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Kern Pistachio Notes

October 2014

Register now for the 2014 Pistachio Production Short Course!

Tuesday, November 18 - Thursday, November 20, 2014

This three-day short course will be held at the Visalia Convention Center, and will include presentations by UCCE Farm Advisors and Specialists, covering pistachio production topics, such as field preparation, planting, pruning, economics, IPM, and harvesting.

This will be a course for orchard decision makers, which will cover the basic science, not as experimental data, but as accepted science, that supports current and developing production practices including regional differences.

Early registration fee is $750; $900.00 after September 29; $1000 at the door. There are still some open spots.

For much more info on this event see: http://ucanr.edu/sites/PistachioShortCourse/

Register now for 2015 Pistachio Day!

The Statewide Pistachio Day will be held on Wednesday, January 21, 2014 at the Visalia Convention Center in Visalia, California. This will be a full-day session, adjourning at 4:30 pm with a hosted lunch break. Pistachio Day is designed to deliver the latest research-based production practices in a format that enables prospective or current pistachio growers, production managers, and pest control consultants to better achieve their pistachio-growing goals. The agenda appears below.

Registration fee is $40.00 per person until January 5, 2015. After January 5, 2015 the registration fee is $60.00 per person. *On-site registration is $80.00 per person.*

For more info and how to register see: http://ucanr.edu/sites/pistachioday/

Agenda

2015 Statewide Pistachio Day
Wednesday, January 21, 2015 8:00 a.m. – 4:30 p.m.
Visalia Convention Center, 303 East Acequia Ave., Visalia, CA 93291

Session 1
Moderator: Elizabeth Fichtner, Cooperative Extension Advisor, Tulare County

8:00 a.m. Welcome

8:15 I**ndustry update**
Bob Klein, Manager, California Pistachio Research Board

8:30 **Comparison of the Traditional Chill Hour Model and New Chill Portion Calculations**
Louise Ferguson, Cooperative Extension Specialist, Dept. of Plant Sciences, UC Davis

9:00 **Update on Foliar and Fruit Diseases of Pistachio**
Themis Michailides, Cooperative Extension Plant Pathologist, Dept. of Plant Pathology, UC Davis

9:30 **Pollination Requirements, Fruit Set and Blanks**
Gurreet Brar, Cooperative Extension Advisor, Fresno County

10:00 *BREAK*

Session 2
Moderator: Kris Tollerup, Cooperative Extension Advisor, IPM Program

10:30 **Nutrient Management in Pistachio**
Patrick Brown, Professor, Dept. of Plant Sciences, UC Davis

11:00 **Groundwater Quality, Availability and Upcoming Regulation**
Ken Schmidt, Principal, K.D. Schmidt and Associates

11:30 **Saline Irrigation Effects on Soil Quality and Yield and its Mitigation**
Blake Sanden, Cooperative Extension Advisor, Kern County

12:00 p.m. *LUNCH*

Integrated Pest Management for Pistachios
Sponsored by the UC Statewide Integrated Pest Management Program

1:30 Moderator Welcome - David Haviland

Management of Navel Orangeworm in Pistachios

1:40 **Phenology and Monitoring Techniques**
David Haviland, Cooperative Extension Advisor, Kern County

2:00 **Winter Sanitation and Chemical Control**
Brad Higbee, Director, Entomology Research, Paramount Farming Company

2:40 **Using the Past to Predict the Future: Trends from Harvest Data Analysis**
Joel Siegel, Research Entomologist, USDA-ARS

3:00 *Break*

'Bug' Management in Pistachios

3:30 **Phytocoris: Friend or Foe?**
Bob Beede, Emeritus Farm Advisor, Cooperative Extension, Kings County

3:50 **Management of Leaf-footed Bug and Stink Bugs**
Kris Tollerup, Cooperative Extension Advisor, IPM Program

Pistachio diseases

4:10 **Pistachio Diseases: Diagnosis and Demonstrations**
Themis Michailides, Cooperative Extension Plant Pathologist, Dept. of Plant Pathology, UC Davis

4:30 Closing and Adjourn

Manganese Deficiency in Saline, High-Organic Matter Soils in Kern County

John Gebhardt, a pistachio grower and consultant and Ismail Siddiqui, in his employ, brought an interesting pistachio problem to my attention earlier this year. While U.C. Farm Advisors in Kern County may have assisted in narrowing down the cause, full credit to correcting the field problem goes to the afore mentioned individuals in coming up with a diagnosis of the problem and acting on it.

