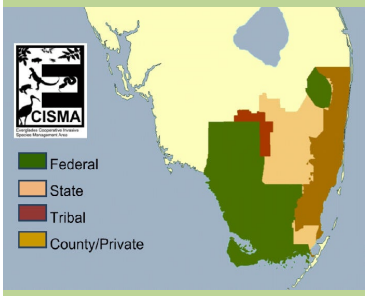
CISMA
Everglades Cooperative Invasive Species Management Area



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Florida Fish and Wildlife Conservation Commission officials hold up a skin from a 21-foot Burmese python at the Python Challenge Awareness and Awards event. From left: FWC Press Secretary Susan Smith, Public Information Coordinator Carli Segelson, Officer Bobby Dube, Regional Director Chuck Collins, Nina Segelson, and Officer David Bingham. *Photo credit: Alicia Wellman, FWC*

Results of the 2013 Python Challenge™ Will Help Develop Management Options

by Frank Mazzotti, UF, Kristen Sommers and Jenny Ketterlin Eckles, FWC

For the first time, the Florida Fish and Wildlife Conservation Commission (FWC) held a month-long competition to remove Burmese pythons (*Python molurus bivittatus*) from state lands in south Florida. From January 12 through February 10, 2013, the general public and individuals previously permitted by the state to remove pythons competed separately for cash prizes for the longest and most pythons harvested. Twenty-four permit holders registered to compete in the competition along with 1558 members of the general public. Ultimately, 68 Burmese pythons were removed from state-managed lands (Table 1); that is the most Burmese pythons removed from state lands over the same time period from any other year. Permit holders captured 42 Burmese pythons and the general public removed 26 pythons.

The primary goal of the 2013 Python Challenge was to raise public awareness about Burmese pythons in Florida and how people can help limit the impact of this and other invasive species. In addition to this educational component, the competition provided scientific data which FWC will apply to gauge the effectiveness of using an incentive-based model as one tool to address an invasive species management problem. All pythons captured during the competition were received by staff from the University of Florida Ft. Lauderdale Research and Education Center.

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Table 1. Number of Burmese pythons removed from state lands open to participants in the 2013 Python Challenge.

State Lands	Number of Burmese Pythons Removed
Florida Fish and Wildlife Conservation Commission Lands	
Big Cypress Wildlife Management Area (WMA)	6
Everglades and Francis S Taylor WMA	28
Holey Land WMA	0
Rotenberger WMA	0
South Florida Water Management District Lands*	34

*Only python permit holders were allowed to remove Burmese pythons from South Florida Water Management District lands during the competition.

ECISMA Receives 2012 Department of the Interior "Partners in Conservation" Award

by Art Roybal, USFWS

ECISMA was recognized nationally as one of 17 organizations to receive the 2012 Department of the Interior's "Partners in Conservation" award for outstanding conservation results through public-private cooperation and community engagement. The award recognizes conservation achievements that involve collaborative activity among a diverse range of entities, including federal, state, local and tribal governments; citizen groups; non-governmental organizations; universities; and private citizen volunteers. ECISMA's achievements in information/technology transfer and innovative outreach were singled out, including the development of web- and smart phone–based reporting applications and a 24-hour phone reporting system for invasive plants and animals, invasive species informational training programs, and public outreach events such as Nonnative Pet Amnesty Days.

"The Partners in Conservation awards offer wonderful examples of how America's greatest conservation legacies are created when communities from a wide range of backgrounds work together," said Deputy Secretary of Interior David Hayes, who announced the winners at an award ceremony held in Washington, D.C. on October 18, 2012.

Congratulations ECISMA!

ECISMA partners pose with Deputy Secretary David Hayes after presenting him with a commemorative T- shirt for Secretary Ken Salazar who was not able to attend the award ceremony. From left: Jennifer Eckles, FWC; Art Roybal, USFWS; Tony Pernas, NPS; DOI Deputy Secretary David J. Hayes; Dennis Giardina, FWC; LeRoy Rodgers, SFWMD and Jon Lane, U.S. Army Corps of Engineers. *Photo credit: DOI*

PYTHON CHALLENGE, continued from page 1

Competitors recorded information on the date, time, location, weather, and habitat associated with each capture, and UF researchers collected data on each snake that was turned in. These data will help managers understand the status of Burmese pythons on state lands and develop options for controlling and containing them.

Currently, FWC allows the take of pythons during hunting seasons within four wildlife management areas; however, very few pythons are reported by hunters. Furthermore, most permitted python removal agents have thus far only reported trips when they do encounter or remove pythons. During the Python Challenge they were required to turn in data and provide GPS tracks for all trips. Information from unsuccessful removal trips is extremely important because the amount of effort it takes to find a python is our best measurement of the abundance of pythons in Florida.

In addition to data collected on snakes and captures, University of Florida researchers administered an attitude survey to participants at the end of the Challenge and received a 42% response rate (n = 660). Eighty-seven non-participant attendees of the Awareness and Awards event also filled out a short version of the questionnaire. Survey results will be analyzed to help managers understand public attitudes about invasive species management, to assess how well the Challenge succeeded at meeting its educational objectives, and to help improve future events.

For more information, please go to http://www.pythonchallenge.org/.

