



 **FOXGLOVE**
WHOLESALE NURSERY

**FERTILIZING TREES
& SHRUB NUTRIENT DEFICIENCY SYMPTOMS**

FERTILIZING TREES & SHRUB NUTRIENT DEFICIENCY SYMPTOMS

Do newly planted trees and shrubs need fertilizer?

- In most landscapes, healthy trees and shrubs do not require fertilizers, especially when they reach their mature size.
- It is not recommended to fertilize at planting time. Research studies show most of a plant's energy is directed to root growth during the establishment period. The application of nitrogen during this period seems to suppress root growth rather than enhance it.
- Trees and shrubs absorb nutrients applied to adjacent turfgrass.
- Fertilizer is not a remedy for landscape problems. Get your soil tested if you expect a nutrient deficiency. Most trees and shrubs prefer a soil pH (acidity level) of 5.5 - 7.0.
- Proper watering of newly planted trees and shrubs is the most important maintenance practice for establishing plants.

Fertilizer types

Fertilizers are identified by a guaranteed analysis (product label) such as 10-6-4 or 5-10-5. The three numbers represent the percentages by weight of nitrogen (N), phosphate (P₂O₅), and potash (K₂O), respectively, contained in the fertilizer.

Complete analysis granular fertilizer

A fertilizer with the three major plant nutrients, nitrogen, phosphorus, and potassium, is called a complete fertilizer. Commonly used complete fertilizers for trees and shrubs have a ratio of 3:1:1. Select an analysis that supplies the nutrients your plant needs without over-supplying unnecessary nutrients. If your soil test indicates levels of phosphorus and potassium are adequate you only need to apply nitrogen. However, it is often harder to find a nitrogen-only granular fertilizer. As an alternative, select a fertilizer with low amounts of phosphorus and potassium. Secondary nutrients like calcium, magnesium, and sulfur are sometimes included in fertilizers. Read the guaranteed analysis.

Slow-release nitrogen

This form of nitrogen is supplied slowly over a relatively long period of time. It is usually more expensive than the more common water-soluble (fast release) nitrogen, but less likely to contribute to nutrient pollution of our water resources. Slow-release nitrogen is available at a uniform rate over the entire season. Many tree and shrub fertilizers are a combination of slow-release and quick-release sources of nitrogen.

Organic fertilizers and compost

These can be substituted for chemical fertilizers. Using shredded leaves (run collected leaves over with a lawnmower) to mulch trees and shrubs provides a slow release of nutrients as the leaves break down and eliminate the need to purchase mulch. Compost can also be used but don't apply more than a 1-inch layer.

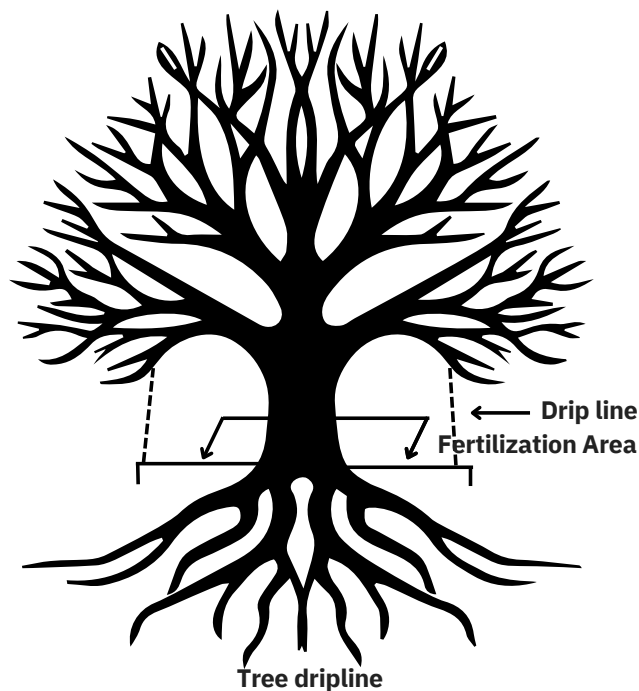
When to fertilize

If you do fertilize, fertilize in the fall, between late October and early December, or in late winter or early spring, between late February and early April. Never fertilize in late summer or early fall because the available nutrients will stimulate new growth at a time when trees and shrubs are preparing for dormancy.

