JANUARY/FEBRUARY 2022

Subterranean Termite Bait Efficacy | Florida's Toxic Trees

PESTPRO

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

The Termite Protection Code: Part of the Florida Building Code

OFFICIAL MAGAZINE OF FLORIDA PEST MANAGEMENT ASSOCIATION

Bugs Get Sick Too

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VOL. 18, NO. 1
January – February 2022

PESTPRO

magazine is a publication of
Pest Management Education, Inc.,
and is the official magazine of the
Florida Pest Management Association

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PESTPRO (ISSN 1553-4693) is published Jan.–Feb., March–April, May–June, July–Aug., Sept.–Oct., and Nov.–Dec. by:
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5814 Nob Hill Blvd.
Port Orange, Florida 32127
Phone (352) 392-2326

POSTMASTER: Send address changes to:
Pest Management Education, Inc.
5814 Nob Hill Blvd.
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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Closeup of a crop pest known as cabbage looper, or *Trichoplusia ni.* Scientists can produce medicine for humans with the help of viruses that infect caterpillars, including cabbage loopers.

Photo by U.S. Geological Survey

Happy New Year 2022!

Message from the President of FPMA, Suzanne Graham

WE WENT OUT with a bang with a successful 2021 Clay Shoot, and we enter 2022 full of enthusiasm for our plans for the upcoming year.

Plans Under Way for 2022

Although we recognize we are not completely free of concerns surrounding the pandemic, we are looking forward to putting on a full series of events this year starting with our Business & Operations EXPO, January 18–22. At this writing, the attendee slots for our new TECH Day are filling up, so if you would still like to participate, please give us a call at HQ to see if we can squeeze you in. Call (407) 293-8627.

By now those of you who are members will have received a copy of the 2022 Budget and proposed changes to the By-laws. Both will be presented at the Annual Business Meeting at 4 PM on January 20. The results of the Economic Impact Study will also be presented at this meeting. As is customary, the Regional Directors will also be sworn in.

The new Regional Directors are already starting to plan for meetings in 2022. Venues are being reconsidered, speakers are being contacted, and we expect to resume meetings on a more regular basis.

The 2022 Summer Conference will be held at Hammock Beach, June 13–15. Given the success of last year's the strictly business class format, we plan to invite speakers who can address the concerns of owners and upper-level managers. Networking with colleagues in an informal atmosphere has always been the focal point of this event, and we intend to give our attendees plenty of information and ideas to stimulate lively conversation.

FPMA 2022 SUMMER CONFERENCE at PALM COAST, FLORIDA

Hammock Beach Golf Resort and Spa is the place to be June 13–15, 2022

Industry Market Heats Up

Finally, I'm sure you are all aware of the "hot" mergers and acquisitions market for pest control companies in Florida. This has been a trend for some time, and we will continue to evaluate how this will affect us as an association in terms of our operations, events, and programs.

The one thing I do know is that FPMA was formed to represent and be responsive to the interests of ALL pest control companies in Florida — regardless of their size. Membership has never been more important, and we need both your financial support and your ideas and suggestions to continue to evolve and grow as an association.

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

Suzanne Graham
President, FPMA

Seven-Year Anniversary of *PestPro*

IT WAS seven years ago that Pest Management Education, Inc., began publishing *PestPro* magazine. We founded the nonprofit corporation to provide quality pest management information to the urban pest management industry in Florida. The magazine is provided free of charge to all pest management professionals in the state of Florida. Any profits from publishing the magazine are used to support urban entomology students and research at the University of Florida.

About six years ago, we started cooperating with the Florida Pest Management Association via the publication, and *PestPro* serves as the official magazine of FPMA. We are proud to provide the industry not only scientific and technical information, but also information about issues that face the industry in Florida.

We are glad to have the column "Legislative Corner" become a routine part of the magazine. We hope this new column will address some of the potential regulatory and governmental changes that may occur due to legislative action in Tallahassee and Washington, D.C.

Almost all the entomological and scientific information in the magazine is provided by faculty, staff and students at the University of Florida/IFAS. We pride ourselves in providing current information that is the best that science can offer the pest management industry. It is a winning combination of skills and knowledge that can help make the industry better each year. Our goal is to have not only the largest and most successful pest management industry in the United States, but also one that prides itself on providing the highest quality service.

THE PEST MANAGEMENT industry has always had a close relationship with academia. The industry has always looked to universities to give unbiased and scientifically sound information. Much other available information is biased in some way, so the industry looks to our faculty and students to report on research and discoveries to improve the knowledge and service provided by employees.

Holly Glenn, UF/IFAS

During the past six or seven years, many things changed in the pest management industry. *PestPro* magazine attempts to address important changes in pests, pesticides and procedures. These are constantly changing. This industry differs from other industries because of constant change.

Changes in INSECT PESTS

Insect pests are constantly changing. For instance, there is probably a new invasive pest every week in Florida. Without the scientists at the University of Florida, you would probably be working on the assumption that there are only 13 species of termites in the state, as we had 45 years ago. We now have more than 20 species, and most of those are invasive species that are now important. We have more species of household pests than 20 years ago. Last month we published an article on an aquatic cockroach that is found in much of Florida. Who would have thought that cockroaches would inhabit wetlands rather than kitchens and trees?

Lawn and ornamental pests have changed, as well. Sago palm used to be an easy landscape plant to grow. Now it is difficult to grow sago palms because of the cycad aulacaspis scale, pictured above.

Changes in PESTICIDES

Not only are the insect pests changing, but the amount of chemical needed for effective pest control is changing due to resistance and other factors. Every field strain of German cockroach that we have brought back to the lab for testing has exhibited some form of resistance. Resistance is widespread in *Aedes aegypti* mosquitoes and chinch bugs. Chemical treatments that worked 20 years ago for control of a particular pest may no longer be effective.

When insect resistance to insecticides changes, the industry needs to update as well. It used to be that the chemicals used to control pests changed rapidly. For instance, DDT, chlordane and heptachlor used to be chemicals the industry relied on for control of most pests. Those chlorinated hydrocarbons were replaced with organophosphates and carbamates. Now the industry cannot use these cholinesterase inhibitors. So along came the insect growth regulators, pyrethroids and neonicotinoids. Most of the products used for spraying are those last three classes of chemicals. They have been around for about 20 years. Another generation of chemicals is on the way. How will you decide which one to use? Hopefully University of Florida research delivered in *PestPro* magazine will help you make that decision.

Changes in PROCEDURES

Procedures used in pest control have changed drastically. Twenty years ago it was common to spray the entire floor for flea and other household insect control. Now applications are required to be more limited. Many pest management professionals say no to sprays and yes to bait applications. Who would have thought that changes like that would happen, be recommended by University researchers, and then implemented by the pest management industry?

THE MAIN PURPOSE of *PestPro* magazine is to provide current, correct and useful information to the urban pest management industry. We at *PestPro* attempt to bring you information that is the most accurate for the Florida industry from researchers who have spent their careers gaining the knowledge and experience to assist the industry in providing better technical service.

Let's hope that we can continue this effort for another seven years, or 14 years, or even longer. PP

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

Bugs Get Sick Too

Roberto Pereira

HAVE YOU ever seen a cockroach sneeze? No, because cockroaches do not sneeze.

But like any other animal — in fact, any other living organism — insects have bugs that bug them. No kidding!

Insect pathology is the study of the diseases that affect insects. Some of these studies have made surprising contributions to the world.

Lab dish photos, above: Bt toxins present in peanut leaves (top dish) protect it from extensive damage caused to unprotected peanut leaves by lesser cornstalk borer larvae (bottom dish). Herb Pilcher, USDA-ARS

TAKE genetically engineered crops, for instance. When people hear about *Bt* corn and other *Bt* crops, many are not aware of where the *"Bt"* comes from. Actually, *Bt* is short for *Bacillus thuringiensis*, a species of bacteria that produces proteins that are toxic to insect larvae.

