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

## The Invasion Of The Landscape Snatchers!

## Brown Basilisk



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## Managing Director

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

## Managing Editor

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

## Production Editor

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

## Advertising Manager

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

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advertising manager, Sandra Krempasky, at (904) 679-  
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James H. Miller



### ON THE COVER

Brown basilisk adult male. These fascinating creatures are “akin to what you might see in a Jurassic Park movie and reminiscent of mini-velociraptors,” according to UF/IFAS Extension agent Ken Gioeli.

*Photo by Brockswood*



# Passing the Torch

*Message from the President of FPMA, Suzanne Graham*

**T**HIS WILL BE my last column, having served as President of the Association for the last three years.

Two years of pandemic and the simultaneous loss of two members of our Executive Committee are the two most important reasons why this anomaly came to pass. They have been an eventful three years to say the least, and I am very grateful to those who have supported me throughout my tenure.

Very early into the pandemic, we learned that we could easily do without a main office. We were able to let our lease expire and have our HQ work from home, because the FPMA employees were able to successfully transition and still produce quality work. This was a significant cost savings. Thank you, Leslie Herren, Melissa Tyler, and Christine Updike, for successfully navigating this change.

When our much loved and respected David Cooksey passed away (McCall Services) and Kyle Varona's company (Fahey Pest Solutions) was sold, we lost two crucial members of our Executive Committee. To keep our leadership consistent through this shakeup, Chis Cavanagh wound up serving in double capacities as Vice President AND Treasurer and then held down the Vice President position for another year. Chris took it for the good of the body and I know he is eminently qualified to serve as FPMA President in 2023. Thank you, Chris Cavanagh!

Special thanks as well to the current Executive Committee: Jeremy Maneol, Elliot Zace, and especially Eric Hoffer, who has now served on the EC for six years!! I think that's a record.

The inability to put on our Regional Meetings meant our members could no longer count on going to those meetings to get their CEUs. So what did we do? Became the first group to put on LIVE, online CEUs. We instituted our "Last Chance CEUs" in this format, and it has been so successful, it is now a regular part of our May agenda.

Unable to hold Summer Conference in 2020 or EXPO in 2021 meant another blow to our personal interface with our members and our revenue. Both were called off and rescheduled at the last minute but that didn't mean that the planning hadn't been going on. Thank you Stacey Miller, for getting us through the events debacle without any losses and helping us navigate our subsequent events through a very different environment.

We were able to weather these years without cutting back on our staff. In fact, we were busier than ever, yet we still had losses of revenue. Our bookkeeper, Kevin Chinfatt, did all the work in helping us file and collect ERC credits we were entitled to and got us a nice chunk of change in the process. Thank you, Kevin, for making that happen and unfailingly providing us with the financial reporting that allows us to make informed financial decisions.

Also, I want to thank everyone who has served on the Board for these three years, especially Erich Hobelmann (Allied Representative), Derek Pumphrey (North West Region Director and Education Committee), Denise Trad Wartan (North East Region and Clay Shoot organizer extraordinaire) and Crissy Crenshaw (Central West Regional Director).

As for our committees, Sean Brantley continues to lead our Government Affairs Committee and fight for our interests at every turn. And to you fumigators, nobody can speak for you better than Sean. Thank you, Dave Johnson, Paul di Lorenzo and Leanne Prewitt of the Membership Committee, for coming up with a sensible new dues structure.

Education Committee Chair Andrew de la Chapelle, along with Derek Pumphrey, Steve Mock, and Cory G., came up with and executed our first-ever TECH Day in 2022. This was a game-changer. TECH Days 2023 is now two days and promises to continue with more innovative hands-on training. You guys rock!

These folks and so many others are what have made it such an honor, an albeit longer-lasting one than I could have ever imagined. Thank you to my bosses at Massey Services for allowing me to serve. Thank you, FPMA. **PP**

*Suzanne Graham  
President, FPMA*

Visit [flpma.org](http://flpma.org) for currently scheduled meetings and more.

# More is *Not Always* Better

**W**HEN I grew up, we were taught to use everything effectively and not waste anything. In pest control, the application of more pesticides is not always better. In fact, too much pesticide, besides being wasteful, can cause a lot of problems.

DDT was discovered in 1939 and rapidly became the cure-all for all insect issues. In urban pest control, DDT and other chlorinated hydrocarbons were applied to the ceiling for mosquito and fly control, to the walls for cockroaches and bed bugs, to the floor for fleas and ants, and to the soil for termites. Pest control was simple: Just apply DDT as a broadcast treatment everywhere, and the insects would disappear.

By the early 1950s, DDT and chlorinated hydrocarbon resistance were widespread in insects like flies, mosquitoes, cockroaches and even bed bugs. Pest controllers would spray, and the insects did *not* disappear.

## **The SMELL of PEST CONTROL**

So, guess what happened next? In the late 1950s and early 1960s, organophosphates and carbamates were used as replacements for DDT and other chlorinated hydrocarbons. They also were initially used as broadcast treatments to all surfaces.

Eventually, some of the most important insects, like German cockroaches, mosquitoes and house flies, developed resistance due to the continual and widespread usage of these new chemistries. All these early formulations had a distinct odor, and people expected that effective pest control would smell. I remember when the carbamate Ficam (bendiocarb) was first developed as an odorless spray. Many pest control companies received complaints that they were spraying with water. Customers were unhappy if the pest control service did not have a bad odor when all surfaces were sprayed in the house and on the yard.

## **CRACK-and-CREVICE TREATMENT**

Pest control started changing in the 1970s. EPA started regulating pesticides and their use. Besides that, Blanton Whitmire produced a product line of insecticides designed to be injected into cracks and crevices for pest control. This type of application was initially controversial. So the Whitmire Company, now part of

BASF, decided to educate the industry on targeting treatments to locations where insects lived.

The adoption of crack-and-crevice treatments for pests was a slow process. Rather than drenching surfaces with insecticides, crack-and-crevice injection of a chemical became the standard of treatment. But in order to do this more limited treatment, the industry had to train technicians to inspect for signs of pests, find the pests, and treat the locations where they occurred. For these pests, more was not better. Precise application of sprays meant better control. Less was better.

The reduction in treatment area—going from broadcast applications to crack-and-crevice injection of insecticides—also reduced the odors associated with treatments. The standard smell of pest control was minimized with new active ingredients and formulations. Customers started expecting fewer insect problems rather than the lingering odor of the pest control technicians' work.

## **The DAWN of BAITS**

Another innovation in pest control started in the 1980s with the development of baits for indoor use. Baits were developed for cockroaches, ants and flies. The baits reduced the widespread applications of insecticides because they attracted insects to the food-based formulation, then killed them when they ate it. When you think about the way baits work, they reduce the need for broadcast, spot, and crack-and-crevice treatments by attracting the insect to its death. As had previously occurred with the movement of pest control from broadcast applications to crack-and-crevice treatments, technicians needed more training in order to do bait applications properly. Austin Frishman, one of the gurus of pest control, taught the industry to “think like a cockroach” in order to control it. As less insecticide became better, technician knowledge of the pest became more important.

## **BUILDING on BAITS**

In the early 1990s, another innovation in pest control was the development of subterranean termite baits. Dr. Nan-Yao Su taught the industry to apply baits with

insect growth regulators — chitin synthesis inhibitors. Termites live in colonies and share their food, which allows the active ingredient in baits to be passed among all the individuals in the colony. When the insects molt from one stage to the next, they die because their cuticle is not formed properly. The innovation of termite baits had the ability to replace broadcast treatments of termiticides underneath and around the house. Again, technicians' jobs for termite bait placement and maintenance required increased training.

Flea control also changed drastically in the 1990s. Broadcast treatments for fleas were the standard in the industry. It was recommended that entire floor areas should be treated with broadcast treatments for flea control. In 1991, a landmark on-animal treatment, Advantage, followed by Frontline, was developed and provided by prescription by veterinarians. Fleas that developed in carpets and in floor cracks were killed when they jumped onto pets. Flea control in the industry has not been the same since. Broadcast treatment of floors has been replaced by treatment of pets.

There are now topical treatments as well as ingested treatments. All these need to be used according to the pet's weight, so almost all these types of treatments are available from veterinarians, not the pest control industry.

Another innovation since the 1990s is the use of flying insect light traps. These traps started out as zapping traps that exploded flies and mosquitoes using electricity. Due to contamination in food-handling facilities, the insect light traps evolved into capturing insects on glue boards. These traps have eliminated insecticides and capture flies when they are attracted to the light.

## **TODAY, LESS is MORE**

Currently in pest control, more insecticide is not better than less. But technicians need training to utilize modern methods of pest control most effectively. Customers expect treatments to be limited to areas where pests are a problem. Therefore, the use of insecticides is minimized with these higher tech methods and materials, but insect control is maximized. **PP**

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



# The INVASION of the LANDSCAPE SNATCHERS!

Taylor Clem

**Mexican petunia:  
The gift that never stops giving**



Melaleuca branch

“IT STARTED — for me, it started last Thursday, in response to an urgent message from my nurse, I hurried home from a medical convention I’d been attending. At first glance, everything looked the same. It wasn’t. Something evil had taken possession of the town.”

