Celebrating our 34th Year

Fumigants & Pheromones

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Fall 2014
Routing:

EPA Award Winner
Best of the Best

A Newsletter for the Insect Control & Pest Management Industry, est. 1981

"In 2014 we received more calls about brown recluse spiders than we can ever remember,"

stated Dave Mueller, President of Insects Limited.

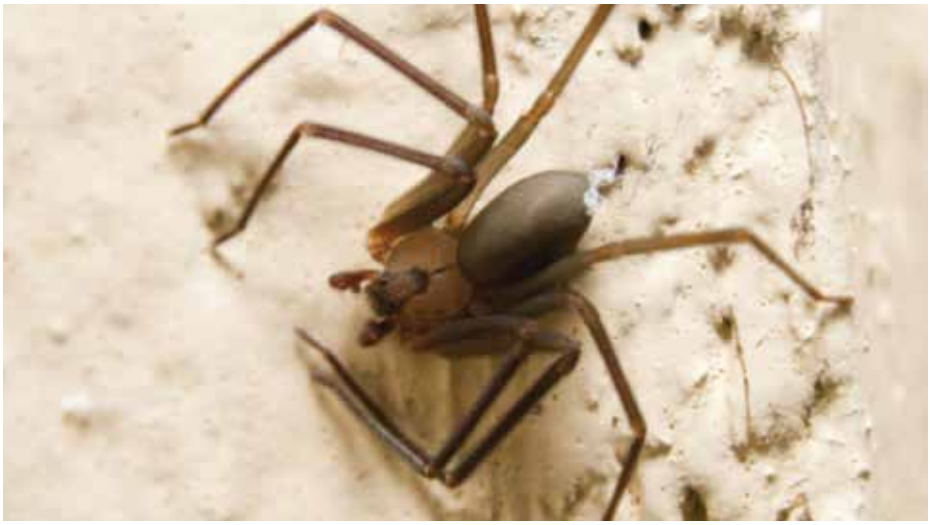


PHOTO: ISTOCK

A Brown Recluse Spider

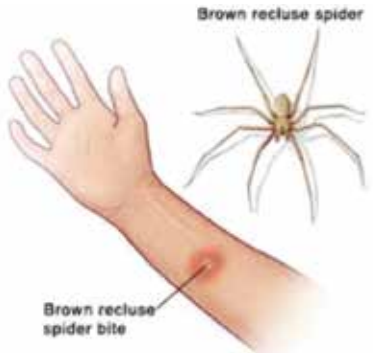
TUSTIN, Michigan – Medical experts are calling it a 'rare death' — a healthy 58-year-old woman has died after being bitten by a brown recluse spider in Central Michigan.

Charles Strickland said his wife Betty Ann came home on Monday, June 30, 2014, after working the afternoon shift at her nursing job. The couple lives in Tustin, a rural area just east of the Manistee National Forest.

Betty Ann showed her husband a bug bite on the top of her right foot. "I looked at it, and it didn't look usual at the time. It wasn't swollen excessively, there was not a lot of redness," he said. But two days later, Strickland could tell something was really wrong with his wife.

"I was helping her down the stairs, she kept telling me how bad her foot hurt," he said. "At that time, she had a great big bump about the size of a marble protruding out of where the bug had bitten her." Strickland said his wife then started having trouble breathing so he called 911.

"While I'm talking to the lady, I'm talking to my wife, trying to figure out what's going on, and my wife couldn't talk. Her eyes were fixed straight ahead and she just couldn't, she was gasping for air but she couldn't get any air, is what it looked like," he said. Strickland said his wife stopped breathing.



"My daughter and I did CPR on my wife for about 40 minutes until the ambulance could get here," he said. "And then they took over and did it for another 20 or 30 minutes, I guess, and that's when they called it and said that my wife had passed away."

The experts said the bite on Betty Ann's foot was from a brown recluse spider and that it was highly unusual.

"Normally when people get bit by a spider, they get bit in a muscle or in a fatty tissue and my wife had been bitten in the blood vessel," Strickland said. "The toxins were just circulating throughout her blood stream and it was infecting

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Bad Bugs...

10 Most Evil Animals

I like those top 10 lists that pop up in the media from time to time. You know – like the Happiest Countries (Denmark #1) and Ten Most Depressed Countries (Moldova #1). The world's fattest nation overall is Nauru, a South Pacific island where 71% of its 10,000 population is obese. But, I'd never thought about the top 10 most evil animals until Time magazine published its list.

At number ten is the **Asian carp**, a nasty native of China, sometimes weighing as much as 100 pounds. When startled, they jump out of the water; attack fisherman and often cause the unfortunate angler broken bones and black eyes.

