

# Fumigants & Pheromones

Issue 44  
 Winter 1997  
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A Newsletter for the Insect Control & Pest Management Industry

## ECO<sub>2</sub>Fume™

A New Fumigant

ECO<sub>2</sub>Fume™ is a new fumigation technology from Australia. Over 9 million metric tons of grain were fumigated last year with this cylinderized phosphine fumigant.

Australia currently enjoys a reputation for export grain that has one of the highest levels of insect freedom. This 'insect free' status was achieved using residual pesticides, but during the last decade pesticide residues in grain have featured prominently as a concern of overseas customers. The market's demand for insect-free and pesticide-free food should ensure that residual pesticide grain protectants will be phased out. Products like malathion will most likely be eliminated.

The safe, accurate and controlling metering of the universal grain fumigant phosphine, has revolutionized stored-product disinfestation. ECO<sub>2</sub>Fume is a patented non-flammable mixture of phosphine (2%) in carbon dioxide marketed by the BOC Group.

Fumigation Service & Supply, Inc. in cooperation with Oklahoma State University has been actively testing this new fumigation mixture. We expect ECO<sub>2</sub>Fume to be thoroughly tested in the United States, Canada, and England in 1997 and registered by the EPA in the next 6-12 months.



New ECO<sub>2</sub>Fume™



### Food Protection '97

March 18-19  
 Chicago

March 20-21  
 Purdue  
 Ag Center

### Your Assignment:

Find out what these guys know:

D. Mueller	Binker	J. Mueller
Cuperus	Rust	Cole
Barile	Richards	Hitch
Stanbridge	Dowdy	Liscombe
Plarre	Sullivan	Pierce
Cogan	Ryan	Arthur

Classroom Lectures: March 18-19  
 Fumigation Workshop:  
 March 20-21

Here are some results from some recent tests being conducted by Fumigation Service & Supply, Inc. in conjunction with BOC Gases and the Sloan Group:

## ECO<sub>2</sub>Fume vs. Solid Fumigants

### Purpose:

These five test fumigations were carried out under controlled conditions to evaluate the efficacy, ease of application and costs for BOC's ECO<sub>2</sub>Fume versus conventional solid fumigants. Magnesium phosphide from Degesch FumiCels™ and Degesch aluminum phosphide pellets and tablets were compared to BOC's ECO<sub>2</sub>Fume at 65°F and 40°F. The former is an average temperature for fumigations and the latter is the extreme low limits for fumigation labeling in the US.

Test insect mortality and disposal are discussed.

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## ARTICLES IN THIS ISSUE

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- ✦ Burkholder Award
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- ✦ Ozone Funding

**ECO<sub>2</sub>Fume***(continued from page 1)***Test #1:** ECO<sub>2</sub>Fume vs. Aluminum Phosphide Tablets @ 65°F**Vehicle Fumigation Methods and Materials:***Identical Refrigerated Trailers:*

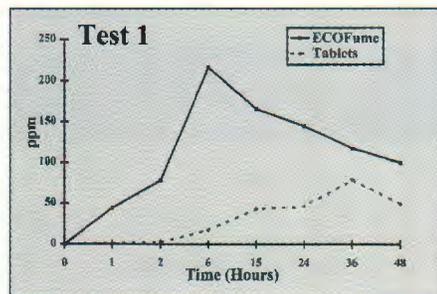
New, Thermo King, 45 foot trailers, 45' x 9' x 8' = 3240 cu. ft.

Contains accurate temperature controls even in sub zero conditions. (-40°F to +80°F) ± 5° for a test duration of 48 hours.

*Test Insects:* 5 sets of moths and beetles, mixed ages and stages*Target Temperature:* 65°F ± 5°*Starting relative humidity:* 35%-79% measured with Sperry DTH-1 A*Outside temperature:* 8° - 58°F*Commodity:* none*Flow rate for ECO<sub>2</sub>Fume:* two regulators without heaters setup: 4.4 l/min.

(2 hours to reach 200 ppm in a 3240 cu.ft. trailer at 4.4 l/min.)

