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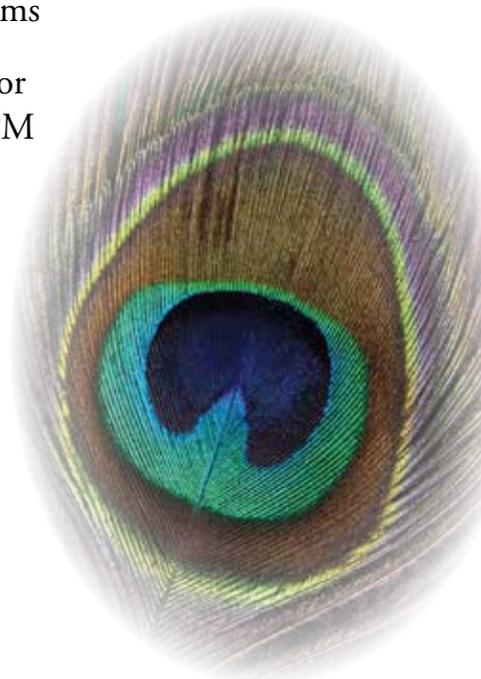
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ON THE COVER

Tampa reached its largest-ever population at 404,636 in 2021 and is predicted to grow 22 percent by 2025. Florida's rapid rise in urbanization will likely increase the number and the types of urban pest problems. Can urban pest control technology keep up?

Photo by Sean Pavone



Set Sail for St. Pete

Message from the President of FPMA

Suzanne Graham



AHOY, MATEY! This year's pirate-themed FPMA in Paradise Summer Conference, which will take place on June 14 –16 at the TradeWinds on St. Pete Beach, is full steam ahead!

This will be the first major, in-person event FPMA has held since our EXPO in January of 2020. We can feel the excitement from our members, who are really looking forward to meeting with the vendors, catching up with colleagues, and just plain having fun.

Our format has changed somewhat this year to reflect input from the members — both PMP and Allied — goals articulated during our Strategic Planning process last year, and the challenge of holding a physical event in the current environment.

View From the Crow's Nest

First, we decided to tailor the event to make it more inclusive for all as well as all-inclusive. More inclusive, because except for the Leadership Forum, the schedule for Exhibitors and Attendees is the same. That means maximum networking time. And all-inclusive in that the Exhibitor and Attendee packages BOTH include all meals and activities.

Second, this year's content will be strictly business oriented, with an intensive Leadership Forum held on June 15. We will not be providing CEU classes as we have done in the past because there are many ways to get CEUs online, and FPMA itself has done two full rounds of online/live classes in January and March and will be doing another round of "last chance" classes in May.

Third, we have limited the number of Exhibitors in order to ensure social distancing in the Exhibit Hall.

In keeping with shifting focus toward business education, we have come up with a new initiative called the Compass Program. This program is under development and aims to provide business education targeted according to what different stakeholders in pest control companies need to get, and keep, their edge. The Compass Program consists of two "Courses" called Helmsman and Navigator.

The Helmsman Course will consist of classes specifically geared to give technicians and those in the field education on issues that routinely come up that are above and beyond killing bugs. Some of the topics include: How to Handle Skips, Cancellations and Complaints, Representing Your Brand, Creating Sales Goals as a Technician, and What to Do When You Don't Know What to Do.

The Navigator Course classes will be designed to address the concerns of company owners and managers and will cover topics such as hiring, recruiting,

benefits, sales, marketing, and technology. More details on the program will be forthcoming at the Summer Conference and via email to the membership.

AS YOU may or may not know, the open enrollment period for health care has been extended to August 15. If you still haven't resolved your health insurance needs/benefits and haven't checked out the FPMA/LIG portal, there is still time to take advantage of this member benefit. Feel free to call HQ for the dedicated link.

As we approach our busy season, don't forget to check out the FPMA website from time to time. We continue to post Vendor Specials, an Industry Calendar with third-party events and webinars as well as our own, and GAC News, including our Legislative Updates.

As always, we are listening and we are here for you. **PP**

Suzanne Graham
President, FPMA



TradeWinds Island Grand, St. Pete Beach

Visit flpma.org for currently scheduled meetings and more.

Future of PestPro Magazine

FOR THE PAST 20 years, the University of Florida Urban Entomology Lab has participated in the publication of *PestPro* magazine. It started out as a magazine produced by a commercial publisher. A little more than six years ago, we took over the magazine and formed Pest Management Education, Inc., a nonprofit organization, to be able to handle the financial affairs and provide the funding to print and mail the publication to about 12,500 pest control operators in Florida and elsewhere.

In those past few years, many print publications have disappeared as advertisers have cut back on advertising in print publications and shifted their resources to advertising online. We still produce a hard-copy magazine with an archive online for people who want to read the content on their computers or cell phones. We can't say this has been an easy time, but we have survived and are still producing a quality magazine.

COVID-19 has made life even more challenging for us to produce the magazine. Costs of production have increased dramatically. You can look at the supermarket and see what has happened to food prices. They have increased 3 to 4 percent during the past year. The cost of home construction has increased as supplies for new houses have increased. Did you know that the cost of 2x4 lumber has gone up three times its pre-COVID cost? Everything is costing more, even for those of us trying to produce a quality magazine for the pest management industry. And we are getting squeezed between difficult-to-receive advertising dollars and increased production costs. Will we survive?

RELIABLE INFORMATION FROM OUR LAB to YOU

We at the lab are convinced that a print magazine for the pest management industry is still appreciated and needed by the industry. When it comes to reading articles and features, the vast majority of people in the industry still prefer a publication that they can hold



in their hands. There is something about holding a magazine, flipping through the pages, and the subtle scent of ink on paper that captivates many readers. Information on new and current pest problems as well as new methods of controlling pests is something the industry needs and what *PestPro* magazine delivers. This sort of information is not easily obtained on the web.

While the internet is a great resource, it is good for answering specific questions. For instance, if you wanted information on a specific insect pest and needed that information to solve a problem for a customer, you would go to the web and look at a picture and read a little bit. Then you could go to your customer and provide some information.

However, if you want to be educated, you probably would like to sit down with a printed magazine like *PestPro* and learn about the pests, their management, and current trends for the industry. Most readers classify sitting down and reading a physical magazine as a form of relaxation that they are not able to achieve online. It gives technicians and owners a break from a good portion of their day that is spent in traffic and in the service vehicle while at work.

THANKS TO OUR TEAM for SERVING OUR READERSHIP

We have to thank the Florida Pest Management Association for their support and cooperating with us on the magazine. *PestPro* serves as the official magazine of the Florida Pest Management Association. By FPMA working with us to provide association news and information, we have expanded from just providing educational information to providing information on the history, current meetings, and issues that affect the entire industry. FPMA's involvement is critical for the magazine's survival.

Our goal is to keep the magazine going through all the turmoil in the world. Our writers provide interesting and educational content. FPMA provides information on their meetings and activities. Together we provide a sense of community that is essential for any industry to thrive.

Also, our readers want a hard copy of the magazine and not just a digital version. In fact, recent surveys have shown that over 50 percent of readers would use the printed version and less than 25 percent of them would prefer online content.

We are and continue to support the pest management industry with an educational resource primarily produced by writers from the University of Florida. We learned a long time ago that research that is published in scientific journals is not useful for most pest management practitioners. That research and those publications do not inform the industry. On the other hand, a trade journal like *PestPro* translates the research for ready understanding and use by the industry.

The UF Urban Entomology Lab is proud to continue to provide quality information and education for the industry. We will continue to produce a quality print magazine to help educate and inform the entire urban pest management industry in Florida.

Let us know your thoughts on our magazine! **PP**

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



Steven W.

Swarm of red imported fire ants, *Solenopsis invicta*



Alex Wild and Ed LaBrun

Pupae and worker tawny crazy ants, *Nylanderia fulva*

Where humans go, pests will follow.
Effective pest pros seek to manage those pests *and* safeguard the environment.

Sean Pawone



Environmentally Friendly Urban Pest Control



Roberto Pereira and Philip Koehler



Urban expansion

Florida saw a 14.6 percent population gain from 2010 to 2020. The state's estimated population was 21,538,187 as of April 1, 2020. The maps above project urban development in Florida in 2060.

ENVIRONMENTALLY friendly urban pest control might mean different things to different people, but for the purposes of this article we will stay with a fairly simple definition: pest management service that is performed under guiding principles that minimize potential effects on the environment and native wildlife.

Urban invaders impact our ecosystem

It is important to remember that most of the urban pests we need to control are not native to the environments where they are found. The elimination or reduction of these invading species represents a step toward restoring a more natural environment.

Consider invasive ants: Just two pest ant species — red imported fire ant and tawny crazy ant — have gained major importance in Florida and other areas of the Southeast United States. Effective urban pest management can help minimize these ants' impact on our environment and native wildlife.

Invasive species like these damage the environment at considerable cost. For example, the tawny crazy ant, *Nylanderia fulva*, originated from Brazil and was introduced into Colombia as a biological control agent against leaf-cutting ants and poisonous snakes during the 1930s and 1940s. The tawny crazy ant took over in Colombia and eliminated 36

native ant species, seven other species of soil insects, one snake species, and three lizard species.

Fast forward to 2002, when a significant new infestation of tawny crazy ants, then referred to as "Raspberry crazy ants," was found in Texas. By 2012, *N. fulva* had sprung up in 24 counties in Florida, and these infestations are expanding.

We do not know the level or the cost of environmental damage *N. fulva* is doing in the United States, but we can be certain that this ant *is* causing some damage. Control of the tawny crazy ant protects our ecosystem and, therefore, can be considered an environmentally friendly activity the pest management industry performs.



The population of Gainesville, Florida, continues to grow at a steady rate.

Look into GreenPro — and good old IPM

There are established standards and protocols for environmentally friendly pest management such as those certified by the National Pest Management Association's GreenPro program. This NPMA program recognizes pest management companies that are committed to providing pest control services with reduced risks to the environment. The program focuses on integrated pest management strategies such as habitat modification, exclusion, removal of food and water sources, sanitation, repairs that do not require use of pesticides,



and the use of inspection and monitoring services.

