FRUIT TREE FERTILIZATION GENERAL GUIDELINES

FACT SHEET

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Effective management practices for productive orchards include a thorough knowledge of the crop and periodic evaluations involving both foliar and soil analysis.

Because of the vast root system of a fruit tree, it is difficult to obtain a representative sample of the area where the root system is absorbing its nutrients. As a result, there is usually poor correlation between a soil test and leaf analysis for a given nutrient. This should not, however, rule out the use of soil testing as a basic tool in determining fertilizer needs. Soil fertility levels are more easily adjusted prior to new plantings. A complete nutritional picture for fruit crops though, can be obtained by using soil analysis in conjunction with foliar analysis. Leaf analysis is the best way to diagnose and confirm nutrient imbalances and/or deficiencies.

SOIL pH

The optimum pH range for most tree fruits is between 6.0 and 6.5. Soil pH levels as low as 5.5 may be tolerated. Soil pH is difficult to adjust because lime moves very slowly in the soil. It is advisable that the soil pH be adjusted to an optimum level prior to a new planting and maintained at that level with a lime application every three or four years.

NITROGEN

Nitrogen is the most important nutrient in fruit production. Rates should be based on yield, color, quality, management, soil nutrient balance, variety, age of planting, pruning, etc.

Nitrogen can generally be considered at an optimum level when the foliage is a moderate to dark green color, yield is good, and fruit color is satisfactory. Rates should be adjusted on the basis of terminal growth, fruiting characteristics of the previous season, and results of a foliar analysis.

Annual terminal growth is an indicator of whether an apple or peach tree is receiving the correct amount of nitrogen. Satisfactory nutritional conditions exist when annual terminal growth is 8 to 12 inches for mature, bearing apple trees, and 12 to 18 inches for peaches and nectarines. The nitrogen application should be reduced or eliminated the following year if growth exceeds these levels.

Apply nitrogen in late fall or early spring. Summer and early fall applications may result in poor fruit color and winter injury. Although many factors need to be considered, a general guideline for nitrogen application on young fruit plantings is 0.1 pound of actual N per tree per year of age. For mature fruit plantings, depending upon grower evaluation, vegetative growth, and fruit color, apply 50 to 75 pounds of N per acre for apples and pears, and 75 to 100 pounds of N per acre for cherries, plums, and peaches.

PHOSPHORUS

Fruit trees need little phosphorus and are unlikely to respond to additional amounts. Phosphorus, however may be needed if sod or some other cover crop is being maintained. The need for phosphorus in fruit trees can best be determined by plant analysis. Apply 0.1 pound P_2O_5 per tree per year, or 80 to 100 pounds per acre, if a need is indicated.

POTASSIUM

Potassium is frequently required. Stone fruits are generally more susceptible to potassium deficiencies than apples or pears. The need for potassium in fruit trees is best determined by plant analysis. A medium application rate for potassium is 0.1 pound K_2O per tree per year of age, or 80 to 100 pounds per acre.

MAGNESIUM

Magnesium deficiencies have sometimes been observed. Sandy soils with a low pH are most susceptible to magnesium deficiency. Magnesium deficiencies can be corrected with applications of 2 to 3 tons of dolomitic lime, or 40 to 50 pounds of magnesium as magnesium sulfate. If deficiencies are acute, magnesium may be applied in the first two cover sprays at the rate of 20 pounds of magnesium sulfate (4 pounds of elemental magnesium) per 100 gallons of water.

CALCIUM

Calcium deficiencies are most likely to occur on low pH, sandy soils. Low levels of calcium in apples often relate to certain physiological diseases such as bitter pit cork spot. Maintain the soil pH at an optimum level to help avoid calcium deficiencies. Calcium may be applied in cover sprays using 2 to 3 pounds per acre of calcium chloride (approximately 1 pound of elemental calcium) in 100 gallons of water. Make 4 applications at 2 week intervals with the last spray 2 to 3 weeks before harvest.

BORON

Of all the tree fruit crops, apples are most sensitive to boron deficiency. Sandy, low organic matter, and/or alkaline soils are most susceptible to boron deficiency. A foliar application using Solubor at 1 pound (0.2 pounds of elemental boron) per 100 gallons of water in the first two cover sprays is the preferred method for correcting boron deficiencies. Soil applications are also effective, but much slower.

MANGANESE

Manganese deficiency is usually associated with very wet, high pH soils. Deficiencies may be corrected with foliar applications of manganese sulfate at the rate of 4 pounds (approximately 1.5 pounds of elemental manganese) in 100 gallons of water in the first two cover sprays. Manganese chelate applied at the manufacture's recommended rate is also acceptable. On very low pH soils, manganese toxicity may occur. This can be avoided by maintaining optimum pH levels.

ZINC

Zinc deficiencies are normally corrected with an application of dormant spray. Applications of 1 to 2 pounds of zinc sulfate (approximately 0.5 pounds of elemental zinc) in 100 gallons of water may be used. Zinc chelate applied at the manufacture's recommended rate is also acceptable. The application should be made as late as possible but prior to opening of leaf buds.

FERTILIZING NEW PLANTINGS

Fertilizer and lime requirements should be based on soil tests prior to planting. Fertilizers and/or fertilizer solutions in the tree hole at planting time may be of little benefit if soil analyses are at optimum levels. High nitrogen levels should be avoided at planting as excessive top growth and incomplete tree hardening may result.

SAMPLING FOR FOLIAR ANALYSIS

Two types of foliage sampling may be of value in your fertility program:

Diagnostic: First there is the problem block in which some production problem has appeared. In this situation the problem area should be sampled and also where possible, an adjoining area not having the problem should be sampled for comparison.

Monitoring: The second type of sampling is that in which you desire to have periodic appraisals of the nutritional status of the tree. This type of sampling is quite desirable from a standpoint of maximum returns from your fertilizer dollar and the maintenance of optimum tree growth. Fruit tree monitoring involves testing both the leaves and fruitlets at various growth stages.

Care should be taken to follow the precise directions for sampling. Standardization of sampling is necessary in order that the results may be compared with standards determined from samples collected in the same way. In this way the results will be most meaningful to you.

1) Each sample should be from only one cultivar (variety), one rootstock, and from one block, using trees of the same age. Do not sample trees less than four years old unless a severe problem is anticipated.
2) The block should be covered as completely as practical, sampling representative trees in all parts of the block or area that the sample is intended to represent.
3) A sample should consist of about 100 leaves. Dividing 100 by the number of trees available for sampling will give the number of leaves to be obtained from each tree. Thus if 25 trees are sampled, then 4 leaves per tree will be required
4) Leaves for sampling should be selected from the outside periphery of the tree, from 4 to 8 feet in height and about equidistant around the tree. Leaves should be disease-free, undamaged leaves that include the entire petiole.
5) Leaves should be taken from terminal shoot growth which is of about average length for the tree. *The leaves should be taken from mid-portion of the current season's growth.* Leaves are easily removed with a slight jerk backwards toward the base of the shoot.

Additional information on fruit tree monitoring is available from a variety of sources, such as county extension services and universities. Other publications on foliar sampling and fertility monitoring are available from our laboratory.