

Chlorosis: Yellowing of Foliage

Many red maple, oak and river birch trees in the Fox Cities area tend to develop problems with pale yellow foliage and dark green veins. If symptoms persist long enough, there may be a browning or scorched appearance between the veins as well. This is not an insect or disease problem at all; rather, it is a pH issue. In Appleton and the surrounding area, most subsoils are around 7.5 or higher. This makes our soils very basic. Once the soil reaches that pH level, some of the micronutrients get locked into the soil, typically iron in oaks and birches, and manganese in maples. This makes it nearly impossible for trees to take them up and function properly.



Severe chlorosis on a red maple tree (*Acer rubrum*)

The dark green leaves on a healthy plant are indicative of a high chlorophyll content. It's also a sign of a healthy rate of photosynthesis, or food production. Trees that are chlorotic, however, grow slowly because they cannot maintain a healthy level of food production, and therefore continue to decline until they die.

The first step when you have a stressed tree is to get a soil test done. This will tell you what the pH of your soil is, as well as macronutrients in the soil. If you would like it tested for micronutrients, such as iron or manganese, you may do that as well. Once you know the soil type and pH, you can begin to solve the chlorosis problem. If the pH is 7.5 or higher, consider lower it by sprinkling elemental sulfur under the tree's canopy. You may do it twice a year at 5 lbs per 100 sq ft each time. The soil pH reaction will slowly change as rainwater converts the sulfur to sulfuric acid. The likelihood of yearly applications is high. Most homeowners in this area will do this twice a year for two to three years, and once their pH is down 0.5 to 1.0 points, they have to continue adding elemental sulfur once per year or every other year in order to keep the pH level down. Consider having a soil test done once every 3-5 years to get an accurate reading of pH.



One other thing that may help alleviate chlorosis is to remove any grass surrounding the tree. Mulch keeps grass roots from competing with the tree for water and nutrients, and it also keeps the soil temperatures from fluctuating too much. Apply the mulch at a two to three inch depth around the tree's roots. Be sure to keep the mulch pulled away from the tree trunk itself.

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Newer varieties of oak are being bred for higher pH tolerance. If you prefer red maples, but don't want to add sulfur each year, consider purchasing a hybrid maple, such as Autumn Blaze, Sienna Glen, or Matador. They have the fast growing habit of silver maples, but the stronger wood and beautiful red fall color of the red maple. Some hybrid maples are seedless as well.

*Note: red maples are trees that display the scarlet color in fall. They have green foliage all summer. Do not confuse this species with a Norway maple such as Crimson King or Royal Red, which have purple foliage year-round.



Top left: Healthy red maple foliage
Lower left: Norway maple 'Royal Red' tree
Right: Hybrid maple 'Autumn Blaze'

