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Fumigants & Pheromones

Issue 104

Fall 2012

Routing:



EPA Award Winner
Best of the Best

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

Fumigating Warehouses

By David Mueller, BCE

Rodents and insects can cause damage to products while in storage. Untold amounts of money are spent on establishing a reputation for a brand. The appearance of defects in a product can tarnish a brand and nullify the labor of many. The goal is to provide a quality product with a consistently perfect appearance.

Fumigation is utilized because the rodent or pest insect population has reached an economic threshold. In the past, warehouses were fumigated with phosphine fumigants. Brand names like Phostoxin™ or EcoFume™ were commonly used. Phosphine is a very good penetrating gas that kills insects in 2-3 days while the rodents commonly die in 1-2 days.

The problem with phosphine is that it can be corrosive to precious metals like computers, fork trucks, shrink wrapping machines, and copper products if not removed or properly managed. This is especially true in refrigerated warehouses where copper pipes are plentiful and often exposed.

ProFume™ Pros and Cons

Since 2007, ProFume™ fumigant has replaced phosphine for most structure fumigations like stored seed, flour mills, and food processing facilities. ProFume is colorless and odorless and comes in a steel cylinder.

One advantage of ProFume is that it is also a good penetrating gas; it will reach center pallets of shrink wrapped stored products in 6–10 hours. It has not shown any genetic resistance to insects or rodents like phosphine and is starting to develop worldwide. Another advantage to ProFume is that it is quicker than phosphine. It takes 24–36 hours to fumigate.

The disadvantage of ProFume is that it is more expensive than other fumigants. It needs more specialized gas monitoring equipment and training than phosphine. Another disadvantage is that the sulfuryl fluoride in the product ProFume is a 'sticky' gas. When it gets into bags and other enclosures, it is often slower to escape than phosphine.

This is an important safety concern. Warehouses with bags of products enclosed often need to aerate for approximately 24 hours before reentry. Special aeration equipment and detection equipment are needed to perform these fumigations safely.

Safety is increasingly important in any contracted work on company property. Accidents can be prevented with proper training, equipment, supervision, and documentation. Today's fumigator needs to understand safety policies and provide the proper training, equipment, supervision, and documentation to ensure accident-free jobs.



Jeffery Moorhead, Chicago Regional Manager for FSS, is monitoring ProFume gas readings during a large food warehouse fumigation.



Unlike fogging insecticides, fumigants are designed to penetrate. This includes penetrating shrink wrap, paper bags, 0.5 mil inner liner of plastic and inside the middle of the pallet to kill hidden infestations. Then the fumigant has to leave this route at the end of the fumigation and go from over 20,000 PPM to <1 PPM of SF before the workers can return. This takes the skill and equipment of a trained and experienced fumigator.

Mission Statement

In all, 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.

VISIT US AT: www.insectslimited.com

Bad Bugs...

Brown-Dotted Clothes Moth (European House Moth)

by Alain VanRyckeghem, BCE

In the past few years we have seen a trend with homeowners, especially from NY, NJ, PA, CT and MA, catching a different kind of moth on Insects Limited's Webbing Clothes moth pheromone baited trap. These new darker moths are being primarily caught in the months of June to August.

The dark colored moths are Brown-dotted Clothes Moth, (*Niditinea fuscella*) which is also known as the European House Moth in other parts of the world, or the close relative (*Niditinea orleansella*) which is native to North America.

Adults of this small moth have a wingspan of 14 mm (5/8 in). Their forewings range in color from a dull brown-grey to shiny gold flecked-brown and bear three large blackish-brown dots each. The

base of the forewing is also marked with a dark spot or band. The hind wings are a silvery white; they are surrounded by a long-haired fringe, as usual for fungus moths in the family Tineidae. The body is dull brown, and the head bears a tuft of reddish-brown or brown-grey hair.

