

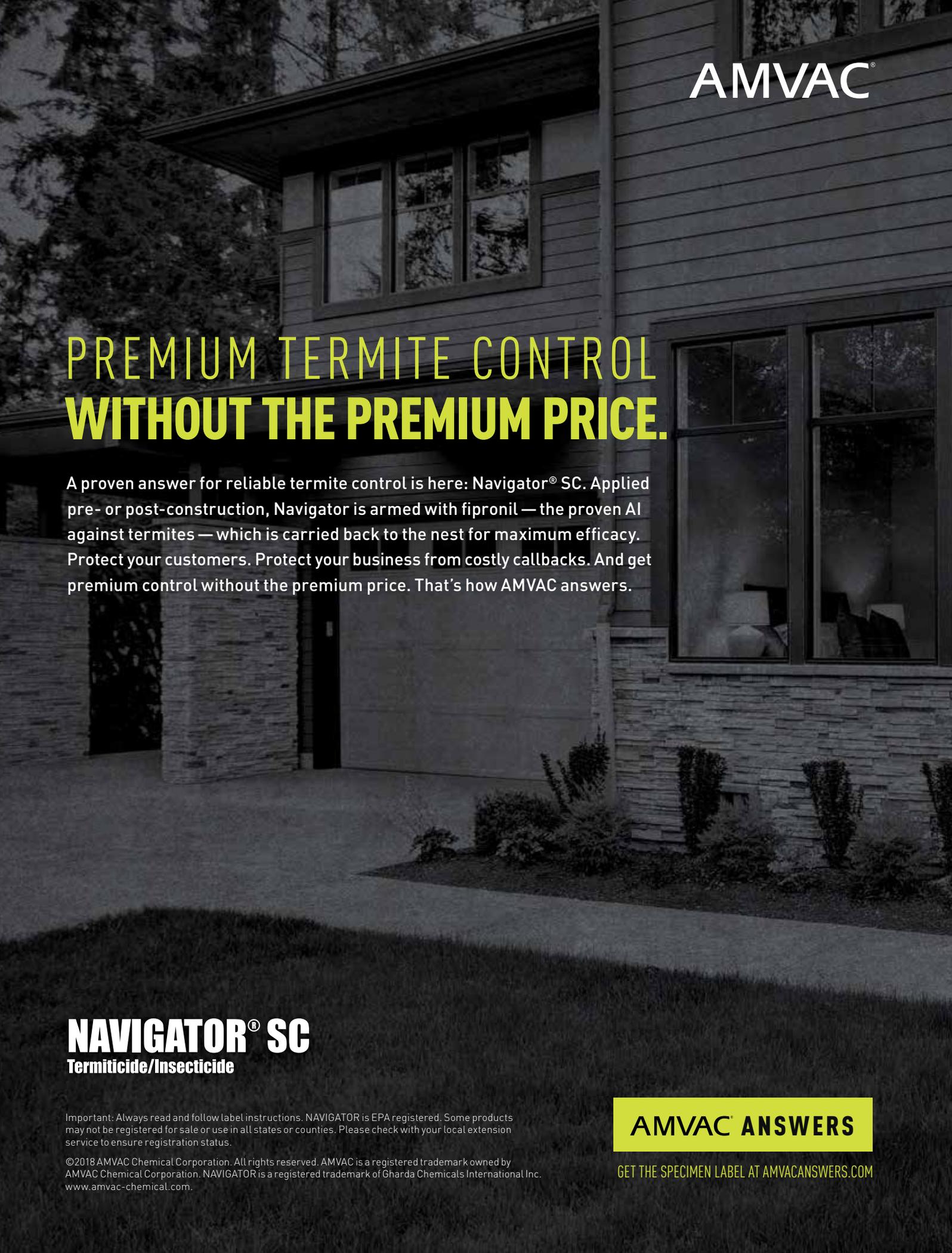
# Scuttle Fly: A Case Study

# PESTPRO

From Pest Management Education, Inc. to Landscape and Pest Managers

# German Cockroach: The No. 1 Pest





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## ON THE COVER

All stages of German cockroaches, egg to adult, aggregate in colony at the UF Urban Entomology Lab. Understand the behavior and effective management techniques of this common pest, and you can shut them down like a pro.

Photo by Jane Medley



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# Looking Back, Moving Forward

## Message from the President of FPMA

Eric Hoffer

**A**S I WAS thinking of all that happened in 2019 and what a year it had been, someone brought to my attention that it was also the end of the decade. Looking back on a year is not too hard to do, but when you think of a decade — wow!

There is so much to be thankful for, and so much I have learned. I will focus on the past year of 2019 for this article and, more importantly, because it was my year as president of FPMA.

Let me start by saying that the past three to four years have helped make this year of presidency one of the best ones I could have possibly asked for. It's easy to say that I stand on the shoulders of giants as I lead this association. Past presidents, hard work and sacrifice have made it possible for me to be as successful as I have been this year.

Most importantly, they worked to find a solid executive vice president that works so hard and passionately for us. Leslie and her leadership are one of the main reasons we were able to accomplish so much this year in such a tactical way.

While there were many great events and projects that we tackled this year at FPMA, I would say one of the most needed and laborious was the new website and association management software. Leslie and her team were able to make this project almost seem easy. Unfortunately, we have changed association management software many



times before. I truly feel that this change was one of the most thought-out for not only our current needs but also our needs as we continue to scale this association into greater numbers.

Our association is in a better financial position than it has been in a very long time. We have a growing membership despite breaking away from the National Pest Management Association in late 2018.

We have put a larger focus on business training and development and have looked to partner with other industry resources on the technical training aspect. We have a great set of leaders in line to continue to focus and provide direction going forward.

**MOST IMPORTANTLY**, we have a dedicated membership that continues to renew year after year in record numbers. To these members, the idea of a well organized collaborative group of like-minded business people is critical to ensuring that our businesses can thrive year after year in this great state of Florida.

This year has been great for me. I am very fortunate to have worked with everyone I have had the honor of serving with. I can easily say I have gotten so much more out of my time volunteering for this association than the time I have had to put into it.

I look forward to what lies ahead and seeing what others can accomplish for this great industry and association. I certainly plan on staying active, not only to offer my help, but because I have so much more to learn from all our great members. I look forward to seeing everyone around at our great events. Thank you all. **PP**

*Eric Hoffer*  
President, FPMA

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# Make the Florida Pest Management Industry Greater!

THE PEST management industry in Florida has never fallen into disarray, so we would be wrong to call for a movement to make it *great again*. But we certainly can work to make the pest management industry in Florida even *greater* and *better*.

Pest management in Florida has always been among the best in the world. However, there are people who are chasing that greatness and, if we are not aware and striving to be better, people elsewhere may surpass us.

Of course, who is judging the best in pest management? And what is happening to make the industry better and greater?

## PEST MANAGEMENT INDUSTRY REVENUES IN FLORIDA

I guess one way to judge greatness is to look at how much revenue the industry generates. We at *PestPro* started asking that question and started with the *Pest Control Technology* list of 100 largest pest control companies in the United States. Florida is always well represented on that list, which is compiled by Gary Curl in Jacksonville, Florida.

We talked with Gary about the situation and concluded it is hard to judge how big Florida revenue is because some companies operate in more than one state. A company in Georgia, for instance, may have significant revenues in Florida. Also, some companies in Florida may have revenues in Georgia. It is really hard to figure out those revenues that come strictly from Florida.

Another factor in calculating revenues for the industry is that lawn and ornamental pest management revenues are excluded in these calculations. This is because lawn maintenance and lawn pest care are often intermingled. So, all the data that is calculated for pest control can be expanded by probably 20 to 40 percent to account for L&O work.



FPMA IS TAKING ON THE TASK OF getting a number on the pest management revenues for the state of Florida. My guess would be that pest management in Florida is probably 16 percent of the total U.S. market. That would amount to more than \$2 billion dollars a year in revenues. If that number is close to reality, then the urban pest management industry is worth more than two times the on-farm revenues of the citrus industries in Florida.

According to a new report on the global pest control market published by KBV Research, the global pest control market size is expected to reach \$26.3 billion by 2025.

## WHAT ABOUT URBAN PEST RESEARCH IN FLORIDA?

Do you realize that there are many state programs paid by tax dollars in Florida to improve the citrus industry? The state of Florida appropriates funds from taxes to fund research programs through FDACS specifically for citrus. The University of Florida receives some of those funds to do the research to improve the citrus industry. The University probably has many more researchers working on citrus than researchers who work to improve the urban pest management industry.

Let's look at this a different way. The urban pest management industry is paying taxes to the state. Those taxes are being used to improve other industries, like citrus, but

not to improve the industry that paid the taxes.

The legislature appropriates funds dedicated to research for many industries in Florida besides citrus. The way the industries get those funds is through lobbying. Industries that have great lobbying efforts get funds to improve their industries.

Lobbying efforts in recent years have been for improvement of FDACS enforcement of regulations. That is important, but funding for pest management research has not been a huge priority in the past.

Regulations overseeing pest management in Florida were initially to prevent pest control companies from up north to do business in Florida. What was happening in the 1940s was that pest control operators in New York, for instance, would come to Florida and sell contracts. When summer came along, those operators would return to New York and leave their Florida customers with worthless service. So, pest control regulations in Florida prevented that from happening.

