

5.3 PHEROMONE DISPENSER RELEASE AND EFFICACY

Fact Sheet Objectives

- Provide an overview of how mating disruption using pheromone dispensers works
- Explain the effects of temperature and wind on pheromone release rates
- Explain how temperature and wind conditions can influence the effectiveness of mating disruption

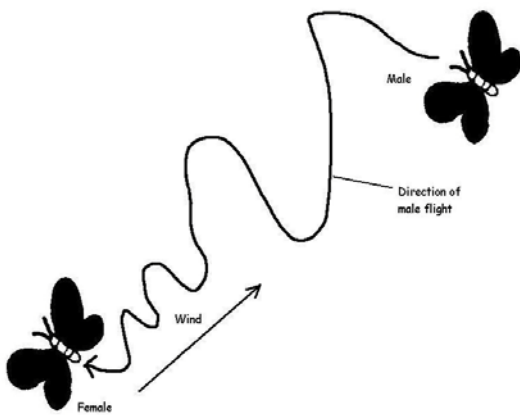


Figure 1. Pheromone carried by the wind

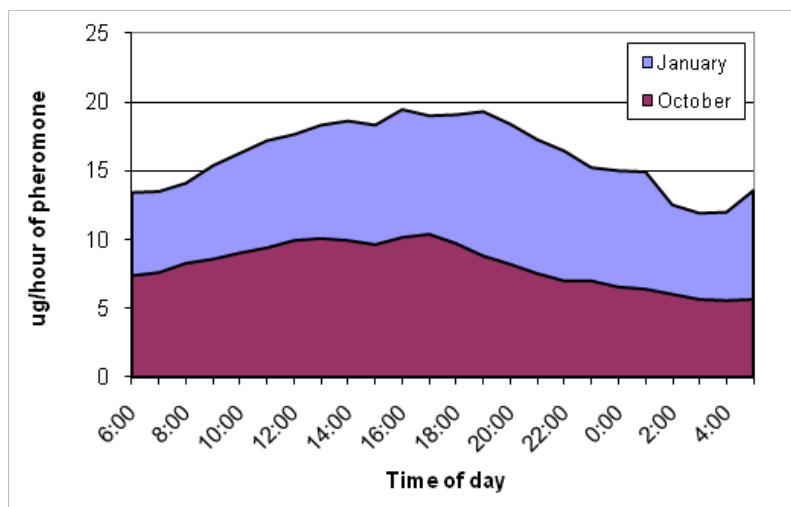
How do pheromone dispensers work?

- Female moths release chemicals called sex pheromones to attract males for mating (figure 1).
- The pheromone is carried away from the female moth by the wind.
- Pheromone dispensers release this same pheromone, which creates a cloud of pheromone throughout the orchard.
- The male moths' antennal receptors are overloaded by the pheromone cloud and they are unable to find female moths.

The effect of temperature on pheromone dispensers

- Moth pheromones are various combinations of long chain alcohols and acetates which therefore evaporate easily.
- Pheromone dispenser release rates are strongly influenced by temperature.
- When it is warm much more pheromone is released into the atmosphere than when it is cold.
- Figure 2 shows there is much less pheromone released during October compared with January and also less in the evening compared with higher temperatures during the day.
- Therefore, mating disruption may not be as effective during times of cooler weather and earlier in the season.
- However if it is too cool the moths will not be able to fly and most pest insects are more abundant later in the season

Figure 2. The predicted amount of pheromone released from Lightbrown Apple Moth dispensers during a day in October and a day in January.



The effect of wind on pheromone dispensers

- Wind distributes the pheromone from the dispensers to form a cloud within the orchard.
- Moderate wind speeds still provide good concentrations of codling moth pheromone at 6m distance from the dispenser.
- Very low wind speed reduces the height of the cloud.
- High wind speed will reduce the concentration in the canopy, hence mating disruption works best in sheltered blocks.
- Wind also has a major effect on pheromone concentration at the orchard boundaries. Planting shelter and adding pheromone dispensers to the shelter will improve mating disruption on the borders.
- In an experiment with Codling Moth mating disruption it was shown that, when clean air enters an orchard, a 15m zone with lower pheromone concentrations is created. On the down-wind boundary, pheromone was found up to 60m away at the same concentration as in the treated orchard.
- Long thin blocks of apples and young trees subject to wind disturbance are generally not suitable for mating disruption.



***Pheromone dispenser
twist tie***

Summary

- The male moths' antennal receptors are overloaded by the pheromone cloud from the pheromone dispensers and are unable to find female moths.
- More pheromone is released when it is warm than when it is cold.
- Mating disruption may not be as effective during times of cooler weather and earlier in the season, but there is also less insect pest pressure when it is cooler.
- High wind speed will reduce the pheromone concentration in the canopy.
- Mating disruption is not as effective in blocks exposed to the wind, especially around the boundaries.
- Long thin blocks of apples and young trees subject to wind disturbance are generally not suitable for mating disruption.

Further information

www.omafra.gov.on.ca/english/crops/facts/03-079.htm#tempe

