NOVEMBER/DECEMBER 2017

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PESTPRO

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

OFFICIAL MAGAZINE OF FLORIDA PEST MANAGEMENT ASSOCIATION

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When the cookie crumbles, the ants come crawling. Thus begins a citizen science project for anyone, anywhere. The simple act of mailing in ant specimens can improve scientists' knowledge of the world around us.

Cover photo by Jane Medley

Enemy Irma Inspires FPMA Spirit of Giving

Message from the President of FPMA

Anne-Marie Tulp

WHEN I first heard of the recent hurricane predicted to make a beeline for Florida, it reminded me of when I was a little girl. On a weekend trip to her apartment, my favorite great-aunt Dottie and I watched an old black-and-white Jerry Lewis comedy, "My Friend Irma."

Flash forward all these years later to when we all realized that Irma was anything but Florida's friend. According to our state's Office of Insurance Regulation, the storm is expected to eventually cost close to *$100 billion,* which would top the *$45 billion* in costs from Hurricane Andrew in 1992.

As Florida residents, we have all been affected in some way by Irma. Some of us lost power, had damage to our homes or businesses, lost revenue and possibly customers as a result of this storm. Even if you did not personally experience the impact of this hurricane, surely you know many who were.

Once the storm passed, FPMA made deliberate moves to make sure our members knew we were there for them. Many of us reached out to our association friends in the line of fire to check in, even though our cell service was intermittent at best. We formed a task force with our president-elect, Steve Lum, spearheading this initiative to find out how we could help those who were in need. A bulletin with a Hurricane Irma assistance email address was established so that members in need could reach out for our help. The FPMA Foundation quickly called a board meeting to determine how to financially help those in need as those emails and calls came in.

This, folks, is what "member driven" is all about. Yes, we are competitors, but first we are members who sincerely care about each other. The strength of this association is due to all of you and is felt by the new members as they come on board. They join because they want to be a part of this fellowship.

Speaking of membership, by this time you should have all received your dues renewal and, as promised, there have been some price DECREASES for some categories. Remember, when you are a member of FPMA, ALL of your employees are automatic members at NO ADDITIONAL COST and are eligible to take advantage of all member benefits. The 2017 annual membership at the first level (Bracket A) is presently $229 and will be reduced to $149 for 2018. That's an $80 per year annual savings! See page 30 for the Dues Renewal/New Member Application Form.

Moving Forward

Now that Irma is in the rearview mirror, it's time to get back to business. November 3 was our first-ever "Behind the Scenes" site visit. Six member companies — Bryan Pest Control, Fahey Pest & Lawn Solutions, Hoffer Pest Solutions, Larue Pest Management, McCall Service, and Slug A Bug — opened their doors to give you the inside scoop on how to take YOUR company to the next level. This one-day, member-exclusive event was chaired by Kyle Verona, who did an excellent job of making the first annual site visit a great success. If you were unable to attend in 2017, I would strongly recommend you sign up early next year to be sure to get a spot!

Next up will be the 2018 Business and Operations Expo on January 11–13 at the Hilton Orlando, Lake Buena Vista. Full registration has stayed at 2017 prices and promises to continue with the theme of providing you with new, up-to-date info on what you need to continue to grow your business. Expo is also the time when I hand the gavel to president-elect Steve Lum. Having worked on the executive committee with Steve over the past four years, I know that he is committed to continue to grow this association and make it even better. But I'm not gone yet — I still have work to do!

As always, don't forget to check out the Past President's Corner on page 13, where we feature Pamela Jordan Wolf, who was FPMA president in 1987–88.

I wish you and your families a wonderful holiday season. I look forward to seeing you all at Expo in January. PP

— Anne-Marie Tulp,
President, FPMA

PS: For those of you who may want to check out that old black-and-white movie: https://youtu.be/FGYf6oReI9g

Pest Pro Community Pulls Together

NOTHING is worse in Florida than a bad hurricane season. Hurricanes have really affected the state and the pest management industry. At PestPro magazine, we hope everyone survived the storm and has been able to repair damages and get back to normal business.

It is interesting that pest management is a close-knit family that helps others in need. It is in times of disaster that we find out how important other members of the industry are. Of course, FPMA is a family of friends looking out for each other. Even though the companies are competitors, they help each other and their communities in times of need. The recent hurricanes have shown that very clearly.

I remember living through the tornado that tore through Gainesville several years ago. I heard the roar early in the morning, went back to sleep, and woke up for work with no power in the house. When I pulled out of the driveway, I looked up the road and saw trees blocking the road to my left. I looked down the road and saw trees blocking the road to my right. So I pulled back into the garage and went back into my house with no power. We were without power for five days, and we met all of our neighbors. Up to that point we had not met anyone except our next-door neighbors. It took a disaster for everyone in the neighborhood to become friends.

I hope that same sense of community comes out of the Hurricane Irma disaster. Everyone in Florida experienced some sort of problems, some more severe than others. But just the process of everyone helping each other creates a sense of community. That community can easily gel into lifelong friendship as a result of all these problems. That community is clearly seen in FPMA. In good or bad times, the association really tries to help everyone in the pest management industry.

FPMA SUPPORTS PEST PROS

FPMA recently led a site visit program that was highly successful. The idea was to bring companies together to show the inner workings of the industry and the University of Florida. The UF Urban Entomology Lab led a tour of laboratories at the main campus in Gainesville. This is the No. 1 entomology department in the world, so the facilities here are superb.

We displayed the cockroach colony room, where we have 16 species of cockroaches in colony. It is interesting to see all these different species alive and in their natural state. We also showed the ant room, where we have 18 species of ants. It is hard to identify ants in nature, but we have them live and in colony. The bed bugs were interesting because we have in colony two species: the tropical bed bug and the common bed bug. In addition, we showed mosquitoes, house flies, two species of fruit flies, termites, silverfish, and stored product pests. The best part of the day was that each participant learned how to prepare their own insect collection of pest species. So they got to go home with a variety of insect pests as a training collection for their technicians.

The other FPMA events were site visits to successful pest management companies. The participants got to see the physical arrangement and equipment other companies use to provide services. This type of open-house meeting was something completely unique and shows how giving this industry can be for others. We often think that the inner workings of a company are top-secret and kept from view. The open house showed that the top pest management companies want other companies to see what is successful for them. This improves the industry as a whole, and everyone then benefits. It was great to see such openness and caring for the industry.

PEST PROS SUPPORT THEIR HOME COMMUNITIES

Even though we lived through a disaster, it did not take a hurricane to bring everyone together. People in the industry have always been supportive and want to do what is best for everyone, including their communities. You can see that with donations of time and services for those in need. In fact, after the hurricane season, there will be increased need in pest management services. Fire ant masses have been in the news floating on flood waters. Cockroaches have been driven into people's houses looking for harborage above the water table. Termites will be thriving because they don't drown easily. Mosquitoes will thrive because of all the water for larval breeding. Flies will breed in all the decayed food and sewage that has been spilled and not able to be picked up. It will be hard to find a pest that won't thrive in the aftermath of the hurricane.

It is great to be in Florida, surrounded by a pest control industry that cares and provides the best-quality service. I know your community needs this industry, and this industry is there to help their community. Thank you for all you are doing. PP

— Dr. Philip Koehler,
Managing Director, *Pest Pro*

1940s – 1950s
CHLORINATED HYDROCARBONS

DDT
chlordane
dieldrin
heptachlor

1950s – 1960s
ORGANOPHOSPHATES

chlorpyrifos
diazinon
malathion

CARBAMATES

carbaryl
propoxur
methomyl

1980s – 2010
PYRETHROIDS

permethrin
cypermethrin
cyfluthrin
deltamethrin

NEONICOTINOIDS

imidacloprid
clothiamidin
thiamethoxam

FIPROLES

fipronil

OXADIAZINES

indoxacarb

DIAMIDES

chlorantraniliprole
cyantraniliprole

TIMES *and* INSECTICIDES *Are Changing* !

Philip Koehler and Roberto Pereira

Are you ready for some shocking news? The urban pest management industry is facing *more* changes in the insecticides that will be available for use.

FOR THE PAST 70 years, a constant stream of novel chemistries has been the basis for the growth and survival of urban pest management. The stream has narrowed and almost been choked off by increasing insecticide regulations and fear of the effects of insecticides on humans and the environment, as well as other factors. Not only has the stream of new insecticide chemistries been choked off, but the number of manufacturers of insecticides has decreased as the industry has consolidated into a handful of manufacturers. The number of companies developing novel insecticides has decreased, and the cost of bringing a new insecticide to the market has skyrocketed.

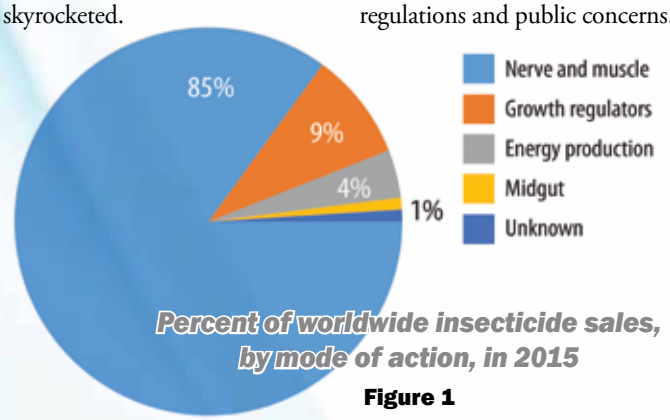
Modern Pesticides: A Brief History

The urban pest management industry really thrived when the chlorinated hydrocarbons burst onto the scene in the late 1940s and 1950s. Although these products heralded the birth of modern pest control, they are long gone in the United States. In the 1950s and 1960s, the organophosphates and carbamates revolutionized the industry. In the late 1990s, the organophosphates and the carbamate registrations began to disappear in urban pest management.

Of course, there have always been chemistries to take the places of those removed by regulations and public concerns. From the 1980s to 2010, the pyrethroids, neonicotinoids, fiproles, oxadiazines, and diamides replaced the previous chemistries.

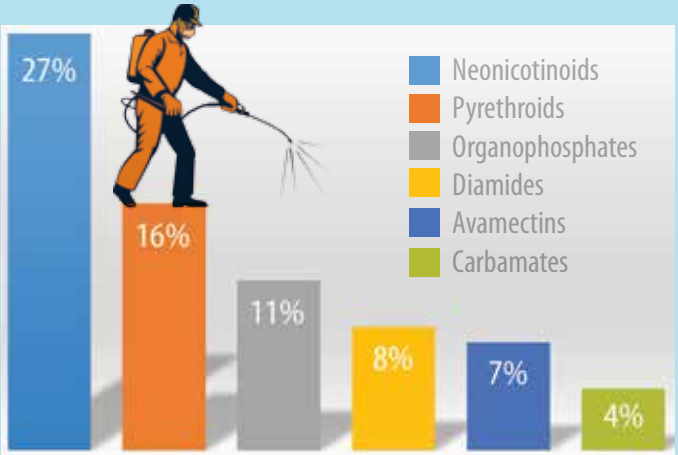
The stream of new chemistries continued through to the 2000s. The typical process to develop each chemistry was to synthesize thousands of candidate chemicals, screen them for activity against several insect species, determine toxicity and hazard to mammals, and then select the best for further development, marketing and sales. That process was extraordinarily expensive and time consuming.