Recently, we have seen a degradation of that protectionism, which was mainly to protect Florida consumers. Some Florida pest control companies are now a segment of national and even international companies. When these companies operate in Florida, they should also support and lobby for research to improve Florida pest control industries.

## TIME TO IMPROVE URBAN PEST INDUSTRY THROUGH RESEARCH

As for the idea of draining the swamp, there is nothing wrong with the concept that a portion of Florida taxes paid by the pest control industry should be used to improve the industry through research. It makes sense to us. Does it also make sense to you? **PP**

— Dr. Philip Koehler,  
Managing Director, *PestPro*

# German Cockroach: The No. 1 Pest

Philip Koehler and Roberto Pereira

**I**T IS the most important urban pest in the United States and has been the No. 1 urban pest for decades. *PestPro* takes an in-depth look at the German cockroach, a pest that has evolved to survive almost anything. Learn to “think like a cockroach,” and effectively manage these pervasive insects.

## **German Cockroach Damage to Humans**

German cockroaches cause psychopathology, mechanical damage, allergies, asthma, transmission of pathogens, and closure of businesses.

From the standpoint of psychopathology, people react badly to German cockroaches with just the thought of cockroaches, the sight of cockroaches, contact with surfaces where cockroaches occurred and, most importantly, contact with cockroaches.

German cockroaches can cause mechanical damage to

people and items in residences. They can gnaw on calluses of hands and feet. They are also known to chew off eyelashes and eyebrows of people. In cases of really heavy infestations, they can chew into human skin and cause lesions.

When German cockroaches are numerous, they cause fecal staining of surfaces throughout structures and leave a cockroach odor in rooms. They are known to consume fabric that is stored, especially starched cloth. In some cases, they will consume fabric soiled with human sweat and oils, completely ruining clothing.

Human health can be severely affected by German cockroaches. Blg 1 is a protein excreted by cockroaches that causes allergic reactions in some people. In fact, 63 percent of homes in the United States contain cockroach allergens, but that number is much higher in urban areas, where 78 to 98 percent of homes have been found to have Blg 1 in bedrooms and kitchens.



**GERMAN  
COCKROACH**



GERMAN COCKROACHES may trigger allergies through their saliva, feces and shed skins. They cause asthma and allergies, especially when cockroach allergens are inhaled, resulting in coughing, sneezing and wheezing.

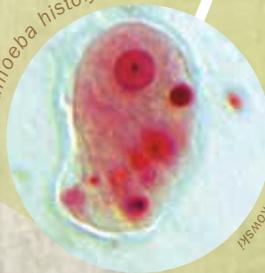
Cockroaches are very mobile and easily move from drains, garbage and sewers. They are known to feed on human feces and human food. They then mechanically move pathogens from filth to food through their great mobility.

Some of the pathogens found associated with German cockroach infestations are food poisoning bacteria (salmonella, *E. coli*, campylobacter, listeria), a fungus (aspergillus), helminths (ascaris, necator, trichuris), a protozoan (*Entamoeba histolytica*), and viruses (hepatitis, poliomyelitis). Therefore, cockroaches are extremely important by adversely affecting human health.

*Continued on Page 11*

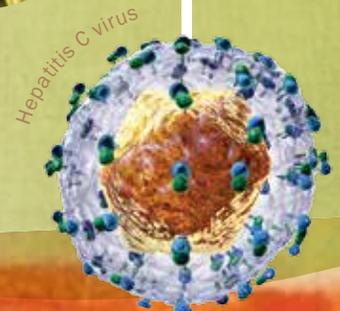


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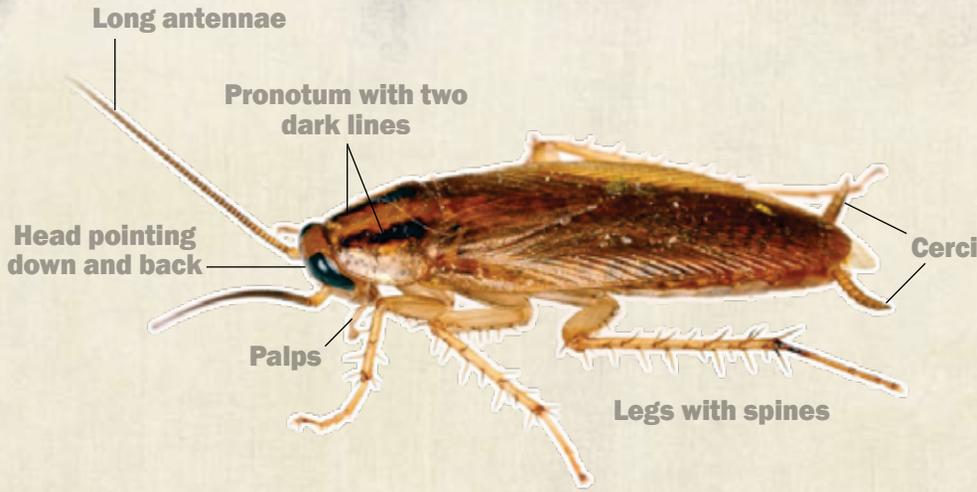
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Above: Features of a German cockroach. Upper right: Female German cockroach with egg capsule visible. Lower right: German cockroach harboring in a crevice, displaying thigmotropic behavior.

*German Cockroach, continued from page 9*

**Biology and Behavior**

The female German cockroach lays its eggs in an egg capsule and carries it for about a month until it is about ready to hatch. About 30 nymphs emerge from a single egg capsule and go through five or more nymphal stages to become the adult stage.

About 80 percent of a given cockroach population is in the nymphal stage, and about 20 percent are adults. Development from egg to adult takes about three to four months in typical infestations.

Cockroaches are thigmotropic. That means cockroaches prefer to harbor in cracks where both top and bottom of a crack are against a surface. This behavior is usually with antennae outside the crack to detect movement in front of them, and cerci inside the crack to detect danger from behind.

They also tend to aggregate, with all stages together. Their feces contain aggregation pheromone, which is an indication for cockroaches that the place is a good location for food, water and harborage. The aggregation is important for cockroach survival because it maintains a high humidity and

also permits the sharing of gut bacteria, which are important for food utilization.

Another important behavior is coprophagy, which is the consumption of feces. Newly hatched nymphs need feces to obtain bacteria from adults for food digestion. Adults tend young to provide nutrients and bacteria, and that coprophagy speeds nymphal development times. Baits are effective for cockroaches because they can cause secondary kill by coprophagy.

**Managing German Cockroaches**

A German cockroach IPM program incorporates several different strategies that work together to eliminate an infestation.

This starts with prevention. Cockroaches can enter a house or restaurant kitchen on infested supplies, storage containers, and boxes and pallets.

In addition to prevention, cultural controls and sanitation help with any management program. So if you “think like a cockroach,” removing food, water and harborage is extremely important.

Physical or mechanical control is sometimes overlooked. It can be as simple as vacuuming cockroaches from harborages. Of course, a HEPA-filter vacuum is needed for this type of effort.

Biological control is not really a good option for German cockroach control. The most important biological controls for cockroaches are egg parasitoid wasps. German cockroaches avoid egg parasitoid wasps by carrying the egg capsule until nymphal hatch.

Finally, chemical control can include the use of insecticidal dusts, baits, residual sprays, or contact sprays (aerosol fogs).

CUSTOMERS CAN HELP with the German cockroach IPM program. Cockroaches need food, water and harborage in order to survive. It is important that your customers cooperate and do their best to remove these three resources that allow German cockroach populations to thrive.

Most importantly, there are four customer-controlled factors that determine the success of your control operations. These are access for treatment placement, disturbance of your treatments, cleaning and removing your treatments, and contamination of baits.

*Continued on Page 14*



# SCUTTLE FLY: A Case Study

Joseph DiClaro, Matthew Lehnert, Mark Mitola,  
Roberto Pereira, and Philip Koehler



## ONE fly-infested snake

Late-instar scuttle fly larvae were found near the right eye of a live, captive-reared western hognose snake.

More than three months later, a postmortem look inside the snake's skull revealed decay in the infected eye, the optic nerve, and the brain case. These factors likely contributed to the death of this snake.

This case study further demonstrates the opportunistic behavior of the scuttle fly.



*M. scalaris* on sticky card by Whitney Cranshaw, Colorado State Univ.

THE scuttle fly, *Megaselia scalaris*, is known to breed in a wide range of decaying organic matter, and is often observed near dirty floor drains and in mausoleums. Widely considered a pest of annoyance, the scuttle fly is also associated with facultative myiasis — larvae invade vertebrate tissue.

The scuttle fly is known to cause human myiasis, with scuttle fly maggots eating human flesh. There are even cases of lung myiasis, where the eggs of scuttle flies have been inhaled and hatched, and the maggots infest lung tissue.

Although there are reported cases of reptile myiasis, there are only a few reports of myiasis in snakes, particularly corn snake, *Elaphe guttata*, in eggs. The objective of this case study was to report ocular myiasis caused by scuttle fly on a western hognose snake, *Heterodon nasicus*.

### The snake in the lab

A snake-breeding facility in Archer, Florida, contacted the senior author regarding a captive-reared female western hognose snake with larvae on its right eye. The facility staff noted that the snake previously had an open wound on its head, most likely caused by a bite from its mate,

and maggots were observed a couple of days later. The snake was observed over a period of 99 days.

