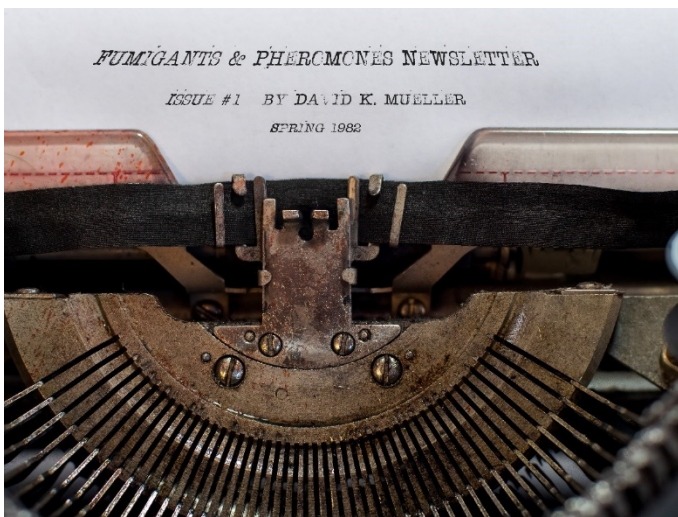


Fumigants & Pheromones

Insects Limited, Inc.

Fumigants & Pheromones Newsletter Releases its 150th Edition



Fumigants & Pheromones digital copies can be viewed on computers, tablets, and smart phones

[The Fumigants & Pheromones Newsletter](#) has hit a milestone of releasing its 150th Edition. The Newsletter has the humble roots of going out to the first customers of [Fumigation Service & Supply](#) and [Insects Limited](#) in 1982. David Mueller began writing the first editions and incorporating his own artwork or other graphics to go along with the articles. Over the years he began to have guest writers supply articles as well as other staff members and scientists. The intent of the newsletter was to better inform and educate the customers of these two companies on regulatory issues and new science surrounding fumigation topics or insect pheromones.

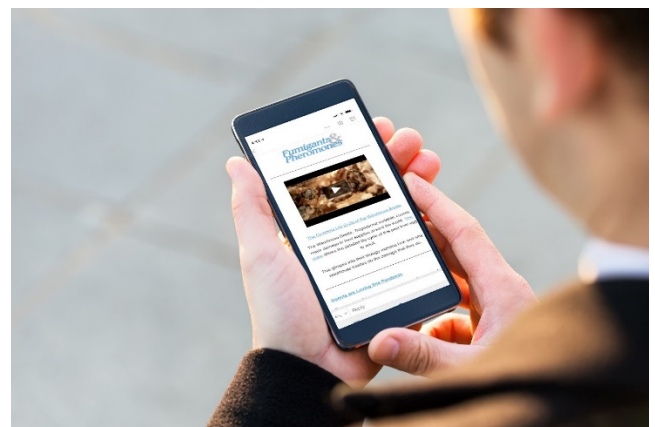
In 2017, after 35 years of offering only print editions of the newsletter quarterly, the Fumigants & Pheromones newsletter went digital. You can find David Mueller making that announcement here:

https://youtu.be/SBQUa_hjdrq



David Mueller announcing that the Fumigants & Pheromones Newsletter is going to go digital in 2017

Currently the newsletter comes out monthly and is available on your computer or even on your smart phone. We at Fumigation Service & Supply and Insects Limited thank you for all your continued readership and comments over the past 38 years! Now we are looking forward to our 200th Edition!



Fumigants & Pheromones digital copies can be viewed on computers, tablets, and smart phones

Fumigants & Pheromones

Insects Limited, Inc.



Tom Mueller

Providing Solutions, Not Excuses with Stored Product Insect Virtual Seminars - Integrated Pest Management

[Insects Limited](#) is a company based on science and education, *and oh by the way, we sell the highest quality of pheromones available for stored product insects.* It all ties together. We want to perform the science, and based on our findings, we want to create the highest quality of products as well as the most up-to-date science through educating others. It is the center of our core and emphasized daily throughout our company.

For this reason, we decided to run a short, three-episode series about the generalities of stored product insects in March and April. We were overwhelmed with the response. Check out a recap of those episodes [here](#). It could be Covid-19, or it could be an industry need, but whatever the reason, we decided to do four more episodes. Unsure of what the industry might want to hear, we sent out a survey and polled our attendees with a list of topics they could rank for future episodes. To my surprise, the answer was Integrated Pest Management (IPM); 1) The general pieces of IPM and 2) IPM specific to food facilities. IPM is discussed everywhere we look, conferences, webinars, magazine and newsletter articles, phone conversations, and meetings. It is drilled into our heads, but we had to give the people what they want so episodes 4 and 5 of our Stored Product Insects Virtual Series were IPM.

