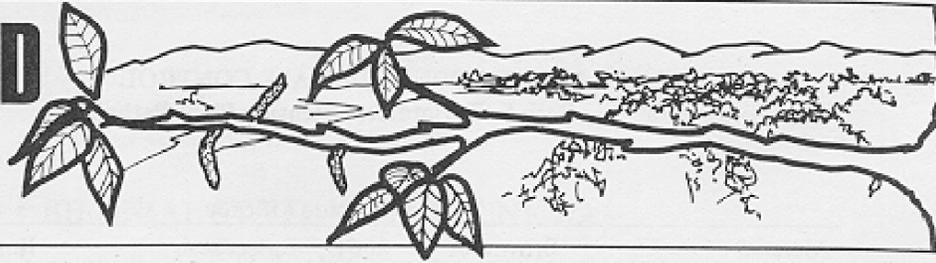


# ORCHARD FACTS



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To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

## Walnut Blight

The following information was provided by Bill Olson and Rick Buchner, Butte and Tehama County Farm Advisors.

**Question: What is our best blight control treatment?**

The copper plus Manex® tank mix is the best walnut blight control we currently have. Data shows superior control on both "resistant" and "non-resistant" blight bacteria. A section 18 registration for 1998 has now been approved.

**Question: What is the best copper to use?**

For the most part, any good quality copper product works well when used at label rates. The key is to use the proper rate for the selected material.

**Question: What copper rate should I use?**

The standard suggestion is 4 pounds metallic copper (8 lbs. of a 50WP) per acre per application. However, new formulations are available which have changed the four-pound rule.

**Question: What about liquid and dry flowable copper products?**

The 4-pound metallic copper per acre rule does not always apply to new "EC" or "DF" formulations. Tests with these products at their respective label rates indicates comparable performance to other formulations particularly when combined with Manex®.

**Question: What happens if Manex® is not available for walnuts in 1999?**

Do the best spray application job you can with full rates of copper. Spray timing and coverage are critical for good walnut blight control.

**Question: Will the addition of surfactants/wetting agents improve disease control?**

No. For this particular disease, surfactants/wetting agents have not been shown to improve disease control and may increase phytotoxicity.

# Ground Squirrels

*Desley Whisson, Extension Vertebrate Pest Specialist*

With the onset of spring, ground squirrels emerge from their winter hibernation. Soon after, they begin to breed, and before you know it you have a squirrel problem on your hands.

The most cost-effective management strategy for ground squirrels is to control them before they have a chance to reproduce. Every female killed early in the season means about 8 fewer young to remove later if the control is delayed until young are active above ground.

In early spring, fumigating burrows is one of the most effective means of control. Fumigants work best at this time of year because soil moisture is relatively high, helping to retain a high concentration of the lethal gases in the burrow systems. Do not fumigate while squirrels are still hibernating because the squirrel plugs its burrow with soil, preventing fumes from reaching the next chamber. The plug cannot be seen by examining the burrow entrance.

You have 3 choices when it comes to fumigants:

(1) Gas cartridges: Gas cartridges are cylinders of combustible ingredients with a fuse. When ignited, they emit smoke and toxic gases. The cartridge is placed in the burrow entrance, the fuse lit, and the cartridge pushed well back into the burrow with a shovel handle. The opening is then sealed off with sod or soil and tamped lightly.

(2) Aluminum phosphide: Aluminum phosphide tablets or pellets react with atmospheric and soil moisture to produce phosphine gas which is lethal to all mammals. The label recommended number of tablets are placed in the burrow entrance. Crumpled newspaper is placed in the opening to prevent soil from covering the table and the entrance filled with sod or soil which is tamped firmly. Aluminum phosphide is a restricted use material and should be handled accordingly.

(3) Acrolein (Magnacide "H"): Acrolein is an aquatic herbicide which has vapors that, in high

concentration, are quite toxic to mammals. This volatile liquid is applied to the burrow system through a hose with a specially constructed wand calibrated to deliver a precise dose. The burrow entrances are sealed with sod or soil. Acrolein is a restricted use material that can only be used by licensed pest control operators.

With all fumigants it is necessary to examine the treated area about 3 days following the applicator to determine if any survivors have dug out. All opened holes should be retreated and sealed.

One way to conserve fumigants is to first fill in all of the burrow entrances with sod or soil. After about 3 days, squirrels will reopen their burrow systems. Fumigants need only be applied to active burrows.

As with any pesticide, it is important to read and follow label instructions with particular regard for safety factors and nontarget species. Gas cartridges have the potential to produce flames so should not be used where a significant fire hazard exists such as near buildings, dry grass, or other flammable materials. To avoid the accumulation of fumes in enclosed areas, never fumigate beneath buildings or in burrows that may open under occupied buildings.

