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# PESTPRO

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## CONTENTS

### FEATURES

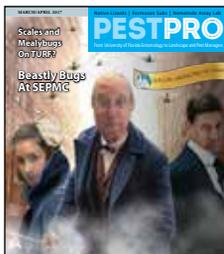
- 9 Perimeter Pests
- 11 Scales and Mealybugs  
— On Turf?
- 16 Student Profile:  
Johnalyn Gordon
- 19 Native Lizards  
In Florida
- 23 Banding Together to Battle  
Formosan Subterranean Termites
- 25 A Nematode Assay Lab  
For You

### DEPARTMENTS

- 6 **FPMA President's Message**
- 7 **Editorial:** The Future of the Pest Management  
Industry
- 13 **Past President's Corner:** J. Bryan Cooksey, Jr.
- 15 **Pest Detective:** Shore Flies
- 22 **Executive Suite:** These 4 Trends Will Change How  
You View Web Marketing in 2017
- 27 **Capitol Corner:** Government Action Committee
- 28 **PCO Pointer:** Some FDACS Fees Eliminated



Daniel Dye



### ON THE COVER

Beasty Bugs are coming to SEPMC!  
See the schedule inside for May 1–3 ...  
if you dare.

Photo illustration by Juan Carlos Tafur-Mejia



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# Welcome Spring



## Message from the President of FPMA

Anne-Marie Tulp

IT'S BEEN a busy year already, and we are only in March! A lot has happened since I took over the role of FPMA president in January. We have had a very successful and well attended FPMA Business and Operations Expo. Our speakers were outstanding, and the exhibit hall was completely sold out. Attendees both in and out of Florida were attracted to our new format and the offering of CEU's for neighboring states. The Expo Committee (Suzanne Graham, chair, Sean Brantley, Mark Ruff, and Marcie Downing) made the impossible very possible, and as a result our association has developed a program that attracted a whole new demographic. They have set the bar high for the 2018 Expo committee, that's for sure!

As promised, we had our very first member-only business webinar presented by Market Hardware, titled *5-Step Formula for Winning New Leads and More Referrals from the Web*. A companion article to this webinar can be seen on page 22. Due to the overwhelmingly positive feedback we had on the webinar, Market Hardware has agreed to do it again on March 15, 2017. FPMA members, watch your emails for further details.

We had our second annual Board of Directors workshop, which covered a lot of information for 2017's incoming Region Directors and was packed into a one-and-a-

half-day schedule. Thank you to all that attended. At the workshop, we also awarded the 2016 Region Director of the Year award to Elliot Zace and the 2016 Chairperson of the Year award to Suzanne Graham. It is only due to these people and the many other volunteers in this association that we continue to grow and strengthen.

One other special 2016 award was presented at the workshop: The Doug Vander Poest Extra Mile award was presented to Bruce Ryser from FMC for all that he has contributed not only to FPMA but to the pest industry. Bruce retired on February 1, and we wanted to be sure he received the sendoff he deserved. Bruce has been a great friend to our region directors over the years and has always made himself available to provide CEUs at region meetings. We wish Bruce a very happy (and relaxing!) retirement.

Be sure to check out page 13, where we once again feature one of our past presidents. This month's *Past President's Corner* spotlights Mr. J. Bryan Cooksey, Jr. of McCall Service, who served as our president in 1973-'74. I hope you all enjoy reading this column each issue as much as I do.

Legislative Days is right around the corner, and if you have not registered yet, don't delay any longer. See the box below for more information about this event.

From what I'm hearing Summer Conference registration is in full swing, so be sure to register if you have not. Because we are expecting a sold-out situation at Hawks Cay Resort, I would encourage you to make those reservations now. Please go to our website at [FLPMA.org](http://FLPMA.org) under Seminars & Events for more information and to register.

It takes a village to accomplish all that I would like to in 2017, and I am grateful to those who have assumed the positions of our Committee Chairs for this year:

**Government Affairs:**

Sean Brantley and Suzanne Graham

**Bylaws and Strategic Planning:**

George Braker

**Education:** Vanessa Ferguson

**Communications:** Eric Hoffer

**Membership:** Jonathan Simkins

**2017 Behind the Scenes Site Tour:**

Kyle Verona

**Budget:** Adam Jones

**Summer Conference:** Michael Tulp

**2018 Expo:** Elliot Zace

I wish you all a busy and prosperous spring season and look forward to seeing you all at our upcoming events. **PP**

— Anne-Marie Tulp,  
President, FPMA



**MARCH 20-22, 2017 | DOUBLETREE BY HILTON TALLAHASSEE**

★ *A DATE to REMEMBER*

**The FPMA 2017 Legislative Days will be held March 20-22**, near the beginning of the 2017 legislative session. We have an entirely new type of session for Florida politics with new lobbying rules, compensation rules, and totally different mechanics. Our industry never ceases to be included in some sort of legislative activity, and we need you to bring your voice as a Florida voter to the table. We have a very special lineup for you again this year, and we promise to make your experience a great one. We are going to give you an education on the process, a private tour of the Capitol, a chance to mingle with movers and shakers of the legislative landscape, face time for your voice to be heard in elected officials' offices, and a special dinner with a lot of guests. Plan to attend now. Save the date, and be on the lookout for registration links at [www.FLPMA.org](http://www.FLPMA.org), under **Seminars and Events**.

— Sean Brantley, Regional Director, Governmental Affairs Committee, FPMA



# The Future of The Pest Management Industry

THE PEST management industry has always had a bright future and has been considered recession-proof. The service is always needed, regardless of the blips and dips in the economy. The only thing that can adversely affect the industry is whether it will ever run out of pests to control. With extraordinarily effective products for control, would it be possible to run out of demand for your service? Are you afraid you are going to run out of pests to control? Is that something that keeps you up at night?

We have the best tools ever for control of cockroaches, bed bugs, subterranean termites, drywood termites, flies, ants, mosquitoes, lawn pests, and ornamental pests. For instance, gel baits just about caused German cockroaches to disappear. Before that, bed bugs disappeared from the United States due to the use of DDT and organophosphates. Termite control is better than ever with the nonrepellent termiticides and termite baits. Zika-vector mosquito control can be the best ever with the use of residual treatments to vegetation that last up to eight weeks.

And there are even more superb products available. The pest management industry now has the most effective technologies ever for control of pests. Does that mean that control could be so good that pests will disappear?

## MIND BLOWN IN 3, 2, 1 ...

Guess what — there are so many insects in the world that it would be impossible to make a dent in their massive numbers. A recent study on insect migration from the United Kingdom was recently published in *Science* magazine, and that study should make you feel better. Do you realize how good tracking technology is for detecting flying bodies? The UK scientists studied high-flying insects with special radar that could track large and small flying insects at heights greater than 500 feet. Their instruments could track only medium-to-large insects with a weight greater than 10 mg. To give you a point of reference, an Asian cockroach averages 100 mg in weight. So Asian cockroaches weigh 10 times more than the smallest insect they tracked.

The UK scientists did this for 10 years. What these scientists discovered is about 3.5 trillion insects migrate above a 70 square

kilometer (27 square miles) area every year. That is the same number of insects over 27 square miles as dollars in the federal budget.

Florida is about 66,000 square miles, so that amounts to 8,500 trillion insects flying over Florida annually. Of course, the United Kingdom has a cooler climate than Florida, so our hot, humid, bug-infested state probably has 10–100 times more insects than the United Kingdom, which puts the number at 80,500–805,000 trillion insects. In addition, we have trillions of insects flying at less than 500 feet and crawling pests that would not be picked up by radar. The numbers of insects then become mind-boggling.

How about insect weight? The UK scientists estimated that the annual weight of insects picked up by radar was 3,200 tons of insects annually over 27 square miles. For Florida, that would amount to about 78,000 tons of insects over our heads. The Washington monument weighs 81,000 tons. So imagine the equivalent weight in insects as the Washington monument flying over your head every year. Just hope they all don't fall on you all at once. Thank goodness individual insects don't weigh much, but all together their numbers and weight are enormous.

Can you believe those numbers? I remember several years ago, the weather service in Georgia saw flying Asian cockroaches on their radar. The swarm was so large it looked like a thunderstorm. There must have been billions of cockroaches on that particular night. Did you know that it is estimated there are 10,000 trillion ants in the world. Those numbers are eerily close to the 8,500 trillion insects flying over Florida.

## HOW ABOUT A FLIGHT OF FANCY?

Now with those numbers in mind, would it be possible for the entire pest control industry in Florida to kill all those insects? First of all, you would not want to kill *all* those insects — some are harmless, some are beneficial, and only a few are pests. But for the fun of doing the calculations, let's assume that all those insects are pests. There are about 40,000 pest control employees in Florida. If there are 8,500 trillion flying insects every year, then each technician would have to deal with about 212 million insects every year to

keep them in check. Maybe your company should set a goal for every employee of killing 200 million insects every year. In other words, each employee would have to kill 98,000 insects during every hour of every workday. That is a lot of productivity. How many of your employees could keep up that level of production?

If it takes 10 micrograms of insecticide to kill an insect, it would take almost 20 pounds of insecticide active ingredient for every technician to kill their 200 million insects. That, of course, is assuming every microgram of insecticide actually hits the insect. Usually less than 90 percent of insecticide actually gets to the target pest. The rest is degraded or absorbed into surfaces, drifts into the air, or ends up in other places. So, it might take each technician being supplied with more than 200 pounds of insecticide to do the job. Thank goodness about 99 percent of insects are not pests and do not have to be controlled.

## REST ASSURED — YOUR SERVICES ARE IN DEMAND

Well, from this discussion, the answer is clear. Even with only less than 1 percent of the insects considered pests, you will never run out of pests to control in your business. There will always be a demand for your service. In fact, the US census has found on their quality-of-life surveys that up to 37.5 percent of residents in Florida have cockroaches in their house. That is close to two out of every five houses that are infested. There is something wrong if you and your employees cannot find someone who needs your service.

