

# Potassium Deficiency

Roger Duncan, Pomology Farm Advisor, UC Cooperative Extension, Stanislaus County

I have seen several almond orchards this spring exhibiting signs of potassium deficiency, especially in the shallow soils of the Sierra foothills. I am sure this has been exasperated by the very heavy set in most of these orchards. Symptoms of potassium deficiency normally begin in the tops of trees but can be distributed throughout the tree when deficiencies are more severe. Symptoms include leaves that are often pale and smaller than normal. Leaf tips and edges burn and often roll upward like a canoe or “Viking’s prow”.

Many growers are cutting back these days due to the small profit margin in almond production. However, potassium is an important nutrient and should not be neglected. Producing an almond crop requires approximately the same amount of potassium as nitrogen. A good guide to follow is approximately 10 pounds of potassium for every 100 pounds of nutmeats produced. That means a 2000-pound per acre crop will need approximately 200 pounds of potassium. However, unlike nitrogen, potassium is released slowly from soil particles and is not readily leached. Many soils in Stanislaus County naturally have adequate amounts of potassium and we rarely see potassium deficiencies in even unfertilized blocks, especially in virgin soil.

From our research trial located in Salida, we have learned potassium deficiency does not decrease fruit set and does not result in smaller nuts except under extremely deficient conditions. Yield loss results from the death of fruiting spurs, a lack of spur renewal and overall reduced growth of the tree. Therefore potassium deficiency results in long-term losses that may not show up the first year you see leaf symptoms. Along the same lines, recovery from potassium deficiency is also a long-term process as it takes time to renew fruiting spurs. Keep in mind, once you see leaf symptoms, trees are already deficient and you are already setting yourself up for yield losses.

The bottom line is that growers need to monitor potassium (and other nutrient) levels with leaf analyses to prevent deficiencies from occurring. Current UC recommendations are to keep potassium levels at least 1.4% in July sampled leaves. Some folks in the almond industry suggest potassium levels should be 2% or higher, although there is no scientific evidence to support this, including our trial in Salida.

Potassium deficiency can be corrected fairly easily in light-textured soils. However, massive doses are often necessary in heavy clay soils. Dry formulations of sulfate of potash or potassium chloride should be applied in concentrated bands to prevent the potassium from being tied up to soil colloids. In clay soils, growers may consider applying double-concentrated bands every other row. Fertilize the skipped rows with double-concentrated bands in future years. Potassium chloride is best applied in the fall when winter rains can leach chloride out of the root zone. Potassium chloride should not be used in areas with water table problems or other soil conditions that prevent chloride leaching.

Foliar potassium sprays can alleviate symptoms more quickly, but these are relatively expensive and effects are short lived. Liquid potassium fertilizers may correct deficiencies more quickly than dry formulations, but these are also more costly. In the long-term, it is cheaper to monitor potassium levels and fertilize when and only when necessary.