

Produced by:

Gurreet Brar  
 Farm Advisor  
 Fresno & Madera  
 Counties

## Some housekeeping tips for almond and pistachio growers

*Gurreet Brar, UCCE Farm Advisor Fresno & Madera Counties*

Dear growers, this is the time of the year when we monitor and inspect our trees for any possible issues that can threaten the next year's crop. As the old saying goes, 'an ounce of prevention is worth a pound of cure', spending some time monitoring the trees and taking orchard sanitation measures can help prevent a lot of pest and disease issues the following crop season. Here is a to-do list of some cultural practices that you must do in the coming weeks:

### Almonds:

#### *Monitoring for diseases:*

Monitor the leaves for the rust lesions. On the upper surface of the leaves, rust appears as small, yellow spots while on the lower side these spots are rusty red because of the rust-colored spores erupting through the surface. Spread of rust is favored by humid conditions. Rust fungus survives from one season to another through the infected leaves that keep hanging on the trees throughout the dormant period. These infected leaves can carry the inoculum to the spring and when spring rains provide humid conditions conducive for the fungal growth, the disease can spread quickly.

In order to prevent the inoculum buildup and carry over through the winters, we need to watch for any leaves that show rust lesions. If any leaves with the lesions are found, apply zinc sulfate (20-40 lb/acre) in early November. This will hasten the leaf fall and thus prevent the inoculum from building up. Application of zinc sulfate also provides the trees with the necessary dose of zinc.

Shot hole fungus lesions on the leaves also pose the threat in the same way. Shot hole lesions on the leaf begin as tiny reddish specks that enlarge into bigger spots that have tan centers and purplish margins. At this time of the year, we need to look for the fruiting structures of this fungus, which appear as small dark speck in the center of the spots. These fruiting structures are typically formed after the fall rains begin, because that is when the fungus right temperature and humidity conditions are present which favor the production of fungal spores. These fruiting structures can be easily seen with a hand lens.

If you are able to find shot hole lesions/fruiting structures, application of zinc sulfate as described above is recommended.

#### *Orchard sanitation:*

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This is one cultural practice that cannot be overemphasized. Removal of mummy nuts from your orchard is of the utmost importance in your pest management program to control navel orangeworm (NOW). The larvae of navel orangeworm overwinter in mummy nuts either in the trees or on the ground. Therefore, the effective removal of mummy nuts offers the most effective control for this pest. Mummy nuts can be removed from the trees by mechanical shaking and by hand poling. In the San Joaquin Valley the recommendations are to clean mummies to less than one per tree by February 1. The rule of thumb is to assume that every mummy nut on the trees is equal to 1% NOW damage the next year. Further, removing mummy nuts from the trees is just not enough- you must also disk or flail mow them before March 15.

Another important consideration is removing mummies from the rogue/abandoned trees around your orchards in places like canal edges, backyards etc. After emerging in spring, the NOW moths can travel several miles around. Therefore, an abandoned tree with lot of mummies just across the road may also become a major threat to your trees even when you took great care sanitizing your own orchard.

### Pistachios:

In pistachios also, orchard sanitation helps reduce the incidence of pests and diseases. Blighted shoots provide inoculum during the current growing season as well as the following spring. You should prune the trees to destroy the infected, dead and dying branches in order to reduce the sources of inoculum for *Botrytis* blossom and shoot blight and *Botryosphaeria* panicle and shoot blight.

During post harvest period, consider applying zinc sulfate to the young trees of up to 6 years age. This will induce defoliation to prevent frost damage and also provides zinc nutrient for the next growing season.

To monitor for mealy bugs look for the sooty mold on the leaves and mealy bugs within the clusters. Also check trees trunks and primary scaffolds for the presence of mealybugs. Take a map of your orchard with you and mark the location of the

trees that have the presence of mealybugs. This will help in effective control of this pest in the next spring.

For orchard sanitation recommendations regarding NOW, follow the mummy nut removal guidelines described above in almonds section. After knocking nuts off of the trees, disking them in is recommended. Pistachios may germinate in the ground, which helps take those nuts out of the picture. Some growers wait for the winter rains before they start shaking the trees, but keep in mind that wet soils can make it difficult for the shakers to move and work.

Soil residual and burn down herbicide combinations need to be applied during the first or second periods of rainfall taking advantage of rainfall activation. Consideration needs to be given to the weeds spectrum when making herbicide selection.



A. Rust Lesions and B. Shot Hole Lesions. In late fall, monitor for rust and shot diseases and if you see any leaf lesion like above, you may consider applying zinc sulfate (20-40 lb/acre) to hasten leaf fall in order to reduce disease inoculum.

