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Managing Director

Philip Koehler (352) 392-2484
pgk@ufl.edu

Managing Editor

Roberto Pereira (352) 392-2485
rpereira@ufl.edu

Production Editor

Jane Medley (352) 871-1809
medleyuf@gmail.com

Advertising Manager

Sandra Krempasky (904) 679-5615
ads@pestpromagazine.com

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Port Orange, FL 32127

FOR ADVERTISING information contact our
advertising manager, Sandra Krempasky, at (904) 679-
5615, or by email at ads@pestpromagazine.com.

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CONTACT SANDRA FOR 2019 MEDIA KIT
ADS@PESTPROMAGAZINE.COM

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ON THE COVER

PestPro's Roberto Pereira and Phil Koehler inspect a Formosan termite carton nest that is on display at Steinmetz Hall on UF campus. This issue of *PestPro* explores new discoveries by Thomas Chauvenc on life deep inside this mysterious habitat.

Photo by Jane Medley



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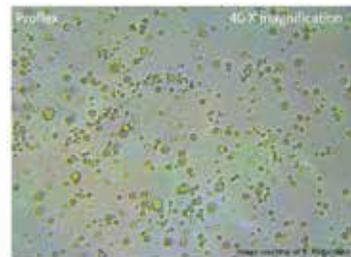
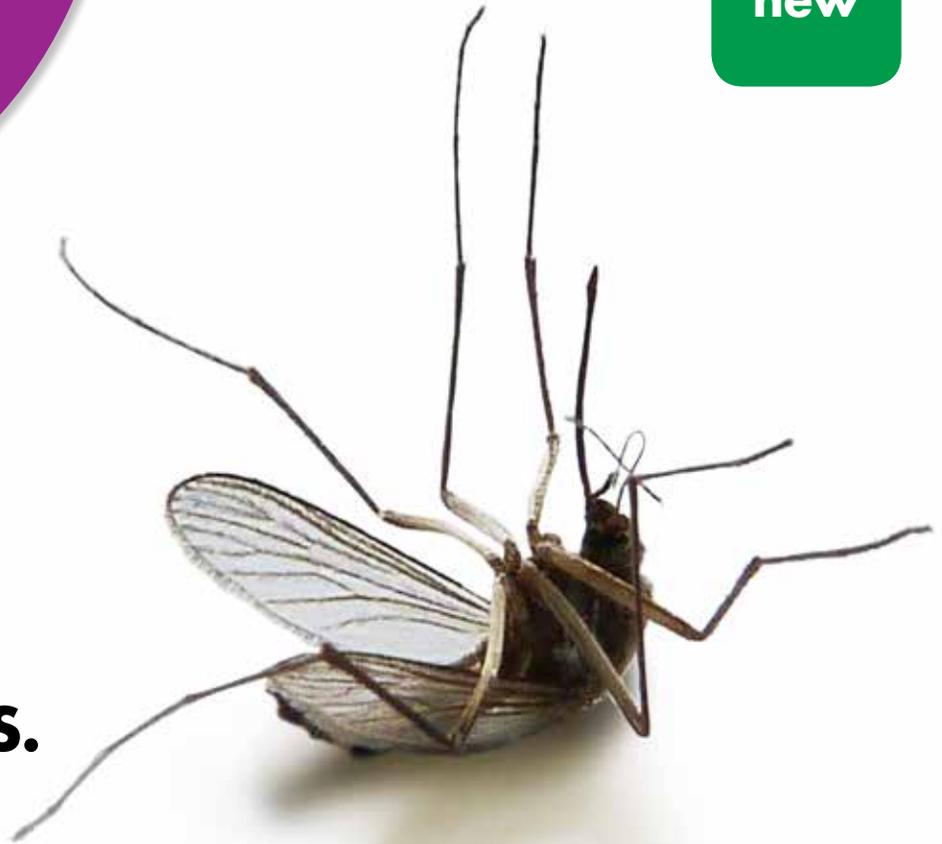
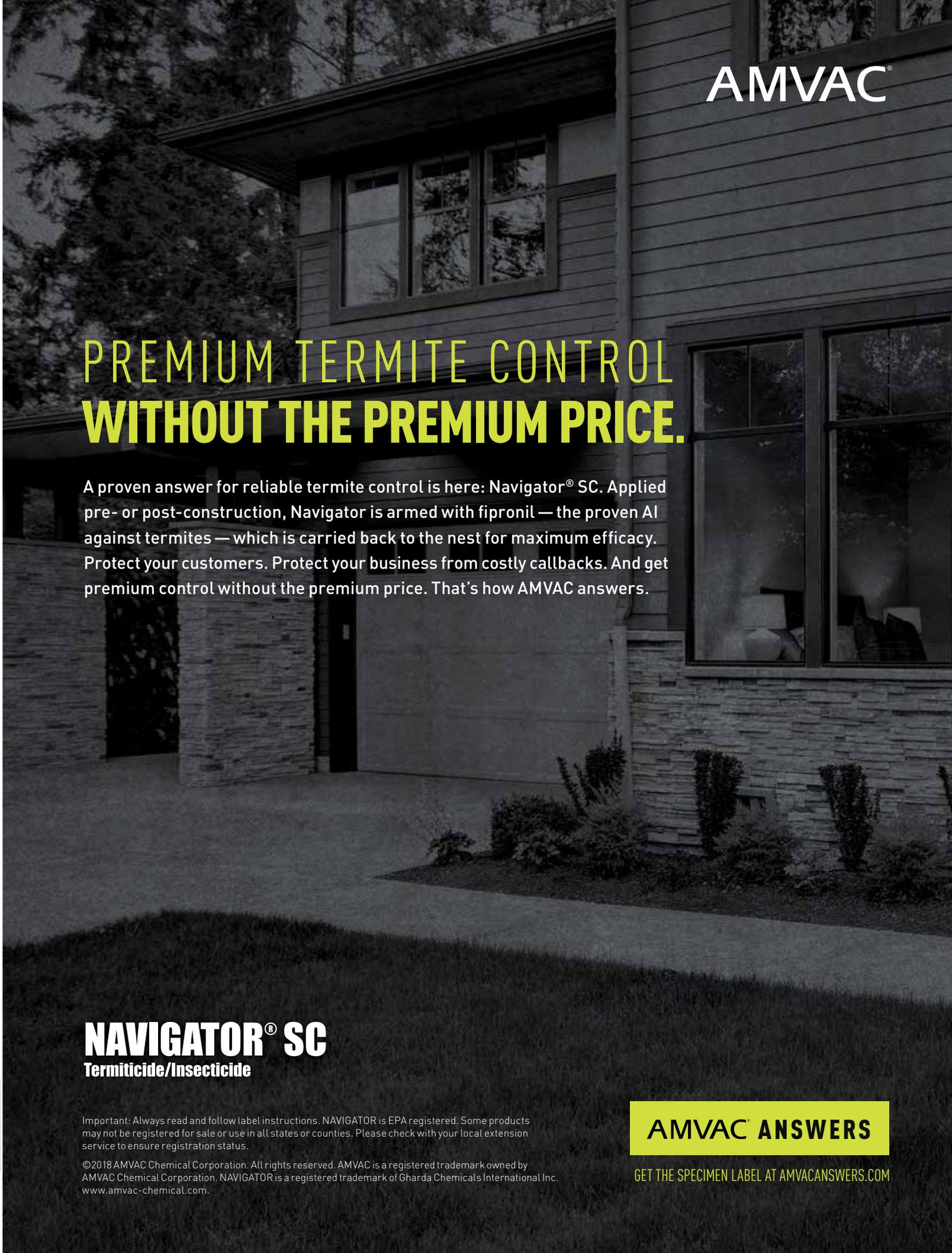


Image of microencapsulation in ProFlex. Note the different sizes of capsules and varying thickness to provide fast-acting, long-lasting results.

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Spring Into Summer Events

Message from the President of FPMA

Eric Hoffer

AS WE SPEED through spring and head into summer, I wish everyone a safe and productive busy season.

We are already almost halfway through my year as president and I can say I am having a great time. I am very lucky to be supported by our staff at Florida Pest Management Association, who help me every day stay on top of things changing in our industry as they work to better serve our members.

We had a great showing at our Legislative Days in Tallahassee. There were over 40 people in attendance and we had our largest showing of first-timers in years.

We had the chance to meet with our local representatives to discuss what was important to our industry as well as offer our help to them should they come across any bills that may fall under our expertise. This is an event you may not always think of attending, but I can assure you it is as interesting as it is important.

Our ability to represent our industry in a professional, educated, and conscientious manner tells representatives that we expect them to make choices based on sound science, not emotion. This event only happens every other year, so I strongly encourage you to participate in 2021.

