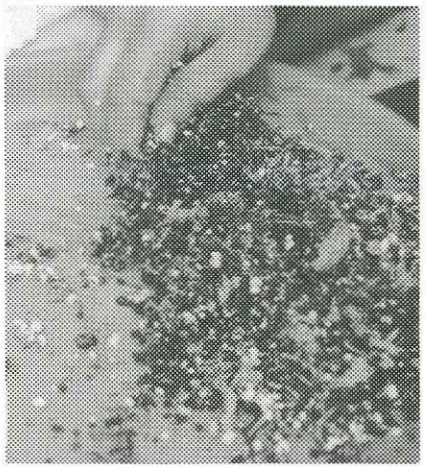


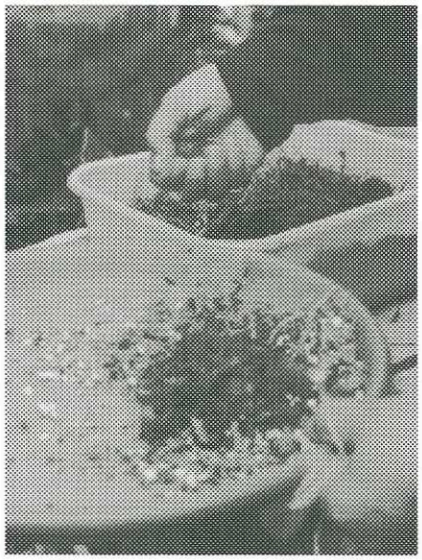


keeping it straight and even, you are promoting even growth of new roots. Working from the top, cut downward. I carefully cut away the bark and cambium until I had a 1-inch girdle.

Step 2: Planting mix

Ingredients:
Long fiber sphagnum moss, perlite, pumice, and water.
Mix in equal parts and soak well.





Step 3:"Dressing the wound"

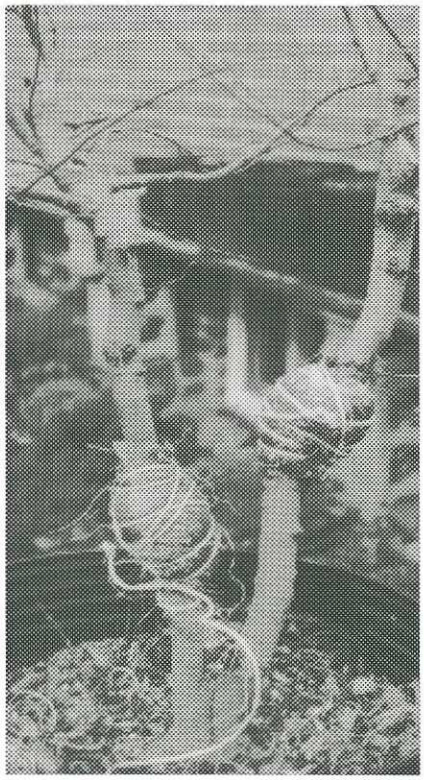
1. Make a wrap for the wound. Pete uses clear, plastic grocery bags and cuts a square out of the part where there's no printing.

2. Cut a five foot length of twine.

3. Wrap the trunk below the wound with the plastic. Secure the top of plastic with twine. Then turn the plastic wrap up over the tied twine to create wrap with open pocket around the wound. Let the left over twine fall out of the opening.

4. Stuff the "Pocket" with soaking wet planting mix. Arrange it around the trunk evenly. The finished planting mix wrap should be 3 times the thickness of the wound.

5. Wrap twine around the stuffed pocket and finally secure the top and tie off. The pocket is made to allow water to pass through and out the bottom. It is OK to poke holes in the bottom of wrap to allow for this.



Step 4: Care

Keep mix in pocket moist all the time. Do not let it dry out but don't drown it either. Be attentive during dry spells. You may have to water twice a day to keep the mix moist. Deciduous trees sprout roots quickly - in two to four months. I'm going back in June to see the results of my three projects. [Ed note: We're hoping to hear what Sally found in June.]

