



# The Pomology Post

Madera County

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## Anthrax



**A**nthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in hoofed mammals and can also infect humans. Symptoms of disease vary depending on how the disease was contracted, but usually occur within 7 days after exposure. The serious forms of human anthrax are inhalation anthrax, cutaneous anthrax, and intestinal anthrax. Initial symptoms of inhalation anthrax infection may resemble a common cold. After several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is often

fatal. The intestinal disease form of anthrax may follow the consumption of contaminated food and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhea.

Direct person-to-person spread of anthrax is extremely unlikely, if it occurs at all. Therefore, there is no need to immunize or treat contacts of persons ill with anthrax, such as household contacts, friends, or coworkers, unless they also were exposed to the same source of infection. In persons exposed to

anthrax, infection can be prevented with antibiotic treatment.

Early antibiotic treatment of anthrax is essential—delay lessens chances for survival. Anthrax usually is susceptible to penicillin, doxycycline, and fluoroquinolones. An anthrax vaccine also can prevent infection. Vaccination against anthrax is not recommended for the general public at this moment but perhaps could become a possibility. More information can be found on Anthrax at the Center of Disease Control website, [www.cdc.gov](http://www.cdc.gov).

## Navel Orangeworm in Pistachios and Almonds

Many of my pistachio growers reported increased levels of NOW last season. With such increases in NOW being reported, perhaps we should review the best strategies for its control. Orchard sanitation is a major part of a successful almond pest management program. Implementing this cultural practice will significantly reduce orchard navel orangeworm (NOW) populations, in turn reducing our reliance on insecticides at hull split and disruption of biological control.

The goal of orchard sanitation is to reduce the overwintering of NOW in

the orchard by reducing their source of food. In fact, studies have shown good orchard sanitation to be quite successful with reductions in NOW populations ranging from 50 to 80 percent. If sanitation is not accomplished what is the impact on NOW population? NOW overwinters and spends its first generation in spring in mummy nuts. Therefore, from November to June, mummy nuts provide the food source for the developing worms. Studies have shown that one mummy can provide enough food for twelve worms. In Madera County it is common to find orchards with 400 to 1,000 mummies per tree. If we assume an 18 percent infestation with two worms per nut, we would have between 10,800 to 27,000 worms per acre. If this population is not managed through sanitation, the new crop will face egg laying females in the thousands to millions.

Sanitation should begin with mummy removal by February and mummy destruction by mid March. Shaking and poling must be complete prior to bud swell. This is important to reduce the loss of buds, a problem more evident in Merced and Thompson varieties as the fruits and buds are closer together. Varieties with a more open suture harbor the greatest populations of NOW, therefore these varieties should be tackled first to ensure one has ample time and weather to achieve good sanitation.

Shell hardness, seal, time and duration of hull-split all influence susceptibility placing Merced, Thompson, Nonpareil, Fritz, Ruby, Butte, Price, Mission, and Carmel from most to least susceptible. This

does not mean other varieties should not be sanitized. In fact, all varieties should be sanitized because NOW can overwinter using the hull as a food source as well. Although time before the deadline is reached there are some biological reasons to accomplish sanitation earlier outside of the meteorological aspects we have touched on.

A top notch program would begin with early shaking and hand poling to maximize the help of birds and *Goniozus* for the remainder of the winter and early spring. Remember the most effective sanitation is achieved one or two days after a rain or foggy morning which softens the fiber and increases the weight of the nuts. The berms should then be blown placing all nuts in the centers. Discing or flail mowing the centers should finish the job. I have observed some orchards where nuts have developed in the centers resulting in an uneven surface. Time should be invested to correct this problem, thus maximizing mummy destruction via mowing. Quality control is the next; all orchards should be walked counting the total number of mummies per tree. The total number of mummies per tree can be accurately quantified by counting mummies on 20 trees per every 10 acres. This may sound time consuming however, it is time well spent. Our goal is two mummies per tree.

