

**Tawny
Crazy Ants
Problem
Pigeons**

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ON THE COVER

Pigeons are present in every city on Earth. Learn to manage conflicts between pigeons and people using the latest advice from UF/IFAS expert William H. Kern, Jr.

Photo: Muhammad Mahdi Karim/www.micro2macro.net
<http://tinyurl.com/pigeon-legal>

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INSTAR WARS

21ST ANNUAL SOUTHEAST PEST MANAGEMENT CONFERENCE
MAY 1-4, 2016, UNIVERSITY OF FLORIDA, GAINESVILLE, FLORIDA

May 2, 2016: General Household Pests (GHP)

- 7:00 AM - 8:30 AM Registration
- 8:30 AM - 9:20 AM **GHP** The Dark Side: Implications of Behavior and Chemical Ecology Research For Bed Bug Management - Emma Weeks, UF/IFAS
- 9:20 AM - 9:40 AM Break
- 9:40 AM - 10:30 AM **GHP** Defeating TIE Fighters: Mosquito, Arboviruses, and Pest Control Industry - Claudia Riegel, New Orleans Mosquito, Termite and Rodent Control Board
- 10:30 AM - 10:50 AM Break
- 10:50 AM - 11:40 AM **GHP** SUMMONING THE FORCE
- Durable Dual-Action Ovitrap for Control of Container-Breeding Mosquitoes - Casey Parker, UF/IFAS
- Ready-to-Use Mosquitocidal Chips for Control of Container-Breeding Mosquitoes - Kristen Stevens, UF/IFAS
- SEPMC, Urban Entomology Lab, and Florida Pest Management Foundation: Partners in PCO Education
- 11:40 AM - 12:00 PM Lunch
- 12:00 PM - 1:15 PM Lunch
- 1:15 PM - 2:10 PM **GHP** Arming the Millennium Falcon: Combination of Silica and Pesticides for GHP Control - Heather Erskine, UF/IFAS
- Phantom Menace: *Cimex* Sp. and Bed Bug Egg Control - Brittany Campbell, UF/IFAS
- Clone Wars: Pyramid Ants - Tony Hughes, UF/IFAS
- 2:10 PM - 3:00 PM **GHP** Ewok Invasion: Occasional Invaders in Florida Homes - Dallin Ashby, UF/IFAS
- Blasting Storm Troopers: Effects of Soaps on Bed Bugs - Jahnalyn Gordon, UF/IFAS
- "It's a Trap": Fly Baits for Control of Small Flies - Megan Bernier, UF/IFAS
- 3:00 PM - 3:20 PM Break
- 3:20 PM - 4:10 PM **WDO** 2-HOUR CORE: The Empire Strikes Back: Insecticide Resistance - Blair Siegfried, UF/IFAS
- 4:10 PM - 5:00 PM Jedi Training: Educational Opportunities for PCOs - Rebecca Baldwin, UF/IFAS

May 3, 2016: Wood-Destroying Organisms (WDO)

- 7:00 AM - 8:30 AM Registration
- 8:30 AM - 9:20 AM **WDO** The Rogue Squadron: Formosan Termite Control in New Orleans - Claudia Riegel, New Orleans Mosquito, Termite and Rodent Control Board
- 9:20 AM - 9:40 AM Break
- 9:40 AM - 10:30 AM **WDO** Charting the Galaxy: Mapping Termites in Florida - Thomas Chouvenec, UF/IFAS
- 10:30 AM - 10:50 AM Break
- 10:50 AM - 11:40 AM **WDO** The Jedi Order: Termite Control Regulation - Paul Mitola, FDACS
- SEPMC, Urban Entomology Lab, and FPMF: Partners in PCO Education
- 11:40 AM - 12:00 PM Lunch
- 12:00 PM - 1:15 PM Lunch
- 1:15 PM - 2:05 PM **WDO** Revenge of the Sith: Hybrid Termites - Thomas Chouvenec, UF/IFAS
- 2:05 PM - 2:55 PM **WDO** The Force Awakens: New WDO Manual - Roberto Pereira, UF/IFAS
- 2:55 PM - 3:15 PM Break
- 3:15 PM - 4:05 PM **WDO** Galactic Senate: Legislative Update and Licensing - Dale Dubberly, FDACS
- 4:05 PM - 4:55 PM Deflector Shields: Selecting Personal Protection Equipment - Phil Koehler, UF/IFAS

May 4, 2016: Lawn & Ornamentals (L&O)

- 7:00 AM - 8:30 AM Registration
- 8:30 AM - 9:20 AM **L&O** Historical Water Successes and Opportunities - Steve Dwinell, Director, FDACS Office of Ag Water Policy, Tallahassee
- 9:20 AM - 9:40 AM Break
- 9:40 AM - 10:30 AM **L&O** Beyond Tried and True: New Plants for Ornamental Beds - Robert Bowden, Director, Harry P. Leu Gardens, Orlando
- 10:30 AM - 10:50 AM Break
- 10:50 AM - 11:45 AM **L&O** New Age for Herbicides: What is Beyond MSMA? - Dr. Ramon Leon-Gonzalez, UF/IFAS, Jay
- 11:45 AM - 12:30 PM Lunch
- 12:30 PM - 1:20 PM **L&O** PSI: Plant Scene Investigation - Matt Orwat, UF/IFAS Washington County Extension
- 1:20 PM - 2:10 PM **L&O** A Trojan Horse in an Ambrosia Beetle: Unexpected Tree Killers and Potential Future Threats - Jason Smith, UF/IFAS, Gainesville
- 2:10 PM - 2:25 PM Break
- 2:25 PM - 3:15 PM **L&O** Pesticide Formulations - Melissa Barron, Syngenta, Gainesville
- 3:15 PM - 4:05 PM **L&O** Pesticide Math - Lloyd Singleton, UF/IFAS Sumter County Extension



Straight from the Researcher's Mouth: InStar Wars Coming to SE Pest

USE THE FORCE to get here in May: “InStar Wars” is the theme for the 21st annual SE Pest Management Conference to be held on May 1–4, 2016, at the Physics Building on the University of Florida campus. We will be presenting information directly by the researchers who are investigating specific pest management practices. Continuing education units, or CEUs, will be offered for GHP on Monday, May 2, WDO and FUM on Tuesday, May 3, and L&O on Wednesday, May 4. Core CEUs are offered every day.

Food will be a specially featured attraction at SEPMEC this year. Monday evening we will have the fabulous Sapp–Walkup Cookout, featuring barbequed steaks, fish, chili and all the fixings, sponsored by Syngenta. Tuesday lunch will be a low-country boil sponsored by B&G Products and prepared by Jennifer Leggett and Claude Thomas. Wednesday will be a barbeque sponsored by Ewing Irrigation and Landscape Supply. Of course, we will have all the coffee, soft drinks, and snacks that you can eat all day. We try to make sure everyone gets fed really well.

MONDAY: MOSQUITOES AND MORE

Besides food, the conference offers great education. The first day of talks is Monday, May 2, for GHP topics and Core. The morning starts with a talk on “The Dark Side” by Emma Weeks, a bed bug researcher originally from the UK, presenting data on the behavior and chemical ecology of bed bugs. Claudia Riegel, director of the New Orleans Mosquito, Termite and Rodent Control District, will be talking about “Defeating Tie Fighters.” The subject will be arboviruses like Zika and dengue, and the pest control industry. That is a very timely talk because of all the headlines and fear about the introduction of Zika into this country. I have heard that some customers are already asking companies to provide mosquito control for them because of their fear of Zika and dengue.

The day goes on with a few of our student researchers talking about our newly developed methods of controlling container breeding mosquitoes — the ones that transmit Zika and dengue. “Summoning the Force” will be presented by Casey Parker and Kristen Stevens, master’s students in our program. They are experts on the implementation of the dual-action durable lethal ovitrap and larvicidal chips for mosquito control. “Arming the Millennium Falcon” is a talk on her master’s research by Heather Erskine on utilizing silica in spray formulations to increase the action of residual pesticides applied around buildings for insect

control. This unique method of mixing active ingredients can really improve products used for perimeter pest control. You will definitely want to hear these talks on these novel methods of pest control by the actual researchers doing the work.

Have you heard about the “Phantom Menace?” The tropical bed bug has now been found in Florida, and Brittany Campbell, a PhD student, will be talking about the discovery of this new pest. Also, bed bug eggs are the cause of massive failures in bed bug control programs. She will be presenting some of her research on solving the problem of reinfestations after treatments. To continue with the new and important pest problems in Florida, Tony Hughes will talk about his research on the black pyramid ant, and Dallin Ashby will talk about pest infestations in mulch around houses. Two undergraduate researchers, Megan Bernier and Johnalyn Gordon, will end the day with their research on killing small flies, and soap solutions for bed bug control.

Core presentations are at the end of the day on Monday, “The Empire Strikes Back” is a talk by our new Entomology Department chair, Blair Siegfried, on insecticide resistance. Rebecca Baldwin will also be presenting “Jedi Training” on educational opportunities for PMPs.

TERMITE TUESDAY

Tuesday is termite day, and we cover the galaxy. The day starts with “The Rogue Squadron.” Claudia Riegel from New Orleans will present the highly successful program for Formosan termites in the French Quarter. With the Formosan termite situation heating up in Florida, the insights into Formosan management are really needed by our industry. Thomas Chovenc, a research associate in Ft. Lauderdale, will be presenting “Charting the Galaxy.” He will present the most current research and the website for mapping termite infestations. With all the new species in Florida, it is important for the industry to stay up-to-date on the most recent sightings of the native and invasive termite species. Thomas will also update us on the status of the hybrid termites that result from matings between Formosan and Asian termites.

Paul Mitola is always a favorite with pros in the industry. His talk on “The Jedi Order” will cover termite control regulations and the way the termite treatments are regulated in Florida. In conjunction with FDACS, we are developing a new WDO manual as a study reference for the WDP certification exam. Roberto Pereira will show the new manual and explain the newly developed sections.

Tuesday will end with Core presentations by Dale Dubberly and Phil Koehler. Dale will cover the legislative changes to the Florida pest control law. Phil Koehler will give a new presentation on selecting personal protective equipment. Do you realize that not using exactly the correct personal protective equipment presented on the label is actually a label violation and may result in a violation?