The bacteria produce spores that help the bacteria survive during harsh times. As a result, a subproduct forms: a crystal that includes toxic proteins that are harmful to certain insects. When a caterpillar eats these toxins, it gets sick, vomits, and eventually dies. Its guts rupture due to the presence of the *Bt* proteins.

For years, *Bt* was sprayed on gardens and crops to control caterpillars. The *Bt* crops grown now come from plants that were modified with bacterial genes so that the plants produce the insecticidal protein. These plants are known as genetically modified organisms, or GMOs.

Because the insecticide is within the plant, insects that are susceptible to the insecticidal protein will die if they consume the plant. By incorporating the *Bt* gene into the plant, scientists produced plants that, if eaten by certain insects, will cause them to die.

Photo above: Caterpillars killed by the toxin produced by the bacterium *Bacillus thuringiensis*. The genes that produce the toxin have been transferred into plants to make them resistant to insect attack. The toxins can be activated only by the target insect larvae. In contrast, when people consume the same toxins, the toxins are not activated and no harm occurs. *Bt* is low in toxicity to humans and other mammals.

PATHOGENS: Just What The Doctor Ordered

In a more surprising use of insect pathogens, scientists can produce medicine for humans with the help of a virus that infects cabbage loopers. The virus takes over the cell mechanism in its caterpillar host, forcing the production of additional viruslike particles. These noninfectious particles are used to form the basis of Cervarix, a medicine for humans.

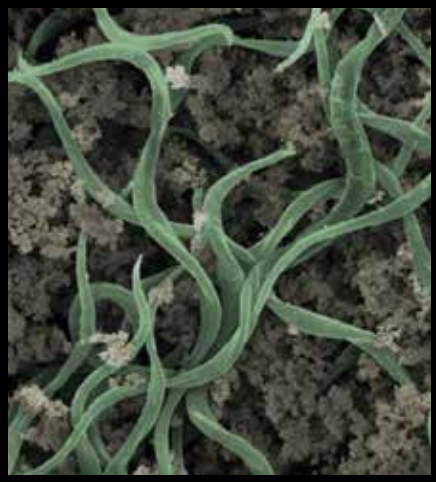
That's right: A virus that causes caterpillars severe diarrhea has been genetically modified to produce certain chemicals that can be used in the prevention of cancer-causing human papillomavirus, or HPV. By growing a caterpillar virus that has been genetically modified, science can produce medicine for humans. Cervarix contains no live virus and no DNA, so it cannot infect the patient.

Continued next page

Cabbage loopers tear through a cabbage leaf

Purdue Univ.

Cervarix is among the medicines for humans that have been developed using insect pathogens.

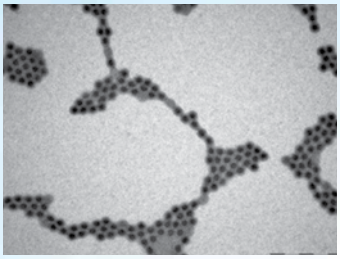


Insects can even have PARASITES!

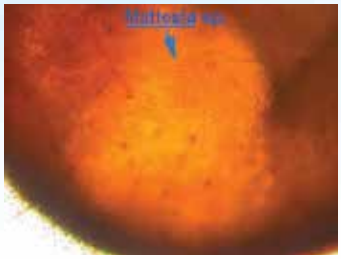
Helicosporidium, a genus of green algae, is a parasite found in the gut of insects. The tinted micrograph image shows the gut content of an insect host challenged with *Helicosporidium* cysts. These microscopic cysts release filamentous cells in the gut lumen of insects. Photos at far left show an intact cyst above and a just-released filamentous cell, below.

Drion Boucias, UF/IFAS

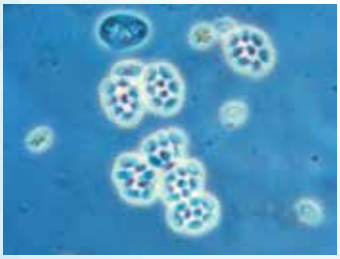
Fire ant colonies can survive floodwaters by forming a ball.



SINV-1 virus found in fire ants.



Mattesia spores in fire ant head.



Knealhazia solenopsae is used as a microbial control of the red imported fire ant.

Myrmecinosporidium durum can infect many species of ants.

PATHOGENS Can Help Pest Pros

PEST PROS probably do not worry much about the medicinal uses of insect pathogens. So let's consider several insect diseases that help us with urban pest management:

- A fire ant virus has been out there killing fire ants. Known as *Solenopsis invicta* virus 1, or SINV-1, this was the first virus attacking an ant ever described. The researchers at the USDA–ARS in Gainesville got an achievement award from the Florida Entomological Society for the discovery of this virus. Additional versions of this fire ant virus have been identified in different ant populations. This family of SINV viruses continues to help us as another source of mortality in fire ant populations.

- Other insect viruses have been identified from termites and other pest populations. Although we may not be aware of their presence in nature, these viruses help us by controlling insect populations that could be harmful to us.

- The microorganism *Knealhazia solenopsae,* which infects only the red imported fire ant, has been intentionally spread around the southeastern United States as a microbial control for the red imported fire ant. Once this pathogen infects fire ant queens, the queens slowly lose their ability to produce eggs. The queens eventually cannot produce any new workers for the colony, and the colony will start dying.

- An organism known as *Mattesia* species causes "yellowhead disease" in fire ants. The disease causes a change in the cuticle of the fire ant. The accumulation of football-shaped spores inside the fire ant head and other body parts gives the ant a yellowish color as opposed to the red-orange color of normal fire ants. This disease has been detected in several areas of Florida and continues to provide some level of mortality in the fire ant population.

- New pathogens are constantly being discovered from different insect populations. Eventually, some of these may become the next silver bullet for the control of urban pests.

Eastern subterranean termite

German cockroaches killed by a fungus, *Metarhizium anisopliae*

Illness Can Also Strike Insects in the Lab

With so many examples of insect diseases, how come we do not hear more about them and see their effects in insect populations? Well, there are not that many people that pay close enough attention to insect populations to allow them to detect these diseases. Many of these diseases are silent killers that do not produce obvious signs of their presence or cause quick death in insect populations.

When raising urban pests in the laboratory, we have to be vigilant so that diseases do not take over — although these diseases could be very useful in maintaining insect populations under control elsewhere. But in our laboratory, diseases can be a problem.

For instance, we have seen cockroach populations in our UF Urban Entomology Lab with unusual mortality levels — above what we normally expect from our lab colonies. After all, our lab cockroach colonies are pampered so they can stay healthy and produce lots of new roaches that we can eventually experiment with. But in this instance, the roaches were infected with a pathogen. They did not seem to be doing well and had unusually high numbers of organisms living in their guts.

There are always microorganisms living in insect guts — and our own guts too! But the unusually high numbers of gut organisms caused a hundred or more of our lab cockroaches to get sick and die — or simply weakened them enough that they died from other causes. In our laboratory these cockroach gut organisms were a problem, but in nature they help keep cockroach populations under control.

The art and science of finding insect diseases rely on being able to detect abnormalities in insect populations: their behavior, their looks, and anything else that may hint the insect is carrying a pathogen in its body. With luck and keen observation, even people that are not familiar with insect diseases can detect colorations, shapes, behaviors and other hints that something abnormal is affecting individual insects or insect populations.

As you go about inspecting your pest control accounts, keep an eye out for unusual insects. Perhaps you can be the one to spot a new discovery that will revolutionize insect pest control. **PP**

Roberto Pereira is Extension Professor in Urban Entomology at the UF/IFAS Entomology and Nematology Department.

