

FUMIGANTS AND PHEROMONES



Issue No. 16 Summer, 1988



By: Fumigation Service & Supply, Inc.
Insects Limited, Inc.
10505 N. College Ave.
Indianapolis, IN 46280
(317) 846-5444 / 846-3399



FUMIGATION OPTIONS

by David K. Mueller, RPE

"It is easier and more economical to save a bushel of grain than it is to grow a bushel to replace it."

The protection of America's grain is of vital importance. Insects every year compete with man before, during, and after harvest for this grain. Both man and certain insects want the same thing at the same time. What man possesses in intelligence, insects overcome with persistence, their reproductive capacity, and that all important ability to adapt and survive.

With the present climate in the pesticide industry, it is hard to keep up with what products are available to control pests. The EPA has drastically reduced the number of toxic chemicals used by the grain and feed industry in the past decade. In 1981 there were over 28,000 pesticide labels registered with the EPA in the United States. Now, in 1988, there are less than 6,000 pesticide labels registered. It is estimated that there will be less than 3,000 pesticide labels by the year 1990.

"In order to stay professional, we must stay current."

Currently there is a handful of useful fumigants and grain protectants available to control stored grain insects. Most of these products have recently gone through extensive changes in their labels and labeling. Here is a review of your options.

Aluminum Phosphide (phosphine, hydrogen phosphide, Phostoxin®)

This solid form fumigant comes in pellets, tablets and a prepackaged form. It is a

Continued on page 2



QUOTABLE QUOTES

"The Journey is Our Reward", Steve Job, Computer entrepreneur. His recent book title.

"From birth to age 18, a girl needs good parents, from 18 to 35 she needs good looks, from 35 to 55 she needs a good personality, and from 55 on she needs cash." Sophie Tucker.

"Perhaps the greatest value of pheromones and attractants are their safety and effectiveness." Wendell Burkholder, Ph.D., USDA, ARS, Department of Entomology, University of Wisconsin, Madison.

"Someday, you in the Pest Control industry, will have to show that there is an existing pest problem before you will be allowed to apply pesticides." Austin Frishman, Ph.D., RPE, consultant.



Austin Frishman's List of 13 places Stored Product Insects are likely to occur in a household:

So often a company will get the blame for infested grain based food products when it is the lack of sanitation from the homeowners which is at fault. This helpful list might help to pinpoint and solve this pantry pest problem:

1. Indian corn
2. Dried dog food, stored or spilled under an appliance
3. Children's bean bags
4. Ornamental foods and grains; printer's box or apothecary jar.
5. Party nuts; left in bar or cabinets
6. Rodent bait; throw packs, old Decon
7. Spices; metal containers with open holes (kept for years)
8. Ethnic foods; seasonal foods, (ie. Matza, Christmas foods)
9. Dog biscuits or treats
10. Stuffed dolls; internal stuffing
11. Turtle food or fish food (turtles carry salmonella)
12. Old books; insects eat the glue in the binding
13. Tobacco; ex-smokers

ARTICLES IN THIS ISSUE:

- Foreign Grain Beetle Research
- Fumigation Options
- Consultant's Corner
- Replacement for Vapona™ Strips
- New Grain Probe
- Bio-Rational Strategies
- Bird Control Program
- Definitions
- Fumigants & Pheromones
- Technical Seminar
- From Canada
- Empty Bin Treatment
- Dave's Soapbox

FUMIGATION OPTIONS

Continued from page 1

relatively safe fumigant in that it has a strong warning odor (ammonia, carbide) that indicates its presence. Phosphine is 1.2 times heavier than air. When mixed or probed into the grain, it will kill all stages of insects if the gas is held in contact with the insect for an effective duration. One disadvantage of this fumigant is that it is a slow killing gas. It takes four or more days to kill all stages of insect life. Phosphine is the only fumigant that can be used in-transit in railcars, barges, and ships. It is a restricted use pesticide.

