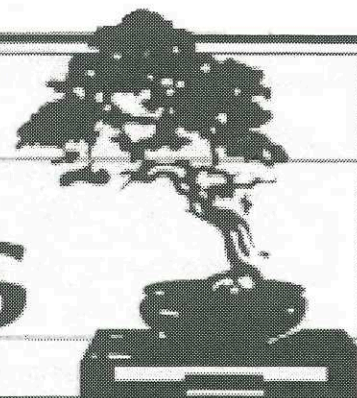


PBA Clippings

NEWSLETTER OF THE POTOMAC BONSAI ASSOCIATION



Volume 28, Number 9

December 1998 - January 1999

!!! FREE - COME ONE, COME ALL !!!

IF YOU PAY DUES TO PBA, come to the PBA Open Board Meeting. Your board needs your input. Come and share suggestions to make our club the most helpful and educational it can be for its membership. Bring a LIST of ideas, if you've got them.

We'd like to understand the low attendance at your symposiums.

*Yoshimura Center, 1:00 p.m.,
10 January 1999.*

Bonsai Vigilanties

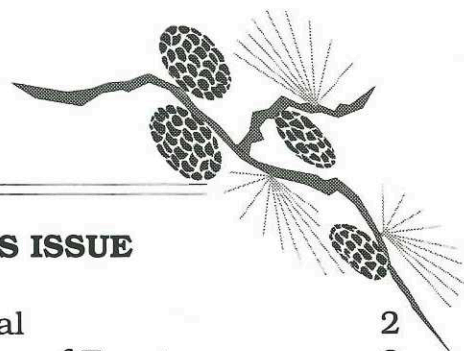


"Okay, Joey, you're on squirrel patrol. Bonnie, you check for heavy snow on the branches.

Leslie, you've got slug and ant duty."

IN THIS ISSUE

Editorial	2
Calendar of Events	3
Much Ado about Fertilizing	5
Haiku	10
A Note on Bonemeal	11
Plant Nutrients . . .	13
Monthly Care Tips	16
What's Been Happening	18
Toronto Bonsai Quiz	19
What Works for Me . . .	20
Suiseki Primer	22
Suiseki Classifications	23





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EDITORIAL - DECEMBER 1998

by Jules Koetsch

Three of the articles in this issue of *PBA Clippings* cover the aspects of fertilizing bonsai so that you can ponder whether your procedures could be modified. When you consider the subject of fertilizing your bonsai, there are a wide variety of options. In fact, you might follow the "cover all the bases" approach and use fertilizer balls or granular slow-release fertilizers along with periodic feedings of a liquid fertilizer. You might not just use one liquid fertilizer, but alternate between two or more to hopefully get macro nutrients and trace elements which may appear in one and not in the other. We hope these articles will help you choose which of the different available fertilizers you should use.

I've always favored using fertilizer balls because small amounts of the fertilizer are slowly fed to the bonsai with each watering, whereas a liquid fertilizer is a weekly or bi-weekly process unless you have an automated drip-feeding system. With a weekly or bi-weekly watering, the fertilizer is applied as a single, jolting quantity; and then it is leached out in a few days with the subsequent waterings. The plant has to wait till the next scheduled application of liquid fertilizer to get some nourishment.

I'm switching to using a slow-release, commercially available fertilizer, Woodace. In the past, I've made fertilizer balls by mixing powdered, dry fertilizers together, then adding water until the mix can be formed into balls or cubes, and allowed to dry. I spaced the balls or cubes around the edge of the bonsai pot so that the plant was fed with every watering. The making of fertilizer balls is a practice we adopted from the Japanese. Bonsaiists in this country either must make the balls or buy those made by the Japanese.

I understand that the making of fertilizer balls is a cottage industry in

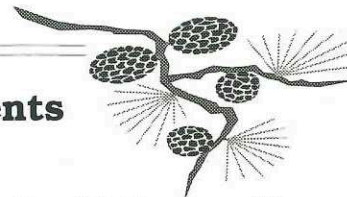
Japan. The customer tells the person making the balls what ratio of nutrients he wants in them. Julie Haga told of her experiences with a bonsai nurseryman in Japan where he would painstakingly remove all the fertilizer balls from his bonsai as soon as it started to rain. I never had an answer for his motives in doing that - was he being frugal as well as keeping the plants from being overfertilized and getting burning of the hair roots?

In the past, I've spent some time making fertilizer balls; but in the last two years I've run out of time to do it. My family is now very happy in that they don't have to withstand the hideous aroma that arises from the product (which gave them the appropriate name of "s-t balls"). Dori Froning used a more acceptable term derived from her story about the senator who gave a speech before a tribe of Indians on their reservation. The speech contained the usual pauses after mentioning key points to await acclamation from the audience - and he received resounding shouts of "ouglah, ouglah" during those pauses. He was feeling mighty proud after the speech, feeling that it was very well received. The Indian chief asked if he would like to ride around a part of the reservation, and the senator heartily accepted. As the senator was walking around the rear of his horse to get in the saddle, the Indian chief said, "Don't step in the ouglah!" Hence Dori calls them "ouglah balls."

If you still want to make fertilizer balls, you can use other products such as Nitro 10 with an N-P-K of 11-0-0, Colloidal or soft phosphate with an N-P-K of 0-22-0, and Greensand with an NPK of 0-0-7 plus 22 other elements. The advantages are a reduced drying time of 3 days vice 2 weeks, there is no vile scent as with the blood-meal balls, squirrels do not bother the Nitro 10 balls, and Nitro 10 balls have more potash in them than the near

insignificant amount in blood meal. You can formulate your own mix of ingredients in the balls just as they do in Japan to match the mix of elements you want to feed specific plants at specific times of year.

There are a number of fertilizers or plant foods, each containing different amounts of plant nutrients; and each one has one of a number of methods for disbursing the nutrients to a plant. Hopefully the articles that follow in this issue of *PBA Clippings* will help you keep your bonsai properly fed.



Calendar of Events

January

9 - NVBS 9:00 a.m. Jan McQuery will lead a discussion of bonsai pots and our needs.

10:00 a.m. Panel Discussion on Tree Diseases and Their Treatments

10 - 1:00 p.m. - PBA Open Board Meeting, National Arboretum, Subject: What do we need to do to increase support for upcoming symposia, and club activities in general? Come and tell us why you didn't show up.

16-24 - 10:00 a.m. - 3:30 p.m., 2d Annual Bonsai Winter Silhouette Show, National Bonsai and Penjing Museum, Special Exhibits Wing. Appreciate the Arboretum's deciduous bonsai even in the wintertime as you view the elegant silhouettes of a select group of these miniature trees. Free.

25 - 7 p.m. Monthly meeting on wiring bonsai. - **Richmond Bonsai Society**

30 - 7 a.m. to 7:30 p.m.: Visit to Bob Town Nursery in Melfa, VA. - **RBS**

February

15 - Edo Exhibit closes at National Gallery. Call (202) 737-4215 for info or visit <http://www.nga.gov>.

**MUCH ADO ABOUT
FERTILIZING**
by Jules Koetsch

It seemed appropriate, in view of Lew Butler's article which appears in this issue and is cited as reference (a) below, to review exactly what one does when fertilizing to ascertain whether there are any pitfalls or room for improvement. Over the years, we've learned that there are "more ways than one to skin a cat" when it comes to fertilizing one's bonsai. The accompanying table lists various locally available fertilizers which the readers have probably used at one time or another. The table is, in a sense, a bonsai restaurant menu from which, if the plant could, it would select what it wants to be fed to keep healthy and happy. Seeds in the wild have no choice but to grow where they have fallen and rely on the soil to still be able to provide what they need. However, our bonsai rely on us to provide food with the proper ingredients so that they can live happily. It sometimes does not take too long for our bonsai to tell us whether or not they are satisfied with their diets of plant food or fertilizer.

