

Fumigants & Pheromones

Digital Newsletter Delivered by Insects Limited, Inc.

Issue 166

Glue science: How we get insects to “stick” around in traps



James Feston, BCE
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One of the biggest issues, when monitoring for insects, is that the insects don't really want to be caught. Go figure.

Regardless of the trap style, whether it be a pitfall trap or a sticky blunder trap, the insects that approach them tend to, by and large, avoid hurtling headlong towards death.

We do our best to design traps to outwit these crafty bugs and if you spend some time watching a trap, you'll see what I mean.

Take a pitfall trap for example, you'll probably see a number of insects walking around the trap and leaving.



Sticky note adhesive is designed to exacting specifications. The glue on the back of each note has the ideal balance of tackifier and elastomer to make peeling easy, not leave behind any residue, and have high enough shear resistance to hold the note on a vertical surface without sagging or sliding.

You might also see insects walking up the ramp and changing their mind as they reach the edge and begin to lose footing. Sticky blunder traps have the same issue. Observation of a glue board will reveal that a decent number of potential visitors might get right up to the glue line, test a toe in the water, then pull themselves free and head the other direction. This tendency towards self-preservation keeps us always working towards the perfect trap. In the meantime, we do catch a percentage of them. This is why so many insect traps are used primarily as monitors instead of eradication methods.

Insects Limited Product Guide

Our newest product guide is a must-see. The 20-page full-color and fully illustrated booklet can be viewed as a hard copy, online, or as a [PDF HERE](#).



It is All about the Glue:

In the pursuit of a better insect trap, manufacturers put a lot of effort into developing glues that balance all the important qualities required to catch the best percentage of unlucky insects. We probably don't give glue that much thought on the average day, but they really are all around us and come in a variety of forms and chemistries.

Take white school glue for example. It falls under the category of a "structural" adhesive. Structural adhesives are those that cure or harden based on one or more factors. Our white glue starts as a liquid using water as a solvent. As the water evaporates, the glue begins to dry out, harden, and bond surfaces together. Not all structural adhesives require "drying" out. Others, like epoxies, rely on chemical reactions that are independent of exposure to air.

Other common structural adhesives, like hot-glue, use high temperatures to liquify the adhesive material until it can return to normal temperatures and provide a strong bond between surfaces. Structural adhesives, with the exemption of hot glue, are good at doing their job of sticking one thing to another, one time.

After that, should the bond be broken, it can't be reestablished without the addition of fresh adhesive. None of these structural adhesives are going to do us much good with insect trapping which is why we are lucky to have another category called "pressure-sensitive" adhesives.

Pressure sensitive adhesives are types of glue that don't require solvent evaporation or curing of any kind. When it comes to pressure sensitive adhesives, think about tape, adhesive labels, and sticky notes. The glue on these products doesn't have to dry or cure to do its job. Simply press the tape or sticky note onto a surface and there you go, it's stuck.

The precise formulation of these adhesives is usually kept fairly close to the vest by their manufacturers, but they generally feature two main components. These two primary components are an **elastomer**, and a **tackifier**.

In order to work, a pressure sensitive adhesive needs to be able to "wet" the surface that it is applied to in order to provide initial "stick". This is where the tackifier comes in. It provides the initial stickiness in the process. Think maple-syrup, nice initial stick, but doesn't really hold anything together when wet. That's why we need the next step for good adhesion, the elastomer.

The elastomer, combined with the tackifier, adds a "rubbery" component to the mix that helps resist shear and peeling forces. Imagine 3 sticky notes. One has a backing that has the tackifier only. The tackifier is semi-liquid and initially sticks nicely to a horizontal surface but you find that you can still slide it around with relative ease.

The second note has the elastomer only. It has a good "rubbery" quality to it and it resists sliding around, but it's not really attached to the surface at all.

The 3rd note, has the best of both worlds, it sticks to the surface, resists sliding and peeling, and it's perfect for sticking futile reminders to perform tasks that are not worthy of today's efforts and are best left to future you.

Remote Monitoring with SightTrap

The SightTrap™ provides a daily image of your pheromone monitor insect catches. View your trap images from anywhere with your mobile device.





The best part about pressure sensitive adhesives in our industry is that the manufacturer can control so much about its adhesive qualities and can even formulate it to continue to perform under harsh conditions, over and over.

Compared to the structural adhesives, that sounds a lot better for our insect trap doesn't it?

In fact, that's why all the sticky insect traps you come across are made with pressure sensitive adhesive of one form or another.

