

MARCH/APRIL 2024

Bigheaded Ants in Kenya | Roach Bait | New Termite Book

Reading
The Weeds

The Red Imported Fire Ant And Its Sting

PESTPRO

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



Pest Management Education, Inc.
5825 NW 52nd Ter.
Gainesville, FL 32653-3359

THE UNIVERSITY OF FLORIDA'S 27TH ANNUAL
SOUTHEAST PEST MANAGEMENT CONFERENCE

MAY 7 — MAY 8, 2024, UNIVERSITY OF FLORIDA, GAINESVILLE, FLORIDA

GHP TUESDAY, May 7, 2024

8:30 AM — 11:40 AM **GHP** General Household Pests Classes

11:40 AM — 11:50 AM Students

11:50 AM — 1:00 PM LUNCH Break

1:00 PM — 4:10 PM **WDO** Wood-Destroying Organisms Classes

5:00 PM — 8:30 PM SAPP WALKUP TAILGATOR

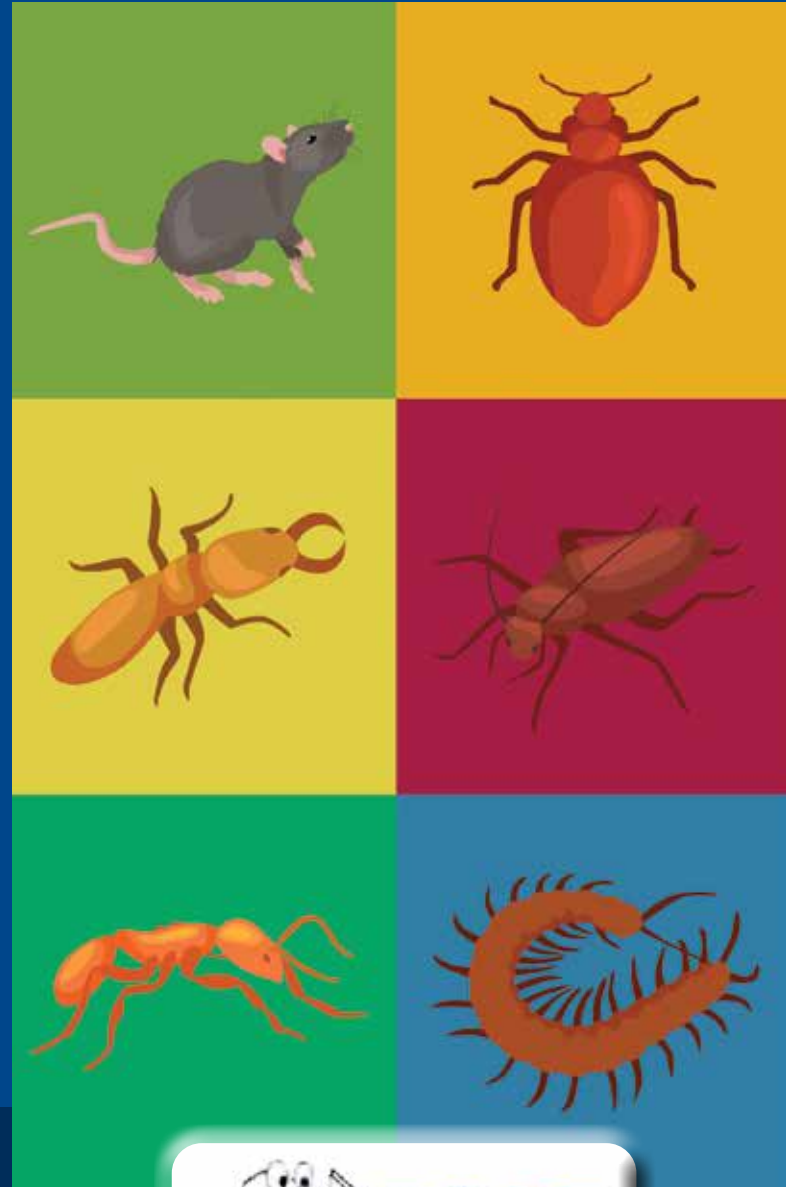
WDO WEDNESDAY, May 8, 2024

8:30 AM — 10:30 AM **CORE** CORE Classes

10:45 AM — 12:30 PM **L&O** UF Facilities Tour

12:30 PM — 1:45 PM LUNCH Break

1:45 PM — 3:45 PM **L&O** Lawn & Ornamental and
Fumigation Classes



REGISTRATION Regular Attendees: \$100
NO SINGLE-DAY Exhibitors: \$350
REGISTRATION (6-foot table available)

Register online at Eventbrite:

<http://tinyurl.com/2024-SEPMC>



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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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ON THE COVER

Its massive mandibles cause the initial pain when you are attacked by a red imported fire ant. Once it gets a good grip with its mouthparts, it pierces you with the stinger at its hind end. Venom enters, and more pain, burning, and foul language ensue. And that's only the mild reaction!

Photo credit: Alex Wild, public domain

CONTACT SANDRA FOR 2024 MEDIA KIT
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FPMA Leaders Committed to a Productive 2024

YOU can never have too much passion for something you love doing!

I was fortunate in life to have found a profession I am passionate about that lets me earn a living doing something I love. I am doubly blessed in that through the 25 years I have spent in the pest management industry, I found a home of like-minded individuals in the Florida Pest Management Association. It is with tremendous gratitude and humility that I begin 2024 as the President of this esteemed Association.

My Path to Pest Management

Reflecting on my journey, I can't help but recognize the unexpected turns that brought me to the pest management industry. Prior to discovering my passion in pest management, I earned a decent living working in bars and restaurants. However, I knew there was something more for me and my family.

Encouraged by friends, I went to work at Bug Out Service, and that changed my life in so many ways. I became involved with FPMA through Bug Out Service, where attending monthly meetings was ingrained in our culture for learning and support. It is precisely this participatory culture that I hope to encourage throughout the association's membership and beyond to the pest control companies who haven't yet experienced what tremendous value there is in being a part of something bigger than themselves.

FPMA Leaders of 2024

My partners in this mission are FPMA's Board of Directors and its committee members. The 2024 Executive Committee (EC) consisting of Elliot Zace (Slug-A-Bug) as Vice President, Paul DiLorenzo (Hoffer Pest Solutions) as Treasurer, Derek Pumphrey (Brock Lawn & Pest) and Chris Cavanagh (Immediate Past President) are already making plans to boost our membership recruitment efforts through the continuation of a program initiated by Immediate Past President Chris Cavanagh. It's with sincere appreciation that I look at this EC and note that each one of them works with an FPMA past president. This gives the association continuity, stability and importantly a legacy of a whole greater than just the sum of its parts.

The members of the Board of Directors represent the face of the industry. They are owners and managers of companies of varying sizes and business interests. All are passionate about helping FPMA evolve, and they are a testament to our collective strength in navigating challenges like industry consolidation and the impact of COVID. Their priority is to provide support for professionals to thrive both professionally and financially through initiatives like expanding Taste of TECH Days and revitalizing regional meetings. I've asked Andrew de la Chapelle (PCO Bookkeepers) to serve another year as the Allied Member Representative, because we can all bear witness to the boundless energy he brings to the Association.

Like Andrew, Steve Mock (Brown & Brown) and Dave Johnson (Hughes Exterminators) have been asked to serve as the Chairs of the Education and Membership Committees respectively. The momentum we have been building in the past three years has largely been due to the leadership of these three individuals. Each was recognized for his achievements by Immediate Past President Chris Cavanagh, who awarded Andrew the Harry J. Balcom Award, Steve the Committee Chair of the Year Award, and Dave the Committee Member of the Year Award.

It almost goes without saying that Sean Brantley (Emory Brantley and Sons) will continue as chair of the Government Affairs Committee. Along with Suzanne Graham (Massey Services) this duo is recognized at both the state and national level for the work they do on behalf of the industry. What they have done and continue to do affects your business every day!

All of these leaders know that the success of the Association demands a united commitment. I have confidence in the creative and dedicated minds within our Board and Committees to generate new ideas and turn them into reality. I look forward to contributing my part to the legacy of this Association and working alongside my colleagues to make 2024 a truly remarkable year for FPMA. **PP**

*Jeremy Maneol
President, FPMA*

Visit flpma.org for currently scheduled meetings and more.

Artificial Intelligence and Pest Control

ARTIFICIAL Intelligence is the latest tool for pest control companies. It is unbelievable all the uses for AI in the industry. The future is here in AI and will greatly enhance the ability of all companies to deliver quality services.

Let me list a few ways that AI will change the pest control industry:

1. Improve route efficiency.
2. Assist in pest identification.
3. Remotely monitor pests.
4. Determine when action should be taken.
5. Predict pest outbreaks.
6. Schedule needed pesticide applications.
7. Draft blogs for websites and social media.
8. Develop artwork for advertising and company recognition.
9. Identify customers who need your service.
10. Create scripts of technical information and advertising delivered in AI generated voices.
11. Route internet contacts to correct places on the company website.
12. Draft preliminary bids for business and government projects.

Universities like the University of Florida are investing extensive resources into the development and delivery of AI. Our students and faculty are being trained now in AI.