Pete encouraged me to learn from him and then to write about it for the club newsletter. So while the sap is flowing in my new zelkovas, I'm keeping the info flowing to you.

pH – SO WHAT?

pH is mentioned in books on bonsai; but more often than not, one is left out on a limb as to what to do about it. The books do not list soil pH ranges for different species of bonsai; and if they did, there is no advice on how to change the pH of the soil. The subject of soil pH has interested me ever since I heard the comment that if the pH of the soil a plant resides in is not within the pH range preferred by the plant, then bad things start to happen. The plant will not take in nutrients in sufficient quantities to remain vigorous and healthy, and in some cases may not accept some vital nutrients. The bonsai starts to lose its vitality and probably will give up the ghost in a few years. People who are into growing gardenias learn that gardenias prefer their soil to have a pH between 5.0 and 6.0 or else the gardenia looks unhappy. (To achieve the requisite pH, one old trick is to make a slurry of used coffee grounds and spread it over the top of the soil so the proper acidity exists in the soil.)

The excellent article on pH written by Ed Mulholland appears in this issue of *Clippings*. A majority of plants have an optimum pH range that includes 6.5. If you'll look at "The Soil Reaction: Soil Acidity and Alkalinity" chart in that article, you'll note that a vertical line drawn down from pH 6.5 cuts through the widths where the most nutrients are absorbed. However, I've seen the same type of diagram in two other articles, and all three diagrams (including the one in Mulholland's article) do not precisely agree. Furthermore, I've tried to find a common or "standard" listing of pHs. I've made some telephone calls to the U.S. Department of Agriculture which eventually ended in an invitation from the librarian to visit the department's library at Beltsville, MD. You'd think someone in the USDA could give me an answer as to where I might find a standard reference for pH. Someday I'll venture over to the library to see what I can find. For example: Mulholland's table of "Optimum pH Range for Plants" lists the pH range for azaleas as being between 4 and 5, while another source lists it as 4.0 to 6.0. A third source came as a pamphlet in a Sudbury Soil Test Kit and is my most comprehensive listing of pHs for plant species. It gives the following pHs for azaleas: alpine 4.5 - 5.0; aboresens 5.5 - 6.0; canescens 4.5 - 5.0; obtusum 4.5 - 6.0; pink 4.5 - 5.5; viscosum 4.5 - 5.0.

Fortunately, there is an optimum range for any plant's pH and with just a glance at the above pH ranges for azaleas, one can accept a pH of around 5.0 as being a good pH for all azaleas except the aborescens variety. Also by use of "The pH Preference Table" in the Sudbury pamphlet, here are the pH's for many of the outdoor plant species used for bonsai which do not appear in Mulholland's table of pHs.

6.0 - 7.0 Apricot (Ume)	5.0 - 6.0 Fir - balsam
5.5 - 7.5 Bougainvillea	6.0 - 7.0 Fir - Douglas
6.0 - 7.5 Boxwood	4.5 - 5.0 Fir - Fraser
5.5 - 7.0 Cedar - red	6.0 - 7.0 Ginkgo biloba *
4.5 - 5.0 Cedar - white	6.0 - 8.0 Hornbeam
6.0 - 7.0 Cherry	6.0 - 8.0 Maple - Japanese
6.0 - 7.0 Cotoneaster	Pine - black
6.0 - 7.5 Crab-apple	5.0 - 6.0 Pine - mugho
5.0 - 6.5 Crab-Japanese	5.0 - 6.0 Pine - red
flowering	5.0 - 6.5 Pine - Scot's
5.0 - 7.5 Crape myrtle	4.5 - 6.0 Pine - white
5.0 - 6.0 Cyperus-Hinoki	5.0 - 6.0 Willow - weeping
6.0 - 7.5 Elm - American	6.0 - 8.0 Wisteria
white	5.0 - 6.0 Yew - Canada
5.5 - 7.0 Euonymous	6.0 - 7.0 Yew - Japanese

*From Societe de Bonsai de Montreal, Vol.: VII No. 3, November 1990

Unfortunately the above listing and that in Ed Mulholland's article do not cover all the species one might be using for bonsai. I'm still looking for the pH range for Cryptomeria, as well as black pine. If anyone knows of a more comprehensive source for plant pHs, please let me know.

