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## Preparing for Harvest

By David Doll, UC Cooperative Extension, Merced County

With the cooler spring temperatures, harvest looks to be about seven to ten days later than a “normal” year. As we finish up with hull-split applications, it is time to start considering harvest time preparations.

### **Water Management:**

In order to determine the last pre-harvest irrigation, a target harvest date must be set. Approximately four to fourteen days are required to "dry down" the trees to minimize bark damage from shaking. This time period varies with soil textures, with sand and clay requiring less and more time, respectively. This depletion of soil moisture tightens the bark to the trunk and prevents damage from the shaker attachment. Also, as the season progresses, the bark adheres tighter to the trunk. Therefore, with an earlier harvest, the chances of shaker damage are increased.

In soils of low water holding capacity (i.e. sand/sandy loams) it may be necessary to irrigate between the harvesting of the varieties. Proper water management between varieties is just as critical as water management before harvest because during this period fruit bud is developing for the next season. Moderate to severe water stress during this period will reduce the formation of fruit bud.

### **Timing of Harvest:**

Harvest timing should be considered using the following criteria:

- The need to avoid naval orange worm damage to nuts on the tree and ant damage once nuts are on the ground;
- The ability to achieve maximum nut removal;
- The ability to maintain yield and quality;
- Minimization of tree injury;
- Availability of harvest equipment;
- Weather conditions that may cause crop loss or damage (i.e. rain).

### **Damage caused by Navel Orange Worm and Ants:**

Early harvest prevents the damage caused by Navel Orange Worm(NOW). The NOW moth prefers to lay its eggs on almonds that are still in the tree, thus almonds that are shaken before emergence of third generation larvae will have less damage than almonds shaken later. Growers of Nonpareil should begin the harvest before this upsurge in worm pressure begins. Later harvesting varieties may have more exposure to NOW.

With Ants, it is just the opposite. The longer the nuts are on the ground to dry, the more ant damage can be expected. Many growers therefore place baits (Clinch, Esteem, or Extinguish) 6-8 weeks prior to harvest to selectively reduce the ant populations that fed on the almonds. If the populations of the almond feeding ants are still high at harvest, it is possible to control ants by making an application of broad spectrum insecticide (Chlorpyrifos) to the soil surface to kill any emerged ants.

### **Achieving maximal nut removal:**

The formation of an abscission layer between the nut and peduncle is needed in order to shake the almonds from the tree. Once the abscission layer has formed, nut removal will be as good as it is going to get. Letting the hulls dry too long on the tree may cause a higher frequency of stick-tights, either causing a loss of crop or requiring a second shake. A good, properly timed shake should remove about 99% of the nuts.

### **Determining when to begin harvest:**

To determine the start time of the harvest, strike a tree limb and see how easily the nuts come off. If conditions appear to be about right, test shake a few trees. Once 99% of the nuts are shaken from the test trees, begin shaking the entire orchard. Determining when to shake the whole orchard should not just rely on nut removal. Upon shaking, observe the bark to see if any damage has occurred. Check for signs of bark breakage, water soaking, or wet lines on the shaker pads. If any sign of tree injury is observed, wait a few days and try again. Bark damage is one of the main means of entrance of the scaffold and trunk pathogen *Ceratocystis fimbriata* .

Mechanical shaking can be tried as soon as the interior orchard trees reach 100% hullsplit. For mature trees, tree nut removal is maximized when shaking at 100% hullsplit. Once the nuts are shaken to the ground, a hullable product should be expected within two weeks.

## **Hull Sampling at Harvest to Determine Boron Deficiency**

Roger Duncan, Pomology Farm Advisor, UC Cooperative Extension, Stanislaus County

Boron is one of the most common nutrient deficiency in Northern San Joaquin Valley almonds. While zinc and nitrogen are commonly applied to area orchards, boron is often neglected. If you haven't applied boron TO THE GROUND recently and your orchard is east of the San Joaquin River, you are most likely deficient. Boron is essential for pollen tube growth. There are no obvious foliar symptoms of moderate boron deficiency, but less than optimum boron can reduce nut set. Analysis of mature almond hulls is a much better indicator of boron status than a leaf analysis. Wait until harvest to collect hulls because they will continue to accumulate boron while splitting.

