

## **Time for leaf analysis**

Leaf analysis can be done from late June through mid August when nutrient levels in leaf tissue are stabilized. Critical values to help guide you in your fertilization practice have been established for almond 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.

To represent the nutrient status of a large uniform orchard collect representative leaves from many trees in a survey pattern across the orchard. Collect about 100 leaves picked at random from non-fruiting spurs about 5 to 7 feet from the ground and place in a paper bag. Leaves 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 Leaf Nutrient Levels for Almond**

	Deficient	
	<u>Below</u>	<u>Optimum</u>
Nitrogen (N)	2.0%	2.2 – 2.5 %
Potassium (K)	1.0%	adequate over 1.4 %
Zinc (Zn)	15 ppm	-----
Manganese (Mn)	-----	adequate over 20 ppm
Boron (B)	30 ppm	30-65 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 nutrient deficiencies and toxicities, sampling procedures,

and critical values, see Chapter 26 in the Almond Production Manual, Publication 3364.

Deficiencies that are most common in this area are nitrogen, potassium, and zinc. Potassium deficiency symptoms can be seen on leaves in the middle of new shoots in the tree tops. The Butte variety is especially susceptible. 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 analysis 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 almond leaf tissue.

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 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. Sampling young leaves or sampling early in the season will result in low calcium levels in the analysis but this doesn't mean that calcium is deficient.

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.