FACT SHEET

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# 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.

Where a good lawn maintenance program is followed, supplemental fertilizer is seldom needed for trees and other woody plants within the lawn area. 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. Since areas around shrubs are usually not as accessible as lawn areas, they frequently are forgotten or neglected in the normal lawn fertilization program.

Fertilizer cannot solve problems from improper planting techniques, poor soil drainage, soil compaction and incorrect watering practices. Difficulties caused by species unsuitable for a given environment are not solved with fertilizers. Select trees and shrubs to suit the local climate and soil.

Signs indicating low fertility 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. Generally 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.

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## Checking Tree Growth

To check tree growth for the current season, measure the twig from the tip to the first ring of bud scale scars. The previous year's growth is the distance between the first ring of scars and the next ring of bud scale scars. By comparing the current season's growth with that of several previous seasons, growth rate can be determined (figure 1).

Base fertilizer needs for landscape plantings on the number of square feet in the growing area of the branch spread. When a root system is restricted by streets, paved areas or curbs, base requirements on the area in which roots are confined.

Preferably base fertilizer recommendations on a soil test. Instructions for taking a soil sample and getting it tested can be obtained from the county Extension office. Without such tests, general lawn fertilizer recommendations of 4 to 6 pounds of actual nitrogen per 1,000 square feet per year are satisfactory for tree and shrub care. In turf areas, do not apply this amount at one time but rather make several applications to prevent fertilizer burn to the turf.

Research shows that 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 tree growth begins.

Soil type also affects the timing of fertilizer applications. For sandy or loam soils apply as soil temperatures begin to rise and before bud break 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 the fertilizer moves more rapidly into the root zone; whereas, in heavy soils, it takes longer for the fertilizer to penetrate to the root zone.



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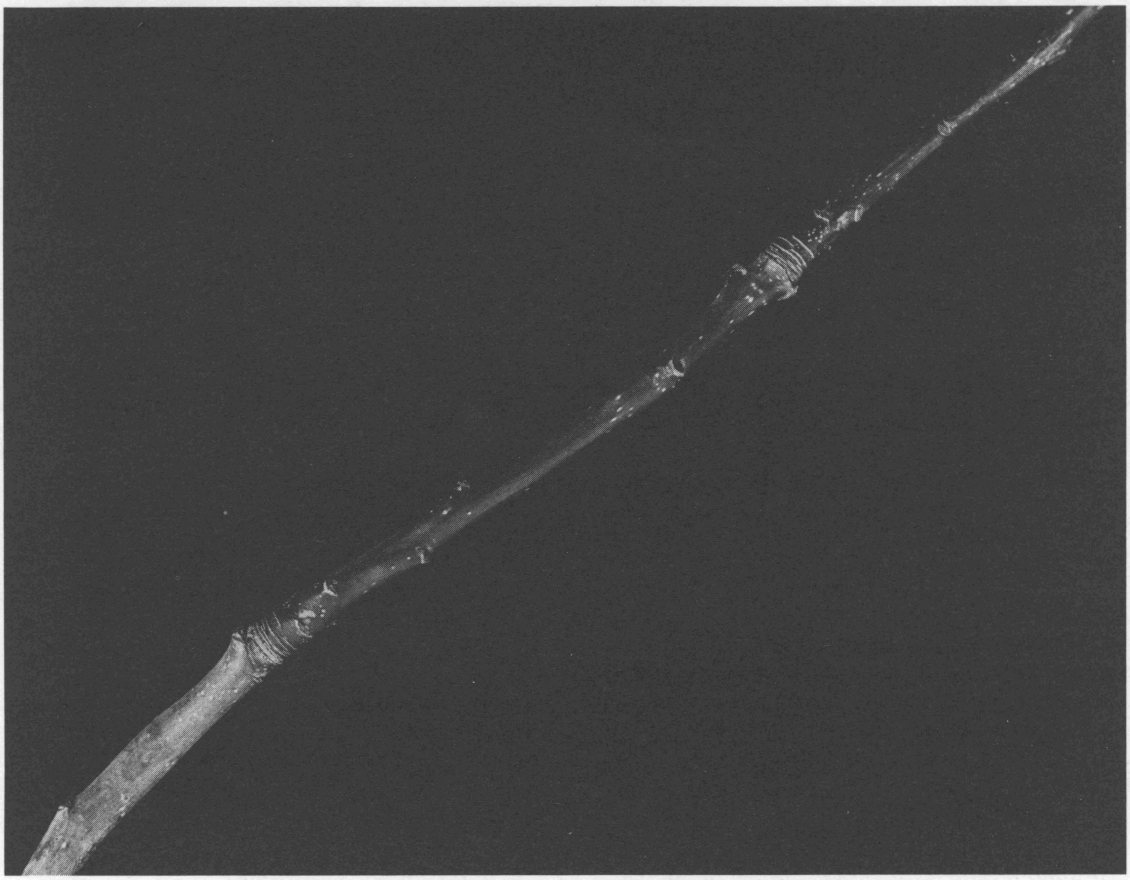

*Figure 1. The distance between bud scale scars provides an excellent indication of a tree's growth rate. The ring of scars on the right shows where growth started last spring. The bud scars on the left denote where the previous season's growth started. By locating bud scars for the past 3 or 4 years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

Table 1 gives the amount of fertilizer mix to use to obtain 1 and 2 pounds of actual nitrogen (N) per 1,000 square feet of area.

