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IRON CHLOROSIS

on turf GRASSES
ORNAMENTALS
VEGETABLES

Texas Agricultural Extension Service
The Texas A&M University System
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on Turf Grasses, Ornamentals and Vegetables

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Iron chlorosis is a condition which results when the green chlorophyll in plants fails to develop or is destroyed. The chlorosis normally appears first on young leaves. The leaves of chlorotic plants range from light green to yellow to almost white, usually accompanied by striping. Iron chlorosis is most prevalent on members of the grass family (such as St. Augustine grass), certain fruit trees (citrus and peaches), vegetables (particularly beans), many flowers and ornamentals and some shade trees. Most soils on which iron chlorosis occurs contain iron which is unavailable to plants, usually the result of alkalinity.

Where Chlorosis Is Found

Chlorotic plants occur over most of Texas, but are more prevalent in areas with alkaline, calcareous soils. In Central, South and West Texas, it is a fairly common and serious problem. See map at right. When found in the East Texas Timberland Region it is usually due to "overliming."

Other Types of Chlorosis

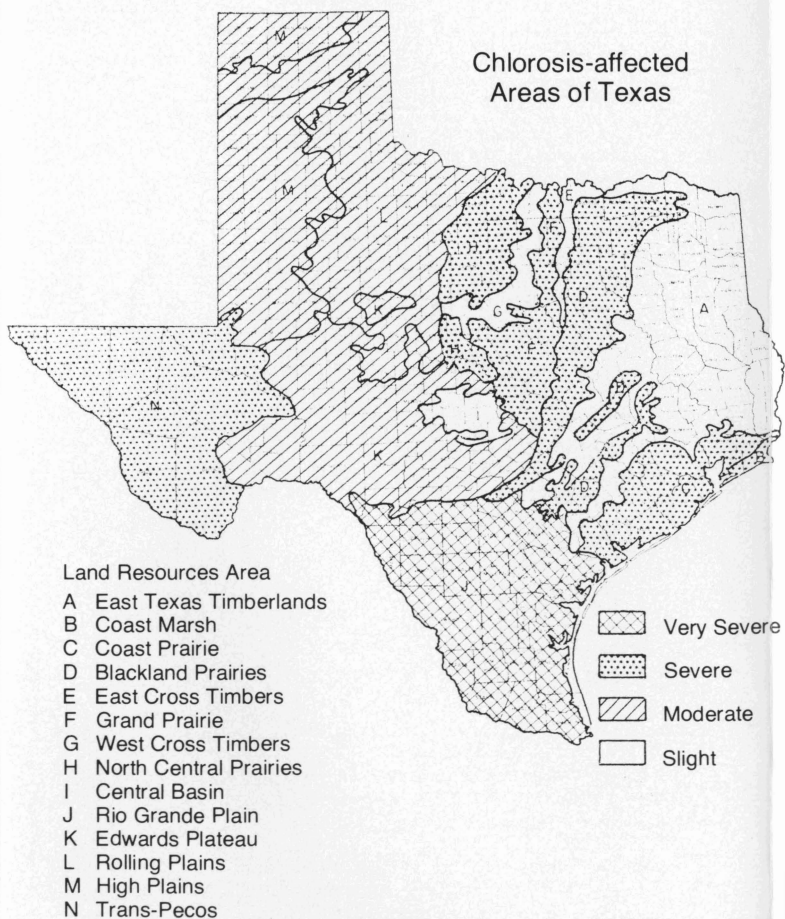
Chlorosis or yellowing of plants can result from poor soil aeration and nitrogen deficiency. However, under these conditions the lower leaves are affected first. Virus diseases, such as downey mildew, also may cause a chlorosis similar to iron deficiency. These disease symptoms are different in that the leaf veins first become yellow with the whole leaf eventually turning yellow.

