

# The Art of Bonsai

By Eugene Howell

Of the four basic requirements for a tree (or any plant) to survive, we have already discussed three of them in previous newsletters. These were temperature, light, and water. Let's now turn our attention to the fourth one – soil.

In the last article – on water – there was a brief discussion of bonsai soil and why the use of it helps prevent root-rot in your bonsai. Let's now look at some of the companion considerations that must be taken into effect when thinking about the needs of the tree.

Whatever soil is used, it must satisfy three essential requirements. We talked about one of them, good drainage, in the last newsletter, so let's go to the next requirement. The soil needs to have a pH level that is acceptable to the plant, and lastly, the soil must provide nutrients that the plant can absorb and eventually convert to food (complex sugars).

A scale, called the “pH scale”, measures the alkalinity/acidity of the soil. It is a scale running from 0 to 14, with the lower end of the scale indicating acid conditions and the higher end indicating alkaline conditions. A reading of 7.0 on the scale is considered neutral; neither acid nor alkaline. Don't try to figure out why the scale has 14 increments, just accept it and the fact that 5.5 to 6.5 is good and anything above 7.0 or below 5.5 is not so good.

Most plants will do very well in a slightly acidic soil, with pH levels of 5.5 to 6.5. Few plants thrive in an alkaline soil (above 7.5). While a neutral soil (pH 7.0) would seem to be perfect, it is virtually impossible to put together such a soil. Interestingly, most plants have an ability to adapt quite easily to a slightly acidic soil, but the opposite is not true. Few plants can adapt to an alkaline one. One of the excellent aspects of bonsai soil is that, if properly put together, it will have a pH exactly where most plants like it; between 5.5 and 6.5. Both sand and Turface are neutral (unless you buy sand that is ground limerick) and ground pine bark is slightly acidic. Thus the resulting mixture is slightly acidic; right where you want it.

Every plant needs several major elements and a whole bunch of minor ones in order to thrive. Bonsai soil has very few of these, so the tree is greatly dependent on you for these essential elements. So the question at hand is “What are these and where do we get them?”

The major three elements required by all plants are nitrogen (N), phosphorus (P), and Potassium (K). These are the elements the fertilizer manufacturer is talking about when he puts the big numbers on the front of the bag or container. As an example, you may see “6 – 10 – 5” on the front of the container. This means that the fertilizer contains 6% nitrogen, 10% phosphorus, and 5% potassium. If you look on the side or back of the container you will see a table that contains a complete listing of all the elements in the fertilizer. It is very helpful if the fertilizer contains such things as iron (Fe), magnesium (Mg), manganese (Mn), copper (Cu), zinc (Zn), boron (B), calcium (Ca), molybdenum (Mb), and chlorine (Cl). The more of these that are in the fertilizer, generally the more it will cost, but your plant will be healthier.

Lack of a couple of these minor elements will cause many plants to exhibit symptoms that are similar to a deficiency of iron. If either magnesium or manganese is deficient, the plant may show a yellowing of the leaves, with the veins remaining green. When chelated iron is added (to correct the supposed iron deficiency) and the plant does not recover complete greenness to its leaves, many bonsai owners have no idea what to do. The symptoms are sufficiently different that a very knowledgeable person can tell which elements are causing the problem, but for the typical bonsai owner this is not possible, so the thing to do is always use a fertilizer with these minor elements.

Two final points on the subject of fertilizing; first, some fertilizers (most of them) are fast release and some are slow release. One that is fast release will release all of its elements over a period of two or three weeks. During the summer, when you water every day, this means that all the fertilizer has been washed from the soil in a relatively short period. A slow release fertilizer releases the nutrients over a period of months.

Even though you water daily, the encapsulated grains remain in (or on) the soil for many weeks and continue to release nutrients to the tree. This gives your plant the ability to achieve its maximum growth rate over the entire growing season.

On the other hand, you can use water soluble fertilizers to maximum benefit only if you know the best way to do it. When you use one of these (and water daily) the fertilizer has completely washed out of the soil within 2 to 4 days. If you use it only once per month (as recommended on most containers) your plant grows in spurts and will not achieve maximum growth rate. The best strategy for the use of this type of fertilizer is to mix it at  $\frac{1}{4}$  of the concentration shown on the package, and use it once per week rather than once per month. The tree will then receive a constant supply of nutrients.

Now for the second point mentioned above. Don't fall into the trap of thinking that "if a little fertilizer is good, then more is better". This is a good way to kill your plant or seriously injure it. Too much fertilizer will "burn" the roots. There is not room now to discuss this concept so just accept it: Never use too much fertilizer.

Many bonsai owners don't really understand the plant's need for nutrients. After this you shouldn't be one of them.