Next, the **emerald ash borer**, also of Chinese origin, destroys trees by the millions. This iridescent green beetle has a gargoyle's face. Unless the USDA intervenes, they have the potential to be a modern-day plague like the Old Testament locusts in Egypt.

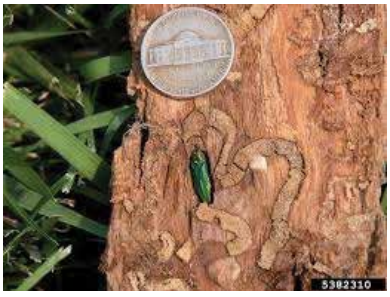


PHOTO: ARINVERSITY.ORG

Emerald ash borer adult and larvae damage.

Eighth place goes to **pandas**. Yes, pandas, that cute, cuddly bear beloved by small children. Again, from China, these deceptively sweet looking critters are lazy, mean-spirited, and prone to abusing their mates and offspring.

I totally agree with number seven. The **tapeworm** invades the liver and digestive systems of other animals, with a preference for humans who unknowingly eat raw undercooked infected meat. They steal food while living happily inside the body without the host even knowing it until there is an unpleasant surprise in the bathroom.

Few people had ever heard of number six until Meryl Streep's 1988 movie "A Cry in the Dark." Based on a true incident, it's the story of an Australian mother falsely imprisoned for killing her baby. Later evidence showed a **dingo** had eaten her 9-month-old. Other reports of dingoes killing children followed.

Fifth place for sheer evil goes to **locusts**. Like number nine, the ash borers, they breed with wild abandon and turn to gang behavior. Aggressive swarms of locusts travel hundreds of miles, devouring entire crops in their wake. Maybe you have read of their infamy in Exodus 10.

At number four is the **tsetse fly**. Fond of human blood, this fast flying African insect transmits the dreaded "sleeping sickness" to its victims. Untreated, the disease is often fatal.

The third most evil creature is the **rat** and its cousin the house mouse. They are disgusting, nasty, disease-spreading relatives. In the 14th century, rats were partially responsible for the Black Death that killed 100 million Europeans over a period of 200 years; one out of three.

Evil creature number two is the **human being**. Hmmmm. I would have rated humans number one most depraved, twisted and malevolent of all God's creations. The Time Magazine article published a gallery of the 50 most evil Americas. Charles Manson is #1, and Scott Peterson is #50. Daily we hear about murderers, child molesters, rapists, war mongers, haters, con artists, and other evil people on this planet. I agree with George Bernard Shaw, who said, ***"Human beings are the only animals of which I am thoroughly and cravenly afraid."***

Drum roll, please.....

The most evil beast in the animal kingdom is the **bedbug**. About the size of an apple seed, they can drink up to three times their body weight in human blood. They've become especially prolific over recent years with infestation reports coming in from all 50 states. New York City, also known for its lesions of rats, had them in almost epidemic proportions last year. In Cincinnati one out of five residents have encountered bedbugs personally. They won't kill you, but when you wake up covered in pink, itchy blotches; you'll probably wish you were dead.

Guest writer: Mary Ready, twice-retired English teacher from Destin, Florida

Dave's Soapbox

...for what it's worth

by David Mueller

Insects, like humans, are looking for a safe place to build their home, multiply, and protect themselves from their enemies.
A food or seed warehouse has hundreds if not thousands of such places at the base of metal racking. Here food and seed accumulates over time and becomes food for moths and beetles. One or two pieces of dog food or bird seed can feed several generations of stored product insects.

It doesn't take spiders long to find these inhabited hiding places. They soon begin spinning delicate webs to trap the insects below. These webs are obvious to the most casual observer. Spider webbing is usually a sign of insect activity. This could be stored product beetles and moths feeding on food that has accumulated in the racking or a misguided cricket that came into the warehouse to flee the approaching cold weather.

Insects accumulate in racking and attract spiders. These fresh spider webs are signs of insects being present.

The insect sleuth should inspect for webbing with a freshly charged bright light to determine if the spider webbing is new or old. New webbing is shiny like a crystal in the sun while old webbing has accumulated dust over time and takes on a dull reflection. With this piece of information, get on your hands and knees and probe the racking for live evidence. Be careful that you don't make a black widow spider or brown recluse mad in your search.

We might think of ourselves as pretty good hunters or inspectors, but when survival depends on finding a prey the spider world is king. They catch insects for survival. Using these spiders and their webbing as key inspection sights will save you much labor and time in the search of a large space for tiny pests.

