

# Fumigants & Pheromones

Issue 56  
Summer  
2000  
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A Newsletter for the Insect Control & Pest Management Industry

## Start with the Insect First

by David K. Mueller, BCE

One insect is found more often than any other stored food and grain insect in the United States, Japan and Europe. This is the Indianmeal moth (*a.k.a. Miller moth, Mealy moth, and Grain moth*). This small moth alone is responsible for much of the problems associated with seed, popcorn, natural health food, pet food, cereal based mixes, candy, nuts, and stored grain products.

Let's take a look at this "Dirty Rat" that spends your money so freely and causes 100's of millions of dollars in finished food to be discarded each year:

- The IMM female lays between 350-500 eggs in her short life span.
- The adult IMM only lives for 7-10 days and doesn't eat but may drink (often found in the sink, vase, or toilet).
- She lays her eggs at night singly or in clusters up to 40.
- She lays her eggs where they have a better chance of surviving. This is near creases in bags containing food or seed where they are hidden from egg parasites.
- The IMM larva can survive outdoors during our worst winters only to start a new generation in the spring.



- The larval stage of the IMM is the damaging and the overwintering stage.
- The larva stage lasts for two



The silken webbing for the IMM larvae acts as an oviposition (egg lying) site.

weeks or longer and goes through 5-6 molts before reaching the pupa stage.

(continued on page 4)

### ARTICLES IN THIS ISSUE

- ✦ Indianmeal moth
- ✦ Food Warehouses IPM
- ✦ Fumigation Tips
- ✦ Yellow Jacket Alert
- ✦ Pheromone Tips
- ✦ Grain Storage



## Grain Storage Management Program

- Remove all old grain and debris from bins.
- Thoroughly clean bin floors and walls.
- Check facilities to make sure they are in good repair.
- Caulk cracks and crevices.
- Check roof for leaks, and walls and floors for holes. Get them filled.
- Mow grass and weeds in a six-foot perimeter around bin.
- Clean outside the storage area, including aeration fan.
- Clean all grain-handling equipment, including augers, combines, trucks, and wagons.
- Spray ceilings, walls, floors and grain-handling equipment with Tempo™ insecticide. (Protect-It™ could be used here too.)
- Spray Tempo™ in a 6-foot border around the foundation and 6 feet up the outside of bin walls.
- Clean and spray false floors. If contaminated areas can't be reached with sprays, fumigation may be required.
- Apply grain protectant directly to grain as it enters long term storage.
- Keep stored grain level to control temperature and aerate more efficiently.
- Monitor your grain with probes, traps, or lures to help protect your investment.

*Reprinted in part from Gustafson, Inc.*

TRIVIA

- 1 **Does every ear of corn have an even or odd number of rows of kernels?**
- 2 **How many acres is the average farm in the U.S.?**
- 3 **Why did a dollar come to be known as a "buck" in early American frontier days?**

*Answers found on page 9.*

## “ QUOTABLE QUOTES ”

***“EPA is big on product stewardship...we are the stewards.”***

*Bob Richardson,  
General Mills*

***“If the pesticides were as good as we thought they were, we should be farther ahead in Food Safety than we are now.”***

*Kim Kemp,  
Ralston Purina*

***“In my part of the world the ozone hole is a real and present threat.”***

*Steve Pratt,  
CSIRO Australia*

***“That which can be foreseen, can be prevented.”***

*Charles Mayo  
(Bobby Corrigan)*

***“The future of this planet is with cereal and water.”***

*The Nestle Company*

***“This newsletter continues to be the best publication of its kind that I receive. It is valuable to me. Thanks so very much.”***

*Russ Seeger,  
Seeger's Grain,  
Harvard, IL*

***“Another early exit by the Hoosiers.” CBS sports announced after Indiana University was knocked out of the basketball tourney by Pepperdine.***

*CBS*

***“Turn back, turn back Oh time in your flight I just thought of the comeback I needed last night.”***

*John Osmun,  
Professor Emeritus,  
Purdue University  
(“Something I remembered from my youth.”)*

## John's Soapbox



### Quality Management & Gas Readings—Fumigation Necessity

No fumigation is ever the same even if you are treating the same structure over and over again. Weather, structure content, structural modifications, and the interior thermal dynamics are always changing and will produce varying fumigation results.

