OC0284

Michigan State University Extension-Oakland County

Chlorosis of Ornamental Plants

IRON CHLOROSIS

Iron is necessary for the formations of chlorophyll which creates 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, sweetgum, dogwood, azalea and rhododendron. Iron chlorosis may occur as the result of one cause or a culmination of various adverse factors. The condition is often due to a high pH in the soil, which makes it possible for other elements to interfere with the absorption of iron, rather than a lack of iron in the soil. This situation can occur in alkaline soil when the pH is above 7.0. As the pH or alkalinity of the soil increases so does the risk or severity of chlorosis. The visual symptoms are often confused with other conditions such as a deficiency of manganese or other non-nutrient related problems.

CONTROL

If overwatering 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 Michigan, and tile lines may have to be installed near valuable trees and shrubs. The pH, particularly in southeastern Michigan, is quite often above 7 and pH reduction can be difficult to achieve for long periods of time. Also, since our water supplies are alkaline, Ph reduction should be considered temporary requiring monitoring and adjustment of the treatment program. A temporary pH reduction can be achieved by applying sulfur to the soil. Sulfur, usually available as soil sulfur at garden centers, is slow acting but safe to plants within recommended rates. Other products may create a quicker pH reduction, but the effects are shorter lived and the products may be toxic if applied liberally or repeatedly. Usually 2 lbs. of sulfur per 100 sq. ft. will reduce the pH by one point, such as from a pH of 7.0 to 6.0. Coarse sandy soil will require somewhat less and clay soil somewhat higher rates. These guidelines are approximate and are affected by irrigation water, soil texture and organic matter. This rate will usually not damage lawn grasses. Reduced application rates applied more frequently will reduce the possibility of lawn injury. Always proceed cautiously with applications over lawn areas. Sulfur acidification takes place slowly over many weeks, and injury can appear weeks after application. For chlorotic trees and shrubs, apply 2 pounds of sulfur per 100 sq. ft. over the entire root zone which extends beyond the drip line or outer most spread of the branches. If possible lawn damage is a concern, place one half or more of the sulfur in 12 inch deep holes drilled or punched in the root zone. Since most

feeder root activity occurs just inside and outside the drip line, holes should be made in this area. As a guideline, if the distance from the trunk to the drip line is 20 ft., avoid drilling holes within 10 ft. of the trunk. Extend the application zone 10 ft. beyond the drip line. Apply in the spring or fall and repeat in fall or spring. This treatment may need to be applied for several years for the best results. If plants remain chlorotic, iron can be supplied to plants in different forms. The two principal types of iron containing materials are iron chelates, an organic form, and inorganic compounds in soluble form, such as ferrous sulfate. Iron chelates are marked under various trade names and in various formulations. Ferrous sulfate is less available and less effective than chelates. The iron in chelates remains available to plants when the chelates are placed in the soil while inorganic forms often become unavailable. Some formulations of iron chelate can be applied to the foliage, but this approach is usually not as permanent as soil applications. Follow the manufacturer's recommendations for application rates. Note: Acidifying fertilizers containing iron chelates are often used for plants prone to chlorosis. However, these products will usually not significantly reduce a high pH to correct a chlorosis problem. Tree implants containing iron chelates are also available for treating chlorosis. Implantation eliminates the problem of spraying, requires less time and equipment than soil applications, and is less troublesome. The capsules can be inserted any time of year but the most effective results are obtained when implantation is completed in early spring before buds of the trees begin to swell. Medicap implants are available at most garden centers. Different sizes are available and kits contain the appropriate drill bit. Implants will usually correct chlorosis for two to three seasons. There is some concern among arborists that drilling holes could lead to decay and this issue is not completely resolved because many factors are involved. If chlorosis is severe, prompt correction is needed, and implants will be the best approach. Hopefully, soil treatment procedures will alleviate the chlorosis before more implants are required. The procedure for installing the encapsulated iron involves drilling a hole unto the tree trunk and inserting the capsule with the head recessed through the bark and slightly into the wood. If inserted properly, the wound will completely close in one growing season. If the capsule is not inserted deep enough into the tree, effectiveness will be reduced. Also, the capsule may be forced outward and closing of the wound will not take place. Spacing and other specifications are covered in the instructions, which should be read carefully. 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 treatments for two or more years to completely cure the problem. Fertilization and even vertical mulching of the root zone can also be helpful. Vertical mulching is a technique that drills holes in the root zone. The holes are filled with organic materials, fertilizers and other amendments that will stimulate root growth in the well aerated vertical mulch cores. These treatments can stimulate root growth and the uptake of iron and other nutrients.

MANGANESE CHLOROSIS

This condition often affects maple trees, and the symptoms are very similar to iron chlorosis. Chlorotic trees often exhibit stunted growth and premature leaf drop in late summer. Treatments are similar to iron deficiency except manganese products are used.

PREVENTION

Proper plant material selection, planting techniques and cultural care will greatly reduce problems with chlorosis. Since chlorosis will often be localized to geographic areas, check neighboring landscapes for evidence of chlorotic plants. If plants, such as oak, maple, magnolia, holly, white pine, or rhododendron are chlorotic, avoid planting these plants.

DIAGNOSTIC ASSISTANCE

For further assistance with diagnosing and treating chlorosis and other plant problems, contact your county MSU Extension Service office.

Would you like additional information?

Additional information is available on-line. Please see MSU Extension-Oakland County's publications as well s MSU Extension's Bulletin Office on campus.

Contact our Plant & Pest Hotline (248/858-0902) for assistance with plant identification, pests and diseases, weeds, trees and shrubs, lawn, flowers, fruits, vegetables, grasses and groundcovers, native plants, plant propagation, and many other gardening topics.

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