In addition to WDO CEUs, Eric Hobelman and Ellen Thoms will be conducting the fumigation training. With all the issues these past few years with fumigation injuries, this training is extremely important.

LAWN/ORNAMENTALS WEDNESDAY

Wednesday is L&O day. It starts off with “Water Successes and Failures in Florida Landscapes.” Water is an essential nutrient for all plant growth, and with new water policies in Florida, this talk will be very beneficial for the industry. The director of Leu Gardens in Orlando will be presenting “New Plants for Florida.” Horticulturists are always looking for remarkable-looking ornamentals, and this presentation will be extremely valuable for folks wanting to recognize these newly acquired plantings.

Ramon Leon-Gonzalez from the IFAS research center in Jay will present a “New Age for Herbicides.” Anyone involved with weed control will need to hear this presentation of the newest in weed management. Matt Orwat will be presenting “Plant Scene Investigations,” which will cover the most common problems encountered in the landscape. We end the L&O day with “Unexpected Tree Killers.” This talk will present the latest on the ambrosia beetle invasion that is killing trees throughout the southeast United States.

L&O Core presentations will be on “Pesticide Formulations” presented by Melissa Barron and “Pesticide Math” by Lloyd Singleton.

DON'T MISS INSTAR WARS!

The Southeast Pest Management Conference has become one of *the* premier events that delivers technical information to the pest management industry. You will not want to miss any of the presentations. You will also not want to miss the food. Don't forget to bring your light sabers to vaporize any pests in the audience. See you there. **PP**

— Dr. Philip Koehler,
Managing Director

Brace Yourself: Tawny Crazy Ants Are Coming

Stephanie Hill



A lone tawny crazy ant forages among scale insects

Lyle Buss, UF/IFAS



A man's shoe is partially covered with the dead bodies of tawny crazy ants

A COMMON meme* on social media is a picture of Eddard “Ned” Stark from *Game of Thrones* with the caption, “Brace yourself, winter is coming.” The caption has been manipulated countless times, warning of different comings: Brace yourself, football season is coming, your birthday is coming, election season is coming, we ran out of peanut butter, and many more. You can eat up at least a half hour googling “Brace yourself” memes. For our purposes, though, the meme would read, “Brace yourself, tawny crazy ants are coming.”

* Meme — a humorous image, video, or piece of text that is copied, often with slight variations, and spread rapidly by Internet users.

Mississippi State Univ.

Who are those ants again?

The tawny crazy ant, *Nylanderia fulva*, has had several name changes. In Florida, it was first called the Caribbean crazy ant. In Texas, it was called the Raspberry crazy ant. Scientifically it has been classified as *Paratrechina pubens*, *Paratrechina* species near *pubens*, and *Nylanderia pubens*. It took twelve years, but we finally decided what to call these ants — besides names that started with expletives.

What do they look like?

To the untrained eye, tawny crazy ants can be difficult to identify, as they look like the red imported fire ant. Tawny crazy ants are reddish brown and 1/8 inch long. Characteristic of other crazy ants, tawny crazy ants have long antenna with a scape that is twice as long as the rest of the antenna. In the field, foraging trails can aid in identifying tawny crazy ants. Tawny crazy ant foraging trails are several ants wide and loose, with the ants moving in a quick, erratic pattern. If treatment has taken place around a structure you may see piles of dead ants along the base.

Where are the ants?

In Florida, there have been population fluctuations since the ants' big population explosion in the early 2000s. Large numbers of tawny crazy ants were first found in and around port cities such as Jacksonville, Tampa and Miami. From these areas the ants spread to 24 counties around Florida. The Jacksonville area was an especially hard hit. The ants caused problems at the zoo, naval base, other businesses, and homes.

In Texas, tawny crazy ants came into the Houston area. As of 2012, Tawny crazy ants were confirmed in 24 Texas counties. Pest control professionals could not keep up with the calls to control this ant species. The structures where the ants were a problem would be treated, and piles of dead ants would accumulate around structures. Not just any piles, but large piles that could cover up 2 to 4 inches of the base of the structure. That made the customers happy until live ants used the dead ants as a bridge, and the ants would continue to invade those structures.

As a caveat, over the past two years there has been a decline in tawny crazy ant populations. In areas that used to be hot spots, very few if any tawny ants are found. Reports like this have been voiced throughout the regions where this ant used to dominate the landscape. Different theories have been

proposed as to why this has happened. The most popular is that the population of tawny crazy ants got so high that it imploded, allowing other ant species to come in and compete for resources. The population implosion, competition for resources, and the efforts of pest management professionals greatly reduced the occurrences of tawny crazy ants.

Why should we brace ourselves?

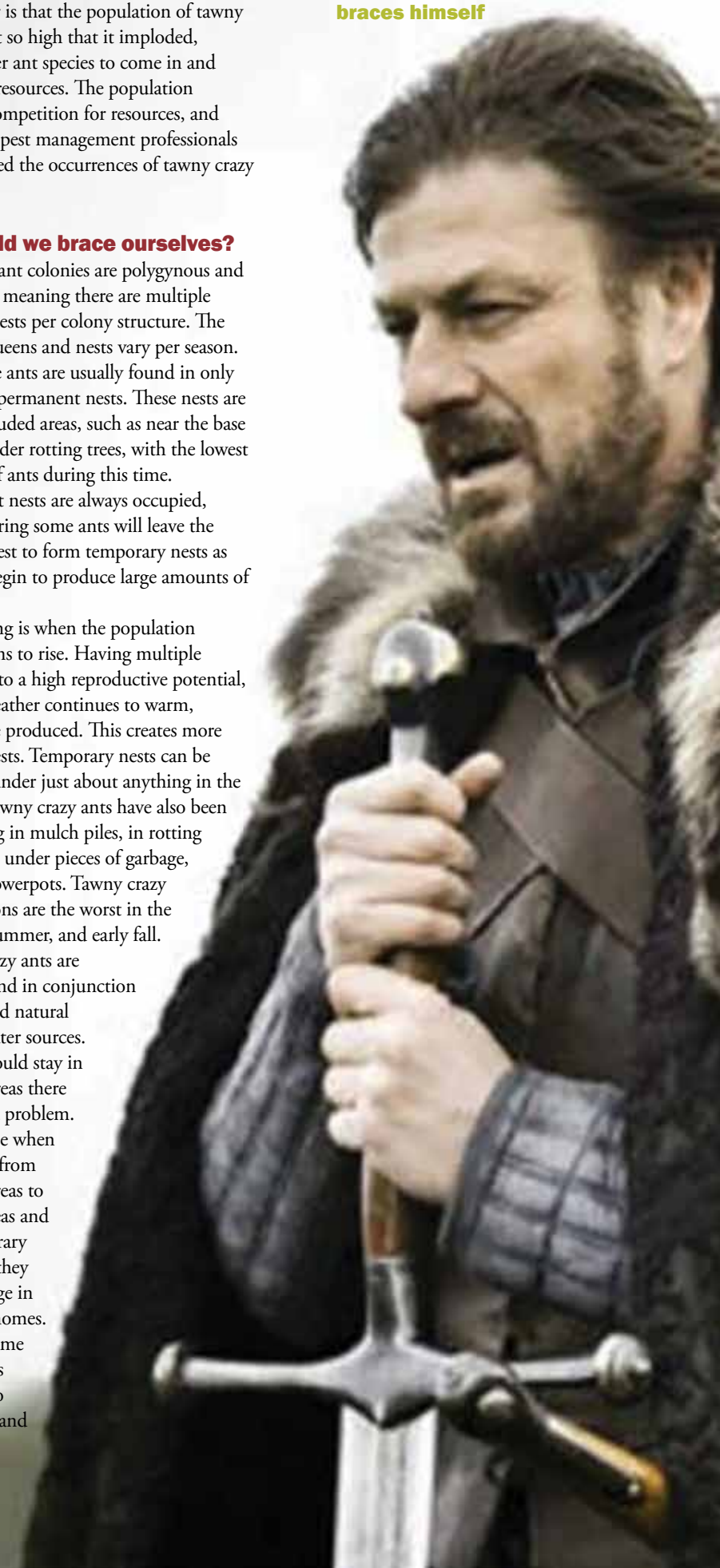
Tawny crazy ant colonies are polygynous and polydomous, meaning there are multiple queens and nests per colony structure. The number of queens and nests vary per season. In winter, the ants are usually found in only one or a few permanent nests. These nests are found in secluded areas, such as near the base of trees or under rotting trees, with the lowest population of ants during this time.

Permanent nests are always occupied, and in the spring some ants will leave the permanent nest to form temporary nests as the queens begin to produce large amounts of brood.

Early spring is when the population number begins to rise. Having multiple queens leads to a high reproductive potential, and as the weather continues to warm, more ants are produced. This creates more temporary nests. Temporary nests can be found in or under just about anything in the landscape. Tawny crazy ants have also been found nesting in mulch piles, in rotting wood, in and under pieces of garbage, and under flowerpots. Tawny crazy ant populations are the worst in the late spring, summer, and early fall.

Tawny crazy ants are generally found in conjunction with protected natural areas with water sources. If the ants would stay in the natural areas there wouldn't be a problem. Problems arise when the ants trail from the natural areas to urbanized areas and create temporary nests, where they begin to forage in and around homes. With new home developments backing up to natural areas and

Ned Stark braces himself



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To register for this course, please complete a Nondegree Registration Request at the following website: <http://tinyurl.com/IPM4254>

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March 21 to May 3, then May 5 to June 23. Fee payments due July 8!

You will need to fill out some personal information on the form and submit the following course information:

- * *Select Year and Term of Registration:* 2016 Summer (May)
- * *College:* THE COLLEGE OF AGRICULTURAL AND LIFE SCIENCES – Entomology Undergrad Distance Courses
- * *Course Information:* Prefix – IPM. Number – 4254.

If you have trouble filling out the form and registering for the course, please contact Ms. Ruth Brumbaugh, Entomology and Nematology Department Student Services Coordinator. Phone: (352) 273-3912, email: brumbaugh@ufl.edu. Please let Ms. Brumbaugh know you are attempting to register for the course as a nondegree-seeking student so she knows how to help you.