Initially, exposed larvae were removed from the snake's head, and the snake was placed into a large plastic box (58 × 43 × 26 cm) fitted with a screened lid. The habitat contained pine bedding and a water container. The snake was force-fed one pinkie rat purchased from a local reptile store every two weeks. Larvae developed in the snake habitat to adults, and were then identified. The hognose snake was kept in this habitat and monitored until death. It was then stored in a -20°C freezer for two weeks before dissection.

The dead snake's head was dissected to determine the extent of tissue damage caused by the larvae using standard dissecting tools. The dorsal cranial bones were removed by cutting across the frontal bones near the prefrontal region of the undamaged left eye toward the damaged right eye.

Two additional posterior cuts were made, each along the distal sides of the parietal bone. A final cut was made across the posterior end of the parietal that connected the two distal cuts, and the dorsal cranial bones were removed.

## Observing the snake

The first examination revealed no obvious puncture wounds on the snake's head or in the mouth. However, there was discoloration and swelling on the right side of the snake's head. Five days later, the right eye protruded from the head, and a large number of late instar scuttle fly larvae were observed in the snake's right eye socket.

Twenty-two days later, the snake's head had crusted over with unsloughed skin. When the excess skin was removed, about 250 late-instar larvae were exposed. Removal of the old skin revealed an empty right-eye socket, but the left eye appeared functional. The snake laid a clutch of three eggs two days later.

Thirty-four days after the snake was first observed, 33 adult flies were collected from the snake habitat and identified as scuttle flies. Four more were collected a few days later.

Empty pupal cases were observed in the bedding of the snake habitat. Both eye sockets were continuously being covered by unsloughed skin. The snake was no longer flicking its tongue and had become less active, and died 65 days later.

The dissection revealed extensive tissue damage on the right side of the head, including extensive degradation of the optic nerve. There was little or no damage on the left side of the snake's head. Damage on the right side extended from the initial wound site near the eye to the basioccipital bone.

## Final observations

It is likely that the death of this snake was associated with the degradation of tissue of the eye, brain, and the surrounding muscle tissue caused by the scuttle fly infestation. Tissue damage was observed from the initial bite region (near the right eye) to the brain (damage on

right side of basioccipital bone), and the right eye was apparently completely consumed by scuttle fly larvae. If brain damage was severe, it could have led to other physiological complications, resulting in the shutdown of necessary life processes.

Given the area of infection on the snake, the vomeronasal organ (i.e., Jacobson's organ) may have been affected by the myiasis. Although the mouth was inspected and revealed no damage to the tongue or the vomeronasal duct, the extensive damage inside the snake's head may have severed the vomeronasal nerve or impacted its ability to function properly because of swelling, which could explain why the snake was no longer flicking its tongue. In addition, if brain damage occurred, it may have impacted the ability to interpret information sent from the vomeronasal organ, such as location of food and water.

To our knowledge, this is the first reported case of ocular myiasis on a snake. Scuttle fly is commonly associated with myiasis in other vertebrates, including reports of human infestations. This case study contributes to our understanding of the spectrum of scuttle fly larval habitats and the robust opportunistic behavior of this species. **PP**

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Adapted from *Journal of Medical Entomology*, Volume 48, Issue 4, July 1, 2011, Pages 934–936, <https://doi.org/10.1603/ME11006>

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*Joseph Diclaro and Matthew Lehnert are former Graduate Assistants, Mark Mitola is Lab Technician II, Roberto Pereira is Research Scientist, and Philip Koehler is Endowed Professor at UF/IFAS Entomology and Nematology Department.*

# SCUTTLE FLY PHORID FLY



Whatever you call it, *Megaselia scalaris* is a particularly troublesome phorid fly species. The larvae are unique in that they feed on a

wide range of organic material. Its flexible diet makes this fly not only a pest but also of medical and forensic importance.

Adult phorid flies are tiny and humpbacked. Phorid flies display a sporadic “run-stop-run” behavior that can be used for initial identification. The flies run on a surface, stop, then continue running in this sequence repeatedly. This behavior is why they are commonly referred to as “scuttle flies.”

Adult flies are perceived as nuisance pests in the urban setting. They are usually associated with sanitation issues such as clogged drains, backed up sewer lines, or broken pipes. They can also be found around garbage indoors that hasn't been taken out recently. These are all perfect environments for the larvae to feed on moist, decaying organic matter.

The larvae can become very opportunistic to anything decaying, including human and animal tissues. Bodily discharges from open, infected wounds can attract female adult flies looking for a place to lay their eggs. After the female flies lay their eggs on a wound, it is only a matter of time before the eggs hatch and the larvae start feeding on the decaying tissues.

While there are few cases of open-wound infestations in the United States, it is likely that most occurrences go unreported. Besides feeding on the living, phorid flies have been found on decomposing bodies. In the United States, phorid flies are usually present late in the decomposition process. When a body is in an enclosed or tightly sealed space it is usually heavily infested with phorid flies, in place of the typical blow flies. The presence of phorid flies indoors could indicate the presence of a hidden animal carcass indoors.

Given their association with filth and decay, phorid flies can be controlled in the urban setting primarily by cleaning up food sources that are available to the larvae. It may be necessary to clean clogged drains and fix broken pipes that could be contributing to organic material and moisture accumulation.

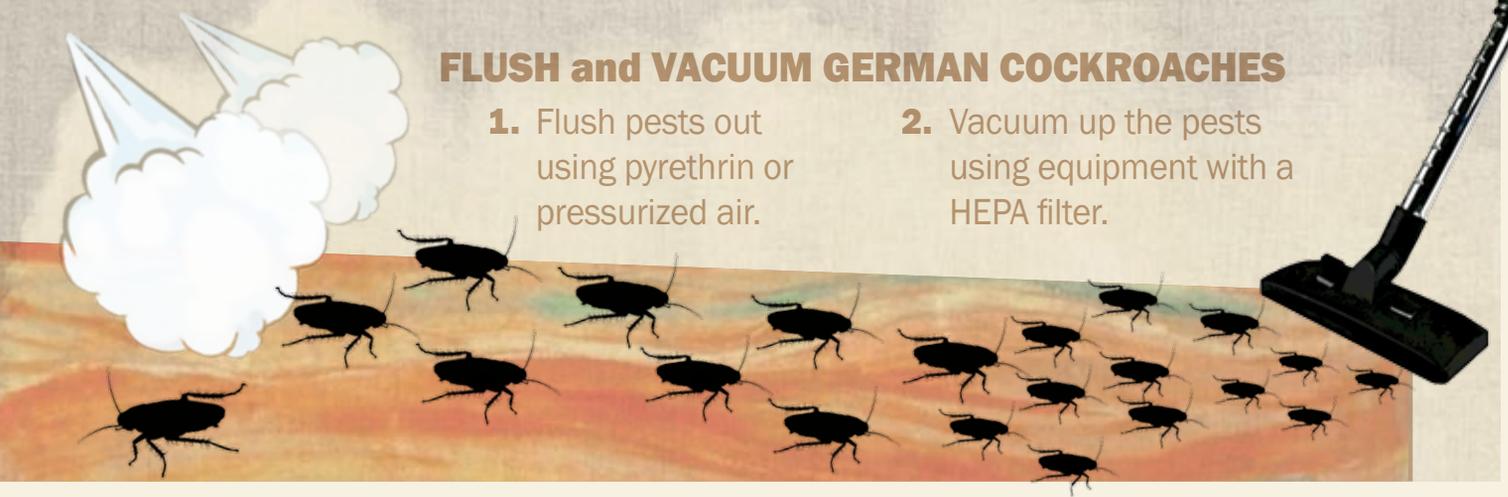
Drains can be monitored for phorid breeding sites by placing clear packing tape over drain openings. Recently emerged adults will fly out of the drains and get caught on the sticky adhesive of the packing tape. Adult phorid flies can also be monitored using insect light traps.

In an effort to relieve fly activity while sanitation measures are being planned, fly spot bait can be used to treat for adult flies and insect growth regulators (IGR) can be used in habitats such as sewer injection pits or septic tanks to help manage the larval stage of these flies.

— Benjamin Hottel, Florida A&M University

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*German Cockroach, continued from Page 11*

**A** VERY IMPORTANT part of a German cockroach IPM program is the removal of German cockroaches from the facility. The program is not just spraying, but physically removing them by flushing and vacuuming cockroaches. Vacuuming and flushing roaches is going to remove German cockroaches from a location. At the same time, it's going to remove shed skins and feces. This debris can trigger asthmatic attacks in children and sensitive people of all ages. The cockroach debris may also trigger allergic reactions in some individuals. The proteins causing the allergic reactions are shed skins, feces and even the German cockroaches themselves.

Do not use a vacuum that does not have a HEPA filter. Vacuums without a HEPA filter will blow the cockroach debris everywhere. That means their shed skins are going to be blown through the room and possibly cause an allergic reaction. A HEPA filter is going to remove all cockroach debris from the vacuum's exhaust air and, therefore, you're going to be able to prevent allergic reactions. Remember, if cockroach particles are blown out into the air, they are going to fall on all surfaces in the room, and perhaps even in surrounding rooms as well.

