

Fumigants & Pheromones

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Routing:



A Newsletter for the Insect Control & Pest Management Industry

Pyrethrum Shortage

Pyrethrum products are used as the key ingredient in domestic and industrial pest control formulations. An effective insecticide with very low toxicity to mammals is a key feature of such products. Pest managers use fogging with pyrethrum as part of a pest management program that offers a low toxic approach to stored food protection. Pyrethrum is used in foggers to kill exposed stages of insects. It is not a fumigant and has no penetration capability.

Pyrethrin is a perennial crop that requires renewal once every five years and is grown in highland areas enjoying moderate well-distributed rainfall, cool night temperatures, and rich volcanic soil.¹ The extraction and refining process involves a number of steps, most of which are undertaken in Eastern Africa before the refined product is exported—primarily to the USA.

Shortage

The cost of pyrethrum insecticide shot up several times to over \$100/gallon in the 1990's. In 2008 this product is so scarce that supplies are difficult to find at any price. This caused people to look for alternatives to this botanical product that is affected by labor, political unrest, and increased demand issues.

There are about 300,000 subsis-



Pyrethrum daisies grown in Kenya.

tence and low income farmers that farm 3-5 acres of land in the highlands of Eastern Africa and a total of 900,000 Kenyans directly involved in the production of this cash crop. Some of the farmers own their own land while some only work the land. The average farmer in Kenya receives about \$390/ year for their efforts. The money to start each season's pyrethrum crop is provided by the Pyrethrum Board of Kenya (PBK). All pyrethrum in Kenyan is sold back to this board. In essence this is a global monopoly since 70% of the pyrethrum grown in the world comes from Kenya.

Political Unrest

The political uprising that occurred in early 2008 was over the results of their presidential general election that caused a complete disruption of the coun-

try and the whole pyrethrum industry. Civil unrest captured the government and the people of this country of 30 million. The farmers didn't get payments from the government. The pyrethrum then was not grown by the farmers. The crops that were harvested needed to be extracted and the hexane and other solvents that are needed to do this were not available. Transportation of highly flammable chemicals was too

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Pheromone Questions:

By Dave Mueller

Pheromone trapping offers an exciting tool for pest managers to use to help solve insect problems for their customers. In order to utilize the traps and pheromones to their full potential, correct placement and interpretation of the trap is important. It is most important to always start with the insect first when you are called to solve a pest problem.

1. How long do pheromone lures last?

Most pheromone lures last for six to eight weeks indoors. They last only about four weeks outdoors due to the elements.

2. What should I do with the old lure?

Instead of removing a pheromone lure from a trap, place a new lure next to the old one in case there is any pheromone left. Record when you placed the latest lure in the trap by using a permanent marker on the trap with the date. After the trap and lures are no longer useful, place them in a sack and dump them in an outdoor waste receptacle.

3. How long will the pheromone lure stay active if the package is not opened?

Most pheromone lures will last at least two years in their original package. They can last indefinitely if placed in a freezer. It is important not to place the package of pheromone lures in a hot service vehicle for long periods. The extreme heat can start breaking down the effectiveness of the chemical pheromone.

4. Should I use the pheromone traps outdoors?

*Yes, it is important to understand what the natural outdoor stresses are on a storage structure or processing facility by monitoring outdoor pest insect activity. The Warehouse beetle (*Trogoderma variabile*) pheromone should be used outdoors instead of indoors. I also recommend using the Indianmeal*

*moth (*Plodia interpunctella*) and Cigarette beetle (*Lasioderma serricornis*) pheromone outdoors. The Cigarette beetles can live outdoors and indoors readily in the warm summer months and pheromone traps are best used outdoors. Outdoor pheromone traps are good to reinforce to workers the necessity of closing doors and openings to prevent the entry of insects and birds.*



5. How do I interpret the results of a pheromone-trapping program?

Interpreting the data from traps can be simple. Periodically count the number of insects captured and record this on a piece of paper. This information is then compared to previous insect captures. A determination of whether the population is increasing or decreasing will then help

make a decision what to do next. Nothing will replace “flashlight time” and knowledge of the pest’s biology along with experiences of the structure and products being inspected.

