MAY/JUNE 2017

Exotic Lizards | Gloomy Scale Insects | 4-H Entomology

PESTPRO

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

Spring Brings Insect Activity and Business

Large Flies of the Filth-Breeding Kind

OFFICIAL MAGAZINE OF FLORIDA PEST MANAGEMENT ASSOCIATION

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Photos in public domain

Another Day in Paradise

Message from the President of FPMA

Anne-Marie Tulp

MAY IN FLORIDA means that the snowbirds have flocked back up north, traffic is lighter on the roads, and you may now be able to actually get a seat in one of your favorite restaurants! It also means pests are on the move and your phones are (hopefully) ringing off the hook. But before I get ahead of myself, let's recap what's been going on in your association since I last checked in.

FPMA Legislative Days took place March 20-21 in Tallahassee. It was great to visit our state's capital to see democracy at work. We were once again treated to a private tour of the capitol building, led by FPMA lobbyist Missy Timmins, followed by a reception at the private governor's club. As is often the case, we would be unable to offer a member benefit such as this without the continued support of our valued sponsors. A big thank you goes out to Douglas Products, Ensystex, Florida Sprayers, Bayer, Bell Laboratories, Dow AgroSciences, Target Specialty Products, and One, Two, Tree.

I hope many of you were able to show support to our friends at the University of Florida by attending the Southeast Pest Management Conference May 1–3. It was an awesome opportunity for you and your team to get lots of valuable education. The highly anticipated Sapp–Walkup Tailgate on Monday night and the Cooksey Family Cookout at lunch on Wednesday always add to the SEPMC experience.

As promised, FPMA headquarters has been emailing a monthly e-newsletter your way to give a recap of how your association has been working for you. May is the third installment of this new communication, and I hope this information gives insight into the value of continued membership in our association.

We have completed two of our four promised webinars for 2017, with the third slated for May 17 entitled Customer Retention vs. Acquisition. Remember, you must register in advance in order to take advantage of this opportunity.

This month in the Past President's Corner we check in on Jim Harding, who served as our president in 1976–77. Based on his photo, it looks like retirement is treating him well! Thank you, Mr. Harding, for sharing your story with us.

As predicted, Summer Conference is a big hit. I am sure by the time this is published, we will be completely sold out in both the exhibit hall and hotel rooms. We have some terrific business sessions, leadership challenges, and exhibitors. For more information, log on to our website flpma.org or email Rachel Borgie @ fpmaevents@gmail.com.

I look forward to seeing you in June at FPMA in Paradise! PP

— Anne-Marie Tulp,
President, FPMA

PestPro is for ***EVERYONE***

IN 2015, the UF/IFAS Urban Entomology Lab took over *PestPro* magazine to continue to provide technical information and education for landscape and urban pest managers. We believe that everyone in the pest management industry can benefit from *PestPro*. We believe that a magazine that is delivered six times a year to practically every pest management professional in Florida enhances our education and Extension mission at the University of Florida, and it also enhances the Florida Pest Management Association's goals of informing their membership, and the industry, in general, on important industry issues and events.

Our recent joining with FPMA to become the official magazine for the Florida Pest Management Association will make both our technical information and their industry information available to more than 12,000 industry professionals in Florida and other states.

Our technical information is provided from scientists at the University of Florida. Just recently, a survey of universities throughout the world was accomplished and published. It reported that we in the Entomology Department at the University of Florida are the No. 1 entomology department in the entire world. In fact, the responses worldwide were 100 percent in voting for our department as No. 1. There were no dissenting voters. The reasons given for that ranking were due to 1) quality of student instruction, and 2) prestige of faculty in our department. We are very proud that a number of our well trained University of Florida students are employed throughout the industry. At *PestPro*, we are proud to have many of our No. 1–rated faculty contributing to our magazine. You can't ask for any better source of good, solid information.

Many industry professionals do not know that *PestPro* is something we do as volunteers. We receive no personal benefit from publishing the magazine. We are not businessmen in the normal sense. We formed the nonprofit corporation, Pest Management Education, Inc., to allow us to make current technical information available to the industry. We do the work of writing and putting together the magazine out of love for urban pest management, not personal gain.

No other entomology faculty in the world has ever taken on the task of developing a magazine for the urban pest management industry, as far as we know. We have received many compliments and notes of appreciation from our readership. It is apparent that many folks see *PestPro*'s value and are happy to receive new and current information every other month. We have a dedicated staff that does a wonderful job of laying out and producing a quality magazine. Also, we are proud that our advertisers support our efforts and help us make the magazine available to everyone in the industry.

The funds that Pest Management Education, Inc. receives are almost solely used to print and mail the magazine. As required by the charter of PME, Inc — *PestPro*'s nonprofit publishing company — proceeds in excess of expenses are donated to the University of Florida to give scholarships to students and support urban pest management research. Our costs of printing and mailing the magazine are equal to and sometimes greater than the support from our advertisers and donations from individuals. We are working toward finding a solution for this challenge.

As volunteers in publishing the magazine, we were happy to combine our mission and goals with those of FPMA. FPMA has a message to carry to their membership. It is important for companies and individuals in the industry to band together and make sure their interests are represented. We get no form of compensation from FPMA. However, we encourage every pest management professional in Florida to join his or her favorite association so that your voice can be heard, and the industry can be stronger and better. I said several years ago that this industry is composed of friends who help each other succeed. By working together as friends, the industry can grow and prosper, implementing the new discoveries and information made available from the University of Florida. As a partner, FPMA also works to advance the industry.

Our goal is to make *PestPro* an educational tool for the entire industry. We hope that everyone will join with us in our efforts to provide current and educational information from University of Florida scientists and other well known contributors. PP

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

Large FILTH-BREEDING Flies

Philip Koehler and Roberto Pereira

Here are a few fun facts for your customers:

Plastic bags of water will not keep flies away. Even adding a penny to the bag doesn't work.

Green bottle fly
Lucilia serricata

Bronze bottle fly
Lucilia cuprina

The average speed of a fly in flight is 4.5 miles per hour. Some flies, like horse flies, are speed demons and can go more than 20 miles per hour.

Stable fly
Stomoxys calcitrans

House fly
Musca domestica

Flesh fly
Sarcophaga hemorrhoidalis

Little house fly
Fannia canicularis

Small flies don't grow into large flies. Adult flies don't grow larger. So a small adult fly never molts into a larger fly. Those are different species.

In the right conditions, adult flies can live for three weeks. However, they will die within 24 hours if deprived of sugars for energy. They burn a lot of energy flying.

Black blow fly
Phormia regina

Secondary screwworm fly
Cochliomyia macellaria

Flies taste with their feet. So they usually land on food and can tell immediately if it is something they would enjoy eating.

Fly photos this page, from top: Clint Mason, Pavel Krok, Graham Wise, Alexey Goral, Don Hall, Janet Graham, Tom Murray, Judy Gallagher

FLIES ARE a lot like cats: There are large flies, and there are small flies. The sources of small flies differ considerably from those of large flies. Small flies are the terrorists. They usually live and breed inside structures such as houses, restaurants and commercial buildings. Large flies are the invaders. They usually live and breed in filth outside and around structures, then enter when conditions outside are poor for their survival. Let's take a look at the **large flies** and how to control them for your customers.

USDA/ARS

A sterilized male New World screwworm fly about to be released.

Fly Control

Fly control has evolved into something that should be offered by most pest control companies, because there are a lot of new, highly effective products available. Most fly control products are baits. They come as three different types of baits: scatter baits, sprayable baits, and bait stickers. Many of the baits have a sugar base, an insecticide active ingredient, and a sex attractant. The sex attractant is muscamone, Z-9-tricosene, which is actually considered an active ingredient by the US Environmental Protection Agency.

Golden Malrin® is one of the longtime fly baits available as a scatter bait. The active ingredient is methomyl, which is a carbamate, and it has muscamone as an attractant. That is one of the last carbamate insecticides available to the pest control industry. The product now has a lot of warnings on the label specifically stating that it should not be used around residential dumpsters or places where children or animals can contact it. It is still a good product for use at commercial facilities where dumpsters are enclosed.

QuikStrike® Fly Bait is another scatter bait with muscamone attractant. QuikStrike has dinotefuran as the active ingredient. Dinotefuran is a fast-acting nicotinoid insecticide. Like all the scatter baits, it should only be used around dumpsters that are enclosed. The usual method of application is to scatter the bait where flies occur. However, the label also allows use in fly bait stations that are secured at least 4 feet above the ground.

MaxForce® Granular Fly Bait is a scatter bait that can be applied to areas where flies congregate and in bait stations. It is unique in that it can also be used as a paint-on application. The active ingredient is imidacloprid, and it has muscamone as an attractant. Imidacloprid also is a nicotinoid and acts quickly in knocking down flies. The label does not have the warning about enclosed dumpsters, so it can be used more broadly than other scatter baits.

MaxForce® Fly Spot Bait also has imidacloprid as an active ingredient with muscamone as an attractant. It can be applied either diluted in water as a spray application or as a paint application. It is registered for use outdoors as well as indoors in nonfood areas of food-handling establishments. This product is also fast acting because of the nicotinoid, imidacloprid, and has been a long-time favorite of the industry.

PT® Alpine® is a pressurized aerosol spray fly bait. It is a very convenient formulation that contains dinotefuran as the active ingredient. It does not have any volatile attractants and should be applied to areas where flies occur. It is a very fast-acting bait that can be applied as a band, an area, or a removable bait placement. The label permits application to food areas of food-handling establishments. *Continued*

A fly head is mostly covered with eyes. Many flies have five eyes: two compound eyes and three simple eyes, or ocelli. Their compound eyes can have over 4,000 lenses.

It is not surprising that flies are visual and respond to colors. Our research at UF found that flies are especially attracted to the color blue.

J.J. Harrison

New World screwworm fly
Cochliomyia hominivorax

Judy Gallagher

This fly is important because the maggot feeds on the living flesh of animals and humans.

NEWS ALERT

The New World screwworm fly, *Cochliomyia hominivorax*, which had been eradicated from North America, showed up last year in the Florida Keys. Some of the Caribbean islands and South America were still infested with the fly, and the flies were somehow brought into the Keys again.

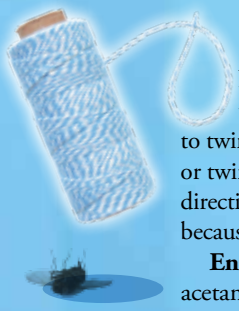
For the first time since 1959, the screwworm fly has now been reported on mainland Florida. On January 9, 2017, the United States Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS) confirmed the presence of New World screwworm in a stray dog near Homestead, Florida. The dog was isolated and his infested wounds were treated. He is now in good health. Federal and state officials started active surveillance in the area.