Roberto Pereira and Phil Koehler inspect a cockroach colony at UF Urban Entomology

German cockroaches in UF Urban Lab colony

Photos by USDA-ARS, USGS, and UF/IFAS

Florida Termite Codes at a Glance

Code Section 105.11 requires the posting a permanent sign which identifies the termite treatment provider, need for reinspection, and treatment contract renewal date. The sign shall be placed near the water heater or electric panel. In addition, Florida Statutes 482.226(5) Require a permanent sign adjacent to the access to the attic or crawl area or other readily accessible area of the property.

Code Section R317.1 states that pressure treated wood and naturally resistant wood cannot to be used as a physical barrier. It defines pressure treated wood as preservative treated wood in accordance with the American Wood Preservers Association. Naturally resistant wood is defined as heartwood of redwood and eastern red cedar.

Code Section R318.1 requires structure to have some form of foundation protection from termites. **Sections R318.1.1 to R318.1.7** refer specifically to soil treatment only. The structure must have a Certificate of Compliance with mandated language issued by a Licensed pest control company on completion of treatment.

Code Section R318.2 Protective sleeves cannot be of cellulose-containing materials. Soil treatments used must have a thickness of 0.01 inches and must be sealed in the slab. No termiticides should be inserted into the protective sleeve.

Code Section 318.3 Cells in concrete blocks cannot contain any cellulose debris.

Code Section R318.1.1 requires Initial soil chemical treatment inside the foundation to be done after completion of excavation, backfilling, and compaction.

Code Section R318.1.2 requires any disturbed soil to be retreated, including spaces that are boxed and formed. Often this occurs when plumbing or other utilities are relocated.

Code Section R318.1.3 requires that spaces in concrete floors must be boxed or formed out using permanently placed metal or plastic forms, grade stakes, and traps.

Code Section R318.1.4 The initial soil treatment shall be protected with a minimum of 6 mil vapor retarder to protect against rainfall dilution.

Code Section R318.1.5 Concrete overpour or mortar accumulated along exterior foundation perimeter shall be removed prior to exterior vertical chemical treatment. Also, inspection clearance is needed between the landscape and exterior perimeter. Landscaping includes sod and mulch.

Code Section R318.1.6 Residual soil applications must also be made within 1 foot of the foundation and under adjoining slabs.

Code Section R318.6 To protect the building against termites and wood decay, water discharge around the building perimeter is regulated. Water discharge lines, downspouts, and sprinkler heads must discharge water at least 1 foot away from the structure.

The Termite Protection Code

A Part of the Florida Building Code

Philip Koehler

Back in the day, pest pros knew that there were two kinds of houses in Florida: those that had termites, and those that would get termites.

FOR MANY years, the Florida building code did not require termite treatments on new construction. The only requirement for termite treatments was from the banking industry, which required a termite treatment to obtain a mortgage and protect their investment from structural damage by termites and other wood destroying organisms.

Actually, a new house could be built and the homeowner could choose to forego a termite treatment and contract. That would be living on the edge.

Termites Wreak Havoc

For many years, I lobbied to have the building code require termite treatments. It made no sense to me that so many houses and other structures were built in a state that had one of the highest incidences of termite infestation, and those structures were not required to be protected from termite attack.

Roland Holt was in charge of building inspections for St. Johns County in the late 1990s and early 2000s. In his county many houses were infested with termites before they were five years old. Those were the days of improperly applied stucco running below ground and concrete overpour causing problems.

The pest control industry was also learning how to apply the newer termiticide replacements for chlordane. Roland said that if a hurricane came along, the roofs would be blown off houses because the wood where the hurricane anchors were fastened would fail due to termite damage. As a matter of fact, hurricanes have since blown the roofs off houses and exposed wood that was badly damaged by termites.

Building the Code

Around the year 2000, Steve Dwinell at FDACS got with me, and we organized a negotiated rulemaking committee to develop the termite protection code to be placed in the Florida building code. The committee was composed of FDACS, IFAS, pest control industry, insecticide manufacturers, county building officials, building code officials, and insurance company and building industry representatives.

Negotiated rulemaking means that all committee members have to agree to all wording in the code. So the termite protection code was drafted and incorporated into the Florida building code, and it remains the only code in the country that requires structural protection of residences from termite attack.

The termite protection code was placed not only in one section of the Florida residential building code, it was integrated into the appropriate sections. For instance, Chapter 1 is for permits and covers the notices needed about termite protection. Chapter 3 involves building planning and the treatments for termites.

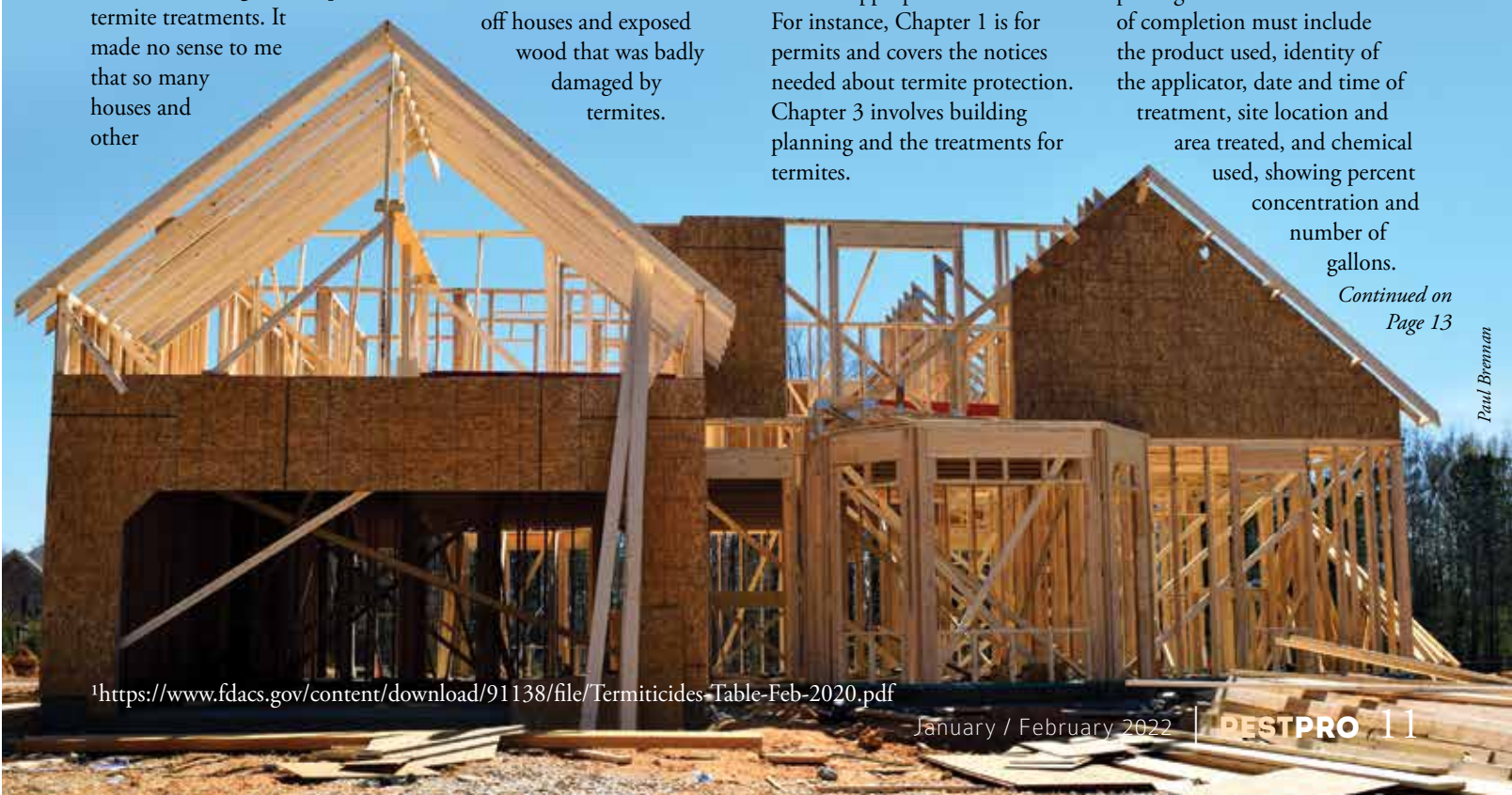
Code Section 105.10 requires that termiticides used for preventive protection of newly constructed residences shall be registered with the state of Florida for soil applications, baiting systems, and wood treatments. The FDACS list of registered termiticides can be found online.[1]

The code also includes other approved methods that would prevent termite access to the building, as well as prevention of termites in "unusual" construction such as buildings in wetlands or coastal areas using pilings and other methods.