Winter sanitation is most effective when carried out on an area-wide basis. This is to say that the maximum benefits of winter sanitation will be realized when both you and your neighbors clean your orchards.

## **Bud Failure Plagues Carmel and Nonpareil**

Non-infectious bud failure or crazy top is dramatically worse this year in many Carmel orchards in Madera County. Bud Failure is more common in the Carmel variety, but Nonpareil, Merced, Price, Thompson, Mission, and Harvey also have well documented cases of bud failure. Crazy top is a genetic disorder which appears when portions of the affected tree bloom but do not leaf out. The first obvious manifestations of bud failure appears in spring when vegetative buds on vigorous shoots of the previous year's growth fail to emerge. Often the buds on the basal part of a shoot are unaffected whereas buds on shoots produced as later flushes of growth are severely affected. These patterns of bud failure develop because the growing points in lateral vegetative buds died the previous summer and fall. Flower buds are usually unaffected and develop normally even when on the same node with a severely necrotic bud. In some years flowers on bud failure-affected branches may set profusely and produce nuts even though few leafy shoots are present. In other years the number of flower buds can be severely reduced, indicating that bud failure reduces flower initiation and fruiting wood. In bud failure affected trees the time of bloom is often delayed.

Researchers at UC Davis who have studied bud failure have shown that symptom development is different in California depending on the location of the orchards. Bud failure was found to develop more frequently and severely in locations with higher average summer temperatures, with

the rate of bud failure directly proportional to average temperatures above 80 degrees. If the average critical temperatures were above 90 degrees trees had a much greater chance of developing bud failure (Figure 1).

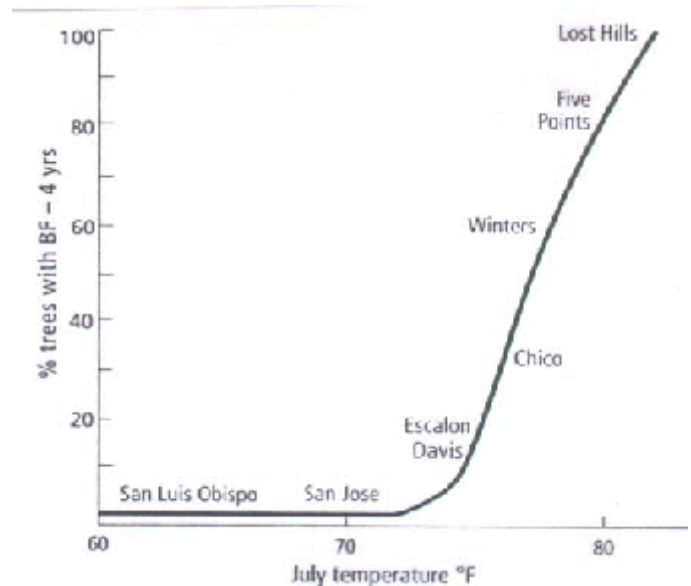
What do growers do once bud failure symptoms appear? Pruning can do little to permanently eradicate bud failure. Symptoms and yields will fluctuate yearly depending on temperature patterns during the previous summer as well as on the amount of new growth. Because yield depends on vigor, growth reduction is not a viable control option. By avoiding moisture stress, particularly in midsummer, the grower may keep symptoms from worsening. In general, no program of management to date has consistently controlled bud failure symptoms once they have developed.

After symptoms appear a grower may consider several options. If young trees between the ages of two and four years old are already showing bud failure I would recommend removing them. The decision to replace a tree involves evaluation of the potential yield loss, the time required to bring replacement into production, and the projected life of the orchard. Replacement is expensive and effective only if the new trees planted do not also get bud failure. The earlier that symptoms appear in an orchard or tree the more severe bud failure will ultimately be, with a greater potential for yield loss. Usually nurseries will replace trees without cost if symptoms show in the first 4 years (may vary depending on nursery). Tree replacement is most effective when the orchard is one to three years of age. At this age tree replants usually have no problems establishing.

