

Fumigants & Pheromones

Digital Newsletter Delivered by Insects Limited, Inc.

Issue 175

Why Pest Identification Matters



Patrick Kelley, BCE
President of Insects Limited

If part of your job involves pest management, trying to solve pest outbreaks can often become a roller coaster ride with all its ups and downs.

Initially, insect pests make themselves known to us by spilling into our living spaces and workspaces.

First reactions can include annoyance, disgust and in some cases shock when pest damage is revealed.

There is often a knee-jerk reaction is to apply a pesticide to the area to kill everything on six legs.



Although this brute force tactic may work on occasion, we find plenty of examples where the insects simply pop out somewhere new after a pesticide application, and pest managers find themselves in a maddening game of Whac-A-Mole.

Geographic location, time of year, and the physical environment all play a role on the pest activity that shows itself. Being a skilled pest manager means that one needs to use all the tools available to attempt to permanently solve the pest issue at hand.

One of the most valuable tools any pest manager can use is being able to identify the pest. Once we know the exact pest species that we are dealing with, we can better focus on how to cause it to leave or die.

At [Insects Limited](#), our IPM strategy is to “Start with the Insect”. What this means in a nutshell is that when approaching a pest management situation, the very first thing that should be done, is to identify the pest. Knowing your pest means gives you a great advantage in controlling it.

The following list are just a few of those advantages:

Insects Limited Product Guide

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Important Things We Can Learn After We Identify Our Pests!

1. What it likes to eat
2. The physical environment that it likes to live in.
3. The stage that causes damage (E.g., Larva, adult, nymph, larva and adult)
4. The number of offspring that females produce (E.g., 50 or 500)
5. How long they live (Life cycle)
6. What low temperature they become active and begin mating, and what high temp they shut down
7. Whether they prefer a humid, standard, or dry environment
8. Whether there is a pheromone that you can use to monitor their activity
9. Whether it is an actual pest or perhaps just an occasional invader from outdoors that poses no real risk
10. The ability to look up specific tips to help control this species from other pest management professionals

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An informed and knowledgeable pest manager is always going to do a better job for their client, for their institution or for themselves than someone who stumbles blindly into a pest management situation.

After a proper identification is performed, insecticidal treatments are often not necessary to eliminate a pest. IPM tools such as sanitation, pest exclusion or other non-chemical means can solve issues with no harmful environmental effects or safety concerns.

On another note, [pheromone monitoring](#) can provide a pest manager with crucial information on where pest infestations are coming from or if their attempts at reducing the pest population are working. Pest identification is extremely critical when wanting to use pheromones as part of a greater IPM program.

Most pheromones are species-specific, meaning that they will attract one, and only one species. Take for example a [drugstore beetle](#), *Stegobium panaceum* and a [cigarette beetle](#), *Lasioderma serricorne*. These two beetle species look nearly identical to the untrained eye, but the pheromone for one has absolutely no attraction to the other.

Without a proper identification, one could spend lots of money on a pheromone trapping system that is doomed to fail. With proper identification, pest managers can easily zero-in on the locations the beetles are coming from.

There are lots of great identification aids out there for pest managers to tap into.

Insects Limited's website has lots of [identification aids for stored product insects](#).

The website also has a section dedicated to [pests found in museums](#).

Reference books, posters or one of the several staff entomologists at Insects Limited can assist with identification. [Contact us](#) if you need any guidance on this.

Most importantly, remember to take the time to correctly identify the pest when a new pest management situation comes your way.

Pest identification matters!



Ethan Estabrook of Insects Limited studies the insects on a glue to trap identify the species

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What Are Pheromones?



Ethan Estabrook, BCE
Research Entomologist and Product
Support, Insects Limited

Pheromones are chemicals that are released by insects that stimulate a behavioral change to other insects of the same species.

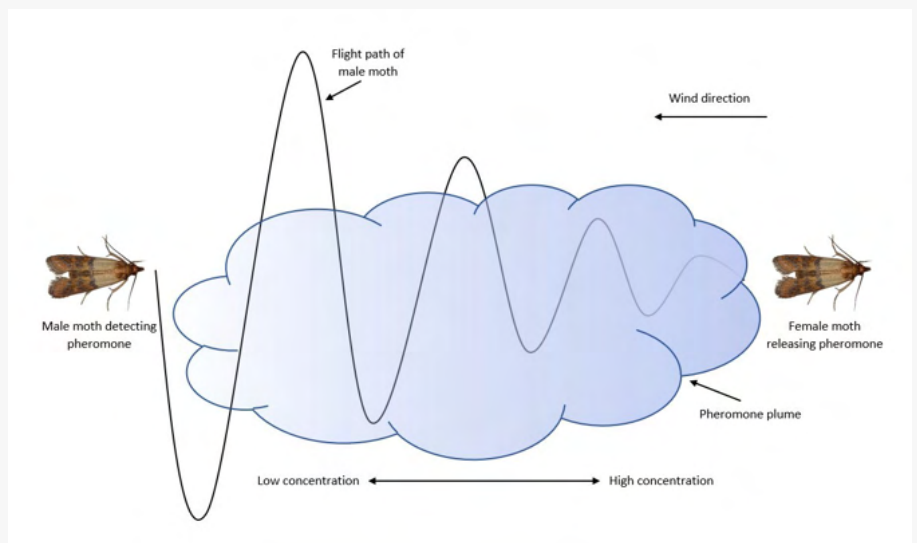
This form of chemical communication is used by insects to direct social behavior - including mate attraction, gathering together, egg-laying, foraging for food, trail following, and colony defense

Many [stored product insects](#) communicate with volatile or airborne pheromones that travel through the air.

