



Tree and Shrub Fertilization

E.R. Hasselkus and E.E. Schulte

For most trees and shrubs, nitrogen is the most important nutrient regulating growth. Except on some sandy soils, the other nutrients are usually present in sufficient amounts for normal growth. The best way to determine how much fertilizer to use is to test the soil (see Extension publication A2166, *Sampling Lawn and Garden Soils*).

You also can get an indication if your trees and shrubs need fertilizer by checking leaf color. If leaves are light green or yellow-green, you'll need to fertilize. Fertilizer is probably also needed if trees and shrubs show short annual twig growth, excessive dead wood, or sparse foliage. If the leaves are dark green and twig growth excessive, reduce or delay fertilizer application for a year or two.

If a soil test shows that phosphorus and potassium are low or medium, use a mixed grade of fertilizer such as 10-10-10, 16-8-8 or 20-10-5. The first number in the fertilizer mixture stands for the percentage of nitrogen, the second for phosphorus, and the third for potassium—three commonly needed soil nutrients. However, if the soil is high in phosphorus and potassium, use a straight nitrogen fertilizer, such as 21-0-0, 33-0-0 or 45-0-0.

Slow-release fertilizers, available in pre-measured tablet or packet form, release sufficient plant nutrients for trees and shrubs, yet will not damage roots of new plantings. These materials are convenient since a single application usually lasts about 5 years. Slow-release fertilizers should be placed in the hole at planting time or inserted into the soil near the root system of established trees and shrubs. These tablets and packets are available from landscape and garden suppliers.

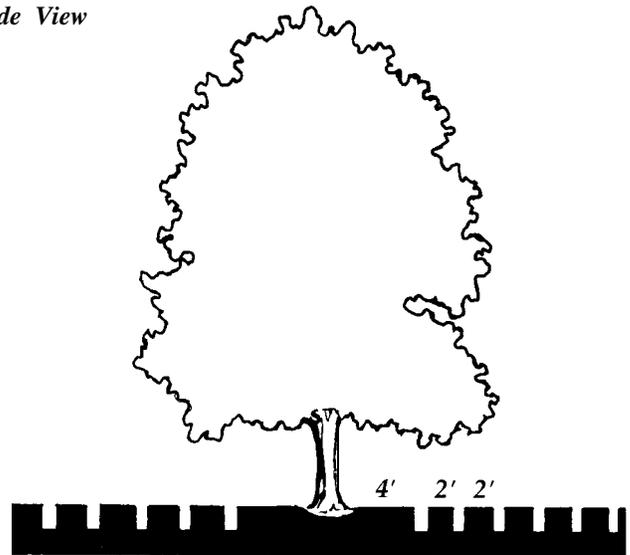
Trees

With the exception of fertilizer tablets or packets, do not put fertilizer in the planting hole when planting trees and shrubs because the fertilizer may burn the roots. The old practice of adding organic amendments to the backfill is no longer recommended.

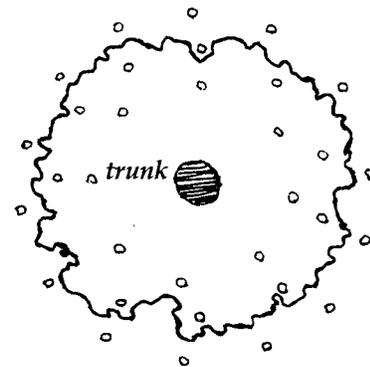
To fertilize established trees, place fertilizer in holes near the trees' feeder roots. The feeder roots of nearly all trees are in the upper 12 inches of soil. They are usually no nearer the tree trunk than twice the distance of its diameter and extend beyond the spread of the branches. For example, a tree with a trunk 2 ft in diameter would have the majority of its feeder roots beginning about 4 ft from the trunk and extending somewhat beyond the outermost branches.

Therefore, fertilize the feeder root area by making imaginary circles at 2-ft intervals under the tree and to a point 6 to 8 ft beyond the dripline of the outermost branches. (See illustration.) The location of the first circle will depend on the diameter of the trunk. For trees 6, 12 or 18 inches in

Side View



Top View



Side and top views of the distribution of holes for fertilizer placement.

diameter, the first circle should be 1 ft, 2 ft and 3 ft from the trunk, respectively.

In each circle, make holes 2 ft apart and 12 to 15 inches deep by using a crowbar, soil auger or probe. Divide the fertilizer evenly among the holes and fill the top portion of each hole with soil or peat moss to avoid damaging existing turf.

Near young trees where shading of lawn grasses by the tree is not significant, apply a double dose of recommended slow-release lawn fertilizer to the feeder root area when fertilizing the lawn.

If trees are growing on bare ground, broadcast fertilizer over the soil surface where the feeder roots are located.

Deciduous Trees

Fertilize shade and flowering trees in late fall after leaves start to take on autumn color and drop or in early spring before buds begin to swell. Do not apply in midsummer since heavy vegetative growth may occur late in the season and could be susceptible to winter injury.

