

Sustainable codling moth mating disruption in diverse agricultural environments

¹Peter McGhee, ¹David Epstein, ²Donald Thomson, ¹Larry Gut
¹Michigan State University, East Lansing, MI, ²DJS Consulting, Seattle, WA

A three year research project in Michigan apple demonstrated that the deployment of area-wide codling moth mating disruption (AW-CMMD) resulted in significantly better control of codling moth than did mating disruption applied to individual blocks (CMMD) or conventionally-treated (No-CMMD) blocks. This is the first direct evidence that applying codling moth disruption to large contiguous apple plantings is superior to treating individual, isolated, blocks. In 2003, fruit farms in central Michigan experienced codling moth injury ranging from 2 to 20%. The project, begun in 2004, included 325 contiguous hectares of commercial apple comprised of 12 individually owned farms. Six additional farms joined the project in 2005 bringing the total number of CMMD treated hectares to 850. All project growers purchased codling moth mating disruption products for their farms at their own cost. Commercial mating disruption products included Isomate[®] C Plus, Isomate CTT, Isomate CM/LR, and Scentry No-Mate[®] CM Spirals. All CMMD treated orchards were supplemented with insecticides as required. In the AW-CMMD orchards, pheromone-baited traps were deployed at the rate of one per hectare. Moth catches in pheromone traps and fruit injury counts were also assessed in 5 CMMD and 5 No-CMMD blocks managed by project growers and located in the same fruit production region. Fruit injury evaluations, conducted at the end of first generation CM egg hatch, and pre-harvest, were performed by visually inspecting 1200 fruit at each farm.

The results of this project were outstanding, as demonstrated by the growers enthusiastic continuation of the project on their own in 2007. Captures of male CM were reduced from 13 to 2 at peak flight 1st and 2nd generation in the AW-CMMD orchards during the first year. Codling moth injury was 77% lower at harvest in AW-CMMD orchards compared to both CMMD and No-CMMD orchards. In the second year, codling moth injury to fruit in AW-CMMD orchards was 90% and 95% lower at harvest compared to CMMD and No-CMMD orchards, respectively. Overall, codling moth catch decreased 74% from 2004 to 2006 in the AW-CMMD orchards and injury to fruit decreased 75% (Figure 1). In comparison, both the CMMD and No-CMMD blocks experienced increased numbers of male moths captured and fruit injury over the course of this project. Average fruit injury more than doubled in the No-CMMD orchards exceeding 4.5% in 2006.

The adoption of AW-CMMD in Michigan has directly influenced the types of insecticides used and the number of sprays specifically targeting codling moth. There was less than a 5% difference in the number of insecticides applied in AW-CMMD vs. No CMMD orchards during the initial year. Upon completion of the second year, of AW-CMMD orchards used 24% less insecticide sprays for codling moth compared to those outside of the program.

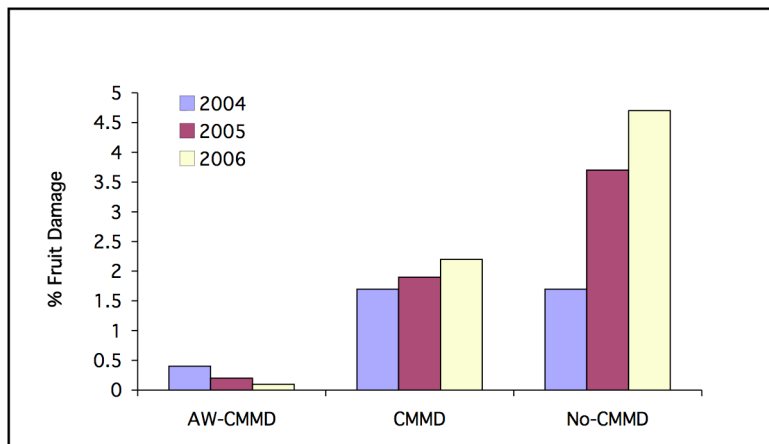


Figure 1. Fruit damage assessments in areawide disrupted(AW-CMMD), individually mating disrupted (CMMD), and no mating disruption (No-CMMD) orchards in Michigan.