



## *Codling Moth in the Home Orchard*

Codling moth – the infamous “worm” in the apple – is difficult to manage in the home orchard. Soon after hatching, the caterpillars bore into apples, pears and walnuts to feed, leaving reddish brown droppings (frass) behind. Early maturing fruit varieties are less likely to suffer damage. Use an integrated pest management (IPM) approach that combines several of the methods described below. Trees that are heavily infested every year require carefully timed sprays.

### **CODLING MOTH LIFE CYCLE**

1. Mature larvae overwinter in cocoons under bark and pupate in spring.
2. Adult moths emerge in mid-March to April and mate after sunset temperatures exceed 62° F.
3. Tiny disc-shaped eggs are laid on fruit or leaves.
4. Hatching larvae immediately bore into fruit.
5. Larvae feed within fruit until mature, then drop to the ground to pupate in the soil, debris or under tree bark.
6. There are two to four generations per year in California.

### **REDUCE CODLING MOTH WITH SANITATION PRACTICES**

Proper sanitation practices will help minimize problems.

1. Promptly remove infested fruit from trees. Look for larvae entry points (“stings”) marked by tiny mounds of red-brown frass.
2. Rake up and destroy dropped fruit as soon as it falls, especially in May and June.
3. Sanitation alone won’t control the pest but is very important for reducing pest populations.

### **PROTECT FRUIT WITHOUT CHEMICAL SPRAYS**

Bagging protects fruit without chemical sprays, even with severe infestations. Bag the fruit when it is ½ to 1 inch in diameter – about four to six weeks after bloom. Here’s how:

1. First, thin the fruit to one per cluster.
2. Cut a 2 inch slit in the bottom of a standard lunch bag.
3. Slip the fruit through the slit, then staple the bag shut.
4. Remove bags just as fruit are ripening.



**Please minimize the use of pesticides that pollute our waterways. Use nonchemical alternatives or less toxic pesticide products whenever possible. Read product labels carefully and follow instructions on proper use, storage and disposal.**

### INSECTICIDE EFFECTIVENESS:

→ Insecticides are effective **ONLY** when sprays are precisely timed to kill caterpillars just as they hatch. The most effective way to time insecticide sprays is with a pheromone trap and a degree-day calculation, the method commercial growers use.

- The pheromone trap will tell you when each generation or flight begins.
- The degree-day calculation will tell you just when egg hatch will occur and when the next generation should begin to fly. Calculate degree-days with a maximum-minimum thermometer and a degree-day chart, or use the automated weather stations and degree-day calculator located on the following UC IPM web page: <http://ipm.ucanr.edu/calludt.cgi/DDMODEL?MODEL=CM>.

### PROCESS:

1. Hang a pheromone trap in your tree in March and check it every few days for moths.
2. Start applying insecticides as soon as degree day calculations indicate eggs are hatching or as soon as you see “stings” on the fruit.
3. Use new stings or degree-day calculations to initiate new sprays for second and third generations.

### USE INSECTICIDES WHEN INFESTATIONS ARE SEVERE

1. In the case of severe infestations, the most environmentally sound approach is to combine low toxicity biological insecticides (Cyd-X or Spinosad) with non-chemical methods such as sanitation. Only if these environmentally benign methods have not been effective should the use of the more toxic product containing carbaryl be considered.
2. Granulosis virus (sold as Cyd-X) is a safe biological pesticide that won't harm bees or other beneficial insects. Add 1% horticultural oil to increase effectiveness and spray to cover thoroughly. Apply weekly after eggs hatch (when you see the first stings) or beginning 200 – 250 degree-days after you begin to see male moths in pheromone traps (see section above for information on calculating degree days).
3. Spinosad is a biological product made from a naturally occurring bacterium called *Saccharopolyspora spinosa*. It is a lower-toxicity material that is safe for most beneficial insects as well as for people, pets, and the environment, although it is more toxic to beneficial insects than is granulosis virus. Three sprays should be applied at 10 day intervals at the beginning of the season (first egg hatch), and two additional sprays per egg hatch at 10 – 14 day intervals later in the season.
4. Carbaryl (sold as Sevin) is effective when properly timed at 14 to 21 day intervals beginning at 250 degree-days or at the first sting. **Please note:** This product is very toxic to natural enemies, honey bees and other non-targets. It can also cause water quality problems. Sevin should not be used within one month after bloom as it can cause fruit drop.

For more detailed information on Codling Moth management (and photos), please see the UC IPM web site: <http://ipm.ucanr.edu/PMG/PESTNOTES/pn7412.html>