“West of Eden – Where Research, Policy and Practice Meet”
A Joint Conference of the Southeast EPPC and Florida EPPC
April 28-30, 2004
Clarion Suites
Pensacola Beach, FL
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"West of Eden: Where Research, Policy and Practice Meet"
April 28-30, 2004
Clarion Suites and Convention Center
Pensacola Beach, Florida

Agenda

Wednesday, April 28th 2004

Moderator: Mike Bodle

0900 - 0910 Welcome
  Mike Bodle, Brian Bowen

0910 - 0945 Keynote Speaker
  Phyllis Windle
  Nine hundred experts and groups call for action!

0945 - 1005 National invasive species issues
  Randall Stocker

1005 - 1020 Break

1020 - 1100 Exotic plant management teams: meeting the National Park Service natural resources challenge
  Nancy Fraley

1100 - 1120 South Florida and Caribbean parks exotic plant management plan and EIS
  Sandy Hamilton

1120 - 1140 Industry influence on exotic plant pest policies
  Barbara Lucas

1140 - 1200 IFAS Assessment
  Alison Fox

1200 - 1300 Lunch (On your own)
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<tr>
<td>1300</td>
<td>Fla. Invasive Species Working Group (ISWG) Update</td>
<td>Alison Fox</td>
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<td>1320</td>
<td>A Southeast coalition for terrestrial and aquatic invasive weed control</td>
<td>Brian Nelson</td>
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<td>1340</td>
<td>Federal Noxious Weeds and other invasive species regulated by USDA APHIS</td>
<td>Jim Bean</td>
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<td>1400</td>
<td>Tag your it! Biocontrol approval process</td>
<td>Al Cofrancesco</td>
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<td>1420</td>
<td>The pesticide approval process</td>
<td>Jim Kriner</td>
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<td>1440</td>
<td>Break</td>
<td>Roger Clark</td>
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<td>1500</td>
<td>What's new with herbicides?</td>
<td>Ken Langeland (Panel)</td>
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<td>1530</td>
<td>Tropical Soda Apple: An update on research efforts and control recommendations in Florida</td>
<td>Bill Kline et al.</td>
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<td>1550</td>
<td>Biological control of Tropical Soda Apple in Florida: one beetle released, four more coming</td>
<td>Jorge Medal et al.</td>
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<td>1610</td>
<td>Plant Pests: pathways and pestilence</td>
<td>Yvette Ogle</td>
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<td>1630</td>
<td>Is the defoliating sawfly <em>Heteroperreyia hubrichi</em> (Hymenoptera: Pergidae) safe to release in Florida for biological control of Brazilian Peppertree?</td>
<td>Jim Cuda et al.</td>
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<td>1650</td>
<td>Florida EPPC Business Meeting</td>
<td>Mike Bodle</td>
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<td>1800</td>
<td>Evening Social</td>
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<td>1900</td>
<td>Fishing Tournament @Pensacola Beach pier</td>
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Thursday April 29th 2004

0700-0840 State of Florida General Pesticide Applicator Certification Standards Training  
Ken Gioeli

Moderator:

Randall Stocker

0850-0920 Legumes—the lovely and the licentious  
Kathy Burks

0920-0940 African origin of Air Potato  
Colin Hughes et al.

0940-1000 Phenotypic evaluations of Dioscorea oppositifolia.  
T. C. Mueller

1000-1020 Break

Moderator:

Dan Thayer

1020-1040 Two flies to hog-tie melaleuca: the news from quarantine  
Susan Wineriter and T.D. Center

1040-1100 Cogongrass invasion of southeastern forests: impacts on pine productivity.  
S. Jose et al.

1100-1120 Is plasticity associated with invasiveness?  
Jean Burns and A. A. Winn

1120-1140 What makes Brazilian pepper such a successful invader in Florida?  
Sharon Ewe

1140-1240 Lunch (On your own)

Moderator:

Amy Ferriter

1240-1300 Application of IKONOS satellite imagery for detecting Lygodium microphyllum in the Everglades.  
Ken Rutcheey and J. Godin

1300-1320 Impacts of Lygodium microphyllum on biodiversity in Everglades wetland ecosystems: the catastrophic responses in species composition and spatial patterns.  
Yegang Wu et al.

1320-1340 Lygodium management on Loxahatchee NWR  
William Thomas and L. Brandt

1340-1400 Biological control agents of Old World Climbing Fern, Lygodium microphyllum.  
Christine Bennett and R. Pemberton

1400-1420 Central Florida lygodium control strategy  
Doria R. Gordon et al.
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<td>Break</td>
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<td>1440-1500</td>
<td>Impact of sedges (Cyperaceae) as invasive weeds</td>
<td>Charles T. Bryson</td>
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<td>1500-1520</td>
<td>Optimizing treatment efficacy armed with science</td>
<td>James H. Miller</td>
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<td>1520-1540</td>
<td>Invasive plant education at Archbold Biological Station</td>
<td>Jeffrey Hutchinson</td>
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<td>1540-1600</td>
<td>What’s bugging Melaleuca?</td>
<td>Cressida Silvers</td>
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<td>1600-1620</td>
<td>Palm Beach County’s invasive non-native vegetation removal incentive program</td>
<td>Matthew King</td>
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<td>1620-1640</td>
<td>Wrap Up</td>
<td>Mike Bodle, Brian Bowen</td>
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<tr>
<td>1650-1750</td>
<td>State of Florida General Pesticide Applicator Certification Standards Exam</td>
<td>Ken Gioeli</td>
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<tr>
<td>1800 -</td>
<td>Banquet and entertainment featuring ‘The Weeds’</td>
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Friday, April 30th 2004: Field Trips

All trips involve carpooling and caravanning to destinations. Meet in the hotel lobby or other announced departure point. (Most trip leaders will be there and route maps will be available for all trips.) Bring, as you wish, your own water, sunscreen, and other light field gear for an enjoyable, interesting trip. Entrance fees may be required.

Alabama Cogon Grass Tour

Take a little trip across the line into Alabama with a visit in the morning to Blakely State Park, known for its Civil War battlefield and old-growth longleaf pine habitats, to see cogon grass control efforts in their second year within the pinelands. The stop includes a chance to see some rare native plants as well, along with a brief demonstration of special equipment for herbicide application at the site. Lunchtime will be picnic-style at the park on the shores of the Tensaw River. Those staying after lunch will travel through Mobile to a large experiment in cogon grass control using chemical, mechanical, and cover-crop (loblolly pine) techniques and will then go on a short distance to the Muddy Creek Restoration Project. With funding from the Mobile Docks group, this area is being freed of invasive exotics and replanted with native bayou wetland plants.

Time: Leaving hotel at 8:30 a.m., back around 4:30 p.m.
Lunch: Bring your own, or bring $5.00 for a provided sandwich.
Trip Leaders: Jim Miller (U.S. Forest Service), Mike Patterson and Wilson Faircloth (Auburn University), and Gena Todia and Fred Nation (private forestry consultants)
Maximum: 30-35 people

Tarkiln Bayou Preserve/Big Lagoon State Park

In this ½-day trip, you’ll first stop at a new acquisition parcel by the Bayou, to see an array of invasive exotics that accompany an old homestead site. Next stop will be Tarkiln Bayou Preserve proper, where natural communities include maritime hammock, mesic flatwoods, wet prairie, and sandhill. Stops include a review of restoration efforts in a pitcher-plant bog, where fire suppression had allowed encroachment by woody species such as ti-ti. As time permits, nearby Big Lagoon SP is also on the agenda, to see invasive-exotic control efforts there. Natural communities at this park include sand pine scrub on relic dunes with dune rosemary; slash pine flatwoods; ti-ti thickets; sandy beaches; and salt marshes.

Time: Leaving hotel at 8:15 a.m., back by about 11:30 a.m.
Trip Leader: Sandra Cashes (Florida Park Service)
Maximum: 10-12 people

Pensacola Naval Air Station

A morning trip to this famous and historic military base (the country’s first permanent naval air station, established in 1911) will focus on its natural areas, especially the wetlands fringing the bayou, to see where invading exotics have established their own beachheads. Natural communities on the Station also include beach dune, maritime hammock, sand pine scrub, mesic flatwoods, and sandhill. Following the field trip, participants may be free to visit a museum and other historic sites at this home of the Blue Angels.

Time: Leaving hotel at 8:15 a.m., back by 12:00 p.m.
Trip Leaders: Riley Hoggard (National Park Service) and NAS Resource personnel
Maximum: Check at sign-up table
Blackwater River State Forest

This trip offers an opportunity to see at least part of what is the largest expanse of sand hills, longleaf pine upland forests, and seepage slopes in State of Florida ownership. On the way, you’ll stop at a nearby International Paper property for a good demonstration of what can go wrong when cogon grass gets involved in regeneration of pine stands. On the Forest, there’ll be some cogon grass, Japanese climbing fern, tallow tree, Chinese privet, and mimosa tree to see and advise on for eradication. The organized tour will conclude by noon at the Forest, allowing participants to explore further on their own the habitats of the Forest or other conservation lands found nearby and on the return to the coast.