If symptoms first appear in a tree when it is five to six years old, and if they appear mostly in the upper parts of the canopy and not in the main framework of the tree, yield may not be seriously reduced. As the age of a tree in which symptoms appear increases the need to replace it decreases and the cost of replacing an older tree may not be recoverable with the remaining life of the orchard. Thus with older trees, I would not bother to replace them for cost of tree replacement and loss of yield during replacement will not be offset by improved yield. If a grower wants to replace bud failure affected trees with other varieties, Sonora and Monterey are choices recommended by Mario Vivero (Kern County Farm Advisor) because they are good producers which bloom with Nonpareil, and Sonora will harvest with Nonpareil and Monterey will harvest with Carmel.

Long term control of bud failure in the almond industry will mean selecting propagation bud wood from sources with a low potential of showing bud failure. Researchers feel confident that they will some day develop tree lines which will be free of this genetic disorder. At the moment the best tree line that we have for Carmel is "FPMS #1." So make sure you ask your nursery for "FPMS #1".

**Figure 1** Correlation of the average summer temperatures at various locations and the average percentage of BF-affected trees produced.



Reprint freely with credit to: **Brent A. Holtz, Ph.D., Pomology Farm Advisor, University of California Cooperative Extension, Madera, CA.**

Sincerely,

Brent A. Holtz, Ph.D.  
Pomology Farm Advisor

## Winter Kill on Walnuts

by Weilbur Reil, UCCE Solano/Yolo Counties

It is still fall so why should I discuss winter kill in walnuts? Waiting until winter to do something is too late. About the only thing to do then is watch the limbs die unless you want to rush out and paint all the limbs and even this doesn't always help. The time to take action to prevent winter kill is now during the late summer and fall.

Damage can occur on both young and old trees although young trees although young trees are generally the most susceptible. Winter kill damages young trees that are growing very vigorously late in the fall. It also occurs on trees that are too dry. Generally it does not occur on trees that are hardened off and then watered properly in late fall. On mature trees the orchard is hardened off at harvest. Young trees should also be hardened off in mid to late September. Usually withholding irrigation water until all terminal growth ceases and no more reddish leaves are emerging is sufficient although full coverage irrigation systems may require a slightly longer, drying period. Water should not be withheld until older leaves turn yellow and drop. After hardening the tree off, resume a normal irrigation program. If the weather is dry like it usually is in the fall this may require more than one irrigation so that the tree has sufficient moisture and is not stressed.

Prevention of winter kill is therefore a two phase management program. Harden the tree off by stopping new terminal growth in late September then provide adequate moisture before the first freezing weather of the winter. Winter kill is usually most severe when warm weather extends into late fall with no freezing weather followed by a sudden cold spell of freezing weather. The freezing weather does not have to be very cold. I have seen damage at about 28F on very dry trees. The onset of cold weather needs to be sudden. Once the trees have experienced a few freezing nights they are quite capable of withstanding temperatures in the teens without damage. Winter kill occurs during the early or first freeze of the fall and usually on stressed trees or extremely young succulent growing trees. Protecting walnut trees at this time will prevent or greatly minimize winter injury.

## Pruning Almond Trees After Harvest

A pruning trial was conducted by Weilbur Reil (UCCE Yolo) at Harry Dewey's almond orchard which compared pruning mature Nonpareil trees each year in October, November, and December. Yield, trunk growth and leaf analysis were taken each year. The trial was designed to show if there way any deleterious effect to trees from pruning before leaf fall, for the fall is usually a good time to prune and many growers believe they need to wait until January or February before they can prune.

In Wilbur's study, pruning mature almond trees in October and November before leaf fall had no effect on yield, growth or nutritional levels when compared to dormant pruning. Removing limbs after harvest should therefore have no adverse effect on the yield or nutrients levels the following year. Pruning in the fall can provide work at a time when few other activities occur in almond orchards. Wilbur's paper can be found in California Agriculture May-June 1991-Vol.45, No.3.