Figure 1 breaks down the mode of action for all insecticides sold worldwide. In urban pest management, the primary way to kill insect pests is by using nerve and muscle agents that paralyze or cause overexcitation of the organism. Unfortunately, these effects on the nervous and muscle systems of insects are very similar to the effects of these same products on humans and other mammals. There has always been a concern about using these



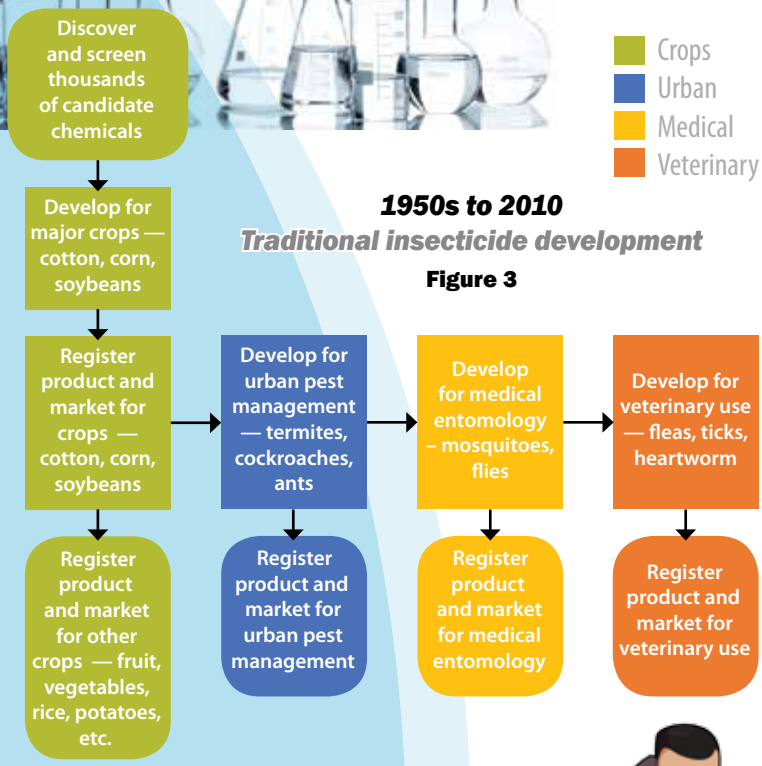
Percent of worldwide insecticide sales, by mode of action, in 2015

Figure 1



Percent of worldwide insecticide sales, by class of insecticide, in 2015

Figure 2



1950s to 2010

Traditional insecticide development

Figure 3

older products around humans, especially children and the elderly.

A further breakdown of worldwide usage, by class of insecticide, is shown in **Figure 2.** The remaining 27 percent of insecticide products usually are not used in the urban market. The most recent valuation of insecticides is that a little more than $17 billion of products were sold per year worldwide, excluding fumigants. Most of this value, of course, was insecticide products used to treat crops.

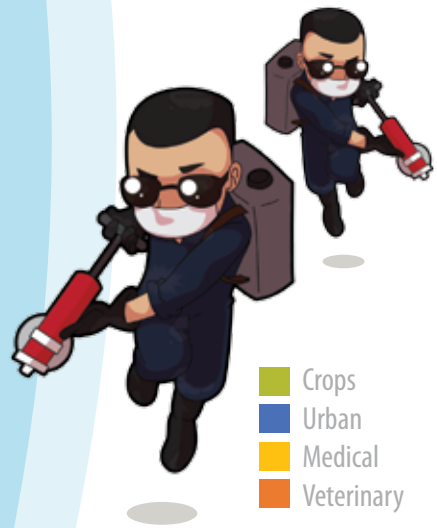
The urban pest management industry has always been a specialty market that received insecticides first developed for crop use and then adapted for use in and around structures like residences, businesses, hospitals, restaurants and food facilities. In fact for the past 50 years or so, insecticides had to first show value for application to cotton, corn and soybeans. If an insecticide was not satisfactory for spraying those crops, it usually would not get developed for the urban market.

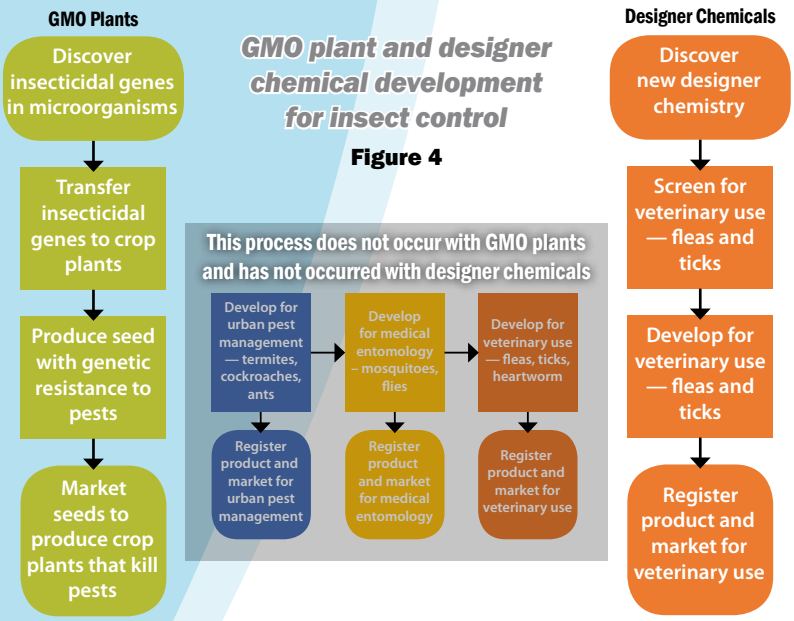
New Kids Are Here: GMOs and DESIGNER CHEMICALS

The process of insecticide development has recently changed from screening thousands of compounds with unknown insecticidal action **(Figure 3)** to developing genetically modified organisms, or GMOs, and designing specific molecules to interact with a target site in the pest.

GMO crops have genes for insecticide production inserted into the plant from bacteria and other organisms. Therefore, the plant itself kills the insect, so the dynamic has changed. There is no need to develop insecticides to be sprayed onto many crop plants, and the manufacturers of insecticides do not find it profitable to develop crop sprays **(Figure 4)**. Therefore, a specialty market like urban pest management gets few new chemicals.

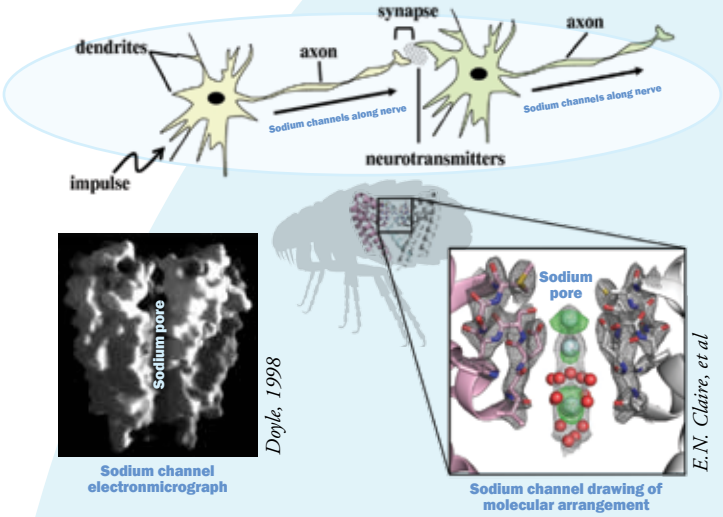
The development of new insecticides for pest control has also shifted because of the ability to develop designer chemicals **(Figure 4)**. Rather than screen thousands of molecules for their effect on insects, chemists are able to three-dimensionally look at the target site (for instance, a sodium channel of a nerve), design a molecule to bind to that site, and deactivate it. Once that molecule has been designed, chemists then work on modifying the basic molecule to make it more efficient, more stable, and safer to manufacture and use. *Continued*





GMO plant and designer chemical development for insect control

Figure 4



Sodium channels in nerve cells that transmit the nerve impulse

THESE POTENTIAL insecticides can be designed to fit specific sites within the insect, and they target molecules that are vital for pest survival and reproduction, **shown above.** Because insect target sites are sometimes subtly different from human target sites, insecticides are being developed that are highly effective and have little to no toxicity to humans and other mammals. Designer molecules are now driving the discovery of new insecticides.

The combined effects of GMOs and designer chemicals have also affected pest management research at universities. Many entomology departments at universities have been merged into other departments or disappeared in the wake of GMO research in plant departments and designer chemicals in medical and veterinary research facilities. There is no longer a pressing need for entomology, just molecular scientists who work on inserting insecticide genes into plants for insect control and chemists who design and produce chemicals that interfere and stop certain vital processes in insects.

Since 2010 most insecticides have actually been designed by chemists working in medical research portions of commercial companies. Many of these researchers were actually developing medications to alleviate pain — blocking the nerve so pain signals don't get to the brain. In that work they need to have an in-depth knowledge of the way nerves and muscles work. Much of that work concentrated on neurotransmitters and channels within cell membranes that transmit the sensory impulse along the nerve cell. Because these newest chemistries are primarily developed within the medical and veterinary community, a whole new dynamic of insecticide development has evolved.

The new method of development is to design chemistries that affect nerves. If they find that the new chemistry affects human nerves, it may be developed as a human and veterinary drug. If they find a new chemistry affects insects but not humans, it may be developed as a parasite medication for animals. That means that the first registrations for the product would be with the Food and Drug Administration. For those company researchers, it is probably easier — because they typically deal with the FDA registration process — and possibly cheaper for them to get an FDA registration than an EPA registration. This new process is shown by the development of the most recent classes of insecticides that are not EPA registered, but FDA registered.

Cutting-Edge Technology: Isoxazolines and More

The newest class of insecticide chemistry is isoxazoline. You have probably never heard of this chemistry, but there are several products registered from that group that are being sold in the United States and around the world. These chemistries have been patented, researched, and developed by companies like DuPont, Bayer, BASF, Merck (MSD Animal Health), Elanco, and Syngenta. However, these chemistries were developed in the drug and pharmaceutical development sectors of their companies.

The isoxazolines that are commercially available are:

- Afoxolaner (Nexgard by Merial) for veterinary use in dogs against fleas,
- Fluralaner (Bravecto by Merck Animal Health) for veterinary use in dogs and cats against fleas and ticks,
- Lotilaner (Credelio by Elanco) for use against fleas and some tick species, and
- Sarolaner (Simparica by Zoetis) for use in dogs against fleas and some tick species.

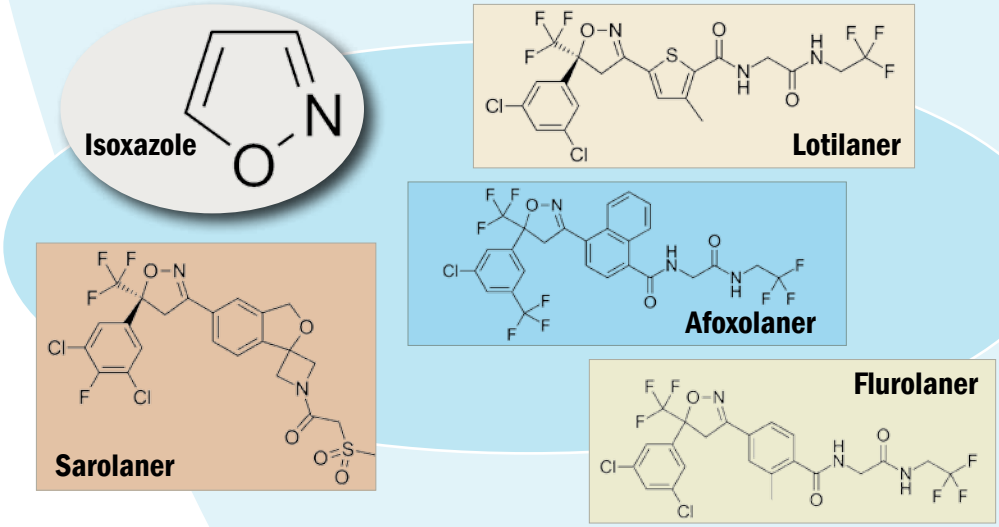
It is interesting that both afoxolaner and fluralaner were first discovered by DuPont and Nissan, but have been registered and marketed by other companies.