Time: Leaving hotel at 8:00 a.m., done by 12:00 p.m.
Trip Leaders: Tom Cathey (Florida Division of Forestry) and Shibu Jose (UF-IFAS, Milton)
Maximum: 15-20 people

Eglin Air Force Base – Santa Rosa Island +

So much to see, so little time—this is the largest forested military reservation in the free world, extending 51 miles east-west and 19 miles north-south. About 86% of the property is forested, with 81% of that sandhill and 15% forested wetlands, flatwoods, or baygall. The base harbors 35 natural communities and 64 rare plant species, and yes, a variety of invasive exotics, too.

This field trip will focus first on tallow treatments in coastal habitats of Santa Rosa Island and then probably include at least one other stop on the mainland in a special habitat. The trip may go most of the day but in that case would have a lunchtime break. An exact itinerary will depend on scheduling of the day’s military missions; more details will be available on sign-up day.

Time: Leaving hotel at 8:00 a.m., done by noon or mid-afternoon
Trip Leaders: Dennis Teague (Eglin Natural Resources) and Mark Zeller (FDEP-BIPM)
Maximum: 15-20 people
Biographical Sketches/ Abstracts/

A Southeast Coalition for Terrestrial and Aquatic Invasive Weed Control

Jim Bean
Environmental Resource Specialist
BASF Corporation
904 Lancelot Lane
Collierville, TN 38017
Phone: (901)853-1444
Cell: (901)496-2443
E-mail: beanj@basf.com

Abstract:

There is much interest in aquatic and terrestrial invasive species control throughout the southeast. However, there is no region wide organization to help promote and coordinate funding for the various initiatives. The purpose of this presentation is to outline potential opportunities to create a southeast invasive species coalition.

Status of Biological Control Agents of Old World Climbing Fern, Lygodium microphyllum.

Christine A. Bennett and Robert W. Pemberton
USDA-ARS
Department of Entomology, University of Florida
Florida Biological Control Lab.
1911 SW 34th Street
Gainesville, Florida 32607
Phone: (352) 372-3505, ext. 166
Fax: (352) 955-2301
Email: hydrilla@ufl.edu

Abstract:

Old World Climbing fern, Lygodium microphyllum, has quickly invaded south Florida spreading into new areas distant from known infestations. 800 acres was discovered in March 2000 in Everglades National Park in an area where none had been found previously. The fern has the ability to grow up and over trees and shrubs completely smothering native vegetation, and in some cases threatening rare and endangered species. In 2000 and 2001 at meetings of biocontrol researchers, land managers and conservationist, biological control was placed as the highest priority for control of Lygodium microphyllum. A leaf-feeding moth from Australia was imported into the Florida Biological Control Laboratory, Quarantine facility at Gainesville in 2000 and safety testing was immediately initiated. Since then two more species had been studied in quarantine, and a fourth species in Australia. We are happy to report progress has been made and the status of four insect species will be discussed.
Impact of Sedges (Cyperaceae) as Invasive Weeds

Charles T. Bryson
Research Botanist
USDA-ARS, SWSRU
141 Experiment Station Road
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Stoneville, Mississippi 38776
Phone: (662)686-5259
Fax: (662)686-5422
Email: cbl)'son@ars.usda.gov

Abstract:

Weedy sedges adversely affect natural plant communities and are major deterrents to agricultural and forest productivity. About 35% weedy sedges are in the genus Cyperus; 56% are in Carex, Eleocharis, Fimbristylis, Kyllinga, Rynchospora, Schenoplectus, and Scirpus; and the remaining 9% are in Abildaardia, Balboschoenus, Bulbostyliis, Cladium, Fuirena, Isolepis, Lipocarpus, Oxycaryum, Scirpus, and other genera. Sedges possess diverse ecological, biological, and reproductive traits and are able to survive a wide range of environmental conditions. The most troublesome sedges germinate, grow, reproduce, and disperse rapidly; maintain large reservoirs of seed, tubers, or rhizomes in the soil and resist chemical, cultural, and mechanical control methods.

Legumes—the lovely and the licentious

Kathy Burks
Botanist
Florida Natural Areas Inventory, FSU
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Tallahassee, FL 32303
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Email: kburks@fnai.org

Abstract:

Kathy will provide identification tips for some exotic species in the legume, or bean, family that have “taken license” with native habitats in Florida and elsewhere in the Southeast and may be confused with certain indigenous plants (always lovely in their home settings!). Trees in the Albizia and Leucaena genera will be discussed, along with vines in the Wisteria genus (with a passing mention of the infamous kudzu vine—Pueraia montana—which we all know too well) and a few shrubs, subshrubs, and forbs in the Crotalaria, Indigofera, Lespedeza, Mimosa, Senna, and Sesbania genera. Kathy will offer diagnostic features for distinguishing the target pest species from non-targets and supply information on additional identification resources.

Is plasticity associated with invasiveness?

Jean H. Burns and Alice A. Winn
Florida State University
Tallahassee, Florida 32306-1100
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Email: burns@bio.fsu.edu
Abstract:

Phenotypic plasticity of particular traits may be a mechanism by which invasive species succeed when other, closely related and otherwise similar species do not. We predicted that under conditions where invasive species have a performance advantage, the performance advantage might be explained by adaptive plasticity of traits such as internode elongation. We compared four pairs of congeneric invasive and non-invasive Commelinaceae across competitive environments to determine whether (and under what conditions) invaders had an advantage, and whether that advantage might be explained by differences in plasticity between invasive and non-invasive pairs. We found that each invader species exhibited enhanced performance compared to the non-invasive relative, when there was no competition. However, when each species was grown in competition with grass, invasive species performed worse or no different than non-invasive congeners for three out of four pairs. Thus invasive species in this study exhibited an opportunistic strategy when released from competition. However, the mechanism that might explain this enhanced performance differs among pairs. In addition, there was an overall trend for invaders to have greater specific leaf area (thinner leaves) than non-invasive species.

TAG you're it. Biocontrol Approval Process.

Al Cofrancesco
U.S. Army Corps of Engineers
Waterways Experiment Station
CEWES-ER-A
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
Phone: (601) 634-3182
Email: cofrana@ex1.wes.army.mil

Abstract:

The Technical Advisory Group for Biological Control Agents of Weeds (TAG) provides recommendations and advice to the United States Department of Agriculture (USDA) and researchers on the introduction of biological control agents to manage noxious plant populations. The TAG was originally formed as a subcommittee under the Joint Weed Committees of the USDA and United States Department of Interior (USDI), which started in 1957. Since that time the TAG has undergone major reorganization and changes in its role including. TAG membership or representation to the TAG is solicited from organizations that have various control authorities over lands or operations that may be influenced by the release of biological control agents. Environmental safety is the primary concern of the organization and all petitions are reviewed according to guidelines established by the group. From 1987 through 1996 the TAG reviewed 108 petitions and provided favorable responses to 77%. Over this ten year period the annual number of petitions reviewed varied from a low of seven in 1993 and 1995 to a high of nineteen in 1989. In examining these petitions we find that 83 biological control agents were petitioned for release on 30 target plants. Four target plants Euphorbia esula, Centaurea solstitialis, Centaurea diffusa, and Centaurea maculata accounted for over 40% of the petitions reviewed.

Is the Defoliating Sawfly Heteroperreyia hubrichi (Hymenoptera: Pergidae) Safe to Release in Florida for Biological Control of Brazilian Peppertree?

J.P. Cuda, J.C. Medal, J.L. Gillmore and J.H. Pedrosa-Macedo
Assistant Professor
UF/IFAS Entomology & Nematology Department
Bldg. 970, Natural Area Drive
PO Box 110620
Abstract:

Brazilian peppertree, *Schinus terebinthifolius* Raddi, is an invasive, toxic evergreen plant that is threatening the biodiversity in Florida. Native to Argentina, Paraguay and Brazil, Brazilian peppertree was introduced into Florida as a landscape ornamental in the late 19th century and eventually escaped cultivation. Brazilian peppertree now dominates most disturbed ecosystems and natural areas in southcentral Florida, forming dense thickets that completely shade out and displace native vegetation. Several insects were identified as potential biological control agents from the exploratory surveys conducted in Brazil in the 1980s. The defoliating sawfly *Heteroperreyia hubrichi* Malaise (Hymenoptera: Pergidae) was initially selected as a candidate for further study because the larvae visibly damaged the plant in its native range. TAG recommended releasing the insect from quarantine following extensive host range testing. However, field release was delayed after consultation with the USFWS because a federal endangered plant was not tested and the larvae contain natural products that can be toxic to some vertebrates when ingested. This presentation will show how these non-target issues were addressed, and will demonstrate that the risk of negative environmental impacts resulting from the release of the sawfly *H. hubrichi* for biological control of Brazilian peppertree in Florida would be acceptable.

