

# PBA NEWSLETTER

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V9 N11

Mr/Mrs Jack W Wells  
1810 37th Street N W  
Washington, D C 20007

## TREE OF THE MONTH

*Satsuki*

*By Julius Koetsch*

サツキ, 杜鵑花, 皇月

Mr. Khan Komai pointed out at the PBA '79 Symposium that if you like plants with gorgeous blooms and you are into bonsai too, you'll get irrevocably hooked, like he, on azaleas. Mr. Komai is hooked on satsuki which the Japanese seem to accept as the best azalea for bonsai. The main reason for using satsuki as bonsai material is that not only are the leaves of an appropriate size, but also the internodal spacings of the leaves is smaller than for other varieties of azaleas.

Satsuki translates literally as "fifth month" and it is in the month of May when satsukis bloom. The blossoms are variegated with shades of white intermixed with pinks or pale reds.

Much has been written about bonsaiing azaleas. One of the best, most comprehensive series of articles can be found in the Spring 1979 issue of "International Bonsai" published by The International Bonsai Arboretum, 412 Pinnacle Road, Rochester, New York, 14623. In view of the wealth of literature, one might ask, "Why another article on azaleas?" The accompanying illustrations and companion text were extracted from an article in Japanese which appeared in "Drawings and Plans for Flowering Bonsai" published by Seibundo Shinko Sha 1974. It is hoped that the illustrations and text will contain a hint or two for the more experienced hand. It describes what one might do with all the cuttings left after pruning the azaleas around your residence (or some friendly neighbor's) as well as what can be done if you start to bonsai an established plant of four or more years growth. Growing azaleas from cuttings insures that the new azaleas will throw blooms equivalent to the parent plant. One cannot always be certain that an azalea grown from seed will be a mirror image of the parent plant.

The captions accompanying the sketches are direct translations from the Japanese including the wire size, the type of soil, and the sizes of the pots. A number 4 pot in the Japanese was felt to be equivalent to a 3 to 4 inch diameter pot and a number 7 was felt to be equal to a pot of 7 inches diameter. The Japanese soil of "deer lake-bog" certainly has the sound of a very humus soil. This type of soil, -high in humus content, is commonly accepted as the ideal environment for azaleas. Since soil mixes are sort of a personal thing, - everybody favoring their own pet formulae, no conversion was attempted. (If one is not too certain about a soil mix, John Naka, in his book recommends 4 parts mulch, one part medium sand, and one part small sand by volume.) At any rate, use soil which has pH range of 4.5 to 6.0. As for wire, remember that if aluminum wire is used instead of copper, aluminum wire need not be paper covered. However, use an aluminum size which is larger in diameter than the copper wire because the aluminum wire is not as stiff as the same diameter copper wire.

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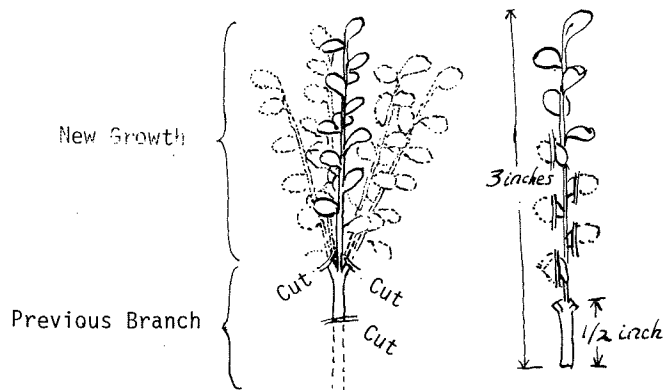
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1 st Y E A R

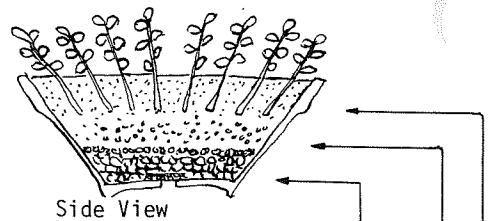
SELECT CUTTING ON LAST 10 DAYS OF JUNE

SELECT MAIN BRANCH



( = cut on these lines)  
 Select branch with straight  
 new growth for cutting

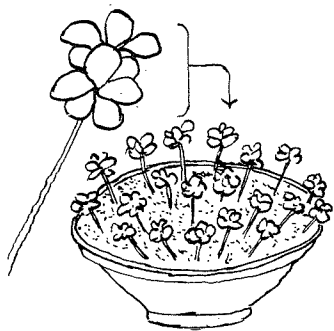
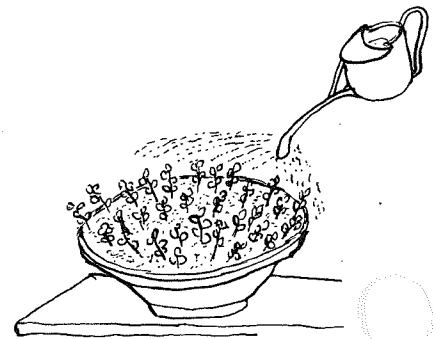
PREPARATION OF POT WITH SOIL  
AND PLANTING DIRECTIONS



Deer Bog Soil (Large size)  
 Deer Bog Soil (Intermediate Size)  
 Deer Bog Soil 1.5 - 2mm (Small size)

WATERING

Insert cuttings on a slant, a short distance into soil,  
 enough to permit watering without falling over.