**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 | 5¼ | 10½ |

Do not apply fertilizers from July 30 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 nutrients — nitrogen, phosphorus and potassium. The analysis is shown on the bag or container and consists of three numbers, for example, 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 a nitrogen deficiency more often than by a lack of the other two major elements. 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, which usually are available, include 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

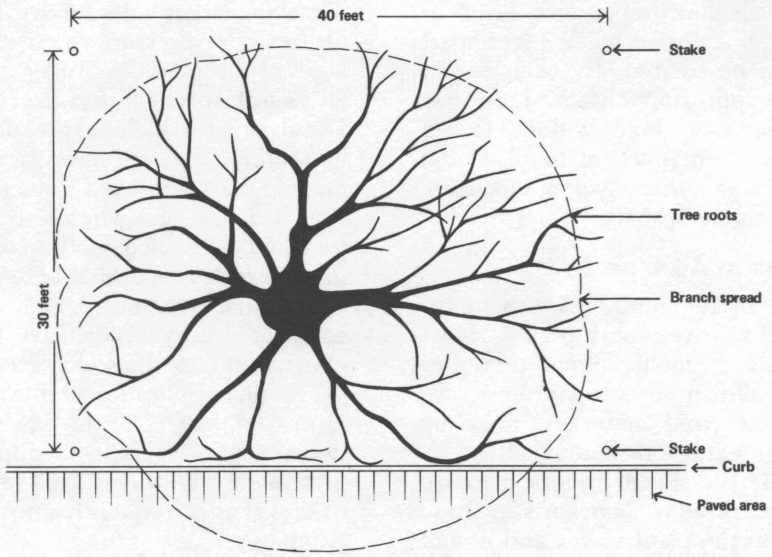


*Figure 2. Stake off a square or rectangle that includes all the branch area not over paved surface. In this example fertilizer is needed for a 1,200-square-foot area.*

nitrate (33-0-0) to each pound of a 12-12-12 fertilizer. The same type fertilizer can be used on shrubs and vines; however, fertilizer recommended for lawn use is adequate for these plants.

## Computing Amount of Fertilizer Needed

To figure the amount of nitrogen-containing fertilizer 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 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 tests 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 |
| Treble 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 | ¼ cup |
| 12-12-12 | 30 lb | ½ cup |

Apply recommended amounts of fertilizer materials in holes 8 to 15 inches deep, depending on soil depth. If there is an impervious layer of clay below the surface, there is little need to go below it. An

exception is where a shallow impervious layer or hardpan can be penetrated. Space holes 2 feet apart throughout the area to be treated. By using 2-foot spacings there will be approximately 250 holes per 1,000 square feet. Do not place holes within 3 feet of the tree trunk. It is seldom practical to place the fertilizer beneath the soil surface when fertilizing shrubs because of their close spacing.

## Fertilizing Evergreens in Alkaline Soils

Research indicates that generally evergreens require less fertilizer than deciduous plants. Most broad-leaved evergreens (magnolia, loquat, etc.) prefer an acid soil. To maintain these conditions, use acid-type fertilizers and avoid materials including 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 except reduce the amount by one-third. For best results, apply in early spring before growth starts.

## Alternative Methods of Applying Fertilizer

Heavy duty power drills with 1 or 1½-inch soil augers for drilling holes may be rented from many rental agencies. If the soil is moist, punch holes in the soil with a heavy punch bar. A hand auger also can be used to drill the holes. The last two methods involve considerable hand labor.

After placing the required amount of fertilizer in each hole, fill the hole with good compost or two parts sand to one part peat moss. Regardless of whether the fertilizer is applied on the surface or placed in holes, thoroughly water the area to a depth of 6 to 8 inches immediately after fertilizing.

Liquid fertilizer injection requires an injector needle or lance that is forced through the soil instead of making larger holes for dry application. Some types utilize water pressure to create the opening. Advantages of these methods over dry applications include faster uptake of the fertilizer and a savings of time. Disadvantages include the need for special equipment, difficulty in probing rocky soils and the fact that organic matter or sand cannot be added at the same time as is the case when fertilizer is applied in holes punched or drilled in the soil. Use of sand and/or organic matter is desirable to overcome soil compaction in parks or other high traffic areas. If soil is compacted heavily, fertilizer applications seldom are effective unless the soil is aerated.

A foliar application of nitrogen fertilizer results in improved leaf color in cases of extreme nitrogen deficiency. This type of application benefits trees growing in a restricted area surrounded by pavement or gravel as is frequently encountered with trees in a patio area.

When liquid and foliar fertilization is needed, employ a qualified tree expert because professionals have the necessary equipment to apply the materials properly.

## 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 a recently developed method, holes are made in tree trunks and a small plastic cap containing iron citrate is inserted which is absorbed by the plant sap. While this is the most rapid method to correct iron deficiency there is danger of girdling the tree if the method is used very often. The cambium layer just below the bark dies back some distance around the hole due to the toxic effect of the chemical. For details on the use of iron sulfate or iron chelates refer to L-435 *Iron Chlorosis*.

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.



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