

Fumigants & Pheromones

Digital Newsletter Delivered by Insects Limited, Inc.

Issue 163

SightTraps - A Year in Review



Ethan Estabrook, BCE

Research Associate, Insects Limited

Wow! What a ride the last year has been!

We started 2020 by taking SightTrap selfies at the Purdue Pest Conference in January before the pandemic hit and then at an IPM Remote Monitoring training program in February.

We visited pet food, seed, and food processing facilities in those early months of the year to help assist in [SightTrap](#) installations.

2020 looked to be a great year!



Insects Limited President Pat Kelley and Vice President Tom Mueller pose for a SightTrap selfie at the Purdue Pest Management Conference in January 2020.

Insects Limited Research Associate Ethan Estabrook poses for a SightTrap selfie at a IPM remote monitoring training program in February 2020.



As we all know, in March 2020, COVID-19 completely changed everything. Like with most companies, [Insects Limited](#) began working remotely from home. We were unable to continue visiting facilities to help assist in SightTrap installations. We reassessed our plan moving forward and decided to refocus on improving software developments.

Insects Limited Product Guide

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In May 2020, we introduced our largest firmware update called release-12. We were able to push the new release-22 update to all connected SightTraps remotely. Release-12 helped improve user experience, reliability, and functionality. Some of the updates included:

- Improved Bluetooth communication between mobile phones and SightTraps during setup
- Extended battery life up to 30% to help coincide with 90 - 120 day pheromone changes
- Ability to connect to both 2.4GHz and 5GHz Wi-Fi networks
- Ability to connect to open Wi-Fi networks
- Moved all communication to AWS and Mender on port 443

As we navigated through 2020 we quickly learned that there were definite benefits to [remote monitoring](#) for pests when people could not physically be present. We saw that COVID-19 did not decrease SightTrap installations, it actually increased them. We learned that the SightTrap offered IPM and QA managers the tools necessary to continue monitoring insects throughout a pandemic. Once SightTraps became FCC (US) and CE (EU) approved, we had the opportunity to help virtually install SightTraps all around the world at flour mills, bakeries, peanut processing plants, automated warehouses, tobacco storage facilities, seed warehouses, grain bins, retail stores, museums, and even in a cave. ([Read about SightTrap Working within a Cave System](#)).



Left: SightTrap installed at a retail pet food store to help protect products and brand names from stored product insects. Right: SightTrap installed at a fully automated warehouse where individuals are unable to access hard to reach areas to monitor for stored product insects on a routine basis.

We were able to see firsthand how SightTraps helped solve difficult insect-related issues. One example is a large (600,000 ft²) pet food warehouse struggling to find the source of stored product insects. We installed SightTraps throughout the warehouse and were able to identify the areas with the most activity within a few days. We then concentrated SightTraps to those areas to help further pinpoint the source population. After a few more days, we performed detailed inspections near those areas and identified a damaged bag of dog food infested with insects. Within a week, SightTraps helped us find and remove the source of stored product insects that may have otherwise gone unnoticed. Seeing is believing!

Another example of how [SightTraps](#) helped solve difficult insect-related issues was at a seed warehouse. At the end of summer farmers return unused seed back to seed companies where they recondition, repackage, and store the seed for next season. SightTraps were able to immediately identify an infested seed return that was brought into the facility.

[Remote Monitoring with SightTrap](#)