[Episode 4](#) outlined the tools in the tool belt.

- Inspections/Assessment
- Exclusion
- Sanitation
- Education
- Monitoring
- Administrative and Service Technician Relationships
- Physical, Mechanical, and Chemical Control
- Documentation

None of these tools will provide complete solutions to stored product insect problems if implemented alone. But combining the tools, constantly assessing and adjusting your program, educating yourself and your customers with all the information you can find about your target pests, utilizing data from documentation to set you down the right path, and a little luck, a well-executed IPM program will give you positive outcomes. Side note: performing these tasks properly will cost you upfront but will save you so much more in the long run.

Inspection/Assessment



Stored Product Insect Virtual Seminar - Episode 4: SPI and Food Safety IPM Component Breakdown

[Episode 5](#) put the tools to use. Our attendees heard the hands-on experience from experts with many years of experience implementing these programs in food facilities across the country. Ethan Estabrook, BCE, Research Associate with Insects Limited, joined us to discuss his experiences with IPM throughout bulk storage facilities. John Moore, MSc, Director of IPM at [Fumigation Service & Supply \(FSS\)](#), enlightened the group about how IPM programs should look in a

Fumigants & Pheromones

Insects Limited, Inc.



Tom Mueller

Providing Solutions, Not Excuses with Stored Product Insect Virtual Seminars - Integrated Pest Management

production, warehousing, and distribution facility. Alexandria Hammel, BCE, Quality Assurance Specialist at Nestle Purina North America, presented on the challenges of a retail environment.



Stored Product Insect Virtual Seminars - Episode 5: IPM in Real Life Scenarios

At Insects Limited we are very excited to be living our Core Values and providing education to the industry during these uncertain times. If you have not yet, [give the episodes a listen](#) and join us in June.

June 9 – 2:00 PM EST – All Things Stored Product Insects Part 1

June 16 – 2:00 PM EST – All Things Stored Product Insects Part 2

June 23 – 2:00 PM EST – Deep Dive into Mating Disruption

Fumigants & Pheromones

Insects Limited, Inc.



Pat Kelley, BCE

USDA ARS Research Scientists Contribute Their Talents to Help Protect Our Food Supplies from Stored Product Insects (SPI'-s)



As a society, we are too often dismissive or skeptical a federal government employee telling us that “I’m from the government and I’m here to help”. We may have had one too many times where a government worker was dismissive to us or where governmental red-tape got us nowhere in our quest. Completely contrary to that is the work being done by the USDA Agricultural Research Service entomologists and molecular biologists based out of Manhattan, Kansas. These extraordinary scientists devote their time and efforts to figure out pest issues that affect our food supply chain. Over the years, they have combined to publish hundreds of research papers specifically related to the control of stored product insects (SPI). Their research focuses on; flour beetles, warehouse beetles, cigarette beetles, insect genetics, cold tolerance, insect resistant packaging, insecticide fogging, IPM, fumigation and pheromones to name a few topics. In case you don’t already know them, let me introduce you to a few of the helpful folks and share what research they have been doing over the past couple of years. There are internet links associated with each person to take you to some of their publications for your review. I would highly recommend you go through these, pick out a few that interest you and learn about the pests we battle each and every day. These publications were meant to be shared and these scientists are truly doing the USA and the world a service by providing a constant flow of valuable information on stored product insects for us to consider. I have to say that in this circumstance, “They are from the government and they are certainly helping us all.”



Frank Arthur, Ph.D. is a Research Entomologist and has been working specifically on Stored Product Insects since 1986. Frank looks toward retirement this year and we will hate to see him go. Frank has been prolific in the amount of SPI research that he has done over his long career. He has been responsible for developing applied research programs for insect pest management in stored cereal grains and processed food warehouses. Frank’s recent research interests are the development of aeration management strategies for crops stored in different geographic regions, microbial products (E.g. spinosid) for use in raw grains or on surface substrates, identification of physical and environmental factors that affect the efficacy of residual insecticides, and simulated field studies involving chemical and non-chemical controls.

Recent Publications:

- Modeling the potential range expansion of larger grain borer, *Prostephanus truncatus*
- Development of *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae) on rice milling components and by-products: Effects of diet and temperature
- Aerosol concentration, deposition, particle size, and exposure interval as mortality factors *Tribolium confusum*
- Growth and development of *Tribolium castaneum* (Herbst) on rice flour and brown rice as affected by time and temperature
- [Link to all of Frank’s Publications](#)

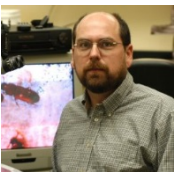
Fumigants & Pheromones

Insects Limited, Inc.