Certificates of protective treatment must be posted on the jobsite posting board. As each protective treatment is completed, a copy goes to the person to whom the permit is issued, and a copy for the building permit files is put on the board.

A certificate of occupancy of the building cannot be issued unless all applications and postings are made. The certificate of completion must include the product used, identity of the applicator, date and time of treatment, site location and area treated, and chemical used, showing percent concentration and number of gallons.

Continued on Page 13



Paul Brennan

[1]https://www.fdacs.gov/content/download/91138/file/Termiticides-Table-Feb-2020.pdf

We are back!

The University of Florida's 3rd Annual
Northwest Florida Pest Management Conference

Niceville Community Center, 204-C Partin Drive N, Niceville, Fla. 32578

TUESDAY, March 1, 2022

7:30 AM – 8:00 AM		Registration
8:00 AM – 8:55 AM	CORE	Record-Keeping Checkup — Sheila Dunning, UF/IFAS
9:00 AM – 9:55 AM	L&O	Lawn Pests in Florida — Adam Dale, UF/IFAS
9:55 AM – 10:10 AM		BREAK
10:10 AM – 11:05 AM	GHP	Bed Bugs and Their Control — Phil Koehler, UF/IFAS
11:10 AM – 12:05 PM	WDO	Termiticides — Roberto Pereira, UF/IFAS
12:05 AM – 1:00 PM		LUNCH: FREE PIZZA WITH EXHIBITORS!
1:00 PM – 1:55 PM	L&O	Mosquito Control — Roberto Pereira, UF/IFAS
2:00 PM – 2:55 PM	GHP	Cockroaches in Florida — Rebecca Baldwin, UF/IFAS
2:55 AM – 3:10 PM		BREAK
3:10 PM – 4:00 PM	CORE	Pesticide Spill Cleanup and PPE — Matthew Lollar, UF/IFAS
4:15 PM – 5:10 PM	WDO	Formosan Termites in Florida — Johanna Welch, FDACS

REGISTRATION

Regular Attendees: FREE
Exhibitors: $100 (6–foot table available)

Register online at Eventbrite — https://tinyurl.com/yy2dwspx

--AND LATER THIS YEAR--

SOUTHEAST PEST CONFERENCE

IS PLANNED FOR
MAY 3–5, 2022
IN GAINESVILLE

Summary of the Florida Building Code and Termite Prevention

105.10	Certificate of Protective Treatment for Prevention of Termites	Requires posting of all applications — no "final approval" if all applications not made, including vertical barrier.
105.11	Notice of Termite Protection	Requires posting of consumer notice inside house — will inform owner of need to renew contract and inspect annually.
R318.4	Concrete-Bearing Ledge — Veneered Walls	Requires 6-inch space between grade and siding for termite inspection — if below grade, termite protective treatment to cavity created between veneer and foundation.
R318.6	Protection Against Decay and Termites	Requires discharge lines and gutter downspouts to terminate at least 1 foot from foundation.
R318.1	Foundations and Retaining Walls — Termite Protection	Requires foundations to have some form of protection from termites "labeled for use as a preventative treatment to new construction."
R318.1.1	Baiting Systems	If soil treatment is used, must be done after compaction.
R318.1.2		If soil treatment is used, disturbed areas must be re-treated.
R318.1.3		If soil treatment is used, forms and traps must be plastic or metal.
R318.1.4		If soil treatment is used, vapor barrier must be installed.
R318.1.5		If soil treatment is used, concrete overpour must be removed.
R318.1.6		If soil treatment is used, applications must also be made within 1 foot of the foundation under adjoining slabs.
R318.1.7		Signed contract ensuring installation for five-year period from issuance of Certificate of Occupancy provided to building official PRIOR to pouring of slab. System must be installed prior to final building approval.
R318.1.8	Wood Treatment	Sections R318.1.1 through R318.1.6 do not apply. Application must be completed per label directions and prior to final building approval.
R318.1	Certificate of Compliance	Licensed pest control company must issue Certificate of Compliance on completion of treatment (mandated language).
R318.2	Foundation Penetration	Protective sleeves around slab penetrations must not be cellulose.
R318.3	Masonry — Termite Inspection (Cleaning)	Cells in blocks must not contain cellulosic debris. PP

Philip Koehler is Emeritus Professor at the UF/IFAS Entomology and Nematology Department.

BUSINESS AND OPERATIONS

EXPO

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Ain't Nothin' Like a Great Team, Baby

RAND HOLLON

LOOKING back on my previous articles, I have covered many components that have an effect on business value and marketability. Examples of these value components include: Service Mix, Financial Performance and Reporting, Fleet, Geography, Business Age, and many other items. Contrary to popular belief, individually, the historic value these components bring to overall transaction value is anything but static. Over the last 30 years, I've seen the impact these individual items have had on overall transaction values rise and fall within the marketplace of business buyers and buyer-types. A value component I would like to address here is the Seller's Employee Team.

The tenure, effectiveness, and assumed stickiness of a selling business's Employee Team is currently viewed in the marketplace with increased importance.

This has not always been the case. As recently as the few years following the financial crisis of the late '00s, many acquirers viewed the retention of a Seller's employees as kind of an afterthought. "Great if they come over, but not mission-critical. We'll try to find a place to put them." That was not an out-of-character Buyer comment while reviewing a Seller's Employee Team dossier.

Generally speaking, most buying organizations already had established, capable supervision, plenty of employees, and, if need be, the labor market provided ready access to more.

Do not misunderstand, when it comes to deal value, a Seller's business having a great staff complement has always been a plus. However, in today's market, it is becoming more of a scale-tipper.

Employee Scarcity

It is no secret that the current labor market in the United States is a mess. Why has it become so difficult to find more great people?

Covid-19 with variants du jour, along with related government involvement/assistance beg to be one answer. Other answer candidates may include the evolution of paperless, holacratic organizations where call centers, Zoom management, and routing software have worked, in some cases, to reduce the need for supervisory staff. In some markets, great pest industry lieutenants have now become as scarce as hen's teeth.

Regardless of why, demand has been increasing for experienced, qualified, employees, and competition in today's marketplace continues to intensify. To a much larger degree, Buyers view an acquisition that includes a great Employee Team as a way to deepen their own well of employee talent.

As an upside, many Buyers are becoming much more adept at on-boarding and retaining a Seller's Employee Team post-Close. This is not an easy task as it is unwise, not in small part due to Buyer-Seller confidentiality restrictions, for employees to get wind of a possible business sale. Typical employee relationships are at-will. In an acquisition, a Seller cannot make contractual assurances to a Buyer that key employees will not leave in the future. If key employees leave post-Close, the onus is on the Buyer to attract and retain a replacement, while at same time working to avoid a loss in in productivity, or worse — loss of customers. Buyers want sticky customers.

The best way for a Seller to deliver sticky customers is to have a great Employee Team. Regardless of your business's size, doing the things to create a great team of employees will only help the value of your business asset. Creating a great team may involve some hiring process improvement, improved training, and other actions which can lead to increased employee tenure, higher employee morale and better service. Whether you're selling or not, all of these items lead to higher customer retention.