Let's not forget one of our most popular events, the FPMA in Paradise Summer Conference. As I am sure you know, this year we will hold this event at the Boca Raton Resort and Club in Palm Beach County. Your ability to network with fellow PCOs will in itself be worth the cost of admission.

I always learn so much just from talking with other people and hearing what they are working on or discussing how they solved a problem — one that I am probably dealing with as well. *Knowledge Through Networking* is this year's theme, and there will be plenty of opportunities to put this into practice; more traditionally through classes, and more informally, at poolside and other social events.

We were able to negotiate one of the lowest rates you will find for this location at \$179 a night. This is your opportunity to enjoy a world-famous resort at a price that is more than reasonable.

We will have some of the best business sessions in the industry going on during this event. While there are many places in our industry to get great technical

advice and training, the ability to find good business training is few and far between. We have worked hard to line up speakers that have valuable information that will help you streamline and scale your pest control and lawn care company to another level. I hope to see you all there!

I feel like the Summer Conference is still just the beginning. After this event we have the Clay Shoot, the UF Lab Tour, and the "Behind the Scenes" Company Visits to keep our membership engaged and learning year-round.

FPMA is hard at work to make your success in this industry achievable, affordable, and enjoyable. See you around! **PP**

Eric Hoffer
President, FPMA



Pest Control Education: *Changes Over the Years*

WHEN I first was hired at the University of Florida in 1975, I immediately participated in pest control education throughout the state. Now in 2019, the face of pest control education has changed drastically. It is interesting to think about what has changed and whether all those changes are for the best.

Of course, *PestPro* magazine is a great part of our continuing efforts to provide quality education to the doorsteps of most people in the industry. Regardless of our efforts, the attendance at educational meetings has changed drastically over the years.

Evolution of Education: Meetings

Back in 1975, I started with 12 meetings, one held for each of the FPCA (now FPMA) regions during the fall of the year. The meetings for the industry were on Saturdays from September through November. Employees attended those meetings on their own personal time, and the scheduling prevented disruption of routes.

The industry was facing new EPA requirements for pesticide certification, and everyone was talking about fulfilling educational requirements. I remember having hundreds of people attend these region meetings. The top attendance was in Jacksonville, with more than 220 people attending. Those days of large meetings are almost history. Times have changed. But specifically, what has changed?

Eventually, those large Saturday meetings evolved into the weekday meetings, with last-chance meetings once a year for various parts of the state. The burden of cost for education was shifted from personal time to work time and company time.

Each region had a monthly meeting that was visited by the FPCA president once a year, I usually did a meeting for each region once a year, and the manufacturers and distributors usually spoke at the rest of the meetings. Also, in those days there was plenty of interest in state regulation of the industry with updates from the state regulators in the Florida Health Department, where the Bureau of Entomology was housed. Later the Bureau was moved to the Department of Agriculture and Consumer Services.

I also remember the January Business Conference of FPCA being held at the University of Florida. Later it was moved to Orlando and is now called Expo. The summer conference was the main event that had pest control educational sessions and as many exhibitors as NPMA's annual meeting. Back then, there were many insecticide manufacturers. Since then, those manufacturers have consolidated due to mergers and acquisitions. Now there are only a few manufacturers of insecticides.

The distributors of products for the pest control industry used to and continue to participate by being speakers at the region and state meetings. Somewhere along the line, the distributors developed their own meetings for the industry. It became good business for them to organize and promote their own meetings in conjunction with their distribution businesses in various parts of Florida. Those meetings now have large attendance and are a great educational opportunity. For instance, Univar has a meeting that attracts more than 300 pest controllers in Tampa, and Forshaw usually has a couple of hundred participate in Ocala. For many, those meetings have replaced the Saturday meetings that FPCA used to present regionally.

Pest Control Training Today

More recently, another set of factors has changed the educational landscape. Large companies like Orkin and Terminix used to "train" the industry. They had and still have inhouse training for their employees, who sometimes left, took their knowledge gained, and formed their own companies. Now through endemic growth, acquisitions, and mergers, more pest control companies have developed an infrastructure for inhouse education that can fulfill the state's education requirements. The large companies have built their own training facilities and staffed them with technical directors who are capable educators. The net result is that the large companies now only send a handful of people to outside educational meetings.

Most recently, online instruction has also impacted the pest management industry. There are several online programs that qualify for CEUs, and we at the University of Florida are starting our own online programs. People can now stay home and get their CEUs without leaving their house. This has resulted in an industry where many people are operating their businesses without meaningful contact with other industry professionals who have the same issues and concerns.

The camaraderie in the Florida industry has changed. Even though there are still many issues facing the industry and particularly pesticide use, only a handful of companies or individuals are working cooperatively to educate their customers, regulators, and politicians. All the above factors have fractionated the industry since I began working at UF in 1975.

There are still states that do not have these issues involving education. In North Carolina, Kentucky and Georgia there are about 800 to 1,000 participants in educational sessions for their association educational meetings. The driving force there are different regulations for pesticide certification and CEUs. Their rules force the entire

industry to attend certain educational meetings. This results in wonderful interactions between and among companies.

I recently attended the pest control association meeting in Arizona. They had about 250 people attend their education meetings. At the beginning of each day, they had an enthusiastic presentation of what the association had done for their members. People ended up on the same page regarding their issues, and they had a clear view of the future of their industry. Their education extended beyond CEU training and provided education on what working together as an industry was getting them in return.

Industry Survival: Looking Toward the Future of Education

Right now, I think many in the industry are considering CEUs just another regulatory hurdle rather than being a part of a cooperative process to better the pest management industry. Education should not be a regulatory hurdle. It is a special and vital part of driving the industry forward to excel in safely protecting people from pests. We should all learn from each other.

Compartmentalization of information within companies and isolated education of individuals does not result in a more vibrant industry. We hope that our educational efforts with *PestPro* magazine and participation at meetings help bring everyone up to date on happenings and opportunities for companies to come together on common issues.

It is definitely time for all segments of the pest management industry to come together. There are many challenges coming in the near future. People do not think of pest control today the same way they did 30 or 40 years ago. They are fearful of the industry and insecticide use. They think that the industry is killing off bees. They think that the industry's lawn treatments are affecting water quality.

Unless the industry has a strong presence with educational efforts geared to pest management companies, politicians, and the general public, assaults on your ability to provide quality service will continue and intensify. The only way to survive is to band together, communicate and educate.

Your competitors can be your best friends. They are interested in everyone providing a quality service for customers. We are certainly glad that *PestPro* is serving as the official magazine for FPMA. We believe in bringing everyone together as friends and colleagues. **PP**

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



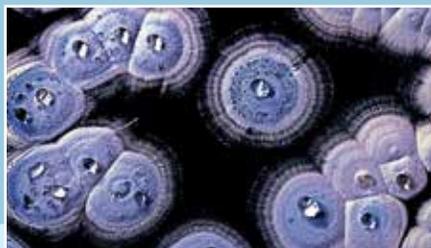
The carton nest made by Formosan termites is the byproduct of digested wood. The nest provides habitat and health to the termites.



Formosan Termites

Can Farm Antibiotics

From Their Own Fecal Nest



Thomas Chouenc

Formosan subterranean termites
Coptotermes formosanus, left, and
Streptomyces bacteria. Each benefits
from the other in the termite nest.

The **Formosan subterranean termite** is a remarkable insect. It can create colonies that contain several million termites, have foraging galleries expanding up to 300 feet, and infest structures and live trees. It is one of the most successful termite invaders in the southeastern United States.

FOR SEVERAL decades, research has focused on trying to find a solution against this formidable foe. This has resulted in the current control strategies that include liquid termiticides and baits.

For the last five decades, researchers around the world tried to find natural enemies to combat this invasive pest, but failed to come up with a cost-effective solution using a biological-control approach. It was easy to kill a small group of termites in the laboratory with a potential termite pathogen, yet in the field the treated colonies simply would not die.

Within the past 10 years, a series of studies showed why. Subterranean termites — which evolved in the soils for more than 50 million years, in direct contact with soil pathogens — adapted to pathogenic pressure. In other words, termites know their natural enemies and know how to prevent diseases from spreading within the colony. We now know why!

Termite health and habitat are uniquely interwoven

Take a few million termites, cram them into small galleries, and expose them continuously to soil pathogens as they forage. This seems like ideal conditions for diseases to spread. Yet it's not happening.

As they evolved, subterranean termites were able to adapt disease-resistance mechanisms that kept pathogens from self-replicating within the termite nest. Pathogens could not reach a lethal concentration.

Why did this happen? First, termites have an **individual immune system** that was inherited from their roach ancestors.

Second, termites — like all social insects — developed **social immunity**, where group interactions help prevent harmful pathogens from surviving in the nest. For example, grooming is an important termite behavior that keeps the termite cuticle clean. Also, when a termite dies it is cannibalized or disposed of away from the rest of the colony, keeping potentially harmful microbes away from the healthy group.