How does one know the pHs of the soil in his bonsai pots? I've tried the use of litmus papers. You place a paper into moist soil and check the color on the paper against a chart with colors graduated against pH. But I began to favor and now use a soil pH meter like the one pictured herewith. One word of advice is that one should wipe the probe clean after each insertion in the soil and then *clean it with the special cleaning pad provided with the meter*. An accurate reading will result. The soil must be moist. The instrument isn't all that expensive, and you can go around plunging the probe into your bonsai pots, as well as into your garden to check pHs. If you go collecting, you might carry the pH meter to check the

soil a chosen plant is growing in so as to duplicate it in your bonsai soil.

I do not know how the above listed pHs were determined for the respective plant species, but I'll wager it may have been just finding where they naturally grow and checking the soil pHs. I would like to know how they did arrive at the above pHs - if anyone knows, please clue me in. Also who came up with the concept of pH and plant growth? Like other concepts, it probably evolved over time with a number of people contributing to the effort. Ed Mulholland's article in this issue contains a map showing the land area of the U.S.A. east of the "lime line" with the sections containing soils of different acidity being delineated. If one knows the place of origin for a species of plant, then, obviously, the soil in that place should yield the desirable pH range for that species. I do not know the pH range for Cryptomeria which is native to Japan. Now all I need to know is what is the pH range where it grows in Japan - any answers?

I've started to try keeping my bonsai plants' soils within their respective pH ranges in an effort to improve their living conditions. My bonsai need all the help they can get because they spend more than half a day in intense shade. Consequently, I limit the amount of organic material, pine bark mulch or peat moss, in my soil mixes to avoid root rot. The commonly accepted recipes for bonsai soil usually contain some of the following combinations, but not all, of either Turface, Gran-I-Grits, Perlite, and an organic such as pine bark mulch or peat moss. If one excludes the organic material, the pH of the soil mix is a neutral 7.0, provided one uses water with a pH of 7.0 which corresponds to my tapwater's pH. By adding the pine bark mulch with a pH around 6.5, or the peat moss with a pH around 5.5, one can attempt to adjust the pH in one's soil mixes to accommodate either the acid loving plants such as the azaleas, or those such as hornbeam which like moderately acid soil.

However I've found that adding the organics to the soil mix in the amounts needed to keep the ratios of solid, liquid and gas around the respective values of about 50%, 25% and 25% (see the May '98 issue of *PBA Clippings*), does not alter pHs enough to lower them so that they are in the desired pH ranges. My soil mixes have pHs close to 7.0. However, since the organics in the mix are a very limited source of nutrients for the plant, one must periodically use solid fertilizers and/or liquid fertilizers. Hence one must rely on the fertilizers to establish the proper pHs in the soil so that the plants will be able to get the maximum benefits from the nutrients.

In fact, the soil mixes mentioned above are not far removed from the sterile mixes used in hydroponics where the solution provided to a plant contains the fertilizer/water mix at the proper pH for the plant. It may of interest to note that when I checked out the two books on hydroponics cited as references, the librarian commented that books on hydroponics were quite popular a few years back but not so of late. I told her that time period corresponded to when certain people got interested in growing Marijuana indoors in a garage or basement.

The following is what reference (1) states under the chapter named "Concerning pH":

"Any reading (of pH) above 7 indicates that the alkaline ions are dominant, and any reading below 7 indicates that the acid ions are present in a greater number. Each number above or below 7 indicates a tenfold increase in either alkalinity or acidity. A pH reading of 4 would be ten times as acidic as a reading of pH 5. If a solution is only one figure away from the pH reading recommended for your solution, that solution is ten times more acidic or alkaline than it should be.