What makes Brazilian pepper such a successful invader in Florida? A study of *Schinus* ecophysiology

Sharon M. L. Ewe
Florida International University
Southeast Environmental Research Center
Miami, FL 33199

Abstract:

I contrasted the ecology and physiology of Brazilian pepper (*Schinus terebinthifolius* Raddi) with native species in several South Florida ecosystems to identify traits which potentially contributed to the success of this invasive exotic in native ecosystems. In the pine rocklands of Everglades National Park, the exotic was less affected by seasonal hydrologic fluxes relative to native species. In the brackish mangrove forests of southwest Florida, *S. terebinthifolius* was also less affected by seasonal fluxes and additionally exhibited some salinity tolerance. Greenhouse experiments examining the impacts of flooding and salinity supported field findings. The plasticity in ecological and physiological responses of this exotic to flooding and salinity make it highly competitive against native species in a wide range of environments.
What's new with the IFAS Assessment?

Alison M. Fox and Doria R. Gordon
Agronomy Department, University of Florida
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Phone: (352)392-1811 ext 207
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Abstract:

Since 2001, considerable progress has been made with the IFAS Assessment of non-native plants in Florida's natural areas. The results for the more than 40 species that have been assessed will be presented, although we need some assistance in completing some species in some zones of Florida. There have been some improvements to the IFAS Assessment, especially in clarifying the various conclusions that will guide the recommendations to be made by IFAS Extension Faculty. Data have been collected about 113 other invasive plant/weed list systems from around the world, and these will be summarized to provide a broader context in which the IFAS Assessment is being used.

Exotic Plant Management Teams: Meeting the National Park Service Natural Resources Challenge

Nancy Fraley
National Park Service
51 Ranger Drive, Asheville, NC 28805
Phone: (828)350-3821 X213
Fax: (828)350-3829
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Abstract:

In 1999, NPS announced the Natural Resource Challenge, a five year program to strengthen natural resource management of Park Service lands. The strategy identified ten actions necessary to sustain natural resources in our parks. One strategy was to aggressively control non-native species. Invasive exotic plants have gained a foothold and are now infesting large areas in many parks. Estimates indicate that nonnative plants infest 4,600 new acres of federal land each day. Total area infested within our national parks is estimated at 2.6 million acres. Beginning in 2000 NPS put an emphasis on exotic plant management with the establishment of Exotic Plant Management Teams (EPMT) in the Hawaiian Islands, Florida, the National Capital Region and the Chihuahuan Desert/Short-Grass Prairie. The goal of these teams is to control or eradicate non-native plant species. Today 17 EPMTs have been deployed throughout the country. Modeled after the coordinated rapid response approach used in wild land fire fighting, EPMT success derives from its ability to adapt to local conditions and needs using weed science expertise and partnerships. An overview and update of EPMTs as an effective exotic plant management tool will be discussed.

Central Florida Lygodium Control Strategy

Doria R. Gordon, Robert L. Nelson and R. Scott Penfield
Senior Ecologist
The Nature Conservancy
Box 118526
University of Florida
Gainesville, FL 32611
Phone: (352) 392-5949
Abstract:

Old world climbing fern (*Lygodium microphyllum*) may be the most threatening of the invasive non-native plant species currently known in Florida. This species is moving northward, invading mesic to wet sites as far north as Lake County. Simultaneously, Japanese climbing fern (*L. japonicum*) is moving southward into south Florida. The two species overlap in central Florida, where we believe the opportunity exists for controlling the infestations and pushing back the area of overlap in the respective directions of spread. We propose a plan for developing a cooperative, comprehensive program of monitoring and control of climbing fern infestations on public and private lands in an 11 county band across central Florida. Our goal is to effectively prevent further expansion of both species by 2007. The approach involves delineating the current ranges of the species, obtaining designated funding for survey, control, and monitoring efforts on public and private properties, developing a cooperative “rapid strike force” for early detection and response, supporting biological control research, and ensuring that county codes require control in incorporated areas. We hope that the *Lygodium* effort becomes a model for a coordinated approach to prevent invasion by other species in Florida.

**South Florida and Caribbean Parks Exotic Plant Management Plan and EIS**

Sandy Hamilton  
National Park Service  
Environmental Quality Division  
Academy Place, P.O. Box 25287  
Denver, CO 80225  
Phone:(303) 969-2068

Abstract:

Florida has some of the most severe exotic plant problems in the U.S. In Florida’s National Parks alone, over 400,000 acres (of about 2 million acres) are infested with invasive exotic plants. The presence and spread of exotic plants in the nine parks in South Florida and the Caribbean threaten the parks’ native species and habitat, cultural landscapes, recreation resources, and the integrity of historic or cultural structures. Recognizing that parks in South Florida and the Caribbean share exotic vegetation types and treatment regimes, the National Park Service is several months into a programmatic planning process for managing exotic vegetation in these nine parks. In December the planning team met with other government agencies active in exotic plant management in Florida and the Caribbean. Public scoping began in February. Analysis of the comments received, both in response to a newsletter and mail-in comment form and in person at six public meetings, has yielded a valuable look at the public’s key concerns and desires for exotic plant management in National Parks. This window on the public perspective may also help managers of other public lands understand the public’s interest in exotic plant management.

**African Origin of Air Potato**

Dr. Colin Hughes and Dr. William Overholt and C. Wallace  
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Biology Department  
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Abstract:

One of the first steps in a weed biological control program is the identification of the geographic origin of the introduced weed, with the premise being that the best biological control agents will be found on plants genetically similar to those in the invaded area. The native range of air potato spans a vast expanse from Asia to West Africa. The source of the air potato that was introduced into the United States is unknown. A previously reported study on the chloroplast DNA of Asian and African air potato showed distinct differences between plants from the two continents. We examined chloroplast DNA from Florida air potato, and matched the restriction fragment pattern to the published patterns. The pattern matches samples from Africa indicating that that is its. Future work should be able to further narrow the source within the African continent.

Invasive Plant Education at Archbold Biological Station

Jeffrey T. Hutchinson
Archbold Biological Station
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Email: jhutch@gowebco.com

Abstract:

Archbold Biological Station is a private non-profit ecological research institution located in Highlands County, Florida. The large number (> 2000) of visiting elementary-school students, high school classes, university classes, and interns that visit Archbold each year presents an opportunity to inform these groups on the impacts of invasive plants to Florida’s natural communities. A $750 grant from Florida Exotic Pest Plant council allowed me to develop a multi-faceted invasive plant education program at Archbold. The program at Archbold now includes a web-site (http://www.archbold-station.org/abslandmanage/ExoticsGrant03/ExoticsMain/aaInvases_index.htm), invasive plant kiosk, invasive plant field guide, treatment and monitoring manual, and presentations. Additionally, volunteer workdays are held 1-2 times per month to remove invasive plants from different areas at the Station. The first year of the Invasive Plant Education Program was successful in that a framework for future education programs on invasive plants was initiated at Archbold. Copies of the Field Guide are available on CD by writing to the Land Manager (landmanager@archbold-station.org).

Cogongrass invasion of southeastern forests: impacts on pine productivity

S. Jose, C.L. Ramsey, P. Daneshgar, R. Collins, and B.J. Brecke
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Milton FL. 32583

Abstract:

A site preparation field study was installed in the winter of 2002/2003, in Santa Rosa county FL. The cutover site was an 18 year-old loblolly pine plantation, which rapidly became infested with cogongrass after timber harvesting in 2000. The primary objective of the study was to determine the effects of cogongrass competition on loblolly pine growth and survival. Another objective was to determine the resiliency of cogongrass to a tank mix of imazapryr and
triclopyr. The study was completely randomized, with five replications. The majority of the cutover site was broadcast treated on October 15, 2002 with a tank mix of imazapyr (Chopper) at 48 fl oz/acre combined with triclopyr (Garlon 4) at 48 fl oz/acre. The surfactant was Timberland 90 applied at 12.8 fl oz/acre. The four treatments included: 1) control (untreated cogongrass infestation), 2) site preparation plots inside the cogongrass infestation, 3) site preparation plots outside of the cogongrass infestation, with native vegetation, and 4) site preparation plots outside of the cogongrass infestation that were kept weed-free throughout the 2003 growing season.

Bare-root loblolly pines were planted on March 6, 2003 on a 1.8 x 1.1 m spacing. Aboveground and belowground biomass for cogongrass and native vegetation was collected on a monthly basis. The effects of cogongrass and native vegetation competition on pine photosynthesis, stomatal conductance, and transpiration were also measured on a monthly basis, starting in July. Pine survival, diameter, and height growth were analyzed at the end of the 2003 growing season. The cogongrass live rhizome biomass for treatment 2 declined until September 2003 and then rapidly increased in October, 2003. Results show that significant productivity loss can be expected of planted loblolly pine if cogongrass grows unchecked. Cogongrass re-infested the plots treated with the herbicide tank mix, but the re-infestation was very patchy.