Screwworm was first confirmed on October 3, 2016, in Key deer from National Key Deer Refuge on Big Pine Key, Florida. This was the first local detection of screwworm in the United States in more than 30 years, and Florida Commissioner of Agriculture Adam Putnam declared an agricultural state of emergency in Monroe County.

Since 2016, 13 Keys had known infestations mostly in the Key deer population, with five confirmed infestations in domestic animals. Animal health and wildlife officials at state and federal levels have been working aggressively to eradicate this pest. Extensive response efforts have included fly assessments to determine the extent of the infestation, release of sterile flies to prevent reproduction, and disease surveillance to look for additional cases in animals. Officials have received significantly fewer reports of adult screwworm flies in the area and fewer cases of infected Key deer. To date, fly assessments have been conducted on 40 Keys.

USDA has released over 80 million sterile male flies from 25 ground-release sites on 12 islands and the city of Marathon. Massive releases of sterile male flies were the technique used previously to eliminate the screwworm from the continental United States. While they can fly much farther under ideal conditions, adult flies generally do not travel more than a couple of miles if there are suitable host animals in the area.

Pest control operators need to be aware of this fly and report any suspected cases of screwworm infestation or adult flies.

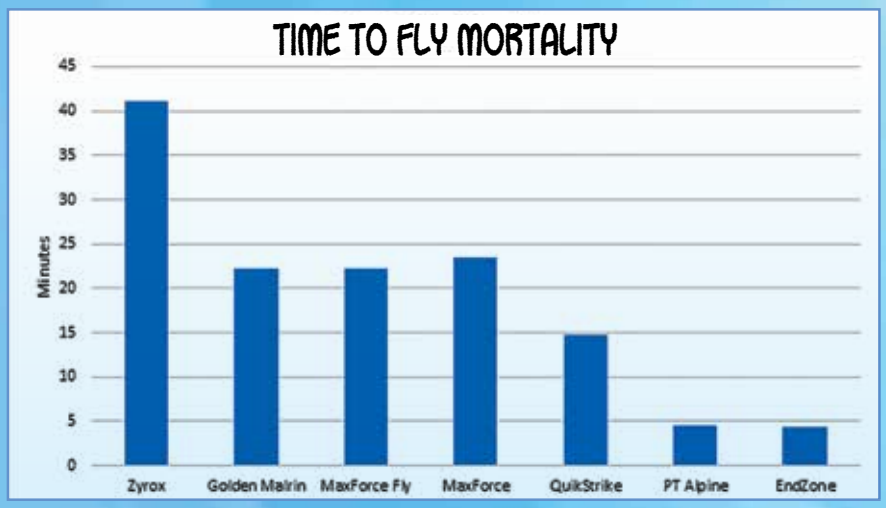


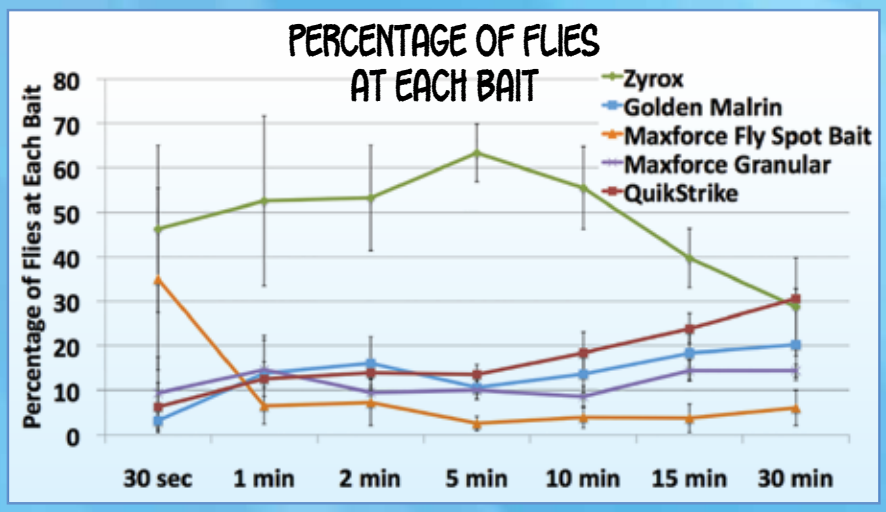
ONE INNOVATIVE part of the label allows application to twine. Flies like to rest on string or twine, where they can see in all directions. This application attracts flies because it is a preferred resting area.

EndZone™ Insecticide Sticker has acetamiprid, a nicotinoid, as its active ingredient. The transparent sticker is designed to be used on the corners of windows and light fixtures where flies congregate. The bait on the sticker is clear and absorbs moisture from the air.

Stickers are most effectively used indoors in air conditioned spaces. It takes practice to remove the sticker's adhesive surface from its protective backing, but application is simple once practiced.

Zyrox® Fly Granular Bait is a unique scatter bait that has cyantraniliprole as its active ingredient. This is the first reduced-risk scatter bait approved by EPA. Cyantraniliprole, in the diamide class of insecticides, affects the ryanodine receptor on the fly's muscle tissue and paralyzes the fly after the bait is consumed.



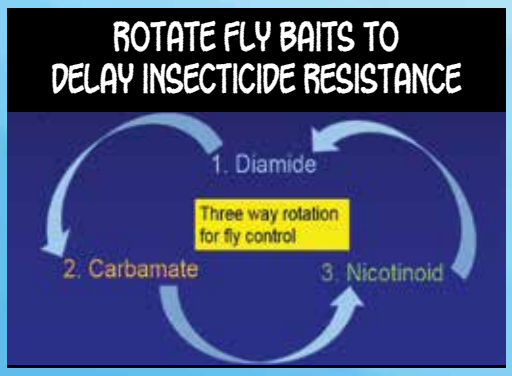


Lab Results

In our laboratory, we evaluated these fly baits to see the time for flies to die after exposure to the baits. Susceptible house flies were placed in 1-quart Mason jars and allowed to feed on the baits. Zyrox was the slowest, and EndZone was the fastest (see Time to Fly Mortality, at left).

However, we followed this up with an attractance study to determine which baits were the most attractive. Flies were released into a large cage, and baits were placed on the floor of the cage in a large circle. Our results, seen in the graph at left, showed that Zyrox attracted up to five times more flies than the other baits. So the slowest bait was the most attractive of the tested baits.

Flies have evolved resistance to many of the insecticide groups. In fact, certain populations of house flies are known to be resistant to the pyrethroids, nicotinoids, organophosphates and carbamates. Constant use of one product can cause failures. Therefore, it is recommended that products be rotated. A reasonable rotation would be to go from a carbamate to a nicotinoid to a diamide, as illustrated in the diagram below.



What It Means For YOU

Large-fly control can be an important revenue source for your company. The bait products can be applied very effectively for control. However, you should look at the various ways they can be used and the active ingredients, and remember to rotate insecticide classes so resistance does not cause failures. PP

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

Spring Brings Insect Activity —and Business

Adam Dale

Lyle Buss, UF/IFAS

Scott Bauer, USDA

OVER THE PAST several weeks the weather has warmed, daylight has increased, and nature has responded. Plants have flushed new leaves and begun to actively grow. Insect activity is closely synchronized with this — largely driven by temperature, but also because insects have fresh new food.

Many herbivorous insects —ranging from sap-feeders like aphids and whiteflies, to leaf-eaters like caterpillars and beetles— strongly prefer to feed on newly developed leaves and buds.

Why the preference?

New leaves are more nutritious. Nitrogen is a limiting nutrient for insects, which generally means the more they can get, the more successful they are. Nitrogen content in leaves follows seasonal cycles, peaking in early spring and late fall. Many insects have synchronized their life cycles and feeding behavior to match these nutrient cycles in plants. That way, they get the most out of what they eat.

New leaves are also easier to chew and digest. Younger leaves are not as thick, have less cellulose and lignin, and are generally not as tough as mature leaves. For chewing insects like caterpillars and beetles, tough leaves mean less eating, slower development, and more wear and tear on their mouthparts. Like cutting hair with dull scissors.

Not only are new leaves less physically challenging, but they also contain fewer defensive compounds like tannins and resins. When insects eat tannins, they

Olgierd Rudak

Lamba

aren't able to break them down and digest the leaf material. Oak trees, for example, produce high concentrations of tannins in their leaves as the leaf matures.

What insects follow this synchrony?

Nearly all insects become more active as spring progresses. However, insect species demonstrate this activity differently. Scale insects are among the most difficult pests to control on ornamental plants. These sap-feeding pests are an excellent example of spring synchrony and its relevance to management because it is when they are most effectively controlled.

Most scale insect species produce their offspring during the spring. These young nymphs, called crawlers, are mobile and do not have a protective covering to shield them from control efforts. My research has found that multiple scale insect species are most effectively controlled if treated during this time. Properly applied insecticides targeting the crawler stage can reduce populations by quite a bit, although it takes persistence and patience.

On the turfgrass side of things, monitoring for mole crickets is critical during the spring. Adult mole crickets fly and reproduce throughout spring. Young nymphs begin to emerge in late spring, which is when they are most susceptible to control efforts.

Conducting soapy water flushes in multiple locations in areas suspected of infestation will allow managers to detect individuals and determine their life stage. Crickets that are approximately ½ inch in length are a good indicator that most of the population has emerged, but individuals are not too large to kill with insecticide applications.

Additionally, products with residual activity should control the remaining nymph population to hatch. The only way to know when scale insects, mole crickets, and other herbivorous pests are in this susceptible life stage is by monitoring for them.

What does this mean for IPM?

Monitoring for pest activity and susceptibility is critical to an effective IPM program. This will inform when populations are abundant, but also when they can be most effectively controlled. As a general rule, younger insects are more vulnerable to control efforts than older insects of the same species. This is a size-dependent toxicity, but also many adult insects can fly and vacate treated plant material.

