

Fort Wayne Bonsai Club Newsletter

Vol.

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February 17, 2007

February Bonsai Club Meeting

The next meeting will be Saturday, February 17th at 10:30 am in the Lawton Park Green Houses at 1900 North Clinton Street just south of Science Central. If you have questions call Darlene or Jerry at 260-637-5104. Dues will be due at this meeting if you have not already paid.

We will make our annual tour of the greenhouses to put us all in the mood for spring which the groundhog said was just around the corner. Are you listening Mother Nature??? I'm ready. I loved global warming in January. What happened???

You can also bring any tropical trees you would like to show off or get advise on. I am bringing a ficus tree that I would like Ed's help in wiring. I am attempting literati style with this tree. You will also be able to ask any bonsai related questions.

The last meeting was the election of officers which took about 2 minutes since there were no nominations from the floor or volunteers. New officers are President: Darlene Kittle, Vice President: Darla Keller, Secretary: Rod Schueler, Treasurer: Ed Hake, Secretary Cat Nelson and Barbara Kirkwood are sharing the position.

Darlene Kittle, Editor

Kathy's Korner

It is hard to believe that spring will be here in another month or so. I hope by the time that you are reading this, the night time lows are above ZERO!! Even as we are putting up with this miserable stuff, it isn't too early to be thinking about the deciduous trees that you want to prune before they break dormancy or begin to bud. That could be the end of February or first of March.

This is a great time to do pruning because you can see your tree's structure without the interference of the foliage. Prune away limbs that are crossing one another, branches on the inside of curves or that are downward growing. Look to the top of your trees

and thin out branches that make the top too thick. There are lots of sources for pruning. Many of the principles will be the same whether you are pruning a full size tree, or one in a bonsai pot. Check out the new downtown library, our own club library, the internet, or other club members.

Jim Hagen has a very quick article in the Spring 2003 ABS Journal discussing "What To Do In Spring—In the Midwest. He cautions about watching for leafing out. Should there be a cold spell after that happens the trees will be in jeopardy and should be covered or taken inside to protect them. In the article, Jim has tips for March, April, and May. The tips include when to wire, why and when to repot, some insects to watch for, and a caution for wire damage due to the rapid growth of trees in the spring.

Other articles of interest to me in that particular month's publication include one on *Growth Media Compaction—Repotting Technique and Bonsai Health*, by Bill Cody and *Defoliation of Figs* by Jerry Meislik.

Lots of interesting stuff to read in the library made available to you through the generosity of members of the Fort Wayne Bonsai Club.

Kathy Lee

2006 Calendar of Local or Nearby Events

February 17, 2007 Lawton Park Greenhouse tour

March 17, 2007 Pot making workshop in Kittle garage.

April 14, 2007 Trip to Gee Farms to meet the Western Michigan Bonsai Club and pick out trees for the Bonsai Bob workshop and the Ben Oki workshop.

April 21, 2007 Bonsai Bob Workshop, limited openings.

May 19, 2007 9:00 am setup Bonsai Show and Club

meeting at Foellinger Freimann Botanical Conservatory

June 2007- Ben Oki workshop at Cheryl's.

July 21, 2007- Our Annual picnic and Auction, location to be determined.

October

20, 2007 9:00 am setup Bonsai Show and Club meeting at Foellinger Freimann Botanical Conservatory

For Sale from the club:

Wire assortments: club members \$40.00, subscribers \$42.00, non-members \$45.00

Micromax micro-nutrients: \$5.00 for members, subscribers \$6.00, non-members \$7.00

Bonsai soil, shopping bag of 2 scoops: \$5.00 for members, subscribers \$6.00, non-members \$7.00

New Fertilizer blocks. ½ lb bag \$2.50 for members,

Subscribers \$3.00, non-members \$3.50 1 lb bag \$5.00 for members, Subscribers \$5.50, non-members \$6.00 We also have bonsai slabs for forest plantings. Prices range from \$25.00 to \$50.00. Call Darlene or Ed regarding purchase.

These products are great buys and priced lower than retail if they are even available in this area. Call or email Darlene or Ed if you want products brought to this meeting.

January Minutes

January 2007's meeting of the Fort Wayne Bonsai Club was held at Little Turtle Library on January 21. The meeting was called to order at 10:38 AM.

Darlene Kittle presented the slate of officers for this year.