Methyl Bromide (Meth-O-Gas)

This fumigant is packaged in steel cylinders as a liquid under pressure. Above 38 degrees, it is released as a gas that is 3.3 times heavier than air. It is necessary to recirculate this gas through a grain bin to be completely effective. Extreme caution should be used when handling methyl bromide because it is colorless and odorless and can cause severe burns to the skin. The advantage to this gas over phosphine is that it is a fast killing gas. A thorough fumigation can take as little as 12 to 24 hours. This is especially useful when fumigating ground piles (bunkers) of grain where the fans can't be turned off for long durations. Methyl bromide is a restricted use pesticide and should be only handled by trained and experienced applicators.

Chloropicrin (tear gas, Larvacide)

This is a liquid fumigant that comes packaged in glass jars, plastic jugs or steel cylinders. Currently it is available to treat grain. However, the EPA has said that they will be notifying the registrants in 1988 of its decision to discontinue its use on grain. It will retain its *empty bin* fumigation label. Chloropicrin is 5.7 times heavier than air. It has an advantage in that it will suppress mold in grain and kill grain mites. It is also effective in treating outdoor rat burrows. This gas is relatively safe to use because it has a pungent (tear gas) odor. Chloropicrin is a restricted use pesticide.

Carbon Dioxide: (CO₂)

This inert gas is not a conventional fumigant in the classic sense. It is injected into stored grain and creates an atmosphere sufficiently devoid of oxygen. It causes death by asphyxiation. This gas

comes packaged in large transportable tanks. The disadvantages of this type fumigation is that it is very slow (7 to 14 days @ 72 degrees). A complete kill is hard to achieve, and it is extremely important that the bins are sealed tight enough to maintain 45% by volume for 7 to 14 days. Some advantages to this 'biological' treatment is that it is residue-free — leaves no harmful traces on the grain, it retards spoilage and bacterial growth, and it is readily available worldwide. Carbon Dioxide should *not* be used where the bins cannot be sealed extremely tight.

Protectants

These products are not fumigants, but they play an important role in grain management. Two new products available in the United States are Reldan 4E and Actellic 5E. These organophosphates are designed to replace malathion usage for long-term



grain protection. Malathion has lost most of its effectiveness due to a resistance buildup by several of the most frequently found beetles and moths. Actellic is not approved for use on wheat, and Reldan is not approved for use in corn. They both have empty bin treatment technical bulletins along with 'top dress' instruc-

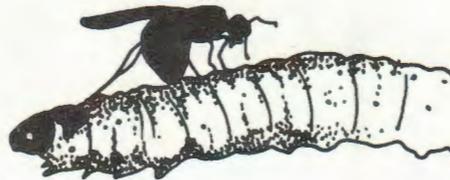


tions. The better a grain protectant is mixed into the grain, the better it will work. They are best applied with water as the grain is being filled into a bin. If the grain is badly infested, it should be fumigated first and a grain protectant could then be applied for long-term storage.

Beneficial Insects

Swarms of small wasplike insects are often found in bulk grain and feed mills. These parasitic insects are not harmful to man or the grain but are beneficial

because they attack and destroy the insects that infest grain and grain products. Indianmeal moths can be successfully controlled by releasing large numbers of



two tiny wasps into a flat storage or grain bins. These beneficial insects are commercially grown and shipped throughout the United States. They go by the names of *Bracon hebetor* and *Trichogramma pretiosum* for moths and AC's (*Anisopteromalus calandrae*) for the weevil group. They search out, attack, and destroy their hosts. Their survival and their progeny's future depend upon it. As of June 1, 1988 this method has not received approval from the Food and Drug Administration (FDA). There seems to be some confusion in Washington D.C. as to who is regulating this type of biological control in grain; FGIS or FDA.

Beneficial insects were researched by the USDA-ARS scientists at the Stored Product Research Lab at Savannah, GA. The scientists found that all the insects that attack stored grains could be controlled by releasing beneficial insects.