If you would like more information about the course, please contact the course instructor, Dr. Jennifer L. Gillett-Kaufman. Phone: (352) 273-3950, email: gillett@ufl.edu. She cannot help you with registration and will forward all registration requests to Ms. Brumbaugh.



Tawny crazy ant

D. Gotzek, et al., 2012

natural areas being incorporated into home developments, tawny crazy ant calls are again on the rise.

The problem is that we can't treat the natural areas, therefore never killing the reproductives, and thus the ants keep coming. The high reproductive potential, nesting strategy, and the abundance of potential of temporary nesting locations allows tawny crazy ants to spread across a landscape, moving from nature preserves to urbanized areas, causing customers to call.

What can we do about the ants?

The key to tawny crazy ant management requires an integrated pest management program. Once the ant is positively identified, homeowner education is the first step. Homeowners need to understand the basic biology of the ants. Tawny crazy ants are not a one-mound-treatment-and-done ant. This ant is going to take ongoing treatment. The customer also needs to understand the location of the ants if you are working with a protected-area situation or the ants are coming from an adjacent property.

Sanitation and exclusion methods are key and require the homeowners' cooperation if they want to see relief. Good sanitation practices should be used to restrict the ants' access to food, water, and shelter, while exclusion techniques are designed to prevent pests from entering structures.

Ant food sources can be reduced by feeding pets indoors and cleaning up animal waste. Avoid leaving garbage in burn cans or fire rings. Wash out garbage and recycling containers with soap and water regularly. As stated before, tawny crazy ants will form temporary nests in almost any lawn debris. By diligently removing this debris, possible nesting sites are reduced. Mulch and leaf debris provide food, water, and shelter. Proper drainage of mulched areas will help in moisture reduction, and moving the mulch away from the structure will allow for inspection. Also, check irrigation systems: Any leak will contribute to tawny crazy ant survival.

Indoor sanitation is important in general. Food needs to be stored in tightly closed containers. Food waste needs to be disposed promptly. Regularly vacuuming and mopping will remove any food particles that may be on floors or carpets and serve as food for ants. Exclusion techniques include checking doorways and windows for tight-fitting doors and screens with properly installed weather stripping. Cracks, crevices and other entry points in the foundation need to be sealed to prevent entry into the structure.

The timing of chemical applications is just as important as the products used. As stated before, populations of the tawny crazy ant are the worst in the late spring, summer and early fall. The sooner in the year a management plan is put into place, the better the chances that the management actions will be successful. It is easier to manage a small population of ants versus a large population. Early in the year, install bait stations around the perimeter of the property. That will stop the ants before they begin to forage on the property, keeping them at bay in the nature preserve. The bait will also be taken back to the nests, helping reduce the amount of brood and reproductives. Recent studies have shown that tawny crazy ants prefer sweet baits in the early spring and change to a protein bait in the late spring and summer as brood production is increasing. Bayer's Maxforce Quantum dilute and Rockwell Lab's Invict Blitz are two products that have shown population reduction.

Landscape plants that are unkempt have the potential to harbor honeydew-producing insects. A systemic pesticide can be used to reduce or eliminate the honeydew-producing insects (removing an ant food source), but does not affect the nectar. It is important

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to read and follow the manufacturer's label regarding application timing. Some systemic labels contain the "bee box," giving specific guidelines on application practices. Tandem (Syngenta) and Temprid (Bayer) are popular systemics.

Applying a residual pesticide around a structure and as far out in the yard as possible will help prevent tawny crazy ants from entering the structure. Most products will kill the ants on contact. If the residual is applied during high-population times, there may be an accumulation of dead ants in the area of application. The ants should be removed with a leaf blower so as to not disturb the pesticide, allowing it to continue to protect the structure.

Brace yourself

You know where tawny crazy ants are in your area. In those areas, executing an IPM program early in the year will help with the population explosion as the weather warms. This creates happier customers, technicians, and office staff. Are you ready? **PP**



Problem Pigeons

William H. Kern, Jr.

Pigeons in North America are the feral offspring of pigeons brought to this continent by European immigrants.

Pigeons have been long associated with disease organisms transmissible to humans and livestock. These include:

Thirteen bacterial diseases including Salmonella food poisoning, fowl typhoid, paratyphoid, pasteurellosis, streptococcosis and tuberculosis

Five fungal diseases including aspergillosis, blastomycosis and histoplasmosis

Six protozoan diseases including toxoplasmosis and coccidiosis

Chlamydiosis

The rickettsial disease Q Fever

Eight viral diseases including eastern equine and St. Louis encephalitis

Newcastle disease and fowl pox of poultry

The tapeworms in the genus *Taenia*, *Davainea proglottina*, and *Railletina tetragona*

Four genera of parasitic nematodes of poultry including *Tetramares* (two species), *Capillaria* (five species), and *Acuaria spiralis*

Fourteen parasitic flukes of poultry, livestock and humans

ALSO known as rock doves, *Columba livia* are domesticated birds raised for sport racing, show, and for food known as squab. The ancestors of the pigeons we see in our cities and on our farms escaped from captivity and found a favorable environment living near humans. Feral pigeons now have a cosmopolitan distribution, having become established every place humans have built cities.

The feral pigeons found in Florida and North America are extremely variable in coloration. They exhibit the full range of coloration that domestication and selective breeding have produced. All pigeons that were developed from rock doves have a white rump, usually a white diamond-shaped patch just above the tail feathers. In white birds the white rump blends with the general body color. Many pigeons have retained the ancestral rock dove coloration: gray body, darker gray head and neck, white rump, dark band on the end of the tail, dark wing tips, and two black stripes running along the back edge of each wing. The total length is around 11–13 inches.

The pigeon is found throughout Florida, congregating in urban, suburban, and rural agricultural areas. It is hard to know the range of the ancestral rock dove because feral pigeons are so widely distributed, but they are believed to occur naturally in southern Europe, the Middle East, and North Africa. Rock doves nest on protected cliffs and inside the mouths of caves. Human cities are made of artificial cliffs (buildings) and caves (attics, abandoned buildings, and open warehouses), so these pigeons feel at home and flourish.

Pigeons feed primarily on seeds and grain, but in urban areas they also eat human food scraps such as bread crumbs. Bird feeders provide a primary food source for pigeons in urban and suburban areas. Pigeons are especially fond of cracked corn and sorghum or milo seeds in general bird seed mixes. In agricultural areas pigeons eat or contaminate large amounts of livestock feed. Pigeons are not picky about their food: They are often seen picking undigested seeds from the feces of livestock.

Pigeons breed year-round in Florida. The nests are simple platforms of sticks built in sheltered locations on horizontal ledges. Pigeons commonly nest on manmade structures such as window ledges, balconies, under bridges, in barns and open warehouses, on or behind signs, and in soffits and attics of houses. They enter attics through missing soffit panels or attic vents. A clutch normally consists of one or two eggs. The incubation period is 16 to 18 days, and fledglings leave the nest at four to six weeks of age. Adult pigeons feed their babies a material secreted by their crops called “pigeon’s milk.”

PROBLEMS AND SOLUTIONS

Aesthetic and Economic Problems
Pigeon droppings deface many urban buildings, monuments, and public spaces. Uric acid is a white material in their droppings that is not just unsightly, it can damage the finish on buildings and automobiles. When birds occupy warehouses and defecate on stored goods, this creates an expensive problem for the warehouse management when their customers refuse to accept contaminated goods.

Health-Related Problems

The most common problem associated with feral pigeons nesting in buildings is bird mites invading the human-occupied space during or after the nesting season. Bird mites such as northern fowl mite and tropical fowl mite will bite humans and cause a small pustule similar to a chigger bite. Pigeons are also important reservoirs and vectors of reintroduction of fowl mites into previously treated poultry houses. Pigeon nests can also be a source of stick-tight fleas, soft ticks, bed bugs, and dermestid carpet beetles invading buildings.

Pigeons are generally a more serious disease vector to livestock, especially poultry and egg producers, and wildlife than to humans. Still, the presence of pigeons where food is prepared or people eat, such as picnic areas and outdoor restaurants, should be a cause for concern about the spread of Salmonella bacteria.

CONTROL

Exclusion

Exclusion is always the best option with a nuisance wildlife situation. Exclusion will also prevent most situations from developing. Make sure all attic and soffit vents are properly screened to keep birds and other animals out.

Large openings filled with heavy door curtains of plastic strip discourage entry. Once inside, pigeons can be discouraged from roosting on ledges and light fixtures by installing sloping surfaces over the flat surface. This can be as simple as a board or sheet metal installed to create a 45° or greater slope.

Birds nesting inside or behind signs can be excluded by sealing the edges of the sign with hardware cloth and silicon caulk or with plastic bird netting. In large, open structures, like barns and warehouses, close off the space above the rafters where pigeons roost and nest with industrial bird netting.

Pigeons can be deterred from roosting on railings or pipes by suspending a wire or monofilament line 1½ to 2 inches over the center of the roost surface so that the birds will be off balance.

Tactile repellents used for pigeon management may be mechanical like porcupine wire, wire loops, electrified wires on roosting surfaces, or sticky substances, usually containing polybutene. All the methods listed make surfaces uncomfortable or impossible for birds to roost on.

Livestock-Area Options

Livestock producers can also reduce pigeon problems. Clean up spilled grain, and do not feed livestock on the ground. Store grain and feed in bird and rodent-proof storage bins. Use bird-proof livestock feeders, especially for swine. Feed livestock in covered areas like pole barns as these areas limit access and are less attractive to pigeons. Use feeds that are difficult for pigeons to handle, such as blocks or cubes greater than ½ inch in diameter, silage, or granular meal. Avoid using grain-sized pellets of approximately ⅜ inch in diameter. Mix protein supplements with silage or other feeds to reduce the pigeons' access to them.

Adjust feeding times to when pigeons are less active if possible. Later in the afternoon is better than morning or midday. Feed cattle supplements at night. In places where water is limited, pigeons can be discouraged by regulating watering troughs so the water is too low to be reached from the top edge and too deep to wade in.

Trapping

Use trapping if a local pigeon population becomes a nuisance. Loft traps are used where large numbers of pigeons must be removed. These traps are usually made onsite since their large size prevents easy relocation.

The decision to construct and use a loft trap or smaller traps should be based on the economics

of the situation. Are the pigeons causing enough economic loss to justify the cost of trap construction or purchase? Commercially produced pigeon traps are available with both bob-type and funnel-type entrances.