2 nd Y E A R

GROWTH IN FIRST 10 DAYS OF MARCH

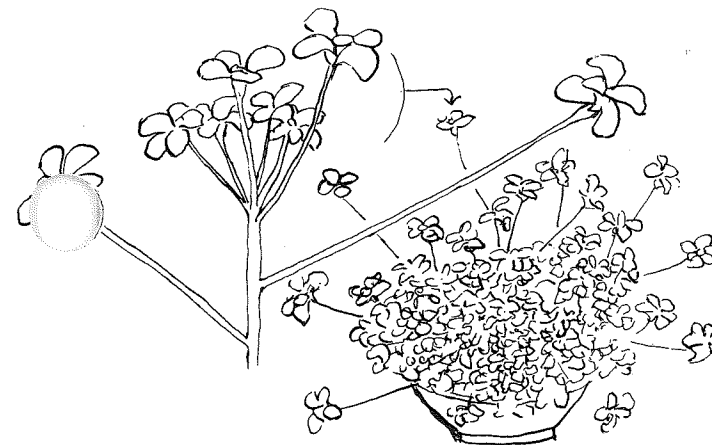
After wintering the first year with adequate watering,  
 fertilize one-time in March.  
 The saplings have full-tips of 5 to six leaves.

3 rd Y E A R

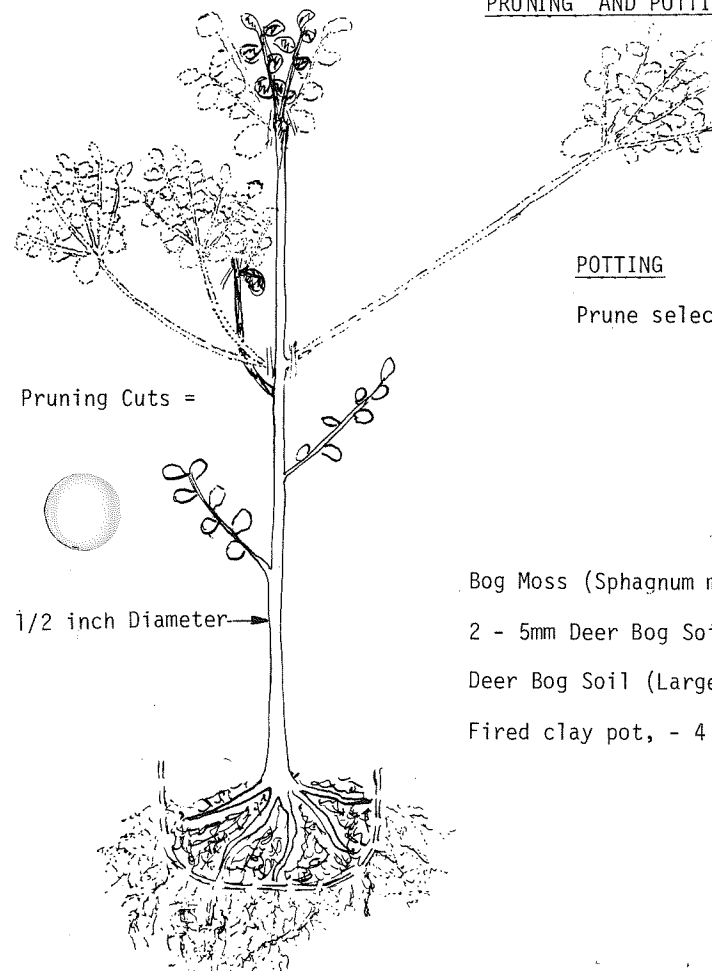
GROWTH IN FIRST 10 DAYS OF MARCH

Again after a full year interval,  
 there are full leaf tips. Apply  
 fertilizer once. Remove growth  
 which appears in the first ten  
 days of March.

Remove dead blossoms after flowering.



PRUNING AND POTTING MID-TEN DAYS OF JUNE



POTTING

Prune selected branches and cut root ball in half.

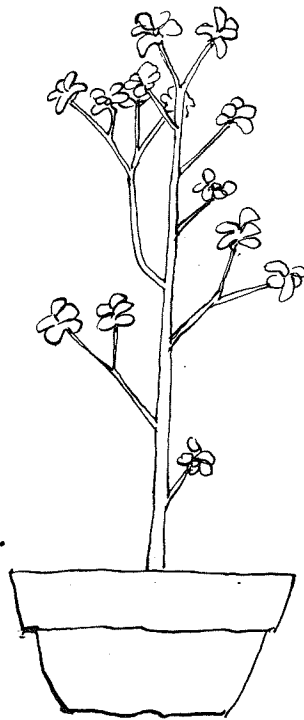
Pruning Cuts =



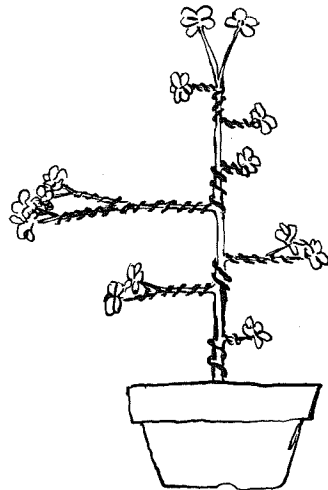
1/2 inch Diameter

Bog Moss (Sphagnum moss)  
 2 - 5mm Deer Bog Soil  
 Deer Bog Soil (Large size)  
 Fired clay pot, - 4 inch diameter

Cut Away One-Half of Root-ball



Before Wiring

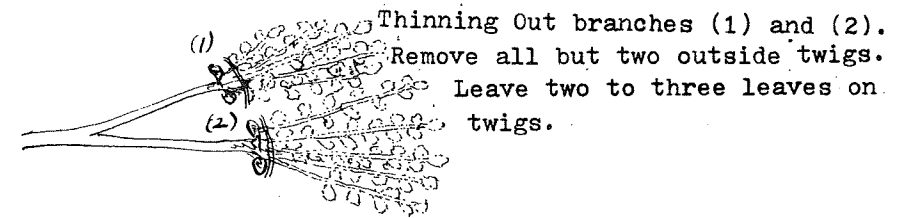


After Wiring

Use paper covered copper wire.  
(Aluminum wire need not be paper covered, if used.)  
Use single wire for two branches via wrap-around of trunk.

