

Codling Moth Mating Disruption

Codling moth mating disruption should be considered the foundation of any apple pest management program. New insecticides that have been registered as reduced-risk alternatives to organophosphates are generally more expensive and require more intensive management to be effective. The key to successful codling moth control with these materials is to disrupt the life cycle in as

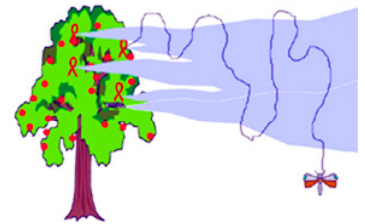
many places as possible. When mating disruption products are applied before moths emerge, mating is reduced thereby limiting the number of codling moth eggs that are deposited in the orchard. Reducing egg deposition results in a smaller population that will need to be controlled with insecticides. Mating disruption can reduce the number of supplemental insecticide appli-

cations necessary to protect fruit from injury, help reduce fruit injury in orchards where pesticide applications alone are not enough to provide acceptable control, and, in the long term, result in more stable and sustainable pest management programs. We estimate that 75% of Washington apple acres are currently treated with codling moth mating disruption.

How Does Mating Disruption Work?

Codling moth, and many other insects, rely on chemical signals to facilitate mate location. The female codling moth releases a specific chemical, a pheromone, that attracts the male moth. The male moth can detect extremely small amounts of this pheromone and will fly, sometimes significant distances, to locate the source, the female, in order to mate. Mating disruption dispensers release this same pheromone

and, when placed properly in an orchard, inhibit the ability of the male moth to locate and mate with the female. There are several pheromone dispensing systems available and research that focuses on optimizing dispenser systems continues. The mating disruption products that have proven to be the most reliable and that Washington apple growers have the most experience with are the hand-applied dispensers.



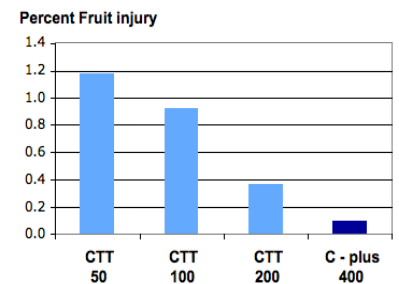
Pheromone released from dispensers inhibits the male's ability to locate and mate with the calling female.

Full label rates of these products range from 200 to 400 dispensers per acre. Each dispenser releases approximately 10,000 times more pheromone than a calling female.

How Many Dispensers Should I Apply?

Many year's of research have been devoted to optimizing application rates with hand-applied dispensers. Based on the data collected from these studies, we recommend that the full rate of any dispenser type be used unless there is a good reason to consider reducing the number of dispensers per acre. Reducing the number of dispensers per acre increases the

risk of crop injury or the need for supplemental insecticide sprays. Under a good pheromone-based codling moth control program it is possible to eventually reduce the number of dispensers per acre. A stable codling moth program in a low pressure orchard may include reduced rates of mating disruption, an insect growth regulator used to control leafroller larvae



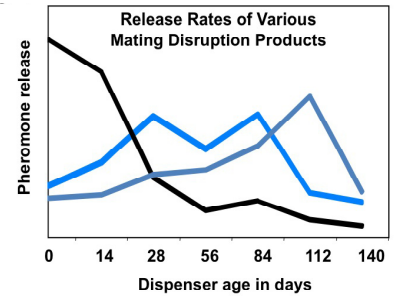
As the number of dispensers per acre were reduced crop damage increased.

and codling moth eggs, and spot treatments with one or more codling moth larvicides.

How Long Does Mating Disruption Last?

All of the hand-applied dispensing systems that are currently available [Isomate C Plus and C TT (Pacific Biocontrol), NoMate CM (Scentry Biologicals), CideTrak CM (Trece), and Checkmate CM-XL 1000 (Suterra)] have been designed to be applied one time per season in Washington conditions. Though each of these products has different release characteristics, all continue to release pheromone for about the same amount of time when

used in the same environmental conditions. In tests conducted at the Tree Fruit Research Center in Wenatchee, Wa., each of these products continued to release pheromone for approximately 140 days, which would indicate that products applied in mid April should continue to release pheromone until early September, or for the approximate duration of two codling moth generations. In locations where three generations of codling moth are expected,



additional control tactics may be required. Implementing a sound monitoring program will help determine if extra controls are necessary.

Monitoring in a Pheromone Treated Orchard

Introducing pheromone into the orchard environment through the use of mating disruption changes the relative attractiveness of the different lure types. In orchards that are not using pheromone treatments, or those treated with sprayable pheromone, the 1X lure is most attractive. In orchards using hand-applied dispensers, the high-load (10X) or kairomone/pheromone combo lures have proven most suitable. Trap catches in orchards with 400 disp/acre indicated significantly higher attractiveness of the Combo lure

than a 10X red septa. The increase in attractiveness of the combo lure makes it a good option in orchards that have a history of false negatives (i.e. no trap captures but incurring CM damage). Switching to a more attractive lure will not correct a situation where false negatives occur because too few traps are used. CM populations are often clustered and enough traps must be used to assess average activity throughout an orchard. We recommend one trap every 2 to 3 acres. Choose a lure you are comfortable with and stick with it.

CM Monitoring Systems:

- Use one trap every 2 to 3 acres.
- Maintain traps and lures to specifications.
- Keep trap entrance clear from obstructions.
- Place traps in upper 1/3 of canopy and at least 3 meters from nearest MD dispenser.

Be consistent with trap placement, lure maintenance, and record keeping.

Visit PMTP online at:
<http://pmtip.wsu.edu>

Next Newsletter: May 1

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