

July -- Time For Leaf Analysis

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Leaf analysis is best taken in July when nutrient levels in leaf tissue are stabilized. Critical values to help guide you in your fertilization practice have been established for walnut by U.C. researchers. Analysis can reveal specific nutrient deficiencies or can alert you to potential problems that might be developing. Having a baseline of nutrient levels in your orchard also provides a useful standard that allows you to compare to future trends. In addition, by keeping the trees in the optimum zone for nitrogen, leaf analysis can save on fertilizer costs by helping to avoid over fertilization.

Concentrations of nitrogen, phosphorus, and zinc on a leaf dry-weight basis start very high early in the season and decline rapidly to a fairly steady state after mid-June, levels plateau and then drop off again from September to leaf fall. Potassium starts high in the spring then decreases reaching a plateau about the same time as nitrogen, phosphorus and zinc. Concentrations of magnesium, manganese, boron and chloride remain fairly constant or increase slightly during the season. Boron, chloride, and sodium however, will increase steadily if excess amounts are present in the soil or water. Calcium is the one element that always starts low and increases steadily over the season as the leaves age.

To represent the nutrient status of a large uniform orchard collect representative leaflets from many trees in a survey pattern across the orchard. Collect about 50 terminal leaflets picked at random from spurs about 6 to 8 feet from the ground and place in a paper bag. Leaflets selected for analysis should be free of obvious tip burn, insect or disease injury, mechanical damage, etc., and should be from normal, healthy trees. If you have a weak area and you'd like to diagnose the problem, sample that area and compare the results with those of a sample from your best area to see if tree nutrition might be involved.

Critical Nutrient Levels for Walnut

	Deficient	
	<u>Below</u>	<u>Optimum</u>
Nitrogen (N)	2.3%	2.3 – 2.7 %
Potassium (K)	0.9%	adequate over 1.2 %
Zinc (Zn)	18 ppm	-----
Manganese (Mn)	-----	adequate over 20 ppm
Boron (B)	20 ppm	36-200 ppm

Not all elements need to be run each time you have an analysis done. If you already have a complete baseline analysis I'd spend money checking only those elements where you suspect a possible deficiency or are interested in the leaf levels for a specific element. Using the shotgun approach where all elements are routinely checked every year is unnecessary. For more information on sampling procedures and critical values, the publication "Guide to Efficient

Nitrogen Fertilizer Use in Walnut Orchards” is available from your local UCCE office as is a list of labs performing leaf analysis.

Deficiencies that are most common in this area are nitrogen, potassium, and zinc. Zinc deficiency, most common in sandy soils and old barnyard locations, is easily identified in the field from leaf symptoms early in the season. In addition, Zinc leaf levels may not be meaningful due to surface contamination from zinc containing sprays that can't be washed off. Boron deficiency is sometimes deficient near the foothills. Manganese deficiency is sometimes seen where soils are kept too wet or in areas with high water tables. Useful critical values are not established for iron or sulfur levels in walnut leaf tissue.

Remember, leaf analysis is only a helpful guide in orchard management. Leaf levels should be considered along with orchard appearance and growth before corrective action is taken. Visual observation is an excellent complement to any lab analysis. Make sure that a deficient element is really the problem before you seek fertilizer applications as a solution.