Flushing is done with chemicals or pressurized air to move cockroaches out from the harborages so they can be removed with the vacuum. The flushing agents used are usually pyrethrins, which are like teargas to cockroaches. They are very effective in causing cockroaches to get agitated and leave the harborage. They actually run out in the open, where they can be sucked up by the vacuum.

*Continued on Page 16*

**Name:** Tim Hulett

**Hometown:** I was born in Ohio, but we moved to Florida when I was a young boy, so I consider West Palm Beach my home town.

**Where you live now:** West Palm Beach.

**About your company:** My brother, sister and I were raised by my dad, who, before going to work for a pest control company, was a route salesman for a local beer distributor.

One day while working his beer route and dropping another 150-lb. keg on his toe, he saw a pest control tech walking across a parking lot carrying a B&G sprayer he said to himself, “That looks a lot better than the work I am doing.”

So he went to work for a local pest control company. A few years later he went into business for himself. Fifty years later, Hulett has grown to having more than 300 team members in eight locations throughout South Florida.

My wife, Liz, and I are proud of the fact that our kids, after all graduating from college, work for the company. We are hoping our five grandchildren will one day be the fourth generation to work in the family business.

**First paying job and what you learned from it:** Mowing grass in our neighborhood when I was 10 years old. What I learned from

that first job was cutting grass was not for me. But it showed me that if you’re going to have a service business, have one with reoccurring income that people need year round. In South Florida, your grass needs to be mowed every month.

**First break in the pest business:** Having my dad drop that beer keg on his foot, then seeing that guy carrying the B&G sprayer a short time later. Then, years later in 1989, having John and Greg Rice walk into my first office with an advertising opportunity.

**Best business book:** *The Worst-Case Scenario Survival Handbook* by Joshua Piven, and David Borgenicht, *The Art of War*.



Tim Hulett

**Best piece of business advice you received:**

Don’t be afraid to open your second office. You’ll figure out how to handle your mistakes.

**What you would tell someone new to the pest business:**

You will be surrounded by some of the most wonderful people on the planet. Get involved with FPMA at the local region level when you’re just starting out, on the state level as you begin to grow, then on the national level as your business continues to grow and expand.

**Where can we find you when you are not at the office?** Spending as much time as we can with our grandkids and having them close by so we can enjoy them as they grow up. I’m fortunate to enjoy our business and this industry and to watch our employees also grow and move up within the business.

**What is the most important trait you look for when hiring?** Integrity.  
PP





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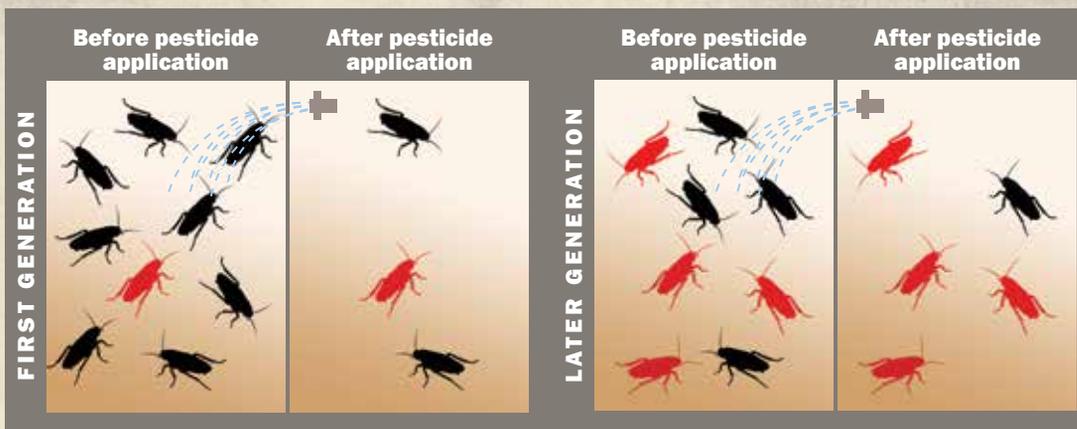



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**INSECTICIDE RESISTANCE**

Pesticide application can artificially select for resistant pests. In this diagram, the first generation happens to have an insect with a heightened resistance to a pesticide (red). After pesticide application, its descendants represent a larger proportion of the population, because sensitive pests (black) have been selectively killed. After repeated applications, resistant pests may comprise the majority of the population.



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*German Cockroach, continued from Page 14*

These flushing agents are usually pressurized contact insecticides, and many of them will kill cockroaches. However, the main idea of flushing is to get the cockroaches to run out of their harborages so you can remove them with a vacuum.

This removal technique prevents insecticide resistance and also bait aversion by physically removing the pest. If you're constantly spraying the same insecticide in order to achieve control, eventually the insects outsmart you by evolving resistance to those insecticides or even refusing to eat the baits that you put out. With this physical removal, there is no way that they can evolve resistance to getting sucked up by a vacuum cleaner. So basically, what you're doing is removing most of the population without selecting for resistant cockroaches.

Once you have gotten customer cooperation and have removed as many cockroaches as possible, chemical controls can be applied. These may be in the form of dusts, sprays, baits and aerosols. Using these in an organized, effective manner can assure effective management.

FINALLY, IT IS IMPORTANT TO follow up on your accounts to make sure that you have quality assurance. Quality control makes sure the German cockroaches in your account have been controlled. In order to do that, you have to wait for some time after treatment to see the effects.

It is always good practice to do visual inspections and place sticky traps



Learn how to interpret sticky traps

Daniel D. Dye II

in accounts. That way, the location of cockroaches in traps may indicate certain harborage that you may have missed in your treatments. Sticky traps can be used to determine the effect of treatment on the structure of the cockroach population.

Say you're still fighting cockroaches after treatment and you want to determine the cause of failure. Traps are a good way to determine whether the new cockroaches were brought in from elsewhere, or whether there was an incorrect placement of treatments.

Check for wings twisted due to IGR treatment



Traps may also indicate that there was insecticide resistance or bait aversion in the cockroach population. When reading sticky traps, look at the cockroaches that are in the traps to see if their wings are twisted, if you have used IGRs. If you suspect chemical resistance, you will probably want to rotate products. In other words, use another product with a different mode of action. **PP**

Philip Koehler is Endowed Professor and Roberto Pereira is Research Scientist at UF/IFAS Entomology and Nematology Department.



Notolomus basalis adult closeup



Rice weevil



N. basalis group



Cabbage palms

Insect photos by Lyle J. Buss at high magnification. Cabbage palm photo by M. McKnight, public domain.

## Notolomus basalis: An Evil Weevil?

Lyle J. Buss

**W**HAT'S YOUR first thought when a customer complains to you about weevils in their house? Probably rice weevils? There are lots of species of weevils, but most feed on plants and don't get into buildings. The most notable exceptions are the rice and maize weevils, *Sitophilus* spp., that develop in whole grains or bird seed and are occasional stored-product pests in homes.

Sometimes people find a weevil called *Notolomus basalis* — sorry, it doesn't have a common name. They are similar in size to rice weevils, about 3 mm long (1/8 inch). Their color is unusual, though, a pale brownish yellow compared to the dark brown color of rice weevils.

These weevils breed in the flowers of cabbage palm and saw palmetto. If you check some palm flowers at the right time, you can find thousands of these weevils. They don't hurt the palms, but they can be a nuisance when they get attracted to lights of homes.

Cabbage palm is found across most of the Florida peninsula and plays an important part in many ecosystems, providing both food and habitat to many animal species. The drupes of the cabbage palm are a large component of the diet of many animals such as deer, bear, raccoon, squirrel, bobwhite and wild turkey. Various birds and squirrels nest in the crown.

People sometimes find large numbers of *Notolomus basalis* weevils on their lanai or at a porch light. Occasionally a few of the weevils will wander into the home. They aren't anything for a homeowner to be concerned about — it likely just means that a cabbage palm is nearby. **PP**

Lyle J. Buss, Scientific Photographer, manages the Insect Identification Lab at the UF/IFAS Entomology and Nematology Department. Additional cabbage palm information from UF School of Forest Resources and Conservation.



**Bed bugs in well plates for an experiment**



**Ashley with Blue, a lab chicken**

# Ashley Morris & the Allure of Bed Bugs



**A**SHLEY Morris hails from Brooksville, Florida — a southern town with no shortage of insects. She graduated from Hernando High School in 2016 and began taking in-person classes at UF through the Innovation Academy program in January 2017.

### Q and A With Ashley

#### **Did you find entomology or did entomology find you?**

A little of both! I remember looking under rocks for millipedes and roaches when I was younger. My dad, who is a state ecologist, used to bring me to controlled burns, where I could see the insects scramble up the trees to escape the heat. My favorite insect at the time was a Florida woods roach, but I sadly lost interest in insects once I picked up a (very angry) insect that stung me. This moment killed my interest and curiosity for a short while.

#### **Did we almost lose you as an entomologist?**

Fast forward to freshman 18-year-old me. I started out at UF as a chemistry major. I know what you're thinking: "Yuck! Why would anyone willingly study chemistry?" Well, I don't know!

#### **How did you regain your focus on insects?**

Entomology found me again on a desperate attempt to change my major after only one semester. I met with Dr. Baldwin, remembered how much I loved insects in the past, fell in love with the department as a whole, and switched my major as quickly as I could.