"Why does this matter? If the solution is either too acidic or too alkaline, certain of the vital nutrients in the nutrient solution will be precipitated into soluble salts, a form in which plants cannot absorb them. And without these salts the plants will begin to exhibit various deficiencies. For example, a pH level far below 6 would cause a deficiency in calcium to occur. Injuries connected to such a deficiency include damage to the root system, burning of tissues in the tip ends of roots, wilting of foliage, and the development of patches of rotten tissue. A solution that is too alkaline will interfere with the plant's absorption of iron, causing the onset of chlorosis. But having said this, we should also note that plants are adaptable in this matter, as in many others."

Hence, when one applies a liquid fertilizer to the bonsai in soils with the above mentioned components, it is in a sense analogous to the feeding of the water/fertilizer solution to hydroponic plants. The manufacturers of the commonly available fertilizers like Peters and Miracle-gro formulate their dry powder mixes so that when they are mixed in water with

a pH of 7.0 the new pH of the solution is within the requisite range for the plants being tested. My tests using the pH meter for liquids mentioned in the August/September '98 *PBA Clippings* are shown below. I got only one erratic reading (on Miracid) with the pH meter used for liquids. Then I checked using the pH meter for soils (6.5) and rechecked after adding the Miracid solution (result - 5.0).

FERTILIZER, N-P-K	pH	
	1 tsp/gal	1 tbs/gal
Miracle-Gro, 15-30-15	6.8	6.0
Peters Professional, 20-20-20	6.9	6.6
Alaska Fish Fertilizer,5-1-1		5.1
Dyna-Gro Liquid Bloom, 3-12-	6.2	5.7
"Roots" Organic/Soil Treatment*		6.8

*"Roots" is the name of a product containing seaweed or kelp which contains many of the micronutrients necessary for plant growth.

Looking at the above table, one notes that increasing the amount of the fertilizer from a teaspoon to a tablespoon per gallon of water increases the amount of acidity. This may account for the reason why some people prefer to use a teaspoon per gallon versus a tablespoon per gallon of their favorite fertilizer. The tablespoon per gallon may increase the acidity of the liquid fertilizer to the point where (over a period of time) the plants, because of the lower pH, will not accept certain nutrients necessary to sustain its life. That may very well be the cause for the demise of some bonsai over a period of time.

Also, from the above table one can ascertain that if one is interested in applying a high nitrogen fertilizer, one might choose either Peters 20- 20-20 or Alaska Fish Fertilizer, 5-1-1. The pH of the Peters fertilizer makes it suitable for plants such as hornbeams and Japanese maples, but certainly not for plants such as white pines, azaleas, and gardenias. However, one can lower the pH of a liquid solution by using what one finds in most households - distilled white vinegar, refs (1) and (2). A teaspoon in a gallon of water will lower the pH about 1.0 or one point. On the other hand, if one wants to use the Alaska Fish Fertilizer for plants with pHs around 6.5, one can add 1 teaspoon of baking soda per gallon of water which does what vinegar does but in the reverse direction, it raises the pH about one point. To change the pH, I use Dyna-Gro pH Up or Dyna-Gro pH Down but I'm going to try drops of vinegar or sprinkle baking soda powder into the solution of fertilizer and water in order to change the pH. First I mix the fertilizer in 2 gallons of water because of the number of plants that I must service. Readers can reduce the amount of solution to fit the number of plants to be served. Then I measure the pH with the pH meter shown in the last issue of *PBA Clippings*. Then, drop by drop, add the pH Up or the pH Down until the pH meter shows the pH I want. The resulting solution is put in a pressure sprayer and applied to the appropriate plants. I've found that I can classify my plants under two pHs - pH 5.5 for pines, azaleas, weeping willows, etc., while pH 6.5 covers the others such as hornbeams, Japanese maple, etc. I put white plant tabs in the pots for those under pH 6.5, and colored plant tabs in the pots for the pH 5.5 plants. When I apply the liquid fertilizer solution from the pressure sprayer, it does not get wasted as it would from a watering can. Those of you who have few plants can get smaller pressure sprayers, but by all means get one and don't use any of those spray bottles such as those sold for Windex. Save yourself the finger-tiring chore of the never-ending squeezing of the trigger on a Windex-type sprayer to get the liquid out of the nozzle.