Trees budded in 2013 were showing symptoms such as those appearing in photos 1, 2 and 3. Generally, the recently budded trees, which began growing well, started a rapid decline. Photo 1 was taken when symptoms were first noticed. Photos 2 and 3 at the height of the problem and Photo 4 in the early recovery phase. Unbudded UCB-1 seedling rootstocks did not show these symptoms. Symptoms appeared only on Kerman and Peters scions and most budded trees in the blocks showed the poor growth and leaf symptoms. Photo 4 shows distinct nitrogen deficiency symptoms which were common on these recently budded trees both initially, and in the early recovery phase, even though the field had extremely high level of available nitrate nitrogen in the top 3 feet of soil profile (greater than 4000 lbs. per acre). This large amount of available nitrogen is the result of application of large quantities of partially composted organic materials trucked in from the south previous to the current owner's tenure on the property. Apparently, young pistachio blocks that had not been farmed with an annual crop after the organic-material applications showed the most pronounced symptoms. Nitrogen, manganese and copper levels were low in the leaf tissue analysis, manganese particularly so.

Application of foliar and soil-applied chelated manganese products (with zinc and copper which were also somewhat low), began correcting the poor growth and other symptoms almost immediately. A search of the literature showed that manganese is important in the reduction of nitrate and the metabolic conversion of nitrogen into important plant constituents such as chlorophyll, amino acids, and enzymes. Manganese related enzyme systems include those related to carbohydrate production and energy relations. We hypothesize that the nitrogen deficiency symptoms seen in the plants were not a result of nitrogen deficiency in the field, which clearly, is almost at toxic levels, but the inability of the *P. vera* (that is the Kerman and Peters scions) to convert that nitrogen to plant growth as a result of a deficiency of manganese. The unusual extreme deficiency of manganese (and low levels of copper) can be attributed to the presence of large quantities of comparatively uncomposted organic matter (> 4% in the top 3 feet of soil profile), the heavy soil, the high pH (approximately 8.0) and high sodium and phosphorous content of the soil. Again, the few ungrafted UCB-1 seedling rootstocks appeared to grow normally with the existing low levels of manganese in the field and even rootstock suckers on the grafted trees appeared unaffected.

I have two research test trials in this affected area, and have been taking annual soil samples within the trials. These samples show that John and Ismail have been successful in reducing the salinity and reclaiming the soil through application of suitable soil amendments and leaching. The leaf symptoms shown in Photos 1 and 3 may not be manganese deficiency symptoms per se, but perhaps general 'starvation' symptoms of a plant that does not have the necessary chlorophyll and enzymatic machinery to capture light energy and turn it into additional plant growth. With the application of manganese the trees quickly recovered and grew robustly during the summer and fall.

The lesson to pass on, I believe, is that for those farming land with a high pH, a high level of salt, and that has had unusually high levels of applied organic matter rich in phosphorous; juvenile grafted trees should be examined closely for the symptoms shown in these photos. In fields like

these leaf tissue samples (including most of the elements necessary for plant growth) should be taken annually and leaf manganese, zinc and copper monitored especially closely. Corrective action should occur rapidly if levels appear low.

Photo 1. Leaf symptom at onset of problem. New growth on these affected trees appeared nitrogen deficient. (Photo by John Gebhardt)

Photo 2. Recently budded tree showing browning and necrotic leaf symptoms and failure to produce new leaves and grow. (Photo by John Gebhardt)

Photo 3. Close up of leaf symptoms as affected leaves aged.
(Photo by Craig Kallsen)

Photo 4. Kerman tree again exhibited nitrogen deficiency symptoms on new growth initially as rapid recovery began. (Photo by Craig Kallsen)

Disinfecting Pruning Implements and Other Tools - Is the Bleach Getting To You?

Relatively recently some growers have begun disinfecting pruning implements and other tools between working on individual pistachio trees in some pistachio orchards planted from 2011-2014. It is my understanding that some of you are using a 10% bleach solution to accomplish this task. While bleach is a very effective way to kill many plant pathogenic microorganisms on tool surfaces, most bleach bottles contain warnings about breathing its vapors, avoiding skin contact, swallowing it and especially, danger to eyes. Even if appropriate protective clothing and eye protection is worn some of you may have noticed that it can discolor and burn clothing and is extremely caustic on most tool parts – especially metals. For those of you wanting a bleach alternative, I have a suggestion from a local consultant that might interest you. The product is called PACE PW-2® Greenhouse Wash. Discussion of research findings necessitates using trade names. This does not constitute product endorsement, nor does it suggest products not listed would not be suitable for use. Some research results included involve use of chemicals which are currently registered for use, or may involve use which would be considered out of label. These results are reported but <u>are not</u> a recommendation from the University of California for use. Consult the label and use it as the basis of all recommendations.

