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Fact Sheet

Fact Sheet 638

Fertilizing Ornamental Trees and Shrubs

Trees and shrubs in landscape plantings are fertilized to keep them healthy and attractive. Over-fertilization may cause excessive growth, especially on shrubs; they may outgrow the location in which they are planted and require extra care and pruning. Trees and shrubs in lawns will already receive some fertilization when the lawn is fertilized. This may be sufficient to maintain small trees and shrubs if the soil is already fertile, but probably will not be sufficient for mature plants. When fertilizer is applied to soils that can be cultivated, it should be incorporated into the upper several inches.

Proper tree and shrub fertilization is an investment in a more attractive landscape planting.

Fertilizing Trees

How much and how often to fertilize shade trees depends on the size and growth of the tree. Trees recently transplanted and trees still in their rapidly growing stage should be fertilized yearly. Well-established, mature trees should be fertilized only every 3 to 4 years.

The best period of the year to fertilize trees runs from the fall, generally after the leaves have fallen, through the winter until the early spring, before active top growth occurs. Fertilizer applied in the fall has a longer time to penetrate the soil so that the roots can absorb it. Thus, the fertilizer is absorbed by the roots during the winter months and available to the plant for growth in the spring.

Several factors should be considered in deciding whether or not to fertilize. The general vigor of the plant and the color of the foliage should be observed. Undersized leaves and short new twig growth generally indicate a need for fertilizer. Yellow or chlorotic leaves may be another symptom of a lack of soil nutrients. Because damage by insects or disease can sometimes cause similar symptoms, these possibilities should be checked out first before deciding that the symptoms are due to a lack of soil fertility. The yearly rate of new twig growth for a tree varies with the species, soil conditions, and general environment. A general guide to follow is that young trees in good condition produce approximately 8 to 12 inches of growth on the main branches yearly. As trees mature, the growth may be only half as much and yet still be healthy.

Will a soil test help? A soil test will provide some indication of soil fertility but it is only one factor in determining the fertilizer needs of trees. Because 80 to 90 percent of nutrient-absorbing roots of most trees grow in the upper 10 to 12 inches of soil and the roots extend in a wide area from the trunk, equal to or greater than the height of the tree, representative soil samples may be difficult to obtain. Therefore, in determining the fertilizer needs of trees, it is necessary to consider soil conditions, age and vigor of the tree(s), previous fertilizing practices, and the place and value of the tree or trees in the landscape.

Select a fertilizer that supplies only nitrogen or a complete fertilizer with a high nitrogen analysis.

Research studies to date have shown the greatest plant response to additions of nitrogen. A commonly used complete fertilizer for this purpose is 10-6-4. Many fertilizers include urea and organic sources of fertilizer nutrients, which are slowly broken down or released into the soil to become available for plant growth. These nutrients provide a long-lasting effect.

The rate of application of fertilizer per tree is based on the diameter of the tree measured at a point 4 feet above the soil line. The standard guide for trees 6 inches or more in diameter is 4 pounds of a 10-6-4 fertilizer for each inch in diameter; for example, a tree 12 inches in diameter should receive 48 pounds of fertilizer. Trees 6 inches or less in diameter are fertilized at the rate of 2 pounds for each inch in diameter; a tree 5 inches in diameter would be given 10 pounds of fertilizer.

The most practical way to fertilize large trees is to broadcast granular fertilizer on the surface of the soil and allow the rain to transport the nutrients to the roots. When using this method, make the application in the late fall, winter, or early spring, just before tree growth begins. Fertilizing trees in late fall or winter reduces the chances of injury to the lawn, especially at the higher fertilizer rates.

Broadcast the fertilizer on the area under the tree, beginning at the midpoint between the trunk and the drip line and approximately 6 to 8 feet beyond, varying with the height of the tree. Also avoid heavy applications of fertilizer on the lawn shaded by the tree.

If the broadcast method is not used, the next recommended method is to inject the fertilizer into the soil. Granular or liquid fertilizers may be injected into holes 8 to 10 inches deep. These holes are made in a regular pattern at 2- to 3-foot intervals, starting within the drip line for single trees and within 3 to 5 feet from the trunk for groups of trees. Fertilizing should extend to a radius equal to the height of the tree. See Figure 1 for a diagram of this fertilizer pattern.

To use granular fertilizers, auger 1-inch to 1½-inch-diameter holes into the soil at 2- to 3-foot intervals (Figure 1). After all of the holes have been drilled, divide the calculated amount of fertilizer by the number of holes and place the proper amount in each hole with a can or funnel. Scrape the augered soil back into the hole after fertilizing.

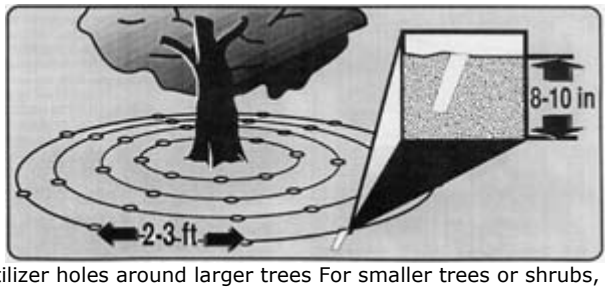

Figure 1. This is how to space fertilizer holes around larger trees For smaller trees or shrubs, place holes closer together and not as deep.