Palm Beach County’s Invasive Non-native Vegetation Removal Incentive Program

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Abstract:

In February, 2003, the Palm Beach County Board of County Commissioners passed a new ordinance that targets nine invasive non-native plant species on properties that border conservation areas in the County. The ordinance requires the removal (the stick) of these plant species on all properties within this buffer, however, coupled with the ordinance, is a generous incentive/financial assistance program (the carrot) to help property owners with the removal of these plants. Matthew King with Palm Beach County Dept. of Environmental Resources Management will discuss how this ordinance came into being, the details of the incentive program, and how the public is responding to this new program.

Tropical Soda Apple: An update on Research Efforts and Control Recommendations in Florida.

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Abstract:

Tropical soda apple (Solanum viarum) is an invasive non-native plant that has become a serious weed problem in pastures throughout Florida and the southeastern United States. In 1990, tropical soda apple (TSA) infested pasture in Florida was approximately 20,000 acres, in 1993, 325,000 acres, and in 1995 1 million acres were reported infested in Florida. Cattle producers in south and central Florida, have had increasing pressure from tropical soda apple (TSA) (Solanum viarum) invasion in pastures. When cattle are shipped out of the state of Florida, there is a high level of concern about contamination of pastures, feedlots, etc. by cattle that have eaten TSA fruit containing...
viable seed. Rapid spread of this weed has occurred from seeds transported in cattle, hay, sod, grass seeds, and wildlife (deer, feral hogs, birds).

Interest in control methods, both mechanical (mowing, burning, etc) and herbicide/combinations for control is a high priority for producers, County Agents, and Univ of Florida Extension weed scientists. Historically combinations of mowing and Remedy™ Herbicide have been used with generally good success, but cost per acre for these treatments are always of concern to the producers and can influence Univ Extension recommendations. Current best management practices developed by the University of Florida, IFAS recommend the use of Remedy herbicide applied at 2 pts/ac. However, new herbicides for use in pastures are available but information is lacking on how these new products will control TSA

The Pesticide Approval Process.

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Phone: (850) 487-2130

Abstract:

The Florida Pesticide Law and Rules (Chapter 487, F.S.; Chapter 5E-2, F.A.C.; Chapter 5E-9, F.A.C.) and Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) are the laws which regulate the distribution, sale, and use of pesticides with the purpose of protecting people and the environment from adverse effects of pesticides in the state of Florida. The initial entry point into Florida and other states is through the distribution and sale of pesticides. Under Chapter 487.041 (Registration) and Rule 5E-2.031 (Procedures for Pesticide Registration) the initial screening for the introduction of a new active ingredient, experimental use compound, special local need use, and any significant new use of a pesticide active ingredient is accomplished. The Florida Department of Agriculture and Consumer Services along with consultation of other state agencies through the Pesticide Registration Evaluation Committee (PREC) and the Pesticide Review Council (PRC) review submitted product chemistry, toxicological, environmental fate, residue chemistry, and worker/applicator safety data from the product's registrant. This data must provide scientific evidence that the pesticide will not cause any unreasonable adverse effects on public health or the environment. After review of the data and provided the submitted data are adequate to address Florida specific concerns the Department will either fully approve the registration; or conditionally register the product; or notify the applicant or registrant of intent to deny registration.

What's new in Herbicides?

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Abstract:

What's new with herbicides?
Herbicides continue to be an important tool in our IPM toolbox for invasive plant management in natural areas. Cooperative efforts among industry, universities, public land management agencies, and commercial applicators continually leads to improved herbicide use for managing invasive vegetation. Efforts in the last year to improve the use of herbicides in natural areas include the following: 1) approval of an aquatic site labeling for triclopyr amine (Renovate), 2) approval of an aquatic site labeling for imazapyr (Arsenal), 3) demonstration of low volume application techniques for imazapyr, 4) Special Local Need Registration (SLN) for the use of metsulfuron methyl (Escort) to control lygodiunm in sites with standing water, 4) expanded use label for fluoroxypry (Vista), a selective broadleaf herbicide, and 5) field trials with new application technology with diquat dibromide (Reward).

Industry influence on exotic plant pest policies

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Abstract:

In response to the 2000 federal executive order, exotic pest councils are forming nationwide. These nascent groups are entrusted with considerable potential to shape their state’s policies. Inevitably, the backgrounds and priorities of council leadership will influence critical decision-making processes. Relevant industries nationwide, ranging from nursery owners to beekeepers, are interested in the outcome of exotic plant pest policy-making. Stakeholder participation in policy formation provides both important industry perspective, and the potential for conflict of interest. This research compares state exotic plant pest councils by 1) level of industry participation in council leadership and/or advisory committees, 2) process for developing criteria for listing species as invasive, and 3) legislation and/or public education strategies produced thus far. An in-depth focus on Michigan’s Invasive Plant Pest Council and state policies will be used for illustration purposes.

Preliminary results show that while some states embrace industry leadership, others prefer to utilize it in an advisory (vs. decision-making) capacity. There is a great deal of variability state to state, with minimal interstate communication concerning these issues. Fighting invasive plant species is a challenge of extraordinary magnitude, and the opportunity to learn from each other will greatly aid our ability to make a difference nationwide.

Biological Control of Tropical Soda Apple in Florida:
One Beetle Released, Four More Coming.

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Abstract:

Tropical soda apple (TSA), (Solanaceae), is an invasive perennial weed in southeastern USA. Native to South America, it was first found in Glade County, Florida in 1988, and it has already invaded more than 1 million acres of grasslands, agricultural, and conservation areas in eleven states. A classical biological control project was initiated against TSA in 1997. Field releases in Florida of the first approved biocontrol agent, the leaf-beetle Gratiana boliviana (Chrysomelidae) began in summer 2003. Establishment, dispersal, and initial impact studies of this beetle are ongoing. Specificity tests with four other candidates (a flower bud-weevil, and three leaf-beetles) will be completed soon.

Federal Noxious Weeds and Other Invasive Species Regulated by USDA APHIS

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Abstract:

APHIS PPQ activities include regulatory, survey, control, and information activities for Federal Noxious Weed (FNW) and other invasive species. Programs used to fund FNW work include Agricultural Quarantine Inspection, Biological Control, Emerging Plant Pest, Noxious Weed, Pest Detection and Witchweed. Contingency Funds were requested for European gypsy moth, citrus longhorned beetle, Asian gypsy moth and tropical spiderwort. The major PPQ weed species targeted for 2004 are cogongrass, common broomrape, giant hogweed, giant salvinia, hydrilla, goatsrue, tropical soda apple, tropical spiderwort and witchweed.

Optimizing Treatment Efficacy Armed with Science

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Abstract:

Never has it been more crucial that we optimize treatment efficacy to effectively combat invasive plants. Much has been learned over the past 40 years of research in the disciplines of vegetation management science (crop science, weed science, forest vegetation management science, restoration science, etc.). Integrated weed management approaches, to be effective, demand that logically timed sequences or combinations of numerous control and cultural treatments be orchestrated over time, and all must be optimally applied for success. Findings and principles derived from vegetation management science will be presented on factors that influence effectiveness when using herbicides, mechanical-manual, prescribed burning, and biological control treatments along with pertinent interactions.
Phenotypic evaluations of *Dioscorea oppositifolia*.

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Abstract:

*Dioscorea oppositifolia*, commonly known as Chinese yam, is an exotic perennial vine that invades natural areas in temperate regions of the eastern United States. Evaluations of *D. oppositifolia* growth, reproductive capacity and management were made from 2001 through 2004. *D. oppositifolia* growth was sigmoidal in nature. Plant growth from bulbils was slow and peaked in early October the first year. However, *D. oppositifolia* growth from established tubers was rapid and peaked near July 1 the following year. Average vine length for plants grown from bulbils was 210 cm, while vine length of plants grown from tubers was 480 cm. Similarly, bulbil production was four times greater for plants grown from tubers. Tuber production for the study period was also evaluated. Solutions containing four percent glyphosate or triclopyr provided >95% and 50% control, respectively. *D. oppositifolia* displays plasticity in growth habit depending on the type of reproductive structure it emerges from. Management of *D. oppositifolia* is possible in natural areas with glyphosate.

