Fumigants & Pheromones

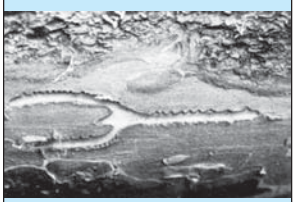
Issue 64
Summer
2002

Routing:

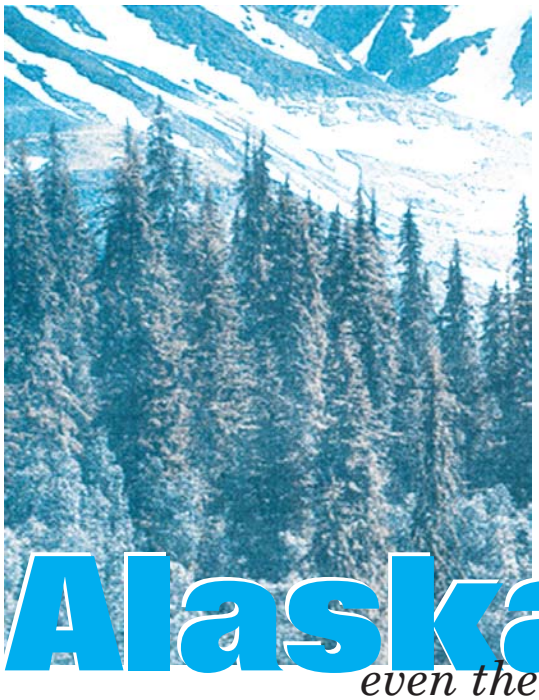
A Newsletter for the Insect Control & Pest Management Industry

Insects Are Environmental Indicators:

Whether it would be spruce bark beetles in Alaska or Indianmeal moths in your facility, insects are sensitive environmental indicators. They can vary their population to meet certain conditions in short periods of time. Whether it be season fluctuation in temperatures, humidity, sanitation or change in food supplies, insects are the first indicators of change. The foreign and flat grain beetle will tell you first that your grain is going out of condition without entering the bin. Here is a story of how insects have been an environmental indicator in Alaska.



Bark beetle damage.



38 million spruce trees on 4 million acres have died on the Kenai Peninsula in Alaska.

Alaska, *even the permafrost is melting*

To live in Alaska when the average temperature has risen about seven degrees over the last 30 years means learning to cope with a landscape that can sink, catch fire or break apart in the turn of a season.

In Barrow, the northernmost city in North America, it means coping with mosquitoes in a place where they once were nonexistent, and rescuing hunters trapped on breakaway ice at a time of year when such things once were unheard of.

In the Kenai Peninsula, a recreational wonderland a few hours drive from Anchorage, it means living in a four-million acre spruce forest that has been killed by beetles, the largest loss of trees to insects ever recorded in North America, federal officials say. Government scientists tied the event to rising temperatures, which allow the beetles to reproduce at twice their normal rate. Scientists have discovered that the mean temperature has risen 5°F in the summer and 10°F during the winter months since the 1970's.

U.S. Senator (R) Ted Stevens of Alaska states: "Alaska is harder hit by global change than any place in the world." Among the consequences are sagging roads, crumbling villages, dead forests, catastrophic forest fires and possible disruption of marine wildlife. These problems will cost Alaska hundreds of millions of dollars.

Meanwhile, President George W. Bush was dismissive of a report the government recently released on how global warming will affect the nation.

"There can no longer be any doubt that major changes in the climate have occurred in recent decades in the region, with visible and measurable consequences," the government concluded to the United Nations last month.

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IN THIS ISSUE:

Alaska

(continued from page 1)

It does not take much to find those consequences in a state with 40 percent of the nation's surface water and 63 percent of its wetlands.

On the Kenai Peninsula, a forest nearly twice the size of Yellowstone National Park is in the last phases of a graphic death. Century old spruce trees are a cinnamon-color and they bleed sap; a sign of stress that allowed the spruce bark beetles to attack and kill the venerable trees. Now they become a tremendous forest fire hazard.