Pressure sensitive adhesives can be manipulated for maximum performance. Cold weather formulas, like on this board, work down to 0 degrees Fahrenheit!

Some sticky trap glues are relatively hard, some are more liquid, some are specially designed to work in extreme low temperatures.

All of them however, are picked purposefully for the kind of insect or pest they are aimed at catching.

The harder glues skew heavy towards elastomer and are good for, stout, crawling pests, and some flying insects.

The more liquid glues skew towards more tackifier and are ideal for catching light, flying insects, by immediately wetting and entangling their wings.

Heavy tackifier glues also have some additional capacity to continue to perform in dusty environments.

The goal when designing a sticky trap adhesive, is to formulate a glue that has the best chance of holding onto the insects that make contact with the glue.



Because the insects resist being caught, the adhesive needs to have the right balance of tackiness to grab them, and elastomer to hold them.

Ultimately, the efficacy of our insect traps relies on its ability to overcome the survival instincts of our insect quarry.

Which is why, when you are choosing a trap for your IPM program, you might take a moment to think about the many factors that go into designing the humble sticky trap.

There is more science to the stick, than meets the eye.

"Wet" glues like in this NoSurvivor™ trap are most common in traps designed to capture flying insects. The tackifier-heavy glue helps to immediately wet and tangle the wings of the insects to disable it inside the trap. Photo by James Feston

Clothes Moth Flat Trap Kit (IL-120)

Clothes Moth kits feature the Insect Limited's signature pheromone Bullet Lures™ that attract three separate species of clothes moth with a controlled release of pheromone over 3 months.



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PMP Magazine: Profitable Products Q&A



Colleen O'Rourke
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As seen in Pest Management Professional Magazine, Profitable Products, October 2021

Q&A with Insects Limited's Colleen O'Rourke

How do your products save PMPs time/labor?

At Insects Limited, we take pride in our quality pheromone technology. Our products will give you the most consistent monitoring data when you pair our bullet lures with the appropriate traps.

We have our NoSurvivor hanging traps, Low Lying Flat Traps, All Beetle trap, and SightTrap.

Our [NoSurvivor Hanging traps](#) and [Low Lying Flat traps](#) were tested by our entomologist in our lab and expert PMPs in the field. We used a 1 x 1 meter arena set up where we actively attempted to create an environment the insect will not want to leave. We give them everything they need but we also present them with the opportunity to travel to our trap and the attractant inside. Through these rigorous tests we found our attractants pulling the insect out of the optimal environment in and into the traps.

[The All Beetle trap](#) was methodically designed by our entomologists who work with and study the target insects every day, they understand the needs of an easy-to-inspect device.

They ensured the device lay flat so there aren't any obstacles for the insects to climb. The slope of the device is mathematically calculated to ensure the insects will create momentum ascending the trap, and once it meets the curved edge, it forces the insect to fall into the adhesive to be captured instead of letting the insect backtrack and go back down the ramp.

Our entomologists also spent hours observing the insects to determine a texture of the slope to complement the insects' behaviors that were observed. So instead of being a smooth surface, the trap has little ridges where it makes it super easy for the insect to climb up.

[The SightTrap](#), which is our remote pheromone monitoring device, saves PMPs the most time and money. We found that on average it takes a pest control professional two and a half minutes to inspect 2 traditional pheromone traps. The average-sized food facility has 77 traditional pheromone monitors. Therefore, nearly 2 valuable hours are spent looking in traps and counting insects.

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Along with other pest control obligations there is little to no time to identify the insects and even less time to solve the issues of why they are there. This device revolutionizes how we monitor for pests so PMPs can stop spending so much time counting insects and more time providing value.

How do your products save PMPs materials?

Insect Limited's lures give you consistent data and only need to be replaced 4 times a year. Most lures from our competitors have a large spike in capturing insects within the first couple weeks, while the Bullet lure attraction remains steady. This is due to the high doses of pheromones that are released when the competing lures are placed out. If your lures have released most of its pheromone within this timeframe, you're more likely to have a high catch rate in the beginning but very inconsistent data throughout the remainder of your monitoring process. Due to this inefficient data, infestations could potentially be growing without you noticing. Having accurate monitoring data will allow you to not waste time purchasing additional materials because the products will be accurate the first time.

How do your products directly save PMPs money upfront?