Finally, termites also have an extended disease-resistance mechanism right where they live. Formosan subterranean termites create large structures known as **carton nests**. This nest structure is actually the byproduct of termite metabolism: large amounts of digested wood, or in other words, poop.

Yes, the brownish, spongelike carton inside Formosan subterranean termite colonies is actually the end result of termite digestion. These termites chew on a tree or a house, digest the wood, and reuse it to create an elaborate nest from their own feces.

A healthy habitat for termites

The carton material increases the surface-to-volume ratio, allowing more termites to live in a very small space. The carton also has an important role in regulating the temperature and the moisture within the nest, giving these termites an integrated air-conditioning system.

The nest is full of life: Many bacteria use the carton nest as an ecological niche on which to feed and live.

Among these bacteria is a group of actinobacteria called *Streptomyces*. These bacteria are known to produce a wide range of chemicals with strong antibiotic activity.

These “good bacteria” in the termite fecal nest provide an important function to the termites: They help reduce the risk of harmful microbes spreading inside the nest and provide an additional layer of protection against pathogens.

There is a potential mutualistic relationship between the Formosan subterranean termites and these *Streptomyces*. On one hand, termites poop a lot, creating this “free food” for the bacteria. In return, the bacteria provide antibiotics, helping termites fight pathogens.

Yes, termites are essentially farming antibiotics in their poop!

The Chouenc Lab digs deeper

However, one question remained. Were termites acquiring beneficial *Streptomyces* from one generation to the next — in a process known as vertical transmission — or were termites “shopping” for good bacteria during their soil-foraging activity?

Continued on Page 20

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Pest Management Education

FROM PESTPRO TO CEUs

Philip Koehler

PestPro is sent out to the industry primarily to provide education to pest management professionals throughout Florida. Of course, *PestPro* is not the only way the industry can gain information to improve service.



AT THE University of Florida, we have many educational options for you. These start with the Southeast Pest Management Conference held at the University of Florida Physics Building in May every year, the Southwest Florida Pest Management Conference held in Ft. Myers in September, and now the Northwest Florida Pest Management Conference held in Milton, Florida, during April in cooperation with Florida A&M University.

There are also county agent-sponsored meetings at Cooperative Extension offices. Several agents have meetings specifically for the pest control industry. The longest-standing ones are in Duval and Pinellas counties. The agents there have annual meetings that provide CEUs and even technician development and training programs. In addition, UF Urban Lab specialists participate in delivering education at association meetings — FPMA or CPCO — throughout Florida.

The Entomology and Nematology Department at the University is advanced in developing online educational experiences for anyone interested in learning more about

entomology and pest control. We have online certificates that are available to any high school graduate. The Certificate in Pest Control Technology presents all the courses for a bachelor's degree in entomology, except students do not have to take the nonscience coursework required for a degree. The Pest Control Technology certificate qualifies students, by way of education, to take the state exams in pest control. Other certificates available to students are Urban Pest Management, Landscape Pest Management, and Medical Entomology. We soon will have a certificate in Apiculture and another in Biosecurity.

Recently we wanted to extend our educational reach to people who lived too far from meeting locations or did not have the time to attend meetings to acquire CEUs. Smaller companies do not have the flexibility of switching people on jobs. An owner/operator often has a full schedule that is not adjustable to accommodating a meeting and being away from work for a day or more. To help those folks we now have online training available to everyone, either for CEUs or for anyone who wants to improve their education about pest management.¹

We have 15 online CEU modules available. Most of these are based on either Tom Fasulo's original CEU programs or the Florida Techpro series on pesticide use and safety.

For Tom Fasulo's CEU programs, you can print out the notes pages so the information is available for you to study. Each section of the Florida Techpro program has a lecture followed by questions. Upon satisfactory completion of the module with a grade higher than 75 percent, you can receive a form for two CEUs to print and return to FDACS at the time of your pesticide license renewal.

These are some of the CEU modules that are available online:

CORE CEUs



IPM and Pesticide Application

Being a pest manager is much more than just spraying pesticides. There is an entire process of diagnosing the pest situation and developing a plan

using an integrated approach. This course acquaints pest controllers with the steps in integrated pest management (IPM). Pest managers must know the proper amount of pesticide product to apply.

Labels and SDS

You have heard the phrase, "the label is the law." The first module presents the components of a pesticide label and the information on the Safety Data Sheet (SDS). This module acquaints new pest control technicians with the information they will find on pesticide labels and on SDSs. Videos explaining how to read pesticide labels and SDSs. The second module summarizes general actions to be taken in the event of pesticide exposure. Learn to recognize symptoms of exposure while watching short videos. The videos detail general first aid steps to undertake until medical help arrives after a pesticide exposure.

PPE and Personal Care

To properly apply pesticides, a technician must be aware of the personal protective equipment, or PPE, required for the application. This module introduces pest controllers to different types of

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¹ <https://ifas-urbanpestmgt.catalog.instructure.com/>

New Turf Options for Florida Landscapes

Erin Harlow





TifTuf™ bermudagrass closeup

Beibel Farms

TURFGRASS in lawns is an important component of a landscape. Benefits include filtration of nutrients and sediments, reducing stormwater runoff, absorbing heat and noise, providing habitat for a myriad of beneficial insects, and adding to the appeal of a landscape design.

Over the years, the options for warm-season turfgrasses have greatly increased. Breeders spend years comparing and selecting new cultivars for possible cultivation and release into the market. They test thousands of samples. Every couple of years breeders may find a cultivar that evidence shows is superior, or they may select for a highlighted trait.

In the last few years, we have seen the release of a couple of new cultivars of bermudagrass and zoysiagrass that were selected for the way they handle drought stress. This year promises to be another exciting year for turfgrass releases with two new St. Augustinegrasses, each chosen for different characteristics.

TifTuf™ Bermudagrass

This bermudagrass was selected for its improved drought response. Developed by the University of Georgia, TifTuf™ was first selected in 2001 and went through research trials until its release in 2016. According to UGA research, the bermudagrass maintained an acceptable level of quality with no water in multiple trials. It was planted under “rain-out” structures that did not allow it to receive rainfall or irrigation from 2009 to 2013 to see how it performed. According to the researchers it uses 38 percent less water than Tifway 419. TifTuf has become a new standard in drought response for other cultivars that are now being developed.

University of Georgia

Released in 2016, TifTuf™ bermudagrass was developed to be extremely drought tolerant.

Continued



Bimini bermudagrass



Bermudagrass photos by Bethel Farms

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Bimini™ Bermudagrass

Bimini™ is a bermudagrass that is similar in size to Celebration™ bermudagrass. Bimini is marketed for the golf course, athletic field and home lawn. It can be maintained at 0.5 to 2.5 inches in height.

This bermudagrass was selected for its excellent wear tolerance and rate of establishment. It has also been shown to have a very favorable drought response.

Bimini has good winter color retention and growth for a bermudagrass. It will be easier to maintain in landscapes compared to many other cultivars of bermudagrass.



Kevin Kenworthy

CitraBlue™ St. Augustine

CitraBlue™ is the University of Florida's most recent release and will be available in 2019. This turf was developed by Dr. Kevin Kenworthy at the UF Plant Science's facility in Citra, Florida, and has been evaluated since 2006.

The name really says it all. The grass has a striking blue-green color. It has a more horizontal growth

Continued on Page 16

Hometown: Jacksonville, Florida

Where you live now: Jacksonville, Florida

About your company: Lindsey Pest Services has been established since 1957. I am the third owner and proud to be serving the community where I was born and raised. We have a fantastic team, and we have so much fun doing what we do! We live by our motto: Passion for what we do ... Compassion for our customers ... Knowledge in our craft... Energy for every day!



Jennifer Leggett

First paying job and what you learned from it: Cashier at Popeye's fried chicken summer of my junior year in high school. I learned about serving the public and handling the good and the bad customers. I also learned the food industry was not for me!

First break in the pest business: Mr. Lindsey agreeing to sell me his business when I was 21 years old.

Best business book: *The One Thing*, by Gary Keller with Jay Papasan

Best piece of business advice you received: I have received so many nuggets of wisdom through the years, it is hard to narrow down to just one. The one I use the most was from Gene Yearty, a dear friend from our industry, who said, "Don't use more words than you need to."



What you would tell someone new to the pest business: Welcome to the most marvelous industry in the world! Be professional, be a good steward of the environment, and join FPMA and NPMA — support the organizations that support our industry.

Where can we find you when you are not at the office? Wherever my loving husband, Claude Thomas, is! Now that he has finally retired from B&G Equipment we spend all the time together that we can. At home, on the boat, or at my happy place: in the RV at Beverly Beach Camptown USA!