Throughout the Kenai, people are clearing some of the 38 million dead trees near their homes, answering the call from officials to create a " defensible space" around their houses for fire protection. Last year two major fires occurred on the peninsula that would make the recent fires in Colorado and Arizona seem small. "It's just a matter of time before we have a very large, possibly catastrophic forest fire," said Ed Holsten off the Forest Service.

Each spring, Kenai Peninsula residents go out into their yards and gather up dead trees and limbs to protect their homes against the increased potential of a forest fire.

Whether you believe the stories about climate change or not, the people of Alaska are experiencing many strange events. Dr. Glenn Juday, an authority on climate change at the University of Alaska at Fairbanks states: "We're experiencing indisputable climate warming. The positive changes from this take a long time, but the negative changes are happening real fast."

Source: Timothy Egan, New York Times, June 16, 2002

Take Home Message:

When trouble hits, warnings sound. Insects are sensitive environmental indicators of change. When you see an insect in your daily life, stop and ask: Why is it here? The answer may lead to a better understanding.

If we *"start with the insect first"* and find its likes and dislikes, we can offer conditions in which it cannot survive. It will then either leave or die.

Grain Fever

Mold and fungus growing on spoiled grain can cause serious human health problems. Summer is the time of year when grain bins are inspected for insects and the condition of the stored living seeds that we call grain.

Climbing in a grain bin without the proper respiratory protection can lead to the following symptoms:

- Shortness of breath for several days.
- Fever
- Severe reaction to drinking alcoholic beverages.
- Coughing

Fumigators are often called upon to treat grain that is seriously out of condition. They walk around in the grain bin head space for 15-30 minutes preparing the bin. The spores from the mold and fungus can become airborne and easily breathed in by the fumigator even when they have the standard dust mask on. To be on the safe side, a HEPA filter full faced gas mask should be considered. These masks will filter out the mold spores. However, breathing in this hot headspace does become more difficult. When wearing a gas mask in these conditions always work in pairs and allow more time for completion.

Some people are extremely sensitive to mold spores. These people should not enter these hazardous environments. The condition called Grain Fever is sometimes called Farmer's Lung, because farmers get into bins frequently and can desensitize their bodies to these toxic spores. Many fumigators also become so sensitive to mold spores in grain that they have to excuse themselves from this type of work permanently.

Mueller and Van Ryckeghem chosen to write chapters in Mallis

The 9th edition of the Mallis Handbook of Pest Control will be published in 2003. Arnold Mallis first wrote this "Bible of Pest Control" in 1944. The handbook of pest control has become the standard reference book for the pest control industry and, like Arnold himself, has played a vital role in helping people to understand and respect pests, while dealing, with pest problems in a rational manner. David Mueller will be revising his previous chapter: Pheromones (8th edition) and Alain Van Ryckeghem will be rewriting the important chapter on Stored Product Insects. This book contains over 1500 pages and 500 illustrations. Stoy Hedges is the editorial director and Dan Moreland from PCT is the editor. Mallis is revised every 7 years. For a copy, visit The Book Store at www.insectslimited.com

Dave's Soapbox

...for what it's worth

I sure hope that reincarnation is not a real occurrence. I have killed so many insects and rodents in my professional career that I will be found lower than whale dung in my next life.

I dream about the day I approach my maker and she (makers are usually she's aren't they?) is sitting there with my name, *David Mueller*, on the top of the page. During her opening statement she explains to me that this is one of the thickest documents she has ever reviewed in her many years of service.

I start sweating bullets about this time.

"Mr. David Mueller, do you realize that you were responsible for the death and suffering of 6,294,936,897,916,793,967,462,493 insects and 3,595,976, 386, 376 rodents in your lifetime while on Earth. Before I make judgment on you, what do you have to say for yourself?"

Well…I am guilty of protecting food, seed, museums, and grain from attack by insects, mites, and rodents. By killing these pests, I have offered a better quality of life for many people around the world that suffer from the lack of proper nutrition and public health.