President- Darlene Kittle

Vice President- Darla Keller

Secretary- Shared position with Barbara Kirkwood and Cat Nelson

Treasurer- Ed Hake

The slate of officers was approved by the membership.

Dues for the year are now payable to Ed Hake. They are \$25 for a single membership and \$30 for a family.

The club has a new web site designed by Cat Nelson. You can access it at <http://home.earthlink.net/~centaura/bindex.html> It includes information about club activities as well as past newsletters.

Kathy Lee has designed a membership application and brochure for the club. There was some discussion on changes. Kathy will make some corrections and check with the [Foellinger-Freimann Botanical Conservatory](#) to see how they would like to be mentioned in the flyer. The members voted to have Kathy print 100 brochures.

The Kendallville Master Cardeners have asked Darlene to speak at their March Home Show.

Saturday, April 14, the West Michigan Bonsai Club is traveling to Gee Farms. This is located about two hours north of Fort Wayne in Stockbridge Michigan. Gee Farms Nursery is the largest retail nursery in Michigan and has twenty green-houses and ten acres of nursery stock. They carry the usual and the unusual. And they even have hand dipped ice cream.

The Farms have a huge selection of dwarf evergreens. The experienced bonsai growers in our group can help you pick out a plant with great bonsai potential. We are forming a couple of car pools and plan to join them. Please let Darlene know if you are interested in this trip. <http://www.geefarms.com/>

Bonsai Bob will be holding a workshop on April 21. Participants will pay \$30. Observers will pay \$10. Participant seats are limited to 10, but check with Ed Hake to see if there are any spots available.

A Ben Oki workshop is also being arranged for June 2007. It will be in Elkhart on a weekday at 4:30 in the afternoon. The cost for the workshop will only be \$30 for members. Workshops at bonsai shows often cost \$100-300.00. This opportunity is a real bargain.

Cat Nelson is making a trip to Memphis in July and will be willing to do some remote shopping at Brussel's Bonsai greenhouse for those of you who would like her to select an excellent specimen at the largest bonsai greenhouse in the U.S. Please call or email her to make arrangements.

Bill Volvanis sent Darlene flyers for the Bonsai Show in Sept. 6-9 in Rochester, N.Y. See Darlene if you have an interest in that information.

Darlene has a friend who paints fabric (T-shirts, aprons, etc.) and Darlene had some wonderful things with bonsai pictures on them. If you would be interested in hiring this friend to make something for you, please see Darlene to select a design or bring a picture of something you would like.

The report on the Japanese garden. About 30 years ago, the Bonsai Club took care of the Japanese garden that is adjacent to the Civic Theater. Over the years, the club has abandoned that effort mostly due to a lack of cooperation with the parks department. Darlene has a blueprint of the plan designed by Bonsai Bob for the garden renewal. There are two big trees that must be removed before our club can move forward on the plan. It is likely we will schedule a spring workday at the garden. The red bud and crabapple trees will need trimming but that will be done after the spring bloom. The sign is not out there yet. The Sister City organization will make a brochure about the garden after we get it in shape. We will probably have two or three opportunities a year for volunteers to work on the garden. There is a Hinoki Cyprus- a rare shrub that we don't want to damage. The pond must be repaired by the Sister City organization before major work can be done.

The parks department work must be done on weekdays and our club has been told that they will cooperate with the joint efforts of the Bonsai club and the Sister City organization.

Cathy Blyth is working with Fort Wayne Community Schools elementary plant program. About 18,000 plants will be sent home with children to care for and experience the joy of watching a plant grow. She needs volunteers to speak with groups of children on general plant care. Please let her know if you would have a few hours to spare at helping to create the next generation of plant enthusiasts.

Darlene will be conducting a bonsai class through the Neighborhood Connection on April 17 and 24. The cost is \$23 and it will be held at Shawnee Middle School on Cook Rd.

Chinese New Year begins Feb. 18 and it is the year of the pig. Door prizes were given out with the Chinese characters for New Years.

恭贺新禧

The Bonsai Club provides all members with a club tree that is cared for and trained for a year. Members bring the trees to the meeting in July. Discussion was held on the type of tree the club should order, and it was decided the tree this year would be a Bald Cypress. The club will order the 1-3 ft. trees and pass them out in April. This is quite an opportunity for those of you with a competitive edge.

The treasurer reported that that club has \$1412.27.