The new dynamic is that the newest insecticide chemistries are being developed for the veterinary parasite market first, and maybe later will be introduced as crop insecticides. The isoxazolines started appearing in the pesticide literature since 2010 for fluralaner and 2014 for afoxolaner. The base molecule for these compounds is isoxazole, **shown in the graphic at left.**

The isoxazolines affect the chloride channels in the GABA receptor of nerves. They bind to the chloride channels in insects

Continued on Page 12

Structure of isoxazoline insecticides. Isoxazole is the base molecule for the class



School of Ants
SUBMISSION FORM
on page 32

CITIZEN SCIENCE:

Using People Power to Map and Monitor Ants

Andrea Lucky

Florida is rich — in ants, that is. Our state boasts more than 200 species — greater ant diversity than almost any other state in the nation, not to mention more than many other countries around the world!

THIS IS great news if you are fascinated by ants, but alarming to people who think of all these ants as pests. Learning about the ants in our own backyards can help us distinguish those troublesome species from the ones that are good for us and our environment. Ultimately, we can control the "irrit-ants" and encourage the "import-ants." One way to learn about ants, and to get close and personal with them, is through a citizen science project called the School of Ants[1], which is mapping and monitoring the ant species of the United States.

You can join the thousands of citizen scientists who have participated in the project. You learn how to easily sample your local ants, and we add them to the School of Ants ant map. It's as simple as crumbling some cookies on a piece of paper and waiting for the ants to come, as shown at left. After about an hour, collect the ants and freeze them overnight (a humane way to kill insects). Make sure to record on our website where and when you sampled your ants. The last step is to send the ants to the Ant Lab at the Entomology and Nematology Department at the University of Florida. There, the School of Ants team identifies the ants in each sample and adds them to the samples on the Ant Map. You can then look up what you collected online[1].

'Crowd-Sourced' Research

Citizen science is a way for nonspecialists to contribute to scientific research. There are other names for this kind of public involvement, such as public participation in scientific research, amateur science and citizen monitoring. The idea behind them all is the same — research benefits from the involvement of all kinds of people, and people benefit from participating in research.

Citizen science is an old idea, dating back to a time when science was a pastime or a passion for people who were curious but didn't identify as professional scientists. Today, many people who are not academic researchers can help study a particular topic or solve a local problem through the many citizen science projects available.

Why should you participate in citizen science? For many people it is a chance to make a positive contribution to research while doing something you enjoy. For others it is a way to feel connected to fellow citizens who share your curiosity. Projects that map the

Continued on Page 14

[1]www.schoolofants.org

Insecticides, continued from Page 10

and ticks, blocking the transmission of nerve signals. The chloride channels in insects are slightly different than in mammals, so affected insects are paralyzed and die, and there is little effect on humans and other mammals. These products are administered to animals orally or as a topical treatment and are absorbed into the blood stream for distribution throughout the animal's body. Fleas and ticks taking a blood meal ingest the insecticide treated blood and die.

The insecticidal action of the isoxazolines is not restricted to fleas and ticks. Isoxazolines have broad spectrum insecticidal activity. Besides fleas and ticks, they are toxic to flies, mosquitoes, cockroaches, beetles, lepidoptera, plant-feeding bugs, mites, spiders, thrips, and Homoptera. In comparative tests on German cockroaches, the 24 hour fluralaner LD50 was 27 ng/insect — not quite as effective as fipronil at 5.2 ng/insect. Fluralaner also has been shown to effectively kill cat fleas, stable flies, blow flies, *Aedes aegypti* mosquitoes, ticks, and spider mites.

The isoxazolines are not the only new chemistries being developed for pest control. Other classes of chemistries are coming, like the metadiamide, cyclxoaprid, cyclaniliprole, tetraniliprole, afidopyropen, flometopquin, and fluhexafon compounds **(see table above)**. Some of these compounds have unknown modes of action, but most are affecting the neuroreceptors for GABA, acetylcholine, and ryanodine. In almost all cases, the new insecticides affect insects much differently than humans and other mammals. So the insecticides would affect insects, but not be hazardous to use.

Final Thoughts

Even though the process of developing and introducing new insecticides into the market has changed, new products are on the horizon. The process of discovering and marketing new chemistries is still occurring, but the method of development for the urban pest management industry has changed. Hopefully new insecticides can be developed for the urban pest management industry. This process is slower in getting new products for urban pest management because the companies will first deal with FDA registration as a drug and later EPA registration as an insecticide. PP

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

Future Chemistries in Various Stages of Development for Pest Control

Pesticide	Chemical Class	Year Discovered	Mode of Action
Afoxolaner	Isoxazoline	2014	GABA gated chloride channel
Sarolaner	Isoxazoline	2016	GABA gated chloride channel
Lotilaner	Isoxazoline	2014	GABA gated chloride channel
Cycloxaprid	Cycloxaprid	2011	Nicotinic receptor
Triflumezopyrim	Mesoionics	2013	Nicotinic receptor
Cyclaniliprole	Diamide	2013	Ryanodine receptor
Tetraniliprole	Diamide	2014	Ryanodine receptor
Afidopropen	Afidopropen	2012	Unknown
Flometoquin	Flometoquin	2011	Unknown
Fluhexafon	Fluhexafon	2014	Unknown

PAMELA JORDAN WOLF, ARAB PEST CONTROL, FPMA PRESIDENT 1987–1988

Name: Pamela Jordan Wolf (Pam)
Hometown: Indianapolis, Indiana
Where you live now: Tampa, Florida
About your company: I was raised in the pest control industry. My dad was Herman B. Jordan, founder of Arab Pest Control and Federal Chemical Company, beginning in 1929. I graduated from college in 1977 with a degree in finance and management. My dad, who had franchised Arab in multiple states, said, "Come to Florida and work in the family business for a year, then I will send you to law school, all expenses paid." Away to Tampa I went. He started me in an entry-level role at minimum wage.

My dad bought a small company in Tampa in the late 1950s that was now doing about $3 million in sales. He had kept the business in Florida, owned by family and a minority partner. Six months after I arrived in Florida, my father passed on a Friday evening of a massive heart attack. I was 24.

What to do now? Selling was not really an option. We were too highly leveraged for that. The only option? "Run the joint!" So I did! Along with a lot of amazing people on the Arab team. Service businesses are always all about the people! Employees, customers, suppliers and advisors.

I had the joy of being part of a leadership team that saw Arab go from $3 million to over $15 million in just 12 short years. We grew organically and through acquisitions to open new markets. Eventually I would have the honor of serving on the Board of FPMA and was elected the first woman president of that association's history.

We sold in 1989 when I got an offer that was too good to be true. Waste Management was happy to pay top dollar for a company with 300 employees, 13 offices around Florida, and an infrastructure they could use to integrate a lot of smaller companies they had purchased.

First paying job and what you learned from it: I was a hostess at Red Lobster. What I learned: show up on time, make sure your uniform is crisp and clean, be willing to do whatever is needed, and NEVER despise small beginnings!

First break in the pest business: The invitation from my dad to come to Florida and work for a year in the family business.

Best business book: I believe everything I need to know about business and life can be found in the Bible. As for business books, one of my recent favorites is "Extreme Ownership."

Best piece of business advice you received: From my friend, business mentor, and former president of Arab, Randy Vaughn: Be the first to show up and the last to leave, but *also* remember — stop and smell the roses. As you build a business, you must remember you are also building a life.


PAMELA JORDAN WOLF

What you would tell someone new to the pest business: Join the trade associations and get involved. Read as much as you can. Become friends with others in the business and gain wisdom from those who have gone before you. Most importantly, don't give up!

Where can we find you when you are not at the office: With my children and grandchildren (total of seven now), on the golf course, or traveling with my hubby.

What is the most important trait you look for when hiring: Attitude, desire and integrity. The rest can be taught! PP

Sharon Pruitt

Citizen Science, continued from Page 11

world around us are trying to better understand the diversity that is hidden in plain sight — whether that is the weather, geology, plants or animals, including ants.

You may know about one of the longest-running citizen science projects, the Audubon annual Christmas Bird Count, which tracks the bird species present in the United States and Canada in late December. Birdwatchers across the continent who dedicate a few simultaneous hours each year to looking and listening for birds make it possible to piece together an annual continent-wide snapshot of the state of our birds.

The vast array of other citizen science projects boggles the mind. If you want to see what projects are available in your area, you can browse projects at a website like **www.scistarter.com**. Whether you want to test your local water quality, track the bud burst rhythms of trees, or map stars in our galaxy, you'll find something for you. All of the projects listed have a common desire to bring the public closer to "doing" science.

Large-scale public participation means the power to tackle tough questions that scientists can't answer alone, and in the process, participants benefit by seeing and doing the research up close. School of ants is a project that does just that — brings people closer to the ants that live around them.

Which Brings Us Back To Ants

Most of us haven't taken much time to look closely at the littlest inhabitants of our yards, sidewalks and gardens, but what you will notice if you do is the massive importance of ants to many other plants and animals. Consider the "good ants." Many are food for spiders and lizards. Ants also provide helpful services by performing tasks such as aerating soil, dispersing seeds of flowering plants, and — especially important in cities — cleaning up garbage by scavenging dead insects and other refuse. Some ants even go about collecting caterpillar poop, which they bring back to their nests to grow a special mushroom to feed their young. Truly, ants are amazing!

With all this good behavior, you would expect ants to be widely appreciated, but a handful of problematic species give ants a bad reputation. The "bad ants" include fire ants, crazy ants, ghost ants and others, all of which are nonnative species that have become established and invasive in Florida.

If any of these species have been problematic for you, you know how frustrating and costly it can be to manage them and keep them from damaging people and property, and you are not alone. Ants rank among the worst insect pests

worldwide because of their highly organized societies. Their numbers give them an advantage over other species in finding food and places to live. Once they are established they can quickly invade new areas, and it can become impossible to eradicate or control them. Our best bet to keep troublesome species from spreading and to keep new pest ant species from gaining a foothold is to keep a close eye on the ant communities around our state. The earlier we can detect and control new invasive ant infestations, the better we'll do in the long run, economically and ecologically.

So, how can you tell if the ants around your home or workplace are pest ants that need to be controlled or wildlife that should be celebrated? If you have a microscope, or a very good magnifying glass, you might be able to identify the species of ants you have by comparing them with photos of ants in field guides. But not everyone can or even wants to do that.

This is where the School of Ants is eager to help you: Send us your samples, and soon you'll get a notification about your species' identity, with links to information about the ant species you collected and what role they play in the ecosystem. You can find out if your ants are native species that belong in Florida, or among those few introduced exotic species that can be problematic.

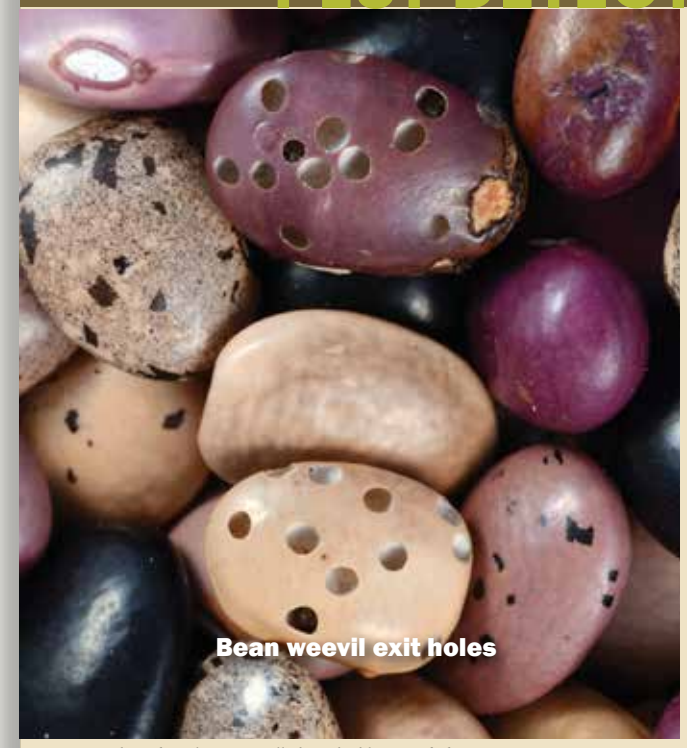
YOU Can Be A Citizen Scientist

Citizen science is a win for science and a win for anyone who participates. By partnering with the public, these projects can grow huge! Our team has collected data on much larger geographic scales than most other ant scientists. Projects can also run over much longer time scales if there is enough public interest.