Pests will remain healthy for a long time. There are more insects to kill than we ever imagined. People tell us they are bothered by insect pests. Pest control companies will flourish, and the business will thrive. Just remember the 8,500 trillion insects that are flying overhead with a weight of 78,000 tons. They are guaranteeing your future success. **PP**

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

# 22ND ANNUAL SOUTHEAST PEST MANAGEMENT CONFERENCE

MAY 1 – MAY 3, 2017, UNIVERSITY OF FLORIDA, GAINESVILLE, FLORIDA

## May 1, 2017: General Household Pests (GHP)

- 7:00 AM – 8:30 AM Registration
- 8:30 AM – 9:20 AM **GHP** Ant Ecology and Sampling — Anthony Hughes, UF/IFAS
- 9:20 AM – 9:40 AM Break
- 9:40 AM – 10:30 AM **GHP** Bed Bugs and How to Control Them — Brittany Campbell, UF/IFAS
- 10:30 AM – 10:50 AM Break
- 10:50 AM – 11:40 AM **GHP** Insecticide Resistance in Mosquitoes — Casey Parker, UF/IFAS  
Repellents Testing Against Mosquitoes — Mohamed Sallam, USEPA  
SEPMC, Urban Entomology Lab, and Florida Pest Management Foundation: Partners in PCO Education
- 11:40 AM – 12:00 PM Lunch
- 12:00 PM – 1:15 PM **GHP** Pesticide Longevity — Heather Erskine, UF/IFAS  
Cockroaches and Wood — Dallin Ashby, UF/IFAS  
Control of Small Flies — Megan Bernier, UF/IFAS  
Container Mosquito Control — Lettie Cronin, UF/IFAS
- 2:10 PM – 3:00 PM **GHP** Mosquito Control Practices in Florida — Phil Koehler, UF/IFAS
- 3:00 PM – 3:20 PM Break
- 3:20 PM – 4:10 PM **COPE** Rodenticide Safety — Rod Smith, Bell Labs
- 4:10 PM – 5:00 PM **COPE** IPM and Quality Control in GHP Control Programs — Don Foster, Gregory Pest Solutions

## May 2, 2017: Wood-Destroying Organisms (WDO)

- 7:00 AM – 8:30 AM Registration
- 8:30 AM – 9:20 AM **WDO** Termites in Trees — Ben Hottel, Florida A&M University
- 9:20 AM – 9:40 AM Break
- 9:40 AM – 10:30 AM **WDO** New Termite Update — Thomas Chouvenc, UF/IFAS
- 10:30 AM – 10:50 AM Break
- 10:50 AM – 11:40 AM Wood Beetles — Jiri Hulcr, UF/IFAS
- 11:40 AM – 12:00 PM **WDO** SEPMC, Urban Entomology Lab, and FPMF: Partners in PCO Education
- 12:00 PM – 1:15 PM Lunch: Gator Low-Country Boil
- 1:15 PM – 2:05 PM **WDO** Formosan Termites in Jacksonville — George Richardson, Peninsular Pest Control, and Erin Harlow, UF/IFAS
- 2:05 PM – 2:55 PM **WDO** Moisture and Fungus Problems in Buildings — Kristen Stevens, Clegg's Pest Control  
Field Trials on Termite Control — Roberto Pereira, UF/IFAS
- 2:55 PM – 3:15 PM Break
- 3:15 PM – 4:05 PM **COPE** New Rules for WDO Control — Paul Mitola, FDACS
- 4:05 PM – 4:55 PM **COPE** WDO Tool Time — Ray Myers, RJM, Inc.

## May 3, 2017: Lawn & Ornamentals (L&O)

- 7:00 AM – 8:30 AM Registration
- 8:30 AM – 9:20 AM **L&O** New and Emerging Pests — Lisa Hassel, Department of Plant Industry, FDACS
- 9:20 AM – 9:40 AM Break
- 9:40 AM – 10:30 AM **L&O** Anticipated Insect Problems and Management Recommendations — Dr. Adam Dale, UF/IFAS Entomology
- 10:30 AM – 10:50 AM Break
- 10:50 AM – 11:45 AM **L&O** PSI: Plant Scene Investigation — Bill Schall, UF/IFAS Palm Beach County Extension
- 11:45 AM – 12:45 PM Lunch Sponsored by McCall Service, at Physics Building Patio
- 12:45 PM – 1:35 PM **L&O** Weed Control in Ornamentals — Dr. Chris Marble, UF/IFAS Mid-Florida
- 1:45 PM – 2:35 PM **L&O** Developing a Program for Turf Nutrients — Dr. Travis Shaddox, UF/IFAS Ft. Lauderdale
- 2:35 PM – 2:50 PM Break
- 2:50 PM – 3:40 PM **COPE** Industry Update on Licensing, Legislation and Labels — Joe Jonovich, Hulett Environmental Services
- 3:40 PM – 4:30 PM **COPE** How to Conduct a Pesticide Safety Self-Inspection for Your Firm — Paul Mitola, FDACS



# BEASTLY BUGS

AND HOW  
TO CONTROL THEM



# Perimeter Pests

Dallin Ashby, Philip Koehler, and Roberto Pereira



'Glue traps'

There are as many landscape designs as there are minds that shape them. Throughout the neighborhoods that PCOs roam, and at every house we inspect or treat, there are nuances that create a vast array of microhabitats.

**V**ARYING SUBSTRATES and ornamental plants incorporate different levels of shade, moisture, decay rates, insect attraction, soil temperature, and erosion. Some landscape components are more common than others, like the use of mulch in shrub beds and flower gardens.

Mulch is widely used because of its aesthetic appeal and utility in keeping moisture next to plant roots. That same mulch can also create a great environment for a variety of organisms, including arthropods such as insects, spiders and millipedes. Depending on such factors as

mulch depth, moisture content, mulch type, and surrounding environment, mulch may create conditions conducive to the survival of pest arthropods a homeowner would not want around.

It is common to see mulch applied during the final stages of new construction. Florida is a diversity hotspot, but when builders disturb habitat by creating new neighborhoods where untamed land once was, much wildlife diversity is locally lost or isolated. Arguably, mulch can maintain some qualities of a natural habitat better than other substrates such as bare soil, concrete or sod. What, then, might one expect to find associated with bark mulch around homes in this type of disturbed habitat?

## SETTING THE TRAPS FOR PESTS

In a relatively new neighborhood in Newberry, Florida, we had an opportunity to survey the types of insects, spiders and other arthropods living in and on pine bark mulch immediately next to homes. Nine homes were surveyed over the course of a year. Because the neighborhood was new there were no mature trees, and shade was sparse. Much of the bark mulch where sampling took place was part of a planted shrub bed, which did provide some shade to the mulch. Sprinklers were used regularly to keep lawns green and shrubs watered. The lawns were well manicured.

It is worth noting that though the bark mulch might provide harborage for some arthropods, these mulch beds were somewhat like islands, surrounded by cut lawn and/or concrete. The root systems and sandy substrate

at the bottom of grass cannot harbor the same suite of arthropods that can be found in relatively deep bark mulch, and concrete harbors practically no arthropod life at all.

In order to sample sufficiently, glue cards, or glue traps, and pitfall traps were used at four locations around each of the nine homes sampled. Sampling was done two to three times per quarter throughout the year, thus taking into account some seasonal variation in population density that year.

Glue traps were placed on the surface of the pine bark mulch to sample the arthropods walking there. To get a better picture of which arthropods might be crawling through or under the mulch, pitfall traps were placed at the level of the soil that was just below the bark mulch. Mulch was removed from immediately around the pitfall traps, allowing those insects and other arthropods that crawled over the surface of the mulch to potentially fall into these traps as well. Each trap was checked approximately 24 hours after placement.

## ASSESSING THE CATCH

Perhaps it is no surprise, especially to those whose job it is to manage perimeter pests, that during those months with shorter daylight periods, few to no insects, spiders, millipedes, or the like, were caught. However, while the sun is warm and the days are long, many critters can be found wandering, foraging and harboring in the mulch around homes. During these times of high activity, there were often very many specimens caught in both the glue traps and pitfall traps. *Continued next page*



A pitfall trap



Little yellow cockroach closeup

Daniel Dye



Little yellow cockroach with size comparison

| One-year Total of Pests Caught<br>36 traps of each type |             |       |         |         |            |         |
|---|-------------|-------|---------|---------|------------|---------|
|   | Springtails | Ants  | Spiders | Earwigs | Millipedes | Roaches |
| Glue Trap   | 25,838      | 1,324 | 108     | 56      | 45         | 40      |
| Pitfall Trap  | 962         | 157   | 26      | 26      | 6          | 0       |
| Total   | 26,800      | 1,481 | 134     | 82      | 51         | 40      |

INTERESTINGLY, there were never any cockroaches caught via pitfall traps, which consisted of glass vials filled with soapy water. However, a few different species of cockroach were occasionally found on the glue cards. The species caught included Australian cockroaches (*Periplaneta australasiae*), Asian cockroaches (*Blattella asahinai*), small yellow cockroaches (*Cariblatta lutea*), and Florida woods cockroaches (*Euricotys floridana*). Both adults and nymphs were found, though smaller-bodied cockroaches were more readily caught.

When I first found a little yellow cockroach on a glue board, I could barely tell it had wings and therefore wondered what life stage it was, let alone what species it was. I ended up using chemicals to dissolve the glue around it so I could take it off and identify it to species.