In some situations numerous birds can be trapped at one time with a walk-in bob type trap, low-profile bob-type traps, or various funnel traps. The secret to trapping pigeons is prebaiting about one week before setting the trap. Usually trap success will be good on the first day of trapping, fair on the second day, and poor by the third day. After the third day, it is time to pre-bait for another week. Immediately release ANY non-target birds you trap, and check your traps at least once every 24 hours. Supply water in your trap to avoid stressing captured birds and to act as an added enticement to enter the trap.

Active removal of nests, eggs, and chicks whenever they are found also helps manage pigeon populations. Check for and remove nests every two weeks for best results. By removing nests more often than every 18 days, you will not have to deal with chicks.

Shooting

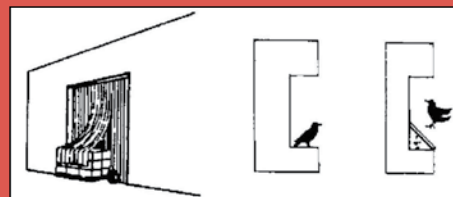
Shooting is usually not a time-effective way to control a pest bird situation. Before considering shooting as a control method, contact your local law enforcement agency to find out about the laws in your area. Some municipalities designate pellet rifles and BB guns as firearms. Many cities and towns also have local ordinances protecting pellet rifles and BB guns as firearms. Many cities and towns also have local ordinances protecting birds—which may include pest species like starlings, house sparrows, and pigeons.

If you are legally permitted to use a weapon and local ordinances do not protect pigeons, it is wise to receive a type of firearm safety training. The Florida Fish and Wildlife Commission offers Hunter Education Classes that stress firearm safety as well as teaching hunting skills. Here you will learn it is safer to use a pellet rifle, shotgun or shot cartridges rather than solid bullets. The bullet from a .22 long rifle can travel over 1.5 miles. Any time you shoot, be absolutely sure where you are shooting, and identify your back stop. A .22 bullet is capable of passing through corrugated tin, drywall, or plywood to hit anyone or anything behind it.

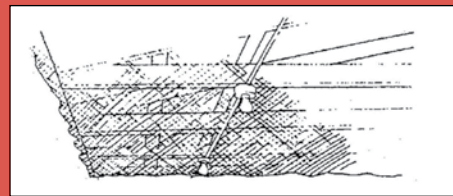
Another consideration is that racing pigeons often mix with feral pigeons, so avoid shooting banded birds. Note: this is easier said than done. Often the bands are only seen when the bird is in the hand.

Poisons

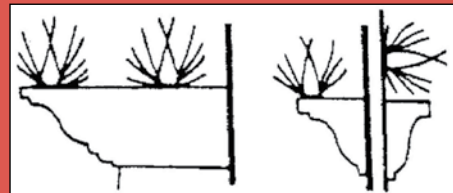
In Florida the only registered avicide, or poison for birds, is Avitrol™. It may be used for pigeon control only with an Avitrol permit issued by the Florida Fish and Wildlife Conservation Commission and a certified pest control license or a restricted-use pesticide applicator license.



Plastic strip door curtain; slanted board excluders.



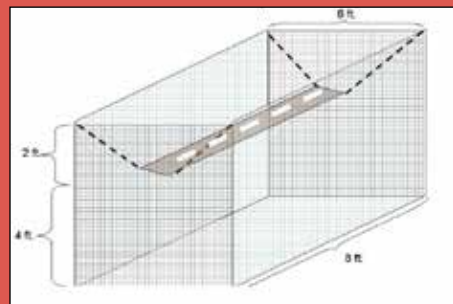
Exclusion with bird netting or chicken wire.



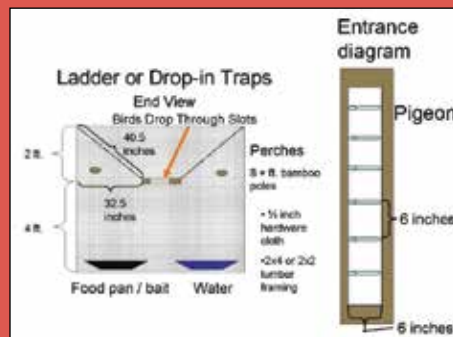
Exclusion with porcupine wire.



Bob-type door of a commercial pigeon trap.

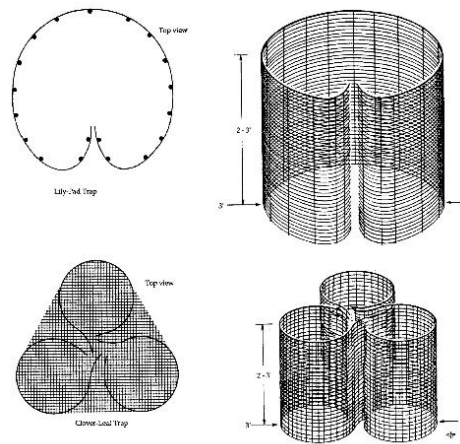


Ladder or drop-in traps.



Ladder or drop-in trap end view, with entrance diagram.

Lily pad funnel trap,
cloverleaf funnel trap, and
double-funnel designs.



In order to get an Avitrol permit, you must adequately describe in your application how you will protect nontarget birds from accidental poisoning. Prebait your baiting station for about a week with the same grain as the grain in your treated Avitrol bait. This will get the pigeons used to coming and feeding at your bait station. Use a sheet of plywood with a raised border as your baiting station. This will make it easier to collect all of the uneaten treated bait. Uneaten bait must be removed from the field at the end of the day. Do not leave the station unattended at any time while poison bait is present.

Be ready to scare away all nontarget birds that come to the feeding station, even if it means scaring away pigeons. Protecting nontarget birds is your responsibility. When Avitrol or any other avicide is used, have crews patrolling the area to collect downed birds quickly.

Be aware that the use of poisons on birds will often cause negative publicity. Therefore, it is not recommended for public places like shopping centers, tourist attractions, and densely occupied urban areas. It is more appropriate for agricultural situations and large industrial complexes where access by the public is limited or restricted. When discretion is needed, discrete trapping is preferred over the use of poisons.

Repellents

Repellents such as naphthalene are registered for nuisance bird control, but they are rarely effective and are never a permanent solution. Naphthalene, in the concentrations needed to repel pigeons, is unpleasant to people and pets as well.

Sound Repellents and Startle Devices

Sound has been tried in many ways to scare away birds. Loud noises like those produced by firearms, pyrotechnics, or propane exploders may scare away flocks of pigeons from a particular area for a short time.

Loud noises are useful for protecting newly planted fields, but have limited usefulness in urban areas and around livestock. Unless the noises are randomly discharged, the birds quickly learn to ignore the sound. Also, producing loud noises during all daylight hours will quickly irritate all but the most understanding of neighbors and may violate noise ordinances.

Ultrasonics. People have tried to get around this problem by using ultrasonic devices that produce sounds above the threshold of human hearing. Ultrasonic devices have problems. Ultrasonic waves reflect off objects, they don't go around them. This produces sound "shadows" where the birds can avoid sound. Research at Purdue University has also shown that some of these devices cause hearing loss in dogs and, probably, cats.

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In general, ultrasonic devices rarely drive pest birds from established home ranges. In fact, pigeons have been observed nesting on top of a functioning ultrasonic repeller, so their effectiveness is questionable.

Distress calls. Another use of sound tried with other species involves recorded distress calls of the target bird species. However, pigeons don't appear to have a distress call — it is the loud flapping sound of a startled bird that usually alerts the rest of the flock to danger.

Effigies, or “scarecrows,” have been used to control bird damage in the past. Models of owls, hawks, snakes and cats have all been used. To keep these scarecrows effective they must appear lifelike and must be moved often so the birds do not become accustomed to seeing them in the same spot every day. Balloons with eye spots, kites with hawk silhouettes, and streamers are more effective because they move.

Mylar™ streamers are effective near roost sites. The lightweight streamers easily blow around in the slightest wind and make birds very nervous, especially when the long streamers reach out toward or touch the roosting birds. Flashing lights and moving shadows have also been used. Roosting pigeons can be driven from roost sites by harassing the birds at dusk for three or four consecutive nights or until they find a different roost.

Spraying the birds with water from a hose or harassing them in other ways encourages the birds to move on. Start harassment as soon as the birds begin roosting. Don't wait until the roost is well established and the birds develop a strong attachment for the site. Be persistent until the problem is solved.

LEGAL ASPECTS

The feral pigeon is an exotic species in North America and is listed as an unprotected species by the U.S. Fish & Wildlife Service and as feral livestock by the Florida Fish and Wildlife Conservation Commission. The birds, their eggs, and nests may be removed by any method except by poison, steel traps, or with guns and lights at night. Some municipalities have issued local ordinances that protect all birds, both exotic and native. Be sure to check with local authorities before starting any bird control activities. If tagged birds are trapped or captured, contact the American Racing Pigeon Union at <http://www.pigeon.org/contactus.php> to return these racing pigeons to their rightful owners. **PP**

William H. Kern, Jr. is Associate Professor of Entomology at UF/IFAS Ft. Lauderdale Research and Education Center.



**A NEW GUINEA FLATWORM FOUND IN CORAL GABLES, FLORIDA
INSET: NEW GUINEA FLATWORM EATING A SNAIL**

Main photo by Makiri Sei, and inset photo by Pierre Gros

New Guinea Flatworm

William H. Kern, Jr.

A NEW SPECIES of land planarian — a terrestrial predatory flatworm — has been introduced into South Florida. *Platydemus manokwari* (Platyhelminthes: Geoplanidae) was carried by human commerce to numerous islands in the tropical Pacific and Indian Oceans. Commonly known as New Guinea flatworm or New Guinea land planarian, it was first found in Florida in 2012 in Dade County and was detected in San Juan, Puerto Rico, in 2014. It had been previously found in Oahu, Hawaii, but the Florida introduction was the first record from North or South America.

The primary ecological concern is due to their feeding habits. *Platydemus manokwari* is a predator of land snails. While these land planaria happily feed on whatever snail is most abundant, such as invasive snail species like *Zachrysis provisorica*, the Cuban brown snail, or *Lissachatina fulica* (formerly *Achatina fulica*), the giant African land snail, they also pose a threat to native snails including endemic tree snails of Florida. The New Guinea land planaria has caused the decline of some Hawaiian tree snails in Oahu.