Advantages of Beneficial Insects

- They reproduce when hosts are available.
- They are good hunters.
- They produce no residue.
- They are safe to use.

Disadvantages of Beneficial Insects

- Most are host specific.
- Some parasites are sensitive to chemicals (ie malathion).
- Frequent releases are required.
- Results may be produced more slowly.

Future

Since primeval man crawled from his cave and decided that he might better his existence through the storage of foods for future use, he has been forced to battle the insect kingdom to protect his stored products. In spite of modern methods and chemicals, this battle rages more fiercely today, than ever before. This is likely to continue as long as man exists. The nature of the chemicals employed in the future must be more selective to the target pest and also environmentally safe.

By David K. Mueller, RPE

NEW GRAIN PROBE

Phostoxin Pellets and Tablets can be injected into the surface of the grain more easily and deeply with this new grain probe. Its all-aluminum construction makes it light-weight and sturdy. They are 1 1/4" in diameter and 7 feet long. The funnel on the top allows for easier filling of the fumigant into the probes.



It is a proven fact that Phostoxin works better if it is introduced under the grain surface. This grain probe can save some labor and make the product more effective by allowing for better distribution within the grain mass.

Cost: \$144.00 each.

REPLACEMENT FOR VAPONA STRIPS

... in Grain Bins

An automatic pyrethrum dispenser is replacing Vapona strips as a head space treatment in grain bins to protect stored grain against the invasion of insects. This fully automated fogging system releases a small amount of 2% pyrethrin every seven-and-a-half minutes. It runs on a single 9 volt battery. Each can of pyrethrin contains 7.25 oz. and lasts approximately 32 days or more. One unit will effectively treat up to 6,000 cubic feet.



The advantages to this type system are that it is guaranteed against defects for two years. It is inexpensive and reusable \$38.55/ kit (1 dispenser, 9 volt battery, one 7.5 oz. aerosol can of 2% pyrethrin per kit). Replacement cans are \$8.06 each.

The label lists flies, mosquitos, gnats, and small flying moths as the target insects and

lists food handling and food preparation areas, food processing plants and stores, farms, dairies, barns, schools, food warehouses, chicken houses, egg and milk handling areas along with several other areas.

Natural pyrethrum is a much safer insecticide than Vapona. With the Special Review that the EPA placed on dichlorvos, alternative options are needed to fill the gap. This automatic dispenser is a bio-rational alternative to the Vapona strips.

EMPTY BIN TREATMENT ...

With Beneficial Insects

Using natural enemies to effectively suppress residual populations of grain insect pests has been demonstrated by LeCato, et.al., at the USDA-ARS Stored Product Laboratory at Savannah, GA. In tests, pest species increased steadily in the facility that received no predators and reached population levels in excess of 2500 after 100 days. When predators (beneficial insects) were present, the pest population increased over the first 20 to 50 days and declined to levels below those at which they were introduced.

Make this Work for You;

To suppress pests which may be hiding in cracks and crevices, *Anisopteromalus calandrae* (AC's), wasps that parasitize weevils; Warehouse pirate bugs, which eat larvae and eggs of most grain pests, and *Trichogramma*, a microscopic wasp that is an egg parasite of moths should be released into the empty storage facility as soon as the old grain has been removed and the facility cleaned up.

These beneficial insects will seek out their hosts (pests) in cracks, crevices, tunnels, or wherever they may be hiding, and will suppress their reproduction. These insects reach places that pesticides do not reach.

Insects Limited, Inc. can help you plan a "bio-rational" strategy with beneficials to keep the pest insects suppressed and the grain should stay relatively free of insects injurious to grains especially where Indianmeal moths are the target pest.

Cost for 2 releases is about \$5.95 per each 100,000 pounds (2,000 cu.ft.) of grain plus shipping charges.