According to the UF website, “In setting the standard for an AI university, the University of Florida is preparing AI-capable students in every discipline for the 21st century workforce while fueling life-changing discoveries by research faculty in every college. This work, guided by a strong foundation in ethics, is driving the creation of a diversified, technology-driven, high-wage economy in Florida and strengthening the country’s competitiveness in a global market.”

The University of Florida has announced a public-private partnership that will catapult UF’s research strength to address some of the world’s most formidable challenges, create unprecedented access to AI training and tools for underrepresented communities, and build momentum for transforming the future of the workforce.

The picture of a large computer, above left, is an artist’s rendering of a UF supercomputer built to advance the development of AI and encourage students to learn how AI will change our lives.¹ The building, Malachowsky



Hall, opened in Nov. 2023 at UF and is set to reimagine research, applications, and transformative advancements in today’s most promising field: artificial intelligence.

Real-Time Artificial Intelligence

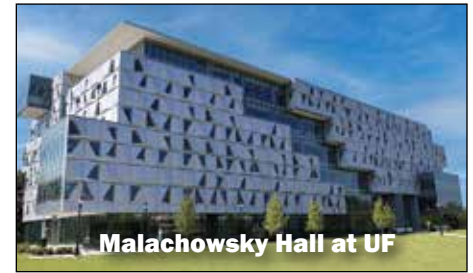
As a test of AI, I asked ChatGPT to write a bid for pest control at a school. You will see that AI gives general information. If you want precise, in-depth responses, you need to go to a professional who knows more. But the bid below gives a general outline of what school administrators are looking for in a competitive bid. Output was generated by this free artificial intelligence system, which searched the web for information on the topic of writing a bid for a school to provide urban pest control services:

“Dear [School Administration],

We are pleased to submit this proposal for comprehensive pest control services at [School Name]. As a dedicated pest control service provider, [Your Company Name] is committed to creating a safe and healthy environment for students, faculty, and staff.

Scope of Work: Our comprehensive pest control services for [School Name] encompass the following key components:

1. Initial Inspection: Our qualified technicians will conduct a thorough inspection of the entire school premises to identify any existing pest issues and potential problem areas.
2. Customized Treatment Plans: Based on the inspection results, we will develop customized pest control plans tailored to the unique requirements of [School Name]. These plans will address common pests found in educational institutions, such as rodents, insects, and other nuisances.
3. Eco-Friendly Solutions: We understand the importance of maintaining a safe and healthy learning environment. Therefore,



University of Florida

our pest control solutions prioritize eco-friendly and low-toxicity methods to ensure the safety of students, faculty, and staff.

4. Regular Monitoring and Maintenance: We propose a regular schedule for monitoring and maintenance to ensure the ongoing effectiveness of our pest control measures. This includes periodic inspections, preventive treatments, and the implementation of integrated pest management strategies.
5. Emergency Response: In the event of sudden pest infestations or emergencies, our team will be available for prompt response and resolution.
6. Educational Programs: We believe in proactive pest control, and to support this, we will provide educational programs and materials to raise awareness among students, faculty, and staff about preventing pest-related issues.

Pricing: Our pricing is competitive and transparent, with no hidden fees. We offer a [monthly/quarterly/annual] service plan tailored to the unique needs of [School Name].”

— ChatGPT response, unedited

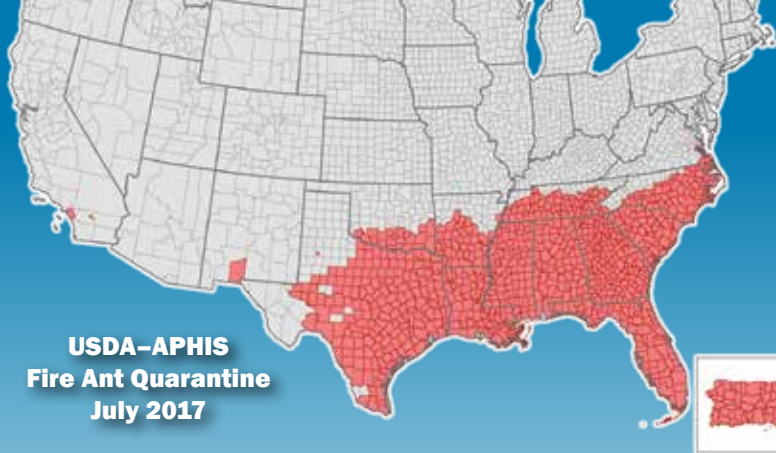
THE ABOVE response by AI may not be perfect for your company, but you can personalize it and adapt it for your company. How much time and effort can be saved by utilizing AI in your company?

Change is always scary. But if you embrace the change to artificial intelligence, your company will prosper in the end by providing enhanced service for your customers. Expect that your new workforce will know about and be trained in AI.

Be prepared for AI to change our lives in urban pest management. **PP**

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

¹ <https://news.ufl.edu/2020/07/nvidia-partnership>



The Red Imported Fire Ant And Its *STING*

Anamika Sharma and Taalib Ferguson



RIFA queen



RIFA drone



RIFA soldier



RIFA worker

FLORIDA is home to several ant species, including both native and invasive ants. As Florida residents, we get bitten and stung by red-brown, tiny ants seemingly every time we step out barefoot or in open footwear in our yards, parks or, in fact, any open areas. These tiny ants are red imported fire ants, often shortened to “RIFA.”

Solenopsis invicta, also known as fire ants, are an invasive species in North America. They are native to South America and were introduced to the United States in the 1930s through ports in Alabama. From there, they spread to several different states and achieved pest status, causing damage to agriculture, landscapes, and public health. Due to their aggressive nature, they are also a threat to native ant species and other living organisms.

Ants are eusocial insects: They care for their brood, have overlapping generations, and have castes that include queens, drones, workers and soldiers in the colony. Before stinging, fire ants first bite with their strong mandibles, then insert their stinger by curving their body, as shown at top. In general, drones and queens do not sting.

Feeling the Burn

Several species of bees, wasps and ants are known to sting. All these are social insects that belong to the order Hymenoptera, which means membrane-winged. Workers of these insects possess a structure known as an ovipositor, which in most female insects is involved in laying eggs. However, the ovipositor of workers of ants, bees and wasps is modified to deliver a sting and is not involved in laying eggs. This is known as a “sting” or “stinger,” through which venom is injected into prey.

The geometry, shape, and refined insertion mechanics of stingers enable them to penetrate with a very low puncturing force. In turn, a high insertion success

rate is achieved. RIFA stingers have curved geometry but are not heavily barbed. Therefore, the ants can retract the stinger and sting several times. As shown above, the RIFA stinger is composed of a stylet — the slender, piercing part — and lancets, which move back and forth alternately while stinging prey. A drop of venom forms and is pumped when the pair of lancets moves.

The RIFA bite causes excruciating pain and annoyance, and the sting causes itching and a burning sensation — hence the name fire ants. If you are allergic to venom, then it can even cause life-threatening conditions. After the immediate pain the sting causes a burning sensation, and the area becomes inflamed, itchy and red. If one is allergic, the sting might cause blisters filled with clear fluid or could cause a pustule filled with white pus.

The area will remain inflamed for a week or two. The pustules are almost diagnostic of a RIFA sting. The RIFA’s venom is responsible for the characteristic sterile pustules associated with these stings.



Adrian Smith, N.C. State Univ.



Fire ant mounds

Bruce Dupree, ACES

**Edema, or swelling****Reddening around sting area**

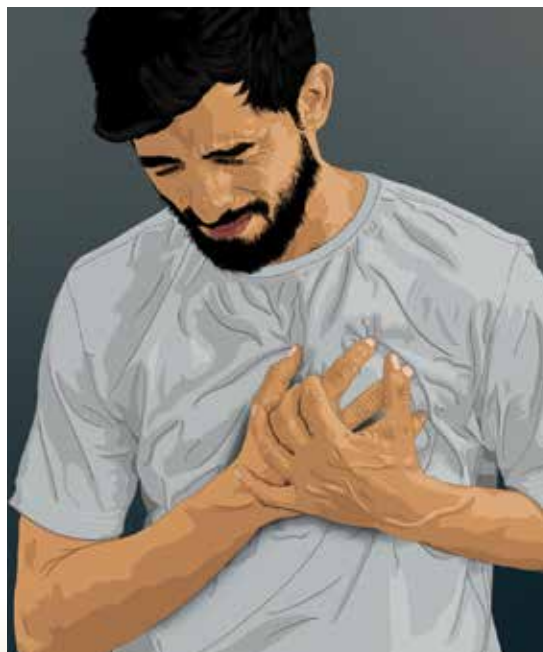
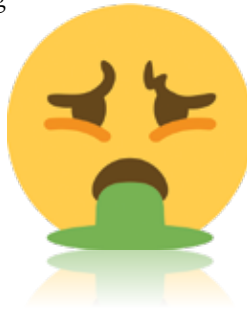
RIFA Venom Reactions

What exactly does RIFA have in its sting that causes such pain? RIFA venom consists of a mixture of carbohydrates, lipids, low-molecular-weight enzymes (proteins), and some high-molecular-weight proteins and alkaloids, which are naturally occurring organic compounds. More than 95% of RIFA's venom is made up of alkaloids.