Dosage rate for aluminum phosphide tablets fumigant: 33 grams/ 1000 cu.ft. or 107 tablets per 3240 cu.ft. (hand counted)

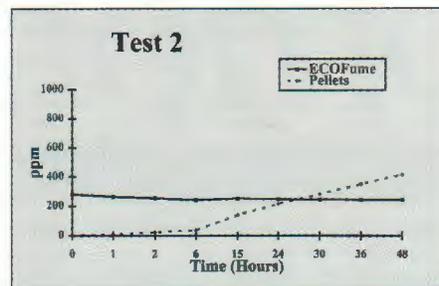
*Gas readings:* new Belfont EC-80 phosphine monitor verified with Draeger tubes/ CH 21201 Range (50-1000 ppm)**Results****Test #1****ECO<sub>2</sub>Fume vs. Aluminum Phosphide Tablets @ 65°F****Test #2****Barrel Test: ECO<sub>2</sub>Fume vs. Pellets @ 65°F**

Identical stainless steel pharmaceutical barrels: (8 cu. ft.)

Test Insects: 4 species of mixed ages and stages

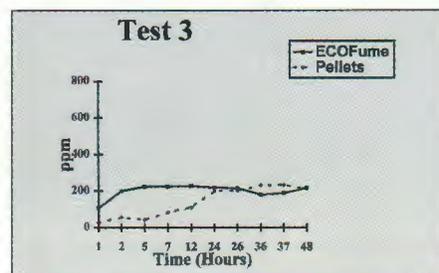
Temperature: 65°F ± 5°F

Relative Humidity: 32% at start

**Test #3****ECO<sub>2</sub>Fume vs. Aluminum Phosphide Pellets @ 40°F**

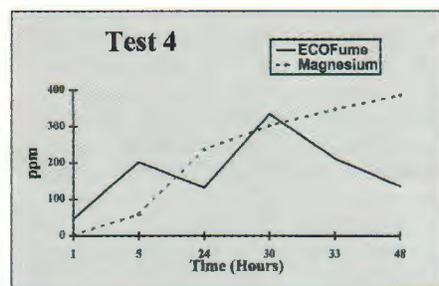
Vehicle Fumigations

Starting relative humidity: 35%

Dosage rates: aluminum phosphide pellets: 535 pellets or 165 pellets per 1000 cu.ft. or 33 grams per 1000 cu.ft. with a theoretical maximum concentration of 825 ppm. ECO<sub>2</sub>Fume targeted concentration: 200 ppm.**Test #4****ECO<sub>2</sub>Fume vs. Magnesium Phosphide FumiCel @ 40°F**

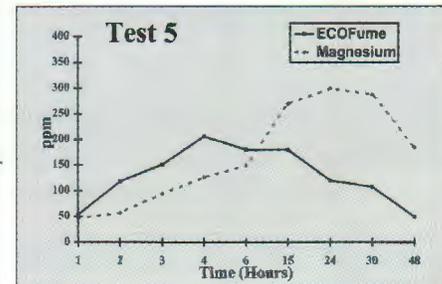
Vehicle Fumigation

Starting relative humidity: 79%

**Test #5****ECO<sub>2</sub>Fume vs. Magnesium Phosphide FumiCels @ 65°F**

Vehicle Fumigation; 3240 cu. ft. each

Same methods and materials as test #4.

**Bio-Assays**

Test Insect Results

**Summary:** The phosphine fumigants were challenged with more difficult insects to kill.This resulted in some survivors. Some Warehouse beetle (*Trogoderma variabile*) larvae were able to survive 200 ppm and 400 ppm at 65°F and 40°F.The Lesser grain borers (*Rhyzopertha dominica*), Indianmeal moths (*Plodia interpunctella*), and Confused flour beetles (*Tribolium confusum*) showed complete mortality in each test. The Rice weevil (*Sitophilus oryzae*) showed a 6% survivorship on the 40°F test. None of the test insects showed a significant difference from the ECO<sub>2</sub>Fume, magnesium phosphide and aluminum phosphide fumigants in test results. These bioassays were incubated in a growth chamber for 30 days.