Doing my first insect collection definitely made me realize how much I love insects and having a major that allows me to spend time outdoors. It was like finding “home” in a large university.

**How did you meet Dr. Koehler and become part of the Urban Lab?**

I found Dr. Koehler through reading about mosquito larvicide chips. At this time, I was fascinated with mosquitoes and other urban insects, as I still am. I contacted him through email, met with him in person, and secured a spot with bed bugs in the lab. Looking back, I am happy I made this decision, as it has enhanced my university experience.

**What are your lab duties?**

I started off with a project concerning a possible correlation between the weight and gender of nymphal bed bugs. To do this, I modified well plates with a screen to allow feeding, placed one bed bug in each well, and weighed each bug after molting. We found that the fifth-instar female nymphs weigh significantly more than the male nymphs, which matched our hypothesis.

Since then, I have maintained the bed bug colonies. I feed these colonies either through artificial feeders or on a live chicken if necessary. I love working

with the chickens and am even inspired to own chickens in the future now.

**What is your favorite thing about the bed bugs?**

For a parasitic insect, they sure do have a lot of personality! They’re so charismatic. For example, the small first-instars like to ride on the adults’ backs. I’m sure there’s a scientific reason behind this, such as the instinct to conserve energy, but I like to think they’re having fun.

**Where do you see entomology taking you?**

To put it simply, graduate school. I want to attain a master’s degree in entomology. As of right now, my sights are set in California. After schooling, I hope to pursue a career in medical entomology.

**Do you have any other interests?**

Coffee — about 90 percent of my blood is coffee by volume, so I’m sure I’m safe from bed bug bites.

My other hobbies include singing as well as playing the ukulele and piano. I’ve written a few “educational” songs on fungi and insects before, as well as some nonscientific songs. I think art is really important and a good way to keep your head clear while dealing with the stress that comes with school. **PP**



**In the Kawahara Lab at Florida Museum of Natural History**



**With friends at the top of a mountain in El Limón, Guatemala**



**As social media ambassador for NASA during the launch of OSIRIS-REx**



**Ashley reared ladybug larvae while interning for IFAS in Immokalee**

# Changes in FDACS and Industry

**T**HERE ARE always changes happening in the pest control industry and in the Florida Department of Agricultural and Consumer Services.

I was talking to some folks at the Structural Fumigation School in Davie, Florida, and someone said that if you think you know everything about fumigation, you are in the wrong industry! A very true statement no matter which category you operate in.

Fumigation, general household pest control, lawn and ornamental, or termites and other wood destroying organisms — things are always changing. Products change, methods change, pesticide labels change, and the state certification exams change.

There are new fumigation and special identification cardholder (SPID) exams, and a new general household pest control exam is coming soon in March 2020.

Pest control companies are changing, like Florida Pest Control, which was sold to Rentokil Steritech.

Some of the changes at FDACS are with personnel: We have a new assistant division director, Courtney Frazier, and we are looking for a new bureau chief at the Bureau of Licensing and Enforcement.

Changes are inevitable! **PP**

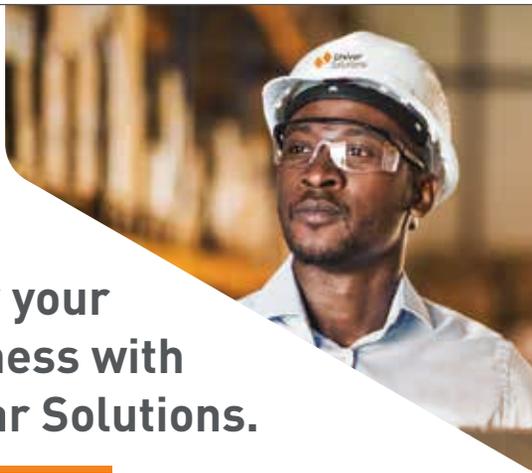
*Report by Paul Mitola, Environmental Consultant*

Questions relating to Restricted Use Pesticides (RUP) license requirements for Private Applicator License, Public Applicator License, Commercial Applicator License, and Pesticide Dealer License should be directed to:

Mail: Pesticide Certification Section  
3125 Conner Blvd., Bldg. 8  
Tallahassee, FL 32399-1650  
Phone: (850) 617-7870  
Fax: (850) 617-7895

Questions relating to Commercial Pest Control license requirements for Certified Operator Certificate, Special Identification Cardholder, Limited Commercial Landscape Maintenance Applicator, Limited Structural Government/Private Applicator, and Limited Landscape Government/Private Applicators /Limited Certification for Urban Landscape Commercial Fertilizer should be directed to:

Mail: FDACS  
Bureau of Licensing and Enforcement  
3125 Conner Blvd, Bldg. 8  
Tallahassee, Florida 32399-1650  
Phone: (850) 617-7997 (telephone)  
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At McCall, we are creating a culture of builders – people who are curious, explorers and catalysts of growth and change. They like to be creative, to think, and to implement ideas. They see the way we do things as just the way we do things now—but not necessarily how things should or shall always be done. McCall is looking for builders that want to participate in a growth story and owners who are looking to find a worthy home for their employees and customers.

If you have considered selling your company in the past, are currently considering selling your company, or are just interested in learning more about the opportunity to partner with McCall, give us a call. Our ownership team is personally dedicated to this process in order to provide the most positive and efficient experience possible.

All information and conversations are kept in confidence and are covered by a non-disclosure agreement. We encourage you to visit our website at [mccallservice.com](http://mccallservice.com) and to get LinkedIn with us at [linkedin.com/company/mccall-service-inc/](https://www.linkedin.com/company/mccall-service-inc/).

Thank you for your time, attention, and daily efforts in making our industry great.

Regards,  
*Jennings B. Cooksey IV*  
Jennings Cooksey IV  
General Counsel & Director of Business Development

- McCall's first acquisition was in 1932 and we've been active in M&A ever since.
- At first, M&A served as a method to diversify and evolve as old business lines died out and new business lines were required.
- Today, M&A in short is driven by our growth mandate and high level of interest in finding great partners and employees to continue our growth story!
- We act very fast and offer a fair price without investment bankers or a phalanx of attorneys and other advisors.
- No cookie cutter formula. Each deal is different and catered to the needs thereof.
- We invest with profitable generational growth in mind.
- We are not driven by quarterly performance or a defined exit time line. So we can offer terms others simply cannot.
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- Numbers are nothing more than a reflection of the great people in your business. We value the people! Pest control is a people business.

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McCall Service, Inc. ("McCall") is a ninety (90) year-old family owned, privately held, employee and client grown, PCT "Top 100" Pest Management Company with a fortress balance sheet and mandate for growth.

# Get 20/20 Vision Into Your Pest Control Company's 2020 Web Marketing Strategy

Alain Parcan



**I**F THE New Year isn't enough to spark interest in setting lofty goals for the months ahead, a change in the decade surely will. As we welcome 2020 and all the potential opportunities that lie before us, it's important to understand what the objectives for your business are and how you plan to achieve them.

When it comes to staying relevant online, where potential customers are looking for your service, there are a few key web marketing tactics that every business should follow in 2020. To help you reach greater success this year — and this decade — be sure to implement these four tactics:

## SEO

We used to say that running a search engine optimization campaign for your pest control business was a great way to get a step ahead of your competition. After hearing that in 2018 more than 55 percent of small businesses invested in SEO, which is only expected to increase in 2020, it's clear this is the new standard for getting noticed online.

The main goal of an SEO campaign is to build relevance for your company online in the area you serve. This style of marketing gets your pest control website on page one of Google, which gets your phone ringing and your operation moving.

A good SEO campaign will help your company keep up with the competition, but a great SEO campaign — which should combine onsite optimization with offsite tactics

— will give your company a major upper hand.

## A Review Generation Strategy

When your potential customers are in need of a treatment or consultation, they tend to begin their search on Google. Once they find your company and its competitors, they'll need to choose one provider. Sometimes, the deciding factor that tips the scales is online reviews.

Next time you search for your company online, take a look at your Google star rating. Is it close to five? Do you have more than 10 reviews? In 2020, you want to be able to answer "yes" to both questions.

If you don't have a strategy in place to drum up positive reviews, this is the year to get it going. A good place to start is by putting links to the most popular review platforms (Google, Facebook, etc.) on your website. You can take it a step further by having review generation be a part of your clients' experience, whether that's your technicians reaching out after an appointment or a link to your Google listing from your company's external emails.

## Mobile Load Speed

Google doesn't always make it clear what they're looking for when they rank websites in search results, but they did make one thing clear back in 2018: Page one websites need to load quickly on mobile devices like smartphones and tablets.

A search engine's main goal is to give users the best experience possible when responding to a query. Providing a website that takes forever to load, meaning five seconds or more, is not delivering on that goal. Considering the fact that 75 percent of searches are done on mobile devices, you can't afford to ignore this trend. In 2020, it's essential that your site be optimized for the mobile experience.

## Focus on Customer Experience

It's often said that it costs five times more to attract a new customer than it does to keep a current one. With this in mind, make sure that your company is doing what it can to keep your customers happy and coming back for more.

One strategy we always recommend is posting educational content about your service to your website. An FAQ page, a blog, or detailed services pages are all opportunities to give potential customers the information they're looking for while also establishing your company as a reputable business. Customers will begin to look at your company as a resource, which ends up paying for itself.