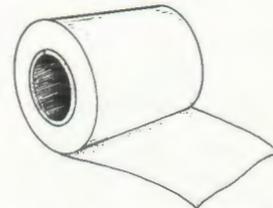
Biological Pest Control is Safe, Economical, and Effective.

FUMIGATOR'S TIPS

Sealing Materials

Poly-Sci: The ability to quickly and effectively seal a structure to hold fumigant in order to affect a complete kill of the target pests.

Professional fumigators learn rapidly that some types of masking tape are not very good to work with on a fumiga-



tion. Here is the best tape available for sealing enclosed structures and vehicles: Armak Tape (PM-2) 3 or 2" x 60 yds. Cost: \$81.40/ case.

Where dust is a problem, there is a very good, quick drying aerosol that helps the tape stick to the wall and the poly. Camie Spray Adhesive; 12 x 18 oz./ case, Cost: \$55.00/ case. For those real dusty areas we use a permanent glue called: Bond-master; 5 gal pail Cost: \$105./ pail.



Most 4 mil poly sheeting can be purchased locally at a roofing or hardware store. However, 2 mil x 40 ft. x 450 ft. large poly is hard to find locally. We use this to cover the top of the grain surface when we fumigate bins and some flat storages. 40' wide polyethylene sheeting; 2 mil x 40 ft. x 450 ft. (185 lbs.) Cost: \$270./ roll



ILLINOIS OFFICE

John Mueller
New Phone #: (309) 827-7233
1718 Springfield Road, Suite #4
Bloomington, Illinois 61701

Call on John for: "Competitive Prices & Unbeatable Service"

CONSULTANT'S CORNER

Austin M. Frishman, Ph.D., RPE:
Video Training Series, Pest control and food processing related.

"Our Videos include valuable reference sheets, a quiz and a verifiable attendance sheet.

"This summer we will develop a new video covering *Pest Control Inspection Techniques in Food Facilities.*"



"This man is the entire industry's consultant". (516) 694-7224

Ted Granovsky, Ph.D., RPE
Latin speaking country experience; fluent in spanish.

Pest Control and Stored Product Insects
New Video: Termite Control; \$54.95 + postage.
includes 160 page manual, 30 minutes.

Florence Dunkel, Ph.D.
International Stored Products
Entomologists
Stored Product Insect Specialist
African experience.
(612) 626-1784

Chris Christensen, Ph.D, RPE
Pest Control Consultant, Authored PCT
Technician's Handbook, For the identification and control of insect pests.
Phorid fly specialist with plenty of "knowledgeable common sense"
(606) 257-5956

BIRD CONTROL PROGRAM

... A Bio-rational strategy.

1. Survey the situation
2. Make sure the target birds are not protected by law
3. How many birds are present; migrating or resident
4. Where do they feed, rest and roost
5. What do they feed on, rest on, roost on

6. What structural factors need to be changed
7. Estimate the cost
8. Sanitation
9. Build them out of the building; netting, pointed wiring



10. Choose a possible repellent; noise, ultrasound, charged wires, glues or jellies
11. Visual distraction; Scare Eye
12. Trapping where applicable
13. Population reduction; shooting

If all else fails...

14. *Population reduction: poisoning (Avitrol or Rid-A-Bird, both restricted-use products)*

FROM CANADA

The 10th Annual Structural Pest Control Conference was held March 7 & 8, 1988 in Toronto. This conference was attended by over 350 people and was sponsored by the Ontario Ministry of the Environment and the Ontario Pest Control Association.

John Miller, Ontario Ministry of the Environment, was the program chairman. Here are some excerpts from his opening remarks:

"The theme of the conference this year is Fumigants, Pheromones and Food-infest-



ing Pests. We hope that this focus, on what can be described as a highly specialized and essential part of the structural pest control industry, will provide you with many new insights into this rapidly-

changing area of pest control."

"What about the next 10 years ?? Where will the pest control industry be in 1998?"

