



University of California Cooperative Extension  
***PISTACHIO NOTES***

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**Outlook Bright for Pistachio Production in 2007**

So far so good on chilling hours for pistachio in Kern County in 2007. According to the Fruits and Nuts website ([www.fruitandnuts.ucdavis.edu](http://www.fruitandnuts.ucdavis.edu)) the following hours below 45 degrees F. have been accumulated at various locations in Kern County from November 1, 2006 to February 26, 2007: Arvin, 960; Belridge, 959; Blackwell's Corner, 972; Famoso, 1128; Shafter, 1173. If hours greater than 32 and less than 45 degrees F. are calculated the totals for the same period are as follows: Arvin, 789; Belridge, 760; Blackwell's Corner, 751, Famoso, 872; and Shafter, 747. The large difference in values between the two methods of calculating chilling hours reflects how much freezing weather the trees experienced this winter. No matter which method is used to estimate how much chilling or 'rest' the trees experienced, these accumulations of chilling are high enough that trees that are in their 'on' year in the alternate bearing cycle should be ready to produce bumper yields. Further good news for Kern County growers is that most orchards will be in the on year at harvest in the fall of 2007. Another plus for growers in western Kern County is that the area is near perfect for producing pistachios. Rainfall in the spring and summer is scant, greatly reducing disease problems and pistachios thrive in the deep, calcareous and boric soils. Of course, growers should never become complacent. Spring and summer weather patterns, insects, disease, overseas producers and markets, irrigation water availability, and who-knows-what-else can always interfere with the most optimistic outlook, so purchases of expensive luxury goods should probably be deferred until profits are safely in the bank.

**Spring Pistachio Fertilization**

The pistachio industry would benefit from more research work aimed at determining the fertilization requirement of pistachios. In Kern County, on our boric and calcareous soils, micronutrients like zinc and copper can become deficient. Foliar sprays applied when the leaf canopy is expanding post-bloom in April and early May can help prevent deficiencies from occurring. In some areas of Kern County, especially on the east side of the San Joaquin Valley, trees will require fertilization with boron, which can be broadcast, applied through the irrigation system, or sprayed foliarly, depending upon the fertilizer. Nitrogen, phosphorous, and potassium are all required by pistachio in fairly large quantities. For heavy-bearing orchards, 150-200 lbs of nitrogen, 50-100 lbs of phosphorous, 75-150 lbs of potassium per acre will probably help maintain yields. Leaf nutrient analysis taken in late July or August, can help determine the nutrient status of the orchard.

Although boron is required by pistachio trees in relatively large quantities, the trees can get too much of a good thing in western Kern County. Often soil analysis shows low or only moderate levels of available boron in soil tests while boron leaf tissue samples can be 900 + parts per million and show extensive burning of tissue on the leaf edges. In these areas, even though very little boron is readily available because of high-soil pH, total boron in the soil can be very high. The addition of acid-forming fertilizers can make this normally unavailable boron in the soil very available to the plant. If this boron is not leached from the profile, the tree can absorb more boron than it needs. Growers using regulated, deficit irrigation usually do not apply enough water to accomplish much leaching. Luckily, pistachio can tolerate high pH. Generally, if boron levels are too high, and the trees are experiencing early defoliation, growers should consider using fertilizers that do not acidify the soil and should not use soil-acidifying materials to lower pH. As pH becomes much higher than 9, or if salt levels are high, other issues related to tree nutrition will come into play, and expert help in maintaining tree nutrition will probably be required.

Generally, pistachio trees do not require frequent applications of foliar fertilizers. Pistachio has an extensive root system. Unlike almonds, pistachios do not blow over in high winds. With the exception of some micronutrients that get tied up in calcareous soils or potassium that is fixed in unavailable forms in some soils, most nutrients can be applied to pistachio through the irrigation system. A temptation exists to cure every problem with a foliar fertilizer or growth regulator. Many common problems associated with tree growth and yields are not related to tree nutrition but to irrigation application or water infiltration. In many cases, some of the money spent on multiple foliar fertilizer

applications would be much better spent on applications of gypsum to improve water infiltration or on monitoring devices to improve irrigation scheduling.

### **The Freeze of 2007**

Generally, the fall of 2007 was a good one for promoting tree dormancy. If trees are dormant, unless temperatures get below about 10 degrees F, established pistachios do not suffer much freeze damage. In some areas of Kern County, cold air puddles in old lake beds or other low areas. In late October, November and even into December, sudden cold snaps with temperature lows only slightly below freezing can damage vigorously growing young pistachio trees. Trees aged 1 – 5 years appear to be especially at risk. Growers soon learn if their fields are in these colder areas. To encourage earlier tree dormancy in areas where early frosts can be a problem, irrigation can be shut off earlier in the year, and trees can be sprayed in the fall with high rates of zinc sulfate to defoliate the tree. In deep soils, water may be turned off as early as the first part of August, knowing that the soil will hold enough water to carry the trees into the fall. Shutting down the water and knocking the leaves off the tree will probably reduce potential growth, but this trade-off is cheap compared to the cost of replacing a large number of trees. Rootstocks with pure *P. integerrima* heritage appear to be more vigorous later in the season, and more prone to frost damage, than those with some *P. atlantica*, *P. lentisca* or *P. terebinthus* heritage.

