

Fumigants & Pheromones

Issue 106
Spring 2013

Routing:



EPA Award Winner
Best of the Best

A Newsletter for the Insect Control & Pest Management Industry, est. 1981

Infrared Imaging A New Tool for Pest Management

By Pete Mueller

Thermo imaging is more commonly used by police and fire departments than pest management professionals. However, because insects are sensitive to temperature changes, this technology may be used in our industry to record heat temperature differences. Knowing the temperature ranges in a structure can help the pest manager predict insect harborage, overwintering locations, emergence times, larval development, reproduction, population potential, and set economic thresholds. A positive identification of the particular insect helps determine the next steps to take to manage or eliminate it. This ultimately leads to a reduction of customer complaints.

We set out to search for areas with temperatures conducive to the growth and development of pest insect populations which could be more readily identified with the FLIR Thermal Imaging Camera for a treatment/ sanitation program.

Method Our tests consisted of thermally mapping areas ideal for insect infestations. The camera had the ability to set temperature ranges. We used a 45° F to 95° F range to filter out extremes in which pests could not survive. Knowing that these areas could be eliminated

from the search, our manpower and resources could be used more efficiently to target the areas that could sustain insect life. In the tests, we found that many parts of the inspected areas could not sustain a growing population of insects. They were either too hot or too cold. As we worked more with the camera we were able to make onsite identifications of harborage areas and address them during the visit.

FUMIGATION BENEFITS

Before a fumigation we were able to identify hidden structural defects that we wouldn't normally see. This allowed for better sealing of the hidden cracks that were allowing fresh air to enter the fumigated area. We noticed an improvement in gas readings and a reduction of fumigant and time needed to reach our time x concentration goal.

FLIR is a thermal imaging camera that uses hundreds of thousands of temperature points to form a picture.

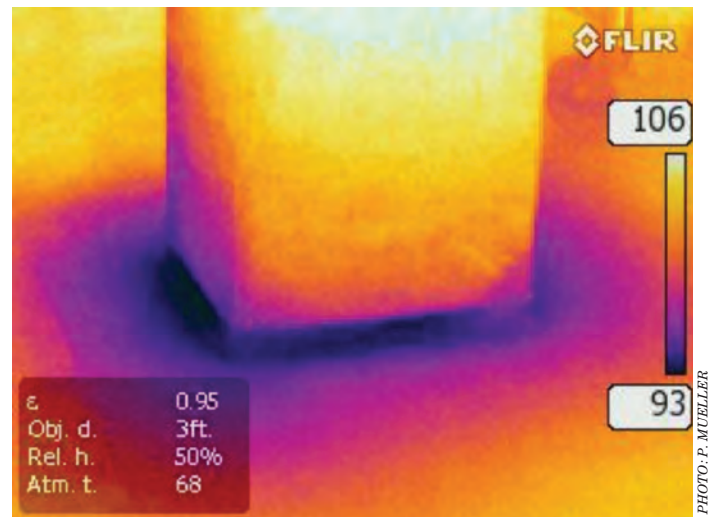


PHOTO: P. MUELLER

Temperature control During heat treatments it was a surprise to discover the difference between ambient temperature and surface temperature. At one point, 20 hours into the treatment, the air temperature was 135° F and the

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Mission Statement

Our aim is to strive for quality service, provide the absolute best products available worldwide, to be a respected world-class organization, and maintain profitability with innovation, alternatives, and education.

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Bad Bugs...

Lasioderma serricorne

Cigarette Beetle



Cigarette beetles can digest toxic plant material like tobacco with the help of internal organisms.