Discussion: The 30 day incubation period showed 97.6%. The increased mortality on the Warehouse beetle larvae came from the higher gas concentrations from the magnesium phosphide (400+ ppm).

The magnesium phosphide seems to release more gas than the aluminum phosphide pellets or tablets.

**Discussion:**

Fumigators have several choices of fumigants to use on any one of dozens of types of fumigations. Many factors play a part in which one will be selected.

For this type of fumigation, in the past we would have chosen to use magnesium phosphide FumiCels™. Even though it is more expensive than the pellets and tablets. It is cost effective from a labor, convenience, disposal

and total time savings for my company and our customer.

Let me explain...people who need something fumigated usually call in a panic. They were ready to process some stored product and found an insect or rodent problem. They did not expect this to happen and they need this product or the space that it is consuming back yesterday. So time is the most important factor. A trailer costs only about \$50 per day. But a food warehouse that gets closed down for insects could cost \$1,000,000 per day or more. Now, the fumigator's job is to solve the pest problem and minimize shutdown time. The fifteen hours that it takes magnesium phosphide to reach the levels already reached and maintained with ECO<sub>2</sub>Fume is very important. It is important not only in shutdown time but also in the valuable time it takes to accumulate the gas in the bodies of the insects to cause mortality...complete mortality.



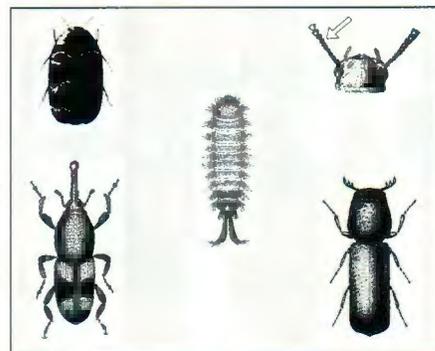
**Disposal**

From a fumigator's point of view, the disadvantage of handling a 175 lbs. cylinder of ECO<sub>2</sub>Fume compared to having to dispose of the undecomposed solid fumigant is significant. Where

does one go anymore to get rid of pesticide waste and not to mention fumigant containers with "skull and cross bones" on the label. I believe that the disposal issue is the biggest advantage of using ECO<sub>2</sub>Fume.

**Observations:** My first use of ECO<sub>2</sub>Fume was easier than I thought it would be. The cylinders and the regulators released a steady flow of phosphine in the trailers and barrels without any problems. For the first time I felt like I was in control of a fumigation with phosphine rather than the fumigant in control. When the target level of 200 parts per million was reached in two hours or less, we shut the cylinders off. If we needed more gas, I turned the cylinders back on. Before this, we would put on SCBA's and two licensed and trained fumigators would walk into the fumigated structure to feel the FumiCels to see if they were still hot to determine if they were finished releasing gas only to add more fumigant knowing that it would be partially decomposed at the end of the fumigation. This would alert me to the extreme problems that have occurred in the past when we tried to deactivate the magnesium phosphide.

**Commentary...**I have a dream: Someday BOC Gases will get ECO<sub>2</sub>Fume registered with the EPA. A fumigation company could have a small trailer retrofitted that they haul from job to job. The trailer has the controls and regulators that will allow them to set up multiple fumigations. We get in our truck and drive to the locations and setup these fumigations with ECO<sub>2</sub>Fume. We monitor the fu-



*Warehouse beetle, Red flour beetle, Rice Weevil, Lesser grain borer*

migation via modem and take the gas readings of the four fumigated locations periodically. If they need adjustment, no problem. What we have with BOC's ECO<sub>2</sub>Fume is a Fumigation Management System rather than a 40 year old fumigation technology that is in need of an update.

David K. Mueller, BCE

**Ozone Funding**

Developing countries will receive US \$540 million over the next three years to assist in their efforts to phase out ozone-depleting substances (ODS's), according to an agreement reached at the Eighth Conference of the Parties of the Montreal Protocol, held in San Jose, Costa Rica, in November. The funds, will be provided by industrial nations under terms of the Protocol. The United States will fund the largest portion, approximately 25%. The new funds should allow developing nations to meet their obligations to freeze consumption of ODS's by the year 2000, with some monies left over to allow a faster phaseout by those nations actively pursuing that option. The decision also specifies that \$10 million of the new funds will go toward methyl bromide replacement demonstration projects.

