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Name of pest control company _____

Date of collection _____

Florida COUNTY* bed bugs were collected from _____

Level of infestation. Please check one box: Low Medium Severe

Building type bed bugs were collected from. Please check one box:

- Residential home
- Multi-unit family housing
- Multi-unit nursing home or assisted living facility
- Commercial building
- Apartment building, condo or town home
- Other _____

* Please list COUNTY ONLY, for confidentiality purposes. This is important information for our study.

Insects Vs. Humans!

Your Customers Rely on You to Protect Them from Pests

HAVE YOU told your customers how much they benefit from your services? You need to tell them about the most dangerous animal in the world. Danger should be defined by the likelihood of dying from an animal. Your customers probably think that humans are the most dangerous animal in the world. You need to tell them this is not true.

The most dangerous animal in the world is the *mosquito*. According to the Gates Foundation, about 750,000 people die yearly due to mosquito-borne diseases, while about 475,000 people die by other humans. Those numbers dwarf the 10 people killed yearly by sharks, which dominated the news headlines this past year.

INSECTS CAUSE A MULTITUDE OF PROBLEMS

There are many ways that insects can cause problems for your customers. Insects can cause annoyance, stings, allergic reactions, disease transmission, food contamination, insect invasion of tissues, and destroy structures. You would think because of pest control that insects would have disappeared and not cause problems anymore. But they have not disappeared, and every year it is more challenging to provide a pest-free environment for your customers.

When we think of severe insect problems, we might think of a person's face in Africa covered with filth-breeding flies. However, insects are still numerous in the United States. Recently, a light trap in Orlando caught 2.24 million mosquitoes within 12 hours. That is a lot of mosquitoes and a lot of potential for disease transmission.

A recent customer survey found that some insects can be more annoying than others. The order of annoyance from most to least annoying is mosquitoes, flies, cockroaches, bees/wasps, spiders, ticks and ants. Of course, this is based on customer bias, not necessarily reality. If you asked someone in the middle of a millipede migration whether millipedes were the most annoying, they would definitely say they dominate their lives. Some Florida residents this past year were faced with waves of millipedes migrating through their lawns, covering the sides of their houses and crawling indoors by the handful. It was a terribly annoying problem for them.

Insects may sting your customers and cause problems. One researcher decided to have 78 species of insects sting him and came up with a scale of pain from 1 to 4. A "1" was least painful, and for him the twig ant was a 1. Next painful on the scale was a "2," which was represented by

yellowjackets, honey bees, paper wasps, and fire ants. A "3" on the pain scale was a velvet ant. And the "4," which was most painful insects, were cicada killer wasps and bullet ants from Australia. Your customers do not like pain and would like you to solve their problems with stinging insects.

Insects can cause allergies in allergic individuals. They can be respiratory allergies or systemic responses of the immune system resulting in anaphylactic shock. Insects that can cause allergic responses are cockroaches, mosquitoes, ticks, kissing bugs, sand flies, fire ants, fleas, chiggers, and horse and deer flies. Allergic reactions to biting and stinging insects can occur within 10 minutes and can progress to loss of life very quickly. Affected people need to get medical attention immediately or be prepared with an epinephrine injection — more than one injection may be necessary to stop anaphylactic shock and possible death.

Cockroach allergy is now widely known to be the major cause of asthma in inner city children. In the cockroach allergy study, they found 50.2 percent of bedrooms had high cockroach allergen levels and 36.8 percent of children were allergic to cockroaches. When allergic children had high allergen levels in their bedroom, there were more lost school days and medical visits, more hospital visits, and caregivers had more nights of lost sleep. This is one of most overlooked problems with insects.

DISEASE transmission is the most feared problem associated with insects and ticks. When we think of disease transmission in this country, we worry about West Nile virus, dengue, chikungunya, Lyme disease, chagas disease, and tick paralysis. Lyme disease is spreading from the Northeast United States to other parts of the country. It starts with a bull's-eye rash and if left untreated, 60 percent of people develop joint pain, and 10–20 percent develop lasting arthritis that can progress to meningitis, facial paralysis, and memory loss.

We have Lyme disease transmitted within Florida. Also, tick paralysis can occur for both your customers and their pets. It is caused by the injection of a neurotoxin from the tick and can result in death due to respiratory paralysis. (Of course, a paralyzed cat behaves the same as a normal cat that sleeps all the time.) If the tick is removed, a person fully recovers within minutes to hours.

Recently, the Centers for Disease Control put out a press release warning of chagas in the Gulf Coast states. Chagas is transmitted by

kissing bugs and is now found in 40 percent of wild animals like raccoons and opossums. A recent survey of rodents in New Orleans found 70 percent of rats were infected with chagas. Bed bugs have also been shown to be capable of developing the chagas disease organism in their guts. Your customers need to be aware of this disease and that pest control is the only way to protect them from getting the disease.

Insects can contaminate food with their bodies, droppings, and the bacteria that they can carry from one place to another. Recently, 14 of 18 food establishments in Florida were closed due to cockroach infestations. Also, food-manufacturing plants and theme-park vendors were cited for cockroach infestations and potential food contamination. Food safety is critical, and transmission of food-poisoning bacteria like listeria, salmonella, *E. coli*, and clostridium needs to be prevented by insect control.

Insects also destroy structures. For instance, termite colonies can have up to 5–10 million workers. That is like a 75-pound animal feeding on a house 24 hours a day. A large termite colony can consume 1 pound of wood per day. Don't let this happen to your customers, like what happened in 2014 in New Jersey. A house had a termite infestation, but the owner didn't have money to pay for termite treatment. A 34-year-old resident was relaxing upstairs in his bathtub when the house collapsed due to termite damage. He fell two stories, the 650 lb man naked but unharmed in his bathtub. Evidently, the metal bathtub full of water saved him from serious harm.

EDUCATE YOUR CUSTOMERS

Let your customers know about all the valuable services you provide. They need to know that pest control increases their life expectancy. From the Bronze Age to the early 1900s, life expectancy of humans increased from 26 years to 31 years. After the invention of antibiotics and insecticides, life expectancy jumped to 48 years in the 1950s, then to 78 years currently in the United States. So insect control has preserved and extended the lives of millions in the United States, while in parts of Africa — where insects are not controlled well — life expectancy is still less than 50 years.

Make sure your customers know they are fortunate to be living in the United States of America and are protected from pests by you and your company. **PP**

— Dr. Philip Koehler,
Managing Director

Nutrient Movement

Florida nitrate leaching studies

Laurie Trenholm



In 2005, research began in three locations statewide to quantify nitrate-N and phosphorus leaching under a variety of conditions and treatments. The research was completely funded by the Florida Department of Environmental Protection.

SITES AND RESEARCHERS included Dr. John Cisar at the Ft. Lauderdale Research and Education Center, Dr. Jerry Sartain (phosphorus) and Dr. Laurie Trenholm (nitrate-N) at the Plant Science Research and Education Unit in Citra, and Dr. Bryan Unruh at the West Florida Research and Education Center in Jay.

The research was broken down into various projects, most of which were conducted at two or three of the sites. Each project was conducted for a period of two to four years per site. Here is a brief synopsis of results from some of the main projects in Gainesville.

General Methodology

Drainage lysimeters were installed in the center of each experimental plot at a depth of 4" below ground. The lysimeters were 22" in diameter and 42" tall. Tubing was fitted to the base of each unit, running to above-ground boxes. A vacuum was applied to the tubing to evacuate the lysimeters weekly. Samples were sent to the Analytical Research Lab for analysis of nitrate-N. Data from all projects are expressed in units of kg ha⁻¹, which is a measurement of the nitrate-N loading that occurred based on nitrate-N concentration and volume of leachate.

Nitrate-N Leaching from Newly Planted Turfgrass

'Empire' zoysiagrass and 'Floritam' St. Augustinegrass were sodded, and N treatments were applied immediately, following the sodding at rates of 0.5, 1.0, 1.5, or 2.0 lbs N 1,000 ft⁻². Nitrogen was applied as soluble urea. Half the plots received the same treatments 30 days later.

Nitrate-N leaching from both grasses over all years was considerably greater than from

the established grass studies, regardless of N rate. The percent of applied N that leached from St. Augustinegrass in 2006 was 73.4% of what was applied the same day as planting in 2006. Leaching from the plots that received a second treatment 30 days later was reduced to 56.4% of the applied N. Similar results were seen in all years.

These losses of nitrate-N are far greater than what is typically seen from established turf, due to lack of a root system on newly harvested sod and potential import of nitrogen from the harvested sod. Newly planted turf, whether sodded, seeded, sprigged or plugged, should not be fertilized with N for at least 30 to 60 days after planting, due to the potential for large nutrient losses before a root and/or shoot system has been established. The delay in fertilizing will not slow down the time for establishment and should not affect turf quality. Most sod is fertilized at some point prior to harvest, which will typically sustain the grass for 30 to 60 days. This is now a best management practices (BMP) recommendation.

