Florida Exotic Pest Plant Council's 23rd Annual Symposium

April 21st - 24th, 2008 • Jacksonville, FL
Crowne Plaza on the Jacksonville Riverfront

FLORA NON GRATA

The Florida Exotic Pest Plant Council's annual symposium provides a forum for the exchange of scientific, educational, and technical information related to the management of invasive exotic plants in Florida's natural areas.

FLORIDA EXOTIC PEST PLANT COUNCIL
EPPC
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Symposium Schedule

Monday, April 21st

Florida EPPC Board of Directors & Task Force Meetings
10:00 AM – 5:00 PM, Amelia Room

Symposium Early Registration
3:00 PM – 6:00 PM, Lobby

Tuesday, April 22nd

Symposium Registration
7:30 AM – 3:00 PM, Lobby

Vendor Expo
8:00 AM – 5:00 PM, 6:00 PM – 8:00 PM, St. Johns Ballroom
Many companies in the invasive plant management industry will demonstrate their products and services.

Chair's Welcome Address
8:20 AM– 8:40 AM, Duval Ballroom
Florida EPPC Chair, Dr. Alison M. Fox

Keynote Address
8:40 – 9:20 AM, Duval Ballroom
The role of native and introduced plants in structuring forest and aquatic food webs.
Dr. Bernd Blossey, Associate Professor of Biology, Cornell University

Dr. Blossey is a leading researcher in invasion biology who has focused much of current research on quantifying impacts of invasive plants on native flora and fauna as well as biological control of non-indigenous plant species in natural areas.

Session I: Exotic Species in the Restoration Context
9:20 – 10:20 AM, Duval Ballroom
Session Moderator: LeRoy Rodgers, South Florida Water Management District

9:20 - 9:40 AM **The effect of climate change on the phenology and distribution of nonnative plants in Florida.** Betsy Von Holle

9:40 - 10:00 AM **Natural enemies thin melaleuca canopy and help increase plant diversity in melaleuca stands.** Min B. Rayamajhi, Paul D. Pratt, and Ted D. Center

10:00 - 10:20 AM **BeFlora and after: Conversion of landscapes.** Hillary Burgess, Jaime Roper, and Jonathan Taylor

10:20 – 10:40 AM **Morning Refreshment Break**

Tuesday, April 22nd continued

Session II: Tracking and Assessing the Risks of Invasions.
10:40 – 12:00 PM, Duval Ballroom
Session Moderator: Kristina Serbesoff-King, The Nature Conservancy

10:40 - 11:00 AM **Testing the potential impacts of implementing a weed risk assessment system on the horticultural industry.** Crysta A. Gantz and Doria R. Gordon

11:00 - 11:20 AM **IFAS assessment of the status of non-native plants in Florida's natural areas: Updates and new additions.** Alison Fox, Ken Langland, Doria R. Gordon, and Aimee Cooper

11:20 - 11:40 AM ***Luzeola subintegra* and *Azolla pinnata*: Two invasive aquatic species newly reported in Florida.** Mike Bodle

11:40 - 12:00 PM **The Florida Invasive Plants GeoDatabase and iMapInvasives: An on-line, GIS mapping tool for invasive species.** Gary Knight

Lunch 12:00 – 1:00 PM

Session III: Updates on Biological Controls
1:00 – 3:00 PM, Duval Ballroom
Session Moderator: Brian Nelson, South West Florida Water Management District

1:00 - 1:20 PM **Biology, host specificity and potential impacts of *Ischnodemus variegatus* (Hemiptera), an herbivore of West Indian marsh grass (*Hymenachne amplexicaulis*) in Florida.** Rodrigo Diaz, William A. Overholt, and James P. Cuda

1:20 - 1:40 PM **Effect of host-plant genotypes on the performance of *Pseudophilothrips ichini*, an approved biological control agent of Brazilian peppertree in Florida.** Veronica Manrique, James P. Cuda, and William A. Overholt

1:40 - 2:00 PM **A potential biological control agent for the invasive plant species, Old World climbing fern (*Lygodium microphyllum*).** Krish Jayachandran, Tainya C. Clarke, and Kateel G. Shetty

2:00 - 2:20 PM **Biological control of Brazilian pepper, Chinese tallow, Australian pine, and hydrilla: Updates from foreign explorations and preliminary host testing.** Gregory S. Wheeler, Mathew Purcell, and Ding Jialing

2:20 - 2:40 PM ***Apocnemidophorus pipitzi* (Coleoptera: Curculionidae), a new candidate for biological control of Brazilian peppertree, *Schinus terebinthifolius* (Anacardiaceae): Preliminary results of its biology and host range.** James P. Cuda, Judy L. Gillmore, and Bolivar Garcete-Barrett

2:40 – 3:00 PM **Afternoon Refreshment Break**

Tuesday, April 22nd

continued

Using Technology in the War on Weeds

3:00 PM – 5:00 PM, Kingsley Room
Led by Alison Higgins, The Nature Conservancy

Curious about the latest technological tools for invasive plant management and data collection? This workshop will introduce participants to cutting edge tools for invasive species assessments, management planning, and control evaluations.

Invasive Plant Identification

3:00 PM – 5:00 PM, Duval Ballroom
Led by Caitlin Elam & Pete Diamond, Florida Natural Areas Inventory

This workshop will instruct participants on field identification of many Florida invasive plant species using diagnostic characteristics. A variety of aquatic and upland invasive species will be featured as well as some native species that are often mistaken for exotic weeds.

Natural Area Weed Management Training Session

3:00 – 5:00 PM, Hecksher Room
Led by Ken Gioeli & Jeff Hutchinson, University of Florida/IFAS

This two-hour short course will prepare participants for the Natural Area Weed Management certification exam for restricted use pesticide applicators. The exam will also be administered on Thursday afternoon following the adjournment of the symposium.

Poster Session

6:00 – 7:00 PM, Ballroom Foyer

Evening Social Event

7:00 – 9:00 PM, Riverwalk Pool Deck

Wednesday, April 23rd

Vendor Expo

8:00 AM – 12:00 PM, St. Johns Ballroom

Session IV: Program Strategies for Invasive Plant Control

8:20 – 10:00 AM Duval Ballroom
Session Moderator: Jon Lane, U.S. Army Corps of Engineers

8:20 - 8:40 AM **Florida's invasive plant research: Historical perspectives and the present research program.** Don Schmitz

Symposium Schedule

Wednesday, April 23rd continued

8:40 - 9:00 AM **Status of *Lygodium microphyllum* in Everglades National Park.** Hillary Cooley and Jonathan Taylor

9:00 - 9:20 AM **Bugwood – Center for Invasive Species and Ecosystem Health.** Charles T. Bargeron, Carey Minteer, and G. Keith Douce

9:20 - 9:40 AM **Mission accomplished on "The Big O."** François Brave Laroche

9:40 - 10:00 AM **Implementing biological controls in the Comprehensive Everglades Restoration.** Shauna Ray Allen

10:00 – 10:20 AM **Morning Refreshment Break**

Session V: Strength in Numbers: Building Alliances in the War on Weeds

10:20 – 12:00 PM, Duval Ballroom
Session Moderator: Kathy O'Reilly-Doyle, U.S. Fish and Wildlife Service

10:20 - 10:40 AM **Partnering across the landscape: Cooperative weed management areas (CWMA's) in Florida.** Kristina Serbesoff-King

10:40 - 11:00 AM **The Adirondack Park Invasive Plant Program: Ten years of partnering.** Hilary Oles

11:00 - 11:20 AM **Update on the Everglades Cooperative Invasive Species Management Area (ECISMA).** Jon Lane

11:20 - 11:40 AM **The First Coast Invasive Working Group: A public/private partnership focused on prevention and early detection and rapid response efforts.** Trish Gramajo-St. John

11:40 - 12:00 PM **Of spores and sprays: An update on the Central Florida Lygodium Strategy.** Rosalind Rowe, Kristina Serbesoff-King, and Cheryl Millett

Field Trips

Julington Durbin Preserve

12:30 - 5:30 PM

This 2,031-acre natural area is located on a peninsula at the confluence of Julington & Durbin Creeks. The preserve features a variety of ecosystems including sandhills, mesic flatwoods, and floodplain swamps. Learn about multiple facets of ongoing implementation of the preserve's resource and recreation management program including recent control activities for Japanese climbing fern, Chinese tallow, and camphor.

Led by J.B. Miller, St. Johns River Water Management District
Transportation and lunch provided with paid registration

Wednesday, April 23rd

continued

Kingsley Plantation/ Ft. George Island

12:30 - 6:00 PM

This combined tour of a state and federal park begins at Kingsley Plantation, an 18th and 19th century cotton plantation, where various exotic plants are currently undergoing treatment. Learn about the plantation's historic resources and current nonnative plant management strategies in a cultural landscape. The tour includes a one-mile hike through an abandoned golf course to a restored 1920's resort, followed by a discussion of the Florida Park Service's treatment of exotic plants.

Led by Dan Clark and Tony Pernas, National Park Service
Transportation and lunch provided with paid registration

Jacksonville Arboretum

1:30 – 5:30 PM

Enjoy a plant hike through this 119-acre park featuring wetland and upland forests and a natural ravine, which takes you to the nation's champion loblolly bay! Attendees will be given pen & paper to help document any undiscovered invasive plants. The park will officially open this year and is in the initial stages of restoration. Restoration efforts have focused on debris removal, vegetation mapping, cogon grass and air potato control, and gopher tortoise relocation projects.

Led by Trish Gramajo, The Nature Conservancy
Lunch provided with paid registration, carpools suggested

Symposium Banquet

7:00 – 10:00 PM, Riverwalk Pool Deck

Thursday, April 24th

Session VI: Research Updates on Herbicidal Control

8:20 – 10:00 AM, Duval Ballroom
Session Moderator: Jim Burney, Aquatic Vegetation Control, Inc.