Dick and Kathy are arranging a tour of the Lawton Greenhouse for the February meeting. Members and interested persons should meet in the parking lot of the greenhouse at 10:30 on Feb. 17.

The member's discussed the possibility of offering a discount to members who are senior citizens. The club decided to offer a \$5 discount to our member who have reached age 60.

Darla is now working for Zelinka, a provider of plants to Home Depot. You may call her if you would like some help selecting a pre bonsai specimen.

The meeting was adjourned at noon. We are a timely bunch.

Respectfully submitted,
Barbara Kirkwood

The Bonsai Traveler

Area Bonsai News from Cat Nelson

Well, it seems to be the year of the anniversary shows. The American Bonsai Society's 40th Anniversary is this year, and they're having a special display at their 2007 Learning Seminar to commemorate it. Its the 30th Anniversary of the Mid-America Bonsai Show in Chicago, and they're talking about bringing in Nakamura to be the judge of this year's show.

Some of the big shows and events this year are the All-Michigan Show on May 12 & 13, the Midwest Bonsai Society Spring Show on May 19 & 20, Rendezvous on May 25-27, The American Bonsai Society 2007 Learning Seminar June 21-24, the Mid-America Bonsai Show Aug. 17-19, and the Shohin Symposium Sept. 6-9.

May is the busiest month so far this year, with 4 major shows. The All-Michigan Show is held in Grand Rapids, MI at the Meijer Gardens. It consists of displays of club trees from the various different Michigan bonsai clubs, the display of the permanent collection of trees held at the Meijer Gardens, about a half-dozen vendors, and a few workshops and demos by Michigan club members. Its a good smaller show to attend, the club displays are very interesting, and its a good place to stock up on tools, fertilizers and starter stock. Admission to the show is free, though admission to the Meijer Gardens is extra.

Next in May is the Midwest Bonsai Society Spring Show held at the Botanical Gardens in Chicago. It has a non-judged display of member trees, a vendor area with several national bonsai suppliers, the Garden's permanent bonsai collection, all surrounded by the Botanical Gardens. The show and the Gardens are free, though there is a parking fee.

Rendezvous is Brussels, s Bonsai annual Memorial Day weekend event, with workshops from nationally known bonsai masters, as well as discounts on their vast array of stock. Brussels is the nations largest bonsai greenhouse, located just over the border into Mississippi from Memphis, TN.

June holds the American Bonsai Society's 2007 Learning Seminar in Virginia Beach, Virginia. Its a weekend of seminars and workshops, with a bonsai display, and their two annual awards for bonsai excellence. August holds the Mid-America Bonsai Show at the Chicago Botanical Gardens, with a judged display of regional trees, vendors and workshops. They are trying to get Nakamura in from Japan to judge this years show for the 30th anniversary. Nakamura donated 17 trees that have become the heart of the Gardens permanent display. If you can't make the show in May, mark your calendar for this one in August!

Last but not least is the Shohin Symposium in Rochester, NY on Sept. 6-9. Held by the International Bonsai Arboretum, its another weekend of workshops and seminars, and it will have North America's largest shohin bonsai exhibit. They are planning this to be a biannual event, to run opposite another shohin convention that is held in California each year. A must for aficionados of smaller bonsai, it is also a chance to see the International Bonsai Arboretum.

Links with more information on each of these events is available on Fort Wayne's new web site.-Cat

Note From Cheryl

Dear Darlene,

Am still working on Ben's trip to our area in June. We thought we had it all complete, ticket was sent to him, etc. and he dropped a bomb. It is California's (Golden State) 50th anniversary and he is on the program and "he forgot". So we are back to square one. I will keep you posted.

I now am sporting a newly repaired shoulder (Sept. 21) and a new complete right hip (Jan. 23.) but am

still in a lift chair and not doing steps. Pretty much off the big pain meds, but on a walker. Not much else to repair, so hope to be ready for bonsai repotting and gardening come time.
Cheryl

Growing Bonsai Indoors

by Brent Walston

Introduction

One of the most common misconceptions about bonsai is that they should be grown indoors. With the exception of tropicals and sub tropicals, all bonsai should be grown outdoors. Temperate climate woody plants must go through a period of cold dormancy in order to survive. This dormancy completes a yearly cycle. In deciduous trees this is a very obvious phenomenon, however, temperate evergreens such as Juniper also need to go through this cycle.