This article compares what nutrients are present in a plant food or fertilizer with what a plant needs and how to detect any shortages or over-feeding of nutrients. I don't know if you have noticed that plant food products are either labeled "Plant Food" or "Fertilizer." "Plant Food" seems to be relegated to products comprised of inorganic matter, whereas "Fertilizer" indicates that the ingredients consist of organic matter containing plant nutrients. In what follows, the words "plant food" and "fertilizer" will be used interchangeably without using the above distinction except where either appears on a manufacturer's product label.

Everyone eventually forms a preference for one or more specific

fertilizers and when they should be applied. Also, one might have a preference for specific fertilizers because of the ways in which they can be applied to a plant - either in a liquid or dry state.

When you are deciding on a fertilizer, the selection process usually begins with the N-P-K numbers. From reference (b): "All fertilizers have a three-number notation. It refers to the percentages of nitrogen (N), phosphorous (P), and potassium (K) compounds, respectively, in a fertilizer. . . . For instance, 5-10-5 is 5% nitrogen which is the sum of ammoniacal nitrogen and nitrate nitrogen or urea; 10% represents the percentage of phosphorous in the form of phosphoric acid; and 5% is the percentage of potassium in the form of potash. The remaining 80% is filler. The fertilizer label may indicate the percentages of micro nutrients and trace elements. In the case of dry fertilizers, those proportions are in percent by weight. In the case of crystalline or liquid concentrates, these proportions are in percent by volume of the properly mixed (dilute) solution."

First, it may be good to review how N-P-K fits into the picture. The following was abstracted from reference (c) which the USDA is not going to update because it's not within their budget. The major elements or macro-nutrients affecting plant growth are: Carbon, hydrogen, oxygen, nitrogen, phosphorous, and potassium. However, there are other elements which play important roles in plant nutrition; and these are termed micro-nutrients and trace elements. The micro-nutrients are: iron, boron, copper, zinc and manganese. Reference (c) states: "Elements that cannot be estimated accurately, but can be detected qualitatively, are simply reported as being present in trace amounts - hence the term 'trace elements.'" The trace elements are: molybdenum, chlorine, vanadium, cobalt, iodine, fluorine and sodium.

One will not find carbon, hydrogen

or oxygen in any fertilizer. The hydrogen is present in the water fed to a plant, and water is by far the most important chemical compound in the life of a plant. From reference (d): "It (water) makes up approximately 90 percent of the weight of plants and is the most limiting factor in plant growth. All plant food elements are dissolved in water and move into and throughout the plant in a water solution. ...Only about 1 percent of the water absorbed is actually used by the plant. The other 99 percent is lost through the leaves and stems as water vapor in a process called 'transpiration.' ...Photosynthesis uses water in the manufacture of food and could not occur without it."

From reference (e): The second most important compound is not usually mentioned in our books; it is carbon dioxide from which the trees extract the element carbon. It is present around our trees all the time, and we all take it for granted. However, horticulture nursery producers, in recognizing the importance of carbon, are enriching the carbon dioxide in greenhouses to increase the growth rate of some plants. Maybe that's the benefit if you follow the advice: "Talk to your plants, give them encouragement and love, and they'll flourish much the same as a growing child under the same care." See reference (f). As you talk, you're exhaling carbon dioxide.

"Carbon dioxide and water exposed to light in the presence of chlorophyll produce the real food for plants which is sugar, which may be stored in the trunks and roots as carbohydrates. Excess oxygen is released as a by-product. (Some oxygen is used by the plant in respiration.)"

Hence, from the six elements most used by a plant to survive, the three remaining elements of nitrogen, phosphorous, and potassium are found in nature in the soil in which the plant is growing or from fertilizers fed to it. Since most bonsai soil mixes contain, at best,

modest amounts of organic material, one must count on adding fertilizer in either liquid or solid form. As pointed out in reference (e) "Nitrogen (N) encourages above-ground vegetative growth, gives the leaves a dark green color, and also seems to regulate the use of the other elements. Phosphorous (P) encourages plant cell division and root growth, makes potash more easily available, increases resistance to disease, and flowers and seeds do not form without it. Potassium (K) acts as a catalyst for other elements, modifies the effects of nitrogen, encourages a heavy root system, is essential for starch formation, is necessary for development of chlorophyll, and improves the quality of roots and fruits."

AMOUNTS OF CHEMICAL ELEMENTS IN FERTILIZERS AND MULCHES Table: The accompanying table lists the N-P-K values for a number of fertilizers and mulches. The last three items (yard trimmings, livestock manure, and municipal sewage sludge) are from reference (g) and show the pH's for each.

The first three items listed in the table are inorganic fertilizers consisting of powders mixed with water. Maxi-Crop is an organic fertilizer consisting of powdered seaweed/kelp that is mixed in water. Both Dyna-Grow, an inorganic fertilizer, and Alaska Fish Fertilizer, an organic fertilizer, are sold as liquids to be mixed with water. Woodace and Osmocote are granular slow-release fertilizers that are applied directly to the soil surface in the pot. The next three items show the N-P-K in ppm (parts per million) for the mulches one might use as organic matter when making a soil-mix of granite grits and Turface or Perlite.

The percentages of N-P-K values in the table indicate the relative amounts of each element in each fertilizer. Directions on each plant food's label indicate that the same ratio of the fertilizer powder, one tablespoon, be mixed per gallon of water for outdoor plants. Based on that ratio,

Miracid with an N of 30% would supply the plant with more nitrogen per feeding than Peters, and Peters would supply more N at 20% than Miracle-Gro with an N of 15%. One can say, "Why should I worry how big the N values are, and for that matter the P and K values?"

The accepted procedure by most bonsaiists is to go heavy with nitrogen, i.e., a fertilizer with a high N in the growing season starting in early spring, no fertilizing during the hot summer months, and using a high P in the fall. The high N is what helps the plant generate new growth in the spring, the time when the plant is naturally accustomed to do that. If you do not want to stress the plant, do not feed N in the fall. It encourages new top growth when what you want is root development.

Some people like to fertilize evergreens year round (see reference (a)) although this does not seem to be the consensus evidenced in Japanese texts. I remember Bob Drechsler somewhat sheepishly admitting that he did start to provide the pines in the National Collection with a weak fertilizer in late January. In this locale, fertilizing usually ceases since the plants are conditioned to do their resting during the winter months.

Final selection may also be based on micro-nutrients and trace elements. If you are making fertilizer balls or concocting a "home brew" liquid fertilizer such as the Pete Jones article recommends in the issue, you have no inkling of any micro-nutrients or trace elements in the fertilizer unless you add some. Note that commercially available fertilizer labels list the amounts of the latter elements; and also that the percentages for a number of like elements in the different fertilizers are very small and in about the same ranges.

The directions on some fertilizer containers may distinguish the time of year to apply them, but not all do. Miracid's

package label has no specific time of year for application, so assume you can fertilize year-round with Miracid. On the other hand, Miracle-Gro label instructions indicate to apply it only during the growing season. Obviously the reason for the word "bloom" in the "Dyna-Gro Liquid Bloom" label is clear, since the percentage of phosphate outweighs those for N and K. Fertilizer manufacturers tailor the N-P-K values to create fertilizer with objectives such as making one's plants bloom, or being an ideal fertilizer for acid loving plants. On the other hand, the N-P-K values for Miracid (30-10-10) do not indicate a high percentage of phosphorous even though the box claims to be a specially formulated fertilizer "for all acid-loving plants" and includes such acid loving flowering plants as azaleas, and camellias. What happened to the high P value and lower N and K values to encourage flowering? Is the reason that the phosphorous value (P = 10%) for Miracid is lower than in the Miracle-Gro because the manufacturer had to formulate the fertilizer with N-P-K values such that the fertilizer solutions, first and foremost, have appropriate pH values - around 5.5 for acid-loving plants and 6.5 for non-acid loving plants? To get the most out of the fertilizers, it is suggested you should adjust the pH of a fertilizer solution, reference (h), to lie within the pH ranges for the species of plants being fed. For example: in the spring, when using Miracid for non-acid-loving plants with a pH above 6, adjust the pH up using a rate of one teaspoon of baking soda to one gallon of the Miracid mix. In the fall when using Miracle-Gro on acid-loving plants, a pH lower than 6.0, adjust the pH down using 1 teaspoon of distilled white vinegar to one gallon of the Miracle-Gro mix.

pH: In view of the above, it would be beneficial to check the pH of the soil in your bonsai pots after applying a liquid

fertilizer, or periodically with a granular slow-release fertilizer, to insure that the pH is in the recommended range for the plant species. You can be assured of the pH values for fertilizer solutions made from Miracid and Miracle-Gro; but what about other fertilizers where the manufacturers' labels claim to be an "all purpose plant food" (e.g., Peters and Alaska Fish listed in the accompanying table)? Reference (h) covers the aspects of checking pH values.