## Lethal paradox canker continues to emerge in southern San Joaquin Valley Orchards

*Elizabeth Fichtner, Farm Advisor Tulare County*

Plant pathologists seem particularly adept at providing fear-inspiring names to new diseases and maladies, such as “Sudden Oak Death” or “Thousand Cankers Disease”; however, such names appropriately illustrate the manifestation of symptoms and provide a catchy name to enhance memory retention of associated diseases. Following this precedent, lethal paradox canker (LPC) similarly holds true to its name as it continues to cause mortality of California walnuts on the hybrid rootstock.

### Symptoms of LPC

On the tree surface, both LPC (Fig 1A) and *Phytophthora* cause dark, viscous ooze or bleeding. When the bark is peeled away, however, LPC symptoms are distinct from those caused by *Phytophthora*. The cankers associated with LPC have more discreet, often lobed, margins than those caused by *Phytophthora*, and may exhibit concentric growth rings in the necrotic tissue (Fig 1B). Additionally, LPC has not been observed on Northern California black rootstock which is susceptible to root and crown rots caused by several species of *Phytophthora*. *Phytophthora* species are common inhabitants of aquatic ecosystems and are generally introduced to orchards via irrigation with surface (ie. canal) water. LPC has been observed in orchards that have historically been irrigated with ground water, and are therefore at lower risk of introduction of *Phytophthora*. Early symptoms of LPC may include small bleeds on the rootstock (Fig 1C) and a general canopy decline, but the canker will envelope the rootstock, girdling the tree and causing mortality. In Tulare County, the most recent reports of LPC have been in ‘Tulare’ and ‘Chandler’ blocks, and generally in orchards ranging from approximately 10-15 years old.



Figure 1. A) The initial symptom of lethal paradox canker is bleeding on the rootstock. B) As symptoms progress, the canker girdles the tree, and a black, viscous ooze stains the base of the tree.

## Research Advances.

The cause of LPC is yet unknown. Although it is commonly thought to be a disease, a causal agent has not yet been identified and the potential for an abiotic cause of LBC is still under consideration. Working with UCCE Farm Advisors throughout the state, Dr. Greg Browne, USDA-ARS and Dr. Ravi Bhat, UC Davis, sampled over 50 trees in 6 counties and have generated a library of putative pathogens. To date, inoculation of healthy trees with putative pathogen isolates from symptomatic trees did not yield characteristic LPC symptoms. Consequently, the team has continued to sample symptomatic trees throughout the 2013 growing season in search of



Figure 2. A) Arrows point to the lobed canker margins that are characteristic of lethal paradox canker. B) Arrows point to concentric rings within the canker tissues.

a new suite of putative pathogens for future pathogenicity testing.

In 2013, our UCCE Tulare County research team mapped LPC incidence in four Tulare County orchards and are continuing to monitor the spatial and temporal spread of LPC within affected sites. Visualization of the trajectory of spread may assist in the development of hypotheses of potential causes of LPC. As of September 2013, the mapped orchards under investigation in Tulare County exhibited 1-3% LPC incidence. Our research team will continue monitoring disease progress during the 2014 field season and welcome the opportunity to visit new orchards with emerging LPC symptoms.

## Statewide Pistachio day

January 29, 2014

Visalia, CA



Register by December 29 (early bird rate)- \$30  
After December 29, registration increases to \$35

On-site registration will be \$40.00

For more information, visit the event website

<http://ucanr.edu/sites/pistachioday/>

Complete the form on the registration page, select payment type, submit, and follow the instructions on the following page

**See you there!**

## Tri-county Walnut Day

February 6, 2014

Visalia Holiday Inn

More information in the next issue of  
'From The Shell' ...

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DECEMBER 3-5, 2013 • SACRAMENTO, CA

**Each year,** The Almond Conference planning team raises the bar to ensure that The Almond Conference is better than ever. With an expected 2,500 attendees and greater representation from all growing regions, this year's conference includes many upgrades. Research updates and plenty of time to interact with industry experts are at the top of the list of improvements.