Florida Invasive Species Working Group, ISWG

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Abstract:

At the request of Florida's governor the Florida Department of Environmental Protection organized a July 10, 2001 meeting of agencies involved with invasive species management activities. The purpose of the meeting was to develop a statewide plan to unify and coordinate the responsibilities of government agencies to prevent and manage invasive species. In subsequent meetings the Invasive Species Working Group (ISWG) was formed to develop an interagency statewide invasive species plan, to resolve jurisdictional and policy disputes among member agencies, to assist in identifying invasive species program priorities and to facilitate cooperative invasive species management programs. The ISWG is composed of the following agencies: Florida Department of Environmental Protection, Florida Department of Agriculture and Consumer Services, Florida Fish and Wildlife Conservation Commission, Florida Department of Transportation, the five water management districts and the University of Florida's Institute of Food and Agricultural Sciences. The statewide plan was completed and approved by the governor during 2002. The plan includes eighteen action items in the areas of statewide coordination and cooperation, prevention, surveillance, rapid response, control and management and public education. Other accomplishments to date include: an MOU formalizing the establishment of the IWSG, establishment of sub working groups for *Caulerpa taxifolia* and risk assessment and recommendations to DOACS concerning large-scale cultivation of *Arundo donax*. 
Plant Pests: Pathways and Pestilence

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Abstract:
This paper will give a very brief overview of the purpose of our survey efforts. These include: early detection of invasive non-indigenous plant pests; arthropods, mollusks, nematodes, pathogens and weeds. Next it gives a report and update on key pests that we have been tracking for Florida. These include, but are not limited to Lobate Lac Scale, Lepidoptera on citrus, Citrus longhorn beetle, Asian Longhorn Beetle, Emerald Ash Borer, Sudden Oak Death, Soybean Rust, Channeled Apple Snail and Giant African Snail. The paper will highlight snail and slugs and their significance as plant pest in Florida; detailing their pathways, their role in the spread of key human diseases and their control.

Application of IKONOS Satellite Imagery for Detecting Lygodium microphyllum in the Everglades.

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Abstract:
Old World climbing fern (Lygodium microphyllum) has become a significantly harmful exotic weed in South Florida, where it is rapidly increasing in density and range. It has been particularly devastating within the Everglades, where it is spreading rapidly and altering the overall ecological integrity of the system. Accurate and timely identification of L. microphyllum is essential so that cost-effective management programs can be designed to reduce its range. New generation satellites and image processing tools may provide a mechanism to rapidly and accurately map plant species with unique spectral characteristics such as L. microphyllum on a regional basis. Five IKONOS satellite images were collected in March of 2002 of Water Conservation Area 1 (WCA-1), a 587 square Km impounded water preserve area within the northern Everglades. Four demonstration plots ranging in size from 300 to 678 ha were set up in the northern portions of the impoundment in order to ascertain whether these data could be utilized to accurately discriminate L. microphyllum. Most of the habitat that is being invaded in WCA-1 is located in tree/shrub habitats and hence an attempt at mapping these vegetation types was also tested. Initial results showed that the classification procedures didn't work well in areas where there is high nutrient influence and hence greater mixing of species. These areas are primarily found on the outer fringe edges of WCA-1 and were excluded from further image processing analysis. The methods utilized and developed in the demonstration plots were then applied to the five IKONOS images and an overall composite image was created for WCA-1. Results show that 11.6 percent of the tree/shrub habitat has been invaded by L. microphyllum, which encompassed a total area of 579 ha. These findings were also compared to on-going System Reconnaissance Flights that are being conducted for investigating the spread of exotics.
What's bugging melaleuca?

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Abstract:

*Melaleuca quinquenervia* (melaleuca) is native to Australia and highly invasive in Florida, forming dense forests that crowd out native vegetation. Melaleuca currently occupies an estimated 400,000 acres of south Florida's natural areas. In 1986 a biological control program for melaleuca was initiated with the intention of reducing tree growth and reproduction, thereby inhibiting further spread of this invasive pest and helping land managers maintain melaleuca-free areas. After years of quarantine-based host specificity testing, the program's first biological control agent, the weevil *Oxyops vitiosa*, was released in 1997 and the second, the psyllid *Boreioglycaspis melaleucae*, was released in 2002. Six years after the first biological control agent release, feeding by the two insects is having a dramatic effect on melaleuca throughout southern Florida. Impacts include reduced flower and seed production, stunted growth, thinning canopy and, in the case of small trees, even death. Current research programs and demonstration projects, including The Areawide Management Evaluation of Melaleuca (TAME Melaleuca), are designed to assess the efficacy of the biological control agents already released, to develop additional biological control agents for melaleuca, and to develop and promote effective strategies for integrating biological control with mechanical and herbicide controls for long-term, sustainable melaleuca management.

National Invasive Species Issues

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Abstract:

President Clinton’s Executive Order 13112 (1999) spelled out the intent of the executive branch of federal government in the arena of invasive pests. The Order’s definitions continue to shape invasive pest discussions. Optimistic descriptions of federal agency duties spelled out the benefits of collaborative agency efforts and programs, together with initial assumptions about the functioning of the National Invasive Species Council, the Invasive Species Advisory Committee, and the National Management Plan. And the results? The Executive Order and studies by the General Accounting Office have encouraged federal agencies to identify total federal expenditures on invasive species, an important starting point for tracking federal budget shifts. The Advisory Committee assisted in the development of this country’s first National Management Plan, with its 59 Action Items. Evolution of the National Invasive Species Council and Advisory Committee has paralleled a general increase in awareness by federal agency, Congressional, and state agency staff about invasive species issues. Public awareness opportunities have increased as more and more news stories report on new problems. Academic programs reflect this increase in awareness, as more and more campuses develop invasives curricula and additional centers/institutes are created. There is still a very long way to go, and many obvious areas where progress has been limited or non-existent. The
deadlines in the National Management Plan were too optimistic—most have been missed. Changes in administration and staffing have delayed progress. And the fundamental role that the Advisory Committee could play with the members of the National Invasive Species Council still has not clearly been defined. Still, the significant progress that has been made deserves commendation, and the role of professional societies, including the Exotic Pest Plant Council’s, is a key factor in that progress. The support of EPPCs and other national organizations will be critical if further, and faster, progress is to be made in the coming years.

Lygodium Management on Loxahatchee NWR

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Abstract:

Old World climbing fern, *Lygodium microphyllum*, an introduced vine from Africa, Asia, and Australia, infests in excess of 10,000 hectares of refuge habitats. This exotic vine adversely impacts native plant communities, affects water flow and drainage, fire ecology, and may be a potential threat to wildlife. Currently, *Lygodium* is the most serious exotic plant threat to the Refuge and the Everglades ecosystem.

An effective Lygodium management program incorporates detection surveys, a species-specific plan of 'attack', treatments, monitoring, research, and education. The distribution of Lygodium on the Refuge is determined via aerial surveys (SRF). Information collected is used to identify areas for treatment. Currently the most effective treatments have been achieved via ground applications of herbicides. However, research on effectiveness of other treatments including aerial spraying and biological controls are underway. Research and monitoring on spore dispersal and effectiveness of different treatments is providing data for the development of an optimal control (*Lygodium*) model that will help direct future management decisions and strategies. Such an integrated approach is our best overall strategy for controlling *Lygodium microphyllum* on the Refuge.

Nine Hundred Experts and Groups Call for Action!

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Abstract:

Participants in Florida EPPC’s tenth annual meeting, in 1994, were among the first to hear about a new report on invasive species by the congressional Office of Technology Assessment. Between then and now, a huge amount of research, education, and agency coordination on invasive species has taken place throughout the United States. However, we have made far too little progress in improving public policy. To change that, more than 900 experts and citizens groups have banded together, laying out an ambitious national agenda of new legislation and programs.
Groups like the EPPC's are crucial to reaching these aims. With a new, 6-million member, environmental coalition in Washington to amplify the EPPC's work, the prospects are exciting!

Two flies to hog-tie melaleuca: the news from quarantine

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Abstract:

The release of the melaleuca bud-gall fly, Fergusonina turneri, out of quarantine into south Florida is expected in 2004. In both field and quarantine studies this fly was specific to Melaleuca quinquenervia. In part, this specificity can be attributed to a nematode which has coevolved with the fly. The life cycles of the fly and nematode are synchronized with one another as well as with the morphology, chemistry and development of Melaleuca quinquenervia. They induce galling of melaleuca buds, which curtails apical growth of stem axes, preempting flowering and seed production. As such, it is clearly the safest biological control candidate that we have studied and will release to date.

Following on the heels of this bud-gall fly is a stem-gall fly, Lophodiplosis trifida. Host-range studies of this fly in quarantine were initiated in the fall of 2003 and are ongoing. This fly galls stems of melaleuca seedlings as well as new growth on older plants effectively preventing further growth. If both flies are as successful in the field as they are in the lab at curtailing new growth, they will greatly enhance the effectiveness of the two existing leaf-feeding biological control agents, the melaleuca weevil, Oxyops vittiosa, and the melaleuca psyllid, Boreioglycaspis melaleucae.

Impacts of Lygodium microphyllum on Biodiversity in Everglades Wetland Ecosystems: the Catastrophic Responses in Species Composition and Spatial Patterns.