To create a pest management program that is more environmentally friendly, try the principles of integrated pest management. Use a multifaceted approach that aims to move away from chemically heavy pest control and programs that depend totally on the use of chemical applications. Here are some simple steps toward environmentally friendly pest management:

- ✓ Inspect for and identify existing pests, their food and water sources, and their harborage locations.
- ✓ Eliminate food and water sources and make — or suggest that the client make — changes that may eliminate harborage for the different pests. Simple

repairs in pipes and changes in waste management can make a world of difference. The most common recommendation to our University of Florida colleagues who complain about ants in their offices is that

- they should not throw food scraps in their waste baskets!
- ✓ Use products with the least effect on nontarget species and the environment, and use doses and application techniques that minimize human and environmental exposure.



- ✓ Consider the use of traps and other nonchemical control products and techniques.
- ✓ Make sure your control actions are producing the expected and desired effects. Make necessary adjustments to products and application techniques if the desired effects are not obtained.

Continued next page

St. Johns County is among the fastest growing counties in the United States

Get ready for new technologies!

Research on cutting-edge pesticides and new control techniques is under development, and initial tests are under way. The goal? To manage pests *and* cause little to no effect on the environment and nontarget organisms.

Keep yourself and your technicians informed on these new developments¹. Some of the latest technologies target a specific pest or closely related pests. We anticipate that new products and technologies will become more widely available in the near future.

The so-called biorational pesticides can be nontoxic to nonpest species and have minimal impact on the environment. The use of pheromones is already well developed against agricultural pests, but less so in urban pest management. Pheromones and other hormones can be used in traps. Other uses may include the disruption of mating and reproduction, disruption of proper development of the pest, and the combination of pheromones and baits or other insecticidal products in order to enhance efficacy and narrow the targeted species.

Insect growth regulators, or IGRs, are already employed in several insect control products,

but many other uses are possible. The combination of different IGRs in a single product can disrupt the insect life cycles at different points and control a multigenerational population more effectively. The most recent technique combines IGRs that prevent insects from maturing properly with IGRs that prevent the normal development of insect exoskeletons. By attacking the insect life cycle at two different points, this combination can be more efficient in lowering existing populations and preventing resurgence of new pest populations.

Of course, the pest management industry can also be helped by advances in the construction industry. The use of insulation material that helps with control of pests is already a fairly common and acceptable practice, but other techniques are being tested and implemented.

ALSO arriving in the urban pest management industry is web-based technology known as the Internet of Things, or IoT. From traps that notify the operator when a pest has been captured to remotely activated pest management actions, the ability to connect and operate remotely could reduce the carbon footprint of the whole pest management industry.



With connected smart traps, product dispensers, and other smart devices, one can easily imagine that we will save millions of gallons of fuel over time as the pest control operator monitors for pests and implements control measures remotely from a central office. This is already happening, with much more yet to come. With greater precision of pesticide applications and lower use of fuel for transportation, the carbon footprint of the pest management industry is certain to decrease in the future.

We have not reached this future, and we will never get there — of course, one never reaches the future! But technology is coming to us so fast, that we can taste and feel it. This new technology will certainly help us achieve a more environmentally friendly era of pest management. **PP**

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

▲ A smarter mousetrap

As new systems are developed and the cost of IoT-based pest control lowered, look for more smart tech in urban pest management.

The “green pest management industry” has grown considerably in recent years, fueled by consumer demand.



¹ <https://topbest.ph/blogs/innovations-pest-control-technology/>

DON'T ASSUME ANYTHING

ASK FOR HELP WHEN NEEDED

TRY THE UNUSUAL

Thinking Outside the Box

To Resolve Pest Problems

Cory Goeltzenleuchter

Are PESTS on your MIND?

AS THE spring break season comes to an end and temperatures start to climb — sometimes above the 90s — we know we are in full pest-pressure season in the Southeast.

I use the term “season” lightly, as we often see pest issues year-round in our tropical climate. Pest management professionals visit thousands of homes each year, following strict company policies and protocols for all actions taken when battling these summertime pests — protocols such as contacting customers, using specific products and equipment, and abiding by the pest specific standard operating procedures, or SOPs.

One of the biggest takeaways to learn in this industry is that every situation you are thrown into will be different. The property types vary greatly, the homeowner or tenant’s cleanliness is inconsistent, the pest

pressures are different, and the expectations that each customer has of you is as unique as their own fingerprint. That is the beauty of the industry, and often it is the answer I get when I ask technicians why they love working in pest control: Every situation is different!

Considering the multitude of diverse situations we face, it is extremely important to be able to think creatively. While routine SOPs must be followed, all of them should allow for your skills and training to take over. These distinct challenges are the true beauty of the industry in keeping us all motivated.

LET’S DIVE into the details to help you defeat a pest problem and think a bit more outside the box. Consider the following three tips: *Don’t assume anything, ask for help when needed, and try the unusual.*

First tip: Don’t assume anything

We all know the popular phrase that making assumptions just makes, well, a fool out of you and me. Have you ever found yourself asking another industry professional a question that you felt was probably futile, but you honestly didn’t know the answer to? That is exactly what Dennis Snow writes about in his book titled *Lessons from the Mouse*, when a Disney park guest asked him what time the 2 PM parade took place. First and foremost, you must stop yourself in these moments to ensure you don’t respond in an offensive way. Snow explained that the park guest was truly asking what time the 2 PM parade reached the spot in the park where they were both standing. It was a smart question, but the guest may not have worded it appropriately.

Continued on Page 11

Model Warns of New Mosquito Invasion in Florida

NOW THAT the disease-transmitting mosquito *Aedes scapularis* has invaded the Florida peninsula, researchers have come up with a method to predict where conditions may be most suitable for its spread.

When a new mosquito species capable of transmitting disease arrives and shows signs it can survive across multiple urban and rural habitats, it brings the potential for public health risk.

Ae. scapularis is a nonnative mosquito discovered in Florida in November 2020. It can transmit yellow fever virus, Venezuelan equine encephalitis virus, dog heartworm, and other pathogens. It ranges from Texas to parts of South America and throughout much of the Caribbean. The species is also widespread in Florida's Miami-Dade and Broward counties.

In a study published in the journal *Insects*, scientists indicated through model predictions that suitable environments for *Ae. scapularis* could be present along coastal counties in much of Florida, from Monroe and Miami-Dade counties north to Martin County on the Atlantic Coast, and in Citrus County on the Gulf Coast.

"At least 16 Florida counties were predicted to be highly suitable for *Aedes scapularis*, suggesting that vigilance is needed by mosquito control and public health agencies to recognize the further spread of this vector," says coauthor Lawrence Reeves, a research scientist at the University of Florida's Florida Medical Entomology Laboratory.

Suitable Environments

The scientists used a process known as ecological niche modeling, which uses a machine-learning

algorithm to predict the potential distribution of a species across the landscape. Researchers often use the process to determine areas that nonnative species could invade.

"We are able to predict the potential distribution of *Aedes scapularis* in Florida and parts of the southeastern United States including Texas, Louisiana, Mississippi, Georgia, and parts of South Carolina," says Lindsay Campbell, an assistant professor of entomology and nematology.

"This model compares environmental and climate data from the native range of this mosquito in Central and South America with similar data from the southeastern United States and Florida to predict where areas might be suitable for the species," Campbell says.



Model output predicting the potential distribution of *Aedes scapularis*, shown in red and yellow. Lindsay Campbell, UF/IFAS

The researchers created a map, above, showing suitable environments where the species could spread. While it does not show the probability that *Ae. scapularis* is found at an exact location, it can identify suitable environments for this mosquito as it continues to spread.

"This information is useful to mosquito control districts monitoring for *Aedes scapularis*, now that it has reached the mainland, and it can be updated regularly," says Campbell. **PP**

— Lourdes Rodriguez, UF/IFAS

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Outside the Box, continued from Page 9

When we are explaining things to our customers, we must do so in a way that they can understand. Education is the key to success. We must educate the customer on what they can do to help us gain control of the issue, and why that is important.

I often use the following example when training on proper education of our customers. In the lawn care industry, if you tell your customer to water their lawn, what does that mean to them? Five minutes per zone, every day, seems like the right amount, right? When discussing situations such as these with your customers, think about them through the “lens of the customer.” You should describe the appropriate amount of water that needs to be put down and then relate that back to their irrigation zones, time per zone, and days of the week in which to water.

Another great lesson in Snow’s book is “How will the customer perceive the information I am about to give them?” For example, which of the following requests is better?

“Mr. Store Owner, please replace the door sweep on your back door. It’s needed.”

Or, “Mr. Store Owner, I noticed light coming from under the back door and upon my inspection, I found a 16 mm gap. That open space is large enough for a rat to get into your restaurant with the door closed. This could be one of the entry ways that the rodent we captured used to gain access into your building. Exclusion is always a great first step in controlling a pest problem, so it would be my recommendation to get this corrected.”

Clearly, the second example shows that you are trying to not only point out issues, but also educate the customer on the reasoning behind it. This type of response shows that you aren’t assuming anything about how your customer perceives your

service or their understanding of your instructions.

Next tip? Always ask for help when it is needed!

While no one is perfect, it is often difficult to admit you don’t know the answer, or next step. Attack the problem using first your own training and expertise. Then, perform a follow up and see how your initial treatment or thought process worked. If the problem hasn’t been resolved, or you aren’t seeing a good reduction of pests, bring it up to your supervisor. Now is the time to switch it up or provide more resources. Whether this is a field supervisor, a technical manager, or an entomologist; having an extra set of eyes and a second thought process surrounding the pest infestation will help to get better results for the customer, and get them more efficiently.

Many service professionals feel that if they bring pest problems to a manager, then the customer will feel like they don’t know how to do their job. At the end of the day, your customer wants the problem resolved, and fast. Bringing in additional resources to a problem shows the customer that you care about their situation and want to come up with the best game plan possible. This industry requires teamwork.

Bring up the specific issue to your company’s staff, get a manufacturer representative involved, take pests to the University of Florida’s Entomology Identification Lab, or reach out to other industry colleagues. Something that will always remain consistent in our field is that we are all here to help each other succeed. Never be afraid or ashamed to ask for help getting the problem resolved.

Final tip: Try the unusual

The definition of insanity is doing the same thing repeatedly but expecting different results. One of the biggest skills I focus



A game camera can catch a rat — or a cat



on in trainings is the ability to use your “technician tool belt” wisely. That means you may have to try different unconventional approaches if you are not achieving good results. This “out-of-the-box” thinking is going to help you problem solve those 3 percent of accounts that just don’t seem to go away.