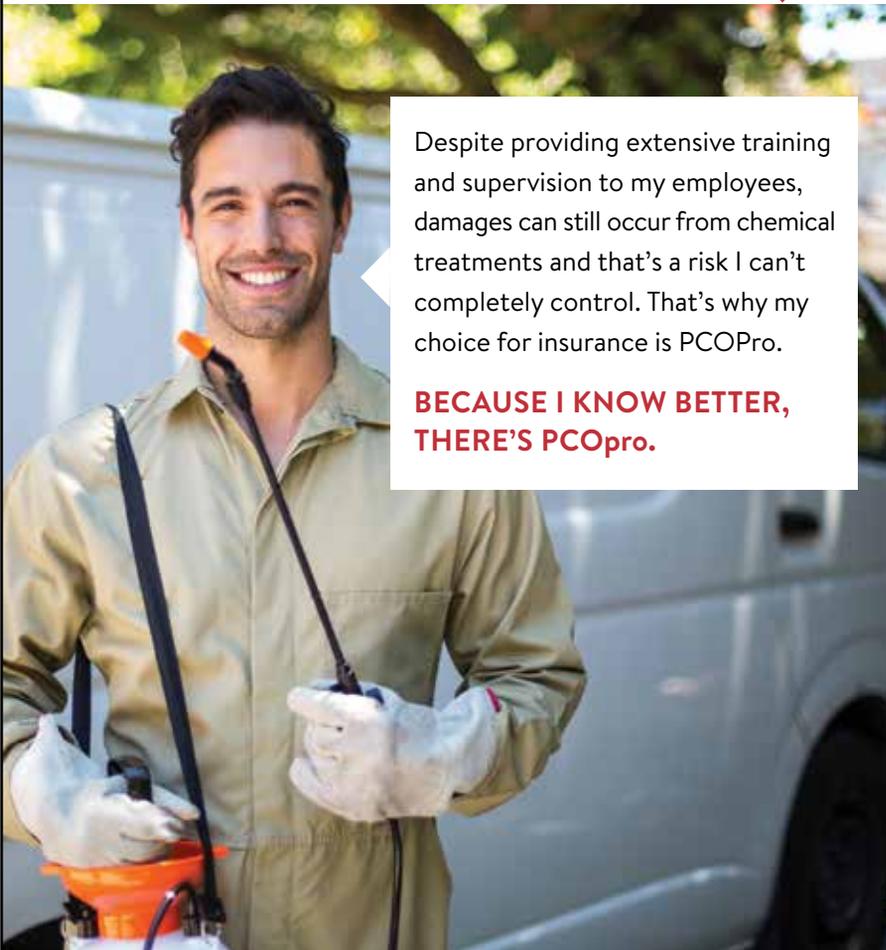
It turns out that these roaches are somewhat common all the way from North Carolina through Florida and west into Louisiana. They can often be found in leaf litter, pine straw and other mulches, and decaying plant matter. Not a whole lot is known about what they eat, but they likely feed on decaying matter and possibly fungi. They are also probably the cutest cockroaches you will ever find! If a cockroach can be cute, that is. The University of Florida is now one of the only universities to have a thriving colony of these tiny roaches.

At an average of just 1.1 roaches caught per glue trap for the entire year, cockroaches were definitely toward the bottom of the most numerous species list. Some other less frequently caught arthropods included psocids (bark lice), mites, isopods (wood lice) and thrips. These small players in the soil ecosystem often go overlooked by homeowners despite the big role they play in defining what arthropod pests homeowners do see. These small organisms often end up as prey for some of the larger pests that we are more aware of such as earwigs, spiders, roaches and ants.

There were, of course, other larger arthropods caught in small numbers. Millipedes were caught just slightly more often than cockroaches — an average of 1.3 were caught per glue trap, plus 0.2 caught per pitfall trap, both over one year. At certain times of year and varying from year to year, millipedes can be seen in large numbers with mass migrations. This one-year sampling could have simply missed these large numbers by not sampling during a year of mass migration in the area.

Continued on Page 29

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# Scales and Mealybugs

## ON TURF

Adam Dale



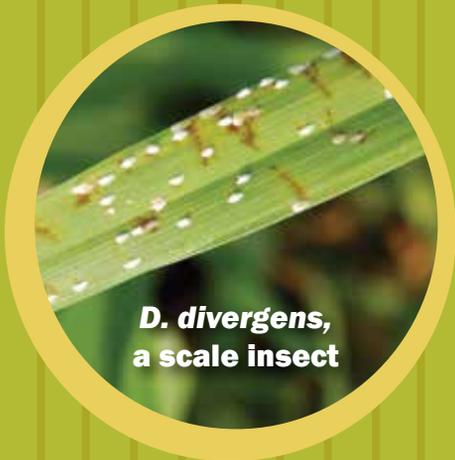
Rhodesgrass  
mealybug



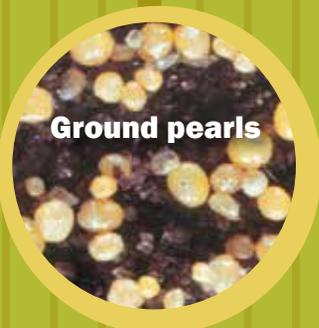
Tuttle  
mealybug



Bermudagrass  
scale



*D. divergens*,  
a scale insect



Ground pearls

Scales are sedentary, sap-feeding insects ubiquitous on landscape plants. There are armored scales, soft scales, mealybugs, and several other less common groups.

**I**N FLORIDA, there are nearly 200 species of scale insects, which feed on an even larger number of plant species. Almost everyone who has managed landscape plants has come across some form of these insects during their career, and I'm sure many of those folks have battled them with mixed success.

Whenever I mention scale insects or mealybugs to landscape professionals, everyone immediately thinks of ornamental plant pests — cottony cushion scale on pittosporum, tea scale on camellias, or Florida wax scale on hollies, among others. However, this is not always the case. As many pest control operators have recently discovered, scale insects and mealybugs can also be damaging and difficult to control in warm-season turfgrasses.

What are these turf scale insects?

There are at least five species of scale insects that can be damaging pests of warm season turfgrasses in the southeastern United States. These include rhodesgrass mealybug (*Antonina graminis*), Tuttle mealybug (*Brevinnia rehi*), bermudagrass scale (*Odonaspis ruthae*), *Duplachionaspis divergens*, and ground pearls (*Dimargarodes meridionalis*), all pictured at left.

Despite the unfamiliar host plant association, the basic biology and behavior of these insects on ornamentals and turf is the same. These are sap-feeding insects that insert hairlike mouthparts into plant tissue and extract vascular fluids or cell contents. They are sedentary and fairly immobile, so they tend to spend multiple generations in the same location or host plant.

Scale insects are able to disperse by wind, but I expect those infesting ground cover are less able to wind-disperse than those on ornamental plants. Research has shown that scale insects can also disperse phoretically — by hitching a ride on other surfaces or organisms — or by the movement of infested plant material. This is the most likely route of movement for turfgrass scale insects. *Continued next page*

## The problem child

Most of these insects are only occasional pests. However, one species seems to be increasingly prevalent and problematic in Florida. This is the Tuttle mealybug, *Brevinnia rehi*.

This pest is globally distributed, but was first documented in Florida in 1975 in Pompano Beach. It was rarely found on or associated with turfgrass damage until the early 2000s. Until recently, this pest was only found in southern Florida, with one report from Orange County in 2012. In 2016, I received Tuttle mealybug specimens from previously undetected parts of Florida, including Duval (northeast) and Walton counties (northwest), as well as multiple cases from southern counties with known infestations.

Tuttle mealybug is primarily a pest of zoysiagrass, although it is occasionally found damaging bermudagrass. Heavily infested turf gradually declines in vigor, resembling drought stress or disease, and exhibits gray or off-brown discoloration. Damage can be widespread in lawns and rapidly become severe due to its nondescript nature and the insect's size and obscure behavior.

We know very little about the specific biology and ecology of this insect. There are two parasitic wasps known to attack Tuttle mealybug, but neither has been found in Florida. While we assume that generalist predators like lady beetles, spiders, and predatory bugs are providing some level of control, it has not been documented. Therefore, a variety of factors may be at play allowing these insects to outbreak more frequently, and we hope to elucidate some of this soon.

## Are they really an issue?

Scale insects and mealybugs cause similar damage in turf and ornamental systems. Plant material turns yellow, brown, and gradually dies. Reduced plant quality and vigor translates to unattractive landscapes and fewer environmental benefits provided by a lawn. Heavily infested areas require more management and open the door for other pest problems like weeds and disease.

Turfgrass scale insects and mealybugs were one of the most common pest management issues that I was contacted about in 2016. The management challenge was often two-fold: 1) He or she did not know what the pest was, and/or 2) He or she was having trouble controlling it.

Both issues stem from the fact that, as an industry, we generally have little experience managing scale insects in turfgrass. Sure, we manage scale insects on ornamental plants all day and have been for decades. However, management strategies do not translate as seamlessly to turfgrass as expected.

## Why are these insects difficult to control?

Scale insects are one of the most difficult pests to manage in the landscape no matter the host plant. This is largely because they are very small, have protective coverings,

*Continued on Page 14*



**Tuttle mealybugs on zoysiagrass**

Lyle J. Brass, UF/IFAS

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**Name:** J. Bryan Cooksey, Jr.  
**Hometown:** Lamont, Florida  
**Where you live now:** Jacksonville, Florida  
**About your company:** McCall was founded in 1928 as McCall Coal Company. In the 1930s the name changed to McCall Fuel Service. By 1954 the name was again changed to McCall Services, Inc. These changes came from movement in the company as well as different ownership and divisions being added. In 1960 I was hired to start a lawn service division for McCall Services, Inc. In 1969 I took a minority ownership position. Over the next 30 years we purchased the remaining stock in the company. During these 30 years, McCall Services, Inc. fuel oil sales declined drastically as fuel oil prices increased and heat pumps replaced fuel oil furnaces in homes. Air conditioning was still a viable business, but not my favorite. The air conditioning business was sold in the 1990s. The company has evolved from a coal company in the 1920s to a regional pest control company over the last 90 years, a period of constant change.  
**First paying job and what you learned from it:** My first paying job was working as a field hand at a tung oil plantation, making \$2.25 per day as a young teenager. I learned two things. First, I do not want to do this for a



living, and secondly, people with less skills and education get paid less.

**First break:** My first break was receiving an academic scholarship to the University of Florida.

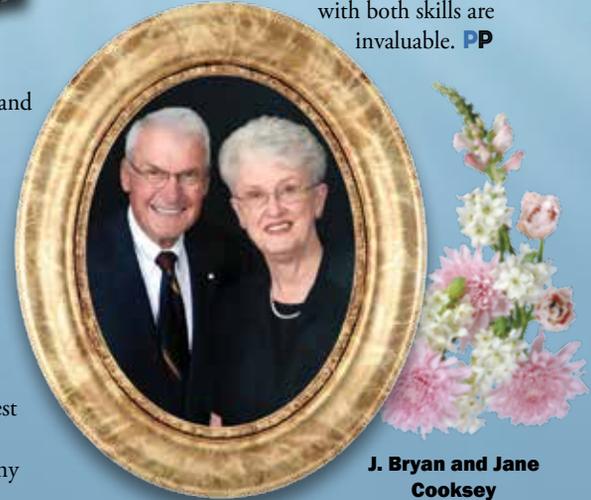
**Best advice:** My predecessor at McCall, Senator C.W. Beaufort, told me take care of your employees and customers and they will take care of you.