You see, when you build trust between your customers and your business, customers start to talk. Whether it's with their friends or in online reviews, happy customers become "influencers" that bring additional prospects to you at no extra cost. While high Google rankings or online

ads can do a good job at getting your name out there, nothing compares to good old-fashioned, word-of-mouth advertising. To put this into numbers, Forbes reports that increasing customer retention rates by 5 percent increases profits by 25 to 95 percent. Whether you're offering client discounts, referral perks, or educational content, do your best to make your customer feel taken care of.

There are times where an "if it ain't broke don't fix it" mentality applies to a situation, but marketing your pest control business is not one of them. In a changing marketplace where more people are taking to the web to find services that they need, you owe it to your company's success to keep your web marketing strategies current and up-to-date with the latest best practices.

See us at FPMA's Business and Operations EXPO on January 21-23. Go to <https://fpma.org/content.asp?admin=Y&contentid=191> to see the schedule and register for the event! **PP**

---

*Alain Parcan, Director of Marketing for Market Hardware, Inc., contributed this article. Alain brings nearly 10 years of experience in educating businesses so they can market themselves more effectively. Market Hardware helps small businesses compete on the web and offers special discounts for professional association members. You can reach Alain's team at 888-381-6925.*



**Nine-banded armadillo in Palm Coast, Florida**

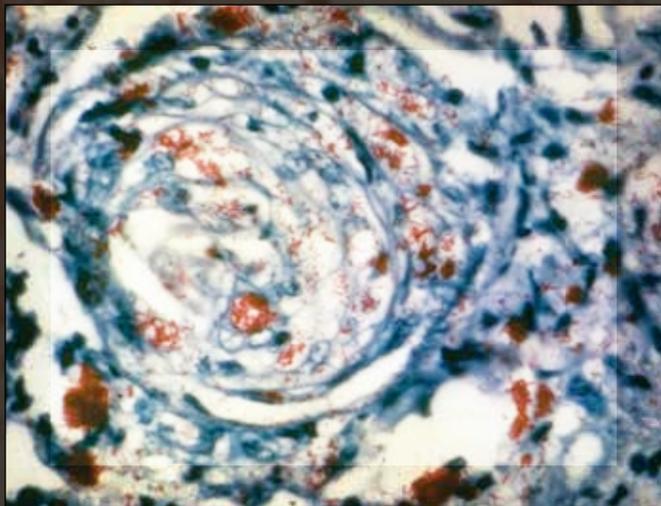


Photo of Aaron Reeve, a Norwegian man who suffered from leprosy in the 19th century.

Jim Mullhaupt

# Nine-banded Armadillo and LEPROSY

Shannon P. Moore and Samantha M. Wisely



This photomicrograph of a skin tissue sample from a patient with leprosy reveals a cutaneous nerve that has been invaded by numerous *Mycobacterium leprae* bacteria, which cause leprosy. Arthur E. Kaye, CDC

## What is leprosy, and how does it spread?

Leprosy is a bacterial disease infecting the skin and nerves that causes disfigurement, nerve damage, and occasionally lung impairment if left untreated. Also known as Hansen's disease, leprosy was recognized as an infectious disease as early as 600 BC. Historically, people with the disease have been shunned by society.

Leprosy is spread among humans via respiratory droplets. In the Southeast United States, contact with armadillos and armadillo habitat is a source of infections. Leprosy can maintain dormancy for months or years before signs of infection occur, but patients can become noninfectious and eventually cured after taking multi-drug

therapy. Worldwide, 250,000 new cases are reported each year, and in the United States approximately 150 new cases of leprosy are diagnosed each year.

## Leprosy in armadillos

Nine-banded armadillos are the only known natural hosts of leprosy besides humans. Leprosy can be transmitted from armadillo to armadillo, but it does not appear to cause symptoms in these animals. The prevalence of leprosy in armadillos in the Southeast is high, but it does not appear to infect other wildlife species at this time.

## Who is at risk of contracting leprosy?

Humans who handle armadillos, eat armadillo meat, or have contact with others who have

leprosy that are not receiving treatment are at risk for contracting leprosy. People working in gardens and outdoors where armadillos are present are also at risk for contracting leprosy. Two-thirds of the U.S. population with leprosy contracted leprosy abroad. Tropical areas have a higher prevalence of the disease.

Risk of contracting leprosy is low. According to the CDC, 95 percent of all adults are naturally immune to leprosy, even if they're exposed to the bacteria causing it. Recent research has indicated that leprosy is a zoonotic disease — can be spread from animals to humans — and the geographic range is expanding.

### How common is leprosy?

#### FLORIDA

- 2001–2010: 101 cases
- Prior to 2015: 2–12 cases annually
- 2015: 29 cases
- 2016: 18 cases
- 2017: 16 cases
- Most common counties: Brevard, Volusia, Polk, Hillsborough, and Dade.

#### UNITED STATES

- 2015: 178 cases diagnosed
- Most common states (72 percent of new cases): Arkansas, California, Florida, Hawaii, Louisiana, New York, and Texas.

*Continued next page*

# Methods of Armadillo Control

## RECOMMENDED METHODS OF ARMADILLO CONTROL INCLUDE:

- ✓ reduce watering and fertilizing lawns,
- ✓ create barriers such as fences,
- ✓ live-trap, and
- ✓ shoot offending individuals.

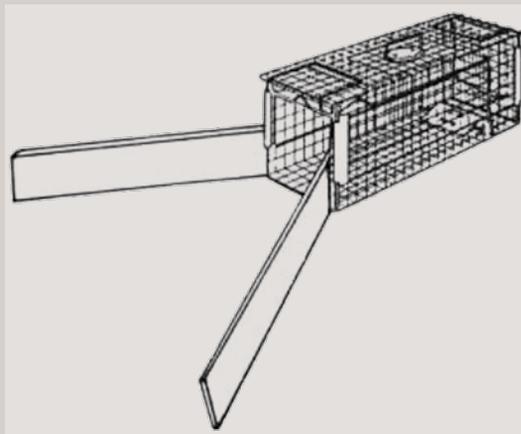
Reducing both water and fertilizer on your lawn will reduce armadillo damage. A moist, lush landscape is perfect for earthworms and insect larvae. Armadillos love earthworms. Sometimes watering adjacent areas may attract armadillos away from a site.

Where highly valued plantings are in need of protection, small fences may be used to keep the animals out. These fences should extend about 24 inches above ground, with the bottom of the fence buried 18 inches underground. Slant the fence outward at about a 40° angle. Laying chicken-wire along a patio, driveway or house foundation will discourage them from burrowing.

Several live-trapping techniques can be used to capture armadillos as they come out of their burrows. One is to firmly insert a 6-inch diameter PVC pipe into the entrance of an active burrow. Regular-sized armadillos will get stuck in the pipe as they try to exit. A nylon throw-net used for fishing can also be staked down so it covers the burrow entrance. Armadillos will get tangled in the net as they emerge. Another trapping technique involves burying a large bucket, larger than five gallons, in front of the entrance and covering it with newspaper or plastic sheeting and a light layer of soil.

Because armadillos are nocturnal, all trapping techniques designed to capture armadillos emerging from burrows should be applied late in the afternoon and checked several hours after dark.

Armadillos also can be trapped in raccoon-sized, metal cage live-traps available from local pest control and feed stores or in homemade box traps. Place traps near the entrance of burrows or along fences or other barriers where they might travel. This trap is most effective when “wings” (1 × 6-inch × 6-foot boards or other material) are added to funnel the animal into the trap, shown at right.



The benefit of using baits with this trap is questionable. Suggested baits are live earthworms or mealworms in

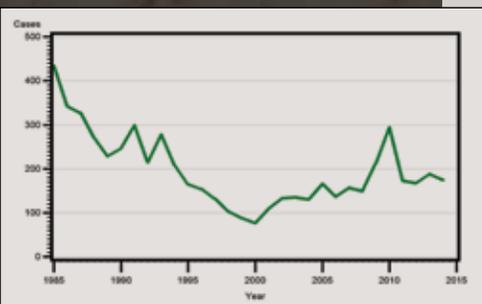
surrounding soil placed in hanging bags made of old nylon stockings. Other suggested baits are overripe or spoiled fruit. Armadillos are more likely to enter a cage trap when leaf litter or soil is placed over the wire bottom.

Relocating problem animals to another area is not recommended. This approach only transfers the problem somewhere else, can enhance the spread of diseases, and upsets the natural balance in the area where the armadillo is released. Further, armadillos are not native to Florida and it is illegal to transport and release them.

Shooting is another method frequently used to control nuisance armadillos where it is legal to discharge a firearm. Recommended firearms are a shotgun with No. 4 to BB-sized shot, or a .22 or other small-caliber rifle. It is illegal to use artificial lights to aid in the shooting of armadillos at night.

Poison baits are illegal and ineffective. No chemical repellents or fumigants are registered for use in Florida. This includes mothballs: see *The Facts about Mothballs*, <http://edis.ifas.ufl.edu/pi254>.

— From EDIS document WEC 76, *The Nine-Banded Armadillo*, by Joseph M. Schaefer and Mark E. Hostetler



*U.S. REPORTED HANSEN'S DISEASE CASES BY YEAR*  
Number of cases each year from 1985–2014 in the United States, where 5,898 new cases were reported in total. Credit: Health Resources and Services Administration.