Continued on Page 14

Florida wax scale nymphs (top) and crawler, right

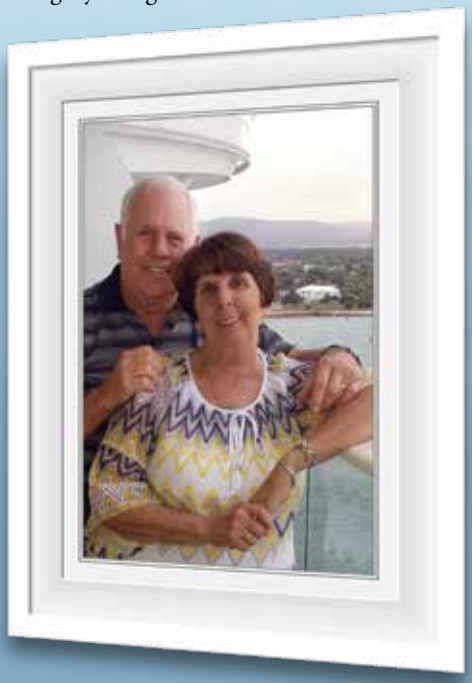
Mole cricket soap flush

JIM HARDING, LABORATORY EXTERMINATORS, FPMA PRESIDENT 1976–1977

Name: Jim Harding
Hometown: Hollywood, Florida.
Where you live now: The Villages, Florida.
About your company: My father founded Laboratory Exterminators in 1946. I worked in that business and eventually took over as president. In 1979 I decided to sell and move my family to Blowing Rock, North Carolina, where I bought Grandfather Mountain Country Store. I wanted a business that I could run with my family and very few employees. My other stipulations were no vehicles on the road. I eventually built a motel next to the store. In 1999 I decided to sell and move back to Florida. All the kids had graduated college, so I lost my help. I went to work for Florida Pest Control and Chemical Company as the GHP training director. I worked for D.R. [Sapp] until retiring in October of 2015.
First paying job & what you learned from it: First paying job was working on a fumigation crew making $75 per week.
First break in the pest business: Biggest break was getting that job at 15 years old.

Best business book: Not much on best book. Just work hard, and pay attention to the little things. The rest will come.
Best business advice you received: Came from my father — never bad-mouth a competitor.
What would I tell someone new to the pest control business? Always do what you say, always be on time or call the customer if running late.

Where can we find you when you are not at the office? I no longer have an office, so probably on the golf course.
What is the most important trait you looked for when hiring: Honesty, integrity and good work ethic. PP



Jim and Dorothy Harding

Size comparison:
Flower thrips, left, and chilli thrips

Using multiple scouting techniques on a regular basis will keep managers ahead of pest infestations. Therefore, spring means increased insect activity, but also that business activity will pick up.

Chilli thrips is an exotic insect pest of many landscape plants that preferentially attacks newly emerged leaves. Feeding by this pest causes leaf distortion and discoloration, which can deform or stunt new growth and lead to plant defoliation. Therefore, if not caught early, infestations can cause damage that requires more drastic measures — like plant pruning — that significantly slow plant growth.

My lab recently did an experiment to determine the most effective IPM approach to managing chilli thrips in the landscape. We found that more than one product worked, but that plant protection depended on insecticide application at the first sign of feeding damage. This was done through weekly surveys for symptoms of chilli thrips damage.

Consider the environment

Recent weather and the local environment can affect insects. Insects are ectothermic, which means they directly respond to the temperature of their environment. Warmer temperatures typically translate to earlier or increased activity, which may increase pest management needs. Years when the weather is abnormally warm for extended periods may mean that insect activity increases earlier in the year. Therefore, landscape managers may need to ramp up monitoring activity earlier in the season so that insect infestations do not get out of control.

In addition to weather, the local environment also makes a difference. For example, urban landscapes surrounded by parking lots, roads, or buildings are typically warmer than landscapes surrounded by more vegetation. As a result, plants in those locations experience warmer temperatures and often more drought stress.

RECENT RESEARCH from my lab found that warmer temperatures and greater drought stress additively increase scale insect reproduction and abundance on urban trees. We selected urban red maple trees in landscapes across a gradient of temperatures and irrigated half of them for two years. At the conclusion, scale insects on the warmest nonirrigated trees produced 17 percent more offspring than those on the warmest irrigated trees and over 65 percent more than the coolest irrigated trees. Therefore, managers may need to focus monitoring efforts on plants in these habitats earlier in the season and generally increase their management efforts at these locations to mitigate pest success.

Herbivores are not the only ones

Obviously, herbivores are not the only insects that increase their activity in the spring. Beneficial insects like predators and parasitoids that attack herbivores also become more active. In many cases, as the abundance and diversity of these beneficial insects increase in concentrated locations, herbivorous pests decrease. My lab is investigating ways to attract these beneficial insects, in greater numbers and diversity, to golf courses earlier in the spring so that they are around to control insect pests like mole crickets and caterpillars that are most vulnerable during this period.

As spring progresses into summer, and insect activity persists, remember to monitor for insect abundance and susceptibility (life stage) and keep an eye on new plant growth. Many pests like thrips, whiteflies, and some scale insects undergo multiple generations within a year, which means they are susceptible to management efforts more than once. Proper insect identification is critical to inform appropriate monitoring efforts, which will identify management timing and need. PP

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

Red maple, *Acer rubrum*

Closeup of lawn shrimp: dead (top) and alive

Lawn shrimp, dead on pavement

Photos by Lyle J. Buss

Lawn Shrimp

Lyle J. Buss

HAVE ANY of your customers ever complained about an invasion of red bugs in their home? If so, then you are already familiar with this critter. It is actually a type of crustacean called a terrestrial amphipod. Because of their resemblance to shrimp, they are often called lawn shrimp.

Lawn shrimp live in moist environments, such as mulch beds or leaf litter. They don't like it too wet, so heavy rains can make them move out of the mulch beds onto sidewalks or into houses and garages. Once inside a house, they quickly die from desiccation. That's why they are usually found dead within several feet of the door. They are dark brown when alive, but dead ones turn red. They are around ¼ inch in length and are flattened side-to-side, like fleas. They may jump to avoid capture.

Lawn shrimp don't cause any damage, so they are just a nuisance pest. As with many household invaders, the best management tactic is to keep the weather stripping around doors in good shape to keep bugs from entering. In areas where they are a frequent problem, changing the habitat to reduce the damp conditions should discourage lawn shrimp from living there, such as removing mulch beds, or reducing irrigation so that areas dry out more.

In or around the home, lawn shrimp may be safely swept or vacuumed up and discarded. There are no labeled insecticidal recommendations for control.

During rainy weather, these tiny crustaceans can cause problems for pool owners. Large numbers of lawn shrimp can be found in swimming pools, where they can clog pool filters. Regular cleaning of filters during this period is the only solution.

Lawn shrimp are sometimes misidentified as springtails. Springtails are commonly found in moist areas, sometimes in vast numbers. However, springtails are not crustacea, but insectlike arthropods with only three pairs of legs, one pair of antennae, and usually a furcula (a forked structure) on the fourth abdominal segment. The group of springtails that might be confused with lawn shrimp has a tubular structure on the last abdominal segment. PP

Lyle J. Buss, Scientific Photographer, manages the Insect Identification Lab at the UF/IFAS Entomology and Nematology Department. Additional material adapted from EDIS publication EENY-220, Terrestrial Amphipods or Lawn Shrimp.

Exotic Lizards *of Florida*

William H. Kern, Jr.

MANY THINGS make Florida an ideal location for invasive reptiles: a tropical-to-warm–temperate climate, a large reptile importing and breeding industry for the pet trade, and a depauperate native lizard fauna. Fifty-four species of exotic lizards have been captured and reported. There are at least 36 species established and breeding, primarily in the southern peninsula.

Brown basilisk

Green Iguana
Iguana iguana

At left is an adult male green iguana in breeding color, with two females at right. Males can reach over 6 feet in length, while females rarely exceed 5 feet. Green iguanas live in trees, especially near water. When threatened, they dive into the water to escape by swimming under the surface until well away from the danger.

An adult green iguana running along a seawall. Notice the love-bite scars at the base of her tail from an amorous male hoping to mate. Females dig burrows in the spring and then lay their eggs in a nest cavity at the bottom of the burrow. After the eggs are laid she doesn't use the burrow again.

A juvenile green iguana, about one month old. Juveniles tend to eat much more animal material than adults, mostly insects. This hatchling is an attractive size for a pet or to sell to a pet store.

Spiny-tailed Iguanas
***Ctenosaura* species**

An adult male black spiny-tailed iguana, *Ctenosaura similis*. The name comes from the rasplike scales on the tail. Spiny-tailed iguanas harbor under or between boulders or in burrows they dig themselves.

A female black spiny-tailed iguana, *Ctenosaura similes.*

Photos by Vinda Maharajh, UF/IFAS/FLREC

An adult female, top, and male Mexican spiny-tailed iguanas, *Ctenosaura pectinata*.

Brown Basilisk, or Jesus Christ Lizard

The brown basilisk, *Basiliscus vittatus*, is sometimes misidentified as an iguana because males can exceed 2 feet in length. It is actually closely related to the collared lizard and leopard lizards native to Southwest US deserts. They are strictly predatory, feeding on insects, nestling birds, and smaller lizards. Females are smaller and lack the conspicuous crest of the male. The name "Jesus Christ lizard" comes from their ability to run across the surface of water when escaping predators.

Matt Saunders

Curly-tailed Lizards

The northern curly-tailed lizard, *Leiocephalus carinatus*, in the family Leiocephalidae. This family is diverse and widely distributed throughout the Caribbean. It was thought to have been deliberately introduced into Palm Beach County as a sugar cane beetle predator. These lizards generally live on the ground and dig retreats under stones and sidewalks.

Kupos

Old World Chameleons

The Oustalet's chameleon, or Malagasy giant chameleon, *Furcifer oustaleti*, is originally from Madagascar and is considered the largest chameleon in the world. A breeding population became established in an area near Everglades City. The panther chameleon, *F. pardalis*, also from Madagascar, is similar but brighter, with green, red and blue bands.

The veiled chameleon, *Chamaeleo calyptratus*, is native to Yemen. Its size and pattern is superficially similar to the *Furcifer* chameleons but has a much taller head crest.

Agamas

The African red-head agama, or African rainbow lizard, *Agama agama*, are 6–8 inches long. The males (top) have vivid colors including an orange or rusty head, while the females are much less colorful (bottom). Agama distribution is expanding in peninsular Florida.

FWC

Tegus

The Argentine black and white tegu, *Tupinambis merianae* or *Salvator merianae*, is a large, South American lizard with males reaching 5 feet long. Tegus are the New World equivalent of the monitors in the Old World. They will eat anything they can swallow: crabs, insects, small vertebrates, eggs of ground-nesting birds and alligators, snails, and even fruit.