Micro-nutrients and Trace Elements: Selecting a fertilizer does not stop with just N-P-K values. The accompanying table also lists the amounts of micro-nutrients and trace elements found in the listed fertilizers. Manufacturers of fertilizers provide the customer with what they consider a well-balanced fertilizer in that their products also contain the percentages of micro-nutrients and trace elements found to be beneficial to a plant's growth. The percentages of all the nutrients, micro-nutrients, and trace elements must be high enough to benefit the plant, but not so high as to cause problems. In other words, the fertilizer must be "balanced" as mentioned in reference (a). See the section Plant Nutrients' Characteristics at the end of this article.

Role of Sea Weed/Kelp: MaxiCrop shown on the accompanying table is a soluble seaweed powder. However, seaweed or kelp can be more readily obtained on the market in a liquid form such as Bonide Kelp Extract or Roots, which should be mixed with water before application. For centuries, the value of seaweed in the diets of humans and plant life has been known. The Japanese use seaweed in their cooking to gain the healthful benefits from it. Why use seaweed? Seaweed can contain 60 chemical elements (ref I) among which are all the nutrients (and especially the micro-nutrients and trace elements mentioned

as essential to plant growth). It seems that it is beneficial if a solution of seaweed mixed with water is periodically applied to the bonsai - like once per week.

Foliar feeding: MaxiCrop suggests that the fertilizer solution should be applied as a foliar spray to the undersides of the leaves to achieve maximum absorption by the leaves. Hence, another reason to use a pump pressure sprayer instead of a sprinkling can for applying fertilizer. Reference (h) gave an in-depth explanation of what goes on when you foliar feed. The packages of Miracle-Gro, Miracid, Peters, Maxi-Crop, and Bonide Kelp Extract suggest foliar feeding, as well as applying them directly to the soil. Some users of seaweed put the recommended dosage of seaweed per gallon of water into the gallon of liquid fertilizer mix, thus combining two feeding operations.

Mycorrhizae: Dr. Edward HacsKaylo introduced PBA members to the subject of mycorrhiza at the 1979 PBA Annual Symposium. Reference (j) gives an in-depth report of a paper that Dr. HacsKaylo published in the 1972 issue of BioScience. Plants growing on land in soil are dependent on the intense biological activity that surrounds their root systems in which mycorrhizae play predominant parts. 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 non-mycorrhizal plants are more the exceptions than the rule. Only a few families of the higher plants, mainly crucifers, chenopods, sedges and aquatics are thought to be non-mycorrhizal. 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.

There are three classes of mycorrhizae and they are capable of invading the root systems of all the plant species used for bonsai. The mushrooms and truffles (the gourmet's delight) found beneath trees and growing out of your bonsai pots in late summer and autumn are the fruiting bodies of ecto-mycorrhizal fungi. They are indicators that your bonsai are happy. My Kingsville boxwood has had miniature mushrooms sprouting out of the soil. People that have grown pines know enough to not get upset when they see a white, powdery mildew-like substance on the bare roots - it's mycorrhizae.

The procedure to promote mycorrhizae in the past was to inoculate new seedlings or plants that don't look healthy with hair-root cuttings from the same species of a healthy plant. You may even be able to detect the mycorrhizae on the hair-root cuttings of the latter plant. Wash the hair-root cuttings prior to putting them in with the soil of the plant being inoculated. This will prevent the introduction of any pathogens which might be in the soil of the plant from whence the cuttings were taken.

This year mycorrhizae transplant inoculants have appeared on the market which are purported to cover a wide variety of plants. One of my packets indicates that it provides spores for both ecto- and endo-mycorrhizae which work the species of plants commonly used for bonsai. The instructions for using the powder point out that it should be spread around the extreme edge of the root ball of a tree or shrub before the hole is closed. If you're using it for bonsai, you can mix it in with the soil before potting/repotting. I've poked holes into the soil in my pots and poured a wee bit into each hole. Those of

us who have tried this approach have had a rude shock, for in a day or two a gelatinous mass of clear, little spheres will be found on the surface of the soil - sort of like clear tapioca pudding. After the initial shock wore off and I realized what caused the gooey blobs, I let nature take its course. After a few days and a few waterings, the blobs were gone - the plants looked happy.

Precautions for Mycorrhizae in the Soil:

1. Do not overfertilize with nitrogen or phosphorous.

2. For each plant species, maintain its correct range of pH in the soil.

METHOD OF APPLICATION: The question of how to use a fertilizer may enter the picture. If you use a granular slow-release fertilizer such as Woodace or fertilizer balls, the plant receives small amounts of food with every watering. I feel that this approach approximates what happens in nature where the plant's soil has the nutrients, and not like most bonsai soils where the relative volume of organic material in the soil mix, usually a mulch, is not large enough to provide enough nutrients to the bonsai (as the accompanying table shows). With a liquid fertilizer that is not fed through an automated drip system, the fertilizer is leached out by daily or more waterings well before the next weekly or bi-weekly feeding of a liquid fertilizer. The Miracle-Gro package suggests using 1/4 teaspoon per gallon of water as a more dilute fertilizer solution for feeding whenever "water is needed." This does not appeal to me - too work-intensive to bother with mixing the solution whenever I water. One can mix a batch of the dilute fertilizer solution and apply it over a period of days; but then there is the possibility that the shelf-life of the solution may be a consideration.

In the past, some bonsaiists suggested using fertilizer balls augmented by weekly feedings of a liquid fertilizer. Usually fertilizer balls contain solid forms

of nitrogen, phosphorous and potassium in the amounts one deems appropriate. Note there is an absence of micro-nutrients and trace elements. Some bonsaiists rely on the weekly or bi-weekly waterings of a liquid fertilizer to provide the missing micro-nutrients and trace elements. Periodically applying a seaweed fertilizer would also be a way around that problem.

CONCLUSION: I'm going to use Woodace in place of trying to make fertilizer balls. Since Woodace has a respectable number of micro-nutrients in it, I won't need a liquid fertilizer to augment the feeding of the bonsai. The bag of Woodace lists its effectiveness as 5 to 6 months. If I put Woodace on the bonsai in late February, the fertilizer will lose its power some time in July, in time for the plants to enjoy their summer respite. In September, I'll turn to using a 0-10-10 fertilizer, or whatever may be available that is high in phosphorous and potassium.

I'll provide a weekly application of a seaweed solution during the growing season and in the fall. I won't do any winter fertilizing. In repotting, I'll introduce a mychorrizal inoculant.

Also, you can add gypsum to the bonsai soil to reduce the amount of harmful salts that form in the soil - about 3/4ths of a tablespoon to a gallon of soil mix. If the plant is not to be repotted, sprinkle the gypsum on the soil.

The pH of the soil in the bonsai pots will be periodically checked and brought within the desired ranges using methods given in reference (h).

Lastly, I'll check out the how the plants are growing against the article in this issue, "Plant Nutrients - Pluses and Minuses." The symptoms a plant evidences when it is unhappy are listed along with the suggested remedies, which I can put to the test to try to make the plants thrive.