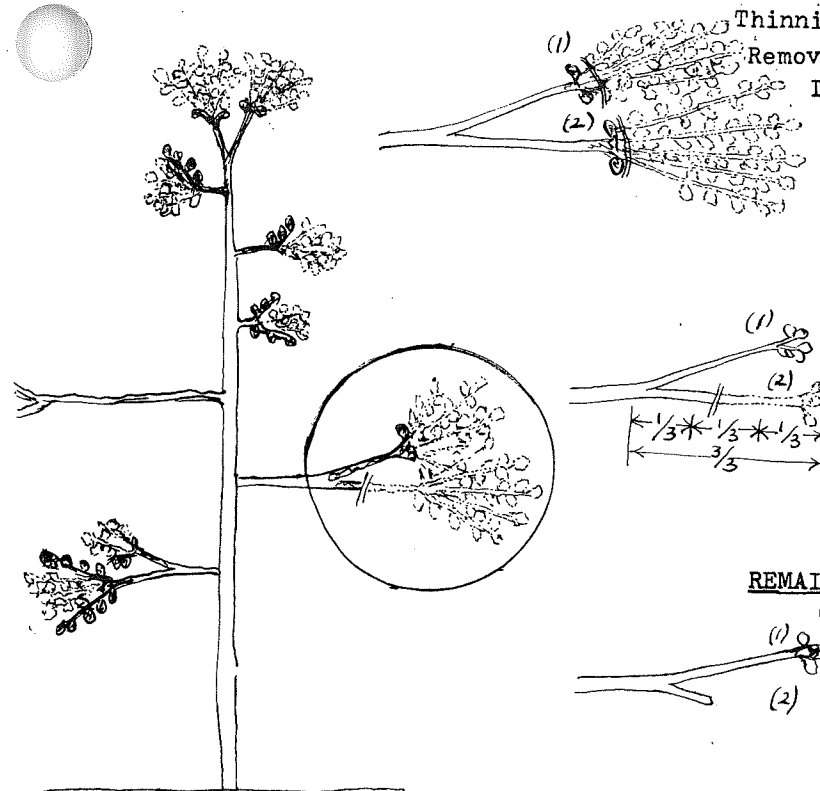
( = Limits of wiring, pruning)

PRUNING CHART FOR THINNING OUT SPROUTS

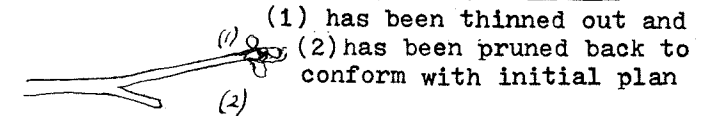


PRUNING BACK

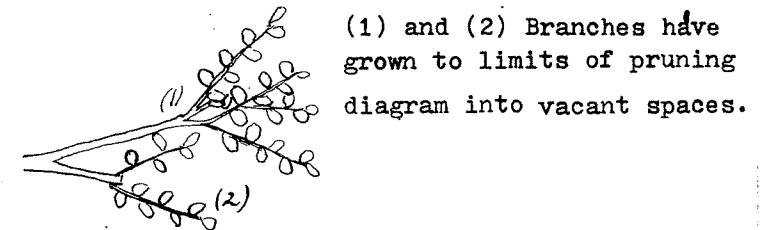
Prune 2/3 of branch two




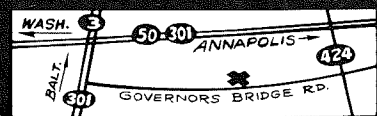
REMAINDER AFTER PRUNING BACK



GROWTH OF PRUNED BACK BRANCH (AFTER 2 MONTHS)



Pruning back and clipping-back of two branches. First of all, thin out the new sprouts removing them to the primary marks as well as clipping the designated branches 1/3 the length

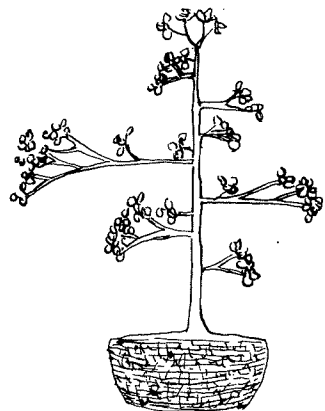
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Dwarf Rhododendrons	Japanese Maples, all sizes and varieties
Dwarf Pomegranate	Cotoneasters      Secondary Planting Materials
Dwarf Conifers	Azaleas              13 varieties of Junipers

We now have seedling Bristlecone Pine,      Small Pots & Bonsai Dishes  
Japanese Black Pine for growing on - for Bonsai

5TH YEAR

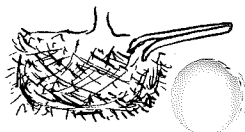
REPLANT IN JUNE



Form After Pruning and Removing from 4-inch diameter pot.