This is from the opening scene of *Invasion of the Body Snatchers*. In the 1956 film and book, alien spores populate a city in California. The spores create large seed pods that replace humans with an emotionless duplicate. While watching the film, as a plant nerd all I can think about are invasive plants. Plants coming into our natural areas and landscapes replace natural areas with sterile, environmentally devastating consequences. It is the invasion of the landscape snatchers.

**Florida’s Landscape Snatchers**

Therefore, it started — for me, it started last week. While perusing social media, I noticed something: A beautiful, purple flower with the caption from the photo’s owner, stating, “I have plenty to share, send me a message and you can come by to pick some up for your garden.” The post had multiple comments from others expressing their interest in picking up their own purple flower. The plant had a beautiful flower, but it, unfortunately, was an invasive plant: Mexican petunia, *Ruellia simplex*. Unbeknownst to the post’s author, they were openly

sharing an incredibly invasive plant with their neighbors. Luckily, a few people quickly noted it was an invasive plant and should not be shared and should be removed.

Look out for the invasive plants in your landscapes!

**What’s an Invasive Plant?**

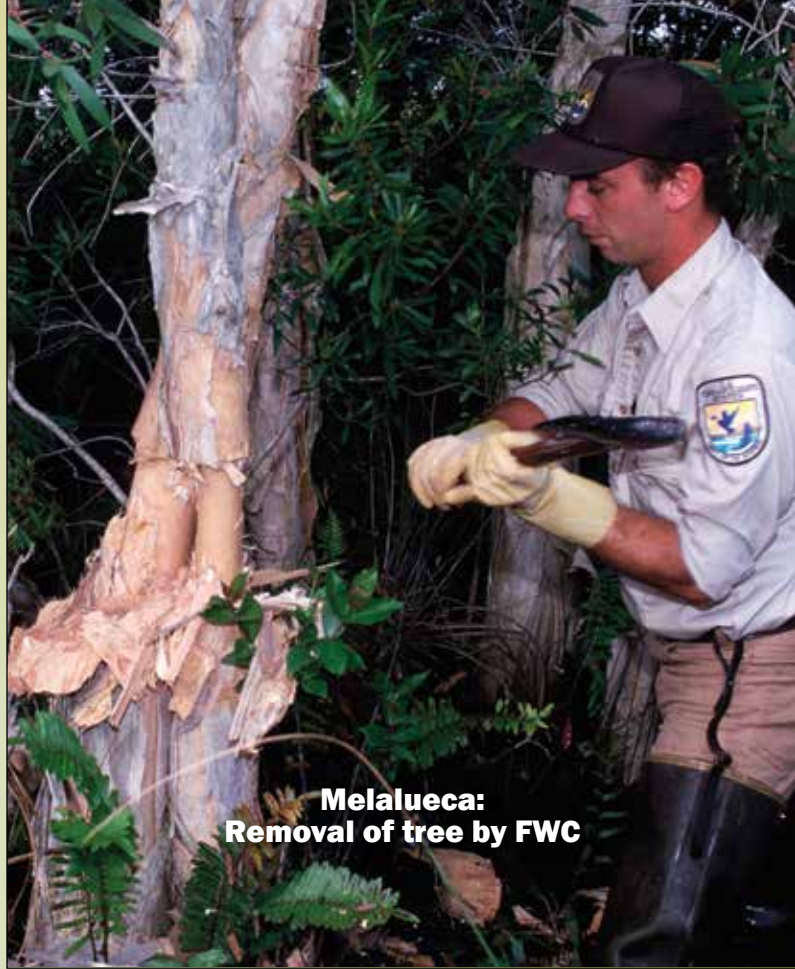
Hundreds of Florida’s plants earned the invasive classification. Invasive plants are classified because they meet three standard requirements.

1. They are nonnative
2. The species has been introduced either intentionally or unintentionally
3. The species causes, or is likely to cause, environmental harm, economic harm, and/or harm to humans.

Common examples of invasive plant species include air potato, *Dioscorea bulbifera*, and melaleuca, *Melaleuca quinquenervia*. The state of Florida classifies melaleuca and air potato as noxious weeds, earning a “prohibited” status. Therefore, the prohibited status makes them illegal to buy, sell, trade or transport.

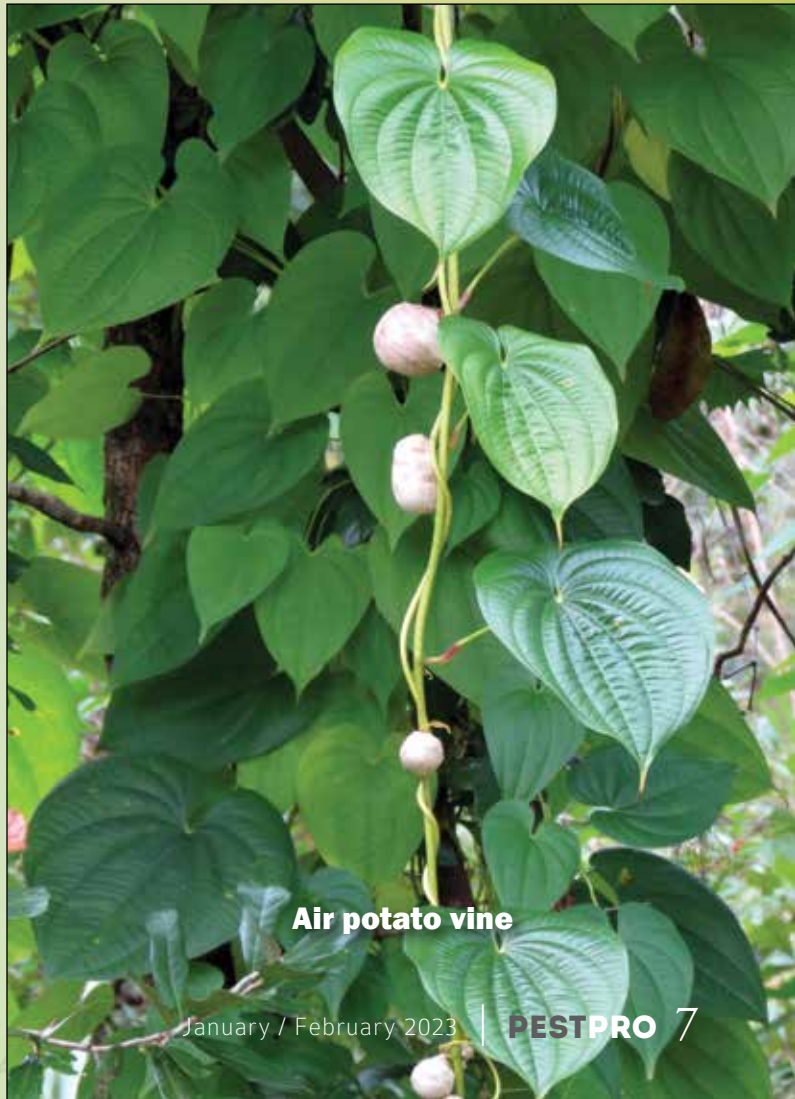
Both plants were introduced for ornamental or agricultural reasons. After an introduction, the plants began to spread and take over natural ecosystems and displacing natural floral and fauna. Despite the noxious weed designation, there are still plenty of invasive plants *without* that designation that can be bought, sold, or traded and thereby impact our environment.

*Continued on next page*



Melaleuca: Removal of tree by FWC

FWC



Air potato vine

Katja Schulz



**Mexican petunia**



**Mexican petunia**

### Common Landscape Invasives

Throughout our ornamental landscapes, we still see plenty of invasive plants being sold, bought, traded, and planted. Some common invasive plants within our landscapes include Mexican petunia (*Ruellia simplex*), mother of millions (*Kalanchoe x bightonii*), the nonnative lantana (*Lantana camara*), and tuberous sword fern/Boston fern (*Nephrolepis cordifolia*). Unfortunately, as I tour around Nassau County and northeast Florida, these and many other invasive plants are all over.

### Natural Area Invasive Plants

Within our natural areas, we find a whole slew of invasive plants because many of our invasive species escaped into the natural areas. Many invasive species established themselves within natural areas. This means the invasive plants are maintaining a self-sustaining population within our environments without human assistance. Some of the common established plants within our natural environments include the plants listed above and coral ardisia (*Ardisia crenulata*), nandina (*Nandina domestica*), mimosa silk tree (*Albizia julibrissin*), and wild taro (*Colocasia esculenta*).