'Politics of Pesticides' such as the demise of chlordane, or of EDB, to name a few, point to one unavoidable conclusion — we cannot count on our pesticide products as we know them today to be around ten years from now. What does this mean to your own personal future in your business or in your career related to pest control? Well, all I can say at this point is that each one of us must strive for flexibility in our future outlook and endeavours. That flexibility can be achieved through greater knowledge and awareness of new developments and concepts in pest control."

"There is no doubt about it, that the roaches and the fleas and the saw-toothed grain beetles and the mice and the carpenter ants will all be alive and thriving in ten year's time. In other words, there will be lots of demand for pest control, and those of us who have adapted will still be making a living from pest control."

"We need to adapt with the times."

FOREIGN GRAIN BEETLE RESEARCH

A study will be conducted by the University of Minnesota in 1988 to learn more about this tremendous nuisance pest. The title of the research project is: Monitoring the Development and Environmental Requirements of *Ahasversus advena* in Stored Grain and Adjacent Areas. Dr. Philip Harein, Professor and Extension Entomologist, will direct the project on this major grain pest of which little is known. Insects Limited, Inc. has sponsored this research project and we look forward to reporting the findings to you a year from now.

FSS LICENSE PLATES



DEFINITIONS

The following are some basic definitions of terms that are commonly referred to on insecticide labels and directly reflect on how we can use the product and where. The definitions are from the *Federal Register*, Vol.38, No. 154, August 10, 1973.

1. **Food Handling Establishments**- "is an area or place other than a private residence in which food is held, processed, prepared and/or served."
2. **Non-food areas** of food handling establishments "including garbage rooms, lavatories, floor drains (to sewers), entries and vestibules, offices, locker rooms, machine rooms, boiler rooms, garages, mop closets, and storage (after canning or bottling)."
3. **Food areas** "include areas for receiving, serving, storage (dry, cold, frozen, raw), packaging (canning, bottling, wrapping, boxing), preparing (cleaning, slicing, cooking, grinding), edible waste storage, enclosed processing systems (mills, dairies, edible oils, syrups)."
4. **Non-residual insecticides** "are those products applied to obtain insecticidal effects only during the time of treatment and are applied either as space or contact treatments."
5. **Space Treatment** "is the dispersal of insecticides into the air by foggers, misters, aerosol devices or vapor dispensers for control of flying insects and exposed crawling insects."
6. **Contact treatment** "is the application of a wet spray for immediate insecticidal effect."
7. **Residual insecticides** are those products "applied to obtain insecticidal effects lasting several hours or longer and are applied as general, spot, or crack and crevice treatments."
8. **General treatment** "is application to broad expanses of surfaces such as walls, floors, and ceilings or as an outside treatment."
9. **Spot treatment** "is application to limited areas on which insects are likely to occur, but which will not be in contact with food or utensils and will not ordinarily be contacted by workers. These areas may occur on floors, walls, and bases or undersides of equipment. For this purpose, a 'spot' will not exceed 2 square feet."

10. **Crack and crevice treatment** "is the application of small amounts of insecticides into cracks and crevices in which insects hide or through which they may enter the building. Such openings commonly occur at expansion joints, between different elements

of construction, and between equipment and floors. These openings may lead to voids such as hollow walls, equipment legs and bases, conduits, motor housings, junction, or switch boxes.

FUMIGANTS & PHEROMONES TECHNICAL SEMINAR

December 8 & 9
Lincoln Hotel and University Conference Center
Downtown Indianapolis

OPTIONS & Strategies

Invited Speakers Include:

Senator Richard Lugar,*

Senate Agriculture Committee (FIFRA, Groundwater Issues)

Dr. Peter Cornwell,*

Director of Research, Rentokil, UK (Methyl bromide, New Fumigation Techniques)

Dr. H.C. Brown,*

Nobel Prize Laureate, Purdue University (Pheromones)

Dr. Wendell Roelofs,*

University of New York, (Pheromones)

Dr. Bruce Ames

University of California, Berkley (Cancer and Pesticides)

