

Mating disruption for Codling Moth

I believe this technology has successfully moved from “cutting edge” to proven and available for any grower who wants to utilize it AND has the conditions for it to succeed. As with any technology, certain parameters must be understood and complied with to be successful. The information gleaned from most trapping programs is spotty and generalized. Attempting to detail manage codling moth from this information will eventually get you in trouble. I will attempt to summarize the basics, if you need more information call your fieldman or contact me.

Elements necessary for success

- Know your conditions, have a program — and follow it.
- Foremost is an understanding that Mating Disruption is not a robust, stand-alone control if codling moth damage was present last season. In nearly all cases it must be supplemented by chemical controls.
- There are no abandoned orchards or active bin storage piles in the immediate area.
- The orchard is not irregularly shaped with a high ratio of border and the canopy is reasonably uniform.
- Pheromone dispensers placement must be completed prior to bloom opening in Red Delicious
- Biofix, using standard (1x or DA combo lures), must be determined at a point outside the treated orchard to accurately time supplemental chemical control of the first generation.
- All Mating Disruption products must be kept cold until they are applied. Any product carry-over needs to be in cool storage.
- Place traps in orchards prior to full bloom on Red Delicious or Gala.

Techniques

Dispenser Placement

The Pheromone dispenser must be placed high in the tree, within the top two feet if possible. It must be securely attached to a portion of the tree that will not bend down with fruit load later in the year or be dislodged by wind. The border of the orchard should be treated at the full label rate unless it is bordered by another mating disruption block. The interior may be treated at a lesser rate if the codling moth pressure is known to be low. Known high-pressure locations within an orchard should be treated at the full label rate. Borders adjacent to bin storages should be closely monitored and supplemented with tank mixes of CM-F sprayable pheromone and pesticide as needed.

The pheromone dispensers should be placed in the orchard in as uniform a grid as possible. In orchards that have been interplanted, place all the dispensers in the larger trees to maintain pheromone height. The pheromone is heavy and will settle and flow into the space occupied by the smaller trees. Placing all of the dispensers that would have been used in the smaller trees to maintain a uniform placement grid into the adjacent mature trees has successfully protected two and four row renewal areas within older orchards. Single rows of mature trees in a replacement block with four to six rows of young trees between will be difficult if not impossible to control with mating disruption. Standard chemical control should be used in that situation.

Larger areas of bearing young trees must have the dispenser placed as high in the tree as possible, or attached to the trellising structure above the tree. Do not place the dispenser on the trellis wire, the wind will move it down the wire and destroy the uniformity of the placement. Also the wire will be warmer than the tree structure and will accelerate the pheromone release rate. You might not be covered for the full season in that case.

In orchards with uniform slopes, increase the dispenser density on the upper side (1/4 - 1/3) of the slope and reduce the density on the lower side by a corresponding amount. In orchards with rolling terrain, shift some of the dispensers from the low area onto the surrounding ridges.

Monitoring

Monitoring low codling moth populations in mating disruption blocks by trapping is unreliable. Managing your codling moth program from trap catch is like playing Russian roulette. Codling moth populations are never uniform unless they are very high. The trap only attracts reliably over about 4/10ths of an acre. This means that at a trapping density of one trap in 2 ½ acres you are monitoring 16% of the area. With one trap in 5 acres you are monitoring 8% of the area! A representative sample this small will not detect the presence of a small or non-uniform population. The first you will know about it will be damage showing up, usually in the second generation when adequate control is nearly impossible.

It is important to monitor low populations in suspected “hot spots” with a trap density of 1 or 2 per acre in the affected area. This provides coverage of 40% to 80% of the area and gives you a better chance of early detection.

The DA and DA combo lures, which attract both male and female should be used in conjunction with your 10X monitoring program. The combination of pear ester and pheromone seems to be more effective, especially in the second generation. The effective trapping area is similar to a pheromone lure; the comments about trap placement apply to it also

Trapping

If you have elected to monitor by trapping, the traps should be placed in the orchard at the same time as the pheromone dispensers. They must be in place before bloom to properly monitor the entire generation.