**What would you tell someone new to the business?** I would pass on the best advice I ever received because it is not only viable in the pest control business, but in any

business. Take care of your employees and customers, and they will take care of you.

**Where can we find you when you aren't at the office?** Since retiring from fulltime employment, my wife, Jane, and I have enjoyed traveling the country. When at home I enjoy outside activities including fishing, hunting, golf and, believe it or not, yard work. We have 16 grandchildren, which we enjoy.

**Hiring trait:** We look for good technical and people skills, especially communication skills. The technical skills we can teach. The people skills are a bit more complicated. People with both skills are invaluable. **PP**



**J. Bryan and Jane Cooksey**

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and live in tight nooks and crannies that are difficult to see or reach with insecticides. These insects also take advantage of environmental conditions or disturbances that favor their development and survival. My research has found that scale insects often thrive in urban landscapes where conditions are generally warmer and plants are under more stress. Thus, insects in those habitats produce more offspring, build up populations faster, and cause more plant damage.

A SINGLE LAWN is often composed of many microclimates with environmental conditions that affect insects living in them. For example, a dense thatch layer creates a microclimate by trapping heat, harboring moisture, and reducing airflow. These conditions can provide a refuge for pests to thrive. Recent research in France has shown that insect pests on the same plant can experience environmental conditions drastically different from one another. Leaves that have warmer temperatures allow insects living on them to reproduce more and survive longer than those on cooler leaves of the same plant. Therefore, insects may be able to flourish in dense thatch, while conditions outside the thatch may otherwise be unfavorable.

In addition to habitat, the location and size of these insects make insecticide control difficult. Thorough coverage is critical for controlling these insects, but also difficult due to the nooks and crannies they live in. Therefore, contacting each individual in a population is unlikely. Moreover, most outbreaks occur in highly managed lawns being regularly treated with cover spray applications of broad-spectrum insecticides for other pests, a practice known to cause secondary pest outbreaks.

#### What are secondary pests?

The most common secondary pests of landscape plants are spider mites and scale insects. Secondary pests are those that exist in the landscape below damaging levels but increase rapidly following the application of broad-spectrum, nonselective insecticides applied targeting another pest. These products (e.g., pyrethroids, carbamates) are toxic to all exposed insects, both pest and beneficial. Scale insects and mealybugs that survive can reproduce without being hunted and eaten. Therefore, using selective products when possible and spot-treating infestations will reduce toxicity to beneficial insects inhabiting the landscape.

## What can we do?

Very little research has been done to determine the best strategies for managing scale insects and mealybugs in turf. In general, management is challenging because the insects are difficult to reach with insecticides, their waxy secretions protect them from insecticide contact, and they are hard to find before they outbreak. Once populations reach high levels, they are difficult to control and often take weeks or months to reduce below damaging levels.

Maintaining a dense, healthy stand of turfgrass while minimizing inputs and disturbances is the best defense against scale insect and mealybug outbreaks. Follow UF/IFAS-recommended irrigation, fertilization, and mowing practices. For example, over-fertilization, drought stress, improper mowing, and thatch buildup may all increase scale insect abundance.

Scale insects and mealybugs are most effectively controlled with thorough coverage of systemic insecticides or those that get into the plant tissue. Contact-toxic products are less effective because they must contact the insect to work, which is difficult for these pests. In contrast, pests ingest systemic products while feeding on the plant. Many systemic products are also compatible with natural enemies, which allows biological control to occur between product applications.

It is important to remember sedentary insects that quickly undergo multiple generations in the same habitat are those most likely to develop insecticide resistance. Therefore, implementing insecticide class rotations into a management program is critical to reduce the likelihood of insecticide resistance.

## Use IPM

Although most of these insects are only occasional pests, it is important to be aware of their presence in the landscape. The obscure nature of these insects makes it easy for them to fly under the radar and unexpectedly reach damaging levels. Following the IPM framework discussed in the January/February 2017 issue of *PestPro* magazine will reduce the risk of these pests becoming damaging and give managers five steps towards effective management. **PP**

*Dr. Adam Dale can be reached by email at [agdale@ufl.edu](mailto:agdale@ufl.edu) or by phone at 352-273-2976. Resources that further explain content discussed here can be found at <http://edis.ifas.ufl.edu> or [dalelab.org](http://dalelab.org).*



**Shore flies crawling on a person's hand**



**Closeup of a shore fly**

*Photos by Chadd Chutz and Malcolm Storey*

# Shore Flies

Lyle J. Buss and Philip G. Koehler

**A**N OUTBREAK of tiny flies has been plaguing some coastal areas in South Florida. Fortunately, they are not biting flies, but they are quite an annoyance in some beachfront areas. Many of the complaints have come from tourists staying at hotels along the beaches. The initial report that we heard came from Marco Island (near Naples) in mid-January. The following week we heard from the other side of the state in the Miami Beach area, where large numbers of flies were around various beaches from Hallandale down to South Beach. This east coast area also experienced heavy fly populations last year from January until about the beginning of spring, but the flies are even worse this year.

At first, some people thought that they were black flies, which are notorious biters. But the flies instead turned out to be a type of nonbiting fly called a shore fly. For those who like scientific names, the species is *Scatella tenuicosta* in the family Ephydriidae. They are very small — only about 2 mm long (a little over 1/16 inch). The body is dark brown to black, and the two wings are somewhat dark, with five small, white spots.

The exact source and cause of the current outbreak is currently unknown. Shore fly larvae feed on algae, and this species is sometimes a nuisance pest in greenhouses when wet conditions lead to algal growth. The highest densities of the flies in South Florida are on beaches, so there are likely some concentrations of algae nearby. The heavy rains in 2015 resulted in tremendous algal blooms in South Florida waters. Part of the problem stemmed from septic tanks that ended up in saturated soil, allowing untreated sewage to enter waterways. This may have caused algal growth that led to an explosion in shore fly populations.

Because they feed on algae and their populations can double in about two days, shore flies can be a problem by resting on structures and outdoor cafes. Although space spraying can kill the flies present at the time of spraying, within a day other flies move in from surrounding areas. Until their food source is washed away or weather conditions change, these flies will remain a problem. **PP**

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

Walk on the

# Wild Side with

**W**HEN IT comes to the outdoors, Johnalyn Gordon, a senior at the University of Florida, does it all. “I am into scuba diving, kayaking, rock climbing, mountain biking, hiking, and I’ve even been skydiving. Anything that gets me outside and in nature, I’m all for it,” says Johnalyn.

However, Johnalyn doesn’t leave the thrills to her free time alone. Her major at UF is wildlife ecology and conservation. Through her studies, she’s gone out on nighttime alligator surveys, set out game cameras in the forest, come face-to-face with a black bear, and caught gators, and snakes, and toads (oh my!). Now, she’s shifting her focus to explore a whole new set of mini beasts.

**First of all, some of these activities you do sound crazy. Aren’t you ever scared?**

Not usually. Although I’ve had a couple of uncomfortable moments. I got stuck on a mountain during a very bad thunderstorm while hiking Arizona. There was lightning crashing everywhere, and not much cover, so I just had to ride it out huddled next to a rock. I’ve also come across a VERY large bull shark while stand-up paddleboarding. It was swimming underneath me for quite some time, and here I am on this little flimsy board hoping it doesn’t get too curious!

**Have you always been interested in entomology?**

I’ve never been afraid of insects, but I wasn’t very interested in them when I was a child either. I enjoyed playing with the isopods, those little roly-polies, in my backyard when I was little, but I have learned since that those aren’t insects. I have to say, I am very grateful I had never encountered a bed bug before joining Dr. Koehler’s lab!

**So, you weren’t born an entomologist. But have you always wanted to be a scientist?**

That’s a good question! I think I wanted to be just about everything over the course of my childhood. I believe in kindergarten, when we had to write about what we wanted to be when we grew up, I said that I wanted to be a lawyer who became the first female president of the United States, and when I was done with that I would use the lifetime salary to get multiple PhDs and go work in the jungles of the world, discovering new species and saving existing ones from extinction. I kind of took the “dream big” thing and ran with it. I have always been drawn to the sciences. The problem-solving component has always been attractive to me. I enjoy the challenge.

**How did you meet Dr. Koehler and end up in the Urban Entomology Lab?**

My sophomore year at UF, I took a class called “Bugs and People” with Dr. Rebecca Baldwin, who is actually an alumnus of Dr. Koehler’s lab. I had approached her about any research opportunities she knew of, since I’d been told it was important to get involved in research as early as possible. She and Dr. Koehler had a project with bed bugs they wanted done, and the rest, as they say, is history.