Alkaloids and enzymes cause local inflammation. High-molecular-weight protein plays a major role in causing allergic reactions or systemic reactions in humans and other animals. When the venom is introduced into the skin, the venom enzymes begin to degrade the surrounding tissue. The release of histamine in response to the venom causes inflammatory responses, including edema, pain, reddening, and increased warmth. Target organs include the skin, vascular system, and respiratory system.

There are three types of reactions that can happen in human bodies. **Localized reaction** causes inflammation and lasts for a couple of days.

Systemic reaction causes the entire body to react to the sting and causes stomach cramps, diarrhea, nausea, vomiting, swollen tongue, and/or trouble breathing or swallowing. The most severe form of reaction is **anaphylaxis**. This causes a severe, life-threatening allergic reaction, including dizziness, a drop in blood pressure, loss of consciousness, and/or cardiac arrest. *Continued on Page 9*

**Anaphylaxis: Seek emergent care****Blisters: Do not squeeze**

RIFA Bites and Stings: What to Do

TO TREAT fire ant bites and stings, the first step is to remove the ants quickly, because they can bite again. Afterward, treat localized discomfort by washing and applying cold compresses to help soothe the inflamed area.

An oral antihistamine can help relieve the itchiness. A low-percentage hydrocortisone cream available over the counter also helps to relieve the itchiness. A topical antihistamine can be applied that can also function as analgesic and will give immediate relief from the pain caused by the sting and its reaction.

For more severe systemic and anaphylactic reactions, different types of oral corticosteroids, prescription-strength steroid creams, and epinephrine injection by EpiPen should be used.

Emergency medical attention, such as antihistamines, oxygen, or even cardiopulmonary resuscitation (CPR) could be required in severe anaphylactic reaction.

If blisters get infected, an antibiotic might also be needed. Most importantly, one should not squeeze the blisters, since that can cause infection and scars. **PP**

**Note: Each actual size
is smaller than its true
actual size.**

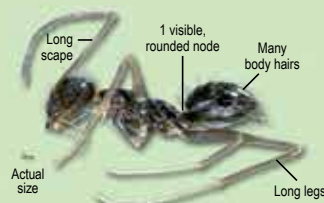
Pest Ants

D.A. Melius and P.G. Koehler¹

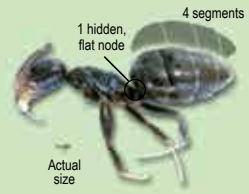
Soil- and Ground-Nesting Ants



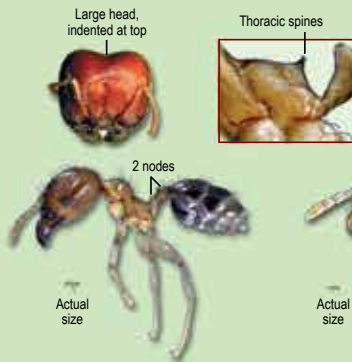
Argentine Ant
Linepithema humile



Crazy Ant
Paratrechina spp.

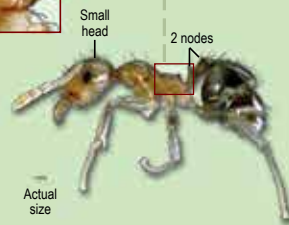


Odorous House Ant
Tapinoma sessile



Major Worker

Bigheaded Ant
Pheidole spp.



Minor Worker



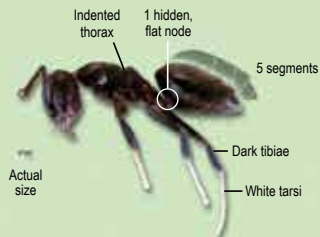
Major Worker

Red Imported Fire Ant
Solenopsis invicta

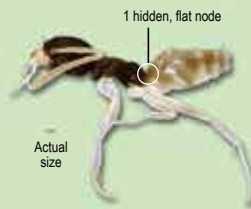


Minor Worker

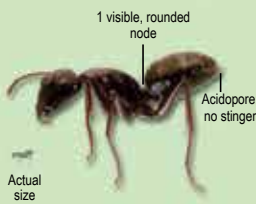
Aerial- and Ground-Nesting Ants



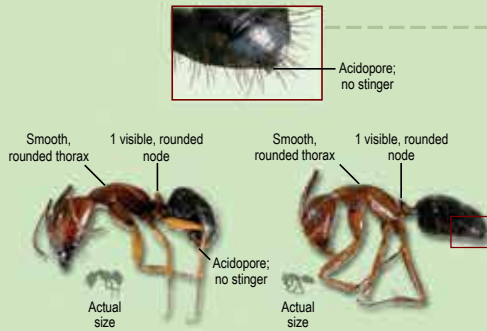
Whitefooted Ant
Technomyrmex albipes



Ghost Ant
Tapinoma melanocephalum

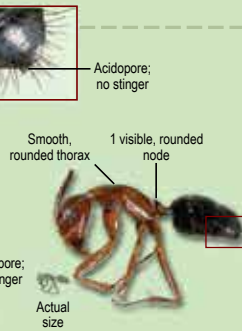


Black Carpenter Ant
Camponotus spp.



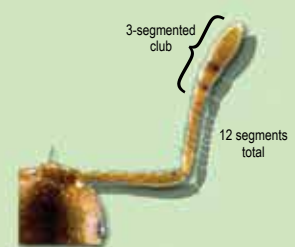
Major Worker

Florida Carpenter Ant
Camponotus floridanus

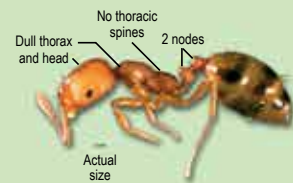


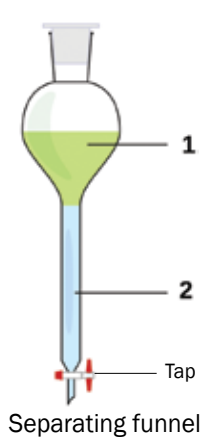
Minor Worker

Interior-Nesting Ant



Pharaoh Ant
Monomorium pharaonis





RIFA, continued from Page 7

Researching RIFA Venom

Discovering the properties and function of ant venom has long been a subject of interest for scientists. To study ant venom, the venom must first be extracted.

One of the methods to extract venom is called artificial flooding. The RIFA bites and stings as a process of offense and defense mechanisms. These mechanisms are increased during a fire ant behavior known as rafting. In nature, a RIFA colony can survive flood conditions by forming a "raft" of ants that float on the water's surface until the flood recedes or the ants find higher ground. During rafting, the RIFA colony releases their venom.

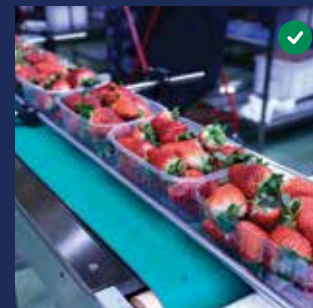
AT LEFT: Taalib Ferguson extracts venom from red imported fire ants by flooding the colony of ants.

Under lab conditions, RIFA nests are collected in a bucket, and the nests are flooded with a slow release of water to force the RIFA to form a raft on the water's surface. The raft is removed and placed into a solution of water and an apolar solvent. The solvent helps to extract alkaloids from the venom and forces the ants to instinctively release their venom.

The solution is then separated with the help of a separating funnel, shown at far left. The alkaloids are collected in apolar solvent (1), and proteins are collected in water (2). Proteins can be further examined with electrophoresis, and alkaloids can be examined with the help of a chromatography process. **PP**

Dr. Anamika Sharma is an Assistant Professor at Entomology, College of Agriculture and Food Sciences, FAMU. Mr. Taalib Ferguson is a senior majoring in biochemistry at FAMU.

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Doveweed

Reading the Weeds

What are your weeds trying to tell you?

JUST as your landscape plants are picky about nitrogen, pH, and moisture levels, each weed prefers a specific set of soil conditions, too. Improve the soil, and weeds will find your garden less inviting.

Here are some common garden and lawn weeds and the conditions they prefer. To confirm any of the problems, we suggest contacting your county Extension office or sending a soil sample to a reputable lab such as the UF/IFAS Extension Soil Testing Laboratory.

For more help identifying weeds and improving soil, please contact your county Extension office.



Matt Lavin

Red sorrel

Rumex acetosella

This weed prefers soil with a low pH (acidic soil). You can raise the pH of your soil by adding liming materials, and a good soil test will include a lime requirement test.

Add lime with caution; it is very difficult to lower the pH of your soil if you accidentally raise it too high. Alternatively, you can install plants which prefer acidic soil, like blackberries, gardenias, azaleas, and blueberries.



Robert Flogaus Faust

Broadleaf plantain

Plantago major

This weed prefers soil with a high pH (alkaline soil). Unlike raising pH, lowering the pH of soil is very difficult, even impossible.

Many of Florida's soils are formed from calcium-containing materials like limestone, which keep the pH high. Routine applications of amendments with elemental sulfur or organic material should lower the pH for a time, but repeated application will be necessary. Instead, we suggest embracing your alkaline soil and choosing plants that prefer a high-pH environment.



Martin LeBar

Clovers and other legumes

are often an indication of soil with low nitrogen. These plants fix nitrogen in their roots, making them less dependent on the soil's available nitrogen and the last survivors in a nitrogen-poor landscape. Because nitrogen levels change rapidly, soil tests don't normally report nitrogen levels. A good soil test report will include nitrogen application rates for turf and ornamentals, so we still recommend it if you suspect low nitrogen.