The solution to these hundreds of potential harborage sights is three-fold:

1. **Select racking that does have void spaces for food to accumulate.**
2. **Vacuum the racking periodically.**
3. **Spray the racking with an approved residual pesticide.**

We think like humans when we walk through a structure to hunt for pests. We are five to six feet tall with a tendency to look for objects that are big and moving. We need to think small and determine the locations that insects prefer to hide from their enemies. Humans are really not the pests' enemy. Insects are hiding from predatory wasps that sting them and their eggs and eventually kill them. Many pests are nocturnal.

To hide from their enemy, some have learned to hide in cracks and crevices and others have learned to reproduce hundreds of offspring to ensure survival of the fittest.

The next time you walk into a warehouse full of racking that organizes food and seed, think small and use the spiders to your advantage. They have expelled their energy to produce a web in that spot for a reason.

Brown Recluse

continued from page 1

everything, all her organs, and he said it actually shut her whole system down, and that's what killed her."

According to the University of Michigan Health System, brown recluse spiders are found most often in the south-central part of the United States and live in hot, dry, abandoned areas, such as wood or rock piles. The spiders are about 0.5 inches long with a dark violin-shaped mark on the combined head and midsection. According to experts, the brown recluse spider is not indigenous to Michigan.

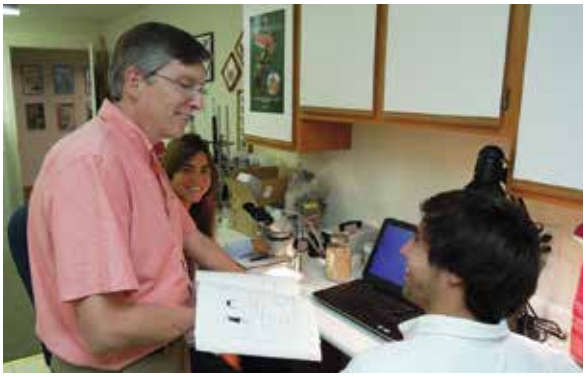
Symptoms from a brown recluse spider bite include reddened skin with a blister that forms on the bite site, mild to intense pain and itching, according to U-M. A week or so following the bite, an open sore will form with a breakdown of tissue, which could take months to heal. Some people have more severe symptoms, such as fever and chills, a skin rash, nausea or vomiting, and joint pain.

Treatment depends on the severity of the bite. Options range from a cold compress to antibiotics and pain medication.

Personal Training

Many times we have all sat through multiple days of continued education programs that have not focused on our particular needs for improving our in-house programs. If you have a new employee who needs personalized training in stored product protection, Insects Limited conducts one-on-one and small group tailored training for stored product protection. Alain Van Ryckeghem, Board Certified Entomologists, technical director, former professor, and board certified stored product entomologist, arranges 1 to 4 day personalized training that includes a wide range of topics to better prepare you to manage your pest problems. Pete Swords of Insects Limited offers one-on-one training for fumigant scrubbers. This includes a full day in the classroom and one day in the field working with this new fumigant destruction technology. David Mueller and Pat Kelley, Board Certified Entomologists, offer one-on-one pheromone training and (museum pest management). This includes basic pheromone set up, reports, bar coding, mating destruction, and (museum pest management). If you wish to become a certified USDA export fumigator or ISPM-15 wood packaging material fumigator, FSS has personnel to show you what it takes to meet these standards.

If you are interested in improving a skill in pest management and would like a tailored program that will address your particular needs, call **1-800-992-1991** or email **Insecthelp@insectslimited.com.**



Florencia and Sebastien Barrutia, from Argentina, recently spent two days receiving personalized training with Alain VanRyckeghem.

Phosphine Resistance Testing

by Ethan Estabrook

Phosphine gas is a widely used fumigant used to protect stored commodity from insect damage. After 60 years of use and misuse, evidence of insect resistance to phosphine is showing up in many parts of the world. It is believed that ineffective fumigations from low gas concentrations are the driving force that contributes to phosphine resistance. Recent studies have shown that phosphine resistance has increased in both frequency and strength of resistance. Now the use of phosphine is threatened by the development of insect resistance.

Current research is working to identify and understand the extent of phosphine resistance. Knowing the species of insect and its level of resistance can give us a better understanding of the extent of insect infestation and allow managers to make more effective and efficient fumigation decisions.

Ethan Estabrook, Michigan Regional Manager, performing phosphine resistance testing.

Outlined are three methods to test for phosphine resistance in insects. Each method requires a different number of sample insects, exposure periods and phosphine concentration.

Screening of Phosphine Resistance

The resistance kit by Detia Degesch can be used out in the field by managers or fumigators to do a quick test to determine if insects have the presence of phosphine resistance. They then can take the recommended actions before fumigating.