**Mother of millions**



**Mother of millions**

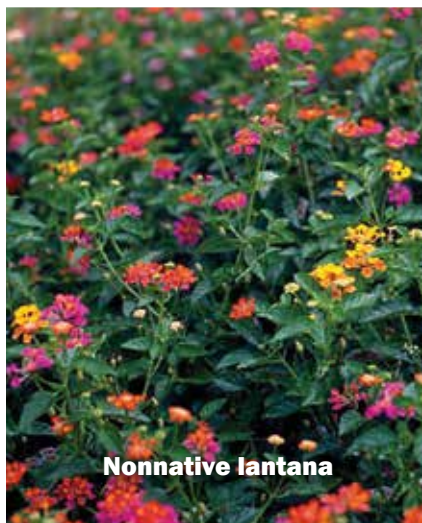
### Spread Knowledge, Not Invasives

Ultimately, raising awareness of invasive pests and communicating with others is the first step in stopping the spread of invasive plants. Properly identifying invasive plants within your landscape or natural area is the first step in control and management. Therefore, there are two important web pages worth sharing. University of Florida's Center for Aquatic and Invasive Plants provides the science-based integrated pest management controls for many invasive species. In addition, you may check out UF's Assessment of Non-Native Plants in Natural Areas web page to learn about a plant's invasive status. You can search a vast database of assessed plant material to learn about its invasive status, which includes links to the Center for Aquatic and Invasive Plants page.

Consider the Florida-Friendly Landscaping Program's first principle, "Right Plant, Right Place," when thinking about your landscape plants. The principle recommends that we select plants that match the environmental conditions we are planting. In addition, we should not include any invasive species within our landscapes.



**Nonnative lantana**



**Nonnative lantana**



Always compare the scientific names of plants (usually written in italics) and not the common names when making a decision. A specific plant can have multiple common names, but the scientific name never changes. In addition, when in doubt, feel free to reach out to your county Extension office.

## Landscape Snatchers in Florida

### Mexican Petunia (*Ruellia simplex*)

You can easily identify Mexican petunia in the landscape. Its upright growth produces beautiful blue to purple flowers. Growing approximately 3 feet tall, it is commonly seen placed as a perennial plant along edges of landscapes to help give height. Gardeners and landscapers introduced this landscape invader to Florida because of its ornamental quality. Unfortunately, it quickly escaped captivity and began spreading throughout our environments. It has earned invasive status and is not recommended for the landscape.

Researchers developed sterile varieties, but IFAS Assessment classifies the sterile varieties as “caution” plants because they’re too difficult to differentiate from the nonsterile variety. A native *Ruellia* is available within commercial trade. Look for the scientific name “*Ruellia caroliniensis*” in order to plant the native *Ruellia*.

### Mother of Millions (*Kalanchoe x houghtonii*)

Mother of millions gets its name because of the hundreds of offspring it produces and spreads across the landscape. This plant has been problematic for coastal ecosystems by displacing the natural plant material along the coastal dunes. You can easily recognize mother of millions because of its succulent appearance. It has succulent, green leaves with purple or black spots on the undersides of the leaves.

Avoid purchasing these plants in the big box store, and remove any from your landscape by pulling them out.

### Nonnative Lantana (*Lantana camara*)

Lantana is an unbelievably common landscape plant, although not all are invasive species. There are native and sterile nonnative lantanas available at landscape nurseries. The nonnative, invasive lantana (*Lantana camara* / *strigocamara*) is usually most recognized by its clusters of bright orange, red and yellow

flower clusters. Many of the invasive lantanas end up within the environment or disrupting agriculture production.

Sterile varieties can easily be found, but if you ever notice a *Lantana camara* that produces tiny, black seeds, it should be removed immediately. The sterile varieties will not produce the seeds. To be safe, look for our native lantanas, *L. involucrata* and *L. depressa*. The native lantanas create beautiful plants for your landscape that attract many different pollinators.

### Tuberous Sword Fern/Boston Fern (*Nephrolepis cordifolia*)

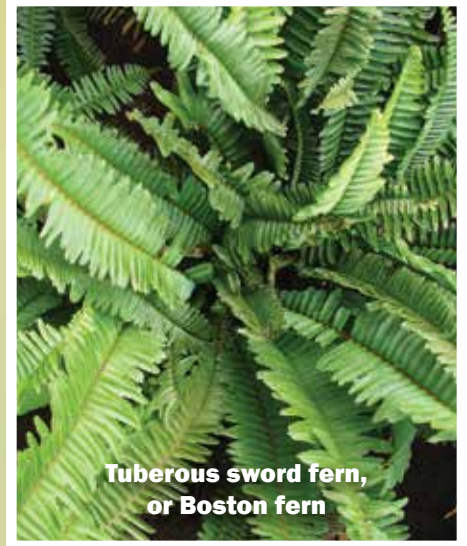
The tuberous sword fern swarms our landscapes and is easily found at many nurseries around the county. It goes by many names, including Boston fern. You can easily confuse the tuberous sword fern with the native sword fern (*N. exaltata*). The two plants look nearly identical, but the tuberous sword fern disrupts and displaces many plant communities throughout Florida. Many homeowners will buy this plant at a local nursery, which then spreads it to the local environment and spreads rapidly.

The key to identifying the native versus invasive fern is to look for the tubers, or little “nuts,” on the roots of the ferns. If you pull some ferns up in your landscape and see the tubers, you have the invasive plant. This plant spreads rather aggressively and continues to propagate from any tubers left in the ground. Without control, this plant will smother and replace many of the plants in your landscape.

### Coral Ardisia (*Ardisia crenata*)

Coral ardisia, in some communities, is recognized as “Public Enemy No. 1.” Its rampant growth throughout our natural communities quickly displaces natural plant communities. First introduced as an ornamental plant, due to its showy red fruit, coral ardisia quickly spread throughout the communities. This prolific seeding plant spreads very aggressively and earned a “prohibited” status from the state. You can recognize coral ardisia from its bright red berries and evergreen leaves with scalloped margins. Therefore, to control coral ardisia, collect the berries in buckets and dispose of them in your trash — do not compost the berries.

*Continued on Page 20*



Tuberous sword fern, or Boston fern

Forest & Kim Starr



Coral ardisia

Dick Culbert



Coral ardisia

Karen A. Raulins, UGA

# MYSTERY CREATURE



Cyclad Core Photography



Male lizard of mystery



Juvenile mystery lizard WALKING ON WATER!

See at <https://youtu.be/QK9mcm0Bnfg>



Iguana falling from a tree



Green iguana

## Reclusive celebrity reptile

**H**EADS UP, fans of Florida celebrity nonnative reptiles! There's a niche member of the scaly glitterati you may have missed in all the furor over Florida's top-billing nonnative reptiles.

### Trendsetters you already know

Naturally, shutters click, flashbulbs pop, and bulletins arrive almost weekly about the exploits of the various enormous invasive constrictor snakes relentlessly digesting everything that walks, swims or flies in the Florida Everglades.

Every winter, nonnative reptile news junkies are treated to a sheaf of stories about frozen invasive iguanas falling from manicured landscape trees in Fort Lauderdale onto unsuspecting pedestrians below. Add to that their highly newsworthy tendency to

burrow through sea walls and munch on landscaping, and it's hard to wrest the spotlight away from these literal scenery chewers.

And gossip flows steadily about the rapacious invasive tegus, pillaging alligator nests in the southern part of the state.

Of course, nobody can even go outside practically anywhere in the state of Florida without seeing a nonnative brown anole. Or 16. Or 60. They're all around us all of the time, racing down sidewalks, leaping from shrubbery, clinging tenaciously to our cars like living hood ornaments, forever hurtling forth in fierce pursuit of fame.\*

### Who is it?

Our mystery nonnative reptile celebrity, by contrast, has received little fanfare, and in fact you might not even know it's in the state at all. If you've watched nature documentaries,

though, or even the odd TikTok, you've probably learned about and marveled at this remarkable little animal.

Can't guess?

It's the **brown basilisk**, the little critter with the big talent, the lizard that *walks on water!* Its famous semi-aquatic trick makes for great footage, so this shy brown lizard gets a lot of screen time. It has developed a big reputation and a devoted fan following.

### Brown basilisks in Florida

A new *Ask IFAS* publication<sup>1</sup> explains that it was those same devoted fans who brought the brown basilisk lizards to Florida habitats in the first place. Like many other nonnative reptiles now living in the wild in Florida, brown basilisks were originally introduced as pet animals and are now established here. They were first spotted at large in Florida in 1963.

<sup>1</sup> <https://edis.ifas.ufl.edu/publication/UW497>

\* Not really. Outside of tortured metaphors in blog posts, lizards do not pursue fame, so if a brown anole is chasing something, it is not the limelight. Most likely it's a member of one of the countless species of nonnative roaches that have also invaded the state.

# RE?



Female lizard of mystery

Andy Kraemer



## spied in Florida!

Susan Gildersleeve



Range of brown basilisk lizards in Florida, 2022. This map is based on records in EDDMapS, Krysko et al. (2006), the FLMNH herpetology database, and iNaturalist. This map approximates the minimum extent of the species' establishment in Florida.