## WORLD

- Approximately 250,000 new cases each year
- Primarily found in tropical regions
- Most common countries: Angola, Brazil, Central African Republic, Democratic Republic of Congo, Federal States of Micronesia, India, Kiribati, Madagascar, Mozambique, and Nepal

### What are the symptoms of leprosy?

The first symptoms of leprosy are pale or slightly red areas on the skin and a loss of feeling in the hands or feet. Leprosy is treatable but often misdiagnosed. Medical doctors who encounter patients with skin lesions that have not responded to standard treatments should ask their patients about their history of contact with armadillos.

People with these symptoms who have been in contact with armadillos should seek medical attention and report their contact with armadillos to their health care providers. A skin biopsy can be performed to determine if a person has leprosy. Here are other symptoms that may indicate an infection by leprosy:

- Faded or discolored skin lesions
- Thick or dry skin

- Severe pain
- Numbness on affected areas of the skin
- Muscle weakness or paralysis, especially in hands and feet
- Eye problems leading to blindness
- Enlarged nerves, especially around elbows and knees
- A stuffy nose
- Nosebleeds
- Ulcers on the soles of feet
- Loss of sense of touch

### How can you limit the spread of leprosy?

- Avoid contact with armadillos. If you do handle armadillos, wash your hands thoroughly with soap and water.
- Avoid cooking and consumption of armadillo meat, but if you do eat armadillo meat, cook it thoroughly. Wash your hands and surface areas that had contact with raw meat with soap and warm water.
- If you have contact with an armadillo or an untreated person with leprosy, you may wish to see your doctor.
- Wear gloves while gardening and use good hygiene to avoid diseases in the environment.

### What should you do after a wild animal bite or scratch?

Although armadillos are the only nonhuman animal currently known to carry leprosy, it is important to use caution around all wild animals, as it is possible to contract other diseases.

Three steps can be taken if you are injured by an animal, come into contact with saliva from an animal, or receive a cut while processing the carcass of an animal:

1. Immediately scrub the site of infection with soap and running water for 5-10 minutes.
2. Report to your doctor, a clinic, or an emergency room promptly so a medical professional can treat the wound and determine if you should receive any post-exposure prevention measures.
3. Call your County Health Department or County Animal Control Agency and give a detailed description of the animal you were in contact with plus information on your location at the time the incident occurred.

IN THE RARE CASE OF INFECTION with leprosy, the National Hansen's Disease Program provides patient care and oversees clinics throughout the United States. Their contact information is:

National Hansen's Disease Program  
1770 Physicians Park Drive  
Baton Rouge, LA 70816  
1-800-642-2477

For more information visit <http://www.hrsa.gov/hansensdisease/>. **PP**

*Shannon P. Moore, student; and Samantha M. Wisely, associate professor; Wildlife Ecology and Conservation Department; UF/IFAS Extension, Gainesville, Florida 32611.*

Article adapted from *Facts About Wildlife Diseases: Leprosy*, WEC363, one in a series on *Wildlife Diseases: Risks to People and Animals* from the Wildlife Ecology and Conservation Department, UF/IFAS Extension. Original publication date December 2015. Revised January 2019. Visit the EDIS website at <https://edis.ifas.ufl.edu> for the currently supported version of this publication.

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# Managing a Winning Team

Laura Simis



**A**S A business owner, you likely invest a lot of time and energy (and money!) into finding the right employees to help you run your business. Are you expending that much time and energy into making sure you're managing the growth and potential of the employees you already have?

When it comes to building a winning team, most people think about recruiting and hiring efforts — but managing your team is also a critical component of making sure you keep top talent and continue to motivate your workforce to achieve. Putting time into building an effective and efficient onboarding program, developing a system

of accountability, and investing in the personal growth of each member of your team can be invaluable to your growing business.

## Onboarding

Onboarding is defined as the process of integrating a new employee into an organization, and it's one of the most important things you can do to set new employees up for success.

Companies that invest in building a strong onboarding process often see new hires succeed in the field earlier than those that don't — but it can also be a factor in the long-term success of your team. Fifty-four percent of companies with onboarding programs reported higher engagement, and nearly 70 percent of employees are more likely to stay with a company for three or more years if they experienced great onboarding.

If you don't currently have an onboarding program at all, the best way to start from scratch it

to lay out, by position, what an employee should know at the end of three months with your company. Then, work backwards to fill in individual topics to create a full curriculum, including:

- ✓ Label training and application protocols,
- ✓ Pest identification,
- ✓ Customer service best practices, and
- ✓ Internal procedures at your company.

Already have an onboarding program?

Automate it! New hire training takes time and energy from business owners and managers, and it can be tricky to make sure you're giving new employees the right tools in the right order when you're trying to handle it in your busiest part of the season. Digitizing your onboarding program through a tool like *Forgely* can help make sure nothing falls through the cracks, so your new hires can complete important trainings and learn the ropes without taking your time and attention.

## Accountability

Everybody likes to know when they're doing well, but everybody needs to know where they're stacking up against expectations. Setting goals to motivate and engage employees is important for a growing business — but it's only effective if you're consistently tracking progress, adjusting the challenge, and

holding your team accountable for getting the job done and doing it well.

There are plenty of ways your team can be involved in tracking and managing their own success, increasing accountability at all levels of your business:

- ✓ Scorecards or monthly reviews for employees to report their production and KPI progress,
- ✓ Vehicle self-inspections to ensure that everyone has the right materials on hand at all times,
- ✓ Regularly scheduled performance evaluations between managers and direct reports, and
- ✓ Publicly recognize top performers and team successes.

## People Development

In today's world, when modern workers spend more time at work than with their families, and the barrier between work and play blurs, it's ever more important to invest in the growth of each individual member of your team. Personal development is not a perk — it's an expectation.

1. Introduce a culture of coaching: Start with 5–10 minutes per employee per month, simply asking your team what they want to do or do better, what they're doing to work toward that goal, and checking in on their progress. Simply being aware of personal and professional goals can help

*Continued on Page 29*



A giant African land snail shell can reach nearly 8 inches long. A young snail is much smaller.

Timor V. Vorontsov

# Giant African Land Snail

John Capinera

**I**N MARCH 2019 it was announced that the U.S. Department of Agriculture was allocating \$7.2 million to Florida as part of its effort to strengthen the nation's infrastructure for pest detection and surveillance, identification, and threat mitigation, and to safeguard the U.S. nursery production system. Those funds included \$1,331,601 to support successful, ongoing eradication activities against the giant African land snail in Florida.

Giant African land snail, *Lissachatina fulica*, might be one of the most damaging snails in the world. It has been observed to feed on at least 500 different types of plants, many of them crops. It is thought to have originated in East Africa.

In September 2011 this mollusc was found in Miami-Dade County. This was not the first occurrence of giant African snail in Florida. In 1966, a Miami child smuggled three giant African snails into South Florida when he returned from a

trip to Hawaii. His grandmother eventually released the snails into her garden. Seven years later, more than 18,000 snails had been found along with scores of eggs. It was eradicated, but it took 10 years at a cost of \$1 million to eliminate this invader.

## Damage Potential

Despite its documented ability to feed on hundreds of different plants, giant African snail can be expected to do most damage to vegetables, flowers and other ornamental plants, and to annual weeds. However, any succulent plant is at risk, particularly seedlings. The need to change cropping practices or to control these snails once they establish creates additional economic burdens.

Giant African snail also has proven to be injurious by transmitting disease organisms to plants and animals, including humans. It can serve as an intermediate host for rat lungworm, which can cause meningoencephalitis in humans.

It also carries a gram-negative bacterium, *Aeromonas hydrophila*, causing several disease symptoms in people, especially those with compromised immune systems.

## Snail Management

Snails favor high humidity. Therefore, elimination of mulch, ground cover, and other dense vegetation, wood and stones will deny them a moist, sheltering environment. Reducing the amount of irrigation may similarly deny them the moist environment they prefer.

Observing plants at night may reveal the presence of marauding snails, even where there are no signs of their presence during daylight. Snails tend not to move far from their host plants, so if damage is visible it is likely that the snail is nearby.

Snails often are large enough to be seen easily, so they can be collected by hand. It is important to wear gloves or to use an implement to pick up the snails as some snails can carry diseases transmitted to humans by touch. If you collect snails, you can kill them by sealing them in a plastic bag and then placing the bag in a freezer overnight.

Snails are susceptible to traps. A board, flower-pot saucer, or unglazed flower pot placed in a shady location can serve as a very suitable refuge for snails. Then the offending animals can be collected by hand-picking during daylight from beneath the refuge, and destroyed. Giant African snail seems to be particularly attracted to banana and papaya fruit, so these can be used as baits to attract them.

Barriers also can be useful for minimizing damage by snails. Copper foil and screening is believed to react with mollusc slime to create an electrical current that deters them from crossing the barrier. The legs of greenhouse benches or the trunks

of trees, for example, can be ringed with copper strips to deter these animals from crossing.

Copper foil designed specifically for deterring mollusc movement is available commercially from garden supply centers and catalogs. Although expensive to implement, copper can be used to ring entire gardens to prevent invasion by molluscs. The copper strip will oxidize with time, however, becoming less effective.