FWC

Nile Monitor

The Nile monitor, *Varanus niloticus,* is a large, predatory African lizard that can reach 5 feet in length. They are very good swimmers and are usually seen near water. They eat frogs, salamanders, fish, snakes, rodents, birds, alligator eggs and hatchlings, poultry, and pets.

Geckoes

There are 15 species of geckos reported from sightings in Florida. They are nocturnal, except for the bright-green day geckos. The Mediterranean gecko, *Hemidactylus turcicus*, is seen on buildings at night throughout Florida. They hide in crevices during the day. They are 4–5 inches long and have a distinctive, pebbled appearance to the scales on the body.

Anoles

Some people call anoles "chameleons" because some can change from green to brown. Anoles are completely unrelated to the Old World chameleons.

The largest anole in Florida is the knight anole, *Anolis equestris*. Many Cuban Americans know them as "iguanitos," or little iguanas. Males can reach over 16 inches in length and are bright green to olive, causing the confusion in identity. Like all anoles, they are predators. Their large size allows them to eat other lizards, baby birds, and birds' eggs, as well as insects.

The most common and widespread exotic anole in Florida is the Cuban brown anole, *Anolis segrei*. They occur throughout the peninsula of Florida and likely can be seen statewide around buildings. Males have a bright-orange dewlap under the throat, extended for display to females and to intimidate other males. PP

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

For more information about these and other exotic lizards in Florida, visit http://myfwc.com/wildlifehabitats/nonnatives/reptiles/ and http://www.flmnh.ufl.edu/herpetology/florida-amphibians-reptiles/lizards/

Mohamed Sallam searching for mosquitoes, fighting diseases

Curiosity and Passion
Lead Mohamed to Seek Knowledge

Muhammad Mahdi Karim

***Aedes aegypti*, vector of many diseases**

In 2017, Mohamed Sallam finds himself a world away from the places he was educated in Egypt and Saudi Arabia. He earned multiple advanced degrees in the Middle East before heading to a new life in Florida at the Urban Entomology Lab in 2014. Along the way, Mohamed's career has become laser-focused on finding ways to fight deadly mosquito-borne diseases of humans and animals, with Zika virus a recent concern.

"***AS A MIDDLE-EASTERN CHILD*** born and raised in Egypt, there were a lot of things I started to question when I was a kid. It was hard to get answers for everything. Access to information was severely restricted in 1980s Egypt.

I was always bombarding people with questions about everything around me: How was I born? How do plants grow? What about the succession of the sun and moon during day and night — and how does this light bulb work?

At first, my parents helped me a lot to get some answers. However, this did not feed my hunger, so they urged me to read a lot of books. That was my first milestone, when I realized that this world has a unique language that everyone understands, and that language is *SCIENCE*. Science was the only language I could understand in the middle of a storming ocean full of inquiries and questions.

In grade school, I was interested in science and math more than other subjects. I always had a passion and curiosity for knowledge about random things, especially biology and physics. In high school as a teenager, I lost this passion for a while. For a moment I got distracted away from my purpose in life — I had always wanted to study medicine and help people. At that moment, my parents treated me sternly: "You drop one class, do not let the door hit your back."

After high school, I chose to attend the College of Science in dentistry. It was against my father's will, but I did what I believed was correct. I was fascinated with molecular biology and biochemistry, until I went to a lecture on medical entomology. I started to read about insects and how these tiny, successful creatures survived all these billions of years. That was my second milestone, which shaped my scientific mentality and career.

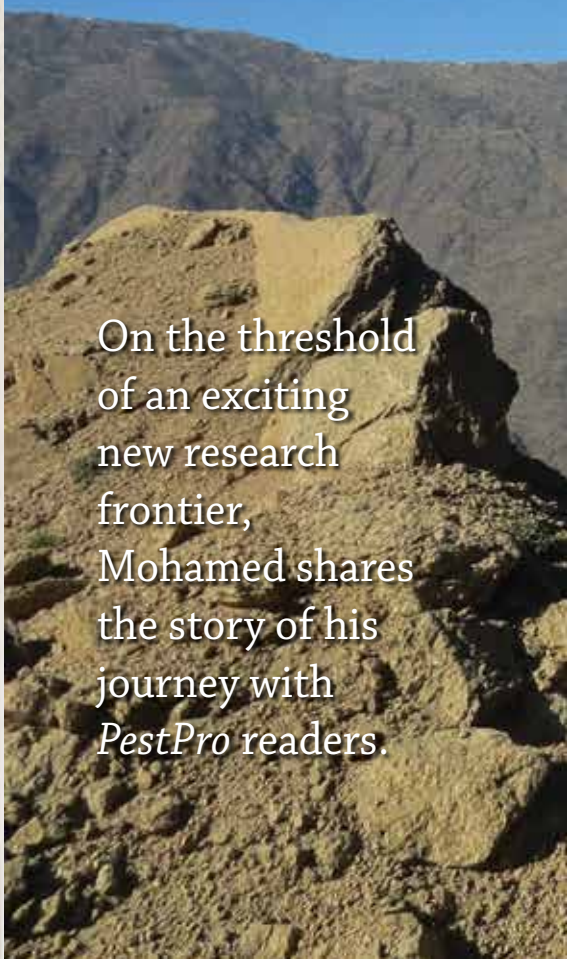
I finished my bachelor's and master's degrees in Cairo, Egypt. My studies were on mosquito vector control, with an emphasis on control of lymphatic filariasis. Also called elephantiasis, it is a dread disease of humans caused by microscopic worms that are spread by mosquitoes. I was very lucky to work through grants funded by the National Institute of Health and World Health Organization.

I worked with pioneers of medical entomology from the University of Miami and Naval Medical Research Unit Three, which is a biomedical research laboratory of the US Navy located in Cairo. NAMRU-3 is the oldest US overseas military medical research facility remaining in the same location since 1942, even in periods of political tension. It is one of the largest medical research laboratories in the North Africa–Middle East region.

Science took me away!

As a field-oriented researcher, again my passion and curiosity made me move to Saudi Arabia to finish my PhD in medical entomology and work on mosquito-borne Rift Valley Fever disease transmission and landscape characteristics of the RVF mosquito vector. RVF is a fever-causing viral disease that infects domesticated animals such as cattle, buffalo, sheep, goats and camels. The disease also can infect and cause illness in humans.

Meanwhile, I worked with a multinational team from Saudi Arabia, the United States, Germany, Algeria, Egypt, and Pakistan on mosquito distribution modeling utilizing geographic information system (GIS) and remote sensing (RS). Graduation was just a license for me to practice research and science as much as I wanted. I was ready to explore new areas and new diseases, and find a new chapter in my career and life.



On the threshold of an exciting new research frontier, Mohamed shares the story of his journey with *PestPro* readers.

And now, a few questions for Mohamed:

How did you meet Dr. Koehler? And how did you find your way to the Urban Entomology Lab?

At the time I was packing up and getting ready to leave Saudi Arabia after graduation, I was looking for new experiences to get on urban pests.

I always used to work in rural or peri-urban areas and did not get the chance to study mosquitoes in the urban landscape. I visited the University of Florida online and found the Florida Medical Entomology Lab and the Urban Entomology Lab, which caught my eye.

I shared my interests and passion with Dr. Koehler in my very first email to him, and he invited me to visit his lab. I got excited the first day he gave me a tour of the lab. However, there was no funding available to work with him at that time. The only thing I cared about was gaining experience and feeding my hunger for knowledge, so I volunteered — weird! I am always being called weird! Later on, I started writing grants as a postdoc and getting involved in almost all the mosquito research work at his lab, and he started paying me!

What projects are you working on?

That is a very good question! With Dr. Koehler I work on everything related to mosquitoes — starting with improving sampling methods of mosquito vectors, evaluating new mosquito traps, developing new applications for pesticides, and finally, landscape characterization of mosquito vectors and their associated arboviruses.

Where do you see urban entomology taking you into the future?

Our knowledge about mosquito arboviruses is limited to rural or peri-urban settings. According to literature, few investigations have highlighted the urban-landscape influence on mosquito-borne diseases. We usually used to flood out salt marsh habitats that bred rural, mosquito-borne diseases such as west Nile virus and eastern equine encephalitis, but we did not flood urban mosquito habitats. In Miami, Zika virus opened our eyes to a new urban mosquito-borne disease, which should be approached with a different strategy.

My urban entomology lab experience led to my current post at the US Environmental Protection Agency – Oak Ridge Institute for Science and Education (USEPA–ORISE). This opportunity is giving me more space to study urban landscape effects on Zika virus vectors.

What is the next passion for Mohamed?

Making technology of mosquito modeling available to the pest management industry. I believe this will be a big leap in the industry, when you are able to predict the magnitude of mosquito markets in the future. This will save a lot of money and labor and alleviate the risks of disease transmission and morbidity. One day, this could be applicable if we have the necessary high-resolution data on climate, urban landscape, and socioeconomic status. **PP**

Mohamed Sallam in Saudi Arabia

Presenting in Florida

Al Akhdar Mountain, Saudi Arabia

Field research in Saudi Arabia

Visiting Jiangsu, China

Norman Cooper

NORM COOPER, whose 63-year pest control career included working as a PCO and consultant, passed away on April 5. He was 85.

A native New Yorker, Cooper in 1954 launched Abby Exterminating Services, a company he owned until January 1971, when he sold it to ESCO (Exterminating Services Co.). He stayed on board at ESCO, eventually becoming president of the exterminating services division. He retired from ESCO in 1996 and launched a highly successful consulting business, Norman Cooper & Associates.

Cooper served as NPMA (then NPCA) president in 1991–1992 and during his presidency created the branding "Guardians of the Environment" — which included the logo and tagline — an initiative many credit for improving the industry's image.

He and wife Marilyn traveled throughout the United States and the world, where Cooper spoke on the industry's behalf in countries such as Japan, Mexico, Canada, Brazil, the United Kingdom, Israel, Singapore, China, and Ecuador. In 2014 Cooper was presented with NPMA's first-ever Global Ambassador Lifetime Achievement Award.

In 2015, he was recognized by PCT and Syngenta with the Crown Leadership Lifetime Achievement Award. At last year's NPMA PestWorld in Seattle, Cooper was presented with the Pinnacle Award, the association's most coveted and prestigious accolade, which honors an individual who has contributed not only to the success of the association but to the industry as a whole over a lifetime or career.