**IMPORTANT TIP:** Believe it or not, it is still very common for fumigation companies to “shoot and run.” They try to get as many fumigations in over a busy fumigation holiday or weekend and fail to stop and qualify the performance of their fumigations while under gas. By taking the time to observe these fumigations in progress we learn where we are losing gas, whether we have the right gas concentration, whether we cut back or add on fumigant next time, what kind of bystander activity is going on around these structures and many more observations that are necessary for a safe and effective fumigation. This is valuable information for the fumigator and his/her customers.

#### Types of high range monitoring devices:

**Methyl Bromide**  
*Fumi-Scope or Dräger Petrohydrocarbon tubes*

**Phosphine**  
*ATI PortaSens, Bedfont, or Dräger tubes, Silo-Chek, Mini-warn*

**Carbon Dioxide**  
*CEA Unit, Dräger tubes Sulfuryl Fluoride Fumi-Scope*



**IMPORTANT TIP:** Polyethylene hose should be run to key locations within the fumigated structure. This line should be purged with a vacuum pump, Mity-Vac™ laboratory duel pumps, shop vacuums, cordless hand vacuums, or any thing that will draw a gas sample will provide accurate sampling.



**Rick Vincent taking gas reading under shrink wrap during aeration.**

One important tip when taking gas readings is to understand that many monitoring devices accurately measure gas at 70° F/ 21° C. If you deviate from that temperature you can get false low concentrations with cooler gas samples and false high concentrations at warmer gas concentrations. Some monitoring devices have a conversion factor for you to use to correlate accurate readings and these conversions should not be over looked. One example of this flaw is a phenomenon called diurnal lift in continu-

ous monitoring charts.

**IMPORTANT TIP:** When the sun goes down and the gas in the building begins to cool, a negative pressure created can cause the small pumps in the detection devices not to draw an accurate gas reading. Sometimes no readings at all are recorded even when the building is still full of fumigant.

**IMPORTANT TIP:** Gas concentrations can go up during the day when no gas has been added—it is through heated gas samples that the monitor gives false high gas readings. Sometimes the fumigated structure's temperatures are constant but the monitoring hose extending out of the structure is heated or cold from external temperatures. This hose then becomes a radiator and changes the sample temperature thus interfering with the monitor's ability to accurately read the air sample.

You can observe the air sample temperature by placing an inexpensive in-line thermometer in your monitoring hose or if you are taking multiple readings make a gas sample manifold and put this thermometer on the front end of this manifold.

*John Mueller*

## Start with the Insect First

(continued from page 1)

### Penetrating Packaging

The first instar larva is small enough to crawl through this period (.). It vigorously searches for the smell of food and searches packaged materials until it finds a small defect in the package and then penetrates. If it doesn't find food in two days, it will die. It is amazing to most humans how this insect finds a way into a package. However, millions of years of evolution have taught it and its offspring to find a meal or die.



*Miss IMM Larva*

After finding food, the **larva** eats and starts to grow. It now spins a single silken thread from spinnerets under its mouth. This webbing has several purposes. It helps the larva crawl across surfaces. This could be the surface of a grain or a burlap bag. The IMM webbing left by the larva acts as an oviposition site (egg laying) for females to cue in on an area that other moths have used to survive and grow. In the winter months the thick webbing acts as a blanket and can help the moths stay warm, continue growing, propagate; and it forms a protective layer against its natural parasitic enemies.

During the sixth instar (molting stage) the IMM larvae needs to wander from this site. This inherent need to wander causes it to chew out the bag that it once penetrated as a small first instar larva. The IMM larvae will graze across a plastic bag, testing it occasionally for weakness. When it finds a weak spot, it will begin the laborious task of slashing at it with its rasping

mouthparts (like a sickle). After hundreds of slashes it may break through or go on to another location. This is much like a man trying to dig a hole in the ground. Some locations are hard and rocky and some are soft and easy. The larva will then crawl through the round hole and may find a nice safe cardboard fluted box or a 90-degree angle to secure itself. The **pupa stage** is a defenseless quiescent stage that is vulnerable to attack by natural predators. The larva carefully chooses safe perch to start pupation. This will be the location where the IMM adult will dry its wings when it emerges from its transformation to take the first flight of its life, perhaps into a sticky pheromone trap.