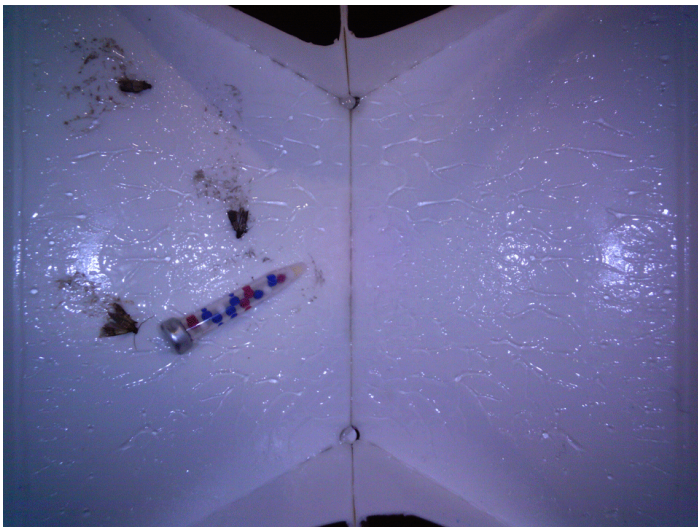
The SightTrap™ provides a daily image of your pheromone monitor insect catches. View your trap images from anywhere with your mobile device.





Left: *Insects Limited* Vice President Tom Mueller sets up a SightTrap at a pet food warehouse.
Right: Utilizing SightTraps helped identify the source of stored product insects at a pet food warehouse.

SightTraps showed the increased Indian meal moth and the IPM manager was able to show the QA manager photos taken by the SightTrap. Seeing how fast moth activity was increasing, the IPM and QA managers decided to perform a treatment before things became problematic. SightTraps can help provide real-time pest data and can provide managers the time to make crucial decisions.



A [GIF](#) of Indian meal moth activity after an infested seed return was brought into a seed warehouse.

As we helped customers install SightTraps for flying insects, we learned there was a need to remotely monitor crawling insects on floors as well.

We created an attachment that allowed the SightTrap to be placed on the floor to take images of glue board traps and pit fall traps like the [All Beetle Trap](#).

This presents new opportunities for the SightTrap from expanding its use at facilities to monitoring more insect species such as clothes moths, carpet beetles, dermestid larvae, flour beetles, grain beetles, cockroaches, and causal invaders.

Currently SightTraps placed on the floor are being utilized at museums and historic homes to monitor for dermestid larvae, clothes moths, silverfish, and other crawling insect activity.

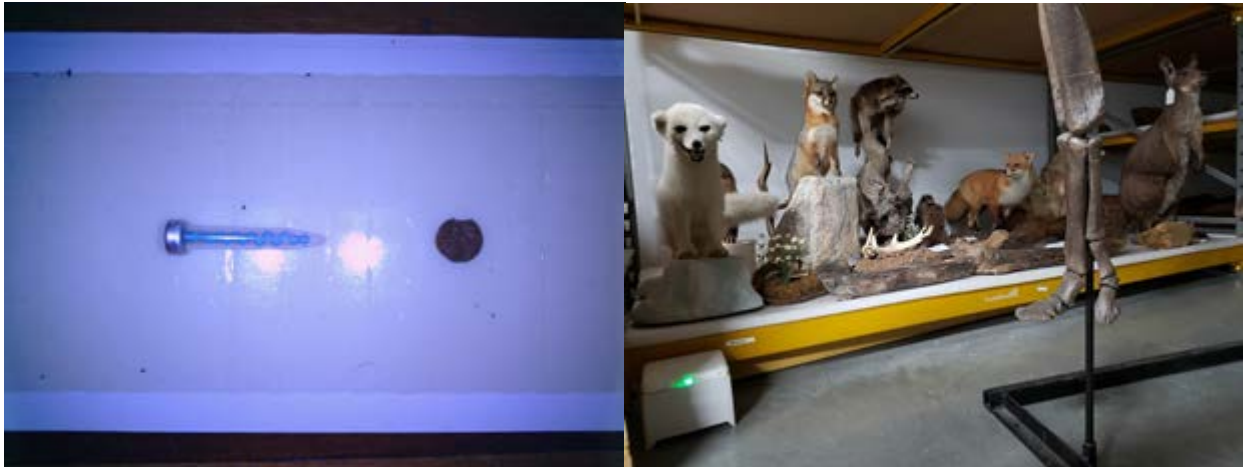
Textiles, animal hides, taxidermy, wood works, natural fibers (like wool), books, and paintings contain material that insects can exploit and do irreversible damage to.