The traps must be properly assembled to provide the opening as it was designed. Improperly assembled or weathered wing traps may have the opening reduced enough to restrict entry or be so open the moth does not contact the catching surface. Either situation will render your trapping less effective and less reliable.

Delta traps are easily serviced and will retain their shape for several seasons if removed from the orchard over the winter. Mark the trap according to the pheromone used (codling moth, leafroller, etc) combining or switching pheromones will lower the efficiency of the trap.

The traps must be placed as high in the tree as possible, never in the lower ½ of the canopy. A 6-foot bamboo rod taped to the wire handle of the trap makes a very easy to use hanger and allows you to place the trap well into the top of the tree. Place the trap 5 to 6 feet away from the nearest pheromone dispenser if possible.

Trap locations should be clearly marked with a bright, non-fading ribbon (orange and pink are best) in the tree, around the base of the tree, and at the end of the row. A trap that is highly visible in May can be completely invisible by early July, or if approached from a different direction.

Use extended service lures. Several companies have developed lures that will last from 30 to 60 days making trap servicing less laborious. All spent lures **MUST** be removed from the orchard or buried to prevent false attraction points. The trap bottoms must be kept in a ‘fresh’ condition by stirring or replacement, the catching surface becomes dirty from blowing dust and insect catch.

Biofix

One or more standard lure traps should be placed in an untreated location with similar exposure conditions to establish biofix. These traps should be monitored on a 1 - 2 day schedule beginning at early bloom until the first sustained catch is recorded. This is necessary to determine the proper timing of any chemical controls that might be needed. If no moths are caught use full bloom on Red Delicious as biofix.

Decision Aid System is an excellent source in determining Biofix

<http://entomology.tfrec.wsu.edu/das/>

Supplemental Control

Complete control of the first generation should be standard operating procedure in mating disruption blocks. The initial season may require two sprays unless the population is very low to begin with. Follow the recommended degree day timing for the materials you choose to use.

Visual Monitoring

Visual monitoring for fruit damage at the end of the first generation when the larva will be large enough to spot easily is important. Concentrate your inspection on borders, areas around bin, prop or brush piles, large trees in interplanted areas, etc.

Fall monitoring of the fruit during or immediately before harvest to locate codling moth damage is critical for long-term success at minimum cost. There may be large areas of a block where damage cannot be found. These areas would not need a supplemental cover the following year. Any areas of the orchard that have visible damage in the fall should be treated with a full rate of pheromone dispensers and supplemental covers the following year on the first generation.

Sanitation

Burn all stump piles, brush piles every spring to destroy any overwintering codling moth larva. If props are no longer being used as a cultural practice, remove them from the orchard border also. Bins, props, prunings must have been in the orchard during August and September to harbor overwintering codling moth larva. Brush, stumps, prop piles, etc; that have been in place outside the orchard for more than one year are “clean”. Codling moth larvae do not march out of the orchard to find overwintering sites.

Remove all uncontrolled ‘wild’ trees and regrowth that you are responsible for. Contact your County Pest Control Board for help with uncontrolled trees outside your property. Spray a 3 to 4 row border around any active bin storage area; do not spread bins into the orchard until immediately prior to harvest to avoid ‘seeding’ codling moth larva through out the orchard.

Summary

- Use 10X traps in known or anticipated problem areas – AT HIGH DENSITY—high in the tree! Include some DA combo lures in your trapping scheme.
- Establish Biofix as accurately as possible
- Plan to use supplemental control on the first generation if any Codling moth damage was found at harvest the previous year.
- Use the degree-day model to time any required spray (first or second generation)
- Visually inspect the orchard for Codling moth damage near the end of the first generation.
- Decide whether or not to spray the second generation on economics, not aesthetics.
- Inspect the bins at harvest – in the orchard – for damage and record the location. This is the information you need to improve next year’s Codling moth control program.

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