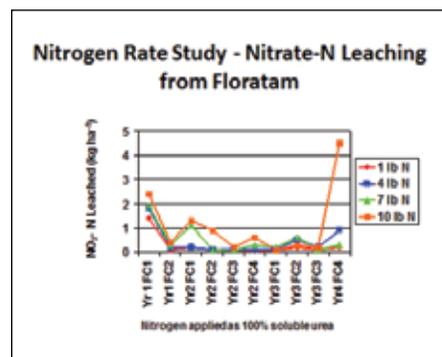
Nitrate-N Leaching From Established Turfgrass

Nitrogen was applied to Empire zoysiagrass and Floritam St. Augustinegrass over a three-year study. Annual N rates were 1, 4, 7 or 10 lbs N 1,000 ft⁻² applied every 60 days throughout the growing season. Nitrogen was applied as soluble urea. Leaching data are presented for 2006 and 2007 for each of the four fertilizer cycles — the 60-day interval between each fertilizer application (Graph 1). Fertilizer cycles are presented as spring (April–May), early summer (June–July), late summer (August–September), and fall (October–November).

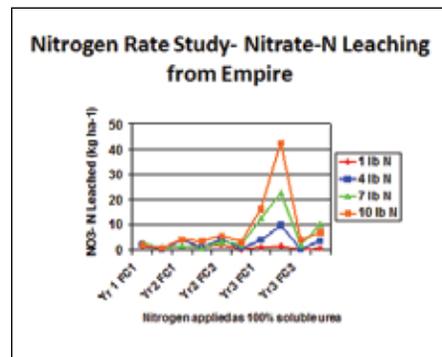
There were few statistical differences in nitrate-N leached due to N rate in St. Augustinegrass. Where there were differences (primarily fall 2007), greatest nitrate-N load occurred at the highest N rate. During this study, the St. Augustinegrass was in good health and had good growth and cover. The dense root and shoot system provided the grass the ability to take up nitrogen at the excessively high rates applied to some of the plots (7 and 10 lbs 1,000 ft⁻² yr⁻¹, which far exceeds the current recommendations for fertilizing St. Augustinegrass in North-Central Florida). Nitrate leached did not exceed 1.4% of the applied N in any fertilizer cycle and was generally below 1% of that applied N.



Drainage lysimeter. Each research plot had a lysimeter installed at the center.



Graph 1.



Graph 2.

Increased leaching occurred in the fall of 2007 at the 10 lb N rate in response to increased disease and associated injury due to the high N rates. This injury reduced the cover and density of the grass, resulting in higher leaching.

Zoysiagrass showed a greater tendency to leach more nitrate-N as N rate increased (Graph 2), but it is important to remember that most of the zoysiagrass cultivars used in home lawns stay green and healthy with less N

Annual N rates (lb 1,000 ft ²)	St. Augustinegrass	Zoysiagrass
North Florida*	2-4	2-3
Central Florida	2-5	2-4
South Florida	4-6	2.5-4.5

* North Florida is defined as north of Ocala, central Florida as Ocala south to Route 60 and South Florida, the remainder of the state.

Table 1. Recommended annual N rates for St. Augustinegrass and zoysiagrass.

than is recommended for St. Augustinegrass. Plots that received the high N rates in this study had large patch disease and poor cover by spring of the third year. This resulted in less ability to take up the N and greater leaching. By late summer, the disease was suppressed and the grass had resumed active growth, slowing down the high leaching losses. When N is applied at the recommended rates for zoysiagrass, leaching is minimized as with St. Augustinegrass. Recommended annual N rates for both grass species are presented in Table 1.

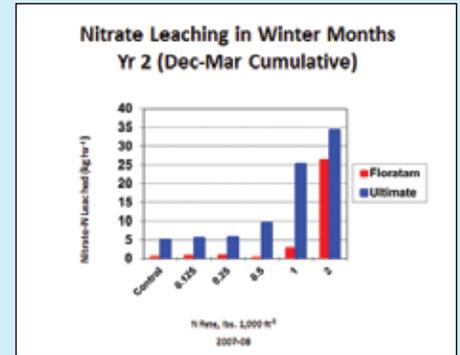
Results of this study clearly indicate the ability of an actively growing, healthy turfgrass to take up the maximum amount of applied N when N is applied at the recommended range of rates. All practices that help to maintain a healthy turfgrass, including proper irrigation and mowing, contribute to a healthy turf. When fertilized within the range of N rates recommended by UF/IFAS, nitrate-N leaching was minimized from these two grass species.

Winter Fertilization

This study was conducted in Citra and Jay to determine the impact of fertilizing dormant or semi-dormant turfgrass through the winter months. Floratam St. Augustinegrass and 'UltimateFlora' zoysiagrass were sodded in the fall of 2006. Nitrogen rate treatments were applied monthly as soluble urea. Rates applied were 0, 0.13, 0.25, 0.5, 1.0 and 2.0 lbs N 1,000 ft⁻² mo⁻¹.

Total nitrate-N leaching losses for the season differed due to an interaction of N rate and grass in years 1 and 2. In both of these cases, St. Augustinegrass had no differences in leaching between control and up to 1 lb N 1,000 ft⁻², while zoysiagrass had greatest leaching from either the 1 or 2 lb N rate (Graph 3).

Nitrate-N leaching was compared between months (Graph 3). In years 2 and 3, after the grass was well established, greatest leaching generally occurred in the winter and early spring months as compared to the fall months. More N was able to be



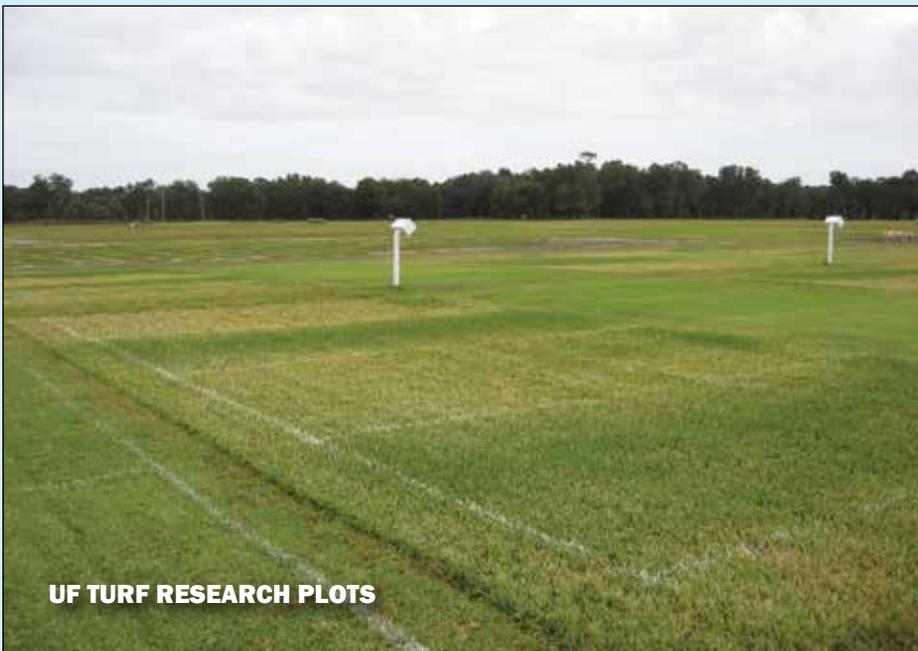
Graph 3.

taken up in the fall when the grass still had a root system when compared to January–March, when the grass was in deeper dormancy and a large portion of the roots had sloughed off. While N fertilization is not recommended for home lawns during the winter months in north and central Florida, there is less potential for nitrate-N leaching from late fall fertilization than from fertilization during January–March. These results are based on north Florida conditions and do not apply to South Florida.

N Source Study

This study ran from 2008 through 2011 on Floratam St. Augustinegrass and Empire zoysiagrass. Treatments are listed in Table 2 and were applied as granular treatments at 1 lb N 1,000 ft⁻² every 60 days, unless noted otherwise. In 2008, this project began in July, and therefore only two treatment applications were applied.

In 2008, St. Augustinegrass had no differences in total nitrate-N loading. Zoysiagrass had significantly greater leaching from ammonium nitrate than from any of the other N fertilizers, with no differences between the other products. In 2009, there were no differences in leaching due to either grass or N source. Similar results were seen in subsequent years.



	N Rate (lb N 1,000 ft² per application)	Frequency of Application
Control	0	0
Ammonium nitrate	1	60 days
Urea	1	60 days
30% SRN	1	60 days
50% SRN	1	60 days
32.8% PCN	1	60 days
32.8% PCN	2	120 days
Milorganite	1	60 days

Table 2. N source study treatments.