8:20 - 8:40 AM **An update on Clearcast experimental use permit trials.** Chris Key

8:40 - 9:00 AM **Response of shoebutton ardisia (*Ardisia elliptica*) to triclopyr (amine form) application.** Gwen Burzycki, Carlos Siso, Andrew Hyatt, and Helena Giannini

9:00 - 9:20 AM **A demonstration project on hydrilla and hygrophila in the Upper Kissimmee Chain of Lakes.** Tina Bond and Kimberly Lawrence

Symposium Schedule

Thursday, April 24th _____ continued

9:20 - 9:40 AM **Absorption and translocation of glyphosate, metsulfuron methyl, and triclopyr in Old World climbing fern (*Lygodium microphyllum*).** Jeff Hutchinson and Ken Langeland

9:40 - 10:00 AM **Selective control of cogongrass and natalgrass.** Steven G. Richardson

10:00 – 10:20 AM **Morning Refreshment Break**

FLEPPC Annual Business Meeting
10:20 – 11:00 AM, Duval Ballroom
Led by Alison Fox

Session VII: Updates on Biological Invasion Research
11:00 – 12:20 PM, Duval Ballroom
Session Moderator: Scott Ditmarsen, Dow AgroSciences

11:00 - 11:20 AM **Primrose willow (*Ludwigia peruviana*) management in restored forested wetlands.** Dr. Steven G. Richardson

11:20 - 11:40 AM **Does propagule pressure explain the abundance of invasive fig trees in south Florida?** Jessica H. Wheeler and Trevor T. Caughlin

11:40 - 12:00 PM **Characterization of microsatellite DNA diversities of hygrophila (*Hygrophila polysperma* (Roxb.) T. Anders) in Florida.** Abhishek Mukherjee, Matthew A. Gitzendanner, and James P. Cuda

12:00 -12:20 PM **Management implications of environmental constraints on establishment of the invasive exotic Old World climbing fern, *Lygodium microphyllum*.** Tom Philippi, Jennifer H. Richards, Paul Groff, and Jonathan Taylor

Symposium Adjourns
12:20 PM
Closing comments from incoming Chair, Dan Clark

Natural Area Weed Management Examination
1:30 PM – 3:00 PM, Duval Ballroom

Special thanks to our symposium sponsors!

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Symposium Information

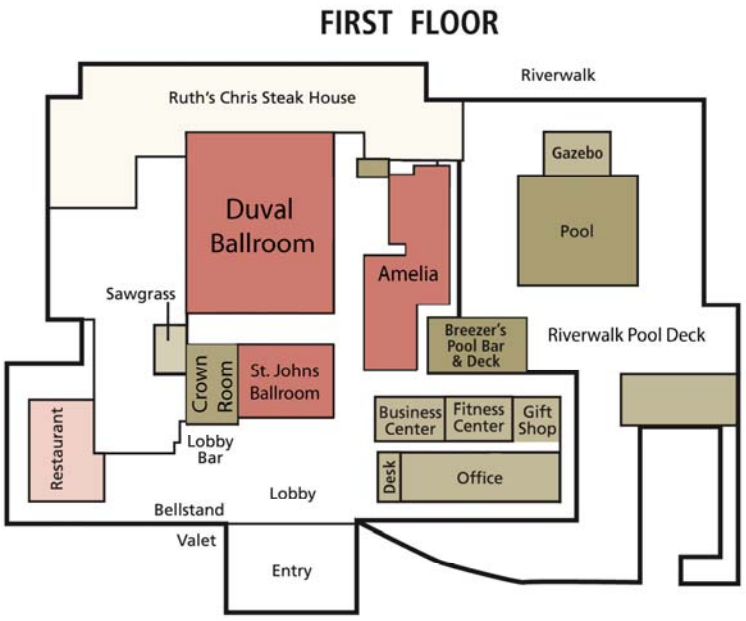
Hotel Information

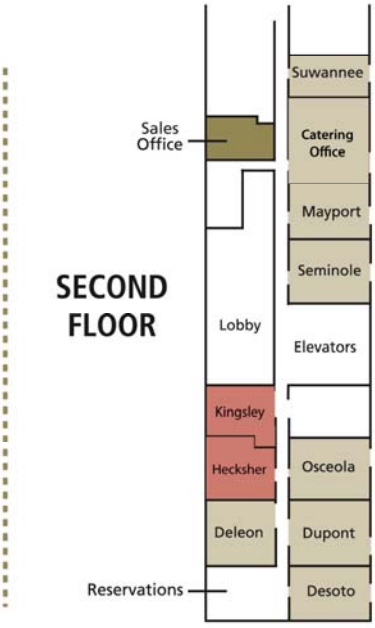
Crowne Plaza Hotel
Jacksonville-Riverfront
1201 Riverplace Blvd.
Jacksonville, FL 32207 United States
Hotel Front Desk: 1-904-398-8800
Hotel Fax: 1-904-398-9170

Driving Directions

Northbound on I-95: Take exit 350A for Main St/Prudential Drive followed by a slight right onto South Main Street. Proceed 2 blocks and turn right at Riverplace Blvd (just before the John Alsop Bridge). Hotel just ahead on left.

Southbound on I-95 (or if merging from east bound I-10): Take exit 350B toward San Marco Blvd. Turn left at San Marco Blvd. Proceed one block and turn right at Prudential Dr. Take the next left onto S Main St. Proceed 2 blocks and turn right at Riverplace Blvd (just before the John Alsop Bridge). Hotel just ahead on left.





Oral Presentations

Implementing biological controls in the Comprehensive Everglades Restoration.

Allen[1], Shauna R. and John Morgan[2]
[1]US Army Corps of Engineers, Jacksonville, FL, [2]South Florida Water Management District, West Palm Beach, FL

ABSTRACT: In 2000, the U.S. Congress authorized the Comprehensive Everglades Restoration Plan (CERP) to restore, preserve, and protect the South Florida ecosystem while providing for other water-related needs of the region. CERP consists of structural and operational modifications to existing flood control and water supply infrastructure aimed at improving the ecological functioning of over 2.4 million acres of the South Florida ecosystem, improve urban and agricultural water supply, improve deliveries to coastal estuaries, and improve regional water quality conditions, while maintaining the existing levels of flood protection. CERP included a feature to evaluate biological control of melaleuca and other exotic plants. This feature included the following elements: 1) construct a new biological control quarantine and research facility, 2) renovation and improvements to the current quarantine facility in Gainesville, and 3) implement biological controls (mass rearing, field release, establishment, and field monitoring) of approved biological control agents. This presentation will provide an overview of the proposed program, including elements of the planning and evaluation of project implementation success.

Bugwood—Center for Invasive Species and Ecosystem Health.

Bargeron[1], Charles T., Carey Minteer[1], G. Keith Douce[1], David J. Moorhead[1], Joe LaForest[1]
[1]The University of Georgia, Tifton, GA

ABSTRACT: The Bugwood Network is becoming the Center for Invasive Species & Ecosystem Health at the University of Georgia. The mission of the Center is to serve a lead role in development, consolidation and dissemination of information and programs focused on invasive species, forest health, natural resource and agricultural management through technology development, program implementation, training, applied research and public awareness at the state, regional, national and international levels. The goals of the Center are: 1) To become a preeminent national and international public service and outreach center for invasive species and ecosystem health, 2) To develop collaboration between UGA and state, university, federal and international partners in these areas, 3) To integrate and develop information and programs in these areas, 4) To produce web sites, publications, posters and presentations in these areas 5) To serve as a clearing house for information, applied research and training in these areas 6) To promote public awareness, education and applied research in these areas. This presentation will introduce the Center and provide information about Center projects including: EDDMapS, Invasive.org, and Invasive Plants of the United States DVD-ROM.

Luziola subintegra and _Azolla pinnata_: Two invasive aquatic species newly reported in Florida.

Bodle, Mike
South Florida Water Management District, West Palm Beach, FL

ABSTRACT: *Luziola subintegra* and *Azolla pinnata* are aquatic plants which were each found in Florida waters for the first time in 2007. *L. subintegra* has very few publications in botanical literature, has never before been found in North America and has never been assigned a common name. *Azolla pinnata* (feathered waterfern) has been found in North Carolina but never before in Florida. *A. pinnata* is also listed as a Federal Noxious Weed based upon invasive growth patterns seen upon introduction elsewhere. Both plants have exhibited very rapid reproductive capacities and challenges for management. Descriptions, introduction range, and management efforts to date will be presented for both plants along with preliminary consideration of their potentials for further spread.

A demonstration project on hydrilla and hygrophila in the Upper Kissimmee Chain of Lakes.

Bond[1], Tina and Kimberly Lawrence[1]
[1]University of Florida/IFAS, Osceola County Extension, Kissimmee, FL

ABSTRACT: Osceola County was awarded a $2,881 grant to discover new herbicides, develop new technology processes or practices, or a new combination or uses of technologies, processes or practices for the purpose of proving technologically feasible and cost-effective means to manage hydrilla, hygrophila and other exotic aquatic vegetation in Osceola County. Many drainage projects have altered the natural hydrology of the central and south Florida ecosystem. The entire system is controlled by water control structures that have imposed significant hardships on natural ecosystems. Due to the ideal climate for plant species growth, many exotics have become dominant in the ecosystem in a relatively short period of time. The specific objectives of the project are to 1) evaluate the effectiveness of experimental use permit herbicides and biological controls for hydrilla and hygrophila; 2) to evaluate new technology processes or practices, or a new combination or uses of technologies, processes or practices for the control of hydrilla and hygrophila using small-scale field work; 3) to implement and monitor successful practices and processes identified in objectives 1 and 2 using large-scale field demonstrations; and 4) to demonstrate the project efforts in alternative technologies to manage hydrilla and hygrophila and disseminate information to the public. The grant will be used to conduct and promote the coordination and acceleration of studies that address the causes, effects, extent, prevention, and reduction of water pollution. This study will provide information on using emerging methods of aquatic weed control to promote increases in oxygen levels and restore the natural lake vegetation.

BeFlora and after: Conversion of landscapes.

Burgess[1], Hillary, Jaime Roper[1], and Jonathan Taylor[1]
[1]Everglades National Park, Homestead, FL

ABSTRACT: Chekika, once a county park but obtained by Everglades National Park in 1991, has been the site of a hammock restoration since Hurricane Andrew in 1992. Following the hurricane, destruction of tree canopy within Chekika permitted exotic St. Augustine grass (*Stenotaphrum secundatum* (Walter) Kuntze) to colonize the hammock from surrounding

recreational lawn. The grass was then mowed, which effectively extended the lawn into the understory of the hammock. Beginning in 1995, hammock restoration efforts involved planting native hammock trees in an attempt to establish an overstory; however, the continuation of mowing the understory St. Augustine grass damaged tree saplings and prevented a native understory from emerging. In late 2006 mowing ceased in exchange for a program to eradicate the St. Augustine grass and other exotics from Chekika. This is a story of how the removal of lawn provides opportunities to restore areas to native habitat or to landscape with natives. At present, the hammock overstory is successfully establishing, and understory species are recruiting naturally. Removing lawn is consistent with policies of the National Park Service and partner organizations such as the Native Plant Society and Florida Exotic Pest Plant Council that advocate xeriscaping, the reduction of greenhouse gas emissions and water use, removal of exotic species and the planting of natives. In turn, reduced mowing has become one of many important alternatives in landscaping and maintenance methods.

Status of *Lygodium microphyllum* in Everglades National Park.