6. Will these pheromone traps control the problem?

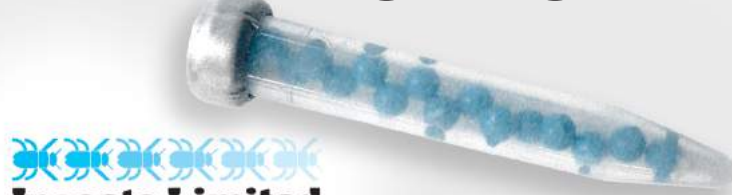
Generally, pheromone trapping is designed to offer only early detection and monitoring for pest activity. However, there are many examples of how the innovative uses of pheromones can eliminate a pest population. Think of pheromone traps as ‘thermometers’ for pest insect activity. The more insects you capture in an area, the higher the potential risk for insect contamination to those products stored in this area.

7. How do you determine if you are getting control?

Since most pheromone traps only capture the male adult insect, this allows the female to roam the warehouse to lay eggs on finished food that could show up later in the supply chain. Determining if the female insect is mated is an excellent tool to determine what degree of control is provided by new mating disruption methods. If most of the male moths are captured and most of the female moths are unmated, then control is possible with pheromones.



PHEROMONES



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Dave's Soapbox

...for what it's worth

Pest management is a combination of methods that alters



Pest Management Includes Environmental Management

the environment to offer the effective control of pests. Environmental management is understanding risks and reducing their impact on the place we live and work.

Today more companies are asking for less customer complaints, fewer call backs, and more guarantees that their pest problems will go away...but...they don't want the risk or the perceived risk of unsafe chemical exposure.

The main driver for the food industry is Wal-Mart. Imagine the largest corporation in America and the largest retailer in the world openly worried about protecting the environment. But going green means more than protecting the environment. It also means being more efficient in managing costs and risks. That adds up to more profits.

If you are a company that provides products to Wal-Mart, you will be expected to provide this product at the lowest cost but also show that you are pest free and with low or no amounts of pesticides on the product. Your future as a preferred customer will depend more and more on helping Wal-Mart become environmentally responsible. This is a huge incentive for anyone trying to move products or services through the Wal-Mart system.

Subaru is an automobile manufacturer and a division of Fuji Heavy Industries of Japan. Subaru has embraced their environmental

activities to be part of their culture in their product and the 3300 associates that work at the Lafayette, Indiana plant that produces about 200,000 cars per year. Since 2004 Subaru has achieved a **zero land fill status**. That means that one household produces more landfill waste than this large automotive manufacturing facility. How did

they do it? They changed the attitude of the worker by conserving resources, by reducing waste, by reusing where possible, and finally by recycling materials. All materials. This includes recycling fluorescent light bulbs into the various components (metal, glass, chemicals) and sorting them to be recycled. The management knows that recycling is one of the most expensive ways to manage waste and that not creating waste is the best way to reduce costs and trips to the landfill. The cost of waste was reduced from about \$350 per car to under \$250 per car just by becoming more efficient.

Environmental management takes a conscious effort in everything we do to protect the limited resources found on this planet. Europeans and Canadians have been practicing recycling regularly for many years. Many Americans have a long way to learn to reduce, reuse, and recycle.

I was at a Purdue Football game with Henrik Lange from Tanaco in Denmark last year when upon leaving the game he looked down the aisles at the thousands of empty beverage bottles and stated: "You Americans are pigs."

Learning to respect the environment in our daily life doesn't happen over night. We should

learn it at an early age. Many of our schools don't recycle beverage containers, metal, or paper so why should the student be expected to do so? The simple job of taking an empty plastic or glass container to a designated receptacle to be stored until it can be moved to a recycling business doesn't seem like a hard thing to do. Beverage companies and many schools sign six figure exclusive contracts to influence students to buy their particular brand. They create full blown marketing programs to capture life long markets much like the tobacco industry did to our WWII soldiers. The motivation for the student or faculty to discard their recyclable products in a responsible way is lacking.

The simple task of placing a recyclable product in these receptacles is a conscious vote by the person that they are openly doing their part to help our planet to get better and not worse. It is simply being an environmental leader.

Now this same student can take this message home to teach his/her parent ideas on being environmentally responsible by saying: "Dad, why are we not recycling?" This leads to more recycling bins being filled instead of more landfills being filled. This leads to more companies offering recycling and teaching their employees about this message, which leads to companies like Wal-Mart and Subaru being golden examples for all of us to follow. In the end it can help your company become more profitable.

What this also leads to is not only improving our precious environment but to providing better services and pest management to our customers. Since we use products that can alter or harm the environment, environmental management and pest management should go hand in hand.

A. K. Mueller

Pyrethrum Shortage

(continued from page 1)

dangerous with gunfire and looting going on. The farmers and the central government were battling and life in general was a deadly mess for the Kenyans. People and their pyrethrum operations fled to surrounding countries like Tanzania. However, the supplies for pyrethrum extraction were not available or easily found.

