



JUNE 2014 PISTACHIO TASKLIST

By Bob Beede, UC Farm Advisor, Emeritus

Crop Status: Crop load is highly dependent upon your location. If you are on the Valley floor, you most likely had sufficient rest satisfaction to provide reasonably good leaf out and overlap between the male and female trees. If you are along the I-5 corridor, you likely have male trees which still have not fully leafed out, and females with fully developed clusters, as well as clusters which just finished blooming. Carla Baker, crop consultant with Weinberger and Associates, sent me photos showing the shedding of male and female flowers created last year that never pushed this spring. Carl Fanucchi, The Pistachio Man in the South Valley, just told me Kern has a good crop, with the exception of those at higher elevations where chilling was clearly an issue. So, it is one of those years where as an industry, we have reason to expect a decent crop with all the young trees coming into bearing, but for the grower with inadequate chilling hours, it is a year not to remember. Even with the cooler weather we had during May, the early leaf out date and warm April appears to have advanced crop development by 7-10 days. Carl says the shells in Kern are almost completely hardened, so NOW is the time to get out in the orchard and mark shell hardening. It is also the time to look for Gill's mealybug crawlers, since the critical spray timing for its control is in June! Dave Petersen reports multiple rain events in northern California, requiring extra fungicide treatments for *Botryosphaeria*. A reportedly good crop easily justifies the extra expense.

Field observations throughout the Valley suggest low insect damage thus far. We expected a large migration of leaffooted plant bug from the warm winter and dry grasses, but neither the almond nor the pistachio growers reported early damage. There has been some plant bug migration from cut wheat and alfalfa fields, as well as activity along riparian areas.

Disease Watch: It's time for the BOT and *Alternaria* sprays! You should be reading this to the shrill of the spray rig! The BOT model created by Dr. Themis Michailides indicates the spring weather conditions resulted in a very low level of infection events. Of course, your individual risk of significant infection is directly related to BOT levels in past years, and your dedication to removing "strikes" during the winter. Growers can never forget that infected wood left in the tree produces active "holdover cankers" which spew inoculum for up to **six** years. Dormant BUDMON sampling is also very valuable in assessing the level of overwintering *Botryosphaeria* which provides the conidia for in-season fruit infection. Disease potential also increases with greater crop load. **The primary inoculum from overwintering pycnidia does not begin a second cycle of infection until mid August.** That means most in-season infections come from infected tissue not removed during the winter! Remember that **BOT infects in the spring, but the symptoms of leaf and cluster collapse occur during hot weather** (optimal temperatures for growth are 81-86⁰F). Themis indicates that the end of May and the third week in June are the most effective timings for a **two-spray BOT** program. If it rains in June, keep in mind that the residual of your last treatment is 14-21 days, depending on what you used. If you are outside this window, you may need to retreat, depending on disease pressure. Because of BOT's genetic stability, most of the strobilurins are still effective against this disease. However, Themis has clearly shown ***Alternaria* develops resistance** to strobilurin chemistry and other single mode of action materials in a period as short as two years, depending on the frequency of use. Reference the UCIPM disease efficacy chart (<http://www.ipm.ucdavis.edu/PDF/PMG/fungicideefficacytiming.pdf>) for product guidelines. UC researchers have all the materials listed and rated for efficacy on specific diseases. It also provides the FRAC number,

which classifies materials by their mode of action and rate of resistance development. Review of the FRAC data reveals the challenge we have in maintaining fungicidal efficacy against *Alternaria*. Repeated use of materials with the same number accelerates resistance development. This is a great publication to have in your pickup for reference. Early June and the first week in July are the most effective spray timings for a **two-treatment *Alternaria* program**. If only one treatment is planned, time it for late June. Also, the first week in July means the **FIRST WEEK!** The later you treat, the less effective the second spray is for *Alternaria*! Want to see your PCA's head explode? Then sit on their spray recommendation for 10-14 days before you take action, and then complain about crop quality at the end of the season! This ought to be cause for having to room with Charles Manson!

Alternaria control by fungicidal treatment is becoming difficult. For this reason, it is critical that growers faced with a serious *Alternaria* problem acknowledge the role humidity and prompt harvest plays in escaping serious defoliation and shell staining. It is too late to open up the canopies now for improved air movement, but this is something growers with chronic infection must do this winter. The quick and cost effective way to achieve an open canopy is to perform side hedging. The depression on next year's yield is proportional to how crowded the canopy is. Expect some loss, since you will have to cut every row to improve air movement sufficiently to reduce your dependency on *Alternaria* sprays.