Management and Outreach to Address Expanding Tegu Population

by Liz Barraco and Jake Edwards, FWC

First sighted in 2008, Argentine black and white tegus (*Tupinambis merianae*) are now considered to be established in the south Florida region, particularly in the area of southern Florida City. Recent reports indicate that this population has been expanding and reaching new areas. To address this concern ECISMA partners including University of Florida (UF); Florida Fish and Wildlife Conservation Commission (FWC); Miami-Dade County Parks, Recreation, and Open Spaces (MDCPROS); South Florida Water Management District (SFWMD); and the United States Geological Survey (USGS) have been actively removing tegus from these areas, surveying to determine population expansion, and providing education and outreach to the public to improve tegu reporting and overall management.

Through efforts led by UF with cooperation from MDCPROS, 126 tegus were captured in 2012. Using credible sightings and camera trap data to determine locations, live traps baited with raw, intact chicken eggs were placed strategically throughout the Florida City area of Miami-Dade County. The traps were operational from March 2012 until November 2012. These traps yielded a Catch per Unit Effort rate of approximately 7%. Eight of the trapped tegus were implanted with transmitters and tracked over the same period of time by UF biologists and volunteers. Over 100 specimens were also received from other sources such as Miami-Dade Venom One Unit and USGS. UF biologists and volunteers performed necropsies on the trapped tegus. Data from the necropsies are currently being analyzed by UF biologists. Stomach contents were collected and are being processed by FWC.

As part of an FWC and Florida Atlantic University research project, 40 camera traps were set and monitored in the Florida City area from March 2012 until November 2012. These cameras yielded photographic evidence of tegu distribution in previously undocumented areas. The information gathered from the game cameras was used to identify target trapping areas and monitor the spread of tegus into adjacent areas. Sighting information from these cameras is being analyzed to determine a potential distribution map for the nonnative lizards. In addition to live trapping and camera trapping, UF and SFWMD personnel sighted and removed tegus during walking surveys. Tegus sighted on these surveys were collected using firearms and turned over to UF for further analyses.

Traps baited with chicken eggs were used to capture 126 tegus in 2012. *Photo credit: Jake Edwards, FWC*

Outreach and education regarding the nonnative Argentine black and white tegu was expanded in 2012. A brochure was developed by FWC to educate the public about tegus and elicit credible sighting reports. Live tegus are currently being kept by UF to be used at educational and outreach events.

In 2013, tegu management efforts will continue in a variety of ways. Camera traps will be installed and monitored in new locations to test for tegu presence and monitor areas of concern. Live trapping will be expanded to cover more areas where traps have not previously been but where cameras or reports indicate tegu presence. Live traps will be moved throughout the year according to trapping effectiveness and habitat priorities. The trapping will also be extended to respond to credible sightings from the public and other stakeholders. Outreach and education events will continue to be attended by representatives of ECISMA organizations.

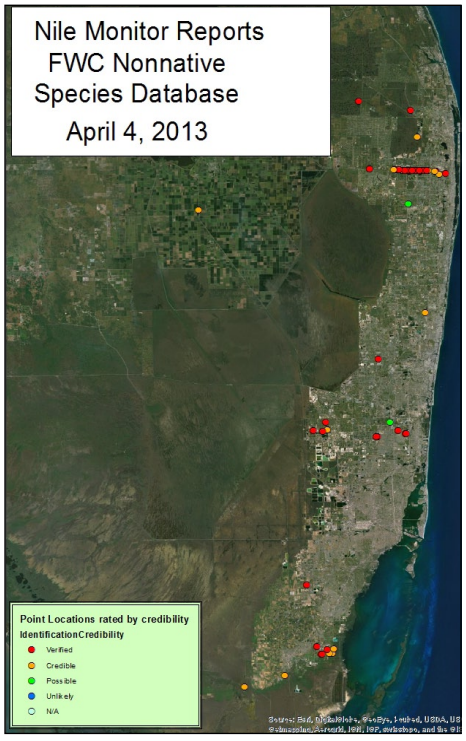
The 40 cameras dispatched and monitored through 2012 captured hundreds of tegu photos, some unexpected. *Photo credit: Liz Barraco, FWC*

Nile Monitors in Palm Beach and Broward Counties

by Jenny Ketterlin Eckles, FWC and Brian Jeffery, UF

Nile monitors (*Varanus niloticus*) have been established and reproducing in Florida for as long as twenty years. Besides the well-documented population in Cape Coral, Lee County (338 records since the late 1990s), there have been sightings near the Homestead-Miami Speedway in Miami-Dade County, and scattered records in southern Broward County that indicate one or more breeding populations. Recently, monitors have been confirmed breeding in Palm Beach County and there have been several sightings in new areas of Broward County. These populations are believed to be separate introductions, not range expansions of the established populations in Miami-Dade County and the Cape Coral area.

In Palm Beach County, there have been 63 sightings of Nile monitors since 2008 (most of them verified) along the C-51 Canal that runs parallel to Southern Boulevard.



Monitor (*Varanus* sp.) locations in Palm Beach, Broward, Miami-Dade, and Monroe counties.