Now more than ever, an established, trained Employee Team is an asset that adds to a pest control business's overall value and marketability. The takeaway, as you work on building your business asset, is to look at more than simply increasing your top-line revenue numbers. Work also at developing an Employee Team that others would be happy to acquire. If you have a great team, make it better. If you don't, work to create one! 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.

Mike Scharf

My wanderings as an urban entomologist ...

BORN IN GARY, INDIANA, in the late 1960s, Dr. Mike Scharf grew up in northwest Indiana. His father owned two Ace Hardware stores and a remodeling business. Almost all of Mike's extended family was in one way or another involved in the construction business.

Growing up, Mike spent his summers playing baseball, fishing and working with his father — whenever he could latch onto Mike. He spent winters skiing locally. Later on, Mike's autumns were spent learning to hunt duck and goose with friends he still has today.

Mike's father owned and operated a hardware store in Portage, Indiana, from 1960–1995.

ACADEMICALLY, I was always drawn to zoology and biology. I recall clearly having to make my first insect collection in sixth grade, which had a significant impression on me. I was fortunate where I grew up and went to school. Chesterton, Indiana, had one of the top-ranked school systems in the state. This was because Bethlehem Steel Corp. heavily subsidized the school system since so many of its employees lived there.

The benefit to me was the excellent biology and chemistry teachers and courses I had access to. I was lucky because I got an excellent education in the construction and home improvement business, as well as chemistry and biology. I also had plenty of shop classes and honors English to round out my very diverse high school education.

Off to College

In 1986, I was accepted into Purdue University as a freshman, just 90 miles away from my hometown. I was actually accepted first into pre-med at Indiana University, but my parents weren't keen on me moving farther away for a more expensive education at the No.-1 ranked party school in the United States. The result was me going to Purdue, but the only program I could get into involved starting as an undeclared major in agriculture. In my first semester, I heard a guest lecture from Professor Al York on entomology as a major. In particular, I was very interested in what he had to say relating to insect physiology and insecticide chemistry. By the time the second semester started, I was majoring in entomology.

As an entomology major I took all the usual insect courses, plus biochemistry, evolution and ecology as my electives. My first summer, I went home to work in my father's business, but my sophomore summer I stayed to work on the field crops entomology crew conducting insecticide and IPM studies in corn and soybeans. After doing very well in introductory biochemistry the following school year, my professor Dr. Krogman asked me if I was planning to go to graduate school. This planted the seed in my brain to consider that possibility — because I apparently had the ability?!

The following summer I landed a job in Dr. Gary Bennett's lab working on the famous cockroach crew conducting efficacy trials in public housing in the city of my birth: Gary, Indiana. I did this job for two summers as an undergrad, then it continued for several additional years into grad school.

Doing this work thrust me headfirst into urban entomology. It was incredibly interesting to me because this field brought together entomology, sociology, public health, and insecticides. I immediately saw this as a real opportunity to use science to help people live better lives.

This experience also opened my eyes in a big way to the problem posed by insecticide resistance in terms of resident quality-of-life — because of cockroach allergies and asthma, and how insecticides can be overused in such situations. This proved to be a big motivator in my work in grad school and beyond.

... and insect toxicologist

Mike Scharf
Endowed Chair in Urban Entomology, University of Florida

Grad School Beckons

In 1991, I started my master of science degree with Dr. Bennett as my major professor. I also worked closely with Dr. Byron Reid, who eventually was hired by Bayer, where he is now senior principal scientist.

For my M.S. degree, I delved deeper into insecticide toxicology coursework and did my research project comparing different insecticide bioassays for measuring resistance in cockroaches. I completed my M.S. in 1993 and applied to many prestigious laboratories for a Ph.D. to delve deeper into insecticide toxicology. Zero opportunities emerged, but luckily and very thankfully, Dr. Bennett always made it clear he had a place for me.

Starting in 1994, I began my Ph.D. program at Purdue. I was given the freedom to develop a research topic that brought together cockroach resistance, evolutionary biology and biochemistry. In 1995, I had a tremendous opportunity appear in the form of an invitation to come to study at the University of Wales (now Cardiff University) in the laboratory of Dr. Janet Hemingway, with additional generous support provided by Dr. Tom Gallo of ICI / Zeneca, Inc.

At the time, Dr. Hemingway's lab was doing groundbreaking work on the biochemistry and molecular biology of resistance in malaria mosquitoes, which afforded me the opportunity to learn and apply the same new tools in cockroaches.

Wales was an incredible experience. In Wales I also met another visiting student working on cockroaches, Dr. Chow Yang Lee, who remains a friend and is an endowed chair in urban entomology at the University of California–Riverside.

After returning to Purdue later in 1995 I immersed myself in my research, and in 1997 I completed my Ph.D. Without getting into too many of the boring details, through my Ph.D. research I was able to document (1) how rapidly biochemical changes happen in cockroach populations as they evolve resistance, and (2) how different insecticides select for different types of resistance mechanisms.

Of course, I did not do this entirely alone. I received a lot of excellent guidance from great mentors along the way, including Gary Bennett, Byron Reid, Janet Hemingway, Jeffrey Stuart, and Jonathan Neal.

Branching Out

Never underestimate the power of leaving your comfort zone and trying something completely different! As next steps in my career, I branched out into different fields, which gave me unique opportunities to work on new research problems and learn new skills that I was eventually able to bring back to urban entomology. In 1997–2000, I worked as a postdoc with Dr. Blair Siegfried at the University of Nebraska on corn rootworm insecticide resistance, and in 2000–2001 I took another postdoc position with Dr. David Soderlund at Cornell University–Geneva, focusing on molecular mechanisms of nerve insensitivity (kdr-type) pyrethroid resistance.

Continued on Page 24

Dr. Gary Bennett, Mike's major professor and eventual colleague at Purdue University.

Mike became a professor himself: here, with some of his lab group at Purdue.

Spiders in the Lanai

AS AN Extension agent in southwest Florida, I frequently receive inquiries about spiders in the lanai. The covered outdoor porches here are ubiquitous and a favored environment for several spider species.

There are about 58 spider species in Florida, and five of these are venomous. Spiders making their home inside of your lanai are hoping to capture small insects such as flies.

Although spiders are often regarded as unwanted visitors, we need them — an average spider eats 2,000 other insects a year, including many nuisance pests that attack both food crops and ornamentals. Due to the immense pest control services that spiders provide, scientists have conjectured that a world without spiders is a world of famine for humans and other animals.

Most spiders are small, shy, and best left alone. However, control tactics can be employed to remove these year-round visitors. If a spider or a web in a lanai is bothering you, you can vacuum it right up! After vacuuming, remove the vacuum bag and place in a sealed bag for disposal.

Routine cleaning is the most important strategy for keeping spiders at bay. Before reaching for a can of insecticides, try these preventative steps:

1. Vacuum your carpets and floors regularly, including under furniture and inside cabinets.
2. Remove webs when you spot them.
3. Seal entrypoint gaps under doors and between screens with weather stripping.
4. Clear clutter such as wood piles and stacks of boxes. Spiders will shelter in undisturbed, darkened cracks.
5. Deter other insects, such as flies that spiders eat, by keeping your kitchen clean and free of trash.
6. Keep your home and lanai dry and ventilated — some spiders are attracted to moisture.

If a spider problem still exists after routine cleaning, you can utilize spot treatment applications of insecticides containing pyrethrins or pyrethroids. Apply to locations where you see spiders routinely building webs. Make sure not to agitate spiders so that they do not drop down on you: This is especially important if you are removing a venomous species. PP

– Hamutahl Cohen
UF/IFAS Collier County Extension

Judy Gallagher

Spiny orb weaver

Learn more about spiny orb weavers at https://edis.ifas.ufl.edu/publication/IN324

Coptotermes formosanus soldier, guarding a pile of eggs

Queen and king of *Coptotermes gestroi* from a mature colony

Two New Studies Shed Light On Subterranean Termite Bait Efficacy

Thomas Chouvenc

Two studies recently published by the UF/IFAS Fort Lauderdale termite team reveal answers to how bait leads to colony elimination.