HAIKU

On a withered branch
a crow has settled -
autumn nightfall.
Basho

I hear faintly the cawing of a crow...
It is not merely crow calling to crow for
it speaks to me too.
I am part of one great creature with
him...

Thoreau

Above are from the book "MORNING MIST, Thoreau and Basho Through the Seasons" by Mary Kullberg; Weatherhill, NY; 1993



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A Note On Bone Meal *by Lew Buller*

It is bonsai folk wisdom, at least in San Diego, that bone meal added to the soil mix or to home-made fertilizer cakes is a good source of phosphorus. For eight years, I have been following this advice, thinking how much good it was doing my plants. Consequently, while reading an old book at my mother-in-law's home in Santa Barbara, I was amazed to find the following information:

"BONEMEAL. This rather slow-acting organic fertilizer is valuable principally for the phosphorus it contains and which may range from 23 to 25%. But it also contains from 1 to 3% nitrogen in readily available form. Depending on the fineness to which it is ground, bonemeal requires from 1 to 3 years or even more for its plant food elements to become available."

This came from the 1951 edition of the *Wise Garden Encyclopedia*, edited by E. L. D. Seymour and printed by Wm. H. Wise & Co., Inc., New York. Thinking that any wisdom existing the year I graduated from high school must surely be outdated by now, I consulted the 1993 edition of *The Ortho Book of Gardening Basics* and got essentially the same answer. Still reluctant to disbelieve the folk wisdom, I called the Los Angeles office of the Bandini Fertilizer Company and was told that while they couldn't give the exact time necessary for uptake, bone meal was the slowest of all fertilizers to release its nutrients to plants.

What's so important about phosphorus? The material in quotation marks which follows at various points is taken from the 1990 Horticulture Edition of the *Western Fertilizer Handbook* (shown as [W]) or the 1993 edition of *The Ortho Book of Gardening Basics* (shown as [O]), unless otherwise attributed.

Three chemicals, nitrogen [N], phosphate [P], and potassium [K], identified on containers of fertilizer, are called primary nutrients. In simple bonsai parlance, nitrogen produces top growth and if used to excess causes rank growth with long spaces between internodes; phosphate produces flowers and berries; potassium produces roots. It is somewhat more complex than that. "Nitrogen stimulates shoot growth in plants. It isn't the presence of other minerals that encourages

plants to bloom or to fruit, but rather the absence or slight presence of nitrogen." [O]

"Phosphorus is present in all living cells. It is utilized by plants to form nucleic acids (DNA and RNA) ... [and] is used in storage and transfer of energy ... phosphorus stimulates early growth and root formation. It hastens maturity and promotes seed production." [W] "Without sufficient phosphorus, top growth slows until the root system has grown large enough to absorb the needed amounts." [O] "Plants need phosphorus and potassium all the time they are growing, but the nutrients don't have to be added often since they persist in the soil for long periods." [O]

Since some of my plants are not transplanted more than every other year or every third year, I thought I might continue to use bone meal as a soil additive. But if the soil mix is as free draining as recommended, the bone meal simply washes out the first time the newly transplanted bonsai is watered thoroughly. I tested it; I transplanted with bone meal in the soil mix, set the plant on a cookie sheet out in the rain, and then watched the bone meal show up on the bottom of the cookie sheet as the water leached it out.

Adding organic phosphates to plants as a top dressing doesn't work very well, as I found out by continuing to read. "Phosphorus is highly reactive, bonding quickly with a wide variety of elements in the soil. It usually combines with oxygen to form ... almost insoluble compounds. Because phosphorus compounds are not easily dissolved, they are very stable in the soil." [O] Adding organic phosphate to the top of the soil simply resulted in the phosphate ions bonding with other ions and becoming insoluble. For this reason, some 0-10-10 fertilizers recommend that the fertilizer be worked into the top inch or two of soil where it will gradually dissolve and become available to the roots.

"Soluble" is a key term in fertilizers. If a nutrient is in soluble form, it will move through the soil and can be taken up by plants, but it can also be leached out of the soil. If the element is in insoluble form, it is not available to plants and generally will not leach out of the soil. Solubility is one of the reasons soil should be moist before fertilizer is added;

the fertilizer can disperse and move through the soil.

My home-made fertilizer cakes became less expensive; no more outlays for bone meal. But how to get phosphorus to the plants? When I went by John Naka's to pick up a plant he had been working on for the Wild Animal Park, I admired his grape bonsai and asked him how he got it to bear grapes so well. He laughed and showed me a can of triple phosphate (superphosphate), 0-20-0, an inorganic, no-nitrogen fertilizer.

Superphosphate ... remains soluble in the soil for between a few weeks and a few months." [O] Phosphorus can be replaced less frequently than nitrogen as it does not move in the soil like nitrogen does. "Dissolved phosphates are present in the soil in extremely low concentrations. Their presence is constant, however. As soon as the dissolved phosphates are absorbed by plants, more phosphate is dissolved to replace them." [O]

It seems the key to getting phosphorus to the plants is using fertilizers containing inorganic, water-soluble phosphates. They may be applied as foliar sprays or as liquids added to the soil. There is some research which says that more nutrients, phosphate especially, are absorbed by leaves from foliar spraying than are absorbed by roots from fertilizer in the soil.

Depending on your choice of application method and frequency of fertilizing, you can choose from several different water soluble fertilizers.

Miracle-Gro, 15-30-15, provides the primary nutrients plus some trace minerals for foliar spraying; it can also be used for root feeding.

Greenlight SuperBloom, 12-55-6, with chelated iron and Vitamin 131, is meant for watering into the soil rather than foliar spraying.

Miracid, with formulations ranging in the 30-15-15 range, is useful for acid-loving plants.

Bandini SuperBloom, 0-10-10 in granular form, provides both phosphorus and potassium and is appropriate for use in soil at transplanting time or as a dressing worked into the top of the soil in the fall.

Coated fertilizers, which slowly release their nutrients as plants are watered, are

another source. Since their release of nutrients is dependent on water, during hot weather when watering is increased, more fertilizer will be released and there may be some risk of over-fertilizing.

The last product I will mention (there are others) is Alaska MorBloom, in liquid concentrate form. It is 0-10-10, based in part on inorganic sources and in part on ocean fish, and can be mixed with fish emulsion to create a balanced fertilizer for root feeding. Since nitrogen washes out of the soil readily, it's a good idea to have a continuous source of nitrogen during the growing season. Since both the fish emulsion and MorBloom' are water soluble, I reapply them regularly. I have two rules: Follow the manufacturer's instructions exactly, or apply twice as frequently but half as strong as recommended.

Two words of caution: First, "balance is important in plant nutrition. An excess of one nutrient can cause reduced uptake of another. A heavy application of phosphorus may induce a zinc deficiency in soil that is marginal or low in zinc. Excess iron may induce a manganese deficiency." [W] Second, organic fertilizers take from two to twelve weeks for soil bacteria to convert them into organic salts which can be taken up by plants; inorganic fertilizers are available immediately as they require no conversion. The difference in the speed of uptake is important in timing the application of fertilizer; start your fertilizer program in time to have nutrients available to the plants when they need them.

While I do not follow Michael Persiano's Superfeeding program, I have increased the use of fertilizer and seen positive results. Deciduous trees are fertilized most heavily during the growing season, with a fall application of 0-10-10 shortly before they go dormant. Conifers are fertilized year round, with the volume reduced during the winter months when growth is slower. But, *no more bonemeal!*

PLANT NUTRIENTS - PLUSES AND MINUSES

Are your plants being fed the right nutrients? How can you tell? What can you do about it? The following should help you answer those questions.