Cooper is survived by wife Marilyn and their two sons, and grandchildren. PP *— Adapted from PCT magazine online, April 2017*

Photo by Adam Dale, UF/IFAS. Inset photo by Forestry Images

'GLOOM' and DOOM

When These Insects are on Hot, Dry Red Maple Trees

GAINESVILLE, Fla. — They are known as gloomy scales, and these insects can make a red maple tree's life downright dreary. This is because the arthropods feed and thrive on them, especially in warm and dry urban landscapes, a University of Florida Institute of Food and Agricultural Sciences researcher says.

Melanaspis tenebricosa, or gloomy scale insects, reproduce more, especially when the trees they live on are under the stress of heat and drought, according to new study led by UF/IFAS entomology assistant professor Adam Dale.

Dale's new research is important as residents and urban landscapers decide when and where to plant red maple trees, which are native and widely distributed in North America from Florida to Canada and whose canopy helps cool urban areas.

Dale conducted the study in Raleigh, North Carolina, when he was a doctoral student at North Carolina State University. He wanted to know how the gloomy scale, an insect widely distributed around the eastern and southeastern United States, would respond to hot, dry weather — conditions typical for urban trees. Researchers studied urban red maple trees at various temperatures around the city. Then they irrigated half the trees twice a week during the summers of 2014 and 2015.

At the end of 2015, they collected gloomy scales from each tree, measured their body size, dissected them and counted the number of eggs the insects produced, Dale said. They then looked at the relationship between the temperature in the tree's canopy and whether the tree was irrigated. Scientists wanted to see if either factor had an effect on the insects' body size or egg production.

The hotter and drier the trees were, the more eggs the gloomy scales produced.

"This insect is drastically more abundant on urban than rural trees throughout the southeastern U.S.," Dale said. "It reduces the health of these trees along with the services they provide to people and the environment."

In many ways, this native pest acts like an invasive insect when it is in urban landscapes, he said.

"This pest can severely damage and kill trees that it feeds on," Dale said. "Plus, its favorite host tree is the most common urban landscape tree in the eastern U.S. Since the gloomy scale benefits from warming and drought — two features common to urban landscapes — and urban landscapes are rapidly expanding, there is a potential for this pest to proliferate and cause even more problems in the future."

Urban foresters and landscape architects can use the study's findings by selecting more appropriate trees to be planted where heat and drought stress may be likely, Dale said. The research holds practical implications for urban residents, too.

"Sites that are surrounded by more impervious surfaces — roads, parking lots, buildings and more — and thus warmer and drier, are not the most suitable sites for these trees," Dale said. "If they are in such sites, irrigating during the warmest months to reduce drought stress can help manage these pests."

Dale's study is published in the online journal *PLOS ONE*.

Dale will continue to work on this research in Gainesville, Florida, with scientists from N.C. State and the U.S. Forest Service in Gainesville during the next few years, with funding from the U.S. Department of Agriculture. PP

Report by Brad Buck, UF/IFAS

OSHA Primer for PMPs

Allen Fugler

OCCUPATIONAL Safety and Health Administration (OSHA) ranks closely with the Internal Revenue Service as the most reviled federal agencies for pest professionals. Perhaps because of a common myth that the agency is funded through fines, or the fear of audits, interruptions, or employee retaliation, PMPs and many other business owners are skeptical of the motives of OSHA. While some of their regulations may be unrealistic and impractical — ask any fumigator! — OSHA does provide some useful safety training resources that can help PMPs improve worker safety and productivity while reducing Workers Compensation claims exposures.

Here are a few important areas of OSHA compliance for PMPs:

New OSHA Injury and Illness Reporting Rules Effective January 1, 2017 with Changes Expected

On March 23, the US Senate joined the House by voting to overturn a final rule from OSHA that addresses employers' "ongoing obligation" to make and maintain accurate records of work-related injury and illness data.

Both chambers of congress voted to disapprove a rule passed in the final days of the Obama administration. As of press time, President Donald Trump is expected to sign the resolution and overturn the rule.

Employers have long been required to record and maintain work-related injury and illness data for five years. However, they could be cited for violations only within a six-month time period. Those guidelines changed Dec. 19, 2016, when OSHA published a rule allowing citations for up to five-and-a-half years for alleged record-keeping violations.

Supporters of the rule say it would allow OSHA to enforce accurate injury and illness recordkeeping. Business owners claim it would create burdens for employers without providing any proof that worker safety would improve.

The expected change does not affect a new OSHA rule[1], effective Jan. 1, 2017, that requires some employers to electronically submit injury and illness data that they have been previously recording on their OSHA Injury and Illness forms. Some of the data will be posted to the OSHA website. The agency's position is that public disclosure will encourage employers to improve workplace safety. Data types and amounts will depend on company size and type of industry.

The rule prohibits employers from discouraging employees from reporting injuries and illnesses. It requires employers to inform employees of their reporting rights without retaliation, a requirement that can be met by posting an OSHA workplace poster (at right). This rule was effective on Aug. 10, 2016, but OSHA deferred enforcement until Dec. 1, 2016.

While the new rule does not prohibit safety incentive programs, it does require that such programs do not deter or discourage employees from reporting injuries or illnesses. They should instead promote safe work practices and encourage employee participation.

New OSHA reporting requirements will be phased in over two years, depending on company size:

- Companies with 250 or more employees in industries included in regulations must submit information from their 2016 Form 300A by July 1, 2017. These companies will be required to submit information from all 2017 forms (300A, 300, and 301) by July 1, 2018. Beginning in 2019 and every year thereafter, the information must be submitted by March 2 for the preceding year.
- Companies with 20–249 employees in certain high-risk industries (including services to buildings and dwellings, where pest control is included) must submit information from their 2016 Form 300A by July 1, 2017, and their 2017 Form 300A by July 1, 2018. Beginning in 2019 and every year thereafter, the information must be submitted by March 2 for the preceding year.

State OSHA plans must adopt requirements that are "substantially identical" to the rule requirements within six months of the rule effective date, Dec. 1, 2016.

Ladder Safety

Ladders are important tools for PMPs, used in WDO inspections, bird, rodent and bat control, and in structural fumigations. However, falls from ladders are some of the most commonly reported Workers Compensation injuries and OSHA violations. In fact, over 15,000 workers were injured and 113 were killed in 2016 in ladder-related falls.

OSHA guidelines for fall protection and ladder safety, and some simple devices, techniques and company policies, are useful in reducing this hazard that technicians face every day. OSHA is the enforcement agency charged with ensuring worker safety; the National Institute of Occupational Safety and Health (NIOSH) is the rulemaking organization that develops OSHA standards.

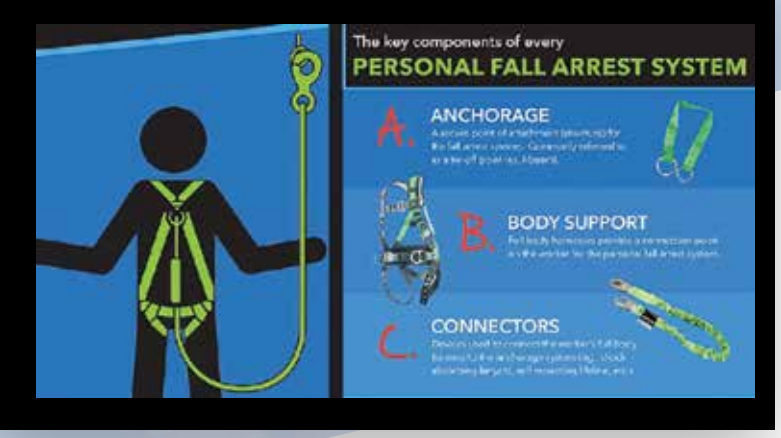
Let's start with the ladder: It should be in good condition with nonskid feet, solid rungs without cracks or missing pieces, and rated for weight-bearing loads for the technicians and materials using it. For heavier weights and roof access, the use of stabilizer arms at the roofline can increase ladder stability. Stabilizers are lightweight, inexpensive, easy to assemble, and adjustable for a variety of roof types. Many models cost under $40, store easily, and quickly connect to the ladder. They are modest investments with high returns of increased worker safety.

Proper ladder placement is critical to its safe use. Ladders should be placed on level ground, with at least three feet or rungs above the roofline. The angle of placement is critical to ladder safety: For every four feet in ladder height, the ladder should be placed one foot from the structure (known as ladder pitch).

To determine the correct angle of ladder placement, NIOSHA provides an app for use with smart phones. You simply open the application (free from Apple iTunes and Google Play), place your phone along the ladder rail, and read the angle measurement. The app will indicate the proper placement angle.

Continued

[1] https://www.osha.gov/recordkeeping2014/NAICSReporting.pdf



TRAINING on ladder use is critical to worker safety and regulatory compliance. Sessions should be documented and training records available in case of an OSHA inspection. Technicians must stay inside ladder rails and maintain three points of contacts when ascending and descending. They must always stay three feet below the top rung. When leaving a ladder onto a roof, a fall arrest system (diagram above) must be used for heights greater than six feet.

Of course, use of proper footwear can avoid slips and falls from roofs and other surfaces. Safety shoes with nonskid soles and no excessive wear, along with fall protection equipment and training, are inexpensive investments in worker safety that can pay big returns in lower Workers Compensation claims rates and in experience modifiers.

OSHA fall protection standards for nonconstruction work call for the use of nets or harnesses as part of a fall arrest system for heights greater than six feet. Where these systems are not possible due to roof configurations, companies should use a spotter and holder at the ladder base. Inconvenience and expense are not valid reasons for noncompliance to OSHA Fall Protection regulations. These regulations can be found on the OSHA website[2].

With proper tools and training, you can avoid ladder mishaps, worker compensation claims, and OSHA violations and fines. You will better maintain a safe and productive workforce and deliver consistent service to your pest control clients.

Slip-and-Fall Accidents

Slip-and-falls may be the subject of comedy video shows, but for pest control employers, they are no laughing matter.

Slip-and-fall injuries are among the most frequent claims and source of debilitating injuries, often leading to lost time, medical expenses, and worker's compensation indemnity payments. The National Safety Council cites annual costs exceeding $10.7 billion in worker's compensation alone, with an average medical cost of $43,000 per accident. Employers should take this issue seriously and conduct documented training programs.

Worker compensation claims will likely raise the experience modifier (a ratio of claims to premium in insurance policies) for the employer, which has a long-landing cost multiplier effect that can last for years after the accident. They can even threaten the insurability and financial viability of the company.

