

SEX PHEROMONE TRAPS USEFUL IN CONTROLLING TREE BORERS

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Borers are the most damaging and difficult to control group of insect pests that attack shade trees and shrubs. Now, after more than five years of experimenting with synthetic sex attractants, a major breakthrough has been made in controlling one important group of borers, the clearwing moths. These moths usually lay eggs on bark surfaces, and larvae hatching from the eggs tunnel into the bark. Consequently, borers are vulnerable to insecticides only from the time they hatch until they chew their way under the bark surface. It is during this short time period that a lethal pesticide residue must be present on bark surfaces to prevent attack and damage.

Before cancellation of DDT and dieldrin registrations, landscape managers applied these materials in the spring before adult emergence began, confident that lethal residues would persist throughout the hatching period of borer larvae. Other insecticides with shorter residual life must now be used. Therefore, we must know when adult borer emergence begins so a short-lived residual

spray can be applied just before larvae begin to hatch. Until now there has been no economical way to predict seasonal borer emergence.

Clearwing Moths: Clearwinged moths include some of the most common and destructive borers of trees and shrubs. Although most moth species fly at night, clearwing moths fly during the day. They resemble wasps or bees in both physical appearance and behavior, but they cannot sting. They feed only on nectar, if at all, and probably live no more than a week. Consequently, they do not cause damage themselves.

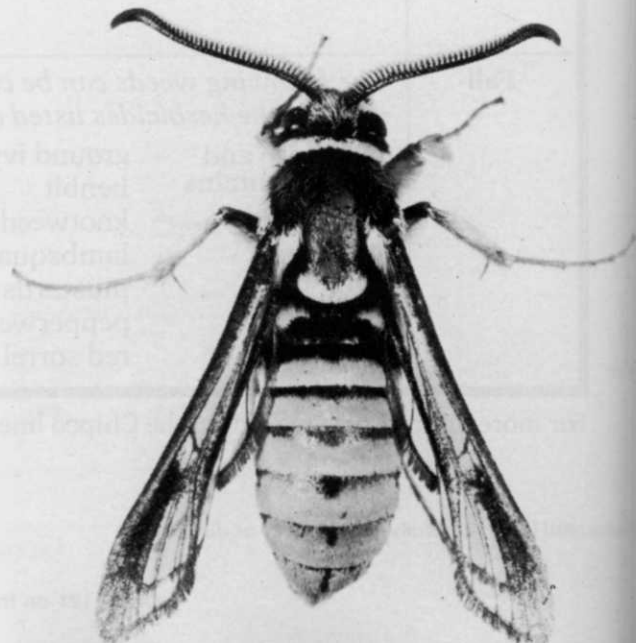
Soon after female clearwing moths emerge from host trees or adjacent soil, they begin to emit a sex attractant odor into the air. Males detect the odor (called pheromone) with their antennae and fly upwind towards the female until they locate and mate with her.

After mating, the female usually deposits her eggs in cracks and crevices on tree bark. Larvae hatch several days later and bore beneath the bark where they construct galleries. Feeding and tunneling by growing larvae damage the plant by weakening limbs and trunks and destroying tissues that transport food and water throughout the tree.

Attractants for Male Moths: The chemical composition of two clearwing moth sex attractants was discovered in 1973. Since that time, attractants have been developed for several destructive species, including lilac borer (= ash borer), dogwood borer, peachtree borer, lesser peachtree borer, and sequoia pitch moth. These attractants are used inside sticky traps to capture



Larvae of a lilac borer inside a branch (above). A classic case of mimicry, yellow jacket (left) and the adult oak borer (right).



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Clearwing Moths

male clearwing moths as they search for non-existent females. Research to develop attractants for males of other clearwing moth pests is continuing in several parts of the United States and throughout the world.

Using Pheromone Traps: Clearwing moth males are capable of sensing and responding to pheromones up to distances of at least half a mile. Consequently, a pheromone trap need not be located directly in a suspected infestation, but can be placed at a site more convenient for the pesticide applicator or landscape manager. Nurserymen and orchardists can place a trap in a tree near their home or office where it can be inspected daily with minimum effort. This reduces costs associated with using the traps and maximizes chances of pinpointing first emergence of borer adults. Pest control operators are encouraged to use four or more traps distributed throughout their operating area for a given borer species. Traps should be deployed at least two weeks before emergence is expected to begin.

Male clearwings of all species begin emerging before females. Females mate and typically begin egg laying the day they emerge. Moreover, approximately ten days elapse between egg deposition and larval hatch. Consequently, a spray to control a clearwing moth borer species should be applied 10-14 days after the first male moth is captured in a pheromone trap.

Clearwings that emerge during a relatively short time-period (six weeks or less) can be controlled with a single insecticidal spray.¹ If emergence continues after six weeks following the first application, a second application may be required. Duration of the flight period can be measured by removing captured males from the trap at weekly intervals to determine if a second spray is necessary.

Future of Pheromones: Clearwing moth borer pheromone traps usher in a new era in borer control. Traps will be available for demonstration purposes in 1978 and on a commercial basis in 1979.² Trap capture information takes the guesswork out of timing borer sprays and reduces probability of unnecessary applications. This scientific approach to pest control introduces landscape managers to the principles and practice of integrated pest management, using all available control tactics to maximize pest control while minimizing impact on the environment.

In the future, we may be able to use pheromones more directly to control certain insect pests. Perhaps enough pheromone traps can be used in a given area to capture all male moths before they can inseminate females. Unfertilized females will then deposit only infertile eggs which, of course, never hatch. We are evaluating this so-called "Mass-Trapping" approach to borer control in North Dakota shelterbelt ash trees.

¹Consult your state cooperative extension office or land grant university to obtain information regarding insecticides approved for use against specific borers.

²Contact your local pesticide distributor about trap availability.