The first generation of IMM in much of North America



*Ms. IMM Pupa*

emerges from the overwintering (large) larva in April-May. In the tropical regions of the United States it can stay active most of the year. This moth doesn't like to fly when the temperatures are below 62-65° F or less. Pheromone traps should be placed when temperatures reach 60° degrees F/ 17° C or higher.

The IMM goes through a new generation every 4-6 weeks during the warm summer

months and 5-8 weeks in the cooler months. In the insect rearing lab at Insects Limited, Inc. we can shorten a generation of IMM to 18 days when the temperatures are set for 29 C/ 85 F and 60% relative humidity on a special diet.

In the Midwest we normally have 3 generations per year (400 x 400 x 400 offspring). In warm summers like the ones we have experienced in the past five years, we are getting 4 generations per year (400 x 400 x 400 x 400 offspring). The reproductive potential then is 26 billion IMM from one pair. With the number of 90-degree weather days doubling last year in many parts of the country, one can see how this moth has been such a nuisance.

The IMM does not carry diseases known to man or causes health problems like mosquitoes, bees, or flies. It is a nuisance pest that contaminates food in your home and your factory with its presence or its webbing. It lives outdoors naturally and feeds on grass seed and cereal protein.

In a survey conducted by Dr. M. Hirao of Japan, over 95% of the 200 households survey from around Japan had IMM indoors and also outdoors.

The IMM does not like hot weather.

They are seldom found in the tropical areas like Southeast Asia or Hawaii. Found there are related cousins like the Rice moth, or the Cocoa moth. The temperate region of the world is where the IMM survives best.



*Mrs. IMM Adult*

One characteristic that Alain Van Ryckeghem of Insects Limited, Inc. recently discovered is that the IMM adults



like to stay near the walls. The pheromone traps near the center of the room capture fewer adult males than the ones near walls. The adult moth seems to prefer resting on the walls in a vertical posture.

Pheromone traps are very effective in locating IMM. The traps should be placed in a convenient location

away from children or fork truck operators. Write the date on the trap when they are first placed and again when the lures are changed. The lures should be changed every 8-10 weeks indoors and 4 weeks outdoors. The traps should be changed when dust accumulates on the sticky surface or the numbers of moths make change necessary. Check the traps weekly if possible and remove all captured insects. Keep excellent records and maps of trap location. Predicting future population trends will be possible by closely evaluated and mapping the collected data.

#### INSECT TRAPPING IN A GROCERY STORE

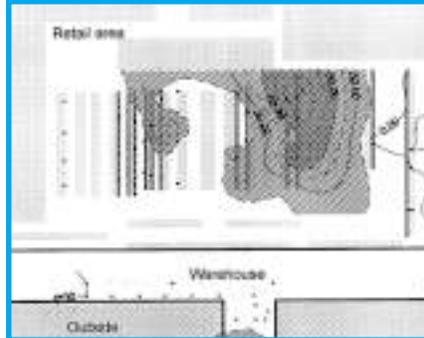


Chart by Alan Dowdy, USDA

#### Conclusion:

***Pest management begins with prevention and monitoring. The pheromone traps for stored product insects shouldn't be considered a control tool but rather sensitive detection and monitoring tool. The accumulated data will help predict future populations for pest insects and better determine the best time for directing a pesticide control program. After several years of collecting data a pest manager can fine-tune his/her pest management program to compensate for unusually warm weather or other circumstances that arise. The Indianmeal moth is predictably programmed through 1000's of years of evolution. It is a controllable nuisance pest of store products. It all starts with knowing the pest... Knowing the pest is half the battle in controlling it.***



## Grain Dust Explosions

Dust explosions can be very dangerous and deadly to people working in and around grain elevators and feed mills. Dust explosions were down for 1999. There were seven dust explosions reported in the U.S. in 1999 according to the USDA. This compares to 18 in 1998, a ten year average of 12.9 explosions, and is the lowest in seven years. There were no fatalities and a total of 19 injured. Among the seven dust explosions reported last year, four occurred in feed mills, while the remaining three occurred in grain elevators.

