FACT SHEET

Chlorosis

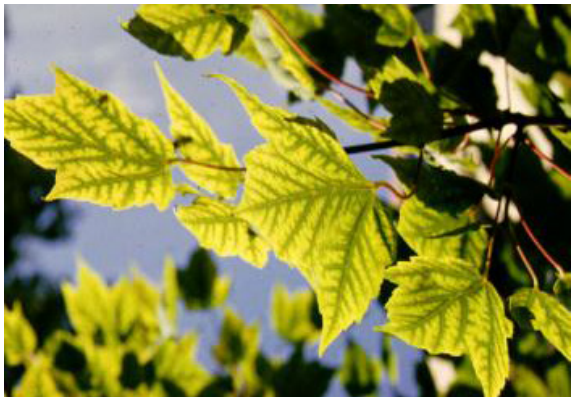
A Common Problem of Shade Trees

Chlorosis is a common problem of shade trees growing in the urban areas of Minnesota. Chlorosis is the result of limited chlorophyll formation in leaves. Chlorophyll is the green pigment needed for the tree to capture energy from sunlight. The most visible symptom of chlorosis is a general yellowing or pale green coloring of the leaves. This chronic condition slowly decreases a tree's vigor and ability to survive. White Oak and Eastern Pin Oaks are highly susceptible, but many other tree species including maples and birch also suffer from this disorder.

White oak with chlorosis (on right) next to a healthy white oak.

Causes of Chlorosis

A tree's chlorophyll production may be compromised by a deficiency of elements like iron, manganese, zinc, or copper. The tree's ability to absorb these nutrients may be reduced by alkalinity in the soil. Root damage and poor drainage can also contribute to chlorosis. In some cases only a portion of the tree may exhibit chlorotic symptoms. Before implementing any restorative treatments, an evaluation is necessary. Testing of soil pH and nutrient levels are necessary to provide successful treatment.



Red maple leaves stay green along veins, turn pale in between.

Helpful Practices in Preventing Chlorosis:

- Have your soil tested before planting new trees. If your pH is higher than 7.0, avoid planting Eastern Pin Oak, Red Maple, or River Birch.
- Mulch the area around trees with Prescription Organic Matter, wood chips or shredded bark. Organic mulches tend to lower the pH and acidify the soil as they decompose. The goal is soil pH below 6.5.
- Avoid limestone rock mulches that can raise the soil pH. Do not use lime under the canopy of shade trees, as lime raises the pH of soil.
- Do not use plastic or fabric liners under mulch materials- they only serve to limit oxygen reaching tree roots.

Treatment of Chlorosis:

Trees with chlorosis require a series of treatments staged over a period of time. Not all the treatments occur at once; each takes place at during an optimum time of the season. As each case is unique, your consulting arborist will propose the treatments most appropriate for your situation.

It is best to begin with the least invasive treatments first, and move on to other measures if they become necessary. Chlorosis can be difficult to treat reliably over the long term. Some treatments may need to be repeated an undetermined number of times to maintain tree health.

Chlorosis may be evident in only portions of the tree.

Treatment:	Purpose:
Tree Nutrition with Iron sulfate and sulfur	Provide nutrients and acidify soil
Cambistat growth regulator	Increase root development
Root Enhancement Service with Prescription Organic Matter	Improve soil conditions for root development, increase organic matter and nutrient levels
Soil application of manganese tablets	Boost levels of Manganese if deficient or unavailable for tree use
Iron/manganese trunk injections	Provide quick, short-term access to necessary iron or manganese
Removal and replacement of tree	Invest care in less susceptible species of tree

Iron injections made directly into the tree roots.