Maker: *"You mean a few innocent insects can cause such a problem?"*

Today we have nearly 4 billion humans on this planet and by 2020 we expect 8 billion humans, maybe 11 billion. Without proper nutrition, humanity will not only go hungry, but the "have-nots" will cross over into the lands of the "haves." This will cause major wars that could destroy the entire planet as we know it. Just look at what greed has done to corporate America, let alone starving people. The sacrifice of a few million quadtrillion arthropods shouldn't be that big of thing.

Maker: *"Every creature on this planet has a mother, you know. You entomologists all think the same. Didn't you hear the screams, didn't you stop to think what you where doing?"*

Screams? Entomologists have worked to protect public health in developed and developing countries throughout the world. Insects cause malaria, yellow fever, bubonic fever, Dungy fever, sleeping sickness, the Bubonic Plague carried by fleas on rodents killed 40% of Europe in the middle ages and still kill humans. This single disease changed the course of history.

Today, West Nile Virus, Encephalitis, Malaria, sleeping sickness caused by mosquitoes prevents habitation in large geographic regions of the world. The human suffering and death from mosquitoes alone is greater than ***all*** the wars man has waged throughout history.

Maker: *"I will make a note about that mosquito character."*

Don't forget the rats and fleas that caused the Plague too! Throw in the disease carrying flies too, will you?

Maker, I have one more thing to admit to. I have been actively working to help repair the Earth's Stratosphere by substituting alternatives for the ozone depleting fumigant Methyl Bromide. You know the Stratosphere I assume? The continuous thinning of this atmosphere has causes the earth to heat up and allow harmful Uvb light to enter the surface. These global changes have the potential to cause serious problems not only to humans, but also to plants and other creatures living on your planet. If this is not corrected, the quality of life on this planet will surely change in the near future for the bad.

Maker: *"How do you know this?"*

As an entomologist, I understand that the insect is an indicator for an environmental condition. As conditions change, so do the species of insects that appear. The wood destroying bark beetles are starting to destroy large areas of the Alaska region. Humans in southern Argentina are starting to show increased skin cancer and cataracts from intense sunshine. Certain animals are starting to disappear like frogs in the Cascades. Plants in Scandinavia are showing stress from intense UV light in the Northern Hemisphere.

Maker: *"OK, maybe I will let you in, but can't you guys come up with something that prevents pests from occurring rather than killing so many of my creatures so indiscrimately?"*

Wow, I must have been dreaming. That was very scary. We really have work to do!

D. K. Mueller

John's Fumigation Crews

We don't mind getting dirty to help solve pest problems.

Over the busy 4th of July holiday week, the fumigators from Fumigation Service & Supply, Inc. fumigated 14 structures containing 22 million cu. ft in four days. This is the combined equivalent to a structure the size of a football field and 450 feet tall. During this week FSS substituted over 16,000 lbs. (8 tons) of methyl bromide with alternative fumigations. The challenge to replace methyl bromide before January 1, 2005 is starting to become a reality. Here are some alternatives that we have been using:

1. ***ECO_2FUME***
2. ***Sulfuryl fluoride***
3. ***Heat***
4. ***Controlled Atmospheres***
5. ***68 Combination fumigations (Heat, CO_2 and Phosphine)***
6. ***Cold***
7. ***Intense Integrated Pest Management (IPM)***
8. ***Insect growth regulators (IGRs)***
9. ***Back to back pyrethrin ULD foggings***
10. ***Using the biology of the pest***

How to replace 5,400 pounds of methyl bromide with 69 pounds of phosphine.

By John Mueller

The heat has been turned up on the pursuit of replacements for methyl bromide. Customers are realizing that in less than 5 months, supply will be restricted to 25%, the price of methyl bromide could increase again, and in less than 2.5 years this fumigant is gone for nearly all of us.