Trees with hull boron levels of less than 120 ppm may benefit from a postharvest boron spray (1-2 lb of a 21% B product in 100 gallons of water per acre). This will help with pollen germ tube growth in the flowers next spring but will not improve overall boron status of the tree. Hull boron of less than 80 ppm indicates the need for a ground application. Fertilize with the equivalent of 10 – 20 pounds of a 21% boron product per acre. Boron can be injected through micro-irrigation systems, broadcast or sprayed on the ground, or included in a herbicide spray. Herbicide sprays containing glyphosate may need to be buffered to prevent reduction of herbicidal activity. Hull levels over 200 ppm indicate excessive boron.

## **Replanting Almonds? Interested in free fumigant?**

We are looking for a location to perform an almond replant trial testing the efficacy of various fumigant and fumigant alternatives compared to methyl bromide. The orchard will need to have a history of bacterial canker/ring nematode. These orchards tend to be on sandy soil. In return for hosting the trial, we will provide the fumigant for the area being tested. If you are removing an orchard this fall, looking to replant back into almonds, and interested in hosting a trial, please let us know – 209-385-7403. Ask for David.

## **Managing European Grapevine Moth in San Joaquin Valley Vineyards**

Stephen Vasquez, Walt Bentley and Lucia Varela

### **Introduction**

European grapevine moth (EGVM), *Lobesia botrana*, was recently found in Fresno County. Traps set in the southeast portion of Fresno County, detected a small population of European grapevine moth (EGVM) in the Fowler/Del Rey farming community. The moth finds resulted in a quarantine being placed on a 96 sq mile area that will necessitate special management protocols for growers. The insect has the potential to cause great economic harm to California's diverse grape industries. Common to Europe and the Mediterranean, European grapevine moth has been intercepted across the US where international travelers, cargo and/or mail disembark from planes originating from overseas. Currently, the grape industry organizations, the University of California and local, state and federal governments are working hard to eradicate EGVM from Fresno County and end the quarantine.

### **What Does It Mean To Be A Quarantine Pest?**

A quarantine is "triggered" when two adult moths or one egg, larva or pupa are found within a three mile area. The quarantined area covers a five-mile radius from the location of the first properly identified insects. A quarantine area could also become larger if additional insect life stages are found further from the "original" location. When a quarantine is in place for a specific pest (i.e. EGVM), movement restrictions out of the quarantine area are placed on all commodities and their respective products. In the case of EGVM, grapes for crush, raisin and table, as well as fresh fruit other than grapes, nursery stock and green waste coming from host material are regulated. To move restricted plant material out of the quarantine area, growers must sign a [compliance agreements](#).

### **European grapevine moth identification**

[European grapevine moth](#) adults can be confused with American grape berry moth (*Endopiza viteana*) native to the eastern United States or European grape berry moth (*Eupoecilia ambiguella*). These two species are not present in California. Wings of the invasive European grapevine moth, *L. botrana*, have a mosaic pattern mottled with black-brown and cream blotches, and gray-blue bands. Fully grown larvae tend to develop a purple cast after feeding and will often be found inside the berry or the cluster. Samples should be taken to a trained entomologist affiliated with the local Ag

Commissioner, university or state for proper identification and documentation. It is important to note that samples should be enclosed in a sealed container, jar, or vial if found prior to moving the insect (all stages) from an infested site.

### **Damage**

Damage can be seen to both grape flowers and developing fruit. Larvae feed on flowers prior to and through bloom. At peak bloom, larvae protect themselves forming nests by webbing flowers parts together and feeding on neighboring flowers and parts. Second and third generation larvae feed on berries hollowing and contaminating them with excrements. Cultivars that naturally have tight clusters—like Chardonnay, Pinot noir and Zinfandel—will suffer the most damage. Much like infestations from other worm pests, feeding damage will lead to infections by bunch rot fungi. Raisin and table grape cultivars will also experience damage, especially when bloom is prolonged due to weather, making flowers less responsive to applications of gibberellic acid used for bloom thinning. Table grape cultivars with tight clusters have the least tolerance for the moth due to fruit feeding damage and contamination with webbing, excrements and rot. All life stages are found in vineyards infested with European grapevine moth but larvae from the second and third generations have been found to be the most damaging when fruit is maturing.