Everyone is concerned with whether or not their plants are getting the proper nutrients. Toward this end, the following information was extracted from "SOIL, The Yearbook of Agriculture 1957," U.S. Department of Agriculture, Washington, D.C. At the time of publication, 16 elements were recognized as essential to the growth of higher plants. Unfortunately, the USDA has stopped publishing a yearbook, so this information is not updated. Of those elements, carbon, hydrogen and oxygen are supplied from the air and water. The others are extracted from the soil or supplied by fertilization.

NITROGEN: Causes the plant to have good growth rate, reproduction and respiration. Provides protein to the plant to stimulate growth and color.

Symptoms:

Lack of nitrogen: Foliage yellow and stunted. Yellowing, and dropping of leaves farthest from growing shoots. Dwarfed plant.

Adequate amount of nitrogen: Vigorous stem and leaf growth with rich, green color.

pH: Soil pH is not a factor.

Available forms: From the atmosphere, i.e., lightning, rain, decaying animals, plants, manure, cottonseed meal, blood meal, nitrate of soda, sulfate of ammonia

Remarks: Provides protein to the plant to stimulate growth and color.

PHOSPHOROUS: Stimulates root development. Necessary for photosynthesis, the synthesis and breakdown of carbohydrates, and the transfer of energy within the plants. Balances the nitrogen used.

Symptoms:

Lack of phosphorous: Older leaves become mottled or yellowed between the veins and scorched at the margins. Lower, older leaves show lack of chlorophyll or the deepening of a green or red color in the leaves. Roots are stunted and poorly branched. May delay plant maturity.

Too much phosphorus: Makes iron and zinc unavailable, see pH below.

pH: Soil micro-organisms change organic phosphorus to inorganic phosphorous at a faster rate as the pH increases. (Note: Organic phosphorus increases as organic nitrogen increases.) When the soil has a pH higher than 8.0, the plant is unable to absorb enough iron, manganese and zinc even though the availability of phosphorous is high. When the pH is lower than 5, the concentrations of manganese and aluminum may be large enough to be toxic to the plant. Also molybdenum becomes deficient in the soil.

Available Forms: See nitrogen; bone meal, super phosphate, treble phosphate, commercial fertilizers

POTASSIUM: Plants need large amounts!!! See remarks below. Regulates plant's digestive system. Enables plant to withstand low temperatures. Thickens the plant. Increases resistance to disease.

Symptoms:

Lack of potassium: Hard to detect potassium deficiency until it is most severe. Older leaves show affects first in yellowing of tips and edges. The yellowing areas get progressively broader.

pH: Soil pH is not a factor.

Available Forms: plant residues, commercial fertilizers, hardwood ashes, manures and compost.

Remarks: If the amount of nitrogen and phosphorus is high relative to the amount of potassium, growth is rapid at first. However, in the process, the potassium concentration may be reduced

to too low a level in comparison to the amounts of nitrogen and phosphorous remaining. If this is the case, the amount of potassium supplied must be increased.

SULFUR: Improves protein synthesis. It makes the plant more prone for nitrogen fixation. Seems to be associated with the making of chlorophyll.

Symptoms:

Lack of sulfur: Similar to those for nitrogen deficiency, but the leaves do not die back in the early stages of the deficiency.

Too much sulfur: Toxic to plants - see remarks.

pH: Not a factor.

Available forms: in the soil, fertilizers, rain and irrigation water, insecticides, fungicides, the atmosphere.

Remarks: With a high supply of nitrogen, but a low supply of sulfur, the plant's growth processes are disrupted. This is most common in greenhouses.

CALCIUM: The calcium in lime is a highly essential nutrient to plants. See remarks below.

Symptoms:

Lack of calcium: A deficiency of calcium first shows by the death or distortion of the cells in the growing points of shoots and roots. In fact, the roots of most crop plants must have a supply of available calcium immediately at the root tips and cannot depend on calcium available in other parts of the root zone if the roots are to continue to grow.

Too much calcium: Since the source of calcium is lime, one must be careful not to raise the pH of the soil for acid-loving plant and those collected in acid soils.

pH: See the last sentence above.

Available Forms: In the soil being used. Commercially available hydrated horticultural lime.

Remarks: Calcium concentrations in the cells affect the activities of certain

enzymes, but it is especially important in combining with pectin to form calcium pectate - a sort of cementing material laid down between cells which aids in holding them together. Some bonsaiists have occasionally sprinkled horticultural lime on junipers and have seen a healthier coloring in the leaves. Don't do this with Western junipers.

MAGNESIUM: Active in enzyme systems. Especially significant in that an atom of magnesium is the central part of every chlorophyll molecule in the cells of green leaves.

Symptoms:

Lack of magnesium: Leaves lack dark, deep green color.

pH: Not a factor.

Available forms: Dolomitic limestone; Epsom salt - an old trick was to give one's potted plants an occasional shot of Epsom salt, about one teaspoon per gallon of water perhaps once per month when feeding the plants.

Remarks: The magnesium taken up from the soil has a vital part in the photosynthesis process.

IRON: A catalyst in the production of chlorophyll.

Symptoms:

Lack of iron: New growing leaves show lighter color in the tissues between veins and become yellow. Only a single branch may be affected.

pH: With a pH greater than 8 in the soil, the plant may not be able to absorb iron.

Available Forms: Commercially available iron sulfate in either liquid or powdered form. See sulfur at the end of this listing to find out its effects on plants. John Naka puts a number of plain nails (those without any plating to prevent corrosion) and places 8 or so around the drainage holes in the pot. As the nails rust, iron oxide is made available to the plant. You can also push nails into the soil if you

haven't put them around the drainage holes.

ZINC: Essential part of certain plant enzyme systems. Enzymes are protein-like substances that catalyze (speed up) biochemical reactions.

Symptoms:

Lack of zinc: Abnormal roots, secondary roots develop at a later time. Rosette. Mottled, little, or yellowed leaves.

pH: If the soil pH is greater than 8, the plant may not be able to absorb zinc.

Available forms: Zinc chelates, foliar sprays, zinc sulfate, zinc-coated nails into trunks of trees (not recommended for bonsai trees).

Remarks: Rosetting is when dense clusters of small, yellowish leaves grow at the ends of twigs that are bare of lateral leaves.

Little leaf produces small, chlorotic, narrow leaves. Leaves of chlorotic plants range from light green through yellow to almost white. Chlorotic mottling progresses inward from the margin in the interveinal tissue. Considerable die back of the branches occurs in severe stages of little leaf.

BORON: Essential for plant growth in that it affects at least 15 functions.

Symptoms:

Lack of boron: First shown by the death of the main stems' terminal points. Multi-branching occurs with dying of the buds on shoots. Thickening of the leaves and sometimes chlorosis. Stunted roots.

pH: Very important since increases in the pH fix the boron in the soil so that it is not released to the plant. Then the pH must be lowered.

Available form: Borax. You may wish to occasionally put a teaspoon of 20 Mule Team Borax, the aid for laundering, in a gallon of water and apply to your plants once or twice during the times of

the year when fertilizing is done. Add a teaspoon of distilled white vinegar to lower the pH of the solution since the borax tends to raise it.

COPPER: Enhances normal plant growth.

Symptoms:

Lack of copper: Gum pockets appear under the bark. Stained spots on the bark of terminal twigs and defoliation. Dying back of twigs.

Too much copper: Reduced growth. Stunted roots. Chlorosis of the foliage. (For description of chlorosis see Zinc remarks above.)

pH: Increasing the pH by liming reduces the toxicity.

Available form: Bordeaux mixture spray.

Remarks: Copper has the tendency to raise the toxicity, but a high phosphate content in the soil reduces the copper toxicity. Hence, if the Bordeaux mixture is used too frequently for other reasons, phosphate added to the soil should correct this.

MANGANESE: essential in certain enzyme systems of the plant cell.

Symptoms:

Lack of manganese: chlorosis in interveinal tissues of leaves.

Too much manganese: Spotted leaves.

pH: A pH less than 6 allows the manganese to be leached from the soil. Liming the soil to raise the pH above 6 fixes the manganese in the soil, thereby causing a manganese deficiency in the plant. The pH should be between 5.7 and 6.0.