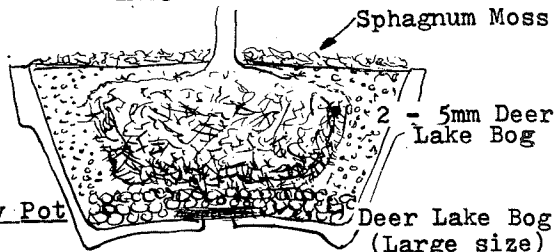


Cut Away Outer Root Sheath. (make fuzzy root ball)



Prick Out Roots

Complete Plant



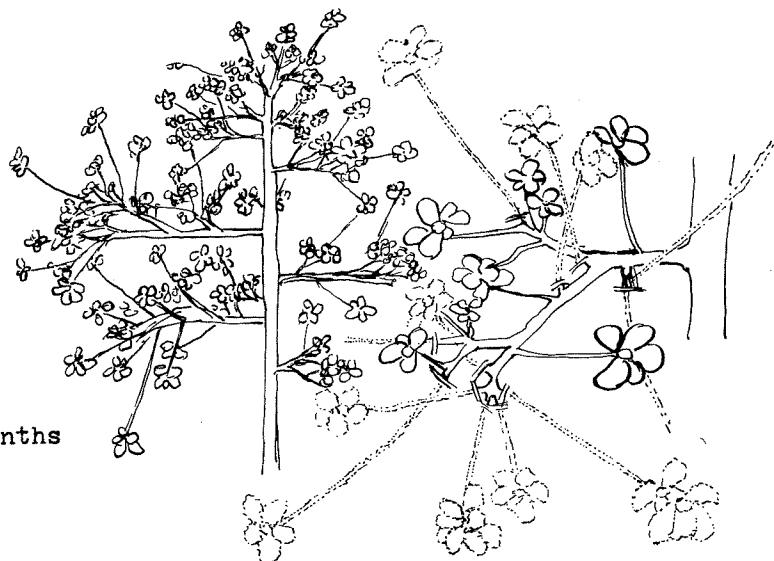
Number 7 Baked Clay Pot

Deer Lake Bog (Large size)

7TH YEAR

PRUNING

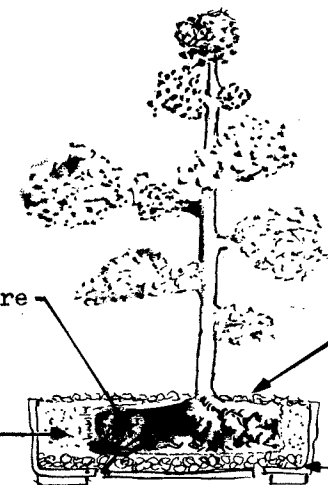
( = Cut and Wire Remainder)



7 Years and 3 months Formation.

8TH YEAR

POT TO COMPLIMENT BLOSSOMS



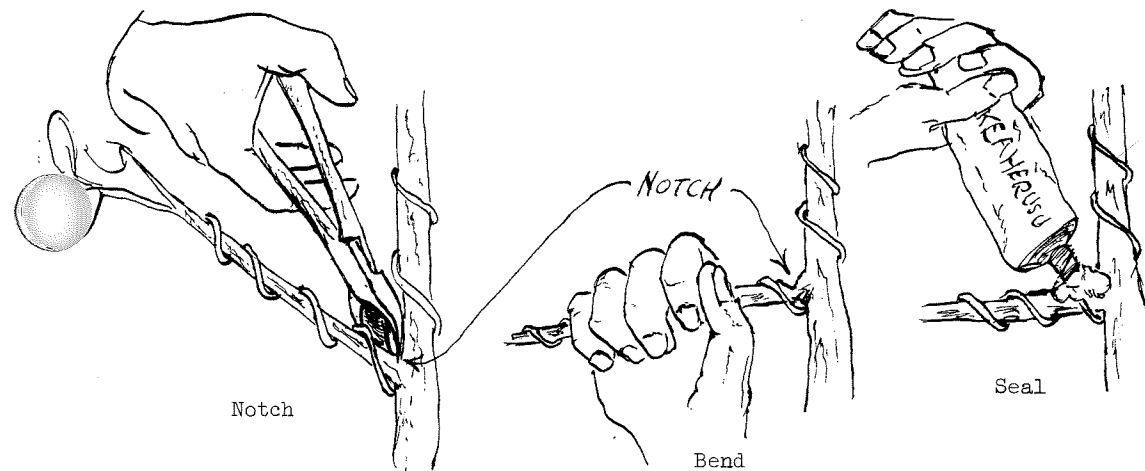
Put On Capsize Wire

Sphagnum Moss

2 - 5mm Deer Lake Bog

Deer Lake Bog (Large size)

On azaleas with a few years of age, four or more, it may be difficult to bend wired branches unless they have been notched. This involves notching through the branch from the top at the juncture with the trunk. One can seal the notch with either Elmers glue or the Japanese product designed for such use.



Notch

Bend

Seal

The style of the azalea in the accompanying sketches is formal upright. Mr. Khan Komai during his presentation at the '79 PBA Symposium, mentioned that some Japanese looked at his azaleas and commented that the trunks should be more interesting. If you prefer curved trunks, look for a follow-on article

SATSUKI SCHEDULE OF EVENTS

MONTH	YEAR				
	1ST	2ND	3RD	4TH	5TH
MARCH Last ten days			Put plants outside on shelf. Water, keeping soil moist. Begin fertilizing, apply once in a month. Insure 1/2 day in shade.		
MAY			Blossoms appear.		
			Fertilize		
JUNE Mid ten days			Prune, Repot. Keep in shade.		
Last ten days	Select cuttings. Shade for 1/2 day.	Remove blossoms			Fertilize a second time, then repot. Keep in shade
JULY First ten days			Remove from shade		Remove from shade Fertilize.
AUGUST First ten days			Fertilize once.		
SEPTEMBER First ten days	Fertilize				
OCTOBER		Fertilize (High in Phosphate)			Wire
DECEMBER		Put in shelter (Greenhouse)			

SIXTH YEAR: Repeat fifth year effort including repotting.