*By Pat Kelley, ACE
Vice President*

Stored product pests never cease to amaze me with the physical traits and abilities they have acquired over evolutionary time. A female granary weevil with her long snout can bore a hole into a kernel of wheat and then turn on a dime and drop an egg into the hole from the tip of her abdomen without even looking. Indianmeal moth larvae can completely cover the dried food goods they are eating with a thick layer of webbing to create their own micro-environments. One of the most mind-boggling traits to me though is the symbiotic relationship that the stored-product pest, Cigarette

beetle, *Lasioderma serricorne* has with yeast-like organisms in its guts. These organisms allow cigarette beetles to digest toxic plant materials like tobacco and go unharmed. If you didn't already know, nicotine can be considered a pesticide and is present in the dried leaves of tobacco. So just how can Cigarette beetles pull off eating such a toxic meal? Well, from a scientific perspective, the digestive tract of the Cigarette beetle has small organ-like structures called mycetomes. Housed in these mycetomes are yeast-like organisms that will eat and de-toxify the tobacco leaf after the cigarette beetle larva has ingested it. The yeast-like organisms benefit by having a food supply brought right to them

from the beetle larva and the larva benefits by not being killed from the nicotine and gaining valuable nutrition from an otherwise inedible food source. Termites, powderpost beetles and carpet beetles have similar organisms to help them digest things like wood and keratin in wool. The insect species and their internal companions make sure that their relationship continues as the female insect will pass along a few organisms from her ovaries to the egg she lays. And so the story goes as our pesty little friends continue to eat our tobacco, wool, and wood right out from under us. Just remember that in this case, it is the beast within the bug that makes it all work out.

New Office Opens in Michigan

Fumigation Service & Supply has opened a new office in Lansing, Michigan. Ethan Estabrook is the Area Manager for the Michigan and Toledo, Ohio territory. Ethan graduated from Purdue University in the College of Science. He has worked on FSS fumigation crews in the field gaining experience with fumigations and pest management at large food processing facilities, mills, and grain operations in the Midwest area.

He stated: "I am working on detecting phosphine resistance in insects in the Midwest area. Phosphine resistance is genetically linked. Insects have passed down this phosphine resistance. In a few years the situation has worsened in both frequency and strength of resistance. It is believed that ineffective fumigations are the driving force behind this genetic resistance."

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Ethan Estabrook
Michigan Area Manager



Save the Date

The 11th Fumigants and Pheromones Conference will take place in the beautiful and historic city of Kraków, Poland on June 2–4, 2014. The theme of this biennial conference is “Pest Management Around the World.” This educational conference is known for sharing practical and useful knowledge in a fun and friendly environment. The conference is organized by Insects Limited and Fumigation Service & Supply of Indianapolis and ICB Pharma of Poland. English is the official conference language by the presenters.

Dave Mueller, the organizer, stated: “The audience attending this biennial gathering is truly international. The three previous conferences combined attracted ~800 pest managers from 60 different countries from six continents.

This includes people representing food plant, food safety, tobacco manufacturers, spices, pest control, fumigation, stored product research, pesticide manufacturers, gas detection equipment, grain, seed, and universities. The invited speakers will offer new technologies and practical experiences that can

improve our businesses by sharing through education. This conference has expanded to include pest management around the world. Meeting people from different countries in similar industries can open dialog for future collaboration.

Posters sessions will allow for more interchange during the conference.

Commercial stands (exhibits) are becoming more popular at the Fumigants & Pheromone conferences. Here, commercial products and services are made available during the conference.

Location:
Downtown Krakow

PROGRAM

A cast of speakers from Europe, Asia, and North America have been invited to offer new and interesting topics. The speaker listed as the most interesting and informative from a previous conference in Indianapolis will headline this conference: Keynote speaker Dr. Bobby Corrigan from New York City. Professor Stanislaw Ignatowicz of Warsaw will bring his knowledge and experience in pest management to this conference in his home country. For more details on the program, go to www.insectslimited.com.

It is easy to come to Kraków. The network of railway, roads and air connections make Kraków one of the most accessible cities in this part of Europe.



Main Square in downtown Kraków, a place where people gather nightly to enjoy a beer and friendship. The Main Square is within walking distance of the 11th Fumigants & Pheromones Conference.

Phosphine-Resistant Stored-Product Insect Pests can be Destroyed!