Applications of Phosphite May Limit Some Pistachio Export Markets

Dr. Bob Klein, Manager of the Pistachio Research Board, and watchdog of our export markets, informed me that in some limited export markets (of course, all markets are important) that levels of the PO_3 anion in pistachio kernels may be in excess of some countries' 'maximum residue limits' (MRL). Countries have the ability to exclude products from their markets if they feel they contain quantities of chemicals that exceed their safety levels. Dr. Klein feels that some applications of phosphite may be resulting of a buildup of PO_3 in the kernel and causing concern in some countries.

I had not realized that phosphite applications were that common in pistachio, but after making a few phone calls and sending a few e-mails, it is clearer to me that phosphite applications are more common than I knew. Phosphite is a poor fertilizer source of phosphorous for plant growth. In most crops it is used as a fungicide for organisms such as phytophthora. However, since our rootstocks are very resistant to phytophthora and a number of other root pathogens (unlike almonds), the need to apply phosphite for this purpose in pistachio is not necessary. Some growers may not even be aware that they are using it, as it may be a part of a more complex mix of a fertilizer/pesticide application.

Phosphites are available in a large number of products and are applied both foliarly and to the soil. At the present time, for regulatory purposes, many are not considered pesticides but fertilizers. To make a longer story shorter, what Bob would like to do is establish an experiment next year testing various phosphite applications to see which might be causing PO_3 to build up in the kernel and thus exceed MRLs of some countries. However, since there are almost an infinite number of ways to apply phosphite through the irrigation system and foliarly, he would like to get some early data to simplify the design and treatments of the experiment. According to Bob, it would be possible to access a cooperating grower's grade-out sheets from the past season that exist in the libraries of the processors, test these nuts for PO_3, and then correlate this information with the grower's phosphite application timing, rate, method etc. that match with that nut sample.

It is probably the case that most applications of phosphite are not causing a problem and that growers will be able to continue the use of phosphite.

Maintaining access to foreign markets is critical to selling our (actually your) ever-increasing crop. Any help that you could give to Dr. Klein in this effort could pay big dividends. I have no doubt that Bob will treat all information obtained confidentially.

Delayed Freeze Injury in Pistachio

In pistachio, most freeze injury is apparent in the spring, shortly after temperatures warm and the trees begin to push. Freeze damage mostly affects juvenile trees. In citrus, this is common as well, and is called dry root rot. In citrus, we commonly see another type of freeze injury that is slower in developing. In citrus, as a result of freeze injury, especially in young plants, the rootstock or trunk of the tree is injured near the ground line. At the time, the tree shows no freeze damage symptoms. In some cases, however, a slow-growing fungus, such as a *Fusarium* species will start to grow in the wound. Generally, it is the same kind of organism that grows as a result of gopher damage or a ding by a disk blade. These organisms grow slowly, and are characterized by a discoloration of the wood, which underlies the bark and the cambium. Fusarium can grow deep into the wood, turning it a dark brown. Sometimes trees continue to die years after a freeze event.

I have made four farm calls in the past two weeks, and two earlier in the year, where I have visited pistachio trees with similar symptoms to what we see in citrus. All were located in cold areas, and at least one of these orchards had suffered a high percentage of tree loss in the spring following a particularly severe freeze event a few years ago. Typically, the scion (i.e. the Kerman or Golden Hills or Peters top) is still alive but gumming, but the rootstock wood is deeply discolored and dead – starting at the soil line. I believe this to be freeze damage which opened the rootstock to infection by fungus that needs a wound to get started. It can take months and even years for this type of fungus to kill a tree. The trees appear to die when enough of the water-conducting tissues are killed and water demand by the tree is high during the summer. See photo 4 for a picture. To find affected trees, look for gumming on the lower trunk of the scion, and then dig around the crown of the tree. The bark will look darkened or dirty in this area. Use a knife or chisel to peel away the bark and scrape the wood beneath. The darkened color of the wood will be obvious.

Photo 5. Picture showing the crown of 4-year old pistachio tree.
The scion was still alive. Note discolored wood of crown area.
(Photo by Craig Kallsen)

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