Preventing Slip-and-Fall Accidents

Pest control employers should be doing all they can to implement strong safety guidelines, provide proper training and equip their technicians with the proper gear. Wearing the correct footwear for the job can decrease the likelihood of slip-and-fall accidents. Safety shoes with slip-resistant soles can help prevent accidents on slippery and icy surfaces. Combined with a safety training course, proper footwear can protect workers from a head injury. Requiring standard safety footwear also completes the uniform of a technician and makes for a truly professional appearance.

There are several vendors serving industries such as pest control that are prone to slip-and-fall accidents. Some companies may even offer a warranty program that pays a certain amount in direct medical costs for accidents that occur while wearing footwear less than six months old. You can access detailed warranty information in some company websites.

I recommend reading OSHA slip-and-fall regulations[3] and using their slip-and-fall training PowerPoint presentation[4].

Other Important Worker Safety and OSHA Regulatory Compliance Areas

- Driver safety training: OSHA, the National Safety Council, and the American Auto Association are good resources. Have a written cell phone–use policy signed by employees and retained in company files. Implement a total ban on the use of personal or company phones for talking, texting and internet use while driving.
- Keep updated written programs and documented training for Hazardous Materials, Safety, and Ladder Safety. OSHA has templates and training materials for all of these programs. You will certainly be asked for them during an OSHA compliance audit.
- Annual and documented fire extinguisher training is required, and OSHA can cite you for noncompliance. Demonstrate and document training on the types, locations and use of fire extinguisher devices. Although not required, I recommend keeping fire extinguishers in all service vehicles. PP

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

[2] https://www.osha.gov/SLTC/fallprotection/standards.html
[3] https://www.osha.gov/SLTC/walkingworkingsurfaces/
[4] https://www.osha.gov/dte/grant_materials/fy07/sh-16625-07/slipstripsfalls.ppt

PPC vs. SEO: *Why Your Business Needs The Right Balance of Each*

ALAIN PARCAN

ONE OF the most common questions we get while speaking at industry tradeshows or providing educational webinars is, "which strategy is right for me?" Businesses are constantly focused on finding the right marketing plan when it comes to generating more business from the web, and it usually comes down to two main choices: pay-per-click advertising (PPC) or search engine optimization (SEO).

Now, imagine a customer calls you and says, "I don't have much money, what should I fix — the termite damage near the entryway, or the ant infestation in my kitchen?" The right answer, as you know, is that both are needed, before the problems get any worse.

Since we are talking about web marketing, I get to give you a slightly better answer than "you need to do both."

The Bottom Line: Both PPC and SEO programs drive more traffic to your website, and they work to increase your sales in different ways. Here are the differences.

Get Immediate, Guaranteed Results From Paid Search ...

Paid search — also known as PPC — refers to online advertising that can guarantee Page One placement on Google, Yahoo and Bing. It is a fast and measurable way to generate inbound leads from web-savvy consumers. Don't underestimate the "measurable" part, either. Google makes it possible to track specific paid search spend so you know what type of return you're getting, even down to specific keyword performance. Modern-day paid search has moved more toward a strategy known as "retargeting," which is a separate topic altogether. If you'd like to discuss that strategy, let me know or keep an eye out for an upcoming article.

Or Get Results That Last Long-Term With Lower Costs From Search Engine Optimization

Search engine optimization — also known as SEO — refers to the process of managing your website's content and organization, both onsite and offsite, to improve its ranking in the "organic" search results. Done right, SEO can provide pest control professionals long-term rewards on the same search engines as PPC, but at a lower overall price.

"Okay, Enough Already — What Should I Do?"

Individually, both PPC and SEO will improve your business exposure in your market area, therefore increasing the amount of leads it generates. But if your budget is tight, I do have a suggestion about which to do first: a locally targeted SEO campaign.

While PPC advertising can provide quicker results, search engine optimization delivers a better long-term return-on-investment. It is a smart and rational web marketing move, especially when targeting a smaller area. Doing so provides a greater likelihood of success, and leaves open the future option of expanding the target area or setting aside funds for a paid search campaign.

Keep in mind: When you stop a PPC campaign, your ads will completely disappear. When you stop an SEO campaign, you can maintain top results until your competitors invest more to rank above your listings.

Now, most web marketing pros will tell you the most effective web marketing plan utilizes not just SEO or PPC, but a combination of these two strategies, with a touch of social media management and a responsive website.

In other words, the pros recommend you use a well balanced strategy that targets audiences in different areas. But I am willing to disagree with that advice in some cases. If you are really watching your budget and need to generate business with the most effective marketing spend possible, SEO will get you there.

However, if you are in a position to be more strategic and want your marketing to be healthier in the long term, SEO and PPC (with a splash of retargeting) work well together. Tracking for SEO is different from PPC, but the long term results can be far more valuable. That said, you do lower your cost-per-lead over time if you do both. Talk to an expert who can provide a well balanced strategy based on your budget and local service area. PP

Alain Parcan, Director of Marketing for Market Hardware, Inc., contributed this article. Alain brings nearly 10 years of experience in educating businesses so they can market themselves more effectively. Market Hardware helps small businesses compete on the Web and offers special discounts for professional association members. You can reach Alain's team at 888-381-6925.

Nurturing the Next Generation of Entomologists

Erin Harlow and Rebecca Baldwin

IF YOU THINK back in your career or life, can you identify one single moment when you became interested in insects? What drew you to this industry and profession? For many people, it comes from an experience they had as a child. Within the University of Florida's Institute for Food and Agricultural Sciences is a group of faculty members and volunteers who engage youth through 4-H programs. 4-H develops young people into leaders in their society. Programs and projects that youth might participate in include shooting sports, cooking events, building robots, showing animals, leadership development, public speaking, and yes, entomology.

Dr. Rebecca Baldwin, assistant professor at UF in entomology, and her team have been working hard to revamp the current entomology 4-H project, now called Insectathon, to better engage and challenge youth. Students create a collection of pinned insects and present

Continued on Page 34

Tyler Jones, UF/IFAS

Budding entomologists in Florida enjoy many opportunities to hone their skills. Shown here, summer campers visit the Santa Fe River.

Erin Powell, Rebecca Baldwin, and Savannah Banner finish up bug camp.

Micanopy 4-Her Leads Entomology Project

Emily Eubanks

FOR MOST of Savannah Banner's 11-year 4-H career, she has been the go-to insect person. Savannah began collecting insects as a Cloverbud and now, as a senior 4-H member, is winning state competitions with her insect collections.

Last summer, Savannah won the Florida 4-H Insect Collection Contest for Division 4. This means she collected 100 insects from 15 different orders and pinned and labeled them correctly.

Savannah got involved with the contest because she's been attending UF Bug Camp for the last six years. For the last two years, she was able to participate as a junior counselor alongside entomology graduate students.

Being a junior counselor at UF Bug Camp inspired Savannah to teach her own Bug Camp for junior 4-Hers. With the help of her horticulture agent and volunteers, she developed a curriculum and organized a weeklong day camp at the county level. For the last two years, she's had more than 15 junior and intermediate members attend. Campers made butterfly feeders, visited the lepidoptera collections at the museum, collected insects, and ate cricket snacks. Savannah is currently planning her third day camp for June 2017.

Last summer, Savannah's passion for lepidopteras earned her a counselor position at the Florida Museum of Natural History's middle school lepidoptera camp. This opportunity continued into volunteering throughout the year in the lepidoptera research lab where she identifies, curates, and mounts butterflies and moths.

Savannah displays her prize-winning insect collections

Savannah mentors many fellow entomology-project 4-Hers and has inspired many of them to participate in the entomology project. She's always available to help catch a butterfly, show how to pin an insect, or identify an insect. She directly mentors four intermediate and senior 4-Hers and has helped them develop leadership skills by having them be counselors at her day camp.

This past fall, Savannah was asked to serve on a state entomology leadership team to revise the state insect collection contest and develop a brand new statewide insect identification contest. Savannah's insight into how to challenge 4-Hers in the entomology project has been invaluable.

Savannah's enthusiasm for the 4-H entomology project is opening many doors for her. Savannah graduates from high school in spring 2018 and is considering an entomology major. PP

Emily Eubanks is education and media coordinator, UF/IFAS Center for Landscape Conservation and Ecology.

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Featured Creatures Update

Explore Tiny But New Featured Creatures Online!

Jennifer Gillett-Kaufman

ARE YOU getting calls about fantastic creatures that are the stuff of nightmares — or an entomologist's daydreams? We all have had these moments on the phone, and I am often surprised by how small some of these evil creatures are. I have compiled for you some of our newest articles on tiny lawn and ornamental insects that may or may not be pests, so you can be ready for the next call you receive from a frantic customer.

We are proud to present you these newest creatures from the University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS) Featured Creatures website. These articles were developed by UF scientists, students and collaborators, and the excerpts below are from the actual articles. If you do not see anything new here, visit the website and look around for information on a few creatures to add to your list tiny insects you recognize.

Winter Ant, False Honey Ant

Jason L. Williams and Andrea Lucky, Entomology and Nematology Department, University of Florida

http://entnemdept.ufl.edu/creatures/misc/ants/Prenolepis_imparis.htm

THE WINTER ANT, *Prenolepis imparis* (Say), is a widespread North American ant that is common across the United States. Sometimes called the false honey ant, this dominant woodland species is most active during cool weather, when most other ant species are less likely to forage. This species is one of the few native ants capable of tolerating competition with invasive species, and it persists in areas invaded by the Argentine ant, *Linepithema humile*. This species accomplishes this by foraging when many invasive species are inactive, and they are also aggressive toward other ants and produce abdominal secretions that are lethal to *Linepithema humile. Prenolepis imparis* is ecologically important as a seed disperser.

Striped Mealybug

Ariane McCorquodale and Amanda Hodges, Entomology and Nematology Department, University of Florida

http://entnemdept.ufl.edu/creatures/orn/mealybug/Ferrisia_virgata.htm

THE STRIPED MEALYBUG, *Ferrisia virgata* Cockerell, is a small insect that is a pest of a broad range of plants. It has been unintentionally introduced across the globe through international trade. Mealybugs are sap-feeding insects that tap into the phloem via a piercing, straw-like mouthpart known as a stylet. Severe infestations of mealybugs can be fatal to a plant. Large populations of mealybugs appear as accumulations of white, cottony-looking wax on the plant. This wax is produced by special glands and gives the insects the "mealy" appearance from which the name "mealybug" is derived.

