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Texas Agricultural Extension Service

esp Environmentally Safe Practices

FERTILIZING WOODY ORNAMENTALS

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Attractive trees and shrubs are important components in all well-landscaped properties. Planned maintenance and care are essential for keeping them healthy and vigorous. An adequate fertilization program is an important requirement of any good woody-plant maintenance program. It is important, however, that plants not be overfertilized and that fertilizer not be expected to overcome problems caused by the use of unadapted varieties, improper planting techniques, poor soil drainage, soil compaction or incorrect watering practices.

In many yards, a good lawn maintenance program may eliminate the need for supplemental fertilization for trees and other woody plants in the lawn. Additional fertilizer would simply be a waste of money and might result in nutrient imbalances or pollution of local water supplies.

Occasionally, additional fertilizer is needed in areas where a tree's root growth is restricted by streets, curbs or other structural features. Shrubs and vines frequently serve as screens or borders for lawn areas within the landscape. Consequently, these plants are frequently forgotten or neglected in the normal lawn fertilization program.

Plant signs indicating the need for fertilization include lack of terminal growth, pale green or yellow leaves, mottled leaves, dead branches, stunted leaves and early loss of leaves.

General tree vigor is determined by comparing the length of twig growth during the past 3 to 4 years (Figure 1). Young trees should have at least 9 to 12 inches of terminal growth per year. Large mature trees usually average 6 to 9 inches of growth. Shrub vigor is determined the same way. Growth varies from season to season and from variety to variety. It also depends on the species and size being examined.

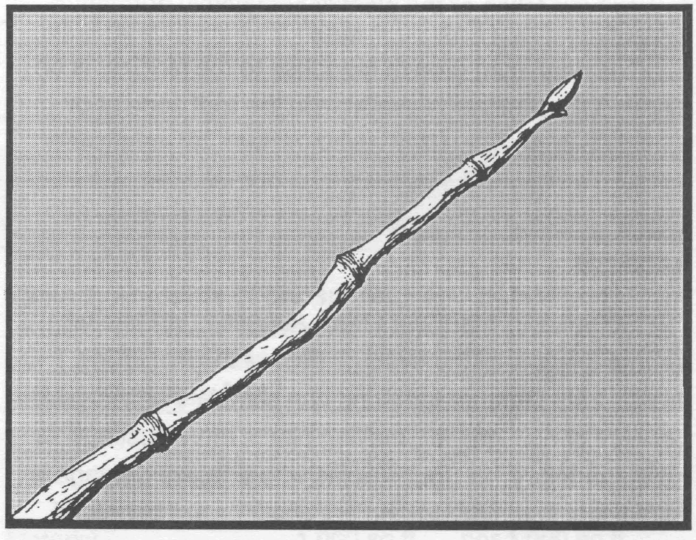

Figure 1. The distance between bud scale scars provides an excellent indication of a tree's growth rate. The ring of scars near the branch tip shows where growth started last spring. The bud scars near the base of the branch denote where the previous season's growth started. By locating bud scars for the past 3 to 4 years the rate of growth can be determined readily.

Obtain a Soil or Foliar Analysis

Fertilizer recommendations should be based on a soil and/or foliar analysis. Instructions for taking a soil or leaf sample can be obtained from the county Extension office. Such analyses allow the application of fertilizers in amounts and ratios that minimize nutrient waste and the threat of pollution.

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Without such analyses, general lawn fertilizer recommendations of 4 to 6 pounds of actual nitrogen per 1,000 square feet per year will meet the needs of most trees and shrubs. In turf areas, do not apply this amount at one time but rather make several applications to prevent fertilizer burn of the turf.

Proper timing of fertilizer applications has a marked effect on the growth of woody plants. In general, the best time to apply fertilizer is in the spring before growth begins.

Soil type also affects the timing of fertilizer applications. For sandy or loam soils, apply fertilizer as soil temperatures begin to rise and before growth occurs. For heavy clay soils apply the fertilizer in late fall after leaves have fallen or the plant is completely dormant.

The maximum growth response to the fertilizer is obtained if the fertilizer is available in the root zone at or slightly before the start of spring growth. In sandy soils fertilizer moves more rapidly into the root zone, whereas in heavy soils, it takes much longer for the fertilizer to penetrate.

Do not apply fertilizers from August 1 until late fall (about the time of the average date of the first killing frost). Late summer fertilizing can stimulate an excessive amount of new growth, making plants more susceptible to winter injury. In South Texas where freeze damage is slight, late summer fertilizer applications are beneficial and provide needed nutrients for late fall and winter growth.