Cultural practices which can be performed immediately to reduce humidity include the application of gypsum for improved water infiltration, basin irrigating every other row during kernel filling (late June to harvest), and applying less water more frequently. After 30 years, I have seen many growers whose standing water problem is associated with their "stacking" the water into the furrows or basins by making irrigation set times of 12 hours or more. If you are doing this, I wish to remind you that you are spending a lot of money on electricity or diesel to donate almost **one-third of an inch of water per day** back to the environment due to evaporative losses! That means one inch of water every three days! So, get those set times down to 6-8 hours, improve your irrigation uniformity, and avoid applying more water than your soil can infiltrate. The goal is to have 50% exposure of the surface in about 24 hours!

If you anticipate an *Alternaria* problem, **prompt harvest is a must**, if you do not want to lose a lot of your clean open splits to dark staining. This is especially true if harvest weather turns hot, since the hulls will break down even faster. Hull russeting also tends to increase its deterioration rate.

Obtaining the best coverage possible is one of the most practical methods of slowing disease resistance development. From what I have observed, the pistachio industry has a major problem achieving good coverage. Remember: two-thirds of the spray volume in the upper half of the manifold on mature trees! Dr. Jack Dibble's years of data also says no faster than 2 mph! Dr. Joel Siegel, USDA/ARS and Brad Higbee, Paramount Farms, have now, after extensive and independent spray research, both confirmed this! Dr. Siegel and Matt Strmiska have also been working with the Air-O-Fan manufacturer (Reedley, Ca) on evaluation of the new Spray Systems "TXR" nozzle. Their work shows improved spray coverage with both PTO and engine-driven Air-O-Fans. These nozzles also operate at greatly reduced pressure (about 40 psi) which extends pump life. They also eliminate the expensive ceramic tips, the need for a swirl plate, and a crescent wrench for removal or adjustment. The improved coverage is largely gained by a greater nozzle number. PTO rigs use two per vane, and engine-driven sprayers employ a two and three-nozzle adapter per vane (see photo). Yes, the number of nozzles increases significantly, but a recent spray demonstration sponsored by Chuck Nichols (Nichols Farms) showed marked improvements in pistachio canopy coverage. Use of this new nozzle method requires installation of a filter on each manifold, in addition to the one already existing at the pump. A small plastic screen filter is also used within each nozzle body, and running clean water for a minute or two through the spray rig at the end of each shift is also strongly advised. Growers are apparently not scared away by the added filtration and maintenance, since nozzles are reportedly limited in stock. Converting to the TXR system can be done at reasonable cost. Growers

interested in considering this update can contact Matt Strmiska at (559) 448-6859 for a complete installation and re-calibration service (I know of no one else doing this), or Air-O-Fan at (559) 638-6546.

Water: Average pistachio water use (ETc) for June 1-15 is 4.00 inches and June 16-30 is 4.6 inches. Research by Dr. Goldhamer indicates regulated deficit irrigation (RDI) during growth stage 2 (late-May to late-June) can be safely implemented at 50% of full ETc **on deeply rooted trees** with no adverse crop effect. This would mean one rather than two, four to five inch irrigations in June. Be sure to meet full ETc by the beginning of nut filling. Do not consider RDI if you are on shallow soil and are already struggling to adequately irrigate during kernel filling.

Nutrition: Nitrogen fertilization was covered extensively last month. Research now suggests that 1000 pounds of dry, inshell pistachios requires 28 pounds of actual N. About 25 pounds of N is needed for tree development. Kernel filling begins in late June, and is THE most demanding sink for N. For that reason, I suggest that 75% of your total nitrogen management program be applied from late June to early August, when demand is greatest. Your nitrogen management program should include tissue, soil AND water analysis to quantify all sources of N and insure that excessive nitrates are not accumulating in the soil from over fertilization.

Potassium (K) uptake is also very high during kernel filling. Research by Drs. David Zeng and Patrick Brown indicate potassium applications up to 200 pounds actual K per acre applied in equal splits over the months of May through August significantly increased yield, split nut percentages, nut weight and reduced blank and stained nuts. Reduced staining was associated with less *Alternaria* leaf infections at harvest. This research was conducted on San Joaquin, Yolo and Arbutle soil series. The greatest response to K fertilization was on the San Joaquin soil series which is lower in total K and less likely to bind the applied K to the clay types in that soil. Young, alluvial soils such as those on the Westside are typically very high in available potassium and less likely to require as much supplementation. Zeng and Brown suggest the August tissue level for K should be about 1.7% for optimum plant performance. The high fixation capacity of some soils requires large K applications to saturate the soil exchange sites and increase K tissue levels. Growers using surface irrigation should therefore band the application. This saturates the exchange complex of the clay and provides more K in soil solution for uptake. Three continuous years of potassium chloride application did not elevate chloride in the leaf tissue. However, consider orchard health, soil permeability, salinity, stratification and deficit irrigation before performing large-scale KCL applications. Siddiqui and Brown calculate the annual K requirement at 25 pounds per 1000 pounds inshell ACP weight.