Alternatives to Natural Pyrethrum (PY)

Without adequate supplies of natural pyrethrum in 2008 and maybe 2009 the question asked by many people is what else can be used in its place. The beauty of natural py was that it has a very low mammalian toxicity, little resistance, and a good knock down capability on insects. In short it is safe and effective. Synthetic pyrethroids have been duplicated in the lab to offer many advantages in the pest control world. They are light stable, have a wide spectrum of food label applications, and have proven to be reliable and consistent. Something the Pyrethrum Board in Kenya and Kenya is not.

Products like Conquer™ (esfenvalerate) are being mixed with base oil and insect growth regulators to replace natural py foggings. Care should be taken when using Conquer to protect your respiratory system. Dichlorvos (Vapona™) is another alternative fogging compound to py. Dichlorvos is a wide spectrum organophosphate that has been used in the food and grain industries for decades. Vapona is an effective fogging insecticide but lacks the safety that py offers to the food industry and for service providers. Vapona was banned in Europe starting in 2008. This is increasing the demand for natural pyrethrum in these countries.

Down Under Cross Training

By Nathan Stocker

To gain a better understanding of fumigation, I was one of three representatives from Fumigation Service & Supply that was able to attend 'Cross Training' in the beautiful country of Australia. I, along with Todd Wilhelm and Dustin Corlett, spent twelve days enjoying the country while learning different fumigation techniques. With the rich agriculture of nuts, grasses, and fruits that are grown in Australia, they had a variety of commodities to exemplify their IPM procedures.

Our first destination was Sydney, where two days were spent at the Australian Milling Conference. The focus of this biennial conference was energy efficiency in all operations along with drought conditions.

Next stop—Adelaide, to visit our extended 'Company Family'—Simon and Sue Ball, Australia Fumigation Company. We met at their depot where they shared how their operation of fumigating soil, land sea containers, and grain storages operates. They then allowed us to travel with them to one of their large grain operations. Here, each one of the entire 500,000 bushel concrete complexes is fumigated with phosphine at very low dosages for long periods of time. The average fumigation takes 28 days at 160 ppm. They had an elaborate plumbing system of valves and

monitors to add gas as it was needed. The same site had six bunkers of grain approximately 80 million bushels which were fumigated with cylinder-sized phosphine.

From the land fumigation station, we traveled to a port fumigation site where we were shown their process of fumigating land/sea containers. Here, I was very impressed with the system that they have in place along with the efficiency of the fumigation. While visiting the port, Simon showed us one of his specialties—permanent bin sealing.



Todd Wilhelm, Nathan Stocker, Dustin Corlett, Simon Ball, and Tim Ryan at an Australian port.

Simon has been very successful at identifying the proper sealants and methods to permanently seal all types of grain storages. Several sites had special batch bins where they would put the grain prior to the shipment. Once the bins are permanently sealed, they can be fumigated much faster with fewer people. Australia has an absolute zero tolerance for insects. From small grain storages to larger port operations, they enjoy quicker, more efficient fumigations with this technique.

Conclusion

This is not the first time we have seen shortages of this popular insecticide that is used to disinfest our commercial buildings and households. A combination of good pest management practices and labeled alternatives will help control pests. Methyl bromide space fumigations have been

reduced or replaced with more frequent foggings in recent years. Fumigations could increase with the present shortage. Expect this shortage to go on for several years until Kenya can reorganize and the Pyrethrum Board and their relation with the Kenyan farmers can stabilize.

Source: World Business Council for Sustainable Development, Nick Tressler, Whitmire Micro-Gen

There is more than Corn in Indiana

By Phil Marshall

The Indiana Department of Natural Resources, Division of Entomology and Plant Pathology is assisting Indiana's eight billion dollar (\$8,000,000,000) timber industry to sell and move logs in the international market to meet phytosanitary requirements of destination countries. The logs must be transported pest and pathogen free. To achieve this, the logs are fumigated per USDA standards. There has been an increased demand for fumigation services at the ports on the east and west coasts. The fumigation centers at the coasts have become overwhelmed with product causing delays in shipping and increased costs.