Add nitrogen to your soil responsibly by following recommended nitrogen fertilizer rates. This will help to prevent plant injury and to protect water quality.



Vengolis



Forest and Kim Starr

Florida pusley *Richardia scabra* (top)

Spurges *Euphorbia* spp.

These weeds may indicate the presence of plant-parasitic nematodes. Nematodes are microscopic worms that are common in Florida's soil. Unlike earthworms, plant-parasitic nematodes attack roots and feed on the plant fluids.

Nematode feeding results in stubby, damaged roots and can stunt the plant's growth significantly. Nematodes are difficult to manage in the landscape and impossible to eradicate. However, soil solarization, organic amendments, and nematode-resistant plants or cover crops can help plants fight existing nematode populations.



Forest and Kim Starr



Lazare Gagnidze

Annual bluegrass *Poa annua* (top)

Chickweed *Stellaria media*

These winter weeds are symptoms of a lawn regularly mown too low. Check the recommended mowing height for your turfgrass. You should also avoid removing more than a third of the blade at one time, so don't let the grass get too long between mowings.

Healthy turf will fight off these weeds with ease. Contact your county Extension office for help improving your turfgrass maintenance.



Harry Rose



NY State IPM

Goosegrass *Eleusine indica*

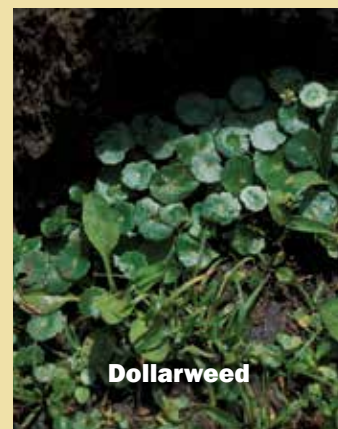
Also called silver crabgrass or crowfoot, this is a turfgrass weed that thrives in compacted and wet soils. Soil compaction is usually the result of heavy foot or vehicle traffic and is common in newly constructed homes. Loosen soil with hoe, pitchfork, or tiller and consider adding organic matter before landscaping.

Aerating your lawn can also help correct soil compaction in high traffic areas. If you're repeatedly walking or driving over the same part of your landscape, install mulch or permeable pavers to serve as paths or driveways.

Charles T. Bryson, USDA-ARS



**Cylindric
sedge**



Dollarweed

Forest and Kim Starr



Eclipta

J.M. Garg

Sedges, doveweed, dollarweed and eclipta

all prefer soggy, wet soil. It is possible that your landscape is overwatered, but these plants may also be a sign of leaks in your irrigation system or of poor drainage.

A 2011 report by UF/IFAS scientists states that "the majority of Florida in-ground irrigation systems have some type of maintenance problem that could be causing excessive water use." For this reason, inspections should be done on a regular basis.

If the irrigation system isn't the culprit, but there are low spots that aren't draining, consider adding soil to raise the elevation or diverting water away from the area with a new drain. You can also embrace the soggiess and turn the area into a rain garden.

PP

UF/IFAS Gardening Solutions

Reading the Weeds a New Way: AI-Powered App Can Detect Poison Ivy

UF/IFAS



Nathan Boyd

POISON ivy ranks among the most medically problematic plants. Up to 50 million people worldwide suffer annually from rashes caused by contact with the plant, a climbing, woody vine native to the United States, Canada, Mexico, Bermuda, the western Bahamas, and several areas in Asia.

It's found on farms, in woods, landscapes, fields, hiking trails and other open spaces. So, if you go to those places, you're susceptible to irritation caused by poison ivy, which can lead to reactions that require medical attention. Worse, most people don't know poison ivy when they see it.

To find poison ivy before it finds you, University of Florida scientists published a new study in which they use artificial intelligence to confirm that an app can identify poison ivy.

Nathan Boyd, a professor of horticultural sciences at the UF/IFAS Gulf Coast Research and Education Center near Tampa, led the research. Renato Herrig, a post-doctoral researcher in Boyd's lab, designed the app.

"We were the first to do this, and it was designed as a tool for hikers or others working outdoors," Boyd said. "The app uses a camera to identify in real-time if poison ivy is present and provides you with a measure of certainty for the detection. It also functions even if you don't have connectivity to the internet."

The next step is to make the app commercially available, and there's no timetable for that yet, Boyd said.

For the study, researchers collected thousands of images of poison ivy from five locations: Alderman's Ford Conservation Park and Hillsborough River State Park, both in Florida, Eufala National Wildlife Refuge in Alabama, York River State Park in Virginia, and Fall Creek Falls State Park in Tennessee.

They labeled images, and in each image, scientists put boxes around the leaves and stems of the plant. The boxed images were critical because poison ivy has a unique leaf arrangement and shape. Scientists use those characteristics to identify the plant.

They then ran the images through AI programs and taught a computer to recognize which plants are poison ivy. They also included images of plants that are not poison ivy or plants that look like poison ivy to be certain the computer learns to distinguish them.

"We believe that by integrating an object-detection algorithm, public health and plant science, our research can encourage and support further investigations to understand poison ivy distribution and minimize health concerns," Boyd said. In their future work UF/IFAS researchers hope to expand the use of the app to identify more noxious plants. **PP**

— Brad Buck
UF/IFAS



James St. John

On an acacia tree in Kenya:

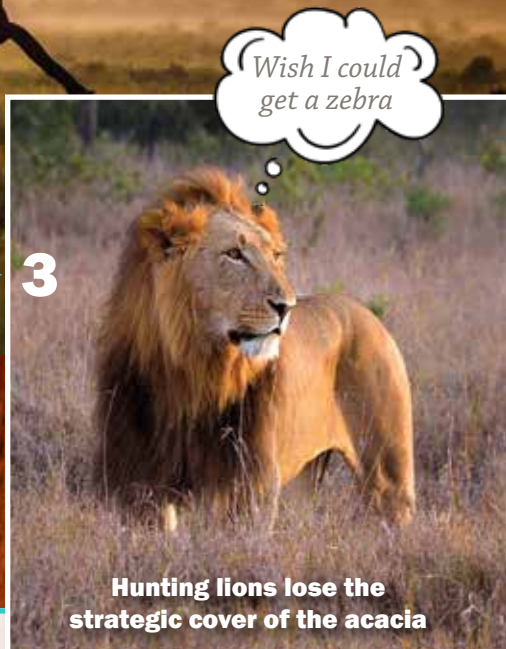
Giraffe, Brad Smithee, and elephant, Daniel Tireau



Bigheaded ants invade

2 Bigheaded ants usurp ants living in the tree. Elephants and giraffes are free to consume all the acacia leaves they can, and the tree dies.

Diana Robinson



Hunting lions lose the strategic cover of the acacia

Bigheaded Ants Disrupt Lions' Hunting Behavior

Bigheaded ants managed to push lions to kill more African buffalo: How a tiny invasive species can become king of the ecosystem.



Lions must prey on Cape buffalo instead of zebras

Kandakaru Nagarjun

IN A STUDY published in January in the journal *Science*, a team of scientists reports that a tiny and seemingly innocuous invasive ant species is changing tree cover in an East African wildlife area, making it harder for lions, the world's most iconic predators, to hunt their preferred prey, zebra.

"These tiny invaders are cryptically pulling on the ties that bind an African ecosystem together, determining who is eaten and where," said Todd Palmer, an ecologist and professor in the Department of Biology at the University of Florida.

The study, which spans research over three decades, comprised a combination of hidden camera traps, collared

lions tracked by satellites and statistical modeling. It illustrates the complex web of interactions among ants, trees, elephants, lions, zebras and buffaloes.

The disruption begins in the acacia trees in the Ol Pejeta Nature Conservancy, an African wildlife area in central Kenya. The trees are historically protected from leaf-eating animals by *Crematogaster mimosae* ants, which nest in the trees' bulbous thorns. In return for their home, the *C. mimosae* ants ferociously defend the trees from gigantic plant eaters, like elephants, giraffes and other herbivores — an arrangement ecologists call mutualism.

In published studies from the early 2000s, Palmer began to unravel the complexities of this

congenial relationship in East Africa between plant and animal species.

"Much to our surprise, we found that these little ants serve as incredibly strong defenders and were essentially stabilizing the tree cover in these landscapes, making it possible for the acacia trees to persist in a place with so many big, plant-eating mammals," Palmer said.

In the latest study, however, scientists say the arrival of an invasive insect known as the bigheaded ant, *Pheidole megacephala*, is setting off a chain of events that has resulted in a shift in predator-prey behavior that may further jeopardize populations of lions — a species already on the brink of endangerment.

Continued on Page 20



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Ask IFAS: What Are Some Quick Tips To Detect A Bed Bug Infestation?

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- Visible bed bugs, nymphs, or bed bug eggs (see egg cases, inset at right).
- Bed bug excrement.
- Blood stains or spotting.

Bed bugs and their signs can be found in cracks, crevices and spaces including, but not limited to:

- Walls, flooring and ceilings.
- In furniture, especially tube beds and upholstered items.
- In mattresses and along mattress seams.
- Behind electric outlet covers and baseboards.