Edwin Tinsworth*

Director Registration Division, EPA, Washington, DC (Pesticide Registration)

Dr. Chris Christensen*

University of Kentucky, (Insect control)

Terri Pitts, RPE*

Gustafson, Inc., Dallas, (IGR Grain Protectants)

Dr. Rick Weinzierl*

University of Illinois, (Grain Insects)

Pat Kelley*

Fumigation Service & Supply, Inc., (New Fumigation Techniques)

Dave Williams*

Dept. of Natural Resources, Purdue University, (Rodent & Bird Control Update)

Buddy Maedgen*

Biofac, Inc., Mathis, Texas, (Beneficial Insects)

David Mueller, RPE*

Insects Limited, Inc., Indianapolis, (Fumigation, Pheromones)

Dick Stanovick*

Degesch America, Inc, Virginia, (New Fumigation Packaging)

Purdue Entomology Research Students*

Award Winners from RPE Student Competition

* denotes speakers that have accepted an invitation already.

Make Plans to Attend the 1988 Fumigants & Pheromones Technical Seminar in December.

OPTIONS & Strategies

What are some Options?
By David K. Mueller, RPE

We are quickly approaching a time when the social conscience of the general public is desiring alternative methods to accomplish pest control or pest elimination. There is a need for new technology to fill this void.

In order to stay professional in our jobs we must stay current, flexible, and adaptable. The purpose of this article is to discuss the current status of bio-rational alternatives, point out some trends that are developing and suggest a bio-rational strategy to meet the demands of our future customers.

History

The insect control industry is evolving at a rapid pace, and it offers opportunities to those who are willing to change. These opportunities have developed into two groups of customers. Those who want the best price and those who are willing to pay for quality results.

"Good service and good products have their price". *Hans Ulrich Kliest*

The modern consumer will shop for value and/or quality. Value customers can have their needs fulfilled with traditional cost-conscious pest (insect) control. But the consumer who recognizes the importance of quality results and products will search for the best and the *safest*.

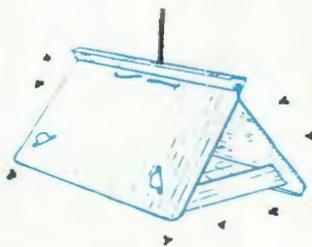
The anti-pesticide movement throughout our planet has had an impact on how our people think about chemicals, and especially pesticides, today. The momentum of this movement is accelerating and the pest control industry is caught in the middle of it with two choices: 1. Fight it and spread our message of dose relationships and portray ourselves as white knights of public health and/or 2. Develop a bio-rational strategy which includes the judicious use of least toxic chemicals and environmentally compatible alternatives.

People today want a pest-free living environment, an insect-free food supply, but without the hidden fear of potentially hazardous chemical residues sharing that living environment or food supply.

The fear of cancer from the diet or the air we breathe is an invisible pest worse than all of our six-legged varieties.

IGR's

Graham Crowe, President of the British Pest Control Association, stated at the National Pest Control Association meeting in 1987, "The pest control industry will be using 95% IGR's (Insect Growth Regulators) and 5% pyrethroids within the next five years." IGR's will be a major player in our bio-rational strategy for the future. It will be used in all facets of insect control. The grain, food, and tobacco industries will rely heavily on IGR's to place a protective coating on the commodities we store and process. The development of resistance to chemicals is inevitable as insects are truly adaptable.



Pheromones and Insect Attractants

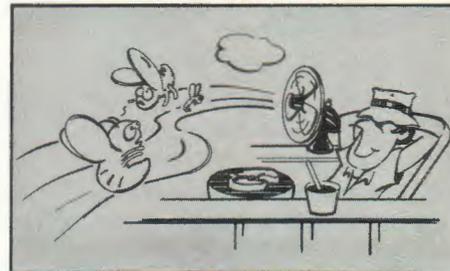
The monitoring for the presence or absence of insect pests is a key to any bio-rational strategy. These sensitive detection tools allow not only an early warning to insect build-up, but also a gauge to evaluate the effectiveness of our treatments.

