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April 2019 Task List for Pistachios
By Bob Beede, UC Farm Advisor, Emeritus

Field Observations: As of March 25, Kerman orchards are not showing hardly any green tip. The Peters are swelling, but there is sign of cabbage heads yet. Chris Wylie, Agri-World Ranch Manager, tells me the early male, 02-16, is at 30% bloom in one Madera orchard. Golden Hills is at green tip, and the Randy's are near cabbage head in the Kings/Tulare growing region. One would that thought that the high chill received this winter would have resulted in earlier bud break, but the weather has still been cold and rainy. Remember, once rest is satisfied, the tree is responsive to favorable weather. Had temperatures been in the 70's with warmer nights, these trees would be much further along. Relax, it's no big deal. We are just getting started, and we should all be so thankful to have had a cold, rainy winter to start the season with.

When Peters receives close to its full dormancy requirement, it develops ahead of Kerman, and makes us nervous about having sufficient overlap to cover all the female bloom. It is observations like this that become important to note down for future reference. I have always hoped that we would develop some type of web-based forum to share our observations, so that we could learn from one another. It is too bad we do not have a password protected industry website to let growers register their observations on important items such as this. It is never too late!

Spring Diseases: If it rains a quarter inch or more during bloom, it may be necessary to apply a fungicide to control *Botrytis* and *Botryosphaeria*. The potential for these diseases depends upon past infection levels and repeated rain events. **Dr. Themis Michailides has determined 0.2 inches of rain and temperatures at or above 55^0 F constitutes a *Botryosphaeria* infection event.** Your inoculum pressure can still be assessed by examining the base of old cluster rachises for blackened tissue **which extends into the one-year-old wood, and looks like verticillium streaking from where the cluster attached to the branch.** Infected old clusters also tend not to break cleanly from the shoot. Instead, they leave a stub when one attempts to knock them off. Also examine older wood for sunken areas, which, when cut into, also have blackened tissue running lengthwise in the limb. These represent old infections, which can possess active pycnidia for up to **six years**. *Botrytis* attacks the male bloom more than the female, because the tufts of pollen are high in sugar and proteins, both good substrates for the growth of this fungus. Male cultivars 02-16 and 02-18 (old selections originally released with Peters to assist in its overlap of Kerman) are more susceptible than Peters due to their denser bloom character. Kerman female trees show Botrytis infection in young, tender shoots. Diseased shoots wilt, and their tips curl like a shepherd's hook. **They turn dark, dull green, not black!** The base of the shoot also develops a cluster of buff-colored spores. ***Botryosphaeria* shoot infections do not occur until later in the summer** when it gets hot. See pages 37-40 of your BOT manual (most of you do not even REMEMBER the BOT manual! LOL!) to contrast *Botrytis* to BOT. Several fungicides are now registered and effective against these diseases. Consider the likelihood of treating for *Alternaria* later in the season, and save the fungicide most effective against *Alternaria* for use in June or July. You can compare fungicide efficacy at the UC website: http://ipm.ucanr.edu/PMG/r605902111.html.
Management of *Alternaria* resistance has now become a major concern for PCA's and growers.

Water:
Due to the wonderfully wet winter, most orchards are presently at field capacity. Hence, irrigating too soon can have a negative effect on root health, especially in heavy textured soil that does not drain readily. So, be

sure to assess your soil moisture status before applying any water. Orchards on heavier textured soils with a rooting depth of five feet probably have sufficient water for stress-free growth until the first of May! Most of you will irrigate before that, simply for the purpose of applying fertilizer. If I have shocked you, then compare your present irrigation schedule with this one: http://cekings.ucanr.edu/files/19310.pdf.

Nitrogen: Pistachio growers are stepping up to the plate to be the BEST stewards of nitrogen usage as possible. Hence, avoid heavy nitrogen applications before fruit set. **Remember that early shoot growth and fruit development is all from STORED NITROGEN! A good nitrogen management program includes soil, plant, and irrigation water N assessment. This means you should have samples taken of each, so you can make a better assessment as to how much synthetic N needs to be applied to the soil to meet the plant/crop requirement.** I would assess my potential crop shortly after fruit set, check past soil analyses and then begin N fertilization at 30 to 50 pounds depending upon irrigation method and estimated crop load. Apply the higher rate under flood irrigation. Some growers/consultants favor N application shortly after bud break, and support this early timing with the accurate statement that it takes about 14 days for ammonia-based fertilizers to convert to nitrate for uptake. Hence, they want the nitrate conversion completed by the time there is sufficient leaf area for its uptake by transpiration. In my opinion, this practice assumes there is inadequate nitrogen stored in the tree and the soil to meet the growth potential of the tree. Based upon UC nitrogen research, the pistachio tree's ENTIRE seasonal N requirement for growth and development is only about 25 pounds. The bulk of the N requirement is associated with crop development. Thus, the nitrogen status of the tree, soil, and irrigation water would have to be quite low to require N application at bud break.

Research by Dr. Patrick Brown, UC Davis, and Dr. Ismail Siddiqui indicates that pistachios remove 28 pounds actual N per 1000 pounds of ACP weight from the orchard system. **This value does NOT account for application inefficiency**! Fertigation applications may be 80% efficient. Furrow/broadcast applications may be as low as 50% efficient. It is for this reason that pistachio growers have largely gone to drip irrigation for improved water and nutrient management. Back off on the N applied this season if you find soil nitrate nitrogen levels above 35 ppm per foot in the root zone. Nitrate nitrogen levels in the irrigation water must also be considered in your budget. A 10 ppm nitrate N level supplies 27 pounds of actual N per acre foot of water applied!

