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Spring Treatments for Fruit Tree Insects

For customers who grow fruit trees, March is the time to start preparing to manage two serious insect pests—codling moth on apples, pears, and walnuts and spotted wing drosophila on cherries. Unmanaged, both of these insects can be devastating to the crop.

Codling Moth

The immature stage of the codling moth is the infamous “worm” in the apple or pear (Figure 1). This pest spends the winter as a mature larva in a pupal case on trunks of trees or in debris around the home orchard. When spring temperatures rise in March, pupae mature and adult moths begin emerging in late March to April. Moths mate and lay eggs on leaves. Eggs hatch several weeks to a month later, and the larvae almost immediately bore into small fruit that has just begun to develop.



J. K. Clark, UC

Figure 1. Codling moth larva and frass in pear.



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Figure 2. Various types of pheromone traps can be used to monitor for codling moth.

To control codling moth with insecticide sprays, you must apply the spray to target the larva just after it hatches and before it bores into fruit, where it will be protected. This requires very careful timing. Sprays applied well before larvae hatch or after larvae bore into fruit won't be effective.

Spray Timing with Pheromone Traps and Degree-days. The best way to time sprays is to hang pheromone traps in trees in early to mid-March to find out when moths are emerging and mating (Figure 2).

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Spotted Wing Drosophila

Spotted winged drosophila (SWD), *Drosophila suzukii*, is a fruit fly that first arrived in California in the late 2000s and now is present throughout most of the state (Figure 1). It can attack various berry crops including strawberries, raspberries, blackberries, and blueberries; however, in backyards most complaints come from gardeners who grow cherries.



M. Hauser, CDFA

Figure 1. The adult male (shown here) of the spotted wing drosophila has a black spot on its forewings but the female doesn't.

Unlike other fruit flies that attack fruit only after it has ripened and is starting to deteriorate, SWD attacks healthy fruit on the tree just before the fruit ripens. On trees with mid- to late-season ripening varieties, almost every cherry can be affected. Unfortunately, gardeners don't often notice the infestation until harvest. By then it is too late to do anything to manage the problem.

Adults lay eggs inside fruit just as it begins to ripen, creating tiny pinprick holes (Figure 2). Eggs hatch into small maggots that feed internally in the fruit. Infested fruit may often have a number of maggots (Figure 3).

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L. L. Strand, UC

Figure 2. Several small punctures or “stings” in this cherry indicate where eggs have been laid. Spray when you see the first sting.



L. L. Strand, UC

Figure 3. Spotted wing drosophila larva on a damaged cherry.

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New Snail and Slug Ingredient Now Available in California

For the last 30 years, home gardeners have been using mollusk (snail and slug) baits that contain metaldehyde. About 10 years ago, iron phosphate came on the market and is now also widely used. Recently, a new active ingredient, **sodium ferric EDTA**, has started showing up on the shelves. You can find this active ingredient in new formulations of Corry's Slug & Snail Killer as well as Dr. T's Slug & Snail Killer, Slugexx, Ferroxx, Ironfist Slug & Snail Bait, and Amdro Snail Block Slug & Snail Killer. Depending on the brand, they will contain 2 to 6% active ingredient.

Although all these active ingredients are effective against snails (Figure 1) and slugs (Figures 2 and 3), there are important differences. Metaldehyde works very quickly, and your customers will see foaming and dead snails by the morning if they apply it at night. However, metaldehyde can cause poisoning and even death to dogs and other mammals that might feed on it.

Iron phosphate is much safer but also much slower acting. Snails may stop feeding on plants after consuming iron phosphate baits but can take up to seven days to die. On the plus side, iron phosphate may be more effective during high humidity or rainy conditions than metaldehyde.

The newest active ingredient, sodium ferric EDTA, works in a similar manner to iron phosphate but is somewhat faster (three days instead of seven). Because EDTA is used to make the iron (ferric) more available and therefore kill the mollusks faster, your customers should still be cautioned that these new products, as well as the others, ought to be used in a way so that pets and children won't be tempted to eat the pellets. Also point out that recommended application rates for sodium ferric EDTA may be somewhat lower than iron phosphate (Table 1).

To be most effective, products containing any of these active ingredients should be broadcast or spread, not piled, near areas



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Figure 1. Brown garden snail.