Nile monitors are most commonly spotted along canal banks. *Photo credit: FWC*

Nile monitors have been confirmed as far east as I-95 and C-51 and west to within a few kilometers of STA 1E. There are also a number of observations along canals to the north and south of the C-51 Canal. The Exotic Species Coordination Section of the Florida Fish and Wildlife Conservation Commission (FWC) began conducting surveys of the canal by boat in May 2011, which yielded seven observations in two trips. Varying sizes were observed including an animal that appeared to be a young-of-the-year approximately 20 cm in total length. As a result, FWC began trapping for monitors along the C-51 in cooperation with the South Florida Water Management District (SFWMD) and more surveys by boat were planned. In 2011, a total of five monitors were removed from the population, three by live trapping. In 2012, FWC ramped up survey/removal efforts by boat, and staff from the University of Florida Ft. Lauderdale Research and Education Center (UF FLREC) began assisting in these efforts. FWC officially began contracting UF FLREC to conduct monthly EIRAMP (Everglades Invasive Reptile and Amphibian Monitoring Program) surveys in December 2012, including a modified boat route along the C-51. During 2012 and through April 2013, FWC, UF FLREC, and SFWMD staff have removed 13 Nile monitors along this canal. Ten additional monitors were observed, and a graduate student from the University of Louisville trapped one monitor along the canal in May 2012 during efforts to gain samples for his dissertation research. Samples from additional specimens collected will be sent to his lab for analysis related to genetics and stable isotopes of stomach contents.

Also in 2011 and 2012, several Nile monitors sightings were confirmed in Broward County in the extreme eastern and western ends of the urban areas. All sightings were of adults. Numerous attempts were made to trap these animals but they are living in areas with more convoluted canal systems than the Palm Beach population and do not seem susceptible to traps. No juveniles were found and it is possible that the sightings are of the same few individuals. However, the population/individuals in western Broward County is of concern due to the close proximity of the state-managed Everglades. Trapping and surveying efforts will continue in Broward County, but eradication is likely to be more challenging in these areas than along the C-51 canal in Palm Beach County.

Chameleon Assessment Suggests Eradication Unlikely

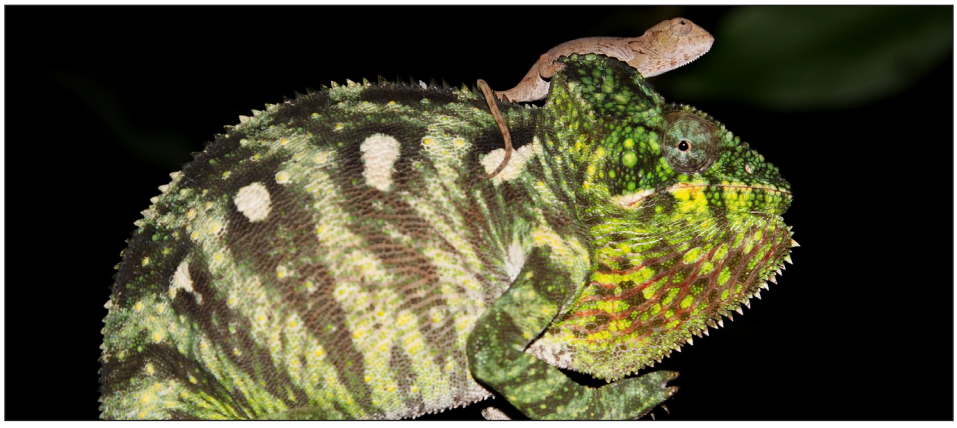
by Mike Rochford and Joy Vinci, UF

A breeding population of Oustalet's chameleons (*Furcifer oustaleti*), native to Madagascar, was discovered in late 2010 in an avocado grove near Florida City, FL. In July 2011, members of ECISMA partnered to conduct an assessment of the population to determine the likelihood of eradication and to understand possible effects on the native ecology of south Florida. Since then, 31 surveys have been conducted resulting in the discovery of 516 chameleons and the removal of at least 486. Data were collected on morphology, habitat use, fecundity, and diet.

For collected specimens whose sex is known, 95 were females and 106 were males. Chameleons ranged in snout-vent length (SVL) from 2.9 cm to 28.0 cm. There is sexual dimorphism in body length, with the longest female having SVL of 20.0 cm and the largest male 28.0 cm. There were a total of 32 male chameleons longer than the largest female collected. It appears that mating takes place from spring through summer with oviposition occurring within three months of breeding. Hatchlings emerge the following summer through fall. Mean clutch size from 17 samples was 43, with a maximum of 62 eggs.

Fecal samples have been processed for 50 individuals. The most common taxa represented in these samples is the weevil family, Curculionidae. Caterpillars of several families of moths and butterflies were also commonly found in the samples. The vertebrate diet of Oustalet's chameleons in this grove consists of small lizards and amphibians, with approximately 16% of adult samples containing either *Anolis* spp. or Cuban tree frog fragments.

Because of the fecundity of this species, it appears that Oustalet's chameleons are extremely difficult to eradicate even from a small area. Further, we are hearing rumors that people have been illegally spreading chameleons to start new populations. Although Oustalet's chameleons may not pose a significant ecological threat in Florida, a population of veiled chameleons (*Chamaeleo calyptratus*) has also recently been discovered in Miami-Dade County. This population is closer to natural areas, including Everglades National Park, and research on feral populations in Hawaii indicates that veiled chameleons may be more threatening than Oustalet's chameleons to vertebrate populations.