If we don't police the efficacy of our work, our customers or regulatory officials will do it for us. There is a real need for good information transfer for this relatively new technology. Insect pests react differently to various types of traps/lures, and it is important to understand their sensitivity or lack of it.

Great advances are being made in perfecting the chemistry of this synthetically produced insect attractants. The insect's antennae are highly sensitive to the correct isomerically pure chemical needed to unlock a pre-programmed behavior. Scientists are discovering that many of these insect pheromones contain several major components. The ratio of these components is critical in many cases. This novel technology is improving and more good researchers are joining in on a technology that will, no doubt, lead to a major player in a complete bio-rational strategy.

Natural Air Movement

Something as simple as the movement of air will repel pest invaders into our living and working environment. Air curtains on an entry way or a fan on a patio could be a simple bio-rational solution. Not all bio-rational strategies are new. We may just need to brush the dust off a few that have been placed on the shelf for a while.



Heat Sterilization & Cold Temperatures

The food processing industry has migrated to heat sterilization instead of general fumigation in a big way. Whole facilities are being converted over to tolerate this harsh 'heat-up' of 140 degrees for 16 hours. The results have been good and the cost is not prohibitive. Cold temperature treatments are so simple that our grandmothers forgot to tell us about it. Some products that are sensitive to insect attack can be preserved by freezing the product or equipment long enough to affect a kill. Some Canadian flour mills will open the windows during a sub-zero period for several days at a time. The USDA's Stored Product Insect Laboratory in Savannah, GA is researching this method of insect control along with other bio-rational methods.

Beneficial Insects

Biological control has a place in controlling pests. There are specific groups of insects that feed upon or parasitize whole groups of pests. In many cases, beneficial insects by themselves will only reduce pest insects and not eliminate a population. In combination with other control procedures like fumigation or pheromone mass trapping, they have a greater potential to develop as a realistic alternative. There are stumbling blocks lurking for any strategy that uses insects to control insects in an industry where "zero insect tolerance" is the goal. However, there are some groups like the seedsmen and natural food stores that think method would fit nicely. The regulatory agencies will be the first stumbling block in the use of beneficial insects. The skeptics are numerous for this biological control method. Only through cautious promotion and selective recommendations will this

type of control procedure make it past first base.

All bio-rational control methods work and no bio-rational control method works, just like anything is toxic and nothing is toxic. It is important to carefully pick-out the situations where we don't force incorrect method and expect more out of it than is realistic. It is important to match the correct tool to the job.

The Future

We are in a transition period where change is occurring faster than ever before for the pest control industry. There will be the group that will try to out-live change and cling to conventional methods of controlling pests. Pesticides *are* safe in the hands of professionals. However, as professionals, we all need to respond to the wishes and demands of a changing consumer attitude. The judicious use of pesticides along with the monitoring of existing populations of potentially destructive pests, will allow for better, more professional pest control. The substitution of IGR's, mating disruption, mass trapping, pheromone monitoring, beneficial insects, heat sterilization, cold temperature treatment, air movement, and/or other biorational pest control methods will offer a challenge that we can try to out-live or accept. *In order to stay professional, we must stay current!* The nature of the control strategies employed in the future must be more selective to the target pest and also environmentally safe.

DILL SEED

New toxicants and/or repellents are needed as protectants for grain and other stored products. Fewer insecticides are now available and many species of stored-product insects have developed a high degree of resistance to malathion.

Dill seed possesses insecticidal and antimicrobial properties. Also, our previous work has shown that dill seed extract gave strong repellency to four species of stored-product insects, and also gave strong repellency to confused flour beetles. The main components of dill extract were identified as d-carvone and dillapiol. Dill extract is a good candidate for development as a protectant against stored-product insects for grain in storage.

by: Helen Su, USDA, Agricultural Research Service in Savannah, GA

This talk was presented at the Fumigants & Pheromones Conference in Toronto, 1988 by David K. Mueller, RPE.

