



January 2014 Task List for Pistachios
By Bob Beede, UCCE Farm Advisor, Emeritus

Chilling and Cold Weather Update: December 5-12 got pretty cold in the San Joaquin Valley. Chris Wylie, Agri-World Ranch Manager, said it reached 19-20⁰F around Highway 145. Goyo Jacobo, West Hills Farm Management, recorded 18⁰F in Coalinga, and Ron and Carl Fanucchi reported temperatures as low as 13⁰F in Buttonwillow. So, what does this mean for pistachio trees? Thus far, comments from the field indicate that most of the trees are symptom-free of cold damage, but it is on the early side to make any firm declarations. There have been scattered reports of first year trees with blackened tips, and shriveled green bark. These orchards were supposedly irrigated well past the recommended cutoff date of early to mid-September, depending upon soil water holding capacity. I have heard of one young orchard receiving water through October. The danger of doing that may soon become evident! When surveying your trees for cold damage, look first at the most tender growth near the shoot tip. Freeze injury to green tissue is obvious, given the fact that it turns a dark green and wilts. Cold damage to slightly older tissue shows black spotting on the bark, and brown discoloration beneath the surface when scraped with a knife or fingernail. Young branches with developed bark tissue take two or more weeks to show damage. Look for wrinkles developing in the bark the length of the shoot, and poke your fingernail into the bark to test it for dryness. Cutting into the bark also allows for dryness assessment, as well as examination of the color of the tissue beneath it (phloem). The phloem should be moist and lemon in color. Injured tissue acquires a gray, “smoky” color, which can turn dark brown with time. Two or three weeks after the freeze event, injury to two and three year old wood can be suspected if the lenticels (gas exchange sites on the bark surface) become more pronounced (swollen and corky), and examination of the phloem with a hand lens reveals dry pockets. Limbs suffering significant injury will also begin to acquire a fermented odor when cut into. The extent of any possible freeze damage is really never entirely known until spring, when bud break begins. Injured wood emerges from dormancy much more slowly, or not at all. After such cold as this one, affected orchards often have considerable loss of the one-year-old wood in the tree tops, but the rest of the tree grows extremely vigorously (and with more lateral branching) from the “natural pruning”. One comforting aspect of this event is the occurrence of cold weather prior to the freeze, which helped “condition” trees. I believe freeze events are much more damaging if they occur after a warm period.

The issue of chilling hour accumulation is not yet one to be concerned about, since we still have half of December (at the time of this writing) and January to meet the estimated requirement of 800 “effective” hours. December and January are the most critical months for hours below 45⁰F, since the tree is now in a state of “full rest”. It is more important to have 750 hours of consistent cold, rather than 1500 hours below 45⁰F which includes lots of warm days, followed by cool nights. You can think of this like poking the hibernating bear with a stick while he slumbers! Disruption of whatever physiological processes occur during dormancy with warm weather results in erratic leaf out and blooming. This translates into reduced fruit set, and uneven maturity at harvest. This is why I keep beating on you to install your own weather station at the ranch! If you do not become a student of the quality of chill hour accumulation, you have no basis to determine the need for oil treatment, or what effect chill hours had on leaf out and fruit set. Personally, I just do NOT get why most of you neglect this critical aspect of basic horticulture, when there is so much money on the line. Your defense might be that you have no control over this, but without site specific weather data it is much more difficult to

intelligently discuss production concerns pertinent to your property. It all becomes just rhetoric and conjecture! So....install a SIMPLE weather station!

To check on your local chilling, reference my website, <http://ceking.s.ucdavis.edu>. From the main page, select and click on agricultural research and education, then grape, tree fruit and nuts in the grey menu box on the left. Once on my UC webpage, select "Management", then "chilling hours". This will take you to the "Weather-Related Models and Services" section of the UC Fruits and Nuts Center. Select "chilling accumulation models" from the menu, and then "Cumulative Chilling Hours". This site allows you to see the chill hour accumulation for every station in the state. You can also click on a given station to get historical data. I find this helpful in estimating where we are relative to other years.

Use of Dormant Oil in Pistachio is the subject for this month. You have until mid-February to decide on whether or not to oil for rest breaking and slightly earlier harvest. I question the practice of oiling mature trees in a good chilling year, and would wait until young trees are at least six years old before treating them, unless your five-year-olds are monsters with a huge flower bud count. Over cropping baby trees can really be hard on their structure, since the branches are usually not of sufficient diameter to support the large crop without possibly circle tying the main scaffolds.