**In the Urban Lab**

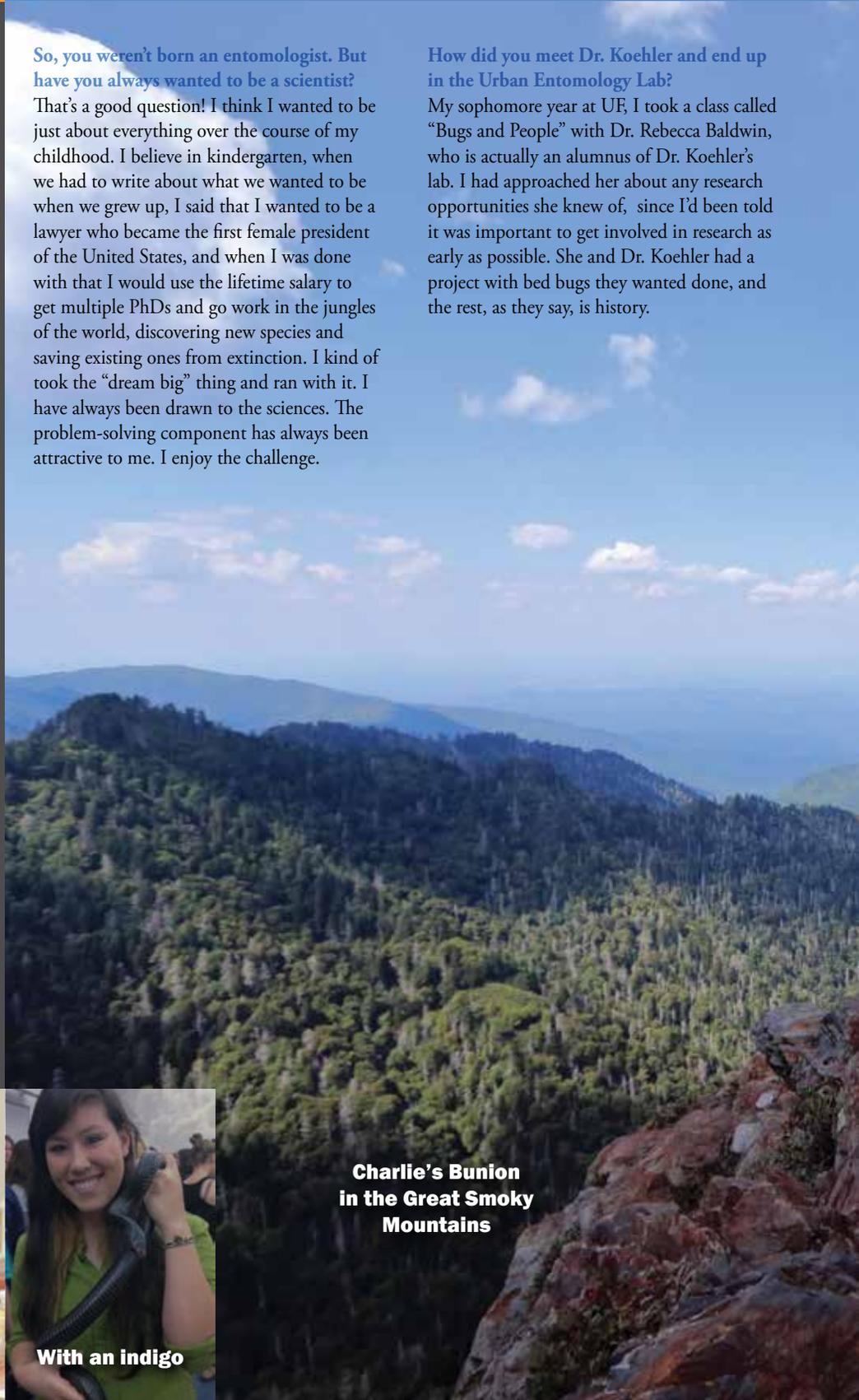


16 **PESTPRO** | March/April 2017



**With an indigo**

**Charlie’s Bunion  
in the Great Smoky  
Mountains**



# Johnalyn Gordon

This avid explorer and nature lover embarks on her greatest adventure yet: the field of urban entomology.



**Studying bed bugs**

## What projects are you currently working on?

I recently finished the bed bug project I had been working on for Dr. Baldwin and Dr. Koehler and am currently working on submitting it for publication. That project dealt with determining the effects of fatty acid salts on bed bugs. In that study, I also looked at the efficacy of liquid dish soap on bed bugs, which was a continuation of Dr. Baldwin's doctoral research with cockroaches. I've also conducted small projects dealing with flies, roaches, ants and mosquitoes. Currently, I'm working on my own project, further exploring the effects of soap salts on bed bugs, and exploring their interactions with essential oils, as seen in many "green," more environmentally conscious products.

## Where do you see urban entomology taking you in the future?

I still haven't given up on those multiple PhDs! I am hoping to pursue my master's and eventually my doctoral degrees in this field. I've really come to enjoy the nature of the research, how applied it is, and how I can very clearly see my findings being put to use and having a very clear impact on the pest control industry.

## Do you have any particular interests you would like to explore?

I want to ensure that I have broad knowledge and experience, and I would like to study an insect other than bed bugs for my graduate studies. Termites are really interesting, especially in their ecology, and mosquitoes are really important from the perspective of disease vectoring. Those are two in particular that I would like to work with in the future.

## What's the next adventure on the horizon?

I love hiking, especially in the mountains. I've hiked Mount Mitchell in North Carolina, which is the tallest mountain in the eastern United States. I'm planning and training for climbing Mt. Whitney in the Sierras later this year, which is the tallest mountain in the contiguous United States! **PP**



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# Native Lizards of Florida

William H. Kern, Jr.



Eastern fence lizard



Eastern fence lizard male



Florida scrub lizard



A glass lizard

## Glass Lizards, or 'Glass Snakes'

Family Anguillidae: Genus *Ophisaurus*

Five species/subspecies in Florida

These legless lizards are often misidentified as snakes. Unlike snakes, glass lizards have external ear openings and eyelids, so they close their eyes. The name *Ophisaurus* means "snake-lizard." Our four species are the slender glass lizard, the island glass lizard, the mimic glass lizard, and the eastern glass lizard.

Glass lizards are very difficult to identify from one another. The mimic glass lizard was identified as a different species in only 1987.

Glass lizards are harmless insectivores. They are called glass lizards because they are very prone to "autotomy," or defensively losing their tails to fool would-be predators. All of our native lizards have this ability, but glass lizards are so good at it that it is almost impossible to capture a glass lizard and keep its tail intact.

## The Fence and Scrub Lizards

Family Iguanidae

Subfamily Phrynosomatinae —

Spiny lizards in the Genus *Sceloporus*

Two species in Florida

The Eastern fence lizard occurs in the northern half of Florida, including the Panhandle, and most of the southeastern United States. The Florida scrub lizard is endemic to the scrub habitats of the Lake Wales Ridge, Ocala scrub, and coastal scrub along the southwest and southeast coasts of Florida.

These lizards are adapted to rest and hunt on the bark of the trunks of trees and fallen logs. They often hide under loose bark on dead, standing trees.

The photo of the eastern fence lizard male, above, shows the vivid blue belly and throat. While fence lizards have jagged bands across their backs, Florida scrub lizards have longitudinal stripes along their backs.

SIXTY-FIVE species of lizards are established or collected in Florida, according to the Florida Museum of Natural History. Of these 65 species, *only 16* are native to Florida.

In South Florida, I actually get excited to see one of our native species because the exotics have become so ubiquitous. All of our native lizards are insectivores.

The goal of this article is for you to identify some of our native lizards, at least by major groupings, to your customers, children or grandchildren.

## The Carolina Anole, or Green Anole

Family Iguanidae

Subfamily Polychrotinae — the anoles

One species in Florida: *Anolis carolinensis*

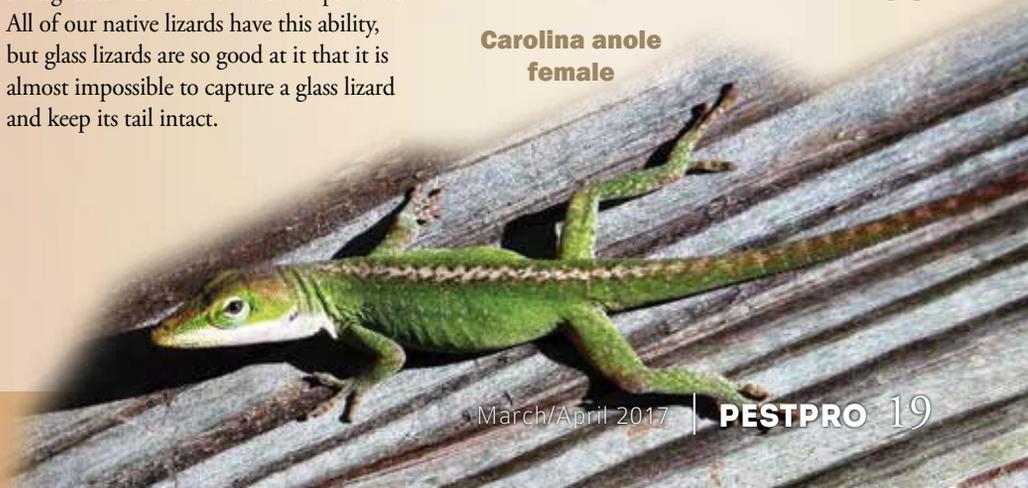
Some people call the Carolina anole a chameleon because it can change from green to brown, but it is completely unrelated to the true chameleons of the Old World.

Our native anole occurs throughout the Gulf Coastal and Southern Atlantic States. It occurs throughout Florida, but has been largely displaced by exotic Caribbean anoles. In South Florida, seeing a green anole doesn't mean it is our native species. Several exotic green anoles have become established, like the Hispaniolan green anole, Cuban green anole, and immature of the Jamaican giant anole.

In the past, anoles hunted in the foliage, fence lizards hunted on the trunks of trees, and the skinks and glass lizards hunted on the ground to partition resources. Now dozens of exotic lizard compete with our native anole in each niche.

*Continued next page*

Carolina anole  
female





**Broad-headed skink, adult male**



**Southeastern five-lined skink**



**Bluetail mole skink**

USFWS at FWS.gov

## CHECKLIST OF FLORIDA NATIVE LIZARDS

- Anolis carolinensis*, green anole or Carolina anole
- Aspidoscelis sexlineata*, six-lined racerunner
- Ophisaurus attenuatus*, slender glass lizard
  - Ophisaurus attenuatus longicaudus*, eastern slender glass lizard
- Ophisaurus compressus*, island glass lizard
- Ophisaurus mimicus*, mimic glass lizard
- Ophisaurus ventralis*, eastern glass lizard
- Plestiodon anthracinus*, coal skink
- Plestiodon egregius*, mole skink
  - Plestiodon egregius egregius*, Florida Keys mole skink
  - Plestiodon egregius insularis*, Cedar Key mole skink
  - Plestiodon egregius lividus*, bluetail mole skink
  - Plestiodon egregius onocrepis*, peninsula mole skink
  - Plestiodon egregius similis*, northern mole skink
- Plestiodon fasciatus*, common five-lined skink
- Plestiodon inexpectatus*, southeastern five-lined skink
- Plestiodon laticeps*, broad-headed skink
- Plestiodon reynolds*, Florida sand skink
- Sceloporus undulatus*, eastern fence lizard
- Sceloporus woodi*, Florida scrub lizard
- Scincella lateralis*, ground skink
- Sphaerodactylus notatus*, reef gecko

### The Skinks

**Family Scincidae; 12 species/subspecies in Florida in the Genus *Plestiodon***

This family has the most representative native species of any of our lizard families. All our skinks have smooth scales, smallish limbs, and the juveniles often have brightly colored tails. The brightness of the tail fades as they mature, especially the males. For example, the stripes and tail color of broad-headed skink juveniles and females are completely lost in fully mature males, shown at top. The coppery head leads some people to believe this lizard is venomous. They are harmless.