### **Host range**

The [host range](#) for European grapevine moth is diverse. In addition to *Vitis vinifera* (cultivated grape), they may also feed on other fruit like cherry, nectarine, persimmon, plum, pomegranate and olive (flowers only). However, they do not complete the three generations on these hosts. Larvae may feed on alternate hosts when the fruit is ripe, thus, they serve as hosts in backyards and not in commercial operations. It has been documented that some grape cultivars are preferred for oviposition. Plants should be inspected for eggs, larvae and pupae. Larvae can be found in flower or fruit clusters along with webbing and in berries or other fruits. Pupae may be found inside a silken cocoon, inside clusters, and under the bark of any of the previously mentioned host. At this time regulations are in place regarding the movement of fruit or other plant material from Napa County and other locations that have had positive finds. Trapping beginning at budbreak, using a commercially available pheromone has been the best approach to monitoring vineyards for activity. Pheromones attract males to traps and are used to follow European grapevine moth flights. With cooler fall temperatures, adult moths will be absent and only the diapausing pupal stage inside a silken cocoon can be found protected by grapevine bark. In the spring, as the weather warms, the moths will emerge and begin their [lifecycle](#) of laying eggs, developing into larva, pupating and emerging as moths. It has been suggested that San Joaquin Valley growers may experience at least three generations. Growers should consult with their County Agriculture Commissioner or University of California personnel to determine the best approach to monitoring and properly identifying European grapevine moth.

### **Management**

Currently, EGVM management is being focused on the second generation of EGVM in the core quarantine area of Fresno County. To date, ten moths have been trapped, with the most recent finds being considered the second moth flight. Because the population is small, it is difficult to identify the optimal time to apply insecticides. Therefore, it is important to follow UC Guidelines regarding this pest because it is not established in the San Joaquin Valley. Management strategies are being developed on the best information that is available and the experience of the grape industry in Napa and Sonoma Counties. The second moth flight has also begun June 10 in the Napa area where EGVM abundance is much greater than in the San Joaquin Valley.

It is important to note that insecticides will be less effective after bunch closure, which makes the current application timing critical. There are several reduced-risk [insecticides](#) registered for use in grapes to control tortricid larvae. These include insect growth regulators, spinosyns, and *Bacillus thuringiensis*.

There are also the traditional insecticides that work well against EGVM too. However, growers should consult with their PCA, packer, shipper or other industry personnel responsible for marketing their fruit so the best management protocol can be identified and implemented. Growers should note that financial assistance is available to those located in the core quarantine area from [National Resource Conservation Service](#) (NRCS) to help offset the cost of insecticides. Growers should contact their local NRCS office for the most recent information.

The most recent moth find has prompted the industry to strongly encourage growers to apply insecticides now in order to minimize further moth development and spread. Don't hesitate. Act now. This is the time for all grape growers to join the fight to eradicate this destructive pest from our valley.

Pay attention for future information from University of California and industry organizations on EGVM. In the meantime, if you have any questions please do not hesitate to contact your University of California Cooperative Extension farm or IPM advisor, Ag Commissioner or industry representatives.

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<http://anrcatalog.ucdavis.edu/pdf/8383.pdf>

# Good Agricultural Practices Reduce Microbial Contamination

Janet Caprile, UC Cooperative Extension

Salad crops are particularly vulnerable to microbial contamination as they are eaten raw and have an edible portion that comes in contact with the ground or irrigation water. ANY crop that can be eaten raw can cause foodborne illness, if contaminated. This includes MANY of the tree fruits (apples, apricots, cherries, peaches, nectarine, persimmons, plums, etc.) and vegetable crops (green beans, sweet corn, sweet onions, green garlic, tomatoes, fresh herbs, cucumbers, melons, summer squash, peppers, etc.).

Contamination can come from soil, water, manure, equipment, workers, or animals. It can occur either in the field or in the packing shed. This might be a good time to review your production practices for possible points of contamination and correct them before next season. Keep in mind that once produce has been contaminated, removing or killing the pathogens is very difficult. The best approach is to prevent the contamination in the first place. Below, are points to consider:

## Manure and Animal management

- Hot compost or age manure before field application
- Incorporate manures/composts prior to planting
- Maximize the time between application and harvest
- Don't top dress with fresh manure or manure "teas"
- Exclude domestic animals (dogs, livestock, poultry) from fields during the growing and harvesting season
- Minimize wild animals in fields
  - Have an active control program for rodents (squirrels, voles, etc.)
  - Bare buffers around fields can discourage rodents, reptiles and amphibians from entering fields
  - Eliminate cull piles, food residues and other attractants for wild animals

## Water used for crop production

- Check irrigation water for fecal coliform contamination
- Be aware of water that passes close to livestock or sewage treatment areas.
- Foliar applications made within 2 weeks of harvest should be from potable water.