Cooley[1], Hillary and Jonathan Taylor[1]
[1]Everglades National Park, Homestead, FL

ABSTRACT: *Lygodium microphyllum* (Old World climbing fern) was first found in Everglades National Park in 1999/2000 in the coastal marsh communities from Cape Sable to Everglades City. Since 1999, there have been efforts by both the exotic vegetation management program and the fire management program to treat *L. microphyllum* in the coastal marsh area of Everglades National Park. The treatment efforts focused on aerial spraying of the infested areas, followed by prescribed burning. Between 2004 and 2006, small populations of *L. microphyllum* were found growing in the understory of areas of outside of the coastal marsh area including; tree Islands in Shark River Slough, Mahogany Hammock, the pond apple heads off of Tamiami Trail and in the East Everglades Acquisition area in melaleuca heads. In the fall of 2007, *L. microphyllum* was found growing in the canopy of a hammock in Rookery Branch in Everglades National Park; this is the first known occurrence of *L. microphyllum* in the canopy of a hammock within Everglades National Park. In January of 2008, *L. microphyllum* was seen growing in the canopy of pond apple heads off of Tamiami Trail. These most recent findings of *L. microphyllum* in the canopy of hammocks within Everglades National Park represent a change in the habitat area and growth structure of *L. microphyllum* within the park. Despite aggressive treatment efforts, changes in treatment strategies are still needed in order to manage the increased locations, additional community types and change in growth habit of *L. microphyllum* populations within the park.

***Apocnemidophorus pipitzi* (Coleoptera: Curculionidae), a new candidate for biological control of Brazilian peppertree, *Schinus terebinthifolius* (Anacardiaceae): Preliminary results of its biology and host range.**

Cuda[1], J. P., J. L. Gillmore[1], B. Garcete-Barrett[2], J. C. Medal[1], and W. A. Overholt[3]
[1]University of Florida, Gainesville, FL, [2]Museo Nacional de Historia Natural del Paraguay, San Lorenzo, Paraguay, [3]University of Florida/IFAS Biological Control Research & Containment Lab, Fort Pierce, FL

ABSTRACT: Brazilian peppertree, *Schinus terebinthifolius* Raddi, was introduced into Florida, from South America as an ornamental in the 1840s. It eventually escaped cultivation and has become an aggressive invader of disturbed and natural areas in peninsular Florida. Brazilian peppertree is a serious threat to the state's biodiversity, especially over large areas

of the Everglades where it is displacing native vegetation. In the 1980s, this invasive weed was targeted for classical biological control because of the extent of the infestation and the absence of native congeners in the continental USA. In May 2007, a thrips [*Pseudophilothrips ichini* (Hood)] from Brazil was recommended for field release by the Technical Advisory Group for Biological Control Agents of Weeds (TAG) and is currently undergoing an Environmental Assessment by the USDA Animal and Plant Health Inspection Service. Recent surveys in northern Argentina and southeastern Paraguay revealed the presence of additional natural enemies of Brazilian peppertree. One of these, a weevil identified as *Apocnemidophorus pipitzi* (Faust), was collected from the plant at several locations. Adults resemble bird droppings and feed mainly on the upper surface of subterminal leaflets, where they produce a characteristic notching pattern. In March 2006, *A. pipitzi* adults were transported under permit from Paraguay to the Florida Biological Control Laboratory located at the Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL. The insects were caged on potted Brazilian peppertree plants in the maximum security room to determine where larval development occurs. Once we discovered that the larvae were stem borers, a laboratory colony of the weevil was established to conduct biological and host range studies. Several generations of *A. pipitzi* have been produced by caging the adults on cut branches of Brazilian peppertree supplemented with leaf bouquets. Females deposit eggs in the cut branches and larvae feed under the bark where they damage the vascular cambium. A new generation of the weevil is produced in ~3 months. Preliminary results of host range tests suggest that *A. pipitzi* probably is a Brazilian peppertree specialist. In addition, the stem boring habit of the larvae should protect this insect from most biotic and abiotic mortality factors likely to be encountered if it is sufficiently host specific to release in Florida.

Biology, host specificity and potential impacts of *Ischnodemus variegatus* (Hemiptera), an herbivore of West Indian marsh grass (*Hymenachne amplexicaulis*) in Florida.

Diaz[1], Rodrigo, William A. Overholt[1], James P. Cuda[2], Paul D. Pratt[3], and Alison Fox[2]
[1] University of Florida/IFAS Biological Control Research & Containment Lab, Fort Pierce, FL, [2]University of Florida, Gainesville, FL, [3]USDA/ARS Invasive Plant Research Lab, Ft Lauderdale, FL

ABSTRACT: West Indian Marsh Grass, *Hymenachne amplexicaulis* (Rudge) Nees, is currently invading the watersheds of central and south Florida. This grass is native to South America and the West Indies and has spread to most countries of the neo-tropics. An adventive insect was found in 2003 causing severe damage to *H. amplexicaulis* in Florida. This insect was identified as *Ischnodemus variegatus* (Hemiptera) and it is considered native to South America. Little information is known about *I. variegatus* biology, ecology and its potential to control *H. amplexicaulis* in Florida. Therefore, the biology, host range and its potential to control *H. amplexicaulis* were evaluated under laboratory and greenhouse conditions. The lower thresholds to complete development (egg to adult) estimated with the linear and nonlinear model were 14.6 and 17.4°C, respectively. The total degree-days required to complete development estimated by the linear model was 588. Host range tests included taxonomically related species, grasses grown as food crops, turf grasses used in Florida, and grasses with ecological similarities to the target plant. We tested 57 plants under no-choice conditions for development and five plants for oviposition. Complete development was obtained on *H. amplexicaulis* (23.4% survivorship), *Panicum repens* (0.4%), *Panicum anceps* (2.2%) and *Thalia geniculata* (0.3%). Oviposition choice tests demonstrated that *I. variegatus* females can lay eggs on several non-target grasses. A factorial experiment with different levels of nutrients, water levels and *I. variegatus* density was performed under greenhouse conditions. No interaction was detected between water level and insect density

for all variables analyzed. High infestations (10 insects/plant) of *I. variegatus* were capable of reducing the growth rate, chlorophyll levels and biomass of *H. amplexicaulis* seedlings. Early damage to *H. amplexicaulis* seedlings is characterized by brown rounded necrotic spots on the leaf. If the infestation continues, the plant turns brown and dies. The major damage occurs by withdrawal of phloem fluids and stoppage of vascular tissues by sheath material left by mouth parts. Field sampling of infestations conducted in the Myakka River State Park showed that *I. variegatus* increased from May to October reaching up to 30 insects/stem. Despite the high densities of *I. variegatus*, only a small decrease of chlorophyll content and panicle length was detected in full grown *H. amplexicaulis* stands.

IFAS assessment of the status of nonnative plants in Florida's natural areas: Updates and new additions.

Fox, Alison[1], Ken Langland[1], and Doria R. Gordon[2], Aimee Cooper[1]
[1]University of Florida, Gainesville, FL, [2]The Nature Conservancy, Gainesville, FL

ABSTRACT: Since the last FLEPPC meeting, 87 more species were assessed using the IFAS Assessment of the Status of Non-Native Plants in Florida's Natural Areas, for a total of 651 assessed plus 42 prohibited species. Additionally, 46 species were reassessed. Of the assessed species: 50 received an "Invasive - do not recommend" conclusion in at least one zone; 94 received, for their most precautionary zone(s), a conclusion of "Caution – can be recommend but manage to prevent escape"; 62 species can be recommended even though they are naturalized in natural areas undisturbed by human activities; 60 are not found in undisturbed natural areas but should be evaluated using a predictive tool; and 385 species are not found in undisturbed natural areas and can be recommended. Two new additions were incorporated into the IFAS Assessment: the Australian Weed Risk Assessment system (WRA) modified for Florida for those species requiring a predictive tool, and an Infraspecific Taxon Protocol (ITP). Field observations of nonnative plants in natural areas have always been made at the "resident species" (a.k.a. wildtype, full species, type species, named species or parent species) level so infraspecific taxon (e.g. cultivars, sub-species, or varieties) cannot be run through the IFAS assessment in the same way that the resident species can. However, in some cases an infraspecific taxon clearly lacks the characteristics that contributed to the invasiveness of the resident species and so should be eligible for conclusions that are less restrictive (or vice-versa). The ITP allows for independent assessment of those taxa.

Testing the potential impacts of implementing a weed risk assessment system on the horticultural industry.

Gantz[1], Crysta A. and Doria R. Gordon[2]
[1]University of Florida, Botany Department, Gainesville, FL, [2]The Nature Conservancy, Gainesville, FL

ABSTRACT: Our retroactive test of the effectiveness of the Australian Weed Risk Assessment (WRA) in Florida led to the conclusion that the WRA is as accurate for Florida as it is in most other geographies. Averaging across all tests demonstrated that the WRA correctly identified major invaders 90%, and non-invaders 70%, of the time. Using a secondary screening tool on species still requiring further evaluation resulted in an average of 10% of the species remaining with that outcome. Regulatory implementation of this approach, however, requires improved understanding of the potential impact on the horticulture industry. With assistance from the horticultural industry, botanic gardens, and other importing entities,

we identified 100 species from various life forms, families, and countries of origin that have been introduced to the United States since 1995. These species are unlikely to have developed any invasiveness over their relatively brief time in the U.S. Data used to address the 49 WRA questions came from occurrences outside of the continental United States. Results indicate that over 70% of these species would be accepted for import, 20% would require further evaluation, and fewer than 10% would be rejected as likely to become invasive in the U.S.

The First Coast Invasive Working Group: A public/private partnership focused on prevention and early detection and rapid response efforts.

Gramajo-St. John, Trish
The Nature Conservancy, Jacksonville, FL

ABSTRACT: The First Coast Invasive Working Group (FCIWG) formed in 2006 to work across federal, state, local, and private lands for invasive species management. The FCIWG focus area encompasses the five-county area of Baker, Clay, Duval, Nassau and St. Johns counties in northeastern Florida. Priority conservation lands entail managed areas in St. Marys, Nassau, and Lower St. Johns River watersheds, and the north Florida coastal areas from the mouth of the St. Marys headwaters and Sea Islands to the Anastasia area. This five-county area allows the FCIWG to manage at a scale large enough for viable early detection and rapid response control efforts while remaining manageable. Communication efforts have been implemented to work with adjacent working groups such as the Central Florida Lygodium Task Force and the Southeast Georgia Coastal Exotics partners. Interagency cooperation of the FCIWG allows the partners to: 1) leverage limited resources; 2) provide an early detection and rapid response regional network; 3) secure and coordinate funding and present a united front to state and federal legislators; 4) implement a coordinated approach to improve the effectiveness of management; and 5) build highly visible and joint community awareness for prevention efforts. This presentation will discuss FCIWG efforts in the areas of inventory/mapping, prevention, and outreach efforts.