Oustalet's chameleons have a high reproductive rate and can reach high densities within an agricultural grove. *Photo credit: Dustin Smith, Zoo Miami*

Evaluating Caiman Infestation and Impacts

by Jake Edwards, FWC

The common caiman (or spectacled caiman, *Caiman crocodilus*) is a species of crocodilian native to Central and South America. It has been established in south Florida since the 1960s, but efforts to eradicate local populations have proven difficult. In 2012–2013, ECISMA partners University of Florida, South Florida Water Management District, and Florida Fish and Wildlife Conservation Commission have been successful in locating and removing 40 caiman from waterways in several areas of Miami-Dade and Broward counties. The goals are to better document the extent of modern local populations and to evaluate the species' potential impacts, especially related to Everglades restoration.

Exotic Wildlife Technician, Jake Edwards, with over a dozen captured caiman hatchlings. *Photo credit: Mike Rochford, UF*

Caiman habitat in Florida typically consists of canals, drainage ditches, ponds and marsh. This habitat usage coupled with the species' carnivorous diet may lead to competition with south Florida's two native crocodilian species.

ECISMA members are developing strategies to determine the extent of the caiman infestation. Standardized surveys will be conducted to assess the status of populations in southern Miami-Dade County and to determine potential impacts of this species on pending restoration projects. Research efforts in Broward County aim to gain information regarding a previously unknown potential population. Data collected from surveys, stakeholder reports, and captures will be imperative to formulating a plan to tackle a growing caiman issue.

ECISMA Workday to Mark National Invasive Species Awareness Week

by Jane Griffin Dozier, Miami-Dade County PROS; Cynthia Guerra, Miami-Dade County EEL Program

On March 6th, 2013, ECISMA partners marked National Invasive Species Awareness Week (NISAW) with a fulfilling day, removing invasive vegetation at Hattie Bauer Hammock EEL Preserve. Located in Homestead, Florida, this Environmentally Endangered Lands (EEL) Preserve was acquired in 1998 with assistance from a Florida Communities Trust grant. The preserve contains nine acres of rockland hammock and numerous listed plant species. It was once the site of Fennel's Orchid Jungle, a roadside tourist attraction that operated for 70 years under four generations of the Fennel family. The Orchid Jungle was largely responsible for the popularization of growing orchids indoors, and achieved numerous awards for orchid cultivation over the years. Unfortunately, such roadside tourist attractions that were once so prevalent have mostly gone by the wayside, due in part to the draw of large theme parks. Declining business and the devastation of 1992's Hurricane Andrew prompted the eventual closing of the Orchid Jungle, but led to a happy outcome made possible by the EEL Program's acquisition of this beautiful place. The entire site has been designated historic by Miami-Dade County.

Two areas of Hattie Bauer Hammock EEL Preserve before and after the invasive plant workday. *Photo credit: Jane Dozier, Miami-Dade County PROS*

Christen Mason of USFWS/Loxahatchee helping to remove invasive plants. *Photo credit: Jane Dozier, Miami-Dade Country PROS*

EEL has been funding the restoration of Hattie Bauer Hammock since acquiring the site, using Miami-Dade Parks Natural Areas Management (NAM) crews, and great strides have been made. The preserve has been pestered by ornamentals that were planted along the trail as part of the Orchid Jungle's operation, and grew far too enthusiastically along the limestone floor of the hammock and well into the canopy. Even the Fennel family had tried to control vines such as *Pothos* and *Syngonium* during their ownership of the property. With only one day's work by ECISMA partners, much needed initial treatment occurred in several areas of the hammock, as well as aggressive follow-up in other areas that had once again become problematic following canopy damage inflicted by Hurricane Wilma. In all, three dump-truck loads (approximately 50 cubic yards) of invasive vegetation were taken away by day's end. In addition to County staff from EEL and NAM, fourteen ECISMA partner volunteers assisted. Agencies/organizations represented included the National Park Service, two USDA divisions, Fairchild Tropical Botanic Garden, the local chapter of the Florida Native Plant Society, South Florida Water Management District, Arthur R. Marshall Loxahatchee National Wildlife Refuge, and independent volunteer extraordinaire, Stuart Krantz. This was truly a tremendous effort that displayed what is best in ECISMA—partnership, teamwork, common focus, and undaunted enthusiasm. EEL and NAM extend their deepest thanks for a job well done.

Aggressive *Mikania* Management Continues

by Andrew Derksen, FDACS/DPI

2012 provided a few new developments in the ongoing struggle against the noxious weed *Mikania micrantha*, but one thing that did not change was the continued management efforts of ECISMA partners in the Homestead area. Ongoing surveys have identified over 115 infested parcels of land in Miami-Dade County since 2009, with 273 separate infestations being reported within those parcels. Survey work conducted by ECISMA members throughout the year found that 51 of those parcels were still infested in 2012—in spite of repeated management efforts. While improved record-keeping suggests that aggressively treated sites have smaller infestations that are less dense than prior years' observations, management efforts must continue.