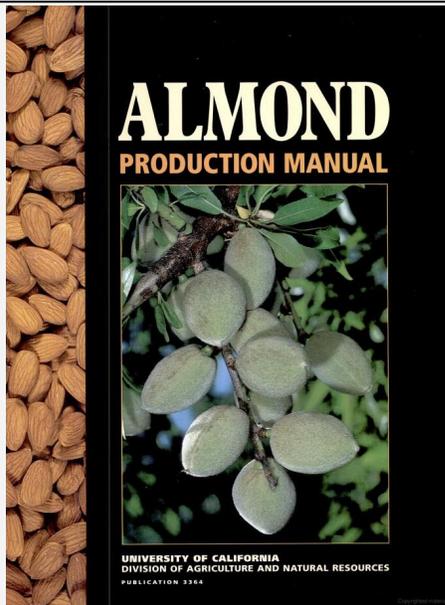
Mark your calendar December 3-5, 2013, and register today at [AlmondConference.com](http://AlmondConference.com).

# 2013

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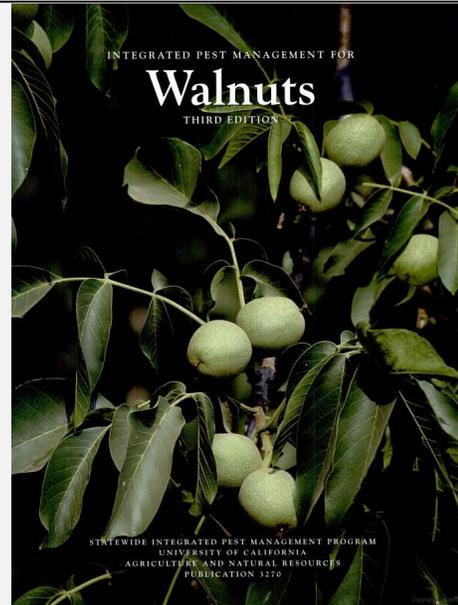
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## Important UC Resources for Nut Crop Growers



### Almond Production Manual

**Author:** WARREN MICKE  
**Inventory Type:** Paperback  
**Language:** English  
**Length:** 294 pp.  
**\$30.00 / EACH**



### Integrated Pest Management for Walnuts

**Author:** LARRY L. STRAND  
**Inventory Type:** Paperback  
**Language:** English  
**Length:** 136 pp.  
**\$30.00 / EACH**

**The Almond Doctor**

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**AUTHORS:**

- David Doll
- Franz Niederholzer
- Brent Holtz
- Roger Duncan
- Brad Hanson
- Joe Connell
- Allan Fulton

**KERNEL GUMMING - HOW MUCH ARE YOU SEEING?**

*Posted by David Doll / September 16, 2013 / Posted in Almond / 2 Comments*

I have had several calls and sample submissions in regards to kernel gumming on "Nonpareil" kernels. In one case, as much as 5% of the kernels have been rejected. Many farmers and consultants are speculating that it is leaf footed plant bug (LFPB) damage. I am unsure of the exact cause, but the observed symptoms do not always match LFPB.

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**SUSTAINABLE NUTRIENT MANAGEMENT- A REVIEW.**

*Posted by Franz Niederholzer / September 08, 2013 / Posted in Almond / No Comments*

Almond harvest looks to be progressing well (knock, knock). Orchard fertility/nutrition planning for the 2014 is beginning. Now is a good opportunity to review the basics of almond orchard nutrient management. While

The Almond Doctor- a blog started by David Doll, University of California Farm Advisor for Merced County, contains articles on a variety of topics related to nut crops production, written by UC farm advisors and other researchers. Here is the link to the blog- <http://thealmonddoctor.com>

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Statewide Integrated Pest Management Program

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- Ag Pest Management: Citrus, Peppermint and Walnut updated.
- Invertebrate pests: new index and menus
- Pest Notes: Asian Citrus Psyllid and Huanglongbing Disease revised

**Home, Garden, Turf & Landscape Pests**

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Website of UC IPM program is a great resource for not only agricultural and horticultural crops, but for home, garden, landscape and natural environment pest issues as well. Go to <http://www.ipm.ucdavis.edu/> for find more about UC IPM program and pest management guidelines.

## Picture Speaks a Thousand Words



**Gill's mealybug** is primarily known as a pest of pistachios. On rare occasions it also infests almonds. Mealybugs can defoliate almond trees and aggregate on the trunk in the winter (left). Parasitoids are the primary means of control in almonds; their presence can be confirmed by looking at mealybug mummies (right). (Text/Photos by D. Haviland, UCCE Kern County)

**'From the Shell'** is produced by UCCE Nut Crops Farm Advisor Gurreet Brar. Contact him for further information, or to be added to the e-mail list, at (559) 241-7526; or e-mail: gurbrar@ucanr.edu



*Our programs are open to all potential participants. Please contact the Fresno County UCCE office (two weeks prior to the scheduled activity) at 559-241-7515 if you have any barriers to participation requiring accommodation.*

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