The second concern with the New Guinea land planarian comes from its potential to act as a mechanical transport vector of rat lungworm, *Angiostrongylus cantonensis*. The giant African land snail, *Achatina fulica* — another invasive species — is known to be a particularly good host of rat lungworm. If a human eats J3 infective stage rat lungworm larvae, it could result in an infection causing human eosinophilic meningitis. Accidental ingestion by a human is highly unlikely and would require the simultaneous presence of infected roof rats or Norway rats, snail hosts, and J3 larvae of the New Guinea flatworm in areas where fruits or vegetables are grown.

The previous two introduced species of land planaria, *Bipalium kewense* and *Dolichoplana striata*, have been in Florida for a considerable period, perhaps as long as 100 years. They are a nuisance or a curiosity, but not considered serious pests. They are predators on earthworms in wet environments.

There are no pesticides registered for land planarian control. Habitat manipulation, i.e., decreasing moisture, has been used on worm farms to reduce damage from *Bipalium* or *Dolichoplana*. Dry weather causes land planaria to retreat into moist refugia, in the soil. Limiting their food supply by controlling pest snails would likely be the most effective measure homeowners or pest control professionals could use to reduce New Guinea land planarian populations. Registered snail baits should always be used according to the label directions. Local rat control would also help reduce the miniscule risk of rat lungworm accidental infection. **PP**

William H. Kern, Jr. is Associate Professor of Entomology at UF/IFAS Ft. Lauderdale Research and Education Center.

Jeff@Work

What do you get if you add advanced degrees in entomology to a distinguished naval career? You get a pest-slayer like Jeff Hertz.



Conducting field research at a state park in Florida

BED BUGS. Lone star ticks. Filth flies. Kissing bugs. Cockroaches. Rodents — wait, what? One of these pests is not like the others, but they all have one thing in common: Fewer of them exist in the world because of the work of Jeff Hertz. From California to the Capitol, from Japan to our own UF Urban Entomology Lab, Jeff steers a course along his illustrious career as a naval officer and an entomologist.

How did you first get into entomology?

I probably have a more convoluted story than most. I didn't grow up playing with bugs and other critters like many entomologists. The closest interaction I had with insects when I was younger was with the crickets I used to bait my fishing pole — and the few times I was stung by bees.

My introduction to entomology came in the navy. I joined the navy directly out of high school as an avenue to leave my rural farming town in Illinois to pursue an education and see the world. At that time, I wanted to work in medicine so I enlisted as a hospital corpsman.

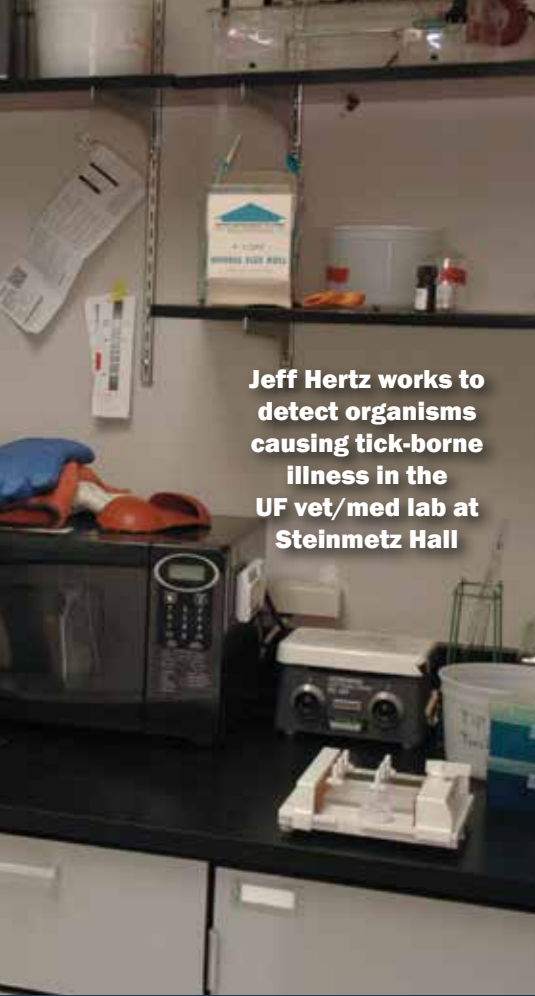
After a few years of working in a naval hospital and a marine corps medical battalion, I decided to specialize as a laboratory technician. My first duty station after this school was in a microbiology lab in San Diego at one of the navy's environmental and preventive medicine units. You can think of these commands as small public health units, similar to county or state public health labs.

At this command, there were two entomologists. One entomologist in particular, Captain Mike Medina (at the time Lieutenant Medina), always would ask if any available corpsman wanted to come with him to work on his projects. I spent many days learning from him, but at that point never considered pursuing entomology as a career.

When I left that command for an opportunity to work for Congress, things changed. Toward the end of my time at the Capitol, the navy announced an opportunity that they would send one enlisted member to attend the university of his choice to study entomology. If selected, the lucky sailor would be commissioned as a naval entomologist. How do you turn down an opportunity like that? You don't. I applied and was selected. I arrived in Dr. Koehler's program shortly after to work on a master's degree.

Entomologists in the navy? Really??

That's right. Many can't imagine that the navy would need entomologists, but if you think about it, ships are self-contained cities or small



Jeff Hertz works to detect organisms causing tick-borne illness in the UF vet/med lab at Steinmetz Hall

Jane Medley, UF/IFAS

towns depending on the size of the ship. They get their fair share of cockroaches, bed bugs, stored product pests, and rodents from time to time.

Also, the navy provides the medical resources to the marine corps. When the navy first began commissioning entomologists during World War II, the marines were taking a lot of casualties from vector-borne disease in the Pacific. Today, we have 46 active duty and reserve entomologists in the navy. They are stationed all over the world conducting research, developing policy, consulting, and directly supporting marine corps and fleet operations.

I am sorry, did you say “fair share of rodents”? How is that entomology?

Military entomologists like to joke that anything that lives, breathes, and doesn't shoot back usually ends up on the desk of the entomologist. This includes spiders, scorpions, snakes, feral animals, birds, rodents — you name it.

If you ever want to hear some funny stories, find an old navy entomologist to ask about some of the weird things they have had to deal with. I recall Dr. Koehler once telling me one of his old sea stories. It involved some manatees, a lettuce garden, and the base commanding officer. Come to think of it, Dr. Koehler's hatred of cats may have roots in the navy. Someone should probably ask him about that.

What did you work on in Dr. Koehler's lab during your master's research?

I was in Dr. Koehler's program from 2005–2007. One of my mentors in the navy entomology community recommended Dr. Koehler because of the program's history developing military students and its focus on applied entomology.

Since I was brand new to entomology when I arrived, I really had no idea what direction my research should go. The only thing I did know was that I wanted the research to be focused on real problems faced by our deployed warfighters. Dr. Koehler recommended that I focus on filth flies because no matter where in the world our military deploys, pesky flies plague them shortly after camp is set up. He recalled a technique for controlling flies that was used routinely in the 1950s, called fly cords.

What are fly cords?

Fly cords are simply cords dipped in pesticide, which are allowed to dry, and then hung in fly-infested areas. This simple technique is actually quite effective because it targets the flies' tendency to rest on similar objects like wires and fence lines. As the flies perch on the pesticide-treated cord, they absorb a lethal dose and die. Our study determined the landing preference of house flies on different types of natural and synthetic cords, and evaluated the effectiveness of newer pesticides' ability to control fly populations. This research was combined with research of other students, including Navy Lieutenant Joe Diclaro, in a patented trap called the Florida Fly Baiter.

You are working on your PhD now. Why didn't you return to Dr. Koehler's lab — was it really that bad?

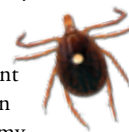
YES!!! No, not at all. In fact, there are many things I miss about the environment in his lab, like all the free food. I still sneak over there from time to time to get a bite to eat.

On a more serious note, one thing I really do miss is all the Extension work I was involved in during my master's research. Right before I began working in Dr. Koehler's lab, bed bugs became a hot national issue. For the most part, the pest control and the general public were uneducated on the basic biology and the management strategies used to combat them.

To tell you the truth, we were very limited on information as well. I don't know if you remember, but in those days the Entomological Society of America's bed bug book was incredibly rare and expensive, selling for hundreds of dollars online. Fortunately, Dr. Koehler had a copy of the book in his library. Also, we were able to get a lot of informational assistance from Dr. Harold Harlan, including a bed bug colony of our own! We began to put technical information together, and traveled the region to consult, teach and conduct inspections. I learned a lot from that experience — a lot about bed bugs and the pest control industry.

Tell us about your current research.

Well, I started in 2013, following another announcement that said the navy was willing to send one entomologist to a university of their choice to work on a doctorate degree. Needless to say, I didn't turn that opportunity down either. I quickly applied and was selected. This time, however, I am not working on filth flies. I decided to focus my research on another very important arthropod that is a threat to our military — ticks.



I have always known ticks were important vectors, but my direct interest in ticks began in 2009 when I read a news report of an army soldier who died of Crimean-Congo hemorrhagic fever in Afghanistan. For some reason, this news report really heightened my awareness to the reality that ticks do pose a significant risk to our forces. I bet many *PestPro* readers don't realize that the most important arthropod vectors in the United States, based on CDC disease reports, are ticks — not mosquitoes. Thousands of people are diagnosed with tick-borne infections across the country every year, including many in the military.

My research is focused on the most aggressive human-biting tick in the South, the lone star tick. These ticks come out in very large numbers over the summer and are important vectors of ehrlichiosis, certain viruses, and, likely, spotted fever.

In Florida, reports of tick-borne infections are relatively low compared to most of the country. However, it is widely assumed that most tick-borne infections are grossly underreported throughout the country. For example, about 30,000 people are reported through public health departments to be diagnosed with Lyme disease every year, but a CDC survey of national labs and insurance companies found that the number being treated might be closer to 300,000!