Miami-Dade County staff remove *Mikania micrantha* from a hammock in Camp Owaissa Bauer, a County Preserve in the Redland. *Photo credit: Jennifer Possley, Fairchild Tropical Botanic Garden*

Those efforts culminated in a series of workdays during the fall of 2012, focused first on surveying for the weed as it began its rampant blooming growth, and then scourging it from as many locations as possible. The Florida Department of Agriculture (FDACS) continued to review active nurseries upon whose fences the vine is occasionally found with repeat visits until the vine is clear for at least three months. Surveyors returned to the railroad tracks for the first time since 2009, and found that these areas previously reported as clean were now infested. ECISMA members worked hard to remove the vine for nearly a mile and a half up and down the tracks. Other teams including members from Florida Fish and Wildlife Conservation Commission and the National Park Service focused on abandoned nurseries to which property owners had granted access, while Miami-Dade County PROS aggressively removed the vine from natural areas where the vine endangered rare native plants.

Left: The tendril-like stipules of native *Mikania scandens*. Right: The ragged flap-like stipule found at the internodal segment on invader *Mikania micarantha*.

FDACS botanists also developed new morphological techniques to identify *M. micrantha* in the field. They finalized an improved list of diagnostic characters which were consistent across the many samples provided by ECISMA members, and which were consistent with molecular determinations. While previous field guides discriminated between invasive *M. micrantha* and native *scandens* using floral characters, the new guide recommends observation of stipules at the vine's nodes. *M. scandens* has thick, tentacle-like stipules at the internode, and invader *micrantha* has a ragged flap. A detailed exploration of these diagnostic features and additional photographs can be found at: http://www.freshfromflorida.com/pi/enpp/botany/botcirc/botcirc37.pdf.

Perhaps the most significant find of the year was an interception of the *M. micrantha* vine by FDACS plant inspectors at a nursery in Broward County. The suspect vines were growing in palms due to be shipped out of the country, and were confirmed using both molecular and morphological features. The sale was stopped, and the palms were treated with several herbicides. Tracing the palms back to their source led first to a nursery in Hendry County, and then to a natural area in Collier County where they had been harvested. No additional populations of *micrantha* have been found at any of these locations, but repeated surveys will continue. Had those palms made it to their final destination still infested with the vine, it might have resulted in quarantine actions placed against the entire Florida nursery industry. This serves to demonstrate the danger that the vine continues to represent, and illustrates a pathway by which it might leave the infested area.

Python Patrol: A Public-Private Partnership for Detection and Response

by Cheryl Millett, TNC

Graduates of Python Patrol training in Broward County, June 2012. *Photo credit: Cheryl Millett, TNC*

Controlling Burmese pythons (*Python molurus bivitattus*) in south Florida is complicated by difficulty in locating this cryptic species, so capitalizing on any observation is important in preventing pythons' spread. The Nature Conservancy created Python Patrol to coordinate conservation professionals and citizens in Early Detection/Rapid Response (EDRR) to prevent the establishment of Burmese pythons in new areas, and is testing this model of EDRR with the intention that it could be applied to other species. The three elements of the program are 1) training key audiences to identify and report pythons, 2) providing a quick and easy mode of reporting, and 3) training conservation professionals to safely and humanely capture exotic constrictors.

Since fall 2010, when funding from the National Park Service brought Python Patrol from the Keys to the mainland of Florida, more than 2,500 professionals and citizens have been trained to identify and report Burmese pythons and other invasive animals. Trainings have been provided in person and through the online REDDy (introduced Reptile Early Detection and Documentation) program created by the University of Florida and modified for various audiences. The 1,582 participants in the 2013 Python Challenge™, the state's month-long Burmese python capture competition, were all required to take a variation of the REDDy training with a special emphasis on distinguishing native vs. exotic snakes. No native snakes were turned in or observed taken as part of the competition.

Observers have three tools available to report nonnative species in Florida: a hotline (1-888-IVE-GOT-1), IveGot1 apps for iPhone and Android, and IveGot1.org online reporting through EDDMapS (Early Detection and Documentation Mapping System), created and maintained by the University of Georgia Center for Invasive Species and Ecosystem Health. Use of all three reporting tools has increased. As of March 2013, 365 professionals have been trained to safely and humanely capture constrictors. Sixty-one percent of trainees who responded to a survey (n=64) reported capturing at least one nonnative constrictor, and one person reported capturing eight. Co-trainer Jeffrey Fobb has been vital to the success of the capture trainings, providing wild-caught, wild-acting snakes and an overarching attitude of calm and safety, prompting Jeff Carter of the Florida Park Service to call the training "as good as or better than training I've received to handle venomous snakes through zoos."

Python Patrol is currently funded by the Florida Fish and Wildlife Conservation Commission (FWC) and the U.S. Fish and Wildlife Service Partners for Fish and Wildlife program. Python Patrol is being transferred to FWC in fall 2013 because it has proved to be an effective way to obtain valuable sighting data and to provide trained responders to assist in capture efforts, extending EDRR capacity. Already, FWC staffs the hotline and responds to call reports. Locations and participants for trainings (both detector-reporters and responders) have been identified in coordination with local CISMAs, including the Everglades CISMA. This approach can be applied to other species; for example, it has enabled EDRR by documenting sightings of Nile monitors (*Varanus niloticus*) and Argentine black and white tegus (*Tupinambis merianae*) in areas where they were novel.