Fourlined Plant Bug

Matthew Borden and Adam Dale, Department of Entomology and Nematology, University of Florida

http://entnemdept.ufl.edu/creatures/veg/leaf/Poecilocapsus_lineatus.htm

THE FOURLINED PLANT BUG, *Poecilocapsus lineatus* (Fabricius), is a common garden pest found throughout much of the United States and Canada east of the Rocky Mountains. It causes distinctive feeding damage on an enormous range of plants, but most often damages ornamentals in the mint (Lamiaceae) and composite (Asteraceae) families. Nymph and adult stages are active for a relatively short period during late spring and early summer. These insects overwinter as eggs deposited in tender stems of early-season plant growth. For unknown reasons it appears that populations naturally fluctuate, causing periodic outbreaks for one or several seasons.

Tuliptree Scale

Matthew Borden and Adam Dale, Department of Entomology and Nematology, University of Florida

http://entnemdept.ufl.edu/creatures/orn/scales/tuliptree_scale.htm

TULIPTREE SCALE, *Toumeyella liriodendri,* is an important soft scale insect pest of tuliptree (*Liriodendron tulipifera* L.) and other species in the family Magnoliaceae. It is most damaging to very young trees. Scale insect feeding removes tree sap, reduces vigor, distorts growth, and sometimes causes death. Their damage is further compounded by the large amounts of honeydew they produce, which facilitates sooty mold growth. Tuliptree scale is widely distributed in the eastern United States.

insidious Flower Bug, Minute Pirate Bug

Danielle Sprague and Joe Funderburk, North Florida Research and Education Center, University of Florida

http://entnemdept.ufl.edu/creatures/beneficial/bugs/Orius_insidiosus.htm

THE INSIDIOUS FLOWER BUG, *Orius insidiosus* Say, is a common predator of a wide variety of small, soft-bodied arthropods. *Orius insidiosus* is in the family Anthocoridae. Species

Jennifer Gillett-Kaufman is Featured Creatures Editor and Project Coordinator, University of Florida/IFAS Entomology and Nematology Department.

of the genus *Orius* are commonly referred to as minute pirate bugs, while the common name for *Orius insidiosus* is the insidious flower bug (Funderburk 2009). *Orius insidiosus* is an important predator of many economically important pests (Lattin 1999, Funderburk et al. 2000, Silveira et al. 2004, Xu et al. 2006). In Florida, *Orius insidiosus* receives recognition for being the key predator of a major economic pest, the western flower thrips, *Frankliniella occidentalis* (Funderburk et al. 2000, Funderburk 2009).

Longtailed Mealybug

Morgan A. Byron and Jennifer L. Gillett-Kaufman, North Florida Research and Education Center, University of Florida

http://entnemdept.ufl.edu/creatures/fruit/mealybugs/longtailed_mealybug.htm

THE LONGTAILED MEALYBUG, *Pseudococcus longispinus* (Targioni Tozzetti), is a widely distributed pest that feeds on many economically important hosts, particularly tropical fruits and ornamentals. This mealybug gets its common name from the two long, waxy filaments protruding from the last abdominal segment of adult females. This characteristic helps distinguish it from other mealybugs that may feed on the same host plants, although these long filaments sometimes break off.

Solanum Whitefly, Pepper Whitefly

Vivek Kumar, University of Florida, Entomology and Nematology Department, Antonio Francis, FDACS, Muhammad Z. Ahmed, University of Florida, Entomology and Nematology Department, Catharine Mannion, UF, Ian Stocks, FDACS, Eric Rohrig, FDACS, Cindy L. McKenzie, ARS-USDA, and Lance S. Osborne, University of Florida

http://entnemdept.ufl.edu/creatures/veg/Aleurotrachelus_trachoides.htm

NATIVE TO THE Neotropical region, *Aleurotrachelus trachoides* Back, commonly known as the solanum or pepper whitefly, is an emerging pest of pepper and many other horticultural crops in the United States. It has been in the United States for more than five decades as an intermittent pest of pepper although, until recently, was never considered a key pest of economic importance. However, in the past few years, records of its spread and damage have been reported from private residences and nurseries throughout Florida. Feeding by this pest can cause stress to the plant by removing nutrients and water. Additionally, the feeding exudates excreted as honeydew also promote the growth of black sooty mold.

We hope you learned something new from reviewing the excerpts from these articles. If you would like to receive periodic updates when new Featured Creatures articles become available, you can register for weekly updates from the UF/IFAS Pest Alert Blog at http://blogs.ifas.ufl.edu/pestalert/ or for monthly updates from the UF/IFAS Entomology and Nematology Department Newsletter at http://entomology.ifas.ufl.edu/news/. PP

CAPITOL *Corner*

Sean Brantley and Suzanne Graham

THE 2017 FPMA Legislative Days event was great once again. We had two Commissioner of Agriculture candidates, Senator Denise Grimsley and Representative Matt Caldwell, stop by and talk to us. FPMA gave out its FPMA Legislator of the Year Award to Representative MaryLynn Magar, who supported FPMA and defended the rights of Florida PCOs.

FPMA's very own Bryan Cooksey III, NPMA president-elect, shared with us what NPMA is doing for industry and offered some valuable tools and insights available to members and FPMA. Missy Timmins, Timmins Consulting, gave us a very special day on Monday by offering a private tour of the Capitol complex, a private event at the Governor's Club and an educational session on what to do and how to do it.

FDACS Chief Dale Dubberly spoke and gave us a perspective on what is happening in the Department and what we can look forward to this year. In addition to that, FPMA members, volunteers and staff went to the Capitol for appointments to meet with elected officials and promote FPMA as the leader of all things pest control.

And if that was not busy enough, we also had a private tour of the DACS laboratories and bureau offices along with a personal visit with Division Director Andy Rackley, Chief Sarah Oglesby, and other leaders at DACS. Our two-day storming of the Capitol concluded with our supper social at St. Andrews, where we mixed our group with the UF Wedgworth Leadership Institute group that was in town also.

We offered a lot for two days, and I think everyone that attended felt the value and importance of being there to keep FPMA front-of-mind.

THE LEGISLATURE has confirmed that the 2018 legislative session will be a January start again. That means the FPMA will not be hosting Legislative Days in 2018, due to the challenges of having Expo and Legislative Days just days apart if we tried. As we have previously done during these early-start years, we will assemble a small army to be on the ready in case we have legislative activity pop up on us. Get with us if you can be part of that rapid response team, please.

The 2017 legislative session, at the writing of this article, is still under way. At this point, we had the luxury of being supportive of many pro-business bills and had no anti-industry issues to deal with. We are maintaining pretty good communication during the session in real time, but this article cannot possibly cover the session in a timely fashion. We will be doing a wrap-up of the session at the FPMA Summer Conference in the Keys. Hopefully we will see you there.

THE DEPARTMENT of Ag has finally compiled and published all of the final rules from the 2016 and 2017 workshops. This includes the consumer notification form, fumigation rules for stewardship training, fumigation rules for recordkeeping, fumigation rules for clearance device records, and changes to and additions of forms used by PCOs and DACS.

These rules are the direct result of the FPMA's dedication to industry and the relationship we have with DACS. We have an agreement with DACS to give these new rules some time to sort themselves out and we are both making lists of what works or doesn't work over the next year.

We plan to have several coordination meetings along the way to visit possible future rulemaking as needed. FPMA is confident that we have a good working product to help strengthen the industry and protect consumers.

The Department has also been slowly but surely pushing industry to use their web-based services. These services can give quicker turnaround, in some cases immediate, for applications, renewals, fines, forms and more. We are encouraged that with the new system in place ID cards can be nearly instant. You can register and access the page online[1].

We are also working with the Department directly on the exact point and purpose of ID cards as we move into the electronic age with DACS. Our discussions are mostly about issuance of ID cards and new standards. Stay tuned for more information on those discussions over the next few months.

The chemically sensitive registry has some new technology. You can now view a GIS map interactively to see the "bubble" around chemically sensitive registrants. The link can be found on the DACS website[2]. By using the map, you can see areas where you have overlap and notification issues. The way GIS works you may even be able to import stats to your software, but that is above my pay grade. By the way, that link is long, but you should be able to navigate through the DACS webpage to find the link also. PP

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

[1] https://aesecomm.freshfromflorida.com/Test_mp.aspx
[2] http://fdacs.maps.arcgis.com/home/webmap/viewer.html?webmap=b975919fba8b48fea767c4e5d3efc464

Consent vs. Notification Forms

HOPEFULLY, this will clarify the two mandated forms under Chapter 5E-14.105 for each WDO contract.

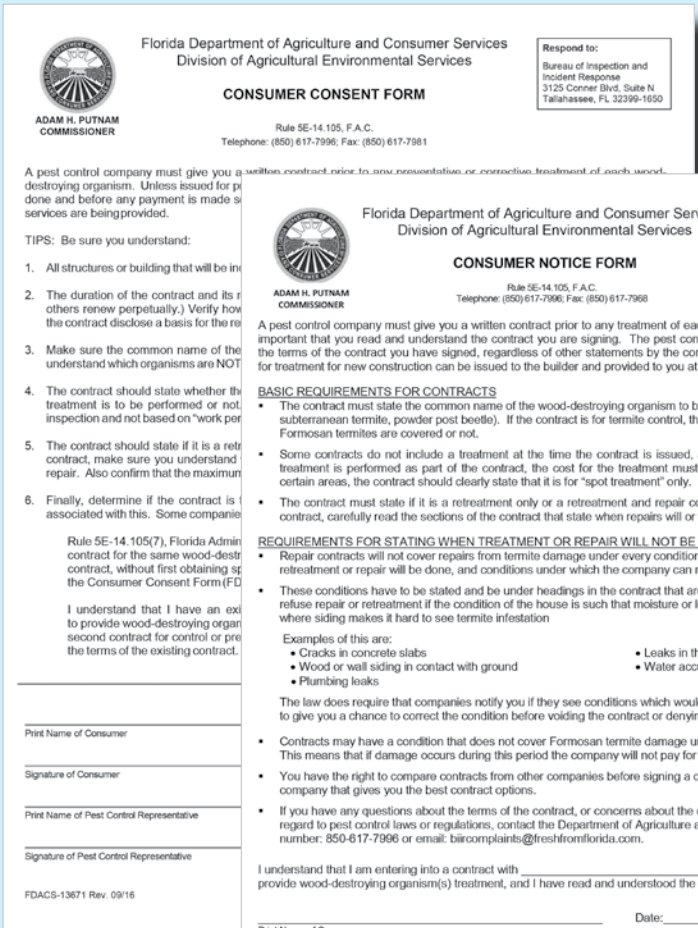
The consent form 13671 is for "taking over" an active WDO warranty/contract. From 5E-14.105: "(7) A structure shall not be knowingly placed under a second contract for the same wood-destroying organism control or preventive treatment in disregard of the first contract, without first obtaining specific written consent signed by the property owner or authorized agent using the Consumer Consent Form," (FDACS-13671).