The increased demand for fumigation services at the ports as well as competitive pricing has fostered the opportunity to fumigate in the interior of the country. To aid the timber industry, Fumigation Services & Supply (FSS), the Indiana Department of Natural Resources, and the Indiana Department of Agriculture worked with USDA/APHIS/PPQ to certify the FSS Export Container Treatment Center to meet USDA/APHIS/PPQ standards in June 2007. To meet these standards Department of Entomology and Plant Pathology staff monitor the fumigations as FSS conducts them to ensure that USDA/APHIS/PPQ fumigation guidelines are met. The Division of Entomology and Plant Pathology then assists FSS and the exporter

in preparation of phytosanitary documents required to send the logs to the port and on their way to the destination country.

In the past year FSS has worked with a dozen different exporters from all over the country. Over ninety containers have been fumi-



The emerald ash borer is a serious pest of North American forests.

gated for export at the Export Container Treatment Center since the center was certified by the USDA/APHIS/PPQ in June of 2007.

To date the Fumigation Service & Supply Export Container Treatment Center has fumigated over four thousand logs from the State of Indiana. This amounts to hundreds of thousands of board feet of lumber that has been successfully fumigated in the first year of operation of the facility. The Export Treatment Center fumigates oak, ash, hickory, walnut, and other species of trees destined primarily for the overseas ports of China, Hong Kong, and the European Union. In this manner the company is ensuring that the logging industry in the State of Indiana is not negatively impacted by the inability to move product outside the continental United

States in a timely manner.

This insect lives and feeds exclusively on ash (*Fraxinus* sp.) species including white, red, green, blue, black, and pumpkin ash which are found throughout Indiana. In Indiana, ash comprise approximately seven percent (7%) of woodlots in Indiana. The U.S. Forest Service has estimated that there are approximately one hundred and forty-seven million ash trees in Indiana forests and woodlots. Urban foresters have estimated that Indiana has nearly as many ash trees in the urban environment, in the form of street trees and landscape plantings, as in the forested environment consisting of another one hundred and forty-five million trees. The reported value of ash logs processed through Indiana mills on an annual basis is over eight million dollars, another three hundred and sixty-four million dollars

has been estimated to be invested in urban and street trees not on private property. Currently, the emerald ash borer has been found in 17 counties in the state of Indiana. At the present time, science has not provided the tools necessary to combat this pest either by early and reliable detection of individuals or low level populations, nor by effective controls over large expanses of territory. Education and regulatory work are the best available tools at the present time to prevent long range artificial spread of this pest and its associated impact in tree mortality to Indiana's ash resource.

Phil Marshall is the State Plant Health Regulatory Official for Indiana. He has his Master's in Forestry from Duke University, many years being a Forest Health Specialist with DNR Division of Forestry, and a State Entomologist.

Research Update

In house research is very important to grow your company and improve pest management methods by creating new products and ideas. Here are some research projects currently underway by Insects Limited, Inc. and Fumigation Service & Supply, Inc:

Mating Disruption: By placing large amounts of female pheromone in a building, the male moths become disoriented to a point where they stop searching and mating with female moths. This delay in mating causes the male moth population to decline in one to two weeks. We have seen declines from 400 moths per week captured in traps to less than 10. Female IMM are being captured along with the male moths and are taken back to our lab to be examined for spermocytes (male sperm organ) and female egg sacks to answer: are the females mated or not? This information is vital to determine whether or not the mating disruption method is actually working. Research trials are being conducted this summer in Indiana (food pantry, nut warehouse/production, bird seed storage warehouse), Kentucky (organic food storage warehouse/production), and Texas (bulk peanut storage). The evaluation of this new non-toxic organic moth control strategy will be completed by the end of this summer.

Methyl Bromide Alternatives for Structures: After fifteen years of searching for ways to replace the ozone depleting fumigant methyl bromide, FSS and its crews of experienced fumigators continue to fine tune the alternative methods. New fogging techniques incorporating various insect growth regulators and dynamic documentation that not only

verify and trace the application methods but map the presence or absence of pest populations. This program of using many methods to control pest populations prior to having an expensive outbreak are replacing methyl bromide in many locations.

Fumigation Aeration: The safe reentry of a fumigated structure is essential. With the increased use of sulfuryl fluoride and phosphine to fumigated structures and containers, new methods to speed up the aeration process have been researched and developed by FSS. Fumigation aeration and gas monitoring can be time consuming for fumigators. A secure and automatic aeration door is attached to the warehouse to prevent uninvited guests while allowing for a large flow of air to be exhausted after the required fumigation duration. This saves valuable unproductive man-hours during the busy summer fumigation months.