Tropicals and similar 'houseplants' can be successfully trained for bonsai and grown indoors year round. In mild climates, temperate bonsai should remain outdoors year round. In cold climates, temperate climate plants should be grown outdoors during the warm seasons of the year, but will need winter protection (the subject of another article). It is possible to grow temperate climate plants indoors in winter if they are first given the required period of dormancy.

The urge is strong for beginners to grow their bonsai indoors. Although a few traditional species for bonsai may be grown indoors year round if they are given a dormant rest period, you should be aware that this requires some skills usually obtained from growing bonsai for a few years. Below are some procedures that should be followed for indoor bonsai.

The Need for Strong Light

The major problems in indoor growing are the lack of intense light and a cool dormant period for temperate climate plants. Even if you kept your plant in an unobstructed south facing window, I doubt that the light would be sufficient for many species of woody plants. Most people just don't understand how dark it is in the house, even in front of a window.

Consider that, outside, the light comes from not only the direct sun, but from 180 degrees of sky PLUS all the reflected light of objects in the other 180 degrees. Light from a window is little better than a point source of light. If you measure the light level with your camera (not pointing it directly at the sun, but obliquely to get an average reading) you will find that

the level inside is two to three f-stops lower than just outside the window. One f-stop would be half as much light, two f-stops is 1/4 as much light, etc.

From experience I can tell you that most woody plants will perform best at full sun to 50% full sun. I get 50% by growing plants under shade cloth. Less than this amount, performance falls off, and at 70% shade, plants get leggy and problems can begin.

You can correct this by putting your bonsai in the sunniest window of your dwelling, but not too close to the glass or it will experience excessive heat buildup. This light may be too intense for some tropicals that are used to growing on the forest floor, but for most woody temperate climate plants it is still insufficient. Couple this with an overhead fluorescent lamp for these species. Keep the lamp about six inches above the plant. Twin forty watt fixtures are inexpensive to purchase and use. Special bulbs are not necessary. Keep the lamp on 12 hours a day to augment the sunlight. If you lack a window with sufficient light for even low light tropicals, you can safely use fluorescent lamps as outlined above as the only source of light.

Providing a Dormant Period

The other major problem is the lack of a cool dormant period. Temperate climate plants, even evergreens, need a dormant or rest period that is activated by cooler temperatures. For most plants, this is a period of at least six to eight weeks at temperatures of 30F to 40F or lower. Most temperate woody bonsai can tolerate temperatures down to 20F without any protection. Many plants will of course lose their leaves at this time. Other species such as Chinese Elm, *Ulmus parvifolia* may or may not lose their leaves during this dormant period. At mild temperatures (above freezing) they will remain evergreen, losing all of their leaves during the following season, but not all at once, so it appears evergreen. Kept outside in zone eight or less they will nearly always be deciduous (depending on the cultivar and severity of the winter). Temperate evergreen species also need a cold dormant period, but will not lose their foliage.

Without this dormant period, deciduous species will continue to grow for as much as two years, then go dormant no matter what the season or temperature. This can be very stressful for the plant, and it in some cases fatal.

Watering

Another problem is watering. Virtually no one with extensive experience in bonsai recommends watering by immersion, or watering to a schedule. This is a marketing scheme to make raising bonsai seem easy.

Watering by immersion occasionally is fine, for instance if the plant is extremely dry and needs immediate resuscitation, or if it has just been repotted, or if you want to soak it in fertilizer solution. Watering by immersion tends to accumulate salts in the soil. Watering from overhead will help flush salts and waste gases from the soil. Water overhead from a watering can with a fine rose head, 'throwing' the water at the plant and waiting a few seconds for it to absorb the water, before giving it another toss. Do this until water pours from the drain holes. This will reduce runoff and keep from eroding the soil. For a single plant this might take thirty seconds. Never let a plant sit its own drain water (the rare exceptions are Wisteria and Bald Cypress growing outdoors).

Outdoor watering in sunny summer weather is easy, the plants dry out every day, so you water them everyday. Indoors is more difficult. You should only water when the plants need water, not to schedule. The interval will vary with the light level, temperature, degree of colonization of the roots in the pot, amount of foliage, and the humidity.