Identifying Bed Bugs

Bed bugs are reddish-brown, flat insects about the size of a tick. They can be seen with the human eye.

- Before feeding, bed bugs have a wide, rectangular appearance. After feeding, adult bed bugs have a more elongate shape and redder color.
- Look for bed bug egg cases.
- Bed bugs, their excrement, nymphs, and eggs can also be found in cracks and crevices, such as mattress seams and bed skirts.



Bed Bug Detection Canines

If you use dogs to detect bed bugs, that counts as a pest control activity in Florida and requires licensing from FDACS.

Both you and the dog need special training to be able to accurately assess the presence of bed bugs. It is best practice to seek third-party certification.

Using canines for bed bug detection is especially helpful in the following cases (from the National Pest Management Association):

- When bed bugs are suspected, but visual inspection does not reveal live bugs or viable eggs.
- For building-wide inspections.
- In nonbedroom sites and unconventional areas, including offices, theaters, schools, and public transportation.
- To confirm that bed bugs have been successfully controlled or are not present.

PP

Florida Bed Bug Workgroup
<https://sfyl.ifas.ufl.edu/bed-bugs/>



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March / April 2024

PESTPRO 15



Wendy Wilber

Statewide Master Gardener
Program Coordinator



WENDY Wilber has been with the University of Florida since 2000, when she became an environmental horticulture agent and Master Gardener Volunteer program coordinator for UF/IFAS Extension Alachua County.

In 2015, she took over as Florida's State Master Gardener Volunteer Program Coordinator. In this role, she coordinates 4,000 volunteers and serves as a resource for many on plant and landscape issues.

Wendy grew up on a tropical fruit farm in Miami Dade County, and before coming to the University, worked in the landscape industry. She is a graduate of Stetson University in DeLand, and received her master's degree in horticultural sciences at the University of Florida.

As an environmental horticulture agent for Alachua County, Wendy's main focus was teaching residents how to create



The Florida Master Gardener Volunteer Program

and maintain environmentally friendly landscapes. Her biweekly columns in the *Gainesville Sun* and *Ocala Star Banner* highlighted these concepts and provided practical answers about gardening. In her 14 years as Master Gardener Volunteer program coordinator for the county, Wendy trained over 300 Master Gardener volunteers. These volunteers participate in an intensive course to learn about gardening, horticulture and landscaping. In turn, these volunteers advise and teach people of Alachua County in areas of plants, landscape, and insects and diseases of plants.

Wendy is recognized as a leader in the Florida Master Gardener Volunteer program and was granted the Florida Master Gardener professorship in 2012.

Helping people to be more sustainable in their home landscapes is a continuing goal in her education program. Home vegetable gardening and fruit

growing is a special passion for Wendy. She has taught many classes on home food production to thousands in Alachua County.

Youth education through 4-H has been another component of her Extension work. Wendy has taught 4-H programs for 3rd and 4th graders, where they learn about plants, wildlife, and watersheds with an emphasis on environmental stewardship. She strives to teach the children to understand our environment so they will later protect it.

She has served on numerous boards in committee over her career to include: the University of Florida/IFAS assembly, UF Wilmot Gardens advisory board, Kanapaha Botanical Garden Spring Garden Festival, FACAA board executive board, Santa Fe Springs working group, Florida Master Gardener advisory committee, and the UF/IFAS Water conservation initiative committee. Wendy has brought Florida-Friendly Landscaping™

concepts to states such as Louisiana, South Carolina, and North Carolina.

She is also a faculty member with the UF/IFAS Center for Land Use Efficiency.

A resident of Alachua County for over 20 years, she remains active in the community by volunteering with Keep Alachua County Beautiful and working with the North American Butterfly Association. Wendy enjoys fishing, hiking, and traveling to botanical gardens across the country with her partner Eric and daughter Sophie.

"Being able to serve the community as an environmental horticulture agent has been such a blessing in my life," Wendy says. "I am very fortunate to have a very meaningful career where I can help to improve people's lives and the environment in the community that I am so proud to be a part of."

Continued

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Master Gardeners may support youth activities

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Wendy Wilber, continued

The Florida Master Gardener Volunteer Program

The Florida Master Gardener Volunteer Program is a citizen-driven program that benefits UF/IFAS Extension and the residents of Florida. The program relies on dedicated volunteers who have an interest in gardening and in giving back to their communities.

History

In 1979, a group of Florida Extension agents chose to maximize resources by using a new volunteer training model, developed in Washington in 1973, called the Master Gardener program. The horticulture “Master” volunteer concept is so effective that it has since spread throughout the United States and several provinces of Canada.

Program Structure

Within Florida, each county Extension office chooses whether it wishes to participate in the statewide program. Active counties select a Master Gardener Volunteer Coordinator, typically the horticulture Extension agent for that county, who coordinates that county’s volunteer recruiting, training, and management efforts.

The Statewide Master Gardener Volunteer Coordinator provides overall guidance and a centralized curriculum to the county coordinators. The statewide office also issues programmatic policies that counties with active programs must follow.

The volunteers — or MGs, as they call themselves — execute a variety of outreach tasks as determined by the county coordinator. Duties are quite varied and can include answering horticultural questions over the phone or through the media, participating in public service projects, giving educational programs, supporting youth activities, assisting in field research, and other activities.

The ultimate end to all these activities is to extend the vision of UF/IFAS Extension — protecting and sustaining natural resources and environmental systems, enhancing the development of

Continued on Page 22

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Risky Business

Allen Fugler

PEST CONTROL technicians share much in common with postal letter carriers: compact, often urban routes, multiple stops per day, many hours behind the wheel, and the constant threat of dog attacks.

The U.S. Postal Service reported that more than 5,300 postal employees were attacked by dogs in 2022. The threat of dog attacks is so prevalent that the U.S. Postal Service takes an active role in the annual National Dog Bite Prevention Week, which is held the second full week of April each year.

With an estimated population of 89.7 million dogs living in U.S. households, millions of people, mostly children, are bitten by dogs every year. The majority of these bites are preventable.

- ✓ The Insurance Information Institute estimates that in 2022, insurers across the country paid over \$1 billion in dog bite claims.
- ✓ The American Society for Reconstructive Microsurgery reports that according to the American Society of Plastic Surgeons, 18,917 reconstructive procedures were performed in 2022 to repair injuries caused by dog bites.
- ✓ Children, elderly, and postal carriers are the most frequent victims of dog bites.

Dog bites are a major driver of workers' compensation claims medical expenses, second only to motor vehicle accidents. Fortunately, most dog bite injuries do not create lost time and the associated wage-payment costs.

Here are U.S. Postal Service tips to prevent dog bites:

- ✓ Don't run past a dog. The dog's natural instinct is to chase and catch you.
- ✓ Never approach a strange dog, especially one that's tethered or confined.
- ✓ If a dog threatens you, don't scream. Avoid eye contact. Try to remain motionless until the dog leaves.
- ✓ If you believe a dog is about to attack you, try to place something between yourself and the dog, such as a backpack or a bicycle.

National Dog Bite Prevention Week



- ✓ If you are knocked down by a dog, curl into a ball and protect your face with your hands.

The USPS also provides the following guidance for pet owners to help prevent dog attacks against postal workers. I encourage pest control companies to share these tips adapted for pest control situations with their technicians and dog-owning customers:

- ✓ Ask your customer to keep their dog in a room behind a closed door before opening the front door for you. Remember, dogs are capable of jumping through glass and screen doors.
- ✓ Be careful when handing anything to a customer or even shaking hands in the presence of a dog, who may perceive any contact as a threat to their owner. Of course, children should not be present during any treatments.
- ✓ If you feel unsafe around a dog or if the dog is loose, ask the owner to secure the dog before service is performed.

Postal workers are empowered to use aerosol dog-repellent products in the event they are attacked. While this policy is a last resort only during an attack, the USPS holds worker safety as paramount and has provided guidelines for using these products in self-defense.

If you are considering equipping your technicians with repellent sprays, you should have a clear policy on their use, including first requesting securing pets and declining to provide service if potentially dangerous pets are loose. That way, self-defense use of repellents can be limited to attacks by feral or unleashed dogs not owned by customers.

You should include training on policy and handling dog encounters as part of your new employee onboarding and in regular training sessions. **PP**

Allen Fugler is Director of Risk Management at Commercial Services Pest Control Division, Aegis General Insurance Agency Inc.

Bigheaded Ants In Florida

THE bigheaded ant (BHA), *Pheidole megacephala*, is a very successful invasive species that is sometimes considered a danger to native ants. It has been nominated among 100 of the "World's Worst" invaders.

The BHA has been a pest in southern Florida for many years. According to reports by pest control operators, BHA has become the most pervasive nuisance as it has replaced other ants such as the red imported fire ant, *Solenopsis invicta*, and the white-footed ant, *Technomyrmex difficilis*, in most areas.

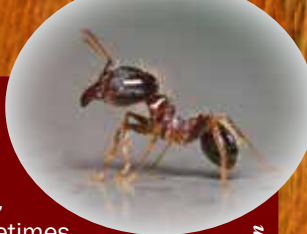
It is possible that the increase in Florida BHA infestations was augmented by excessive hurricane activity from 2003 to 2005 that damaged lawns and killed trees, which necessitated the use of sod and other replacement vegetation that may have been infested with this ant. In addition, it is thought that the BHA usually out-competes most other established ants, thereby dominating new areas.