Be aware of the signs of nontarget species such as kit foxes or burrowing owls inhabiting abandoned ground squirrel burrows. Do not treat a burrow if you suspect a nontarget animal is present. County agricultural commissioners can provide additional information on how to recognize active ground squirrel burrows.

Further information on ground squirrel control may be obtained from the county agricultural commissioner.



# How to Minimize PFA in Serr and Other Cultivars

*Steve Sibbett, Tulare County Farm Advisor*

PFA (pistillate flower abscission) is the condition where, at bloom, female walnut flowers (nutlets) enlarge to 1/8" to 3/16" mm in diameter, become necrotic and fall from the tree. In some cases, loss of all flowers in a cluster occurs, while in others only one flower abscises. In some orchards, PFA can result in as much as 80% flower loss of especially sensitive cultivars such as Serr. Such loss of flowers translates directly into yield loss. Serr yield was reduced substantially (on average 20%) due to PFA.

PFA is due in large part to excessive pollen load; PFA is much more severe in close proximity to pollinizer cultivars ironically placed in the orchard to improve yield. Note, when Serr sheds pollen during its female bloom, PFA was more severe than when Serr catkins shed pollen before female bloom.

## Managing PFA

*What situations should I be concerned about?*

Serr orchards with established pollinizers are at most risk, especially those rows close to the pollen source. As well, in those years when Serr pollen shed overlaps its own female bloom, excessive PFA will occur. Other poor cropping orchards, especially Chandler, should be observed for PFA.

*What about other cultivars?*

Although PFA has been noted to some extent in most cultivars, most problems have been

measured in Serr. Of concern is Chandler, especially in San Joaquin Valley. It exhibits moderate PFA when excess pollen conditions are optimal (i.e., next to pollinizer trees); up to 20% - 40% of its flowers can abscise with reduction in yield.

*How do I minimize pollen load contributed by pollinizers?*

There are two ways:

- 1) Catkin removal from pollinator cultivars, by shaking trees as catkins enlarge (before pollen shed), has been shown to reduce pollen load and reduce Serr and Chandler PFA to improve yield in the field. Two years' data shaking catkins from Franquette pollinizer rows in a Chandler orchard with modest PFA also resulted in reduced PFA and higher production than that part of the orchard where pollen was allowed to remain.
- 2) Where single rows or scattered pollinizers exist, their removal is recommended in those orchards with chronic PFA. Removing pollinizer rows dramatically reduced Serr PFA and improved yield.

In older, mature orchards this strategy should be viewed with more caution. Pollinizers contribute to the per acre yields and their removal eliminates that yield potential. We generally suggest that catkins be shaken from the pollinizer rows in a mature orchard to reduce pollen load. Removal may be appropriate in those older orchards where the pollinizer's yield is quite low due to crowding, or they are difficult to farm (harvest especially) because of their position in the orchard. **In isolated orchards, removal of all pollinizers is not recommended; leave enough pollinizer trees to approximate 2% of the total trees.**

*What about shaking catkins (pollen) from my main cultivar, in addition to pollinizer trees?*

Walnut trees exhibit dichogamy. That is, usually there is some degree of separation between pollen shed and the female bloom. When separation in the main cultivar is pronounced, little PFA occurs. When overlap occurs, degree of PFA is dependent upon the cultivar's sensitivity to PFA and the extent of overlap. Growers should observe bloom development, especially in Serr, and when overlap is expected, catkins should be removed (shaken) from those trees as well. The degree to which this is problematic in Chandler (i.e., high PFA due to own pollen) is unknown.

*When should I shake catkins for best removal?*

Catkins need to be shaken before pollen shed occurs. Shaking is best timed when the first catkin naturally falls in the orchard; that's the beginning of pollen shed. At that time, most catkins are enlarging, stiff and easy to shake.

*If I remove the catkins from pollinizers, will it adversely affect yield of my main variety?*

No! You will not remove all of the catkins with a light shaking. We have not observed or measured a yield loss of Serr (and Chandler in the San Joaquin Valley) that is not offset by yield gain by reducing PFA. Indeed, yields have improved with this practice.

*If only a small percentage of catkins is removed by shaking, should I reshake the trees?*

Growers have done this and have been pleased with the results as additional catkin/pollen removal occurs.

## Botryosphaeria Panicle

## and Shoot Blight

*Article supplied by Themis J. Michailides, Plant Pathologist*

Botryosphaeria panicle and shoot blight caused by *Botryosphaeria dothidea* has become a disease of major importance for pistachios grown in California in the last 10 years. Initially this disease was a problem only in pistachios grown in the Sacramento Valley, and was not a major concern for the majority of pistachio growers, since only a small acreage of pistachios is grown in Northern California. In the last 4 to 5 years the disease has spread and caused significant losses in pistachios grown in the San Joaquin Valley. Based on the levels of destruction this disease can cause in an orchard, it is now considered the most serious threat to pistachios grown in California.