What is the most important trait you look for when hiring? Curiosity and compassion. **PP**



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ProVista™ St. Augustine

Bethel Farms



CitraBlue™ St. Augustine

Kevin Kenworthy

Turf, continued from Page 14

pattern compared to 'Floratum.' This means that it should require less mowing and possibly less fertilizer. The dense growth habit makes it more difficult for weed seeds to germinate, resulting in less use of herbicides.

CitraBlue was chosen as UF's newest release not just for the unique color, but also because it had a consistent quality over time that should do well in a homeowner's landscape.

ProVista™ St. Augustine

Developed by Scotts Miracle-Gro, ProVista™ St. Augustine is a unique, genetically modified St. Augustinegrass. With its genetic roots from 'Floratum,' it is marketed as having the toughness that we expect from 'Floratum' but with some added features.

ProVista differs because it is the first turf that is glyphosate-tolerant. This means that weeds such as torpedograss and bermudagrass could be selectively controlled in this St. Augustinegrass. It was also selected for its dense, horizontal growth which should mean less mowing.

Icon™ Zoysia

Icon™ zoysiagrass was released in 2018 in the United States. This zoysiagrass was developed through an Australian breeding program and is a *Zoysia macrantha*. This species is different than the others we typically find in Florida, which include *Z. matrella*, *Z. japonica*, and *Z. tenuifolia*.



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• Low odor and non-repellent	✓	✓	✓
• Long-lasting residual activity	✓	✓	✓
• Use in food and non-food areas	✓	✓	✓

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Icon™ zoysia

Dwight Sod

This zoysiagrass is supposed to be more salt-tolerant than our typical species, which could make it a good choice for our coastal landscapes.

Icon zoysiagrass has a medium blade and was selected for its quick establishment, lateral growth, and less thatch production. It has the soft texture that appeals to people who may be more used to a northern turfgrass. It is being marketed as able to handle the environmental stress of Florida.

Final Thoughts

To breed and select new turf cultivars takes time and funding. On average, all of these releases spent more than 10 years in research trials. Drought response and breeding for a consistent quality with less inputs is a common theme across most of these new releases.

It is important to remember that education is key if a client installs a new cultivar that survives on less water. Review the client's irrigation schedule and plant-watering needs to make sure that they are not wasting water.

Turfgrasses that adapt to a drought-tolerant, Florida-Friendly™ landscape design are here, and the future of turf in Florida landscapes is bright green. **PP**

Erin Harlow is Commercial Horticulture Agent, UF/IFAS



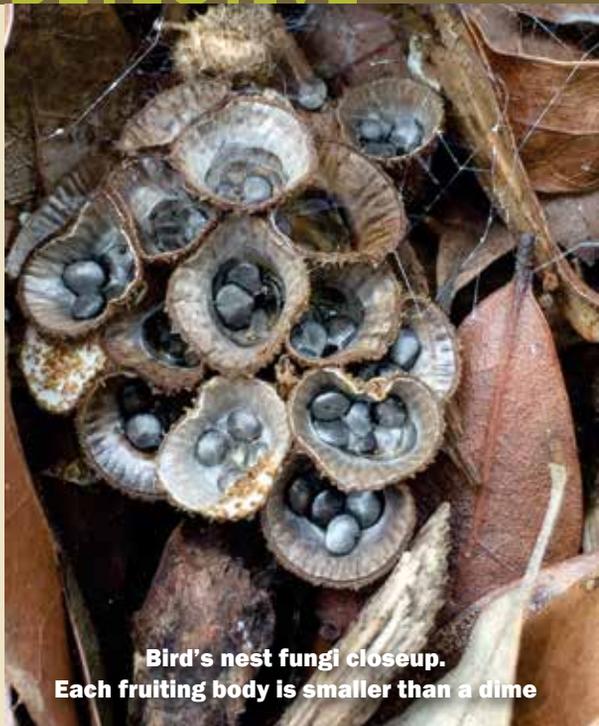
These black dots are peridioles, or spores, from bird's nest fungi



Closeup

On a leaf

Cyathus striatus peridioles



Bird's nest fungi closeup. Each fruiting body is smaller than a dime

Photos by Lyle J. Buss

Bird's Nest Fungus

Lyle J. Buss

IF YOU do pest management work in landscapes, then perhaps you have seen bird's nest fungi. The first time I encountered them, I was checking out an ornamental plant bed by a hotel. Many of the leaves had small, black discs on them. At first I thought they were armored scales, but they actually turned out to be spores from a bird's nest fungus, *Cyathus striatus*.

Bird's nest fungi used to be known as **saprophytes** — organisms that live on dead organic matter. However, the fungi that were called saprophytes are now called **saprobies**. Plants that were called saprophytes are now called **mycotrophic**.

Bird's nest fungi grow on decaying wood, so they are often found in areas where bark or wood chips are used as mulch. The fungus' name comes from its fruiting body, which resembles a miniature bird nest with eggs. It's not conspicuous like your typical mushroom, but is quite small, only about 3/8" tall. The "eggs" are spores — more correctly called **peridioles**.

The peridioles are dispersed by rain, so when a drop of rain hits the bowl just right, the peridioles are splashed out. The sticky peridioles can get flung several feet away, and may stick to nearby leaves or buildings. I have seen peridioles at least 6 feet high on my garage, so they can be splashed long distances by water running off the roof.

Peridioles stuck on plants may be mistaken for insects, but they aren't actually harmful to the plants. Bird's nest fungi may look odd but do little harm to the environment. No chemical treatment is necessary. To get rid of them, simply collect them into a trash bag and throw them away. **PP**

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



Time for Constance

IT'S RARE to find anyone as excited about bugs as UF entomology senior Constance Darrisaw. From common pest insects to outreach exotics, she is always ready to wrangle.

A NATIVE of New Smyrna Beach, Florida, Constance graduated from the Volusia County school system in 2015 and went on to pursue her Associate of Arts degree from Daytona State College before transferring to the University of Florida in January 2018.

How long have you been into bugs?
The short answer would be "my whole life." I can't remember a time when I wasn't in love with insects. As a little girl my mom would take me to the library a lot, and I must have checked out every insect book in the children's section of the New Smyrna Beach Library. Probably three times over! I think I could still point you to the right shelf.

As much as my parents didn't understand me, they didn't try to stop me. My garage was a graveyard of plastic bug catchers and butterfly nets. I was always content to be outside and with the help of my assistant, my big sister, I would catch anything I could get my hands on.

Then no one was surprised that you took up this major?

Actually, it was still a surprise, even for me. Although I had spent the better part of my formative years announcing to everyone that I would become an entomologist, I was never exposed to the world of entomology and therefore didn't know how real it was.

By the end of middle school, when they wanted to start hearing realistic answers for future careers, I decided I should choose something that wasn't just a hobby and took up interest in the medical field. I went through high school and the first year of college pushing my ever-present love for bugs to the back burner.

So, what brought you 'back to the light'?

While at my state college I met my mentor, Ms. Sonya Guidry. A godsend, honestly! She got me involved with the Florida Native Plant society, which got me outside again after all those years. Then she took me on an expedition with Earthwatch Institute to study the butterflies and bees of the Indian Himalayas. That did it. After spending nearly two weeks doing entomology field research as a citizen scientist, I knew I couldn't possibly deny the call any longer. As soon as I got back home, I started my research into entomology programs.

Do you actually love bugs as much as they say?

Yes, and probably more! The joke around the lab is that I stand outside and sing for all the bugs to come to me. Everyone at home is really shocked to see my insect



collections for my classes because they know that, for me, killing bugs is a cardinal sin. They're also pretty confused about me working in pest control.

But I love more than just bugs. I have four turtles, two tadpoles, a giant water bug, a young tarantula, and a plethora of fish. I also used to raise frogs every summer. My parents were very allowing. Thanks for that.

So how did a girl from the beach end up in the swamp?

When I found out that UF had an undergraduate entomology program it became my first choice. The fact that it's the No. 1 program in the world was merely a perk. I immediately contacted the advisors to make sure I would have all the prerequisites taken care of so I could transfer over.

Speaking of girls, are you intimidated to be in a male-dominated field?

Absolutely not! As a female and a minority, I feel that my difference often becomes my strength. I am afforded opportunities to reach crowds that others may not connect with. I also find the entomology field to be pleasingly diverse, and right now UF's Entomology and Nematology Department is skewed toward women. Many of my professors and peers are highly respected women for the work that they've done. I'm hoping to follow their examples to success. We're making a comeback in a big way, and pretty soon that's going to be reflected throughout the pest control industry.



With pet turtle Michael



With mentor Sonya in India



With mom, Felicia

Asian tiger mosquito,
a Zika vector



You're involved with a lot of outreach. Are you in it for the bugs or the people?