Always start with the basics. Let’s consider rodent control, for example. It will probably take the least amount of your effort to trap the largest part of the population. It’s the last 10 percent of the population that will take most of your time and energy.

For me, the best example of this is in the use of game cameras. It is typically not a common practice to put game cameras out at every rodent trapping job, right? Of course not. That said, service professionals should know when to utilize such out-of-the-ordinary tactics.

Rodents can be very neophobic, or afraid of new

items, so learning the behaviors of the few alpha males that are left behind can help you fully resolve your customer’s issue. The use of game cameras can really give you a great picture or video of what is happening and what the pest is really doing when you aren’t there.

The camera will also help you determine best locations for trap placements as well as which of the food baits or lures that you used are being consumed the most. They might even tell you what specific pest you are facing. I think we could all agree the above game camera picture probably came from Dr. Koehler’s home!

This industry has an incredible number of tools, gadgets, products, and other resources to solve a pest-related problem. It is our job as the professionals to be able to deviate from our norm and get these issues resolved. Can’t capture that last rodent? Have pest problems in a vehicle? A new product might help.

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FPMA

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Insecticide Selection for Effective Landscape IPM

Adam Dale

EFFECTIVE landscape integrated pest management, or IPM, requires the use of multiple management tactics to manage the (eco)system, promote plant health, and reduce plant pests. In most cases, insect and mite pests become damaging in response to poor cultural practices like improper irrigation, fertilization, or plant selection. In other instances, predatory or parasitic organisms unable to thrive. When cultural practices can be improved, it sets the stage for fewer pests and easier pest management. Unfortunately, many lawn and ornamental pest control professionals have no control over their client's cultural management practices. But you can still make a difference.

Insect conservation

The topic of conservation has been more common in the media and on social media platforms recently. Much of this attention has been triggered by a mounting body of research evidence showing that insect biodiversity is dramatically declining around the world. Wildflowers, native plants, and rewilding urban areas are often the conservation strategies that first come to mind. However, conservation and pest management should also go hand-in-hand, particularly in an IPM program.

A primary tenet of IPM is to sustain background populations of pests and beneficials because these organisms help keep the ecosystem in balance. In the absence of predators, pests will thrive and reach damaging levels. Predators need prey to sustain themselves. Although predators will not eradicate a



Wolf spiders are important predators of many turf pests.

pest population, they will keep it below damaging levels. They do it all the time in nature.

I can almost guarantee that I'll find an individual plant pest on any plant in a landscape if I have enough time to search. In most cases that pest is not causing damage. That is because if managed properly, lawns, trees, and shrubs are supporting pests and predators. It is common to find lady beetles and lacewings crawling around plant leaves in search of prey.

If you haven't shined a flashlight at eye level across your lawn at night, I encourage you to do so. If the lawn is being managed appropriately, you should see hundreds of glistening eyes looking back at you. The spiders behind those eyes are key predators of many turf pests.

The absence of predatory organisms coupled with plant stress are what give those lone pests the opportunity to reach damaging levels and require intensive insecticide use. Pairing insecticide use with biological control provides the most effective and sustainable pest management program.

As pest control professionals, you may not have the ability to adjust plant management practices or install flowering plants in a landscape, but you can

affect the presence of predatory and parasitic insects in other ways.

Conservation via insecticide selection

In addition to basic label requirements (like PPE and application site), if you are applying an insecticide, at a minimum you should know the active ingredient and your target pest. I would argue that you should also know several other details about the product.

For example, does the insecticide rely on contact with the target pest or does it kill the insect as the pest feeds on the plant? If on contact, how long will the contact toxicity last? Research has shown that some contact-toxic products like z-cypermethrin are toxic to pest and predatory insects up to 14 days after application, simply from insects walking across a treated leaf. Consider when that broad-spectrum toxicity is necessary and when it is not.

Insecticides that get into plant tissue and rely on being consumed by a pest to provide control substantially reduce negative nontarget exposure to predatory and parasitic insects. This includes systemic products that move through a plant's vascular system and translaminar products that are taken up by plant tissue

Wolf spider eyes reflect light at night. See a video at tinyurl.com/eyes-in-lawn

they are applied to. Although not perfect, there are real IPM advantages to these products. Some, like chlorantraniliprole, provide extended plant protection by controlling caterpillars and beetles that feed on treated plant tissue, while allowing predatory beetles and other beneficial insects to thrive and control the pests that survive insecticide exposure.

Reduced-risk insecticides have been identified by the U.S. EPA as being highly compatible with IPM programs because they have reduced impacts on beneficial insects, applicators, and the environment. Many newer insecticides, particularly for ornamentals, fall within this category and provide highly selective control of target pests. Recent examples include flupyradifurone, afidopyropen, cyantraniliprole, and chlorantraniliprole.

Ask yourself, of the products you use on a regular basis, which ones are systemic? Which ones rely on contact? Are any reduced-risk products?

Tailor insecticide applications to the situation

It is also important to know when to use a product based on its spectrum of activity and how it controls the target pest. Two terms to simplify this are "curative" and "preventive."

Curative insecticides typically rely on contact with the target pest and are broad-spectrum, meaning they rapidly control most insects they encounter.

Continued on Page 25

Phil Koehler

ON PHIL KOEHLER

MAYBE some people did not know that I was not always a University of Florida professor. I have been at the University of Florida for over 45 years, and most of my friends are associated in some way with UF.

I have been fortunate to be associated with so many colleagues and students over the years. This has been a wonderful place. However, maybe you wonder where I came from.

I was born in southeast Pennsylvania. My father was a minister in the Evangelical and Reformed Church — now it is called the Congregational Church.

When I was a child, I spent my days watching ants crawl on the ground and was fascinated by them. I lived in an area where baseball, not basketball, was the sport of choice. I was the right fielder for the Little League team. In case you didn't know, the right fielder is usually the worst player on the team.

I would stand in right field and watch the ants crawl on the ground. I didn't even go after balls hit to me until people yelled. The ants were the best entertainment for me.

When I was in high school, I was considered a real nerd. I wanted to go to college but realized that my father's salary would not cover the tuition, room and board. I got a job working at McDonald's in 1963, just a few years after the company was formed, when I was a sophomore in high school.



I was paid \$1 per hour and worked four hours after school during the week and eight-hour shifts on Saturdays and Sundays. When I graduated from high school, the owner of the McDonald's franchise offered me to run one of his restaurants and to become a part owner of the franchise. I said "no," I want an education. The person who took the job became a multimillionaire before I graduated from college.

Undergrad Studies

I went to Catawba College in Salisbury, N.C., and majored in biology. The college gave me a scholarship that covered my tuition because it was a church-affiliated school, and my father was a minister. So basically, my savings from my salary at McDonald's were sufficient to see me through my undergrad years.

I applied and received funding for a summer National Science foundation fellowship to do research at Oak Ridge National Laboratory. I did that for two summers, after my sophomore and junior years in college. The research was fascinating. I worked with chironomid midges (blind mosquitoes) that lived in the radioactive muck at the bottom of White Oak Lake.

The radioactive material was World War II waste from the production of A-bombs that had been buried in the ground. The bombs had rusted through and released the waste. A dam was built to contain the waste. I studied the chromosomal aberrations from exposure from this radioactive material for two summers in Oak Ridge, Tenn.



Blind mosquito

Since I had so much fun wading in radioactive waste to collect the midges, I applied for and received another NSF fellowship to go to Argonne National Labs near Chicago, Ill. There I studied radiological physics with classes from the University of Chicago, where the first nuclear reactions were accomplished. I specifically was using neutron activation and gamma ray spectroscopy to study trace element pollution in fish of the Great Lakes.

It was here that I found out what I did NOT want to do. I did not want to be a radiation physicist. I did this research during my senior year for Catawba, and drove from Chicago to Salisbury, N.C., for my graduation.

Advanced Studies and Military Service

I had loved my first entomology course at Catawba College and applied for graduate school in Entomology at Cornell University. Dr. David Pimentel accepted me as a Ph.D. student and provided a stipend to do research on the alfalfa weevil for my Ph.D. dissertation.

Part of my responsibilities as a graduate student was to be a teaching assistant in medical entomology. I used that teaching position to keep the Army from drafting me for Vietnam for one year. This was the height of the Vietnam War, and I had a draft number of 27, which meant I had no way out of being drafted for the infantry.

I applied to the Navy for commissioning as a lieutenant medical entomologist in the Medical Service Corps. I went through the School of Health



Care Administration training at Bethesda, Md., and my final duty station was the Disease Vector Ecology and Control Center in Jacksonville, Fla. Today that station is called Naval Entomology Center of Excellence (NECE).

I started out there as training officer and eventually was both training officer and operations officer for the command. As training officer, I was responsible for training the pest control personnel for both shipboard and ground installations for the entire eastern United States.

As operations officer, I was responsible for reviewing pest control operations for ships and shore installations in the Southeast United States. In that role, I traveled a lot and got to visit Key West; Pensacola; Guantanamo, Cuba; Tennessee; and Charleston, S.C.

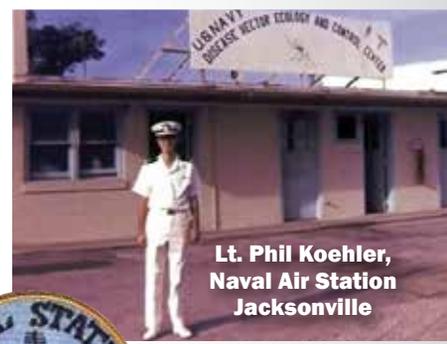
I still remember seeing the Acey Ducey Club bar on the base at Charleston. They had a pressurized system for delivering 1 ounce of whiskey from barrels through plastic tubing to the bartenders. The rats had learned to chew through the tubing and get drunk. There were drunk rats running everywhere on base.

The biggest problem we dealt with back then was German cockroaches aboard ship. Some of the ships had horrendous infestations. One sailor came up to me and asked if cockroaches can bite. I said they have chewing mouthparts and they can pinch your skin. He said to look at his eyelashes. They were chewed off by cockroaches. He said they crawled on him while he slept and chewed on him during his off-duty hours. ▶

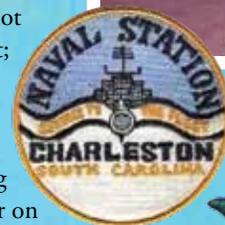
Continued on Page 20



Phil at pupil stage



Lt. Phil Koehler, Naval Air Station Jacksonville



Dr. Roberto Pereira with Dr. Phil Koehler and fly trap, UF Urban Entomology Lab





Indian Peafowl In Florida

Pavo cristatus



Peacocks are strutting, eggs are hatching, and Indian peafowl breeding season is well under way in Florida.