The information provided by SightTraps can help make effective pest management decisions to protect and ensure the continued longevity of important historical artifacts and objects of [cultural heritage](#).

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.





Left: Image from a SightTrap placed on the floor to monitor for dermestid larvae, clothes moths, silverfish, and other crawling insects at a historic home. Right: SightTrap installed in a museum's natural history collection to monitor for insects that may damage textiles, animal hides, taxidermy, wood works, natural fibers (like wool and cotton), books, and paintings.

We are excited to see what the future holds for the SightTrap. We are currently working on website features to help improve user experience. Some of our current projects include:

- Allowing for multiple thresholds that permits customers to choose a variety of insect species, number of insects, and number of days.
- An improved alert and notification system of when thresholds are met, when glue boards need to be changed, and when pheromone lures expire.
- An improved and more detailed summary data report to help identify insect counts, temperature, and humidity on specific days.

The SightTrap and its software, [ForesightIPM](#), can be a valuable tool for IPM and QA managers by providing information, such as the detection of insects, insect species, population trends, and locations of infestations.

If you are interested in knowing more about the SightTrap, contact Ethan Estabrook at 317-896-9300 or E.Estabrook@InsectsLimited.com

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Temperature Over Everything



Tom Mueller

Vice President, Insects Limited

When it comes to insects it is temperature over everything.

Maybe "Temperature over Everything" is not a good title, but rather "Temperature IS Everything" would be more fitting.

If you are not taking temperature into consideration when executing a pest control program, then it is highly unlikely you can categorize this program as "integrated pest management."



Paul Fields, Ph.D.



Jeff Waggoner, ACE

The last two webinars we have broadcast in our [Stored Product Insect Virtual Series](#) have tied in well to each other (along with each of the other 14 episodes we have created and produced) when it comes to temperature.

In May, Paul Fields, Ph.D. joined us to discuss the "Role of Temperature in the Biology and Control of Stored Product Insects" which was the most attended webinar we have produced to date.

During his presentation, Dr. Fields explains how important the role of temperature is in nearly everything an insect does.

From the food it decides to infest to the behaviors we can observe while using temperature as a control method, insects will choose the micro-environment that is best suited for their reproduction based on small changes in temperature gradient.

Looking at the both the "Temperature Effects on Biology of Common Stored Product Insects" and the "Average US Temperatures" charts below, we can see that stored product insects increase in population over 7 straight months during the year. Know the biology of your pest is half the battle in preventing it.

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Temperature Effects on Biology of Common Stored Product Insects