One way PMPs can save money is by using our multi-species lures or Ready-To-Use line. We blend together certain pheromones in our lab that will attract a multitude of insects. For example, we have our [clothes moth lure \(IL-123-10\)](#) that will attract Webbing Clothes Moths (*Tineola bisselliella*), Case-making Clothes Moths (*Tinea pellionella*), and Brown-Dotted Clothes Moths (*Niditinea fuscella*). By using our multi-species lure or ready-to-use products, PMPs can save time and money by not having to purchase an array of different products.

How do your products help PMPs generate more revenue?

Using our traps and lures will tell you if pests are present, indicate where they are coming from, and tell you whether the control measures that you have taken are working or not. Using our Bullet lures will give you the most accurate monitoring data in your pest management program. This will not only enable you to save time and money but also help you decide the appropriate next steps after insect detection has occurred. Having a successful monitoring in your IPM program and early detection will ensure you to generate more revenue.

In what other ways do your products make PMPs more profitable?

We believe that the combination of providing our three main pillars – Science, Education and Innovation – to PMPs, along with our customer service is a recipe for success. Having accurate monitoring data will enable trust within the companies you are working with, and people work with people they trust. Our products will give you a true glimpse of what's going on with insect monitoring so you can focus on next steps and other tools within your IPM program.



Quality Pheromones and Trapping Systems

Insects Limited was established in 1982. It was founded on a statement made by an entomology professor at Purdue University while founder Dave Mueller was attending college: ***"The future of pest control is without the use of toxic chemicals"***.

Today, **Insects Limited, Inc.** researches, tests, develops, manufactures, and distributes quality pheromones and trapping systems for food infesting insects to a global marketplace with a focus on the statement above. At our core, Insects Limited focuses on bring **Science, Education, and Innovation to the Stored Product Industry**.

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Arizona Arthropods



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Arthropods are a phylum of invertebrate animals that contain an exoskeleton, a segmented body, and paired appendages.

Some of the most popular arthropods include scorpions, spiders, millipedes, centipedes, crustaceans, and insects.

Ethan Estabrook had the unique opportunity to see a wide variety of arthropods on his recent trip to the Sonoran Desert of Arizona.



The giant hairy scorpion (*Hadrurus arizonensis*) is the largest scorpion in North America reaching sizes of 6 inches (15 cm).

These scorpions feed mainly on other scorpions and invertebrates but have been known to feed on larger prey such as lizards, snakes, and mammals.

The venom of the giant hairy scorpion is not very potent and is comparable to a bee sting.

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Desert centipede (*Scolopendra polymorpha*) go by multiple common names such as the common desert centipede, tiger centipede, banded desert centipede, and Sonoran Desert centipede. They are large centipedes reaching sizes of 7 inches (18 cm) in length. The desert centipede uses appendages called gnathostomes or gnathopods to pinch rather than bite, injecting venom into prey. Once eggs are laid, a mother desert centipede will guard her eggs by coiling around them for protection.



The Black witch (*Ascalapha odorata*) is a large bat-shaped, dark-colored nocturnal moth. They are the largest noctuid (night owl moth superfamily) in the United States reaching wingspans of 9 inches (24cm). The black witch is considered bad luck and is associated with death or misfortune in many Central American cultures. In the novel *The Silence of the Lambs*, serial killer 'Buffalo Bill' placed black witch moth pupae in the mouths of his victims. In the movie adaptation, they were replaced by the death's-head hawkmoth (*Acherontia*) pupae.



The Tucson Bronze Tarantula (*Aphonopelma vorhiesi*) is a large tarantula species reaching a leg span size of 6 inches or more (15cm).

Tarantulas, like all spiders, use venom to help take down prey and primarily feed on insects and other arthropods. Males live 10 to 12 years while females can live twice as long. Male Tucson brown tarantulas are dark brown to black while females are light brown.



The giant whip scorpion (*Mastigoproctus giganteus*), also called the giant vinegaroon or grampus, is the only native whip scorpion in the United States.

They have a long, thin, whip like tail and can spray 85% acetic acid from the base of their tail to help defend themselves from predators. The giant whip scorpion feeds on various insects, worms, and slugs.



Tadpole shrimp (*Triops longicaudatus*) is a crustacean that lives in freshwater ponds and pools.

It is the most widespread notostracan species (Tadpole shrimp order) and can be found in western North America, South America, Japan, South Korea, and several Pacific Islands. They are one of only two tadpole shrimp species that can have three reproductive strategies including bisexual, unisexual (parthenogenetic), and hermaphroditic.

Offspring stay inside eggs during the dry season and hatch as rainwater fills up seasonal ponds and pools.

Tadpole shrimp live for about 20-90 days if water does not dry up where they feed on fairy shrimp and other invertebrates.