- 20 insects
- 3000 – 8000 ppm
- 8 – 15 minute exposure

Frequency of Phosphine Resistance

Testing for the frequency of resistance identifies the presence or absence of phosphine resistance. The frequency of resistance is determined by the number of insects who survive a period of phosphine exposure. Insect populations that have about ≥ 80% survival are considered to have high frequencies of phosphine resistance and should be tested in a level of phosphine resistance study.

- 200 insects
- 20 – 50 ppm
- 20 hour exposure
- Sampled insects vs non-resistant insects (USDA sample)

Level of Phosphine Resistance

Testing for the level of resistance identifies the concentration of phosphine gas required to kill resistant insects. This will give managers and fumigators the information needed to determine if a higher concentration of phosphine gas is needed or if an alternative fumigant should be used to eradicate insects.

- 500 insects
- Range from 20 - 1000 ppm
- 72 hour exposure
- Sample insects vs non-resistant insects (USDA sample)

When phosphine resistance insects are found some management strategies to eradicate resistant insects include:

1. **Better fumigation practices** (better sealing, monitoring, ability to add gas, pressure testing)
2. **Increase phosphine dosage rates**
3. **Use of alternative chemicals** (alternative fumigants, combination of grain protectants)
4. **Sanitation** (clean transfer equipment, clean bins before and after use, cool grain to minimize insect activity and populations)
5. **Continue using phosphine** with a plan and strategy to manage phosphine resistance (test for resistance, monitor insect activity)

Phosphine fumigants are effective when used correctly. They are inexpensive, easy to apply, effective with a wide range of pest species, and have a broad acceptance as a residue free treatment. It is necessary to do regular testing of phosphine resistance in insects to ensure the sustainability and use of phosphine fumigants.

Good Bugs

by Pat Kelley
Entomologist

Silk producing moth, Bombyx mori; bees wax from honey bees

Nearly every issue of the *Fumigants and Pheromones* Newsletter has a piece about "Bad Bugs". This edition focuses on brown recluse spiders and how they can cause pain and suffering. Writing about bad bugs usually takes priority in this newsletter, since it is the bad bugs that cause destruction of our food and property, cause death and disease as well as psychological distress.

Green Tree Ant used by Aboriginal tribes to cure headaches; honeybee stings used as a treatment for arthritis

For one time, let's look at the flip-side of the coin. There are a whole lot of "Good Bugs" out there that can supply us with enjoyment, better health and a better quality of life. Let's take this moment to focus on the good bugs and look at all they do for us.

Beauty and Art: Many bugs have evolved into what we humans perceive as great beauty. This has lots to do with bright coloration and reflection of light. They look so appealing to us that we often use them to create works of art.

Spilopyra sumptuosa, a Chrysomelid beetle in Australia; the European Peacock Butterfly

Pollination and Food: Insects perform a double duty in supplying mankind with food resources.

1. Bees, butterflies and some species of flies spread the pollen from crops, flowers and other plants which allows the plants to reproduce and thrive in nature.

2. In some cultures, the insects themselves are a food resource.

Natural Products: Insects directly supply us with natural resources that we use to make valuable products for use in our daily lives.

Medicinal Properties: Insects have proven to cure ailments and heal wounds.

Sanitation: If it weren't for the insects speeding up the degradation process, our world would be scattered with dead plants, animals and our own trash.

Welcome Tom Mueller

Insects Limited, Inc. is pleased to announce the addition of Tom Mueller. Tom brings 5 years of business sales experience in BioMed and technically focused industries.

Tom graduated from Ball State University in 2009 where he received a degree in sports administration with a minor in sales and marketing. He was the captain and a pitcher for the Ball State University baseball team. He is married to Dana Mueller. Tom enjoys hunting, Cross Fit, and continues to play baseball.

The son of Dave and Mary Beth Mueller, founders of Insects Limited, Inc., Tom has been exposed to and involved in various aspects of the stored product pest management industry. Tom's involvement will include working in sales and marketing with the GreenWay residential line, the F.A.S.T. Fumigant Scrubbers, as well as various other Insects Limited products and projects. Dave Mueller stated, ***"It is exciting to have Tom join our company. He is a very good salesman; every company needs good salesmen."***

Deer skull being cleaned by insects; ants carrying away a piece of food.

So the next time that mosquito takes a bite out of you and you find yourself cursing at bugs in general, remember that there are also a whole lot of good things that these guys do for us as well. It might make that mosquito bite itch just a little bit less!

