

# Home Grounds Fact Sheet

## Fertilization of Trees and Shrubs

To maintain and promote vigorous growth of shade and other ornamental plants, it is necessary to have ample nutrients and water. In forests, decaying organic matter helps feed trees and retain moisture. Since these conditions do not usually exist along city streets, lawns and parks, it is often necessary to feed and water them.

The type of fertilization program recommended for established plantings depends on many factors, i.e. amount of growth desired, acceptability of existing site, soil quality and fertility. If plants are growing well and look good, the best recommendation may be not to fertilize. Annual fertilization should rarely be necessary. However, if additional growth is desired, the plant looks weak or pests and external stresses have affected its well-being, fertilizer would be beneficial.

Essential elements for plant nutrition include nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), zinc (Zn), copper (Cu), molybdenum (Mo), magnesium (Mg), iron (Fe), sulfur (S), manganese (Mn) and boron (B). They come from the soil and from applied nutrients. The first three are identified as major elements and appear as guaranteed minimum percentages of N, P and K on any fertilizer product. Other elements such as boron, zinc, manganese, iron, copper and molybdenum are spoken of as trace or minor elements. Plants require very small amounts of them. However, they are just as essential for plant growth as those required in larger amounts (N, P and K).

Of greatest concern environmentally and as it pertains to rate of application is nitrogen. It is also used in

the greatest quantity by plants. Nitrogen is called the "fleeting element" as it is used up and dissipates rapidly once exposed to the environment. Studies indicate that 50% to 75% of the nitrogen applied as a fertilizer can be lost due to run off and evaporation as a gas to the atmosphere, which is 78% nitrogen. Nitrogen is used in the leaf of a plant as a part of chlorophyll; the greater the supply of nitrogen the greater the amount of chlorophyll produced, resulting in rapid vegetative growth and a deep green color. At times, this "quick fix" approach is not always the most beneficial for plants. Excessive chlorophyll production results in excessive sugar production which can be an open invitation to certain fungi that thrive on sugar. Additionally, rapid growth is not always considered healthy growth because it can succumb to environmental stresses.


### Methods, rates and timing

Several methods can be used to fertilize trees and shrubs: broadcasting the dry or liquid fertilizer on the ground, subsurface application of either granular or soluble fertilizers, or injection.

### Broadcasting

This method is the least expensive and, in certain instances, can be just as effective as subsurface techniques. It is the method most commonly used for small tree and shrub fertilization. Where lawn areas surround the tree, it is suggested that the fertilizer be applied over the entire lawn area to stimulate and improve both

**VOLATILITY**



15% to 20%  
Escapes as gases  
to the air.

**LEACHING**




Little to a lot  
Most on sandy  
soils overirrigated

15%-75%  
Average  
50%



Crops get what's left.



33% to 66%

Tie up both  
temporary and  
permanently

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lawn and tree. Adjoining garden areas of shrubs or ground covers should be fertilized as well. Complete fertilizers such as 10-6-4 or 5-10-5 can be used effectively for the general range of trees and shrubs on soils that are neutral to acid in reaction. These fertilizers should be broadcast at the following rates:

a) **For most flowering shrubs**

At the first sign of growth in spring, apply a 5-10-5 type fertilizer at 2 to 3 pounds per 100 sq. ft. or 10-6-4 at 1 pound per 100 square feet.

b) **For trees where fertilizer is broadcast over the entire area**

Starting at a distance 2½ feet away from the trunk, evenly apply 20 pounds of 5-10-5 or 10 lbs. 10-6-4 to each 1000 square feet of established lawn. Apply when the turf is dry and water-in immediately afterwards. If not watered in thoroughly, most of the fertilizer in a turfed or ground-covered area will be taken up by these plants at the expense of the trees and shrubs.

Applications for trees and shrubs are generally made in early spring. However, if applied during recommended times for turfgrass the trees and shrubs will also benefit. Use the following rates per inch of trunk diameter:

**Trees 3" or less in diameter (diameter is measured at breast height (4½ feet))**

10-6-4: 1 lb./inch trunk diameter

5-10-5: 2 lb./inch trunk diameter

**Trees 3" or more - DBH**

10-6-4: 3 lbs./inch trunk diameter

5-10-5: 5 lbs./inch trunk diameter

### **Subsurface application of fertilizer**

In almost all instances, subsurface root fertilization is more effective than surface fertilization, provided adequate moisture is present in the soil. Although surface fertilization is satisfactory for shrubs and small trees (up to 3" trunk diameter at breast height) growing in beds or lawn areas, one may want to alternate with a subsurface application to ensure that the slower-moving phosphorous (P) is placed into the root zone of larger, deep-rooted trees.