## Plastics from Corn

Cargill Dow Polymer broke ground recently in Blair Nebraska for a new facility to produce polyactic acid (PLA). PLA is made from corn and has been a major focus of check-off funded research over the last six years. The facility is expected to be fully on line by late 2001 and will use 40,000 bushels of corn per day for an annual use of 14 million bushels. The process will turn corn into small chips or pellets of plastic-like material that manufacturers will then process into fabric for clothing, drink and food containers, packaging and home and office furnishings such as carpets.

Source: KFGA Membergram

# Pheromone Tips



and 5 outdoor pheromone traps with 10 lures. It should take about 60 minutes to inspect the traps once a week.

### Pheromone Tip:

One way to increase the efficiency of a pheromone-trapping program is by using two or more lures in one trap. Two stored product insect pheromones commonly used in the same trap for monitoring purposes are the Indianmeal moth and Warehouse beetle. They both fly and are often found in the same locations. By using this method you can significantly reduce the amount of time you spend checking your pheromone traps. A third lure often used in these traps is for the Cigarette beetle. The sex-attractant pheromones are so powerful that they don't interfere with the effectiveness of the total trap catch. The Pantry Patrol™ traps from Insects Limited, Inc. utilize five different pheromones in one corner trap (3 beetles and 2 moths). Over 20 different species of insects have been captured in this unique liquid-baited pheromone trap.

### Pheromone Tip:

*How do you set up a pheromone-trapping program in a warehouse?* Since most pheromone trapping programs are designed for monitoring or early detection of pest insects, the traps should be placed on a simple natural grid. Use the vertical support beams that are set in a grid that are usually 60' x 40' or 60' x 60'. The Indianmeal moth, Warehouse beetle, and Cigarette beetle sex-attractant pheromones will pull male insects from a 30-50 foot radius. The warehouse in the illustration needs 50 pheromone traps with 50 Indianmeal moth lures, 50 Warehouse beetle lures,

### Pheromone Tip:

*How high should I place the traps?* Place the pheromone traps a little

above eye level on the vertical support beam and not the racking. If the warehouse is full all the time you may have to get inventive and place them in the channels of the vertical support beams marked with a yellow marking ribbon placed high on the beam to help locate the trapping locations. You may want to hang the traps high with a long pole and hook to help retrieve it. When the warehouse is full, I prefer to place traps near the fire extinguishers/ fire hoses that are required to be left open. Some times the traps get buried and you just have to make a note of this on your log.

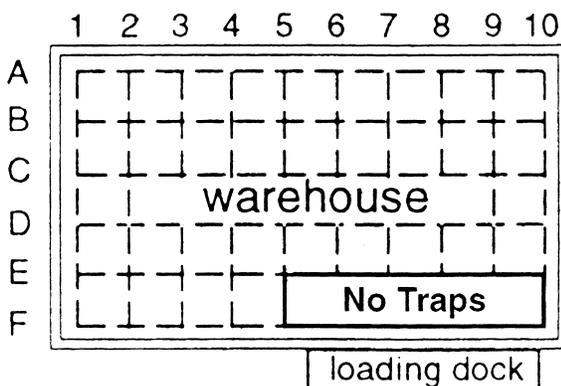
### Pheromone Tip:

In order to make sticky pheromone traps last longer, clean out the insects after recording the catch. This works especially well in areas that catch small numbers of insects. Bring a Popsicle stick or coffee stirrer and a paper towel with you to inspect traps. Use the stick to remove the insects, and wipe them on the paper towel. This will allow the extraction with minimum mess and helps make it easier to keep track of catches from one week to the next. When replacing lures in traps that don't need to be replaced, it isn't necessary to pull out the old lures. Just add the new one to the trap. This can enhance the effectiveness of the lures if any pheromone is still left. Write the date when the new lures were added to help you keep track of when they will need to be replaced. Most pheromone lures last for 8-10 weeks indoors.