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Everglades Division, South Florida Water Management District
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Abstract:

Lygodium microphyllum (Old World Climbing Fern) originated from the Old World Tropics and was first observed as a naturalized plant in South Florida in 1965. It has since become a nuisance exotic and has rapidly spread and is being established system-wide in extremely remote and undisturbed areas such as the Florida Everglades. In particular L. microphyllum is primarily invading higher topographic areas such as Everglade tree islands. Once established, L. microphyllum rapidly outcompetes understory as well as shrub and canopy native vegetation. Of particular concern is that L. microphyllum is disrupting, at an alarming rate, the flora and fauna of the native ecosystem at the same time that a major 8.4 billion dollar Everglades restoration program is trying to enhance these same attributes. Recent research utilized IKONOS satellite data for mapping L. microphyllum within the 350,447 ha Water Conservation Area 1 wetland. Results showed that approximately 11.6 (579 ha) percent of the tree/shrub
vegetation within the impoundment had been infected by *L. microphyllum*. The *L. microphyllum* IKONOS derived coverage data was utilized in this study to explore the spatial spread patterns of *L. microphyllum*. Results suggest that *L. microphyllum* appears to be spreading from the northwest to the southeast in the landscape. However, it is more likely to establish on the southeast side of a tree island and then spread to the northwest, which corresponds to the prevailing wind direction in south Florida. Spatial pattern analysis of *L. microphyllum* spread indicated that it is correlated with the density and spatial distribution of tree/shrub vegetation. It appears that the dispersion of *L. microphyllum* is density dependent, which can be expressed as a logistic function and has a catastrophic threshold of 180 meters of mean distance between tree islands in the Everglades. It is estimated that the spread of *L. microphyllum* can be expressed as \( A = 0.388 \times Y^{2.774} \) (\( A \)=total hectares impacted; \( Y \)=years since establishment), which suggests that approximately 58% (2,930 ha) of the tree islands in the Refuge might be invaded by *L. microphyllum* by 2012.

**Posters**

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**Distribution of *Lygodium japonicum* and *L. microphyllum* on The Lake Wales Ridge**

Tabitha Biehl and The Lake Wales Ridge Ecosystem Working Group Exotics Committee
The Nature Conservancy
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Lake Wales, FL 33853-3712

**Abstract:**

Objective: By 2006, detect and contain exotics on private and public lands that could become larger threats and infestations. Therefore, by 2013, *Lygodium* infestations are under a maintenance control system (continuously surveying and treating infestations).

Methods: Conduct systematic and repeatable ground and aerial surveys for *Lygodium japonicum* and *microphyllum (Lygodium)*. The Lake Wales Ridge Ecosystem Working Group (LWREWG) exotics committee has been collecting location information from public and private landowners on these species. Once assembled the information is spatially referenced and distributed. A central location to share and compile information was designated. Initially paper surveys were distributed to partners and the private sector to gain feedback on known locations of *Lygodium* and will continuously be collected. At the end of every six months the distribution map is updated and redistributed to all parties that participated to be used to continue to collect data. Helicopter surveys were conducted to detect any large infestations and reach areas not covered by previous ground surveys. The helicopter flew east west transects spaced 1 km apart.

Progress/Results: As of March 2004, there are 213 mapped locations of *Lygodium* on the Lake Wales Ridge. The helicopter survey covered approximately 400,000 acres and was conducted February 28 - March 3 2004. The last ground survey information was updated in January 2004. Monitors discovered that the larger infestations of *Lygodium* occur at the southern end of the ridge, largest over 100 acres. In addition, we found in Highlands County 90 locations and only Polk 21 locations. This is not to say that *Lygodium* has not reached Polk County it only means that the infestations have not reached a size to be detected from the air. Comparing locations from the helicopter survey 111, to the ground surveys 108, only eight of these locations are duplicates, meaning 103 new infestations were mapped during the helicopter survey. This survey provided great insight into the immediacy of the problem on the ridge. Almost all infestations found during the helicopter survey on conservation lands have been located and treated. However, of the 111 locations of *Lygodium* found during the helicopter survey only 12 of these were on conservation lands, the remainder occur within non conservation private lands. The helicopter survey was donated by South Florida Water Management District and was implemented by staff from The Nature Conservancy, Department of Forestry and Florida Fish and Wildlife Conservation Commission. The LWREWG exotics committee is continuing to develop and implement strategies to assist private and public lands with continuous surveys and treatment for both species of *Lygodium*. 


Potential of LH-PCR for the Comparison of Microbial Diversity in Melaleuca and Non-Melaleuca Forest Floors in South Florida

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Abstract:

The invasive Australian tree, Melaleuca quinquenervia (melaleuca), threatens nearly 200,000 ha of native ecosystems in Southern Florida. As melaleuca monocultures develop, there follows dramatic litter accumulation, the production of large mats of feeder and/or aerenchyma roots that trap floating materials, the slow release and accumulation of phenolics and terpenes from the litter, and the disappearance of native plants such as Cladium sp. (sawgrass). These physical and chemical changes may induce shifts in microbial composition and species richness of the soil community. Microbial population shifts may in turn perpetuate the loss of native plant species and changes in litter decomposition dynamics. The study of complex soil microbial communities using the traditional culture dependant methods is difficult because of differential microbial growth rates and the inability of an approximately 85% of soil microbes to survive in culture. We are investigating the potential of a non-culture dependant method, length heterogeneity polymerase chain reaction (LH-PCR), to compare microbial community composition and species richness of soils dominated either by melaleuca or sawgrass. Preliminary data indicate that this method is repeatable and able to detect differences in both fungal and bacterial community profiles between soils and soil horizons of the two vegetation types.

Study Psyllid (Boreioglycaspis melaleucae) Feeding Affects Nonstructural Carbohydrate Levels in Melaleuca quinquenervia Saplings.

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Abstract:

Changes in nonstructural carbohydrate levels in Melaleuca quinquenervia saplings by the feeding of psyllid, Boreioglycaspis melaleucae were examined. Nonstructural carbohydrate levels were quantified as mg/gm dry weight using a microplate technique. Starch levels were exclusively quantified in one experiment conducted over a six-week period using 36 plants under greenhouse conditions. Changes in nonstructural carbohydrates due to insect herbivory were also examined by exposing 26 plants to 7,600 psyllids over a 21 week period. Upon the last harvest date two of the infested trees were cut to the base and monitored for regrowth. The results of this study show psyllid feeding significantly reduced plant growth and accounted for 40% of the dry weight loss of the infested plants. Nonstructural carbohydrate concentrations in structural roots were significantly different between infested and uninfested saplings. In severely damaged trees, root starch concentrations decreased up to 88% during the sampling period. The relationship between root starch reserves and plant regrowth will be discussed.
Biology of *Ischnodemus variegatus* (Signoret) (Blissidae): a potential biological control agent of *Hymenachne amplexicaulis*

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Abstract:
The exotic true bug, *Ischnodemus variegatus* Signoret, was recently found in Florida feeding on the invasive grass *Hymenachne amplexicaulis*. Damage by this insect is recognized by red coloration on the leaves and if infestation continues the plant turns brown and dies. The biology of *I.* variegatus is unknown; therefore, we performed studies under laboratory conditions. Eggs are laid and nymphs feed in tight spaces between the leaf sheath and the stem. Adults occur singly or mating in the terminal whorl of *H.* amplexicaulis and are recognized by a light-colored “M” pattern at the base of the wings. Mean developmental times at 28°C in days were: egg 11, nymph I 9.8, nymph II 5.4, nymph III 5.3, nymph IV 6, nymph V 7.8. Adult longevity ranged from 29 to 115 days. On average, females oviposited over a 44 day period and laid 206 eggs. Field and laboratory observations suggest that *I.* variegatus is strongly gregarious. The egg parasitoid *Eumicrosoma* spp. and the entomopathogen *Beauveria bassiana* are important sources of mortality of *I.* variegatus. Ongoing host range tests will determine whether *I.* variegatus can be used as a biological control agent against *H.* amplexicaulis.