There are three basic methods to determine if the plant needs water. My favorite, not necessarily the best, is to simply pick the plant up. Dry plants are significantly lighter than well watered ones. You can easily learn the difference. The second is to scratch the soil with your finger and see how dry it is under the surface. It varies somewhat with soils and volume, but if the soil is dry down past a quarter of an inch, it probably needs watering. If the surface is still moist, it most definitely does not need watering. The third method is the infamous Persiano Pick, a method devised by one of our illustrious Internet Bonsai Club (IBC) members. Use a piece of chopstick or wooden skewer as a sort of dipstick. Leave it in planted in the pot. To test for water pull it out and check the moisture on the stick. If the stick is dry or dryish, it's time to water. All of these methods take a little practice, but you should be able to satisfactorily learn one or all of them in about a week.

Fertilizing

You can fertilize to a schedule, and that is probably the best way. Most soluble fertilizers recommend that you fertilize full strength every other week. Simply water it in. Always use them as directed. Forget the half strength stuff for bonsai, this is a myth, use them as directed. Begin to fertilize when the plants start actively growing and stop at the beginning of the dormant period. For tropicals continue to fertilize as long as new growth is evident.

Air Circulation and Humidity

Secondary considerations, but important ones, for indoor growing are air circulation, humidity, and insect/disease control.

Air circulation in summer can be as easy as leaving the window open to get a little breeze. In winter you might want to get a very small fan to gently waft the air about your plant.

Humidity is greatly over emphasized for temperate climate plants kept indoors. For many beginners, misting is mantra, a way of showing that you care, but many plants could care less. Many tropicals need high humidity, temperate climate plants do not, but it is important not to let levels approach desert aridity, which can happen inside during the winter. Misting plants once or twice a day in my opinion is a worthless procedure. The only thing that happens with misting like this is that you build up salts on the leaves as the water dries. If you mist the entire area around the plant to bring up the humidity, then you are doing something useful, but in the house this is usually not possible. Instead, create humidity by placing your plant on a bed of small stones in a large flat tray filled with water. Do not let the pot actually touch the water. The flatter the tray the better, this will help keep down algae and other critters because nearly the entire volume of water will evaporate each day.

Insect and Disease Control

Insect and disease control will actually begin when you do all the above, because you will have an active healthy plant that will be able to resist them. However, there are bound to be some problems. Watch very closely for spider mites. These are almost microscopic, and can be best seen with a five to ten power hand lens. They live on the undersides of the leaves, so that's where to look for them. Turn a leaf over and look for webbing or debris. A healthy leaf will look absolutely clean (unless you have been misting a lot and building up salts) except for possibly hairs on some species. If you see any debris or webbing at all, start searching for mites. They are little spider-like creatures and they will have very tiny translucent round eggs. Red spider mites are easy to see with the lens and visible with the human eye for those of you with eyes under forty. Two spotted mites are smaller, translucent except for two dark spots on their back, and can even be hard to see with a five power lens, you have to search for them.

Mites, aphids, woolly aphids, mealy bugs, scale, and nearly all potential pests can be controlled if caught early and sprayed with an appropriate insecticidal soap. These soaps may be phytotoxic to some species

and cause leaf damage, so try only a few leaves first to make sure. Repeat sprayings are necessary to get the new hatchlings. Once every five to seven days is sufficient if done three times in most cases. For very difficult cases you may have to resort to chemical insecticides. Always follow the instructions exactly. Systemic insecticides can prevent infestations of some species of insects, but you must be aware that you are living in the continual presence of a deadly chemical. This can be of particular concern for indoor plants.

Fungal and other diseases are, in my opinion, more difficult to diagnose and treat. Without an organism, such as insect, to identify, diagnosis becomes very difficult, even for the experts at times. Diseases in plants are most often the result of the presence of an organism, and not the organism itself. This is especially true of fungal diseases. Most fungal diseases of container plants are caused by creating environments more favorable for the organism and less favorable for the plant, so the place to begin is with the environment. If you are getting root rot, shift to better draining soils, water less often, give it more sun (if appropriate), optimize growing conditions to get the roots to quickly colonize the soil. If you are getting leaf fungal diseases, decrease the humidity, stop misting, give it more light and air circulation. If these do not work, seek help in identifying the problem so that you can choose an appropriate fungicide, if one exists.

And finally

Follow these tips and you should be able to grow suitable species indoors for bonsai. It will not be possible to grow *every* species indoors. You should carefully choose only those with a moderate chance of success. Start out with the easiest, Ficus, a really good tough plant for indoor growing.