The lizards have yellow or cream-colored stripes on their sides, and both male and female lizards sport little crests on their heads when they're grown. They usually lose much of their ability to run on water as they get heavier, so most of the footage you see of their famous trick features juvenile lizards without the distinctive crests. The grown lizards are still comfortable in and around water, and, though they may not do much water-walking anymore, they are still plenty athletic. Adult lizards can still do their spectacular hind-leg running on solid ground. They're good swimmers, too, and can dive beneath the surface of the water if they're threatened.

Wherever they end up, basilisks appear to favor the coasts. They are originally from coastal regions of Central America, ranging from central Mexico south to Panama. In Florida, they hug the Atlantic

and Gulf coasts, and the southern coast of Lake Okeechobee.

They usually prefer to be left alone, and you probably won't see them because, in the time-honored tradition of reclusive celebrities, they hide and avoid attention. If you do get to see one do its nifty trick, count yourself lucky!

Unlike so many of their more notoriously badly behaved and destructive fellow nonnative reptiles, brown basilisks have not made a tremendous impact outside their native range and do not appear to be doing much harm in their new home. Brown basilisks haven't been studied as much as other nonnative species, though, so there may be undiscovered problems we're not yet aware of. **PP**

Susan Gildersleeve is Editor at UF/IFAS Communications.

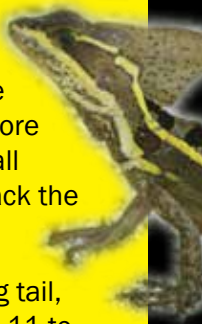
## CHECK IT OUT!

The head crest is found on both male and female brown basilisks, but is more developed in males. Small basilisks of both sexes lack the head crest.

When including their long tail, adults range in size from 11 to 27 inches.

Brown basilisks do not pose a direct threat to pets or people.

— BROWN BASILISKS IN FLORIDA, Kenneth T. Gioeli, Steve A. Johnson, and Amanda Thompson, UF/IFAS



Burmese python



Burmese pythons and iguanas, far left, hog their fair share of media limelight.\*



# SAVE THE DATES!

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# ‘Help! We Have Houseflies In Our Operating Room!’

Bob Belmont



**W**HEN I was a technical director, I was regularly sent to act as the bloodhound for some of the most difficult urban pest situations in our industry. With years of experience in both residential and commercial pest management, I have helped solve many pest problems in medical facilities and hospitals across the Southeast United States.

House flies often enter through main entry doors and sometimes pose control problems for pest managers. But when flies enter hospital operating rooms, the usual protocol is to close down the room and seal openings — or locate and remove the fly infestation if it can be discovered — sterilize all surfaces, wait a designated period to ensure activity has ended, then reopen the room once the flies are gone.

I was once asked to travel to a very large, old hospital that was losing a quarter million dollars a day in revenue in just one operating room! Open heart surgeries that were recently booked had to be canceled because adult house flies were somehow entering the room. No other rooms in the hospital or nearby hospitals were available, and the flies needed to be dealt with “NOW,” in order to free up the room for needed revenue and, of course, to accommodate the patients in need of surgeries.

## The Search Begins

I was first directed to the office of the vice president of patient services. She introduced me to the head of engineering and three of his team members, with their baggie of house flies from the operating room, who were instructed to accompany me. I

was given full access to all areas throughout the hospital to solve this problem. The pest control technician assigned to the hospital also helped.

The engineering team accompanied me as I started inspecting the operating room with the flies. It was on the top floor. Evidently, only one or two adult flies were still entering for the last two days since sealing had been “completed,” so Surgery already had lost half a million dollars in revenue.

Everything in the surgery room was spotless and extremely clean. There were absolutely no entry points around, under or behind sinks or cabinetry for flies to enter. It was difficult to even find one tiny spot of dust or debris, the room was so clean.

But I was stunned when I looked up and saw clean, freshly painted ceiling tiles in a standard

drop ceiling. Most modern hospital operating rooms have smooth, solid ceilings that can be cleaned and that do not allow pest access. This older hospital had ceiling panels that were well placed, except for a few that either had a tiny hole in a corner where a wire or cord had been passed through in the past or a panel or two that did not fit perfectly flush to the drop-frame. This was enough of a void for house flies to detect blood and enter from above.

My first request was to have them set up the ladder below the area of suspected fly entry so I could see what was in the void above.

I was amazed to see an extremely dry, slightly dusty void with no evidence of fly activity. Three huge, 2-foot holes were cut through what I expected would

*Continued on Page 15*

# Queen and Washingtonia Palms are Under Attack

The culprit is a fungus known as *Fusarium oxysporum* f. sp. *palmarum*.

WE CONTINUE to lose many Queen and Washingtonia palms in residential and commercial properties all over South Florida. According to University of Florida IFAS Extension, early symptoms include a one-sided discoloration of the lower fronds. Eventually, all of the lower fronds turn brown, and the dieback moves progressively upward in the canopy until the entire palm is killed.

## Decline comes quickly

Once symptoms become evident, decline usually progresses fairly quickly. Palms often die two to three months

after initial symptoms are observed. Unlike nutrient deficiencies, there is no stunting or frizzling of the fronds as often seen with nutrient deficiencies. And with queen palms, the dead fronds do not typically droop or bend down and break off as they often do after a lightning strike or infection with *Ganoderma zonatum*, another fast spreading, hard-to-control fungus. Rather, they remain relatively rigid, as if freeze-dried.

It is not known exactly how the *Fusarium oxysporum* fungus spreads so widely in the South Florida landscape, but wind-blown spores are strongly suspected as a primary method of

transmission. Contaminated pruning tools may be a second method by which the fungus spreads. Therefore, do not prune palms that look suspect. If you must prune them, do so at the conclusion of the job, and then sterilize your pruning tools to avoid future contamination.

## Unfortunately, no cure

Currently, there is no cure for this lethal disease which can easily spread from one infected Queen or Washingtonia palm to another. Therefore, it is very important that you identify and remove *Fusarium*-infected palms from your property as soon as possible.

When you remove a palm, it is always a good idea to

grind out the stump. That is because palm stumps are ideal sites for *Ganoderma zonatum*.

## Choose a replacement wisely

As far as replacement options are concerned, if you remove a *Fusarium*-infected palm we recommend you not replace it with another palm of the same species. Early identification and removal of diseased palms from your yard or neighborhood may significantly reduce disease spread saving you dollars and keeping your landscape lush and beautiful. **PP**

*Dr. Michael Orfanedes  
UF/IFAS Extension  
Broward County*



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## House Flies, continued

be sealed firewalls. Two holes went through to adjacent rooms, and one went out to the hallway, with pipes and wires clustered together in masses traveling in many directions through the cut holes. Adjacent rooms did not have walls cut for hallway access above their ceiling panels.

As I scanned the underside of the roof over the drop ceiling void, I noticed that the underside of the actual roof was completely sealed. The flies were surely coming from adjacent rooms or from the hallway, entering the void above the drop ceiling and then dropping down through the few small gaps that were not yet sealed.

I replaced the panels in the operating room and thought, *If house flies were collected just from this room, then why weren't the adjoining rooms with similar drop ceilings having a fly problem?*

The only thing different in the adjoining rooms was no access for pipes and wires to the hallway.

### Finding and Following the Clues

I started inspecting the void above the hallway drop ceiling panels. This was no easy task. The hallway T'd to three hallways at this room. One went hundreds of feet in one direction, one went hundreds of feet the other way. The hallway that traveled straight out of the operating room to the other end of the hospital was three times as long, with similar hallways branching to the left and right every 50 to 100 feet or so.

What a task this would be to look up over everything. Where should I start? I asked all nurses in the vicinity of the operating rooms if they had seen a house fly in hallway areas in the past week, and none had seen any fly

activity. Although flies can travel quite a distance to find a food source, logic told me to start my inspection from the junction outside the operating room and work slowly away, rather than going to the end of the hallway and working back to the operating room.

After one hour of inspecting everything in the void above the shortest hallway, stopping every 15 feet or so, my legs were getting achy from going up and down the ladder and standing at the top of the ladder while scanning with my bright flashlight for evidence of flies.

It was almost lunchtime, and my stomach was already growling. The hallway straight out from the room was a better choice for the next inspection because it only went about 90 feet until it intersected another hallway. If flies were not found to that intersection, then I felt it was pretty unlikely for flies to make a decision to come this way, given a choice of four different directions to go that far from the room. Another five or more 15-foot inspection spots had no success at locating anything, so I went back to the operating room to complete the last leg of the upper hallway inspection.

By this time, everyone was hungry. One of the tough young maintenance men blurted out, "Are you sure you know what you're doing? Boss, I think he's wasting all of our time. The morning is over, and we have that Room 302 work to finish!"

The hospital maintenance personnel reluctantly followed me along, continuing every 15 feet. I could now barely step up the ladder as my waist was very tired from tightness during standing and inspecting above the high panels. About 150 feet down the

hall, after I popped up a panel and scanned the area, I instantly shouted, "I found them! They're HERE! We got 'em!"

I came back down, smiling, and said, "Wow, I thought this might take a day or two, but I'm sure happy now!"

The young maintenance man immediately scurried up the ladder and looked and shouted, "BOSS! There are NO FLIES UP HERE AT ALL! He's lying to us. Come see for yourself! There's just one old roach egg and nothing else!"

