Topics in Subtropics Newsletter

University of California Cooperative Extension

Fresno, Kern, Madera, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara,Tulare,&Ventura Counties

News from the Subtropical Tree Crop Farm Advisors in California

Volume 6, No. 3
Summer 2008

Editor's Note:

Please let us know if your mailing address has changed, or you would like to add someone else to the mailing list. Call or e-mail the farm advisor in the county where you live. Phone numbers and e-mail addresses can be found in the right column.

Please also let us know if there are specific topics that you would like addressed in subtropical crop production. Copies of Topics in Subtropics may also be downloaded from the county Cooperative Extension websites.

Eta Takele
Editor of this issue

NRCS EQIP Program

The USDA Natural Resources Conservation Service (NRCS) is now accepting applications for conservation planning on farms and ranches. Cost share assistance is available for developing and implementing conservation plans addressing soil erosion, irrigation efficiency, water and air quality, and wildlife habitat. Cost share is also available for IPM monitoring and irrigation water management. The deadline for cost share assistance through the Environmental Quality Incentives Program (EQIP) is Nov. 2, 2008. More information on the program can be found at www.ca.nrcs.usda.gov/programs/. Contact your local NRCS office usually found with the Resource Conservation District office or the State NRCS office at 530-792-5647.

Farm Advisors

Gary Bender – ***Subtropical Horticulture, San Diego***
Phone: (760) 752-4711
Email: gsbender@ucdavis.edu
Website: http://cesandiego.ucdavis.edu

Mary Bianchi – ***Horticulture/Water Management, San Luis Obispo***
Phone: (805) 781-5949
Email: mlbianchi@ucdavis.edu
Website: http://cesanluisobispo.ucdavis.edu

Ben Faber – ***Subtropical Horticulture, Ventura/Santa Barbara***
Phone: (805) 645-1462
Email: bafaber@ucdavis.edu
Website: http://ceventura.ucdavis.edu

Neil O'Connell – ***Citrus/Avocado, Tulare***
Phone: (559) 685-3309 ext 212
Email : nvoconnell@ucdavis.edu
Website: http://cetulare.ucdavis.edu

Craig Kallsen – ***Subtropical Horticulture & Pistachios, Kern***
Phone: (661) 868-6221
Email : cekallsen@ucdavis.edu
Website: http://cekern.ucdavis.edu

Eta Takele – ***Area Ag Economics Advisor***
Phone: (951) 683-6491, ext 243
Email: ettakele@ucdavis.edu
Website: http://ceriverside.ucdavis.edu

Mark Freeman – ***Citrus & Nut Crops, Fresno/Madera***
Phone: (559) 456-7265
Email : mwfreeman@ucdavis.edu
Website: http://cefresno.ucdavis.edu

USDA Risk Management Agency Releases Avocado Insurance: Details of the California APH Avocado pilot insurance program (the Crop Provisions, Underwriting Guide, and Loss Adjustment Standards Handbook) were officially released this week and are available on the RMA Web site at:http://www.rma.usda.gov/pilots/2010pilot.html.

*NEW REGISTRATION FOR THE BIOCONTROL PLANTSHIELD HC AGAINST HYPHODERMA GUMMOSIS OF CITRUS**

By **J. E. Adaskaveg, H. Forster**, University of California, Riverside and Davis, respectively, **N. O'Connell and B. Faber,** UCCE, Tulare and Ventura Co., CA, respectively.

PlantShield HC by BioWorks, Inc. received a Special Local Need registration in California for management of Hyphoderma gummosis of citrus. The Section 24C was issued in July 2008. The active ingredient is a patented fungus, *Trichoderma harzianum* strain T-22, that protects plants from many plant pathogens. The product PlantShield HC is sold in California as a biological soil amendment for nursery and ornamental crops and now the label has been expanded to allow foliar and branch treatments of citrus trees in production. Specifically, the label allows the biological control material to be a treatment of wood-exposing wounds of citrus in California.

