Iron Chlorosis

by Natalie P. Goldberg and Jason M. French[1]

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One of the most common landscape plant disorders in New Mexico is iron deficiency, also called iron chlorosis. Iron deficiency symptoms typically begin in spring when the plants are leafing out. As summer progresses, untreated plants typically exhibit severe symptoms and have an overall unhealthy appearance. Samples from these plants are often submitted to the NMSU Plant Diagnostic Clinic (PDC; plantclinic.nmsu.edu) because growers are concerned that there is a disease agent involved. In most cases, the plants are suffering only from iron deficiency either by itself or combined with other environmental stresses, such as water stress, hot and drying winds, and other nutrient deficiencies.

Figure 1. **Iron deficiency on sweetgum.** (Photo by J.M. French, NMSU-PDC.)

Figure 2. **Iron deficiency on Bradford pear.** (Photo by N.P. Goldberg, NMSU-PDC.)

Iron deficiency is one of the most common nutrient deficiencies in all sorts of landscape plants. Some of the most commonly submitted plants for diagnosis include photinia, willows, mulberry, maples, sycamores, poplars, roses, apples, pears, hawthorne, stone fruits, and pecan.

Iron (Fe) is an essential element for normal growth and green color. Although iron may be plentiful in the soil, often it is tightly bound to the soil particles in high-pH (alkaline and calcareous) soils. Under these conditions, the iron is unavailable for plant use.

The classic symptom of iron deficiency is interveinal chlorosis where the leaf turns yellow and the veins remain green (Figures 1, 2, and 3). In very severe cases, leaves may turn white in color (Figure 4) or develop necrotic spots, which can resemble a fungal infection, on the affected leaves (Figure 5). Over time, plants that remain untreated will start to die back

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Figure 3. **Iron deficiency on aspen.** (Photo by J.M. French, NMSU-PDC.)

Figure 4. **Whitening of the foliage caused by severe iron deficiency on photinia.** (Photo by J. Viers, NMSU.)

Figure 5. **Leaf spots caused by severe iron deficiency on hawthorne.** (Photo by J. Viers, NMSU.)

(Figure 6), become unsightly in appearance, and may eventually die. Symptoms can be made worse when shrubs are planted in heavy, poorly drained soils.

Applying a chelated iron product should correct the problem. If done in the spring, applying chelated iron to the leaves (foliar applications) is usually effective. In the spring, the iron is readily taken up by the newly developing foliage. Once the foliage is fully developed, iron will not be readily taken up by the leaves. In addition, foliar applications should not be made when the temperature is over 85°F because the chemical will burn the foliage. For treatments later in the growing season, chelated iron should be applied to the soil. High temperatures will also affect the ability of roots to absorb the nutrient; therefore, soil applications during hot weather may be less effective.

In addition to temperature and leaf development stage, the form of iron chelate should also be considered when iron is applied to the soil. Chelated iron is available in four different forms: FeEDDHA, FeEDTA, FeDTPA, and FeHEDTA[2]. FeEDTA is the most common iron chelate available. This can be applied to the foliage, but is not effective in New Mexico's alkaline soils. FeEDDHA is the best iron chelate available for alkaline soils. It can be expensive, and is available online and at most local garden stores. The two other chelated forms—FeDTPA and FeHEDTA—will not be effective in alkaline soils and should be avoided.

Figure 6. **Dieback on photinia with severe iron deficiency symptoms.** (Photo by N.P. Goldberg, NMSU-PDC.)

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[2]FeEDDHA – ferric diethylenediaminedihydroxyphenylacetic acid, FeEDTA – ferric ethylenediaminetetraacetic acid, FeDTPA – ferric diethylenetriaminepentaacetic acid, and FeHEDTA – ferric N-hydroxyethyl-ethylenediaminetriacetic acid.