I immediately laughed and shouted up to him and everyone else, "That's not a roach egg capsule, it's an empty housefly puparium! A fly emerged from this, and the maggot originally dropped down from the black pipe next to it from the tiny gap in the roof that the pipe passes up through!"

I faced the head of engineering and asked him, "What does this pipe go to on the roof?"

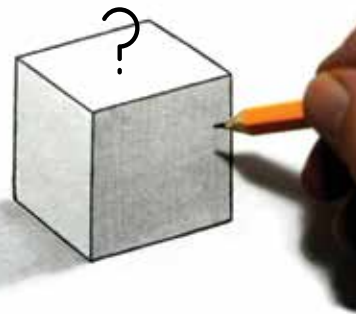
He went up the ladder to see, came down, and said, "I have no idea what this pipe goes to, but we'll sure find out fast. Let's go see!"

I said, "Please wait a sec." I went down to the end of the hallway, where there were three tall, thin windows together, and paced all the way back to the ladder to see how many paces it took to this pipe.

### Up On the Roof

Once on the roof, as I predicted, there were so many pipes and housings that none of the team knew where they were or even near where this pipe was located. I did, because I had counted my paces. I said, "I'll tell you where it is — wait a sec."

I walked carefully to the roof edge and then, extremely carefully, while on my stomach, peered over the edge of the



building to find the three tall windows. Then once above them, I walked the exact number — I'll never forget the 43 paces — directly to the spot. As I approached the spot, there was a housing: a sheet metal cover about 3 feet long, 3 feet wide, and 3 feet high, with screened vents on the bottom for natural airflow cooling.

I said, "Here it is — so what's in here?"

The head of engineering said, "I have no idea, but open it up, guys, and let's see!"

The cordless drills came out, and the screws were out in a jiffy as two of the men carefully banged, nudged and finally popped the top off, and *voilà!* Inside were three rotting pigeons covered with thousands of maggots, while dozens of house flies flew out. The birds had pushed their way through the vent screen and got trapped inside.

The young worker apologized to me and told me he could have sworn there were no flies around this area. He had no idea what a fly puparium looked like.

The head of engineering accompanied me to the vice president's office. We told her this entire story, which really intrigued her. She thanked me for my work, and I thanked her for her trust in us. **PP**

---

*Bob Belmont received his M.S. in entomology at the University of Florida and is a retired entomologist with over 40 years of experience in the pest management industry.*



*A group of house fly pupariums*



# George Richardson



*From pest control technician to commercial horticulture agent*

THIS PAGE, FROM TOP: George examines Formosan termite mud tubes on a tree and, below, performs a residential bait treatment.

AT LEFT: Live Formosan termite wood damage display.



**Northeast Duval County  
Extension Office**





**George & Carolyn Richardson**



**A Jacksonville landmark**



I WAS born into this industry. In fact, I was probably almost born in a meeting had my mother, Carolyn Dixon Richardson, not been told, “No, you have to go to the hospital, your meeting can wait!”

Carolyn is the daughter Earl and Louise Dixon, who started Peninsular Pest Control Service Inc., out of their home in Arlington, Jacksonville, Florida in 1954. Earl was a graduate and staff member of the University of Florida Department of Entomology. He was hired by Otto Orkin to begin his career in the pest control industry.

The Honorable R. Earl Dixon also served in the Florida House of Representatives in the late 1960s and 1970s. Louise was also the first licensed female pest control technician in the state of Florida, to my knowledge. They are a lot to live up to.

My parents, George and Carolyn Richardson, helped grow the business into one of northeast Florida’s largest independent family-owned pest control businesses. Our wonderful vice president of operations, “Uncle” Terry Shepherd, went on to the great beyond in April 2022. Running the business was not the same without him, and they sold the business to Massey Services in July 2022.

### Finding Inspiration

Although I was born into the industry, I did not have a passion for it until after college.

I attended the Episcopal School of Jacksonville for high school. While there, my love for biological sciences sparked. I had a fantastic biology teacher, Sally Russo, who ignited my passion for plants and biological processes.

Also, while I was there, that spark was almost diminished by multiple concussions from playing multiple positions on my small high school football team. Luckily, I was able to bounce back, keep my grades up, and be accepted into the University of Florida’s urban pest management program.

I was not that interested in pest control nor insects prior to getting to UF. Growing up my father would catch insects and try to show them to me. He made me look like Usain Bolt as I sprinted away from those confrontations.

I chose the major to honor my grandparents, whom I have had a close relationship with my whole life. I was the only remaining grandchild that had some interest, so I felt it was up to me to try and keep that thing going.

### A New Direction

Once I got to the University of Florida and strolled into Steinmetz Hall for the first time to schedule courses, I had a rude awakening. Although I had no previous interest in insects or related taxa, I had killed quite a few roaches or spiders with a flip-flop. I was amazed by the women in the entomology program as I

walked into one of the labs where the students were congregating, waiting to schedule courses with advisors. *These women were handling scorpions and tarantulas!* I thought, *What on earth have I done to myself? Why didn't I just do business management?*

I eventually calmed down after taking a few courses and learning more about insect biology. Although it took a while, I became involved in the Urban Entomological Society. While in the club, I did not involve myself in classical research as I joined after the beginning of the semester. I did assist with termite colony management at the “voluntelling” request of Dr. Phil Koehler. As most research projects were under way at this point, I asked what I could assist with. Dr. Koehler and Dr. Roberto Pereira pointed out that they had not seen a wood destroying organism damage collection in a while and sent me off in that direction.

As a student, I did not have time or resources to collect all the damaged pieces of wood. Luckily, I had the assistance of Lyle Buss, with the UF Insect ID Lab, and local pest control operators to collect damaged wood. I recently discovered from Dr. Rebecca Baldwin that one collection is still in use today! I would also like to thank Don Foster and Randy Buckley, who were working on their master’s degrees at the time, for not allowing me to saw my fingers off as I made the collection. *Continued on next page*



FROM TOP: George’s UF graduation photo. Dr. Rebecca Baldwin handles a scorpion at an outreach event and, below, a tarantula grabs the spotlight.





### Focus on Termites

I'm not sure if it was making the wood destroying organism damage collection or crawling underneath houses during my degree-required internship with Peninsular that led to my fascination with termites. During my internship with my family, I installed Sentricon stations, followed on trench-and-treat liquid termiticide treatment crawls and borate treatments, and did ride-alongs with my father.

My father was originally a dairy farmer and has a degree in dairy science from the University of Florida. He learned everything from on-the-job training and continuing education presentations in his more than 35 years in the pest industry. He was a great wealth of knowledge.

Oddly enough, my internship coincided with the swarming season of the Formosan subterranean termite, *Coptotermes*

*formosanus*. I was on a ride-along with my father in an area with a heavy Formosan population due to the age and construction of the homes. As he was talking with a customer who was showing us his destroyed garage, I became bored and curious as there were no active termites in this structure. I walked around the property and block and found active Formosan mud tubes on eight out of the 10 healthy-appearing trees I looked at. *Yikes*.

A crucial element of my story is my father's working relationship with the previous UF/IFAS Duval County Extension commercial horticulture agent, Erin Harlow. He would keep her in the loop on pest problems going on in the county. After the media and public got involved in the formosan termite situation, so did the city. The agent and city officials formed the Jacksonville Formosan Termite Task Force

to determine the population density of termites and next steps.

I was very lucky that this occurred because it led Erin to seek an intern for her program. I applied and was accepted. During my internship I assisted Erin with a termite mapping project<sup>1</sup>. I was also able to learn exactly what someone in her position did. I had attended her CEU courses before, but I did not understand the full scope of her responsibilities with the green industries.

I joined Erin on site visits with industry technicians to determine what was going on with the plants and how to resolve them through an integrated pest management approach. I additionally learned of the UF/IFAS Extension Office and its other services. I had no idea of the scope of what IFAS did in each county. She was a fantastic role model, and I had a great experience as an intern.

### A Career is Born

Then it was back to the real world. I finished up my senior year at Florida and moved back home to Jacksonville to start my full-time career in pest control. I initially started out as a Sentricon technician. I then worked my way up to inspector, sales, general household pest control service, technician training quality control, and V.I.P. Service. Due to being a family member of a family business I had to wear many different hats.

My most valuable skill was one that I shared with my father. We were the "lemonade makers." We handled those sour customers and turned them into sweeter situations.

I worked for my parents full time until the sale in July. Although some may see the sale of the company as a negative impact on my future, I feel quite the opposite. My parents could fully retire and enjoy spending time with their grandchildren. I was also able to escape the smell of three-day old trapped rodent calls.

Then it was on to my next chapter in life. I knew I wanted to do something related to the industry, given my experience and education. Luckily, the commercial horticulture agent position was open in Duval County at the time. They even accepted me! Now here I am, trying to provide relevant CEUs and information to folks in my county. **PP**

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<sup>1</sup> <https://sfyl.ifas.ufl.edu/duval/hort-and-pest/termite/>



# Happy New Year! Time to Make the Doughnuts Again?!

**RAND HOLLON**

**T**HE NEW YEAR is upon us, and it's time to make New Year's resolutions!

(Groan — I get it.)

