Iron Chlorosis

Iron is necessary for the formation of chlorophyll, which is responsible for the, green color in plants and is the source of plant food and energy. When the amount of iron, available to plants is inadequate for normal growth, leaves become pale green, yellow or white and eventually brown, particularly between the veins. Mildly affected plants become unsightly and grow poorly. Severely affected plants fail to grow flower or fruit and may even die from lack of iron.

Iron chlorosis occurs most often in pin oak, white oak, white pine, magnolia, holly, sweet gum, dogwood, azalea and rhododendron.

Iron chlorosis may occur as a result of one or a combination of causes. The condition is often due to high pH, which makes it possible for other elements to interfere with the absorption of iron, rather than a lack of iron in, the soil. This occurs in neutral to alkaline soils when the pH is above 6.5

Clorosis may be caused by an actual deficiency of iron or by applications of excessive amounts of lime or phosphate to certain soils. It may be caused by over-watering, poor drainage or high levels of certain mineral elements in the soil such as manganese, copper or zinc.

The visual symptoms are often confused with other conditions such as a deficiency of magnesium, manganese or boron, or possibly other non-nutrient related problems.

Control

If over watering or poor drainage are possible causes, they should be corrected. Poor drainage is quite common in much of the silt and clay loam soils in Ohio, and. tile lines may have to be installed near valuable trees.

The pH, particularly in central and western Ohio, is quite often above 7. For permanent control, this must be lowered by annually applying to the soil ammonium sulfate, aluminum sulfate or sulfur. Ammonium sulfate is used at the rate of 10 pounds per 1,000 square feet and sulfur at 25 pounds per 1,000 square feet per pH unit to be lowered and aluminum sulfate at-higher rates.

A soil sample and leaf sample should be taken and forwarded to the REAL Laboratory at OARDC. The reports that are returned will give soil pH reading and levels of as many elements as the sender specifies. This will reveal if elements are deficient or in excess and, therefore, interfering with iron uptake.

Once these other possible causes have been corrected, applications of iron may not be needed. If, however, plants remain chlorotic, iron can be supplied to plants in different forms.

The two principal types of iron-containing materials are iron chelates, organic in nature, and inorganic compounds in soluble form such as ferrous sulfate. Iron chelates are marketed under various trade names and in various formulations. The iron in chelates remains available to plants when the chelates are placed in the soil. Some formulations of iron chelate can be applied to the foliage; however, this approach is usually not as permanent as soil applications. Follow the manufacturer's recommendations for amount of use. Some fertilizers contain iron chelates, and use of these with plants susceptible to iron deficiency is recommended.

Ferrous sulfate can also be applied to the soil or foliage. For foliar application, use 2 1/2 ounces of ferrous sulfate in 3 gallons of water. This treatment will probably require reapplication a number of times. A convenient way to determine how much ferrous sulfate is needed for soil application is to measure the diameter of the periphery of the tree at the drip line (ends of branches). If the treatment is made when the trees or shrubs are dormant, use 1 gallon of ferrous sulfate solution (1 pound of ferrous sulfate per gallon of water) for each foot of the diameter of the periphery. If the treatment is made during the growing season, use 1/2 gallon per foot diameter. The solution can be applied over the surface of the soil; however, it's more effective if holes are drilled and the solution poured in. Drill holes 3 feet apart around the periphery and deep enough to hold 1/2 to 1 gallon of solution.

Injections of liquid iron sulfate into tree trunks under pressure have also been effective for one to two seasons.

Encapsulated ferric ammonium citrate inserted into pin oak trees around the base of the trunk will prevent iron chlorosis for up to three years and is usually more effective than either foliar or soil treatment. The small wounds caused by drilling and capsule insertion should close in one season.

Generally, trees that are chlorotic from a lack of iron will respond to one of the above treatments. Some plants may require a combination of above treatments for two or more years to completely cure the problem.

Information obtained through the Ohio State Extension Factsheet HYG-I009-88