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Prevention and Control

Iron chlorosis prevention calls for treatment of soil so that iron becomes available. Application of large amounts of well-rotted organic material on a regular basis tends to make the soils less alkaline and the iron more available. Well-decomposed compost plus 1 pound of powdered sulfur per 100 square feet can be used to make the soil less alkaline. Acid peat also can be used.

To control chlorosis by the addition of iron, use iron sulfate (copperas) or iron chelates according to instruction in Table 1. Iron sulfate is generally best for spray applications. Chelates are preferred for soil treatments.



(Bottomlands not shown due to limitation of scale)

Table 1. Suggested rates of iron chelate and iron sulfate

Plant	Iron chelate (dry) ¹		Iron sulfate	
	Foliar spray	Soil application	Foliar spray	Soil application
Lawn and turf grasses	3 level tbs. per gal. water. Wet leaves thoroughly.	1 lb. per 1,000 sq. ft.	4 level tbs. per gal. water. Wet leaves thoroughly. (repeat)	10 lbs. per 1,000 sq. ft.
Ornamentals ²	1 level tbs. per gal. water. Wet plants thoroughly.	2 level tbs. per plant.	3 level tbs. per gal. water. Wet plants thoroughly.	½ lb. per 100 sq. ft. (repeat if necessary).
Fruit trees	2 level tbs. per gal. water. Wet leaves thoroughly.	2 level tbs. per diameter in. of tree.	5 lbs. per 100 gal. water. Wet leaves thoroughly.	¼ lb. per diameter in. of tree.
Vegetables	2 level tbs. per gal. water. Wet plants thoroughly.	1 lb. per 1,000 sq. ft. before planting.	3 level tbs. per gal. water. Wet foliage thoroughly.	5 lbs. per 1,000 sq. ft. and mix with soil.

¹These rates are based on chelates containing from 8 to 10 percent iron. If the product used is in solution or of a different concentration, adjust the suggested rates up or down to give comparable amounts of iron.

²Ornamentals include trees, flowers and shrubs. Spray applications should be accompanied by soil applications of iron. These can be applied as a spray on the soil at the time plants are sprayed.

Iron chelates are organic compounds which can hold iron in an available form for plant use. A chelating compound acts in much the same way as a crab's claw encloses an object. Chelates can be mixed in the soil. They remain available longer than iron sulfate and normally are needed in smaller quantities for soil applications.

Rates in Table 1 will vary with conditions and types of iron chelates. Check the container for iron concentration in the chelate to be used. If the chelate is in solution to be diluted, rates of application should be based on the final concentration.

Method of Application

Before iron compounds are applied, be sure that the observed chlorosis is iron deficiency. Soil application of iron sulfate can be broadcast for lawn and turf grasses. For trees, iron sulfate is more effective if placed in holes punched with a crow bar or similar tool to a depth of about 2 feet. The holes should be even with the outer edge of the spread of the branches for trees or in the area of small feeder roots. The holes for shrubs should be 1 to 3 feet from the plants depending on size. For flowers, band the iron sulfate 2 to 3 inches to the side, and 4 to 6 inches below the seed or young plant.

Iron chelates can be broadcast and worked into the soil for ornamentals, flowers and vegetables. They can be applied broadcast for lawn, turf grasses and trees. Chelates should be watered in soon after application.

Spray applications of both sulfates and chelates should take place in the late evening when the plant is actively growing. Late evening applications result in less evaporation, thus reducing the danger of burning. When preparing the spray solutions, add 1 teaspoon of soap detergent for each gallon of water for better coverage of foliage.

Spray applications generally give quicker results than soil applications. However, the effect will normally not be as long-lasting and repeat applications may be necessary. Sometimes three to four applications at 2 to 3 week intervals are necessary to control the chlorosis. A combination soil treatment and spray application may give best results. Applying iron on the leaves usually reduces the chlorosis within 5 to 7 days. Soil treatments require longer to be effective but last longer.

Iron sulfate (copperas) will stain concrete and light colored brick. Therefore careful control of both spray and granular applications is needed to prevent damage.

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