Participants who have our cookie crumb recipe for ant catching have often shared with us their excitement and satisfaction about contributing to real-time science. Many report that they are more interested in insects around them than before they participated. People also note that they feel more trust in science after having the opportunity to participate in research as a citizen scientist.

So if you are interested in ants or some other topic in which you are not an expert, you can become a citizen expert today. Join a project and learn about the ants and other animals that share the spaces we live in. After all, who should care more about the wildlife in your backyard than you? PP

Andrea Lucky is Research Scientist at UF/IFAS Entomology and Nematology Department. See the School of Ants submission form on page 32.



Photos by Lyle J. Buss. All photos highly magnified.

Seed Beetles

Lyle J. Buss

I BET MANY of you often get cases of "tiny beetles in a house," and it's not always easy to figure out where they are coming from. That's when identification of the pest can really help. Let's say you can identify it as a stored food pest, at least. That helps a lot, but you may still end up looking over a lot of food products in the kitchen. But when you have a case of seed beetles and can recognize it as such, you'll be able to narrow your search to dry beans and peas.

Seed beetles are sometimes called seed weevils, although they are not in the same family as true weevils like the rice weevil. They are small, stout beetles around ⅛ inch (3 mm) long. The first segment of their hind leg, or the femur, is enlarged or swollen.

Seed beetles are "internal feeders," meaning that each beetle develops inside a single seed. The species that are stored food pests develop in legumes, namely beans and peas. Eggs are laid on the surface of the seed, and the larvae burrow into the seed to feed. They pupate inside the seed, and the adult creates a large, round exit hole when it emerges.

The species that I see most often in Florida homes is the cowpea weevil, *Callosobruchus maculatus*. They do especially well in black-eyed peas, but also may occur in other beans like chickpeas and lentil beans. Bean weevils are olive-brown mottled with dark-brown and gray and attack stored beans and peas. Mexican bean weevils are similar to bean weevils, and are not to be confused with Mexican bean beetle — a bright, spotted crop pest in the family of ladybird beetles.

Like most pantry pests, management is accomplished by finding and discarding infested foods. Besides the obvious dry beans in the kitchen and pantry, also inspect decorative items that contain whole beans. PP

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

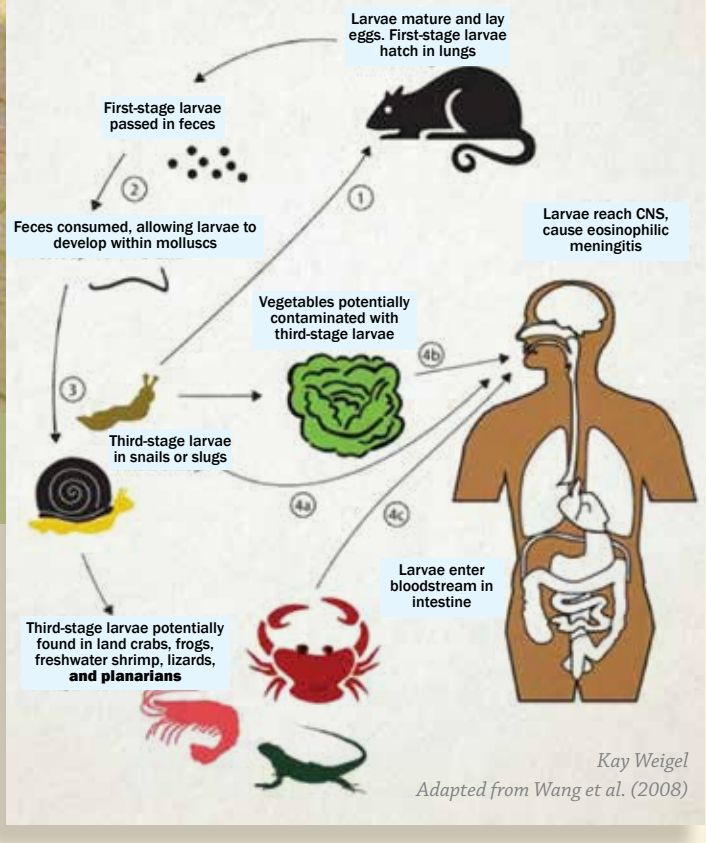
New Guinea

Pierre Gros

New Guinea flatworm

Platydemus manokwari
(Platyhelminthes, Geoplanidae)

A NEW GUINEA FLATWORM feeds on a European land snail in France. Notice the distinctive light belly and the dark dorsal color. Under certain conditions, this flatworm can help spread rat lungworm to humans.



Kay Weigel
Adapted from Wang et al. (2008)

Jarvi Lab, Univ. of Hawaii

Rat lungworms, highly magnified

CDC Statement On Rat Lungworm

DON'T eat raw or undercooked snails or slugs, frogs, or shrimp/prawns. If you handle snails or slugs, wear gloves and wash your hands. Always remember to thoroughly wash fresh produce. When traveling in areas where the parasite is common, avoid eating uncooked vegetables.

A NEW SPECIES of land planarian — a terrestrial, predatory flatworm — has been introduced into South Florida. New Guineea flatworm was first found in Florida in 2012 in Miami-Dade County and was detected in San Juan, Puerto Rico, in 2014. Years before, it was carried by human commerce to numerous islands in the tropical Pacific and Indian oceans. It had been previously found in Oahu, Hawaii, but the Florida introduction was the first record from continental North or South America.

The primary ecological concern is due to its feeding habits. New Guinea flatworm is a predator of land snails. It may feed on whatever snail is most abundant, such as invasive snail species like the giant African land snail, the Cuban brown snail, the Asian tramp snail, and *Paropeas achatinaceum*. New Guinea flatworm also poses a threat to native snails, including endemic tree snails of Florida. It has caused the decline of some Hawaiian tree snails in Oahu.

The second concern with the New Guinea flatworm comes from its potential to act as a mechanical paratenic (transport) vector of rat lungworm, *Angiostrongylus cantonensis*. The giant African land snail, another invasive species, is known to be a particularly good host of rat lungworm. If a human eats J3 infective-stage rat lungworm larvae, it could result in an infection causing human eosinophilic (type of white blood cell) meningitis.

What sequence of events is required for the New Guinea flatworm to transport rat lungworm and infect a human?

- Roof rats or Norway rats in the area must be infected with adult rat lungworm.
- The juvenile J1 lungworm larvae are dispersed by the rat in its feces.
- The J1 larvae are ingested by snail host when it eats the rat's feces.
- The lungworm grows and molts twice inside the snail to become an **infective J3 larva**.
- At this stage usually the rat eats the snail, and a J3 larva infects the rat, or a person accidently eats something covered in snail slime that contains the infective larvae and becomes a dead-end host.
- But sometimes, a predatory land planarian eats an infected host snail. The infective lungworm larvae ride on the land planarian's slime, and the slime may be deposited on a leaf or fruit that a person eats without washing or cooking.

Each of these steps has a probability that it will occur at a given place. All of these steps have to occur in the same place and at the same time for transmission to occur. A 2017 study conducted in Florida found that rat lungworm was found in either rats or snails in Alachua, Duval, Hillsborough, Orange, and St. Johns counties. Of 171 roof rats examined, only 39 were found to be positive for rat lungworms. Of 1,437 snails examined, only 27 tested positive for rat lungworms.

The probability that a person could become infected with a rat lungworm from a New Guinea flatworm is extremely small at the current level of infestation within rats and snails in Florida. However, it is just good practice to wash all fruits, herbs and vegetables that will be consumed raw. Cooking kills the infective worms, but do you really want either a worm or snail slime on your food, even if it is cooked?

Flatworm

William H. Kern, Jr.

A TWISTING TALE

THE DIAGRAM at left shows potential routes of infection of the human central nervous system (CNS) by the rat lungworm, *Angiostrongylus cantonensis*.

The normal life cycle involves:

(1) consumption of molluscs by rats, then
(2) excretion of nematodes in rat feces, which are then
(3) consumed by molluscs.

Human infection can occur:

(4a) when uncooked, infected molluscs are eaten or, more rarely —
(4b) when vegetable matter or
(4c) uncooked, contaminated paratenic (transport) hosts are consumed.

From J. Capinera and H.S. Walden Rat Lungworm, Featured Creatures, UF/IFAS

PLANARIAN IDENTIFICATION

The previous two introduced species of land planaria, *Bipalium kewense* and *Dolichoplana striata*, have been in Florida for a considerable period, perhaps as long as 100 years. They are a nuisance or a curiosity, but not considered serious pests. They are predators on earthworms in wet environments. Differentiating the three species is easy based on shape and pattern.

PLANARIAN CONTROL

There are no pesticides registered for land planarian control. Habitat manipulation, i.e., decreasing moisture, has been used on worm farms to reduce damage from *Bipalium* or *Dolichoplana*. Dry weather causes land planaria to retreat into moist refuge in the soil. Limiting their food supply by controlling pest snails would likely be the most effective measure homeowners or pest control professionals could use to reduce New Guinea flatworm populations. Registered snail baits should always be used according to the label directions. The active ingredients in some snail baits are highly toxic to wildlife and pets. Local rat control would also help reduce the miniscule risk of rat lungworm accidental human infection. PP

William H. Kern, Jr. is Associate Professor of Entomology at UF/IFAS Ft. Lauderdale Research and Education Center.

THE THREE FLORIDA land planaria. From left: *Bipalium kewense*, with a shovel-shaped head; *Dolichoplana striata*, with a pointed head and slender body; and New Guinea flatworm, *Platydemus manokwari*, which generally has a broader body than *Dolichoplana*.

CLOSEUP DORSAL PATTERN of the three Florida land planaria. From left: *Bipalium kewense*, tan with a strong dark median stripe; *Dolichoplana striata*, generally black or dark gray, sometimes with a faint midline stripe; and New Guinea flatworm, *Platydemus manokwari*, with dark back, strong, light midline stripe, and belly distinctly lighter than the back.

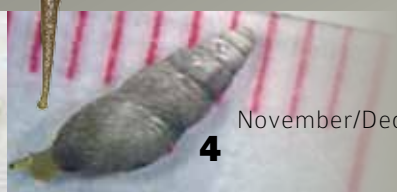
Exotic Snails Found to Host Rat Lungworm

1

1. Giant African land snail, *Lissachatina fulica* *(R. Zimmerman, USDA-APHIS)*
2. Cuban brown snail, *Zachrysia provisoria* *(Lyle Buss, UF/IFAS)*
3. Asian tramp snail, *Bradybaena similaris* *(Jax Shell Club)*
4. *Paropeas achatinaceum* *(Pest Net)*

2

3



4

ABOVE: Pine harborage used to lab test American cockroach longevity without food or water. Wood pieces were wetted to various moisture levels.

LEFT: Dallin Ashby identifies insects under a microscope for Florida Pest Control.

