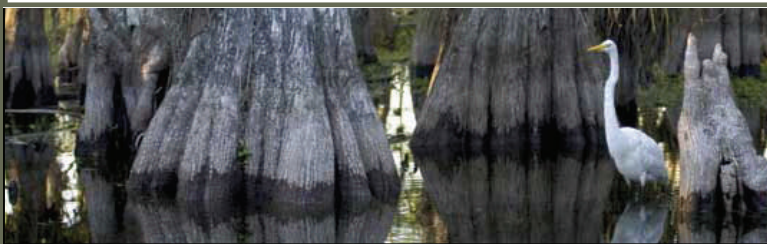




Newsletter



Volume 3, Issue 1

March 2012

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The Eco-Impact of Tegus Could Be Significant

-Tony Pernas, NPS and
Dennis Giardina, FWC

The South American Tegu has become established in Florida and is rapidly expanding its range and population density throughout the central and southern portions of the state. They were first identified living in the Miami-Dade area in September 2008. Two species have become established – the Argentine Black and White Tegu (*Tupinambis merianae*) and the Colombian or Gold Tegu (*T. teguixin*). These reptiles have been imported into the United States as part of the pet trade (between 2000-2006, 13,400 live tegus were imported).

may be as far north as South Carolina. Its habitat preference is moist tropical forests, semi arid scrub forests, prairies, beaches, dunes and disturbed habi-



tats. In Brazil, tegus are commonly observed foraging along beaches. Despite intensive harvesting for their hides and meat, tegus they remain one of the most abundant reptiles in South America.

Tegus breed in March/April beginning when they

are 3 to 4 years old. Clutch size averages 30 eggs with an approximate 3 month incubation period. They can live for up to 20 years.

Tegus are omnivorous while juveniles are insectivorous. They can dig their own burrows or use the burrows of other animals. Because of their subtropical to temperate origins, tegus can tolerate the damaging effects of freezing temperatures better than pythons.

In Brazil, four tegus were introduced on to the island that contains the Fernando de Noronha National Park to control rats. They rapidly expanded their population size to an estimated

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First Annual Pet Amnesty Day in Palm Beach County

- Rebecca Harvey, UF

Prevention and Early Detection & Rapid Response (EDRR) are the most effective and least costly approaches to addressing impacts of invasive species before they become intractable problems. ECISMA's outreach efforts focus on both EDRR and prevention by: 1) teaching field staff and people who work in natural areas how to identify and report nonnative species, and 2) reaching out to the public to foster responsible pet ownership. To meet the latter goal, the Florida Fish & Wildlife Conservation Commission's (FWC's) Nonnative Pet Amnesty Program is a tried and true method that gives people a viable alternative to releasing their pets. This

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Step on the GAS—Management Update for the Giant African Snail in Southern Florida - *Andrew Derksen, FDACS/DPI*



East African land snail, note the handler's protective gloves against its parasitic nematode.



Another view of the East African land snail.

“Giant African snails also pose a threat to Florida's natural resources. The snail feeds readily on over five hundred documented species of plants, including several rare and endangered native plants.”

The giant East African land snail, *Achatina fulica* has long been considered by the United States Department of Agriculture (USDA) to be a significant threat to North American plant communities. The World Health Organization has shown a direct relationship between the global expansion of the snail and its parasitic nematode, *Angiostrongylus catonensis*, a cause of eosinophilic meningitis which affects humans.

Giant African snails also pose a threat to Florida's natural resources. The snail feeds readily on over five hundred documented species of plants, including several rare and endangered native plants. Individual snails are capable of exfoliating whole plants overnight to fuel their rapid growth, and under optimal conditions, snails can achieve sexual maturity in approximately six months. That prodigious growth rate and voracious appetite also feeds a high rate of reproduction, with the hermaphroditic snails laying as many as six clutches of a hundred or more eggs a year. With reproductive rates this high, there is some concern that giant African snails in the Florida ecosystem could potentially crowd out or outcompete indigenous tree snails such as *Orthalicus* or *Liguus*.

Since September 7th,

2011, fourteen separate populations have been identified in urban and suburban Miami. All infestations were brought to the attention of Department of Agriculture scientists by concerned homeowners. More than 900 calls to the helpline number **(1-888-397-1517)** have been investigated, with a total of 210 positive



properties being uncovered. Five of the infestations constitute almost nine-tenths of the snail's current range in Miami. Only one new infestation has been detected in the last two months of 2011, but spring weather will likely increase the snail's activity and more populations may be identified early next year.