Queen Egg Laying and Egg Hatching Abilities are Hindered in Subterranean Termite Colonies When Exposed to a Chitin Synthesis Inhibitor Bait Formulation

Subterranean Termite (Coptotermes gestroi (Blattodea: Rhinotermitidae)) Colony Elimination Through Exposure to a Novaluron CSI Bait Formulation in Laboratory

TWO particularly destructive invasive subterranean termite species, *Coptotermes formosanus* and *Coptotermes gestroi,* continue to spread in southeastern states. The list of Florida counties with records of either of these invasive termite species continues to grow every year. Urban localities within the states are increasingly at risk for damage from these silent destroyers. Termite control companies therefore remain a fundamental element of the pest management industry in Florida.

However, with a changing termite pressure over the years, termite control has changed over the past few decades, and will most likely continue to change in the near future.

Before the 1980s, subterranean termite control primarily relied on organochlorine chemicals such as chlordane, heptachlor and DDT as soil termiticides, but were phased out owing to their bioaccumulation in the environment and their long-lasting ecological impact. By the mid 1990s, newer chemicals with relatively short half-lives were implemented as soil termiticide solutions to create a temporary chemical barrier around structures.

Coptotermes gestroi egg pile

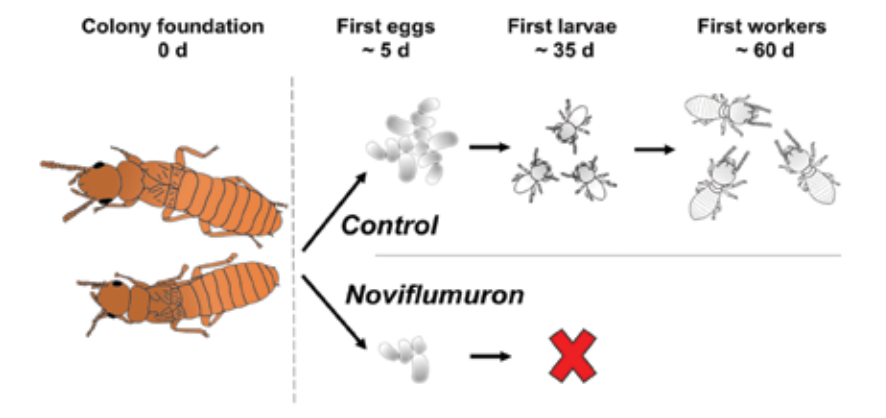
Photos by Thomas Chouvenc, UF/IFAS

Alternative termite control strategies also emerged in this time frame, one of them being chitin synthesis inhibitor (CSI) bait formulations. CSI termite baits use a fundamentally different approach for subterranean termite control as it relies on two termite features: their inherent molting physiology and their trophallactic behavior, or food sharing. A long series of studies published over the years by the UF/IFAS subterranean termite laboratory in Fort Lauderdale has contributed to a better understanding of termite biology and how bait strategies impact termites at the colony level.

CSI: Termite Colony

A subterranean termite colony represents a social family unit with queen and king as the primary pair of reproductives. Sterile helper castes — workers and soldiers — are relatively long-lived individuals maintained in a juvenile morphology throughout their lives. As a result, termite workers must molt regularly in order to renew their aging cuticle and replace their dull mandibles with a pair of sharp ones. In addition, workers are the only individuals in the colony able to feed on wood, while soldiers, eggs, larvae, queen and king rely on workers to feed and take care of them.

CSI bait formulations are consumed by foraging workers, then shared with the rest of the colony through trophallactic exchanges. Once individual workers engage in their periodic molting event, the CSI interferes with the formation of the new cuticle, leading the individual to bleed to death. This mode of action allows for a dose-independent lethal time. Delayed mortality follows, allowing the



Queens exposed to a CSI bait rapidly lose their ability to lay viable eggs. *Figure from Chouvenc and Lee, 2021, Journal of Economic Entomology.*

active ingredient to spread to all individuals before the onset of mortality from asynchronous molting.

As all workers progressively die, the soldiers, queen and king ultimately die from starvation, inevitably leading to colony elimination within three months. Although it is relatively well understood how CSI baits impact subterranean termite at the colony level, a series of questions remains.

Two New Studies Provide Answers

It was previously observed that the brood is remarkably absent from dying baited colonies, but the reason behind this early brood elimination remained speculative. One of the new studies by Chouvenc and Lee in 2021 was able to solve this uncertainty by revealing that subterranean termite queens of baited colonies rapidly lose their ability to lay eggs. Within ten days after exposure, the number of eggs laid by these queens was halved. Within 30 days, the CSI-exposed queens ceased completely to lay eggs.

This observation confirmed that when queens are exposed to CSI, although the active ingredient does not directly lethally affect them, they rapidly become unable to lay eggs. In addition, none of the last laid eggs were able to hatch, confirming that eggs laid by a CSI-exposed queen are not viable, with failed embryonic development.

The second study, produced by two graduate students from the UF termite lab (Gordon, Velenovsky and Chouvenc 2021), looked back at the question that is often asked during meetings: "How much bait does it take to kill a colony?" This question was partially answered a few years back, that a termite colony of 1 million individuals only needs to feed for a single day on a bait formulation and accumulate just 93 miligrams of active ingredient to reach colony elimination.

However, it was still unknown how many termites feeding on a bait is necessary to obtain the death of the whole colony. This new study showed that less than 5 percent of the foraging workers are capable of acquiring sufficient active ingredient to kill the colony. In addition, the study showed the minimal amount required is actually lower than previously determined and that 77 milligrams of CSI ingested per million termites is sufficient for colony elimination.

It is, therefore, possible to reconstitute the missing pieces of the puzzle to understand the processes involved in subterranean termite colony elimination in the field with a CSI bait approach.

First, foragers — relatively old workers within the colony — feed on the bait, bring it back to the center of the nest, and share it with the rest of the colony by trophallaxis, resulting in the queen and larvae being indirectly exposed to the active ingredient.

Second, within 30 days the queen becomes unable to lay viable eggs, and all larvae die in the process of molting. At this point, very few workers are impacted by the CSI, as molting has yet to occur for them. This implies that although foraging activity is maintained by workers, the colony has already lost its entire brood.

Third, by 45 days workers progressively start dying massively until day 80, when only old workers remain, unhealthy and ready to die.

Fourth, all soldiers die of starvation between 80 days and 90 days. Finally, at around 90 days, the queen has lost more than half her biomass, and the queen and king starve to death.

These recent findings revealed that, even after feeding for just a few days on a CSI bait formulation, the colony has already reached a point of no return toward colony elimination. Within a month, it has lost its ability to recover the upcoming loss of its working force because the brood has already been wiped out, and population replacement functions have already been terminated.

What is remarkable is that, as long as a subterranean termite colony is able to feed just a few milligrams of active ingredient from a small fraction of foragers, colony elimination is ensured. This confirms that termite bait technology remains by far one of the best control solutions, with a virtual absence of negative impact on the environment. It does so by nipping it in the bud, or more appropriately from the French equivalent expression, by killing the problem in the egg. PP

Thomas Chouvenc is Assistant Professor in urban entomology specializing in biology, ecology, evolution and control of termites at UF/IFAS Ft. Lauderdale Research and Education Center.

Photos by Lyle J. Buss

Mystery Bug

Lyle J. Buss

I GET a lot of insect identification requests based on photos, and sometimes these photos show some rather strange-looking critters. The inspiration for this article is just such a submission from West Palm Beach, Florida, seen in the large photo above. Obviously, it's a newly emerging lady beetle adult, right?