Dallin Ashby

Pest Expert, Family Man

In Utah, one can find excellent locations to mountain bike, water ski, hike, camp, and, of course, collect insects. This was the environment into which Dallin Ashby was born in 1982.

DALLIN grew up as an enthusiast of the outdoors, partaking of the many available activities and observing the natural world around him. Fortunately, even his small backyard was big enough to explore, and he oftentimes sneaked the critters he found outside into his home, much to the chagrin of his mother. Anything from crickets to garter snakes was fair game.

In his early years, Dallin conducted experiments on insects and sought out ways of killing them en masse. Experiments included testing the effect of decreased air pressure on wasp locomotion, the duration of alcohol exposure needed to kill box elder bugs, and nest dominance among several wasp species competing for a single foundling nest.

He also attempted to kill an ant colony by combining the granules of 150 "snaps" into a single paper towel and dropping the makeshift bomb onto the mound. It produced a very loud BANG, but resulted in zero mortality (though it did garner some curious looks from the neighbors). These early experiences set the stage for what would become a lifelong pursuit of entomological learning and application. Perhaps it can be said that what brought Dallin to where he is in life now is the fact that he just never grew up!

Outside of entomology, Dallin's most life-changing experience was serving a church mission in the Philippines from 2002 to 2004. While overseas, he learned to communicate in the Tagalog language, learned to love the culture, learned to love the people, and learned to live on his own.

Though his focus was on serving as a missionary, Dallin couldn't help but notice the wonderful insect diversity that existed on the islands. During his days off, he used a homemade butterfly net to collect several butterflies and other insects. Though he was unable to bring the insects back to the United States with him, he took pictures of what he could and made bookmarks of the butterfly wings as mementos.

Three weeks after returning home from his mission, Dallin met the young woman who would become his wife, Allyson. She attended school at Brigham Young University. In 2008, he graduated from Salt Lake Community College with an associate of science degree in general biology, which he transferred to the University of Utah. In 2010, he earned his bachelor of science degree in general biology from the University of Utah, where he spent much of his time volunteering in multiple entomological research endeavors.

Q and A With Dallin

What brought you to Florida from Utah?
Finding a job post-graduation proved to be more difficult than expected, but I eventually landed a job in Salt Lake City as a pest control technician. I handled residential and commercial accounts, taking care of pest issues such as tracking odorous house ants, excluding rats, controlling fleas, dispatching raccoons, handling cockroach elimination, trapping pocket gophers, obliterating yellow jackets, and repelling pigeons.

After four fulfilling years in the pest management industry, my wife and I decided it was time for me to pursue further education and to realize my dream of being an entomologist. In 2015, I applied for the master's program in the Entomology and Nematology Department at the University of Florida and was accepted.

What path did your research take at the Urban Entomology Lab?
Under the direction of Dr. Philip Koehler, I conducted research on American cockroaches and their ability to survive without food or water for extended periods of time. It was discovered that under conditions of starvation and entrapment within wood, American cockroaches would readily eat wood, though the wood consumed apparently did not provide sufficient nutrition for survival.

As a recent graduate, have you pursued your entomology career?
I graduated at the end of the summer semester in 2017, with my master of science degree in entomology and nematology.

Upon graduating, I started working for Florida Pest Control and am learning what it takes to be a training director for the company. My focus is on learning about taking care of lawns and shrubs while being immersed in the Florida Pest Control culture. I spend time getting to know the technicians and gaining experience with the equipment and chemicals that the company uses.

How do you unwind after a busy day in the lab and field?
In my free time, I have many hobbies and interests including running, cycling, mountain biking, collecting insects, drawing, painting, photography, playing various instruments, and spending time with my family.

I am well known among my friends and associates for my propensity to commute by bike, having ridden thousands of miles over the years, commuting to school and/or work. During

PHOTOS AT RIGHT, FROM TOP:

Dallin Ashby with a backpack sprayer as part of training for Florida Pest Control.

Dallin Ashby after graduating with his Master of Science degree in Entomology/Nematology from the University of Florida. With his wife, Allyson.

The Ashby Family, from left: Nathaniel, Allyson, Briant, Carmen (dog), Dallin, Eliza, Rose, Myles

my time at UF, I rode over 5,000 total miles to school and back, traveling about 12 miles per day. Today, most of my cycling miles are recreational, riding both solo and in groups.

Above all else, I enjoy being with my family. My wife, Allyson, and I have enjoyed 12 years of marriage and are the proud parents of five children. Our children, Myles, Rose, Eliza, Briant and Nathaniel, are 11, nine, seven, five and one year old, respectively.

Would you choose to do it all again, without the challenge of simultaneously raising a family?

No way! Family life while going through six-plus years of higher education and early career development has been tough and rewarding at the same time. My family means so much to me, and it was really having them to come home to that helped me keep my sanity. I love getting hugs from the kids before leaving in the morning and being greeted with enthusiastic clamor when I return home. The only real burden has been financial, but even that has not been insurmountable. I hold to the idea that no other success can compensate for failure in the home.

For me and my family the future looks bright, and I am enjoying my life as an entomologist as I support my family. As a kid who grew up thoroughly enjoying my time playing with insects, I am living a dream come true! PP

The Year in Review:
Insects and Mites in the Landscape

Adam Dale

MOST pest management professionals are familiar with the suite of insects or mites they need to watch for every year. Many also know the phenology, or seasonality, of those pests, which helps them gear up before it's too late. 2017 was characterized by weather extremes, with a serious drought through the spring and the most precipitation on record during the summer. Although environmental conditions directly affect insects, most remained predictable throughout the year. However, some were more difficult than others.

There were two primary pests that generated the most noise from turfgrass professionals this year. Both are obscure, hard to find in low numbers, difficult to control, and found in turf. These were the bermudagrass mite, *Aceria cynodeniensis,* and Tuttle mealybug, *Brevennia rehi.* Given the right — or wrong — conditions, these pests can break out and cause extensive damage to large areas of turf.

The similarities

Both of these arthropods are secondary pests. Secondary pests are always present in a plant system, but remain below damaging levels because they are regulated by things like biological control organisms or plant defenses. We know from previous research that secondary pests like mites, scale insects, and mealybugs frequently break out when disturbances like environmental changes or broad-spectrum pesticide applications occur.

To me, the frequency of these pests breaking out emphasizes our need for effective IPM tactics in the landscape. This means proper plant maintenance, plant selection, pest control measures, and other components of a multidisciplinary IPM program. In some cases, pest control managers need to adjust their programs. However, we also lack, or are just beginning to understand, many of the effects that our management practices have on pest success in the landscape.

Bermudagrass mite damage, closeup

The mite

The bermudagrass mite is a well established pest throughout the southern United States, but has recently reared its head. This is an eriophyid mite, which is a family of microscopic mites common on many landscape plants. Under the right conditions, these mites break out and cause plant damage that disfigures its normal growth habit. Bermudagrass mites create shortened internodes and tufted growth, or witches brooming, which can create masses of knotted plant material that turns yellow and dies back.

This past spring, I was contacted several times by golf course superintendents and sod producers with large infestations of bermudagrass mites. One of the biggest challenges with managing these pests is that there are very few, and only broad-spectrum, products labeled for their control. Multiple studies have shown that plant-feeding mites frequently break out in response to broad-spectrum insecticide applications — e.g., pyrethroids or carbamates. This has been explained by a handful of reasons, but most commonly due to natural predators being killed by the insecticide, which leaves the mites that remain free of threats.

Two of the most commonly applied insecticides to bermudagrass on golf courses and sod farms are pyrethroids and imidacloprid. Research has shown that some spider mite species produce more offspring after feeding on leaves treated with imidacloprid, and others become more abundant after applications of pyrethroids. I am not saying that overapplication or indiscriminate use of these products has contributed to increased occurrence of this pest. However, evidence from previous research should make us think more critically about what effects our current practices are having on nontarget organisms and secondary pests.

Continued

Lawn with bermudagrass mite damage

Tuttle mealybug favors thatch in zoysiagrass

Tuttle mealybug closeup on blade of grass

MY LAB has found promising results with recently reformulated and relabeled chemistries like abamectin, but the options remain few and mostly limited to use on golf courses. Encouragingly, we have found that by simply mowing low, or scalping, and collecting clippings in affected areas, we can reduce mite damage on the new growth by about 40 percent, which persisted in our study for the remainder of the season. Combined with abamectin we reduced mite damage by over 90 percent.

The bug

Compared to the bermudagrass mite, Tuttle mealybug is relatively new. It is an established but spreading pest of zoysiagrass lawns throughout Florida. Prior to 2016, this historically southern-Florida pest was not documented north of the Orlando area. However, it has since spread throughout north Florida and created a frequent management challenge. The spread of this insect has been somewhat surprising due to the sedentary nature and relative immobility of mealybugs. However, zoysiagrass lawns have been and continue to become more common.

Coinciding with the increase in zoysiagrass lawns has been a growing realization that people are less familiar with its maintenance needs. One of the biggest challenges that improper zoysiagrass management leads to is thatch accumulation. As we know through experience with other pests, too much thatch can harbor insect pests by providing refuge that protects them from control and makes it difficult to get insecticides to the right place.

Our current evidence suggests that the most effective approach to controlling Tuttle mealybug is by reducing thatch. This opens up the turf canopy, which facilitates access by natural enemies and insecticides. It also reduces favorable microhabitats where these insects can hang out and reproduce. Once lawns are already infested with these bugs, thatch reduction in addition to mowing low and removing the clippings will expose them to control. This is a preventive practice and a component of curative control.

Thatch accumulation in zoysia lawns contributes to more issues than Tuttle mealybug. To address this suite of challenges, the turf faculty at the University of Florida have developed a series of zoysia management workshops that take place throughout Florida.

In summary

As insect activity slows down, it is important to think about what happened this year so that you can be more prepared for 2018. Evaluate your management program to identify potential areas of improvement. Think about the cultural practices and chemical inputs that could be affecting insects in the landscapes you manage and do your best to minimize their unintended effects.

Spring is on the way, and it will soon be time to monitor for mole crickets, survey for bermudagrass mite damage, and implement practices that increase your chances for success. PP

Adam Dale is Assistant Professor at UF/IFAS Entomology and Nematology Department. For more information about research and Extension programs from the UF/IFAS Turf and Ornamental Entomology Lab, visit http://dalelab.org.

Start Turning Negative Reviews Into **Positive Results**

Alain Parcan

YOUR ONLINE reputation plays a big part in whether or not a potential customer decides to hire you. Your reputation is largely based on the unfiltered opinions of your customers, who have access to a larger audience than ever before. While dealing with unhappy customers has always been a challenge for business owners, today negative reviews are for everyone to see, which makes handling the situation properly even more important. This begs the question: What's the best way to deal with a negative review?

Step 1: Take a Step Back and Relax

This is both the most important step in dealing with a negative review and the one most business owners get painfully wrong. If someone leaves a negative review about your business, chances are it isn't personal. However, many business owners take negative reviews personally, and understandably so — they're proud of the service they deliver, so when someone makes a public comment about that service being lackluster, those business owners feel threatened, hurt and upset.

In these cases, it's important to take a step back and try to remove emotion from the equation. Reacting emotionally tends to lead to an over-the-top response, which usually just adds fuel to the fire. Instead, take some time to relax and think about where the customer may have felt slighted — whether they are right or wrong.

Step 2: Respond Reasonably

Once you've taken some time to consider all angles of the situation, it's time to respond. You never want to air out an entire conversation in a public forum, so start with a simple, generic response. Rebecca Hussey, Market Hardware's director of account management, suggests the following responses:

- Thank you for voicing your concerns, [NAME] — we are looking into your account, and will be in touch to work toward a resolution.
- I'm sorry to hear that you weren't happy with your service, [NAME] — could we contact you directly to try to resolve the error?