As was the case in the 1998-99 freeze, large numbers of rootstock trees were being planted in Kern County when the 2007 freeze hit. Trees fresh from the nursery sometimes are tenderer than trees that have hardened off in a planted field. As a result, and as was the case in 1998/99, tree mortality will be high in some of these newly planted orchards. November, December, January and early February plantings all carry an increased risk of freeze damage. Planting in these months could be just as risky in the near future. We could get another freeze similar to this one in any year. There is no guarantee that freezes will be spaced 8 years apart, as they have been in recent history.

Not much work has been done on how to rehabilitate frozen rootstocks. New sprouts may form on the trunk or even below ground. Growers should have time to evaluate trees between when the rootstocks will begin to push leaves (usually in late February) to when they hope budding will occur. Often the extent of frost damage will not be obvious until temperatures rise and stress is placed on the trees' water or carbohydrate conducting systems. Don't allow the tree to grow around frost killed tissue. Remove all frozen, dead tissue by pruning into green wood. Frost-killed tissue is an excellent home to fungi, like some *Fusarium* species, that can slowly grow into living wood eventually killing the tree.

### **Pistachio Acreage to Increase**

Just based on rootstocks that have already been sold, the San Joaquin Valley may be in for a 20,000 acre increase in pistachios this year. No wonder some people started planting in December.

### **Field Budding or Planting Nursery-Budded Pistachio Trees**

Most pistachio orchards in the Central Valley of California initially are planted with rootstocks which are later grafted in the field with buds from female and male varieties. This practice of budding trees in the field contrasts with most other perennial fruit and nut crops, where orchards are planted with baby trees that were previously budded in a nursery. While few scientific comparisons were made on the relative performance of pistachio trees budded in the field versus trees budded in nurseries, observations made by growers seemed to point to better success with budding trees in the field. Some new observations related to the growth of nursery-budded trees and other developments in the pistachio industry suggest that planting nursery-budded trees may have some advantages.

Typically, rootstocks grown for one year in the nursery are planted as dormant, potted rootstocks in late January or early February. Rootstocks are sometimes planted in the fall, or in early spring. As long as the trunks of rootstocks are of sufficient size, field budding usually takes place in mid-July or early August. Commercial budding services are available that guarantee that 95% or more of the buds will survive and grow. Trees with buds that fail to grow are typically rebudded in September. Recently, some growers are using dormant buds to produce trees. Dormant buds are collected in late January or early February when the trees are still dormant, refrigerated, and budded to rootstocks of sufficient size in late May or early June.

So why has the pistachio industry gone with field budding trees instead of using nursery-budded trees? One reason frequently given for using field-budded trees is that they appear to grow faster than nursery-grown trees. At least one large nursery, that sells both rootstocks and nursery-budded trees, has come to the conclusion that success

with nursery-grown trees can be at least as good as that for field-budded trees by paying close attention to the time of planting. They suggest that nursery-budded trees should be planted in September, October, February or March. Nursery-budded trees should not be planted during the first leaf flush which typically occurs in April through May. Trees planted during the first leaf flush appear to go into a transplant shock like most other plants, but unlike most other plants, will not flush again for the remainder of the year. Even growers that do not intend to establish orchards using nursery-budded trees, should be aware of time of planting if they intend to use nursery-budded trees as replants in existing orchards.

Once the costs of field budding and early pruning are included, the cost of nursery-budded trees is comparable to that of field budded trees. One risk of field budding trees is that sometimes weather conditions, or the condition of the rootstock or buds, are not conducive to a good bud take. If only 60 to 70% of the trees are successfully budded in the field, the trees in the orchard will get off to a non-uniform start which can complicate irrigation, tree training and other cultural activities. Thus some of the risk of establishing an orchard is removed by buying nursery-budded trees, since the trees are purchased with viable scion growth. It is imperative that growers get water to nursery-budded trees more quickly and in greater volume both before planting and after, than might be necessary for a younger rootstock, since the nursery-budded tree is a larger tree at planting.

Another developing issue is the availability of new varieties of pistachios. In the past almost the entire California pistachio acreage was composed of the female variety, 'Kerman' and the male variety 'Peters'. Budders seeking buds for use on new acreage, simply had to find a young pistachio planting and remove female and male buds from trees and be almost 100% certain that they had Kerman and Peters buds for transfer to rootstocks in a new planting. Now however, several new pistachio varieties like 'Golden Hills' and 'Lost Hills' are beginning to be planted, as are some older varieties like the V2-selection of Kaleghouchi. Fortunately, the pistachio industry has many highly reputable commercial field-budding companies from which to choose. As time passes, it will become increasingly important that growers continue to hire responsible people to do their field budding so that they can be sure that the variety that they ordered is the variety that they obtain. Reputable nurseries, by their nature have a considerable investment in location, facilities, and reputation. Varietal mix ups are rare, but if they occur an established nursery is likely to make good on any problem that might occur in its nursery-budded trees. When anything goes wrong with a nursery-budded tree a single source exists for lodging a complaint, instead of two companies for a field budded tree – the commercial budding company and the company that grew the rootstock.

As the pistachio industry in California develops, new options of planting and growing trees have emerged. A new, potential pistachio grower should evaluate these options with advice from experts, including those who will provide trees and services, to determine which options are most likely to help them establish a successful orchard.

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