

Leaf Analysis of Nutrient Disorders in Tree Fruits and Small Fruits

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Leaf analysis has been widely used as a diagnostic tool for many years, for two purposes:

- To determine the element associated with a nutrient disorder and to prescribe a corrective measure
- To estimate fertilizer needs before nutrient disorders occur

Leaf analysis also may help you avoid excessive use of fertilizer.

It has been shown that growers can use leaf-element content as an index to the plant's nutritional status, which is related to growth and fruit production. Leaf-nutrient levels (shortage, below-normal, normal, above-normal, and excess) have been established through fertilizer experiments.

However, these levels may vary throughout the season, from leaf to leaf on the plant, and from plant to plant in one area. Thus, standards developed in these experiments are valid only for leaves collected during the proper period, from the proper part of the plant, and handled in a standard fashion. *It's important to follow sampling procedures carefully, so that your leaf sample will be considered valid.*

Sample kits

Leaf sample kits are available from your county office of the OSU Extension Service or from the OSU Central Analytical Laboratory (541-737-2187).

What to sample

Sample leaves of apples, pears, sweet and sour cherries, peaches, prunes, filberts, walnuts, holly, blackberries, raspberries, blueberries, boysenberries, grapes, and cranberries.



Figure 1.—On a walnut tree, take one midleaflet from a leaf in the middle of a fruiting terminal.



Figure 2.—Select about 50 leaves for a test sample. For reliable test results, follow leaf-selection instructions precisely.

When to sample

Collect leaf samples (except holly) during August in all areas except Umatilla County, where July 15 to August 15 is best. Sample holly in November or December. The sooner the Central Analytical Laboratory gets your samples, the sooner you'll receive results.

Selecting plants

A single sample should represent an area no larger than 5 acres. Two samples from each uniform 5-acre area will reduce the chance of misrepresentation.

In diagnosing a trouble spot, take at least two composite samples, one from five affected plants and one from five unaffected plants. Four samples (two each from affected and unaffected plants) are preferred.

If you don't have a trouble spot, take the first sample from five plants of average vigor spaced evenly throughout an area of less than 5 acres. Cross the area in another direction for your second sample.

Include only one variety or strain in a sample and, if possible, only one rootstock type.

Mark or map each plant you sample so you can resample it in the future.

Selecting leaves

From all crops except walnuts, choose leaves from the middle of the current season's terminal shoots of about average vigor.

With walnuts, take one midleaflet from a leaf in the middle of a fruiting terminal (Figure 1). If five leaflets are present, select the leaflet immediately back of the terminal leaflet. If seven are present, select one from the second pair of leaflets back of the terminal leaflet.



Unless leaves are unusually small, 50 leaves are enough for a sample (Figure 2). Collect 10 leaves per plant from shoots you randomly select from all sides of the plant. Select only one leaf from a shoot. Collect leaves that are free of any disease or other damage. Except in the case of grapes, leave the petiole (leaf stem) attached to the leaf. For grapes, submit the petiole only.

Take spur leaves only if no other leaves are available. (If you do take spur leaves, note this on the sample kit's information sheet.)

Preparing samples

If your samples are contaminated with soil, spray, or other visible residues, wash them in a detergent solution and rinse with soft water. Nearly all detergents are satisfactory for this

procedure. *Wash quickly (1 minute or less) while leaves still are fresh, to avoid loss of nutrient elements.*

Remove excess moisture by blotting with a paper towel. Then allow the leaves to air-dry. Don't place them in a damp location where they could mold or otherwise spoil. Fresh samples submitted in good condition will be washed at the OSU Central Analytical Laboratory.

Shipping samples

Fill out the sample kit's information sheet completely—all of this information may be useful in making an accurate diagnosis. Put the sheet, along with the dried leaves, into the paper bag furnished in the kit. No other container is necessary unless you're submitting a large number of samples.

If you're submitting more than one sample, please code each sample with a number (and keep a copy of the numbers you assigned).

Seal the bag(s) securely and mail to:

Central Analytical Laboratory
Department of Crop and Soil
Science
Oregon State University
Corvallis, OR 97331-2911

Analyzing samples

The laboratory analyzes samples for nitrogen, phosphorus, potassium, sulfur, calcium, magnesium, boron, iron, manganese, zinc, and copper.

The laboratory sends its computer-produced reports to you and your county Extension agent, who then can discuss the results with you upon your request.

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