



February 2017 PNP Task List
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Pistachio growers are out pruning trees, destroying overwintering mummies, finishing up their pre-emergent weed treatments, fixing equipment, and assessing what the crop potential is for this season. Here is an update on where we stand for 2017.

Rain and Irrigation: Wahoo!! Every time it rains, I just stop and watch, and give thanks! Believe it or not, the rainfall pattern has been tracking the wettest recorded winter of 1982-83, and the “Atmospheric River” occurring just after the New Year puts 2017 ahead as of mid-January! The warm temperatures accompanying the Pineapple Express melted a lot of snow, and forced the Army Corps of Engineers to initiate water releases. Fortunately, the riverbeds are so dry that this water has percolated quickly into the soil to recharge the groundwater. Prior to these big storms, the Department of Water Resources reported an alarming deficiency in the snow water equivalence of the during their New Year’s survey. Data as of January 13, indicates the snow water content is averaging 63 to 97 percent more than average for this date! This is all wonderful news, and truly an answer to our prayers! Let’s hope future storms will be cold enough to pack snow in every corner of the Sierras! You can get update your water and snowpack data base by going to 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. 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. The water in the major reservoirs clearly shows that most are at or above their historic average for the first time in four or more years. Although this is great news, we all know how critical it is to have water stored as snow; hopefully the future storms will be cold ones.

Even though it has rained a bunch, every grower should still be out checking soil moisture with an auger to verify soil water content. I auger to five feet, and use the guidelines at: <http://cekings.ucanr.edu/files/19006.pdf>. to assess water content at one-foot increments with my fingers. This manuscript is for walnut irrigation, but the appendix describes how to accurately assess soil texture, and how to estimate its present water content using the feel method. Most of you are wondering if I have slipped a gear, considering how much rain we have had. However, I am not as concerned about there being too little water in the rooting profile, but rather too much! This is especially true in the heavier, saline-sodic soils some of you have planted, whose bulk density allows for large quantities of water to be stored, BUT these soils are also typically characterized by poor drainage. This means you have to avoid irrigating too early in the spring, when the root system is just beginning to recover from excessively wet soil conditions. Also, when practical, it is important to pump standing water out of low areas as quickly as possible following high rainfall events, to avoid rotting tree roots. Growers in the rolling foothills of Madera are well versed in this!

Chilling Update: CIMIS stations in pistachio production areas statewide report we are falling behind in chill accumulation based on the Chill Portion model. As you know, we have migrated away from the traditional use of the below 45⁰F model, due to the occurrence of fogless, unusually warm days during past winters. The solar

radiation associated with warm days raises the bud temperatures well above 45⁰ F, and thus they do not contribute to the rest requirement of the tree. We often state that elevated temperature “negates” hours of chill accumulation, but we really do not know what that means. Some argue that you cannot take away what you have already made. Other researchers suggest that this negation may be more related to the consumption of limited soluble sugars within the bud and adjacent branches, whose concentration is critical to pushing the bud under favorable spring temperatures. I have written previously about the effect high January temperatures has on respiration; an increase of 10⁰ F can double the respiration rate, and rapidly deplete the stored carbohydrates. Regardless of the actual physiological mechanism, use of the Chill Portion Model considers these warm temperatures with the intent of providing a more accurate ESTIMATE of effective chilling. Also known as the Dynamic Model, it calculates chilling hours between 35-55⁰F in units known as “chill portions”. Dr. Ammon Erez and a team of researchers developed this more sophisticated model in the 1990’s to account for temperature variability, since it was common in their native country of Israel. Erez et. al, theorized that fluctuating warm temperatures inhibit physiological processes associated with satisfaction of deciduous tree rest. Rather than cancelling chill portions already created, Dr. Erez suggests that **warm weather prevents the creation of additional chill portions**. So, even if there WERE temperatures below 45⁰F for a given day, the existence of warm daytime temperatures negates their effect on rest development, and thus, a chill portion is not created.

Dr. Katherine Pope, Yolo County Farm Advisor, was funded by the pistachio industry to test the validity of the Chill Portion Model as a doctoral candidate. Although the results were not as conclusive as she hoped, Dr. Pope’s data suggest that Kerman pistachios require about 58 chill portions to prevent yield reduction from inadequate rest. Peters blooms best at about 61 or greater chill portions. I have prepared Table 1 to contrast the Chill Portion accumulation this season, as of January 15, with that of previous years on the same date. The values in parentheses are the total number of Chill Portions accumulated from September 1 to February 15. As you can see, we are behind last year, and with another month remaining in our traditional chill accumulation period, we need to average one chill portion every 36 hours to completely satisfy the rest requirement. You can determine the likelihood of this by comparing the chill portions accumulated between January 15 and February 15 for high and low chill years. Since the beginning of New Year, we have been averaging one chill portion every 33 hours, so it is possible to get 20 additional hours. However, if one compares the statewide average chill portions for 2014, a poor chill year, and 2015, a good year, one learns that we received 15.2 additional chill portions from January 15 in 2014, and 16.2 in 2015. So, the cold winter of 2015 had only **ONE** more chill portion than the warm winter. Thus, the averages would suggest that we could reach about 55 chill portions this year. Time and orchard access conditions are also limiting any value obtained from application of a “chill enhancing” material described in last month’s task list. However, if my orchard weather station indicated I had fewer chill portions than Table 1, I would apply such a material if the ground dried out, and the weather turned warm. I have no idea how effective aerial application of these products is. They represent a new frontier for field researchers!