Absorption and translocation of glyphosate, metsulfuron methyl, and triclopyr in Old World climbing fern (*Lygodium microphyllum*).

Hutchinson[1], Jeff and Ken Langeland[1]
[1]Univesity of Florida, Center for Aquatic and Invasive Plants, Gainesville, FL

ABSTRACT: We evaluated absorption and translocation of glyphosate, metsulfuron methyl, and triclopyr in Old World climbing fern (*Lygodium microphyllum*) for five treatment methods (cut and spray, basal spray, 25% foliar coverage, 50% foliar coverage, and 100% foliar coverage) using 14C labeled herbicide. For all herbicides and treatment methods, autoradiographs and liquid scintillation indicated that most of the 14C remained in the treated leaflets or rachis of Old World climbing fern. We observed limited basipetal movement of all three herbicides to the rhizomes of Old World climbing fern, but there was no horizontal movement within the rhizomes. For all herbicides and treatments, there were no significant differences ($P < 0.05$) for total mean radioactivity absorbed and translocated to the top, bottom, and rhizomes of Old World climbing fern.

A potential biological control agent for invasive plant species, Old World climbing fern (*Lygodium microphyllum*).

Jayachandran[1], Krish, Tainya C.Clarke[1], and Kateel G. Shetty[1]
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ABSTRACT: One of the greatest threats to the native ecosystems in any part of the world is invasion and permanent colonization by non-native species. Florida is no exception to this biological invasion, and currently colonized by an extensive variety of exotic plant species. The unrestricted growth of many of these nonnative plants jeopardizes the survival of an array of native plants in Florida. Originally imported from Asia over 30 years ago, Old World climbing fern (*Lygodium microphyllum*) has become one of the most invasive and destructive weeds in southern Florida. To date different effective control measures of its growth and spread has not been successful. Fire and herbicide application is currently in practice, however they are not a cost-effective or environmentally-friendly approach. In light of the highly delicate ecosystem affected by *L. microphyllum*, we explore that a biological paradigm is a more ecologically-sound approach to the containment of this noxious weed. We have identified a sicklepod fungus, *Myrothecium verrucaria*, as a possible bioherbicide against *L. microphyllum*. A series of greenhouse studies demonstrated that *M. verrucaria* can be used as a potential biocontrol agent against *L. microphyllum*. This type of biocontrol method can be incorporated as a valuable tool in the over all management strategy to restore native ecosystems in a cost effective and environmentally friendly manner.

An update on Clearcast (imazamox) experimental use permit trials.

Key, Chris
BASF Corporation, Wesley Chapel, FL

ABSTRACT: Clearcast is the newest aquatic herbicide to be registered for an Experimental Use Permit (EUP). Clearcast's active ingredient is imazamox, which was first approved in 1997. It is currently used in over 15 different crop markets throughout the world and is the only aquatic herbicide to receive an exemption from tolerance designation from the US EPA, resulting in the waiving of food residue tolerance requirements for all potential food or feed uses of imazamox, including irrigated crops. This presentation will provide an overview of efficacy results to date on three invasive plant species problematic in Florida and the Southeastern US-- Chinese tallow (*Sapium sebiferum*), Brazilian pepper (*Schinus terebinthifolius*), and Camphor tree (*Cinnamomum camphora*). Control efficacy data will be presented for aerial treatments of Chinese tallow (64oz/ac @ 20 gpa) and foliar treatments of Brazilian pepper and camphor tree (2% or 2.56 oz/gal).

The Florida Invasive Plants GeoDatabase and iMapInvasives: An on-line, GIS mapping tool for invasive species.

Knight, Gary
Florida Natural Areas Inventory, Tallahassee, FL

ABSTRACT: An essential component of protecting Florida's unique biodiversity is bringing under control the invasive non-native species that displace native plants and animals, change the structure of natural communities, or affect adversely the ecological functions of our ecosystems. The Florida Natural Areas Inventory (FNAI) is working on multiple fronts to develop partnerships and tools to collect, manage, and share information on invasive species.

FNAI is contributing to the control effort with the establishment of a methodology for an ongoing statewide mapping of these invaders. The overall scope of this project is to provide a geo-referenced inventory and tracking tool for occurrences of invasive exotic plants on Florida's public conservation lands. Tasks include development of a statewide easy-to-apply system, data collection to populate the system, analysis of results as the system builds, and collaboration with natural resource managers statewide in adding and updating data. In addition, the project team may focus as requested on special management issues such as the spread of the highly invasive exotic climbing ferns. The project is funded by the Bureau of Invasive Plant Management, Florida Department of Environmental Protection. As of January 2008, the GeoDatabase had approximately 20,000 records. On another related front, FNAI is a charter member of a consortium created to develop an on-line, GIS-based, all-taxa invasive species mapping tool to be called iMapInvasives which will focus on serving the needs of invasive species managers. A particular emphasis will be placed on applications designed to aid in Early Detection/Rapid Response efforts. The initial consortium is comprised of five partners: the natural heritage program of the state of Florida (Florida Natural Areas Inventory (FNAI), the New York Natural Heritage Program (NYNHP), The Nature Conservancy in Oregon, and the Global Invasive Species Team of The Nature Conservancy (TNC-GIST), and NatureServe. This presentation will review the status of the Florida Invasive Plants GeoDatabase and the iMapInvasives project.

Update on the Everglades Cooperative Invasive Species Management Area (ECISMA).

Lane, Jon
US Army Corps of Engineers, Jacksonville, FL

ABSTRACT: Florida has a long history of invasive species organization cooperation such as the Florida Exotic Pest Plant Council, Noxious Exotic Weed Task Team, Florida Invasive Animal Task Team and Invasive Species Working Group. Everglades restoration poses new challenges for invasive species management and has created a need for a more defined commitment to cooperation among agencies and organizations. In 2006, invasive species biologists representing numerous federal, state, and local governments, Indian tribes, and non-profit organizations convened an invasive species summit to formally organize an Everglades cooperative invasive species management area (ECISMA). The primary goal of this cooperative effort is to integrate coordination, control and management of invasive species at regional, multi-jurisdictional levels. Pulling together to achieve common goals while preserving individual agency missions represents significant challenges. Early efforts for the ECISMA focused on formalizing and organizing the group, defining common goals, and completing initial cooperative projects. This presentation will update the status of the ECISMA. It will delve into the formation, current structure and organization, annual plan and accomplishments to date.

Mission accomplished on "The Big O."

Laroche, François Brave
South Florida Water Management District, West Palm Beach, FL

ABSTRACT: *Melaleuca quinquenervia*, a species native to Australia, was originally introduced and planted on the lakeward side of Lake Okeechobee's Herbert Hoover Dike in the 1930s. These plantings were expected to protect the levee from erosion due to storm-generated wave action. Given the species' prolific seed production, lack of natural competition

and predators, and adaptation to fire and flood, melaleuca eventually colonized over 1/3 of the 100,000-acre marsh. By the early 1990s, large, mature monocultures dominated the southwest portion of the lake. The South Florida Water Management District, in cooperation with the Florida Department of Environmental Protection and the U.S. Army Corps of Engineers initiated a coordinated melaleuca management project in 1993. This program used an integrated approach, combining ground and aerial herbicide applications, mechanical harvesting prescribed fire and biological controls. Over a 15-year period, melaleuca was successfully brought under maintenance control. All mature melaleuca has been controlled in the lake and biological control agents now suppress young melaleuca seedling and post-treatment regrowth. The operational and experimental work conducted on the lake demonstrates that this weed species can be effectively controlled on a large scale by an integrated management approach. However, achieving this level of success was not inexpensive. Approximately $10 million was expended on this project over 15 years. Interagency coordination, coordinated operational planning and a dedicated funding source were key to the success of this program. The intent of this presentation is to provide an assessment of the Lake Okeechobee melaleuca control project as an example of successful integrated weed management.

Effect of host-plant genotypes on the performance of *Pseudophilothrips ichini*, an approved biological control agent of Brazilian peppertree in Florida.

Manrique[1], Veronica, James P. Cuda, William A. Overholt[1], Dean Williams[3], and Greg Wheeler[4]

[1]University of Florida/IFAS Biological Control Research & Containment Lab, Fort Pierce, FL, [2]University of Florida, Gainesville, FL, [3]Texas Christian University, Fort Worth, TX, [4]USDA/ARS Invasive Plant Research Lab, Ft. Lauderdale, FL

ABSTRACT: Brazilian peppertree, *Schinus terebinthifolius* Raddi (Anacardiaceae). is native to South America, and is one of the most invasive weeds in Florida. Genetic studies have recognized two Brazilian peppertree haplotypes (A and B) in Florida, and extensive hybridization has occurred between these two genotypes. In addition, genetic studies in the native range have identified nine cpDNA haplotypes (A, C–J), and haplotype D is the most common and widespread. The thrips *Pseudophilothrips ichini* Hood (Thysanoptera: Phlaeothripidae), a potential biocontrol agent of Brazilian peppertree, was recommended for release in Florida by the TAG in May 2007. Both larval and adult stages damage the host plant by feeding on the growing shoot tips and flowers causing flower abortion. Genetically distinct populations of *P. ichini* have been found feeding on different plant genotypes in the native range. Therefore, the objective of this study was to compare the performance of two populations of *P. ichini* on all Florida Brazilian peppertree genotypes, two Brazilian genotypes and a congener *Schinus molle* L. The two thrips populations were collected on Brazil A near Vicosa, and on Brazil D and C near Curitiba, Brazil. Survival to adult and time of development were recorded for each host plant, and 6-8 replicates per treatment were used for each thrips population. In a separate experiment, adult longevity was measured for each plant genotype including a treatment with no food. A third experiment was conducted to evaluate the host-plant preference of each population of P. ichini. Six newly emerged adult females were placed inside a Petri dish (15 cm diameter) containing six leaflet disks (2 cm diameter) of the different host plants: Florida A, Florida B, Florida hybrid A, Brazil A, Brazil D, and *S. molle*. In total 40 Petri dishes were used for each thrips population, and observations were conducted every half hour for a total of four hours. Results showed that the two populations of *P. ichini* differed significantly in their ability to utilize different genotypes of their host-plant. While poor survival

to adult (0-4%) on Florida genotypes was obtained of thrips collected from Brazil D and C, higher survival (40-50%) was recorded of thrips collected on Brazil A. The ecological significance of the results is discussed in the context of plant genotypes and possible local adaptation of their natural enemies.

Characterization of microsatellite DNA diversities of hygrophila (Hygrophila polysperma (Roxb.) T. Anders) in Florida.