SEVENTH YEAR: Prune in March. Repeat sixth year effort.

EIGHTH YEAR: Final pot and blossoms of plant should harmonize for full enjoyment. Repeat work of seventh year.

NINTH YEAR: Repeat work of prior year. Repot, removing root sheaths as done in fifth and sixth year. Insure one half of day in shade.



Dr. Hacskaylo gave a lecture on mycorrhize at the PBA Fifth Annual Symposium on the 6th and 7th of October.



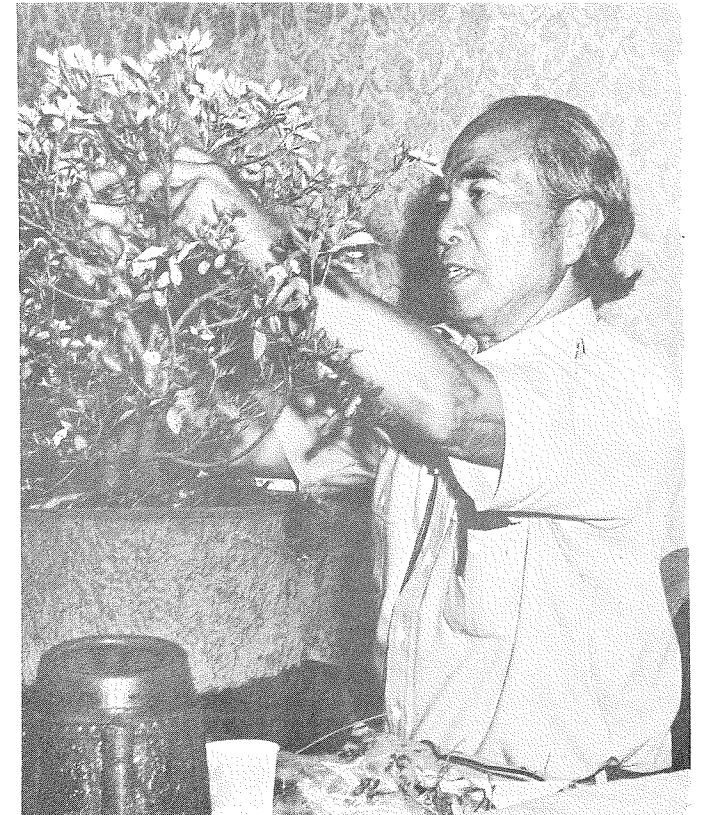
Cliff Pottberg gave a demonstration and lecture on tree styling.

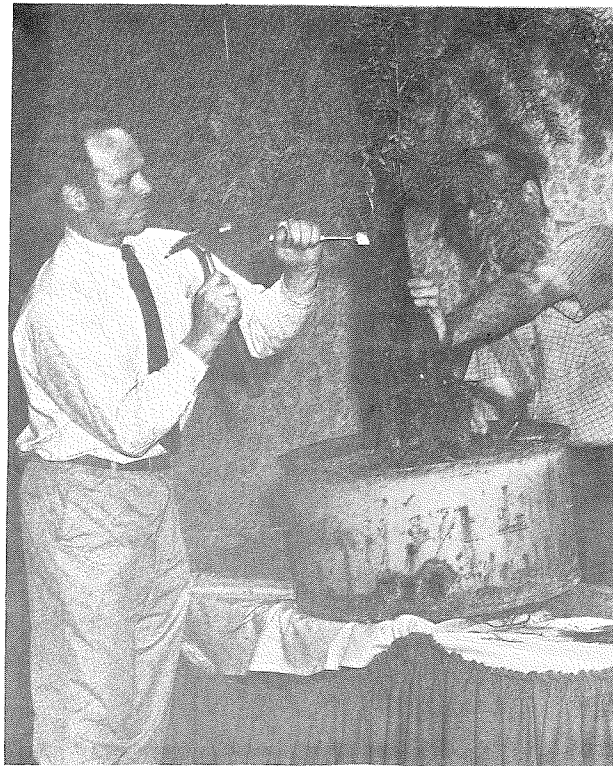


# KHAN KOMAI & AZALEAS



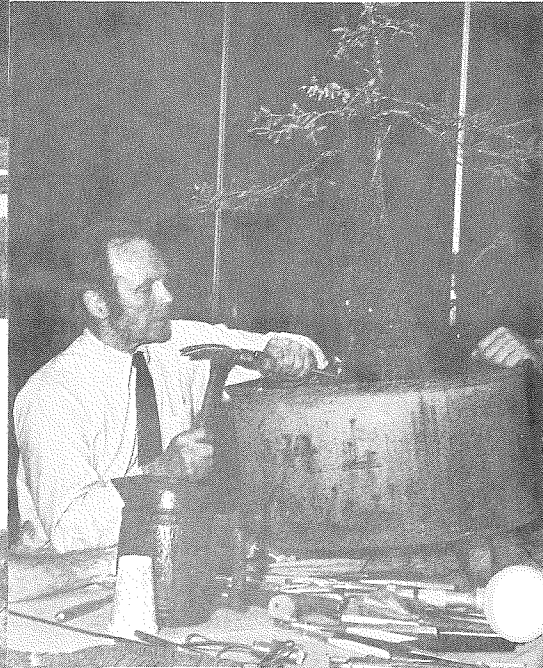
One Hinocrimson azalea and two Satsuki azaleas were styled by Mr. Komai at a demonstration featured by the 1979 PBA Symposium. The Hinocrimson was styled into a twin trunk tree. Of the smaller Satsuki azaleas, one was wired into an upright style while the other was wired into a cascade. All three of the trees were raffled off.





