Are Your Trees Starving to Death?

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Since this is a turfgrass conference, I will confine my remarks to trees growing in turf areas.

In most cases, the chances are your trees are not starving to death. But, rather, they are enjoying a more than adequate diet of N, P and K, since turf people are known to be fairly liberal in applying fertilizer to turf. And where turf is well fertilized, the trees in those areas are also well fertilized.

However, there are a couple of situations where the trees could be starving to death in areas of plenty. This would be where you are irrigating the turf with water of high pH in the range of 7.5 to 8.5, and where there are tree species--oak, sugar maple, sycamore--that do not like the alkaline environment. In this situation, the trees develop chlorosis; that is, the leaves fail to develop the green color in the area between the veins, although the area adjacent to the veins remains green. The chances are fairly good that the trees are suffering from iron or manganese chlorosis. It is difficult to determine the difference between the two deficiencies without chemical testing. The probability is fairly good that on the oaks, especially pin oak, the problem is related to iron and on maple it could be Mn. Also, the manganese deficiency seems to be associated in the northeastern part of the lower peninsula; at least that is the area where it has been identified.

Iron chlorosis is aggravated by factors that promote the oxidation of iron from the ferrous (Fe^2) to the ferric (Fe^3) form. It is associated with alkaline soils containing relatively high concentrations of phosphates and bicarbonate ions. Irrigation water in many parts of Michigan contains considerable quantities of calcium or bicarbonates which contribute to the problem. Also, decomposing organic matter in alkaline soil will help to increase the alkalinity of the soil and thus maintain iron in the ferric form.

Plants that cannot counteract the alkaline soil factors will develop iron chlorosis. The fate of the plant is related to its ability to change iron from Fe^2 to Fe^3.

Many remedies have been recommended to correct iron chlorosis. They include: 1) the pounding of iron nails into the trunk, 2) injecting iron salts, such as ferric citrate, iron tactrate and iron sulfate into the trunk, 3) spraying the leaves with various solutions containing iron, 4) application of iron salts to the root zone, 5) the use of iron chelates both as sprays and soil injection, and 6) modifying the soil pH by using various acidifying agents, such as ammonium sulfate, sulfur, aluminum sulfate or sulfuric acid.

Iron sprays will green up the foliage with which it makes contact. However, leaves that develop after the treatment are generally yellow. Sprays containing chelates are generally unsightly and therefore not too desirable. Treatments used to change the pH of the soil are slow with the exception of the sulfuric acid treatment which is rather critical and must be applied with caution. The best results have been obtained by the use of soil treatments, particularly with the use of iron chelates. However, these remedies have not been without their disappointments. Presently, the suggested treatment is the use of iron chelates or iron sequestrians adapted for use on alkaline soils. These products should be applied in early spring before or just after growth starts and at concentrations recommended by the manufacturers.

The use of iron-containing capsules inserted into the trunk of chlorotic trees has also shown promise. A number of holes are bored into the trunk of the chlorotic tree, with the aid of a high speed drill. The holes should be deep enough so that the capsules when inserted will be situated in the sapwood with the head of the capsules flush with the xylem. This will allow the iron citrate to be dissolved in the sap and translocated to the leaves. Capsules inserted during the early stages of growth have produced positive results in 10 days or less.

Information for the correction of manganese deficiency is not as readily available since Mn deficiency of ornamental trees is not too common. But the use of manganese sprays has been effective in "greening up" the foliage. However, the use of manganese chelates injected into the soil in early spring should produce more lasting results.

In summary, trees in well maintained turf areas are probably not starving to death. But in areas where turf is being irrigated with water that has a high pH, it is possible that certain species of trees may be lacking in iron or manganese. These deficiencies can be corrected by the use of Fe or Mn chelates or by inserting iron-containing capsules into the trunks of trees.

Help keep Michigan green--as green leaves are man's basic source of energy.