### **Symptoms, Signs and Diagnosis of the**

**Disease.** Depending on April temperatures, wilting shoots first appear in late April, early to mid May, and during June. Infected shoots quickly turn black and their leaves wilt and dry. Later, blighted shoots and leaves become distinctly brown. Infections on fruit clusters turn black, usually starting at the basal (because of infection of buds) or branching points of the rachis. Infection of rachises result in blighted clusters with the fruit adhering to the stem.

Infections of leaf stems or leaf midribs are black in color and result in leaf blight. Secondary infections on leaves start as small, angular or round, black lesions that enlarge and become large brown lesions with chlorotic margins. Secondary infections of fruit also start as small black lesions which enlarge, turning hulls black. Eventually, the hulls of infected nuts become characteristically light gray to silvery color with small black spots which are the pycnidia of the fungus inside the hull tissue. Only 2 to 5 nuts

may have the characteristic light gray color, while the rest of the blighted nuts are brown. By September, distinct cankers can be found on shoots surrounding infected clusters, leaf stems or buds. Under favorable conditions during August, the disease can increase to epidemic proportions within 2 or 3 weeks and can kill most of the clusters of the trees. Under these conditions, the fungus can invade the 2-year old wood from infected clusters and produce pycnidia in the resulting long lived cankers.

Rains in the late spring may be important for the spread and development of *Botryosphaeria* blight. In addition, both hemipteran insects, which are very common pests of pistachio, and birds can be important vectors of the disease, especially when they are present in a highly infested orchard. The fungus overwinters on the tree inside the infected shoots (cankers), panicles, buds, leaf stems, infected fruits, and leaves. Pycnidia of the pathogen can provide viable spores for at least 6 years (1997, *unpublished research*). Hot and humid conditions in the orchards seem to favor the disease; optimum growth of the pathogen is at 80 to 85EF.

**Control Strategies.** Control of *Botryosphaeria* blight will be difficult. Most tested fungicides were not effective in controlling the disease. Since *Botryosphaeria* sporulates profusely on dead branches left in trees or on the orchard floor, removal of this food source is essential to reduce the inoculum level. Pruning and removing the brush seems to keep the disease under control in orchards lightly infected. Therefore, a combination of control approaches should be tried. The following methods are suggested.

A) *Orchards with Botryosphaeria blight just starting to show.*

### ***Cultural control suggestions***

- e Use sprinkler with low trajectory angle so that irrigation water does not reach the tree canopy (for orchards irrigated with sprinklers).
- e Apply short irrigations.
- e If possible, use drip irrigation and avoid flood or sprinkler irrigation.
- e Run irrigation systems with lower pressure to minimize fogging and humid conditions.
- e Survey trees in orchard yearly to detect and prune out the first blighted shoots and clusters; repeat pruning for two growing season.
- e Maintain a weed-free orchard floor to reduce humidity and hemipteran insect habitat.

### ***Chemical control suggestions***

Fungicide sprays were found to be ineffective in orchards already heavily infected, where the growth of the pathogen within the tree keeps pace with tree growth. However, some of the fungicides showed some disease reduction in orchards moderately infected by *Botryosphaeria* blight. A benomyl spray at early to full bloom can reduce the disease.

**Integrated Control.** For effective control of *Botryosphaeria* blight, a combination of approaches is needed, depending on incidence of the disease in orchards:

Prune blighted shoots and clusters during summer. Prune infected shoots and clusters

about 2 inches below the canker. Pruning brush should be moved outside the orchard and burned, or chopped immediately to allow time for decomposition. Note, it is easier to spot the infected shoots and clusters before mid-August as the disease symptoms are very obvious during this time. If pruning is done carefully and systematically, it can eliminate disease from the orchards. Apply benomyl each year during bloom.

B) *Orchard with high levels of Botryosphaeria blight.*

Fungicide sprays have been ineffective in orchards which are already heavily infected. Here, severe pruning before harvest is recommended in order to remove as many of the infected shoots and clusters as possible. This

should be followed with additional pruning during the conventional pruning period, and by a benomyl application at early bloom the following spring. Irrigation should be conservative to avoid development of high humidity, but without imposing stress on the trees.

## Pest Management Updates

We will be monitoring Peach Twig Borer, San Jose Scale, Navel Orangeworm and Codling Moth in local orchards. I plan on making this information available weekly through e-mail. If you have e-mail and would like to receive these updates, please call our office at 865-1107.

**COOPERATIVE EXTENSION**

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