Horticultural mineral oil (HMO), is referred to by many as "dormant oil", since it is most often applied to certain deciduous trees in the winter for the control of scale insects. I originally got HMO registered on pistachios for the control of immature soft scale and *Phytocoris*, both which overwinter in the egg stage on the tree. While performing this insect research, I discovered that oil assists in overcoming delayed leafing and erratic bloom caused by inadequate chilling. Additional research over twelve years showed that it can also significantly increase nut production in young and mature trees, providing they have an abundance of fruit buds. Harvest is also advanced by about four days, depending upon the season. Growers planning on applying dormant oil should do so in mid February. Good results have also been reported in Kern County with mid to late January applications. A three-year oil timing test was performed several years ago with Chris Wylie at Agri-World (Madera) in which he faithfully applied 6 gallons of Volck[®] oil (originally refined by Chevron Chemical, but discontinued by Valent in 2006) weekly from January 17 to March 7. Volck[®] was a 476 oil, which indicates the temperature in ⁰ F at which 50% of the oil "cracks" off from the refinery's distillation tower. Weekly ratings of the Agri-World trial by Chris and I during bud push and bloom confirmed that in the Madera area (one of the higher chilling pistachio regions), the best oil response (uniform and coincidental leaf out and bloom of male and female flowers) occurred from applications during the first two weeks in February. Treatment after mid-February was not as consistent or advanced. Waiting until mid-February also allows the maximum accumulation of "natural chilling" from winter temperatures below 45⁰ F. Volck[®] has now been replaced with oils similar in their 50% distillation rating, but the carbon-based molecules comprising the oil have less range in molecular weight. This results in a slightly faster rate of breakdown on the plant tissue, which may affect their insecticidal and rest breaking efficacy. Britz/Simplot is one company marketing a "Volck[®]-like" oil registered for pistachios. Its 50% distillation temperature is 470⁰ F and I have confirmed its efficacy and safety on pistachio. Other oils researched and registered for pistachios include oils with 415 and 440⁰ F distillation temperatures. Oils "cracking" from the distillation refining tower at these lower temperatures are lighter in molecular weight. Lighter weight oils provide less risk of phytotoxicity (injury to plant tissue). **My research with oil over twelve years indicates pistachio is quite tolerant of dormant oil application. However, this is NOT to say oil damage cannot occur.** I witnessed true oil burn for the first time on six-year-old trees in 2005 in Tulare County. It was isolated in one area of the block and the adjacent row showed no symptoms. The cause was never determined. The injury was limited to loss of vigorous, one-year-old wood in the tops of the canopies. Excessive vigor and low carbohydrates was suspected.

My research also indicates oil with higher 50% distillation temperatures (470 oil) provides better rest breaking effects than lighter oils when the chilling hours are less than 700 hours. Such a test was performed at Tejon Farming (base of the Tehachapi's) during the 2003 season where only 550 chilling hours were recorded. A

470 oil applied in mid-February resulted in 50% bloom on April 10 compared to May 1 for the untreated trees. Trees treated with a 415 oil were about five days behind those treated with 470 oil. Unfortunately, yield data collection was not possible, but needless to say, Tejon now regularly uses oil!

Oil is not for everyone! It is a TOOL with many factors affecting its performance! It cannot put buds on trees! Nor can it overcome deficit irrigation, which significantly limits the tree's productive capacity from low carbohydrates and insufficient fruit wood. **Oil applied at sprayer speeds too fast for optimal coverage, improperly timed, applied to stressed trees, used at too low a concentration, applied by tractor drivers who miss rows, or used in an area with potential spring frost can easily negate any benefits of use. Oil should NEVER be used if it is MILKY in color!! This means the emulsifier has broken off (separated) from the oil, and burn to the pistachio trees is guaranteed!! Protect yourself by never transferring oil from the vessel it is delivered in, unless you have one dedicated to oil alone!**

Rain? Bring It ON! Growers wishing to periodically check on reservoir and snowpack status can do so my website: http://cekings.ucanr.edu/Agriculture/Grapes_Tree_Fruits_Nut_Crops/. Select "Management" in the main menu, then "Water and Weather". Select "Snowpack Status" from the menu, which will link you to the state water resources webpage. This page converts snowpack into water content and plots it for three major sections of the state. It also compares this year to wet and dry seasons and the 30-year average. These plots really provide a visual picture of where we stand in water availability. Thus far, the plot for this year is frightening! Statewide reservoir conditions can be accessed by selecting "Reservoirs Status" from my webpage menu. This takes you to a DWR web site that lets you click on the reservoir of interest. It then brings up information about current and historic water status, and allows you to select what years you would like to compare in graphic form. It is pretty neat, and gives you lots of sound data to spread around at the coffee shop! Most reservoirs are presently HALF or less of their average capacity!

Navel Orangeworm Management: I wish I could pass on this subject, since we are all so tired of hearing about it, but your processor will tell you that CLEAN CROP is the KEY to keeping your markets! If we are going to rave about California pistachios, we had better walk the talk, or get ready to figure out what to do with the carryover! Dr. Joel Siegel is warning us once again that the lack of rain creates BIG PROBLEMS for high overwintering survival! YEP! SAME OLD PROBLEM, AND SAME OLD MESSAGE! Brag Higbee, Paramount Farms Entomologist, can now tell you that over time, SANITATION PAYS in pistachios! So unless you know something I do not, clean up your orchard, or lose big money in premiums and lost markets. I need not tell you how important the overseas markets are these days! They want nice clean, stain-free product, just like in the California Pistachio ads!

Happy New Year, Farming, and see you at Pistachio Day, Wednesday, January 29, 2014!