Insect Species	Low Temp. Effect		Temperature for Population Growth			High Temp. Effect	
	Extreme 100% Kill	Moderate 100% Kill	Lower Limit	Optimum Temp.	Upper Limit	Moderate 100% Kill	Extreme 100% Kill
Granary Weevil	5°F/ -15°C 24 hours	18°F/ -8°C 14 days	52°F 11°C	81°F 27°C	82°F 28°C	105°F/ 41°C 12 hours	130°F/ 54°C 30 min
Rice Weevil	5°F/ -15°C 24 hours	18°F/ -8°C 3 days	59°F 15°C	84°F 29°C	93°F 34°C	102°F/ 39°C 17 days	131°F/ 55°C 1 hour
Lesser Grain Borer	14°F/ -10°C 4 hours	23°F/ -5°C 10 hours	64°F 18°C	93°F 34°C	100°F 38°C	109°F/ 43°C 4 days	131°F/ 55°C 1 hour
Cigarette Beetle	14°F/ -10°C 8 hours	23°F/ -5°C 4 days	63°F 17°C	90°F 32°C	97°F 36°C	109°F/ 43°C 4 days	122°F/ 50°C 24 hours
Drugstore Beetle	0°F/ -18°C 4 hours	28°F/ -2°C 90 days	59°F 15°C	81°F 27°C	93°F 34°C	105°F/ 41°C 12 hours	120°F/ 49°C <30 minutes
Warehouse Beetle	-2°F/ -19°C 10 days	14°F/ -10°C 30 days	64°F 18°C	90°F 32°C	104°F 40°C	113°F/ 45°C 30 hours	122°F/ 50°C 12 hours
Sawtoothed Grain Beetle	14°F/ -10°C 24 hours	23°F/ -5°C 15 days	63°F 17°C	90°F 32°C	102°F 39°C	113°F/ 45°C 12 hours	125°F/ 52°C 1 hour
Merchant Grain Beetle	14°F/ -10°C 20 hours	23°F/ -5°C 14 days	64°F 18°C	90°F 32°C	102°F 39°C	105°F/ 41°C 12 hours	120°F/ 49°C <30 minutes
Red Flour Beetle	23°F/ -5°C 24 hours	37°F/ 3°C 28 days	68°F 20°C	97°F 36°C	97°F 36°C	113°F/ 45°C 30 hours	122°F/ 50°C <30 minutes
Confused Flour Beetle	21°F/ -6°C 24 hours	32°F/ 0°C 9 days	63°F 17°C	90°F 32°C	90°F 32°C	111°F/ 44°C 24 hours	122°F/ 50°C <30 minutes
Indianmeal Moth	-2°F/ -19°C 1 hour	10°F/ -12°C 7 days	64°F 18°C	86°F 30°C	95°F 35°C	113°F/ 45°C 2 hours	131°F/ 55°C 30 minutes
Mediterranean Flour Moth	0°F/ -18°C 1 day	14°F/ -10°C 10 days	46°F 8°C	77°F 25°C	82°F 28°C	113°F/ 45°C 30 minutes	131°F/ 55°C <30 minutes

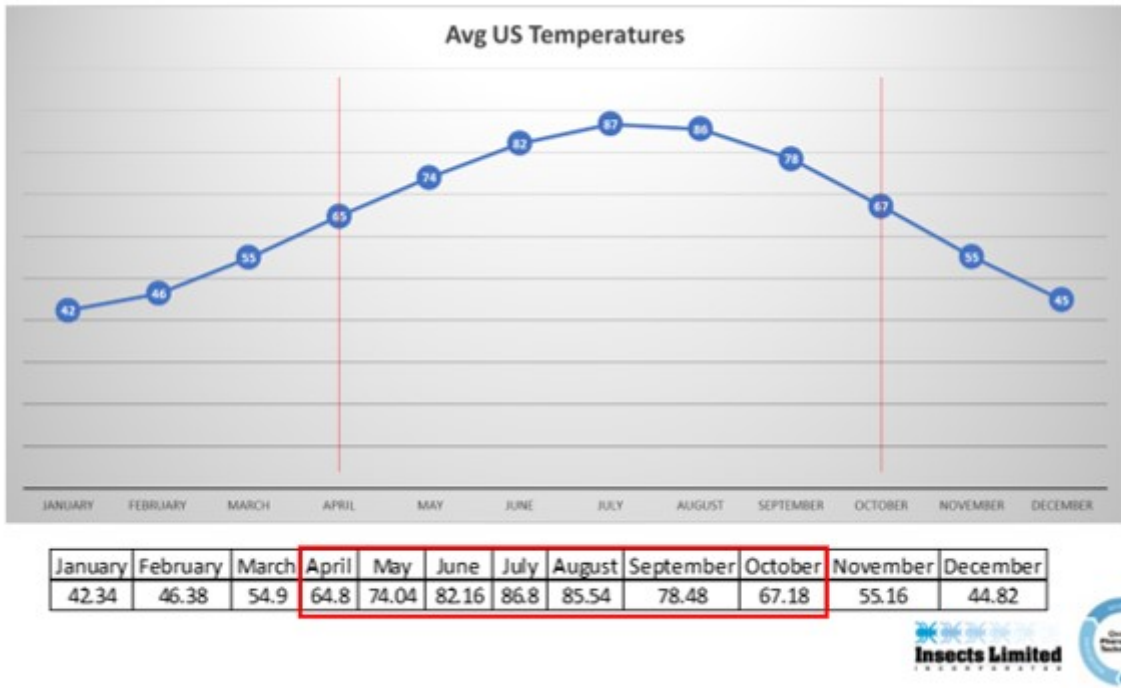
* The temperature data are derived from laboratory reared insect cultures. Insects acclimated to cold temperatures will require colder temperatures and or longer exposure times. From Fields (1992), Strang (1992)