Regulating the pH with liquid solutions of fertilizer is easier than working with solid fertilizers. Referring to Ed Mulholland's article in this issue, there is a table of "Soil Reactions to Fertilizers and Soil Conditioners" which shows whether some of the commonly used solid fertilizers provide either an acid or alkaline reaction when water hits them. Note that the combination frequently used in fertilizer balls (bone meal, cottonseed meal, and dried blood) as well as Osmocote 14-14-14 are listed as being acidic when in solution. When you use solid fertilizers, you should periodically check the condition of the soil with a pH meter for soils. If the soil is too acid, hydrated horticultural lime can be lightly sprinkled on top of the soil or the pot can be soaked in a solution of 1 teaspoon of baking soda to one 1 gallon of water. Note that if the pH meter gives a pH reading you want to increase by less or more than one point, vary the amount of baking soda accordingly. To get the soil more acid, aluminum sulfate can be sprinkled sparingly on the surface of the soil, or else the pot can be soaked in a solution of white vinegar and water.

In conclusion the reader will probably say - is all the above fussing about pH necessary? To that one can add what Mr. Nicholls states in reference (1):

"But having said this, we should also note that plants are rather adaptable in this matter, as in many others." After all, a seed does not have much choice in the matter and must try to grow wherever it has landed. There is much homage paid to pH but see if you can find the pH range next to any plant in gardening books. All the hype - why bother?

I've been using the above mentioned procedure to regulate the pH of the fertilizer solutions I've been feeding my bonsai, and the plants have shown marked improvements in their appearances. Try it for yourself. After all, that is the fun and excitement of bonsai, trying different things. But if you feel comfortable with what you're doing, so be it.

REFERENCES:

(1) BEGINNING HYDROPONICS; by Richard E. Nicholls; Running Press, Philadelphia; 1990.

(2) THE HYDROPONIC HOTHOUSE; by James B. DeKorne; Loomponics Unlimited, Port Townsend, WA; 1992.

Loomponics Limited

Housing of Out-of-Town Symposium Attendees

The annual PBA symposium is scheduled for October 24-25 at the National Arboretum. In order to help out-of-town PBA members cut down on expenses (mainly from Richmond and Lancaster), PBA is looking for local members who would be willing to house a new friend on Saturday night. At time of printing, two local members have volunteered to help. If you can help a fellow bonsaiist, call Jerry Antel, (301) 320-5251.

EDITORIAL

Continued from page 2

most profound of all those ever written, and I agree. It is by Matsuo Basho who was born in Japan in 1644. The poem was written in 1686 is the haiku for this month:

Furu-ike ya
Kawazu tobi-komu
Mizu no oto.

Literally translated the above reads:

Old pond,
Frog jump in,
Water sound.

The literal translation for the above haiku seems to be able to stand alone. Obviously the 5, 7, 5 rhythm of the Japanese syllables cannot be retained in the English translation. People who transform haiku from the Japanese into English often veer from giving a literal translation for fear that the haiku would lose its true meaning to the readers. Some authors indicate that one must have a background in or appreciate Zen to be able to accomplish a meaningful translation. The author Harold Stewart of the book "A Net of Fireflies," Charles E. Tuttle and Co., ***Rutlannd,*** VT, 1993, indicates that the haiku translated in his book benefit from his background in Zen. The following is his English version for the above haiku by Basho:

IN A TEMPLE GARDEN
The old green pond is silent;
here the hop
Of a frog plumbs the
evening stillness; plop!