### **Crowbar or subsurface method**

1. Trees are best fertilized in early spring. Although applications can be made at other times, mid-season fertilization can stimulate new growth at the wrong time of year. Since root growth continues into December and early January, fall fertilization has merit if the fertilizer used has nitrogen in the controlled or slow-release form.
2. The crowbar method involves the placement of granular fertilizer in holes punched at 18" intervals to a depth of 8"-18" for deciduous trees (8" for evergreens).

Start the holes 2-2½' from the base of the trunk and extending about one-third of the distance beyond the branch spread. This is necessary to prevent injury to the lower portion of the trunk and the large roots in that area. With newly-established trees, the majority of the feeder roots are inside the drip line and the fertilizer should be applied there. The feeder roots of older trees are usually at or well beyond the drip line, so they must be fertilized accordingly. If the area beneath the spread of the branches is restricted by driveways, sidewalks or streets, decrease the fertilizer application in proportion to the area covered.

Curb trees should not receive over 1/2 the amount of fertilizer determined by measuring the trunk diameter. If the full amount were to be applied within the restricted area, many roots could be burned or damaged.

Pour about a cupful of 5-10-5 fertilizer or 1/2 cup of 10-6-4 in each hole; then fill each hole with water. After the water drains away, fill the hole with topsoil.

Commercial firms that manage trees inject solutions containing fertilizers beneath the soil surface. These solutions usually contain soluble fertilizers and controlled-release forms of nitrogen suspended in solution. Such combinations provide both immediately available nutrients as well as nutrients that will gradually become available over an extended period of time.

Subsurface applications by either means should be made at the first signs of growth in the spring. If such applications are made at other times of the year, it is advised that a major portion of nitrogen be controlled-release. This avoids the forcing of late plant growth as the result of applications of totally soluble forms of nitrogen; it also reduces the risk of nitrogen leaching during late fall and winter.

### **Trunk injection**

This is a relatively new technique employed by commercial firms in extraordinary situations. Observations to date indicate varying degrees of success with trunk injection and, in some cases, injury to plant parts has occurred.

### **Types of fertilizers for woody plants**

For convenience and adequate fertilization of most woody plants, home gardeners use complete fertilizers containing all three of the major fertilizer materials. Every package of fertilizer must be labeled to show the guaranteed minimum percentages of the three major nutrients. For example - a 5-10-5 fertilizer contains at least 5 percent nitrogen, 10 percent phosphoric acid and 5 percent potash.

### **Inorganic Types**

These fertilizers are composed of simple chemicals that are quickly absorbed by plants. They are the least expensive and can be found at any farm or garden supply store. Inorganic fertilizers are available in both liquid and granular form.

## **Organic Types**

Natural organic fertilizers and synthetics (urea-forms) release their nutrients somewhat more slowly. Many of these organic or synthetic forms are incorporated in other all-purpose fertilizers that are widely available. They may appear on the label as “water-insoluble nitrogen (WIN),” “urea-form,” “IBDU” and “sulfur coated urea.” They are more expensive but the danger of burning plants is reduced provided the recommendations on the label are followed.

## **Readily Soluble Fertilizers**

These fertilizers are high analysis (ex. 20-20-20), dry, concentrated fertilizers. Most of their components are derived from inorganic sources. Usually the recommendations are to dissolve a specified number of ounces or teaspoonfuls in a particular volume of water. They can be applied safely to growing plants. One of the concerns in using readily soluble fertilizer is that nitrogen can be readily leached. To alleviate this concern, formulations are available that combine soluble forms with controlled-release forms of nitrogen.

## **Complete Liquid Fertilizers**

These are similar to readily soluble fertilizers. The only difference is that they are liquid concentrates. Complete liquid fertilizers can be used in the same manner as readily soluble fertilizers. The manufacturer’s recommendations should be followed to avoid plant injury.

## **Foliar Fertilizers**

Foliar applications of readily soluble fertilizers offer homeowners advantages as well as disadvantages. Advantages include convenience and ease of application, correction of minor element deficiencies and “green-up” of yellow, nutrient-deficient foliage.

The problems occasionally associated with foliar applications of fertilizer are mainly a result of not following the manufacturer’s directions. Only those materials that give specific recommendations should be used, and directions should be followed closely. Foliar applications of fertilizers should generally be looked on as a supplement, not a substitute for soil applications of fertilizers.

## **Chelates**

Applying chelated iron to the soil produces a longer-lasting effect than spraying the foliage. Repeated applications are often necessary to maintain attractive green foliage. The addition of chelated iron is supplemental to regular fertilizer practices for certain plants. Carefully follow the manufacturer’s recommended application rates.

*Information Source Bulletin 24, “Suggested Practices for Planting and Maintaining Trees and Shrubs,” pp 10-12.*