



# Kick-Off the Fall Season with Fertilization Management / Fall 2005

## Balanced Soil Fertility Management for Tree and Vineyard Crops



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**F**or successful tree and vine production, vigorous and high-yielding plants are essential. Shortages and imbalances in the nutrient supply can lead to many problems for perennial crops, including reduced yields, quality, and overall profitability. In addition to overall soil fertility, the physical, chemical, and biological properties of the soil may vary widely across a field. Fall is an excellent time to take a closer look at maintaining the soil in top condition to sustain many seasons of excellent crop growth and to correct those problem areas that drag down your overall yield.

### Crop Removal Can Lead to Soil Depletion

Fields become gradually depleted of certain nutrients through continuous harvest and removal of fruit and nuts (**Table 1**). Without periodic deposits into the soil "bank", these essential elements will eventually run short and depress plant growth. It is common to primarily focus on maintaining an adequate supply of nitrogen (N), since this deficiency is easily observed. However, for most tree and vine crops, the amount of potassium (K) removed in crops is actually much greater than N removal and creeping K deficiencies may be more subtle and difficult to visually identify (**Figure 1**). For many perennial crops, the impact of nutrient deficiencies may not show up until yields are depressed the following season...when it is too late to completely correct it!

### Providing Balanced Nutrients

There are very few ideal soils that contain all essential plant nutrients in the exact ratio required to support all types of plants. Many soils can provide the majority of the essential nutrients, but virtually all soils need some adjustment so that plants meet their growth and yield potential. Periodic soil testing is useful in tracking long-term fertility trends of relatively immobile nutrients such as phosphorus (P) and K, as well as assessing potential pH and salinity limitations. A regular tissue testing program also provides valuable feedback on plant health.

Supplying the proper nutritional balance promotes the efficient use of all the applied fertilizers. When one nutrient is limiting plant growth and development, then the other nutrients cannot be effectively utilized. For example, if P or K is limiting plant growth, added N may stimulate vegetative growth at the expense of fruit development, or the added N may remain unused in the soil where it can be leached

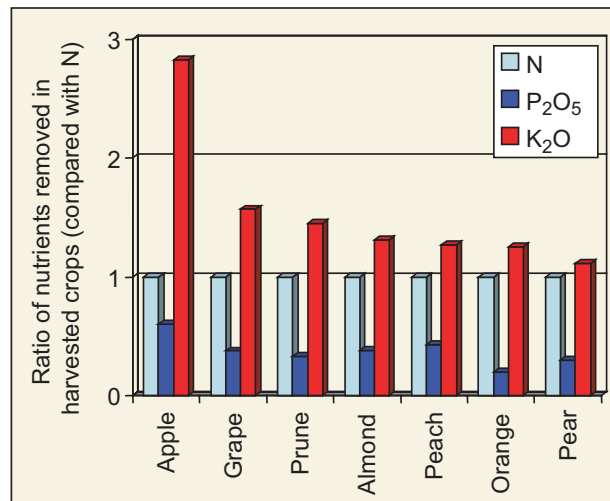
**Table 1. Nutrient removal from the harvested portion of various fruit and nut crops.**

	Nutrient removed in harvested crop, lb/ton		
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Almonds	130	50	170
Apples	6	3.6	17
Grapes	8.3	3	13
Oranges	8.8	1.8	11
Peaches	6.3	2.7	8
Pears	5.7	1.7	6.3
Plums	6	2	8.7

from the rootzone (posing a potential environmental concern). Either way, the applied N fertilizer would not be used by the plant to improve yield, quality, or profitability.

### Timing Nutrient Application

**Fall is an excellent time to supply many of the nutrients that will be needed for growth during the following season.** Fall-applied nutrients will continue to be absorbed by trees and vines as long as roots are active (soil temperature above 45° F). Post-harvest nutrient additions will be taken up into the root system or translocated to the top where they are stored for the next season's growth.



**Figure 1. Primary nutrients removed in harvested portion of selected fruit and nut crops—ratio relative to N.**



**Early spring is the most critical period for K availability for many tree crops, because this is the period of rapid vegetative growth and fruit development.** It makes sense to apply K in advance of this critical period so that it will be available to the plant when it is most needed. Applications made after this

critical time can help avoid future deficiencies, but will never fully overcome lost production that results from shortages during this early period of fruit and leaf development.

**Temporary nutrient deficiencies are also becoming more frequently observed.** These arise from extreme demand placed on the nutrient supply from rapidly developing fruit while the nutrient extraction comes from an increasingly small rooting volume (under drip or micro-sprinkler systems)—making it difficult for trees and vines to obtain sufficient nutrients. This shortfall during the growing season causes nutrients to be transported from the surrounding leaves to meet the demands of the fruit. Of course, when leaves are nutrient-starved, the entire plant and fruit yield suffers, too. Providing an adequate nutrient supply in advance of these peak demand periods can help reduce later mid-season stresses.



*Early spring is a critical time for K availability in tree crops such as almonds. Applying the nutrient in advance makes sense so it will be available when needed.*

**Nutrient applications can be made to perennial crops throughout the year, but regular maintenance of proper nutrition is essential for keeping high yielding plants in top health.** Once the fruit is picked, attention should be given to getting plants in top shape for the next season before winter rolls around. Consider all the nutrients that should be added during the post-harvest period that will be stored and used by the plant the following spring. ■

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