According to folklore, skinks are venomous, but this is completely false. The larger species can bite and give a painful pinch, but are considered harmless.



**Six-lined racerunner**

### Six-lined Racerunner

**Family Teiidae**

**One species in Florida: *Aspidoscelis sexlineata***

The six-lined racerunner was formerly classified as *Cnemidophorus sexlineatus*. These fast-running lizards occur in open areas like scrub, sandhills and dunes. They are most active in the heat of the day, but they retreat to their burrows at night to escape danger or excessive midday heat.



**Florida Reef Gecko**

USFWS at FWS.gov

### Florida Reef Gecko

**Family Gekkonidae**

**One species in Florida: *Sphaerodactylus notatus***

This is our only native gecko. Unlike most of Florida's invasive gecko species, reef geckos have a round pupil. This is a small lizard, up to 2 inches, that lives in the leaf litter of pineland, tropical hardwood hammocks, and vacant lots. Our subspecies occurs in the Florida Keys (Monroe County) and coastal Miami-Dade County. There are other subspecies of reef geckos found in Cuba and the islands of the Bahamas. **PP**

A full list of lizards found in Florida is available at:

<http://www.flmnh.ufl.edu/herpetology/florida-amphibians-reptiles/lizards/#Checklist>

*William H. Kern, Jr. is Associate Professor of Entomology at UF/IFAS Ft. Lauderdale Research and Education Center. All native lizard photos by W. H. Kern, Jr., except as noted.*

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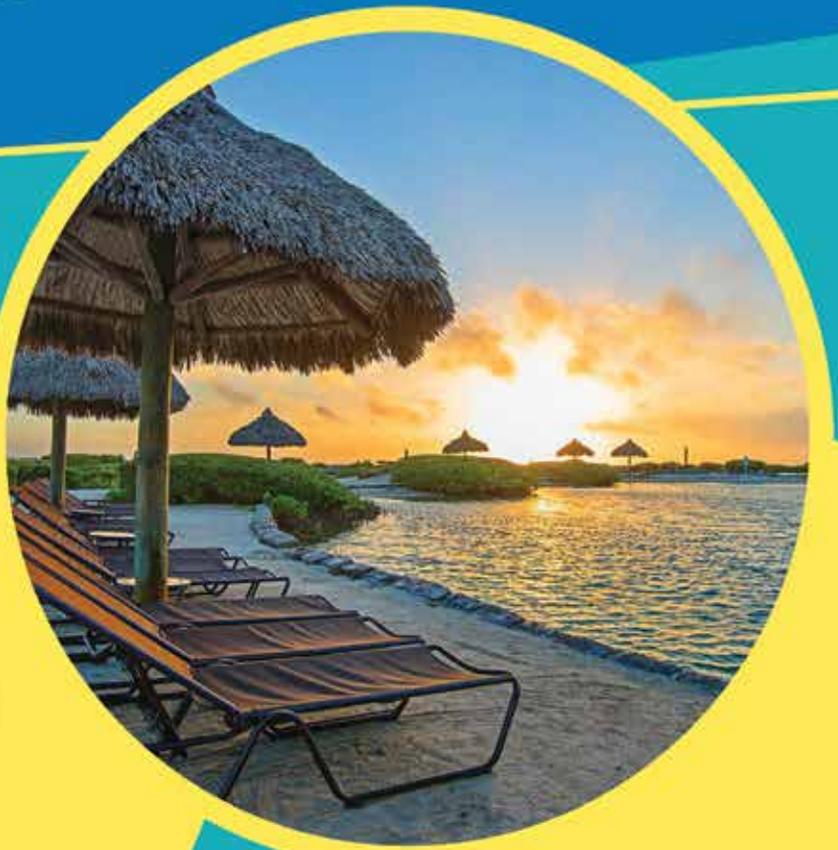
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# These 4 Trends Will Change How You View Web Marketing in 2017

ALAIN PARCAN



**W**ITH THE New Year officially here, now is as good a time as any to reflect on how much website marketing trends have changed in the last year, so that you can make the right adjustments heading into 2017.

Market Hardware's team of web marketing experts put their heads together to come up with a comprehensive list of the four web trends pest control companies need to be familiar within 2017. Here's what you need to know:

## **Trending Up: Responsive website design (because mobile will rule the Web in 2017).**

According to Pew Research Center, 68 percent of American adults own a smartphone of some kind, which doesn't take into account the amount of tablet users. Point being, the mobile trend has shown no sign of stopping and should continue into 2017. If you're ready to upgrade your site, then responsive website design is a must-have in order to impress anyone who is scanning websites from their phone or tablet. Studies show that if a visitor lands on a site that is difficult to navigate and requires zooming in and out, they'll simply exit and move on to a new site. **HINT:** Want to see a responsive site in action? Shrink down your browser window on the <http://www.bugoutwf.com/> website to see how it automatically adapts to the window size.

Moreover, Google has firmly hitched its wagon to the mobile trend. Since April 2015, mobile readiness has been considered a ranking factor when it comes to identifying what companies show up highest in search results. In other words, Google wants user-friendly sites to rank highest in search results. Google has already said that designation will become even more important in 2017.

## **Trending Up: Proper email newsletter marketing as a retention tool.**

As more businesses invest in digital marketing as a customer acquisition tool and the marketplace becomes more crowded,

acquisition costs are likely to skyrocket. Therefore, allocating a portion of your marketing budget to retaining existing customers is more important than ever. Recent estimates suggest the cost to acquire a new customer is almost 10 times as much of the cost to retain an existing customer — so investing a small amount in customer acquisition will go a long way toward improving your bottom line.

As for the most effective way to retain clients using the Web, email newsletter marketing is becoming increasingly popular. That doesn't mean you should be sending out spammy emails with coupons and offers every week. The *right* way to run an email newsletter marketing campaign is by sending out educational content that your customers will appreciate. The top businesses utilize a 90/10 rule, where 90 percent of their email newsletter content is purely informational, and only 10 percent is self-promotional (usually a paragraph at the end of the email). Customers appreciate receiving valuable content that they can learn from, and it'll keep them coming back to your business time and time again.

**C**ONSIDER REDUCING your focus/marketing in the following areas:

## **Trending Down: Social media as a lead generator.**

Social media still serves a major purpose in the pest control industry. However, after its growth phase a couple of years ago, businesses quickly learned that social media content cannot be relied upon for a steady lead flow. Dollars, time and energy are all better spent on other marketing strategies, such as the ones listed above.

Here's a simple social media plan that is becoming increasingly popular: Plan out some posting tips and ideas for Facebook and Twitter at the beginning of each month. By doing so, you can spend as little as a few minutes each week posting interesting and engaging content on these two popular social media platforms. You can regularly

post pictures of your facilities and staff, as well as include occasional offers. There is certainly value to be had by being active on social media and staying in front of your existing customers, but look elsewhere if you're focused on growing your business.

## **Trending Down: Yellow Pages and newspaper ad spending continue to shrink.**

Surprised? You shouldn't be. Consumers just aren't opening up Yellow Page books or newspapers to find service providers as much as they were five to ten years ago. They are far more likely to type a search online and scan a company's website in order to request a service. Businesses have been picking up on this trend for years and have understandably pulled their marketing dollars out of traditional marketing channels. While there is still a small audience that uses those channels to find local businesses, that audience is dwindling. There might be some value to investing some marketing dollars to target those smaller audiences, but we recommend you focus the majority of your dollars in more modern channels.

## **Bringing it Together**

These trends should provide excellent insight into what businesses might be doing a great job of heading into 2017, as well as why businesses might want to work on a few items a bit more. Ultimately, it's important to at least be aware of these trends so you're prepared to adjust on the fly should changes be needed at any point in 2017. The more you're familiar with it, the better prepared you'll be to win more business on the Web. **PP**

*Alain Parcan is the Director of Marketing for FPMA Member Market Hardware, Inc. Market Hardware helps pest management businesses compete on the web and offers special discounts for FPMA members. Additionally, they will be providing a webinar on March 15, 2017. Register today, check your FPMA emails for info.*

# Florida Strikes Back At Formosan Termites

Erin Harlow and  
Rebecca Baldwin

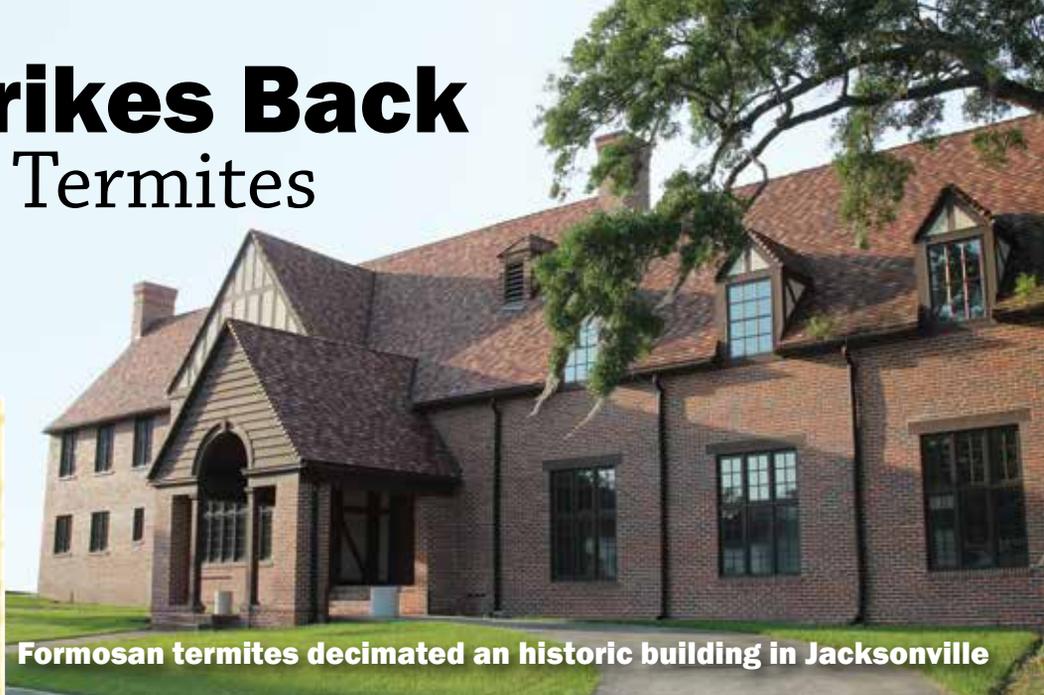
## FORMOSAN FAST FACTS

► **Formosan termites**, *Coptotermes formosanus*, are more destructive than the native eastern subterranean termite because the colony can include several million individuals. Workers forage approximately 300 feet from their nest, and reproductives, or swarmers, are fairly weak flyers. Like our native subterranean termite, Formosans need a constant moisture source.