Remember the key is to save time and be efficient when you check these traps. Make the path simple and accessible. Don't forget to take time to look around the warehouse for other signs of problems (e.g. mouse droppings, excess spider webs, door sweeps missing, temperature gradients, poor personnel practices, old code dated product, insect webbing, spills, and excess weeds, etc.).

by David Mueller, BCE

## WAREHOUSE TRAPPING GRID



*Notice that five traps are placed outdoors around the loading dock area. This can intercept pest insects around the opened doors and help point out the need for keeping doors closed. No traps are placed near the doors to prevent unwanted entry.*

(Traps every 50 feet, 60 traps total)

Trap

## C A S E S T U D Y

# Food Warehouse Integrated Pest Management



by **Larry Pierce, RS**  
**Food Protection Services,**  
**Mililani, Hawaii**

## History

**Commodity:** Food warehouses containing a variety of stored products in Hawaii.

**Pests:** Stored product insects.

**Alternative:** Integrated pest management based on insect trapping and monitoring.

**Performance:** Excellent control of insects.

**Costs:** IPM system costs substantially less than methyl bromide treatments.

**Regulatory approval:** None required for insect monitoring and trapping. Pyrethrins are registered throughout the world.

**Comments:** This IPM system has been used for 10 years with excellent results in several food facilities in Hawaii. It can be adapted for many other regions.

Food warehouses often hold large consignments of high-value food products such as rice, nuts, dried fruit, spices, candy, pet foods, pasta, and a variety of flour-based products. Potential infestation of these

foods during storage is a major concern to companies involved in food manufacturing, warehousing, and distribution. Any infestation complaint creates adverse publicity and a financial loss, but the most significant liability is from possible litigation, regulatory sanctions and/or loss of reputation.

## Case Study in Hawaii

The food warehouse featured in this case study is operated by HFM FoodService, one of the largest food service distribution companies in Hawaii, with annual sales of more than US\$ 74 million.

**The number one replacement for Methyl Bromide will be not needing to fumigate.**

## Region

Hawaii has a tropical climate. Temperatures vary from 22-27° C/ 73-82° F and the relative humidity ranges from 50 to 80%. Stored-product insects can breed in and around food facilities all year round.

## Commodity Storage

Most food facilities in Hawaii, including the HFM FoodServices warehouse, are left partially open for ventilation making them particularly susceptible to infestations from outside.

**The primary insect pests that require control in food warehouses are:**

- Cigarette beetle, *Lasioderma serricorne*
- Red flour beetle, *Tribolium castaneum*
- Indianmeal moth, *Plodia interpunctella*
- Almond moth, *Ephesia cautella*

- Lesser grain borer, *Rhyzopertha dominica*
- Rice weevil, *Sitophilus oryzae*

## Use of methyl bromide and insecticides

Methyl bromide has not been used in the HFM FoodService warehouse in Hawaii. Prior to 1989 HFM used insecticide fogging (in ultra low doses) as a control method. But due to poor results, high cost, worker safety concerns and increasing public and regulatory aversion to pesticide use around foods, fogging was phased out from 1987 to 1989 and replaced by an extensive pheromone trapping program described below.

## Commercial use of alternative— insect trapping and monitoring system

During the past 10 years, Food Protection Services (FPS), a pest management company, has worked with HFM FoodService to implement a cost effective IPM program for protecting food in a large warehouse in Hawaii. Variations of the pest control system are used in a number of other premises in Hawaii.

## Techniques

The system used in the HFM warehouse is based on the principle of **early detection** and **removal of pests**. Pest numbers are not allowed to build up to problem levels, so fumigation is not required. The IPM system includes five components described below:

- Trapping and monitoring insects
- Locating and removing infested products
- Suppressing insect populations
- Repelling insects that try to enter the warehouse
- Attracting and killing insects outside the warehouse

## What is Heat Sterilization? (Part 2)



by **Bobbie Gannon**,  
**Quaker Oats**

**Answer: It is one method of insect control.**

The temperature of a room or enclosed area is raised and maintained at a level that becomes too hot to sustain insect life that is either exposed or may be hiding in cracks/crevices. Since insects do not have the ability to cool themselves, they will seek an optimum temperature or die from dehydration or/ damage to their enzymes.

Generally all stages of insects are killed from exposure to temperatures ranging from 120° F to 130° F for a 20-30 hour period of time.

Steam is a good/logical heat source since most mills already have boilers in the United States and Canada. There are several types of heaters available that use either steam, gas, or oil. Portable heaters are also used very successfully. Unit heaters must have good circulation and be able to maintain the desired temperatures for the required time period.

