Using Fertilizers Wisely

Fertilizers are compounds that contain one or more essential plant nutrient(s) and are formulated to be applied to plants either through the soil or by foliar spray. They may be: organic or inorganic; complete or incomplete; contain micronutrients or not; immediately available or time-released; and the list goes on and on. The range of products is virtually limitless. Fertilizers are useful in many situations. However, fertilizers, especially those containing nitrogen, are often overused by home gardeners in their landscapes.

Fertilizers can be important for maintaining healthy lawns, productive irrigated pastures, flowering plants such as roses, productive fruit trees and vegetable gardens, for annual flower beds, and indoor plants. However, when fertilizers are applied indiscriminately to woody ornamental plants, the results can be negative:

- excessive plant growth, requiring more irrigation and pruning
- weak wood, susceptible to breakage
- increased susceptibility to disease, especially via wounds from breakage or pruning
- an attraction to insect and vertebrate pests due to more succulent foliage and higher levels of nutrition
- decreased drought tolerance
- potential contamination of nearby rivers and streams.

Native and drought-tolerant plants rarely need fertilizers and the negative effects listed can be even more extreme. Consider whether you should use fertilizers at all. Only use fertilizers on woody ornamentals when you have observed a specific nutrient deficiency.

Fertilizers containing nitrogen are especially tempting because they encourage green foliage and rapid growth. The initial symptom of nitrogen deficiency is when the oldest leaves are a uniform light green or yellow coloration. As the deficiency progresses, the entire plant quickly becomes light green in color and growth rate virtually stops. You can be easily fooled into imagining a nitrogen deficiency in native and drought- tolerant plants because they do not grow fast when they are irrigated properly and many of them do not normally have dark green foliage.

Nitrogen deficiency in Chrysanthemum (*Chrysanthemum pacificum*) showing green new leaves and yellowing older leaves (John Ruter, University of Georgia, Bugwood.org).

In northern Arizona, some plants often display iron deficiency symptoms in the spring – especially when growing in alkaline soils. This is often noticeable in red-tip Photinia (*Photinia fraseri*). Iron deficiency is exemplified when newly emerging leaves have interveinal chlorosis (yellow or whitish leaves with somewhat greener veins). This occurs because we have alkaline and sometimes, poorly drained soils that remain cool into late spring. Yet red-tip Photinia is evergreen and initiates growth in early spring. Iron deficiency can be treated with a foliar application of chelated iron to improve the leaf color, but in most cases, the chlorotic leaves usually green up once the soil warms up.

Iron deficiency in red tip Photinia (*Photinia fraseri*) showing yellow leaf surfaces with green leaf veins (interveinal chlorosis) on newest leaves (from: xtremehorticulture.blogspot.com).

Iron deficiency in pin oak (*Quercus palustris*) showing yellow leaf surfaces with green leaf veins (interveinal chlorosis) on newest leaves (Joseph OBrien, USDA Forest Service, Bugwood.org).

Iron deficiency symptoms can be made worse when nitrogen fertilizer is applied. Here the plant is trying to grow even more leaves while iron availability is limited. Other acid-loving ornamental plants such as gardenia, azalea, rhododendron, white birch, and pin oak often display iron deficiency symptoms. These plants should be avoided where alkaline soils with a pH of 8 or greater are present.

Native and drought-tolerant plants have adaptations that allow them to endure alkaline soil conditions. Among these adaptations are slow growth rates, root associations with mycorrhizal fungi, and the ability to conserve moisture during long periods without precipitation.

If you think you are observing a nutrient deficiency symptom, be sure to analyze the situation for evidence of insects and/or disease. In addition, look at the irrigation system. The plant in question may not be receiving enough irrigation. Established woody landscape plants do best with deep infrequent irrigation applied in a fashion that encourages a widespread root system.

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