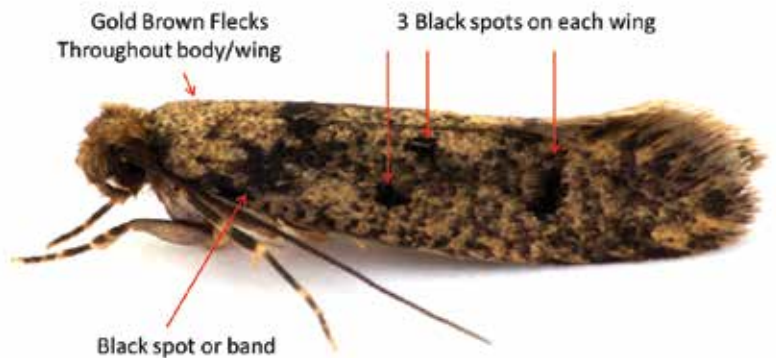
It is widespread and common in much of western Eurasia and North America. The adult moths fly during May to September, depending on the location; they are not fond of bright daylight and will only come out in the late afternoon and night.

The caterpillars of these two moths feed on dry animal and plant remains. Despite the species' common name, they are rarely recorded as a pest of clothing. It is not likely that these larvae will feed on clean dry woolen clothing or rugs. Woolen rugs in poor conditions such as damp basements may be susceptible to attack. They are more commonly found in bird nests – particularly of chicken, domestic pigeon, and swallows, where they feed on shed feathers and feces. These moths have been found on taxidermy mounts feeding on feathers, and in insect cultures feeding on dead bodies

and frass. They are scavengers of grain or soybean dust in damp dark buildings. The larvae may also feed on organic litter in wooded areas, farm buildings such as poultry houses or feeding on fungus growth in mulch around homes.

The severe heat and drought of the past few years has likely forced the moths to seek cooler damper locations in air conditioned homes by accessing chimneys, and gaps in doors and windows of garages or the main structure. Once inside the structure they are strongly attracted to the pheromone of the webbing clothes moths. These captures often alarm the homeowner as hundreds may be caught in a few nights.

Note from Matt Frye:
*I am the entomologist at JP McHale Pest Management in Buchanan, NY. We employ your *Tineola bisselliella* (webbing clothes moth) pheromone traps as part of our integrated pest management program targeting this pest. This summer we have been catching a new moth on your pheromone traps; a moth that I have not yet been able to identify. I was wondering if Insects Limited has heard of this happening elsewhere?*



(PHOTO: M. FRYE)

Here's to
the Bugs!

Dave's Soapbox

...for what it's worth

After millions of years on this planet, insects have shown us how to survive in almost any condition. We should appreciate their ability to survive and plan our pest management around a creature that can adapt to almost any condition. My favorite toast at parties:

“Here's to the Bugs!”

The first seven months of 2012 were hot. I mean record Hot. However, the change in temperature in most of the U.S. brought several positive things: the hot weather brought low humidity. It was not unusual to have humidity at 20–30 percent. Like snakes, scorpions, mammals, and birds living in the desert, we found ourselves staying hidden in the hot daylight hours and crawling out of our habitats when the sun went down and the nights cooled off.

The insects were the same way. Rarely did you see an insect hit the windshield of your car this summer. One could travel down the highway for hundreds of miles and not smash a bug on the windshield. They were hiding deep in the cracks and cool places that still held moisture.

Grass

One advantage of the hot summer was that you didn't have to cut your grass. Walking on the grass in July was like walking on potato chips. Except for a few hearty weeds, the hours you spent on grass maintenance allowed you several additional hours each week.



Mosquitoes

I saw only a few mosquitoes this whole summer. The low humidity caused the standing water to dry up and thus prevent mosquito development. With West Nile Disease mentioned in the newspapers often, the incidence of bites were reduced.

Japanese beetles

Where did Japanese beetles go? The roses and plants that they usually defoliate looked normal.

Allergies

The hot summer slowed the pollen generating plants from growing and producing allergies. Millions of workers take 3–4 days a year off work when their allergies are ignited. Lying in bed with an allergy attack is not fun. The productivity that was increased from the lack of pollen and allergy attacks must have helped our human suffering and increased productivity.