Propagation of Woody Plants by Cuttings .by Brent Walston

Introduction

Most cuttings are pretty easy with the proper environmental conditions. Cuttings need: 1) a clean well drained rooting medium, 2) a rooting hormone provided either naturally or by applying one, 3) a constant supply of moisture to make up for the lack of roots, 4) sufficient light to allow the manufacture of food (softwood and semi hardwood), 5) bottom heat in some cases, although almost all do better with it.

Rooting Medium

The medium must be sterile for good rooting percentages over a wide range of species. Some species appear to be

immune to ever thing fungal in the soil and others are very prone to infection . Most roots also need air to form, as well as to minimize infection. You must balance the need for drainage against the need for a constant supply of moisture. Without automatic mist the medium must hold more water. A good place to start is 50% peat and 50% perlite. With automatic mist or in an environment of cool moist air such as a coastal area, it is better to move closer to all perlite.

Perlite is now nearly universally used instead of sand or volcanic aggregate because it is lighter, sterile, and inexpensive. I use about eight parts perlite to one part peat and one part vermiculite. The peat and vermiculite make the perlite easier to handle, reduce the fluffiness and aid in punching the holes for the cuttings. I also harden off and grow out the cuttings in the propagating flats so the peat and vermiculite give me a small amount of nutrient holding capacity, perlite has none.

I use 18 inch square propagating flats with mesh bottoms that give excellent drainage but still hold the medium inside. The mesh is about half inch squares. Ground covers are frequently grown in these flats. I use a dibble board that I made to punch the holes for the cuttings, 182 per flat. All of this is old fashioned these days with the advent of Oasis type cells, but for me it is cheap and easy and allows me to keep the rooted cuttings in the flat longer.

Rooting Hormones

There are two types of rooting hormones on the market, talcs and solutions. Talcs such as Hormex contain the hormone indolebutyric acid, or simply, IBA at various concentrations, that's what the numbers mean, Hormex #1 is 0.1% IBA. Rootone is 0.1% IBA and also contains another hormone. Rootone also contains a fungicide, Thiram. Rootone is fine for easy cuttings but will be worthless for cuttings needing a high level of IBA. The liquid hormone solutions such as Dip and Grow and Wood's are a solution of IBA and NAA in alcohol. The alcohol acts as a carrier so lower concentrations can be used. Both are only 1% IBA at full strength. Some cuttings are sensitive to alcohol and can burn. I have found the solutions not effective for cuttings requiring low levels of hormone.

How do you know what levels for each species? There is one book that is far superior to all the others for this type of encyclopedic information, Propagation of Woody Plants, by Dirr and Heuser, available from Timber Press, they have a Web site. It costs about \$40. It is my propagating Bible, although I know most of it by heart now. It is a compendium of studies from around the world including the information compiled by the International Plant Propagators Society, IPPS. If you have only one propagating book it should be this one. Beginners will find it only slightly overwhelming at first.

Moisture

Without a root system cuttings rely on absorbing moisture through the stem and leaves. This works just fine if the medium is constantly wet and the humidity is high and it is

cool, seventy to eighty degrees during daylight hours. This is the toughest aspect to achieve at home. You must reduce the rate of transpiration to protect the cuttings from wilt. You can do this by keeping them cool, keeping the leaf surfaces wet, and by reducing the leaf surface area. You can remove some leaves to reduce surface area so that only two or three small leaves remain, or you can, as I prefer, remove the bottom leaves then cut the remaining leaves in half. After a while you get a feel for how much leaf area each species can support given your individual conditions.

For the home owner the above can be as simple as keeping the cuttings under the bonsai bench (But off the ground) that is watered once or twice a day where they will receive no direct sunlight. The next step up is to build a propagation case and provide it with automatic mist. The first case I built was eighteen inches wide by about six feet long and two feet high and covered with clear fiberglass. It held three or four flats. It had three Floramist nozzles overhead (available from Mellingers for about a buck apiece).

I am a great tinkerer which gets me in trouble but I have a lot of fun designing and building stuff. I built my own mist system and put heating cables in a bed of sand in the bottom. I built my own 'leaf type' mist switch that was counterbalanced and dropped down when wet opening the contact on a microswitch, and rising when dry closing the circuit and kicking in a solenoid allowing the water to flow to the misters. Commercial units are available for about \$150. Mine never did work right and I was always frying cuttings.