The BHA does not sting or cause any structural damage. It usually does not bite unless the nest is disturbed, and even then, the bite is not painful. There are some 17 *Pheidole* species in Florida, of which 14 are native to Florida.

The BHA, a soil-nesting ant, is sometimes confused with subterranean termites because it may create debris-covered foraging tubes that are somewhat similar, albeit much more fragile, than termite tubes. More often these ants leave piles of loose, sandy soil. Homeowners are annoyed by these "dirt piles" and by ants foraging in bathrooms and kitchens and around doors and windows, as well as on exterior paved or brick walkways or driveways.

Control of the BHA is difficult because the ant colonies are numerous, and populations usually extend across property lines. **PP**

— John Warner and Rudolph Scheffrahn
From UF/IFAS Publication EENY-369



Rion Lerm



M. Kuhn

Elephants avoid *C. mimosae*

Bigheaded Ants,
Continued from Page 13

BIGHEADED ants are small but voracious hunters of insects. Bigheaded ants destroy colonies of the tree-protecting *C. mimosae* ants but do not defend the trees from the larger animals, as *C. mimosae* have been doing. Having lost their bodyguards, the acacia trees are being obliterated by elephants and giraffes. The lions, which are ambush predators, rely on the tree cover to stalk and hide before pouncing on zebras. Less tree cover means lions are not as successful at ambushing their prey.

"Oftentimes, we find it's the little things that rule the world," Palmer said. "These tiny invasive ants showed up maybe 15 years ago, and none of us noticed because they aren't aggressive toward big critters, including people. We now see they are transforming landscapes in very subtle ways but with devastating effects."

Making the best out of a bad situation, the lions are turning their attention to buffaloes, Palmer said. However, buffaloes are larger than zebras and hang out in groups, making them much more formidable prey.

"Nature is clever, and critters like lions tend to find solutions to the problems they face," he said, "but we don't yet know what could result from this profound switch in the lions' hunting strategy. We are keenly interested in following up on this story."

The field work in Kenya was led by University of Wyoming

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***C. mimosae* enter an elephant's trunk and proceed to bite it**

doctoral candidate and Kenyan scientist Douglas Kamaru. Palmer, along with Jake Goheen, from the University of Wyoming, and Corinna Riginos, with The Nature Conservancy, were coprincipal investigators on the National Science Foundation grant that funded the work. In addition to studying the phenomenon, the researchers say they also are interested in finding solutions to halt the loss of tree cover in these iconic landscapes.

"These ants are everywhere, especially in the tropics and subtropics. You can find them in your backyard in Florida, and it's people who are moving them around," Palmer said. "We are working with land managers to investigate interventions, including temporarily fencing out large herbivores, to minimize the impact of ant invaders on tree populations."

As science continues to move toward highly advanced technologies like AI-powered data collection, Palmer said their group's persistent focus on Kenyan wildlife has involved traditional methods over several decades, showing the staying power of boots-on-the-ground research.

"There are a lot of new tools involving big data approaches and artificial intelligence that are available today," he said, "but this study was born of driving around in Land Rovers in the mud for 30 years."

— Karen Dooley

News and Content Management
University of Florida



Palm seed weevil, left, cowpea weevil, top, and bean weevil



Palm seed weevil



Palm seed weevil, side



Damage to palm seeds



Bean weevil damage



Cowpea weevil on black-eyed peas

Photos by Lyle J. Buss, UF/IFAS

Palm Seed Weevil and Other Bruchids

Lyle J. Buss

I OFTEN get questions from homeowners and PMPs about an unusual beetle they find in homes — the palm seed weevil, *Caryobruchus gliditsiae*. It is native to the southeastern United States and develops inside the seeds of cabbage palm and other palms.

It doesn't attack seeds of plants other than palms, so it really isn't a pest. But it does sometimes wander into homes or may be attracted to lights, making it an occasional nuisance. Finding them in a home usually just indicates that a cabbage palm is nearby, but no control measures are warranted for this beetle.

The palm seed weevil is not a true weevil, as it doesn't have a long, narrow snout. It actually is classified within the leaf beetle family Chrysomelidae, in the subfamily Bruchinae. Entomologists often refer to this group as "bruchids," or "pea and bean weevils."

Bruchids generally have a broad, thick body that narrows toward the head. If you were to examine one closely, you'd notice that it has huge hind legs. The first segment (the femur) is very swollen and often has small spines along the lower margin. The next segment (the tibia) is curved in many species. These enlarged hind legs are actually used for grasping rather than jumping.

All bruchids develop within whole seeds, especially seeds of legumes. Several species attack black-eyed peas and other edible beans, and they can be pests in homes and places where beans are stored.

The cowpea weevil, *Callosobruchus maculatus*, and the bean weevil, *Acanthoscelides obtectus*, are a couple examples of the pantry pest species. They are pretty small, around 2–4 mm long. As you can see from the comparison photo, the palm seed weevil is much larger.

At 5–8 mm long, the palm seed weevil was the largest bruchid in the United States until the coconut borer, *Pachymerus nucleorum*, was found in Florida in 2005. The coconut borer looks similar to the palm seed weevil but is slightly larger. It also breeds only in palm seeds, but it isn't seen as often as the palm seed weevil. **PP**

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

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– Jimmy White, Owner
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Wendy Wilber, continued from Page 18

human resources, and improving the quality of human life through the development of knowledge in agricultural, human and natural resources and making that knowledge accessible.

Program Success

The success of the program has been phenomenal. Even during the pandemic, in 2020 Florida Master Gardener Volunteers (MGVs) were able to contribute to the UF/IFAS Extension service and volunteered 186,000 hours. A volunteer hour is valued at \$24.93 in the state, resulting in a contribution worth \$4.6 million to the citizens of Florida.

Despite the limitations of stay-at-home orders, volunteers were able to answer horticulture questions via phones and email. They also held horticulture trainings for Extension clientele via online learning platforms such as Zoom.

Volunteers also increased their personal horticulture expertise by logging over 60,000 continuing education credits. Additionally, 657 new MGV trainees were trained to become active in the organization.

The ultimate end to the educational outreach efforts of the Florida Master Gardener Volunteer Program is to extend the vision of the University of Florida/ Institute of Food and Agricultural Sciences, all the while protecting and sustaining natural resources and environmental systems, enhancing the development of human resources, and improving the quality of human life through the development of knowledge in agricultural, human, and natural resources and making that knowledge accessible. **PP**

<https://gardeningsolutions.ifas.ufl.edu/mastergardener>

Strategic Financial Management



Theresa Childs

IT'S NO secret to veterans of the pest control industry that killing bugs is the easy part — we know how to do that. But managing and growing a profitable organization requires a whole other set of business-related skills. Using and understanding the business metrics that impact profit is an area that often requires more focus.

The Importance of the Profit and Loss Statement

The original tool for managing your business — your profit and loss (P&L) statement — stands as a crucial tool for strategic decision-making. Regular review of the P&L statement empowers business owners to make informed choices, accurately gauge financial health, and identify emerging trends that could impact future performance.

This statement, reflecting the financial outcomes of business activities, is essential for understanding both the current position and future potential of a business.

Understanding Core Costs Over Time

Central to managing a pest control business effectively is the understanding of core costs, often called cost of goods sold (COGS), which includes labor, chemicals, fuel, and vehicle maintenance. Keeping a close watch on these costs over time is vital for identifying patterns,

grasping seasonal variations, and detecting inefficiencies. This ongoing analysis is key to implementing effective cost control measures and enhancing operational improvements. For example, noticing a steady increase in fuel costs might prompt a business to consider more fuel-efficient vehicles or to optimize routes to reduce travel distances.

Labor costs, often the largest expense in service industries, require careful management. This involves not just monitoring wages but also understanding the impact of training, turnover, and productivity on overall profitability. Investing in employee training can lead to more efficient service, reducing time per job and increasing customer satisfaction.

Using the P&L Statement and COGS to Make Business Decisions

The P&L statement serves as more than a summary of revenues and expenses; it's a strategic tool for business decisions. By analyzing individual line items, businesses can identify the most profitable services and may decide to focus more on these areas. This could mean expanding certain services, investing in specialized equipment, or marketing more aggressively in profitable niches.

Cost management is another critical area where the P&L statement is invaluable. Regular



review helps in identifying rising costs early, allowing for timely adjustments in operations. This proactive approach is essential for maintaining profitability in the face of fluctuating market conditions. Tracking your COGS year over year will not only help you identify areas of opportunity, but it will often dictate when you need to take a price increase and how much that increase should be.

The P&L statement also guides investment decisions. For instance, it can help determine whether purchasing new equipment or expanding service offerings is financially feasible. This insight is based on understanding the current financial capacity and the potential returns on these investments.

Budgeting and forecasting are other critical areas where the P&L statement plays a key role. Historical data from the P&L can be used for accurate budgeting and forecasting, which are essential for long-term strategic planning. This process involves projecting future revenues and expenses based on

past trends, helping businesses set realistic financial goals and make informed decisions about resource allocation.

Performance evaluation, an ongoing necessity in business management, relies heavily on the P&L statement. Regular comparison of actual performance against budgeted figures helps in evaluating the effectiveness of business strategies. This comparison can highlight areas of the business that are underperforming, prompting necessary adjustments.