► **Formosans can create carton nests** in addition to mud tubes commonly associated with subterranean termites. These nests are made from termite excrement, soil and chewed wood and are commonly found in walls and trees. The carton nests are believed to help the termites regulate colony temperature and retain moisture to sustain the colony. Damage from Formosan termites can be quite extensive. They have been known to infest living trees and will consume wood, leaving paper-thin pieces behind.

► **Like other termites, Formosans have three castes:** reproductives, workers and soldiers. When a Formosan termite colony is located, it is fairly easy to identify because it will consist of approximately 10 percent soldiers, which is a considerably higher percentage than other termite species. The soldiers have a teardrop-shaped head with an opening on the top called a fontanel. They can excrete a milky-white substance that irritates predators. They are fairly aggressive and readily attack predators with their curved mandibles.

► **Swarmers may be seen flying April-July in the early evening.** They are attracted to lights and can be seen swarming in huge numbers. Swarmers are identified from other termites by their relatively large size — about half an inch — and the hair on their wings. The body is yellowish.



Formosan termites decimated an historic building in Jacksonville

THE FORMOSAN subterranean termite, a native of Asia, has been in Florida since 1980. With changing environments and movement of wood, these invasive termites have spread through the southeastern United States, threatening historic structures and communities. Once this termite has infested an area, it has never been successfully eradicated.

## FORMOSAN TROUBLE IN FLORIDA

Formosan termites were catapulted into the Jacksonville media spotlight in the summer of 2016, when the Cummer Museum of Art and Gardens made the decision that it would have to destroy the 89-year-old Woman's Club of Jacksonville building because of substantial termite damage. The museum had invested \$7 million in the structure, which was listed on the National Register of Historic Places. The museum estimated it would have to invest a total of \$10 million to correct the structural damage done by the termites.

The museum was able to salvage some roof tiles and masonry, but the wood was fumigated and incinerated to prevent the spread of termites to other structures. The loss of this historic structure, economic impact on the museum, and potential for future losses of historical structures sparked community interest.

## NEW TASK FORCE FIGHTS FORMOSANS

As a result of this interest, UF/IFAS Extension in Duval County and the City of Jacksonville developed the Jacksonville Formosan Termite Task Force. Members include UF/IFAS Extension faculty, several departments from the City of Jacksonville, the mayor's office, industry representatives, real estate associations, the Riverside Avondale Historic Preservation, the Florida Department of Agriculture and



Formosan sub termites

Scott Bauer, USDA

Consumer Services, and the Springfield Preservation and Revitalization Council. The goal of this task force is to educate community members through a community-wide effort about the identification and damage detection of wood-destroying organisms, including invasive species like the Formosan subterranean termite. The task force aims to provide research-based information about an integrated approach to managing these pests.

The task force has been busy since its inception in the summer of 2016. Members have provided countless television, radio, and newspaper interviews. Workshops have also been conducted for residents throughout Jacksonville on termite basics, to raise awareness about Formosan termites.

In 2017, the task force will be monitoring swarmers in May and June throughout Jacksonville but will focus most heavily in the Riverside area. This area is where the Cummer Museum is located and is believed to be the most infested part of Jacksonville. With its historic homes and structures, mature tree

*Continued on Page 30*



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A lab technician processes a nematode sample

UF/IFAS file photo

# A Nematode Assay Lab for YOU

Tesfa Mengistu

**T**HE NEMATODE Diagnostic and Assay Laboratory at the University of Florida is the primary nematode diagnostic clinic for the citizens of Florida. The lab performs nematode assays for diagnostic, predictive and research purposes. This service is provided to growers, researchers, Extension specialists, golf course superintendents, home gardeners, and anyone else involved in plant production that could be concerned with plant-parasitic nematodes.

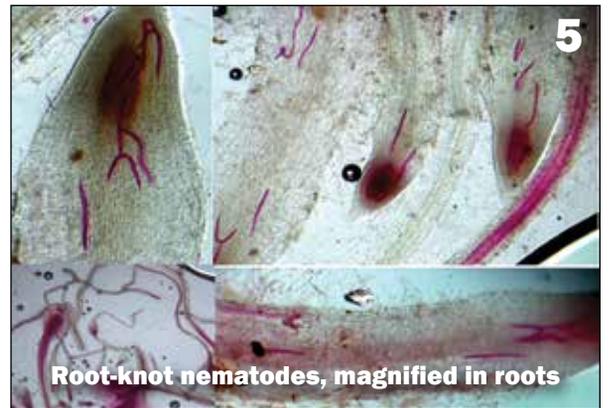
Nematodes are a diverse group of wormlike animals. They are found in virtually every environment that can support life, including fresh water, salt water, all kinds of soil, and as internal parasites of humans and animals. They are generally minute, but some species can reach several meters in length.

Most of the nematodes that inhabit the soil are microbial feeders or predators of other soil organisms. Some parasitize plants and are called plant-parasitic nematodes. Most plant-feeding nematodes

live in the soil and feed on plant roots, thereby reducing the plant's uptake of water and nutrients and reducing tolerance to other stresses such as drought.



**1** Nematode stylets, highly magnified



Some nematodes transmit disease-causing agents to plants as they feed.

There are potentially millions of different nematodes species, but only about 26,000 are identified so far. Like many of the critters that exist in our world, there are good nematodes and bad nematodes.

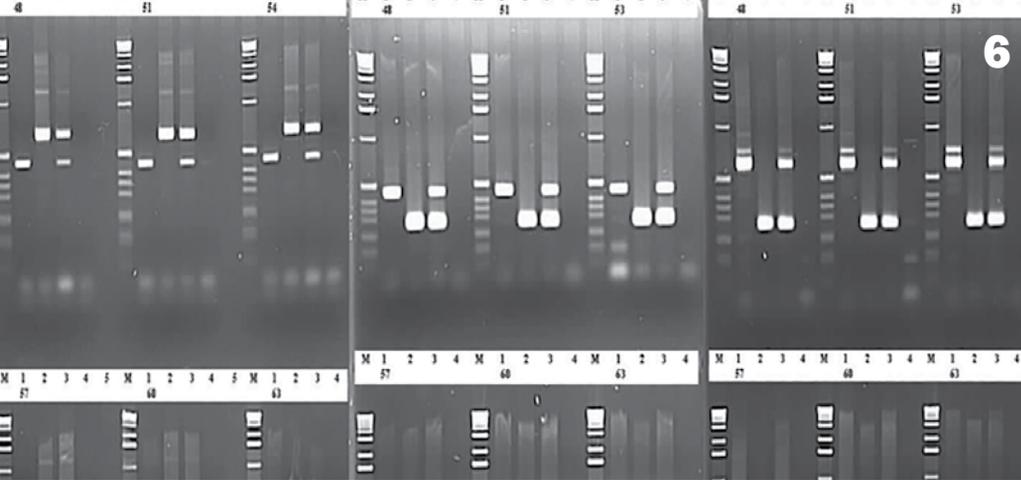
Plant-parasitic nematodes are important in agriculture because they inhibit root growth and, eventually, overall plant development. This results in poor crop performance and sometimes crop failure. Because plant-parasitic nematodes are difficult or impossible to see in the field, and their symptoms are often nonspecific, the damage they cause is often attributed to other, more visible, causes.

Plant-parasitic nematodes are armed with a spearlike structure called a stylet (1), which they can use for feeding. This

structure is inserted into the plant's cell and is used to withdraw the cell contents. The amount of damage nematodes cause depends on a wide range of factors, such as their population density, the virulence of the species or strain, and the resistance or tolerance of the host plant.

**S**YMPTOMS caused by nematode infestation vary depending on the crop and the type of nematode. Nematode-damaged plants usually occur in patches. Infested plants may appear stunted (2) or wilted, with reduced yield.

Nematode feeding also causes below-ground symptoms such as root galling (3), stunting (4), and root distortion. Some nematodes such as the root-knot (5) and the cyst nematodes establish a specialized



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feeding site where they remain for the rest of their life cycle. Other nematodes such as the root lesion nematode burrow into the root, feeding and causing damage as they move through the root.

Knowing which nematodes are which requires accurate identification of the nematode in question. At the UF/IFAS Nematode Assay Lab, we identify nematodes of different kinds for the purposes of diagnosis, monitoring, and management recommendations. The Nematode Assay Lab processes an average of 7,000 – 8,000 samples a year.

Our focus is mainly on those nematodes that attack our plants. A nematode assay is a microscopic examination of soil and roots that identifies the identity of the given nematode, estimates population size, and assesses the potential damage of any plant-parasitic species present.

We also provide molecular identification of nematode at species level (6). This is important to the success of agriculture and helps in the development and evaluation of efficient nematode control strategies. The nematode assay samples come from several sources, including growers, researchers, Extension offices, homeowners, and golf course superintendents.

The accuracy of diagnosis depends upon the quality of information provided, the soil/plant material collected, and the condition of the specimen when it arrives at the Nematode Assay Lab. Use the following tips to ensure your nematode sampling success:

- ✓ During sampling, make sure to place the soil and roots in a plastic bag, seal, and properly label.
- ✓ After the soil sample is collected, it should be kept cool and sent to the lab as quickly as possible.
- ✓ Samples should not be allowed to dry, freeze, or be exposed to high temperatures.
- ✓ Samples also should not be stored in sunlight or in a parked vehicle, because high temperature can kill nematodes.

Please contact the Nematode Assay Lab via phone at (352) 273-3936, or visit our website at <http://nematology.ifas.ufl.edu/assaylab/> for detailed instructions and sampling procedures. **PP**

*Tesfa Mengistu, Director of the UF/IFAS Nematode Diagnostic and Assay Laboratory, is Assistant Professor at the UF/IFAS Entomology and Nematology Department.*



# CAPITOL Corner

Sean Brantley and Suzanne Graham

**T**HE 2017 Florida legislative session is under way. With lofty goals and significant changes to House rules, the session will take on its own personality once again. We have never had a session like this before, folks, so get ready for all kinds of stories out of Tallahassee.

