DEPARTMENT OF HORTICULTURE  
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CHLOROSIS IN HORTICULTURAL PLANTS  
A. M. Binkley

When something happens which prevents the formation of green coloring matter, known as chlorophyll, or something destroys it in the leaves, plants turn yellow. This "sick" condition is called chlorosis.

The small chloroplasts in the cells of leaves obtain their energy from the sunlight for combining carbon dioxide and water to form sugars and carbohydrates. A plant is largely made up of products manufactured by the chlorophyll, and when plants are very yellow there generally is not sufficient chlorophyll present for good growth. Severely affected plants may die.

Causes of Chlorosis

Conditions which interfere with the normal assimilation or distribution of nutrients in the plant may cause chlorosis. A few of the many causes are:

1. Deficiencies of certain elements in the soil, such as nitrogen, potash, magnesium, manganese, zinc, copper, and iron.
2. Excesses of certain elements in the soil, such as lime.
3. Virus diseases.
4. Fungus or bacterial diseases.
5. Insufficient light. (Not a problem here)
6. Not enough carbon dioxide gas in the air. (Not a factor here)
7. Winter injury.

Other factors which affect the degree of chlorosis are temperature and excess applications of irrigation water to plants. Under cool temperatures plants may become more chlorotic. Where over-irrigation is common plants may become yellow which may be due to high water tables, lack of aeration in the soil, or poor drainage. Of these various types of chlorosis, the one form most common in Colorado is the one where iron is lacking. This trouble occurs where soil alkalinity is high. Sodium, potassium, and calcium salts may accumulate to increase alkalinity of the soil. High calcium carbonate, however, is the most common associated with chlorosis. Apparently plants growing in excessively alkaline soils cannot utilize the iron which they take up to manufacture chlorophyll. Iron is necessary for chlorophyll formation but it is not found in chlorophyll itself.

Control of Iron Deficiency Form of Chlorosis

1. Treatment of chlorotic plants with soluble iron compounds. These are temporary measures.
   (a) Spraying the foliage, shrubbery, or perennials with ferrous sulphate. Use a 2 percent solution or about 1 pound ferrous sulphate to 10 gallons of water. Do not use the Ferric sulphate salt.
(b) Use of dry iron salts. Drill $\frac{1}{2}$-inch holes in the trunk or main lateral roots of ornamental trees in the early spring or winter. Treatment during the growing season may result in partial or complete defoliation of the tree. New green leaves will come out, however. Use 1 to 2 ounces of ferrous citrate per each 10 inches in diameter of the tree. Drill holes in the main roots with brace and bit, deep enough to hold iron salts. Size of drill hole should be made according to size of tree. Seal the hole with grafting wax or heavy asphalt emulsion. Drill holes about 3 inches apart on different sides of fully chlorotic trees and as many as is necessary to receive the measured amount for the tree. Do not drill holes in the trunks of ornamental trees.

This treatment is not always successful on all species of trees.

2. Soil treatments.

(a) Addition of iron sulphate, about 1 pound per square yard, washed in to the soil with irrigation water, will help temporarily on some soil types.

(b) Any practice that will maintain or increase organic-matter content on the soil. Turning under legume, green-manure crops, heavy additions of well-rotted manures (do not use fresh animal manure). Peat moss, composts of leaves and lawn clippings, turned under the soil will make iron more available.

(c) Cottonseed meal is helpful or any organic or inorganic fertilizer that will leave acid residues is helpful. Ammonium sulphate as a nitrogen fertilizer may leave the soil slightly more acid. Treatment of the soil with sulphur is of value on shallow-rooted crops, although somewhat slow in action.

(d) Plant crops, trees, shrubs, and perennials, and varieties of plants that are tolerant to alkaline soils, and are not susceptible to chlorosis.

Treatment of deep-rooted trees for chlorosis is always difficult and any attempt to change the alkalinity of soils in any large acreage to any great depth is a very slow and expensive process.

Since there are many causes of chlorosis in plants, and in some cases it is not due to iron deficiencies, do not attempt large-scale treatments until a test on the cause of the trouble is run. Try out the treatments on a small scale first.

Contact your County Agent or write to the Experiment Station for information about chlorosis before you hire a so-called tree doctor or invest money in treatment of your plants.

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