Commercial fertilizers with a high nitrogen content—such as 12-6-4, 16-8-8 or 20-10-5—usually work best. Shade trees usually need 2 lb (2 pints) of fertilizer per 100 sq ft of root-zone area. Flowering trees should be limited to only 1 lb (1 pint) per 100 sq ft of rootzone area. On alkaline soils or soils testing very high in phosphorus and potassium, substitute ammonium sulfate (21-0-0) at the above rates. All fertilizers should be applied in holes as described previously.

Needled Evergreens

Evergreens should be fertilized in late fall or early spring and usually need less fertilizer than deciduous plants. Broadcast commercial fertilizers, such as those for deciduous trees, at 1 lb (1 pint) per 100 sq ft of rootzone area. Avoid getting fertilizer on foliage.

For shrub-like evergreens planted in beds, follow the recommendations listed under “Shrubs.” Large evergreens—such as spruce, fir and pine—often do not need fertilizer, but it can be used to stimulate growth.

Fruit Trees

Fertilize fruit trees in late fall or early spring before buds begin to swell. Broadcast fertilizer in a circular band about 3 ft from the trunk and extend out to the spread of the branches. Apples, plums and cherries need 3 to 8 oz (1/2 to 1 cup) of 10-5-10, or equivalent, per year of age of tree, with a maximum of 8 lb for a mature tree 10 years of age or older. If shoot growth is excessive, reduce the rate of fertilizer.

Overfertilization may cause pears to be more susceptible to fire blight, a serious pear disease. Limit fertilizer to 3 oz (1/3 to 1/2 cup) of 10-5-10, or equivalent, per year of age of tree, with a maximum of 4 lb per pear tree. If the soil has high levels of phosphorus and potassium, substitute ammonium nitrate (33-0-0) at 1/3 of the amount suggested for 10-5-10, or equivalent, for all fruit trees.

In early spring, to check if your fruit trees need fertilizer, measure the length of the previous year's shoots at the end of several branches and determine the average length. Growth starts at the bud scars (compressed scars that circle the twig) and extends to the tip. For healthy trees up to 6 years old, an average shoot length of 10 to 20 inches is normal. For healthy bearing trees, an average shoot length of

8 to 12 inches is normal. When shoot growth is excessive, or lawn grasses under trees are fertilized regularly omit special fertilizer applications.

A soil test will give specific fertilizer recommendations but, generally, you will need to increase fertilizer applications if shoot growth is below average and decrease or omit it if growth is above average.

Shrubs

Apply fertilizer to shrubs in late fall or early spring. Most shrubs make only one flush of growth each year and that ends in early to midsummer. Fertilizer applied in summer can cause new growth that can be injured in winter. Since many shrubs initiate flower buds in midsummer or later, fertilizer applied late in the season may also reduce the number of flower buds formed.

Use a commercial fertilizer high in nitrogen—such as 16-8-8 or 21-0-0—and apply 4 oz/ft of the shrub's height or spread. Where shrubs are planted in beds on bare soil, apply 2 lb (2 pints) per 100 sq ft of bed area.

Apply fertilizer properly to reduce maintenance and pruning. Generally, the more fertilizer you use, the more plant growth you get. Apply fertilizer annually when plants are small and rapid vegetative growth is desired. As plants reach desired size, reduce or eliminate fertilizer to limit growth.

Shrub plantings mulched with organic mulches such as wood chips and shredded bark require regular applications of nitrogen fertilizer because these materials are high in carbon, low in nitrogen. Soil organisms decomposing these mulch materials will obtain the nitrogen they need from the soil—in competition with shrubs—and may induce a nitrogen deficiency.

Manure

Manure may be substituted for commercial fertilizers. For deciduous trees, use about 1/4 bu of well-rotted material per inch of trunk diameter. For evergreens, use about 1/8 bu per foot of height or spread. The application rate for large trees will be limited largely by the distance to the edge of your property.

Apply 1/10 bu manure per year of age of tree for apples, plums or cherries.

For shrubs, 1 bu of cattle manure will contain about the same amount of nitrogen as 1½ lb of 16-8-8 fertilizer—enough for a 6-ft high shrub or 100 sq ft of bed area. If you use poultry or sheep manure instead of cattle manure, reduce the above recommendations to 1/3 bu.

WEX University of Wisconsin–Extension, Cooperative Extension, in cooperation with the U.S. Department of Agriculture and Wisconsin counties, publishes this information to further the purpose of the May 8 and June 30, 1914 Acts of Congress; and provides equal opportunities in employment and programming including Title IX requirements.

E.R. Hasselkus is professor of horticulture and E. E. Schulte is professor of soil science, College of Agricultural and Life Sciences, University of Wisconsin–Madison and University of Wisconsin–Extension, Cooperative Extension,

Produced by the Department of Agricultural Journalism, University of Wisconsin–Madison,

This publication is available from your Wisconsin county Extension office or from:

Agricultural Bulletin, Rm. 245
30 N. Murray St,
Madison, Wisconsin 53715
Phone 608-262-3346

Editors, before publicizing, contact Agricultural Bulletin to determine availability.