Large temperature gradients occur at points where convection currents are strong or where there is inadequate air flow. Circulation/pillar fans should be left on to help circulate heat throughout the area being treated. If equipment is not properly opened, pockets of static air will develop in machinery and machinery housing. All case chutes to unheated areas must be sealed. Air make-up systems should be

covered. (The use of masking tape or duct tape is not recommended because it will not stick very well during the heat up.) Double wall spaces, cracks/crevices in walls and floors, spaces in bins, cracks or openings around doors and windows are other locations where heat can escape.

All sprinkler heads should be set for at least 185° or 210° F.

the process is the most important factor. Every individual within the facility has a responsibility for assuring that all necessary preparations are completed and hourly employees have a clear understanding of the value, necessity, and overall rationale of the procedure.

Preparation for the heat is one of the most important factors of a successful heat treatment

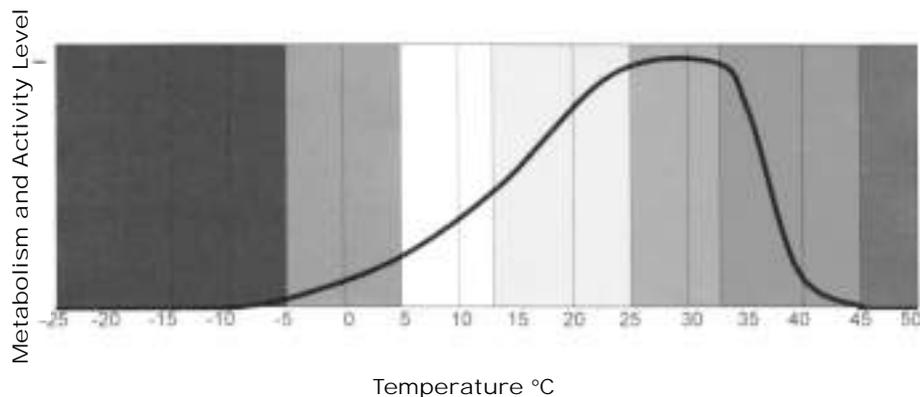
Heat treatments should be scheduled during the warmer months. During the winter months the outside temperatures make it difficult to maintain the needed temperatures inside the buildings and especially in the outside walls. Older buildings can not hold the heat very well, especially during the nighttime hours. It is helpful to have a 3-day time frame. This will allow for the building to cool down at a slower rate and there will be less thermo shock to the building and the equipment. It will also provide a better opportunity for doing insecticide applications in the unheated areas where aeration time is required. Reproductive rates are usually lower during the colder months, December to March, so it is sometimes more practical to use a

The temperature and time for obtaining the desired mortality has several determining factors:

- The area to be treated
- Amount of equipment in the area
- Target insect (120-145° F will kill all stages of stored product insect pests)
- Outside temperatures (We do not heat between Thanksgiving and Easter).

The success or failure of using heat as a tool for pest control depends on a number of factors. Preparation for

### Response of Stored Product Insects to Temperature



by **Alain Van Ryckeghem**

general insecticide spray or fog in troublesome areas of your mill or plant. (Note: You should do some form of insect control every 6-7 weeks during the warmer months, and every 10-12 weeks during winter. This spacing will interrupt the normal life cycle of cereal/grain infesting insects. If you live in warmer climates, the 6-7 week intervals will be the recommendation.

Checklists need to be developed to assure that there will be no gaps in the success of the heat sterilization process. As the items have been addressed they should be marked off the list so that all areas are covered between shifts. (Any left to chance

“  
***The most important component of any heat treatment is sanitation prior to heat-up.***”

***Alan Dowdy, Ph.D.  
USDA***

can result in loss from down time for production, loss of product left in the heat, unit heaters not working, leaks in steam lines, etc.) Lists should be made for maintenance-sanitation/cleanup- removal of specific ingredients and heat sensitive supplies/tools. The ingredient lists should be very precise. Some items that are left could be destroyed due to heat.