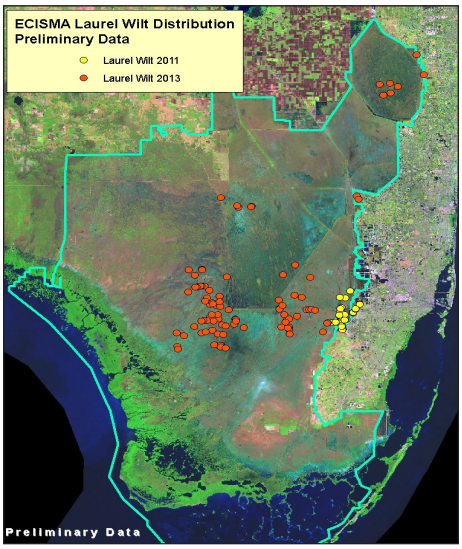
Laurel Wilt Expanding Rapidly in Everglades

by LeRoy Rodgers, SFWMD

Take a drive down Tamiami Trail in western Miami-Dade County and you will likely notice an alarming number of browning trees dotting the otherwise lush roadside vegetation along the Everglades National Park (ENP) boundary. Sadly, this is not some sort of seasonal change in foliage color. These are dying trees—native swampbays (*Persea palustris*)—succumbing to laurel wilt, a vascular plant disease caused by the exotic fungus *Raffaelea lauricola*. And it is not only roadside swampbays that are taking a hit. Recent reconnaissance flights by ECISMA partners confirmed what many had already concluded: laurel wilt is expanding rapidly across the Everglades landscape and, in some cases, causing substantial swampbay mortality in remote tree island plant communities.

Heavy laurel wilt damage to swampbays in an Everglades tree island (WCA 3B). *Photo credit: Ellen Allen, SFWMD*

The pathogen *R. lauricola* is transmitted from tree to tree by the redbay ambrosia beetle (*Xyleborus glabratus*). This Asian beetle has an affinity for members of the laurel plant family (Lauraceae) and a particular appetite for *R. lauricola*. Adult beetles bore tunnels into healthy host trees, where they oviposit their eggs and deposit spores of *R. lauricola*. The fungus spreads though the tree, eventually accumulating in water conducting tissues and physically preventing water transport. Signs of vascular wilt begin and most trees are dead within six months. The most common host tree species are redbay (*P. borbonia*) and swampbay, but laurel wilt also infects avocado (*P. americana*), pondspice (*Litsea aestivalis*), silkbay (*P. humilis*), and sassafras (*Sassafras albidum*).



Laurel wilt distribution within ECISMA - 2011 and 2013.

The redbay ambrosia beetle was first detected in the United States (Georgia) in 2002, and laurel wilt was confirmed the following year on infected redbays in South Carolina. Since then, laurel wilt has spread across the southeastern United States and, in 2011, was found a few miles from ENP. ECISMA members and FDACS biologists conducted aerial reconnaissance in April 2011 to assess laurel wilt distribution in the Everglades region and found that it had spread across an area of roughly 20,000 acres. This included infected trees in northeastern ENP, the Bird Drive Basin, and Pennsuco wetlands. In 2012, symptomatic swampbays were detected during flights in the Loxahatchee National Wildlife Refuge; laurel wilt was subsequently confirmed by FDACS biologists.

Preliminary information from spring 2013 aerial reconnaissance flights suggests a significant increase in laurel wilt's range within the Everglades, with up to 300,000 acres containing symptomatic swampbays (Fig. 1). In most cases, observed canopy mortality represented a small percentage of the tree island (<15%), but many tree islands were experiencing much higher canopy mortality (up to 40%). Follow-up ground surveys and sample collections are needed to confirm the presence of *R. lauricola* across this area.

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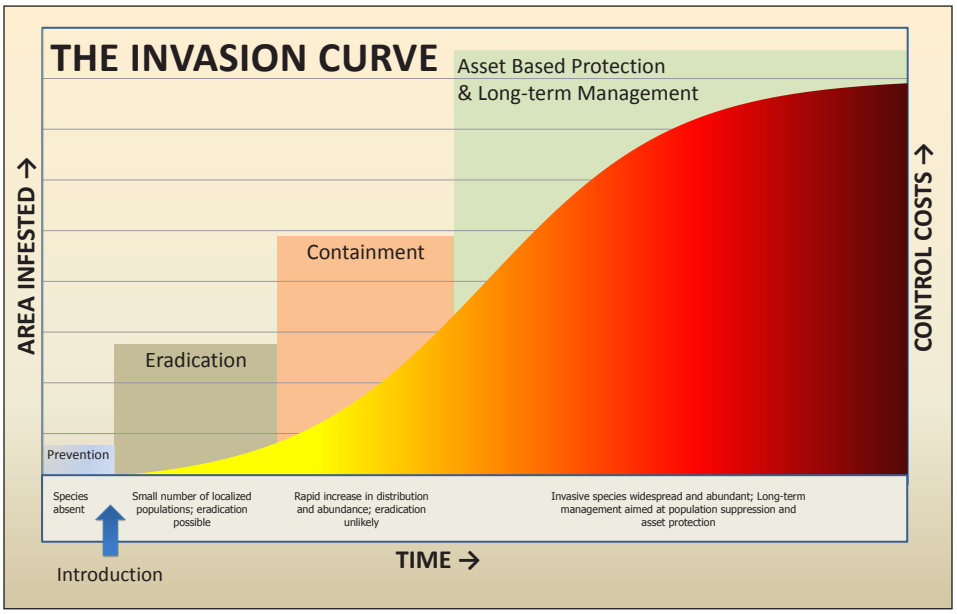
Eliminating *Lumnitzera Racemosa*