A little bit of both. I love any chance to handle the live arthropods, but I also love educating the public about them. I especially love teaching children about them. I learned this during my two years working at the New Smyrna Beach Boys and Girls Club. I took every opportunity to teach the students about insects and even ran a program about our native pollinators and made bee houses. I think it's important to expose children to entomology early because even if it doesn't become their dream job, we could at least get rid of some of the stigma around bugs.

How did you get involved with Dr. Koehler and the UF Urban Lab?

Last spring I wanted to get into research, so I looked through the undergraduate research directory. When I saw that Dr. Koehler was looking for some help with a project concerning Zika-carrying mosquitoes, I was in. I met with him and started later that week. I've been in the lab ever since.

What projects are you working on?

I'm working on a joint project between urban entomology and materials science engineering under Dr. Chris Batich. We are hoping to create an artificial blood meal to lab-rear mosquitoes, especially for implementation of sterile insect technique.

In the near future we may eliminate the need to purchase blood for our mosquitoes.

How has your work in the Urban Lab helped you?

Working in the urban lab has exposed me to the world of applied mosquito-control research. The knowledge and experience I gained here even in just one semester of volunteering under Dr. Sanchez Arroyo were enough to help me get a summer position last year with the Manatee County Mosquito Control District. It's also been great interacting with members of the pest control industry and getting an idea of how it all works.

You're still an undergrad. What does your future look like?

Well, I plan to graduate in December with my bachelor of science, then I'm hoping to go straight into my masters. Maybe about halfway through that you could ask me about a PhD.

After all of my schooling I'd like to get a job doing applied mosquito-control research. I'm not overly excited about the idea of spraying every mosquito to death, so I'd like to get into some biological control work. **PP**



In Meteora, Greece



Scott Bauer, USDA



Where termite research happens: the Chowenc Lab at UF/IFAS Ft. Lauderdale Research and Education Center. Dr. Chowenc's research focuses on subterranean termite biology, with a particular interest in the field of termite-microorganism associations, termite ecology and the evolution of insect societies.

Termites, continued from Page 9

The Chowenc Lab's 2018 study showed that termites encounter a wide diversity of *Streptomyces* in their foraging soils. Some of these *Streptomyces* are passively recruited, incorporated into the carton nest, and produce antibiotics around them.

This mutualistic relationship between termites and bacteria is opportunistic and always slightly different. The *Streptomyces* in the soil are diverse and different among sites. The local *Streptomyces* at a given site are therefore uniquely diverse to their Formosan subterranean termite colony. Because this diversity is very important, it is enough for the termite colony to acquire a "good partner."

Our lab's new study describes a case of opportunistic mutualism between insects and bacteria where the termite fecal nest material is always colonized by *Streptomyces* from surrounding soils. Opportunistic mutualism is a situation where two organisms benefit from one another one if the opportunity arises. Otherwise, they can live independently.

The termite fecal material provides a nutritional niche to the symbionts, which in return provide protection to the termite colony against pathogens. This association occurs not as a result of long-term coevolutionary processes, but because a *Streptomyces* guild is reliably present in the termite's soil environment and can be reliably recruited every time a termite nest is formed.

This mutualistic association likely emerged as an exaptation — when a organ is used for a function other than it is normally used. In this case, a) the existing termite fecal nest material obtained a secondary function, beyond being the nest walls, as a nutritional framework for soil microbes, while b) the existing bioactive metabolites, which evolved from the "arms race" among competing soil microbes, obtained a secondary function in termites as a protection against harmful soil pathogens.

Termites are able to take advantage of this opportunity. We can now explain why termite biological control never worked and probably never will — unless we can find a way to prevent the bacteria that are living in the walls of termite nests from helping the termites fight pathogens. **PP**

Thomas Chowenc is Assistant Professor in Urban Entomology at the UF/IFAS Ft. Lauderdale Research and Education Center. His research focuses on invasive species of termites. Email tomchow@ufl.edu. Twitter: @ChowencL

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Three Ways to Make Your Pest Control Website Stand Out From the Rest

Alain Parcan



WHEN IT comes to getting your business in front of potential customers in your service area, a website is an essential piece of the puzzle. With more and more customers researching companies online before hiring them, any company that's missing a website lacks the necessary credibility to add new customers, and ends up missing out on new business. In one noteworthy report, researchers found that 63% of consumers primarily use a business's website to find and engage with a local service.

So if your company has a website — great, you've passed step one! But if you're going to stand out among the pack, it's going to take some added effort. Here are three ways to make your pest control website stand out from the rest:

1. Provide Educational Content

There's a lot on a customer's mind when they search for a local pest control company. They want to know if your business can solve their problem, if they can trust you and if you know what you're talking about. This is where it helps to host educational content about your industry.

Your content can take the form of blog posts, FAQs or pages with detailed information about your services. This helps win over smart shoppers who like to know as much as they

can about a topic before they close on a deal. Not everyone is familiar with why it's important to inspect for termites, but you can break the mold and list some information on your website that spells out how dangerous a latent termite infestation can be.

Even if the consumer doesn't end up making a deal with you, featuring this educational material on your website will do the following:

- ▶ Establish your company as an industry expert that knows what it's talking about,
- ▶ Create a relationship between the customer and your business where they know they can trust you without any sales pitches,
- ▶ Help customers make an empowered decision they can feel good about, rather than a skeptical choice stemming from sales tactics, and
- ▶ Increase the chance your website is shown for relevant searches on Google.

2. Use Personalized Visual Media

Another way to get in front of your competitors is by posting visual content that is unique, personalized and high quality. When perusing a series of pest control sites, there's two ends of the spectrum that websites tend to fall in. On one end, there are the sites with low-quality images taken from a cell phone. On the other end, you'll find sites that showcase the same stock images as dozens of other companies.

The key is to find a spot in the middle ground that combines quality with personalization.

Enlisting the help of a professional photographer (or even someone with a great camera) to take some photos of your office and team is a great way to let your customers know they're dealing with real people. Customers will have an easier time trusting a company with personalized media than they will with a cookie-cutter template site.

Push it a step further, and have a professional put together a company video for your website. According to Google, about half of internet users look for videos related to a service before contacting the company. Video content is an awesome way to explain to your audience who you are and what you do. Sure, your website is able to do that as well, but a personalized video will be able to do so in a way that is quick, fun, and convenient for your website visitors.

3. Give Calls-To-Action

If you've followed the first two steps, you're on your way to a great site that is sure to stand out! There's more to a quality website than great content, however. User experience should always be the first thing on your mind when designing a site, which is why it's key to include a call-to-action, or CTA. Typically in the form of a button, CTAs guide your website's visitors through your site.

Maybe you want your visitors to see the different product packages you offer. You should feature a noticeable button that says "View Our Service Packages!" that is easy to find on the home page. Once you link this button to your Services page, you've effectively made the user experience friendlier for the potential customer.

To seal the deal, place another CTA on the Services page that reads "Request Service," which links out to your Contact page. From a marketing standpoint, you've strategically laid out a path that converts curious shoppers to interested leads.

When it comes to your website, quality design and content will yield noticeable results in the long run. It's not enough to simply exist online anymore; you also have to be able to stand out. And there's no better way to stand out than by building a website that is well designed and full of smart, personal content. Online searchers don't settle for less, so neither should you! **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.

Cane Toads

Toxic Amphibians In the News

The cane toad, *Rhinella marina*, sometimes is referred to as the “bufo,” giant, or marine toad.

Cane toads are poisonous throughout their life cycle, with adults the most toxic due to large poison glands.

These invaders have become established in Florida. Learn how to tell cane toads from harmless native toads.

A. Wilson and S.A. Johnson

CANE TOADS were introduced to Florida as a method of biological pest control in the 1930s. The toads were supposed to eat beetles threatening the sugar cane crop, but the introduced population did not survive.

In the 1950s, a pet importer released about 100 cane toads — maybe by accident or on purpose, no one is sure — at the Miami Airport. There are other documented incidents of purposeful releases in South Florida.

Cane toads have since spread through much of South and Central Florida. As of 2017, they were established in much of the southern peninsula as far north as Tampa (see map). There have been several isolated sightings in northern Florida, and one sighting in southeast Georgia.

A small population appears to be established in Deland in Volusia County, and there was

a population that survived for several years near Panama City. Cane toads are still available through the pet trade, and isolated sightings in northern Florida may be escaped or released pets.

In their native range, cane toads are found in greater densities in human-modified habitats than in natural settings. They are common in yards and similar open areas.

Their ability to exploit habitat modified by humans is a common trait among many invasive species. Cane toads have proliferated in yards, golf courses, agricultural areas, and similar habitat types in Florida. Fortunately, there are few records of cane toads in Florida’s native habitats, and they do not appear to invade most natural areas in the state.

Although their ecological impacts in Florida may be limited by their habitat use, they are a

significant nuisance to people and are potentially lethal to pets that attack the ground-dwelling toads. For information on protecting pets, see the article on page 34.

