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Fertilizing Shade and Ornamental Trees

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Analysis

Trees should be fertilized on a more or less regular basis to maintain growth, foliage color, fruit production, and general vigor. Not all trees require the same attention nor do they all need the same mineral element supply. Fertilizers commonly are used to provide a growth stimulus for young trees or to help provide the raw materials for an older tree to put on a new flush of growth. Mineral elements enhance the foliage color and in some cases increase the fruit set for the following year. Fertilizers also are used to correct element deficiencies, which usually show in the leaves.

What to use as a fertilizer

The most growth response on trees is obtained with nitrogen applications, but several additional elements usually are needed to provide a balanced growth. Nitrogen helps to supply the stimulus for new growth, continue production of foliage, and maintain green color in the leaves. A lack of nitrogen results in small, yellow foliage on most trees.

Phosphorus and potassium have a less obvious role than nitrogen, but they are essential to the healthy growth of most trees. Neither of these elements, however, is used at the same rate as nitrogen. Nor do they wash into (or out of) the root area as easily. Therefore, phosphorus and potassium applications should be made less frequently. A soil analysis will indicate if either of these elements is needed.

Minor elements are essential to plant growth, but ample amounts usually are present in soils. One or more of these elements may become deficient, however, and the tree will show specialized symptoms unique to the element in short supply. Minor elements likely to become deficient in Oregon soils include iron, manganese, and boron.

Well rotted barnyard manure is one of the best materials for young trees, trees being transplanted, and trees in large open spaces where applications are possible. This is not used extensively though, since its effective application is limited to open spaces where it can be worked into the soil. Commercial fertilizers are available and can be used under most conditions to supply the same elements as would be obtained from barnyard manure.

No general agreement exists among scientists or commercial arborists as to the *best* formula for tree fertilizer, or the amount to apply. Some claim a tree cannot be overfertilized, while others claim that severe injury may result from too much fertilizer. But all agree that a complete fertilizer mixture containing the three critical elements—nitrogen, phosphorus, and potassium—should be used.

Most of the recent research indicates that fertilizers with approximate 3-2-1 ratios of nitrogen, phosphorus, and potassium are suitable for shade trees. Complete fertilizer mixtures such as 10-6-4 and 10-10-5 are also suitable.

When to fertilize

Many trees make their spring growth, flower, and fruit set with the mineral element reserves stored from the previous year. Nitrogen responses usually are seen the same year the element is applied, while phosphorus and potassium responses may not be evident until the following year. Trees may be fertilized either in late fall after any possibility of growth is past, or in early spring as growth begins. Often an added push may be noticed when nitrogenous fertilizers are applied just ahead of growth flushes. Minor element deficiencies may be corrected by foliar or soil applications of the necessary element in early summer.

Amount of fertilizer

Considerable variation of opinion exists on the amount of commercial fertilizers that should be applied. Recommendations range from 1 to 8 pounds of commercial fertilizer mix for each inch in diameter of the trunk at breast height. One of the more common formulae now in use is based as follows:

- ✓ For trees with a trunk diameter at breast height of 6 inches or more, use 1/2 pound of actual nitrogen per inch of trunk diameter.
- ✓ For smaller trees, use 1/4 pound of nitrogen per inch diameter.

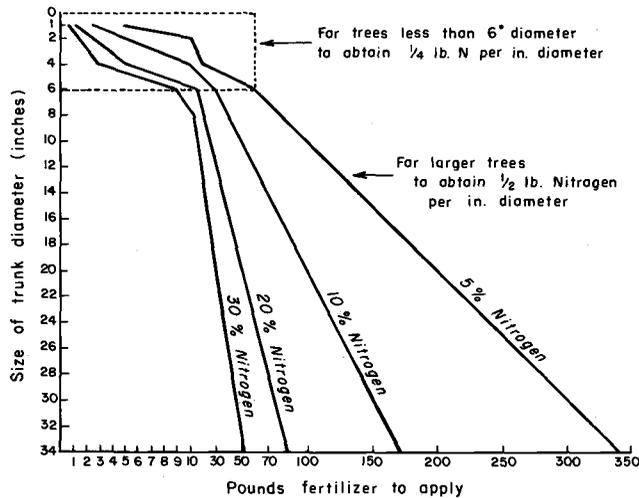
The accompanying chart will help determine the amount of fertilizer to use, based on varying amounts of nitrogen in the mix. It is impossible to correlate

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volume with weight for all fertilizer mixtures available, but roughly speaking, 2 cups of fertilizer mix equals 1 pound.