DAVE'S SOAPBOX



... for what it's worth.

Imagine, if you will, that you are given the job of hammering a nail into a wall. You have a choice of using a large sledge hammer or a small tack hammer. Which do you use?



The big hammer will accomplish the job quicker but at the risk of bending the nail if the force is not directed accurately. The wall's surface could be blemished if the nail is missed or hammered too hard.



The small hammer takes more taps to sink the nail into the wall and there is less chance in bending the nail or putting a hole in the wall.

The big hammer, if misdirected, can strike the thumb or hand of the applicator and

inflict greater pain than the smaller tool. If the smaller tool misses its target, it will not leave the same damage as the hole in the wall that the larger tool could leave behind.

The small and large hammers represent the choice of toxic pesticides or less toxic (bio-rational) control strategies. The applicator's thumb or hand represents the health risks to which the pesticide applicator submits himself every time a pesticide application is made. The surface of the wall represents the precious environment in which we live and work. The bent nails represent the resistance that occurs in our pests that can't be corrected or straightened.

Moral

The moral to this very simple scenario is: we have a choice to make. Do we automatically grab for the big hammer every time we are asked to do a job of killing insects and other pests or do we stop and consider our options and alternatives? Often, the big hammer *is* necessary to complete a job effectively. However, not *all* of the time.

The next time the phone rings and you are asked by the person on the other end to correct a problem, *remember that we are problem solvers, not chemical salesmen.*

XVII International Congress of Entomology
University of British Columbia, B.C., Canada
July 3 to 9, 1988
Pheromones and Attractants
Biological Control of Stored-Product Pests
- Highlights in Issue 17 -

FREE INSECT I.D.

If you would like a second opinion on an insect in-question, Insects Limited, Inc. will supply you with free insect identification. If it is a stored-product insect, it can usually be 'keyed' out to the species. Send the specimen in a box with tissue paper or in a vial of alcohol to preserve the legs and antennae (not stuck to a piece of tape). Write a short note describing where the insect was found (ie. grain bin, office) and what it was feeding on (ie. corn screenings, dog food). Please include a self-addressed stamped envelope, and I will copy some vital information about the pest and return it to your attention.

Knowing the pest is half the battle in controlling it.

FUMIGATION SERVICE & SUPPLY, INC.

Indianapolis, Evansville, Bloomington, IL
NEW National Toll Free Telephone Number

1-800-992-1991

- Custom Grain Fumigation
- Phostoxin Fumigants
- Methyl Bromide Fumigant
- Safety Equipment
- Pheromones/Beneficial Insects
- Grain Protectants
- Training Seminars
- Competitive Prices
- Unbeatable Customer Support



"Problem solvers, not chemical salesmen"

NEWSLETTER

Fumigants & Pheromones is published by Fumigation Service & Supply, Inc. and Insects Limited, Inc. for the professional pesticide applicator. 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 that 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., P.O. Box 40641, Indianapolis, IN 46280 (317) 846-5444.

800 NUMBER

Fumigation Service & Supply, Inc. and Insects Limited, Inc. now have a toll free 1-800 number. The number is 1-800-992-1991. We are always trying to upgrade our customer service and this 1-800 is a big

step in providing you *"Competitive Prices and Unbeatable Service"*.

**NEW Toll Free Nationwide
Phone Number: 1-800-992-1991**

Copyright 1988 Fumigation Service & Supply, Inc. All rights reserved. No part of this publication may be reproduced or transmitted by any means without permission from the editor. *This includes illustrations.*

Fumigation Service & Supply, Inc.

10505 North College Avenue

Indianapolis, IN 46280

1-800-992-1991

Bulk Rate
U.S. Postage
PAID
Permit No. 14
Carmel, Indiana