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ABSTRACT: Hygrophila [*Hygrophila polysperma* (Roxb.) T. Anders, Family: Acanthaceae] is a federally-listed, invasive aquatic plant in Florida that is spreading to other warm water areas of the United States and Mexico. This plant is a threat to all Florida waterways due to its wide range of water temperature tolerances and the tendency for seeds or viable fragments to be transported unintentionally to new locations. Recent experiences in south Florida indicate that practical solutions for long-term control of this plant are not currently available. Alternative methods are needed to address the hygrophila problem in order to prevent its rapid regrowth and spread. It has been suggested that genetic change and adaptive response play important roles in the establishment of invasive species. Thus descriptive studies of patterns of genetic diversity in weed populations can be extremely important as they often provide essential information for further research. Knowledge of genetic polymorphisms present in Florida hygrophila populations will aid in management and will assist in searches for biocontrol agents. Microsatellites are tandemly repeated simple sequences. The length of microsatellite varies between 1 – 10 base pair, such as (TG)n or (AAT)n. Owing to their ubiquitous presence in the eukaryotic genome and highly polymorphic nature, they are now frequently used to study population-level genetic variation. In this project, we used microsatellites to study the genetic variation of hygrophila in Florida. Hygrophila samples were collected form ten locations in Florida and preserved in silica gel. The DNA was extracted using a standard procedure. A microsatellite capture protocol was used to develop the microsatellite primers. Initially, twelve primers were developed and after screening their performances, six primers were selected. Our preliminary findings demonstrated that hygrophila propagates mostly clonally. Considering this fact, we expect our current research to show that hygrophila exhibits little genetic variation in Florida. The lack of genetic variation will make it easier to find biological control agents that can operate across the population.

The Adirondack Park Invasive Plant Program: Ten years of partnering.

Oles, Hilary
The Nature Conservancy, Keene Valley, NY

ABSTRACT: The Adirondack Park Invasive Plant Program (APIPP) is a regional partnership program in upstate New York initiated in 1998, which focuses on invasive plant prevention, early detection, rapid response, management, and education. A coalition of more than 30 cooperating organizations, APIPP aims to protect the Adirondacks from the negative impacts of non-native invasive plants. The APIPP utilizes the strengths of each partner organization, coordinates hundreds of volunteers, and approaches the daunting challenge of invasive species in a comprehensive, systematic, and cooperative manner that produces real on-the-

ground results. This presentation will discuss program goals, strategies, and activities and highlight ways in which partnerships and regional planning are essential to effective program implementation. Highlights of APIPP's successes include developing a training program for invasive plant identification; instituting a regional volunteer invasive plant monitoring and mapping program to gather data about invasive plant distribution; creating educational materials to distribute to partner staff, volunteers, and residents; designing a website to share and distribute information about invasive plants; developing training programs for regional staff of partner agencies to encourage prevention and detection during routine activities; preparing vegetation management plans for utilities, transportation rights-or-way, campgrounds, and other public day uses areas; and connecting and coordinating groups across the Park who are concerned about invasive plants.

Management implications of environmental constraints on establishment of the invasive exotic Old World climbing fern, *Lygodium microphyllum*.

Philippi[1], Tom, Jennifer H. Richards[1], Paul Groff[1], and Jonathan Taylor[2]
[1]Florida International University, Miami, FL, [2]Everglades National Park, Homestead, FL

ABSTRACT: Old World climbing fern (*Lygodium microphyllum*) is a major invasive exotic in southern Florida. Because its spores are aerially dispersed over kilometers, and a single spore can produce a new infestation, this species has immense potential to colonize new habitats throughout the Everglades. Therefore, control may require continuous detection of incipient Old World climbing fern populations and targeted releases of natural enemies, and direct control such as herbicide and burning. The life cycle of Old World climbing fern includes spores that disperse and germinate to produce haploid gametophytes, which produce eggs and sperm that must unite to regenerate the diploid sporophyte (large plant). These additional steps are potential filters; unsuitable environmental conditions at any step prevent establishment of new diploid plants. Quantifying the environmental requirements for each step can help target management efforts to spores and sites most likely to produce establishment. *Spore Dispersal Phenology*: From May 2005 through March 2007 we deployed samplers to quantify spore influx at the A.R.M. Loxahatchee National Wildlife Refuge (LNWR) and Everglades National Park (ENP). At LNWR sites, May-August 2005 influx rates ranged from 45 to 509 spores m^{-2} day^{-1} but declined to 19 to 50 m^{-2} day^{-1} after October, which may reflect seasonal phenology or pre- v. post-hurricane conditions. Influx rates at ENP sites ranged from 0.4 to 6 m^{-2} day^{-1}. Lygodium spore influx varies greatly with distance from major infestations, and seasonally or episodically, but even isolated sites in Shark Slough of ENP receive low background rates of spore rain. *Gametophyte Environmental Requirements*: Spores germinated rapidly to produce gametophytes under all conditions. However, in growth chamber experiments, production of eggs and sperm and thus diploid sporophytes by the haploid gametophytes was delayed and inhibited by higher temperatures (30°C/25°C v. 25°C /20°C) and longer photoperiods (13:11 v. 11:13 hr light:dark). *Flooding Survival of Juvenile Sporophytes*: Sporophytes from 1-17 cm tall survived one week of inundation. Mortality increased with longer flooding durations. At any duration, larger sporophytes were more likely to survive. *Management Implications*: 1: Sporophyte production can be restricted by ambient conditions in south Florida. These ecological parameters combined with weather records and EDEN water depths may predict the most likely sites for new infestations. 2: Even if fires disperse spores, spores dispersed by April-August burns are unlikely to produce sporophytes because the warmer summer temperatures and longer days inhibit gamete production. 3: Low numbers of spores arrive everywhere; quarantine measures such as boot and vehicle sterilization are not necessary.

Natural enemies thin melaleuca-canopy and help increase plant diversity in the melaleuca stands.

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ABSTRACT: The Australian tree *Melaleuca quinquenervia* (Cav.) S.T. Blake (melaleuca) formed dense monocultural forests several decades after invading Florida and the Caribbean islands. These dominant forests have displaced native vegetation in sensitive wetland systems. We assumed that native plant diversity would increase following reductions in density of mature melaleuca stands in south Florida. We therefore examined data on changes in melaleuca densities, evidence of tree-canopy damage through biomass and litterfall analyses and plant species diversity derived from permanent plots that were monitored from 1997 to 2005. These plots were located within mature melaleuca stands in non-flooded and seasonally-flooded habitats. Two host-specific biological control agents of melaleuca, *Oxyops vitiosa* Pascoe and *Boreioglycaspis melaleucae* (Moore), were introduced during 1997 and 2002, respectively. Also, an adventive rust fungus *Puccinia psidii* G. Wint and lac-scale insect *Paratachardina pseudolobata* Kondo & Gullan became abundant during the latter part of the study period. Aboveground biomass analyses showed reduced leaf (2.5-fold) and seed (7-fold) biomass from 1996 to 2003. Leaf-litter analyses for 1997 to 2005 period showed positive correlation between the melaleuca leaf damage in the canopy and species richness in the stand. Overall melaleuca density decline coincided with 2- to 4-fold increases in plant species diversity in the forest stand. The greatest declines in melaleuca density as well as the greatest increases in species diversity occurred in non-flooded as compared to seasonally-flooded habitats. The rapid increase in canopy-damage and reduction in melaleuca density during our 8-year study period may be attributed to the impact of natural enemies. Densities of other woody plants, particularly *Myrica* and *Myrsine*, which were sparsely represented in the understory also declined during the same period possibly due to infestation by the generalist lac-scale insect. These findings showed natural-enemy mediated reduction of melaleuca dominance which positively influenced plant diversity and facilitated the rehabilitation of degraded habitats.

Primrose willow (*Ludwigia peruviana*) management in restored forested wetlands.

Richardson, Steven G.
Florida Institute of Phosphate Research, Bartow, FL

ABSTRACT: Primrose willow (*Ludwigia peruviana*) has been considered a “nuisance” species in Florida DEP regulations and recently has been added to the FLEPPC’s list of Category I invasive plant species. Long term research was conducted to examine the competitive effects of primrose willow on wetland tree growth and the effects of the developing tree canopy on primrose willow. We have found that baldcypress, popash, red maple, and water hickory are only mildly affected by competition from primrose willow, and these trees will grow through and overtop the primrose willow in a few years. The tree canopy eventually (about seven years after tree planting in our studies) shaded-out the primrose willow. We observed that the chemical and mechanical methods commonly used to control primrose willow had detrimental effects on desirable understory species and may also injure the trees. The early canopy closure of the primrose willow combined with the planted trees was beneficial to the development of shade tolerant understory plants. Removal of primrose willow opened the sites to invasion by various sun-requiring weeds. The primrose willow appeared to help keep various vines off the young trees. Our findings indicate that forested

wetlands can be successfully established without the expense of controlling primrose willow, because the tree canopy will eventually control it.

Selective control of cogongrass (*Imperata cylindrica*) and natalgrass (*Rhynchelytrum repens*).

Richardson, Steven G.
Florida Institute of Phosphate Research, Bartow, FL

ABSTRACT: Cogongrass (*Imperata cylindrica*) and natalgrass (*Rhynchelytrum repens* or *Melinis repens*) can be controlled with high rates of imazapyr or glyphosate, but what if there is desirable native groundcover worth saving? We have found that at lower rates of imazapyr (e.g., 0.188 to 0.375 lb a.i./acre) several native species have greater tolerance than does cogongrass, thus making selective control possible. In one field experiment, cogongrass cover was reduced by 97% eight months after treatment with 0.250 lb a.i./acre and by 86% with 0.188 lb a.i./acre. Several native species exhibited minor injury and/or good recovery, including wiregrass (*Aristida beyrichiana*), golden aster (*Pityopsis graminifolia*), swamp sunflower (*Helianthus angustifolia*), and milk pea (*Galactia elliotii*). Timing of application is another factor in obtaining selective control. Maidencane (*Panicum hemitomon*) treated with imazapyr at up to 0.5 lb a.i./acre during the dormant winter season regrew in the spring with no apparent injury while cogongrass was well controlled. Glyphosate can also be sprayed over maidencane in the dormant season. Fluazifop butyl is not as effective as imazapyr or glyphosate for cogongrass control, but it is safer for use around many broadleaved species. We have used fluazifop at 0.375 lb a.i./acre for selective control of cogongrass in young broadleaf tree stands, but repeated applications were necessary. Seedling natalgrass was controlled by imazapic at 0.125 lb a.i./acre, but higher rates were required for control. Several native species, including *Andropogon* spp., *Aristida beyrichiana*, *Eragrostis* spp., *Liatris* spp., *Chaemaechrista nictitans*, *Pityopsis graminifolia*, *Schizachyrium scoparium* var. *stoloniferum*, and *Solidago stricta*, have shown tolerance to imazapic at 0.125 to 0.188 lb a.i./acre. Hexazinone at 0.75 lb a.i./acre effectively controlled natalgrass and smutgrass (*Sporopolus indicus*). Wiregrass and pines have shown tolerance (none to minor injury and good recovery) to hexazinone at 0.75 lb a.i./acre, but many broadleaved species are injured. Shade of wax myrtle and other large shrubs or trees can control cogongrass. Pines provide less effective shade, but because of their tolerance can be combined with imazapyr for cogongrass control.