Monitoring and inspection are not the only segments of an IPM program to concentrate on temperature.

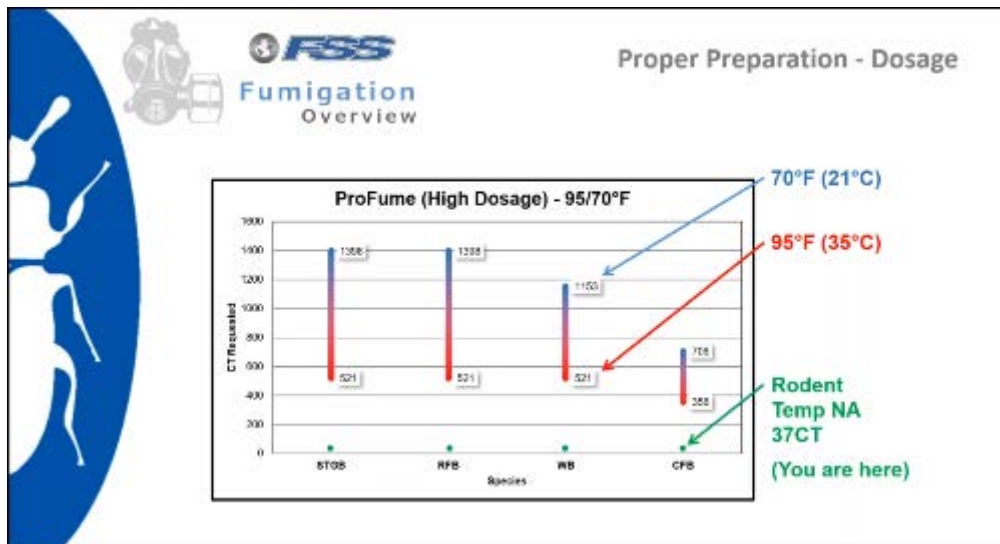
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In our most recent episode of the stored product insect virtual series, Jeff Waggoner, ACE with FSS, Inc. elaborated on the importance of temperature when considering chemical application for control measures of food infesting pests during his presentation on “An overview of fumigation.” He highlighted that when conducting a fumigation, a licensed professional can work with their customer to raise temperatures in facilities which will also increase the efficacy rate of the fumigation while decreasing the cost. Also making the point that the micro-environments and temperature differences within the facility must be considered as well. An example of this was made with how warm air accumulates around the ceiling, with temperatures being much cooler near the floor.



Slide from Jeff Waggoner's An Overview of Fumigation presentation

Clothes Moth Flat Trap Kit (IL-120)

