

# Arid Zone Times

An Arid Zone Trees Publication

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## Desert Tree Fertilization

The vast majority of the trees in the arid landscape palette evolved in and are well adapted to nutrient poor soils. The lack of rainfall and the limited availability of nutrients serve to moderate the growth of trees in the native Sonoran desert. When trees are planted in landscapes, water and fertilizer become effective tools for managing tree growth and overall health. Applying fertilizer formulations that contain nitrogen and phosphorous immediately following transplanting promotes rapid vegetative growth and contributes to new root development. Obviously fertilizers applied in the cooler months, when little if any tree growth occurs, have no immediate effect on establishment. For dormant trees, an application at bud break is recommended. Established, maturing trees present different challenges.

Once trees approach or reach the desired size, reducing or eliminating the application of nitrogen and limiting irrigation serves to slow growth to a rate approaching native desert conditions. Slower growth of maturing trees helps reduce the risk of wind throw, severe branch damage in summer wind storms and limits the amount of annual pruning required. As has been mentioned in previous articles, late summer and early fall applications of nitrogen can encourage late season vegetative growth that is more vulnerable to freeze injury in winter.

Many people think of fertilizers as plant food. A more accurate analogy would be to think of them as plant vitamins. Fertilizers are typically a combination of inorganic elements like nitrogen, phosphorous, iron or copper. Trees need these minerals to "manufacture" essential complex molecules like proteins, starches and structural tissues. Ideally fertilizers are applied to soils to supplement minerals that may be in short supply or that are present in a form that cannot be absorbed by the tree.

Fertilizers can be applied to stimulate rapid growth, promote root development, encourage flower and fruit development and help trees resist diseases and temperature extremes. Minerals used in large amounts by trees, like nitrogen, phosphorous, and calcium are called **MACRONUTRIENTS**. **MICRONUTRIENTS** are minerals needed in very small amounts and include copper, zinc, boron and manganese. While over application of certain macronutrients can stimulate excessive tree growth, high concentrations of micronutrients can be toxic or fatal to certain trees.

The most common fertilizer formulations are dry (granules or crystals), liquid and slow release. Dry fertilizers are easy to handle and apply and allow selective application to trees within the landscape. For best results **homogeneous** formulations of dry fertilizer are recommended. In these formulations each granule of product has the same nutrient concentration (eg. 20% N, 20% P and 20% K). **Blended** NPK fertilizers (e.g.. 20-20-20) are separate nitrogen, phosphorous and potassium granules mixed together. Liquid formulations can be applied directly to individual trees as a foliar spray, soil drench or through the irrigation system. Slow release fertilizers are specially formulated or coated to inhibit the solubility of the nutrients. These products come in small granular form (like Osmocote) applied to the surface of the soil or as large tablets buried in and around tree root balls. Nutrients are only released from these formulations when they are wet, making product placement and frequency of irrigation critical for effective use.

Most fertilizer formulations contain some combination of Nitrogen, Phosphorous and Potassium (N, P, and K, respectively). Formulations that contain all three are called complete fertilizers; those that contain only one are called simple. **NITROGEN** is by far the most heavily applied fertilizer in the landscape. Trees use large amounts of nitrogen to form protein, chlorophyll, enzymes and structural tissues. Of all the nutrients, nitrogen has the quickest and most profound effect on tree growth. Consequently, applications of large amounts of nitrogen fertilizer can result in excessive vegetative growth. Such growth may make trees more subject to wind throw or severe cold injury. **PHOSPHOROUS** is essential for the development of roots (particularly lateral and fibrous roots), flower and fruit formation and seed maturity. Only a small portion of the phosphorous in native soil is in a form that can be absorbed by trees. Even when soluble forms of phosphorous are added to soils they are quickly bound up like soil phosphorous, and are also largely unavailable. **POTASSIUM** or Potash as it is sometimes called, is involved in the formation of starch within trees and seeds and increases tree resistance to temperature extremes and diseases. In contrast with nitrogen and phosphorous, potassium is readily available in all but the sandiest of soils and is rarely required as a soil amendment in southwest landscapes.