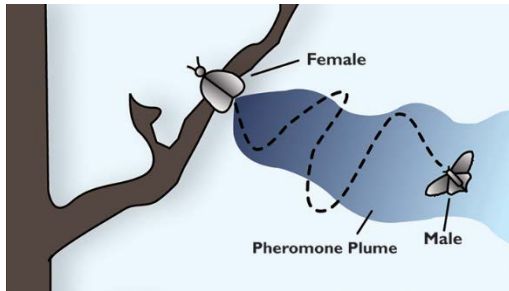




CODLING MOTH LIFE CYCLE

Adult Codling moths emerge from over wintering sites under bark, in bins, and on woodpiles, and begin flying in early May. These insects are referred to as the First Brood/Generation, Spring Brood/Generation, or the over-wintering Generation of codling moth.



Female codling moths release pheromone into the air; this “perfume” calls the males. Males follow the pheromone trail back to the female and mating takes place under the right environmental conditions. Mating occurs during twilight hours when temperatures are above 12°C to 15°C.

Females lay **eggs** on leaves or fruit. The Spring Brood female lays between 25 and 60 eggs singly or in groups of 2 to 3. Depending on temperature and humidity, 50 to 75% of the eggs hatch into tiny larvae (the “worms”). Male to female ratio of larvae is 50:50.



Larvae enter the fruit and feed for 16 to 24 days, depending on the temperature and apple variety. Larvae will go through 5 growth stages known as instars. 5th instar larvae, about 2cm long, exit the fruit to find a dry place to continue development. Codling moth larvae have now completed the feeding part of the lifecycle.



5th instar larvae spin **cocoons** of silk and remain in a quiet state for about 2 weeks. Some of First Brood larvae will enter **diapause** where they will put development on hold until internal and/or environmental cues break diapause.

Codling Moth Diapause allows insects to survive the winter or other unfavorable weather conditions and chemical controls (i.e., all insects are never in the same stage of development)

After diapause, larvae develop into **pupae** and it is during this stage that larvae change into adult codling moths.

Codling moths that emerge from the pupae stage the same year are known as Second Brood/Generation or Summer Brood/Generation. Females from the Summer Brood lay more eggs than the Spring Brood females, however the number of eggs that hatch still depends on the temperature and humidity. Larvae that do hatch from Summer Brood eggs will develop as in the Spring Brood. Most 5th instar larvae will enter over wintering diapause, to begin the cycle again the following Spring.

In warm years, a Third Brood/Generation or Fall Brood is possible. Because of cool fall temperatures, Third Brood larvae rarely survive to the diapausing stage.

Good Control of First Brood → Minimizes Second Brood

Good Control of Second Brood → Minimizes problems for the following year

For more information about the Sterile Insect Release Program please call Toll Free 1-800-363-6684 or visit our website at www.oksir.org.



CODLING MOTH CONTROL STRATEGIES

Choosing a codling moth control strategy -- consider the economic, environmental and long term implications of the control method(s). The best codling moth control results from using a combination of strategies.

The following control methods are NOT "stand-alone".

The Home-Owner

- Tree Pruning and Removal of All Infested Fruit
 - Summer pruning is advised throughout the growing season to improve air circulation and to remove broken, diseased or injured branches, waterspouts, and root suckers. Major removal of twigs and branches should be done during the dormant season, preferably before active growth begins in the spring.
 - Each week throughout the growing season check your fruit and pull off all infested fruit. Bag and send to the landfill or place infested fruit in a bucket of water for several days to drown the larvae. **DO NOT COMPOST.**
- Complete Blossom/Fruit Removal
 - This is the most effective method of control but it must be done during spring blossom. Prune and open the canopy during the dormant season (Nov to March) then snip off all blossom stems that appear in early spring. Fruit forms behind the flower petals so the whole bud (stem) needs to be removed.
- Chemical Spraying
 - Whether you hire a contractor or self-spray it is essential that your sprays are applied at the appropriate time.
 - Codling moth sprays are targeted at the egg/larvae stage as they hatch, or before they burrow into the fruit. If larvae have entered the fruit, spraying will be less effective and removal of the infested fruit will be necessary.
 - Spraying may not be 100% so you will need to supplement your spray program with regular pruning, thinning, monitoring and removal of infested fruit.
 - If you have a history of codling moth damage you may require more spray applications than your contractor applies or what is suggested on the spray label.

SIR Program

- Banding
 - Attach corrugated cardboard (banding) around tree trunks and scaffold limbs before July to collect mature larvae exiting fruit. Bands must be removed from trees and destroyed before the following Spring.
- Sterile Insect Release
 - The Okanagan-Kootenay SIR Program continues to release factory-reared, sterilized codling moths in **commercial orchards** in the program area. Sterile Insect Technology controls codling moth when the sterilized moths mate with wild moths thereby ending the reproductive cycle. Sterile insects must out-number the wild insects so it is important to keep the number of wild insects very low.



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