*See Issue 55 for Part 1: Checklist for Heat Sterilization.*

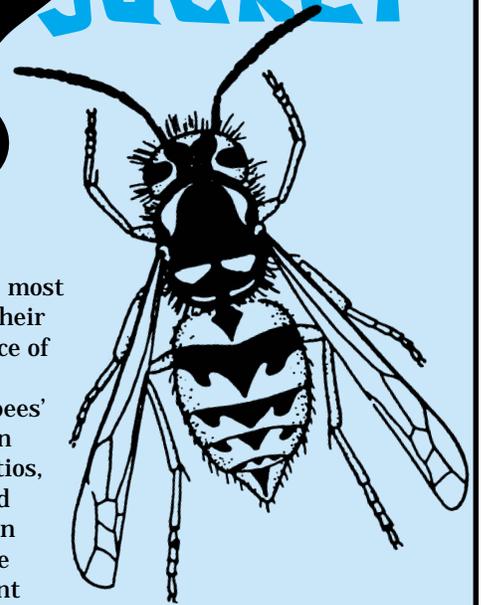
***Bobbie Gannon is a contributor to the Freez'em or Fry'em Workshops.***

### Trivia Answers:

1. Even
2. 467
3. The skin of a buck deer brought a dollar on the market.

# Yellow Jacket Alert

Did you know many experts consider yellow jackets the most dangerous of insects because of their aggressiveness and the prevalence of allergic people? Their constant scavenging of human food puts 'bees' in frequent conflict with people in picnic areas, parks, backyard patios, etc. Yellow Jackets typically build their nests underground, they can produce over 1000 workers in one season. Yellow Jackets are present from July through late October.



## Tips...

for preventing pain and suffering from Yellow Jacket attacks.

1. Serve soft drink cups with tops and straws (this will reduce the number of serious stings to the face and throat).
2. During the Yellow Jacket season, try having your outdoor activities after dark when possible. Or use screened in areas during the daylight hours.
3. Don't wave or slap at Yellow Jackets, this will only aggravate them.
4. Cover all meat and sweets when outdoors.
5. Clean up all fallen fruit under fruit trees.
6. Aggressively clean up food spills around picnic tables and other eating areas.
7. Do not wear perfume or fruity after-shave when outdoors.
8. Change trash can liners often and secure tight fitting lids on trash cans.
9. Because there may be dozens of active nests in your neighborhood, it is nearly impossible to eradicate the entire 'bee' population.
10. Leave nests and entry holes alone and call a professional pest control company to remove or destroy the nest.

*Provided by Insects Limited, Inc. © 2000*

# Training for the Future



## FREEZ'EM *or* FRY'EM

### WORKSHOP

November 14-15, 2000 • Westfield, IN

*"The only thing worse than training employees  
and having them leave,  
is not training them and having them stay."*



**ECO<sub>2</sub>FUME Stewardship Training Programs**  
call for dates and locations and more information  
(317) 896-9300.\*

September 12-16, 2000, Lisbon, Portugal  
**Fumigation Conference & Workshop**  
in conjunction with the 1st International Conference  
of Portuguese Pest Control Professionals.\*

November 14-15, 2000, Westfield, IN  
**Freez'em or Fry'em Workshop\***

November 16, 2000, Westfield, IN  
**Workshop on Advanced Uses of Pheromones\***

February 7, 2001  
**Basic and Advanced Insect ID\***  
Log on [www.insectslimited.com](http://www.insectslimited.com) for more information  
and online registration.



March 19-22, 2001  
**4th Fumigants & Pheromones International  
Technical Conference & Workshop\***  
Thessaloniki, Greece



\*These training programs are  
organized by Insects Limited, Inc.

## We hope to see you here:

- ✓ **Australian Postharvest Technical Conference, Adelaide, South Australia, August 1-4, 2000\*\***
- ✓ **National Pest Management Assoc., Las Vegas, October 18-21\*\***
- ✓ **University of Kentucky 30th Annual Pest Control Short Course, October 3, Lexington, KY\*\***
- ✓ **Target Specialty Products 28th Annual Fall Seminar and Exhibit, October 10 & 31, Sacramento and Ontario, CA\*\***
- ✓ **Stored Grain Conference and Exhibition, October 16-18, Rosario, Argentina\*\***
- ✓ **Controlled Atmosphere and Fumigation Conference, October 30, 2000, Fresno, CA**
- ✓ **Methyl Bromide Alternatives Conference, November 6-9, Orlando, FL**
- ✓ **Minnesota Grain Fumigation Certification Program, November 14&16, Detroit Lakes/Mankato\*\***
- ✓ **Tennessee Pest Control Association, November 29, Knoxville, TN\*\***
- ✓ **Entomological Society of America, December 3-5, Montreal, Canada,\*\***
- ✓ **North Carolina Pest Control Assoc., January 16-18, 2001, Raleigh, NC\*\***

\*\* we are invited speakers at these meetings.