Wine

If you grow grapes you know that the best and most expensive wines come from the years that are the driest. The green vines and plump grapes will be a positive outcome of the hot weather.

Indoor bugs

Many stored product insects came originally from the Middle East. Places like Egypt, Iraq, and Tanzania where it is hot in the summer. Insects like the red flour beetle, warehouse beetles, and rice weevil like hot weather. The reproductive time from egg to adult can go from 40–50 days to 20–30 days. This means one generation can take half as long and produce more eggs during the summer months. One red flour beetle can lay up to 500 eggs in her life. When you normally have 2–3 generations per year in the Midwest, you now can have 4 or

more generations of beetles in a hot year like 2012.

Indian meal moths

The summer of 2012 was more like the desert. This popular moth species does not like hot weather. The pheromone trap counts this summer were low on IMM. They are not found in places near the equator like Hawaii and equatorial Africa. They enjoy the temperate climates that the United States and Europe normally offer.

Take Home Lesson

What we learned in the first seven months of 2012 is that record breaking months like March (14,000 towns and cities in the United States broke 120-year temperature records in March) helped the pest population get a quick start. Continuing with record breaking temperatures the first six months of hot, dry weather created a problem on the crops, insects, and our grass. But now the rains have come back and the temperatures have adjusted to normal in many parts of North America. We as humans feel the effects of temperature and humidity and pollen counts each hour of each day. It is easy to forget about those factors and their misery when conditions change. Insects are programmed to respond to conditions, adjust biologically, and most importantly, survive. Insects have a great ability to survive because of their small size and small demand on their resources. Insects have the ability to shut down when they lack oxygen, food, water, or hot or cold temperatures. Insects have been around for 250–300 million years. I'm sure they have seen a few years like 2012.

D. K. Mueller
Dave Mueller

How Do Bed Bugs Spread from One House to Another?

By David Mueller, BCE

Electronic tablets are becoming more and more popular in educating our students. In fact they are starting to replace books. These tablets and laptop computers go home and are returned to the school or office. In the summer they are stored and inspected by the school district. One unwanted guest that has appeared in the cushioned carrier bags is the bed bug (*Cimex lectularius*). This should not be a surprise to people because the bed bug has been found in increasing numbers throughout the United States and the world.

Entomologists speculate why this is occurring. One reason is that the electronic devices produce heat and provide harborage. Bed bugs are attracted to body temperatures (e.g. 98.6° F). They hide in dark places that have crevices like the edge of a bed or a cushioned tablet carrier. Some experts suggest the increased presence of bed bugs is because of global warming, resistance to modern pesticides, removal of effective pesticides like DDT, and the changing travel patterns of humans. It could be simply that the bed bugs have learned to adapt to our human environments much like the house mouse and grain insects that we live with.

Case Study

Recently a school district inspected its electronic tablets to make sure they were functional for the start of school. Their IT technicians found bed bugs in many of the cushioned bags. It is important to note that bed bugs don't carry diseases but they do need a blood meal on humans to survive and breed. However, bed bug bites can



The tablets are commonly placed on or near the bed for evening reading and homework. Bed bugs are attracted to warm objects with good hiding locations. (PHOTO: BEST BED BUGS TREATMENT)



This truck trailer with 7000 electronic tablets and cushioned bags was recently fumigated for bed bugs.

cause skin irritation, rashes, loss of energy, and secondary infections.

The tablets and their cushioned bags were stacked in a truck trailer and sent to Fumigation Service & Supply's fumigation warehouse. The fumigant used on this job was Vikane™ gas fumigant manufactured by Dow AgroSciences LLP. This is the same fumigant that is used to fumigate tented homes for termites. Fumigants are unlike fogs in that they penetrate the cushioned bags, the on-off switches, and recharging ports on electronic devices to kill all stages of the bed bug including the eggs. Vikane has



Ryan Yutzy, safety coordinator for FSS, is checking for unsafe fumigant concentrations in the NetBook bags.

been shown, when used according to the label, not to affect the electronics in the devices being fumigated.