AKA: Common peafowl, blue peafowl, Indian peacock

Male: Peacock. Full adult plumage is not attained until three to five years old

Female: Peahen

Related species: Guinea fowl and pheasant species

Native: India and Sri Lanka

First seen in Florida: 1950s, probably as introduced or escaped ornamental birds

Predators and hazards: Raccoons, gray foxes, coyotes, dogs and cars



Peahen and young

HUMAN interactions with Indian peafowl can be both positive and negative. Some of your customers may enjoy these spectacular birds roaming their neighborhood, while others may find them to be a nuisance.

The most important element in preventing conflicts with peafowl, as it is for every species of wildlife, is: **Don't feed them!** This is the first step to reduce the chance they will establish a residence. However, there is no guarantee that neighbors will follow this recommendation and, regardless of any human-provided food, the peafowl may find a suitable roosting site locally.

Biology and habits

Indian peafowl populations are firmly established in Florida, with widespread breeding from free-living, semidomestic, or feral populations. They tend to roam in spring and summer until they have found a suitable home range. Then they may remain resident in that area. Males will defend a territory in the breeding season. Single males, or peacocks, may roam all year long.

Peafowls' estimated Florida range is growing. From large pockets in central and northern Florida, their range has extended much farther south over time. An increasing population is now found south of Miami and into the upper Florida Keys.

Their preferred urban habitats are along the edges of cities and within agricultural areas, large estates, suburban gardens, arboreta, and large, grass-covered common areas.

Omnivorous and opportunistic feeders, Indian peafowl are highly destructive to cereal and peanut crops and garden flowering plants. Peafowl generally feed on seeds, grain, berries, tender young shoots of crops, flowers and flower buds, fruits, snails, insects, lizards and frogs. Peafowl also eat termites!

Indian peafowl impact on native species is unknown.

Nests are constructed on the ground under thick cover. Roosting sites tend to be in larger trees — pines may be favored.

Clutch size is typically four to eight eggs, but as many as 10 eggs are laid and incubated for about 28 days. At hatch the chicks are precocial, or relatively mature and mobile. Covered in downy feathers, chicks are able to forage and eat on their own and capable of leaving the nest two hours after hatching. Chicks do, however, require the hen to protect and keep them warm and safe. Chicks may stay with their mother for nine months.

THE FOLLOWING section presents issues that might arise and the humane responses that effectively resolve these issues.

You have found a peafowl chick

If they are lost or the female is dead, chicks need to be caught and may need to be brought into care. A lost peafowl chick or chicks will call in high-pitched peeps, and, most obviously, be alone.

Peahens with broods may adopt chicks of other broods. However, you will need to supervise and intervene if this process is not successful. Begin this process by distracting the peahen with food such as bird seed or cat kibble. Release the orphan once the adult is eating, then observe her behavior over the next several hours to ensure she accepts the new chick in her brood.

Peafowl are roosting in your trees or on the roof

They may be moved along by using the humane hazing strategies listed on page 17. You can also try using the noise-maker approach. These methods take A LOT of repetition, because often once they are scared off, they come back 10 minutes later. Don't be discouraged after one day. If done consistently, you should see fewer and fewer peafowl as time goes on.

Photos this page: J.M. Garg, Jatin Sindhu, and Winkelbohrer. Facing page: Javo Martinez

They are pecking at your car or windows

During the spring and summer breeding season, male peafowl see any intruding males as competition. The reflection on your car or windows is perceived as a strange male in their territory. This male must be evicted, hence the attacks on these shiny, reflective surfaces.

You can reduce the issues by covering your car. For windows, set the sprinkler to go off if the peacock approaches the area. You can also try spraying him with your garden hose. If he is very persistent, you could also try covering the windows, or even spray him with a mixture of water and dish detergent to reduce the reflection.

They are so noisy

The main periods of calling are dawn and dusk while in the roosting areas. However, their calls may be heard all day. Reducing foraging opportunities and hazing as noted at right will help keep them out of your immediate area. Using a motion-sensitive water sprinkler system at the roost sites may encourage them to move to a safer area.

Just keep in mind that peafowl make sounds for a number of reasons. For instance, calling in the morning and evening helps keep the family together — they are a “Goodnight, John-Boy,” “Goodnight, Dad,” type of thing. During the day, males call to advertise their presence and availability. Essentially, they are looking for love!

You can't stand the feces in your pool/porch/garden

If you need to remove the mess, try wearing gardening gloves or other protection to pick up and dispose of feces,

or simply hose it away. White vinegar will help remove stuck-on feces and dissolve any white urates. Then, use the hazing suggestions to reduce the number of peafowl in the area.

PEAFOWL tend to remain in a localized area and can form a strong attachment to a roosting or feeding site. Steps to reduce the attractiveness and suitability of these areas are outlined below.

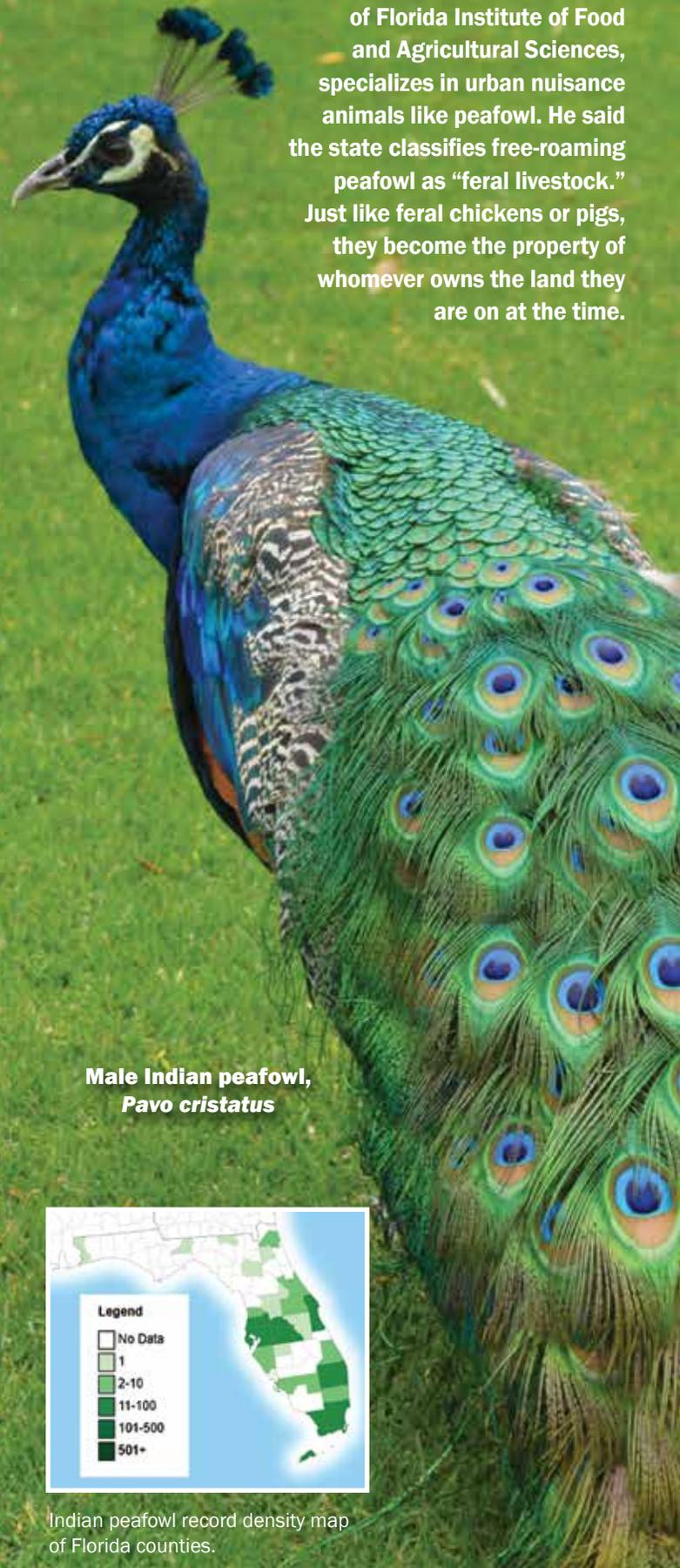
Humane hazing techniques

1. Use a motion-sensitive water sprinkler system set to spray the area if any motion is detected.
2. Make loud noises: air horns, whistles, bang pots and pans together.
3. Advance on the birds waving a white towel to help make you look big and scary
4. Walk outside with your dog on a leash and allow your pet to bark at them.
5. Use your leaf blower to make noise and odd wind movements.
6. Turn your garden hose on the birds to annoy and encourage them to move.

A humane (and legal) note: Peafowl are considered domestic animals, and are the responsibility of the property owner. They cannot be subjected to any action deemed cruel. They may not be wounded or have any pain inflicted on them. That means you cannot shoot them, injure them, or in any way use inhumane methods to remove them. **IP**

Article adapted from the publication Indian Peafowl, Pavo cristatus, courtesy of South Florida Wildlife Center, Ft. Lauderdale, Fla.

EDDMapS. 2021. Early Detection & Distribution Mapping System. The University of Georgia – Center for Invasive Species and Ecosystem Health. Available online at <http://www.eddmaps.org/>; accessed April 12, 2021.