**If you need a speaker or a full day program for an upcoming  
educational program, call 1-800-992-1991.**

## New Tubing Trailer



by Jeff Waggoner, FSS

Fumigation Service and Supply, Inc. is the proud owner of a brand new... carnival ride?

### “What is that thing?”



On my return from picking up our new tubing trailer, I was asked more than once “What the heck is that thing?” Sure it has lights, a big spinning wheel and goes fast, but it doesn’t resemble any carnival ride I’ve ever ridden, and guess what, it’s not a carnival ride! It is our new tubing trailer.

I’m sure at one point or another you have seen a grain bin. They have many different characteristics, thus demanding different techniques in order to provide a successful fumigation. Many larger structures like the ones pictured above, require a process known as re-circulation. In

circumstances where a permanent re-circulation system is not feasible or desired, we can install a temporary recirculation system using solid corrugated tubing; the same tubing primarily used in drainage systems. Depending on the structure, we may be required to run several hundred feet to several thousand feet of this tubing.

Following the fumigation we remove this temporary re-circulation system and restore the aesthetic appearance of the site. Prior to the acquisi-

tion of our new tubing trailer this required many hours of cutting the tubing into smaller sized manageable pieces for disposal at the local landfill. We also have attempted to re-roll the tubing back into its original form for future use. Often, and I do mean often, this process was unsuccessful and time consuming.

The solution is now at our disposal and is currently being used with tremendous success. We are now able to store up to 3,000 feet of 4" corrugated tubing weighing almost 2,000 pounds and manage it with ease. Re-rolling is a snap. We now



FSS crew fumigating grain bin with recirculation method.

use internal menders and a special tape to mend the pieces onto our roll. We are now using this tape in place of the brown paper tape in all tubing connections and have noticed improved gas retention. Previous gas loss was contributed to the inability of the paper tape to stand up to the weather elements and tubing flex.

### Trailer Specifications:

- Height—12' 6", Width—10', Length—14'
- 8 HP power unit (electric start)
- Hydraulic drive unit / brake and hydraulic tilt
- Pennel hitch system
- 3,000 ft capacity (4" corrugated poly tubing)

What makes this tubing trailer unique from other units is its ability to tilt 90° from the vertical resting position to its horizontal working position. The operations are controlled by three hydraulic valves located near the power pack mounted on the tongue of the trailer.

Our new tubing trailer is just another innovation enabling Fumigation Service and Supply, Inc. to fulfill our promise of providing our customers with the best services, techniques, and products available.

If you would like to learn more about our new trailer or to see how a tubing trailer could be an asset to your company, contact Jeff Waggoner at Fumigation Service and Supply, Inc. for details.

# 100,000 lbs. Replaced



**FSS's fumigation crew on a recent Combination Fumigation in a large food processing plant near Chicago. This was the 50th methyl bromide alternative fumigation that FSS has performed since 1995. This represents over 100,000 lbs. of methyl bromide replaced with this patented method. John Mueller stated: "With the cost of methyl bromide going up each year, this 24 - 36 hour alternative looks better and better."**

## Cellular Phones

Dear Dave,

I am writing to thank you for sending me the Fumigants & Pheromones newsletter. It is helpful and interesting and I would like to stay on your mailing list. The campaign against car phones is also entertaining. They really are intrusive as well as possibly dangerous. Our government here has just issued a health warning to advise children not to use them for long periods because of possible brain damage. More research on long-term effects is being encouraged.

Keith O. Story  
Winchester  
Consultancy,  
Winchester, England

***I knew that those cell phones would rot your brain.***



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: David K. Mueller, Fumigation Service & Supply, Inc., 16950 Westfield Park Rd., Westfield, IN 46074 USA.



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