Recently I found an interesting pocket-sized booklet in the Smithsonian's store dealing with Orientalia. The title is "Morning Mist, Thoreau and Basho Through the Seasons" by Mary Kullberg, Weatherhill, New York, 1993. It contains on each page a haiku by Basho accompanied by poetry written by the man who is considered the father of the environmental movement in this country - Henry David Thoreau. This book gave me the idea that I should follow Dori Froning's practice and put an excerpt of a page from the book in each issue of *PBA Clippings*. The first one is from the page containing Basho's haiku cited above. Note how Mary Kullberg's translation of Basho's haiku varies from the two translations above - the literal one and the interpretive one:

The ancient pond,
a frog jumps in -
the sound of the water.
- Basho

The meadows were drinking
at their leisure.
The frogs sat meditating.

The frog had eyed the heavens from his marsh until his mind was full of visions.
- Thoreau

So every month another set of Basho/Thoreau poems from the above book by Mary Kullberg will appear to add a little bit of class to this publication. Furthermore, it may induce some of the readers to try their hand at writing a haiku or a short poem about nature. Send your haiku for sharing in *PBA Clippings*.

MONTHLY CARE TIPS for OCTOBER

The following tips have been compiled from 4 Japanese bonsai magazines and Yuji Yoshimura's book. A major portion of the following schedules are from a Japanese book which cites the various tasks one can perform during each of 12 months for each of 5 climate zones of Japan extending from the coldest parts of northern Hokaido to the warmest, southernmost parts of Kyushu. The average temperatures for the region wherein Tokyo lies correspond closely to the average temperatures for the area around Washington, D.C. Weather patterns everywhere in the world change from year to year and those changes play an important role in one's selection of dates for doing the various tasks relative to the styling and maintenance of bonsai. For example, the dates to remove plants from winter storage can vary from year to year, as well when to put them in winter storage. The following listings give you suggested periods of time during a year when you should consider doing various bonsai-associated tasks. As you gain experience, you can establish your own schedule. It is suggested that neophytes check with experienced members of their respective clubs when there is any doubt about the timing of any task. Nothing in bonsai is inflexible.

For some species listed below, wiring is indicated as a task in periods when the foliage is present. There is nothing wrong with wiring a plant when the foliage is mature. But it should not be done with any new buds or growth present because of the high possibility that the wiring will destroy them.

Most practitioners of bonsai in this country have a general rule that in the summer months, they do not fertilize their bonsai. The reasoning is that the plants get too stressed and burn out trying to grow after they consume the fertilizer. Those practitioners resume fertilizing in September/October. As in the previous months' schedules, wherever fertilizing is to be done, it is noted as "apply fertilizer balls" since that is how the Japanese do it. If you do not use fertilizer balls, you can consider applying the fertilizer of your choice during that time. One application of fertilizer balls is expected to be good for about 30 days. Hence you will have to make up your own schedule for applying your fertilizer during those 30 days. For example, if you are using a certain strength liquid fertilizer and apply it once per week, you can apply it once every week for a month starting from when the words "apply fertilizer balls" appear. If a gap of more than a month appears between "apply fertilizer balls"in the schedule, you should hold back on applying any fertilizer during that time period. As for fertilizing in the summer months, you will note in the following schedules that for some species the application of fertilizer balls is called for in June or July. It has been alleged that some Japanese bonsai growers think we do not fertilize enough. You must decide for yourself when to fertilize.

CONIFERS

Black pine: Repot any time if needed. Repotting is normally done every 3 or 4 years. Remove unnecessary branches. Wire any time during month. Give plant full day of sunlight.

Crytomeria: Pluck or trim back and thin out new growth. Keep the plant in a half day of shade.

Hemlock: Wire. It is possible to wire until December. Keep in one-half day shade.