Many think that slow-release N sources are less likely to leach. However, these results indicate that there are no differences in nitrate-N leaching from either soluble or slow release sources when they are applied to actively growing, healthy turfgrass. Healthy turf that provides good ground cover is able to take up the fertilizer that is applied to it, as long as the fertilizer is properly applied.

Closing Thoughts

All of the research results from the three locations show similar results, indicating that actively growing, healthy turfgrass mitigates nitrate-N leaching when fertilizer is applied correctly. Maintaining a healthy turfgrass cover includes proper irrigation, mowing, fertilization and pest control. Following the BMP recommendations for all turf cultural practices can reduce nutrient leaching and potential nonpoint source pollution. **PP**

This article appeared in Florida Turf Digest 29 :2 (12-18)



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New Florida Termites

Philip Koehler and Roberto Pereira

Get ready for some new termites to control. Even though we have had a lot of invasive termites enter Florida and thrive, there are still more that could come.

TERMITES are not able to spread very far on their own. They are usually spread from their native habitat to Florida by movement of infested materials. Because there is so much international commerce, the likelihood of new termites invading Florida and the United States is increasing every year. It is very likely that in the coming years, additional species of termites will be found in Florida.

Because termites are cryptic, it is very easy to move termites from one place to another. However, not every kind of termite is a candidate to become the next exotic species. Just think of all the ways they can get here. They can be brought in potted plants, shipping containers, wooden pallets, furniture, wooden carvings, pleasure boats, ships, airplanes, and other ways.

Most invasive termites are in the families Rhinotermitidae, which are subterranean termites, and Kalotermitidae, which are drywood termites. These invasive species share three characteristics in common: They feed on wood, they nest in the wood, and they have the ability to produce many secondary reproductives. These three factors allow them to be cryptic and hide in infested material. A portion of a colony can even be brought in with secondary reproductives that can keep the colony going.

Florida Termite History

Let's review some history of termites in Florida and the termites that have invaded the state. In 1949, E. Morton Miller at the University of Miami published a booklet describing the species of termites known to be in the state. When I arrived at the University of Florida in 1975, that list was still the same. No new species had been discovered beyond Miller's list.

In the past 40 years, the number of termite species in Florida has grown. We now have 70 percent more termite species than ever in the past. In 1975 we had 13 species of termites. Now I know of 22 species of termites that are established in the state. There may be more, but they are not known by me to be here and established.

Where did all these new species come from? There are several species that occur naturally in Florida, but were undiscovered and not described as a species. However, the vast majority of new termite species were accidentally imported into the state, became established, and were discovered later.

New Subterranean Termites

The number of subterranean termite species is now 175 percent greater than in 1975. In fact, the greatest number of invasive termites has been in the family Rhinotermitidae, or subterranean termites. We used to have four species in the state—the eastern sub termite, dark southern sub termite, light southern sub termite, and the Cuban sub termite. These subterranean termites usually nest in soil, although they can nest in wet wood and logs. Historically, the eastern subterranean termite has been the most damaging termite in Florida and the eastern United States.

DRYWOOD TERMITES



Kalotermes approximatus



West Indian powderpost
Cryptotermes brevis



Cryptotermes cavifrons



Incisitermes milleri



Incisitermes schwarzi



Southeastern drywood
Incisitermes snyderi



Calcaritermes nearcticus

SUBTERRANEAN TERMITES



Eastern subterranean
Reticulitermes flavipes



Dark southern subterranean
Reticulitermes virginicus



Light southern subterranean
Reticulitermes hageni



Cuban subterranean
Prorhinotermes simplex

FLORIDA DAMPWOOD TERMITES



Southern dampwood
Neoterme castaneus



Neoterme jouteli

1975

THE ODDBALL native termite is the Cuban subterranean termite that was previously called the Florida dampwood termite, but actually is now seen as a subterranean termite. The species is interesting because it possesses the traits of both subterranean and dampwood termites. Although it nests in wood, it also forages in soil, which true dampwood termites do not do, to seek out fresh food sources. This is why the Florida dampwood termite is now called the Cuban subterranean termite. The genus is tropical, and the termite has mainly been found in the Miami area.

In 1980, I discovered the Formosan termite in Hallandale. The native habitat for the termite is in eastern Asia and Taiwan. It first spread to North America and was found in Texas, Louisiana and South Carolina in the mid 1960s. Discovered in Florida in 1980, the Formosan termite has spread to every major metropolitan area in Florida in the past 35 years. Almost all the spread was due to human movement of infested wood, like railroad timbers.

The Asian subterranean termite is a close relative of the Formosan termite and is the major termite pest in South America. Its natural habitat is Southeast Asia, but more southerly in distribution. It has spread through the Caribbean and South America and was reported to be in South Florida in 1997.

The Asian subterranean termite is now a big problem in the Florida Keys. In the past, no subterranean termites infested the Florida Keys. The Asian subterranean termite has changed that situation and is now damaging structures severely in Key West. This past year it was discovered that Formosan and Asian termites will mate and produce offspring. These hybrid termites were discussed in the previous issue of *PestPro* magazine. I did not know whether to call this a new species or not. So for this article, I did call it a new species.

The West Indian subterranean termite was discovered in Miami in 1995 and was the first record of a *Heterotermes* species in North America. This termite genus is found in tropical locations throughout the world and will not likely spread north from Miami. It is a structure-infesting termite and is known to severely damage structures. This termite has diffuse nests in the soil that are very similar to nests of *Reticulitermes* species. Interestingly, the ranges of *Reticulitermes* and *Heterotermes* do not usually overlap.

A new native subterranean termite, *Reticulitermes nelsonae*, was described in 2013 from specimens collected on Sapelo Island, which is just off the state of Georgia. Collections of this termite have been made from South Carolina through Georgia and into North Florida at Branford. The body of the winged reproductive is a pale brown and can easily be confused with the light southern subterranean termite. Little is known about the behavior and damage potential of this termite species, since it is newly described.

New Higher Termites

The Florida dark-winged subterranean termite is a higher termite in the family Termitidae. This termite is the only member of this termite family east of the Mississippi River, so it is unique. The termite is a native of Florida and was first described in 1989. The distribution of the termite is in scrub lands of west central Florida, extending from Tarpon Springs east to Sebring and south to Punta Gorda.

Wood damage is characteristic, with workers excavating wood surfaces instead of creating galleries. These termites take wood back to their nest, where they feed chewed up wood to fungus, which serves as food for these termites. Foraging tubes are built over feeding sites and are covered with a characteristic black fecal lining. The black color is due to the termites feeding on their fungus gardens.

The conehead termite was previously called the tree termite. This termite was first discovered in Florida in 2001. The name "tree termite" was abandoned because although most *Nasutitermes* termites live in and eat trees, this one also lives and feeds away from trees, including in structures. Conehead termites build brown nests, usually in the shape of a large ball with a hard surface. Nests may be on, in or next to a tree, shrub or structure. Their foraging galleries can extend underground. The tree termite is known to be in Dania, Florida. Currently, FDACS has a program to eradicate this termite from Florida.

Continued next page

SUBTERRANEAN TERMITES



Formosan subterranean
Coptotermes formosanus



Asian subterranean
Coptotermes gestroi



Formosan x Asian hybrid



West Indian subterranean
Heterotermes sp.



Reticulitermes nelsonae



Florida darkwinged sub
Amitermes floridensis



Conehead
Nasutitermes corniger

DRYWOOD TERMITES



Western drywood
Incisitermes minor

FLORIDA DAMPWOOD TERMITES



Neotermes luykxi



Western drywood termite soldier, *Incisitermes minor*

New Non-Subterranean Termites

Florida has two longstanding species of true Florida dampwood termites, and a third newer one that was first described in 1989. All these dampwood termites are common in subtropical woodlands, mangrove forests, and urban settings of South Florida. The newer species, *Neoterмес luykxi*, has been found from eastern Broward County to Key Largo. These termites nest in wet wood. Because of their moisture requirements, structural infestations of Florida dampwood termites are associated with sources of free water, like wood-to-soil contact, wood-exposed water leaks, or wooden siding exposed to rainfall.

Florida has seven species of drywood termites that are native or have been in the state for a long time. There is one recently introduced species, the western drywood termite. The native range for the western drywood termite is in California north to Washington state. It is the most damaging termite in the southwestern United States. This termite has spread to Hawaii and more recently to Florida in 1986. The western drywood termite nests in dry, sound wood and can be easily carried in infested furniture to various parts of the world. Infestations have even been found in Georgia and Canada. The reproductive has a characteristic red color to its head and thorax, and dark wings that differentiate it from other Florida termites.

How Will More Termites Arrive?

