

High-performance mating disruption can be achieved using formulations that provide many attractive point sources

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Our research supports competition between pheromone dispensers and females as an important, if not essential, mechanism of communicational disruption of tortricid moths in the field. There are important practical implications in the commercial development of more cost effective formulations. First and foremost is the recognition that it will not be an easy task as profiled in the model illustrated in

Figure 1. Deployment of relatively few dispensers per unit area has a large impact on the male's ability to find pheromone traps - this is the "easy phase" of disruption. For economic reasons, most commercial use of mating disruption operates within this area of the disruption profile. In the "difficult phase", increases in dispenser density only provide a small increase in disruption as shown by the reduction in moth captures in monitoring traps will be difficult, especially without the use of supplemental insecticides to drive down populations and subsequent adult numbers. Formulations designed to provide 98 to 100% mating disruption (high performance) should be competitive with females. This may require optimizing the blend and/or release rate to generate plumes similar to those produced by females. The active ingredients in formulations need to be well protected from photo-oxidation and isomerization to optimize attraction. Attractive point sources should be applied at high densities and uniformly distributed in the crop canopies so as to avoid pheromone-free areas.

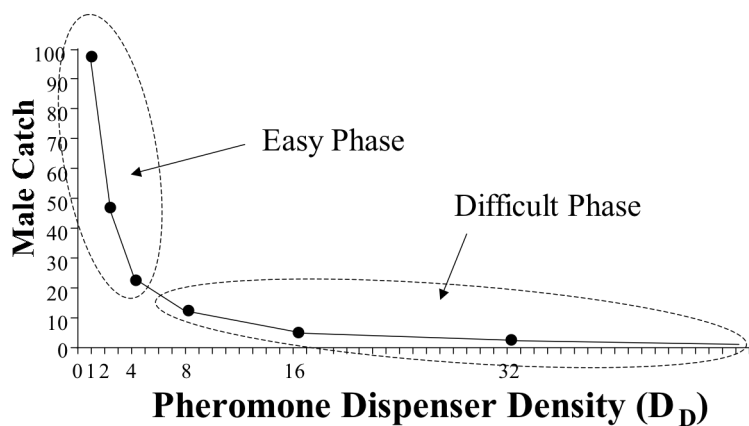


Figure 1. Two phases of disruption as they occur under a competitive attraction model .

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Our efforts to achieve high-performance disruption have focused on the development of high-density formulations for some key tortricid pests of tree fruit. For Oriental fruit moth (OFM), *Grapholita molesta* (Busck), we have developed a mechanized applicator for high-speed deployment of pheromone dispensers made of paraffin or microcrystalline wax. A single application of 0.3 g wax drops (10% pheromone) at an intended rate of 20/tree (3,500 per hectare) provided high-performance disruption of OFM for more than 100 days. For codling moth (CM), *Cydia pomonella* (L.), we are investigating several promising formulations applied at densities (>60 per tree) (>10,000 per hectare). High densities of Trécé Cidetrack pieces cut to 1/7th the size of a standard dispenser and applied at the rate of 75/tree (18,750 per hectare) provided "high performance" disruption, and superior efficacy compared to that achieved using a standard commercial formulation applied at 1 or 2 per tree (1000 dispensers/ha). Several wax-based formulations that can be applied at high densities are being evaluated in both small and large plot experiments this summer.