2002 has brought a flurry of Combination Fumigations. Recently we fumigated a 5,000,000+ cubic foot food processor with the Combination Fumigation Technique. Previously, this facility was fumigated with 5,000 to 5,400 pounds of methyl bromide twice a year. This was a modern food processing facility and held gas very well. The sum total of phosphine that we used was 69.7 pounds. This facility will be able to claim a 2.67 ton pesticide reduction for this fumigation and potentially 5.349 ton pesticide reduction for the year. Of course, recycled carbon dioxide was used to achieve this savings—86,000 pounds. The carbon dioxide was all added within 3.5 hours. We achieved a peak concentration of carbon dioxide at 19% with a 10.25 hour half loss. This is a very good rate for carbon dioxide that is extremely difficult to retain.

"If you are not monitoring you are not fumigating"
—Herb Yeaman, Degesch America

There have been other food facilities with similar stories. A flour mill in Michigan exchanges 600 lbs. of methyl bromide for 7.5 pounds of phosphine. Another mill replaced 2.25 lbs. phosphine for 250 lbs. of methyl bromide, and a facility in Kentucky has traded 5,000 pounds of methyl bromide for 74 pounds of phosphine annually for several years now. All achieved without any corrosion problems. Monday morning start-ups were fine.

NOTE: the Combination Fumigation Technique is a patent protected fumigation precedure. (No. 5,403,597, April 4, 1995) If you have questions on how to acquire permission to use this process contact Dave or John Mueller at 800 992-1991 or email me at Fumig8r@aol.com

Over the past 8 years we have learned that by focusing on using fumigants more efficiently, gathering more data and focusing on applicator, operator, and by-stander safety we stand a greater chance of being able to answer the hard question that regulators will ask in the future. The days of fumigants being like magic beans for fumigation crews that shoot and run are being replaced with mandatory product stewardship and mandatory fumigation monitoring.

New Pheromone *from Insects Limited, Inc.*

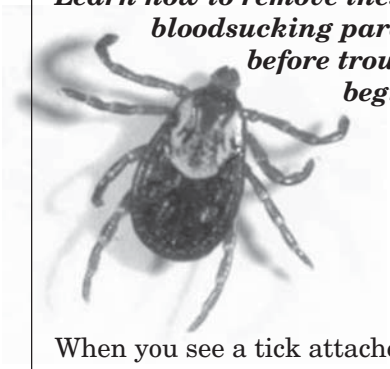
For the first time, the pheromone for the case-making clothes moth *(Tinea pellionella)* has been synthesized and tested in the field to be effective in monitoring for this fabric pest.

The case-making webbing clothes moth is found in the United States, Near East, India, Pakistan, China, and South America. This moth looks very much like the webbing clothes moth except for the darker color. For more information on this and other new pheromones, contact Alain Van Ryckeghem at 1-317-896-9300.

Bad Bugs...

Pick that Tick

Learn how to remove these bloodsucking parasites before trouble begins.



When you see a tick attached to your skin, your first reaction—to get it off now—is understandable. However it's important to know and understand the risk of contracting Lyme disease and other tick-borne illnesses.

Small and Stubborn

A tick has three active life stages: Larva, nymph, and adult. The Deer tick and the Western black-legged tick are capable of transmitting Lyme disease bacteria to humans during the nymphal and adult stages. The deer tick can also transmit other pathogens to humans. At the nymphal stage, these ticks are no larger than the point of a pencil tip. The female adult is about the size of a sesame seed, yet can swell 10-fold in size when fully engorged. The nymphs and adult females are the main transmitters of Lyme disease.

Did you know?

One female tick can produce 3000 young.

The much larger American Dog Tick is commonly found in the Midwest. It is a carrier of the pathogen for Rocky Mountain Spotted Fever.

The height of tick season is during the warm-weather months. Ticks live in shrubs, grassy areas, and open fields and attach to humans and animals during close contact. They lodge themselves by inserting their mouthparts into the skin surface, secreting a cement like substance into the wound to provide a firm attachment.