New Female Indianmeal Moth Trapping: Insects Limited is partnering with Texas A & M to create new ways to attract and monitor female Indianmeal moths. Attracting male moths to sticky traps has been used for pest management for over 30 years. Capturing female moths is relatively new to stored product pest management. Moth Suppression was introduced by Insects Limited and Oklahoma State University in 2004. It has allowed for the reduction of reproductive

female moths when it is important to capture the last few moths in a finished food warehouse containing brand named products. Every female captured could mean 500 eggs prevented from moving through the distribution chain and becoming potential customer complaints. The new female attraction method should work well with the mating disruption method of overpowering the males with large doses of pheromone to offer non-toxic control.



Dave Mueller, President of Insects Limited, Inc. and Dr. Christain Nansen, Texas A & M University, working in peanut storage warehouses in Northern Texas to gather information about Indianmeal moth mating disruption.

BioSensors: Purdue University and Insects Limited are partnering to create a new way to monitor insect mortality. Live insect eggs and pupa are placed in chambers with tiny sensors that measure the amount of oxygen being consumed by the insects. When the insect stops consuming oxygen, the sensors send a signal to a display outside the fumigated area. This is part of a SBIR grant from the State of Indiana and the USDA. A second phase of the grant will create prototypes to test in practical fumigation situations.

Clothes Moth Trapping: Insects Limited is partnering with Dr. Rudy Plarre of the BAM in Berlin, Germany to survey outdoor areas in North America for Webbing clothes moths (*Tineola bisselliella*). Rudy

Plarre has a theory that certain insects are not found outdoors and depend solely on man for their needs. If you would like to participate in the survey, please contact Insects Limited. This basic biology question will help pest managers understand this serious fabric pest better.

Methyl Bromide Alternatives for Wood: Fumigation Service & Supply, Inc., Dow AgriScience, and the Dr. Al Barack of the USDA are conducting research on alternatives to methyl bromide on wood packaging materials and cut logs. Currently methyl bromide is used for quarantine and pre-shipment. A schedule to determine the concentration of sulfuryl fluoride at various temperatures is being researched for the serious invasive insect, Emerald ash borer. Currently sulfuryl fluoride (Vikane®) is being used to replace the pre-shipment fumigations for ISPM-15 products that include wood packaging materials like pallets and dunnage.

New Pheromone Research:

Alain Van Rychehem is continually searching for new chemistry for new pheromones that are not available presently and improving old ones. Alain has hired a new chemist and a Purdue graduate entomologist to help work on some of these new research projects. The discovery of the Brown house moth (*Hofmannophila pseudospretella*) has found this tiny brown moth in many unexpected places: museums, old historical houses, natural history animal mounts, and in the fireplace of a new home.

Orville Redenbacher once said: "People who don't know will buy from people that do know." The search for better methods to control pests will not only offer better ideas and methods to use, it will help you turn every job into a private research project.

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Quotable Quotes

"The taste of poor service lingers long after the sweetness of a low bid."

—Unknown

"Everything that irritates us about others can lead us to an understanding of ourselves."

—Carl Jung

"When the swallows com a' flying atop our silos, you know the moths are in the bins."

—Elevator Operator in Illinois

"People who don't know will buy from those who do know."

—Orville Redenbacher

Museum News

David Pinniger Wins The Plowden Medal

On June 3, 2008, David Pinniger was awarded the Plowden Medal. The criteria that is used to award the Plowden Medal is an individual who has made a significant recent contribution to the advancement of the profession or in recognition of a lifetime of commitment and achievement. Pinniger fit this criteria due to his expertise and dedication he has exhibited towards the work he has done throughout the field of pest management in museums, historic properties, and archives in the UK. Reducing pesticides along with improving the ability to detect insect activity are among his well known developments.

The Plowden Medal was first awarded in 1999 by RWHA in memory of Hon. Anna Plowden CBE, who was a well known conservator along with being the Association's Vice President. After graduating from the Institute of Archaeology in 1996, Anna started what is now the world's largest commercial conservation firm, Plowden and Smith.

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Insects Limited / Fumigation Service & Supply will be speaking, attending, or organizing the following:

August 3-6*
International Association for Food Protection
 Columbus, OH

October 8-11*
National Hardwood Lumber Association
 San Francisco, CA

October 19-21*
International Distillers Grains Conference & Trade Show
 Indianapolis, IN

October 22-25*
National Pest Management Association
 National Harbor, MD

December 7-9
USA Rice Conference Outlook
 Little Rock, AR

March 3-5, 2010**
9th Fumigants & Pheromones Conference
 Valencia, Spain

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9th Fumigants & Pheromones CONFERENCE & WORKSHOP



March 2010

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