Before we get too deep into that one, let's first talk about a lady beetle that you're more familiar with, the multicolored Asian lady beetle, *Harmonia axyridis.* It has that classic lady beetle appearance: round and orange with black spots. The larva is pretty distinctive, with a mostly black body that is covered with large, branched spines that are black or orange. Multicolored Asian lady beetles are commonly found on plants where they feed on aphids, whiteflies and other small insects.

When the larva has finished feeding, it enters the pupal stage. As it changes into a pupa, it sheds the larval skin, pushing it to one end of its body. If you look closely at the pupa photo, you can see the large orange and black spines of the larval skin, which helps you recognize it as a multicolored Asian lady beetle pupa!

Another interesting lady beetle is the cactus lady beetle, *Chilocorus cacti.* Its spiny larvae like to feed on scale insects on cacti, palms, and other plants. Their larvae congregate together to pupate. The larval skin splits open down the back, and the pupa forms inside that larval skin. In a couple of weeks, that pupa will become a black lady beetle with two red spots.

So going back to that large mystery bug photo, we can now better interpret what we are seeing. It is a dark lady beetle sitting on top of its own spiny larval skin, from which the beetle recently emerged. Based on the color of the adult and its larval skin, I believe this is a species called the metallic blue lady beetle, *Curinus coeruleus.* This species is native to the Caribbean and Mexico, and was probably introduced into South Florida for biocontrol of pests back in the 1950s. PP

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

Ask IFAS: *How do I manage cycad aulacaspis scale?*

SAGOS were once considered traditional Florida landscape plants, but their popularity has dwindled, thanks to a pest called cycad aulacaspis scale, or Asian cycad scale.

Aulacaspis yasumatsui is an armored scale that has been observed on many cycads in Florida from the Cycadaceae, Zamiaceae, and Standeriaceae families, although this scale seems to favor sagos.

Newly hatched scales, called crawlers, initially infest the trunk and base of the leaves. These crawlers will also infest the leaves, cones, seeds, and roots of cycads. The damage from these tiny sucking insects initially appears as yellow or bleached-looking spots, eventually making the leaves brown and crispy. Highly infested cycads are almost completely covered with a white crust that consists of living and dead insects.

Cycad aulacaspis scale seems to spread over short distances by wind, and long distances by the transport of infested plants. It can coat a sago within months and kill it within a year. The scale can even affect the roots down to two feet deep.

Cycad aulacaspis scale is a tough pest to get rid of, but repeated treatments with horticultural oils or an approved systemic insecticide may help. To manage this scale, wash your plant with a vigorous spray of water to remove any dead or living scales. Then apply a horticultural oil, like Organocide, SunSpray oil, or Ultra-Fine oil, over the entire plant weekly for one month.

If you have heavily infested plants, remove the leaves before treating. Carefully discard removed fronds with household trash, not yard trash. In the case of severe infestations you may need to treat the roots as well. Frequent oil treatments can result in an unsightly buildup of oil and dead scales, but this can be improved by occasionally hosing the plant off.

South and Central Florida have seen some decline in Asian cycad scale populations recently. In South Florida, two natural enemies of the scale were introduced in 1997–1998: *Cybocephalus nipponicus,* a predaceous beetle, and *Coccobius fulvus,* a parasitic wasp. While they have contributed to a decrease in the population of the scale, neither insect is able to provide complete control.

Jeffrey W. Lotz, FDACS

Cycad scale closeup

Cycad aulacaspis scale is a pest of great concern in Florida. Watch for a more detailed article, including more management options, arriving soon in a future issue of *PestPro* magazine. PP

From UF/IFAS Gardening Solutions, a program of the University of Florida's Institute of Food and Agricultural Sciences.

LEGISLATIVE *Corner*

Rick Bell, ACE, VP of Government Affairs at Arrow Exterminators

THE FOLLOWING are three national issues that involve the pest management industry:

1. Rodenticide Use and Pre-Emption in California, AB 1788, passed in California in 2020. It banned the use of second-generation rodenticides throughout the state except by special approval for applicators and government employees in certain authorized situations. There are carve-outs for agricultural activities such as food production and winery facilities, but some of the locations on the banned list may surprise you, and it's worth a look.

California collects and analyzes deceased animals such as puma, hawks, owls and kit foxes, and some contain traces of anticoagulants in their tissue. Wildlife predators in California are considered part of the public trust, just like air and water.

Also take a look at the California Coastal Commission and their attempt to expand oversight into pesticide use with the City of Malibu. The city has drafted and passed an ordinance to restrict environmentally harmful rodenticides, herbicides and pesticides to protect wildlife, habitats, pets and people in the city limits.

And last but not least, AB 1346 was introduced in California to phase out small gasoline engines because of their effect on the environment — think mister blowers, lawn mowers, termite rigs, and so on. How might that affect your business?

2. The Georgia Structural Pest Control Commission has successfully proposed and gotten passed code amendments regarding the application of spray polyurethane foam, or SPF, in new construction. It took three years to accomplish, but with stakeholder groups including the Georgia Home Builders Association, Georgia Association of Realtors, Georgia Pest Control Association, Certified Pest Control Operators of Georgia, the Association of Structural Pest Control Regulatory Officials, NPMA, and the Georgia Department of Agriculture coming together in support, the changes were unanimously passed by the Georgia Department of Community Affairs. As an industry we have much more work to do, but it's a big start.

3. NPMA's Public Policy Team is monitoring over 640 bills moving through state houses across the United States, covering everything from neonics to pollinators to pre-emption and beyond. Many thanks to Jake Plevelich and Ashley Amidon for their work on our behalf! PP

Mike Scharf, continued from Page 17

Faculty Success

In 2001–2004, I moved back to Purdue University as a research faculty member, which gave me the opportunity to once again reinvent myself. I started what proved to be a ground-breaking research program applying new genomic technologies to study termite caste differentiation. This research proved very fruitful and has continued through today, thanks to a number of very talented colleagues, students and postdocs I have been able to work with over the years.

In 2004 I moved to the University of Florida for my first independent faculty position as a research scientist in insect molecular toxicology (2004–2007), and eventually an assistant and associate professor (2007–2010). This is when I began teaching in earnest and developed a well received course in insect toxicology.

At UF, I had the opportunity to dig deeper into several research topics including termite caste differentiation and digestion, cockroach resistance, volatile insecticides for fly and mosquito control, chinch bug resistance, and even mole cricket toxicology. I had some great collaborations during those years with Dr. Faith Oi, Dr. Drion Boucias, Dr. Eileen Buss, and of course Dr. Phil Koehler. I would also be remiss if I did not acknowledge my department chair, Dr. John Capinera, who was very nurturing and a big factor in my early successes at UF.

DESPITE all the great and positive things happening at UF, in 2010 a very significant opportunity materialized back at Purdue University in the form of the O. Wayne Rollins / Orkin Endowed Chair in Urban Entomology. Not only was this a great opportunity professionally, but it was an opportunity to be closer to my aging parents and family. This position provided significant resources to continue pursuing my research interests, recruit excellent students, work with the Urban Pest Industry and be part of the Annual Purdue Pest Management Conference.

I continued to teach graduate-level toxicology, as well as develop a new undergraduate course called "Insecticides and Environment." These two courses were fun and provided many good challenges to help me develop as a teacher.

It was also during this time at Purdue that I and Dr. Ameya Gondhalekar secured a grant from HUD to revisit the cockroach resistance topic. Together with postdoc Dr. Mahsa Fardisi, we were able to conduct coordinated field and lab studies that revealed new evidence to show how fast resistance can reach unmanageable levels in cockroach populations from multifamily housing: literally three to six months!