Available form: manganese sulfate.

MOLYBDENUM: Needs to be present in only minute amounts. It is essential in the enzymatic processes which convert nitrate nitrogen that is taken up from the soil to forms of organic nitrogen which in

MONTHLY CARE TIPS for JANUARY

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



Nutrition cont'd from pg 15.

turn are used in synthesizing amino acids and proteins.

Symptoms:

Lack of molybdenum: Poor development or growth.

pH: Not a factor.

Available forms: Sodium molybdate. Molydic acid.

CHLORINE: Needs to be present in the form of the chloride ion in minute amounts. It has a colloidal effect and is an enzyme activator.

Symptoms:

Lack of chlorine: Leaves display symptoms of wilt, chlorosis and necrosis (death of leaves).

pH: Not a factor.

Available sources: Rainwater which comes off the ocean, tap water.

Remarks: Plants need more of this trace element than any other trace element, except possibly iron.



.....
•Support your club--Volunteer! Learn from
•our "old timers" while taking some of the
•pressure off them.
•.....

the average temperatures for the area around Washington, DC. Weather patterns everywhere in the world change from year to year; and those changes play an important role in selecting the 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 as when to put them in winter storage. The following listings give the reader suggested periods of time during a year when one should consider doing various bonsai-associated tasks. As you gain experience, you can establish your own schedule for bonsai tasks. 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 when any new buds or growth are 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 the September/October timeframe and discontinue fertilizing of any kind during the winter months. 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: Water once per day.

Cryptomeria: Water once per day including the leaves.

Hemlock: Water as needed.

Hinoki: Water as needed.

Larch: Water as needed.

Needle juniper: Water once per day including the leaves.

Sawara cypress: Water as needed.

Shimpaku (Sargent juniper): Water once per day. Weather permitting or if the plant is in a cold frame, you can consider rewiring and repotting any time after the 20th of January. Remove the old wire before rewiring. Repotting need only be done every 3 years.

Spruce: Keep the spruce in a cold frame or polyhouse. Water once per day.

White pine: Water once per day. Unwanted branches can be pruned. Wiring can be done; but once the tree has been wired, it should be placed in a cold frame or polyhouse.

Yew: Water as needed.



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.

Another member of NVBS and I lost yews this year because hardwood bark was in the organic mulch incorporated in our soil mixes.

DECIDUOUS (Remarks on winter protection refer to a polyhouse or cold frame.)

Non-fruiting/non-flowering

Beech: Water once per day. Keep in winter protection such as a polyhouse or cold frame. Wiring can be done.

Chinese elm: Water as needed. Wiring can be done.

Gingko: Water as needed.

Hornbeam: Water once per day. Keep in winter protection. Wiring can be done. Unnecessary branches and sprouts can be removed.

Japanese maple: Water once per day. Keep under winter protection. Wiring can be done. Unnecessary branches and sprouts can be removed.

Trident maple: Water once per day. Keep under winter protection. Wiring can be done. Unnecessary branches and sprouts can be removed.

Winged Euonymous: Water as needed. Wiring can be done.

Flowering/Fruiting Plants

Cherry: Keep in winter protection. Water once every 2 to 3 days.

Crabapple: Water every other day. Keep in winter protection.

Gardenia: Winter protection. Fertilize in middle of month with high phosphate.

Holly: Keep in full sun until last 10 days of the month.

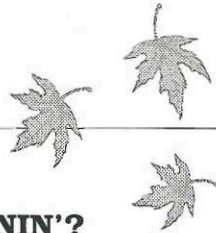
Pyracantha: Keep in full sun all day.

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-day shade/half-day sun.

Ume (Japanese flowering plum or apricot): Apply fertilizer balls during the first 10 days of the month. Repot anytime 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.



WHAT'S BEEN HAPPENIN'?

You may have been wondering what's been going on with *PBA Clippings*. When Beth Potratz moved away last summer, *PBA Clippings* was left without a desktop publishing capability. Since then, we've used a commercial source on two occasions; but if this practise is kept up, in time the PBA treasury would be defunct. With this issue, we're trying to go back to the old approach used for *Clippings* in hopes that the publication cost will be financially more acceptable. In the meantime, one of PBA's members has volunteered to get proficient in desktop editing so that the old cost-free avenue will be open once again. The editor apologizes for this issue covering a 2-month period, but then 2 months of articles are packed into this issue.

The Editor

Thanks to Mike Ramina for directing our attention to the article by Lew Buller (A Note on Bonemeal) and obtaining permission to publish it from Golden Statements, the Bonsai Magazine of Golden State Bonsai Federation. Ed.

These handy bits of information come to us from *BONSAI, The Newsletter of The Greater Evansville Bonsai Society*.

Thanks, Dave Bogan, Editor.

Something Fishy

Bonsaiists with aquariums and fish ponds may be overlooking a source of organic tree food. It's simple. When you change water in the tank, save it. The deposits in this highly organic, "previously occupied" water are very beneficial to your trees. The fish really won't mind at all.

Charcoals !

Wood Charcoal: This type retains water very well and will eventually break down, to a certain extent. Its potash is a good source of food. Grinding it to a fine powder and putting it in the top soil will help your moss grow rich and green. [Ed. Note: Illinois "ists" must have slightly different attitude toward their moss.] Fig species particularly seem to enjoy a good measure of wood charcoal.

Bone Charcoal: This type is used to keep water fresh and sweet. You see it used a lot with fish aquariums to prevent the water from getting sour. Use it especially in the soil of trees which are kept sitting in a pan of water (e.g., willows, buttonwoods and wisteria). It also has a valuable phosphorus content as well.

Better in your soil than in your stocking!



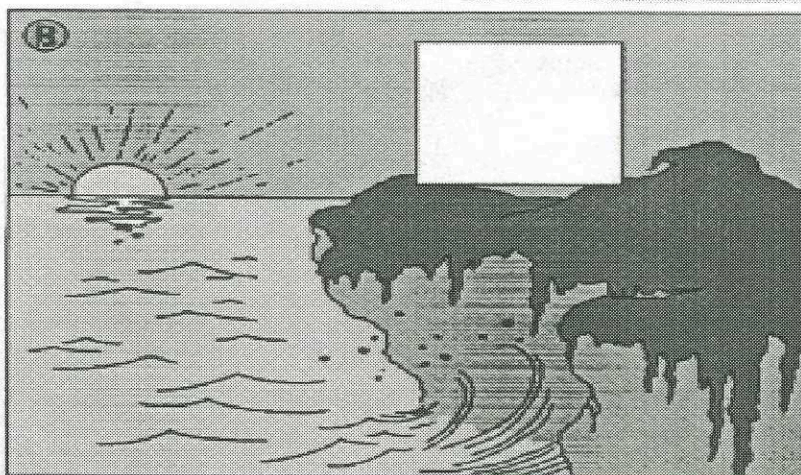
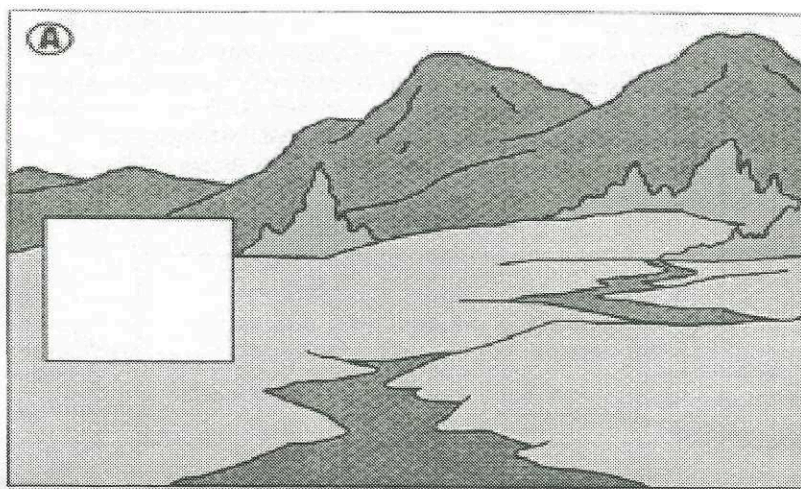
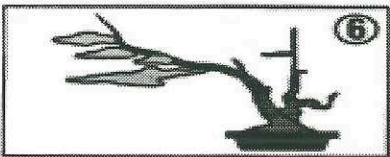
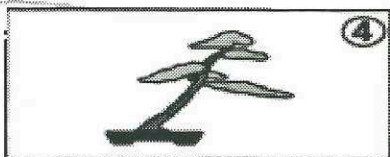
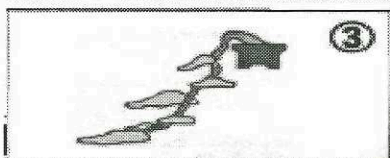
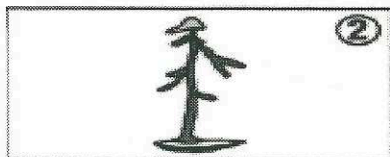
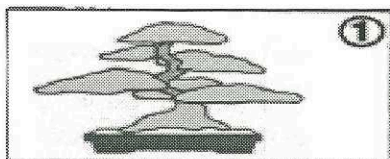
Club and Society Presidents: Check your club info on back page. Inform Betty Yeapanis of needed corrections. Contact your secretaries and remind them to send in your club schedules. Remind your members to attend the Open Board Meeting mentioned on the cover page.



