



Fertilizing Trees

Shade and ornamental trees can benefit from added fertilizer when nutrients are either deficient or unavailable. Symptoms of nutrient deficiency include slower than normal growth, smaller than normal leaf size, excessive twig die back, or discolored leaves.

Trees planted or growing in modified urban soils can benefit from added fertilizer when soil is moved during construction of the home. However, if the homeowner has a fertilization program for the turf, additional fertilizer is often not needed unless soil tests show the need.

When abnormal growth is observed, a soil test should be taken. Soil samples should be taken 6 to 8 inches below the ground surface. Several samples should be taken in random locations, then mixed together in a clean bucket. After the soil is mixed in the bucket, about one pint of soil is needed for testing. The results of the soil test will help develop the most effective fertilization program. If tree growth and vigor continue to be abnormal after fertilization, the tree should be inspected to determine if other problems exist.

Discolored leaves (pale green) for species such as pin oak, sweetgum and silver maple often is a sign of iron chlorosis as opposed to a nitrogen or other fertilizer element deficiency. For information on iron chlorosis, see the K-State Research and Extension publication: MF-718 *Iron Chlorosis in Trees*.

Fertilizer Content

Fertilizers available to homeowners are divided into two general groups: organic and inorganic. Some products are labeled as "slow release" fertilizers. Slow release fertilizers have a protective coating on the granules that slowly breaks down to release the elements. These fertilizers are often more expensive. However, they release nutrients over a longer time and have a lower burn potential than granular water soluble fertilizers.

The most common ingredients in fertilizer are nitrogen, phosphorus, and potassium, usually expressed as N-P-K on the product. Fertilizers differ in the amount of each nutrient they contain. The analysis or grade of the fertilizer is displayed on the product. For example, a fertilizer product with the three numbers 10-6-4 on the label has 10 percent nitrogen (N_2), 6 percent phosphorus (P_2O_5) and 4 percent potassium (K_2O). If the bag or package has a weight of 50 pounds, the actual weight of each element in the product is: nitrogen-5 pounds ($10\% \times 50$ lbs.), phosphorus-3 pounds ($6\% \times 50$ lbs.), and potassium-2 pounds ($4\% \times 50$ lbs.). Many fertilizers contain other elements in small quantities. Fertilizers containing sulfur can help lower soil pH and make iron and other micro-nutrients available. This can be a benefit if the soil tests show a soil pH above 7.0.

Some fertilizer products contain chemicals to control broadleaf weeds in the turf. The products, frequently called "weed and feed" fertilizers, contain

herbicides such as 2,4-D or dicamba. These chemicals should be used cautiously near trees, as they can cause damage if they contact the tree or roots.

Fertilizer Application

The best time to apply fertilizers is during the dormant season (usually November through April). The second-best time is during the spring and early summer months (May through June). In general, trees are not fertilized between July and the first hard freeze (October). If fertilizer is applied in late summer, it may stimulate new growth that may not be able to "harden off," resulting in winter injury. Newly planted trees are not routinely fertilized in their first growing season, but a very low-analysis starter solution can be used. After the growing season, fertilizer can be applied.

The application method of fertilizer can depend on the type of nutrient(s) needed. Nitrogen is mobile and can move through the soil into the root zone. Phosphorus and potassium are not as mobile in the soil. Potassium is seldom deficient in the soil, but phosphorus levels will vary. Soil test results will provide information on the levels of each element. If a fertilizer containing nitrogen is needed, it can be broadcast with a spreader, injected or distributed in drilled holes. Studies have shown that up to 3 pounds of nitrogen per 1,000 square feet will increase the growth of young trees. If turf exists where nitrogen fertilizer is broadcast

over the surface, split applications will be needed to avoid “burning” the turf. Most recommendations for turf do not exceed 1½ pounds of nitrogen in one application.

Granular fertilizers containing phosphorous and potassium can be broadcast over the top of the soil, then incorporated through core aeration. Phosphorous and potassium also can be applied through liquid injection or placing fertilizer in holes drilled into the soil.

The process described below would only be needed if soil nutrients are very low, with heavy clay soils or if the site is very compacted. Holes and injection sites should be spaced 2 feet apart and be 6 to 8 inches deep. The holes or injection sites can form a grid pattern under the tree, beginning 2 to 3 feet from the trunk and extending beyond the ends of the branches (see diagram). A soil auger, punch bar, soil probe, or large drill bit can be used to make the holes. A hole 1 to 2 inches in diameter is ideal. Calculate the amount of fertilizer needed (based on label) and apply equal amounts of fertilizer in each hole. The root systems of trees often grow well beyond the drip line. Therefore, holes placed past the drip line are recommended. If a root is struck during digging, remove the bit and dig to one side or the other.

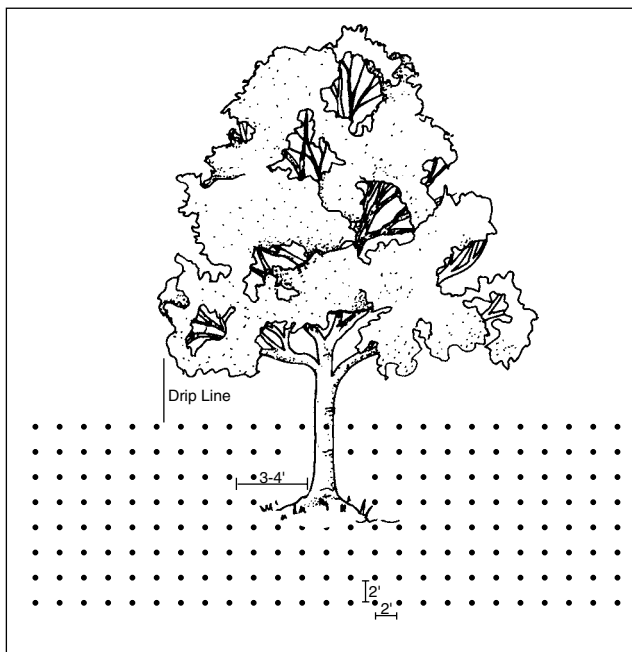
Soil injection of water soluble fertilizers is an excellent way to fertilize trees. This method reduces the growth stimulation of the surrounding turf by placing the fertilizer below most of the grass roots. Most “injectors”

attach to a garden hose and are easy to use. Their use does not require drilling holes as with dry fertilizers. Liquid “root feeders” are available from lawn and garden supply stores. Follow the manufacturer’s directions and application rates carefully.

Some fertilizers can be applied to trees through Mauget micro-injection. Micro-injections can be an effective way to apply several elements, including iron, if chlorosis is a problem. These products are available to commercial arborists and can be used where granular or liquid fertilizers cannot be applied to the soil.

Fertilizer spikes or stakes are a convenient method for fertilizing trees. However, the cost can be high when comparing the nutrient content in the spikes. If the spikes are used, follow all label instructions when calculating the amount of material to be applied.

Evergreen trees such as pine, redcedar, spruce and fir trees are rarely fertilized. These trees grow well in a wide variety of Kansas soils — unless they are too wet. Even in very poor sites, adapted pine varieties and redcedar usually do well without fertilizer. However, if evergreen trees are fertilized, the general recommendation is to use half of the recommended rate for deciduous shade and ornamental trees.



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