It would be great if there were no more invasive termites to bring to Florida. But that is not the case. Of the 26 invasive species of termites worldwide, only five species have been discovered in Florida. So we still have a long way to go. There are nine species of invasive drywood termites, and so far we have only imported one. Of the 13 invasive subterranean termites, we have only had five introduced. What is great about pest control is that everything is constantly changing. The chemicals change, the equipment changes, and even the termite pests change over time. So there is a constant need for the industry to learn about these new situations.

The question is how new termite species are specifically introduced into an area. The best-known example is the Formosan termite. After World War II a lot of equipment and supplies were shipped back to the United States from the Pacific. Some of the material was loaded onto wooden pallets that sat on the ground for years. Probably Formosan termites established in these wooden members in China and Formosa, were put on ships, and offloaded at port cities like Galveston, New Orleans, and Charleston. The termites spread into these cities and infested railroad ties. The old railroad ties became landscape timbers that were sold and moved throughout the South. Similarly, our native eastern subterranean termite was taken from the United States to Europe and has established all the way from France to Spain to Italy.

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Drywood termites, like the western drywood termite, were moved on infested furniture from the western states and Mexico to Hawaii and Pacific islands. Quite a few species of *Cryptotermes* are invasive, but have not been brought to Florida, so future infestations of new drywood species is likely.

Interestingly, most invasive termites are found in island situations, and Florida has a lot of coastline and islands. There are two plausible explanations for why invasive termites are associated with islands. The first is that islands have ports where a lot of supplies are brought to the residents. The second is that termites can infest wood aboard ships and pleasure boats. These termites can swarm and establish nests near the docks. Most termite species probably are spread to new habitats by a combination of these two methods.

Moving Forward

The future is bright for the termite industry. None of our older, established species has gone extinct. So the work of killing these well-known species is still available. The challenge is dealing with the new, invasive species that have become established and in many cases are causing a great amount of structural damage. In fact, some of the newer species like the conehead termite may become agricultural pests, as well.

The pest control industry will boom as never before when it is realized that termites can affect agricultural production of fruits and vegetables. Get ready: Your future is changing every day as new termites come to Florida. **PP**

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

Termite photos by UF/IFAS except as noted

BIO Photography Group, Biodiversity Institute of Ontario:

Kaloterms approximatus
Cryptotermes cavifrons
Incisitermes schwarzi
Incisitermes snyderi
Reticulitermes hageni
Prorhinotermes simplex
Neotermes castaneus
Reticulitermes nelsonae
Nasutitermes corniger

Pest and Diseases Image Library, bugwood.org:

Cryptotermes brevis
Coptotermes gestroi
Heterotermes sp.
Incisitermes minor, Page 14

Whitney Cranshaw, CSU, bugwood.org:

Incisitermes minor, Page 13

Susan Ellis, bugwood.org: *Reticulitermes flavipes*

Gerald J. Lenhard, LSU, bugwood.org:

Reticulitermes virginicus

USDA: *Coptotermes formosanus*



OLIVE SHOOTWORM LARVA and DAMAGE

Photos by Lyle J. Buss, UF/IFAS

Olive Shootworm

Jim E. Davis

THE OLIVE SHOOTWORM is a Lepidopteran in the family Crambidae. These are moths that prefer plants in the olive family, Oleaceae. The family Oleaceae includes tea olive (*Osmanthus fragrans*), Florida privet (*Forestiera segregata*), fringetree (*Chionanthus virginicus*), olives (*Olea europaea*) and Japanese ligustrum (*Ligustrum japonicum*). The olive shootworm has been documented in the Florida counties of Sumter, Broward, Collier, Hillsborough, Miami-Dade, Monroe and Osceola. The primary detection was observed in The Villages, Sumter County, in 2012, on a row of Japanese ligustrum.

The adult olive shootworm, *Palpita persimilis*, has an almost pure-white body and a yellowish tinge on the forewings. This is a small moth, about ½ inch to 1 inch in length. The eggs can be found under the leaves. Eggs are laid individually, and one moth can produce up to 200 eggs. Larvae are green with a yellow head, reaching a length of about ¼ inch. Depending on the environment, the larval stage ranges from 30 to 45 days. When ready to pupate, larvae find a suitable location within crevices of the bark and begin to pupate, with pupation lasting about 10 to 20 days. The olive shootworm can have up to five to six generations per year. For positive identification, submit insect samples to the University of Florida Insect ID Lab, due to the fact that this moth looks very similar to two other *Palpita* species.

When scouting for damage, it is best to look for larvae and frass. Larvae prefer new growth, but larger larvae also chew on the older leaves. When observing the plant, look for the chewing damage along with folded leaves. The larvae roll leaves together and conceal themselves within. This offers protection from the elements and predators. Scouting also reveals webbing and the brown/black frass. When opening a leaf, you may see the green larvae hiding inside.

The olive shootworm is not easy to manage. Contact insecticides may prove difficult due to the concealment of the larvae within the leaf. Integrated pest management practices should be used. Proper scouting is critical in management. Identify the pest, then determine the acceptable threshold of damage. We have noticed that on many ligustrums, damage may be minimal and may not require any control. To date, we have not seen any ligustrums die strictly from olive shootworm damage. In all of the cases in Sumter County, the damage is cosmetic.

Pruning may be done to remove eggs, larvae and nests. Mechanical control such as this can prove effective if all eggs and larvae are removed and the plant tends to look better for the client. However, pruning may not be the sole management option. There has been evidence that after five weeks of pruning plants to remove eggs, larvae and nests, the new growth from the plant was sustaining another generation of oliveshootworm. Excess pruning may also stress the ligustrum and make it more susceptible to other pests, such as *Cercospera*. Biological control using natural enemies has shown varied success. **PP**

Jim E. Davis is a UF/IFAS Sumter County Extension Agent II.



Above: A young Bryan Cooksey and his father, Jennings Cooksey, with their family hogs in Lamont, Florida, around 1937. Bryan Cooksey would grow up to found a pest control dynasty that his sons David, John and Bryan II (below) continue to this day.

John Cooksey:

This Florida Native Mixes Business and Education, With Outstanding Results

As he works to complete his PhD, second-generation entomologist John Cooksey carries on a family tradition of pest control business success.

IN DAYS GONE BY, life in Florida often meant dealing with dread diseases spread by mosquitoes or lice. Chronic illnesses or even death were the common result of a mere insect bite. The Cooksey ancestors were no exception.

John Cooksey's grandfather Jennings Cooksey suffered his entire life from Brill-Zinsser disease, a relapsing form of epidemic typhus — a disease spread by body lice. John's grandmother fought off three different malarial infections growing up on her Florida farm. Malaria, of course, is spread by certain mosquitoes and was common before World War II brought about advances in chemical treatments.

John's own father, Bryan Cooksey, took quinine growing up in order to prevent malaria. Bryan's house had no electricity or running water until he was 14. It seems fitting that at age 16, Bryan left for Gainesville to attend the University of Florida to study entomology.

Bryan went on to work at and eventually assume ownership of McCall Service, a Jacksonville-based fuel oil company. Over time he nurtured and grew a pest control branch of the business and expanded its services

throughout Florida and into Georgia. He married, and his family grew as well.

Now Bryan's sons, Bryan II, David and John Cooksey, manage McCall Service, Inc., with each brother contributing his unique talents to the business that their father passed down to them. Bryan II leads overall management and direction, David handles administrative and financials, and John is chief operations officer, managing the day-to-day business operations.

McCall's Service provides general pest control, bed bug treatments, mosquito remediation, termite control, wildlife management, lawn care, and fuel oil services for residential and commercial properties. McCall services customers from its seven locations in Jacksonville, Gainesville, Tampa, Ocala and Tallahassee, Florida, and Albany and Savannah, Georgia. McCall specializes in food-processing pest management and commodity fumigation. They are partners in the Copesan organization, which provides pest management services to customers throughout North America.

John Cooksey recently found time to share some of his past adventures and future plans with the *PestPro* audience.



John, how did you first get involved with entomology?

My father majored in entomology at UF. He always talked about how much he enjoyed it. I grew up around the pest control business my entire childhood. When I went to get my undergraduate degree at Florida State, I chose chemistry. I never thought I would end up in the pest control business back then. I worked as a chemist for a while out of college in South Florida. My wife, who was a banker back then, got an opportunity transfer to Jacksonville, where we were both from. My dad gave me the opportunity to try out the pest control business if I was interested. I did, and I really loved it. I liked it so much I applied to the University of Florida to get a master's degree in entomology. I had no idea how interesting it was until I went to UF. I graduated with my master's in 1996, and reapplied to start working on my PhD in 2012.

So you have had jobs in industries other than pest management?

