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Fertilizing Trees and Shrubs: Some FAQ's

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Spring is an excellent time to fertilize trees and shrubs in the landscape. However, there are a number of questions that are frequently raised when it comes to fertilizing landscape plants.

Why should I fertilize my trees and shrubs?

The short answer is to keep trees and shrubs in your landscape healthy. Remember trees are continually removing mineral elements from the soil. In a native forest, elements are recycled as leaves drop down to the forest floor and decompose. In most landscapes we interrupt this process by raking and removing leaves in the fall. Without periodic fertilization, mineral elements, especially nitrogen, will become deficient.

Besides nitrogen, what other elements do trees and shrubs need?

Like all plants, trees and shrubs require 16 essential elements for growth: carbon, hydrogen, oxygen, phosphorus, potassium, nitrogen sulfur, calcium, iron, magnesium, manganese, boron, copper, zinc, molybdenum and chlorine. Carbon, hydrogen and oxygen come from air and water while the rest must be supplied from the soil. Those elements needed from the soil in the largest amounts are termed macronutrients (nitrogen, potassium, phosphorus, calcium, magnesium, and sulfur) while the remainder are needed in relatively small amounts (micronutrients).

Do I need to add all these elements?

Not usually. Most soils are able to supply the majority of nutrients needed for trees and shrubs. The biggest exception is nitrogen. Because nitrogen is taken up in the largest amounts and is also lost from the soil through leaching, periodic additions of nitrogen are needed for optimum tree growth. Also several elements (potassium, magnesium, calcium, manganese) are lost over time through leaching on sandy soils. Iron can also be limiting due to high soil pH. If you suspect a specific deficiency the rule to remember is “test don't guess”. Contact your local Extension office to get a soil sample analyzed.

When should I fertilize?

Spring is the best time to fertilize since this is the time when nutrients are in greatest demand for new growth. Trees and shrubs may also be fertilized in fall once they have set bud. As a rule of thumb, fall fertilization rates should be about half of the spring application. Many Extension publications promote fall as the best time to fertilize, however any nitrogen that is not taken up will be subject to leaching over the winter.

How much should I fertilize?

One to three pounds of nitrogen per 1,000 sq feet of root zone is adequate in most cases. A tree's root zone usually extends beyond the drip line of the crown. Most recommendations assume the root spread is about twice that of the crown.

So if the crown spread is about 10 feet from the trunk, the roots spread at least 20 feet. To find the total square feet covered by the roots, use the following formula.

$3.14 \times (\text{root radius}) \times (\text{root radius})$. In this example this would be:

$$3.14 \times 20 \times 20 = 1256 \text{ square feet}$$

So the tree should receive 1.25 to 3.75 lbs of nitrogen.

How do I convert from lbs of nitrogen to lbs of fertilizer?

Fertilizers are labeled with the grade or analysis, which gives the percent nitrogen, phosphorus (as P_2O_5) and potassium (as potash). So if a fertilizer grade is listed as 20-0-10 you would need to add 5 lbs to get 1 lb of N ($5 \text{ lbs} \times 20\%$) and you would also be adding 1/2 lb of potash. If you don't like calculating fractions and percents, the table below can give you some rules of thumb.

How should I fertilize?

The easiest and most effective method of supplying nutrients to the entire root system of the plant is broadcasting - spreading granular fertilizer evenly

over the entire root zone. Be sure to keep fertilizer away from driveways and other paved surfaces, as it can wash into storm drains and lower the water quality of our streams and lakes.

Digging or drilling holes throughout the root zone and partially filling them with fertilizer is not effective, as most of the feeder roots of a tree or shrub are in the upper layer of soil, and drilling puts fertilizer below the level of the feeder roots.

Can I fertilize newly planted trees and shrubs?

Yes. Many Extension publications and even the International Society of Arboriculture standards advise against it, and I don't understand why. The usual explanation for not fertilizing is that it will promote top growth over root growth. But ultimately the energy to promote new roots comes from the leaves so I don't follow this logic. The important thing here is to avoid potential fertilizer burn: fertilize at a low rate and never, ever, put fertilizer directly into the planting hole. Apply as a surface broadcast only.

Fertilizer	Analysis	Lbs of fertilizer needed for 1 lb of nitrogen
Ammonium nitrate	33-0-0	3.0
Ammonium sulfate	20-0-0	5.0
Urea	46-0-0	2.0
Ureaformaldehyde	38-0-0	2.5
Di-ammonium phosphate	18-46-0	5.5
Calcium nitrate	15-0-0	6.5
Potassium nitrate	13-0-44	7.5
10-10-10	10-10-10	10
Osmocote	18-6-12	5.5

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