All properties within a half-mile of known infestations have been surveyed for the snail and the Florida Department of Agriculture and Consumer Services (FDACS) has begun a control program designed to eradicate it. Thus far, over thirty-three thousand snails have been collected and re-

moved from infested properties. All properties within two hundred meters of the infested sites have been treated with the organic molluscicide, iron phosphate. USDA, FDACS, and University of Florida scientists have initiated research projects further exploring the mollusk's biology, responsiveness to pesticides, and are developing improved trapping and detection mechanisms.

In spite of this progress, USDA and FDACS scientists remain concerned that low-density infestations persist undetected, and that there are not enough eyes patrolling the natural areas of Miami-Dade County. Remaining vigilant and watching for signs of feeding damage near illegal dump-sites will be important to the long-term containment of this pest.

WANTED

GIANT AFRICAN SNAIL

LOOK FOR THEM! REPORT THEM!
888-397-1517

A major landscape and agricultural pest, even eats stucco on homes

Public health threat - known to carry rat lungworm that may cause meningitis in humans

Able to reproduce rapidly - one snail can lay 1,200 eggs in a year
 Can grow to up to 8 inches in length - no natural enemies

We need your help to stop this pest!

www.freshfromflorida.com/pi

Year	Trapping	DOR	Other	Total Tegus
2009	12	1	0	13
2010	15	4	2	21
2011	114	3	7	124

Table 1 shows the results of tegu population assessments beginning in 2009.

Tegus continued from page 1

two to eight thousand individuals posing a significant threat to shorebirds



and sea turtles. In Florida, adult tegus have few predators and could impact the American crocodile, alligator, Eastern Indigo snake, turtles (especially sea turtles), the Key Largo rat, and native bird populations. The severity of their impacts will likely depend on population densities.

Population density assessments began in 2009 with surveys, trapping, and necropsy. In 2011, radio telemetry, camera traps, burrow cameras were deployed. For trapping, a number of baits were tested until chicken eggs proved to be most effective. The target area was around Florida City

and Homestead.

In 2011, the number of tegus trapped increased substantially from 2009 and 2010 (see Table 1) while the number of tegus found dead on the road (DOR) remained relatively low. When combined, the total number of tegus trapped or observed increased dramatically from 2009 in the area just east of Everglades National Park.

Radio telemetry and camera traps are helping to determine the home range size, migration, routes, and population densities of tegus. Preliminary data indicates that tegus can be individually identified by their distinct markings.

Necropsies have been performed on 30 individuals at Florida Atlantic University by Dr. Colin Hughes. Conclusions to date indicate that many tegus become sexually mature when males are greater than 288 mm SVL (snout vent length) and females are greater than 248 mm SVL (see Figure

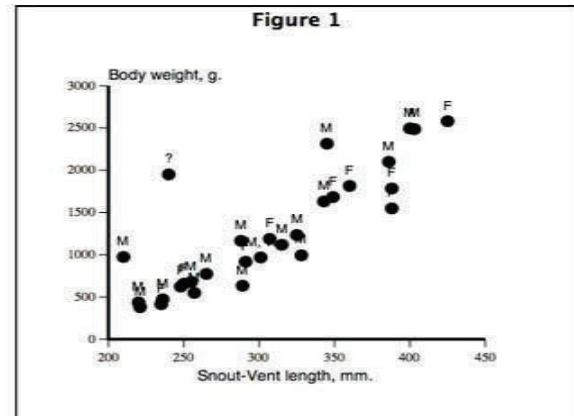


Figure 1 shows size of tegus collected - body weight and snout - vent length (SVL)

1 for the size of tegus collected). Their diets are diverse. They feed on mammals, reptiles, birds, amphibians, insects, snails, fruits, and plant matter. Tegus can store fat in the fall (as much as 182 g per individual) and are well adapted to our state's temperature regimes and seasons.



Trapping of tegus in 2011 has yielded the highest number of animals caught since 2009.

Tegus will likely expand their range in Florida. Without management funding, containment or eradication efforts will be impossible.

In 2012, ECISMA will continue the assessment of the Argentine Black and White Tegu. The Florida Fish and Wildlife Conservation Commission, National Park Service, University of Florida, Zoo Miami, U.S. Department of Agriculture, and others will collaborate on the assessment that will continue live trapping, camera trapping, and radio telemetry.