Yes. As an undergrad I worked in Alaska in the fishing industry during the summer. I worked on a boat on the Yukon River and on the Bering Sea in the area of the Aleutian Islands. We would travel around and buy salmon off the fishermen. We would clean them and freeze them in the hold of our ship. When we filled it up we would go out into the Bering Sea and sell everything to the Japanese. Then we would go back and do it again, all summer long. I also worked for the Department of Chemical Oceanography at FSU. I worked as an assistant to various graduate students getting their PhDs. One project was an atmospheric mercury study; the other was a trace metal study of the North Atlantic. We went from Nova Scotia to Scotland on a boat taking water samples every 100 miles or so from the ocean floor to the surface water. We traveled up the coast of Greenland and around the north side of Iceland. It was a long time to be stuck on a boat in the worst seas imaginable. I had started working on my master's in chemical oceanography, but that job made me change my mind.

A lot of time has passed between getting your master's degree and beginning your PhD. Has the Urban Lab changed?

When I started my master's degree in 1995, the building had just been built. I was with a great bunch of students back then:



John Cooksey observes a fly colony in his office at McCall Service. John's PhD work is studying the effects of aged bulbs on fly attraction in insect light traps. His biggest study to date utilized six restaurants in the Jacksonville area to see what happened to fly catch as bulbs in the ILTs got older.

Clay Scherer, Dini Miller, Jon Simkins, Marci Downing, and many others. Back then I was in the lab every day. This time around they hardly ever see me. It's still a great group of students. I guess I'm twice as old as most of them but I like being around them. They are full of energy and always working hard on their research. The building has gotten bigger, and there are a lot more students than there used to be. Dr. Koehler is still the same. I don't think he ages. Dr. Roberto Pereira is there as well. It's great working with the two of them. They are both always very supportive and encouraging.

Why did you decide to go back and earn your PhD?

I had always wanted to do it but never really thought I could because of working and family. The thing that really pushed

me over the edge was a project I worked on in Haiti. I worked with a charity group that was building a food processing facility in that country that would produce a food supplement called Nurimambi. It is a high-protein food source made from locally grown peanuts. The idea was to give people jobs, use locally available resources, and provide a great, high-nutrition product for the local people. I was there to implement a pest management program and get it started for them. I was working with a bunch of scientists from all over the United States and elsewhere. I enjoyed it so much I decided I wanted to position myself to get more opportunities like that. I felt like earning a PhD would help me along in that process. I'm not sure that it will, but I have learned so much that will help me in the future that I feel it's been worth it.

Continued next page



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What area of research do you focus on?

Most of my research has focused on the house fly, but I have worked with small flies as well. I am studying the effects of aged bulbs on fly attraction in insect light traps. My biggest study to date utilized six restaurants in the Jacksonville area to see what happened to fly catch as bulbs in the ILTs got older. We know that the amount of UV light put out by an ILT goes down over time as the bulbs age. What we didn't know was what effect that would have on fly catch.

What advice would you give to other pest control professionals who may be considering furthering their education?

Anything you can do to further your education is always extremely beneficial. There are so many options. You can get an online master's degree from the entomology department at UF now. The classes are outstanding and you learn so much. There is much more to the science of entomology than you would normally learn about in strictly urban pest management courses that you may take as part of the industry. The science is the base of everything. When you learn about the physiology, genetics, ecology, and other aspects of the science behind it, your

understanding of why we do what we do in this industry skyrockets. The more you learn, the more you realize how little you know.

What is it like to work so closely with your brothers, and would you recommend it to others (working with family)?

My family is more important to me than anything. My wife and kids have always supported me in everything I have ever undertaken. Work and school have taken me away from them on many occasions. We have three kids, ages 14, 16 and 18. Our middle daughter has autism, which has been an interesting undertaking. Our oldest child is about to go to college — maybe UF. My wife is my biggest fan and the one that pushes me the most.

My brothers and I are sixth-generation Floridians, and every generation has been involved in agriculture in one form or another. Only for the last two generations have we been involved in the pest control industry. My brothers are fantastic to work with. They are both military academy graduates (Air Force and West Point). We work very well together and back each other up. Any one of us could be out on a side project and the others would step in, no

questions asked. My brother David, who is a lieutenant colonel in the Air Force reserves, was recently deployed to North Africa. We were able to cover for him for six months, and it wasn't too bad. We are fortunate that we get along great and work together well.

In what ways do you and your brothers contribute to the pest control industry?

We have always been very active in the pest control and agriculture industries in several associations. My father, brother (Bryan II) and I all served as the president of the Florida Pest Management Association. We were also very active in many of the committees of the Association. One of the best things Bryan and I did was take part in the Wedgeworth Leadership Institute for Agriculture and Natural Resources. It's put on through IFAS at the University of Florida. It's a two-year program that gives you a prospective of local, state, national and international issues facing all aspects of agriculture and government. I got to visit the Czech Republic, Greece and Ireland and listen to issues in all aspects of agriculture. It was the best program outside of entomology that I have been part of. Bryan is also going to be the president of the National Pest Management Association in 2017. **PP**

Jumping Spiders: Our Tiny Allies in the Field?

GAINESVILLE, Fla. — Jumping spiders, voracious predators that eat pests around the world, can learn to distinguish the color red in their prey, thus allowing them to avoid toxicity in what they consume, according to new research led by a UF/IFAS scientist.

That means they can stay alive longer and eat pests ranging from caterpillars to beetles to flies, many of which damage agricultural products, said Lisa Taylor, an assistant research scientist in entomology at the University of Florida Institute of Food and Agricultural Sciences.

Because jumping spiders consume most small agricultural pests, growers can avoid using some chemical treatments on their crops.

Jumping spiders are fairly ubiquitous: More than 5,000 species are found on every continent except Antarctica, Taylor said.

In a new study in the journal *Behavioral Ecology*, Taylor and her colleagues from the University of Pittsburgh found that *Habronattus pyrrithrix*, a species of jumping spiders, could be trained to prefer or avoid red. That's important

because many pests emit that color to signal toxicity, Taylor said.

"We show that they are able to learn to associate the color red with toxic prey – and avoid it – or to associate red with high-quality prey and seek it out," Taylor said. "One reason this is important is that it helps us understand how these spiders might interact with a new type of prey that appears in their environment."

For example, scientists previously assumed that because these spiders have small brains, they would have an innate aversion to the color red and therefore avoid toxicity, Taylor said. If this were the case, then spiders would avoid a new species of red insect that appeared in an area where the spiders live — for instance a farm or ranch — even if that insect was not toxic. This means that the spiders would miss out on eating non-toxic red prey, such as red blood-filled mosquitoes.

"This study shows that the spiders will test out new prey and quickly learn and remember the colors associated with them," she said. "This



A jumping spider guards its red prey. A new study shows that jumping spiders can quickly learn the colors of prey that are safe or unsafe to eat.

helps the jumping spider survive because they can make more informed choices about what to eat. For humans, it's good because it means that spiders can respond to changes in prey communities and be more effective biological control agents." **FP**

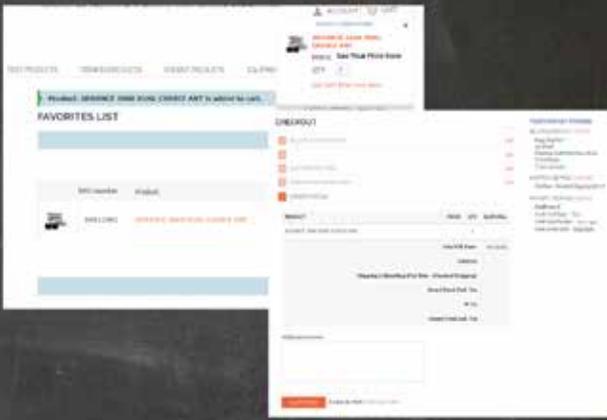
Report by Brad Buck, UF/IFAS Science Writer.

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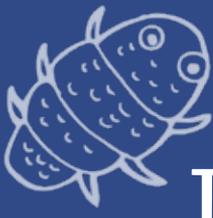
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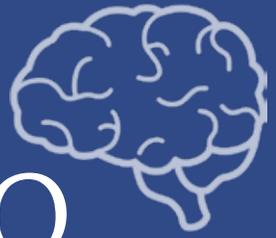
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Test Your Pest Control IDENTIFICATION IQ



THE PICTURED PESTS were submitted by *PestPro* readers. Can you correctly match all three pests by looking at the pictures and clues below, for a perfect Identification IQ? Send in your pest photo and it might appear in a future issue.