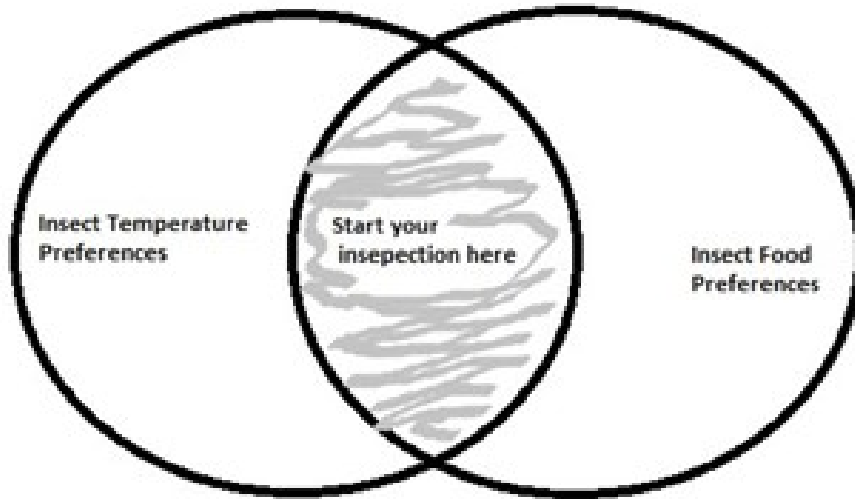
Clothes Moth kits feature the Insect Limited’s signature pheromone Bullet Lures™ that attract three separate species of clothes moth with a controlled release of pheromone over 3 months.



I encourage you to listen to both [episodes](#) and critically think about your approaches to pest management. They will undoubtedly prepare you to seek a long-term solution using the insect's behavior and biology.

To truly solve an insect issue, educate yourself on the temperature preference of your target insect. Then educate yourself on the food preferences of your target insect. Locate the areas these two preferences overlap and start your inspection there.

To help you even further, use [a quality pheromone monitor](#) in those areas to help you pinpoint the infestation and determine if your efforts are working. Correct the conducive condition and you will correct the problem.



Interested in learning more? Check out [The Control of Stored-Product Insects and Mites with Extreme Temperatures](#) by Dr. Fields. A list of his publications can be found [here](#).

Sharing Through Education

Insects Limited has prepared virtual presentations from expert speakers on various topics within the pest management industry, with more to come in 2021.

Each training program is intended to make your staff and company better by Sharing Through Education.

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Cicadas Among Us

You would never know it, but lying in the ground beneath trees are billions of bugs just waiting to emerge into daylight. The wait can be really long though, as in 17 years long! The telltale red eyes of the 17-year locust give away how long they have been patiently waiting to visit the earth above ground. Here is their story.

On warm spring nights they all begin to emerge together. Their numbers can be in the billions on a given year. As they finally pop their heads out above ground after the long wait, they look for a tree or vertical post to climb. Once they find a spot that they deem acceptable, they will literally pop out of their skin and transform into the final adult stage of their lives. After a few days of rest, their wings fill out and their shells harden. Now they are ready to start their important job of reproducing.



PHOTO: USDA.gov, via Wikimedia Commons

The males begin the mating process by calling the females to them. They do this by popping organs on their abdomen called "tymbals" in and out. The synchronized chorus of cicadas has been called one of the loudest sounds in nature. Mating takes place over the next several weeks. During this time many cicadas will be eaten by animals or insects and will not survive, but their numbers are so large that the population always succeeds.

As a final act of her brief life as an adult, a female cicada will bore a deep hole into a tree branch and lay her eggs. After only 6 weeks since the masses of cicadas emerged from beneath the ground, they are all gone. Eggs the size of a grain of rice soon hatch, and the young cicadas drop to the ground beneath the tree and instinctively dig downward. The nymphs will spend their time beneath the surface feeding on juices they suck from the roots of trees. And so the 17-year waiting period goes.

The reason we can hear cicadas each and every year is because of the 150 different species of cicadas in the U.S, some will emerge on any given year. Scientists have studied the different species and they know what years will be the "big" years for different areas of the U.S. You can find this information at cicadamania.com. So as you sit out at night this summer and you hear the distinct shrill noise of the male cicada calling for a mate, know that there are probably many more in the ground beneath you just waiting for the right time.

Most of the 17-year cicadas have telltale red eyes. Watch a video about them here: <http://bit.ly/28R77JB>

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