Recommended Trap Types for Stored Product Insects

Common Name	Scientific Name	Pheromone Type	Recommended Spacing (m)	Recommended Trap Types: Diamond Trap	Wing Trap	Delta Trap	Open Flat Sticky Trap	Covered Flat Sticky Trap	Bucket Funnel Trap	Light Trap	Pitfall Trap	Surface Grain Probe	Deep Grain Probe	Trap Placement
Almond moth Indianmeal moth Mediterranean flour moth Tobacco moth Raisin moth	*Ephestia (Cadra) cautella* *Plodia interpunctella* *Ephestia kuehniella* *Ephestia elutella* *Ephestia figulilella*	Fem sex	5 – 15 m	✓	✓	✓	✓	✓	✓					Floor, Shelf, Eye Level
Angoumois grain moth	*Sitotroga cerealella*	Fem sex	5 – 15 m	✓		✓		✓						Floor, Shelf, Eye Level
Webbing Clothes moth	*Tineola bisselliella*	Fem sex	2 – 5 m	✓		✓	✓	✓						Floor, Shelf
Case-making Clothes moth	*Tinea pellionella*	Fem sex	2 – 5 m	✓		✓	✓	✓						Floor, Shelf
Black carpet beetles	*Attagenus* spp	Fem sex	2 – 7 m	✓		✓	✓							Floor, Shelf
Cigarette beetle	*Lasioderma serricorne*	Fem sex	5 – 15 m	✓		✓		✓		✓	✓			Floor, Shelf, Eye Level
Confused flour beetle Red flour beetle	*Tribolium confusum* *Tribolium castaneum*	Male agg.	2 – 5 m					✓			✓			Floor, Shelf
Drugstore beetle	*Stegobium paniceum*	Fem sex	5 – 10 m	✓				✓		✓				Floor, Shelf, Eye Level
Furniture beetle *Currently not available*	*Anobium punctatum*	Fem sex	5 – 10 m	✓				✓						Floor, Shelf, Eye Level
Granary weevil	*Sitophilus granaries*	Male agg.	2 – 5 m								✓	✓	✓	Shelf, Floor, Grain
Khapra beetle	*Trogoderma granarium*	Fem sex	5 – 15 m					✓			✓			Floor, Shelf, Eye Level
Larger grain borer	*Prostephanus truncatus*	Male agg.	5 – 15 m	✓							✓	✓	✓	Shelf, Eye Level, Grain
Lesser grain borer	*Rhyzopertha dominica*	Male agg.	5 – 15 m	✓							✓	✓	✓	Shelf, Eye Level, Grain
Rice weevil Maize weevil	*Sitophilus oryzae* *Sitophilus zeamais*	Male agg.	2 – 5 m								✓	✓	✓	Shelf, Floor, Grain
Merchant Grain beetle Saw-toothed Grain beetle	*Oryzaephilus mercator* *Oryzaephilus surinamensis*	Food attractant only	2 – 7m								✓	✓		Shelf, Floor, Grain
Varied carpet beetle	*Anthrenus verbasci*	Fem sex	2 – 7 m	✓				✓		✓				Floor, Shelf
Warehouse beetle	*Trogoderma variabile*	Fem sex	5 – 15 m	✓		✓	✓	✓		✓				Floor, Shelf, Eye Level

How to use this chart: Go down the left hand column and find the pest insect. Then cross the page and find useful information about that insect's pheromone, trap spacing, recommended type of trap and placement. This chart was created by Alain VanRyckeghem, Technical Director for his chapter on Pheromones in the Mallis Handbook of Pest Control.

CLIP & SAVE

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: Peggy Rutkowski, Fumigation Service & Supply, Inc., 16950 Westfield Park Rd., Westfield, IN 46074 USA.

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CALENDAR OF EVENTS

** October 21-24; National Pest Management Association, Orlando, FL
** November 4-6; Methyl Bromide Alternatives Outreach (MBAO), Orlando, FL
* November 4-6; Agriculture and Business Assoc. of KY (ABAK), Louisville, KY
** November 22-26; International Stored Product Working Group, Chiang Mei, Thailand
** January 12-14, 2015; 79th Annual Purdue Pest Management Conference, W. Lafayette, IN
*** January 15; Advanced Pest Management, Stoy Hedges, BCE, Westfield, IN
*** January 15-16; ACE and BCE Certification Training, Allison Tailey, BCE, Westfield, IN
** TBA; Norwegian Pest Control Association
** TBA; Tobacco Pest Management Training, Harare, Zimbabwe
*** SAVE THE DATE! March 6-9, 2016;

12th Fumigants & Pheromones Conference; Adelaide, Australia

* attending
^ exhibiting
** invited speaker
*** organizer