Trends in Route-Based Service Businesses

For route-based businesses, there are several areas where our industry is focused:

Technological Advancements:

The implementation of route optimization software and GPS tracking technologies can lead to significant cost savings and operational efficiencies. These technologies enable businesses to optimize routes in real-time, reducing travel time and fuel consumption. *Continued*



Bill Oxford

Industry Focus, continued

Customer Retention Rates:

High customer retention rates are a strong indicator of customer satisfaction and service quality. These rates provide valuable insights into the effectiveness of both route planning and customer service strategies. By monitoring customer feedback and retention rates, businesses can identify areas for improvement in their service offerings.

Employee Retention Rates:

Your business needs reliable, competent employees in order to be profitable. How are you attracting and retaining talent? Not all employees, even tenured ones, are equal. Are you evaluating and responding to employee needs individually? It's certainly more work to analyze performance individually, but it's a great way to identify opportunities and best practices in your organization.

Analyzing Route Efficiency Using the P&L Statement

Managing the efficiency of routes is critical in the pest control business, and the P&L statement can be instrumental in this regard. By analyzing costs per stop, businesses can identify which routes or services are more profitable and which may need optimization. This analysis can lead to adjustments in routes, possibly by grouping customers geographically or by service type, to maximize efficiency and profitability.

For instance, if the P&L analysis shows that certain geographical areas are more profitable than others, a business might decide to allocate more resources to those areas. Similarly, if certain types of services (e.g., commercial vs. residential pest control) are more profitable, the business might choose to specialize or expand in those areas. If your business is small but

growing, it's time to consider investing in one of the industry specific software services, called Customer Relationship Management (CRM) software, to level up in your customer account management and route optimization.

Responding to Market Changes

The pest control industry, like any other, is subject to market fluctuations and changes. The P&L statement can help businesses respond effectively to these changes. For instance, in a downturn, the P&L can help identify areas where costs can be cut without compromising service quality. During growth periods, it can guide investment in areas that will drive further growth.

One example is marketing. When times are lean, businesses often buckle down and focus on customer retention and route density. In periods of growth, businesses are more easily able to focus on marketing and route expansion

Conclusion

In conclusion, the effective use of the P&L statement is vital for pest control businesses. It is not only a tool for understanding core costs but also a guide for making strategic business decisions, adapting to market trends, optimizing routes, diversifying services, and expanding operations. By leveraging the insights provided by the P&L statement, pest control businesses can achieve sustained success and growth in a competitive market. **PP**

Theresa Childs is Vice President of Marketing and Client Relations for Kemp Anderson Consulting.

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Is Gel Bait Still a Viable Choice For German Cockroach Control?

Daniel D. Dye II

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KNOW**

I RECALL the time in my career when I was first introduced to cockroach gel bait. I was working in Pensacola as the assistant manager for one of the largest family-owned pest control companies in Florida.

I had two German roach cleanouts to perform that day. In my tool box were all kinds of products to choose from. I decided to use only roach gel bait.

I explained to the customers what I was doing, and all were receptive to the treatment. They understood my instructions and agreed to allow me to return in 30 days for a followup inspection. The infestations were moderate to heavy.

When I returned, I was surprised at the outcome. The infestations were completely gone, except for one area in the kitchen. Can you guess where? It was under the refrigerator!

I took a sheet of printer paper, folded it in half, placed several droplets of bait in it, and slid it under the refrigerator. Problem solved!

Atrix Omega Green Supreme vacuum, shown with optional backpack harness.

What About Bait Aversion?

Now let us fast forward. With stories of bait aversion being spread throughout our industry, one would think that complete German cockroach elimination is coming to an end.

Not so. In fact, research is proving over and over again that roach gel bait applications are still one of the best choices, even if sanitation conditions are less than ideal.

In one study, insect sticky trap monitors were placed to evaluate German cockroach populations in eight infested apartment units. These units were in a low-income, senior complex. The researchers placed six traps in each apartment in or near typical harborage areas, such as under the kitchen sink and under the stove. The

traps yielded six to 150 German cockroaches per day.

A treatment was performed by placing 0.1 gram (approximately 1/16-inch diameter) spots of roach gel bait into harborage areas in each apartment. During the test, the sanitation in each apartment was not changed. Some apartments had clutter and garbage accumulation.

After the treatment, insect sticky traps were once again placed in the apartments. These traps were inspected once a week for four weeks.

By the end of the first week there was a 72% reduction in the German cockroach population. The fourth week yielded a 99% reduction in the population overall. No additional baits or other control products were applied after the initial baiting.

It sure looks like applying roach gel baits is still an excellent method for controlling German cockroaches. However, it also depends on the technician's level of skills and applying the bait correctly.

Effective Gel Application

So, how do we apply cockroach gel baits correctly? Let's talk about that.

First, before you apply any roach gel bait use a suitable vacuum system, such as the Atrix Omega Green Supreme vacuum. Vacuuming will go a long way toward reducing the cockroach population and allow for more efficient use of the roach gel bait.

Continued



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Photos may not be representative of label-consistent bait placement.

*Rodents may consume a lethal dose in a single feeding, which may result in population knockdown.

**Rodents may consume a lethal dose and cease feeding on bait in a single night, resulting in less bait used in comparison to anticoagulant rodenticides.

Gel Bait, continued

You may already know gel baits should never be placed where residual products have been or are going to be applied. Doing so will reduce the palatability of the bait considerably.

Keep in mind, several BB-sized applications distributed within a harborage area are more effective than a few larger applications. When treating a heavy infestation, you should apply two spots per linear foot, or one spot every 6 inches. For a light to moderate infestation, apply one spot per 2 linear feet. One spot application should equal about 1/8 inch in diameter.

Cockroach gel baits can be applied as a crack-and-crevice treatment only in or near the harborage areas as the label allows. Areas to apply cockroach gel baits should include cracks and crevices in and around cabinets, behind or under equipment, within or near garbage collection areas, cracks and crevices along walls or floors, under tables, and within framing of tables or furniture.

Never apply baits on cabinet door hinges, plumbing under sinks, or any other place where the customer can see the baits in plain view. Always think cracks and crevices: This is where the roaches hang out.

Considering the Options

What about cockroach gel baits vs. residual crack-and-crevice products?

Here are a few things to consider:

- Properly applied gel baits keep roaches where they hide — cracks and crevices. Sprays often disperse them. Remember this: Sprays chase, baits attract.
- Some cockroach gel baits have a secondary kill, i.e., a roach eats bait and dies. Then another roach eats the dead roach and dies. Most residual sprays do not have a secondary kill.
- With gel baits, one feeding will often kill the roach. With residual sprays, the roach must be exposed to the product over time to get a lethal dose.

If applied correctly, the result will be total elimination in just a few weeks. It's a win-win for both you and the customer.

PP

Daniel D. Dye II is Associate Certified Entomologist Emeritus.

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UF Termite Researchers Contribute To New Book on Formosan Subterranean Termite Biology and Control

Thomas Chouvinc

A FEW days before the end of 2023, *Biology and Management of the Formosan Subterranean Termite and Related Species* was officially published. This was a great moment of celebration at the UF Termite Laboratory in Ft. Lauderdale, as this book had been on our minds for many months.

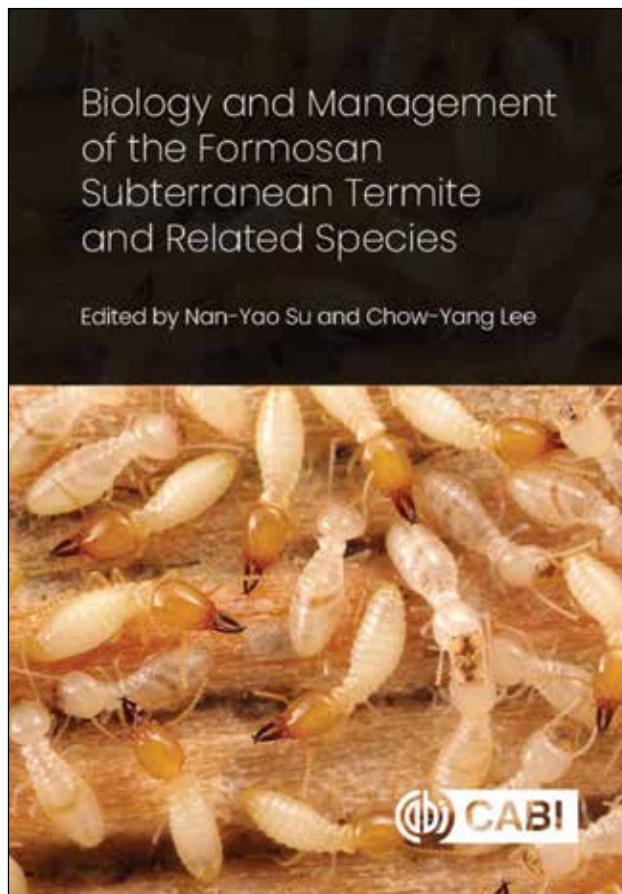
Spearheaded by Dr. Nan-Yao Su of University of Florida and Dr. Chow-Yang Lee of University of California Riverside — both experts in termite biology and urban pest management — this new book is the result of two long years of hard work by 17 authors and coauthors from around the world. Five of them are current UF professors or UF alumni. It brings together a most comprehensive perspective on a multitude of biological aspects of one of the most infamous invasive termite species in the world: the Formosan subterranean termite.