Tegu teeth.

ECISMA Uncovers First Wild Tegu Nest in Miami-Dade County- *Dennis J. Giardina, FWC and Tony Pernas, NPS*



Tegu nest hidden in a mound of discarded potting soil at the base of a tree stump.



Excavated nest mound that revealed a clutch of 21 eggs.



Tegu egg recovered from the nest.



Dallas Hazelton prepares the burrow cam.

The establishment of a breeding population of Argentine black and white tegus (*Tupinambis merianae*) has been documented by partners of the Everglades Cooperative Invasive Species Management Area (ECISMA) in Southern Miami-Dade County. In the radio telemetry study, five live-trapped adult tegus (sex ratio 3:2) were implanted with radio transmitters and their movements monitored between August 2010 and June 2011.

Radio telemetry locations for all five transmitted tegus showed a marked decrease in movements between November 2010 and February 2011, reflecting the dormancy period typical of the species in its native range in subtropical and temperate South America.

In late February 2011, all five tegus began making wider movements. The three males made more frequent and longer range movements than did the two females, which remained fairly close to their dormant season refugia.

One of the females was originally captured in a live trap baited with chicken eggs on Sept 9, 2010. A radio transmitter was surgically implanted on Sept 30, 2010 and was released at the capture site on Oct 4, 2010. A total of 36 radio-telemetry locations were recorded

for this female including 16 within a ruderal thicket dominated by invasive exotic plants where a nest was eventually located and excavated.

The nest was located beneath a mound composed of discarded potting soil, decomposing organic material and detritus at the base of a tree stump covered by arrowhead vine (*Syngonium podophyllum*), an invasive plant species. The female tegu was captured in a live trap on June 7, 2011.

On June 9, 2011, the suspected nest mound was excavated by removing the vines and systematically dismantling it, using hand tools. In the approximate center of the mound, a swipe of a council rake uncovered a nest chamber, containing a clutch of 21 eggs. During the excavation, several eggs were damaged and one was opened to verify the target species and estimate the age of development. The remaining eighteen eggs were collected.

A second, older nest chamber was unearthed just behind and below the first one that was comprised of 22 hatched egg shells and 13 unhatched eggs. ECISMA partners will continue the radio-telemetry monitoring and resume camera and live trapping in 2012.



Aaron Parns (NPS) surrounded by Mikania.

The Mikania micrantha Wrap Up-*Jane Griffin Dozier, Miami-Dade Parks and Recreation*

After two years of ECISMA-led rapid responses to *Mikania micrantha* in Miami-Dade County, we can state on the positive side that we now have a better idea of the scope of the infestation. Mikania appears to be confined to the Redland Agricultural Area of Homestead. Operating ornamental plant nurseries are regularly inspected, and for the most part, are cooperating with FDACS DPI by treating Mikania with herbicide in their nursery stock and on their properties to avoid quarantine.

Every private property owner contacted by ECISMA was willing to sign a liability waiver and allow volunteer crews to remove Mikania. Even though we continue to document more Mikania sites in the Redlands,

Continued on Page 5

***Mikania* continued from Page 4**

a number of previous positive finds were found to be no longer present. Through CAPS and ECISMA, multiple agencies are working together proactively to find, map and treat *Mikania* in an effort to keep it out of large natural areas like Everglades NP and the South Dade Wetlands. We believe that if we had unlimited access to all the known *Mikania* infestations, we could – if not eradicate it - relegate it to being an occasional weed of plant nurseries.

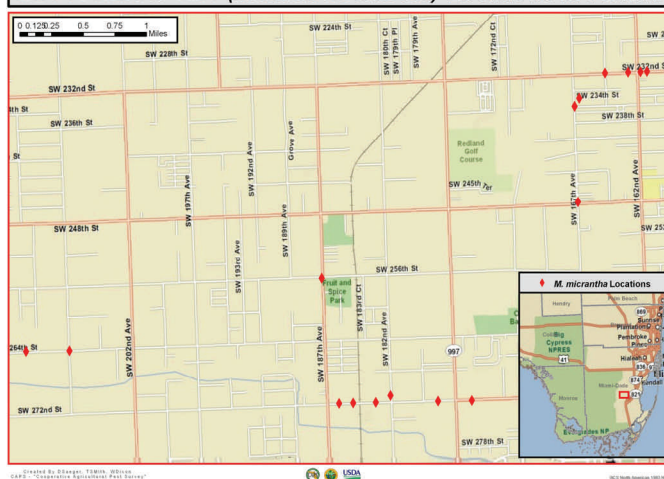
On the other side, there are big challenges. In the Redland, there are many abandoned plant and tree nurseries. We have documented several that are literally covered with tens of acres of *Mikania* and attempts to reach some infested property owners were unsuccessful. Even though they cannot legally sell their stock, abandoned nurseries

are vulnerable to theft and if *Mikania* is present, it goes wherever the stolen potted plants travel. There is also a lot of it growing in people's yards. We are limited because we can only encourage homeowners to control it.