by Dennis Giardina, FWC and Tony Pernas, NPS

In 2008, an Asian mangrove species, *Lumnitzera racemosa*, was discovered to have escaped from Fairchild Tropical Botanic Garden into the mangrove forests of Matheson Hammock County Park in Miami-Dade County. *Lumnitzera racemosa* was able to out-compete established stands of native mangroves with stem densities estimated at over ten thousand per acre and an estimated rate of spread of about 20% a year. At the same time another Asian mangrove, *Bruguiera gymnorrhiza*, was also found to have spread from the two specimens collected and planted by David Fairchild at his home (now the Kampong National Tropical Botanic Garden), to approximately a hundred individuals. *Bruguiera gymnorrhiza*, although apparently less aggressive than *Lumnitzera racemosa*, was also able to recruit and expand into the surrounding native mangrove forest with an estimated annual rate of spread of about 6%.



Lumnitzera racemosa was detected within the "eradication possible" part of the Invasion Curve. *Image credit: LeRoy Rodgers, SFWMD*

Since 2009, ECISMA has organized multiple volunteer workdays to delimit and map the extent of the spread of *Lumnitzera racemosa*. Trees up to 30 feet were cut down, herbicide was carefully applied to the stumps, and smaller individuals were hand-pulled. In 2010 and 2012, funding was provided by the Florida Fish and Wildlife Conservation Commission to private contractors to employ work crews to systematically treat the entire area. The most recent *Lumnitzera* workday took place on January 25, 2013 with dozens of ECISMA volunteers. Even though the private contractor's work crew very thoroughly hand-pulled thousands of small and seedling *Lumnitzera* in May 2012, more than nine hundred more were removed during the ECISMA workday. ECISMA has offered to remove the *Bruguiera gymnorrhiza* from the Kampong but as of yet, has not received that permission. A survey of the Kampong is an ECISMA priority for 2013.

All of the *Lumnitzera racemosa* seedlings that were hand-pulled during the ECISMA workday at Matheson Hammock County Park. *Photo credit: Dennis Giardina, FWC*

Worldwide there are approximately 62 species of true mangroves. Of all the continents, Asia has the greatest area of mangroves and it also contains the world's highest mangrove diversity, with more than 50 species growing along its coasts. Florida's mangrove forests by contrast are composed of only four species: red (*Rhizophora mangle*), black (*Avicennia germinans*), white (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). The highest mangrove diversity in the entire Western Hemisphere (10 species) occurs along the border of Columbia and Panama. Due to the competitive advantages of some Old World mangroves, the relatively species-poor mangrove forests of the New World appear to be susceptible to invasion by them. This troubling scenario was analyzed in a paper by Fourqurean, Smith and Possley, "Are mangroves in the tropical Atlantic ripe for invasion? Exotic mangrove trees in the forests of South Florida," http://sofia.usgs.gov/publications/papers/exotic_mang/index.html

ECISMA partners are determined to eradicate *Lumnitzera racemosa* and several factors are working in our favor: 1) The *Lumnitzera* infestation was the result of a single

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LAUREL WILT, continued from page 9

There are currently no feasible control options for laurel wilt in natural areas. Researchers at the University of Florida's Tropical Research and Education Center are pursuing biological control options for the redbay ambrosia beetle, but progress is hampered by limited funding. With no control options, natural resource managers are left with little to do but document the spread and impacts of laurel wilt. Monitoring will likely continue as part of the Everglades invasive plant mapping program and other efforts (e.g., EDDMapS reports). An important question for Everglades restorationists and land managers is how serious the impact of laurel wilt will be; Will the sudden and widespread loss of swampbays cause deleterious changes to tree island plant communities, at either the species or ecosystem level? Will heavy swampbay mortality increase tree island vulnerability to invasive plant encroachment? Discussions between ECISMA partners and Everglades researchers to determine the feasibility of assessing laurel wilt impacts are underway. Hopefully resources will become available to address this important question.

Visit the FDACS laurel wilt website (http://www.freshfromflorida.com/pi/enpp/pathology/laurel_wilt_disease.html) to learn more about this harmful disease. If you find symptomatic trees, please report the citing at the online ECISMA laurel wilt reporting site (http://www.evergladescisma.org/laurelwilt.html).

LUMNITZERA RACEMOSA, continued from page 10

source population. 2) The infestation was identified early enough that eradication was feasible and a rapid response was undertaken while it was still confined to Fairchild and Matheson Hammock. 3) Our surveys have so far indicated that *Lumnitzera* has not escaped out into the mangroves of Biscayne Bay. 4) Repeated surveys and removal of seedlings are planned for years to come and should eventually deplete what is left of the *Lumnitzera* in the seed bank. At the same time, we will continue to seek permission to remove the *Bruguiera gymnorrhiza* infestation at the Kampong National Tropical Botanic Garden.

