

Mating Disruption

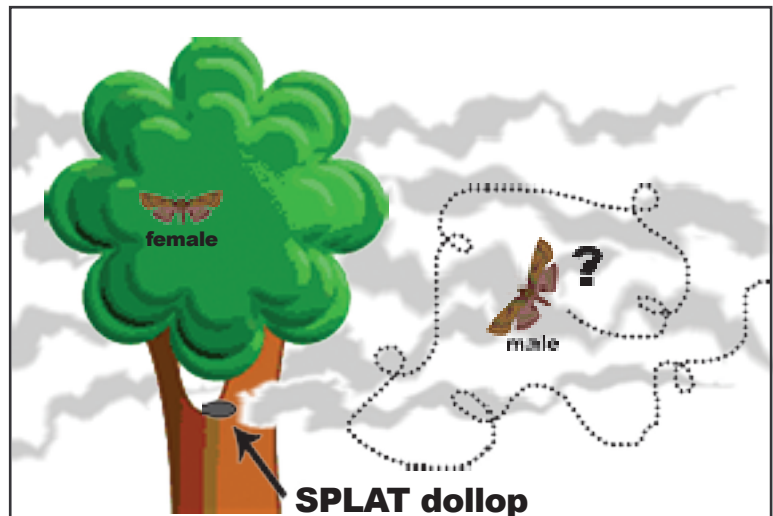
Through the use of ISCA's SPLAT Formulation

What is Mating Disruption?

Mating disruption is an insecticide-free pest management strategy that uses synthetically produced nature identical pheromones to confuse males and limit their ability to locate females for mating.

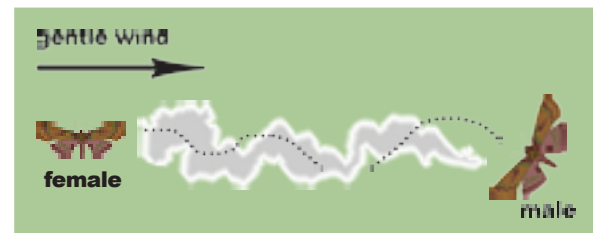
By reducing the likelihood of successful mating through mating disruption, the infestation level decreases. ISCA's SPLAT (Specialized Pheromone & Lure Application Technology) mating disruption formulation is an environmentally-friendly dispenser used to disrupt mating through the controlled release of semiochemicals.

See diagram on the right for a visual representation of mating disruption.



Typical Insect Mating

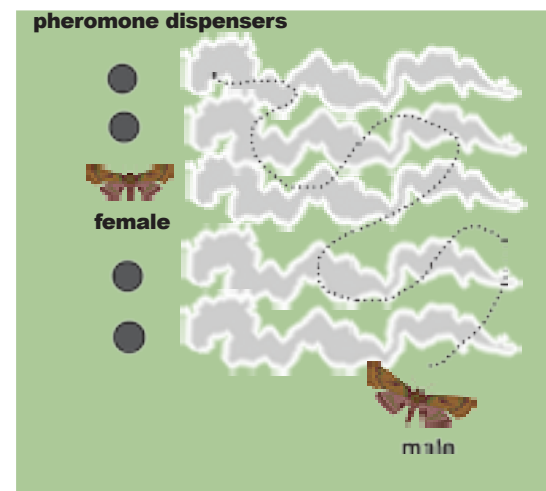
Semiochemicals, such as sex pheromones, are chemical signals that insects use to communicate with one another. Sex pheromones are released by females to let males know they are available to mate. The female releases this chemical signal, which is carried by the wind to males. When a male becomes aware of the pheromone, he follows the plume upwind to reach the female and mate with her.



How does Mating Disruption Work?

By placing several pheromone dispensers in the insect's habitat (i.e. codling moth pheromone dispensers in an apple orchard) we can permeate the atmosphere with pheromone and disrupt mating in 4 ways:

- 1. Habituation** - Males become so accustomed to the pheromone that they do not respond to it. Since the pheromone is everywhere, they respond to it as if it was just naturally part of the environment. When a female tries to signal a male with her pheromone, he does not even notice it.
- 2. Camouflage** - Males become bombarded by the pheromone, so that they cannot find the females they seek. When a female tries to signal a male with her pheromone, he is aware of it and wants to find her, but there is so much pheromone around him that he cannot distinguish between the pheromone dispensers and the female.
- 3. Competitive Attraction** - Males are attracted to the pheromone put out by the pheromone dispensers, so actively seek to find the dispensers and not the female. This reduces the chance that they will find the female and mate with her.
- 4. Trapping** - When the pheromone dispenser is placed in a trap, the males respond to the pheromone and become trapped. This removes the male from the population, thereby reducing the amount of mating that can occur.