Optimal spatial control of *Lygodium microphyllum*

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Abstract:
Old World Climbing Fern (*Lygodium microphyllum*) is a harmful pest plant currently invading many natural habitats in the Florida Everglades ecosystem. Its presence can result in detrimental changes to local communities including reduced habitat quality for native plants and animals and increased fire intensity. A key question in implementing treatment efforts is how to best apply limited management resources in a spatially explicit manner. I develop a computational model that accounts for the dynamics of growth, spread and treatment of *L.* microphyllum. An optimal control framework that defines the possible treatment scenarios is developed and provides a ranking of scenarios according to their effectiveness in controlling *L.* microphyllum, with particular application to management in A.R.M. Loxahatchee N.W.R. Results indicate that incorporation of spatial structure strongly influences the predicted ability of an optimal treatment plan to control *L.* microphyllum. The model provides a method to determine the effect on the optimal treatment plan of uncertainties in the patterns of growth and dispersal of *L.*
A potential biocontrol agent of West Indian Marsh grass (*Hymenachne amplexicaulis* (Poaceae)): documenting the impacts of *Ischnodemus variegatus* (Hemiptera: Blissinae) on the photosynthesis and growth of the invasive exotic grass

Sharon M. L. Ewe, William A. Overholt, Eric C. Morgan, Rodrigo Diaz and Onour E. Moeri
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Abstract:

We investigated the impacts of a non-native insect (*Ischnodemus variegatus* Signoret (Hemiptera: Blissinae)) on the gas exchange and growth of the invasive semi-aquatic grass *Hymenachne amplexicaulis* Rudge (Nees) (Poaceae). In the field, net carbon dioxide (CO$_2$) assimilation of infested plants was approximately 65% of non-infested plants and the CO$_2$ uptake rate was related to insect density. In the greenhouse, relative growth rate (RGR) of the infested plants was 77% of control individuals. Infected plants also had less biomass at the end of the experiment. However, even at artificially high densities compared to natural populations in the field, plants were not killed.

The accidental introduction of *I. variegatus* into Florida may be beneficial or detrimental to the state, depending on its host range. If it only feeds on *H. amplexicaulis*, *I. variegatus* will be regarded as a fortuitous biological control agent, but if it also feeds on native or economically important plants, then it could be a new pest. Host range studies are currently being conducted to determine this.

Cogongrass Control on Highway Rights-of-Way

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Cogongrass ([Imperata cylindrica (L.) Beauv.] is an undesired species on highway rights-of-way (ROWs) due to its displacement of native and/or more manageable grasses, unsightly growth characteristic, and propensity for fire. Most importantly, ROWs provide corridors to un-infested areas, therefore, expanding the range of this noxious weed. Two projects were located on Interstate 10 ROW in Baldwin Co., near the towns of Loxley (est. fall 2000) and Malbis (est. fall 2001). Both projects integrated chemical control with the subsequent revegetation of highly competitive and more desirable species. Herbicides were glyphosate and imazapyr. Replacement species were bahiagrass (*Paspalum notatum* var. Pensacola), common bermudagrass (*Cynodon dactylon*), browntop millet (*Panicum ramosum*), crimson clover (*Trifolium incarnatum* var. AU Robin), and annual ryegrass (*Lolium multiflorum* var. Gulf). Treatments were comprised of various combinations of herbicides and replacement species. At least two years continuous treatment and/or reseeding was necessary for adequate visual control and reduction in stand of cogongrass. Glyphosate alone as a treatment was only effective when applied in the three year regime (Loxley) or in the two year regime (Malbis). Imazapyr consistently provided long-term control regardless of glyphosate. Winter cover crops, especially crimson clover, delayed cogongrass emergence in spring, but made no difference in overall control. Specific treatment combinations were less important than the number of times in which those treatments were applied.
Identifying the origin of invasive plants is an important first step in classical biological control. However, the historical record is non-specific about the South America origin(s) of the Florida exotic population of Brazilian pepper. To uncover the origin(s) and patterns of introduction, we collected Brazilian pepper samples from 345 plants in Florida, and 26 plants in Brazil. These samples were genotyped at 8 microsatellite loci, and a region of the chloroplast DNA was sequenced. Microsatellite data revealed a significant subdivision within Florida though measures of genetic diversity were similar across the state. Brazil had a significantly higher allelic richness than Florida. We found two chloroplast haplotypes in Florida and five in Brazil. The more common Florida haplotype was among the Brazilian haplotypes, but the geographic source of the second haplotype has not been identified; sequence data indicate that it came from a region far from those already collected in Brazil; this source needs to be identified. In combination, the microsatellite and cpDNA analyses suggest that there were two introductions of Brazilian pepper tree into Florida, and complete mixing of the two types. Biocontrol agents should be sought in both source regions of Brazil.

Cumberland Island Exotic Species Survey

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Abstract:

Twenty-thousand acres of barrier island habitats and historical dwellings in Camden County, Georgia are being surveyed for exotic plant species. Preliminary results include: species checklist, Access database, GIS database, and herbarium vouchers. Fifty-three species from 29 families have been recorded. Fourteen of these species are listed as pest species by GAEPPC, FLEPPC, or both. One hundred and twenty-nine acres of exotic vegetation consisting of 130 isolated individuals and 56 populations have been mapped with herbarium vouchers produced for each population. This data will be useful for the prioritization of exotic plant management on the island.

GIS for Baseline Mapping of Brazilian Peppertree (Schinus terebinthifolius Raddi) from Multi-Temporal Remote Sensing and Field Data

K. Liang Huang, Jonathan D. Jordan, William A. Overholt and James P. Cuda

A baseline map of the current extent of Brazilian peppertree (Schinus terebinthifolius Raddi) in Florida is needed for planning and eventually evaluating Integrated Weed Management efforts. This plant forms dense canopy stands in abandoned fields, disturbed areas, and a wide range of natural community types—esp. pineland and mangrove areas.
Its characteristics of dense evergreen foliage, suppression of other vegetation beneath it, and seasonal masses of flowers and bright red fruits form the basis for distinguishing it by means of remote sensing.

This research aims to create a baseline map of Brazilian peppertree distribution in Florida using a geographic information system (GIS) database of image-maps and field transects. The image-maps are being processed from multi-temporal set of Landsat-7 satellite images (ETM+ L1G), which cover the peppertree range area of central and south Florida. Fieldwork is being performed with Global Positioning System (GPS) equipment to identify "end member" areas of pure peppertree and areas of other vegetation community types, which will be used in training-stage and accuracy evaluation of the image-maps.

As the spatial resolution of the baseline image-maps is 30 m, it is anticipated that certain sites with large stands of peppertree will be imaged periodically with finer-resolution airborne instruments at a later date. This will potentially allow for monitoring the effects of biocontrol agents in slowing the spread and reducing the density of Brazilian peppertree, and perhaps identifying the damage to stands and individual plants as a result of the biocontrol agents.

**Rookery Bay National Estuarine Research Reserve's invasive species program and its battle against Old World Climbing Fern.**

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Rookery Bay National Estuarine Research Reserve has recently felt the effects of the Old World Climbing Fern. Old World Climbing Fern is an invasive vine that smothers native vegetation, alters fire ecology, and creates thick mats of damaging plant material. The staff at Rookery Bay has placed Old World Climbing Fern at the top of our invasive program, ahead of Brazilian pepper, melaleuca, and lather leaf. This poster demonstrates the ways in which Rookery Bay is utilizing its resource management team, volunteer and outreach programs, as well as, the latest techniques, to combat these invaders.

**Occurrence of non-native plants in riparian forests across a land use gradient.**

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As urbanization expands into rural areas, an increase in the number of non-native plant species at the urban-rural interface is expected due to the increased availability of propagules from ornamental plantings. A study investigating the distribution of non-native plants in riparian forests across an urban-to-rural gradient north of Columbus, GA was initiated in 2003. Shrubs and herbaceous plants were sampled twice (June and September) in 15 watersheds. Transects were established along a 500 m section of each stream and percent cover of all herbaceous plants within 1 m² quadrats and number of shrubs within 1.3 m diameter plots centered on the m² quadrats was determined.
Quadrats were randomly placed at approximate intervals of 30 m along each transect. A significantly greater number of non-native plant species occurred at the urban sites and at one of the sites at the urban-rural interface. However, the importance values of non-natives did not change significantly across the land use gradient due to the high frequency and abundance of *Ligustrum sinense*, *Lonicera japonica* and *Microstegium vimineum* in the majority of the watersheds. Species richness and overstory regeneration were negatively impacted by *Ligustrum* and *Microstegium*.

**Apalachicola River Basin Invasives Working Group**

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The Apalachicola River watershed encompasses the northwest Florida counties of Jackson, Gadsden, Liberty, Calhoun, Gulf and Franklin. It is known that the establishment of invasive non-native plants and animals can disrupt native systems. It is most certain that disruption of the aquatic and terrestrial systems within the Apalachicola River watershed will occur if the invasion of non-native species is left unchecked. Responding to the threat non-natives pose we are leading the development of the Apalachicola River Basin Invasives Working Group. Currently, land managers are addressing non-natives on a local scale with some success. However, to work more effectively against non-native species a comprehensive, region-wide approach must be implemented. The Apalachicola River Basin Invasives Working Group is a partnership of public and private land managers working within the watershed to address all taxa of invasive non-native species. This working group will provide a forum for partners to work together coordinating efforts, locating resources and developing innovative strategies for implementation of invasive species monitoring programs, future eradication projects and restoration of native systems within the Apalachicola River watershed.