Giant African Snail Eradication Program Picks Up Speed

by Mark Fagan, FDACS

It has been 18 months since the first urban detection of giant African land snails (GALS) in Miami-Dade County. Since then, the 45-person field inspection staff of the FDACS-managed, USDA-supported GALS Emergency Eradication Program has collected more than 120,000 snails. There are 20 neighborhoods infested with the snail, stretching from Southwest 268 Street (east of U.S. 1) on the south to Red Road (near the Florida Turnpike) on the north. The last new core was discovered November 13, 2012.

The GALS program sought and received EPA permission to use a metaldehyde-based molluscicide in March 2013. The use of this product is proving to be very successful, showing a greatly increased mortality rate compared to the use of iron phosphate. We created a tiered system of treatment in which application rates are based on the number of snails collected on a property since inception of the program. According to Tracy Wright, GALS Program Director, "This refined approach will accelerate the eradication effort, allowing us to reach our goal in much more timely manner."

Wright and other program managers attended a GALS symposium in Gainesville, FL which drew malacologists and other members of the scientific community from countries that have been making their own efforts at GALS eradication. The Division of Plant Industry–sponsored symposium illuminated issues addressed in the Miami-Dade infestation, as well as efforts that were unsuccessful outside the United States. An important conclusion of the symposium was that with Florida's agriculture so important to Floridians and the nation, eradication must be achieved.

All sizes of giant African land snails. *Photo credit: FDACS/DPI*

Giant African land snail damage to plant. *Photo credit: FDACS/DPI*

Rapid Response, Successful Eradication? *Chrysopogon Aciculatus* at Homestead Air Reserve Base

by Andrew Derksen, FDACS/DPI

Chrysopogon aciculatus, or golden beardgrass, is a federally listed noxious weed. The rapidly growing grass has a distinctive "purple Christmas tree" shaped inflorescence, and gangly rhizomes that fade to a yellow shade, giving it the name. While the rapid growth has led to its use as a tool for erosion prevention in central Asia, it is considered a weed in pastures. The viciously hooked seeds can cause ulcerating wounds in the mouths and feet of livestock and in the calves of unprotected hikers. It was first detected in Florida in September 2012 when Keith Bradley and Sarah Martin of the Institute for Regional Conservation (IRC) identified the weed in two patches along the southern runway of Homestead Air Reserve Base. Populations of the grass were only identifiable by their seed heads, making detection difficult. The rhizomal and blade characteristics were hard to separate from the mix of other nonnative grasses growing at the base. Reduced mowing might have allowed for a larger proportion of the grass to go to seed, making it easier to identify—but this management option was not available. Certain other nonnative grasses would grow more rapidly, beginning to obscure the runway for pilots and encouraging bird habitat—increasing the likelihood of bird-jet collisions. ECISMA's exotic weed rapid response team struck immediately, treating the two confirmed sites. With the assistance of USDA wildlife management personnel stationed at the base, NPS exotic weed management personnel, FDACS plant inspectors and pest surveyors, IRC led another survey through the area, identifying two more sites and expanding the treated area.

Monthly surveys conducted by IRC and USDA wildlife management staff failed to uncover additional populations of the weed at the airbase on the runway or at any other location on base. IRC will continue to search for it within the perimeter of the base and at other IRC work sites in south Florida, but cautiously suggests that the population may have been successfully eradicated. While it is unlikely that few seeds of the grass would survive the required regular mowing, it remains possible that the plant could have grown and blown seeds into the surrounding ornamental plant nurseries before being mown. Repeated inspections of planted material at the palm nurseries surrounding the airbase by FDACS have not revealed additional populations of the weed. A volunteer workday with ECISMA staff to further examine planted areas surrounding the base may be in order to increase confidence in our continued non-detection of the weed, but the rapid interagency collaboration in this matter may well have eradicated this grass before it could become established in south Florida.

Sarah Martin and Shane McKinley spraying *Chrysopogon aciculatus* with 5% Rodeo plus water and blue dye. *Photo credit: IRC*

CISMA

Everglades Cooperative Invasive Species Management Area

ECISMA was created to formalize cooperation among land management agencies to improve the effectiveness of exotic species control by sharing information, innovation and technology across borders through a memorandum of understanding with the ultimate goal of helping to ensure the success of the Comprehensive Everglades Restoration Plan.

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Agency/Organization Abbreviations

DOI - Department of Interior
EEL (Miami-Dade County) - Environmentally Endangered Lands
FDACS/DPI - Florida Department of Agriculture and Consumer Services / Division of Plant Industry
FWC - Florida Fish and Wildlife Conservation Commission
IRC - Institute for Regional Conservation
PROS (Miami-Dade County) - Parks, Recreation, and Open Spaces
NPS - National Park Service
SFWMD - South Florida Water Management District
TNC - The Nature Conservancy
UF - University of Florida
USDA - U.S. Department of Agriculture
USFWS - U.S. Fish and Wildlife Service