For me, New Year's resolutions often end miserably too.

Don't get me wrong, knowing the last year is in the history books and a new year has dawned creates in me a new vigor. An energized vigor full of forward-looking proclamations about increased effectiveness, taking better care of myself and my family, lowering both my cholesterol and my golf handicap.

However, at least with me, all the new-gotten vigor is quickly lost and forgotten with the help of my couch, a big bowl of chips, an adult beverage, and a TV full of college bowl games and NFL playoffs!

What I'm talking about is making a New Year's resolution for your business.

(Groan — I get that too!)

You talk to enough people in business for as many years as I have, sometimes all those New Year's resolutions kinda start to sound the same.

The new year is upon us, and business people are focused, in one way or another, on growth, sales, and how "we're gonna blow the doors off this new year!"

Fair enough.

Going forward, growth is certainly important. And when it comes to business valuation, proof of historic growth is a critical and much considered metric.

As a business owner, working at your business, you work at growth every day. Making the doughnuts. Making more doughnuts.

Resolving every year to make more doughnuts than you did last year.

Change up your resolution.

Resolve to make better doughnuts.

Resolve to spend more time working on your business.

I think everyone would agree that whether your annual revenues are \$500 thousand or \$500 million, there's always room for improvement somewhere.

There are plenty of things pest business owners can do to work on their business.

Once you begin to work on your business, you'll agree that many improvements are fairly minor. But over time these improvements can give you back your work-life balance. You can be in control of your business instead of your business being in control of you.

Because pest businesses are typically smaller (less than \$5 million), most improvements can be made a little quicker and result in a shorter term to realization.

Additionally, if you ever look to sell, these smallish improvements can also greatly increase the marketability and overall deal value relative to other businesses that may be, in terms of annual revenues, the same size.

Here are three things that come to mind:

## **Financial Reporting**

No matter the size of your business, good financial reporting tells the story of how much money you're bringing in and how much it costs you to run your

business. My advice is to develop a relationship with a good local CPA for something other than tax preparation. If you don't have one, get one.

How to find one? Ask other successful business owners you may know in your community for a referral. Who provides their accounting?

Have your CPA prepare monthly P&Ls (income statements) and balance sheets. Create a dialog with your CPA to discuss these items. And, over time, you'll learn how to interpret/understand something that will be pretty critical to the overall value of your business.

## **Production Reporting**

Production reporting is another good pulse to have your finger on.

Regardless of what software you use, work to discover what report/s best tell the story of the revenue your business creates. Good financial reporting tells a story and so does good production reporting. A good summary production report, tells in snapshot what you did to create the money evidenced in the financial reporting. Review of these reports on a monthly and trailing 12-month (TTM) basis will help answer a multitude of questions. As a business owner, they'll also help you ask the right questions related to the successful, and not-so-successful service packages you offer your current customers. If necessary, these reports will provide you with the basis to make changes on the fly, to make the "good" things "great" and make the "not-so-good" things "better."

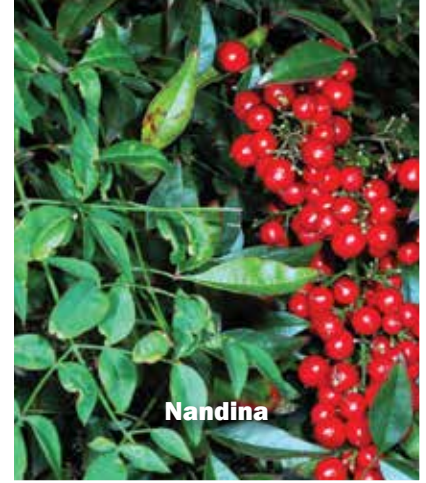
*Continued on Page 26*



**Mimosa silk tree in bloom**



**Mimosa pods**



**Nandina**

*Landscape Snatchers, continued from Page 9*

**Nandina (*Nandina domestica*)**

Nandina, or heavenly bamboo, started in the landscape and now appears throughout some of our natural areas. This evergreen shrub grows upright and produces bright red berry clusters, similar to coral ardisia. It reaches heights of six to eight feet, with tri-pinnately compound leaves. The leaves start as a reddish color before turning green, then they turn red again in the fall.

This plant primarily travels via commercial trade, but also from wildlife. The berries attract birds, who unintentionally disperse the seeds throughout the area. If you have nandina in your landscape, remove all components of the plants (leaves too) and put them in the garbage or trash. Do not compost or put it with your yard waste.

**Mimosa Silk Tree (*Albizia julibrissin*)**

I'll be the first to admit — this is a beautiful tree. Unfortunately, it is highly invasive. You can easily see this tree sprinkled throughout the landscape because of its beautiful flowers and unique leaves. Originally introduced in the United States in the 16th century, mimosa silk tree now spreads easily along forest edges and pops up in our landscapes. It produces very attractive flowers and long, straw-colored bean pods about 6 inches long. It is located in North Florida. Keep an eye out for this invasive tree, and report it if you discover it in your landscape or natural area.

**Wild Taro (*Colocasia esculenta*)**

Unlike other invasive plants introduced for their ornamental quality, wild taro appeared as a potential crop substitute. The U.S. Department of Agriculture introduced

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Wild Taro

it in hopes to develop a substitute for potatoes, which is a major agricultural crop of Florida. Since its introduction, wild taro quickly spread throughout wet areas around the state.

You can easily see clusters of wild taro in ditches, along creeks, and along roadways. It can easily be identified by its large, heart-shaped leaf. Although different plants, taro is often confused with elephant ear. Taro is much smaller than elephant ear, and its petiole attaches to the leaf differently.

### In Conclusion

Next time you find yourself perusing social media and someone wants to give away free plants, make sure it is not an invasive species. We're in the midst of the invasion of the landscape snatchers. Therefore, by stopping and controlling the spread of invasive species throughout our landscapes and natural areas, we can preserve and protect the vital environmental communities of Florida that we love. **PP**

---

*Dr. Taylor Clem, a graduate of the University of Florida and the University of Kentucky, has two degrees in landscape architecture and a doctorate in horticulture sciences. Dr. Clem has worked as a graduate student for the University of Florida's Center for Landscape Conservation and Ecology, with experience in the Florida-Friendly Landscaping Program, landscape design, and behavior change. Dr. Clem is now serving as Nassau County's Horticulture Extension Agent and County Extension Director.*

## PEST DETECTIVE

Kissing bug  
*Triatoma sanguisuga**Phthiacnemis picta**Acanthocephala declivis**Spartocera fusca* adult*Spartocera fusca* nymphs*Leptoglossus phyllopus*

Photos by Lyle J. Buss

## MORE Kissing Bug Lookalikes

Lyle J. Buss

**K**ISSING BUGS” are a group of bugs in the genus *Triatoma* that vector the parasite that causes Chagas disease, mainly in Central and South America. A couple *Triatoma* species are found in the Southeast United States, so people often send me photos of bugs that they suspect are kissing bugs. In the previous issue of *PestPro*, I wrote about various assassin bugs that often get mistaken for kissing bugs in Florida. This time I want to focus on another group of lookalikes, the leaf-footed bugs.

Leaf-footed bugs belong to the family Coreidae. Their common name refers to the leaflike expansions on the hind legs of species like those in the genera *Leptoglossus* and *Acanthocephala*. They feed on plants and are commonly found in gardens and landscapes. Over much of the United States, but not in the Southeast, the western conifer seed bug, *Leptoglossus occidentalis*, is often mistaken for the kissing bug. This species often sneaks into homes in the fall, increasing their chances of being encountered. Kissing bugs have normally shaped legs, so bugs that have modified hind legs are obviously not kissing bugs.

In my experience, the bug that is most often mistaken for a kissing bug in Florida is *Spartocera fusca*. It also belongs to the family Coreidae, but doesn't have the expanded hind legs. It mainly feeds on black nightshade, and is often found on the plant in large numbers of adults and nymphs. *Phthiacnemis picta* is another coreid found on nightshade and other solonaceous crops in gardens.

Leaf-footed bugs are active during the day, sucking sap from their host plants. They are relatively large, similar in size to the ¾-inch-long kissing bugs. The species I have mentioned are often found in gardens and near homes, so it's not surprising that they are mistaken for kissing bugs. However, kissing bugs feed on blood of mammals and birds, so they aren't likely to be found on plants. During the day, they hide under leaf litter or the bark of dead trees, or in nests or burrows of their host animals. They are often found at night near lights. **PP**

---

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

## New Chair:

# Andrew Short to Lead UF Entomology and Nematology



UF/IFAS

**Dr. Andrew Short**

**A**NDREW SHORT joins the University of Florida as professor and chair of the UF/IFAS Entomology and Nematology Department. His tentative start date is May 15, 2023.

Short will lead the highly ranked department of nearly 80 faculty members based in Gainesville and around Florida.