Responding with a version of these can help buy you time and move the conversation into a more private setting. Communicating with an upset customer in a personal manner, such as over the phone or in person, can help eliminate any misunderstandings and speed up solutions.

It will also show the disgruntled customer you are aware of the situation and are working to sort it out. Perhaps more importantly, anyone else that sees the negative review will know that you care enough to address a customer's concerns about your business.

Step 3: The Nonconfrontational Confrontation

Now that you've thought rationally about how you want to deal with the review and indicated to the disgruntled customer that you're looking into the situation, it's time to follow up directly. Rule No. 1: Be as polite as possible (this is why Step 1 cannot be skipped). Demonstrate to the customer that you genuinely care and value their feedback. A positive attitude will help get a positive result. In many cases the customer just wants to have their voice heard, and being receptive to what they have to say might be all it takes for them to remove the review. Which brings us to the next step …

Step 4: Removing the Review (Optional!)

For starters, remember that most review sites won't let you take down a negative review, and probably won't even bother to investigate a potentially false negative review. It would take up too much of their time and resources to sift through every negative review to find out which ones have legitimate claims in them.

So, based on how well you completed steps 1 through 3, you'll have to make an on-the-fly decision about this step. If you feel like you've had a positive conversation with your formerly disgruntled reviewer, and you've addressed their issues appropriately, it may be time to ask them to edit or remove their negative review. Just proceed with caution. You don't want to undo any goodwill you may have reestablished.

If you do not feel comfortable asking the customer to remove the review, ask them to reply to their initial review with an update on the situation. You don't want it to look as though no action was taken after the initial response. If people see you've taken the time to remedy a negative experience, this can go a long way in boosting your reputation.

Step Five: Be Proactive — Get Positive Reviews

Whatever the outcome is from the first several steps, the No. 1 strategy when it comes to combatting negative reviews is to consistently encourage your happy customers to leave positive reviews. One blemish won't have much of a negative effect when surrounded by several glowing reviews, and the fact that reviews boost your search rankings makes this an added bonus.

Typically, only a small portion of your customers will take the time to leave reviews online. This group tends to have the strongest feelings toward your business, whether positive or negative. Try to get in the habit of encouraging your customers to leave you reviews online or even consider sending out an email blast with a link to different review sites, with Google being a priority. Chances are you have many happy customers who would be happy to take a minute or two to leave a review.

Your online reputation is vital to your business's success. It affects your online marketing strategy, so don't take it lightly. Monitor the popular review sites regularly, and make sure you follow these directions closely if you do happen to run into a negative review along the way. 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.

Mosquito Control Licensing

MOSQUITO CONTROL activities are divided into two groups:

- Individuals or contractors operating on a for-hire basis making mosquito-control applications to private or commercial properties (homes, hotels, resorts, etc.)
- Government entities or government-contacted vendors making widespread community or municipal mosquito-control applications over a large area

Individuals operating a business installing and servicing automated mosquito misting devices and/or offering residential or commercial fogging and barrier treatments to clients other than local government entities must obtain a pest control business license and have on staff a pest control operator certified in General Household Pest Control or Lawn and Ornamental Pest Control.

Pest control companies contracted to perform mosquito control activities for a government agency or mosquito control district must have a Public Health Pest Control license or be operating under the direct supervision of a Public Health license holder.

How to Obtain a Public Health Pest Control License

Examinations

Two exams must be passed to qualify for certification. The first exam, referred to as the Core exam, tests the applicant on general pesticide use and safety. The second exam, known as the Public Health Pest Control Exam, covers the applicant's knowledge of mosquito biology and habitats, control methods, regulations, medical importance, and nonmosquito arthropods of public health importance.

How to Schedule an Exam

There are no set examination locations, dates or times. Exam scheduling arrangements must be made through your local county Extension office. There are no fees required to take the exams.

Continuing Education Requirements

The Public Health Pest Control License is valid for four years. During the four-year life of the license, the applicator is required to attend 16 hours of continuing education training. Training must cover specific areas of study listed in Section 5E-13.040(4), Florida Administrative Code.

Activities that qualify for CEU credit:

- FDACS-sponsored mosquito control workshops
- Florida Mosquito Control Association (FCMA) and American Mosquito Control Association annual spring and fall meetings
- FMCA/FDACS/IFAS-sponsored Plenary, Specialty and Regional Dodd Short Courses
- Up to four hours of Core training obtained through county Extension offices. Please contact FDACS at (850) 617-7997 if you have earned Core CEUs that you would like to count toward your Public Health License renewal.

License Renewal

A renewal license will automatically be sent to license holders who have completed and submitted at least 16 CEUs. Failure to meet the CEU requirements will result in a 90-day temporary expiration grace period. If the CEU requirements are not met during the grace period, the license will permanently expire. You will be required to retake both examinations and reapply for a new license.

Information about exam study materials and FDACS Public Health Director Certification can be found at http://www.freshfromflorida.com/Business-Services/Mosquito-Control/Mosquito-Control-Licensing. PP

For questions about the Public Health Pest Control or Core exams, contact Cherie Trimble at Cherie.Trimble@FreshFromFlorida.com or call (850) 617-7997.

Customers' Roles in Termite Protection and Bed Bug Treatments:

Contracts and Cooperation

Allen Fugler

TERMITES and bed bugs may seem like very different pest treatments, but both have one common trait for treatment success: customer cooperation. Once that cooperation becomes a partnership to remove and prevent infestations, contracts can prevent misunderstandings from becoming claims and lawsuits.

Termite Contracts

Termite protection is a partnership between the homeowner and the treating company. Without both parties living up to their respective responsibilities, the termites "win," defeating control efforts and damaging the biggest investment most homeowners will ever make — the houses they call their homes.

Customers have the responsibility to properly maintain their homes to avoid leaks, excessive moisture, poor drainage and ventilation, cellulose/wood-to-ground contact, and other conducive conditions that can defeat the best treatments with the most effective products. They have the responsibility to notify you about changes in the structure — more on that below — and to correct conditions for which you notify them. In Florida, pest control regulations allow a company to cancel a contract mid-term if corrections noted during the annual inspection are not corrected within 60 days. All Florida termite treatment contracts should refer to regulation 5e-14.105 8 (c) to cite their rights.

In addition to making applications according to label directions, pest professionals have the responsibility to explain their treatments, how long they will take to control termites, and for how long treatments can control termites. Even today's chemistries degrade over time, and manufacturers, such as BASF, recommend a retreatment interval of no more than ten years on treatments that are intact and made under optimal conditions. Use the company technical bulletin found online to explain the need for retreatment to customers.[1] BASF recommends a retreatment interval of no more than 10 years.

Treatments that have been disturbed by landscaping, building additions, soil movement, or subsidence must be retreated to be effective. By referring to the previous year's graph, an inspector conducting an annual termite renewal inspection can detect and treat these areas and note the changes in the structure on the graph for next year's inspection.

[1] http://pestcontrol.basf.us/fallpromo/resources/2016-termidor-restoration-pmp-guidance-excluding-ok-ne.pdf

Termite protection is a successful partnership only when all partners do their part.

Retreatment of structural modifications may involve costly and time consuming drilling, and that's why the homeowner has responsibility to notify the company of changes that could disturb the retreatment and endanger their termite protection. Your contracts should require homeowners to notify you in a reasonable time, no more than 60 days, of new patios, driveways, pavers, landscaping or other work. Failure to notify you should allow you to void or change warrantees and/or charge for retreatments. Be sure to check your state's regulations for your contractual rights.

Contracts should sunset (end your offer of renew) and mention a retreatment offer, even without listing costs. That will tell the homeowner to eventually expect retreatment costs in excess of their annual contact renewal.

Contracts should also include these disclaimers and clauses to help define your responsibilities:

- Aerial infestations (no ground contact) are excluded — especially important in Formosan termite-prone areas.
- Definition of "new" damage is to include presence of live termites at time of inspection; "old" damage is assumed to be present prior to treatment and not the responsibility of the company.
- Binding arbitration is required (state laws vary on how arbitration can be compelled and administered).
- An inspection by the state pest control regulatory agency must be conducted before any legal action is initiated (a regulatory agency inspection report can determine that you followed label directions and help defend allegations of negligence).
- Structural modification, landscaping, and conducive conditions require written notice within 60 days, or the treating company reserves the right to void or change warrantees and/or charge for retreatments.
- The company reserves the right to charge a deductible as customer responsibility prior to payment of damages.
- Additional treatment methods different from the original treatment (i.e., fumigation) and exploratory deconstruction are the responsibility of the customer.

- Carpet, wallpaper, and wood flooring may be depreciated in calculating repair/replacement costs.

Interior inspections should be made during annual renewal inspections to check problematic areas like bath traps. If interiors are inaccessible during annual inspections, written notices provided to homeowners will help document your attempts but is not a replacement or release for termite infestations that could have been seen in an interior inspection. Remember, attic inspections are part of thorough interior inspections.

Photos and moisture readings, especially around windows, can be recorded on graphs and stored in customer files very inexpensively. Most pest management software systems allow storage of photos and correspondence in customers' files. Emailing these structural conditions to customers with renewal notices is strong documentation and puts the homeowner on notice that corrective action must be taken. This can be especially helpful on those "problem houses" where construction makes control difficult and retreatments have been necessary.

Explaining your and your customer's responsibilities, documenting and notifying your customer of conducive conditions, and having a well written, legally reviewed contract will limit your claims exposure only if live termites are discovered in a structure you have under contract. In that case the allegation will likely be that your treatment was faulty, and your negligence allowed termite entry and resulted in damage. By accepting renewal payments, you accepted responsibility and the liability that followed. Only your willingness to nonrenew the contract of an uncooperative customer will protect your company from the irresponsible actions of your customer. Termite protection is a successful partnership only when all partners do their part!

Bed Bug Guarantees

Bed bugs have reemerged as a significant pest after decades of obscurity. With inexpensive national and international travel, they have become fully established in many urban areas in the United States. Since the ban of chlordane in the 1980s, bed bugs have developed resistance to the classes of chemistry in available products, compounding the difficulty of their control.

Current types of treatment include chemical, cryogenic spot treatments, heat and fumigation. Each type of treatment offers its own advantages and limitations:

Chemical treatments do not provide an instant contact kill, but offer some long-term, limited residuals. Most products can be applied only to nonbedding areas such as crevices of bedframes, headboards, bedside tables, and electrical outlets — places that do not have the potential for human exposure. Since infestations begin in harborage areas of untreated mattresses, bed bug populations will often build to an intolerable and noticeable level before they move into the treated areas.

Cryogenic treatments use a directed stream of liquid nitrogen, or CO^2, to kill bed bugs on contact. This method is labor intensive and a direct contact kill only, so its use is usually limited to modes of transportation and furniture/furnishings. There is no residual with this treatment.

Heat treatment for bed bugs has become a commonly accepted alternative or addition to conventional pesticide treatments. Consumers often believe heat is a "green alternative" that eliminates potential pesticide exposures. Research shows that bed bugs die when exposed to temperatures of 120°F, so standard treatment protocols call for heating areas between 120°–140°F and holding temperatures in that range for several hours to allow lethal heat to penetrate mattresses, upholstered furniture and all potential harborage areas. There is no residual with this treatment.

Heat may cause property damage, especially in fragile plastics, wax, cosmetics, electronics and other items left in the heated environment. The use of a preparation checklist for heat treatment, signed by customer and retained in files, can help protect companies in these cases. They require the customer to cooperate by removing items, washing clothing and bedding, and eliminating clutter that provides safe, cooler harborage for bed bugs during the treatment. Customer cooperation in treatment area preparation is critical for the successful heat treatment elimination of bed bugs.