I also had several excellent graduate students and postdocs over these years who did groundbreaking work on a wide range of topics. These included roles of gut microbes in different aspects of termite biology, gut bacteria and cockroach resistance, cockroach tergal glands, impacts of insecticides on cockroach parasites, chemical communication in ants, bed bug resistance, and movement of nicotinoid insecticides in urban landscapes. Several of these graduate students and postdocs have gone on to become faculty colleagues and industry leaders. I also am hopeful that the same kinds of groundbreaking work can continue in the coming years.

New Beginning at UF Entomology

Fast forward to the present: I have returned to Florida. In January 2022 I will assume the Urban Entomology Endowed Chair recently vacated due to the retirement of Dr. Phil Koehler. Dr. Koehler was tireless and immensely successful in this role for over 45 years. He has been unparalleled in his efforts in research, teaching, Extension and in service to the industry. His shoes are extremely big ones to fill. That's why I am thankful I will have a great team of urban entomologists to work with statewide in the UF system to keep up the momentum.

Continued on next page

Mike supervises his first graduate student at UF, Matthew Tarver.

Dr. Tarver now works as application technology lead for North America with Bayer.

Mike Scharf, continued

My assigned roles are mainly in research and teaching: I will lead "Urban" teaching efforts and keep my research programs moving forward, as well as collaborate statewide with urban programs in Gainesville (Dr. Oi and Dr. Pereira), Fort Lauderdale (Dr. Su, Dr. Chouvenc, Dr. Scheffrahn and Dr. Kern), and other locations where and when possible.

Urban Extension programs are already extremely strong statewide, including Pest Management University, Southeast Pest Management Conference, and School of Structural Fumigation. I will support these Extension programs as needed. Extension programming will provide a mechanism for identifying research needs and for building the most industry-relevant research programs possible. Of course, Dr. Koehler will remain active and will continue to be a valuable institutional resource as we move the program ahead.

FROM A personal perspective, I am very happy to be back in Gainesville. It is a great community and wonderful town to live in. Natural resources and wild places that I enjoy are also abundant and readily accessible nearby. I continue to be an avid fisherman and duck hunter, and I hope to enjoy these activities in the coming years as my responsibilities permit.

Time in the outdoors provides excellent quality time to ponder research questions or how to approach a writing project or lecture, so I value it very much. The outdoors is also a great place to spend time building friendships and new collaborations. Something else I spend my free time doing is collecting, trading and playing guitars, which I've been doing for over 35 years.

I look forward to working closely with and supporting the Florida urban pest management industry, as well as working with the great group of urban colleagues statewide in the UF system and training future generations of urban entomologists in the broadest sense possible. I am excited for the opportunity to elevate the Florida pest management industry and UF Urban Entomology to new, unprecedented levels in the coming years. PP

Manchineel tree and fruit

Toxic Trees of Florida

Reports by Myrna Moore and Sydney Park Brown

Manchineel Tree
Hippomane mancinella

Dangerous and even deadly, this Florida tree made the news in 2021. The media cited toxic fruit, painful burns from rain mixed with sap, blisters from touching leaves, and blindness caused by smoke should the wood be burned. And those are its *good* qualities!

THE manchineel tree is a member of the family Euphorbiaceae, or spurges. Its botanical name is *Hippomane mancinella.* The name is derived from the Spanish word manzanilla, meaning "little apple." In the Florida Everglades and the Caribbean coast it is called "beach apple."

The *Guinness Book of World Records* classifies this tree as the most dangerous tree in the world. All parts of this tree, including the fruit, are poisonous. The medical symptoms include contact dermatitis, blistering of the skin, conjunctivitis with blindness for up to three days, and severe gastrointestinal symptoms if ingested. Even burning the wood may injure the eyes.

The Calusa Indians in Florida used the sap from the manchineel on their arrow tips. During a battle with the Spaniards near Charlotte Harbor in 1521, Juan Ponce de Leon was struck by an arrow with the poisonous manchineel sap and later died. The conquistadors referred to the tree as the *manzanilla de la muerte:* "the little apple of death."

Since this tree likes a swampy environment such as growing between mangroves, I assumed it would not grow in Volusia County. I was surprised to find one growing in the backyard of an Ormond Beach home.

It is recommended that homeowners do not try to remove this tree but have a professional tree service do so because of its toxicity.

Continued

Report by Myrna Moore, a Master Gardener in Volusia County.

Large photo in Public Domain. Fruit photo by Dick Culbert. Small tree photo by Barry Stock.

Poisonwood, showing trunk variations and an oily patch of sap. *Photos by Kim Gabel, UF/IFAS*

Poisonwood
Metopium toxiferum

Poisonwood is an evergreen shrub or tree that grows 25–35 feet tall in hammocks, pinelands, and sandy areas near saltwater. It is particularly abundant in the Florida Keys. As of this writing, poisonwood's range has been confirmed in only five counties in South Florida: Martin, Palm Beach, Broward, Miami-Dade, and Monroe.

The tree has a spreading, rounded form with a short trunk and arching limbs with drooping branches. The bark varies in color from reddish brown to gray, depending on the habitat, and has oily patches of sap on the surface. Older trees have scaly bark.

Each leaf is comprised of three to seven oval leaflets, although five leaflets are typical. Leaves are glossy and dark green above, paler underneath, and have smooth margins, or leaf edges. Irregular blotches of resin dot the surface of many of the leaflets, as shown in photo inset. The fruit is ½ inch long, oval, yellow to orange, and hangs in loose clusters. The poisonwood fruit is an important food source for the threatened white-crowned pigeon.

During a rainstorm, do not walk where poisonwood is known to grow. Rainwater dripping off the poisonwood leaves contains urushiol, which causes contact dermatitis.

Continued on Page 30

Report by Sydney Park Brown, Associate Professor Emeritus, Department of Environmental Horticulture, UF/IFAS Gulf Coast Research and Education Center.

PCO Pointer

Facts from FDACS: Correct Use of Employee Identification Cardholders

THIS SCENARIO has happened to me many times in the past: When I worked for a large company, I had a termite technician call in sick, but I had a full day of termite jobs to do, which required me to use one of my GHP technicians do those termite treatments without providing the proper training.

This, however, is a violation of Florida Statute Chapter 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.

This is why cross-training is very important! PP

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


STATE OF FLORIDA
Department of Agriculture and Consumer Services
BUREAU OF LICENSING AND ENFORCEMENT

Date May 22, 2019 | File No. JE Card Number | Expires September 30, 2019

THE ID CARD HOLDER NAMED BELOW HAS REGISTERED UNDER THE PROVISIONS OF CHAPTER 482 FOR THE PERIOD EXPIRING: September 30, 2019 AT

Licensee Name
Location, FL 32736

Cardholder Name
Licensee Name
Licensee Address

Regular

nicole fried
NICOLE "NIKKI" FRIED, COMMISSIONER

Example of a Florida state ID card that all salespeople, office staff, and technicians are required to carry.

What are the different types of pest control categories?

Pest control falls into four different licensing categories:

- General household pest control (GHP) for pests such as ants, cockroaches, fleas, rodents, and other pests generally related to the indoors.
- Termites and wood-destroying organisms (WDO) such as beetles and wood-decay fungi.
- Lawn and ornamentals (L&O).
- Fumigation.

Excerpt from *Homeowner's Guide to Selecting a Pest Control Service,* EDIS document ENY-2043

CLASSIFIED ADS

Poison sumac, fall color

John Barber

Toxic Trees, Continued from Page 28

Poison Sumac
Toxicodendron vernix

Poison sumac is a deciduous woody shrub or small tree that grows 5–20 feet tall and has a sparse, open form. It is more allergenic than poison ivy and poison oak. It inhabits swamps and other wet areas, pine woods, and shady hardwood forests. In Florida, poison sumac has been confirmed in the north and central regions as far south as Polk County. PP

Report by Sydney Park Brown

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