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Figure 2. Tawny slug on strawberry.



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Figure 3. Gray garden slugs.



C. A. Wilen, UC

Figure 4. Don't pile snail baits. The white iron phosphate pellets in this photo show a proper scattering technique.

Table 1. Comparison of rates and active ingredients for some snail and slug products.

| Product example | Active ingredient | oz/100 ft ² * | Remarks |
|--------------------------------------|--------------------|--------------------------|--|
| Ortho Bug-Geta Snail and Slug Killer | metaldehyde | 0.3 | Apply to the ground only, not plant parts. Moisten the ground before applying. |
| Sluggo | iron phosphate | 0.8-1.6 | |
| Dr. T's Slug & Snail Killer | sodium ferric EDTA | 0.9 | |

*Read the label and apply as directed. These rates are for the products in the example.

where the mollusks are causing damage (Figure 4). Customers should also be reminded to remove plant debris and other snail and slug hiding places as well as avoid overwatering, which increases mollusk activity.

For more information about snail and slug management, see *Pest Notes: Snails and Slugs* at <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7427.html>.

Briefer versions of this information, called Quick Tips, are also available on the UC IPM Web site both in English, <http://www.ipm.ucdavis.edu/QT/snailsslugscard.html>, and Spanish, <http://www.ipm.ucdavis.edu/QT/snailsslugscardsp.html>.

—Cheryl Wilen, UC Statewide IPM Program, South Coast, cawilen@ucanr.edu

Wet Weather Increases Outbreaks of Fire Blight in Apple and Pear Trees

If it's been rainy when apples, pears, quince, cotoneaster, and pyracantha are in bloom, be prepared for customers complaining about the sudden blackening and death of branches and blossoms on their trees.

This malady is called fire blight, because affected branches appear as if they've been scorched by fire (Figure 1). The disease is caused by the bacterium *Erwinia amylovora*, which commonly enters these trees and shrubs through blossoms when conditions are wet.

Once damage symptoms are seen on new tree growth, it is too late to spray. However, infections can be pruned out of trees in summer or during the dormant season. If you choose to prune in summer, wait until all chance of rain has gone and disinfect pruners with a 10% bleach solution to reduce chances of further spreading the disease.

All discolored tissue plus healthy wood at least 8 inches below the damage must be removed (Figure 2). It is important to remove infected wood because it can be a source of new infections in subsequent years (Figure 3). In the dormant season, inspect trees for scars left by fire blight and also prune out infected wood 8 inches below darkened areas in wood.

In areas where fire blight is a problem every year, or during especially rainy springs, a spray of copper soap or copper ammonium complex can be made just as blossoms open. Sprays should continue at four- to five-day intervals as long as rainy weather continues and blossoms remain on the tree. Make sprays late in the day as a precaution against injury to bees; also, don't apply sprays when it is actually raining. Once blossoms are off the tree, sprays will be ineffective.

When planting new trees, customers in fire blight-prone areas may wish to consider apple or ornamental pear varieties that are less susceptible; most edible



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Figure 1. Terminals of affected branches look as if they've been scorched by fire.

pear varieties are quite susceptible. Varieties of ornamental pear trees that are less susceptible to fire blight are Capitol and Red Spire, while Aristocrat is highly susceptible. Among the more susceptible apple varieties are Fuji, Gala, Golden Delicious, Granny Smith, Gravenstein, Jonathan, Mutsu, Pink Lady, and Yellow Newtown. Also, too much nitrogen can increase fire blight, so warn customers against overfertilizing.

For more information about managing fire blight, see *Pest Notes: Fireblight* at <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7414.html>.



J. K. Clark, UC

Figure 2. Prune back fire blight-infected branches at least 8 inches below the infection as indicated here by the dark wood. Green wood is healthy.



J. K. Clark, UC

Figure 3. Bacterial ooze on a twig with a fire blight infection.

—Mary Louise Flint, UC Statewide IPM Program and Entomology, UC Davis, mlflint@ucdavis.edu

New Resources

UC IPM recently released two new titles in its Pest Notes series of publications about home, garden, landscape, and wildlife pests.

Goldspotted Oak Borer, <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74163.html>, contains detailed biological and management information for this invasive pest that is killing California native oaks in woodlands and landscapes in San Diego County. It has been recently found in Riverside County and will likely invade other areas of California.