The pathogen *Hyphoderma sambuci* causes the disease Hyphoderma gummosis of citrus trees. Hyphoderma gummosis has only recently been described causing disease on lemons and potentially other citrus crops in California. Symptoms include yellowing of leaves, branch cankers and dieback of entire scaffold branches, as well as eventual tree death. The organism is a wood decay fungus that belongs to the Basidiomycota and enters woody plants through wood-exposing wounds. Air-borne basidiospores are actively released from fruiting bodies, deposited on pruning wounds or other injuries, and germinate in wet environments. The colorless, thin-walled spores are not long-lived, however, once the fungus is established in the wood of the tree, the organism can persist for years producing numerous annual fruiting bodies (and more spores!). Although research has been conducted on the use of wound-protecting fungicides against wood decaying fungi, fungicides are not systemic in wood and only provide a superficial barrier that can be breached by the fungus. As the wounds heal, drying occurs and subsequent cracks in the wound expose untreated areas.

In our research, treatments with this biological control PlantShield HC were very successful in protecting wood-exposing wounds from the wood decay pathogen *H. sambuci* due to its ability to colonize host tissue and allow for natural wound healing and preventing invasion by the pathogen. Thus, the biological control organism provides protection by excluding the pathogen as a primary colonizer. *Trichoderma* species are also known mycoparasites. Thus, these species can parasitize other fungi. Thus, parasitism is an additional mechanism of plant protection.

Currently, Plant Shield HC is an EPA-registered and OMRI-approved organic product for use on selected crops in the United States including California. The new use of the biological control is for protecting tree wounds where wood is exposed. The Section 24C label is for most citrus-producing counties in California including: Fresno, Imperial, Kern, Kings, Madera, Riverside, San Bernardino, San Diego, Stanislaus, Tulare, and Ventura. The treatment is applied with a non-air-assisted (high-volume) sprayer or hand application with a paint brush following pruning or other wood exposing injuries. Pruning wounds and other wood exposing injuries should be treated as soon as possible after pruning or within 4 to 5 days (application should be done at temperatures above 48F). A total of one to two applications can be made to wood-exposing injuries. There are no restrictive entry interval (REI) requirements. PlantShield HC should not be applied within 30 days of harvest of lemons. For specific directions on usage and disposal follow the current label.

Research on the biology and management of Hyphoderma gummosis was supported by the Citrus Research Board of California. The registration of PlantShield HC was supported by the California Citrus Quality Council.

ATMOMETERS FOR IRRIGATION MANAGEMENT

By Mark Battany,
UC Cooperative Extension
Viticulture/Soils Farm Advisor,
San Luis Obispo and Santa Barbara Counties

Efficient and precise irrigation management is becoming increasingly important in California agriculture, both for maximizing crop quality and for conserving water. The most advanced irrigation scheduling strategy is based on local measurements of reference evapotranspiration (ETo), which is converted to crop evapotranspiration (ETc) with an appropriate crop coefficient (kc).

To be able to use this method, an irrigation manager needs to have locally accurate ETo values throughout the growing season. However, the highly variable microclimates that characterize many farming areas often make it difficult to use data from distant weather stations; therefore an accurate local measurement may often be preferable to relying on a regional value.

One inexpensive option for measuring ETo locally is to use a simple atmometer (Fig. 1). Atmometers are water-filled devices, in which the actual evaporation of water is measured over time. In their simplest form, the atmometer is outfitted with a graduated sight glass on the water supply tank which allows the user to easily measure the evaporation that occurred over a given period. In practice, this type of atmometer is most suited for making readings at multiple day intervals, for example once per week, or on days when irrigation is applied.

The performance of atmometers versus more expensive weather stations was evaluated on the Central Coast in 2003. In this study, atmometers were placed adjacent to seven weather stations throughout the area, and weekly values for both methods were compared (Fig. 2). The results indicate that the atmometers and weather stations have very comparable ETo readings, with the atmometers indicating somewhat lower ETo values under conditions of lower evapotranspiration.

Like any technique, using atmometers has advantages and disadvantages. Advantages include their very low cost and ease of operation, with no computer or power required. Disadvantages include the potential for damage by freezing weather, the need to refill the water supply (every three to six weeks), and the need to read the gauge manually. Also, if they are installed in a large open area, birds may tend to perch on the evaporating surface and foul it with their droppings; for this reason several wires are installed on top of the device to discourage birds from perching there. In general, atmometers function quite reliably with few problems.