SPLAT (Specialized Pheromone & Lure Application Technology) is a proprietary base matrix formulation of biologically inert materials used to control the release of semiochemicals and/or odors with or without pesticides. Having a wide range of viscosities and application methods (e.g. tractor, metered backpack sprayer, caulking gun, aircraft, etc.), SPLAT increases productivity by mechanizing the application of pheromone dispensing points.

SPLAT pheromone formulations are successfully deployed in pheromone **Mating Disruption** and **Attract & Kill** programs for the following pests:

- Codling moth *Cydia pomonella*
- Oriental fruit moth *Grapholitha molesta*
- Pink bollworm *Pectinophora gossypiella*
- Brazilian apple leafroller *Bonagota cranaodes*
- Light brown apple moth *Epiphyas postvittana*

SPLAT vs. Traditional Pheromone Dispensers

ISCA's proprietary SPLAT formulation offers many advantages over traditional dispensing technologies:

- **Multiple Methods of Application:**
Having a wide range of viscosities and application (e.g. tractor, metered backpack sprayer, caulking gun, aircraft, etc.), SPLAT increases productivity by mechanizing the application of pheromone dispensing point sources.
- **Easy Application for Small-scale & Large-scale Operations:**
The amorphous and flowable quality of this highly adaptable product allows for an easy transition from small-scale manual applications to large-scale mechanical applications.
- **Adjustable Strategies Same Amount of AI:**
A fixed quantity of this material can be applied differently depending on the pest population pressure. The application of this matrix can be tailored by the user to best match the pest distribution and density in the field.
Using a fixed amount of SPLAT per area, one can choose:
 - A high density of small point-sources (**Figure 1b**), thus maximizing the mating disruption effect (recommended for higher pest pressure).
 - A low density of larger point-sources (**Figure 1c**), thus increasing the longevity of the application (recommended for lower pest population pressure).
- **Rain Fast, Biologically Inert, and Bio-degradable Formulation:**
SPLAT is a biologically inert and bio-degradable matrix. Once cured, SPLAT will not wash off of vegetation while providing rain and UV protection for the pheromone and/or the pesticide.
- **Season-Long Protection & More:**
SPLAT can remain effective in managing pest populations for up to a 8 months.
- **Develop Formulations with Desired Blend of Pheromones and/or Active Ingredients:**
A SPLAT product can be formulated with the desired blend of active ingredients to specifically target one or more species with a single application. The desired blend can include semiochemicals (pheromones, kairomones, attractants, repellents), feeding stimulants, visual stimulants (e.g. colorants) and/or pesticides.

Traditional Pheromone Dispensers



Figure 1a: For traditional dispensers, changes in the number of dispensers changes amount of AI per acre.

SPLAT Pheromone Dispensers

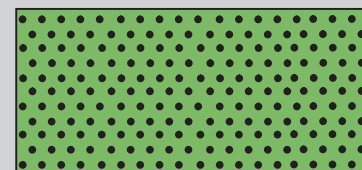


Figure 1b: For high pest pressure, number of applied dispensers can be increased while size of each dispenser is decreased; AI per acre remains unchanged.

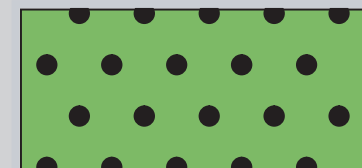


Figure 1c: For low pest pressure, number of applied dispensers can be decreased while size of each dispenser is increased; AI per acre remains unchanged.

Unlike traditional dispensers (1a), the number of SPLAT point sources can be tailored according to the pest density without changing the amount of AI per acre. For high pest densities, the use of many small point sources (1b) is more effective; for low pest densities, the use of fewer large point sources (1c) will provide adequate protection for the entire season.