Cane toads can be confused with native toads, so be sure to correctly identify the species before taking action to remove invasive cane toads from your property.

How do I know if I have found a dangerous cane toad or a harmless native toad?

First, be sure you have a toad, then read on to identify the species.

General Toad Features

- ✓ Live on the ground and do not climb well
- ✓ Stout bodies with short legs
- ✓ Slightly webbed rear feet
- ✓ Dry, warty skin



Size and color vary

Alex Popoukin



Poison gland is large and tapers to a point

Donald Höbern

Known cane toad distribution in Florida as of January 2017.



- ✓ Poison glands, also called parotoid glands, on shoulders
- ✓ Mottled with various shades of gray, brown and black

Invasive Cane Toad Features

- ✓ May be larger than 3 inches (young are smaller)
- ✓ Poison glands enlarged and somewhat triangular, tapering back to a point
- ✓ No knobs or crests on top of head
- ✓ Ridge around eyes and above nose

Adult cane toads measure between 3 and 6 inches long, and some individuals reach 8 or 9 inches.

Males and females can be distinguished by differences in coloration and the texture of their back skin. Females have smooth, mottled, brown-and-white backs, while the rough backs of males are more yellow.

Baby cane toads recently transformed from tadpoles are the size of raisins and are easily confused with native toads. *Continued*



Baby cane toad

Greg Schaefer



Some cane toads measure up to 9 inches long

Bernard Dupont

Poisonous toads infest suburban Florida neighborhood

PALM BEACH GARDENS, Fla. (AP) — A Florida suburb is being plagued by thousands of poisonous toads.

Experts say the amphibians are bufo toads, also known as cane toads. Residents in the infested Palm Beach Gardens neighborhood worry toxins secreted by the toads will harm their pets and children.

News stations broadcast images of the small toads clogging pool filters, hopping en masse across driveways and sidewalks, and lurking in landscaped lawns.

Resident Jennifer Quasha told WPBF her family first noticed the toads Friday. She said hundreds of them were in her swimming pool.

Mark Holladay of the pest removal service Toad Busters told WPTV that recent rains coupled with warm temperatures sent the amphibians into a breeding cycle.

Holladay said even more toads are likely to spread throughout South Florida in the coming weeks.

— March 24, 2019





Southern toad



Oak toad



Eastern spadefoot

S.A. Johnson

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HARMLESS NATIVE TOADS

Southern Toad

- ✓ Rarely larger than 3 inches
- ✓ Small, oval poison glands, no danger to pets
- ✓ Two obvious crests on top of head. However, crests are not obvious in southern toads smaller than ~1 inch
- ✓ Gray, brown or reddish body

Oak Toad

- ✓ Florida's smallest toad at no larger than 1.5 inches
- ✓ Small, oval poison glands, no danger to pets
- ✓ Indistinct crests on top of head
- ✓ Light line down center of back
- ✓ Underside of feet orange

Eastern Spadefoot

- ✓ Rarely larger than 2 inches
- ✓ Poison glands flattened and indistinct, no danger to pets
- ✓ No crests on top of head
- ✓ Often with hourglass shape and numerous yellow markings on back
- ✓ Prominent digging "spade" on rear feet

Homeowners can hand-capture and humanely euthanize cane toads in the yard by generously applying a benzocaine or lidocaine ointment or spray to the toad's back or belly, then freeze it overnight. Several over-the-counter products containing benzocaine or lidocaine are readily available at most drug and grocery stores.

Be sure you have correctly identified the toad as an invasive cane toad before euthanizing it! Learn more about cane toads at <http://edis.ifas.ufl.edu/uw432>. **PP**

A. Wilson is former MS Graduate Student and S.A. Johnson is Associate Professor, UF/IFAS Department of Wildlife Ecology and Conservation. Article adapted from EDIS publication WEC387.

UF Startup Florida Insect Control Group Featured at University Innovation & Entrepreneurship Showcase in Washington, D.C.

UNIVERSITY of Florida researchers behind Florida Insect Control Group, a pest control device company, originally intended to protect deployed military personnel from insect-borne diseases, shared the story of their successful path at the University Innovation and Entrepreneurship Showcase in Washington, D.C., on Wednesday, April 10.

Organized by the Association of Public & Land-grant Universities and the Association of American Universities, the D.C. showcase highlighted the role of federally funded university research in fueling entrepreneurship, innovation and economic opportunity nationwide. The Florida Insect Control Group, which offers environmentally safe, longlasting, and cost-effective solutions for control of both adult and larvae mosquitoes and flies, is one of 20 startups participating in the event.

“The initial goal for the research was to protect deployed warfighters from flies and mosquitoes,” explained Philip Koehler, a professor at UF’s Department of Entomology and Nematology, Urban Entomology Laboratory, and head of research for the Florida Insect Control Group.

Florida Insect Control Group develops products that are easily manufactured and shipped. Instead of releasing pesticides into the air or water, the startup embeds the pesticide in microporous plastic polymers or within porous fabrics, providing the exact minimum lethal dose needed to kill. The products attract the insect by providing the right shape, color, odor, surface



UF/IFAS Urban Lab’s Roberto Pereira, second from left, with (from left) director of UF Innovate Jim O’Connell, Italian businessman Enrico Levi, and Florida congressional representative Gus Bilirakis in Washington, D.C.



From left: Jim O’Connell, Enrico Levi, Florida Congressman Ted Yoho, and UF/IFAS Research Scientist Roberto Pereira in Washington, D.C.

and materials mosquitoes and flies like.

Grants from the Deployed WarFighter Protection program enabled Koehler, fellow researcher Dr. Roberto Pereira, and their team to develop the fly trap and the mosquito traps and chips. The military provided military students to do a lot of the research; these were preventive medicine technicians familiar

with issues associated with deployed warfighters worldwide.

“Their experience was invaluable to incorporate their knowledge of vectors in other countries so that the products would work in virtually any part of the world,” Koehler said.

UF obtained about six patents on the technologies the team developed; Florida Insect Control Group, led by founder and CEO

Enrico Paolo Levi, licensed the technologies.

Florida Insect Control Group’s products target container-breeding mosquitoes — carriers of dengue, Zika, West Nile, chikungunya, and yellow fever — and house flies that are responsible for spreading more than 60 different diseases including typhoid fever, dysentery, anthrax, and tuberculosis.

“The story of being funded for research for the military, providing education for military students, publication of results in theses, dissertations, and peerreviewed journals, and, finally, commercialization by Florida Insect Control Group so that products become available to the military as well as the general public is a compelling story,” said Koehler.

“It shows that federal funding and partnership can result in needed products being made available broadly.”

The mosquito products are in the last phases of approval by the Environmental Protection Agency and the European Union. Florida Insect Control Group has the attention of firms all over the world interested in distributing or using the products.

A selection committee of innovation experts chose participating startups based on level of student engagement and the strength of the technology and its connection to research.

Members of Congress, their staff, and national economic development and innovation policy members were present at this widely attended event. **PP**

— Report by Sara Dagen
UF Innovate

DeSantis Speaks at UF Entomology and Nematology



DeSantis spoke at UF's Steinmetz Hall courtyard atrium about his recommended \$625 million environmental budget for Everglades restoration efforts and protection of the state's water resources.

FLORIDA Gov. Ron DeSantis and state officials spoke at the University of Florida Tuesday, April 16, about the state's efforts to protect Florida's waterways.

DeSantis, flanked by Department of Environmental Protection Secretary Noah Valenstein, Chief Scientific Officer-designate Tom Frazer, UF president Kent Fuchs and environmental officials, spoke at UF's Steinmetz Hall courtyard atrium about his recommended \$625 million environmental budget for Everglades restoration efforts and protection of the state's water resources.

DeSantis announced in January his commitment to invest \$2.5 billion into environmental efforts by the end of his first term — \$1 billion more than was invested to protect water resources in the previous four years.

Before he spoke, DeSantis participated in a roundtable discussion with Fuchs and UF student researchers about red tide, issues facing coral reefs, and a new Florida blue-green algae task force.

— Daniel Smithson, *The Gainesville Sun*

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Featured Creatures Update

ABCs of Insect Pests: 10 Most Popular Pest Profiles On UF/IFAS Featured Creatures!

Jennifer Gillett-Kaufman

SOME *Featured Creatures* articles are more popular than others, and we can't say why. Is it the pictures? Is it the topic? Is it the time of year everyone wants to know more about love bugs?

If we knew the answer we would write only highly popular articles — that would be nice. To encourage you to read some of our more popular articles, here for you are the ABCs of *Featured Creatures* articles.

We are proud to present you these *Featured Creatures* articles from the University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS) *Featured Creatures* website. These articles were developed by UF scientists, students, and collaborators. The excerpts below are from the actual article.