Hinoki: Apply fertilizer balls during first 10 days of the month. Wire during the middle of the month. Repot during last 10 days of the month if needed. Repotting is normally needed every 3 years.

Larch: During the last 10 days of the month remove the wiring, and the larch can be pruned. Wiring can be done in the end of January. Keep in one-half a day of shade.

Needle juniper: Until 10th of the month, pluck sprouts to retain desired shape. Keep in full sun for the full day.

Sawara cypress: Wiring and repotting can be done during the first 10 days of the month. Repot every 3 years. During the last 10 days of the month wiring should be checked and remove any where necessary. Wiring can be done during the last 10 days of the month. Keep in one-half a day of shade.

Shimpaku (Sargent juniper): The first 10 days of the month is the optimum time period in which to repot. You can repot any time during the month; but repotting need only be done every 3 years. Wiring can be done any time during the month. Keep in full sun.

Spruce: Continue watering 2 to 3 times per day if necessary. Prune, remove any unnecessary branches, wire, and/or repot any time during the month. Repot after the first 5 years in training, and thereafter once every 3 years. Apply fertilizer balls during the last 10 days of the month. Keep in full sun.

White pine: Any time during the month, wire, prune, remove unnecessary branches, and remove dead needles. During the last 10 days of the month, fertilizer balls can be applied. Keep in full sun and where there is wind or air movement.

Yew: Repot during the first 10 days of the month; and only repot every 3 years. Rewire any time during the month. Apply fertilizer balls during the middle of the month. Keep in the shade.

WARNING: From the USDA Integrated Pest Management Tips for May: Avoid using shredded hardwood bark mulch on yews. As it decays, it often releases toxic quantities of copper and manganese. Yews are very sensitive to these metals. Affected plants are stunted, may turn yellow, and in severe cases, small branches may die. Use pine bark, chopped leaves, or another mulch; and limit its depth to 2 inches.

DECIDUOUS

Non-fruiting/Non-flowering:

Beech: Begin watering 2 times per day. Leaves turn yellow during the last 10 days of the month. The tree can now be pruned and wired. Place where there is half a day shade.

Chinese elm: Prune branches during the first 10 days of the month. Leaves turn during last 10 days of the month - appreciate the fall coloring. Keep the plant in full sun all day.

Gingko: Prune unnecessary branches. Keep the plant in full sun all day.

Hornbeam: Begin watering 2 times per day. Give plant half a day shade.

Japanese maple: Water 2 times per day if necessary. Keep plant in half a day shade.

Trident maple: Keep plant in half day shade.

Weeping willow: Give plant half a day of shade.

Winged Euonymous: Around the middle of the month the leaves turn crimson. Give plant a full day of sunlight.

FLOWERING/FRUITING PLANTS:

Cherry: Repot during the first 10 days of the month. Repot every 2 years. Should be in full sun.

Crab apple: Remove wire during the first 10 days of the month. Repot during the first 20 days of the month. Leaves turn color during the end of the month. Keep in full sun.

Gardenia: Keep in full sun. Watch the temperature and winterize plant where temperature remains above 32 degrees Fahrenheit.

Holly: Keep in full sun.

Piracantha: Keep in full sun all day.

Quince: During the first 10 days of the month remove any wire and repot. Repot once every 2 years. Prune during the first 20 days of the month. Keep plant in full sun.

Satsuki (azalea): During the last 10 days of the month remove any wire and cut back on the watering to once per day. Give plant half a day shade.

Ume (Japanese flowering plum or apricot): Apply fertilizer balls during the first 10 days of the month. Repot any time during the first 20 days of the month. During the middle of the month, cut back on watering to once per day. Keep plant in sun all day.

Wisteria: Keep plant in sun all day.

Should I Submerge That Bald Cypress?

By Ross Campbell (Washington Bonsai Club)

As bonsaiists, we try to create the ideal environment for our trees so that they will flourish. But, as we all know, we do not grow our trees under natural conditions. They are confined to a pot; and the soil medium is a contrived assortment of materials. Can we help our trees along by introducing a natural variable while still keeping them in the bonsai pot? One species of tree for which this question is appropriate is the bald cypress (*Taxodium distichum*).