To inject liquid fertilizers into the soil, a special injection rod, or "needle," is used and the fertilizer solution is injected under pressure. This is a frequently used commercial method. Special injecting needles that connect to the garden hose and prepackaged water-soluble fertilizers are available from garden shops. When using these, the tip of the injection needle should be inserted 8 to 10 inches into the soil at 2-foot intervals.

Holes for fertilizer can be made by driving a crowbar, a heavy rod, or a pipe into the soil instead of using an auger. However, as the hole is made larger by wiggling the bar, the wall of the hole is made less porous as a result of the accumulation of a shiny coating of very fine soil particles on the side of the hole. This coating may delay the movement of the fertilizer into the surrounding soil. Such coatings develop most commonly in silty or clay soils.

Compressed fertilizer "spikes" are also available for tree fertilization. These are driven into the soil with

a heavy hammer and can only be used effectively when the soil is moist. However, they are costly if used at the fertilizing rate recommended in this bulletin. Their popularity is based on simplicity and ease of application.

Vertical Mulching

The growth of trees in heavy clay or silty soil can often be improved by vertical mulching. This is done by augering holes 1½ to 2 inches in diameter, 12 to 18 inches deep, in a pattern and area similar to that used for fertilizing. The holes are filled to the surface with compost or finely ground pine bark. Vertical mulching allows greater airflow into the soil, which encourages better root distribution and growth.

Fertilizing Acid-Loving Rants

Rhododendron, azaleas, camellias, mountain laurel, pieris, and leucothoes require an acid soil. The first step is to plant them in soils that are naturally acid, approximately pH 4.5 to 6.0, and to incorporate liberal quantities of peat or other organic matter into the soil as it is being prepared for planting.

Lime should never be used for these acid-loving plants unless a soil test indicates the need for it.

One yearly application in early spring of a complete fertilizer, such as a 10-10-10, is sufficient. Apply this at the rate of 1 pound per 100 square feet.

If the soil is well supplied with phosphorus and potassium, only nitrogen is necessary, such as ammonium sulfate, at the rate of 1 pound per 100 square feet.

Trade-named fertilizers prepared for acid-loving plants often include some material to maintain an acid soil. Such products should be used only at the rates that are recommended and then only when necessary.

Iron deficiency (chlorosis) appears as a yellowing of the new leaves at the ends of the branches, while the mature leaves remain dark green. The veins in the chlorotic leaves may be green. This deficiency can be temporarily corrected by one or two applications of iron sulfate sprayed on the foliage at the rate of 1 ounce per gallon of water. If necessary a second application may be made in 10 to 14 days. For longer-lasting control, apply 1 to 2 pounds of iron sulfate per 100 square feet of ground area under the plants and water thoroughly. Iron chelate is another material that will correct iron deficiency. This is used at the rate of 1 ounce per 10 gallons of water and is sprinkled over the plants and onto the soil.

Poor soil drainage, overwatering, overmulching, planting too deep, magnesium deficiency, root nematodes, or any condition that causes root injury will also produce chlorosis. Soils, either alkaline or near the neutral point, generally have an insufficient amount of iron available to plants for proper growth. Such an iron deficiency condition sometimes develops near building foundations, where plaster, cement, and other construction debris have been discarded and covered with soil.

To make soils acid, apply a combination of iron sulfate and finely powdered sulfur in equal amounts. The rates of application are based on the existing pH. Soils with a pH between 6 and 7 will require 1 pound of each per 100 square feet. Soils with a pH above 7 will require 2 pounds of each per 100 square feet. In established planting, the materials should be cultivated into the soil as deeply as possible without causing root damage. With new plantings, both materials should be thoroughly worked into the soil, along with some organic matter, before planting.

In very sandy soils, magnesium deficiency can also be a serious problem with acid-loving plants. The symptoms generally appear as chlorosis, that is, pale yellow-green foliage and short and unhealthy-looking new growth. Soil testing is the only accurate method to determine this deficiency, providing

samples are taken from the upper 3 inches of soil within the drip line of the plants. The deficiency can easily be corrected by applying one-half of a cup of magnesium sulfate (Epsom salts) per 100 square feet and irrigating thoroughly.

Fertilizing Newly Planted Trees and Shrubs

The soil should be fertilized before new shrubs are planted. Apply a 1-inch layer of peat moss or compost over the area to be planted. If peat moss is used, apply 5-10-5 or 10-6-4 fertilizer at 2 to 4 pounds per 100 square feet. If compost is used, there is no need to apply fertilizer. Spade or cultivate the soil to a depth of at least 6 inches before planting. This will supply adequate nutrients through the first growing season.

When digging holes for individual trees or shrubs, save the topsoil to add to organic matter and a complete fertilizer (such as 2 to 3 ounces of 5-10-5 or 10-6-4 fertilizer per bushel). If compost is used as the source of organic matter, fertilizers are not necessary. This prepared soil can be used for filling in around the roots or the root ball after the tree has been placed in the hole. Wait until the plant has been growing for one season before fertilizing again.

Fertilizing Evergreen and Deciduous Shrubs

The best practice in growing evergreens and deciduous shrubs is to start with a well-fertilized soil. Then only a light application of fertilizer is needed each year to maintain the shrubs in a healthy condition. Apply the fertilizer in late fall or early spring. Broadcast it uniformly on the soil under the plant and cultivate it lightly into the soil. An application of 2 to 3 pounds of a 5-10-5 fertilizer per 100 square feet should be sufficient. Plants growing in soils with a low level of fertility or plants that have not been fertilized for several years may have the rate increased to 4 to 5 pounds per 100 square feet the first year it is applied.

Educating People To Help Themselves

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