Remove ASAP

If you discover a tick on you, remove it promptly. Don't panic, because not all ticks are infected with diseases. Also, the probability of contracting a tick-borne disease, such as Lyme, is greatly reduced if the tick is dislodged within the first 24-48 hours.

The tick may appear embedded in the skin, but only its mouthparts penetrate the skin's surface. Insert the fine pointed tweezers tips under the tick's body from the side and grasp its mouthparts or head at the skin surface. Gently pull the tick straight out, making sure that all the part is removed. Then clean the bite with antiseptic.

Close up of a tick's head. Notice the reverse barbs that make it difficult to pull out of the skin.

Do not crush, twist, or burn the tick with a match, or smother it with petroleum jelly, as you may have learned in the past. These procedures are not effective and increase the chances of disease transmission. If you do not have tweezers available, use a tissue or leaf to grasp the tick with your fingertips and provide a barrier against the tick's bodily fluids if it should burst.

Did you know?

20-30 million Americans have asthma 3.4 million are children. Cockroaches and house dust mites are a leading cause of asthma.

Precautions

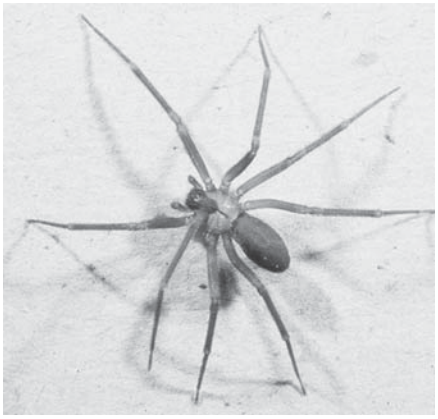
During tick season, take steps to guard against becoming a host. Travel on cleared, well-populated trails; wear long-sleeved shirts and long pants in light colors (which make it easier to spot ticks); tuck pants into your boots or tape pant legs to boots or shoes; apply effective tick repellants containing permethrin periodically. Check your head, skin, and clothing often.

Biology

From early spring until mid-autumn, you'll find ticks outdoors. Seed ticks, the newly hatched young, appear in early July and persist until a killing frost; they are particularly bothersome because they are very tiny and several hundred can be contracted at a time. One female tick can produce 3000 young.

Source: Field Stream, October 2001, Daria Gionta and www.nps.gov/maca/ticktalk.htm

Brown Recluse Spiders



The number of reported brown recluse spider bites has increase dramatically over the past few years. The brown recluse spider, *Loxosceles recluse*, has gained a reputation over the years as one of North America's "medically important" spiders. Although the brown recluse's natural territory range in the United States is in the southern states, primarily from western Georgia through Texas, it has been known to range as far north as parts of Missouri, Indiana, Illinois, and Nebraska. However bites have been reported in Maine, Minnesota, New Jersey, Delaware, Maryland and numerous other locales.

Did you know?
The highest land animal on earth is the small Black Attid spider. It lives at an altitude of 22,000 feet on Mount Everest, the peak of the Himalayas. Wild sheep and mountain goats in the Himalayan Mountains live only as far up as 17,000 feet.

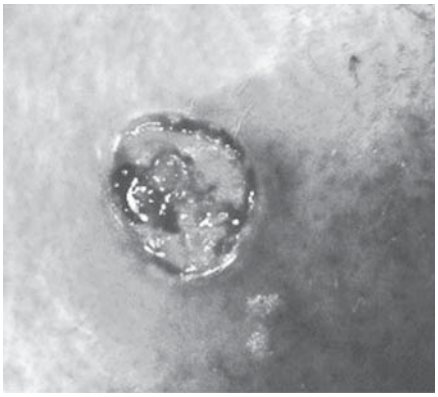
The brown recluse naturally occurs in outdoor situations, living in piles of debris, in closets, behind paneling, utility boxes, rodent bait stations, attics, wood piles, crawl spaces, basements, under bark, logs, and stones. It has adapted quite well to indoor habitats.

Recently the author was in a hotel in central Kentucky and a brown recluse was found on the bed linen in the hotel room.

