Codling Moths, *Cydia pomonella*, attack apples and pears. Males are attracted by pheromones, not visual cues (unlike the apple fly maggot). They have been significant pests in apples and pears for the past 200 years.

The larvae enter the fruit and move directly to the core, where they feed (unlike apple fly maggots, which feed on flesh throughout the apple). As they eat, the larvae push their excrement out of the fruit through the entry hole, where it appears as frass. The larvae leave trails from the skin, where they enter, to the core. Damage occurs to the fruit throughout the summer and fall.

**Life Cycle.** In order to reduce infestation by codling moth, it’s important to understand—and interrupt—the insect’s life cycle. Like the apple maggot fly, it has three stages: adult, larvae and pupae.

**Adult.** There are typically two generations of adults. The first adults begin to emerge in late April/early May and can be seen flying around trees from May through July. They lay eggs immediately, usually on leaves. Once these larvae hatch, mature, and pupate, a new generation of adults can emerge in late summer (mid-July to early September). Adults are slightly larger than a house fly (about ½”) and are speckled gray-brown.

**Larvae.** Damage to fruit is done by the larvae. They emerge in 1 – 2 weeks, enter the fruit and move to the core, where they eat seeds and flesh. After about a month they leave the fruit to pupate. The full-grown larva has a dark head capsule and thoracic shield (unlike the apple fly maggot, which is all white). The later (2nd generation) larvae do more damage than earlier larvae.

**Pupae.** Mature larvae leave the fruit and tuck themselves under loose bark scales on the tree, in leaf litter at the base of the tree, or on nearby objects. They form cocoons prior to pupating. The cocoon is creamy gray.

**Sanitation.** Harvest all infested fruit before the maggots emerge to pupate. Pick up all fallen fruit at least twice a week and dispose of these safely. Do this for two years. This interrupts the life cycle by destroying maggots before they become pupae.

**Banding.** Banding the tree trunk with corrugated cardboard or burlap will collect some of the larvae migrating down the trunk to pupate. Bands should be in place by mid-June, and even on smooth-barked trees, where they work best, bands only collect a percentage of the larvae. Remove bands and destroy the cocoons once a week and inspect the tree bark for cocoons. With burlap bands, fold the burlap into bands that are about 5” wide and wrap the band around the tree about 1-1/2 times with the folds facing down. It should be 2–3 feet from the ground. For cardboard bands, use a 4” strip of large-core corrugated cardboard and wrap it around the tree so that the tubes are vertical. It should be about 18” or more from the ground. Make sure the bands are snug.

**Traps.** Because the codling moth is attracted by pheromones, a pheromone jelly plus an insecticide (permethrin) is used in traps to attract and kill male moths (e.g., LAST-CALL™). A new product, Pherocon CM-DA Combo, attracts and kills males and females.

Sticky traps with pheromone attractants can be used to monitor the number of codling moths in the vicinity. They aren’t useful for controlling moths.
Natural Predators. Most insect pests have some soil contact, especially in the pupal or larval stages. Natural predators eat these. The following predators eat insects:

- Chickadees, especially in early spring;
- True bugs (Pirate bug, Big eye bug)
- Lacewings, especially the Brown Lacewing. Lacewings are voracious, eating up to 100 insects per day. Lacewings can be purchased in the egg or larva stage.
- Ground beetle & Rove beetle (black, shiny beetles) predate in the soil, at the soil line.
- Parasitoids — act as both predator and parasite, often wasps. For example, the Trichogramma micro wasp lays its egg inside the moth egg; the wasp larva feeds on the contents of the moth egg. One female moth is able to parasitise over 50 moth eggs. These wasps are commercially produced in some places.
- Other natural enemies of the codling moth are tachinid flies, ichneumon wasps, bracconid wasps, chalcid wasps, carabid beetles, earwigs, ants and spiders.

Barriers and Bags. Bagging fruit provides a barrier against the codling moth.

When? Barriers must be put in place before the first codling moth appears. It’s most efficient to bag fruits when they are thinned—about three weeks after petal fall, when the fruit is the size of a dime.

Which fruit: Bag only the good fruit—that is, fruit that is hanging free from branches and exposed to the sun. Consider removing all non-protected fruit to cut down on the population of codling moths. Remove the lower, shaded fruits.

Types of barriers:
- Japanese 2-ply apple bags
- Sandwich bags of waxed paper or clear plastic
- White or tan paper sacks. May need to be replaced after rain. Apples won’t redden.
- Clear poly bags with drawstring closures
- Disposable nylon foot socks. Easy to put on, but less effective with codling moth.

Sprays

Nematodes can be watered into the soil around the tree or sprayed on the trunk in the fall. It eliminates local insects, including codling moth pupae. It only attacks insect pests, not beneficial insects.

Bacillus thuringiensis (bt) is a bacterial product which works on the codling moth larvae and affects only caterpillars, but needs to be timed just right. Insects must ingest the bacteria in order to be effected. Apply before the insects bore into the fruit where they are protected.

Spinosad, a bioinsecticide (Garden Alive’s ‘BullsEye Bioinsecticide’) marketed under the names “Entrust” and “Bulls-Eye,” is a natural control made from soil fungi. It contains a neurotoxin that kills the codling moth larvae, as well as a broad range of other pests, yet reportedly has only a limited toxicity to most beneficial insects. Care must be taken to avoid killing bees. Read the label carefully.