The house speaker has adopted a significant set of rules that will greatly affect the way business is done in the chamber. Lobbying rules, registrations and disclosures, permission on private planes, how bills are filed, and various reporting schemes are all designed to elevate ethics but are causing huge rifts in the House and problems with getting the reporting done. These changes alone are presenting challenges to lawmakers that are quite unique and make quite a different time moving all these bills.

The House and Senate leadership have many similar goals and also many different ones. Higher education needs are very important, and both sides seem very lined up. Dealing with water issues, including Lake Okeechobee land purchases and water storage, are not so in line. On top of that, the governor's proposed budget isn't in sync with that either. Funding is the key issue to all of this, and the governor's budget clearly outlines priorities differently. Some leaders think we have a spending problem, and some think we have a revenue problem, but the truth is probably more about priorities being the problem.

Some of the key issues we are following include the proposed \$618 million in business tax cuts

and \$85 million in economic incentives for business, worker's comp rate increases, water issues, pollution transparency, budget and allocations for our industry related agencies, plastic bags for door hangers (yes, that is real), open carry (think employees with sidearms and Mrs. Jones's house) and several other pending issues business related but not strictly pest control. There are no fertilizer issues filed right now, but we are always watching closely. Chapter 487 will be opened for rulemaking authority over ag applicators and the EPA Worker Protection Standards. There is a possibility that we may begin the rulemaking process in relation to certain fumigation definitions for applicators that hold the "Raw Agricultural Commodity" license.

The year 2018 is the big election year for us. We have the governor and the cabinet up for election, and we are working through Pest PAC to get FPMA in a good position. The race for commissioner of ag is already heating up, with several people already jumping in and a few immediately jumping out. The governor's race is shaping up, and Commissioner Adam Putnam is building a huge war chest, emerging early as a favorite.

Rulemaking from last year has been completed. We now have a new form, the Consumer Consent Form, to go along with every contract issued for the treatment of wood-destroying organisms.

In addition, the fumigation sector has:

✓ seen incorporation of the stewardship programs into rule,

- ✓ defined training requirements,
- ✓ defined disciplinary actions by registrants and the department,
- ✓ created a new endorsement for identification card holders performing fumigation operations (fumigation endorsement),
- ✓ revised the allowances for less than 24-hour Notification of Fumigation forms to remove "emergency" fumigations,
- ✓ established a database to track fumigators' clearance devices and their calibration status,
- ✓ adopted new forms for the state inspectors for all things pest control,
- ✓ removed the issuance fee for certificates,

- ✓ provided more business transactions to be conducted online, and
- ✓ added more opportunities for state testing at IFAS locations on demand.

There are already discussions about further rulemaking in 2017, and we will keep you advised. FPMA Government Affairs Committee is hard at work for you! **PP**

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

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# Facts From DACS: Fees Eliminated for Certified Operator and Fumigation

**D** ID YOU KNOW that the Florida Department of Agriculture and Consumer Services has REDUCED the amount of money it collects from the pest control industry?

Effective July 1, 2016, the Florida Department of Agriculture and Consumer Services no longer requires the \$150 issuance fee to receive the Chapter 482, Florida Statutes, Certified Operator's certificate; or the \$100 issuance fee to receive the Special Identification Card in Fumigation.

If you pass either of the certification exams, the certificate or Special ID Card is automatically issued just like any other certification issued by the Bureau of Licensing and Enforcement. (Additional certified operator categories have always been added to your certificate at no additional cost.)

A person who passes the certification exam no longer runs the risk of having to reexam for failing to timely apply for issuance.

Also, you can now apply for all pest control certification examinations online at <https://aesecomm.freshfromflorida.com/>. If you don't have a user account, click on the "New User? — Sign Up" link to create your account, which requires a valid email address.

Each step of the application process must be completed in sequence and during the same session, so be sure to read the instructions at the start of the process, and have all of your supporting documentation scanned into the computer you are using for application so you can upload it at the appropriate step.

If you do not complete the entire application process, you will have to start the entire process over again when you have the documents gathered and ready to upload.

Once you've been approved, you can schedule to take your exams at several local UF/IFAS county Extension offices. You are provided a link to their site to determine if your county Extension office offers electronic examination. Prospective CPOs should always contact the local office directly to make sure they understand that you are taking the four-hour pest control exam and that an adequate time slot is reserved. **PP**

*Report by Joe Parker, Florida Department of Agriculture and Consumer Services*

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## Perimeter Pests, continued from Page 10

Earwigs were caught more often than millipedes in both glue traps and pitfall traps (1.6 and 0.7 average per trap, respectively), and spiders were even more numerous than earwigs (3 per glue trap and 0.7 per pitfall trap per year). What do these numbers mean? If we extrapolate to what could be expected for the homeowner, more than 400 spiders would be found at every home throughout the year! That is more than one new spider for a homeowner to find every day! This being said, each of the traps used was relatively small compared to the mulch beds where they were placed and probably only caught a small fraction of the arthropods living in and on the mulch.

Springtails (Collembola) were by far the most numerous arthropod collected. Even though springtails are small and not often seen by homeowners, they are major players in the food web and can affect which pests are seen. For example, many ants feed on springtails, so larger populations of springtails means larger populations of ants can be supported. For example, red imported fire ants, *Solenopsis invicta*, rely heavily on springtails as a food source. Springtails were more numerous than the combination of all other arthropods

collected by a ratio of greater than 2 to 1. On average, each glue trap caught 717.7 springtails for the year and each pitfall trap averaged 26.7 springtails for the year.

AS MIGHT be expected, one of the most numerous arthropod types collected throughout the year of sampling were ants. These charismatic pests are so well known by homeowners partly due to their recruiting behavior, but also because they often have no qualms about traversing bare concrete and invading man-made structures and landscapes. In fact, some ants prefer to live where people have removed natural obstacles and placed turf and concrete instead. While observing a trail of foraging ants, you may notice them following paths of least resistance, preferring linear concrete surfaces to haphazard surfaces of organic substrates.

Because ants forage in large numbers (recruitment), it was not uncommon to find either no ants or lots of ants on any given glue card placed as part of the survey conducted. The same goes for the pitfall traps. Glue traps averaged 36.8 ants per trap over the year; pitfall traps averaged 4.4 ants.

## FURTHER CONTEMPLATION

Perhaps the numbers of arthropods are even higher in landscapes surrounded by less disturbed habitat. For example, where mature trees are present, more shade is available to mitigate the sun's hot rays as well as provide additional microhabitats. These could increase the diversity and abundance of insects found. Also, areas where natural ground cover is not replaced by manicured lawn, more of the natural arthropod species could exist.

Seldom do we stop to think about why we see the pests we see. It is hard to comprehend all of the tiny forces at work. Some are benign, and some are a nuisance, but the more we understand about these small worlds, the better we will be able to manage the pests that customers care about.

Take time to think about the microhabitats on a property and what organisms you might find there. You just may find that answers to pest problems can be found in unexpected places. **PP**

*Dallin Ashby is a Graduate Assistant, Philip Koehler is Endowed Professor, and Roberto Pereira is Research Scientist at UF/IFAS Entomology and Nematology Department.*

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Formosan Termite, *continued from Page 23*

canopy, and proximity to the St. Johns River, it is the ideal location for large Formosan colonies.

Through a citizen-science volunteer program, other areas of Jacksonville will be monitored during the eight-week termite swarming period. All monitor stations will be analyzed for Formosans and mapped accordingly. The task force plans on monitoring and mapping for several years to help determine

if education efforts and treatment of trees reduces populations. This will also help focus efforts where treatments are most needed.

Trees on city property are also a major focus of the task force. Volunteers and task force members have been inspecting trees throughout the Riverside area to monitor populations. The city is also now recording if trees have termites as part of the canopy survey and update and are recording tree species, location, health, and if it has termites. These surveying projects will help guide the task force in creating recommendations for landowners in Jacksonville and also help the city develop an action protocol when a tree on city property is identified as having termites.

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**T**HE FINAL FOCUS of the task force is the education of residents. The task force was asked to develop a curriculum for the Northeast Florida Association of Realtors (NEFAR). This curriculum will be used as part of their certification process of new realtors. The focus is not only Formosan termites, but wood-destroying organisms, why WDO inspectors include certain items on the inspection form, and what is considered a WDO. The termite basics educational program for the general public is also being converted to an online training format. Printed educational materials for distribution to residents and business owners is also in development. Once completed, all of this information will be available at our website, <http://duval.ifas.ufl.edu/termites.shtml>.

We believe this program will be successful in Jacksonville because of the community-wide approach. It is also heavily grassroots-driven and is important to local government. Other similar programs throughout the country have been examined and consulted, so that we are using the best methods from each program. We continue to receive help and guidance from the New Orleans Mosquito, Termite, and Rodent Control Board, LSU Extension, UGA Extension, and NC State Extension. This is truly a program that is bringing together concerned citizens, government, UF/IFAS Extension and research faculty, industry, government agencies, and preservation groups to address an invasive pest that is doing significant economic damage in our community.

For more information about the Jacksonville Formosan Termite Task Force, please contact the authors, Erin Harlow at [eeeck@ufl.edu](mailto:eeeck@ufl.edu), or Dr. Rebecca Baldwin at [baldwinr@ufl.edu](mailto:baldwinr@ufl.edu). **PP**

*Erin Harlow is Commercial Horticulture Agent for UF/IFAS Extension in Duval County. Rebecca Baldwin is Assistant Professor at UF/IFAS Entomology and Nematology Department.*



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FumigationFacts.com, to help take the worry out of fumigating.  
So you can more easily make the sale while giving homeowners  
the real termite solution they need. We know you don't take any  
of this lightly, so we don't either. We're working to make sure you  
have fumigation as an option today and in the future. Which is why

Douglas Products backs Vikane with  
the most experienced sales  
and technical support team,  
product quality assurance  
and the industry's  
most comprehensive  
stewardship tools.

Our investment in  
research and innovation  
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puts more into pounding  
termites into oblivion than  
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percent of drywood termites  
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