The brown recluse can be detected by the skins that they shed when they moult. Learning to identify these shed skins will warn you of the presence of this venomous spider.

Habits

The brown recluse spider is a nocturnal spider. It searches for food such as firebrats, cockroaches, crickets, or other soft-bodied species. Lights left on in a building will attract food from outdoors and increase the populations of spiders indoors. Males wander further than females and are the sex most commonly crawling into shoes, trousers, or other clothing. Bites occur when a spider hiding in clothing or bedding is accidentally trapped against the skin.



The venom usually kills the affected tissue and causes skin loss and necrosis or death of the tissue.

The Bite

Also known as the fiddleback or violin spider, the brown recluse can inflict a bite that may not even be felt yet may result in severe skin and tissue damage. The bite may be painless, or it may be of the same degree as the sting of an ant. Usually a localized burning sensation develops and lasts about 30-60 minutes. Over the next eight hours the reddened area enlarges and a pus-filled blister forms in its center. Within 12-24 hours after the bite, systemic reaction may occur, characterized by fever, malaise, stomach cramps, nausea, and vomiting. Removal of the dead tissue may be necessary followed by skin grafting. Normally the site heals in six to eight weeks.

Did you know?
The venom of the black widow spider is fifteen times more powerful than that of the rattlesnake.

When someone suspects a spider bite, they should seek medical attention. The area should be cleansed immediately and attempts to locate the spider for proper identification should be made.

General treatment of spider bites or open sores includes cleaning the wound area with iodine or hydrogen peroxide and then topical application of corticosteroids.

Source: NPMA Pest Management Library, Mallis Handbook of Pest Control, 8th ed.

Did you know?
Hunter wasps catch and paralyze spiders. The mud dauber, or *Thposyloninae*, builds a mud house with many tube-like rooms or cells. With its stinger it paralyzes spiders and puts many in each cell. Eggs are laid on top of the spiders, and when they hatch, the larvae eat most of the spider. The spider remains left behind become food for scavenging *Trogoderma* (Warehouse beetles). These mud dauber mud tunnels should be removed each year to stop this stored product pest from overwintering.

Our experience with ProFume™

by John Mueller

For the past three years we have been working with Dow AgroSciences and their old/new fumigant sulfuryl fluoride. "Old" refers to Vikane®, which is the brand name of sulfuryl fluoride. It has been used in the termite control market since 1960. "New" refers to Dow's introduction of sulfuryl fluoride [SF] to the food processing / grain market under the name ProFume™ fumigant gas. Dow has done an impressive job of analyzing the market, preparation for trials, comprehensive trial execution, submitting labels to EPA and product analysis.

What has FSS done with SF? We have fumigated the same flour mill with SF for three years. With each trial fumigation we have worked with Dow's SF team to develop better fumigation techniques, sealing methods and gas circulation strategies. We worked through many nights with Dow's field research team, their environmental group, environmental analysis contractors, efficacy specialists and Dow has even had the foresight to include their marketing group in these marathon exercises in fumigation exhaustion. We have all learned a great deal.

We learned that the way methyl bromide fumigations have evolved over the years has yielded not "best practice" fumigation procedures but "most convenient" applications—i.e. seal quick, shoot and run to the next fumigation. We have learned that "100% mortality" can be achieved if this is truly your goal, but with some of the ways methyl bromide was used—100% mortality was normally not achieved.

The fear of change—SF is so similar to MB it is scary. Let us compare and contrast:

Sulfuryl fluoride:
- Colorless odorless gas
- PEL of 5 PPM
- Fumiscope for high range monitoring
- Comes in liquid form
- Cylinderized - 125 lb. cylinders
- Deadly to all stages of food storage pests
- Use for temps. above 40° [F]
- Water solubility - low
- Weight verses air - 3.52
- 264 psi in cylinder @ 80° [F]

Methyl Bromide:
- Colorless odorless gas
- PEL of 5 PPM
- Fumiscope for high range monitoring
- Comes in liquid form
- Cylinderized - 50, 100, 175, 200, 1500 lb. cylinders
- Deadly to all stages of food storage pests
- Use for temps. above 40° [F]
- Water solubility - low
- Weight verses air - 3.27
- 150 psi in cylinder

QUOTABLE QUOTE

"The challenge for pheromone manufacturers is to produce lures that release structurally correct synthetic pheromones at the proper concentration and component ratio over a long enough time period, and at sufficient levels, to elicit the desired effect on the target species."

