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SPLETH
PHEROMONES

Did you ever wonder what makes ants converge on your picnic lunch in such short time? It doesn't take long for one ant to get the word to dozens of others. But how do they do it? Does one little ant stand up, cup his hands around his mouth, take a deep breath and yell at the top of his lungs, "Come and get it!"?

Not quite. The ant releases a pheromone--a natural chemical that sends a message to other ants. All insects and animals release pheromones for special purposes: aggregation, trail (this one brings the ants to your picnic), alarm (when the bee hive gets stirred up) and, most important to scientists, sex attraction.

Scientists have found that they can produce a synthetic sex pheromone of an insect and disrupt the insect's mating behavior, thereby creating a new form of insect pest control.

The problem is that making the synthetic pheromone is expensive. That's where Phillips research and development comes in. During the last year, company scientists have been trying to develop a new method for making pheromones.

Research chemist Dennis Banasiak of Bartlesville is in charge of the project and he explains how the synthetic sex phermone works: "The female insect releases the sex pheromone as she flies around. The wind carries the chemical to the male, who then flies in the direction of the scent,

finds the female and mates with her."

To disrupt this natural mating scheme, scientists release a higher concentration of the pheromone. A female insect normally emits the chemical in billionths of a gram. Scientists put up a "smoke screen" by releasing the chemical in concentrations hundreds of times higher, perhaps 5 to 10 grams an acre or about 1/100 of a pound.

The result, says Banasiak, is that "the male is totally overwhelmed. He thinks there are thousands of females around, but the concentration of the pheromone is so high that he doesn't know which direction to fly to find them. He literally flies himself to death."

Sounds a little cruel? "Not really," says Banasiak. "As one entomologist put it, they die happy."

Tests have shown that mating can be reduced by over 90 percent when synthetic pheromones are used. Damage to crops is reduced by a similar amount because fewer insect larvae are in the field eating the crops.

The advantage of pheromonal insect control is that the pheromones are very selective. Each insect species has its own distinct set of pheromones, each of which is different in chemical composition. So a farmer can effectively control a pest in his crops without disturbing other beneficial insect life. And unlike conventional insecticides, pheromones are non-toxic to animals and humans.

More important, scientists believe that because the synthetic pheromone is a chemical the insects manufacture themselves, pests won't be able to adapt themselves to it and become immune as they have with insecticides. -2 -8

There are problems with pheromones, however. One is that the farmer must know precisely when to release the chemical in his field to disrupt mating. Also, the pheromone must be time-released so that it lasts the duration of the mating cycle and doesn't dissipate in the wind. -14

The other disadvantage, which Phillips hopes to remedy, is cost. According to Banasiak, conventionally produced pheromones cost anywhere from $200 to $50,000 a pound: "That's expensive, even though you only use five to 10 grams per acre." -20 -26

What Phillips hopes to do is create a cheaper production method. Banasiak says the pheromones being made today are pure chemical compounds that take 10 or 12 steps to produce. "We're working on a mixture ~~[illegible]~~ can take up to we can produce in fewer steps," says Banasiak. He adds that Phillips is now working with other companies to do the actual testing on insects. -32

If scientists are successful with pheromone research, they could open up a whole new area of safe chemicals. Says Banasiak, "The field is still in its infancy, but there's great potential for high value crops like fruits and -38 -44

vegetables. People will not buy blemished crops, so if there's a way to keep an insect from damaging them, farmers are willing to spend a little extra for the protection."

About 600 insect pheromones have been isolated since 1959, but the chemical industry is primarily working on perfecting synthetic sex pheromones for the most damaging pests. These include the tobacco budworm, which in various forms attacks such things as tobacco, cotton, corn, tomatoes and fruit; the western pineshoot borer, which stunts the growth of pine trees in the northwestern United States and western Canada; and the pink bollworm, which may cause damage of up to 40 percent in cotton crops.

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