

Phony Pheromone Foils Gypsy Moth Males

Scientists are looking to sabotage the gypsy moth's love life by air-dropping mini pheromone dispensers into tree canopies where the insect mates.

Their aim is a chemical-free way to prevent the moth's caterpillar offspring, which hungrily defoliate forest and shade trees such as oak and poplar.

Kevin W. Thorpe and ARS colleagues envision using standard, planeborne sprayer equipment to seed the dispensers into the tree canopy. Held to leaves, branches, and trunks by means of glue-like sticker, the dispensers' job would be to saturate the air with Disparlure, a commercially produced pheromone that mimics the natural chemical sex attractant of female moths.

"With so much synthetic pheromone in the air, the male is actually unable to home-in on the real thing coming from a female," says Thorpe, an entomologist at ARS' Insect Biocontrol Laboratory in Beltsville, Maryland.

The two types of dispensers that are being investigated look like tiny plastic beads and flakes of confetti less than 3 millimeters in size. Both forms are fashioned after commercial designs, Thorpe says.

In past years, pheromone strips were hung by hand in trees to try to disrupt mating. But studies showed that air-dropping the tiny dispensers places more of the attractant where it's most effective—high in the tree canopy, where the moths usually mate.

"When you have a huge area of forest," notes Thorpe's colleague Barbara Leonhardt, "hanging strips becomes impractical." She is director of ARS' Plant Sciences Institute in Beltsville.

The focus now, she adds, is to perfect inexpensive ways of formulating the dispensers so they'll flow freely from aircraft sprayers.

Leonhardt and Thorpe see the pheromone primarily as an insecticide-free weapon against new or isolated infestations of the moth. Use of the dispensers—along with other natural weapons such as insect viruses or *Bacillus thuringiensis* (Bt)—would allow USDA's Forest Service personnel and others greater flexibility in halting the moth's assault on forest or woodland near wildlife preserves or residential areas.

Thorpe says field studies of the two dispenser designs have been encouraging. In a recent test conducted in Virginia's Augusta and Rockridge Counties, use of the dispensers kept nearly 100 percent of moths from mating. That, as a result, cut the number of fertile egg masses by 75 to 100 percent on pheromone-protected trees, compared to those in untreated plots.

By adjusting dispenser size, it is possible to regulate the amount and rate of pheromone that's released.

One reason this is important is the \$12 to \$20 per-acre cost for pheromone. Add to that the \$3 to \$8 cost of incorporating it into the bead or flake, respectively.

Another reason is that it ensures the pheromone will last throughout the moth's 3- to 6-week mating period, which kicks off in late June to early July. If too much pheromone is released, the supply depletes itself too soon; if there's too little, a male may succeed in finding one of the flightless females.

So what actually happens when the moths fail to meet? She'll still deposit eggs, though they'll be sterile. And the hapless male? Says Thorpe: "It'll eventually use up its energy reserves and die, because it doesn't feed."—By **Jan Suszkiw**, ARS.

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Gypsy moth caterpillar.