Fumigation is uncommon due to its high costs, but is an effective control method. Bed bug fumigations are conducted like treatments for drywood termites, with the required tarping, aeration times, displacement of occupants, and removal of items identified on a preparation checklist. It is effective in reaching areas that heat may not penetrate, such as cluttered rooms and wall voids. Once the structure is cleared for reoccupancy, there is no residual with fumigation.

Bed bug and all general pest agreements should include a bodily injury disclaimer for insect bites and stings. If you are offering any type of guarantee against reinfestation, you have to communicate that heat leaves no residual and bed bugs can be reintroduced immediately after a hotel room or any treated area is put back into inventory or use. The only guarantee that you can make is the elimination of bed bugs in the treated area at the time of treatment.

Any guarantee offered should differentiate between "bed beg free at the time of treatment"

and "guaranteed to not get bed bugs after treatment." The latter should not be used for any of these treatments, unless you are willing to come back and retreat for free. And even then, you cannot "guarantee not to get bed bugs after treatment." There is no insurance coverage for this type of guarantee, and you must bear all retreatment costs.

Remember, nonresidual treatments cannot provide extended protection against reinfestation. You cannot control infestations from sources beyond your control, and overpromising the future efficacy of nonresidual treatment will create claims exposures. The next hotel guest, subway passenger, movie theater customer, halfway house resident, or housekeeping employee can transport bed bugs and start a new infestation. Bodily injury allegations can come from hotel guests who transport bed bugs into their own hotel rooms or leave bed bugs in their rooms for the next guests.

Check with your insurance company on language you may want to add to contracts. The insurance company HIIG-CRU provides sample bed bug contract language that will clearly explain the treatment limitations and guarantees on the client area of its website. This language should be adopted in your agreements for all types of bed bug treatments.

Other features you may find at the HIIG-CRU website include a free online driver safety course (recommended for all drivers), a database of state pest control regulations, a pest ID submission form sponsored by the University of Florida Entomology and Nematology Department, and downloadable OSHA compliance assistance and other regulatory and loss control checklists and information. PP

Allen Fugler is Director of Risk Management for Houston International Insurance Group – Capital Risk Underwriters, a leading national provider of insurance products and services for the pest management profession. Contact him at afugler@hiig.com and 407-241-3037.

How Pet Pythons *Set Off An* Unlikely Chain of Events *That Could* Make You Sick

Burmese python

SOMETIME in the 1980s, it became cool to own a pet reptile in Florida. Cooler still was owning one from far away, like from Madagascar, Egypt or Burma. The more exotic, the better. Thousands of coldblooded creatures moved through Miami's international airport to their new glass-box homes.

The Burmese python — which can be draped around a neck — was especially popular. A baby python is just 10 inches in length. Much to the surprise of some of their owners, those babies could grow up to 20 times that size.

Maybe it was those overwhelmed owners who let their snakes loose. Maybe it was Hurricane Andrew, which destroyed a reptile breeding facility in 1992 and might have sent its specimens into the wild. One way or another, by the early 2000s, Everglades National Park was teeming with giant nonnative pythons, which strangled, and then gobbled whole, almost anything in sight.

Foxes and rabbits, which once commonly roamed the park, appeared to have vanished. Deer, raccoon and opossum populations dwindled by as much as 99 percent. The snakes targeted more than mammals: Once, a 13-foot python ate an entire 6-foot alligator before exploding.

In 2015, Bob McCleery, an associate professor of wildlife ecology and conservation at the University of Florida, sent 26 rabbits into the Everglades. Three-quarters of his tracking devices — along with the rabbits — ended up in the stomachs of the snakes.

"The best explanation for the rapid decline of most mammals throughout southern Florida is pythons," McCleery said. Most of the mammals, he said, are simply gone.

But not all of them.

One hardy species endured the invasion: the hispid cotton rat. There are a number of theories about why the rat survived. It could be that its population was already dense and abundant, or that its predators — foxes and bobcats — were eliminated. Or it could be that the hispid cotton rat reproduces even more prolifically than rabbits. (A female can breed again within a few hours of giving birth.)

The rat is also one of the only known hosts of a particular strain of the Venezuelan equine encephalitis complex, known as the Everglades virus, which is spread by mosquitoes.

And, with fewer big mammals to feed on, the native Everglades mosquito had fewer choices for its next meal.

According to a new study, the amount of rat blood in the Everglades mosquito's diet has quadrupled since 1979.

"We were as surprised by the results as anyone else would be," said Nathan Burkett-Cadena, an assistant professor of entomology at the University of Florida, whose research, published this past week in the journal *Biology Letters*, looks at whether invasive species could increase the risk of disease for humans by setting off such chains of events.

In humans, the Everglades virus can cause fever, headache and, in some cases, encephalitis, a swelling of the brain.

"I don't think that anyone could have predicted that this large snake, decimating some native mammals in a relatively wild area, could have some kind of cascading impact for human health," Burkett-Cadena said.

While no known human outbreaks have occurred in Florida, Burkett-Cadena and his team pieced together information from Venezuela, Guatemala and Mexico, where it is thought that viruses in the same family may have spread from rats to people. Together with three of his students, Burkett-Cadena spent five months collecting "blood-engorged females" from the Everglades and Vero Beach, Florida, to see whether the mosquitoes' eating habits changed at snake-infested sites. (Only females drink blood, in preparation for egg-laying.)

"We never get to sit down and talk to a mosquito and say, 'Hey, you feeling OK? Let me feel your forehead — seems like you've got Everglades. Do you remember what animal you bit last?'" he said.

McCleery, who was not involved in his colleague's study, said the missing mammals would have far-reaching impacts. "As ecologists, we've known that this is really bad for some time," he said. "You can't completely alter an ecosystem and not expect that there won't be other implications that will impact humans."

Kenneth L. Gage, an entomologist and ecologist at the Centers for Disease Control and Prevention, said exotic species could disturb ecosystems in ways that humans could not anticipate.

"We have no idea, really, what we're doing when we move all these animals and pathogens around the planet," Gage said. PP

— Livia Albeck-Ripka
The New York Times
October 2017

Hispid cotton rat
J.N. Stuart

CAPITOL *Corner*

Sean Brantley and Suzanne Graham

BY THE TIME you are reading this article, Florida's legislative session is just around the corner. This is an early year, and we are already in "committee weeks" ahead of the regular session. There is plenty of action already, with a lot of discussion around Hurricane Irma, water issues, and utilities just from the big storm in September. And yes, there are still elections coming and a lot of posturing to get in the best places to say the best things and get those votes. That is all very fluid, and a magazine article written more than a month ago just can't cover it correctly. But we certainly have other issues to discuss with you.

THE CONSUMER Consent Form (FDACS-13671) and Consumer Notice Form (FDACS-13692) seem to be something we need to discuss a little more. The newer form, Consumer Notice Form, is to be signed by a consumer prior to entering a contract for any wood-destroying organism treatment. Remember that according to 5E-14.105 (1) you must enter a written contract with the property owner for any treatment of a wood-destroying organism. That means spot-treats, whole-house guarantees, retreatment only, repair and retreatment, no warranty, and any other type of application, service or treatment for wood-destroying organisms. Are you doing that? Make sure you are, because DACS is checking.

Many companies have been misinterpreting the rule and offering treatments without warranty, or some other type of treatment, and not issuing a written contract. That is not compliant with the rule. In addition, because they aren't issuing a written contract they are not getting the Consumer Notice Form signed. So they are now in double trouble. To be clear, you have to issue a contract even if the contract says there is no warranty or guarantee, and prior to that you must have the Consumer Notice Form signed.

The older form, Consumer Consent Form, is another one that a lot of companies are not issuing as specified. This form is specifically for the consumer's consent to a contract where a prior contract was in force. In other words, if Mrs. Jones had a Termidor contract current with A2Z Termite and you sold her a Sentricon job, Mrs. Jones must acknowledge the second contract via the Consumer Consent Form.

And yes, if you are doing take-over warranties you should have these as well. These are the forms that people are talking about and often mistakenly messing up. The Consumer Notice Form is for every job you do that treats WDOs. The Consumer Consent Form is for issuing a contract when one already exists from someone else. Check your files, I bet you will find an "uh-oh" along the way.

Pretreatments make for a lot of questions with these forms, as you can imagine. If you read the forms and the rule, there is deliberate guidance on pretreatment issues and the rule compliance. The Consumer Consent Form wouldn't really apply to new home construction, but could easily apply to you issuing a whole house warranty for a pretreat you performed on an addition where the original structure was under contract currently. The Consumer Notice Form would be issued to the builder along with the contract(s) and passed to the buyer at closing. Yes, a Consumer Notice Form is required when you did the pretreatment for the addition we mentioned above. There will be times where both forms are getting signed prior to your issuance of the contract.

The rules are a great thing to reread and study from time to time. Rule 5E-14.105 is a good one to go to right now and revisit. You can access the rule at www.flrules.org and enter 5E-14 in the Florida Administrative Code search box.

SPEAKING OF rules, we have been discussing the lawn signs again with relation to your general household pest control applications. And yes, we are really seriously talking about removing the requirement for GHP applications when broadcast applications aren't used, such as L&O or fleas. There are no real plans in place for rulemaking in 2018, but that could always change.

DACS SPENT a great deal of time on mosquito control since Zika's introduction and most recently in the post-Irma applications. The DACS mosquito control program has been applied to nearly every county that requested assistance and has taken its toll on resources and personnel.

DACS has arrived at the thought that industry needs to be on the same page with treatment methods and patterns. UF is working on basic practices for mosquito treatments and DACS is going to get the word out to applicators. To be clear, there is not likely to be new endorsement or training requirements. This is meant to be industry training that helps unify efforts among mosquito control programs. Look for that to materialize soon.

Keep your eyes open — the 2018 legislative session is in January, and we will be busy following the issues. Attend your local FPMA meetings and participate. Come be heard and get involved. PP

Sean Brantley and Suzanne Graham are Co-Chairs, FPMA Government Affairs Committee

Florida Pest Management Association
PMP Membership Application/Renewal

Your dues payment provides for a joint membership in FPMA and NPMA.

THIS IS A: ☐ RENEWAL ☐ NEW MEMBER APPLICATION

Active Member (PMP)
A pest control company actively engaged in the pest control industry in Florida (licensed by appropriate State Agency under Chapter 482, Florida Statutes) is eligible to be an Active Member and is entitled to one voting representative for each registered office or branch.

Active Member Employees and Branch Offices
Any firm with an Active membership in the Association, having branches or separate offices has the option of registering any and all branches or separate offices as Active Branch Offices. Active Branch offices have voting privileges and can hold office. The member licensee shall inform the Executive Vice President in writing of the individual's name who will have the voting privileges for the Branch Office(s).

YOUR INFORMATION: *(Please complete all fields.)*

First Name: _____ Last Name: _____

Business Name: _____

Address: _____

City: _____ State: _____ Zip Code:_____

County: _____

Phone: _____ E-mail: _____

Website: _____

Certified in: ☐ GHP ☐ L&O ☐ Termite ☐ Fumigation

BRANCH INFORMATION:

# of Branches/Offices in Florida: _____

There is no additional fee to list additional branches/offices for mailing privileges. Please attach a list of all branches/offices in Florida, including company name, contact person, address, telephone and email.