The book was written with a specific goal in mind: to make it a universal, one-stop resource that gathers all the modern knowledge about subterranean termites. It was assembled into distinct chapters that cover the most relevant aspects of subterranean termite biology and management practices. Each contributed chapter was written by academics that possess in-depth knowledge of each topic, bringing a wide range of perspectives, insights and know-how.

More impressive, this book can both serve as a starting point for students to introduce themselves to the complexity of termite biology and as a solid resource for pest control providers, with a comprehensive review of the science behind management practices.

Unequivocally, this book will have a long-lasting impact on the pursuit of knowledge in termite biology. It will also certainly bring more students and pest control providers to a delightful appreciation of how complex and beautiful subterranean termites can be.

<http://tinyurl.com/Formosan-Sub-book>



Editor Nan-Yao Su



Editor Chow-Yang Lee

BIOLOGY AND MANAGEMENT OF THE FORMOSAN SUBTERRANEAN TERMITE AND RELATED SPECIES

408 pp.

Edited by Nan-Yao Su and Chow-Yang Lee

ISBN: 9781800621572

List of Chapters:

- 1) Introduction — Nan-Yao Su and Chow-Yang Lee
- 2) Biogeography of *Coptotermes formosanus* — Rudolf Scheffrahn
- 3) Taxonomic Status of *Coptotermes formosanus* and Related Species — Houfeng Li and Chia-Chien Wu
- 4) A Primer to Termite Biology: *Coptotermes* Colony Life Cycle, Development, and Demographics — Thomas Chouvinc
- 5) Ecology and Foraging Behavior — Nan-Yao Su
- 6) Physiology of the Formosan Subterranean Termite, with Special Reference to Wood Degradation and Metabolism — Gaku Tokuda, Shuji Itakura, and Nathan Lo
- 7) Chemical Ecology — Qian Sun
- 8) Symbiosis and Microbiome in Termite Guts: A Unique Quadripartite System — Claudia Husseneder

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List of Chapters, continued

- 9) Dispersal and Genetic Structure of Colonies and Populations of *Coptotermes formosanus* and *Coptotermes gestroi* — Edward Vargo
- 10) Inspection and Monitoring — Faith Oi
- 11) Management Using Baits — Nan-Yao Su
- 12) Management of Subterranean Termites Using Soil Termiticides — Chow-Yang Lee and Kok-Boon Neoh
- 13) Prevention of Damage to Building Materials Using Wood Preservatives — Wakako Ohmura and Koichi Yamamoto
- 14) Alternative and Experimental Management Methods — J. Kenneth Grace
- 15) IPM and Area-Wide Population Management — Nan-Yao Su
- 16) The Asian Subterranean Termite, *Coptotermes gestroi* — Kok-Boon Neoh and Chow-Yang Lee
- 17) Hybridization Between *Coptotermes formosanus* and *Coptotermes gestroi* — Thomas Chouvenec and Hou-Feng Li
- 18) Using *Coptotermes* for Laboratory Experiments: Field Collection, Laboratory Rearing, and Bioassay Visualization — Thomas Chouvenec
- 19) More Questions to Answer — Nan-Yao Su. **PP**

Thomas Chouvenec is an Associate Professor in urban entomology at the Ft. Lauderdale Research and Education Center of the University of Florida Institute of Food and Agricultural Sciences.

Mosquito Control Licensing in Florida

Requirements for Government Entities

Government employees or government-contracted vendors making widespread community or municipal mosquito-control applications over a designated area are required to obtain a Public Health Pest Control license.

If you are seeking to become director of a county, municipality or district mosquito control program, Florida Department of Agriculture and Consumer Services (FDACS) Mosquito Control Director's Certification is required.

Mosquito control programs with aerial capacity must employ a licensed pilot; this employee is required to obtain a Public Health Pest Control license with an added category for aerial.

Requirements for Individuals and Private Contractors (Pest Control Companies)

Individuals and private contractors operating on a for-hire basis making mosquito-control applications to private or commercial properties (homes, hotels, resorts, etc.) must obtain a pest control business license and have on staff a pest

control operator certified in General Household Pest Control or Lawn and Ornamental Pest Control.

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

How to Obtain a Public Health Pest Control License EXAMINATIONS

Two exams must be passed to qualify for certification:

Core (General Standards) Exam covers general pesticide use and safety.

Public Health Pest Control Exam covers mosquito biology and habitats, control methods, regulations, medical importance, and nonmosquito arthropods of public health importance.

STUDY MATERIALS

Core Exam: *Applying Pesticides Correctly*, available at the UF/IFAS Extension Bookstore.

Public Health Pest Control Applicator Training Manual, PDF available online.

How to Schedule an Exam

There are no set examination locations, dates or times. Exam scheduling arrangements must be made through your local county UF/IFAS Extension office.

Fees

There are no fees to take the exams.

FDACS Public Health Aerial Category

Mosquito control programs that conduct control operations by air must have employees who maintain a pilot license as well as the Public Health Pest Control (PHPC) license with the aerial category.

AERIAL EXAM

The aerial category can be obtained by taking the **PHPC Aerial Exam** after issuance of the **PHPC license**.

STUDY MATERIALS

Aerial Category Exam: *Aerial Application*, available at the UF/IFAS Extension Bookstore. **PP**

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Head Lice Evolution Mirrors Human Migration And Colonization in the Americas

Global genetic study of lice suggests they arrived twice in the American continents on human hosts

A NEW analysis of lice genetic diversity suggests that lice came to the Americas twice – once during the first wave of human migration across the Bering Strait, and again during European colonization. Marina Ascunce, who conducted the research at the Florida Museum of Natural History, and colleagues report these findings in a new study published in journal PLOS ONE.

The human louse is a wingless, blood-sucking parasite that lives its entire life on its host. It is one of the oldest known parasites to live on humans, and the two species have coevolved for millennia.

Due to this intimate relationship, studying lice can offer clues to how humans evolved as well. In the new study, researchers analyzed the genetic variation in 274 human lice from 25 geographic sites around the world.

A genetic analysis based on louse DNA revealed the existence of two distinct clusters of lice that rarely interbred. Cluster I had a worldwide distribution, while cluster II was found in Europe and the Americas. The only lice with ancestry from both clusters are found in the Americas. This distinct group appears to be the result of a mixture between lice descended from populations that arrived with the First People and those descended from European lice, which were brought over during the colonization of the Americas.

The researchers also identified a genetic relationship between

lice in Asia and Central America. This supports the idea that people from East Asia migrated to North America and became the first Native Americans. These people then spread south into Central America, where modern louse populations today still retain a genetic signature from their distant Asian ancestors.

The patterns observed in the new study support existing ideas about human migration and provide additional knowledge about how lice have evolved. The researchers point out that they selected genetic markers that evolve quickly and are best suited to recent events. Thus, future studies that use markers that have changed more slowly could shed light on more ancient events. Additionally, the methods developed for



Gilles San Martin

Head louse on human hair

this work could guide the development of new analyses to study other host-parasite systems.

The authors add: “Human lice are more than annoying human parasites, they are ‘satellites’ of our evolution. Because human lice feed on human blood, they need us to survive, and over millions of years this resulted in a long co-evolutionary history together.”

PP

Florida Museum of Natural History

Ariel Toloza of the Consejo Nacional de Investigaciones Científicas y Técnica, Angélica Oliver of the Universidad Nacional Autónoma de México, and David Reed of the University of Florida are coauthors on the study.

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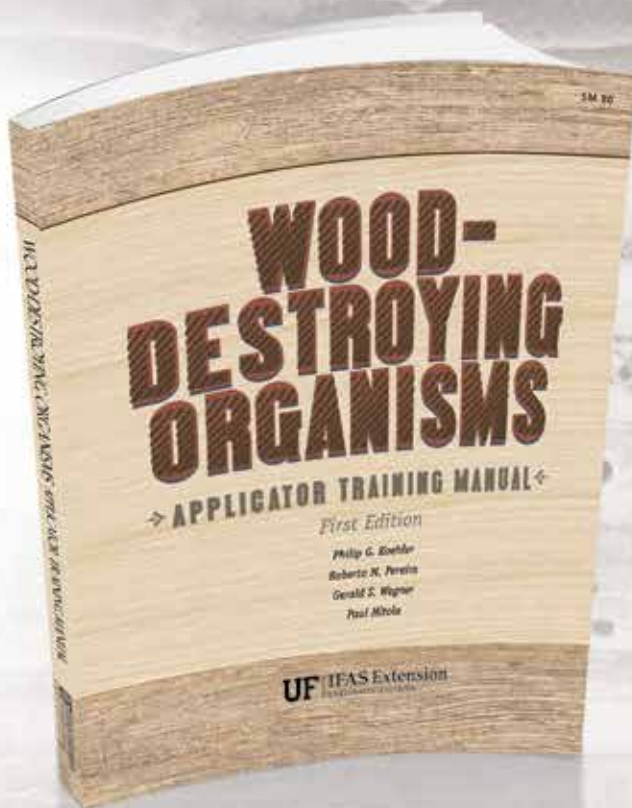
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