The bald cypress is known as an obligate wetland species. This means that it can tolerate saturated conditions; and that it is typically found in wetlands. Most plants do not thrive in saturated (or anaerobic) soils. There is not enough oxygen or nutrients available for their roots. Obligate wetland species have developed anatomical adaptations that allow them to out-compete other species in saturated soils. This does not necessarily mean that they prefer to be saturated, but that they can tolerate it when other plants cannot.

The characteristic bald cypress "knee" is thought to be one of those anatomical adaptations, although its function is not known with certainty. The two primary theories are that they help keep the tree upright in an unstable wet environment, and that they help with oxygen transport.

Some of us who have had bald cypress bonsai trees have wondered if we could encourage the growth of knees by flooding it to mimic natural conditions. A more basic question, perhaps, is how flooding will affect the tree's health and growth. The following presents some data from recent research that relates to the latter question.

McInnch and Biggs conducted an inundation experiment with ten tree species, including bald cypress. Using trees in 5-gallon containers (to give an idea of tree size) they subjected 5 to 10 bald cypress to the following condition: mesic (meaning 3 waterings per week); half saturation (permanent saturation to half the container's 10-inch height); and full saturation.

After the end of the growing season, they remeasured each tree's height. The cypress under the mesic conditions averaged 45 percent growth, those that were half saturated grew an average of 48 percent, and those fully saturated grew only 21 percent. None of the trees died.

DeShield, et al, also conducted an inundation experiment with bald cypress and other species. Their approach was to change the timing of the inundation rather than the extent. They used 20 cypress saplings 18-20 inches in height. The saplings were flooded to 3 inches above the soil surface. One group was flooded for 50 consecutive days starting in May. Another was flooded for 55 days starting in July, and a third was flooded for 50 days starting in September. A control group was thoroughly watered once a week.

None of the bald cypress saplings died during the experiment. The average stem weight, average root weight, and average total weight of the cypress saplings were measured after the flooding. The average root weight was lower for all of the flooding treatments than for the control group. The saplings that were flooded in September had a higher average total weight than the control group, while those flooded in May and July had a lower average total weight. The same pattern held for the average stem weight.

McInnch and Biggs also examined root growth for the various species tested. In general, they found that root mass was affected by saturation. Roots in the mesic conditions were extensive and grew deeply into the pot. The roots of the half-saturated trees extended to the saturation line,

and those of the fully-saturated trees were only 1 to 2 inches deep and low in biomass. One of the features we strive for in bonsai is a good surface root mass (if not actual knees, as in the case of bald cypress), suggesting that inundation might help us achieve that characteristic. The caution, I suppose, is that inundation also reduces root mass, which may increase the chance of mortality over the long term.

The concentration of root mass near the surface is one of the wetland adaptations McInich and Biggs attribute to bald cypress. The others are: (1) the development of adventitious roots on the stems; (2) loss of original root system followed by regeneration of succulent roots that are larger in diameter and contain more, and larger air spaces; and (3) stem hypertrophy (swelling of the trunk). The last of these adaptations is particularly relevant to the bonsaiist looking to put some bulk on a bald cypress.

What does all this suggest we do with our bald cypresses? Well, we probably won't kill our trees if we flood them for part of the growing season. We may be better off doing the flooding late in the season. If we do flood them, we are more likely to see a positive impact on trunk diameter than on height — not a bad outcome for bonsai. As for knee production, that is not clear from these studies. The trees they worked with were young, and the experiments short in duration. My guess is that you will need to wait many years for knees, so you might as well get started and flood your cypress next year.

By the way, a potential source for inexpensive bald cypress trees with trunks 1-2 inches in diameter is Environmental Concern in St. Michael's, MD, (410) 745-9620. Website: www.wetland.org

Sources cited:

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