By Dr. G. P. Opit and N. Shakya; Oklahoma State University

Dr. Opit (left) and Shakya (right)

Phosphine gas is an important tool for the management of stored-grain insect pests, and the occurrence of phosphine resistance in pest populations presents challenges to the continued effective use of this fumigant. Phosphine is commonly used because it is inexpensive, is easy to apply, leaves no residues and can be used in many types of grain storage structures and on many commodities. Therefore, in order to 1) maintain the cost-effectiveness of phosphine, 2) retain the ability of phosphine to kill nearly all stored-product insects that are fumigated in commercial storage structures, and 3) extend the useful life of phosphine, it is important to find ways to eliminate phosphine-resistant insects. Examples of ways that could be explored to eliminate phosphine-resistant insects include alternative fumigant gases (sulfuryl fluoride) and residual long-acting insecticides such as spinosad (Sensat™) and a mixture of chlorpyrifos-methyl (21.6%) and deltamethrin (3.7%) (Storcide™ II).

We recently evaluated efficacies of the grain protectant insecticides

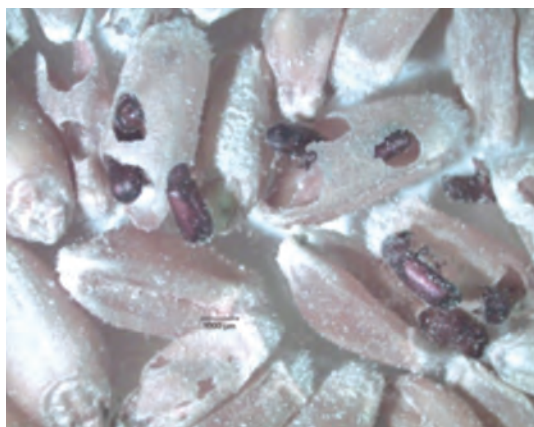


Storcide II and Sensat against phosphine-resistant and – susceptible adult LGB and RFB collected from Oklahoma. The RFB and LGB tested were 119 and 1,519 times, respectively, more resistant

than their susceptible counterparts. Storcide II is labeled for use on stored wheat and for structural treatment of grain storages. Sensat is a liquid formulation of spinosad, which is produced from a soil bacterium

(*Saccharopolyspora spinosa*), and is registered for use on stored grains in the U.S.

We found that both Sensat and Storcide II were highly effective against phosphine-resistant and – susceptible adult LGB and caused 96 - 99% mortality for treated wheat stored for up to 336 days. These two insecticides also



Lesser grain borers (l), and insect damaged kernels (IDK). Red flour beetles (r).

caused total offspring production suppression in phosphine-resistant and -susceptible LGB on treated wheat stored for the same period of time, i.e. adults held on the treated wheat produced no live offspring over a 336-day period. Sensat was not effective against phosphine-resistant and -susceptible RFB; the highest adult beetle mortality it caused was only 3% in treated wheat stored for each of the following time periods: 2, 84, 168, 252, and 336 days. Storcide II was effective against phosphine-resistant and -susceptible adult RFB only in treated wheat stored for 2 and 84 days where it caused mortality which ranged from 93 to 100%. Whereas Storcide II was effective and achieved total suppression of offspring production in both phosphine-resistant and -susceptible RFB in all storage time periods; this was not the case for Sensat which was not

as effective at suppressing offspring production of phosphine-resistant and -susceptible RFB.

Based on our study, both Storcide II and Sensat can be used to eliminate phosphine-resistant LGB whereas only Storcide II can be used to eliminate phosphine-resistant RFB. This means wheat infested by phosphine-resistant LGB can be treated using Storcide II or Sensat. Wheat infested by phosphine-resistant RFB and empty storage structures infested by resistant insects of both species can be treated using Storcide II to eliminate these pests. Sensat and Storcide II are effective insecticides for the management of phosphine resistant LGB and RFB.