Table 1. Chill portion accumulation for various CIMIS stations statewide from 9/1-1/15 for selected years. Numbers in parentheses are the total chill portions accumulated at each station by year from 9/1- 2/15. By RH Beede. 1/16/17.

Year	2016	2015	2014	2013	2010
Durham	46	51 (66)	42 (55)	40 (54)	58 (70)
Patterson	37	44 (59)	48 (63)	44 (63)	56 (73)
Madera II	48	49 (66)	37 (52)	41 (57)	(NA)
Parlier	39	51 (67)	48 (64)	40 (53)	57 (74)
Five Points	40	48 (65)	37 (52)	40 (55)	54 (69)
Coalinga	39	49 (62)	33 (48)	41 (53)	56 (70)
Shafter	33	47 (59)	47 (61)	46 (63)	52 (70)
Delano	39	48 (65)	40 (58)	42 (56)	55 (73)
Blackwell’s	42	47 (67)	38 (52)	40 (50)	58 (75)

Arvin/Edison	39	47 (61)	31 (44)	43 (55)	51 (66)
Porterville	26	54 (76)	44 (63)	43 (59)	50 (63)

What About Using Oil This Year? Oil?? It's your call! After oil took such a whipping in 2015, I have hesitated to suggest its use. I know what my years of research data showed; oil improved yield, and advanced bud break and harvest. However, the years in which I researched oil did not include these warm winters, which effect rest satisfaction, and depletion in stored carbohydrates. These are critical to bloom and the grand period of growth. I did one project with Dave Demkey, former Tejon Ranch Nut Crop Manager, in a young pistachio orchard east of Highway 99, where he documented only 550 hours below 45°F. I tested 415 and 470 oils from Exxon, and experienced a one month enhancement in bud break over the untreated trees. We were unable to obtain yield data, unfortunately. Does this single test in a low chill site provide adequate support to suggest its use in other locations? NO! We do NOT know enough about the “threshold carbohydrates” needed in the bud and fruiting wood to know what to expect. It was comforting to hear David Doll, UC Farm Advisor, Merced County, tell me that his 2016 oil treatment produced 500 pounds more dry weight than the untreated trees at a site with good chilling. So, there you go! There is obviously more research needed on manipulation of rest in pistachio, especially if warm winters become the norm!

Scale management: Soft scale should be treated before the “rubber stage”, which usually occurs by the third week of February. Sevin XLR plus oil is very effective. Oil alone is probably enough in most situations unless they look like beads lined up on much of the one-year-old wood. Seize 35W or Assail are also effective alternatives to Sevin plus oil, and eliminates the rest breaking effect.

NOW management: The 2016 crop averaged almost two percent insect damage, which represents 18 million pounds of product and \$100 million lost. Poor quality puts the processors up against the “worm ropes” as they try to make bad nuts into good ones. Aflatoxin levels also rise, even with AF36 applied to most orchards. Processors already offer considerable bonus incentives to keep the worms out of the plant. If you do not think quality is critical for your industry, then you are part of the problem, not the solution! Regardless of what others say, I will go down with the ship preaching that winter sanitation is the cornerstone for effective NOW control! It is very important that growers blow the berms and destroy over-wintering nut mummies as best you can to minimize NOW survival. I also think the industry is making a mistake by not employing more mating disruption. There will come a time when the number of pesticide applications will be limited, or at least monitored for their necessity. The rains help greatly with nut removal and degeneration, but NOW loves a moldy nut! It is preferable to shred knocked mummies, but discing is better than leaving them undisturbed on the orchard floor. This is critical in orchards suffering from high NOW populations. Insect damaged nuts are a major concern to foreign buyers because of their unsightly appearance and greater susceptibility to aflatoxin-producing molds. Sanitation also helps reduce BOT inoculum, which can splash up into the trees during heavy storms. Remember: we want all diamonds in the bags, so the consumer keeps shelling out the shekels!

BOT management: During pruning, keep looking for Botryosphaeria. Wood infections remain capable of releasing inoculum for six years! So, if growers do not cut it out during the winter, it will build up and bite you again. I would also collect a couple hundred fruit buds and cut them in half to see if they are black. Black buds are most likely infected with BOT. As you collect them, look for dead one-year old shoots, and black fruit rachises which do not knock off the tree easily. Cut into the base of these shoots or rachises to see if there is a black streak in the limb extending beyond the base. Wood damaged from cold also has a black zone between the live and dead wood, but its margin is very sharp, and it does not run into the limb. Ignoring these symptoms allows inoculum levels to build and overwintering cankers will increase. During wet springs, tremendous quantities of spores will be spread throughout the orchard, so many that even the most intensive fungicide program will be unable to prevent major cluster infection and crop loss. Reduce the threat of this disease by getting rid of as much overwintering infections as possible. Remember, it is a

numbers game! The lower the inoculum, the less risk you have of major crop loss. Happy Farming, and we look forward to seeing the American Pistachio Growers in Palm Desert!