Fertilizing Fruit Trees

To ensure healthy foliage, to promote vigor, and to maximize fruit quality, fertilize deciduous fruit trees each growing season, beginning with the second growing season after planting. Nitrogen can be applied in organic or synthetic chemical form. The most common forms of synthetic nitrogen fertilizer are ammonium sulfate, ammonium nitrate, and urea. Many nurseries also offer fruit tree fertilizers. Commercially available organic fertilizers are also available but may be expensive when used in the orchard. This publication focuses primarily on synthetic fertilizers. However, if you know the nitrogen content of an organic fertilizer, the principles are the same.

Here's a quick fertilizer review. All fertilizer containers have three numbers listed in the form of x-x-x, i.e. 10-10-10. These three numbers are known as the guaranteed analysis. The first number is the % nitrogen (N) by weight found in the container. The second number is phosphate (P) and the third is potash (or potassium) (K). Most gardeners simply memorize the sequence "N-P-K". There is 1 pound each of nitrogen, phosphate, and potash in a 10 lb container of 10-10-10 fertilizer. When fertilizing fruit trees, always apply amounts based on the nitrogen content expressed on the label.

The simplest method to calculate the appropriate application rate is to read the product label. The manufacturer often includes an application recommendation for fruit trees either based on tree diameter or age. Otherwise, you can calculate the fertilizer rate based on the guaranteed analysis and the University of Arizona's recommendations. I know this is scary to those with the dreaded affliction known as math anxiety. Don't worry, I will give you some "cookbook" recommendations.

First, here are the guaranteed analyses of the fertilizers listed above: ammonium sulfate (21-0-0), ammonium nitrate (34-0-0), and urea (46-0-0). For comparison, here are some average nitrogen percentages for organic materials: cottonseed meal (7% N), hoof and horn (12.5% N), sheep manure (0.55% N), rabbit manure (2.4 % N), blood meal (15% N), and alfalfa hay (2.5% N). Availability of nitrogen to plants in ammonium and urea fertilizers is somewhat dependent on soil temperatures. Soil bacteria must be active to convert urea into ammonium and ammonium into the plant available form: nitrate. When using organic nitrogen sources, availability is even more dependent on soil temperatures. Here, soil organisms must decompose the proteins into amino acids, amino acids into ammonium, and ammonium into nitrate.

The University of Arizona Cooperative Extension fertilizer recommendations are provide below. However, it is very important to remember that these recommendations are based on percent nitrogen (N%) and not a specific fertilizer product. For apples, peaches, nectarines, plums, cherries, and apricots, apply 0.1 pound of nitrogen per inch of trunk diameter (or years of age) up to a maximum of 1.0 pound of nitrogen per tree. For pears, apply 0.05 pound of nitrogen per inch of trunk diameter (or years of age) up to a maximum of 0.5 pound of nitrogen per tree.

1. First, lets run through the calculations step by step for a five-inch apple tree using ammonium sulfate (21-0-0) as a nitrogen source.
   Calculate the amount of nitrogen needed by the five-inch apple tree by multiplying the rate times the diameter (0.1 lb. N x 5" trunk = 0.5 lb. N).
2. Calculate a conversion ratio by dividing 100 by the N% in ammonium sulfate (100/21 = 4.8). This ratio is the reciprocal of the N%.
3. Multiply the first number (N/tree) times the second number (conversion ratio) to get the amount of ammonium sulfate per 5" tree (0.5 lb N/tree x 4.8 = 2.4 lbs. ammonium sulfate/5" tree).

You can use a kitchen scale to calibrate weight to volume. To do this, weigh an empty cup, then fill it with the fertilizer and weigh it again. The difference is the weight per cup. It's not rocket science but then again, I'm a plant nerd. If the calculations are giving you grief, then Table 1 shows a few cookbook fertilizer recommendations. You can over-fertilize, so if you are still in doubt simply purchase a fertilizer with recommendations on the container.

Fertilizer recommendations for apples, peaches, nectarines, plums, cherries, and apricots using commonly available fertilizers. Simply cut these numbers in half for pear trees.

Fertilizer	Amount Per Inch of Trunk Diameter	Maximum Application Per Tree
Ammonium Sulfate	0.5 lb.	5 lb.
Ammonium Nitrate	0.3 lb.	3 lb.
Urea	0.2 lb.	2 lb.
Blood Meal	0.7 lb.	7 lb.
Cottonseed Meal	1.4 lb.	14 lb.

Fertilizer applications should be made in spring (February or March). The fertilizer should be spread evenly on the soil surface in the irrigation basin under the tree and lightly raked into the soil. Following the fertilizer application, generously irrigate the tree. Proper pruning, fertilization, and irrigation is the solid foundation to build healthier and more vigorous fruit trees.

Additional Resources:

Backyard Fruit Production at Elevations 3500 to 6000 Feet, University of Arizona

June 29, 2024

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