#1 American Dog Tick

Wai-Han Chan and Phillip E. Kaufman

http://entnemdept.ufl.edu/creatures/urban/medical/american_dog_tick.htm

AMERICAN DOG TICK or wood tick is found predominantly in the United States east of the Rocky Mountains. It is most commonly found on dogs as an adult.

Dermacentor variabilis is a three-host tick, targeting smaller mammals as a larva and nymph and larger mammals as an adult. Although it is normally found on dogs, this tick will readily attack larger animals such as cattle, horses and even humans. The eight-legged adult is a vector of the pathogens causing Rocky Mountain spotted fever and tularemia and can cause canine tick paralysis. While the American dog tick can be managed without pesticides, a recommended acaricide is an effective way of eliminating a tick infestation near residences.



#2 Black Scale

Morgan A. Byron, Jennifer L. Gillett-Kaufman, University of Florida, and Sandra A. Allan, USDA-ARS-CMAVE

http://entnemdept.ufl.edu/creatures/citrus/black_scale.htm

THE BLACK SCALE, *Saissetia oleae* (Hemiptera: Coccidae) is an important pest of citrus and olive trees. Originally from South Africa, this scale is now distributed worldwide. In Florida, black scale is found on citrus (*Citrus* spp.), cultivated olive (*Olea europaea* L.), avocado (*Persea americana* Mill.), and many popular landscape plants. It is likely that black scale, like many invasive pests, was imported to the United States on infested nursery plants. Based on their small size and the unique life history of scale insects, these insects are difficult to detect and control.



#3 Coconut Scale

Salahud Din and Steven P. Arthurs, University of Florida

http://entnemdept.ufl.edu/creatures/fruit/tropical/coconut_scale.htm

COCONUT SCALE is a pest of over 60 plant families and is found globally in tropical and subtropical areas. This armored scale was described by Signoret in 1869 and appears to be native to South Asia but has spread around the world, mainly on infested coconut and banana. The insect feeds on plant sap from leaves, stems and fruits, causing yellowing, tissue distortion and die back. The coconut scale is a pest of concern on coconut and other perennial crops due to its relatively short life cycle of around 35 days and multiple overlapping generations per year. Coconut scale is known to be dispersed by birds, bats and insects as well as wind.



#4 Dark Southern Drywood Termite

Joseph F. Velenovsky and Rudolf H. Scheffrahn

http://entnemdept.ufl.edu/creatures/urban/termites/Kalotermes_approximatus.html

SIMILAR TO nearly all lower termite species, *Kalotermes approximatus* cannot be easily or reliably identified by examining members of the worker caste. Therefore, in order to identify *Kalotermes approximatus*, members of the soldier and/or reproductive caste must be examined. *Kalotermes approximatus* soldiers are approximately 7.5 mm in length, described as medium–small size in comparison to other Kalotermitidae species present within their range. Identifying characters are a pronotum that is as wide or wider than the head capsule and two or more marginal teeth visible on the interior margin of the left mandible.

Continued

Jennifer Gillett-Kaufman is *Featured Creatures* Editor and Project Coordinator, University of Florida/IFAS Entomology and Nematology Department. Visit the *Featured Creatures* website to read the complete articles at <http://entnemdept.ufl.edu/creatures/>



#5 Emerald Ash Borer

Haleigh Ray and Jennifer L. Gillett-Kaufman, University of Florida

http://entnemdept.ufl.edu/creatures/trees/beetles/emerald_ash_borer.htm

THE EMERALD ASH BORER, *Agrilus planipennis* Fairmaire, is a highly destructive wood-boring beetle that feeds on the phloem of ash trees (*Fraxinus* spp.). Though the emerald ash borer has not been found in Florida, there is potential for it to establish via movement of infested wood into the state and the presence of ash trees in Florida. Since first being recorded in Michigan in 2002, the emerald ash borer has broadened its range in the United States and has killed millions of ash trees.



#6 False Chinch Bug

Babu Panthi, Braden Evans, and Justin Renkema

http://entnemdept.ufl.edu/creatures/orn/turf/false_chinch_bug.html

FALSE CHINCH BUG, *Nysius raphanus* Howard, is a small, greyish, native North American herbivorous seed bug. It is recognized as the most serious pest among members of the genus *Nysius* (Demirel and Cranshaw 2006b), but reports of heavy infestations and serious crop damage are uncommon. When damage occurs, it is associated with large aggregations of the false chinch bug following periods of drought or the removal of weed hosts. The false chinch bug is highly polyphagous, though it has demonstrated a strong preference for mustards (*Brassica* spp. and *Sinapis* spp.).



#7 Giant Woolly Bear (Larva), Giant or Great Leopard Moth (Adult)

Donald W. Hall, University of Florida

http://entnemdept.ufl.edu/creatures/misc/moths/Hypercompe_scribonia.htm

THE GIANT LEOPARD MOTH is our largest eastern tiger moth. It was formerly in the family Arctiidae, which now composes the subfamily Arctiinae in the family Erebiidae. Giant leopard moths are nocturnal. Males are commonly attracted to lights at night. Sometimes dozens of males come to bright lights set out in good habitat.



#8 Hornworm

Morgan A. Byron and Jennifer L. Gillett-Kaufman, University of Florida

http://entnemdept.ufl.edu/creatures/field/tobacco_hornworm.htm

THE TOBACCO HORNWORM, *Manduca sexta* (L.), is a common pest of plants in the family Solanaceae, which includes tobacco, tomato, pepper, eggplant, and various ornamentals and weeds. Caterpillars in the family Sphingidae are known as hornworms due to their wormlike body shape and the presence of a small, pointed "horn" at their posterior. The adult stage is a heavy-bodied moth that resembles a hummingbird, and *Manduca* adults are

commonly referred to as hawkmoths or hummingbird moths. The larval stage (hornworm) of this species is more often encountered, as it resides on the host plant during the day and can cause significant defoliation of economically important crops.



#9 Imperial Moth

Donald W. Hall, University of Florida

http://entnemdept.ufl.edu/creatures/bfly/moth2/imperial_moth.htm

THE IMPERIAL MOTH, *Eacles imperialis imperialis*, is one of our largest and most beautiful moths. It is also the most variable in appearance and the most widely distributed of our large, eastern U.S. saturniid moths. Imperial moth larvae are polyphagous with many recorded hosts. However, there are probably regional differences in food preferences.



#10 Japanese Beetle

Jamba Gyeltshen, Amanda Hodges, and Clayton Bania

http://entnemdept.ufl.edu/creatures/orn/beetles/japanese_beetle.htm

THE JAPANESE BEETLE is a widespread and destructive pest of turf, landscape and ornamental plants in the United States. It is also a pest of several fruit, garden and field crops. Adult Japanese beetles feed on foliage, flowers, and fruits. Leaves are typically left with only a tough network of veins. The larvae, commonly known as white grubs, primarily feed on roots of grasses often destroying turf in lawns, parks and golf courses. The Japanese beetle is the most widespread pest of turfgrass and costs the turf and ornamental industry approximately \$450 million each year in management alone. **PP**

FPMA Launches P.E.S.T. Relief Responders Program in Florida

TWO organizations, P.E.S.T. Relief International® and Florida Pest Management Association, are launching a pilot program in the state of Florida to provide pest control services and clean bedding to individuals requiring financial assistance.

Last spring, P.E.S.T. Relief® established its presence in Florida through the REST® Initiative — Making Orphanages and Shelters a Safe Place to Sleep.

Initiated by FPMA Past President Steve Lum and Allied Representative John Riley, the pest control industry united their efforts to serve the Brevard Rescue Mission. Here they furnished an apartment and beautified the grounds for residents to rest and recover.

The success of this collaboration was the beginning of a new program administrated by FPMA Executive Vice President Leslie Herren to recruit P.E.S.T. Relief® Responders who could serve individual families and expand the REST® Initiative into the residential community.

Stepping up to the plate, the first P.E.S.T. Relief® Responders were Eric Hoffer of Hoffer

Pest Solutions and Todd Barber of Barber's Best Termite and Pest. Both men extended their services for bed bug remediation, while Mattress Safe® donated mattress and box spring encasements.

Here are their success stories:

Eric Hoffer, current president of FPMA, came to the aid of a single mom and her daughter, whose school in South Florida was forced to consider suspending the girl for fear of spreading bed bugs to other students. With the services that Eric provided, the daughter was able to stay in school and continue her education.

Eric said, "We feel very fortunate to have the ability to help those who need our services but may not be able to afford them. We are glad to be of service to the great community that allows us to prosper in business."

In the Florida Panhandle, Todd Barber treated a severely infested residence occupied by a family of six with one of the children living with Level 5 cerebral palsy and a tracheotomy. Todd was contacted by the

Florida Department of Children and Families because the infestation was so severe there was concern that bed bugs would crawl into the tracheal tube, causing lethal repercussions.