Fumigant gas readings were taken throughout the treatment. Temperatures need to be at least 80° F to keep the bug's respiration accelerated. After 24 hours of aeration and careful inspection of the closed cushioned bags, the trailer was returned to the district to continue the process of preparing them for the upcoming school year.

Take Home Message

Pests live with humans in their homes, schools, and offices. The issue of transporting insects and other vermin back and forth will continue. Managing and understanding the biology of bed bugs will help reduce their impact. Inspecting for bed bugs in our own portable electronic devices can help track the spread of bed bugs in homes and offices. Fumigating them may be necessary until we can learn to create an environment that they cannot tolerate and then will leave or die.

Personnel

Two new additions to the Fumigation Service & Supply staff are Ethan Estabrook and Ryan Yutzy. Casey Vollmer is the new sales and marketing coordinator for Insects Limited.

Ethan is a May 2012 graduate of the College of Science at Purdue University. Eithan is a licensed fumigator and a manager-in-training for FSS. His job is to travel to the various regions and learn as much as possible about protecting stored products. Ethan is coordinating the Phosphine Resistance Project. He collects samples of beetles and weevils from a five state area to test in the lab for levels of phosphine resistance. This

study will help determine the proper fumigant and dosage rate to use for future fumigations. Ethan is from Albany, Indiana.

Ryan is a 2010 graduate of Purdue University with a major in Occupational Leadership and Supervision with a minor in Entomology. Ryan is the Safety Coordinator for FSS. He is a licensed fumigator with a DOT-Hazmat Endorsement. Ryan performs safety training for the FSS staff and its customers. You can find Ryan on the job site auditing safety performance. In the office he works on state and federal compliance. He is from Athens, Illinois.

Casey Vollmer is a graduate of Ball State University in the School of



Ethan Estabrook



Ryan Yutzy



Casey Vollmer

Communications and Marketing. She has worked with Insects Limited since 2009. She is the sales and marketing coordinator for the new GreenWay™ product line. GreenWay products are pheromone based traps targeted for the homeowner market rather than the commercial or professional markets. She was a four year varsity field hockey player and captain for Ball State's Division 1 field hockey team. Casey is from Myerstown, PA.

Fumigation Continued Education Program

December 5, 2012 • Westfield, Indiana

The field of fumigation has made large changes in the last three years. Safety requirements by companies and their risk management departments have changed the way we perform fumigations. Never has there been more regulations and regulatory oversight as we are seeing today. US DOT, EPA, state lead agencies, local agencies, State environmental management agencies, and large companies with ever changing on-site requirements are challenging fumigators to know more and take more responsibility.

Cost: \$125 for FSS customers and \$195 for non-customers. 'Weevil Bucks' can be redeemed and this training program will be limited to 40. Continued education credits will be

applied for in Indiana, Illinois, Ohio, Michigan, Kentucky, Iowa, and Wisconsin. Lunch will be provided.

Speakers: **Pete Mueller, Corey Kirby, Pat Kelley, Jeff Waggoner, Dave Mueller, Pete Swords**

Topics: **Start with the Insect First, Regulatory Changes, Non-Confined Space Grain Bin Fumigations, Developing a Fumigation Management Plan, Fumigants and Their Properties, Calculating Dosage Rates Correctly, Fumigant Monitoring, Respiratory Safety, Fumigation Application and Safety Problem Solving.**

Scrubber Workshop Announced

After many inquiries about fumigant abatement, a **"Build Your Own Scrubber Workshop"** will be held December 5-7, 2012 in Westfield, Indiana. Pete Swords will take each attendee through the science and chemistry of removing and destroying dangerous fumigants. This will include phosphine, sulfuryl fluoride and methyl bromide. This workshop will provide an understanding of fumigants, scrubbing technology,





and instructions to make your own scrubber. Your scrubber unit will be used in a real fumigation setting. Containers will be fumigated and your scrubber will be used to abate the enclosed fumigant. Gas readings will be taken during the field applications and the scrubbing solution will be quenched to a non-hazardous material at the end of the workshop. Each person can take their scrubber or have it shipped back home.