Fertilizer application methods & rate for broadcasting

Surface broadcasting

The easiest and most cost-effective way to fertilize large trees surrounded by mulch or bare soil is to broadcast granular fertilizer on the surface of the soil. Broadcast the fertilizer on the area under the tree, beginning near the trunk to the drip line (ends of the branches). Irrigate the area after fertilizing if rainfall is not expected. Broadcasting on turf or sloped surfaces should be avoided. Sweep off any fertilizer that lands on impervious surfaces like sidewalks or driveways, do not fertilize if a heavy rainstorm is in the forecast or the ground is frozen, and don't fertilize within 10 to 15 feet of waterways.



Liquid deep root feeding

This is a popular application method used by the commercial tree and landscape business. The nutrients are mixed in water and injected into the soil. In general, liquid application fertilizers are more expensive than granular types for the same amount of nutrient applied.

Application Rates for Nitrogen Fertilizer

Established Landscape Shrubs - .25 oz. nitrogen per plant

Example: Using a 10-6-4 fertilizer

$$\begin{array}{l} \text{N application rate} = \text{Amount of fertilizer per plant} \\ \text{N content of fertilizer} \\ \text{(written as a decimal)} \end{array} \qquad \begin{array}{l} \underline{.25} = 2.5 \text{ oz.} \\ .10 \end{array}$$

Established Small Tree - .5 oz. nitrogen per plant

Example: Using a 10-6-4 fertilizer

$$\begin{array}{l} \text{N application rate} = \text{Amount of fertilizer per plant} \\ \text{N content of fertilizer} \\ \text{(written as a decimal)} \end{array} \qquad \begin{array}{l} \underline{.5} = 5 \text{ oz.} \\ .10 \end{array}$$

Large Mature Tree - 2-3 lbs. nitrogen per 1,000 sq. ft.

Example: Using a 10-6-4 fertilizer

Start by measuring the approximate area to be fertilized. Generally, it is from the trunk to near the drip line. The "drip line" is the distance from the trunk that the branches reach.

If the root zone is 25 by 25 ft., the area is 625 sq. ft. The amount of fertilizer is based on the actual nitrogen. The recommended rate of nitrogen is 2 lbs. of actual nitrogen per 1,000 sq. ft. To fertilize 625 square feet using a 10-6-4 analysis fertilizer at the rate of 2 lbs./1000sq. ft. of nitrogen, would require 12.5 lbs. of 10-6-4 for the entire 625 sq. ft. area.

Formula for fertilizer needed:

$$\begin{array}{l} \text{N application rate} \\ \text{N content of fertilizer} \\ \text{(as a decimal)} \end{array} \quad \times \quad \frac{\text{Sq. ft. to be fertilized}}{1000} \quad = \text{Amount of fertilizer needed}$$

$$\begin{array}{l} \underline{2} \\ .10 \end{array} \times \frac{625}{1000} = 12.5 \text{ lbs. of fertilizer needed}$$

Fertilizer spikes

Compressed fertilizer spikes are another popular method used by homeowners. These are driven into the soil with a hammer. They can only be used effectively when the soil is soft and moist. Their popularity is based on the simplicity and ease of application. Follow the instructions on the product label for the correct spacing and number of spikes to use.

Foliar application

Plants can absorb nutrients through their leaves. There are various brands of liquid fertilizers that attach to the end of a garden hose for foliar application. Although plants will absorb some nutrients through their leaves, large shade trees are not fertilized using this method. However, very small trees can benefit from this fertilizing method, if a nutrient deficiency is identified from a soil test. Applying fertilizer diluted with water to the foliage and also on the soil around the plants is done when the leaves are fully developed in late spring to early summer. It is very important to follow the directions on the product. An excessive concentration of fertilizer, especially if applied during the hottest time of the day, can burn the foliage. Foliar fertilization is a common way to apply chelated iron to plants suffering from iron chlorosis. The benefits of foliar application of nutrients are only seen for one season.