Similarly, diatomaceous earth can be sprinkled around a garden or planting bed to exclude mollusks, as they dislike crawling over this abrasive material. As is the case with a copper barrier, however, this does nothing to suppress any snails that are already present. Diatomaceous earth is easily disturbed by rainfall and irrigation, so it works best in arid environments.

**MANY FORMULATIONS** of molluscicide are available for purchase, but nearly all are bait products that contain toxicants. They usually kill by ingestion of the bait. None are completely effective because mollusks sometimes learn to avoid toxicants or may detoxify pesticides, recovering from sublethal poisoning.

It is good practice to apply baits after a site is watered or irrigated, as water stimulates mollusc activity, increasing the likelihood that baits will be eaten. However, do not water immediately after bait application.

Baits can be applied by broadcast on or around gardens containing susceptible plants. It is best to scatter the bait, as this will decrease the probability that pets or vertebrate wildlife will find and eat much of the toxic bait and become sick or perish.

Metaldehyde-containing baits have long been useful

*Continued on Page 30*

# I Second That Emotion

RAND HOLLON



In past articles related to pest industry mergers and acquisitions, I've written on topics related to valuation, value-creation, acquired business transition, negotiation, due diligence, and so on. Many of those articles, in one way or another, have touched on the fact that, unlike many other service-related businesses, pest control is solidly a "people business."

**U**NDENIABLY, there's an emotional component that runs through almost every facet of the pest industry. And if you've heard as many "How-I-started-my-business" stories as I have, you'll agree that very few pest industry business start-ups were based on exhaustive market analysis and research. The overwhelming majority of pest businesses began with an emotional, "I-can-do-this!" decision.

The emotional component was there when the business started.

The emotional component will be there when the business sells.

The difference is that when the business started, the emotional component is based on an idea, a concept, with no real marketable value.

When it's time to sell, the emotional component rests on a relationship-based business that has marketable value.

Managed well, the emotional component can help lead to an efficient, value-based, friendly sale.

Ignored and left unmanaged, the emotional component can have an adverse effect on the deal, derail the process, and crater overall transaction value.

For that reason, early on in the process of selling, I advise clients not to shortchange this emotional component or the effect it can have on the process.

Nonetheless, after a career of dealing with technicians, pest control customers, and suppliers, most owners erroneously assume they've had plenty of preparation for what can best be described as an "emotional rollercoaster."

Untrue.

Selling a business is a complex and elaborate undertaking. The seller's role changes/evolves throughout this necessarily intrusive and invasive process. And, although the buyer/seller relationship may at first seem contrary, the relationship must ultimately evolve into one that's collaborative and beneficial to both parties. Left unrecognized and unmanaged, the emotional component can easily upend the entire process.

## So how to best manage emotions during a sale?

You need to have someone on your team with an "outside-the-box" perspective.

It's no secret that an owner lives within the vacuum of his own business. An experienced advisor will bring objectivity to the process so interactions with prospective buyers are based on facts, not emotions. As a seller, having a view of factors from outside their own limited vantage point will always be a bonus.

Unhelpful emotions are borne out of what you don't know versus what you do know. Early on, a good, experienced advisor will educate you on the process, which will allow you, eyes wide open, to make good decisions quickly without

sacrificing the time and energy you need to continue running your business. It's not uncommon for sellers to have an emotional attachment to both their customers and their employees. Sometimes sellers (and their advisors) ignore the emotional aspect of selling a business with tragic result. Once engaged in the process, it's important to not let emotions interfere in your ability to quickly make the decisions that will need to be made.

IN SHORT, SELLING A BUSINESS is much more complex than selling a house or a boat. There's no denying the emotional component. The business you've built from the ground up involves a universe of longstanding relationships that include both employees and customers. It's personal and can be emotional. However, the mere presence of emotions doesn't create a negative. An experienced advisor will help you manage the emotional rollercoaster to create a successful transaction.

There's a difference between simply selling a pest control business and selling a pest control business well. Recognizing, understanding, and managing the emotional component is a good start to selling well. **PP**

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*Rand Hollon, a graduate of Florida Southern College, is a second-generation pest industry veteran. Preferred Business Brokers has exclusively served the pest industry for 30 years. Working exclusively in the pest industry, Hollon has led transaction processes and brokered pest industry deals throughout the United States and the Caribbean. Over the years, Hollon has also authored M&A-related articles for several pest industry publications and has served as an M&A participant/speaker for numerous local, state and national events.*

# 2020 Northwest Florida Pest Management Conference



THE ENTOMOLOGY PROGRAM at Florida A&M University and the Urban Entomology Lab at the University of Florida will hold their second annual

Northwest Florida Pest Management Conference. The conference will take place at the Niceville Community Center at 204-C Partin Dr N, Niceville, Florida, on March 10, 2020. On-site registration begins at 7:30 AM. Speakers begin at 8 AM.

Speakers on the agenda include Dr. Phil Koehler (UF), Dr. Roberto Pereira (UF), Dr. Adam Dale (UF), Sheila Dunning (UF), Matt Lollar (UF), Paul Mitola (FDACS), and Dr. Johanna Welch (FDACS).

This one-day meeting will cover updated information on general household pest issues, wood-destroying organisms, and lawn and ornamental pests. We will be applying for CEUs for these topics for Florida, Georgia and Alabama. The best part, pest management professionals get free admission.

For more information on the Northwest Florida Pest Management Conference, please visit <https://tinyurl.com/2020-NWPMC>. PP

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- you understand what motivates your team, where they may want to or be able to add value to the company, and shows them that you care about their growth.
2. Map out your organizational chart, and map out what it might look like in three years: Showing your team what new opportunities will be available in the future shows employees step-by-step how they can advance and build a career at your company.
  3. Offer leadership training opportunities: Is your next manager getting a chance to develop their leadership skills? Identifying and nurturing leadership potential is important to you as a business owner, so consider asking team members to step up and take on a leading role on side projects.
  4. Invest in your team: When employees see that their company is willing to put time, money or effort into their development, they feel valued. Consider things like conferences, team-building events, additional training, or certification programs.

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Laura Simis is Communications Manager at Coalmarsh.



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*Giant Snail, continued from page 26*

and remain available. Although effective, metaldehyde-containing formulations are quite toxic to pets and wildlife, so care must be exercised if this toxicant is applied. Also, it is a good idea to avoid contamination of edible plants such as vegetables with metaldehyde-containing bait.

There are alternatives to metaldehyde. Some molluscicide-containing products include carbamate pesticides (alone or in combination with metaldehyde).

Newer mollusc baits may contain an alternative toxicant: iron phosphate. Iron phosphate is much safer than metaldehyde and/or carbamates for use around pets and vertebrate wildlife, and also is effective.

Other bait formulations contain boric acid as a toxicant. Though

not yet thoroughly proven, boric acid-containing baits seem promising for giant African snail control. Regardless of the toxicant, baits should be scattered thinly in and around vegetation, so as to make it unlikely that pets or wildlife will ingest too much of the bait.

The USDA and Florida Department of Agriculture and Consumer Services carry out a giant African land snail eradication program in Miami-Dade County. Call the Help Line at (888) 397-1517. **PP**

*John L. Capinera is Professor Emeritus and former Chairman, UF/IFAS Department of Entomology and Nematology.*

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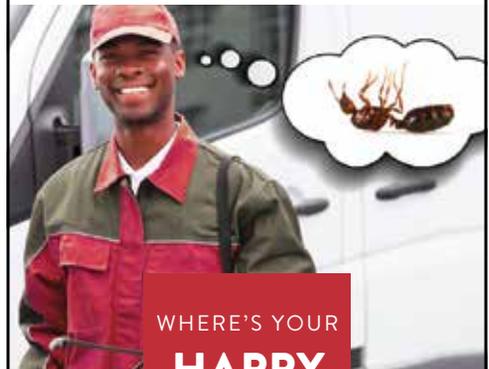
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The banner features a red and white Formula 1 race car on a checkered background. The text 'REGION 5' is in a stylized font on the left. The event title 'AUTOBAHN' is in large, bold letters, with 'INDOOR SPEEDWAY IIII' and 'NETWORKING EVENT' below it. The date 'MARCH 17, 2020' is written in red on a white diagonal banner.

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**IN PARADISE**

June 8-10, 2020 | Tradewinds Island Grand Beach Resort | St. Pete Beach

The banner has a blue background with white wavy patterns. On the left, there is a circular inset image of a resort pool and building. The text 'FPMA' is at the top, and 'IN PARADISE' is in large, bold, white letters. The date and location are at the bottom. A small 75th anniversary logo is in the top right corner.

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**CLAY SHOOT TOURNAMENT**

December 1, 2020  
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The banner features a graphic of a hand holding a shotgun on the left. The text 'REGION 5' is in a stylized font. The event title 'CLAY SHOOT TOURNAMENT' is in large, bold, red letters with a target graphic. The date and location are below. Logos for FPMA and the Jacksonville Clay Target Sports are in the bottom right.

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The banner has a green background with white icons of a speech bubble, a palm tree, a graduation cap, a bar chart, and a smartphone. The text 'BUSINESS AND OPERATIONS' is at the top, and 'EXPO' is in large, bold, orange letters. The date and location are on the right. The FPMA logo is in the bottom left.



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