NO PROCTOR REQUIRED --

This quiz was submitted to *The Journal of the Toronto Bonsai Society* by Norman Haddric, who found it in an unnamed Japanese bonsai magazine.

In each of the pictures of natural scenes A and B, there is an empty square. Choose the most appropriate pictures of bonsai 1-6 to complete the empty squares. Use every number. Answers are not restricted to one each. Do not use any number more than once.



1. It is hard to grow healthy trees when they are kept on the ground or on concrete. True/False
2. Generally, tree species such as maples, elms and yews are called leafy deciduous trees. True/False
3. Conifers like an environment where they always receive evening dews. True/False
4. Nitrogen, phosphorus and potassium are the three main components of fertilizers. True/False
5. Insecticides, such as malathion and sumithion, protect new shoots and young leaves from sap-sucking aphids. True/False
6. If you carry out repotting when the soil in the pot feels dry, it is easy to injure roots. True/False
7. When you cut thick roots, the application of a wound dressing will stimulate the growth of roots. True/False
8. It is desirable to have roots growing evenly in all directions but, depending on the shape of the tree, it is not necessary. True/False
9. When you are using the bark ring removal layering technique, you must also remove the cambium layer, True/False
10. Stylish thin-trunked bunjin trees will harmonize well with somewhat deep, cornered, rectangular pots. True/False
11. The rainy season is the optimal time to carry out the wiring of needle junipers. True/False

Answers in the next issue. If you consider these items controversial, send in your comments. We'll put them in print and see what the rest of the membership has to say about it.

What Works for Me . . . by Pete Jones
(NVBS)

As I think back over the years, this article (pre-1993) has helped me to understand how to care for my bonsai and plant materials I wish to develop based on the soil and fertilizer I am using. Often we spend time searching for that magic formula to improve our bonsai rather than using what we have known or should know by now, what really works! As this article points out, we need to get back to basics: soil, water, light, and applying fertilizer. How many times have we heard about a new soil mix or a new plant food? As this article points out, no two books agree on soil mixes, nor will we find the same recommended fertilizing methods. Soil mix and fertilizing are just as individual as each of us. I have used Roy Nagatoshi's basic soil mix for 9 years. I modify Roy's soil mix according to the type of bonsai tree I am planting. I am very pleased with the root development and vigorous growth I get using his mix.

I have often stressed when teaching a beginners' course that we must first understand our own horticulture practices--how we grow plants, the type of soil we use, and how the plants respond to our care. Next, we need to understand how the plants respond to the type of fertilizer we use and our method of application. After these two very basic functions for growing plants, we should do the necessary research on the requirements for growing the type of plants we wish to grow. This research should provide growing condition (such as the type of soil and the ideal pH), water needs, the maximum/minimum sunlight, and feeding requirements for the type of plants we are growing. Failure to ascertain the plants' requirements often leads to both you and the plants being

unable to make each other happy.

Too often we ask fellow club members about a tree we wish to grow. Although this is helpful, we have no idea as to what horticultural practices they are using. Most of the time, they will tell you how they have succeeded, with little or no information on their failures or their research for growing such a tree. A club member's notes on how they grew a particular plant will be valuable information which could help you learn how to succeed. You should use those notes, plus keep your own notes which will add to your experience as your tree develops. Too often we are quick to point out what someone told us didn't work for us, which sounds like we are trying to blame them for our failure.

Fertilizing bonsai is an easy task once we understand the consistency of the potting mix we are using, and the feeding requirements of the type of bonsai we are growing. Rather than asking others, I wish to suggest that we use the various articles printed in the *PBA Clippings* and other books as guidelines for developing our own feeding schedule. Our research on feeding bonsai should also include a list of certified organic fertilizer suppliers. You should also obtain an analysis of the specific fertilizer you may wish to use. You want to know the pro's and con's, such as, the salt content, the effects on soil pH, and trace elements of the fertilizer you wish to use. Some suppliers will provide this information if you request it. Most major universities have a horticulture department which may be a good source of information on soils, fertilizers, soil pH, and trace elements.

There are many types of organic fertilizers available. I have found those fertilizers certified for organic farming use perform quite well for growing bonsai. In my search for fertilizers, I

have found some most interesting products. One fertilizer, Peruvian Seabird Guano (PSG) from Worm's Way Garden Supply, has the highest complete NPK (14-11-2) and trace elements of all the organic fertilizers I have used. PSG can be used as a foliar feed spray or broadcasted. Using PSG as a spray, I add FoliaGro, a water-soluble kelp powder which I ordered from Necessary Trading Company, New Castle, VA. To this mixture, I also add a 4-in-1 organic garden dust/spray which consists of rotenone, pyrethrin, sulfur and copper. This dust/spray is ordered from Garden's Alive. In addition to regular soil feeding I do once a month, I spray this mixture every 2 weeks to feed the plants, and help control disease and insect damage. Esposma's Plant Tone is a good all-purpose organic fertilizer for feeding bonsai.

I shall continue to provide information on the various types of organic fertilizers with which I'm experimenting. This past summer, I added a horse manure tea to my foliar feeding spray.

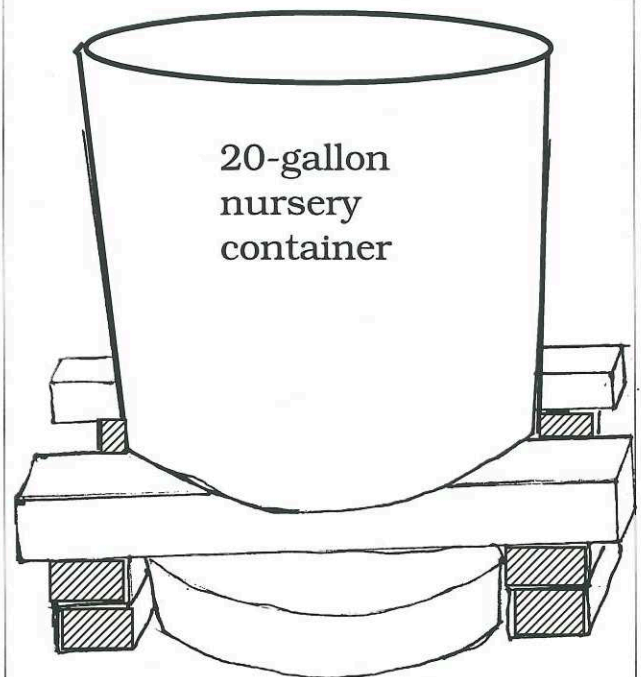
When manure tea was needed, the container was watered like any other large container with a plant in it. Between me watering and the rain, I had to use a 5-gallon bucket with a lid to store this black gold. This manure tea was also used to soak plants when transplanting. I am so pleased with the results of this type of manure tea that plans have been made to set up two such containers next year.