My goal is to collect data to get a better understanding of the risk of acquiring lone star tick-associated infections in Florida. I have been conducting surveys of lone star ticks and their wildlife hosts throughout Florida for the last couple of years. Hunters have been sending me tick and blood samples, and I have been collecting ticks from several state parks and

Nymphal ticks can't escape Jeff's tweezers



Fieldwork photos by Alex Catalano, UF/IFAS



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wildlife management areas. The samples will be tested for infection or exposure to the bacteria that cause ehrlichiosis and spotted fever. I am wrapping up my research now, and will hopefully graduate this summer.

What did you do between your master's degree and returning to the University of Florida?

Immediately after graduating, the navy sent me to officer indoctrination training in Rhode Island. This short course introduced the fundamentals of the organizational components of the navy, and focused on the leadership qualities the navy expects from every commissioned officer. Then, I reported to the Navy Entomology Center of Excellence (NECE) in Jacksonville, Florida, for my first assignment as an entomologist.

NECE has a very unique mission for the Department of Defense, in that they develop and evaluate novel products and application technologies to better protect deployed forces. I was able work on several projects, with different groups, testing multiple pieces of equipment and methods to target flies, mosquitoes and ticks. While at NECE, I was deployed on a humanitarian mission in Central and South

America. It was a great experience because I was able to interact with scientists and public health workers who were battling the vector-borne diseases that I had only read about.

One memorable experience was doing kissing bug surveys with the local biologist in some small villages in El Salvador. Kissing bugs are the primary vector of the parasites that cause chagas disease. These are the same bugs making the news lately in regions of South Texas.

My time at NECE was short because the navy needed an entomologist to support the marines. After a "short" flight, my family and I were resettled in Okinawa, Japan. We spent three-and-a-half years in Japan, surrounded by good food, great people, and pristine beaches — literally a tropical paradise.

My time there was very busy. I spent a lot of the time on military exercises throughout Southeast Asia. My entomology work focused on the preventive measures needed to reduce vector-borne disease in the areas we were working. My last duty station prior to beginning my PhD was

at the same preventive medicine unit in San Diego, where Captain Medina initially introduced me to entomology. This time, I was the entomologist looking for corpsmen to work on projects. I worked in San Diego on some tick, cockroach and rodent surveillance projects for a little over a year before transferring back to Gainesville.

What are your plans after graduation and the military?

Well, I still have a lot of goals to accomplish in the navy. Normally, the navy will move recent doctorate graduates into a utilization tour to one of our research positions. We have three positions overseas and few more here in the United States. My family and I are hoping to go to the research lab in Singapore. There is a lot of vector-borne disease work I am interested in in that region, and my family really enjoyed our past experiences we have had in Southeast Asia. However, it really boils down to the needs of the navy, and we will go wherever I am needed. As far as my post-military career, I am keeping my options open, but if you are looking to hire an entomologist let me know! I work with a lot of great ones. PP

Zika Virus Questions & Answers

From Centers for Disease Control

BACKGROUND INFORMATION

What is Zika virus disease (Zika)?

Zika is a disease caused by Zika virus that is spread to people primarily through the bite of an infected *Aedes* species mosquito. The most common symptoms of Zika are fever, rash, joint pain, and conjunctivitis (red eyes). The illness is usually mild with symptoms lasting for several days to a week. People usually don't get sick enough to go to the hospital, and they very rarely die of Zika.

Is this a new virus?

No. Outbreaks of Zika previously have been reported in tropical Africa, Southeast Asia, and the Pacific Islands. Zika virus likely will continue to spread to new areas. In May 2015, the Pan American Health Organization (PAHO) issued an alert regarding the first confirmed Zika virus infection in Brazil. Since that time, local transmission has been reported in many other countries and territories.

What countries have Zika?

Specific areas where Zika virus transmission is ongoing are often difficult to determine and are likely to change over time. If traveling, please visit the CDC Travelers' Health site for the most updated travel information.

SYMPTOMS AND TRANSMISSION

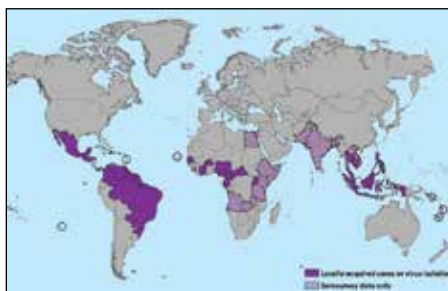
What are the symptoms of Zika?

About one in five people infected with Zika will get sick. For people who get sick, the illness is usually mild. For this reason, many people might not realize they have been infected.

The most common symptoms of Zika virus disease are fever, rash, joint pain, or conjunctivitis (red eyes). Symptoms typically begin two to seven days after being bitten by an infected mosquito.

How is Zika transmitted?

Zika is primarily transmitted through the bite of infected *Aedes* mosquitoes, the same mosquitoes that spread Chikungunya and dengue. These mosquitoes are aggressive daytime biters and they can also bite at night. Mosquitoes become infected when they bite a person already infected with the virus. Infected mosquitoes can then spread the virus to other people through bites. It can also be transmitted from a pregnant mother to her fetus during pregnancy or around the time of birth.



CDC map of Zika distribution as of January 2016

PREVENTION AND TREATMENT

Who is at risk of being infected?

Anyone who lives in or travels to an area where Zika virus is found and has not already been infected with Zika virus can get it from mosquito bites.

What can people do to prevent becoming infected with Zika?

There is no vaccine to prevent Zika. The best way to prevent diseases spread by mosquitoes is to protect yourself and your family from mosquito bites. Here's how:

- Wear long-sleeved shirts and long pants.
- Stay in places with air conditioning or that use window and door screens to keep mosquitoes outside.

- Use Environmental Protection Agency (EPA)-registered insect repellents. All EPA-registered insect repellents are evaluated for safety and effectiveness.
 - Always follow the product label instructions.
 - Reapply insect repellent as directed.
 - Do not spray repellent on the skin under clothing.
 - If you are also using sunscreen, apply sunscreen before applying insect repellent.
- If you have a baby or child:
 - Do not use insect repellent on babies younger than two months of age.
 - Dress your child in clothing that covers arms and legs, or
 - Cover crib, stroller, and baby carrier with mosquito netting.
 - Do not apply insect repellent onto a child's hands, eyes, mouth, and cut or irritated skin.
 - Adults: Spray insect repellent onto your hands and then apply to a child's face.
- Treat clothing and gear with permethrin or buy permethrin-treated items.
 - Treated clothing remains protective after multiple washings. See product information to learn how long the protection will last.
 - If treating items yourself, follow the product instructions carefully.
 - Do NOT use permethrin products directly on skin. They are intended to treat clothing.
- Sleep under a mosquito bed net if you are overseas or outside and are not able to protect yourself from mosquito bites.

What is the treatment for Zika?

There is no vaccine or specific medicine to treat Zika virus infections.

- Treat the symptoms:
- Get plenty of rest.
 - Drink fluids to prevent dehydration.
 - Take medicine such as acetaminophen to reduce fever and pain.
 - Do not take aspirin or other non-steroidal anti-inflammatory drugs.
 - If you are taking medicine for another medical condition, talk to your healthcare provider before taking additional medication.

What should I do if I have Zika?

- Treat the symptoms:
- Get plenty of rest
 - Drink fluids to prevent dehydration
 - Take medicine such as acetaminophen to reduce fever and pain

- Do not take aspirin or other non-steroidal anti-inflammatory drugs

Protect others: During the first week of infection, Zika virus can be found in the blood and passed from an infected person to another person through mosquito bites. An infected mosquito can then spread the virus to other people. To help prevent others from getting sick, avoid mosquito bites during the first week of illness.

See your healthcare provider if you are pregnant and develop a fever, rash, joint pain, or red eyes within two weeks after traveling to a place where Zika has been reported. Be sure to tell your health care provider where you traveled.

Is there a vaccine to prevent or medicine to treat Zika?

No. There is no vaccine to prevent infection or medicine to treat Zika.

Are you immune for life once infected?

Once a person has been infected, he or she is likely to be protected from future infections.

POTENTIAL RISKS ASSOCIATED WITH ZIKA

Does Zika virus infection in pregnant women cause birth defects?

There have been reports of a serious birth defect of the brain called microcephaly (a condition in which a baby's head is smaller than expected when compared to babies of the same sex and age) and other poor pregnancy outcomes in

babies of mothers who were infected with Zika virus while pregnant. Knowledge of the link between Zika and these outcomes is evolving, but until more is known, CDC recommends special precautions for the following groups:

- Women who are pregnant (in any trimester):
 - Consider postponing travel to any area where Zika virus transmission is ongoing.
 - If you must travel to one of these areas, talk to your doctor first and strictly follow steps to prevent mosquito bites during your trip.
- Women who are trying to become pregnant:
 - Before you travel, talk to your doctor about your plans to become pregnant and the risk of Zika virus infection.
 - Strictly follow steps to prevent mosquito bites during your trip.

Does Zika virus infection cause Guillain-Barré syndrome (GBS)?

Guillain-Barré syndrome (GBS) is a rare disorder where a person's own immune system damages the nerve cells, causing muscle weakness and sometimes, paralysis. These symptoms can last a few weeks or several months. While most people fully recover from GBS, some people have permanent damage and in rare cases, people have died.

We do not know if Zika virus infection causes GBS. It is difficult to determine if any particular germ "causes" GBS. The Brazil Ministry of Health (MOH) is reporting an increased number of people affected with GBS. CDC is collaborating with the Brazil MOH to determine if having Zika makes it more likely you will get GBS.

ZIKA IN THE UNITED STATES

How many travel-associated cases have been diagnosed in the United States?

CDC continues to work with states to monitor the United States for mosquito-borne diseases, including Zika. As an arboviral disease, Zika is nationally notifiable. Healthcare providers are encouraged to report suspected cases to their state or local health departments to facilitate diagnosis and mitigate the risk of local transmission. To date, local vector-borne transmission of Zika virus has not been identified in the continental United States. Limited local transmission may occur in the mainland United States but it's unlikely that we will see widespread transmission of Zika in the mainland United States.

Should we be concerned about Zika in the United States?

The U.S. mainland does have *Aedes* species mosquitoes that can become infected with and spread Zika virus. U.S. travelers who visit a country where Zika is found could become infected if bitten by a mosquito.