Mikania, a vine, often grows entwined with desirable vegetation like hedgerows and is difficult to treat effectively with herbicide without non-target damage. Although at the moment *Mikania* is known to only occur in the Redland, there are many similar agricultural areas in Southeast Florida where it could also be present, a disconcerting prospect.

ECISMA partners have determined that a continued effort is needed to stop the spread *Mikania micrantha*. And it is a high priority to keep it from becoming another costly weed of public wild lands. One option being considered (if funding can be acquired) is to employ one of the Florida's ap-

Mile-A-Minute Vine (*Mikania micrantha*) Locations in Florida



Approximate distribution of *Mikania* in Florida in 2011.

proved exotic plant contractors to treat all the known, accessible infestations once a year for several years. If future ECISMA volunteer workdays could be devoted to surveying, mapping and seeking the permission of homeowners to allow the contractor's crew to treat and remove *Mikania* from their properties (as FDACS DPI continues to seek compliance from infested plant nurseries), then there would be a much better chance of containing this aggressive, noxious weed.

2012 ECISMA Summit

In 2012, the ECISMA Summit will be a 2-day meeting composed of representatives from ECISMA's partner agencies.

The dates are June 5-6, 2012, please mark your calendars. The Summit will be held at the Long Key Nature Center, Davie, Florida.

Tentatively, day 1 will feature operations reports and EDRR updates. Day 2 will include break out sessions to express issues or concerns identified ahead of time by the Steering Committee.

For more information about the Summit, please contact Mr. Dennis Giardina at 239-229-5403



2012 SUMMIT

About ECISMA

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.

Pet Amnesty continued from Page 1

program spreads the message that releasing exotic animals into the wild is illegal, harmful to the animal, and a threat to native wildlife. Pet Amnesty Days allow people the opportunity to surrender any exotic pets they can no longer care for—no penalties and no questions asked. After examination by a vet, healthy animals are placed in new homes with experienced, pre-approved adopters. It is a win-win-win outcome for pet owners, adopters, and the environment.

The Palm Beach Zoo, U.S. Fish & Wildlife Service, and ECISMA hosted (with guidance from FWC) a Nonnative Pet Amnesty Day on January 14, 2012 at the West Palm Beach Garden Club. This was the first annual Pet Amnesty Day in Palm Beach County. From 10 am to 2 pm, a steady stream of families and individuals arrived at the garden club and surrendered a total of 94 animals of 29 different species. Of the 94 pets surrendered, there were 25 snakes (including 4 very large Burmese pythons and 3 species of boa among others), 24 turtles and tortoises, 5 green iguanas, 1 skink, 8 wild-caught Oustalet's chameleons (caught during a survey by FWC and UF researchers), 16 birds (including sought-after species such as African grey parrot and sulphur-crested cockatoo), and 15 mammals (chinchillas,

prairie dogs, sugar glider, and more). The most common species were red-eared slider turtles (19) and ball pythons (13).

In the afternoon, the event shifted gears from accepting surrendered pets to placing them with adopters. Thirty-five adopters showed up, displayed their FWC-issued approval letters, and waited patiently until it was their turn to walk through and take a look at the available animals. Their names were then called in random order. One by one they selected which animal they would take home. Several stayed for a second and third round of selections, and by the end of the day all of the animals had been adopted except for some of the red-eared sliders, which were taken by FWC for their dog detector program.

Thirty-six surrenderers completed a brief, anonymous questionnaire to help organizers learn about the target audience and improve future events. Of these, 17 (47%) stated their reasons for surrendering their pets as some combination of the difficulty, cost, and time involved in caring for the animals. Four more (11%) specifically cited the animal's size and space requirements. Twelve people (33%) reported they were giving up their animals because of a household move or other recent or

impending household change (e.g., child going to college, new baby). Three people (8%) attributed the surrender to a family member's health issues such as allergies or asthma, and one boa owner (3%) acknowledged that the animal was unsafe for their household.