Converting atmometer ETo readings to the amount of irrigation run time required to replenish the soil moisture lost to evapotranspiration is fairly straightforward. A relatively simple example for a sprinkler-irrigated field is presented below in Table 1.

Table 1. Example conversion of ETo to irrigation run times for a sprinkler irrigated field

A. Measured atmometer ETo for one week	2	inches
B. Crop coefficient (kc)	0.8	
C. Calculated ETc for the week (=AxB)	1.6	inches
D. Sprinkler application rate	0.13	in/hr
E. Hours of irrigation required (=C/D)	12.3	hours

(Note: To convert Gallons to Inches: Gallons ÷ Area (square feet) ÷ 0.6234 = Inches

To convert Inches to Gallons: Inches * Area (square feet) ÷ 1.604 = Gallons)

Figure 1. An atmometer installed on a steel fencepost at the end of a vineyard row.

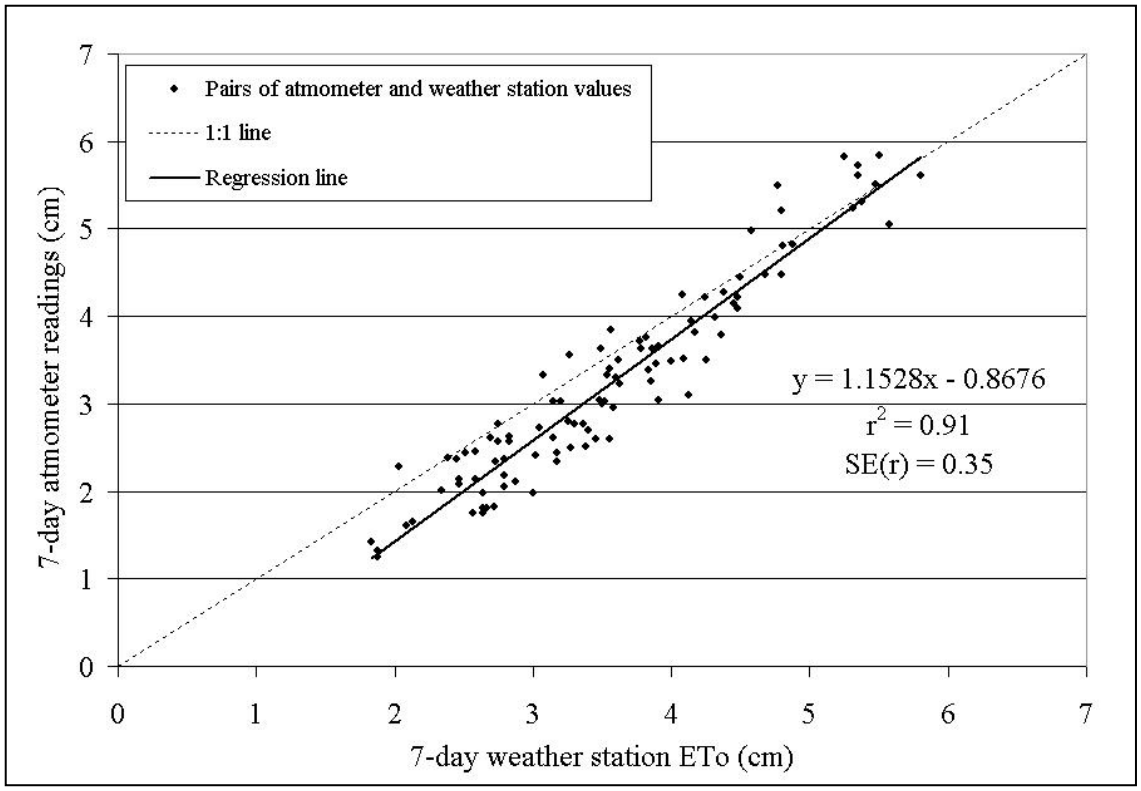

Figure 2. Comparison of atmometer and weather station ETo readings at seven locations in the summer of 2003.

ASIAN CITRUS PSYLLID HAS ARRIVED IN SAN DIEGO COUNTY

By Gary S. Bender

Asian Citrus Psyllid has been confirmed by the U.S.D.A. to be in the Bonita-Sweetwater Reservoir area of Southern San Diego County. After the insects were found in Tijuana in June, Agriculture Department workers from U.S.D.A, the California Department of Food and Agriculture and the County Agriculture Department have been monitoring yellow sticky traps placed in citrus trees in various locations near the border. These particular insects were found at the end of August in traps, nine were found and collected and analyzed for the Huanglongbing disease and found to be negative.

