



IRON CHLOROSIS IN CENTRAL KANSAS

Iron Chlorosis is a condition in which leaves develop an abnormally light green or yellow color. In central Kansas the most common cause of chlorosis in trees is a deficiency of iron in plant tissues. There are other possible causes of chlorosis such as over-watering, damage to roots, and deficiencies in manganese or other micronutrients. High soil pH plays the primary role in iron deficiency. As soil pH increases, micronutrients such as iron become less available to susceptible plants.

Symptoms:

- **Yellow or pale green leaves with green veins**
- **Browning or scorching on leaf edges-especially during summer heat**
- **Branch dieback over time as plant vigor decreases**
- **Severely affected trees may die over a period of several years**



Iron chlorosis symptoms

Causes of Chlorosis

High soil pH: High soil pH is the leading cause of iron chlorosis in plants. Soil pH in central Kansas can commonly be 7.5 or higher which leads to problems with iron chlorosis in many plants.

Wet soil: Roots need oxygen to function properly and soil that stays wet will be deficient in oxygen. Roots will not grow properly and thus cannot pick up enough iron and other micronutrients. Excessive rainfall can cause temporary iron chlorosis in many plants.

Compacted Soil: Severely compacted soil restricts root growth and can aggravate problems with iron chlorosis

Root damage: Any damage to roots can potentially lead to chlorosis. Construction damage is a common cause.

Tips

Avoid overwatering: Iron chlorosis is worse in consistently wet soil. Plant roots need oxygen just as much as they need water. Allow soils to dry properly between each watering to encourage maximum root growth.

Mulch properly: Keep the soil temperature and moisture levels more consistent with a layer of 2-4 inches of mulch over as large an area as possible around the tree. Do not pile mulch up against the tree trunk.

Use proper planting techniques: Dig a wide, shallow hole when planting trees. Do not plant trees too deep. Main roots (root flare) should be at or slightly above soil surface. Cut any girdling (circling) roots, spread roots out in the hole and remove all wire, burlap or other materials.

Trees to consider

Consider planting trees that are less susceptible to iron chlorosis:

oaks (bur-one of best, also chinkapin, English, shumard)

elm (many new varieties available)

Kentucky Coffeetree

Hackberry

Littleleaf linden

London Planetree

Silver linden

Caddo/John Pair Sugar

Maple

Hedge Maple

Norway Maple

Japanese Zelkova

Ginkgo

Goldenraintree

Osage Orange
(Thornless/Fruitless)

Eastern Redbud

Crabapple

Smoketree

Tatarian Maple

Treatment options

Trunk injections

Larger trees can be good candidates for a trunk injection of iron and a trunk injection can last for 2-3 years. In this method, holes are drilled in the lower trunk and an iron solution is fed into the tree. The preferred time of application is during the spring just after the leaves have fully expanded. The main disadvantage to trunk injections is that wounds are left in the tree trunk which may take a year or more to heal. If using this method it is usually best to use a professional arborist to properly administer the tree injection.

Iron chelates

Iron chelates can be used as a soil treatment. Iron chelates EDDHA or EDDHMA are most effective in soils with high pH. These can be found in the products Sequestar 6% Iron Chelate, Millers FerriPlus, Sprint 138, Southern Ag 6% Iron Chelate, or Sequestrene 138. It is best to use these products in the spring just as or after trees begin leafing out. Dry chelate can be sprinkled on the soil in the proper amount around and inside the tree dripline and watered in. Chelate can also be dissolved in water and applied as a drench under the dripline of the tree. In some cases holes are cored under the tree dripline and inward and the chelate is applied in the holes to increase effectiveness or when the tree is on a slope where runoff of the chelate is likely to occur. Normally, soil-applied chelates last only one year and can be expensive when treating a large tree. Annual treatment may be necessary.

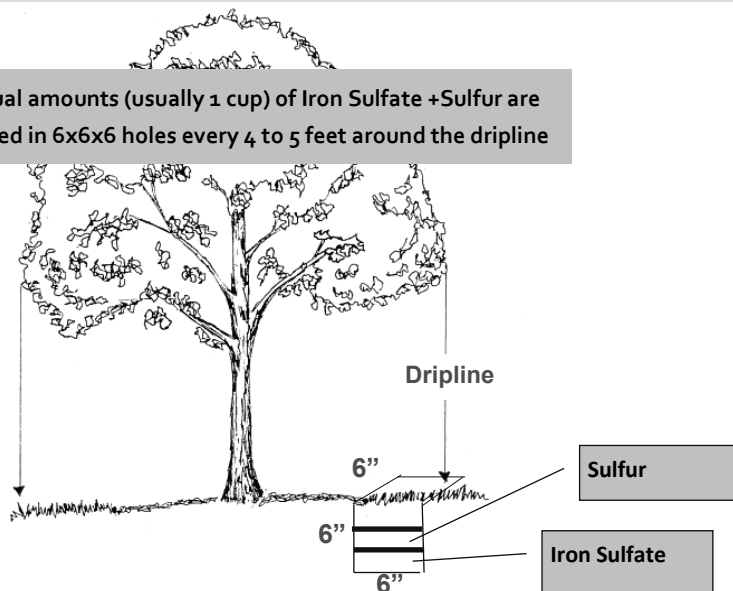
Products such as Sequestrene 138 and Sequestar 6% and other similar products formulated as EDDHA or EDDHMA are available from retailers online or through phone order.

*Note: Many cheaper iron chelates are available that are formulated as EDTA and DTPA. These products are less effective as soil pH rises and may not work at all if soil pH is over 7.5.

Iron Sulfate + Sulfur

Acidifying small areas of soil in the tree root zone can be tried as an alternative in cases where the cost of using iron chelate is prohibitive. An equal amount (**usually 1 cup**) of a granular iron sulfate such as High-Yield Copperas, Ironite, or others and elemental sulfur or sulfur pellets are placed in small 6x6x6 holes dug every 4 to 5 feet around the drip line of the tree. A soil plug is removed, the products placed in the hole with the iron sulfate placed on the bottom of the hole followed by the sulfur on top and then the soil is replaced and watered well. Over time the sulfur reacts to lower pH in a small area and allow the tree to obtain iron. This method works more slowly but can correct the problem for several years. In cases of extremely high soil pH or calcareous soils, results may be less satisfactory.

Equal amounts (usually 1 cup) of Iron Sulfate + Sulfur are placed in 6x6x6 holes every 4 to 5 feet around the dripline




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