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Technical Bulletin

036 11/07/00

LONGEVITY OF APPLIED MICRONUTRIENTS

When applying micronutrients like iron (Fe), or other minerals that affect greening (Magnesium [Mg], or Manganese [Mn]), how long can you expect the mineral to last in the soil or in the plant tissue? This question affects your decision about the frequency of application.

Fate of Micronutrients in Plant Tissues

Micronutrients like iron, magnesium, and manganese are natural chemical elements needed by plants in minute amounts. They cannot be broken down into simpler materials, and they cannot be destroyed. Therefore, they are cycled in the tissues to be used over and over again. They are lost when the plant loses tissue. The major occurrence of this in trees is at leaf fall. In turf, it occurs whenever the turf is mowed. Prior to leaf fall in trees, some of the mineral content is moved into woody tissue, but not all. Turf is not so lucky, since leaf tissue is removed after mowing.

In the natural setting, recovery of these lost minerals would occur slowly, as leaf litter decomposes by bacterial and fungal action, and the minerals are cycled back through the soil. However, in urban and golf course settings, fallen or mowed leaves are removed, and are not available for nutrient recycling. Therefore, micronutrients lost at leaf fall or mowing must be replaced by external application.

Absorption of Micronutrients

Micronutrients must be soluble to be absorbed. Therefore, adequate water must be present for absorption to occur. In addition, the soil pH is a significant factor in determining if specific micronutrients are soluble. For example, the most common form of soluble iron added in fertilizers is iron EDTA. This is quite soluble at pH's below 6. Above 6, the iron precipitates in an insoluble form, and is no longer available to the plant. Soil pH above 6 is particularly common for turf. So when iron EDTA is sprayed on turf in soils above pH 6, the iron is absorbed by the leaves (foliar absorption). But any iron that reaches the soil soon becomes insoluble and unavailable. To address this problem PHC BioPak Plus and Flexx are formulated with a special type of iron chelate that is soluble in acid, neutral, and alkaline soils.

Practical Longevity of Micronutrients

The practical longevity of applied micronutrients depends upon several factors, including:

- The degree of deficiency vs. the amount of micronutrients applied
- The frequency and degree of micronutrient loss (leaf fall or mowing)
- The rate of soil leaching

Trees vs. Turf

Deciduous trees in temperate settings experience leaf fall once each year. Therefore, a standard application of micronutrients could last the entire season, since the absorbed micronutrients can be recycled until lost at leaf fall in the autumn. A good time to apply micronutrients to trees is in the fall. Fall feeding of trees should involve a lower emphasis on macronutrients (N-P-K), and a greater emphasis on micronutrients. The macronutrients, if applied too late, can delay the onset of winter hardening needed to protect the tree from early frost damage. The micronutrients, on the other hand, will not be returning via decomposing leaf litter. Therefore, it makes sense to add them

at this time. However, they can be added in the spring, or at other times when symptoms of micronutrient deficiency become evident.

Conifers, such as spruce, fir, and certain pines, may retain needles for several years. Each year needles are shed, but these needles may be 2 to 6 years old. Micronutrients in conifers, therefore, are internally recycled longer than deciduous trees because conifers do not defoliate completely each year.

Turf is mowed regularly, particularly in golf course settings. Therefore, application of micronutrients to turf needs to be more frequent to maintain adequate greening and overall health and vigor of the grass. Therefore, turf maintenance programs recommend the regular application of macro and micronutrients. Flexx is applied monthly in residential settings, and every 2 weeks in golf courses.

Other Product Benefits

PHC BioPak Plus and Flexx provide other important benefits besides micronutrients. They also contain a complement of rhizosphere bacteria to promote the chemical and biological fertility of the soil. Also included are ingredients which promote microbial growth and improve soil structure. Yucca is included to increase water penetration through the soil as well. The strategy of providing macro and micronutrients formulated together with biostimulants and biological factors provides a complete and balanced package for maintaining healthy plants.