Of spores and sprays: An update on the Central Florida Lygodium Strategy.

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[1]The Nature Conservancy, Babson Park, FL

ABSTRACT: The Central Florida Lygodium Strategy (CFLS) is a partnership including The Nature Conservancy (TNC) and other land management conservation groups, federal, state and local governmental agencies, and private landowners. The CFLS was formed to create a “lygodium-free” zone across central Florida and now encompasses all or part of 14 counties. This coordination of public and private land owners and managers is building a landscape-level approach through shared work and funding, striving for rapid detection and early response. Through CFLS and a private lands initiative, TNC staff and contractors now have surveyed over 13,000 acres and worked 1274 acres on 26 private properties adjacent to public conservation lands. During 2007, the Central Florida Lygodium Strategy focused on working with public land managers and private landowners in Pasco, Polk, Lake, Volusia and

Seminole counties to locate and control the northernmost infestations of Old World climbing fern (*Lygodium microphyllum*). Direct funds have been awarded through a USDA Cooperative Forest Health Program grant administered by the Florida Division of Forestry and through the US Fish and Wildlife Service Partners for Fish and Wildlife Program and Private Stewardship Grant and the National Fish and Wildlife Foundation. Equally important are the match funds and in-kind services that have been generated through the Florida Department of Protection Bureau of Invasive Plant Management, and Southwest and South Florida Water Management Districts. Over the past year, there have been treatment successes and challenges with these spore-dispersed plants, and both have underscored the necessity for rapid detection and response. To this end, mapping, treatment, and follow-up of northern infestations continues to be conducted with support of several federal and state agencies.

Florida's invasive plant research: Historical perspective and the present research program.

Schmitz, Don
Florida Dept. of Environmental Protection, Bureau of Invasive Plant Management, Tallahassee, FL

ABSTRACT: During the past 400 years, Florida's natural areas have been invaded by mostly tropical and subtropical non-native plants, and these invasions increased during the Twentieth Century with the rise of the ornamental plant industry and through unintentional contaminants of imported commodities. Recognizing that research is the basis of environmentally and economically sound invasive plant management programs, the State of Florida, through the Department of Environmental Protection (FDEP), began funding invasive plant research in 1971. Early research funding targeted biological control methods using insects, herbivorous fish, and plant pathogens, plus mechanical control and water level fluctuation control methods. In the 1980s, invasive plant management research in Florida shifted toward developing second-generation effective aquatic herbicides like fluridone and glyphosate that have low toxicities for fish and invertebrates and are relatively selective in controlling invasive aquatic plants among non-target plant communities. In the 1990s, research priorities targeted wetland and terrestrial species. By 2002, Florida's research program shifted its research priorities and state funding to find new management techniques for hydrilla (*Hydrilla verticillata*) and for the rapidly spreading Old World climbing fern (*Lygodium microphyllum*). FDEP in 2006-2007 funded 42 research, outreach, and economic impact projects at a cost of $1.8 million. Eighteen of these projects involved biological control research. Eight projects targeted research on hydrilla encompassing new potential herbicides to biological control research while five research projects looked for more efficient means to control Old World climbing fern.

Partnering across the landscape: Cooperative weed management areas (CWMA's) in Florida.

Serbesoff-King, Kristina
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ABSTRACT: A CWMA, or Cooperative Weed Management Area, is a partnership of federal, state, and local government agencies, tribes, individuals and various interested groups that manage noxious weeds or invasive plants in a defined area. CWMA-type partnerships are cropping up in Florida under various names including CISMA (Cooperative Invasive Species Management Areas) and ISWG (Invasive Species Working Groups). These groups are

addressing prevention, early detection/rapid response, and control. They are able to cross boundaries resulting in an expansion of efforts across the landscape, rather than just within political or property boundaries. These collaborations are helping land owners and managers understand and respect the differences and commonalities in their missions. This presentation will give a basic primer on "What is a CWMA" as well as discuss some of the benefits and challenges of forming a CWMA.

The effect of climate change on the phenology and distribution of nonnative plants in Florida.

Von Holle, Betsy
University of Central Florida, Orlando, FL

ABSTRACT: Florida is one of the most highly invaded states and devotes significant resources for the control and eradication of invasive nonnative species. With global warming, subtropical nonnative plants currently found in southern Florida have the potential to expand their ranges northward. I am testing the hypothesis that global warming has altered the reproductive phenologies of populations of nonnative species found in more northern parts of Florida so that their reproductive periods have become more like those of southern Florida populations. To investigate this, I am focusing on 29 invasive plant species, chosen from the FLEPPC list of high impact invasive plant species that have widespread distributions across the state of Florida and relatively discrete flowering times. I have recorded flowering, fruiting, and budding dates of 29 nonnative Florida plant species from approximately 1300 accessions. The majority of the herbarium accessions were collected from 1923 to 2007. From 1923 to 2007, these nonnative plant species had flowering or fruiting structures progressively later in the year. Specifically, over this time period central Florida nonnative plant populations produced flowers and fruits significantly later in the season. Flowering phenologies of nonnative plant populations of central Florida may be more likely to change with global warming, as the freeze line intersects central Florida and these populations may be the most highly affected by warming temperatures.

Biological control of Brazilian pepper, Chinese tallow, Australian pine, and hydrilla: updates from foreign explorations and preliminary host testing.

Wheeler[1], Gregory S., Mathew Purcell[1], Ding Jialing[2], Fernando McKay[3], and Marcelo Vitorino[4]
[1]USDA/ARS Invasive Plant Research Lab, Ft Lauderdale, FL, [2]Chinese Academy of Science, Wuhan, China, [3]USDA/ARS South American Biological Control Laboratory, Buenos Aires Argentina, [4]FURB- Regional University of Blumenau, Blumenau, Brazil

ABSTRACT: Brazilian pepper (*Schinus terebinthifolius*), Chinese tallow (*Sapium sebiferum*), Australian pine (*Casuarinas* spp.), and hydrilla (*Hydrilla verticillata*) are among the worst environmental weeds in Florida and other areas of the US. These species occupy diverse habitats causing many environmental problems including decreased biodiversity of the infested areas. Although chemical controls are known and used to control these invasive species, biological control presents an attractive alternative when practiced safely. The native ranges of these species include South America, Australia, and China. The USDA/ARS Invasive Plant Lab, colleagues at the South American biological control lab, the Australian biological control lab, and the Chinese Academy of Science have been conducting foreign surveys searching for insects that will be safe and effective at controlling these species in the

US. By conducting monthly surveys many new herbivores are being recovered throughout the native range of these species. These include many new weevil, thrips, psyllid, eriophyid mites and lepidopteran species. Several of these species are, or have undergone preliminary testing to determine suitability for release here. Progress will be presented describing the potential of these herbivore species as potential biological control agents.

Does propagule pressure explain the abundance of invasive fig trees in South Florida?

Wheeler[1], Jessica H. and Trevor T. Caughlin
New College of Florida, Sarasota, FL,

ABSTRACT: Invasive exotic species are considered a major threat to global biodiversity. Propagule pressure has been suggested as a primary factor determining habitat invasibility. However, determining the relative importance of propagule pressure versus microhabitat characteristics for predicting invasions has remained difficult, due to the complicated variables involved in plant establishment. Invasive hemiepiphytic figs in South Florida represent an ideal way to study the effect of propagule pressure on invasion dynamics because they recruit almost exclusively on a single species of palm and are obligately dependent upon animals for dispersal. This results in easily quantifiable establishment site quality. Our research evaluates the importance of propagule pressure relative to microhabitat in shaping the distribution of invasive exotic (*F. microcarpa*) fig trees throughout Southwest Florida.

Q-37: Curtailing introductions of insects and plant diseases on imported plants for planting.

Campbell, Faith T.
The Nature Conservancy, Arlington, VA

The impacts of non-native insects and diseases on America's forests have been profound. Since the mid-1800s, more highly damaging forest pests have been introduced via imports of plants than via any other pathway. Worse, rates of introduction and establishment have increased dramatically in recent years. The Continental Dialogue on Non-Native Forest Insects and Diseases brings together government, forest resource, silvicultural, horticultural, research and conservation groups to develop collaborative efforts to reduce the threat to North American forests from non-native insects and diseases. Dialogue participants have developed consensus recommendations to USDA Animal and Plant Health Inspection Service (APHIS), adoption of which we believe can virtually eliminate forest pest introductions via imported live plants by 2015. The poster will present these recommendations and suggest steps the reader can take to support efforts to curtail such introductions.

A proposed FLEPPC Category III: Invasive exotic species that impede ecological restoration.

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ABSTRACT: FLEPPC has long maintained two lists of exotic pest plants, both historically understood to be based upon the degree to which those species have proven to be problematically invasive in relatively intact native plant communities. However, few natural areas now remain genuinely undisturbed and many of the exotic plants that readily invade places where the soil surface has been scraped have been largely overlooked by resource managers. Many Florida ecologists do not even recognize that many of these “roadside weeds” are indeed non-natives and few other than experienced hands-on restorationists understand how they complicate attempts to reestablish native plant communities. This poster argues that FLEPPC should recognize a broader range of exotic pest plant species and pay closer attention to the characteristics that cause certain species to hinder restoration and management of lands disturbed by resource management activities, recreational damage, and fire suppression, as well as areas heavily impacted by “natural disasters” like hurricanes and tornadoes. The poster will be set up to enable conference attendees to share their observations and comment on a proposed list of Category III species.

TAME Invasives Portal: A solution for your life.