Huanglongbing (also known as Greening Disease) is a very serious disease of citrus and is currently believed to be spread only by these psyllids. Huanglongbing (HLB) is caused by a bacterium in the genus *Candidatus.* The bacterium is a phloem invader and causes the following symptoms:

- **Mottling of the leaves** that somewhat resembles zinc deficiency, but differs in that the mottling will cross leaf veins. True zinc deficiency will only be found as mottling between the veins.
- **Yellowing of the shoots**. Entire quadrants of trees may stick out as being yellow.
- **Stunted trees, sparsely foliated and may bloom off-season.**
- **Lopsided hard fruit with dark seeds.**
- **"Greening" of the fruit.** Portions of the fruit peel may be quite green and will not color.
- **Bitter taste to the juice.** The taste of juice from these trees has been described as having a "turpentine" flavor.

This disease is not curable with antibiotics. Essentially the tree must be removed so it doesn't serve as an infection point for the rest of the grove.

We do not have this disease yet in California!

So, what is the concern? The concern is that we might already have the disease in a citrus-related plant that legally came in from Florida as nursery stock. A likely candidate might be orange jasmine *Murraya paniculata.* While we don't believe the Asian Citrus Psyllid (the vector of the bacterium) is in California (except for this find), there is a good chance it may come on plants that people smuggle across the border. Interceptions have been made by agriculture inspectors at the borders, but how many have come across that were not intercepted?

For now all growers need to learn what the insect looks like and to monitor their groves very closely. In Florida, young trees are treated with imidicloprid (Admire) as a systemic control for the insects. If the tree becomes diseased it is removed.

Nurseries here in California will have a real problem if the psyllid becomes established. The nurseries may be required to grow all of their citrus trees in screenhouses for protection from the psyllids. This may be too costly for the nurseries and the growers that will have to buy new trees for replacements.

There is a good publication on the UC Agriculture and Natural Resources website on the disease and the psyllid by UC Entomologist Beth Grafton-Cardwell with Kris Godfrey with Michael Rogers of the California Department of Food and Agriculture, Carl Childers, University of Florida, Citrus Research and Education Center; and Philip Stansly, University of Florida, Southwest Florida Research and Education Center. The link is http://www.anrcatalog.ucdavis.edu/pdf/8205.pdf.

Quarantines. The area around the find site was immediately placed under quarantine for movement of citrus and citrus-related plants. On September 8 an extensive quarantine was established that includes almost half of the coastal county, from the Mexican border north to Highway 78 and east to Ramona and south to the Mexican border. The quarantine does not allow movement of citrus and citrus-related plants unless they are stripped of leaves, and fruit is not allowed to leave the quarantine area unless they are commercially cleaned and packed in a packing house. The quarantine also regulates movement of greenwaste; this must go to a regulated compost facility inside the quarantine zone. Assuming the insect does not enter into the citrus growing areas of North County, this area will not be under quarantine.

Unfortunately there are some commercial citrus groves inside the quarantine zone, mostly lemon groves along the coast. It has not been decided yet how the fruit from these groves will be handled.

Psyllid facts

Host plants for Asian citrus psyllid is not limited to citrus but also includes ornamental plants. Below is a partial list from the California Department of Food and Agriculture: (courtesy of the San Diego Union)

▪*Bael fruit* ▪*Chevalier's aeglopsis* ▪*Uganda powder flask* ▪*curry leaf*

▪*Cape chestnut* ▪*calamondin* ▪*citrange* ▪*African cherry orange*

▪*citrus, pink wampee* ▪*clausena* ▪*desert lime* ▪*kumquat* ▪*wood apple*

▪*finger lime* ▪*round lime* ▪*mock orange* ▪*trifoliate orange*

▪*Chinese box orange* ▪*tabog* ▪*orange climber plant* ▪*orange jasmine*

▪*toddalia* ▪*white ironwood*

Adult and waxy tubules produced by nymphs of Asian Citrus Psyllid (photo by M.E. Rogers).