

Mrs. Holloway
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Iron Chlorosis



THE AGRICULTURAL AND MECHANICAL
COLLEGE OF TEXAS
TEXAS AGRICULTURAL EXTENSION SERVICE
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What It Is

Chlorosis is a condition in plants which results when chlorophyll (the green coloring matter in plants) fails to develop or is destroyed. Iron chlorosis normally appears first on young leaves. The leaves of chlorotic plants range from light green to yellow to almost white. Iron is necessary for the formation of chlorophyll. When iron is unavailable for plant use, chlorophyll fails to develop properly and plants exhibit chlorosis. Iron chlorosis is most prevalent on members of the grass family (such as St. Augustine-grass, Johnsongrass and grain sorghum), certain fruit trees (citrus and peaches), many vegetables (particularly beans) and many flowers and ornamentals. Most soils on which iron chlorosis occurs are well supplied with iron, but it is in a form unavailable for plant use.

Where It Is Found

Chlorotic plants are found over all 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 the map at right.

Other Causes

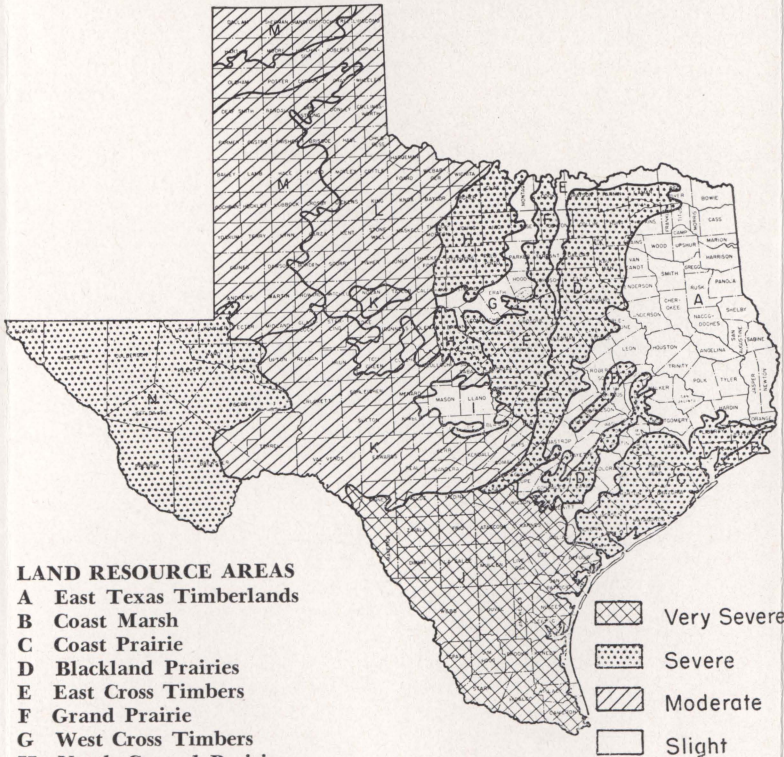
Chlorosis, or yellowing, of plants can result from other causes. Sulfur or manganese deficiencies cause chlorosis. Poor drainage and aeration cause a general yellowing of plants. A nitrogen deficiency also can cause yellowing of plants, but it affects the lower leaves first.

Chlorotic symptoms, similar to iron deficiency, may be due to virus diseases. These disease symptoms are different, however, in that the leaf veins first become yellow while the remainder of the leaf remains green. Virus diseases also may appear at first as yellow rings on the leaf, with the whole leaf eventually turning yellow. Symptoms due to virus diseases may disappear, then recur.



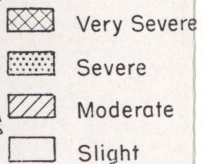
Iron chlorosis of St. Augustinegrass.

CHLOROSIS-AFFECTED AREAS OF TEXAS.



LAND RESOURCE AREAS

- A East Texas Timberlands
- B Coast Marsh
- C Coast Prairie
- D Blackland Prairies
- E East Cross Timbers
- F Grand Prairie
- G West Cross Timbers
- H North Central Prairies
- I Central Basin
- J Rio Grande Plain
- K Edwards Plateau
- L Rolling Plains
- M High Plains
- N Trans-Pecos



(Bottomlands not shown due to limitation of scale)

Control

To control iron chlorosis, it is necessary to treat the soil so that iron becomes available, or else provide supplemental iron as a spray or soil application. Application of large amounts of well-rotted organic material on a regular basis will correct the basic cause of chlorosis by making the soil less alkaline, resulting in iron being more available. Well-decomposed compost plus 1 pound powdered sulfur per 100 square feet can also be used to make the soil less alkaline. Acid peat can also be used.

To control chlorosis by addition of iron, use iron sulfate (copperas) or iron chelates according to methods and rates listed in Table 1. Iron sulfate is relatively cheap and a good source of iron to use. Its use should be restricted generally to spray application. If iron sulfate is applied to an alkaline calcareous soil, the iron may become unavailable for plant growth.

Iron chelates can be applied in the soil or as a spray. Iron chelates also become unavailable in soils high in free calcium carbonate (caliche) but remain available longer than iron sulfate. Present costs of certain iron chelates make their use prohibitive on most field crops. Iron chelates normally are needed in much smaller quantities than iron sulfate for soil applications.

Chelates are organic chemicals which can envelop certain elements (such as iron) and keep the iron available for plant use. A chelating compound acts on iron in much the same way as a crab's claw encloses an object. Rates given in Table 1 will vary with conditions and types of iron chelates. Check the container for suggested rates of application for iron chelates.

Method of Application

Iron sulfate can be broadcast for lawn and turf grasses for soil applications. For trees, iron sulfate might be more effective if it is placed in holes punched with a crow bar, or similar tool, to a depth of about two feet. The holes should be placed even with the outer edge of the spread of the branches for trees or in the area of small feeder roots. For shrubs the holes should be 1 to 3 feet away from the plants, depending on size. For flowers, the iron

sulfate can be banded 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, vegetables and field crops. It 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 be made in 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 of both sulfates and chelates may often be more effective and give quicker results than soil applications. However, the effect will normally not be as long-lasting and repeat applications may be necessary if chlorosis reappears.

Table 1. Suggested rates of iron chelates and iron sulfate.

Plant	Iron chelates		Iron sulfate	
	Spray*	Soil application	Spray*	Soil application
Lawn and turf grasses	3 oz. in 10 gal. water per 1,000 sq. ft.	2 lb. per 1,000 sq. ft.	3 oz. in 5 gal. water per 1,000 sq. ft.	10 lb. per 1,000 sq. ft.
Ornamentals**	1 oz. per 25 gal. water	2 oz. per 100 sq. ft.	1 oz. per 5 gal. water	1 lb. per 100 sq. ft.
Fruit trees	3 lb. per 200 gal. water per acre	2 oz. per diameter inch of tree	4 lb. per 100 gal. water per acre	4 oz. per diameter inch of tree
Grain sorghum and small grains	Use 1% solution and apply 20 gal. per acre	See below***	Use 2.5% solution and apply 20 gal. per acre	Not recommended
Vegetables	2 lb. per acre as a 1% solution	See below***	10 lb. per acre as a 2.5% solution	Not recommended

*One teaspoon per gallon will give approximately 1 pound per 100 gallons water.

**Ornamentals 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 on heavy-textured soils have not proved profitable. On medium and light-textured soils, follow directions on container.



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