Ensign Wasp *Evania appendigaster*

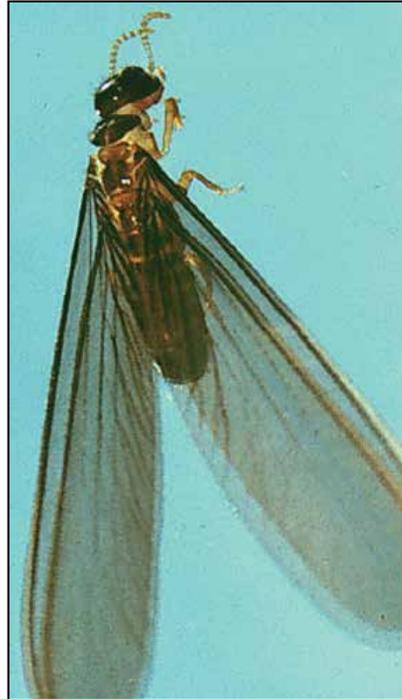
The larvae of these solitary wasps feed on cockroaches. The female wasp lays an egg inside the roach ootheca (egg case), and the wasp larva hatches quickly and consumes the roach eggs. Some ensign wasps are able to oviposit even when the female cockroach still carries the fresh ootheca around, while other ensign wasps will only attack oothecae that are completed and have been dropped by the mother roach.

Florida Darkwinged Subterranean Termite *Amitermes floridensis*

It is the most recent native termite species to be recognized in the United States. Although astute pest control operators knew of this termite decades before, *Amitermes floridensis* was not described until 1989 from specimens collected in St. Petersburg, Florida. Their summer dispersal flights or "swarms" are often massive, and a witness once described a series of alate launches as looking like plumes of smoke coming from the ground.

Cycad Scale *Aulacaspis yasumatsui*

Cycad scale is a very serious pest of sago palms, because it can cause severe damage and will ultimately kill the host plant. One solution that has proven somewhat effective, especially on smaller sagos, is to simply spray the plant with a hard stream of water from a hose (Mannion, 2003). Done regularly and thoroughly, this technique can at least slow the pest down drastically.



1. _____

2. _____

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ANSWERS
 1. Florida darkwinged sub termite, 2. Cycad scale, 3. Bn sign wasp

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Pension Planning For a PCO Business

John P. Corrigan, Esq., Dan Gordon, CPA, and Norman Cooper

IF YOU are a PCO business owner looking for additional tax deductions and the ability to defer income without having to make a significant contribution for all employees, then you know how difficult it is to figure out what is the best plan to suit a closely held business.

Options for SEP IRAs, simple IRAs, 401(k) plans, profit-sharing plans, money purchase plans, ESOPs, defined benefit vs. defined contribution plans, and hybrid plans become confusing to the typical small business owner who has no desire to spend significant sums on pension consultants, insurance brokers, investment advisors, ERISA attorneys, actuaries, or CPAs to all bill at the same time, crafting a one-size-fits-all plan that gets the vast majority of the contribution being allocated to the PC owner.

What one needs to know is that the variations fall into two categories: defined benefit plans, or DBP, and defined contribution plans, or DCP. Basically, a DBP provides a specific benefit being paid out a retirement, e.g., annual pension for life equal to 50 percent of final average pay in the last three years of employment. A DCP provides a set amount or percentage of pay going into the plan for the benefit of each employee, and time value and investment return will determine what a retiring employee will receive as a lump sum.

Under the DPT, an employer takes a risk that an employee may live for 30 years after retirement and be burdened with such cost. Under the DCP, an employer takes no risk other than the stated contribution being made each year to an employee's account. Whether the DCP balance is sufficient or not to meet the employees' needs if they live for many years is no longer the concern of the employer.

In the last two decades, employers have been moving mostly to DCP plans, like the most common 401(k) plan. Also, some people are unaware that a DCP can have multiple parts such that a 401(k) is combined with a profit-sharing component, so that if an employer does well in one year, then more can be contributed to the employee's account balance. In lean years, a portion can be either terminated or reduced, depending on the circumstances.

Where can one start before spending too much money on professionals, who will all have different opinions on the best route? The IRS and Department of Labor provides some

useful help as well as comparison tables of the basic choices typically used 1,2. However, going beyond the basics is worth your while, as there are opportunities to plan, in part, around existing IRS and ERISA rules seeking to make business owners much more socialistic in terms of sharing the wealth among all employees, not just keeping wealth for the owners on a tax-deferred basis.

Other key terms an employer needs to understand in designing any pension plan would be "top-heavy limits" and "nondiscrimination rules," as the laws seek to limit the very thing employers want to do that contributes the lion's share for their own benefit. These technical issues are beyond the scope of this article, but they must be adhered to lest the IRS disqualify the pension plan, which could have significantly adverse tax consequences for the employer-sponsor of the plan.

For a PCO owner who has not set aside enough savings but now has a business producing a healthy, steady amount of annual profits, it may be time to consider an option that would not be normally seen in a PCO business having \$5 million or less in revenues. Usually, the fear of needing outside professionals to assist in the implementation of such a plan and the ongoing administrative costs and annual tax return filings (Form 5500) have acted as a deterrent, but an overrated one after considering the benefits.

One aspect in designing these types of plans is that Social Security integration can be utilized to create even greater allocations to highly paid employees. To the extent the lower-paid employee will receive greater Social Security benefits in relation to their overall compensation vs. the highly compensated owner, this allows for a positive adjustment to the owner under the newly adopted pension plan.

Enter the Age-Weighted Profit-Sharing Plan

A small company with one or more key employees who are older and more highly paid than the rest of the workforce will likely find an age-weighted profit-sharing plan, or age-weighted PSP, to be very desirable. An age-weighted PSP has the same features as a standard profit-sharing plan, which of course

allows an employer to decide when and what amount will be contributed to the employees' retirement accounts. However, the age-weighted PSP allows a greater allocation to older employees, essentially legally allowing a certain degree of discrimination. This is because the plan contributions are based on benefits at retirement age and not on allocations of contributions to the plan. Out of a total contribution to make in any given year, it is quite possible that the owner could garner between 70 to 80 percent of the total amount being contributed for all employees. There are formulas to use, but it acts like a DBP without the minimum funding requirements.

ANOTHER benefit for a PCO owner with technician turnover every two to three years is that you are allowed to establish a vesting schedule for participant balances, meaning the plan will have funds in it that the departing non-vested employees will be taking with them. In addition, eligible employees may receive a contribution of up to \$53,000 for 2015, or 100 percent of compensation (based on the first \$265,000 of compensation), therefore allowing an older PCO owner an opportunity to sock away a large amount in a few years. This plan can also be combined with a 401(k) plan to allow employees to defer compensation as well.

In addition to the age-weighted PSP, there is also a variation called a new comparability plan, or NCP. The key distinction for NCPs over age-weighted PSPs is that the employees are broken into separate groups for purposes of conducting the nondiscrimination testing formulas.

In closing, although the thought of delving into such a type of pension plan design may seem daunting, it is well worth the effort to explore. Investment advisors and insurance brokers are usually more than willing to provide such up-front assistance for free, given that there will be pension assets to manage and annual fees to garner for many years. **PP**

The authors are Directors of PCO M&A and Succession Planners, LLC, an affiliate of PCO Bookkeepers. For more information visit www.pcosuccessionplan.com or send us an e-mail at info@pcobookkeepers.com.

MULTICOLORED Asian Lady Beetle

Russell Mizell III

The multicolored Asian lady beetle, *Harmonia axyridis* Pallas, was introduced from Asia both purposefully for classical biological control of arthropod pests and accidentally into the United States many times during the 20th century.

IT FINALLY became established and quickly spread over the entire United States sometime in the late 1980s and early 1990s. By 1994, *Harmonia axyridis* had colonized the United States from Florida to Canada and from coast to coast.

Asian lady beetle adults occur in several color patterns, or “morphs,” varying from solid orange to orange with black spots, to red with black spots. They should not be mistaken for another introduced lady beetle from Europe, the seven-spotted lady beetle, *Coccinella septempunctata* Linnaeus, which is often found feeding on the same insect hosts and plants.

Asian lady beetles oviposit in or near prey infestations. The larvae are larger than most native lady beetle larvae and are especially fond of crapemyrtle aphids, *Tinocallis kahawaluokalani* (Kirkaldy), found only on crape myrtle, *Lagerstroemia indica* L. Crape myrtle aphids also originated from Southeast Asia, home of Asian lady beetles.

Many native beneficials also feed on crapemyrtle aphids. It is suspected that Asian lady beetles may be responsible for reduction in the numbers of native beneficial insects, including other lady beetle species, through cannibalism and by elimination of scarce prey. This supposition remains to be proven scientifically.

Use In Classical Biological Control

The Asian lady beetle is a voracious predator of arthropod pests such as aphids, mites, thrips, scales and Lepidoptera eggs. As a predator, it is beneficial for most of the year and has contributed to a decrease in pesticide use in a myriad of orchard and other crops. Both larvae and adults feed on pests and quickly build up to large numbers locally.