As expected, negotiators did not make any decisions regarding a phaseout of methyl bromide for developing countries or any acceleration of other phaseout schedules for developed countries. Delegates did request the Technical and Economic Assessment Panel (TEAP) to conduct further studies on potential critical-use exemptions for methyl bromide to be presented at the next Conference of the Parties in Montreal next September. \*

*Vol. VIII, No.23, Global Environmental Change Report, 12/13/96*

Eco2Fume and Metal Phosphides		
Species Days	Post Fumigation Mortality	After 30
Rice weevil (adults): n=3	98%	100%
Confused flour beetles: (eggs, larvae, pupae, adults) n=32	100%	100%
Indianmeal moth: (eggs, larvae, pupae, adults) n=32	100%	100%
Warehouse beetle mortality: (larvae, adults) n=30	83%	88%
Lesser grain borers (adults) n=30	100%	100%
<b>Total test insect mortality: n= 1500 (48Hr Exposure @ 40° &amp; 65°F)</b>	<b>96.2%</b>	<b>97.6%</b>

## Dave's Soapbox



### Smoke Alarms

There is a delicate balance in nature. Any slight change in the balance will benefit or harm one side or the other. Vice-president Al Gore mentions in his book *Earth In The Balance* a Marshall Plan (a.k.a Reconstruction of Europe after WW II) if he ever gets in a position to affect the environment. He is in that position now. These 100+ pages in the final chapter lay out the five part plan for protecting and defending the earth against man. The first controversial step is controlling population growth. The projected eleven billion people on this planet is much too much. Gore also talks about the 25,000 people that die each day from water borne diseases from poor sanitation in over crowded urbanized areas like Bombay and Mexico City. Clean drinking water is something we take for granted in industrial nations.

Lately we are hearing more and more about subtle changes in the ecosystem. There are the Chicken Littles of the world that run around in their tie-dye crying out: "The sky is falling". There are the "It can't happen here" folks that, like the ostrich in trouble, bury their heads and ignore the problems. There are the "I'll defend my stack of gold no matter what you say" industry group and there are the patient scientists who do what they do for science.

Science was described to me once as the ability to establish a fact that is not compromising.

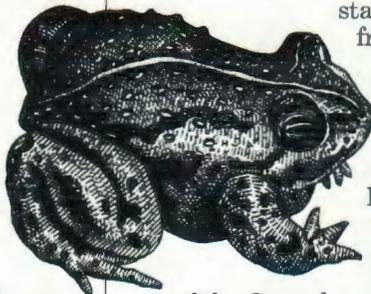


We have all heard about the jobs vs. spotted owls issue that has been so public in the past few years in Oregon. According to 60 Pacific Northwest econo-

mists, the number of jobs in the region increased by 940,000 (18 percent) between 1988 and 1994, and real income triple the national rate. William Hartwig, regional director of the U.S. Department of Interior in Fort Snelling, Minn. states: "The tired argument about jobs and spotted owls simply does not hold up. Oregon's jobless rate is less than 5%. Jobs are shifting from timber-related to other areas like health-care specialists, accountants, cabinet-makers or auto mechanics. High tech companies are relocating to the area and bringing in new jobs, and the natural beauty of the recreation opportunities of the region are critical assets. Tourism has also benefited."

A strong economy and a healthy environment go hand in hand. The two are closely dependent on each other. If you don't believe this ask the Japanese.

Unfortunately it is easy to ridicule species such as the fairy shrimp of California and the spotted owl of Oregon. It would be perhaps more constructive to think of them as natural smoke alarms, signaling that something is amiss with the natural systems that keep us all alive. Ignoring the smoke detector's warning won't put out the fire.



Scientists have recently found a startling number of frogs in Minnesota with disturbing abnormalities: extra limbs, missing eyes or legs fused together. Some entire species of frogs in mid-altitudes

of the Cascades of Washington State are vanishing. One theory suggests that the shallow egg laying habitats are not withstanding increased UVb light caused by a thinning of the ozone layer. The Washington Post reports that deformed frogs have been found at more than 100 sites in 57 of Minnesota's 87 counties. No one knows what is causing this problem.