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Pheromone Lure Spotlight

The Bullet Lure has been engineered to offer consistent release of the pheromone for a 60 day period.

The unique colored beads in the lure are there to hold the pheromone on a hard surface area rather than soak into the poly vial. This allows the liquid pheromone a chance to release through the semi-permeable membrane in the metal cap. This membrane is specially designed to release the pheromone consistently over time. Comparisons to other pheromone lures have shown that the rubber septa style pheromone releases like a sponge. The pheromone releases most of its pheromone in a blast at the beginning and is less effective after two weeks. This offers an inconsistent

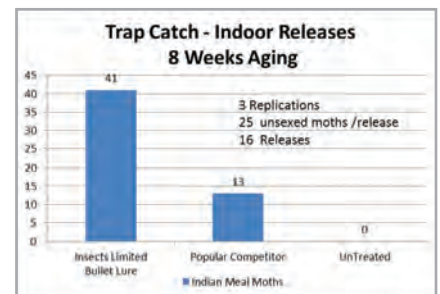


data collection that can lead to poor decision making. An example is if you capture 50 moths per week on the first 14 days and you capture 50 moths in the next 14 days. Does it represent the same population trends or does it mean the lure is less

attractive and your pest population has rapidly increased?

Does this mean there are less insects present or does this mean there is less active pheromone attracting the moths?

The Bullet Lure has been tested to last 60–90 days. Sixty days outdoors and 90 days indoors.



This graph shows the comparison of the Bullet Lure with other popular pheromones. Insects Limited strives to offer consistently high quality and cutting edge pheromone synthesis and research and the technical support to help reduce customer complaints.

PHEROMONE TRAPS

The Indian meal moth is the most common stored product pest. Moths can be found in homes, movie theatres, food processing, and grain storage facilities feeding on flour, milled products, cereal, nuts, bird seed, dried fruit, and pet food.

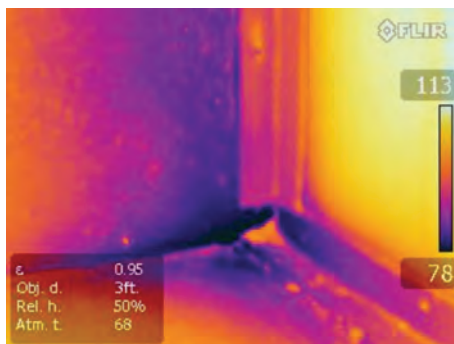


Infrared Imaging

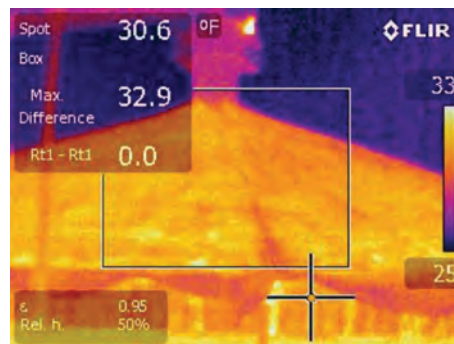
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surface was 85° F. At the other extreme, in a seed warehouse with bagged product, it took over two months in non-climate controlled buildings to cool down to the point the product was the same temperature as the ambient air.

Sanitation With the FLIR Thermal Imaging Camera we quickly learned the importance of good hygiene and pretreatment cleaning. We saw, a number of times, where product residues on the floor and walls had the ability to insulate insects from the effects of the heat treatment. Even pockets of product at depths as shallow as 1/4 of an inch would insulate insects from the heat treatment. Since we performed this Thermal Imaging Camera study in various food and stored product facilities, we have shared the information with a number of the participants. They have begun collecting data in order to improve their sanitation program.



Cracks that need to be sealed.



Heat escaping from a covered grain pile.