With the recent outbreaks, the number of Zika virus disease cases among travelers visiting or returning to the United States will likely increase. These imported cases may result in local spread of the virus in some areas of the United States. CDC has been monitoring these epidemics and is prepared to address cases imported into the United States and cases transmitted locally.

What is CDC doing about Zika?

CDC has been aware of Zika for some time and has been preparing for its possible introduction into the United States. Laboratories in many countries have been trained to test for chikungunya and dengue. These skills have prepared these laboratories for Zika testing.

CDC is working with international public health partners and with state health departments to

- Alert healthcare providers and the public about Zika.
- Post travel notices and other travel-related guidance.
- Provide state health laboratories with diagnostic tests.
- Detect and report cases, which will help prevent further spread.

The arrival of Zika in the Americas demonstrates the risks posed by this and other exotic viruses. CDC's health security plans are designed to effectively monitor for disease, equip diagnostic laboratories, and support mosquito control programs both in the United States and around the world. **PP**

US Centers for Disease Control and Prevention



In this Dec. 22, 2015 photo, Luiza has her head measured by a neurologist at the Mestre Vitalino Hospital in Caruaru, Pernambuco state, Brazil. Luiza was born in October with a head that was just 11.4 inches (29 centimeters) in diameter, more than an inch (3 centimeters) below the range defined as healthy by doctors. Her rare condition, known as microcephaly, often results in mental retardation. — Reported by Maggie Fox, NBC News

Felipe Dana, AP



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Fostering Accountability: The Path to Growth, Part I

HARVEY F. GOLDGLANTZ

DO YOU command accountability from your staff? If not, it is one major reason that your growth is impeded. When you hold employees accountable, the result is a higher level of productivity and greater efficiency. However, for accountability to be effective, it must be fostered, not forced.

When accountability is lacking, it is not the fault of the technicians, sales or office staff; rather it is the direct result of inadequate management and poor leadership. In other words, accountability, or the lack of it, flows from the top down.

A culture of accountability results in improved performance, a greater degree of employee participation, increased feelings of competency, increased employee commitment to the work, more creativity and innovation, higher employee morale and increased job satisfaction.

Nurturing an atmosphere of accountability requires managers or owners to take specific actions. Employees need to clearly understand their role in the company and what they are responsible for accomplishing. Managers need to define and reinforce expectations and ensure their employees are empowered to do what is expected.

How to Implement Accountability In Your Company

Involve employees in setting clear, challenging yet attainable goals and objectives, and give them the authority to accomplish those goals; coach employees when they request help, and support employees in all aspects of the job; monitor progress towards goals, and provide feedback that includes credible, useful performance measures; provide the training and resources employees need to do the work; and recognize employees for good performance, both formally and informally.

Providing Direction Is Key for Success

It is crucial that managers are explicit when assigning responsibilities and creating goals.

Don't just give direction; be sure that your staff understands your expectations by seeking feedback. If your message is not communicated clearly and is misunderstood, it's your responsibility. You must ascertain employee understanding, otherwise you cannot hold them accountable. Develop a time line. Managers who don't give guidance and set parameters up front cannot hold staff accountable. It's foolish to present high expectations to employees without providing the tools for them to complete their work. Train first, and then implement accountability.

Feedback is Critical

Providing continuous feedback on performance to employees is a requirement of a strong leader. When employees are engaged in performance reviews, that is the moment a manager can revisit accomplishments compared to expectations.

Create a Culture of Accountability

When the work environment is designed for accountability, it can flourish. Culture dictates employee behavior. Setting expectations creates culture and allows

accountability to flourish within the company. Accountability encompasses more than just completion of an assigned task. It means employees act with initiative, attend to the details, proactively communicate with others and go the extra mile. Accountability embodies the essence of taking ownership of an assigned task or project. Creating a culture of accountability requires effective management and leadership. Developing a culture that rewards and reinforces accountability is critical.

Part II of this column on fostering accountability will appear in a future *Executive Suite*. If you have any questions regarding this column, or would like more information about setting up business or marketing systems that will help you grow profitably into the future, please give me a call at (215) 906-9988. **PP**

Harvey F. Goldglantz is President of Pest Control Marketing Company, Inc., a consulting firm to the pest management industry located in Elkins Park, Pa. His clients range in size from start-up companies to those with revenues in excess of \$30 million. Goldglantz has been in the pest control industry for more than 40 years. He served three terms on the National Pest Management Association Board of Directors.

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Palm Diseases

Monica Elliot

Diagnosing palm problems is not easy! Many physiological and nutritional deficiency symptoms look similar to disease symptoms.

However, observations made in the landscape should allow you to narrow the cause of the problem to two or three possibilities, which then informs you regarding the type of tissue sample needed to obtain the correct diagnosis.

All too often diagnostic labs receive the wrong tissue sample for diagnostic purposes. Since primary root rot diseases are extremely rare in the landscape, root samples are not appropriate samples, and palm diseases are never diagnosed based on soil samples. For some palm diseases, it is not possible to confirm the cause until the palm is felled and cross-sections are made through the trunk or apical meristem (bud).

PALM DISEASE DIAGNOSIS

The first step for correct disease diagnosis is observation of the problematic palm, other palms in the landscape (do they also have the same symptoms?), and the entire landscape (is the entire landscape suffering?).

Palm diseases normally occur very randomly in the landscape. When you observe a whole row of palms or an entire landscape with similar problems, then you are often dealing with physiological problems — for example, high soluble salts in the soil or poor or imbalanced nutrition.

The next step for disease diagnosis — still keeping in mind that the problem could be physiological and not pathological — is to make a good, educated guess as to the cause of the symptoms. Two keys are available to help you with this step (see the sidebar).

Once you have made an educated guess as to the pathogen causing the disease symptoms and you need a laboratory confirmation of this diagnosis, then refer to the table at right to determine what palm tissue needs to be sampled.

Never rely on a laboratory diagnosis without also making a good-faith attempt at a field diagnosis. The two diagnoses should agree. If they do not, then you need to determine which one is correct or why they do not agree.




Remember, a laboratory diagnosis is based on the tissue sample that you sent to the lab. If the wrong tissue was sent, the sample was inadequate, or the sample was degraded by the time it arrived, the laboratory may not be able to make a diagnosis. Always send pictures, preferably showing the various stages of disease development. A history of the palm is also very beneficial.

Continued on Page 26

PALM DISEASE KEYS

- **FLREC Palm Problem Key**
<http://frec.ifas.ufl.edu/palmprod/palm-problems-key/>
- **UF/IFAS/USDA (Lucid) Key**
<http://idtools.org/id/palms/symptoms/index.php>

Field Diagnosis	Palm Tissue to Sample for Laboratory Diagnosis ¹
Bud Rot	Spear leaf or next youngest leaf exhibiting typical disease symptoms. If bud is already rotted, it is often too late for pathogenic identification, as secondary microorganisms hinder isolation of the primary pathogen. http://edis.ifas.ufl.edu/pp144
Fusarium Wilt	Petiole or rachis exhibiting dark stripe on one side with corresponding internal discoloration. http://edis.ifas.ufl.edu/pp278 and http://edis.ifas.ufl.edu/pp139
Ganoderma Butt Rot	Laboratory diagnosis is not usually possible or necessary. Field diagnosis is based on presence of conk growing from trunk or cutting multiple cross-sections through lower 3-4 feet of trunk when removed. http://edis.ifas.ufl.edu/pp100
Lethal Yellowing (LY)	Internal trunk tissue for detection of phytoplasma. Instructions at: http://frec.ifas.ufl.edu/media/frecifasufledu/pdfs/LY-TPPD-Trunk-Sampling.pdf http://edis.ifas.ufl.edu/pp146
Leaf Spots or Leaf Blights (numerous pathogens)	Leaf exhibiting typical symptoms of disease: entire leaf or, at a minimum, 5 to 8 leaflets or leaf segments with symptoms. http://edis.ifas.ufl.edu/pp142
Nutrient Deficiency	Select the youngest, fully expanded leaf. Remove 4 to 6 middle leaflets on both sides of rachis of a feather-leaved palm. Remove 4 to 6 middle leaf segments from blade of fan-leaved palm. http://edis.ifas.ufl.edu/pp273
Petiole (Rachis) Blight (numerous pathogens)	Petiole or rachis exhibiting dark stripe on one side with corresponding internal discoloration. http://edis.ifas.ufl.edu/pp145
Texas Phoenix Palm Decline (TPPD)	Internal trunk tissue for detection of phytoplasma. Instructions at: http://frec.ifas.ufl.edu/media/frecifasufledu/pdfs/LY-TPPD-Trunk-Sampling.pdf http://edis.ifas.ufl.edu/pp163
Thielaviopsis Trunk Rot	Select a cross section of the trunk that has both decayed and healthy trunk tissue. http://edis.ifas.ufl.edu/pp143



Nitrogen is one of the 16 nutrients used by plants to function. It is classified as a macronutrient because it is needed by plants in relatively large amounts.

Nitrogen Sources for Turf

Erin Harlow

NITROGEN assists with chlorophyll production, protein and enzyme development, resulting in a dark green color and shoot growth. Plants that are deficient in nitrogen will appear yellower, weaker and have an overall slower growth habit. Nitrogen deficiency can be distinguished from other nutrient deficiencies by the uniform yellowing over the blade.

Macronutrients, such as nitrogen, are transient in the leaf tissue which results in the plant moving nutrients from the lower, older leaves to the newer leaves. This will result in some of the older leaves dying faster and yellowing to start at the bottom of a plant.

When choosing nitrogen for your fertilizer it is important to consider factors such as the time of year, the budget, how often you plan on visiting the property, and if there is access to irrigation. Nitrogen sources are categorized as slow or controlled release and fast or quick release. Quick-release products are usually used more frequently at lower doses in “spoon-feeding” type applications to prevent burning and result in rapid response, but for shorter periods of time compared to slow release products. Quick-release nitrogen sources include ammonium sulfate, urea and ammonium nitrate.

Quick-Release Products: Ammonium Sulfate, Urea, and Ammonium Nitrate

These products are highly soluble in water and release their nitrogen very quickly. Results from quick-release nitrogen sources typically last for a few weeks and require reapplication for adequate turf. Low doses are usually used to prevent plant injury. Once urea is released it has to be converted to a usable form by the plants, normally

within a few hours after application. Until that process is complete, urea has a high potential for volatilization.