Most fertilizers are purchased according to their analysis which is the percentage of the three major plant nutients - nitrogen, phosphorus and potassium. The analysis is shown on the bag or container and consists of three numbers (i.e., 12-4-8). The first number indicates the percentage of nitrogen (N), the second gives the percentage of phosphorus as phosphoric acid (P_2O_5); and the third is the percentage of potassium as potash (K_2O). A 50-pound bag of a 12-4-8 fertilizer contains 6 pounds of N, 2 pounds of P_2O_5 and 4 pounds of K_2O.

Tree growth is limited by nitrogen deficiency more often than by lack of phosphorus or potassium. For this reason, it is recommended that a fertilizer with a 2-1-1 or 3-1-1 ratio be used for trees. Fertilizers with a 2-1-1 or similar ratio are readily available, including 10-8-6 and 12-6-6. If the desired ratio is unavailable, a 3-1-1 ratio fertilizer can be approximated by mixing 12 ounces of ammonium nitrate (33-0-0) to each pound of a 12-12-12 fertilizer. The same type fertilizer can be used on shrubs and vines (Table 1).

Table 1. The amount of nitrogen fertilizers needed to supply 1 to 2 pounds of actual nitrogen per 1,000 square feet.

Material	Approximate pounds of fertilizer needed to supply 1 lb N	2 lb N
Urea (45-0-0)	2	4
Ammonium nitrate (33-0-0)	3	6
Ammonium sulfate (21-0-0)	5	10
10-10-10	10	20
12-12-12	8	16
10-20-10	10	20
12-6-6	8	16
10-5-5	10	20
16-20-0	6	12
15-5-10	10	20
12-4-8	8	16
19-5-9	5 1/4	10 1/2

Computing Amount of Fertilizer Needed

To figure the amount of nitrogen-containing f needed for woody plants, stake off a square or rectangular area that includes the entire branch spread of the trees and shrubs in an area. If roots are restricted by pavement, curb or a building, subtract the restricted area from the total area computed (Figure 2).

Application Method

Research shows that when fertilizing trees and shrubs, surface applications of nitrogen-containing fertilizers are as efficient as the old method of punching holes. Fertilizer may be distributed by hand or with a fertilizer spreader. Distribute the fertilizer evenly and avoid skips and overlapping which result in light and dark streaks in grass growing beneath the trees. To obtain even distribution, divide the fertilizer into two equal lots

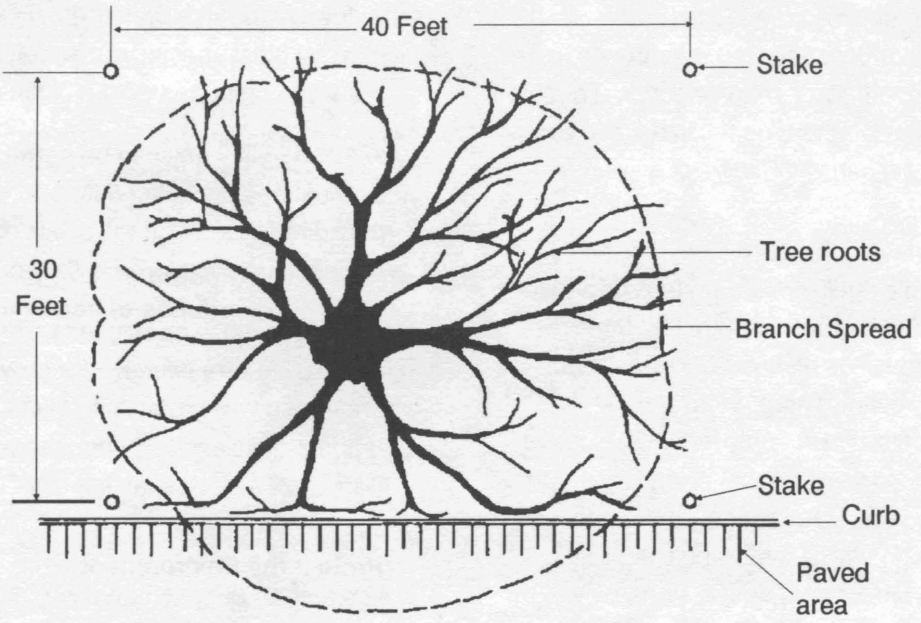

Figure 2. Stake off a square or rectangle that includes all the branch area not over paved surface. In this example fertilizer is needed for a 1,200 square-foot area.

and apply one-half lengthwise over the area and the remainder crosswise over the area. Water the area thoroughly after fertilizing, soaking the soil to a depth of at least 6 inches.