Details and registration can be found on the Fumigation Service & Supply website: www.Fumigationzone.com or by reaching Pete Swords at P.Swords@insectslimited.com. This workshop will be limited to 20 people.



Types of Fumigants

by Pete Mueller and Corey Kirby

	FUMIGANT	Duration of Application	Minimum Length of Fumigation at 20°C/68°F	% Active	Monitors
	Solid Phosphine Tablets and Pellets	10-20 mins for 1 case	3 days	55% Al PH ₃	Multiple electronic High and Low range, also High and Low range tubes
	EcoFume (cylinderized PH₃ & CO₂)	20-30 mins per cylinder	2 days	2% PH ₃ 98% CO ₂	Multiple electronic High and Low range, also High and Low range tubes
	VaporPH₃os (cylinderized pure PH₃)	7 hours for 21 Kg with HDS 200	2 days	99.3% PH ₃	Multiple electronic High and Low range, also High and Low range tubes
	ProFume (Sulfuryl Fluoride)	30-45 mins per cylinder	24 hours	99.8% SF	High Range: Spectros ReportIR, Fumiscope Low Range: Spectros ExplorIR, Interscan



Technical Support from Insects Limited

Call on Insects Limited to help reduce your customer complaints: 1-800-992-1991

- On-Site Consulting by Board Certified Entomologists
- Insect Identification Reporting
- Insect BioAssays for Fumigation/Fogging
- Classroom Training
- Expert Witness Experience
- Product Testing
- Phosphine Resistance Testing
- Emergency Response Team
- Years of Experience in Food Safety

Guys & Gals

The U.S. Olympic team isn't the only place where women outnumber the men. Females also now outnumber males in ag curriculums at U.S. colleges. In a tally of six major categories of agricultural studies at 67 land grant universities, which offer broad selections of ag-related degrees, female enrollment was 24,300 in '08, then shot to 29,000 last year while the male count rose to 26,500. The spike in ranks of women is led by such increases as 39% in animal science studies in the years of '04 - '11. Ag mechanization and engineering ... 69%. Food sciences and technology ... 156%.

Source: *Kipling Agriculture Letter*

“Quotable Quotes”

Weight for Transportation	Byproduct Left Behind	Odor?	Flammability Potential?
26.5 Kg/ 58 lbs per case	Yes, dust	Yes	Yes
103 Kg/ 228 lbs per cylinder	No	Yes	No
85 Kg/ 187 lbs per cylinder	No	Yes	Yes
102 Kg/ 225 lbs per cylinder	No	No	Gas is not flammable, but there is a potential to create a spark while applying

“When you are outside of the box you are not trespassing.”

“It is not what the right answer is — it is what the next right answer is.”

“It takes an average of 14,000 pictures to get one photo for National Geographic (400 rolls of film).”

“Are you a success or significant?”

— Dewitt H. Jones, Photographer for National Geographic

“A bug is a ‘bug’ when it gets to the customer.”

— Pete Mueller

New Grain Protectant
From Insects Limited
1-800-992-1991



- Labeled for stored Barley, Corn, Oats, Popcorn, Rice, Rye, Sorghum, and Wheat
- Controls Insects on Stored Grains and Seeds
- Long-Lasting Residual
- Caution Statement; Not a Restricted-Use Insecticide
- Comes in 1- and 2-gallon Containers
- Can be mixed with Diacon™
- Good for Empty Bin and Perimeter Treatment
- Cost: 4.0 – 4.5 cents per Bushel for Combination of Centynal plus Diacon

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NOW HIRING — Regional Managers • Area Managers • Technicians

Fumigation Service & Supply and Insects Limited specialize in a unique niche of pest management that started out as an idea and has developed into a business that provides a range of products and services that are becoming mainstream in protecting stored food, grain, tobacco, timber, museums, and fiber worldwide. Our companies pride themselves on innovative pest solutions through our quality products, supplies, and outstanding service.



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