Status As An Overwintering Pest

Unfortunately, like many of our native lady beetle species, *H. axyridis* adults aggregate in high numbers to overwinter. In Japan, these lady beetles overwinter en masse in rocky outcrops on the sides of mountains and in other structures, similar to the behavior of the convergent lady beetle in the United States. However, unlike other lady beetles in the United States, Asian lady beetles are attracted to light-colored dwellings and other manmade objects, which it uses as overwintering sites. As a result of this behavior, *H. axyridis* enters dwellings it is attracted to through cracks, crevices and other small openings around windows, doors and roofs.

Flight to overwintering quarters, triggered by the onset of cold weather and scarcity of prey, occurs at different times from year to year and occurs progressively later from northern to southern latitudes:

October in Michigan and November–January in north Florida. These mass migrations to overwintering sites proceed over a period of a few days in the north to a few weeks or more in the southern United States, again dependent on local weather.

During the overwintering phenomena, Asian lady beetles aggregate in large numbers on dwellings, which usually are white,

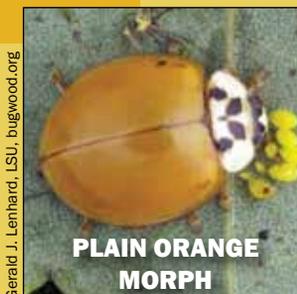
beige or tan, although occasionally darker buildings also are used. Usually these dwellings have walls facing in the general directions of south to west, which in the fall are highly reflective of sunlight due to the sun’s lower azimuth. These bright reflective surfaces shine intensely and are visible and attractive to the lady beetles from long distances. This is especially true for areas of the United States and Canada that are hilly or mountainous, e.g., Tennessee and New York, where light-colored dwellings in the mountains or at high elevations may be visible for miles.

As a result of this overwintering behavior, Asian lady beetles are a nuisance during and after the flight periods as they aggregate on the walls and other parts of dwellings. These lady beetles may enter houses in large numbers—15,000 to 20,000 is not uncommon. Inside the walls, floors, attics and crawl spaces of dwellings, they crawl around looking for cool places to spend the winter. With large numbers of

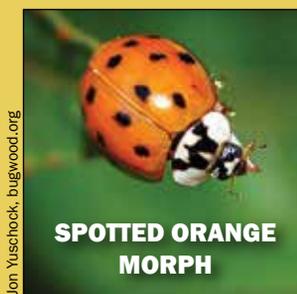
lady beetles, this annoying movement can be heard from inside the house.

Moreover, the interior walls of the dwellings are often warmer than the lady beetles require for dormancy. Therefore, they continue to crawl around and often exit the dwelling walls into the interior over the course of the winter or in spring.

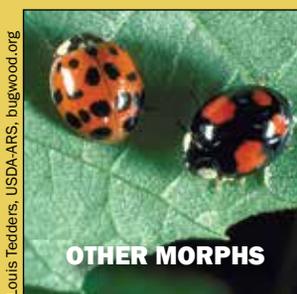
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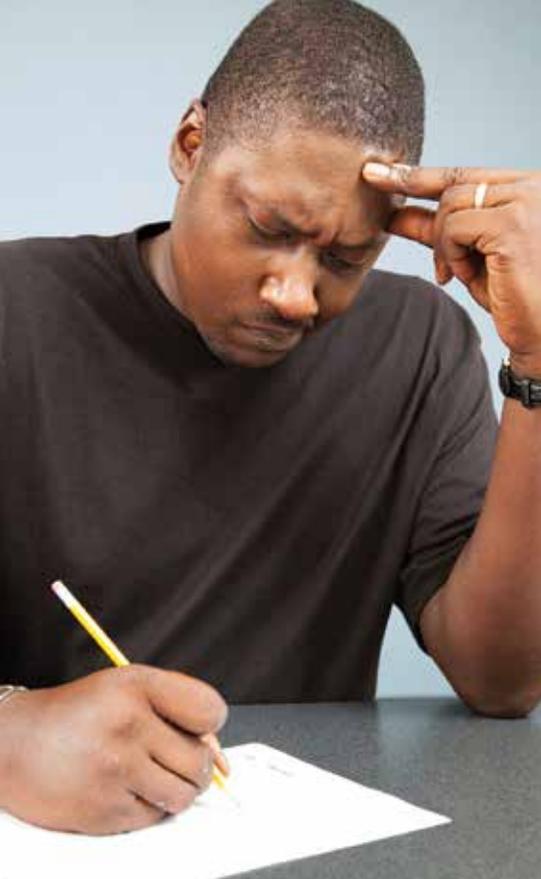
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CPO Testing Opportunities Come Closer to Home

Erin Harlow

If you are a licensed pesticide applicator, or ever considered getting a pesticide license in the state of Florida, you have probably figured out that it can be a confusing and daunting process.

FLORIDA has many different pesticide licenses in several areas, with over twenty different categories, and each is based on the site of where the product will be applied. Once you figure out if you need a structural or restricted-use pesticide license, you have to determine which category — perhaps aquatics, ornamental and turf, right-of-way, or a certified operator's license in lawn and ornamental or general household pests. If it is a restricted-use, limited, or public health license, you could go to your local Extension Office and take the test on paper.

These are provided based on the schedules of the offices, perhaps once a month or even as a walk-in. However, if you were testing for your certified pest control operator's exam, then you could only do it once a quarter and had to travel to Apopka. Good news: Beginning in January 2016 that will no longer be the case, since these exams are coming to you.

For the last five years, the Florida Department of Agriculture and Consumer Services (FDACS) and the University of Florida have been working hard to create computer-based exams that are available at local Extension offices. After several years in production, almost all exams are now

available, including the newest editions — the certified pest operator exams. While not all Extension offices provide the computer-based exams yet, there are 24 offices that provide them throughout the state, and more are joining each day. The dates and times vary with each location, so you should check with your local office for their schedule.

The restricted-use categories (private, right-of-way, aquatics, natural areas, etc.) were initiated first, and all 18 categories are now available on the computer system. Then the limited exams (lawn and ornamental, commercial landscape maintenance, wildlife, and structural) were added. As of January 2016, the Certified Pest Control Operator exams, including the categories of General Household Pest, Wood Destroying Organism, Lawn and Ornamental and Special Fumigation Identification Card, will become available at offices.

To make the process even easier, you can now apply and pay for online any of your licenses. For the operator's exam, you still have to go through the approval process and the paperwork is the same, but instead of mailing the application you upload it to the website. Once approval is gained, you can register online to reserve your seat at your Extension office. You still have four hours



Computer-based exams are now available at many County Extension offices.

to complete the exam, just like you would if you were in Apopka.

If you are taking your limited exam, you also can apply and pay online — this should be done before you take your test. However, if you are taking a restricted-use license exam, then you apply online, but pay for the license upon successfully completing the appropriate exams. The payment process may also be accomplished through the same website the next day. To begin the process of applying for your license or if you want to renew your current one, visit the FDACS website at <https://aesecomm.freshfromflorida.com>.

Many offices are providing different testing dates for those who are taking their restricted-use and limited exams versus those taking their certified pest control operator exams. This is because the amount of time allotted varies depending upon the type of exam, so make sure you sign-up for a slot that has a four hour block if you are taking your operator's exam.

Also, the number of computers varies at each location, so seats may be limited. Some offices are providing the exams on scheduled dates, for instance once a month, while other offices may provide the exam at any time once your paperwork is approved. Be

aware that since the certified pest operator exams are structural, offices located in urban hubs are generally more prepared to provide these exams and answer questions.

To schedule any exam and reserve your seat, you can visit UF's pesticide exam website at <https://pesticideexam.ifas.ufl.edu/>. It is also a great resource for determining which license you may need, FAQs, and links to testing centers and schedules.

On the day of your test, you need to bring a few things with you to the testing center. Make sure you have a picture ID such as a driver's license, and bring your system-generated voucher number that was provided to you when you registered for an exam. If you are taking your operator's or limited exam, then bring along the paperwork that says you have been approved by FDACS for testing and a receipt for payment if you have one. It is a good idea to leave cell phones, electronic devices, and other material at home or in the car when you enter the building, as they are not permitted in the exam room. If you are sitting for your fumigation exam, you need to bring a fumigator calculator with you as instructed by FDACS. The test proctors will provide everything else to you.

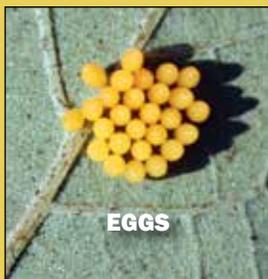
The new computer-based testing is a wonderful service for pest management professionals. Not only do you have unofficial results instantly, you can test closer to home, saving you money and travel time. On some occasions, Extension offices may also provide exam reviews and the opportunity to test following the review. While this may not be the case with the operator's exams yet, there are several industry organizations and private companies that continue to provide these services.