Requirement for 13671 (consent) form has been on the rules since 2008, and is ***enforceable now!***

The new consumer notification form is required for all new WDO contracts issued. It is a consumer education notice covering information contained in WDO contracts. From 5E-14.105: "(1) Each licensee must enter into a written contract with the property owner or his authorized agent for each treatment for control or prevention of wood-destroying organisms. No such contract shall be entered into after six (6) months following the effective date of this rule without first obtaining specific written consent signed by the property owner or authorized agent using the Consumer Notice Form," (FDACS-13692).

Requirement for 13692 (notification) form went into effect on January 9, 2017. Enforcement will begin on this new notice on July 1, 2017. **PP**

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



Florida Department of Agriculture and Consumer Services
Division of Agricultural Environmental Services

ADAM H. PUTNAM
COMMISSIONER

CONSUMER CONSENT FORM

Respond to:
Bureau of Inspection and Incident Response
3125 Conner Blvd, Suite N
Tallahassee, FL 32399-1650

Rule 5E-14.105, F.A.C.
Telephone: (850) 617-7996; Fax: (850) 617-7981

A pest control company must give you a written contract prior to any preventative or corrective treatment of each wood-destroying organism. Unless issued for p done and before any payment is made s services are being provided.

TIPS: Be sure you understand:

1. All structures or building that will be in
2. The duration of the contract and its r others renew perpetually.) Verify how the contract disclose a basis for the re
3. Make sure the common name of the understand which organisms are NOT
4. The contract should state whether th treatment is to be performed or not inspection and not based on "work per
5. The contract should state if it is a retr contract, make sure you understand repair. Also confirm that the maximum
6. Finally, determine if the contract is associated with this. Some companie

Rule 5E-14.105(7), Florida Admin contract for the same wood-destr contract, without first obtaining sp the Consumer Consent Form (FD

I understand that I have an exi to provide wood-destroying organ second contract for control or pre the terms of the existing contract.

Print Name of Consumer

Signature of Consumer

Print Name of Pest Control Representative

Signature of Pest Control Representative

FDACS-13671 Rev. 09/16

Florida Department of Agriculture and Consumer Services
Division of Agricultural Environmental Services

ADAM H. PUTNAM
COMMISSIONER

CONSUMER NOTICE FORM

Bureau of Inspection and Incident Response
3125 Conner Blvd, Suite N,
Tallahassee, FL 32399-1650
biircomplaints@freshfromflorida.com

Rule 5E-14.105, F.A.C.
Telephone: (850) 617-7996; Fax: (850) 617-7968

A pest control company must give you a written contract prior to any treatment of each wood-destroying organism. It is very important that you read and understand the contract you are signing. The pest control company is only obligated to follow the terms of the contract you have signed, regardless of other statements by the company or salesperson. (Note: Contracts for treatment for new construction can be issued to the builder and provided to you at closing).

BASIC REQUIREMENTS FOR CONTRACTS

- The contract must state the common name of the wood-destroying organism to be controlled by the company (e.g. subterranean termite, powder post beetle). If the contract is for termite control, the contract must clearly state whether Formosan termites are covered or not.
- Some contracts do not include a treatment at the time the contract is issued, and that should be clearly stated. If a treatment is performed as part of the contract, the cost for the treatment must be stated. If the treatment is only for certain areas, the contract should clearly state that it is for "spot treatment" only.
- The contract must state if it is a retreatment only or a retreatment and repair contract. If it is a retreatment and repair contract, carefully read the sections of the contract that state when repairs will or will not be covered by the contract.

REQUIREMENTS FOR STATING WHEN TREATMENT OR REPAIR WILL NOT BE COVERED BY THE CONTRACT

- Repair contracts will not cover repairs from termite damage under every condition. The contract must state when retreatment or repair will be done, and conditions under which the company can refuse to retreat or repair.
- These conditions have to be stated and be under headings in the contract that are in bold print. Companies typically refuse repair or retreatment if the condition of the house is such that moisture or leaks result in termite infestation, or where siding makes it hard to see termite infestation

  Examples of this are:
  - Cracks in concrete slabs
  - Wood or wall siding in contact with ground
  - Plumbing leaks
  - Leaks in the roof
  - Water accumulating against side of house

  The law does require that companies notify you if they see conditions which would void the repair promise and they have to give you a chance to correct the condition before voiding the contract or denying repair coverage.
- Contracts may have a condition that does not cover Formosan termite damage until a specific time period has passed. This means that if damage occurs during this period the company will not pay for repair.
- You have the right to compare contracts from other companies before signing a contract with a company. Choose the company that gives you the best contract options.
- If you have any questions about the terms of the contract, or concerns about the compliance history of the company with regard to pest control laws or regulations, contact the Department of Agriculture and Consumer Services at phone number: 850-617-7996 or email: biircomplaints@freshfromflorida.com.

I understand that I am entering into a contract with _____ (fill in company name) to provide wood-destroying organism(s) treatment, and I have read and understood the terms of the contract.

Print Name of Consumer — Date:

Signature of Consumer — Title: Property Owner or authorized agent

Print Name of Pest Control Representative — Date:

Signature of Pest Control Representative — Company:

FDACS-13692 Rev. 09/15

Do YOU Know WHO?

AS ONE of the facilitators at the state pest control certified operator exams, it amazes me how many people don't know who regulates what, such as:

Who regulates storage facility and pesticide spill reporting?
Department of Community Affairs
Under what authority?
Florida Statute, Chapter 252

Who regulates pest control companies?
FDACS Bureau of Inspections and Incident Response
Under what authority?
Florida Statute, Chapter 482

Who regulates mosquito control?
FDACS Bureau of Scientific Evaluation and Technical Assistance and The Bureau of Inspections and Incident Response
Under what authority?
Florida Statute, Chapter 388

Who regulates employee safety?
Occupational Safety and Health Act (OSHA)
Under what authority?
The Federal Government

Who regulates pesticide applications to crops, turf grass production and golf courses?
FDACS Bureau of Inspections and Incident Response
Under what authority?
Florida Statute, Chapter 487

Who is responsible for maintaining a list of registered products used for preconstruction treatments?
The Florida Department of Agriculture and Consumer Services

Who regulates building practices related to subterranean termite prevention?
Florida Department of Business and Professional Regulation
Under what authority?
Florida Building Code

Who must you contact within 15 minutes of a spill that leaves any oil sheen on any body of water?
The National Response Center @ 800-424-8002 and The State Watch Office @ 800-320-0519

Who regulates the transportation of any hazardous material/substances in Florida?
The Florida Highway Patrol Division of Commercial Vehicles (formerly FDOT)

Who regulates beekeepers?
FDACS Bureau of Plant and Apiary Inspection
Under what authority?
Florida Statute, Chapter 586 (In July 2014, some of these changes went into effect.)

UF Entomology No. 1 in the World

THE UNIVERSITY OF FLORIDA'S entomology department is the best in the world, and a host of other UF programs rank in the top 10 globally from among more than 26,000 degree-granting institutions of higher education, according to the 2017 Center for World University Rankings list released in April.

The programs, followed by their world rank and their score, are:

- Entomology (World Rank: 1, Score: 100.00)
- Zoology (World Rank: 4, Score: 87.78)
- Mycology (World Rank: 8, Score: 83.42)
- Agriculture, Dairy & Animal Science (World Rank: 9, Score: 92.56)
- Biodiversity Conservation (World Rank: 9, Score: 89.55)
- Horticulture (World Rank: 9, Score: 90.63)
- Psychology, Applied (World Rank: 9, Score: 91.57)
- Hospitality, Leisure, Sport & Tourism (World Rank: 10, Score: 79.86)

The CWUR Rankings by Subject 2017 rank the world's leading universities in 227 subject categories, based on the number of research articles in top-tier journals. Data is obtained from Clarivate Analytics (previously the Intellectual Property and Science business of Thomson Reuters).

The Center for World University Rankings publishes the only global university ranking that measures the quality of education and training of students as well as the prestige of the faculty members and the quality of their research without relying on surveys and university data submissions.

The ranking started as a project in Jeddah, Saudi Arabia, in 2012 with the aim of rating the top 100 global universities. In 2014, the ranking expanded to list the top 1,000 out of 25,000+ degree-granting institutions of higher education worldwide, making it the largest academic ranking of global universities.

The Center for World University Rankings is headquartered in the United Arab Emirates. **PP**

Report by Steve Orlando, UF News, April 3, 2017

CLASSIFIED ADS

Young Entomologists, continued from Page 27

it at 4-H University, a leadership conference. In 2018, students will be asked to collect, pin and present their collections, plus they can participate in new events. The Insectathon not only involves their collections, but an insect art contest, insect identification, insect damage identification, an insect quiz bowl, a special topic, and a skill-a-thon. It will truly be a test of knowledge and technical skill.

Students as young as five and up to 18 can participate.

Another opportunity for youth to be introduced to the insect world are the many 4-H summer bug camps that happen throughout the state at local Extension offices. Events range in scope and age. If you are interested for your child or know of one that might be interested in attending a summer bug camp, contact your local Extension agent to see if they have one or know of one.

There is also a camp held at the UF entomology department each summer. This year it is June 19–23, 2017. More information can be found at http://entnemdept.ifas.ufl.edu/extension/uf-entomology-field-camp/. This camp has produced many potential future entomologists. Several students attended this camp years ago and now have state-winning bug collections, have attended and taught other students at ICE (the International Congress of Entomology), routinely teach others around the state, and are considering becoming entomologists.

If you or your company has a vested interest in future entomologists, then please consider supporting the 4-H Entomology Insectathon, the state bug camp, or your local Extension office bug camp. Because the state contest is a new program, it needs funds to provide training, scholarships, and awards. If you are interested in providing support, please contact Dr. Rebecca Baldwin at baldwinr@ufl.edu. Every little bit helps, and no donation is too small to help impact these young entomologists.

Donation checks should be written to the University of Florida and include a letter that states the donation is for Entomology Education and Outreach. PP

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

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