JOINT MEMBERSHIP DUES SCHEDULE
Please circle appropriate category

Category	Annual Sales Revenue	Dues Amount
A	$0 - $50,000	$149
B	$50,001 - $150,000	$229
C	$150,001 - $300,000	$359
D	$300,001 - $450,000	$459
E	$450,001 - $700,000	$598
F	$700,001 - $1,000,000	$884
G	$1,000,001 - $2,500,000	$1,638
H	$2,500,001 - $3,000,000	$2,949
J	$3,000,001 - $4,500,000	$4,699
K	$4,500,001 - $7,000,000	$5,897
L	$7,000,001 - $10,000,000	$6,989
M	$10,000,001 - $15,000,000	$10,924
N	$15,000,001 - $20,000,000	$12,139
P	$20,000,001 - $25,000,000	$14,574
Q	$25,000,001 - $30,000,000	$16,998
R	$30,000,0001 - $50,000,000	$19,418
S	$50,000,001+	$21,209

COMMUNICATION AGREEMENT: I understand that by providing my mailing address, email, and telephone number, I am consenting to receive communications via these methods from FPMA. I further understand and provide consent that this information will be published in Florida Pest Management Association publications, both online and print.

Signature: _____Date: _____

CODE OF ETHICS: I would like to join other Florida Pest Management Association professionals, and I agree to adhere to the Association's Code of Ethics (found at www.flpma.org). I understand that membership is not effective until payment is received and official notification has been provided.

Signature: _____Date: _____

Dues to FPMA are not deductible as a charitable contribution but may be deductible as an ordinary business expense. A portion of dues, however, is not deductible as an ordinary and necessary business expense to the extent that FPMA engages in lobbying. The non-deductible portion of dues for 2015 was 8.0%..

PAYMENT METHOD: ☐ Check #_____ ☐ Visa ☐ Master Card ☐ American Express ☐ Discover

Billing Contact Name: _____

Billing Address: _____ City: _____ State: ____ Zip Code: _____

Card Number: _____ Exp Date (mm/yyyy): _____ CVV(V) Code: _____

email address for payment confirmation: _____

COMPLETE AND RETURN WITH PAYMENT TO:

Florida Pest Management Association
P.O. Box 0294• Goldenrod, FL 32733-0294
Questions? Contact info@flpma.org or (407) 293-8627

At the Cummer Museum in Jacksonville, plant damage is evident two weeks after Hurricane Irma flooded the area.

Plants, Flooding *And* Salt Damage

Erin Harlow and Maxine Hunter

Hurricanes can bring an unexpected amount of rainfall to a landscape in a short amount of time and cause significant amounts of damage.

UNDERSTANDING how to prepare for a storm, what to expect, and what to do afterwards can greatly assist with recovery efforts for your community, business and customers. If you are in a coastal area then salt water in the landscape can add another challenge. This article will review what to expect and remediation recommendations.

Flood Recovery Results Will Vary

How well a landscape recovers after a storm is dependent on many factors including how long the flood waters were sustained in the area, if they were tidal, the salt content of the water, wind velocity, and plant species. Plants that experience long periods of flooding will usually experience some level of root damage. The root damage may cause the plant to die soon after the floods, or in the case of larger plants, it may take several months to see plant decline.

After flood waters recede, environmental changes will occur, usually starting in the spring, times of drought, or during the summer of the following year if the damage occurred in the fall, as is the case with most hurricanes. The plant can become completely stressed and potentially die because the root systems are too weak to support itself, or a root disease may have been introduced as a result of the stress and the plant succumbs to the disease. If there is a high-value plant at the account, a preventive systemic fungicide application to the roots can help protect the plant while new roots are being generated. A fungicide drench should not be considered a guarantee that the plant will survive.

If the flood water is brackish or salty, then the saline conditions may be too high for plants to grow properly after the water recedes. Most plants will drop their leaves or turn yellow soon after the water level drops. Some larger plants or conifers may not drop their leaves. Soil testing to measure the electrical conductivity (EC) can give a baseline of the salt level in the soil. Flushing with a freshwater source such as irrigation water or rainwater is the most effective way to bring down EC levels.

Generally, 1 inch of irrigation water can flush the top 12 inches of soil, in sandy soils similar to those of most of North Florida. This should be done after the soil is no longer saturated, so the salts leach downward. If the irrigation water is coming from a well, then the irrigation water's EC should also be tested prior to attempting to flush salts from the soil. Irrigating from the aquifer has the potential to cycle the salty water back to the top of the soil profile. If the irrigation water has a high EC level then alternate water sources are recommended; this may only be needed temporarily, but monitoring the well water's EC is essential.

Some literature may suggest applying gypsum prior to leaching, but this is generally recommended for soils with clay and not for Florida's sandy soils. It is recommended

Continued on Page 34

Make Your Own Collection for the School of Ants

MATERIALS:

- 8 white 3x5" index cards (or similar sized paper)
- 1 pen or pencil
- 2 Pecan Sandies cookies*
- 8 small zip-lock bags (1-quart)
- 1 big zip-lock bag (1-gallon)
- 1 envelope for submitting your kit by US mail, plus postage

**Allergy warning: contains nuts!*

COLLECTION DATA	
Collector Name	Address where ants were collected
Weather (e.g. sunny, cloudy, rainy)	Temperature (°F)
Collection Date	Time of collection
Habitat type: GREEN (e.g. lawn, forest, garden)	Detailed habitat: GREEN (e.g. base of tree, in grassy yard)
Habitat type: PAVED (e.g. sidewalk, driveway, playground)	Detailed habitat: PAVED (e.g. gravel driveway, street corner)
CONFIRMATION CODE: (Issued after you enter collection data online)	

~~~~

Thanks for joining our investigation of the ants that live around us! The School of Ants is mapping ant species in cities and towns, starting in your backyard or school. Your samples help us to understand local biodiversity, document native and introduced species, and will help us track the effects of climate change and urbanization. To get started, follow these **5 easy steps** to collect and submit a sample. *After we receive and identify your ants, we will alert you by email that your ants are mapped!*

~~~~

Step 1: GREEN SPACE. Take 4 notecards and 1 cookie to a green outdoor space (lawn, garden or forest), preferably on a warm sunny day. Write the word GREEN on the cards and place them on the ground about 1 foot apart. Place a rock on the cards if it is windy! Break the cookie into 4 pieces and each on top of a card. Be sure the edges of the cards touch the ground so ants can easily discover your delicious crumbs*. Record your collection information on this sheet.*

Step 2: PAVED SPACE. Repeat step 1, but choose a nearby site that has paved surfaces (e.g. sidewalk, driveway, playground) and write PAVED on each card. Record your collection information on this sheet.

Step 3: COLLECT. One hour after you set out your cookies, it is time to collect the ants! Pick up each card and quickly pour the crumbs, ants, and card into its own zip-lock bag (Note: some ants can sting, so be careful. Use extra caution if you are allergic to bee or wasp stings.) Seal each bag right away! The card should show where your ants were collected (Green vs. Paved). To preserve your samples for research and prevent them from decomposing, place all 8 bags into a large zip-lock bag and freeze them overnight. This is a humane way to sacrifice ants. **Suggestion: leave a bit of air in each bag to cushion the ants so they won't get crushed in the mail!*

Step 4: REGISTER. Register your kit on our website www.schoolofants.org. You will need to make a username and password. Follow the prompts to enter your data and you will receive your Confirmation Code. Write this code in the data table on this sheet.

Step 5: SUBMIT. Submit your sample after completing this checklist.
Your package should include:
☐8 small bags each with a card labeled GREEN or PAVED, hopefully full of ants, frozen overnight
☐This sheet, with the CONFIRMATION CODE you received after entering your collection data online, printed clearly above.
☐Send your kit in to:

The School of Ants c/o Dr. Lucky
University of Florida
Dept. of Entomology & Nematology
970 Natural Area Dr.
Gainesville, FL 32611-0620 USA

NOTE that you are responsible for postage!

From the whole School of Ants Team, thanks for participating

New Bee Lab Breaks Ground

The UF Honey Bee Lab Will Open in June 2018

Gainesville, FL — After four years and two vetoes by Gov. Rick Scott, ground broke on Monday for the new beekeeping research lab at UF.

Last year, the state granted UF $2 million, with the requirements that the university match that amount with $500,000 and the beekeepers raise an additional $200,000.

Jamie Ellis, UF associate professor of entomology, said although the expected amount totaled $2.7 million, all contributing parties went above and beyond, eventually gathering about $4 million for the construction of the research lab.

The new honey bee laboratory, which will be built near Steinmetz Hall, provides ample research and learning opportunities for both UF students in the College of Agricultural and Life Sciences and beekeepers across the state, Ellis said.

Dr. Jamie Ellis, his four children, and his wife Amanda break ground for the new UF honey bee lab near Steinmetz Hall in Gainesville, Florida.

"It will be research projects focused on honey bee health, extension aimed at helping beekeepers directly and then instructional efforts in training new students in our beekeeping courses," Ellis said.

Although nothing is currently in place, the college is hoping to develop a beekeeping certificate within the UF curriculum.

Cameron Jack, a third-year entomology doctoral student, welcomes the new opportunities and professional networking that will come with a new, top-notch facility.

"That's a big positive because it will allow me to have collaborations with these scientists and meet and work with a lot of these people," the 29-year-old said. PP

— Emily Lehman
Independent Florida Alligator, October 2017

Flooded Plants, continued from Page 31

Plant Tolerance	Electrical Conductivity dS/m or mmho/cm	Salinity mg/L or ppm
Sensitive	<3	<2100
Moderately Sensitive	3–6	2100–4200
Moderately Tolerant	6–8	4200–5800
Tolerant	8–10	5600–7000
Highly Tolerant	>10	>7000

Relationship between plant salinity tolerance and soil EC or salinity measurements for sandy soils

Shober, A., reviewed 2015.

to continue to monitor a site's EC levels weekly or bimonthly for several months after a major flooding event. If you need assistance monitoring EC levels, contact your local Extension office. Several Extension offices offer this testing. or you may send samples to the UF/IFAS Soils Laboratory[1].

The table above provides a range of EC levels for plants. The plant tolerance describes the level of sensitivity the plants has in relationship to the EC. If a plant is very sensitive to salt, then an EC reading above 3 dS/m may cause damage. It is important to realize that soil structure, application method, and environment can influence how salts move in the soil. If it becomes dry after a flood then the salts can have a greater influence on the plant material. Salts can also move upward in the soil profile back toward the root zone by means of capillary action.

The amount of water needed to leach depends on several factors. While it can be calculated, it depends on soil structure, soil pH, the type of salt in the soil, irrigation water EC, and the amount of free lime in the soils, among other factors. It is easiest in a flood situation to baseline test your soil for the EC immediately following the water receding. Then continue to monitor the EC level over several months until the soil returns to acceptable conditions. Testing the irrigation water EC may also be needed to make sure that well water is not adding sodium back to the surface.

How a plant responds to flooding will depend on the health of the plant prior to the floods, whether salt is present in the soils after the flooding, how long the plant is submerged, and various other factors. The longer a plant sits in water, the less likely it will survive. For instance, St. Augustinegrass that is submerged in salt water for approximately three days or less tends to turn yellow within a week of water receding but most likely will recover fairly quickly if it was healthy prior to the flood (see photos on page 31, which were taken two weeks after flooding).

Most foliage will turn brown. The best way to determine if plants are still alive is to scratch the surface of the stems to see if it is still green. The plant may look dead, but may just need time to recover. Recovery times can be extensive for larger trees and shrubs, taking up to several years to fully recover from serious weather events. Some plants will hold their leaves that are brown, and others will lose them, so again, it is best to cut into the plant to determine if it is alive.

Don't be alarmed if plants continue to die. Larger plants are going to take longer to expire. As mentioned earlier, if there are plants on the property that survived the floods but are susceptible to root rots, then a fungicide drench could be considered to provide some protection. Patience will be needed by both you and your customers to let plants regrow and the landscape to become balanced once again. PP

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CORRECTION: George Richardson IV, Undergraduate Assistant, UF/IFAS Urban Entomology Lab, and Intern, UF/IFAS Duval County Extension, was coauthor along with Erin Harlow in the September/October issue of PestPro for the article "Little Landscape Home Invaders."

[1]http://soilslab.ifas.ufl.edu

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