Pat Kelley, BCE

USDA ARS Research Scientists Contribute Their Talents to Help Protect Our Food Supplies from Stored Product Insects (SPI'-s)



James Campbell, Ph.D. is a Supervisory Research Entomologist. Jim's research interests include the behavior of stored product insects and their natural enemies and how the use of behavioral information can improve the

management of insect pests. Specifically, his research into pheromones and insect monitoring over many years has made his work especially enlightening for us here at Insects Limited. Jim currently has projects looking into the evaluation of structural fumigation and aerosol insecticide efficacy for management of the red flour beetle as well as red flour beetle interactions with pheromone traps.

Recent Publications:

- Semiochemical solutions for management of post-harvest insect pests
- Entomology and engineering: Working across borders to improve aerosol insecticide efficacy inside food facilities
- Temporal and spatial patterns in aerosol insecticide droplet distribution: modifying application strategies to improve coverage and efficacy
- [Link to all of Jim's Publications](#)



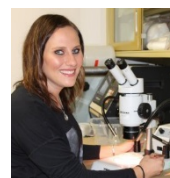
Rob Morrison, Ph.D. is a Research Entomologist. Rob's current focus for his program includes developing integrated pest management programs for stored product insects by exploiting their behavioral and chemical ecology.

Specific techniques being pursued are attract-and-kill,

improving trap designs for monitoring, and habitat manipulation.

Recent Publications:

- Modeling the potential range expansion of larger grain borer, *Prostephanus truncatus*
- Mobility of adult *Tribolium castaneum* (Coleoptera: Tenebrionidae) and *Rhyzopertha dominica* (Coleoptera: Bostrichidae) after exposure to long-lasting insecticide-incorporated netting.
- Sanitation improves stored product insect pest management
- [Link to all of Rob's Publications](#)



Deanna Scheff, Ph.D. is a Research Entomologist. Deanna currently works with Frank Arthur and Jim Campbell and her research interests include evaluating packaging incorporating insect growth regulators

(IGR's) against insect penetrations and subsequent infestation, investigating how insects exploit food spillage inside and outside food facilities to improve pest management techniques, evaluating spatial distribution of aerosol insecticides and the impact on the efficacy on stored-product insects, and insect behavior and management pertaining to the food safety of human and animal food products.

Recent Publications:

- Case study: A practical application of an aerosol treatment in a commercial mill

Fumigants & Pheromones

Insects Limited, Inc.



Pat Kelley, BCE

USDA ARS Research Scientists Contribute Their Talents to Help Protect Our Food Supplies from Stored Product Insects (SPI'-s)

- Aerosol dispersal patterns and resulting effects on *Tribolium confusum* (Coleoptera: Tenebrionidae) adults
- Evaluating penetration of *Plodia interpunctella* (Hubner) (Lepidoptera: Pyralidae) larvae into multilayer polypropylene packages
- *Plodia interpunctella* and *Trogoderma variabile* larval penetration and invasion of untreated and methoprene-treated foil packaging
- [Link to all of Deanna's Publications](#)



Erin Scully, Ph.D. is a Research Molecular Biologist. Erin's current research interests include functional genomics of sensory systems of stored product pests and how behavioral and chemical cues can be disrupted to reduce

these insects' abilities to locate food and mates. In addition, she is also interested in genomics of invasive insects and identification of genes that enable stored product insects to adapt to abiotic (non-living) and biotic (living or once living) stresses.

Recent Publications:

- Leveraging insect genomic resources to improve management of invasive and emerging agricultural pests
- Recent Innovations in Post-Harvest Entomology: Improving Food Security in an Era of Globalized Agriculture
- High Quality Genomic Resources for Stored Product Insects
- [Link to all of Erin's Publications](#)



Alison Gerkin, Ph.D. is a post-doctoral Research Molecular Biologist. Alison currently works in Dr. James Campbell's lab and her research interests focus on understanding the phenotypic and genetic plasticity responses to stress using behavioral, thermal, and life-history bioassays.

Recent Publications:

- Artificial selection to nonlethal cold stress in *Trogoderma variabile* shows associations with chronic cold stress and body size
- Understanding delays in mating and the importance of the female response
- Physiological and morphological changes associated with selection for cold tolerance in a stored product insect pest
- Using long-term capture data to predict *Trogoderma variabile* Ballion and *Plodia interpunctella* (Hübner) population patterns
- Red flour beetle (Coleoptera: Tenebrionidae) response to volatile cues varies with strain and behavioral assay
- [Link to all of Alison's Publications](#)

The USDA ARS Staff information and papers were taken from the website ars.usda.gov