This summer in Canada certain plants were showing a burnt effect from increased UVb light. "A researcher with AgCanada has been doing research on plant damage from increased UVb and findings effects", said Linda Dunn, of the Environment Bureau of Agriculture & Agri-Food Canada of Ottawa. This same phenomena was recently

demonstrated in Scandinavia. The increased UVb light is a result of a thinning of the ozone layer in the earth's stratosphere.

Is the sky falling? Probably not. But maybe a smoke alarm is sending us a signal. And maybe it is time to pull our heads out of the sand and start fixing the problem.

*W. K. Mueller*

### Burkholder Award

An award has been established by Insects Limited, Inc. of Indianapolis since 1993 in the name of Dr. Wendell D. Burkholder.

Dr. Burkholder recently retired after 35 plus years of patient research in pheromones and stored product protection. For the past 30 years he directed the USDA Stored Product Insects Laboratory in the Department of Entomology, University of Wisconsin, Madison where he has a joint appointment as Professor of Entomology.

Some of the past recipients of this award are 1993 Dr. A. Hussaim, Pakistan, Meghn Parajulee, Nepal, 1994 Dr. Thomas Phillips, USA, 1995 Dr. Pasquale Trematerra, Italy, and Paul Cogan, UK, and 1996 Dr. Francis X. Webster, USA.

The 1997 recipient of the Burkholder Award goes to Dr. Rudiger Plarre. Rudy is presently working in Dr. Burkholder's lab for two years. He is a native of Berlin, Germany and was educated in Berlin and Vanderbilt Universities.

Rudy is the son of a German agricultural geneticist and specializes in the behavior and pheromone of the granary weevil and microwave technology.



Rudy will be a guest speaker at Food Protection 97 in Chicago this March where he will speak about: Zapping Insects in Grain Using High Powered Microwaves. ✱

## Speakers Added

Dr. Frank Arthur and Dr. Alan Dowdy of the USDA/ARS Grain Marketing Research Lab in Manhattan, Kansas will be speakers at this year's Fumigants & Pheromones Technical Conference. The conference will be held in Chicago and the Fumigation Workshop will be at Purdue University.

Dr. Alan Dowdy will speak on his exciting work in DNA fingerprinting of insects and his recent work on spatial mapping of insects in food operations. His talks will be on Wednesday afternoon. Dr. Frank Arthur will take part in the Fumigation Workshop on Thursday, March 20 at Purdue. He has two very important messages: Research into the effectiveness of 3% pyrethrin foggings in food operations and a review of the current grain protectants and the new grain protectants being developed.

These two seasoned stored-product scientists should add much to an excellent program. Come join us for our 10th Fumigants & Pheromones Technical Conference in Chicago on March 18. \*

## Zapping Insects with Microwaves

By: Halverson, Burkholder, Bigelow, Nordheim and Misenheimer.

*Abstract: Insect mortality studies were performed with a high-power microwave source operating at a frequency of 10.6 Ghz at power levels of 9-20kW to irradiate samples of soft white wheat infested with maize weevils and red flour beetles. More than 94% mortality was observed.*

The U.S. Government is actively seeking alternatives to chemical pesticides because of general concerns about effects on human health and the environment and because insect resistance to chemical pesticides is increasing. Specifically, in accordance with Section 602 of the Clean Air Act (USC 1995), it has proposed eliminating the use, production, and importation of methyl bromide by January 1, 2001. Methyl bromide is a widely used agricultural pesticide believed to be involved in the depletion of the ozone layer. The National Agricultural Pesticide Impact Assessment Program has concluded that unless alternatives to methyl bromide are found its loss will have a serious negative impact on U.S. agriculture. Therefore, incentives exist

to explore alternative treatments for infested stored products by microwave radiation at frequencies >1 Ghz, previously believed to be the upper limit for effective usage of the microwaves. The purpose of this preliminary study was to test the hypothesis that the mortality of insects in stored products is not a monotonically decreasing function or frequency at specific product temperatures and that high mortality can be achieved efficiently and economically at frequencies above 1 GHz. \*

*This study presented by Rudy Plarre, Ph.D. will assess the effectiveness and economy of microwave treatment of infested stored products at the March conference in Chicago.*

source: *J.Econ. Entomology* (89) 6. p.1638.