So far, this method of caring for my bonsai has worked well for years. It has helped me save many sick plants. I shall continue using these methods to stay as organic as possible. Nature has done quite well with the forests and plains of the world. It is up to me to understand how she does it.



Pete's Magic Elixir

To make the manure tea, 1 pound of Esposma's Plant Tone and 1 pound Kelp were mixed with enough aged manure to fill a 20-gallon nursery container. The horse manure was aged in a plastic bag over winter (about 6 months). This container was placed on rack high enough so a 24" wide by 5" deep plastic saucer could be placed under it.



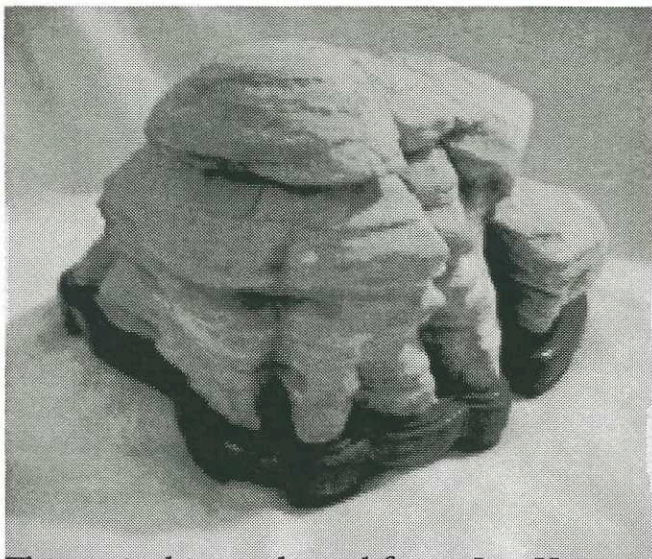
2x2x30" timbers set upon bricks over a 5-inch deep saucer

Notice to Club and Society Secretaries:

Please send in your schedules of upcoming events. Doug French's address is in Col 1 of Page 2. Our membership can't attend your interesting programs if you don't tell us about them.

Suiseki. The following two articles are reprinted with permission of The North American Viewing Stone Society (NAVSS) from their excellent newsletter, *Waiting to be Discovered*. Many of our members have expressed interest in suiseki, and a small group is trying to form a local club. If you are interested in a local club, contact Chris Yeapanis by e-mail (preferable) at ibonsai@erols.com or by phone **after 11:00 a.m.**, (703) 591-0864.

You can contact NAVSS at NAVSS@juno.com or by mail: NAVSS, P.O.B. 27, Broomall, PA, 19008-0027.



This suiseki purchased from Jim Hayes, NAVSS, belongs to a NVBS member. It is approximately 2 5/8" tall x 5 1/2" wide. The dai was made by Sean Smith of Pennsylvania, also a NAVSS member.

Some seasonal haiku to bring you to a peaceful moment, and perhaps lighten your spirit --

Year's End

Now this year goes away:
I've kept it hidden from my parents
that my hair is gray.
Etsujin

Over wintry fields
Bold sparrow companies fly
Scarecrow to scarecrow
Sazanami

A Suiseki Primer by Cliff Johnson

The enjoyment of Suiseki as an art for originates in the Orient and dates back to the Tang Dynasty in China (A.D. 618-906).

The introduction of Zen and the renewed interest in painting, calligraphy and the tea ceremony in the Muromachi era, 14th to 12th Century, coupled with Suiboka painting, resulted in an awareness of the beauty of line and form in stone.

The word Suiseki (water stone) is an abbreviation meaning "a stone representing mountain and water" which was derived from a painting depicting such a scene.

In later years, a wider classification has been given to Suiseki--stones representing human or animal forms, or stones having spiritual or abstract thoughts are included.

A Suiseki is a stone formed by nature using fire, wind, sand, and water to create an artistic masterpiece-to-be-found by the seeker and displayed on a carved wooden stand, or in a shallow container filled with sand or water--whichever is most in keeping with the spirit of the stone.

A good Suiseki is more suggestive than realistic--thereby leaving the viewer to use their imagination for full enjoyment and oneness with the stone.



Windy winter rain . . .
My silly big umbrella
Tries walking backward
Shisei-jo

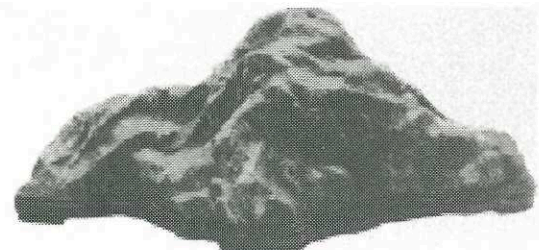
Oh, the first snowfall !
Who could stay indoors on such
A glorious day!
Kikaku

Suiseki Classifications *by Frank English*

Stones from the collection of Frank English—Photography by Maury Levin.



Distant Mountain Stone (Toyama-ishi)



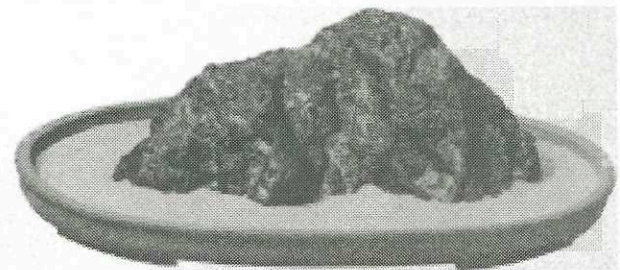
Mountain-shaped Stone (Yamagata-ishi)



Mountain Range Stone (Rampo-seki)



Mountain-shaped Stone (Yamagata-ishi)



Near-view Mountain Stone (Kinzan-seki)

By far the most popular and important of all suiseki classifications is the *Yamagata-ishi*, or "Mountain-shaped Stone." Indeed, *yamagatas* tend to dominate in the majority of suiseki collections—to the point of near exclusivity in some. Generally speaking, the first suiseki that most collectors acquire are Mountain-type stones, and often these continue as favorites.

Recognized *yamagata* variations are numerous. Among these are stones with Single, Double, and Multiple Peaks; Round-top, Flat-top, and Snow-capped; plus Near-view, Distant Mountain, and Mountain Range styles. "Mountain-shaped Stones" will frequently include one or more lakes, caves, mountain streams, and/or waterfalls as bonus features, adding to the interest and variety within this classification.

In spite of their styling differences, "Mountain-shaped Stones" as a class have much in common. In addition to such basic suiseki characteristics as specific hardness, color, and surface texture, a number of configuration standards apply.

A. Stones can feature one or more well-defined peaks, preferably odd in number if more than two.

- B. All sides slope down and outward from peaks.
- C. Height and depth are from one quarter to one half the stone's total length.
- D. Multiple peaks should be somewhat staggered rather than in straight picket fence-type alignment.
- E. The dominant peak or principal concentration of bulk is normally offset to either the right or left of center.
- F. A well-formed *yamagata* has only one flat side—the bottom.
- G. Avoid stones with excessive overhangs.
- H. Viewed from front, back, or topside, the ideal *yamagata* outline is that of a scalene (all sides uneven) triangle.
- I. Distant Mountain Stones have smoothly subtle contours. Near-view mountains clearly display rugged surface detail.

And then—the most important standard of all—suggestiveness. A *Yamagata-ishi* must truly look like a mountain. As seen from any direction it should evoke reminiscence of Nature's own mountain majesties in this handy "carry-home" version of the real thing.