## DR. DAVID ANDREWS

Dr. David Andrews tackles a bald cypress that he collected in Florida. He opened the trunk to a hollow center that already existed within the tree and styled the tree in an upright style. The tree was raffled.



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# MYCORRHIZA: Why Plants Live!

by Julius Koetsch

The questions one might hear are, "Why do plants live? How do they best grow?" More often you'll hear it phrased more pointedly, "Why do my plants die?" This is one of a series of articles which will attempt to shed some light on this fascinating mystery. Dr. Edward Hacskeylo introduced many of the attendees at the PBA '79 Symposium to the information contained herein during his, the lead-off presentation. Dr. Hacskeylo is one of the modern pioneers in the research on mycorrhiza (pronounced my-cór-ry-za). He is the Principal Plant Physiologist and Leader, Pioneering Research Unit on Mycorrhiza, Forest Service, U. S. Department of Agriculture stationed at the Forest Physiology Laboratory, Division of TMR, Plant Industry Station, Beltsville, Maryland. The information which follows was edited, with Dr. Hacskeylo's permission from his article "MYCORRHIZA: THE ULTIMATE IN RECIPROCAL PARASITISM" which appeared in the October 1972 issue of BioScience.

Plants growing on land in soil are dependent on the intense biological activity that surrounds their root systems. In the area of the roots, micro-organisms are an integral part of numerous physiological interactions that range from living on decaying matter (saprophytism) to various degrees of living on other living material (parasitism). Playing a dominant role among these are mycorrhizal relationships.

Mycorrhizae are Symbiotic associations in which the smallest order of secondary roots are invaded by specific fungi during periods of active root growth. Mycorrhizal associations are so prevalent that nonmycorrhizal plants are more the exceptions than the rule. Only a few families of higher plants, mainly crucifers, chenopods, sedges, and aquatics are thought to be nonmycorrhizal. The others are totally or partially mycorrhizal.

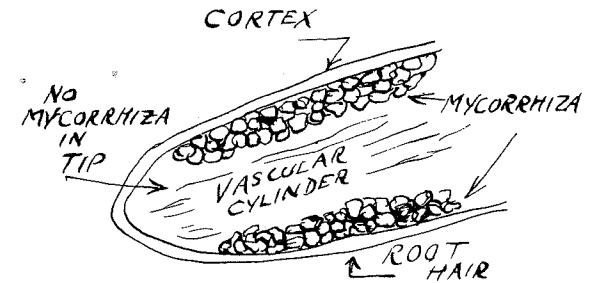
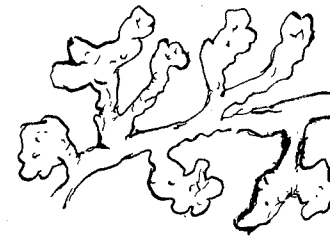
Without mycorrhizae, most plants, including important forest and horticultural species, could not survive in the dynamic, highly competitive biological communities found in natural soil habitats. Mycorrhizal fungi increase solubility of minerals, improve uptake of nutrients for host plants, protect roots against pathogens (deadly diseases), produce plant growth hormones, and move carbohydrates from one plant to another. Several regions of the world can attribute successful ventures in afforestation to the introduction of specific mycorrhizal fungi. Strangely, however, the role of mycorrhizae in life cycles of the associated fungi and their associated hosts are only vaguely familiar to plant scientists in general.

**CLASSES OF MYCORRHIZAE:** Mycorrhizae are separated into three major groups: ectomycorrhizae, endomycorrhizae, and ectendomycorrhizae. The inherent characteristics of the host plant determines which groups of fungi may enter the root and consequently the type of mycorrhizae that can become established on a species.

**ECTOMYCORRHIZAE:** Ectomycorrhizae are widespread, particularly in temperate regions, and occur on many of the most important woody species. In the gymnosperms (plants whose seeds are not enclosed in a shell or ovary), all of the family of Pinaceae, e.g., Douglas-fir, hemlock, spruce, larch, and pine, are ectomycorrhizal. In the angiosperms (those plants with their seeds enclosed in shells or ovaries), ectomycorrhizae are usually limited to the dicotyledonous, amentiferous families which include willow, poplar, walnut, hickory, oak, and beech.

The majority of mushrooms and the gourmet's delight, truffles, that are found beneath trees in late summer and autumn, are fruiting bodies of ectomycorrhizal fungi, and not saprophytes on decaying organic matter, as is often believed.

(Editor's note: Upon removing a healthy pine from its pot, a white, powdery mildew like matter can be seen by the naked eye. This matter is ectomycorrhizae.)