## Mary Kay's Uptown Cafe

Indiana, USA

It's a rainy 57° outside, the leaves are falling, and harvest is full throttle.

Farmers are pulling their loads of grain to the elevator, taking care to turn the corners slowly. People are strolling into Mary Kay's Uptown Cafe for morning coffee and their daily good

(continued on page 6)

### CORN'S MANY USES U.S. food and industrial use (1995) In thousands of bushels

Fuel alcohol	519,460
Beverages	398,815
Industrial starch	183,499
Dry milled products	118,000
Beverage alcohol	83,070
Misc. foods	53,513
Baked goods	47,317
Canning	47,278
Confectionery	45,790
Dairy products	36,529
Pharmaceuticals	31,167
Condiments	18,025
Jams and Jellies	17,773
Cereals	3,855

### CHANGING MARKETS Millions of bushels

Year	Food, seed & industrial use	U.S. animal feed use	U.S. corn export use	Total corn use
1975	522	1,711		5,802
1978	609	2,124		6,997
1981	733	4,264	2,010	6,912
1984	1,067	1,865		7,641
1987	1,243	4,798	1,716	7,757
1990	1,373	1,725		7,761
1993	1,588	1,328		7,620
1994	1,693	5,534	2,177	9,404
1995	1,685	2,150		8,435

Sources: Corn Refiners Association, USDA/World Agricultural Outlook Board

## "There is nothing the world will need more than corn."

Dennis Avery, food expert at the Hudson Institute

Corn's newfound potential reflects the simple fact that world population will almost double in the next

few years. Most of the growth will be in Asia, where affluence is spreading fast and demand for meat is rising. And there is nothing that beats corn for fattening livestock.

The U.S. Corn Belt is the world's largest crop-growing area with level ground, good soil, temperate climate, and generous rainfall. It has the technical and managerial ability to raise a decent crop even in a lousy weather year.

## Mary Kay's

(continued from page 5)

mornings. Mary Kay greets everyone with a smile and says, "Coffee this morning?"

"Hi Miles, did you get your CB fixed – Good morning Miles, what do you have?"

Seniors meet to fill their time with familiar stories and welcomed laughter. Politicians come to 'press the flesh.' Salesmen come to finish their paper work. Everyone knows this is the place to get the best biscuits & gravy and lots of fresh coffee in town. Outside there are more new pickup trucks than ever before – a good harvest must be under way.

"Thank you" and "please" are the only backtalk you hear at Mary Kay's. Only one thing really is important at the cafe today and that's basketball. It's the religion spoken most often in Indiana. We all have our own opinions and hearsay.

"Check please, Mary Kay."

"Oh, just put it on the cash register, I trust ya." she says. ✱

dm

## New Catalogs



6 ways to get your new 1997-1998 Fumigation Service & Supply, Inc. and Insects Limited, catalog:

1. Call 1-800-992-1991 ask for Angie
2. Fax: 1-317-846-9799
3. E-mail: insectslimited@aol.com
4. They are on our Web Page: <http://www.surf-ici.com/insectslimited,inc/home.html>
5. Pick one up at our booth
6. Pick one up at our office

## Bugs

The gypsy moth, now a major pest of forests, was imported from France in 1869 by a Medford, Massachusetts, naturalist. He had hoped to cross them with the American silk moth and create a hardy, thread-making caterpillar.

The male gypsy moth can detect if a female of its own species is anywhere within seven miles.



A caterpillar may sample a hundred different leaves before it settles down to eat one.

A bee may fly 60 miles a day while collecting food. ✱

## Bar Coding Technology in Pest Control



By D.W. Keenan

Imagine accessing information about any customer or technician at the touch of a button. Imagine collecting this information without ever writing a word. Bar coding technology has brought this future to the pest control industry.