Insects: David Haviland, Kern County Entomology Farm Advisor, is continuing to study pistachio Gills mealybug. **Treat mealybug when most of the crawlers have moved out from under the adult females (early to mid-June in the San Joaquin). Avoid early treatment to allow the crawlers time to emerge from under the female. Do NOT MISS this treatment timing if you have mealybug problems!** Doing so means marginal control later with less effective materials, loss in nut quality, and a sticky mess on the harvesters, which should be pressured washed prior to moving to the next field to avoid unwanted spread! Growers would be wise to inspect the harvesters upon arrival, if they wish to minimize the need for this expensive treatment. **Be sure to discuss your choice of insecticide with your processor BEFORE treating, to insure there are no concerns over acceptable residues.** Processors are ACUTELY sensitive to the worldwide pesticide testing, and neither they nor you can afford to have pistachios refused for this reason.

Also watch for light browning of the nut rachis and fruit from citrus flat mite. This often goes undetected until economic injury has occurred. Control is easily achieved from 30-40 pounds of dusting sulfur per acre or 15-25 pounds of wettable sulfur. Finally, keep your eyes and ears peeled for stinkbugs and leaf-footed bugs, which could become significant in June, prior to kernel development.

Navel Orangeworm Update: As of May 16, Dr. Siegel reports that NOW emerged rapidly early in the season with the warm weather, and a new peak started at the end of April. We are about 100-150 Degree Days

(DD) ahead of 2013 based on the sites he monitors in eastern Madera. The Suterra BioLure® is performing similarly to virgin females in attracting adult males. However, many consultants are still running standard egg traps as a reference for past years. David Haviland, UCCE Entomologist, Kern County, reports a NOW egg trap biofix in pistachios of April 10. Roger Duncan, UCCE Farm Advisor, indicates an egg trap biofix in Stanislaus County of April 17. UC IPM guidelines suggest the treatment timing for the second generation of NOW is 1050 DD from the egg trap biofix. This does NOT conflict with Dr. Joel Siegel's recommended timing of 1700 DD, because Joel uses January 1 as a starting point for DD accumulation, and there is roughly 650 DD accumulated between this date and the onset of regular egg trapping. Why the different methods? Many consultants report difficulty in recent years with obtaining a clear egg biofix. Using male adult catches in the new wing trap as the new biofix method may also require study, since some PCA's report adult male catches are routinely two weeks ahead of egg laying activity.

UC entomologists agree with Dr. Siegel on the need for treating the third and fourth generations of NOW, which, using Dr. Siegel's DD accumulation method, typically occur at about 2200 and 2700 DD. However, there is some disagreement regarding the need to treat the 1700 DD (second generation) flight, which is predicted this year to occur towards the end of June. The controversy stems from the difficulty in assessing the overlap between NOW development and the presence/abundance of early "pea split" nuts. Although we still do not know why these small nuts develop so far ahead of the main crop, they are strongly believed to be the insect development link between the old mummies and the new crop. This link is critical for NOW survival and population increase. Those of you walking the furrows know that pea split nut numbers vary greatly from season to season, and orchard to orchard. In some orchards, one may only find an occasional pea split in five to ten minutes of monitoring. In other orchards, they are readily observed. The problem YOU face as a producer, is that we only have an ESTIMATE of the NOW population through our monitoring programs, AND YOU are not a NOW female actively looking for freshly split pistachios to lay eggs on! So, the decision to pass on the 1700 DD timing becomes pretty risky, given the fact that there are more and more consumer complaints about worms in their expensive pistachio bags! This bad press threatens your market, so much so that Chuck Nichols had the COSTCO product purchaser come to the recent sprayer demonstration to politely say, "Watch the worms, growers, because your product is on our radar". So... do I spray at 1700 DD or not? Well, if you have never had a NOW problem, and your monitoring program says the NOW population is not changing over time, and you harvest promptly, and sanitize thoroughly in the winter, then you probably do not need to treat this flight. HOWEVER, remember that the processors want the incoming loads to be LESS THAN ONE PERCENT NOW DAMAGE!! That is a tough goal to achieve! So, sit down with your crop consultant and have a good discussion over ALL the factors YOUR orchard faces before deciding that the 1700 DD treatment is not necessary in your orchard. These "factors" include how well you sanitized, what your present trapping levels are, what level of pea split nuts you traditionally have, what your history of worm damage is, what the surrounding crops are and their susceptibility to NOW infestation, when they are harvested relative to when you pick your pistachios, etc. SEE all the things you have to consider?? THEN you have to get the SPRAY on TIMELY (cover your acreage within five days) and with the best COVERAGE possible! Quite honestly, I do not think enough of you are taking this challenge as seriously as you should, and thus you place the industry that feeds you handsomely at marketing risk! Like President Obama says about the Affordable Care Act: "If you like your program, you can keep it!"

Happy Farming!

Figure 1. The new TXR Spray Systems nozzle configuration. Photo by Dr. Joel Siegel.