“I am incredibly excited to work with and steer such a vibrant community of faculty, students and professionals in the Department of Entomology and Nematology,” Short said. “Its people, programs and facilities are world-class and uniquely positioned to address a range of pressing entomological challenges facing society, including protecting public health, feeding the world, fighting invasive species and preserving biodiversity.”

Short is currently professor and associate chair of graduate studies in the Department of Ecology and Evolutionary Biology at the University of Kansas, and senior curator in the university’s Biodiversity Institute.

Short’s research focuses on the diversity, biology and evolution of aquatic beetles, with field work taking him

and his students on dozens of expeditions to Costa Rica, Venezuela, Guyana, Suriname, the Brazilian Amazon, and elsewhere. He has received funding from the National Science Foundation and serves on the governing board of the Entomological Society of America.

For Short, joining a land-grant institution like UF is a return to his educational roots. Short attended two land-grant institutions, the University of Delaware and Cornell University, where he earned his bachelor’s degree and doctorate, respectively. Before that, Short was an active member of the 4-H program in his home state of Delaware and volunteered and worked at his county Extension office.

Those early experiences were his gateway to the field of entomology and inform his approach to leading the department.

“The motto of 4-H is ‘To Make the Best Better,’ and that ideal guides my goals and aspirations for the department,” Short said. “One of the first goals I have is to enhance communication, integration and understanding among all the department’s varied program and centers.

“With a shared strategy, we will ensure the department remains the preeminent program in the world for entomology and nematology. I also plan to strengthen and continue diversifying an already outstanding graduate program through expanded funding opportunities.”

Scott Angle, UF’s senior vice president for agriculture and natural resources and leader of UF/IFAS, noted several strengths Short will bring to the role of chair.

“When you already have a department that’s one of the world’s best, improvement depends on inspired leadership,” Angle said. “Dr. Short’s demonstrated ability to secure funding that drives world-class science, his intention to unite a large team behind a shared vision, and his commitment to the diversity that drives innovation indicate he’s the leader the department needs to achieve even greater impact.” **PP**

*Samantha Murray*  
*UF/IFAS Communications*



Gilles San Martin

Adult female bed bug

# Pesticides To Control Bed Bugs

U.S. Environmental Protection Agency



**EPA** has registered more than 300 products for use against bed bugs. Most of these can be used by consumers, but a few are registered for use only by specially trained professionals. EPA evaluates data on the safety and the effectiveness of the products before approving them.

Learn more about EPA's regulation of bed bug products.

These 300 registered products fall into seven chemical classes of pesticides that are currently registered and widely used for bed bug control:

- pyrethrins,
- pyrethroids
- desiccants,
- biochemicals,
- pyrroles,
- neonicotinoids, and
- insect growth regulators.

There is also an additional chemical class registered for a very narrow use pattern. Dichlorvos (also known as DDVP, an organophosphate) is registered as a pest strip for treatment of small enclosures.

Each chemical class kills bed bugs using a different mode of action. It can be helpful to use pesticides that differ in their mode of action because it can reduce the likelihood that the bugs will develop resistance. The

following paragraphs discuss in more details each of the more commonly used chemical classes for bed bugs.

**Pyrethrins and pyrethroids** are the most common compounds used to control bed bugs and other indoor pests. Pyrethrins are botanical insecticides derived from chrysanthemum flowers. Pyrethroids are synthetic chemical insecticides that act like pyrethrins. Both compounds are lethal to bed bugs and can flush bed bugs out of their hiding places and kill them. However, where resistant bed bug strains exist, these treatments may cause them to move to a new hiding place or temporarily flush them out of existing locations.

Some bed bug populations have become resistant to pyrethrins and pyrethroids. Sometimes using a combination product (either multiple pyrethroid or pyrethrin active ingredients, or one that combines different chemical classes into the same product) can improve bed bug control. It can also be helpful to switch to an entirely different chemical class to control resistant bed bug populations. Some pyrethroid pesticides come in the form of a total-release fogger.

*Continued on next page*

## Myth:

Pesticide applications alone will easily eliminate bed bug infestations.

## Reality:

Bed bug control can only be maintained through a treatment strategy that includes a variety of techniques plus careful attention to monitoring. Proper use of pesticides may be part of the strategy, but will not by itself eliminate bed bugs.

In addition, bed bug populations in different areas of the country have developed resistance to the ways many pesticides work to kill pests. If you're dealing with a resistant population, some products and application methods may not work.

**It is a good idea to consult a qualified pest management professional if you have bed bugs in your home.**

— EPA



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Where do you want to use this product?  
(Check one or more, if applicable. If you don't check a box, your search will return all types of bed bug products.)

Mattress  
 Whole Home  
 Whole Room  
 Crack/Surface/Void (e.g. open spaces inside structures such as walls or floors)

You can refine your search by specifying one or more of the following options:

Which product are you interested in?

You can leave blank to get a list of all products which fall under your criteria

Are you interested in a particular active ingredient?

Are you looking for a specific company name?

Do you know the EPA registration number of the product you are looking for?

You can leave blank to get a list of all products which fall under your criteria.

ABOVE: The bed bug product search tool by EPA lists pesticide products that may be used by the general public.



### Bed Bug Pesticides, continued

**Desiccants** work by destroying the waxy, protective outer coating on a bed bug. Once this coating is destroyed, the bed bugs will slowly dehydrate and die. Desiccants are a valuable tool in bed bug control. Because desiccants work through a physical mode of action, the bed bugs cannot become resistant to desiccants as they can to pesticides with other modes of action. In addition, they have a long-lasting effect and don't disturb normal bed bug activities.

Examples of desiccants include:

- Diatomaceous earth.
- Boric acid.

When using desiccants to control bed bugs it is critical to use those that are registered by EPA and labeled for bed bug control. Desiccants that are intended for other uses, such as food-grade or for use in swimming pools, pose an increased inhalation risk to people. Use of desiccants is limited to cracks and crevices only to reduce inhalation risk.

**Biochemicals:** Cold pressed neem oil is the only biochemical pesticide registered for use against bed bugs. Cold pressed neem oil is pressed directly from seeds of the neem tree, a tropical evergreen tree found in Southeast Asia and Africa. The oil contains various compounds that have insecticidal and medicinal properties. It is also used in making products including shampoos, toothpaste, soaps and cosmetics. Performance trials conducted at the approved label rates show both products control bed bug adults, nymphs and eggs.

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**Pyrroles:** Chlorfenapyr is the only pyrrole pesticide currently registered for use against bed bugs. The compound is a pro-insecticide, i.e. the biological activity depends on its activation to form another chemical. The new chemical disrupts certain functions in the bed bug's cells, causing its death.

**Neonicotinoids:** Neonicotinoids are synthetic forms of nicotine and act on the nicotinic receptors of the nervous system by causing nerves to fire continually until they fail. Because neonicotinoids use this different mode of action, bed bugs that are resistant to other pesticides will remain susceptible to the neonicotinoid.

**Insect growth regulators:** Insect growth regulators are chemicals that mimic juvenile growth hormones in insects. They work by either altering the production of chitin (the compound insects use to make their hard external "shell," or exoskeleton) or by altering an insect's development into adulthood. Some growth regulators force the insect to develop too rapidly, while others stop development.

#### Find a Bed Bug Pesticide Product

EPA has developed a search tool that can help you choose an EPA-registered bed bug product that meets your needs. We cannot provide specific pesticide use recommendations. The products listed in this search tool are those that can be purchased by any consumer. There are other products that are only available for purchase and use by specially trained individuals.

#### Bed Bug Product Search Tool

As with all pest control situations:

- Use a product that fits your needs.
- Never use products indoors that are not approved for indoor use.
- Ensure that label directions are followed. For example, be sure to consider where you want to treat your bed bug infestation.
- Be aware of the reasons that treatment can fail.

Foggers and bug bombs should not be used as the only method to attempt to control bed bugs. **PP**

*Excerpted from EPA.gov: "Pesticides to Control Bed Bugs," "Find a Bed Bug Pesticide Product," and "Bed Bug Myths."*

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Taking a monthly view of your customers' payment habits may help you identify improvements you should make in your payment collection effort.

Those are but three examples of the many small things that make for a better business. (You're welcome to call me for more tips.)

And here's the best part, when you're making better doughnuts, you'll be selling more of them too!

Now that's what makes for a *Happy New Year!*

See you in 2023! **PP**

*Rand Hollon, a graduate of Florida Southern College, is a second-generation pest industry veteran. Preferred Business Brokers has exclusively served the pest industry for 30 years. Working exclusively in the pest industry, Hollon has led transaction processes and brokered pest industry deals throughout the United States and the Caribbean. Over the years, Hollon has also authored M&A-related articles for several pest industry publications and has served as an M&A participant/speaker for numerous local, state and national events.*



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Why are some people mosquito magnets and others unbothered? Medical entomologist Jonathan Day points to metabolism, body odor, and mindset

Univ. of Melbourne



**Aedes aegypti:**  
A mosquito species that prefers to feed on humans

## Mosquito Attraction: *How Does It Work?*

Jonathan Day

IT'S RARE to attend an outdoor party in warm weather without hearing people complain about mosquitoes. They swat away, sit in campfire smoke, cover up with blankets and eventually just give up and go indoors. On the other end of the spectrum, there are plenty of people who don't seem bothered by mosquitoes in the slightest.