Gioeli[1], Ken, Ken Langeland[2], Jim Cuda[3], Bill Overholt[4], and Julio C Medal[3]
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ABSTRACT: The UF/ IFAS St Lucie County Cooperative Extension has developed a web portal entitled "TAME Invasives: A Solution for Your Life." The portal can be accessed at http://pesticide.ifas.ufl.edu. This portal features research-based information and multimedia products that focus on four high priority invasive pest plants including Old World Climbing

Fern, Tropical Soda Apple, Brazilian Pepper-tree, and Melaleuca. In addition, online courses have been developed to teach course participants how to 1) effectively manage these high priority invasive pest plants; 2) use herbicides in an effective manner that is safe for people and the environment; and 3) understand the role of biological control and IPM in the management of invasive plant species. The primary audience for this coursework includes pesticide applicators licensed through the Florida Department of Agriculture and Consumers under F.S. Ch. 482 and Ch. 487. Members of the general public who need training to manage these invasive plants on their personal properties may also benefit from this information and coursework. The purpose of this presentation is to inform FLEPPC Conference participants about the availability of this portal and how it can benefit people throughout Florida.

Evaluation of repeated herbicide treatments on tree islands using glyphosate and metsulfuron methyl in the Arthur R. Marshall Loxahatchee National Wildlife Refuge.

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ABSTRACT: We conducted pre-treatment evaluations on ground cover (<1m), canopy cover (>1m), and shrubs and trees on 50 tree islands infested with *Lygodium microphyllum* in the A.R.M. Loxahatchee National Wildlife Refuge during December 2005. This was followed by aerial herbicide treatment with either glyphosate (1.8 or 3.6 liters / 75.7 liter diluent / 0.4 ha) or metsulfuron methyl (56.7 or 113.4 grams / 75.7 liter diluent / 0.4 ha) during February 2006 to evaluate the effectiveness of each herbicide rate on *L. microphyllum* and impacts to non-target vegetation. One year post-treatment evaluations were conducted during December 2006, followed by ground treatments to *L. microphyllum* in March 2007. We conducted two year post-treatment evaluations during January 2008 and additional ground herbicide treatments were conducted in March 2008 on *L. microphyllum*. The final evaluation will be conducted in January 2009 to determine the effects of repeated herbicide treatments on *L. microphyllum* and the response of non-target vegetation. We will present the results of this study two years post-treatment.

Independent and combined effects of two biocontrol insects on seedling growth and survival of the invasive tree *Melaleuca quinquenervia* in Florida.

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ABSTRACT: We investigated the effects of two insect herbivores introduced as biological controls, on growth and survival of seedlings of the invasive tree *Melaleuca quinquenervia* (Myrtaceae). The two insects are the leaf-feeding weevil, *Oxyops vitiosa*, and the sap-sucking psyllid, *Boreioglycaspis melaleucae*. We experimentally exposed *M. quinquenervia* seedlings to different densities of weevils and/or psyllids in a greenhouse. *M. quinquenervia* occurs in two contrasting soil types in Florida, organic and sand, and this was incorporated into the experiment. Each seedling was transplanted to an individual pot and placed inside a screened PVC cage; one replicate consisted of three potted seedlings within a cage. Insects were manually added to each plant twice throughout the duration of the experiment. The experimental design consisted of three levels of weevil densities (zero/low/high), three levels of psyllid densities (zero/low/high), and two soil types (organic/sandy) combined in a 3x3x2

factorial design, along with caged and uncaged controls (5 replications each, N=100). We estimated growth as relative change in height, stem diameter and number of leaves, and we recorded survival. Effects on total above-ground and below-ground biomass were also investigated. We found an independent negative effect of high density of weevils and psyllids on seedling height compared to control plants. When both insects were present in high densities, the effects on seedling growth measured as change in height were intensified. Caged controls, and low and high psyllid density plants grew relatively more in organic than in sandy soil. No differences between soil type were found in the rest of the treatments. The presence of both insects at high densities decreased survival of plants growing in organic and sandy soils compared with controls and plants receiving damage from only one type of insect. Our experiment shows that both weevils and psyllids are effective in reducing *M. quinquenervia* seedling growth and survival, and that the effectiveness is stronger when both insects are present in high densities.

Potential for use of natural plant pathogens of Brazilian pepper (*Schinus terebinthifolius* Raddi) in the Everglades National Park.

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[1]Florida International University, Miami, FL, [2]Everglades National Park, Miami, FL

ABSTRACT: Brazilian pepper (*Schinus terebinthifolius* Raddi), an exotic invasive hardwood tree species, now covers hundreds of thousands of acres in south and central Florida, as well as many of the islands on the east and west coasts of the state. Significant infestation of Everglades National Park (ENP) by Brazilian pepper has occurred in an area known as the "Hole-in-the-Donut", (HID) covering over 3,000 ha that were previously agricultural lands. Biological control is proposed as a tool useful for ecosystem restoration and management. Most of the potential hazards of classical exotic introduced biocontrol agents can be avoided by selecting pathogens that are already endemic in the area where they are to be used. We have initiated studies to discover and develop potential native microbial biocontrol agents of Brazilian pepper. Periodic field surveys for occurrence of disease were made. Putative fungal and bacterial pathogens were isolated and tested for pathogenicity using detached leaf assay and seedling inoculation. We have found that native microbial pathogens of Brazilian pepper trees do occur with capability to cause significant damage. Among the potential pathogenic fungal isolates sporulation was observed in only five isolates on culture media. Three fungal isolates were tested in a greenhouse spray inoculation study. All the three isolates caused necrosis of apical buds and only one isolate caused leaf spots and chlorosis on young leaves. Among the bacterial isolates from the Brazilian pepper tree disease samples, two were found to be pathogenic. Further, evaluation of the two bacteria in a controlled greenhouse spray inoculation study showed only one of the isolates was able to induce leaf spot symptoms on leaves. Another potential bacterial pathogen was isolated from Brazilian pepper trees showing inflorescence blight with complete absence of drupes. Limited inoculation studies using the bacterial isolate from the blight on inflorescences caused flower discoloration, absence of drupe development and tip dieback. Various culture media to induce sporulation in fungal pathogens and inoculum formulations to increase the efficiency of the biocontrol agents are needed for successful development of biocontrol agents. The continued need to protect ENP's diverse plant community makes it imperative that the discovery and use of native microbial biocontrol agents be included in the over all invasive plants management and restoration processes.

Biological control of weed seed in different ecosystems.

Mousavi Nik[1], Atefeh and Hassan Mohamad Alizade[1]
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ABSTRACT: To evaluate the influence of seasons (spring, summer and fall) and ecosystems (uncultivated land, alfalfa field and tillaged field) on the quantity of post dispersal seed predation of Jimson Weed (*Datura stramonium*), wild mustard (Sinapis arvensis), (*Vaccaria pyramidata*), bindweed (*Convolvulus arvensis*), dock (*Rumex crispus*) and maurorum (*Alhagi camelorum*) a field experiment was conducted in Karaj, Iran from 2006 to 2007. The experiment was arranged in a factorial, completely randomized design with four replications. To determine the quantity of predation, 50 seeds were placed in Petri dishes and placed in the field, then collected and counted after 14 days. Results indicated that predation was highest in spring in the uncultivated ecosystem land (98%) and lowest in fall in all ecosystems (20%). Seed predation was highest for wild mustard (70%) and lowest for maurorum (2%). Ants were the dominant seed predators and accounted for 80-85% of all seed consumed.

The response of *Poa annoua* to different herbicides.

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ABSTRACT: An experiment was conducted in Karaj, Iran to study the response of annual blue grass (*Poa annua*) to the ACCase herbicides, coldinafop-propagyl, diclofop-methyl and fenoxaprop-p-ethyl. The experiment was arranged as a factorial completely randomized design with four replications. The factors were the type of herbicide (coldinafop-propagyl, diclofop-methyl and fenoxaprop-p-ethyl) and the growth stage of plant (2-3 leaf stage in green house, 2-3 leaf in cold room (4°Ċ) and 5-6 leaf stage in green house). Green house and cold room treatments were set to compare the difference between spraying in spring and fall because annual blue grass is a winter weed and germinate in fall. The result of this study shows that coldinafop-propagil is a suitable post-emergence herbicide for annual blue grass control in wheat and the best stage of growth for spraying is in 2-3 leaf stage in green house because the herbicide was not effective in cold room condition.

Florida Invasive Species Partnerships: Thinking locally, acting neighborly

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ABSTRACT: Invasive species know no boundaries and continue to degrade Florida's declining habitats. If landowners and land managers wish to achieve long term success, it is critical for them to reach out and collaborate with all stakeholders, including private landowners. The Florida Invasive Species Partnerships (FISP), originally formed in 2006 under the Invasive Species Working Group as the Private Land Incentive Sub-working Group, is striving to focus statewide efforts on prevention as well as treatment. By working together, we hope to encourage development of innovative management approaches, provide new tools, decrease implementation costs, and ultimately increase effectiveness. During 2006 and 2007, FISP developed the dynamic "Incentive Program Matrix" of existing federal, state and local funding sources, incentive programs and technical assistance for private landowners in Florida. The interactive matrix database will allow both private and public land managers to determine what current technical and financial assistance is available to best suit their specific needs and coordinate control efforts across boundaries. In 2007, FISP began promoting the

concept of Cooperative Weed Management Areas in Florida. The goal of this effort is to encourage development of local partnerships between federal, state, and local government agencies, tribes, individuals and various interested groups to manage noxious weeds or invasive plants in a defined area. To date, there are ten CWMAs across Florida from Walton County to the Florida Key's Invasive Task Force. The Incentive Program Matrix and locally led CWMAs allow us to expand invasive species management efforts across the landscape and build community awareness. These coordinated efforts serve to protect our valuable conservation areas, public lands and private lands from the continuing colonization of invasive species across the landscape.

Studies on the interaction of a novel tobamovirus, TSAMV, and *Gratiana boliviana*.

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ABSTRACT: As a Category I invasive exotic plant that occurs on more than 1 million acres in Florida, *Solanum viarum*, or tropical soda apple (TSA), is having negative effects to Florida's economy and native biodiversity. Mosaic symptoms suggestive of virus infection were first observed on foliage of TSA plants in pastures near Okeechobee, FL in the fall of 2002. Samples were taken back to the lab for isolation of the virus. Mechanical transmission of the virus from leaves of a symptomatic TSA plant to *Nicotiana benthamiana* was initially used to isolate a novel tobamovirus from *N. benthamiana*, named tropical soda apple mosaic virus (TSAMV). TSAMV is known to be transmitted between plants by mechanical means and through seeds, but it was unknown whether *Gratiana boliviana*, a beetle introduced into Florida for biological control of TSA, could also transmit the virus on its mouthparts. *G. boliviana* were allowed to feed for 48h on TSA inoculated with TSAMV and then moved to uninfected TSA plants and allowed to feed for an additional 48h. None of the uninfected plants became infected within a 50-day monitoring period. ELISA testing and back inoculation to local lesion tobacco with leaf samples from the target plant of each replication confirmed that *G. boliviana* did not transmit TSAMV. Dual choice preference studies revealed that adult *G. boliviana* do discriminate between TSAMV-infected and uninfected TSA for feeding and oviposition with more beetles selecting uninfected plants. Feeding on infected plants also appears to be detrimental to beetle fitness.