Through the use of a cigar-sized bar code data collector, any information can be gathered regarding your pest control operations. This data may include route schedules, technician activities, pesticide usage and pest occurrences. Once the data is collected, it can be uploaded remotely or directly to the host computer where the data is sorted and translated into useful reports. These reports can be as simple as time and date stamped route stops or as complicated as annual activity

comparisons of one or more accounts or numerous mechanical mouse traps.

The elimination of both written reports and manual transfer of data reduces the risk of costly errors. The Datawand replaces the technicians pen while location unique bar-codes ensure that duties are being properly performed. Uploading of this data ensures that critical information is imported and stored accurately.

Just some of the benefits of bar code technology are in the ability of the technician to justify recommendations and possibly pre-empt infestation through the use of historical account data. Management will appreciate streamlined operations as well as accelerated customer responsiveness. The age of accurate and timely documentation is upon our industry. These are times when a mistake can cost hundreds of thousands of dollars. Very often these mistakes are due to inaccurate documentation. It is time that we looked at IPM beyond our application tools and incorporated it into our written documentation. ✱



Mr. Dean Stanbridge of Pro-Pest Consultants working with the bar code wand on a service route in Toronto. Dean will speak about this technology at the 10th Fumigants & Pheromones Technical Conference.

## Research Sold

Research Products Company, of Salina, KS has been sold to United Phosphorus Ltd, Bombay, India.

Mr. Rajju Shroff, Chairman, has been instrumental in consolidating the fumigation industry worldwide. United Phosphorus Ltd. is a large (2400 employees), rapidly growing basic producer of agricultural chemicals, pesticides and feed stock chemicals which are marketed worldwide. The company holds particular expertise in the economical production of aluminum phosphide such as Weevil-cide™ Pellets and Tablets. ✱

*Fumigator's Tip...***Metal Phosphide Disposal**

By John Mueller



Disposal of metal phosphide residual waste has been a problem for many fumigators over the years. When using pellets or tablets for space fumigation a gray ash remains even after the fumigant is spent. Aluminum phosphide only loses a third of its weight after off gassing, therefore two thirds of the weight remains as a residual waste [of this residual waste 3-5% is un-released gas] which must be deactivated and disposed of according to the label. In the case of pre-packaged forms, the gray ash is contained in a permeable membrane, but like pellet and tablet residual, pre-packaged fumigant must also be deactivated after use.

There are two methods of deactivation: wet and dry. Wet involves placing the waste material in drums of water with detergent mixed in. Wet deactivation takes 36 hours. After this time in most states the slurry is dumped in low traffic areas. According to the manufacturer the slurry is not a ground water threat and will not kill any vegetation. Dry deactivation involves containment units designed to keep the waste locked open to a free flow of air and protected from moisture.

Disposal is very simple if fumigators follow the label and properly prepare for the fumigation. Safe disposal starts by thoroughly planning your fumigation and using situational analysis. [Situation analysis - means you understand that every fumigation is different in some way. Finding the changes and planning for these differences can save hardships later on] Choosing the proper type of metal phosphide which should be used is based on the environmental condition of the storage or building you are treating. Magnesium

phosphide is ideal for cooler weather fumigations or when down time is a concern.

The most common disposal problems are:

**Problem 1**

*Not allowing for the full length of time required by the label based on the temperature of the structure you are treating.*

**Suggestion:** Many reasons surround this problem. Sometimes the customer will only give us a certain amount of time, or your schedule is tight so you fudge a couple of hours. Whatever the reason the result is violation of the label therefore violations of the law. This short cutting usually leads to 'hot disposals'. 'Hot disposals' are when excessive active ingredient is present in the waste dust/ash. When this active dust contacts the drum of detergent and water fire or explosion can result. Follow the label and you should not have these problems.

**Problem 2**

*Thinking the product or headspace temperature is the only temperature needed for fumigant consideration in determining the length of the fumigation.*

**Suggestion:** The only temperature that counts is the temperature where the fumigant will rest, i.e. when placing pellets or tablets on plastic and the plastic is resting on the ground, you should use a slab thermometer. The temperature of the concrete will be a major component to the rate of release for the metal phosphide. It is common for the ground temperature to be lower than the air temperature.