Usually a safe method would be to use 2 to 4 pounds of complete fertilizer for each inch diameter of the tree trunk. Small trees (less than 6 inches in diameter) should have half the above dosage. For example, a tree 10 inches in diameter should receive 20 to 40 pounds (2 to 4 pounds per inch diameter) of commercial fertilizer, whereas a tree 4 inches in diameter should receive 4 to 8 pounds (1 to 2 pounds per inch).

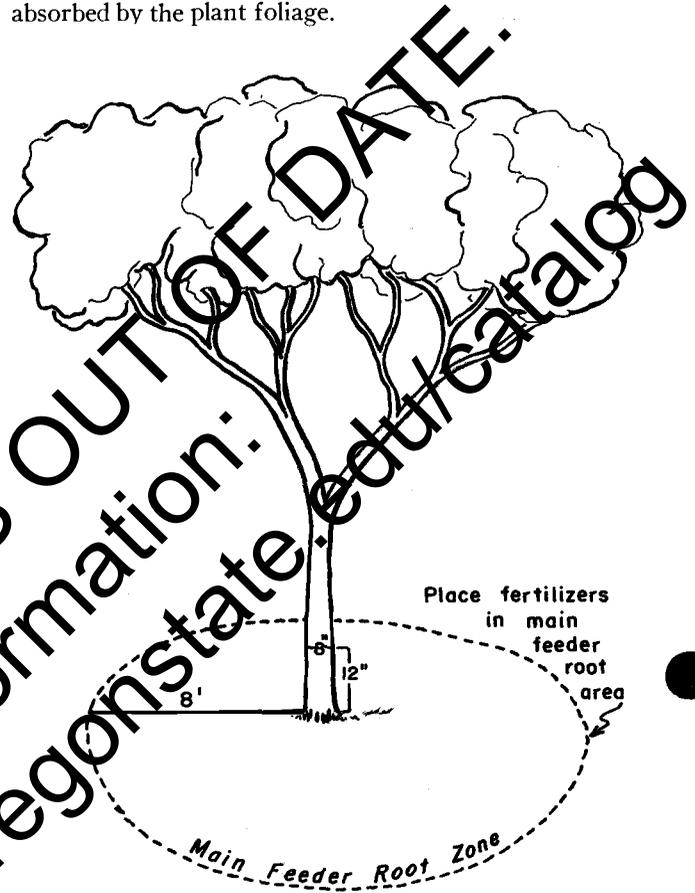
Where to fertilize

The majority of the feeder roots which take in the nutrient elements are in the dripline area of a shade tree. Where possible, fertilizer should be applied in this area. Though trees differ, a reasonable rule of thumb for finding the area of greatest number of feeder roots is as follows: The radial spread of the roots in feet is equal to the diameter of the tree trunk (one foot above the soil line) in inches. For example, a maple tree with a trunk diameter of 8 inches (one foot above the soil line) will have most of its feeder roots in an 8-foot radius from the trunk.

Since phosphorus and potassium usually do not wash into the soil effectively, it is best to place fertilizers containing these elements 12 to 18 inches deep to insure their uptake by the roots. Use a punch-bar to make a number of holes in the area described above, or dig fertilizers into the soil surface. Surface applications often

are used by the lawn or other ground-covering plants and do not help the tree.

Foliar applications of nitrogen, iron, or magnesium are valuable for rapid correction of deficiencies or for use where root zones are covered by pavement. Apply these materials in soluble spray form so they can be absorbed by the plant foliage.



Other problems

Other problems may show symptoms that could be mistaken for nutrient disorders. More often than not, causes other than nutrition contribute to poor plant appearance. These include:

- ✓ Poor root action due to wet, cold, or poorly aerated soils
- ✓ Drought-associated problems
- ✓ High salt content from overfertilizing, excessive calcium in the soil, or hard water
- ✓ Disease and insect damage, both to the roots and to the upper plant parts.