—Tom Phillips

West Nile Virus

by Ray Siegel
Indiana State Chemist Office
Pesticide News

What is all this fuss I've been hearing about West Nile Virus (WNV)? Where does it come from? Is it something I should be concerned about?

West Nile Virus is a type of encephalitis that was originally found in the West Nile province of Uganda in 1937. The disease is transmitted by mosquitoes and is caused by a virus, which attacks the brain, destroys nerve cells and can cause brain inflammation and swelling. In humans the disease usually manifests itself as an unknown infection similar to the flu and is sometimes accompanied by a rash. In a small percentage of the patients, the disease can cause severe or fatal infection.

People have recently been killed in the U.S. by this mosquito carrying disease, mostly on the East coast and Louisiana.

Encephalitis diseases have no known cure; only the symptoms can be treated. Symptoms start occurring in humans 3-14 days after being bitten. Prevention is the best method for controlling these types of diseases. Eliminating breeding sites is one such method. Old tires and other containers that hold water for a week or longer are prime mosquito breeding grounds.

The virus has produced a wide range of morality in various bird species with crows and blue jays being the most susceptible. Dead birds are being collected by county and state health departments throughout the country to test for this new human pathogen.

MEETING CALENDAR:

**	July 22-26, 2002	8th International Working Conference on Stored Product Protection, University of York, Contact Paul Cogan, www.csl.gov.uk
**	July 28- Aug. 1, 2002	Methyl Bromide Alternatives in Flour Mills, GTZ/Proklima, Mauritius
	Aug. 19-23, 2002	6th National Stored Product IPM Training Conference. Manhattan, KS contact: Dr. Subi, bhs@wheat.ksu.edu
**	Sept. 16-19, 2002	Nestlé Purina PetCare Food Safety Symposium, Sedona, AZ, contact Kim Kemp
**	Oct. 16-19, 2002	National Pest Management Assoc., Orlando, FL, Gaylord Palms Hotel, www.pestworld.org
**	Oct. 17, 2002	Minnesota Food Processing Re-certification Program, Minneapolis, Colleen Cannon, 612 625-4798, cacannon@umn.edu
**	Nov. 10-12, 2002	FAOPMA, Yokohama, Japan, faopma@knt-tokyo.gr.jp
**	Nov. 17-20, 2002	Entomological Society of America, Ft. Lauderdale, FL, www.entsoc.org
*	April 8-10, 2003	Fourth National Pest Management Symposium/Workshop, Indianapolis
***	June 3-5, 2003	6th International Fumigants & Pheromones Conference and Workshop, Copenhagen, Denmark, Barb Bass 1-800-992-1991, www.insectltd@aol.com, Lange@Tanaco.dk

The Børsen (Royal Stock Exchange Building and Conference Center)

denotes: *attending **invited speaker ***organizer

MOSQUITO FACTS:

Got Blood?

- Only female mosquitoes of a few species attack human beings and animals.
- There are about 3000 species of mosquitoes; about 150 live in the United States.
- Adult mosquitoes live from a few hours to a few months.
- Some mosquitoes carry germs that cause serious diseases
- They are found all over the world, even in the Artic.
- Most mosquitoes live on plant nectar or rotting material.
- Mosquitoes usually stay within about 2 miles of their breeding grounds.
- Mosquitoes are attracted to the victim's warmth, odor, moisture, and carbon dioxide in the breath.
- The itch is caused by an allergic reaction to the saliva, which causes the wound to swell into a welt.

Source: Earth Sun Moon

NEWSLETTER

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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