Understanding & Managing Chlorosis

Chlorosis
Maples, Pin and White Oaks, River Birch, Tulip, Sweet Gum, Bald Cypress, Magnolia, White Pine and Many Other Trees

What is Chlorosis?
Chlorosis is a serious condition where a tree’s ability to manufacture chlorophyll has been compromised. Chlorophyll is the pigment that gives trees their green color and plays a vital role in the conversion of the sun’s energy into sugar. Trees use this sugar for all metabolic processes including growth and defense. Chlorophyll deficiencies weaken trees, making them more susceptible to being attacked by opportunistic insects.

Signs and Symptoms
- Overall yellowing of the tree.
- Yellowing in between veins on newer foliage.
- Dead areas developing on chlorotic leaves.
- Tip dieback and decline.

Susceptible Trees
Commonly affected tree species include maples, pin and white oaks, river birch, tulip tree, sweet gum, bald cypress, magnolia, and white pine. Although these are the most common species to have chlorosis problems, just about any tree can have difficulty manufacturing chlorophyll and become chlorotic.

Photo, top right: Chlorotic trees are unable to make enough food because of the lack of chlorophyll. Above: River birches are commonly chlorotic, notice the veins of these leaves are still green. Below, top: Oak tree treated with Cambistat increases chlorophyll and leaf health. Below, bottom: Control tree not treated with Cambistat.
The long term goal of managing chlorotic trees is to establish sustainability, a condition where a tree can exist without chlorosis and without the need for further inputs.

One of the major causes of chlorosis is a compromised root system, so restoring the roots as well as providing nutrients for chlorophyll production will deliver the best results. Effective management strategies for chlorosis include: using Verdur® or Verdur® Mn to increase chlorophyll production, wood mulching to create good soil conditions for root development, and stimulating fibrous roots using Cambistat®.

**Treatment Strategies**

**Step 1: Increasing Chlorophyll with Verdur®**
Depending on the type of tree being treated, Verdur® and Verdur® Mn are tree infusion products that will quickly restore the trees ability to make chlorophyll and absorb energy. Verdur® Fe restores green color for approximately three growing seasons and Verdur® Mn for approximately two. Common trees to use Verdur® Fe include oak, birch and most other trees. Use Verdur® Mn on maples.

**Step 2: Stimulating and Maintaining a Healthy Root System**
The second step of treatment involves helping the tree re-grow its root system and provide a healthy root environment. Putting a 3 inch deep mulch ring around the trunk of the tree will help keep the roots moist and increase the fibrous root system. The optimal size for a mulch ring is one foot diameter for every inch of trunk diameter; however, any size mulch ring is beneficial.

**Step 3: Controlling Growth with Cambistat®**
The third step is to use Cambistat® (a growth hormone regulator) to control growth by favoring root development over top growth. Cambistat® will further stimulate root growth, thereby increasing drought tolerance, and creating a healthier, greener top.

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**DIY Shopping List**

**Step 1:**
**Application Type – Root flare injection**

**DIY Product/Equipment Needed**

- Verdur® or Verdur® Mn
- Low Volume Macro-Infusion Pump Kit
- Shovel or trowel
- Drill (with high helix drill bits)
- Stiff bristled hand brush
- Gloves/safety glasses

**Step 2:**
**Application Type – Soil drench**

**DIY Product/Equipment Needed**

- Cambistat®
- Graduated cylinder measuring in mL
- Shovel
- Measuring or diameter tape
- Bucket or watering can