**Worker health and hygiene:** Hepatitis A outbreaks have been linked to infected workers. Any workers who touch fresh produce can contaminate it. This includes pickers, sorters, graders, packers.

- Train workers about microbial risks and proper procedures
  - Wash hands before handling produce
  - Wash hands after using the restrooms
- Supply soap, clean water, single use towels *and enforce their use.*
- Provide clean restrooms and *enforce their use.*
- Be careful when moving or servicing toilets to prevent leakage
- Provide bandages to handlers with cuts or lesions.
- Gloves should be kept clean if they touch produce.
- Re-assign sick employees to non- food contact jobs.

## Field & Harvest Sanitation

- Harvest bins, equipment, implements and surfaces that touch fresh produce should be cleaned and sanitized daily.
- Remove excess soil in the field
- Minimize crop bruising and damage

**Packing and Post Harvest:** *Water that contacts fresh produce after harvest is widely recognized as the most essential pathogen control point.*

- Use potable water for cooling, washing, dipping, grading, etc.
- Use potable water for making ice
- Chlorinate wash water and monitor levels and pH
- Pay special attention to water quality in dump tanks and re-circulated water
- Cool produce quickly to minimize potential pathogen growth
- Clean and sanitize staging, loading & food contact surfaces regularly
- Keep birds and rodents out of packing and storage areas

You can find more detailed information at:

UC Good Agricultural Practices website: <http://ucgaps.ucdavis.edu>

<http://anrcatalog.ucdavis.edu/pdf/8102.pdf>

UC Small Farm Center: <http://www.sfc.ucdavis.edu> (Click Program Areas, then Food Safety)

### **Farmers should make a skin check a priority**

"More than 11,000 Americans die each year from skin cancer," says Dr. David M. Pariser, a dermatologist and president of the American Academy of Dermatology. "But when detected early, skin cancer has a cure rate of 99 percent. Since research shows farmers are among the least likely workers to receive a skin examination by a physician, it's important that farmers perform regular skin self-examinations, which could mean the difference between life and death."

It's as easy as "ABC" to remember how you can identify a mole or lesion that needs the attention of a dermatologist:

Asymmetry (one half is unlike the other)

Border (irregular, scalloped or poorly defined)

Color (varies from one area to another)

Diameter (the size of a pencil eraser or larger)

Evolving (changing in size, shape or color)

To help farmers minimize their risk of skin cancer, the American Academy of Dermatology recommends that everyone be Sun Smart:

\* Use water-resistant sunscreen with a sun protection factor (SPF) of at least 30 on all exposed skin, before heading out to the field or pasture. Re-apply approximately every two hours, even on cloudy days.

\* Wear long-sleeved shirts, pants, a wide-brimmed hat and sunglasses.

\* Stay in the shade when possible, and make sure your tractor has a sun umbrella. The sun's rays are strongest between 10 a.m. and 4 p.m.

\* If working near water, snow or sand, seek extra shade because these surfaces reflect the sun's rays and increase your chance of sunburn.

\* Look at your skin after each harvest. Ask a partner to help. If you notice any moles or spots changing, growing or bleeding, make an appointment to see a dermatologist.

The Academy offers a downloadable Body Mole Map with information on how to perform a skin exam and images of the ABCDEs of melanoma. The mole map is available at [www.aad.org/checkspot](http://www.aad.org/checkspot). The site also has information on how to find a free cancer screening from a dermatologist in your area.

Performing a skin self-exam requires regularly looking over the entire body, including the back, scalp, soles of the feet and between the toes, and on the palms. It is important to use both a full-length mirror and a hand-held mirror to see the scalp, back and buttocks.

For more information about skin cancer, visit the SkinCancerNet section of [www.SkinCarePhysicians.com](http://www.SkinCarePhysicians.com).

### **Free on-line!**

Understanding Your Orchard's Water Requirements

<http://anrcatalog.ucdavis.edu/pdf/8212.pdf>

Ground Squirrel

<http://www.ipm.ucdavis.edu/PDF/PESTNOTES/pngroundsquirrel.pdf>

Nutsedge

<http://www.ipm.ucdavis.edu/PDF/PESTNOTES/pnnutsedge.pdf>

Understanding, Planning & Paying for Long Term Care

<http://anrcatalog.ucdavis.edu/pdf/8382.pdf>