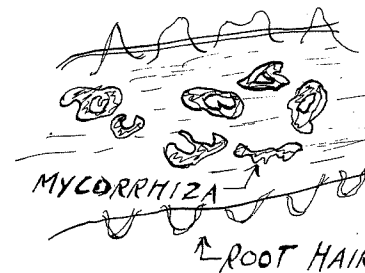


Ectomycorrhizae. On Root-Hairs Magnified 20 times

Cross Section of Pine Root

**ENDOMYCORRHIZAE:** Endomycorrhizae are by far the most common type. In the gymnosperms, they are found in Cupressus, Thuja, Taxodium, Sequoia, and Juniperus. Also the majority of the angiosperms are endomycorrhizal. This covers all woody species not included among the ectomycorrhizal families, and thousands of other herbaceous plants. Many of these, the legumes, grasses, tomatoes, apples, strawberries, peaches, orchids, coffee, and others, have considerable economic importance.

**ECTENDOMYCORRHIZA:** Ectendomycorrhizae have been reported only in tree species that are usually ectomycorrhizal, such as pine, spruce and fir. Apparently they are more common in tree nurseries than in forest soils. Ectendomycorrhizae combine the anatomical features of ecto- and endomycorrhizae.



Endomycorrhizae in Root-Hair

Ectomycorrhizae form sort of shell or coating just beneath the outer layer of a hair root. Endomycorrhizae are interspersed inside the hair roots and among the plant cells.

**HISTORY:** Some of the history is of interest in showing how relatively recent are the events concerning discoveries about mycorrhizae. In 1885, A.B. Frank, a German botanist, first suggested that the mycorrhizal fungus absorbs water and nutrients from the soil and translocates them into the tree, which in return supplies simple carbohydrates to the fungus. A great deal of controversy followed.

It was only as late as 1950, that E. Melin and his coworkers began to prove through some elegant experiments, that absorption of radioactive nitrogen, phosphorous, calcium and sodium from the substrate by mycorrhizal roots of Scotch pine was much more efficient than by nonmycorrhizal roots. These radioisotopes were readily translocated from the roots to other parts of the seedling. Thus, after many years of speculation and circumstantial evidence, it was proved conclusively that ectomycorrhizal fungi play a very active role in nutrient uptake by trees. Baylis in 1959 demonstrated that endomycorrhizal fungi absorb nutrients from soil and translocate them in a manner similar to ectomycorrhizal fungi.

Inoculation of soil with mycorrhizae has been proven successful and one was recently conducted in Puerto Rico by Dr. Hacskeylo and Vozzo. Prior to the inoculation experiments, during a period of approximately 20 years, seeds of 26 species and hybrids had been imported in attempts to establish pine on the island of Puerto Rico. However, the seedlings, planted in nursery beds, grew only to heights of 3 to 12 inches, became chlorotic and then showed symptoms of extreme phosphorous deficiency. At this stage the plants stagnated and died. These experiments drew occasional speculation that it might be necessary to introduce appropriate mycorrhizal fungi.



In 1955, B. J. Huckenpahler of the USDA Forest Service introduced soil inoculum from a stand of pine growing in The United States. In an experimental plot of slash seedlings high in the Puerto Rican mountains, he inoculated certain trees and left others as uninoculated controls. Within three years the effects were dramatic. Uninoculated plants were not more 12 inches tall and had only small tufts of needles at the tips. In contrast, inoculated plants were fully needled and up to 8 feet tall. Thereafter, all nursery seedlings grown on the island were inoculated in a planned program. The Honduras strain of Caribbean pine now grows so successfully that it is not uncommon to grow 10 feet in one year.

Another interesting case on record is that concerning the re-establishing of vegetation over the acres of black anthracite coal wastes that cover the valleys and hillsides of the eastern portion of Pennsylvania. J. R. Schramm in 1966 found that certain tree species, after a very intensive study, would grow in these wastes. He found that species which would develop ectomycorrhizae or shrubby species with nitrogen-fixing root nodules could be grown on that wasteland. By carefully planting to protect seedlings from heat, wind, or frost-heaving, he was able to successfully establish seedlings of trees such as pine, poplar, oak and nodulated shrubby species, birstly locust (*Robinia hispida*), sweet fern (*Comptonia perigrina*), and mountain alder (*Alnus glutinosa*). It is important to note that the endomycorrhizal plant species that grew nearby the coal wastes had not and would not successfully colonize the wastes.

FACTORS CONTROLLING MYCORRHIZA FORMATION: There is some controversy as to what predestines certain roots to penetration by specific mycorrhizal fungi. A critical examination of the roots of maple trees and of oak trees living side by side in a forest will always show that the maple was endomycorrhizal and the oak ectomycorrhizal. The inherent factors that predetermine the type of mycorrhizal fungus that will invade any given root have been subject to speculation, but are still a mystery. However, certain conditions that will affect mycorrhizal formation are fairly well defined.

The availability of inorganic ions, particularly nitrogen and phosphorous markedly affects mycorrhizal formation. Many researchers have experimentally shown that mycorrhizae are more abundant in soils that contain relatively low amounts of nitrogen (N) and phosphorous (P). Increases in the availability of these elements can suppress or even eliminate mycorrhizal formation.

The relationship of carbohydrates to ectomycorrhizal formation was studied by E. Björkman (1942) in Sweden. He concluded that an excess of carbohydrates within the roots is essential for infection by ectomycorrhizal fungi.

For years, mycorrhiza researchers have suspected that ectomycorrhizal fungi protect roots from invasions by pathogenic (disease causing) organisms. This has been proven to a very limited extent for ectomycorrhizal fungi but any such results for endomycorrhizal fungi are still to be shown.