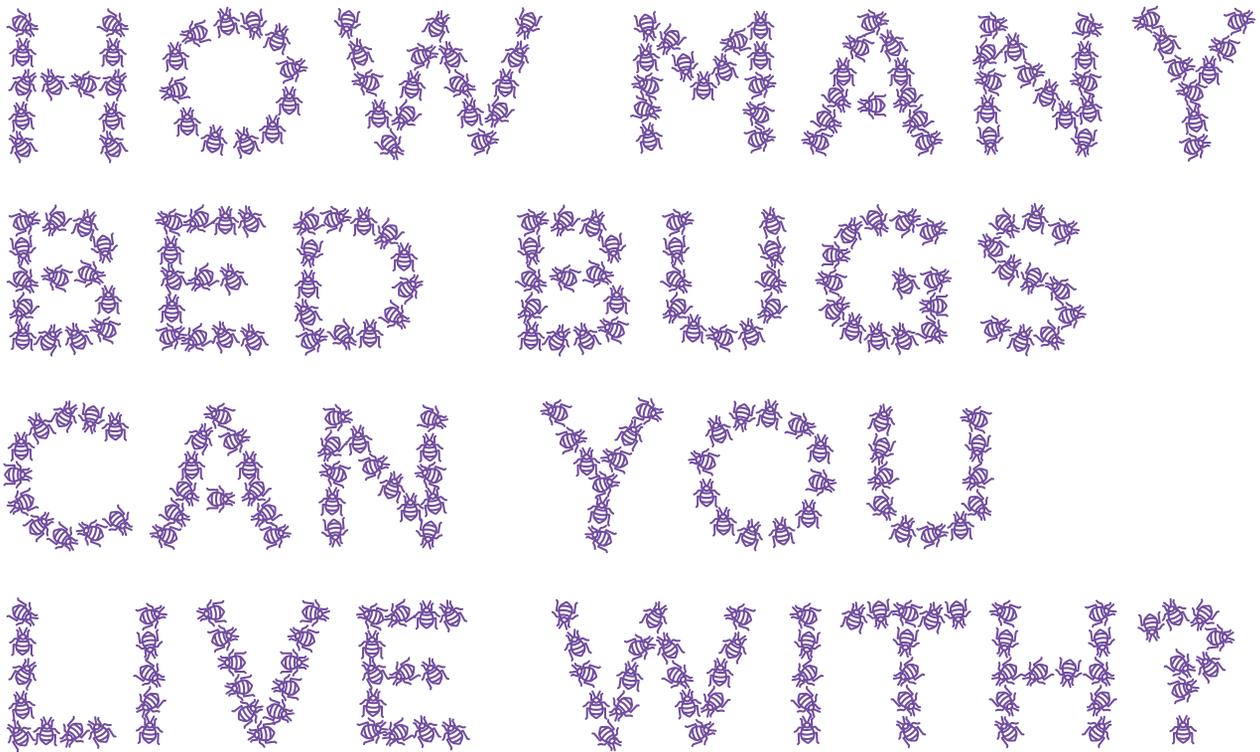
Dr. William Kern, associate professor of entomology and nematology at the University of Florida Institute of Food and Agricultural Sciences, specializes in urban nuisance animals like peafowl. He said the state classifies free-roaming peafowl as “feral livestock.” Just like feral chickens or pigs, they become the property of whomever owns the land they are on at the time.

Male Indian peafowl, *Pavo cristatus*

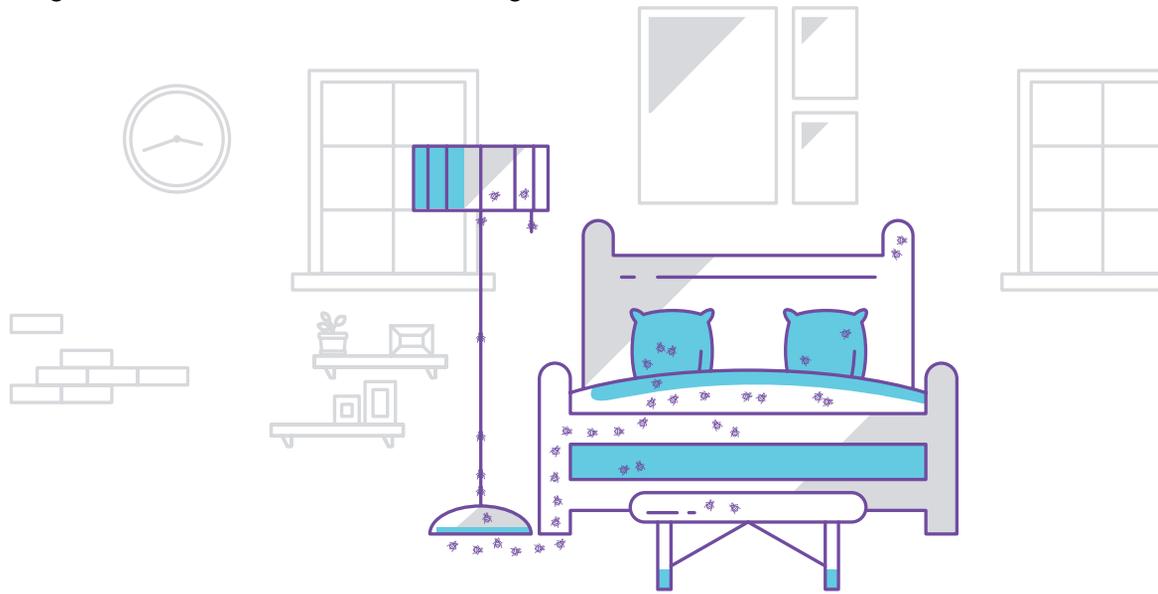


Indian peafowl record density map of Florida counties.

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Name: Steve Lum

Hometown: Bronx, New York

Where you live now: Cocoa, Florida

About your company: Slug-A-Bug Inc., Melbourne, Fla., was founded in 1982 by Douglas C. Vander Poest. We are a full-service pest management company. We help people enjoy life and wellness in a pest-free environment. We are a people investment company disguised as a pest management firm.

First paying job and what you learned from it: Dishwasher. Dishwashing taught me that if the down-and-dirty does not get done, then things just stay a mess.



Steve Lum

First break in the pest business:

Answered a newspaper ad for a salesperson to work for Orkin. At Orkin I heard about a small company called Slug-A-Bug. I eventually got

fired from Orkin because, though I loved the service, I was not a very good salesperson. I went on to other jobs but never forgot about my interest in pest management.

Some years later I walked into Slug-A-Bug's then-tiny office and asked for an application. In my application I stated I was with Orkin for six months. I met with the founder of Slug-A-Bug, Doug Vander Poest. His first statement to me was, "So I see you worked for Orkin for six years." I stated NO, I was only with Orkin for six months. Doug's next words to me were, "You're hired."

Best business book: *Fierce Conversations*, by Susan Scott. It is more of a personal development book than a business book. However, you cannot do business without the skills in that book. It literally changed my life by changing my view on confrontations.

The best piece of business advice you received: Know where you've been. Know where you are. Know where you are going and how you will get there. What got you here, won't get you there.

What you would tell someone new to the pest business: Though it is critically

important to operate with technical excellence, your success or failure in the industry will depend on how well you take care of and connect with your clients and how well you care for, lead, and develop your team. Take care of your people, and they will take care of you.

Where can we find you when you are not at the office? I love to be home working on the house or on my property. I enjoy doing absolutely nothing except enjoying time with my wife, since I rarely get the chance to do nothing.

What is the most important trait you look for when hiring? One trait is hardly enough. I look for one's desire to give, serve, learn, grow and develop themselves so they can make a difference in the lives of others. **PP**



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Adele and Phil

Phil Koehler, continued from Page 15

As training officer, I organized training programs that incorporated information from professors at the University of Florida. I could usually let them play golf on the base courses in exchange for a great lecture to our Navy personnel. So, I got to know them quite well.

I stayed in the Navy for three years. During my last year in the Navy I married my wife, Adele, who had just gotten her M.A. degree in art history. We both

decided that we did not want to stay in the Navy because it would require packing up and relocating households every two to three years.

Phil Joins the Gator Nation

I interviewed for positions at the universities of Massachusetts, Delaware and Florida. I was fortunate to be selected to become an assistant professor and Extension entomologist at UF. I accepted the position and moved to Gainesville in 1975.

It was during this time that the EPA began requiring certification of pesticide applicators. I wrote the Florida manuals for livestock and poultry and structural pest control. We traveled a lot giving certification programs for the agricultural and urban pest control industries throughout the state.

In those days, the CEU programs were held on Saturdays. For five years, I would work almost a full week, travel to Miami or some other site on Friday afternoon, give a six-hour program on Saturday, and then drive back to Gainesville on Sunday.

Because there were seven regions for FPMA, it would take all of September through November to do the training. There were basically no days off because the university expected professors to be on the job during the week. There were no days to watch a football game. I was so glad when the association started providing the programs during the work week.

IN 1982, Dr. Richard Patterson asked me if I could take a sabbatical and work at the USDA Lab in Gainesville for a year to help him get the Household Insects Project running. I talked with my department chair to see if it was possible. He said to just do a job relocation. I asked what that was, and I was told to just go to work at the USDA. So I did, and became a visiting UF professor at the USDA.

Dr. Patterson and I worked together and won just about every award that the USDA offered. Dr. Patterson even was named Scientist of the Year and did a worldwide tour of universities in many parts of the world.

It was funny that nobody ever told me to return to the University of Florida to work. So, I stayed at the USDA for 13 years, rather than one year.

Continued on Page 26

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FL West Coast		Gross \$500,000	Maryland	SOLD Gross \$1.8 million
FL West Coast	SOLD	Gross \$680,000	Central FL	SOLD Gross \$1,000,000

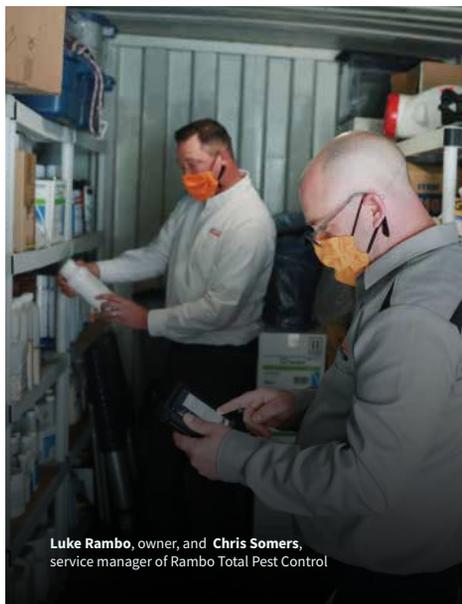
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Insecticide Resistance Operations



Tal-Beth Cohen, Lauren Maestas, and Neil Sanscrainte



▲ The Center for Medical, Agricultural, and Veterinary Entomology, or CMAVE, is a part of the USDA Agricultural Research Service in Gainesville, Florida. Within the walls of CMAVE lie state-of-the-art laboratory equipment and dedicated researchers focusing on a myriad of topics affecting human health and agriculture.