Product temperature is another factor. When cool storages are warmed or when cold product is placed in warm structures which are sealed for fumigation the product temperature will have a negative effect on fumigant release rate.

**Problem 3**

*Containing the residual waste in plastic or containers while removing the waste to the disposal drums.*

Containing the waste material can result in auto-ignition of the container being used. Never contain the waste, always limit the amount of waste material, keep it vented, and move this material to the deactivation area immediately. Never allow the waste to be covered.

**Problem 4**

*Not using detergent when disposing of metal phosphate gray ash.*

Liquid detergent is required on the label. The lack of detergent in a wet deactivation can result in a 'hot disposal'. Detergent acts as an emulsifier which helps mix the dry ashy material into the water allowing the residual active ingredients to deactivate.

**Problem 5**

*Low relative humidity.*

**Suggestion:** Metal phosphates break down through hydrolysis. Atmospheric moisture reacts with the metal phosphates to create a chemical reaction which results in hydrogen phosphates gas. The lower the humidity the slower the reaction. Humidity concerns are not in the label, but when fumigating product or storages with very low humidity you will want to allow extra time for your fumigation.

*Note: This will mean you need to add a humidistat to your fumigation travel bag.*

**Problem 6**

*Warm building but cold outside conditions.*

**Suggestion:** Most structures being fumigated have fresh air insurgence. When outside temperatures are low, air enters the building and drops downward, eventually warmed by the natural convection currents of the building. Cold air entering the building not only cools the building, it cools the floor area where the fumigant usually rests. In cooler temperatures plan on adding extra time on the fumigation.

These suggestions are to give helpful fumigation tips for some of the problems with metal phosphide disposal. They do not take the place of common sense or the fact that all applications of metal phosphide must be in compliance with the label.

**Take time to read the label! \***

## How Diatomaceous Earth Works

For years we were told that the tiny microscopic fossilized aquatic plant life would scratch the cuticle (outside layer) of the insect and cause it to die by dehydration.

The latest findings show that the insects do die by dehydration but from the wicking of hydrocarbons from the pores of the insects that help slow

(continued on page 8)

**Diatomaceous Earth**

*(continued from page 7)*

down water loss. Without these hydrocarbons the water loss is rapid and the insect will gradually die of dehydration. \*

**Quotable Quotes**

"From these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion."

*Abraham Lincoln, Gettysburg Address, Nov. 19, 1863*

"It is clear that the demand for food by a world population that is expected to reach more than 11 billion by the end of the century, coupled with the sensitivity to environmental degradation, will provide a significant challenge for entomologists engaged in food protection."

*Herbert Oberlander, Ph.D., Center Director for USDA-ARS, Gainesville, FL*

"Keep it simple, keep it consistent, and keep it affordable"

*Dole Pineapple Company*

"People allergic to ragweed can be allergic to pyrethrin sprays."

*Jeff Tucker, Whitmire symposium*

"The average homeowner doesn't know the difference between a roach and a raisin"

*Mike Potter, Ph.D, University of Kentucky*

**EPA Backlog**

**The Office of Pesticide Policies (OPP) have the following backlog on pesticide registrations:**



New active ingredients.....	34
'Me too' products.....	912
Label amendments.....	3290
New uses.....	122
Section 18's.....	452
Experimental Use Permits.....	102
Tolerances.....	141
Special Local Needs; 24c.....	373

Since August 3, 1996 when Congress passed the Food Quality Protection Act not one new registration has passed through the EPA. One EPA deputy of registration stated: "We are moving at the speed of a glacier." The

The Office of Pesticide Policies at EPA has 10 divisions and 740 workers. They work (Top Three) on:

- 30% Reregistration**
- 25% Registration**
- 9% Special Review**

lawyers in EPA are busy sorting out what this law means and how to implement it before any movement can be made at the EPA. Like most gov-

ernment agencies, the EPA is under-budgeted and under-staffed to perform its responsibility. \*

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