If soil or foliar analyses indicate a need for either phosphorus or potassium, place fertilizer in holes rather than on the surface because these materials penetrate too slowly to reach tree roots in adequate amounts when surface applications are made. Phosphorus or potassium applications are needed only every 3 to 5 years. In most areas of Texas, except possibly in the acid soils of East Texas, the amount of phosphorus and potassium in the soil is sufficient to adequately supply the needs of woody plants. Check with your county Extension office before applying additional phosphorus or potassium. See Table 2 for the amount of phosphorus and potassium-containing materials to use per 1,000 square feet of area if required.

Table 2. Amounts of phosphorus and potassium fertilizer materials needed to supply 3.6 pounds P_2O_5 per 1,000 square feet and 6 pounds of potash (K_2) per 1,000 square feet.

Material	Quantity needed per 1,000 sq ft	Amount per hole based on 250 holes per 1,000 sq ft
Phosphorus (P)		
Superphosphate (0-20-0)	18 lb	2 tbsp
Triple superphosphate (0-46-0)	8 lb	1 tbsp
Potassium (K)		
Muriate of potash (0-0-60)	10 lb	1 tbsp
Nitrogen, phosphorus, potassium		
10-20-10	18 lb	1/4 cup
12-12-12	30 lb	1/2 cup

Fertilizing Evergreens in Alkaline Soils

Evergreen plants generally require less fertilizer than deciduous plants. Most broad-leaved evergreens (magnolia, loquat, photinia, etc.) prefer an acid soil. To maintain these conditions, use acid-type fertilizers and avoid materials such as wood ashes, lime, fresh manure or bonemeal.

Sometimes organic fertilizers are preferred for use around broad-leaved evergreens. Nutrients in these materials are released to the plant slowly and do not produce excessive growth. There is less danger of damage from overfertilization. Apply fertilizers such as cottonseed or soybean meal at 5 to 6 pounds per 100 square feet of planted area. Another organic-type fertilizer can be prepared using one part by weight of sulfate of potash or muriate of potash; two parts by weight of 20 percent superphosphate; and five parts by weight of cottonseed meal. Thoroughly mix the materials and apply at a rate of 2 to 5 pounds per 100 square feet of area under the trees or shrubs. Apply the fertilizer mix to the surface or work into the top few inches of soil, avoiding injury to the roots. One application every other year usually is adequate.

In general, the procedure previously outlined for fertilizing other woody plants is adequate for narrow leaved evergreen trees but reduce the amount by one-third. For best results, apply in early spring before growth starts.

Micronutrients

The micronutrient most commonly deficient in Texas soils is iron. This deficiency usually is noted in alkaline soil regions. The iron becomes insoluble and the plant cannot extract sufficient amounts from the soil for good growth. Iron deficiency symptoms include pale green to yellow leaves with darker green venation. It is very common on plant species not adapted to alkaline soils including some of the red oaks, maples and hollies.

Iron deficiency can be corrected partially with foliar applications of chelated iron provided label recommendations are followed. If the soil is only slightly alkaline, use soil applications of iron sulfate or sulfur.

In general, woody plants adapted to the local area are usually very effective for growing in landscaped areas with well-maintained lawns. In the event that nutrient deficiencies occur, the practices described above will aid in maintaining strong, healthy trees.

Protect the Environment

Fertilizer applied in excess of plant needs or with improper timing often goes to waste. In the case of nitrogen, the excess material may quickly leach into the subsoil and result in pollution of underground water supplies.

To reduce pollution of surface water supplies (i.e., rivers and lakes), minimize the amount of fertilizer which ends up in the storm sewer by keeping fertilizer off the pavement and driveways. A small amount of runoff from each yard can add up to a major pollution problem for a city.

Insure efficient fertilizer use by following fertilizer recommendations based on soil and/or foliar analysis. This will prevent applying excess nutrients, causing nutrient imbalances and poor plant health.

ESP, Environmentally Safe Practices, is a Texas Agricultural Extension Service program designed to promote the use of safe practices around the home and landscape. Whether one is working in household activities, home landscaping and gardening or in production agriculture, environmentally sound practices should be used. It is the responsibility of our generation to make wise use of environmental resources and to extend the use to future generations.

This publication was made available through Extension Service-United States Department of Agriculture funding in cooperation with the Texas Agricultural Extension Service.

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Zerle L. Carpenter, Director, Texas Agricultural Extension Service, The Texas A&M University System.

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