AMONG CMAVE topics is the high-throughput analysis of mosquitoes for genetic resistance to insecticides. Over the years, the Navy Entomology Center of Excellence, or NECE, has benefited from a long-standing partnership with CMAVE that has led to operational work in insecticide resistance (IR) and genetics on both local and global scales.

Due to generations of widespread insecticide use and overapplication of insecticides such as dichlorodiphenyl-trichloroethane (DDT) and pyrethroids, insecticide resistance has become a major impediment to the control of insect pests such as mosquitoes, house flies, and cockroaches.

One important mechanism that confers resistance, in various insect species, to

both DDT and pyrethroids is knockdown resistance gene (*kdr*), by reducing the binding capacity of the target sites in insects to these insecticides.

The *kdr* mutation affects the function of the voltage-gated sodium channel of nerve-cell membranes in various insect species by either canceling or reducing the knockdown (*kd*) effect. In other words, this mutation leads to reduced sensitivity of the insect nervous system to the active ingredients in pyrethroids and DDT.

Battling IR begins with the isolation of the resistance mechanism and differentiation between resistant and susceptible mosquitoes. The USDA has continuously maintained an insecticide-susceptible *Aedes aegypti* colony as a reference strain since it was collected from Orlando in 1952. Additionally, an *Ae. aegypti* pyrethroid-resistant strain was collected from Puerto Rico by collaborators and maintained at CMAVE through insecticide pressuring of larvae as needed.

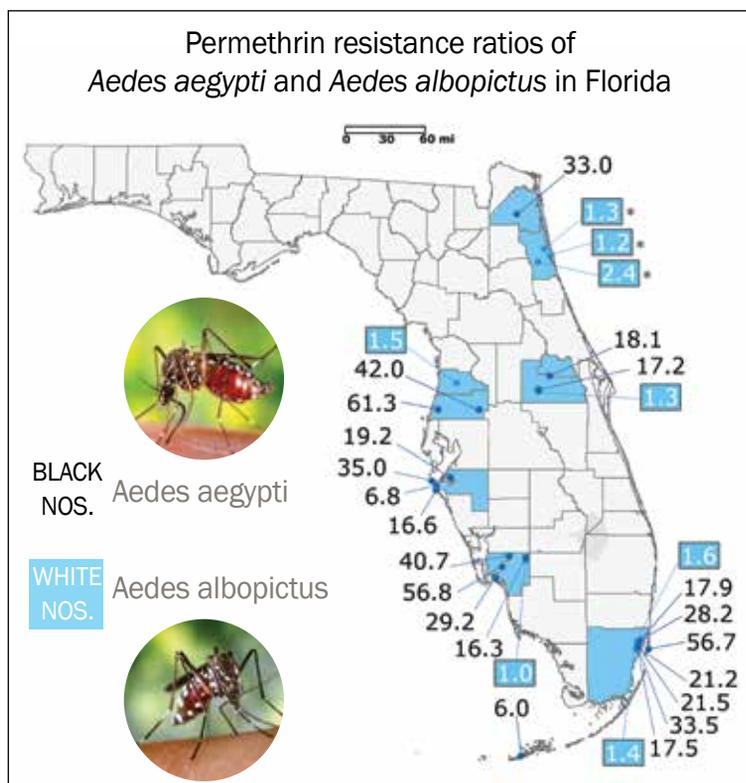
The current efforts at CMAVE are directed toward understanding the insecticide resistance mechanisms for a better management strategy. Two major assays are conducted at CMAVE for IR: standard toxicological and *kdr* molecular assays. The toxicological assays are performed to confirm the resistance status of an *Ae. aegypti* population by using topical application and bottle bioassays recommended by the Center for Disease Control and Prevention (CDC). *Continued next page*

MAP AT BELOW RIGHT:

Permethrin resistance ratios of *Ae. aegypti* (black numbers) and *Ae. albopictus* (white numbers in blue boxes) in Florida.

Resistance ratios for the different strains were calculated by dividing the dose needed to kill 50 percent of the population of a certain mosquito strain by the dose needed to kill the standard susceptible mosquito strain.

Resistance ratios represent how much more pesticide would be needed to kill a certain mosquito population in relation to the standard susceptible mosquito strain. Some populations in Florida require more than 50 times the normal dose for a comparable mortality level.



Neil Sanscristine, USDA



James Becnel and Al Estep

The *kdr* molecular assay targets two to three regional forms of the *kdr* mutation. The molecular assay is validated by testing both pyrethroid-susceptible and pyrethroid-resistant individual *Ae. aegypti* whose insecticide-resistance profile was determined from toxicology/pesticide exposure assays. The corroboration of these assays helps demonstrate the link between *kdr* mutations and resistance.

Scientists at NECE and CMAVE have integrated this method into a high-

throughput *kdr* testing program that resulted in the first statewide map of pyrethroid resistance in Florida *Ae. aegypti*.

THE mosquito *Aedes aegypti*, the main carrier of dengue, Zika virus, and yellow fever worldwide, is becoming more common in Florida. Limited Florida outbreaks of dengue in 2009–2010 and Zika in 2016 involved *Ae. aegypti* as the major disease carrier, according to James Becnel, an entomologist at CMAVE.

During public health emergencies, multiple strategies are used to control mosquitoes, including application of pesticide sprays by truck or aircraft. Understanding the magnitude of insecticide resistance is critical to an effective control program, Becnel said.

Pyrethroid insecticide resistance is common in *Ae. aegypti* in many locations worldwide and can adversely affect mosquito control operations, Becnel said. However, the resistance status of *Aedes* in Florida has largely gone unreported until now.

The four-year study, published in *PLOS Neglected Tropical Diseases*, shows that resistance to permethrin—an insecticide in the pyrethroid family—was present in all 20 *Ae. aegypti* strains collected from around the state. Importantly, permethrin doses up to 60 times above susceptible levels were required to effectively control some resistant populations, according to Becnel. In contrast, *Ae. albopictus* strains collected did not show permethrin resistance.

The study found a strong correlation between the actual resistance status of adult *Ae. aegypti* (determined by topical application) and the mosquito genotype. This data can be used to rapidly predict pyrethroid-resistance in mosquitoes within 24 hours by detecting certain genetic mutations. This information, Becnel said, can then inform control districts as to whether they need to try other control strategies, such as using larvicides to target immature aquatic mosquito life stages before they become adults.

These findings also allow scientists and control districts to be more thoughtful in selecting effective control methods for mosquito populations that are resistant to pyrethroids. The research also emphasizes the need for resistance testing in any effective mosquito management program.

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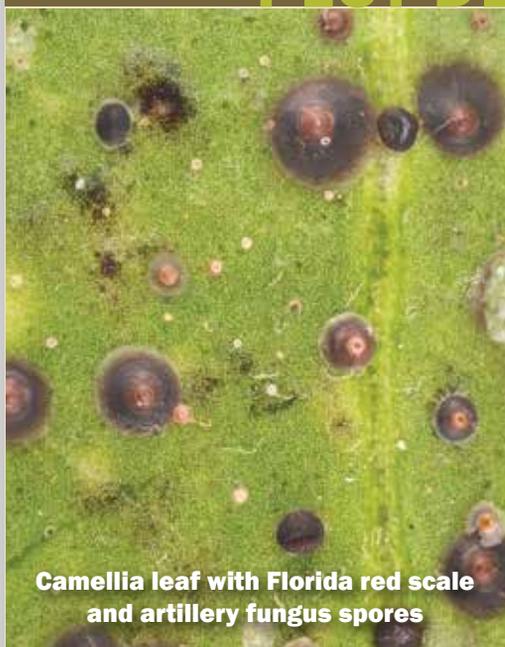
NECE and CMAVE scientists have also used their combination of genetic and toxicology testing to conduct population-level surveillance for pesticide resistance on field-collected mosquitoes for control districts in Texas, Arizona and California. These findings can then be used operationally to inform the suite of insecticides that should be applied to manage pest populations. While kdr mutations vary by species, this technique could be expanded to other mosquitoes such as *Culex* and *Anopheles* species.

Developing best management practices for pests is not the only function of the joint resistance initiative by NECE and CMAVE; it has provided training in genetic resistance assessment methods, served as the provider of assay controls for collaborators, and assisted with data production/analysis to support local, state and DoD vector control operations. Additionally, both domestic and international laboratories have set up rapid testing programs based on the automated high-throughput assay system born from this Navy and USDA partnership. **PP**

This article was written by Lt. Tal-Beth Cohen, Navy Entomology Center of Excellence, Naval Air Station Jacksonville, Jacksonville, Fla., Lauren Maestas, Navy Entomology Center of Excellence, Naval Air Station Jacksonville, Jacksonville, Fla., and Neil Sanscrainte, Center for Medical, Agricultural, and Veterinary Entomology, United States Department of Agriculture, Gainesville, Fla.

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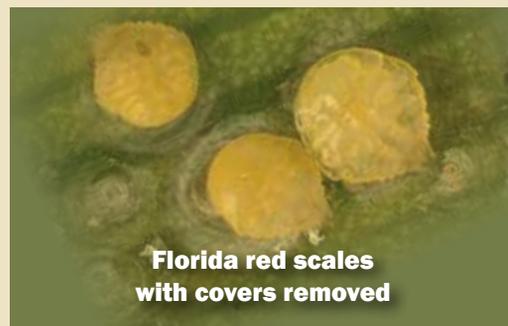
Additional text provided by Sandra Avant, USDA Agricultural Research Services, the U.S. Department of Agriculture's chief scientific in-house research agency.



Camellia leaf with Florida red scale and artillery fungus spores



Artillery fungus spores closeup



Florida red scales with covers removed

Photos by Lyle J. Buss

Artillery fungus, a scale look-alike

Lyle J. Buss

MY NEIGHBOR knows I like bugs, so he sometimes shows me interesting plant pests in his yard. Last time he directed me to a camellia that had a lot of dark spots on the underside of the lower leaves. At the above left is a closeup photo of the leaf surface — what is your diagnosis?

The main problem on the camellia leaves was scale insects. For those of you that don't work with plants, scale insects are a group of small insects that are classified in the same insect order as stink bugs, bed bugs, and aphids. They have strawlike mouthparts that they insert into plant tissue to suck out sap. Most of them don't move much — once they find a place on the plant to feed, they remain there for the rest of their lives.