THE BOTTOM LINE: In summing up what the above all means, here's the editor's view:

To promote mycorrhiza in bonsai:

1. Always take some of the soil the plant is growing in with the plant when transplanting it, especially true when taking a plant from the wild. (Where have you heard this old, old bit of advice before? Now you know why.)
2. Don't overfertilize with nitrogen or phosphorous.
3. Maintain the correct range of soil pH for the plant.
4. Inoculate new seedlings or established plants which do not look healthy with hair-root cuttings from the same species of plant. Wash the hair-root cuttings prior to putting them in with the soil of the plant to be inoculated. This will prevent introducing any pathogens which might be in the soil that initially surrounded the hair-roots.

## PRESIDENT'S MESSAGE

Now that the Symposium is over for another year, we can pat ourselves on our collective backs for a job well done. The program was well received and timely, the topics varied enough and informative. Again we a number of out-of-town bonsai neighbors who attended, including 5 from the Toronto Bonsai Society, making our Symposium an international one again.

It was a weekend of difficult choices to make. Having to choose between participating in such an historic event as the visit of the Pope; what was for many families a three-day weekend, and a bonsai symposium was difficult. We hope not to have to present such a multitude of choices next year.

For those who were just plain too lazy to attend - shame on you! You missed a valuable learning experience. The Symposium Committee worked its butt off to bring you the best kind of program we knew how, but it doesn't do you any good unless you take advantage of it. This Symposium was for YOU. You can't learn bonsai by long-distance osmosis and if you wonder why someone else's trees keep improving every year while yours go nowhere it's because these other people take the time and make the effort to attend PBA's program and learn how to improve their trees. If you care about your trees, take the time to learn to care for them.

Dr. Edward Hacskeylo of the U.S. Department of Agriculture and an expert on mycorrhiza (those friendly fungus) led off the Symposium with a fascinating and thought-provoking slide program and lecture. Following Dr. Hacskeylo was PBA's own Cliff Pottberg with an audience-participation talk on styling. After lunch Nick Lenz of Massachusetts gave delightful and informative talk on larches and those of us who were there were also able to admire some of Nick's collected larch which were on exhibit. Dr. David Andrews rounded off the Saturday session with a lecture/demonstration using a beautiful bald cypress. A special word of thanks to David is due also for the tree he styled was one he collected in Florida and which he donated to PBA for the Symposium. The formal program ended on Sunday with Khan Komai talking about azaleas, especially Satsuki, their styling and development and then styling a lovely twin-trunked azalea.

You may have noticed I have not mentioned anything about the raffling of the demonstration trees and that is because both David Andrews' bald cypress and Khan Komai's azalea were won by one person - Dave Morse of the Washington Club. It may sound like sour grapes on my part but the truth of the matter is that I'm green with envy and only begrudge Dave his luck because his was better than mine. Good luck, Dave, and we'll look forward to seeing those trees in PBA shows in a few years.

The fun and excitement is over for another year, but plans are already under way for next year's Symposium. In the meantime there is plenty of time to put into practice what we have learned this year and to look forward to what will be in store for next year.

--- Mary Holmes

## BEJEWELED CHRISTMAS

PBA still has some sterling silver pins, earrings and cuff links which make nice gifts either for yourself or for your favorite bonsai nut. Prices start at \$5.00 and are available from Vick Ballantyne. Call her at (301) 647-3224 and she can give you more detailed information and arrange to get them to you.

## CLUB CALENDAR

NOVEMBER 3  
Saturday  
2 pm

NOTE: Not November 10. Slide and talk on SCI-ABS July '79 convention in New York City. Winterizing plants. Bring a tree with good fall foliage. Also, bring trees needing critique or styling help.  
NORTHERN VIRGINIA

NOVEMBER 17  
Saturday  
10 am

NOTE: Change in usual DATE & LOCATION. Meeting will be held at Bethesda Library, 7400 Arlington Road. For further information, contact Fred Mies 299-6194, or Molly Hersh 589-3725. Bonsai Photography demonstration/lecture by Howard Clark. All members are urged to attend and bring their pet tree for a free photograph. We want to begin an annual photographic archive of Brookside members' trees. Bring your own camera if you wish. BROOKSIDE.

NOVEMBER 12  
MONDAY

Workshop using Procumbens nana juniper, which will be available at the meeting from the club at wholesale cost of \$3 for one-gallon size. St. Margaret's Church. Please note day change from Tuesday to Monday for this meeting. ANNAPOLIS

NOVEMBER 18  
Sunday  
3 pm

Winter protection and fall fertilization. Cylburn Park Mansion. BALTIMORE

NOVEMBER 17  
Saturday  
2 pm

Soils Workshop: Discussion & preparation of different soils for various types of plants. Tree raffle. Bring a tree to talk about. Meeting will be held in the downstairs classroom of the National Arboretum. For additional information contact Linda Mayben before six p.m. at 552-3921.



## Snips and Slips

### FALL FEEDING

Although the trees in our area have pretty much blazed forth with their fall color and many have already exposed their winter silhouette, some may still benefit from very light feeding. Remember, though, that fertilizer should have little or no nitrogen. Nitrogen is used by plants for foliar growth and this is what you don't want to encourage this time of year. Roots will continue to grow for about another six weeks and can benefit from a little bone meal, but even indoor bonsai are slowing down for the long winter nap and none should be urged to try to grow again until spring.

Mary Holmes

### OOPS!

Last issue we forgot to give credit to Marian Borchers and Cliff Pottberg for their contributions to the newsletter. Marian wrote the fine story on Baldcypress on page 1 and Cliff wrote the interesting piece on Mountain Laurel on page 7.



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