Todd replied, "This was a severe infestation and will require three treatments. The family was very appreciative and worked hard to have the proper preparation completed before I arrived. It was very validating to volunteer and make an impact."

These successful trials resulted in more responders joining the front line in January at the FPMA Business & Operations Expo, with the goal of every FPMA Region having at least one P.E.S.T. Relief Responder. In addition, Bayer Industries has committed to provide materials at no cost to assist in the Responder effort.

"We are grateful for those who have given of their time to rescue the destitute and defenseless," shared Andrea Hancock. "Together we are bringing hope, restoring dignity, and enabling life transformation." **PP**

— Florida Pest Management Association

Special thanks to P.E.S.T. Relief Responders who have recently joined the team:

Crissy Crenshaw and Michelle Crenshaw Beane, Crenshaw Termite and Pest Control, Inc.

David Cooksey, McCall Service

Dereck Pumphrey, Brock Lawn and Pest Control

Hunter Grimes, Bryan Pest Control

Michael Tulp, Adam's Pest Control

Denise Warton, Trad's Pest Control

Jacqueline Valencia, Fumeout

Kyle Varona, Fahey Pest & Lawn Solutions

Angel Rivera, Florida Bedbug Experts



Andrea Hancock provides an update to FPMA members at the Annual General Meeting at Expo in January 2019.



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Wood-Destroying Organism Inspections

Wood-destroying organism inspections, or WDOs, have historically held the top spot for consumer complaints, and more disciplinary actions have been taken than for any other violation. WDOs also create the greatest potential for litigation. That is why they must be done correctly.

According to Chapter 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 shall be provided by the licensee or its representative qualified under this chapter to perform such inspections.

482.091(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. The application for such identification card

must be accompanied by an affidavit, signed by the prospective identification cardholder and by the licensee or certified operator in charge, which states that the prospective identification cardholder has received training in the detection and control of wood-destroying organisms, including but not limited to training in: (a) The biology, behavior, and identification of wood-destroying organisms with particular emphasis on ones common in this state and the damage caused by such organisms; (b) The inspection forms to be used to report the finding; and (c) Applicable federal, state, and local laws or ordinances. The inspection shall be made in accordance with good industry practice and standards as established by rule (FDACS Guidelines and the Baseline Practices) and must include inspection for all wood-destroying organisms.

482.021 (30) "Wood-destroying organism" means arthropod or plant life which damages and can reinfest seasoned wood in a structure, namely termites, powder-post beetles, oldhouse borers, and wood-decaying fungi. 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, which is the FDACS form 13645, not the NPMA 33.

The inspector must report any of the following that are in, on, or under the structure: 1. Visible evidence (frass, shelter tubes, emergence holes, dead insects, and insect parts), 2. Live organisms (wood decay/fruited bodies/mycelium, live swarmers, workers, larvae, or beetles) and 3. Damage (destruction or consumption of the wood fibers: De-lamination is not considered damage to the fibers. Emergence holes are also considered damage).

Mistakes observed: not utilizing Section 3 of the report "Obstructions and Inaccessible Areas"; not making a complete inspection; failing to open access panels to inspect; using inaccessibility for a reason not to inspect an area that is accessible; not reporting wood-decay fungi or calling it "water damage"; reporting on areas that are not considered part of the structure; not reporting damage that is visible after repairs have been made; Making a second report on areas that were repaired without making a complete report.

FDACS looks at all reports as a "snapshot in time" — they are all considered as stand-alone reports. **PP**

Report by Paul Mitola, Environmental Consultant

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**Ward's Small and Large Pickup Segments compared, 2019 Frontier vs. latest in-market competitors. Based on lowest MSRP models. Price is Manufacturer's Suggested Retail Price (MSRP). MSRP excludes tax, title, license, destination/handling fees and optional equipment. Dealer sets actual price. Comparison based on manufacturer websites.

PPE they may be required to wear during a pesticide application or pest management inspection. There is a wide array of examples of PPE in this module.

Anyone applying pesticides should be aware of the importance of preventing pesticide exposure to themselves, their families, and their pets by following a few personal care procedures each day.

Pesticide Spill Control and Pesticide Vehicle Inspection

This module acquaints pest controllers with proper procedures to manage an unscheduled pesticide release. The steps

of cleaning up a pesticide spill site, beginning with controlling the spill and ending with decontamination of the site, are presented.

Triple Rinse and Emergencies

Triple Rinse procedure for pesticide containers and Pesticide Emergencies. The Triple Rinse module acquaints pest managers to proper techniques to clean and dispose of empty pesticide containers. This module will serve as a valuable training tool for pesticide applicators. The Pesticide Emergency module introduces pest control

managers to the general actions to be taken in the event of pesticide exposure. Learn to recognize symptoms of exposure and watch videos in this module. The videos detail general first aid steps to undertake until medical help arrives after a pesticide exposure.



Cockroach Recognition

These are the most important pests of residences, restaurants, and food handling establishments. Some cockroaches are domestic, meaning that they live and develop indoors. Others are peridomestic, meaning that they live and develop outside structures but invade from the perimeter. Management practices differ for these two categories.

Ants and Stored Food Pests

Recognize ants or stored food pests. Ants are some of the most important household pests. Stored food pests can develop in pantries and places where food is stored for later use.

Blood-Sucking Arthropod Recognition

Recognize bloodsucking arthropods. Some of these are important disease vectors.



Fly, Wasp and Bee Recognition

Recognize flies and stinging insects.

Recognition of Mulch, Moisture and Occasional Invaders

Recognize arthropods that develop in mulch and moisture. At certain times of the year, these arthropods can invade structures and annoy residents.

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Beneficial Insect Recognition

Recognize beneficial insects in the landscape. Many times, these insects are confused with pests. However, these are biological controls for pests. You should try to protect them from pesticides.

Ornamental Pest Recognition

Recognize insect pests of ornamental plants in the landscape.

Pest Caterpillar Recognition

Recognize caterpillar pests. Caterpillars are some of the most visible pests of ornamental plants. Also, stinging caterpillars are usually found on ornamental plants and trees.

Turfgrass Insects

Recognize insects found in turfgrass. Important pests can affect the health and appearance of lawns, while beneficial insects need to be preserved.

WDO CEUs



Wood-Destroying Insect Recognition

Recognize wood-destroying insects and termites. These are the most important insects that threaten homes and structures.

We hope *PestPro* magazine helps keep the industry up-to-date on current developments in pest control. Our CEU training will be enhanced in the future to provide high-quality educational experiences for everyone. We certainly hope that these new CEU programs, along with *PestPro* magazine, will be of great use for the pest management industry. **PP**

Phil Koehler is Endowed Professor at UF/IFAS Entomology and Nematology Department.

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UF Expert: Protect Pets From Poisonous Cane Toads

GAINESVILLE, Fla. — Cane toads can put your pet in peril, and they're more abundant this time of year. But you can take steps to keep your dog or cat safe, says a University of Florida researcher.

Although cane toads are more abundant in the spring and summer months, when there's more rainfall, they can be found just about any time of the year in South Florida, said Steve Johnson, an associate professor of wildlife ecology and conservation at the UF Institute of Food and Agricultural Sciences.

"Cane toad toxin can irritate humans' skin and eyes," said Johnson, who's also a UF/IFAS state wildlife Extension specialist. "If your pet bites or swallows a cane toad, it will become sick and may die, so take it to the veterinarian right away."

Symptoms of cane toad poisoning in pets include excessive drooling and extremely red gums, head shaking, crying, loss of coordination, and sometimes convulsions.

Johnson gets frequent emails and phone calls from residents wanting to know whether the toad in their yard is a cane toad, and if so, what they can do to keep their yard and pet safe. Cane toads are tan to reddish-brown, and their backs are marked

with dark spots. Adults are 3 to 6 inches long, and their skin is warty.

Johnson makes the following suggestions to prevent your dog from getting poisoned by a cane toad:

- ✓ Be aware of your pet's location.
- ✓ Walk your dog on a short leash, especially at dusk and after dark.
- ✓ Don't let your dog sniff under bushes.
- ✓ Trim shrubs so limbs don't touch the ground, and remove debris and clutter in your yard. These two measures will make your yard less attractive for toads to hide.
- ✓ Turn off outside lights, which attract insects and toads.
- ✓ Don't leave pet food out at night.

If you suspect your pet has been poisoned by a cane toad, Johnson has these tips:

- ✓ Wipe your dog or cat's mouth thoroughly with a wet rag.
- ✓ Using a hose, rinse you pet's mouth for about 10 minutes, keeping its head pointed down so water runs out of the mouth.
- ✓ Call your veterinarian for more advice. The vet will probably suggest bringing the pet to the office. **PP**

— Brad Buck, UF/IFAS



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