Check with your surrounding Extension offices to see what trainings they may have available. If you prefer driving to Apopka to test, don't worry because those exam opportunities will still be there. However, they will remain in paper format for the present time.

If you still have questions about which license you might need or the exam process, you can contact your local Extension office at <http://www.solutionsforyourlife.com/>. **PP**

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Lady Beetles, continued from Page 23

Once in the warm interior, they fly around and land on walls, drapes and furniture, causing much general annoyance to the human inhabitants.

Asian lady beetles are of special consternation to inhabitants that are entomophobic, or have a fear of insects. When disturbed, *H. axyridis* produces a yellow, viscous, foul-smelling defensive compound that may soil whatever it contacts. Therefore, when people disturb them or try to remove them with brooms, vacuum cleaners, or other tools, the foul odor spoils the air, and yellow spots appear on people, expensive furniture, and drapes.

This phenomenon of large aggregations of overwintering *H. axyridis* is all too common now across the United States and Canada. The lady beetles often return to the same buildings year after year. In addition to the problem for affected homeowners, the situation is a “black eye” on classical biological control, which in most cases is a highly touted and effective alternative to the use of chemical pesticides.

Managing a Mess of Asian Lady Beetles

Recommendations for protecting buildings from overwintering *H. axyridis* have not been fully developed. All buildings infested by these lady beetles should have any cracks, crevices or holes in the exterior walls — especially around windows and doors — sealed or caulked to prevent entry. The lady beetles often enter attics and can accumulate in large numbers in these spaces over the years.

Once the lady beetles are inside a building, there are several options for removal. The best option is to purchase a blacklight trap and use it in rooms where lady beetles are observed as soon as they are seen. The light traps are very effective when operated at night.

Use of a vacuum cleaner or other cleaning tools that handle the beetles roughly, while effective, will result in production of the defensive compound by the lady beetles, with its unwanted side effects as previously described. Despite their overwintering behavior, Asian lady beetles are very valuable as natural enemies of many insect pests and should be tolerated and conserved when possible. **PP**

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FDACS Division of Agriculture Environmental Services (AES) Reorganization Update

GAINESVILLE — Over the past 18 months, there have been a lot of changes within the Division of AES. On July 1, 2014, the Bureau of Entomology, Bureau of Compliance Monitoring, and Bureau of Pesticides were dismantled and reorganized by functionality. The new bureaus within the division are now the Bureau of Inspection and Incident Response (BIIR), the Bureau of Licensing and Enforcement (BLE), and the Bureau of Scientific Evaluation and Technical Assistance (BSETA).

The Bureau of Inspection and Incident Response (BIIR) will house the pest control inspectors, who will continue to conduct pest control business license inspections, consumer complaint investigations, vehicle inspections, and all the other field inspections that they have been doing. BIIR will also house inspectors to perform inspections of golf courses, farms, market place, feed, seed and fertilizer producers, along with consumer complaints and federal worker protection standards. Some of the inspectors will be cross-trained to address all statutes managed by FDACS (Chapters 388, 482, 487, 576, 578 and 580). The Bureau Chief for BIIR is Mr. Dale Dubberly.

The Bureau of Licensing and Enforcement (BLE) will issue all Pest Control, Private applicator, Public applicator, Commercial applicator, and all other limited licenses and certificates. BLE will also administer the enforcement of the following State Statutes; Chapters 388 (mosquito control), 482 (pest control), 487 (pesticides), 576 (fertilizer), 578 (seed), and 580 (feed). The Bureau Chief for BLE is Ms. Sarah Oglesby.

The Bureau of Scientific Evaluation and Technical Assistance (BSETA) will conduct pesticide fate and risk evaluations and registrations, and provide technical support on matters related to Pest Control Certification Exams, conehead termite outreach and education, Formosan termite outreach and education, pollinator protection, mosquito control technical support and education, and worker protection. The Bureau Chief for BSETA is Dr. Davis Daiker.

Most recently, Assistant Director Mr. Steve Dwinell has accepted the Director position within the Office of Agricultural Water Policy. Stepping into the Assistant Director position is Ms. Kelly Friend. **PP**

Report by Paul Mitola, FDACS Personnel and Environmental Consultant

The NEW BUREAUS:
 Bureau of Inspection and Incident Response
 Bureau of Licensing and Enforcement
 Bureau of Scientific Evaluation and Technical Assistance

Commissioner of Agriculture and Consumer Services Chief of Staff

Office of the Commissioner

- Office of Agricultural Emergency Preparedness
- Office of Agricultural Law Enforcement
- Office of Agricultural Water Policy
- Office of Cabinet Affairs
- Office of Federal-State Relations
- Office of Legislative Affairs
- Office of Policy and Budget
- Office of Public Information

Administration Division

- Information Technology Bureau
- Finance and Accounting Bureau
- General Services Bureau
- Personnel Management Bureau
- Training and Development Section

Deputy Commissioner

- Plant Industry Division
 - Botany Bureau
 - Biological Control Bureau
 - Plant and Apiary Inspection Bureau
 - Pest Eradication and Control Bureau
- Fruit and Vegetables Division
 - Inspection Bureau
 - Technical Control Bureau
- Marketing and Development Division
 - Development and Information Bureau
 - Agricultural Dealer's Licenses Bureau
 - Food Distribution Bureau
 - State Farmers' Market Bureau
 - Seafood and Aquaculture Marketing Bureau
 - Education and Communication Bureau
 - Agricultural Statistics Service Bureau

Deputy Commissioner

- Forestry Division
 - Field Operations Bureau
 - Forest Management Bureau
 - Forest Protection Bureau
 - Forest Resources and Support Bureau
- Animal Industry Division
 - Disease Control Bureau
 - Diagnostic Laboratories Bureau
- Standards Division
 - Fair Rides Inspection Bureau
 - Liquefied Petroleum Gas Inspection Bureau
 - Petroleum Inspection Bureau
 - Weights and Measures Bureau

Deputy Commissioner

- Dairy Division
 - Dairy Inspection Bureau
 - Dairy Compliance Monitoring Bureau

PREVIOUS BUREAUS:
 Agricultural Environmental Services Division
 Agricultural Environmental Laboratories Bureau
 Pesticides Bureau
 Entomology and Pest Control Bureau
 Compliance Monitoring Bureau

- Food Safety Division
 - Food and Meat Inspection Bureau
 - Food Laboratories Bureau
 - Chemical Residue Laboratories Bureau

Assistant Deputy Commissioner

- Aquaculture Division
- Consumer Services Division
 - Compliance Bureau
 - Mediation and Enforcement Bureau
 - Investigations Bureau
 - Consumer Assistance Bureau

Licensing Division

- License Issuance Bureau
- Regulation and Enforcement Bureau
- Support Services Bureau
- Surveyors and Mappers

Office of the General Counsel
 Office of the Inspector General



ORGANIZATION

The Department of Agriculture and Consumer Services is headed by the Commissioner, who is elected statewide to a four-year term. The Commissioner is assisted in managing the Department by a Chief of Staff, three Deputy Commissioners and one Assistant Deputy Commissioner. The Department is organized into 12 programmatic Divisions and one support Division, each headed by a Division Director. Each Division is subdivided into Bureaus, with each headed by a Bureau Chief. The Bureaus are further subdivided into Sections.



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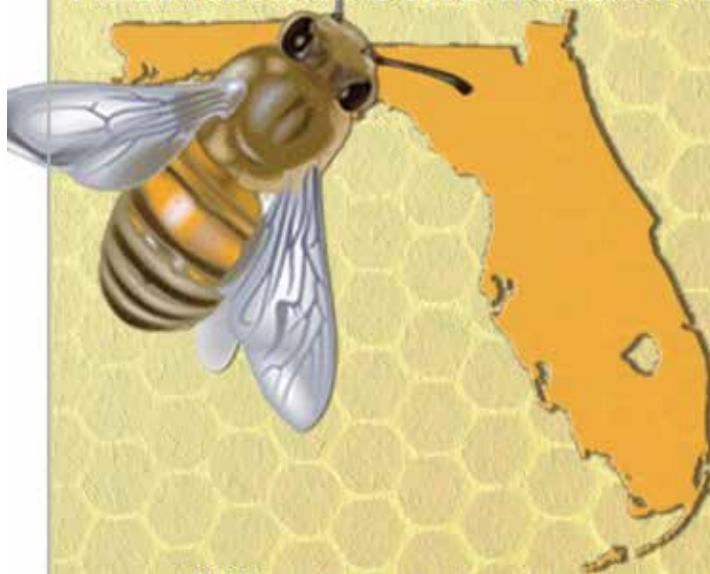
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