I now use timed mist, as do most professional growers. You can now get sophisticated periodic timers from Charlies Greenhouse supplies, they are about \$75. They allow timed periodic mist, so you can vary the period between mist and the duration of the mist. For our climate I find five seconds of mist every twenty minutes sufficient to keep the leaf surfaces constantly wet. Mine is in series with a 24 time clock that is programmed to turn it off during the night. It can still be too wet on cloudy days so I also have it in series with a thermostat that does not allow it to come on unless the temperature is above 72 degrees F. In a propagating case leaving the doors cracked open will allow sufficient air for ventilation.

Sufficient Light

It is thought that roots are stimulated in cuttings by high light levels, although I have not seen the studies to support it. But cuttings do root as a response to food moving down the stem in the phloem (remember your botany test, phloem and xylem) and stopping at the bottom cut. Finding no roots to store the food, it backs up at this point and changes take place in the presence of hormones to convert stem tissue to undifferentiated tissue (callus) to finally root tissue.

This process works better of course if there is sufficient food to make this happen, thus the need for retaining leaves on softwood and semi hardwood cuttings. Food is also stored in the stem tissue itself, and this is sufficient for leafless hardwood cuttings, although the process is much

slower. High light levels obviously play a role here by keeping up photosynthesis. You must balance out the need for light against the buildup of heat. For simple systems all shade works just fine. A VERY light foliar feeding also seems to aid in this process, although nitrogen encourages algae to grow in the medium and will soon create a wonderful swamp if you overdo it.

Bottom Heat

Automatic mist and bottom heat revolutionized the nursery industry around the time of the second world war. Before that most production was by hardwood cuttings, which was slow and effective for a limited number of species. These days there are very few plants that cannot be propagated from cuttings and those that can't can usually be done by tissue culture.

Bottom heat acts a stimulant for the production of roots as well as for faster root growth. In general bottom heat should be ten degrees hotter than the ambient air temperature, although any amount of bottom heat is useful. I have mine set on a thermostat that turns it off during the day when it is over 75F in the propagating room to save propane. The temperature should not be allowed to fall below sixty five and optimal seems to be about 75F or 80F for most species.

Some species are more sensitive to heat than others. Most of the tropicals I have grown in the past, liked it hot. Maples also root much faster when hot. It is thought that a few cultivars of Juniperus actually prefer cooler temperatures once they callus, but the jury is still out on that one. I have had Fuchsia root in five days on high heat, pomegranate in seven to ten. I even had some Japanese Maples begin to root in ten days last year.

The easiest and cheapest way for the homeowner to get into bottom heat is by purchasing a heating mat and controller, you can get a small system for about one hundred bucks. They use a lot of electricity, even a small one, be prepared for your bill to jump. Larger systems are hot water fed. A regular hot water heater can be used with a small circulation pump hooked to thermostat. Commercial units are called Biotherm and manufactured by a small company here in California. I designed and built

my own with drip tubing parts. It has worked fine for eight years.

Cuttings fall into three categories, 1) softwood, 2) semi hardwood, and 3) hardwood.

Softwood Cuttings

These cuttings are taken from new growth at the succulent stage. When a turgid plant tip snaps when bent at ninety degrees it is ripe for softwood cuttings. Most perennial cuttings are done this way, very few woody plants. In general low levels of IBA improve rooting but are not necessary. I find that Hormex #3 on the very bottom of Fuchsia cuttings, not more than 1/8 inch stimulates incredibly dense roots starting in about one week. This would ordinarily be too strong for this type of cuttings and there is some necrosis where the cutting was actually dipped, but roots are amazing.

Semi hardwood Cuttings

Most woody plant cuttings these days are from semi hardwoods. These cuttings are taken from wood that grew this year but is now firm and hard, with hardened leaves. It is well lignified at the base but still may have a soft tip that may or may not be removed. It is better to go by the feel of the wood instead of the calendar. The peak season is June and July. There are also infinitely varying degrees of hardness and each species and sometimes cultivar will respond differently. This is a matter of experience and volumes have been written about it. Some species such as birch and Picea have very narrow windows of opportunity. Others, such as most crabapples can be taken all summer long.

By far, most semi hardwoods require hormone in the range of 0.3% to 1.6% IBA, or Hormex 3 to 16. There are some that require no hormone such as willow, Salix, although I shallow dip my Salix species now and start them flats instead of water. They begin rooting in less than a week and are ready to transplant in uhny

Refreshments: Dick Ruthsatz

See you at the meeting!!!!