To those of us observing the surrender process, it was clear that many of the owners took the decision to give up their pets very seriously and emotionally. Tears and shaky voices were not uncommon. Their appreciation for the event came through in numerous comments about the friendly, caring and professional staff, as well as the ease and convenience of the amnesty process. We certainly learned that there is a need for this service in the Palm Beach County community and plan to continue to offer it on an annual basis. For more information about the Nonnative Pet Amnesty program and how to register as an adopter for future events, visit <http://myfwc.com/nonnatives>.

Volunteers from the USFWS helping the public. Photo credit: Paula Hjertaas.



Albino python. Photo credit: Paula Hjertaas



Exotic birds also made their way to Amnesty Day. Photo credit: Bob Phillips



After an exam by a Vet, healthy animals are placed in new homes. Photo credit: Paula Hjertaas



Will Local Herbivores and Diseases Colonize and Eventually Suppress *Mikania micrantha* in Florida? *Rodrigo Diaz, UF, Amy Roda, USDA/APHIS, Susan Romero, UF, Catherine Mannion, UF, and Bill Overholt, UF*

Mikania micrantha Kunth is native to Central and South America, and considered to be one of the worst invasive plants in Asia. It was discovered for the first time in North America in October 2009 near Homestead, and has since been found at > 30 sites in the same area. Concerns have been raised about the potential of *M. micrantha* to spread rapidly and invade Florida's natural and managed ecosystems, particularly through seed dispersal.

Upon arrival to a new environment, the establishment and spread of exotic plants are limited in part by biotic resistance from local herbivores and diseases. There are two native species of *Mikania* in Florida; *Mikania scandens* (L.) Willd. and *M. cordifolia* (L.f.) Willd. Both are widely distributed in the state, with *M. scandens* found in hydric habitats and *M. cordifolia* in hammocks. Presumably, the native *Mikania* spp. are

attacked by a complex of arthropods and plant pathogens, although no studies have been conducted. As closely related plants tend to share natural enemies, we predict that natural enemies of the native *Mikania* spp. will expand their host ranges to include *M. micrantha*, and provide some level of suppression of the alien species.

To understand the impact of native natural enemies on *M. micrantha*, we are conducting field surveys in the Homestead area and laboratory experiments in our quarantine facility in Fort Pierce. The objectives of field surveys are to identify insect herbivores and diseases of *M. micrantha* and *M. scandens*, and measure the level of damage they cause. To date, we have found several natural enemies, including leaf rollers, leaf miners, mites, aphids and a foliar disease damaging the two *Mikania* species (Fig. 1). Several of the insect her-

bivores were found to attack both plants, indicating that local herbivores have expanded their host ranges to utilize the exotic species. The incidence of the disease was measured from 1 m² of foliage and in some sites, up to 80% of the area was affected. The host specificity of a leaf mining fly (*Calycomyza* sp., Diptera: Agromyzidae) and a stem galling fly (*Neolasioptera eupatori*, Diptera: Cecidomyiidae) are currently being investigated at the University of Florida quarantine facility in Fort Pierce. Our preliminary results clearly indicate that several natural enemies of the native *M. scandens* have expanded their host ranges to include the exotic *M. micrantha*. Whether the degree of damage inflicted by these natural enemies is sufficient to prevent *M. micrantha* from becoming a serious invasive plant in Florida, is not yet known.



Mikania covering abandoned nursery stock.



Mikania in full bloom.