Poison Hemlock, <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74162.html>, is poisonous to humans and other animals and can be a particular problem in grazing areas or when it contaminates fresh forage, harvested silage, or hay.

To access more than 160 other titles, visit UC IPM's Pest Notes Web page, <http://www.ipm.ucdavis.edu/PDF/PESTNOTES/index.html>.



Codling Moth ... continued from Page 1

Check the traps daily, and note when you start seeing moths being caught consistently for two days in a row when sunset temperatures are above 62°F. At this time, you can run a phenological (degree-days) model on the UC IPM Web site, <http://www.ipm.ucdavis.edu/calludt.cgi/DDMODEL?MODEL=CM>, that will tell you when eggs are likely to hatch and the best time to spray.

Spray Timing by Monitoring Stings on Fruit. For those who don't want to use pheromone traps and calculate degree-days, sprays can be timed, although less accurately, by monitoring the first stings on fruit. Stings are the entry points of larvae and are marked by tiny mounds of reddish-brown frass (Figure 3). Start looking for them three to four weeks after bloom, and spray as soon as you see the first sting.

Insecticides. Available effective spray products for codling moth include spinosad, carbaryl, and codling moth granulosis virus (Cyd-X). Cyd-X is the safest product for use around bees and other beneficial insects but isn't available in many stores. Spinosad is an organically acceptable product that is very safe for people, pets, and the environment, although it is more toxic to beneficials than Cyd-X. Spinosad can be made more effective by adding 1% horticultural oil to the spray mixture. After the first spray, two additional sprays at 10-day intervals should be applied. Carbaryl is also effective and doesn't need to be sprayed as often, but it is quite harmful to natural enemies and bees.



J. K. Clark, UC

Figure 3. Codling moth sting on pear.

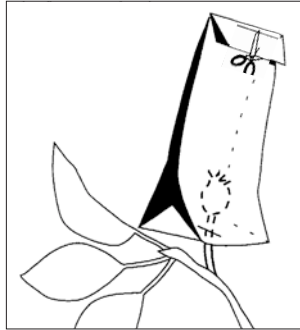


Figure 4. Small fruit may be protected with paper bags. A 1-inch cut on the fold at the bottom of the bag equals a 2-inch cut.

V. Winemiller

Nonchemical Control. For customers who don't want to use insecticides, suggest covering selected fruit with paper lunch bags four to six weeks after bloom when fruit is 1/2 to 1 inch in diameter (Figure 4). Remove the bags a week or so before harvest.

For more about pesticide sprays, degree-days, bagging, and other nonchemical methods, see *Pest Notes: Codling Moth* at <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7412.html>.

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SWD ... continued

Fruit turns mushy and brown and is sometimes invaded by secondary bacteria or fungi.

Home gardeners who had SWD infestations last year will probably want to take some steps to reduce the problem this year. If cherries weren't infested last year, gardeners with cherries should regularly check ripening fruit for damage before unnecessarily treating with a pesticide. They may also wish to hang a fruit fly trap baited with pure apple cider vinegar to help with detection.

Timing Sprays. Sprays should begin as soon as fruit begins to turn from yellow to pink (usually about two to three weeks before harvest). If you didn't have damage from SWD last year, look for stings on fruit to confirm an infestation. You can also hang a fruit fly trap baited with apple cider vinegar and check regularly for fruit flies with spotted wings. If infestations were significant last year, it is probably advisable to treat. In any case, spray when stings are first seen. A second spray should be applied 7 to 10 days later, but be sure to observe the preharvest interval on the label. The only organically approved less toxic insecticide known to be effective on SWD is spinosad. Other products such as malathion can be used, but these are very toxic to natural enemies and bees and can lead to outbreaks of secondary pests.

Gardeners should be urged to clean up and destroy any cherries that drop on the ground or remain infested on trees. Remaining cherries will provide harborage for another generation that can attack later-maturing fruit. Other nonchemical methods that may help are covering branches with a very fine mesh netting well before ripening begins and harvesting early.

For more information, see *Pest Notes: Spotted Wing Drosophila* at <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74158.html>.

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For more information about managing pests, contact your University of California Cooperative Extension office listed under the county government pages of your phone book, or visit the UC IPM Web site at www.ipm.ucdavis.edu.

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