Fertilizing evergreen trees and shrubs

Fertilize evergreens only when it is recommended in a soil test report.

The feeder roots of evergreen trees and shrubs are very shallow and excessive rates of quick-release fertilizer can damage them. Broadcast a granular fertilizer uniformly on the soil under the shrub and a little beyond the drip line of the shrub (refer to the illustration above). Use a maximum application rate of 2 to 3 pounds of nitrogen per 1000 sq. ft. and follow label directions.

A lower rate of nitrogen fertilizer is used around foundation plantings to reduce excessive growth and the resultant need for pruning and trimming.

Many evergreens are acid-loving plants including rhododendron, azalea, camellia, mountain laurel, pieris, some hollies and pines, and leucothoe. They require a soil pH range of 4.5 to 5.5. Boxwood and yew need a pH range of 6.5 to 7.2. Fertilizers prepared for acid-loving plants include materials, such as iron sulfate, to maintain an acid soil. Repeated applications without checking the soil pH can actually make the soil too acidic. Avoid the use of aluminum sulfate unless trying to turn *Hydrangea macrophylla* (bigleaf hydrangea) blue.

Nutrient issues - Deficiency symptoms

Nitrogen

Yellowing or chlorotic older leaves.

Iron Chlorosis

- Iron chlorosis is a symptom of a soil pH problem. Iron in the soil becomes less available to plants when the soil pH is above 7.0. Chlorosis is an interveinal yellowing of new leaves. This deficiency can be temporarily corrected by applications of chelated iron to the foliage or the soil.
- The soil pH should be corrected or the symptoms will gradually recur. If the pH is too high (alkaline), sulfur and/or iron sulfate are applied to the soil to lower the pH.

Follow the directions based on the results of a soil pH analysis. If chlorosis persists, have the soil tested again. Manganese (Mn) and zinc (less common), are other nutrients that become less available in alkaline soils. It is best to test first and avoid misapplication.

Some other conditions that can cause chlorosis include poor soil drainage, over-watering, over-mulching, planting too deeply, root nematodes, or a root injury.

Magnesium

- In very sandy soils, magnesium deficiency can also be a serious problem with acid-loving plants.
- These symptoms generally appear as chlorosis of older leaves and short, unhealthy new growth.
- A leaf tissue test is the most accurate method to determine this deficiency and some soil testing labs perform this test. However, it is more expensive than soil testing.
- The deficiency can easily be corrected by applying 3 tablespoons of magnesium sulfate (Epsom salt) per 100 square feet and irrigating thoroughly. Do this 2 years in a row.

Problems caused by excess fertilizing

- Excess nitrogen fertilization can produce long succulent shoots that are attractive to various sucking insect pests, like aphids.
- High fertilizer concentrations can cause root damage or “burn”.

Excessive use of fertilizer in the landscape can contribute to the nitrogen and phosphorus contamination of groundwater, streams, rivers, and ultimately the Chesapeake Bay. Nutrient runoff can easily occur on slopes. Nutrient pollution of groundwater can happen on many different soil types with any type of misuse of fertilizer but is more likely to result from fast-release fertilizers applied to sandy soils. It is very important to select the correct guaranteed analysis fertilizer, use slow-release whenever possible, and always read the label instructions.

Information based on publication HG 23 Fertilizing Landscape Trees and Shrubs, Author and illustrator: Raymond Bosmans (retired), University of Maryland Extension Specialist, Home and Garden Information Center. Reviewed by Andrew G. Ristvey, UME, Senior Agent. Edited by Jon Traunfeld, HGIC Center Director, Extension Specialist, Fruits, and Vegetables.