Also, I have seen what I believe are *Phytophthora* pruning infections, where the fungus entered the tree at the site of a pruning wound. In order for this to occur I believe moisture must have been present at the time of pruning, most likely either rain or fog. Also, there is a new disease in the San Joaquin Valley called Silverleaf, caused by the fungus *Chondrostereum purpureum*, which forms leathery fruiting bodies (mushrooms) in clusters on tree trunks and scaffolds. This fungus releases its spores during wet weather and can infect pruning wounds. Thus, I prefer that growers prune right after harvest when the weather is still nice and the wounds will dry quickly.

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UNIVERSITY OF CALIFORNIA  
**WINTER TREE FRUIT MEETING**  
 Wednesday, December 5, 2001  
 Dinuba Memorial Hall  
 249 S. Alta, Dinuba

8:00 - 8:30 am	<b>Registration</b>
8:30 - 8:40 am	<b>Welcome</b>
8:40 - 9:00 am	<b>Carlos Crisosto, Post Harvest Physiologist, Kearney Ag Center</b> <i>Understanding the Role of Ethylene During Stone Fruit Cold Storage</i>
9:00 - 9:20 am	<b>Scott Johnson, Pomology Specialist, Kearney Ag Center</b> <i>Experiences with Chemical Thinning of Plums</i>
9:20 - 9:40 am	<b>Shawn Steffan, Staff Research Associate, Kearney Ag Center</b> <i>Summary of Infestation and Costs in the Stone Fruit Pest Management Alliance</i>
9:40 - 10:00 am	<b>Kevin Day, Farm Advisor, Tulare County</b> <i>Pruning as an Aid for Labor Savings</i>
10:00 - 10:25 am	<b>Break</b>
10:25 - 10:40 am	<b>Harry Andris, Farm Advisor, Fresno County</b> <i>What's New on the Disease and Pest Front</i>
10:40 - 10:55 am	<b>Shawn Steffon, Staff Research Associate, Kearney Ag Center</b> <i>New Pest Pressure from Some Old Pests: Katydid and Diabrotica Beetles</i>
10:55 - 11:25 am	<b>Vito Polito, Professor, Department of Pomology, Davis Campus</b> <i>Flowering, Pollination and Fruit set</i>
11:25 - 11:55 am	<b>Ted DeJong, Professor and Department Chair, Davis Campus</b> <i>Environmental and Cultural Factors Limiting Fruit Growth and Size</i>
11:55 - 12:20 pm	<b>Video, UC Davis Communications Department</b> <i>Water Above and Below</i>
12:20 pm	<b>Lunch</b> <i>Catered by the Safari Club Restaurant - Dinuba</i>

**Cost: \$20 per person**

**Pre-registration no later than November 29, 2001**

**Send checks payable to "UC Regents" to:**

**JoAnn Coviello**  
**9240 S. Riverbend Avenue**  
**Parlier, CA 93648**

Note - Payment will be accepted at the door - no guarantee of lunch

PCA/PCO/CCA credit of 3 hours has been applied for.

## UPCOMING EVENTS

December 5-6, 2001 **29<sup>th</sup> Annual Almond Industry Conference**

Location: Modesto Centre Plaza at the DoubleTree Hotel.

Register by contacting the Almond Board of California, P. O. Box 3130, Modesto 95353,

Phone (209) 549-8262, FAX (209) 549-8267

Lunch each day \$10...opening night banquet \$20

March 1, 2002

**Agricultural Direct Marketing Strategies**

Location: Buehler Alumni Center, UCD

Register by contacting David Chaney ([dechaney@ucdavis.edu](mailto:dechaney@ucdavis.edu)) Or

Gail Feenstra ([gwfeenstra@ucdavis.edu](mailto:gwfeenstra@ucdavis.edu)) or telephone (530) 752-7556

Conference fee: \$60