More specifically, this insect is called Florida red scale, and it is a type of armored scale. Armored scales get their name because the scale insect constructs a cover over itself for protection. If you pry up these covers, you'll find that the actual scale insect is a small yellow blob. The covers of this scale are round and mostly dark brown with the center a lighter red. You'll also notice some tiny white spots on the leaf. These are young nymphs that are just starting to make their covers, which they will steadily enlarge as they grow.

There is something else in the photo besides the scales. You can see some spots that are solid black and smaller, about 1 mm in diameter. These are actually spores from an artillery fungus. The artillery fungus is a decay fungus that gets on wood in advanced stages of decay. Their spores are forcibly ejected and stick to houses, plants, and other objects that are as far as 20 feet from the fungus. Once these spores dry, they are very difficult to remove from surfaces.

So why is all this important? Scale insects can build up large numbers on plants, causing leaf discoloration, general plant decline, branch death, and sometimes even death of the entire plant. Artillery fungi are not plant pests, so their spores are only a minor cosmetic problem for plants. Mistaking these spores for scales could lead to unnecessary and ineffective insecticide applications. The more serious problem that artillery fungi cause is when they shoot their spores onto siding of homes or nearby cars. People sometimes damage their siding or paint in their attempts to scrape off these spores. **PP**

Lyle J. Buss, Scientific Photographer, manages the Insect Identification Lab at the UF/IFAS Entomology and Nematology Department.

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Insecticide, continued from Page 13

Preventive products tend to work more slowly but provide longer control and are more selective for the target pest. If southern chinch bugs are crawling up your legs after stepping into a lawn, a curative insecticide application would be appropriate to prevent impending turfgrass death. However, if you see only early signs of plant damage and a couple dozen chinch bugs per square foot, a preventive product would be better suited to manage the problem. Sequential curative insecticide applications to a lawn, tree or shrub are rarely needed.

Eileen A. Bus, UF/IFAS



CURATIVE: Severe chinch bug infestation



PREVENTIVE: Mild chinch bug infestation

Does your treatment need to cure or prevent a given problem? For example, a severe chinch bug infestation would require a curative insecticide application, but a mild infestation would need only a preventive product.

Application techniques

In addition to how insecticides control pests and their spectrum of activity, product formulations and application techniques can also determine compatibility with conservation efforts and IPM.

Foliar liquid applications tend to provide the greatest exposure of an insecticide to insects or mites that may visit the exterior of the host plant. If treating a tree or shrub, consider making a soil drench, root injection, or trunk injection to provide equivalent or better pest control while drastically reducing nontarget exposure to predators inhabiting those plants. If treating a lawn, could you apply the same product as a granular formulation? Research has shown that granular applications reduce nontarget exposure to beneficial insects compared to liquid applications. Similarly, could you treat areas of a lawn with existing pest infestations, but not areas without pests?

Insecticides and IPM

It is important to remember that IPM does not mean “pest management without insecticides.” Insecticides are a critical component of IPM. However, IPM does mean tailoring insecticide use to maximize its compatibility with other forms of pest management. This means selecting insecticides and applying them based on how they work, the presence and severity of a pest population, and using a method that minimizes nontarget exposure.

I hope the details outlined above will help you maximize how truly integrated your pest management programs are. **PP**

Dr. Adam Dale can be reached by email at agdale@ufl.edu. More information about his research and extension programs at the University of Florida can be found at dalelab.org.

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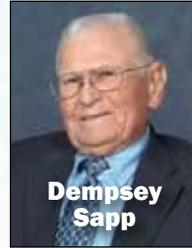
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The lab I worked in was contaminated with asbestos. The USDA closed the entire building where I worked for two years and told me to find another place to work. When I spoke with my UF department chair, I asked him when I would be able to get a lab and office in the entomology building. He said, "Never. Go build your own building." So, I did that with industry support. I moved into the new urban entomology building in 1995.

In 1998, Florida Pest Control Co. founder Dempsey Sapp saw me at an

FPMA breakfast in Orlando. He asked if I could stay after breakfast and meet with him. I agreed. He asked me how much it would cost for him to endow a professorship in urban entomology. I said, "Probably a million dollars." He said he wanted to do that.

So, he and his wife, Margie, endowed the Chair in Structural Pest Control. A little later, the FPMA raised funds for a second Chair in Urban Pest Management. I was named the



Dempsey Sapp

Margie and Dempsey Sapp Endowed Professor of Structural Pest Control and the FPMA Endowed Professor of Urban Pest Management in 1999.

I made sure that the professorships did not pay my salary with the funds, but provided support for students and scientists in the program. Then in 2005, our entomology research program outgrew the urban entomology building. We were able to have an addition built, again with industry funds.

Over the years, I have been very fortunate to be surrounded by wonderful scientists and students at the University of Florida. Many have gone on to become leaders in the urban pest management industry. We have conducted research for the pest management industry on cockroaches, fleas, ants, flies, mosquitoes, and bed bugs. Our labs have been associated with new technologies like the development of cockroach baits, insect growth regulators for fleas and cockroaches, bed bug heat treatment, canine detection of termites and bed bugs, and most recently, mosquito traps and larvicidal chips for control of urban mosquitoes. Just the canine insect detection work has resulted in an estimated 20,000 dogs in the United States working to detect bed bugs.

Look Out, Pests: It's Phil's Second Act

On July 1, 2020, I retired from the University of Florida and have just completed a one-year self-quarantine during the COVID pandemic. I am now back at work at UF and want to continue working. I am still teaching and conducting research and education programs in urban pest management.

One of my retirement hobbies is helping Inzecto with commercialization of the mosquito traps and chips. The University of Florida patented those inventions and has placed them with the Inzecto Co. The traps are now registered with EPA and the European Union, and are being shipped worldwide. We hope that these traps will help control the mosquitoes that transmit dengue, yellow fever, chikungunya, Zika, and West Nile virus.

I am hoping that I have a few more years to be of service to the pest management industry. It is a great industry that has provided a great deal to the health and well-being of people in the United States and around the world. **PP**



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RAND HOLLON



“IT’S NOT what you don’t know that gets you into trouble. It’s what you know for sure that just ain’t so.”

“The Big Short,” a movie about the 2008 financial crisis, attributes the quote to Mark Twain. Although the source is not substantiated, the quote is certainly supported by the historic truth of an unimaginable number of situations (“Hold my beer...”) where the level of risk is wrongly assumed. In the movie, the quote refers to cognitive biases about the state of financial markets prior to the 2008 financial crisis. These biases provided the perceptual distortions, irrationality and inaccurate judgements that helped create the financial crisis. Wrong assumptions were made about risk.

In the pest control business, risk comes with the territory. There are levels of risk attached to everything we do. Risk is present every morning when a service vehicle is started and carries right on through the end of the day when planning the next day’s business. Obviously, part of that planning involves putting new things in place, and evaluating things currently in place that can reduce, or increase, a business’s risk. Every day we all operate based on the assumption of acceptable levels of risk.

Buying or selling a pest business is not without its own risk. And, just like in the movie, cognitive biases the Buyer and Seller may have play a role in creating inaccurate assumptions that can increase risk in an acquisition.

On the buy-side of the equation, here are three examples of assumptions — of which there are many — to be mindful of when buying a business.

1. Changes can be made quickly. The only person that likes change is a wet baby. (That one did come from Mark Twain.) Successful integration of the acquired business into the Buyer’s organization is critical. However, making changes too fast can sacrifice current employees, existing customers, and future profits.

2. The people resources will be there. I’ve said it in a gazillion articles and presentations, “the pest control business is a people business.” Assuming key employee talent will simply sit out post-Close is a dangerous one. Buyers should spend time talking to Sellers in depth about key employees. What are their strong points and weak points? Which employees of the Seller’s organization will prove to be strong assets post-Close?
3. Hot hands. Previous acquisition success doesn’t guarantee future acquisition success. And, even though in the pest industry we’re all doing the same stuff, we’re all different. Allowing past successes to form a cookie-cutter approach to things like due diligence, valuation, contracts, and integration can be self-defeating. In addition to past successes, a successful Buyer’s toolbox should also include lessons learned from past struggles, open-mindedness, and creativity.

Sellers can also wrongfully create their own “subjective reality” and make their own inaccurate assumptions. Here are three examples:

1. Valuation. It’s difficult not to arrive at an arbitrary, but still assumed number. Seller valuation based on emotion, hearsay from pest industry sewing circles, or even burnout, can end with a poor result. Asking too little may cause Buyers to think something’s wrong with the business. An extremely high asking price may repel prospective Buyers convinced that the Seller is simply “fishing.” A thoughtful valuation of the business is often the first step to a successful transaction.
2. Knowing the process. It’s human nature to sometimes oversimplify. Oversimplification often comes with a bushel basket of assumptions. The days of hammering out a deal on the back of a cocktail napkin are long gone. In addition to its own terminology, the world

of acquisitions is rife with varying due diligence procedures, deal structures, purchase agreements, and ancillary document requirements. While you may be an expert at running your business, it can be folly to assume you’ll also be an expert at selling it.

3. Knowing the best Buyer. Assumptions are easy to come by when armed with a drawer full of dusty solicitation letters, old emails, and stale pest industry scuttlebutt. Today’s marketplace is dynamic, local, and global. With the myriad of different buyer-types out there, simply identifying the best qualified Buyer who will place the highest value on a business is a job in and of itself.

I’ve provided but a sampling of wrongful assumptions — and there are many — that can have a negative impact on acquisition transactions for both Buyer and Seller. From the outset, a good team will help you navigate through many of these cognitive biases and assumptions. Effectively navigated, all parties can move forward through a successful transaction eyes wide open. A transaction where inherent risk is greatly reduced and success provided for both Buyer and Seller. A deal where what you know for sure — is for sure. **PP**

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.



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Outside the Box, continued from Page 11

WHAT about a German cockroach infestation in a home where the occupant has respiratory issues? I once had a customer who had been dealing with a bad German cockroach infestation in his home, and since he couldn't leave the home and had respiratory issues, was told there wasn't anything that could be done. After arranging the treatment on a cooler day and asking the homeowner to enjoy some porch time while we performed our treatment, we were able to resolve the issue. We administered compressed air to flush cracks and crevices, and used a vacuum to remove most of the cockroach population.