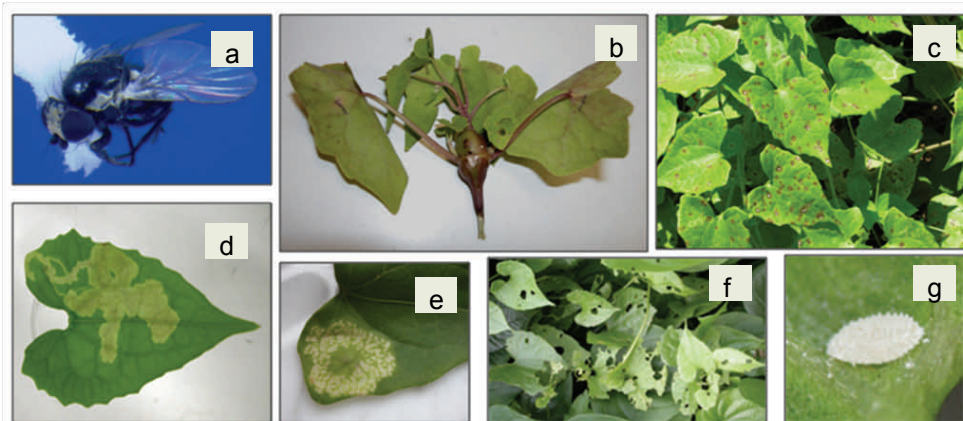


Figure 1. Insect and diseases of *Mikania micrantha* and *Mikania scandens* found in Homestead, Florida. a) Leaf miner adult (*Calycomyza* sp.), b) *M. scandens* with stem gall, c) *M. micrantha* with leaf spot, d) *M. micrantha* with leafminer damage (*Calycomyza* sp.), e) *M. scandens* with leafminer damage (unknown lepidoptera), f) *M. micrantha* with chewing damage, and g) a scale insect on *M. scandens*.



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Common Acronyms:

CAPS—Cooperative Agricultural
Pest Survey

FDACS—FL Dept. of Agricul-
ture and Consumer Services

FWC—FL Fish & Wildlife Con-
servation Commission

NPS—U.S. National Park Service

UF—University of Florida

ECISMA Website:

[http://
www.evergladescisma.org](http://www.evergladescisma.org)

ECISMA—Partnership and Cooperation means good invasive species management

New Biological Control Candidates for Brazilian peppertree

-Jim Cuda, UF

During a recent survey trip to South America in March 2010, a new undescribed leaflet galling psyllid in the genus *Calophya* was collected on Brazilian peppertree in north-eastern Brazil (Salvador, Bahia). A formal description of the new psyllid *Calophya latiforceps* sp. nov. (Hemiptera: Calophyidae), along with molecular evidence confirming new species designation, was published in the September 2011 issue of the *Florida Entomologist*. A complex of leaflet galling psyllids (*Calophya terebinthifolii* Burckhardt & Bassett and the newly discovered *C. latiforceps*) may be good candidates for biological control of Brazilian peppertree. *Calophya terebinthifolii* collected from the Atlantic coastal region of Santa Catarina appears to be locally adapted to Brazilian peppertree haplotype A plants, whereas *C. latiforceps* is associated with haplotype B plants that occur in northeastern Brazil. Both of these Brazilian peppertree haplotypes and their hybrids occur in Florida.

Host Range Testing of Biological Control Agents of Brazilian Peppertree

-Veronica Manrique, Rodrigo Diaz, William A. Overholt, UF, and Gregory S. Wheeler, USDA-ARS IPRL

Recent surveys of natural enemies of Brazilian peppertree (*Schinus terebinthifolius* Raddi) in the area around Salvador City, Brazil resulted in the discovery of three new potential biological control agents: 1) a thrips, *Pseudophilothrips ichini* (Phlaeothripidae), 2) a defoliating caterpillar, *Paectes* sp. (Euteliidae), and 3) a pit-gall former, *Calophya* sp. (Calophyidae). Investigations at the UF/IFAS Biological Control Research and Containment Laboratory in Fort Pierce, FL suggest that *P. ichini* from Salvador has a narrower host range than a previously tested population of the same species collected from further south in Brazil.



Photo of adult Salvador thrips and larvae

The Salvador thrips completes development only on the target weed Brazilian peppertree and its close relative *Schinus molle*, which is not present in Florida. Additional host-range testing will be conducted in collaboration with Dr. Greg Wheeler at the USDA/ARS Invasive Plant Research Laboratory in Fort Lauderdale, FL in order to determine whether this thrips population is safe to release in Florida. The second candidate agent under investigation is an undescribed moth in the genus *Paectes*.

Host range testing of *Paectes* sp. has been completed on 14 plants in the family Anacardiaceae. Under no-choice conditions, high survival to adulthood was obtained on the target weed (50%) followed by *S. molle* (45 %), while low survival (<25%) was found on a few non-target species. However, multiple choice oviposition tests revealed that females preferred to lay eggs on Brazilian peppertree. The third promising agent, a new calophyid species recently described as *Calophya latiforceps* Burckhardt, was initially established in quarantine but the colony collapsed after one generation.

An additional species was recently discovered in Brazil from this same genus feeding on the weed. Because *Calophya* spp. are known to be highly specific, efforts will be made to recollect these agents in 2012 so that host range testing can be initiated.