Slow-Release Products

The release mechanism for slow release nitrogen fertilizers is usually microbial driven, related to soil temperature or through hydrolysis or a combination. Controlled release products also rely on the coating thickness that was applied to the prill. Applicators are familiar with slow or controlled release products in the form of sulfur coated urea (SCU), polymer coated urea (PCU), polymer-sulfur coated urea (PSCU), urea formaldehydes (UF), methylene urea, triazones and isobutylidene diurea (IBDU).

Sulfur and Polymer-Coated Products

These products are coated in a resin or polymer resulting in controlled release sources. The coating thickness influences the length of time that the product will be available. Water moves into these products either through the cracks in the sulfur or through the polymer membrane. Urea is then dissolved and is released. Soil temperature influences how fast the product will move. The warmer the temperature, the faster the product will release.

Urea Formaldehyde, Methylene Urea, and Triazones

These are synthetic organic nitrogen sources and their release rates are dependent on how long the organic molecules are in each product. These products are not coated and release is driven by microbes which are influenced by temperatures. Because microbes are more active in warmer temperatures, these sources are better suited for spring or summer applications.

	Timing	Release Mechanism	% of N	Comments
Ammonium Sulfate	Quick	Hydrolysis	21% N	Subject to volatilization and leaching
Urea	Quick	Hydrolysis; Converted by enzyme in soil during first 24 hours then less likely to leach	46% N	Soluble synthetic organic; subject to volatilization and leaching
Ammonium Nitrate	Quick	Hydrolysis	33-34% N	Subject to volatilization and leaching
Sulfur Coated Urea	Slow/ Controlled	Coating thickness, microbial activity, soil temperature, pH	32-38% N	Better suited for warm season
Polymer Coated	Slow/ Controlled	Coating thickness, soil temperature, diffusion rate	Variable	
Polymer-Sulfur Coated Urea	Slow/ Controlled	Coating thickness, diffusion rate	Variable	Good for both warm and cool season
Urea Formaldehyde	Slow	Microbial, soil temperature	38%; 65-71% WIN	Less effective in cool seasons; can be liquid
Methylene Urea	Slow	Microbial	40% N; 36% WIN	Liquid
Triazones	Slow	Microbial	30% N	Liquid
IBDU – Isobutylidene Diurea	Slow	Soil moisture, granule size, pH	31% N	Good cool-season response; no microbial response

Table 1. Summary of Sources of Nitrogen

IBDU

For nitrogen release in cooler temperatures, a product that is not driven by microbial or soil temperatures is ideal. IBDU release is driven primarily by hydrolysis, making it a good choice for later applications if they are warranted.

Further Considerations

When choosing a slow or controlled release product, it is important to consider the time of year, if a fertilizer blackout period is in place, leaching potential of products and site conditions. In the summer, a microbial driven product would be a better choice because microbes are not as active during the colder, winter months and fertilizer will be less effective. Microbes become active at soil temperatures around 50°F, if fertilizer is applied during colder months and soil temperatures are low then there is a high

potential for leaching and a low potential for plant uptake. Table 1 summarizes the release mechanisms for the most common nitrogen sources.

When creating a fertilizer program other factors such as site conditions should always be considered. If a site has compacted soils or poor drainage then a liquid form of nitrogen may be more appropriate. Because nitrogen is needed by plants in large quantities, there needs to be a healthy and extensive root system for proper uptake, however, if that is restricted by a small root system or compacted soils then a plant may show signs of nitrogen deficiency even if there is adequate nitrogen being applied. A foliar (liquid) application may be necessary to by-pass the soil and problematic site conditions.

Leaching and the off-site movement of nitrogen is a factor that turfgrass managers

should consider when selecting products. Leaching of fertilizers can be influenced by factors such as soil conditions, fertilizer source, and irrigation schedule. It is important to note that research conducted by University of Florida turfgrass specialist concluded that there was no difference in the amount a slow- or quick-release nitrogen source leached if it was applied to healthy, actively growing turf.

Whether you are using a quick release source to spoon-feed or a polymer and sulfur-coated urea to make it through a blackout period, choosing the proper nitrogen source for your sites and business is important and should be reviewed annually. **PP**

Erin Harlow is a Commercial Horticulture Agent, UF/IFAS Extension – Duval County

MAJOR LETHAL DISEASES OF FLORIDA PALMS

Ganoderma butt rot is caused by the fungus *Ganoderma zonatum*. All palms are considered hosts of this fungus, which is not a pathogen of any other plant family. Symptoms may include mild to severe wilting, premature death of multiple older (lower) leaves, or a general decline. The disease is confirmed by observing the basidiocarp, or conk, on the trunk. This is a hard, shelflike structure that will usually be emerging from the lower four to five feet of the palm trunk.

However, not all diseased palms produce conks prior to death. To confirm this disease when conks

are absent, multiple cross-sections are made through the lower portion of the palm in order to observe the internal decay of the trunk. A laboratory sample is not necessary. The fungus is spread by spores, which are produced and released from the conk.

There are no cultural or chemical controls to prevent or cure ganoderma butt rot. A palm with a conk present on the trunk should be removed as soon as possible, as this is an unstable palm. If a palm is removed from the landscape for any reason, the stump should be pulled or ground up to prevent this fungus from becoming established on the stump.

Thielaviopsis trunk rot is caused by the fungus *Thielaviopsis paradoxa*. This fungus can affect all palms

and results in a soft rot of the trunk, usually in the upper third of the trunk of older palms. Only fresh trunk wounds will become infected by the fungus, so disease management includes limiting man-made wounds to the palm trunk. With this disease, the palm trunk either collapses on itself or the canopy falls off the trunk, often without warning, as the palm canopy often appears healthy prior to collapse.

There are two fusarium wilt diseases of palms, with different pathogens and different susceptible hosts. The disease caused by the fungus *Fusarium oxysporum* f.sp.*canariensis* primarily occurs in Canary Island date palms, *Phoenix canariensis*. The disease caused by the fungus *Fusarium oxysporum* f.sp.*palmarum* primarily occurs in queen palms, *Syagrus romanzoffiana*, and Mexican fan palms, *Washingtonia robusta*.

The leaf symptoms include a one-sided death. For the feather palms, this means initially the leaflets on only one side of the rachis are desiccated or dead. On both feather and fan palms, there will be a reddish-brown or dark-brown streak on the petiole and rachis. Eventually, the entire leaf dies. The disease symptoms normally appear first on the oldest (lowest) living leaves, and then progressively move upward in the canopy until the palm is killed.

Disease transmission for fusarium wilt of Canary Island date palm is primarily via infested pruning tools. Disease transmission for fusarium wilt of queen and Mexican fan palms appears to be primarily via wind-blown spores, but likely can be transmitted with pruning tools also. There is no cure for these lethal diseases. Using only sterile pruning tools to prune these palm species is highly recommended. A laboratory confirmation of fusarium wilt, using molecular techniques, is required to separate this disease from petiole/rachis blight, which is normally not a lethal disease.

Lethal yellowing (LY) and Texas Phoenix palm decline (TPPD) are diseases caused by phytoplasmas, or bacteria without cell walls, that are transmitted by phloem-feeding insects. For LY, the planthopper *Haplaxius crudus* is the vector, but the vector for TPPD is unknown. The TPPD phytoplasma is similar to, but genetically distinct from, the phytoplasma that causes LY.

While LY has been detected in over 36 palm species, it is primarily a problem in coconut palm, *Cocos nucifera*, Christmas palm, *Adonidia merrillii*, and some *Phoenix* species. The primary palm species affected by TPPD are Canary Island date palm, *P. canariensis*, edible date palm, *P. dactylifera*, wild date palm, *P. sylvestris*, and cabbage palm, *Sabal palmetto*. Symptoms of these diseases are highly variable.

Preventive management of lethal yellowing and Texas Phoenix palm decline is best accomplished by trunk injections of oxytetracycline HCl (OTC) every three to four months, and planting of palm species that are not hosts of LY or TPPD. **PP**

Monica Elliot is a Professor of Plant Pathology, Fort Lauderdale Research and Education Center

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Endorsement Training and Proper Form To Use

I have had questions about what the requirements are for obtaining the Wood Destroying Organism (WDO) endorsement for a pest control technician's identification card.

As it turns out, there is no time requirement for this training-only content; 482.091(9) For every employee who performs inspections for wood destroying organisms pursuant to 482.226, [which includes 13645 (wood destroying organism report), periodic reinspections and retreatments], the licensee or the certified operator in charge must apply for an identification card that identifies that employee as having received the special training specified in this subsection in order to perform inspections pursuant to 482.226.

The application for such identification card must be accompanied by an affidavit, signed by the prospective identification cardholder and by the licensee or certified operator in charge, which states that the prospective identification cardholder has received training in the detection and control of WDOs including but not limited to training in: (a) the biology, behavior, and identification of WDOs with particular emphasis on ones common in this state and the damage caused by such organisms; (b) the inspection forms to be used to report the findings; and (c) applicable federal, state, and local laws or ordinances.

This means even a GHP, L&O technician or salesperson, if they perform periodic reinspections, and all WDO technicians who perform treatments or retreatments.

The correct form to use for Wood Destroying Organisms Inspection is the FDACS 13645 form updated in '08, not '09. There are a few PCOs using the '09 version, which is not the correct form. The two versions are the same, but the '08 is the form that was established to be used by rule. **PP**

Report by Paul Mitola, FDACS Personnel and Environmental Consultant



Brown Marmorated Stink Bugs: Learn All About Them Online

A NEW video series is available for free online. "Tracking the Brown Marmorated Stink Bug" shows growers and others how to identify BMSB, why this pest is important in agriculture, and what's at stake if we don't stop it. A team of 50 scientists is working toward sustainable solutions, and an outreach team is producing this video series to showcase the group's work.

The original series includes 10 brief videos on subjects ranging from the stink bugs' history and identification to host plants and damage, management, and biological control. Additional research update videos cover new information as it is discovered about these serious pests.

Visit <http://www.stopbmsb.org/video/> to view the videos and learn more about brown marmorated stink bugs. **PP**





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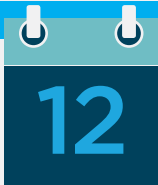
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