Jamaican nightshade: A plant poorly adapted to Florida or an exotic on the verge of rapid expansion?

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ABSTRACT: Jamaican nightshade (*Solanum jamaicense*), is a thorny perennial plant native to Central America, northern (tropical) South America and the Caribbean. It was first seen in Florida in 1930 near Saint Cloud, and has since been reported at a few other locations in Osceola, Orange, Highlands and St. Lucie counties. There is no information on how the plant arrived in Florida, although there is speculation that seeds may have been transported by birds from the Antilles. Herbaria records and field observations suggest that Jamaican nightshade is restricted to shaded areas of hammocks. Once it reaches a suitable habitat, Jamaican nightshade can become dominant in the understory vegetation. No research on the ecology or management of Jamaican nightshade has been conducted, so we do not know

why this plant, which has been in Florida for at least 78 years, has not become a more widespread problem. Research should be conducted to estimate its potential for increased invasiveness in the state, and to evaluate control methods.

Past meets present: Using historical records and GIS to guide invasive exotic plant research.

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ABSTRACT: *Lygodium japonicum* (Japanese climbing fern) is an invasive exotic species present throughout the southeastern U.S. In Florida, this species is listed as a noxious weed and a Category I invasive exotic pest plant. It is capable of growing as a dense groundcover, smothering underlying vegetation, and can also reach mid-canopy levels via its climbing habit. Introduced as an ornamental by the early 1900s (possibly as early as the late 1880s), *L. japonicum* was first reported as naturalized in 1920. Although it was recognized as a weed as early as 1956, research on Japanese climbing fern as an invasive exotic plant did not begin until the 1990s. Historical records, previous field observations and recent research findings were used to develop hypotheses about the environmental requirements for this species. Data relating to *L. japonicum* sightings were collected from The Fern Bulletin (1898-1912), American Fern Journal (1910-present), herbarium records, EDDMapS records, and state and regional studies of vascular flora. Although these records do not represent random samples, they provide general indications of the early distribution of the species as well as early observations about the habitats in which it is found. ArcGIS was used to map locations of *L. japonicum* records. Additional information such as habitat type or presence of disturbances was also noted. Some records indicate pathways of introduction including nurseries, greenhouses, and transplants from residential gardens. The presence of waterways, both natural (creeks, rivers) and man-made (ditches) was featured prominently in the records. Disturbances such as roadways were frequently associated with *L. japonicum* sightings. However, this may be more closely associated with the locations where observers were likely to be searching for specimens than the locations where specimens are more likely to be found. In addition, some observations were made in areas with little disturbance. These results were used to inform ongoing research, including more detailed investigation of water requirements, habitat preferences, and natural and anthropogenic disturbances associated with this species. Based on previous observations, *L. japonicum* appears to be able to tolerate a wide range of environmental conditions; however, identification of the conditions in which it grows best will help to focus monitoring and control efforts.

Organizing a new, Cooperative Weed Management Area in southeast Florida.

Renda, Mike
The Nature Conservancy, Hobe Sound, FL

ABSTRACT: A new, Cooperative Weed Management Area started this past November, 2007. We have named ourselves the Treasure Coast Cooperative Invasive Species Management Area (TC CISMA). Our boundaries include northern Palm Beach County and all of Martin, St. Lucie and Indian River Counties. Major participants are the Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, Martin County, Natural Resources Conservation Service, Palm Beach County, Palm Beach County Solid

Waste Authority, South Florida Water Management District, The Nature Conservancy, United States Fish and Wildlife Service, and University of Florida/IFAS. Our mission is to implement a comprehensive, cooperative approach across boundaries to address the threats of invasive species within the TC CISMA. We drafted five goals: 1. Reduce and control the spread of existing invasive species. 2. Prevent the establishment and spread of new invasive species. 3. Build working relationships between public and private stakeholders to foster cost-effective control of invasive species. 4. Provide education and information exchange about invasive species among stakeholders. 5. Promote applied research in invasive species management. TC CISMA emerged from an existing local workday partnership, friendships, Florida Exotic Pest Plant Council meetings, the Private Lands Incentive Subworking Group (now Florida Invasive Species Partnership (FISP)) support, and individuals' strong desire to cooperatively work across fence lines to achieve success. We look forward to adding new, enthusiastic partners to help us with our next steps of writing detailed objectives, drafting a Memorandum of Understanding, and seeking funding to initiate a pilot project.

Simple cut stem herbicide applicators.

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ABSTRACT: Simple herbicide applicators were made from PVC or CPVC pipe and fittings and bingo dauber tips. Three different tools were developed and tested. The Lop-N-Daub attaches to the handles of lopper and allows the used to apply herbicide to the cut stem of woody plants from 0.25 to 2.5 inches in diameter. In dense stands over 500 plants can be cut and treated per hour. The Snip-N-Daub attaches to the handles of a garden snip and is used for vines and plants with stem diameters under 0.5 inches. Over 900 stems can be cut and treated per hour. The Hack-N-Daub has the applicator in a hack tool made from a metal tube and is used to cut a grove in the bark of a tree into which herbicide is applied. These tools are useful when non target plant damage is a concern. Cut stem application of 13.2% imazapyr (25% Arsenal AC) herbicide using the Lop & Daub or Snip & Daub controlled coral ardisia, bamboo, Brazilian pepper, Chinaberry, Chinese privet, Chinese wisteria and mimosa. Melaleuca and Chinese tallow were not totally controlled with a cut stem treatment of 14.4% imazapyr (50% Habitat). Doubling the concentration of imazapyr improved control of melaleuca and Chinese tallow. Cut stem application of 13.2% imazapyr (25% Arsenal AC) using the Lop & Daub controlled red maple that was suppressing planted cypress, and wax myrtle and sweet gum and other woody stemmed plants in fuel reduction and pine release plots.

Preliminary Studies on Natalgrass (*Melinis repens*) Seed Germination.

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ABSTRACT: Natalgrass (*Melinis repens* – formally *Rhynlenchelytrum repens*) is an invasive grass of South African origin that was first documented in the United States in 1866. Grown as an ornamental and once widely promoted as a forage crop, natal grass has become a widespread problem in Florida's natural areas as well as disturbed areas and roadsides. This species is extremely competitive and a prolific seed producer. Seeds are easily wind dispersed, and rapid colonization of this weed is observed after an area has been disturbed through mining, fire or other event. Therefore seeds play a major role in natalgrass invasion and spread. To better address this problem, a more thorough understanding of seed viability and germination conditions is required. Natalgrass seed was collected from a partially

restored mine site in southern Polk County, FL in December 2007. Seed were collected from racemes on mature plants or from shed seed on the ground. Unless otherwise specified, germination studies were conducted in a growth chamber under the following conditions: 16 hr day/8 hr night photoperiod, 500 µmol.m2.sec-1 light intensity and 32C/20C day/night temperature. A total of 50 seed were placed in each Petri dish with 4 replications per treatment. Seed collected from racemes did not germinate, while seed from the soil deposits averaged 24% germination. Interestingly, germination occurred within 24 to 36 hours after placement in the growth chamber. Natal grass seed was also placed in the absence of light, and preliminary findings indicate light is not a requirement for germination. Further studies will be conducted to test for seed dormancy and factors that may affect natalgrass germination.

The new melaleuca math.

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ABSTRACT: Melaleuca (*Melaleuca quinquenervia*) once spread unimpeded across the south Florida landscape, infesting 0.61 million ha at its height. The complete lack of top down regulation of its growth and reproduction resulted in its rapid spread into pine flatwoods, cypress domes, sawgrass prairies, and hardwood hammocks. The first biological agent, *Oxyops vitiosa*, was introduced in 1997 and the second, *Borelioglycaspis melaleucae*, in 2002. These natural enemies, especially *O. vitiosa*, have transformed both the habit and reproductive capacity of melaleuca as well as it population dynamics. Individual trees attacked by *O. vitiosa* grow slower (9.1 cm yr^{-1} vs 96.1 cm yr^{-1}), produce many more tips (4.2 tips cm $height^{-1}$ vs 2.8 tips cm $height^{-1}$) which results in a shorter, bushier plant, and produce fewer seed capsules (0.006 capsule clusters cm tree $height^{-1}$ vs 0.343 capsule clusters cm tree $height^{-1}$) resulting in 99% less seed. Existing melaleuca populations (recruited in 1998) at a typical west coast site have declined 47.9% since 2002 when not protected from these natural enemies while densities in protected areas remain unchanged. In addition, these protected trees continue to grow and produce seeds while unprotected trees are actually losing height and failing to produce seed. Large (>50 ft tall) melaleuca trees were able to recruit only 3% of the previous density of seedlings/saplings within their seed shadows over a three year period. However, these successful recruits are stunted from continuous insect attack and are unlikely to reach reproductive status. It is now clear that the capacity of melaleuca to invade and dominate new habitats has been severely constrained by biological control.

The ecology of *Lygodium microphyllum* on tree islands in Water Conservation Area 3: Implications for management and control.

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ABSTRACT: In an ongoing survey for *Lygodium microphyllum* within Water Conservation Areas 3A and 3B, we discovered seven populations of this exotic fern on five islands. These findings represent *L. microphyllum* presence on approximately 39% of the total islands surveyed. Most of the infestations of *L. microphyllum* were small and had not yet widely expanded into the canopy although several plants had obvious signs of repeated growth and dieback. This indicated that these individuals were most likely not new growth. Within one population, 29 small (<5 cm tall) seedlings were observed near a large reproductive plant. All L. microphyllum were observed growing on elevated areas, either on dead stumps, or on the

bases of the native golden leather fern (*Acrostichum aureum*) and pond apple (*Annona glabra*). These stumps and bases not only provided structure for climbing, but also kept the fern base from flooding during the wet season. One of the islands where *L. microphyllum* was found had previously been treated by the South Florida Water Management District (District). The *L. microphyllum* individual observed was small (<3m tall) indicating it was most likely a new recruit into this habitat. A second island which had been treated by the District did not have any *L. microphyllum* present, indicating successful treatment of this invasive fern. The District is maintaining a monitoring and treatment GIS to assist in future management strategies. Since 2006, the District's ground herbicide applicators have covered 10,195 acres within Water Conservation Areas 3A and 3B, resulting in treatment of 2,037 acres of widely-scattered *L. microphyllum*. Continued surveys for *L. microphyllum* will be needed to control and restrict the spread of this invasive plant in both Conservation Areas.

Notes

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Aquatic Vegetation Control, Inc.