Adding high levels of N to the soil early in the season will NOT result in greater plant uptake unless the tree is deficient. Available data indicates pistachio growth and yield is not improved with July tissue levels above 2.5 percent. A validated model for predicting July nitrogen and potassium levels from tissue samples taken earlier in the season can be found at: http://www.plantsciences.ucdavis.edu/plantsciences_faculty/brown/Models/PPMtest.html. Created by Dr. M.I. Siddiqui during his doctorate studies with Dr. Patrick Brown, UCD Pomology Professor, this model allows growers to assess the future nitrogen status of their orchards from late April and May tissue samples. For example, a 3% nitrogen tissue analysis 40 days after full bloom would predict that you would have 2.68% in July, a level sufficient to begin kernel filling. I recommend you begin using this model, since laboratory testing last season showed it was an accurate prediction tool.

Micronutrient Sprays: Research shows good zinc uptake at 50% leaf expansion (late April). Use only 2 pounds of zinc sulfate 36%. Research by Patrick Brown and Qinglong Zhang indicates it is safe to add one-half pound of Copper EDTA or one pound of Solubor to the foliar zinc sulfate rate. Buffering this mixture to a pH of about 5 also improves zinc uptake by increasing the amount in solution. Acidification should be done with citric acid (powder) rather than phosphoric buffer to prevent zinc phosphate precipitation. Many growers prefer to avoid the "Betty Crocker" mix and apply liquid materials formulated for pistachios. Check with your supplier for suggestions, but be sure they have adequate amounts of copper, boron, and zinc. **This is especially true of two and three year-old trees.** Deficiencies severely limit canopy development and reduce early bearing potential. They are also very common, suggesting growers are not taking young pistachio plant nutrition sufficiently seriously, and suffer loss in orchard development because of it. My experiences suggest second leaf orchards are especially susceptible to micronutrient deficiency, partly because of all the tipping

performed to create branching. Three sprays are often needed to prevent loss of canopy development during this critical training year.

Shriveling flower clusters do not necessarily indicate fungal infection. Clusters that remain green and shatter off the tree could be associated with low boron levels. Boron deficient leaves have crinkled edges but remain uniformly green and normal in size. Tissue levels less than 60 ppm in May suggests the need for boron fertilization. Boron is taken up by the leaves throughout the season, so application can be made at any time during the spring. Correcting **severe** deficiencies **may** require up to 2 ounces of Solubor **PER TREE** (16 lb/ac) soil applied over time! Yes, you read it right. It's not a typo! Pistachios are boron pigs!

Pest Management: Beating tray monitoring and sweep net sampling of true bugs should be initiated. The native vegetation surrounding pistachios is still green for now, so the migratory plant bugs have no reason to move…yet! That will quickly change as we move into April and early May! Navel orangeworm (NOW) traps should be in place. The NOW adult pheromone lure, has proven to be very effective in catching adults, so much so that some consultants wish to dispense with the high maintenance egg traps. Running egg traps assists in the interpretation of the wing or delta adult trap data, since we do not (and may never) have treatment thresholds for either development stage. Research suggests pistachios compensate for nuts lost to *Phytocoris* and *Lygus* feeding, so early chemical treatment specifically for these pests may not be needed unless you have significant BOT, and Calacoris is your predominant plant bug present prior to shell hardening. Most growers routinely add a pyrethroid to their mid-April nutrition spray to cover this issue. Donnie Thomas, private pest consultant, also likes to assess the presence of Gill's pistachio mealybug at green tip using his beating tray. He beats ten trees per area with his tray beneath the shoot tips, and then surveys the tray for grey, immature mealybug stages that have crawled up the trunk during the warm February weather. Donnie says this has really helped him determine if he is going to have a problem in June. I would appreciate feedback from others who experiment with this.

Weeds: Weed control is critical this time of year, especially London rocket and spotted spurge which are preferred hosts for false chinch bug. When these weeds dry, the chinch bugs can roar out onto your young budded trees and kill them with the toxin associated with their mass feeding. Clovers, Russian thistle and birdsfoot trefoil are just a few of the weeds serving as hosts for lygus (grasses are not hosts for lygus) and stinkbugs. If you did not get the importance of removing London rocket and spotted spurge, read this paragraph over again, or suffer the consequences of dead trees from false chinch bug! You were warned!

Farewell, Corky Anderson: Henry P. "Corky" Anderson, early pistachio pioneer and industry leader with his beloved friend and business partner, Ken Puryear, passed away on February 23, 2019, at Scripps Hospital in La Jolla, California. He was 76 years old. Anyone who knew Corky would agree that he lived life to the fullest. He was an avid hunter, barbequer, water well witcher, golfer, family man, and promoter of the pistachio industry. Spending a day in his bronco was always memorable for the stories, knowledge, and shear fun a being with such a character. Corky always made life more enjoyable. Armed with the advice of Lloyd Jolly, assistant to Dr. Whitehouse at the Plant Introduction Station at Chico, Corky and Ken saved the pistachio industry with the introduction of the Verticillium tolerant, Pistacia *integerrima*,(Pioneer Gold I) rootstock. It remains one of the main rootstocks today. Corky always greeted you with a smile and a firm handshake. His memorial was attended by hundreds of well-wishers. The pistachio industry extends our sympathy to his wife Betty, of 30 years, and all his family. We have lost yet another giant of our industry!

Happy farming!

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