As one of these insects emits pheromone, it creates a pheromone plume that spreads out and decreases in concentration the further away from the emitting insect.

Other insects who are attracted to this pheromone, detect the plume, and move upwind towards higher pheromone concentration until it reaches the emitting insect.

While there are many types of pheromones, two are commonly used as lures to monitor stored product and other urban insects: sex pheromones and aggregation pheromones.



Sex pheromones are produced by females to attract males for mating. Usually, adult insect species with short life spans of only a few weeks produce sex pheromones. Some examples include the [Indian meal moth](#), [webbing clothes moth](#), and [cigarette beetle](#). Adult males with a short life span are highly attracted to sex pheromones due to their determination to find a female to mate with before they die. Male insects can be so sensitive to these sex pheromones that only a few nanograms, which is 1 billionth of a gram, can cause males to search for a female. These pheromones can be active over distances of several hundred feet and in some cases, like the gypsy moth, even miles away.

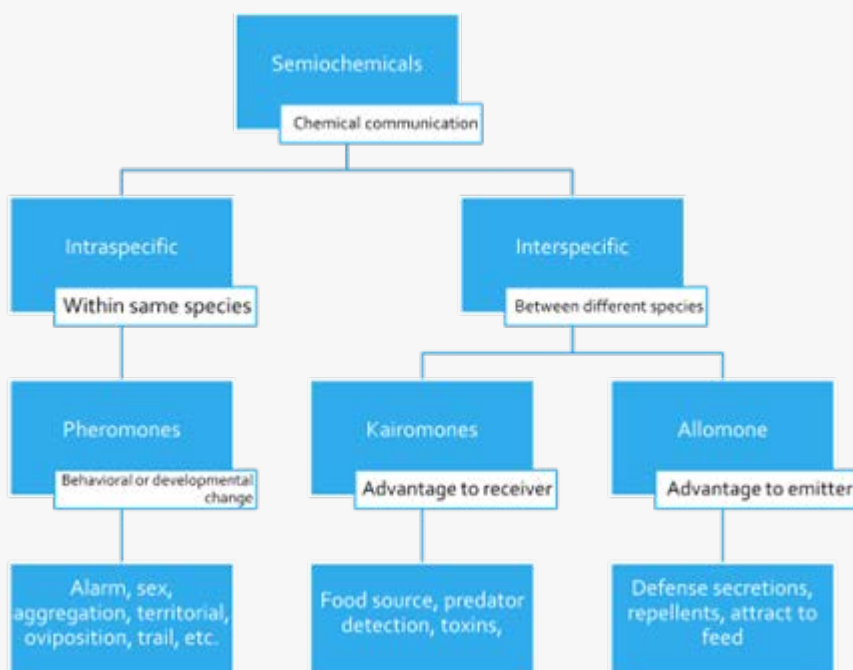
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Aggregation pheromones are typically produced by males to attract BOTH male and females to a favorable location, usually near a food source. Aggregation pheromones can be thought of as the party pheromone. This gathering of insects increases the likelihood of mating and identifies a favorable location where females can lay eggs on food material. Aggregation pheromones are usually produced in species with long adult life spans of several months to years, such as red and confused flour beetles, rice weevils, and lesser grain borers. The attraction distance of aggregation pheromones is much shorter than sex pheromones. In many cases, food odors are used to synergize the attraction effect of aggregation pheromones.

Pheromones are part of a greater chemical communication family called semiochemicals which include kairomones and allomones. Kairomones and allomones are interspecific chemical communication between DIFFERENT species. Kairomones benefit the receiver which can be insects following food scents to find food, or host/prey interactions like a female parasitic wasp finding a caterpillar to lay eggs in. Allomones benefit the emitter which can be defense secretions of ants protecting their nest or repellents to ward off competing species.



In a study from Haskins et al., they describe a unique example of how these different chemical communication classes interact with carpenter ants. Carpenter ants produce and spray formic acid which excites other members of the carpenter ant colony and acts as a call to arms to defend the nest. Formic acid in this interaction can be categorized as an alarm pheromone. Carpenter ants also use formic acid to help protect themselves from predators and to help subdue prey. Formic acid in this interaction benefits the carpenter ant and can be categorized as an allomone. The same chemical also attracts Australian bulldog ants who use formic acid to find and predate on carpenter ants. Formic acid in this interaction benefits the receiver and can be categorized as a kairomone. In this real-world scenario, the same semiochemical, Formic acid, can be categorized as a pheromone, allomone, or kairomone depending on the perspective of who benefits from this particular chemical communication.

References

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