As a medical entomologist who's worked with mosquitoes for more than 40 years, I'm often

asked why some people seem to be mosquito magnets while others are oblivious to these blood-feeding pests buzzing all around them.

Most mosquito species, along with a host of other arthropods — including ticks, fleas, bedbugs, blackflies, horseflies and biting midges — require the protein in blood to develop a batch of eggs. Only the female mosquito feeds on blood. Males feed on plant nectar, which they convert to energy for flight.

Blood-feeding is an incredibly important part of the mosquito's reproductive cycle. Because of this, a tremendous amount of evolutionary pressure has been placed on female mosquitoes to identify potential sources of blood, quickly and efficiently get a full blood meal, and then stealthily depart the unlucky victim. If you check some, or all, of the mosquito's search boxes, then you may find that you are a mosquito magnet.

### Sensing CO<sub>2</sub> and Scent Signals

Depending on when during the day they are active, mosquitoes use sight, sound and olfactory cues to identify a potential source of blood. Most night-active species rely on olfactory or receptor cues. The most important chemical cue is the carbon dioxide that all vertebrates, including humans, release with each breath and through their skin.

Mosquitoes are very sensitive to CO<sub>2</sub> and can sense a CO<sub>2</sub> source that is many meters away. Receptor cells on the mosquito's antennae and legs bind CO<sub>2</sub> molecules and send an electrical signal to the brain. When more molecules hit their receptors, the higher the CO<sub>2</sub> concentration and the closer they are to the host.

However, there are many nonliving carbon dioxide sources such as cars, boats, planes and trains. To separate living from nonliving sources of CO<sub>2</sub>, mosquitoes rely on the secondary olfactory cues that living animals produce. Metabolic processes like breathing and moving

*Continued on next page*



Ian Barber

*Two people at a party:  
Which will draw the mosquitoes?*

*Mosquito Attraction, continued*

generate these scent cues, including lactic acid, ammonia and fatty acids that act as additional olfactory clues that help female mosquitoes zero in on their next blood meal.

So, carbon dioxide production is the first mark of a mosquito magnet. Because the production of CO<sub>2</sub> and secondary attractants is linked to metabolic rate, the higher the metabolic rate, the more attractants are produced. Metabolic rate can be genetically determined, but it also increases as the result of physical activity.

The human mosquito magnets you can spot at summer parties may have a genetically high metabolic rate or may be more physically active than other attendees. They may also be undertaking other activities that increase their metabolic rate, such as the consumption of alcohol. Increased metabolic rate is why runners attract more mosquitoes during their cooldown stretching exercises. Pregnant women, perhaps due to their increased metabolic rate, attract a disproportionately large number of mosquitoes as well.

Natural body odors are also important cues used by mosquitoes to select a host. For example, some species of *Anopheles* mosquitoes are attracted to specific components of foot odor. These mosquitoes transmit human malaria and feed indoors in the middle of the night. By feeding on a sleeping person's feet, the mosquitoes avoid the head, where most of the CO<sub>2</sub> is produced, and reduce the chance of waking the victim.

**Visual Cues**

Mosquitoes active during the day and at dawn and dusk also use visual signals to identify a host. Mosquitoes usually fly close to the ground. From this vantage point they view their potential hosts against the horizon. Dark colors stand out and light colors blend in, so the way a person is dressed will determine the number of mosquitoes they attract. Wearing lighter colors may not just help keep you cool, but will help you evade a mosquito's notice.

Mosquitoes can visually detect motion, again by contrasting a silhouette against the horizon. This is why people who walk near a saltmarsh in the middle of the day after a large emergence of saltmarsh mosquitoes are inundated by mosquitoes that visually detect their presence.

**Psychological Factors**

There is also a psychological component to mosquito activity. Some people simply do not notice the mosquitoes around them. A single mosquito flying around some people will elicit a strong response — you've probably seen someone go nuts trying to track down the droning sound of one mosquito in order to finish off the tiny bloodsucker.

Other individuals are not bothered and do not notice the mosquitoes that are attracted to them, even when the insects are feasting on their blood. Some mosquitoes specialize on feeding on parts of the body that are difficult to see and difficult to swat. For example, *Aedes aegypti* is a mosquito species that prefers to feed on humans, mostly around the ankles.

Whether or not you're a mosquito magnet, their bites feel just as itchy! **PP**

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*Jonathan Day is Emeritus Professor of Medical Entomology, University of Florida.*

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# Facts from FDACS: Pesticide Safety 2023

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**P**ESTICIDE SAFETY sounds simple, but if you have ever tried to read a pesticide label, it can be very challenging. We all know that “the label is the law,” so we must be in compliance with the label.

“Keep Out of Reach of Children” is an important statement on all pesticides. There are many sections of the label that direct you to certain issues regarding the product. The first thing we look for is the “signal word,” which indicates the product’s toxicity.

Next is the first aid section, which explains what to do in the case of an exposure.

**Precautionary Statements Hazards to Humans and Domestic Animals.** This section covers Personal Protective Equipment/Clothing. Labels have different requirements, some labels list the personal protective equipment, such as long-sleeved shirt, long pants, shoes plus socks, and chemical-resistant gloves. Other labels have statements like, “Do not allow this product to contact your skin, eyes or clothing.” So my question is, how do you do that?

**Environmental Hazards** has statements like, “This product is toxic to fish and aquatic invertebrates,” or “May cause ground water contamination.”

**Physical and Chemical Hazards.** Explains the hazards during the use of the product.

**Directions for Use.** It is a violation of federal law to use this product in a manner that is inconsistent with its labeling. All pesticide label directions begin with this statement.

**Storage and Disposal.** Covers storage of the pesticide, pesticide spill control, pesticide disposal and container disposal general information, dilution charts, and general application instructions.

**IT IS YOUR RESPONSIBILITY TO READ AND FOLLOW ALL LABEL INSTRUCTIONS.**

**NOW for the Florida Department of Agriculture and Consumer Services requirements:**

*5E-14.106 Use of Pesticides – Labels, Limitations, Precautions.*

(1) Only those pesticides having federal, or state label registration clearance shall be used. It shall be unlawful to use any registered pesticide in a manner inconsistent with its label and labeling, except as provided by the United States Environmental Protection Agency, the United States Department of Agriculture, or the Department.

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

(3) All pesticide concentrates used in the field shall be kept under lock when in unattended service vehicles. They shall be kept in leakproof containers legibly tagged or labelled for identification and providing information required by EPA regulations or recommendations.

(4) Pesticides kept in containers other than application equipment shall be accurately identified by permanent, durable label or tag, showing the common or chemical name(s) of principal active ingredient(s) and providing information required by EPA regulations or recommendations.

(5) Spray tanks in which pesticides are mixed or from which pesticides are dispensed in pest control operations and to which water is added shall not be filled through direct fill-pipe or hose connections protruding into the spray tank. Fill-pipes or hoses must terminate at least 2 inches above spray tank intake fill opening or be equipped with an effective anti-siphoning device to prevent back siphonage into water supply. **PP**

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



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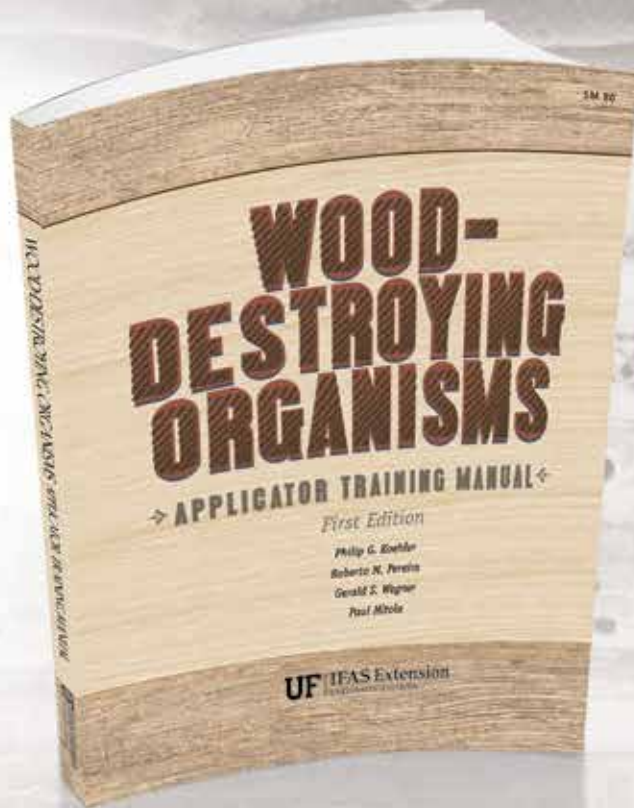
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