Conclusion Monitoring tools that help identify the presence or absence of insect populations are being used to reduce customer complaints. The FLIR Thermal Imaging camera is a graphic way of looking for those structural leaks that allow for the migration of insects and the loss of fumigants. This information along with your pheromone trapping program and visual inspection can improve your pest vigilance. We know that insects are very sensitive to temperature changes. This Thermal Imaging Camera

allows us to determine where those critical areas are and spend more time inspecting or mitigating those areas. The cost of this camera is about \$6,000. The cost of a failed fumigation or an outbreak of customer complaints is priceless.



Pete Mueller
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New Pheromones from Insects Limited

Angoumois Grain Moth – *Sitotroga cerealella*
Granary Weevil – *Sitophilus granarius*
Old House Borer – *Hylotrupes bajulus*
Lesser Grain Borer – *Rhyzopertha dominica*
Larger Grain Borer – *Prostephanus truncates*
Black Carpet Beetle – *Attagenus unicolor*



Pete Swords,
pheromone chemist
in his lab.

Scholarships

College scholarships are provided by Fumigation Service & Supply and Insects Limited for the children of its employees. A total of \$27,500 was recently awarded. The 2013 Scholarship recipients are:

Jared Wilford, IUPUI; (Terry Wilford)

Sarah Lillieoden,
U. of Minnesota, Duluth; (Curt Lilleodden)

Quinn Kelley, Purdue; (Pat Kelley)

Edgar Garcia, Purdue; (Luciana Garcia)

Adam Gough, DePaul; (Paul Gough)

Visits

Alain VanRyckeghem and Dave Mueller, of Insects Limited, and Dr. Spencer Walse, USDA Fumigation Lab in Fresno, California.



10th Serrico Pheromone Education Program in Tokyo, Japan, February 2013.

Ryan Yutzy; Safety Coordinator, Todd Wilhelm, Regional Manager, Jeff Waggoner, General Manager for FSS exhibiting Grain Elevator and Processing Society Meeting in Louisville.



(Top) Casey Vollmer explains her new GreenWay clothes moth traps to a delegate; (bottom) Henrik Lange, Managing Director for Tanaco in Denmark and European distributor for Insects Limited tells a story to Mary Beth Mueller and Casey Vollmer at PestEx.

PestEx 2013

By Casey Vollmer

PestEx is the largest UK trade exhibition and conference for the pest control industry. It is hosted every two years by the British Pest Control Association and attracts over 2000 attendees from about fifty countries. There were sixty commercial stands showing the newest technology in pest control.

Insects Limited exhibited at PestEx in London, England on April 10-11 with 60 other exhibitors. The event was held at ExCel London Exhibition and Convention Center. Insects Limited displayed its new GreenWay line of homeowner pheromone based products, announced the dates and locations for the next Fumigants & Pheromones Conference in Kraków, and presented the new pheromones available from Insects Limited.

Professional pest control is in great demand, but with the speed of technological change, an international forum is vital for our industry. It allows us to discover new ideas and to source the latest advances and products in our sector.

THE NEWSPAPER

Fumigants & Pheromones is published by Fumigation Service & Supply, Inc. and Insects Limited, Inc. We hope that the information that you receive from this newsletter will help you in your business, and you, in turn, will support our business efforts. If you have an associate who would be interested in receiving this newsletter, please contact the address below. We would welcome any comments or suggestions for topics. Address correspondence to: Peggy Rutkowski, Fumigation Service & Supply, Inc., 16950 Westfield Park Rd., Westfield, IN 46074 USA.



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Pest Management Around the World
**11th Fumigants & Pheromones
Technical Conference**
June 2-4, 2014
Kraków, Poland



PLAN TO ATTEND.

**Share your experiences
and meet new people.**

**Take time to explore
Kraków, an ancient
European university
city that dates back
over a thousand years.**

**June is a great
time of the year to
visit Kraków.**

Here Professor Stanislaw Ignatowicz greets two friends from Cypress at a Fumigants & Pheromones Conference. This educational conference is known for sharing practical and useful knowledge in a fun and friendly environment. About 3000 pest managers from 60 countries have attended this conference since 1993.

Kraków promotional video: www.insectslimited.com/conferences

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