Since we hadn't used any pesticides that would contaminate a gel bait product, we were able to go right back in with cockroach gel bait. Was this slightly more time consuming, taking longer to gain control? Maybe. However, we were able to solve this customer's pest problems safely and efficiently. That's our mission.

IT CAN BE EASY to run inside and throw out some gel bait for ant issues in a customer's home and move onto your next stop. What about following that ant trail outside? There you may realize the ants are harboring at the base of the home. In this same area, they are feeding off honeydew-producing insects, i.e., aphids, that are on the ornamentals.

Or, what about flies inside a customer's home that lead to dead rodents within their attic? In the pest control industry, we are often put into situations where innovative and critical thinking can help us achieve better results. Take your time while performing your inspections to truly understand your customer and their needs. Rely on that knowledge and training.

By assuming nothing, asking for help when needed, and trying the unusual, we can often get through the difficult pest problems with a fantastic outcome. Don't forget to think outside the box. **PP**

Cory Goeltzenleuchter, PHE, a member of the NPMA Technical Committee and the Secretary of the Urban Pest Management Technical Committee, serves as the Entomologist and Director of Technical Services for McCall Service, Jacksonville, Fla. He has a bachelor's degree in entomology from the University of Florida and is an ESA Public Health Entomologist Certificate Holder.

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Facts from FDACS: Your Records and Florida Law

I RECEIVE a lot of questions about what records must be kept and for how long you must keep them. Some attorneys recommend keeping pest control records for five to seven years, due to the statute of limitations.

Let's start with the pest control business license Florida statutes:

482.071(3) A licensee shall display its current license at each of its business locations. Each business location of a licensee must be licensed.

Certificate and renewal 482.111(5)

Each certified operator in charge at a licensed business location shall display her or his certificate and current renewal receipt at the business location in her or his charge.

Specimen labels of pesticides used 5E-14.106(2) Licensees and certified operators shall maintain at the licensed business locations specimen copies of current registered labels for all pesticides used in their pest control operations which labels shall be available for inspection upon request.

Employee training records 5E-14.1421(1) The licensee shall maintain written training records for both the initial five (5) day (40 hour) training required in Section 482.091(3), F.S., and the continuing training required in Section 482.091(10), F.S., on all identification cardholders within their employ and make those records available during routine inspection or upon request of the department. Licensees must maintain the training record for at least a two-year period. The training required for Section 482.091(3), F.S., must be conducted by a certified operator or a person under the supervision of the certified operator in charge who has been designated in writing as responsible for training. The 40-hour initial training shall be verified by: (a) Completion of the Verification Record of Initial Employee Training, (FDACS-13665, Rev. 10/15).

482.091(3) A licensee or certified operator may not assign or use an employee to perform any category of pest control without providing trained supervision unless the employee is trained and qualified in that category of pest control. An employee may not perform, solicit, inspect, or apply pest control without first having been provided at least 5 days of field training in the appropriate category of pest control under the direct supervision, direction, and control of a certified operator.

(9) For every employee who performs inspections for wood-destroying organisms

pursuant to s. 482.226, the licensee or certified operator in charge must apply for an identification card that identifies that employee as having received the special training specified in this subsection in order to perform inspections pursuant to s. 482.226.

(10) In addition to the training required by subsection (3), each identification cardholder must receive 4 hours of classroom training in pesticide safety, integrated pest management, and applicable federal and state laws and rules within 6 months after issuance of the card or must have received such training within 2 years before issuance of the card. Each cardholder must receive at least 2 hours of continuing training in pesticide safety, integrated pest management, and applicable federal and state laws and rules by the renewal date of the card.

Fumigation employees 5E-14.1421(5)

Fumigation employees that participate in fumigations using a residential fumigant must complete Initial and Annual Stewardship Training as required by the label and Stewardship Policy for the residential fumigant(s) used as defined in Rule Chapter 5E-2, F.A.C. Information verifying Continuing Education Units for Stewardship Training (Initial or Annual) for all residential fumigant(s) used by the fumigation employee must be submitted to the department annually through <http://ceu.freshfromflorida.com>, or by submitting the Record of Attendance for Continuing Education Units (CEUs), Form FDACS-13325.

5E-14.142(1) Records: Pest control records of the licensee pertaining to pest control activities and including contracts shall be kept at the licensed business location or at the exact Florida address specified in the application for business license for inspection by department inspectors. Records kept electronically must be provided to the department upon request. Licensees operating in the category of fumigation shall record this information along with the individual fumigant cylinder identification number utilized to fumigate a structure.

WDO category 482.226(1) When an inspection for wood-destroying organisms is made by a licensee for purposes of a real estate transaction and either a fee is charged for the inspection or a written report is requested by the customer, a wood-destroying organism inspection report (13645) shall be provided by the licensee or its representative qualified under

this chapter to perform such inspections. The inspection shall be made in accordance with good industry practice and standards as established by rule and must include inspection for all wood-destroying organisms. The inspection findings shall be reported to the person requesting the inspection. The report must be made on a form prescribed by the department and furnished by the licensee. A copy of the inspection report shall be retained by the licensee for a period of not less than 3 years.

482.051(5) That any pesticide used as the primary preventive treatment for subterranean termites in new construction be applied in the amount, concentration, and treatment area in accordance with the label; that a copy of the label of the registered pesticide being applied be carried in a vehicle at the site where the pesticide is being applied; and that the licensee maintain for 3 years the record of each preconstruction treatment, indicating the date of treatment, the location or address of the property treated, the total square footage of the structure treated, the type of pesticide applied, the concentration of each substance in the mixture applied, and the total amount of pesticide applied.

5E-14.105(1) Each licensee must enter into a written contract with the property owner or his authorized agent for each treatment for control or prevention of wood-destroying organisms. No such contract shall be entered into after six (6) months following the effective date of this rule without first obtaining specific written consent signed by the property owner or authorized agent using the Consumer Notice Form, (FDACS-13692, Rev 10/15).

(6) When periodic reinspections are specified in wood-destroying organisms preventive or control contracts, the licensee shall furnish the property owner or his authorized agent, after each reinspection, a signed report of the condition of the property with respect to presence or absence of wood-destroying organisms covered by the contract and whether retreatment was made. A copy of the inspection report shall be retained by the licensee for a period of not less than three (3) years. **PP**

Report by Paul Mitola, Environmental Consultant, Florida Department of Agriculture and Consumer Services

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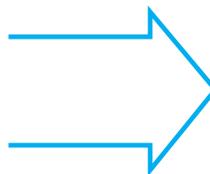


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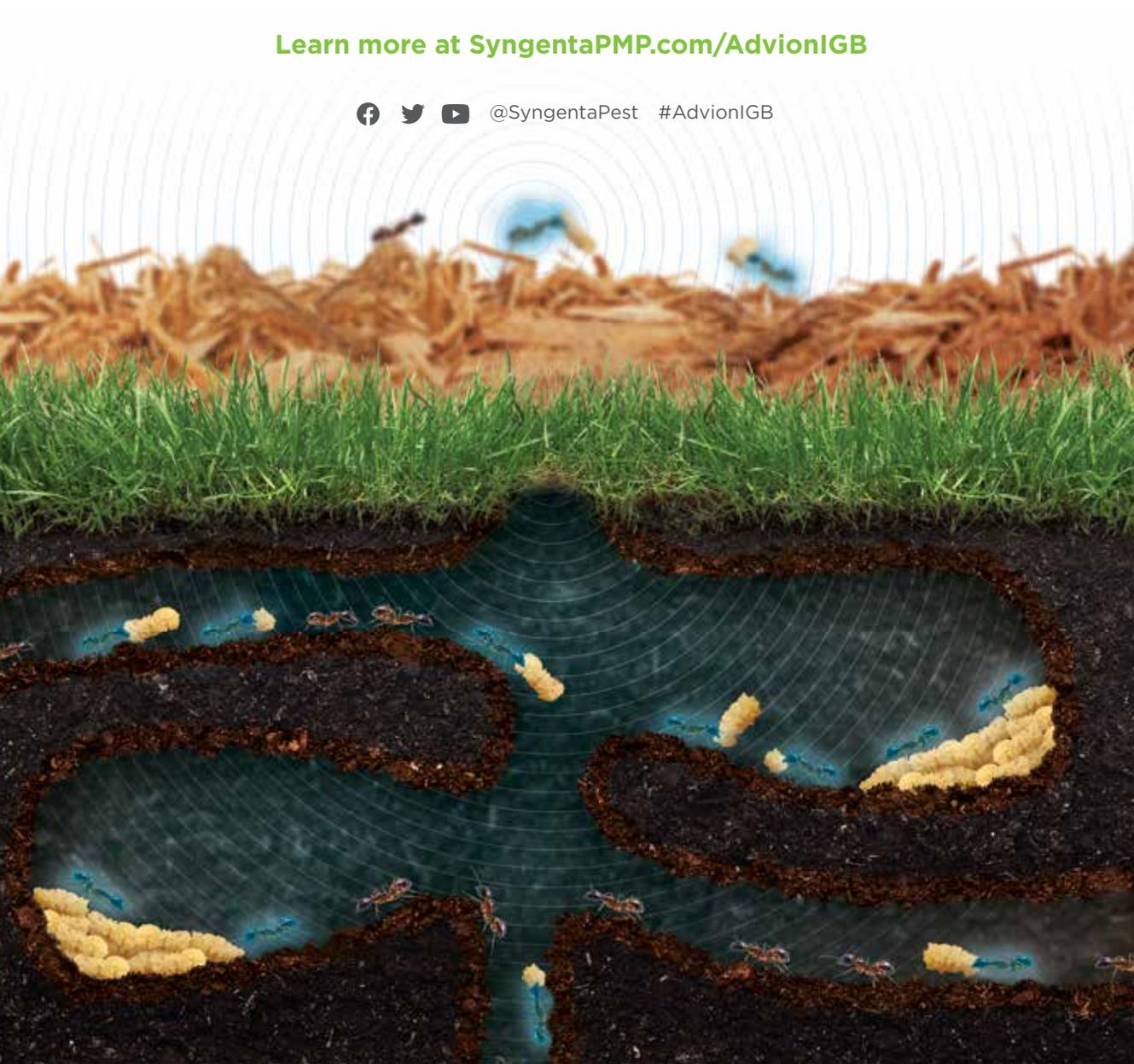
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