**Inhibitory effects upon germination and growth of selected native plants by Schinus terebinthifolius Raddi. aqueous extracts.**

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Miami, FL 33199

*Schinus terebinthifolius*, or Brazilian Peppertree, is an exotic invasive plant species found throughout much of peninsular Florida. This plant has been documented to rapidly colonize disturbed areas and displace native vegetation. While there has been wide speculation, no concrete studies exist about possible inhibitory effects of *S. terebinthifolius* to native species. The inhibitory effect of aqueous leaf extracts of *S. terebinthifolius* on seed germination and aboveground biomass accumulation of three native species was examined using laboratory assays. Seedlings were tested for germination in Petri dishes within growth chambers at a specific temperature, humidity, and light level. The proportion of *Bidens alba* (L.) DC. and *Rivina humilis* L. seeds exposed to the extract was lower than control groups exposed to distilled water. Further tests showed that Bidens alba seeds were not inhibited by an extract of *Quercus laurifolia* Michx (Laurel Oak), possibly eliminating tannins as the cause of decline in germination when exposed to the *S. terebinthifolius* extract. Laurel oak is a common component of the flora in which both *S. terebinthifolius* and *B. alba* are found. Biomass accumulation of *Bidens alba* thirty days after germination was approximately 30% less for plants which were irrigated with an aqueous extract from *Schinus* compared to plants which received water.
**Fairchild Tropical Botanic Garden. Our role in the invasive plant battle.**

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Abstract:

Fairchild Tropical Botanic Garden is one of the world's preeminent botanic gardens, with extensive collections of rare tropical plants. Established in 1938, the 83-acre Garden is among the region's most popular attractions and offers a variety of programs in environmental education, conservation and horticulture. As conservation becomes increasingly important in today's world, Fairchild is broadening and enhancing conservation programs at the local, regional, national, and international level, which includes addressing invasive plant issues. Horticulture staff have screened for invaders long before it became mandatory or fashionable. However, efforts have recently been intensified through more interaction among FTBG departments and with the pest plant community. A new policy on invasives will be drafted later this year. We are taking responsibility for removal of species that have spread to a neighboring county park, and we work with land managers to identify problem species and remove those species from our collections permanently. Fairchild's Research Center is also doing our part, through a program funded by Miami-Dade County Natural Areas Management. The Rare Plant SWAT Team, a monthly volunteer group, removes invasives from County Parks where the survival of rare native flora is being directly threatened. In addition, a research project is underway to examine the effects of the invasive grass Rhynchelytrum repens on the abundance, diversity, and persistence of native plant species.

**Comparison of wildlife diversity and abundance between restored and un-restored wetlands on Sanibel Island**

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Abstract:

It is frequently argued that the relative abundance of invasive non-native plants in wetland habitats of South Florida drastically reduces “function”. Yet very little scientific data support such arguments. Further, the dominance of invasive non-native plants in wetlands can be reversed as evidenced by the numerous eradication efforts across the State. How then does wildlife respond to this “restoration”? In order to determine the effects of such invasions and the ability of systems to recover, we compared wildlife diversity and abundance between wetlands dominated by Brazilian pepper and those where pepper had been removed on Sanibel Island, Florida.
Natural enemy escape and the evolution of herbivory resistance in the invasive plant *Melaleuca quinquenervia*.

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Abstract:

To examine how an invasive plant may evolve resistance to herbivory by biological control insects, we conducted a quantitative genetics study of the invasive tree species *Melaleuca quinquenervia*. We planted seedlings of known maternity from native and introduced ranges into a common garden. Seedlings were either exposed to herbivory by locally occurring populations of introduced biological control agents, or were sprayed with an insecticide as a control. Genotypes from the introduced range had a greater proportion of insects and suffered greater damage than genotypes from the native range, supporting the natural enemy escape hypothesis. Plants from the introduced range also had a lower density of leaf hairs, and thus, leaf hairs were correlated with the presence and damage of insects. Leaf pubescence also appears to be heritable and under directional or possibly stabilizing selection. The results of the study generally support the natural enemy release hypothesis, but do not indicate that the evolution of increased herbivore resistance will pose a substantial threat to biological control efforts.

Post-Release Evaluation of Biological Control of *Melaleuca quinquenervia* in South Florida.

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*Melaleuca* (*Melaleuca quinquenervia*), of Australian origin, is spreading rapidly in the Everglades and other natural ecosystems in south Florida. Presently, the melaleuca biological control program consists of two agents, the melaleuca weevil (*Oxyops vitiosa*) released in 1997, and the melaleuca psyllid (*Boreioglycaspis melaleucae*) in 2002. Additionally, a rust fungus, *Puccinia psidii*, was discovered on melaleuca in 1996. These biological control agents prefer healthy new growth of melaleuca, and cause substantial damage to trees of all ages. Herein, we report preliminary results that show the impacts of these agents on melaleuca stand structure, tree fitness, and regenerative potential. A comparison of data before (1996) and after (2003) indicated over 70% defoliation and 83% mortality of melaleuca saplings at an insect release site in Broward County. This high mortality of juvenile trees directly interferes with natural regeneration of melaleuca stands at the release site.
Effect of simulated herbivory on growth and fruit production of Brazilian pepper tree (*Schinus terebinthifolius*, Anacardiaceae)

Lucinda W. Treadwell and James P. Cuda  
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Among a suite of promising biological control agents for Brazilian pepper tree is the sawfly *Heteroperreyia hubrichi* (Pergidae), whose larvae defoliate entire small trees in their native Brazil during two population peaks each year and often return to the same trees year after year. Sawfly defoliation was imitated by manually snipping leaves from young BPs 1 or 2 times in a year, for 1 or 2 years. Trees that were defoliated only one time compensated for this loss and outperformed controls in growth as well as fruit production over the course of the experiment. Trees that had been defoliated twice in 2 years and again in Fall 2004 remained stunted and with fruit of inferior quality. The other treatments trended smaller and with less fruit than the controls. A marked difference was seen in fruit production among branches in a single tree, with controls significantly outperforming branches that had been defoliated as flowering started.

Classical Biological Control of the Invasive Strawberry Guava, *Psidium cattleianum* Sabine (Myrtaceae), in Florida and Hawaii.

F.J. Wessels, J.P. Cuda and M.T. Johnson  
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Entomology and Nematology  
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Abstract:

The invasive strawberry guava (SG), *Psidium cattleianum*, is a weed native to the Atlantic forest ecosystem of southeastern Brazil. Introduced to Florida as an ornamental, SG escaped cultivation and alters native plant communities. SG is the preferred host of the adventive caribfly, *Anastrepha suspensa* Loew, a major agricultural pest in Florida. A survey of associated entomofauna in Brazil identified five potential classical biocontrol agents of SG. The most promising was a leaf-galling erioccid, *Tectococcus ovatus* Hempel. Biological studies and host specificity testing are underway to determine if *T. ovatus* is safe to release as a biological control agent.
The Garden of Eden, Florida
by Rory Maclean

Drive 43 miles west of the state capital Tallahassee and you’ll reach Bristol, Liberty County. It’s a small, dusty town of dirt roads, shabby bungalows and yawning mobile homes. I’d heard about a Baptist minister, Elvy E. Callaway, who claimed that mankind had been created on the banks of Florida’s Apalachicola River. Callaway studied the matter for 75 years and, as proof, quoted from Genesis that ‘a river went out of Eden to water the Garden and parted and became four heads.’ He maintained that the Apalachicola River was the only four-headed river system in the world. He also noted that the rare gopher wood tree, the Torreya taxifolia, grew only in two places: the Panhandle, and Eden.

I found the utilitarian Bristol City Hall and went in. A Confederate patriarch ash white skin, shadow thin, sitting bolt upright in a straight hard chair wore a crisp, tie-less Sunday shirt buttoned to the collar.

"I'm looking for the mayor," I said.

"Mayor’s gone up to Sink to catch bullheads. Won’t be back 'til Friday.""Tha..." "Then I wonder if you know a Mr. E. E. Callaway?" I asked.

"Sure do," he replied, easing himself up from his chair, his movements stiff. "But he won’t be much use to you. Elvy’s been dead near on twenty years."

"Well, can you direct me to the Garden of Eden?"

"The Garden of Eden?" repeated the old man. "They say it was here," he told me, "but it’s only the whisper of a claim."

"Here In town?" I asked. "In Bristol?"

"Just up the road a few miles. Turn left off Highway 270. It’s real near to the spot where the ark was built."

"Noah’s ark?"

"None other." I wasn’t prepared for the ark. He offered to show me the way personally. We took off in his truck.

"Is this it?" I asked him, both excited and skeptical, as he turned onto a dirt track. We parked at the edge of a sandhill forest and followed a drifting trail through the sparse, longleaf pines. It was hot in the sun and he hurried ahead, anxious to reach the cool cover of beech and evergreen.

"Not good for anything much except to hold the world together," he said, pointing at the odd clumps of wire grass, tufted like a punk’s hair. "Near extinct, too."

His pace slowed when we entered the pale shade of the slope forest. The green canopy darkened the path as it angled down to the edge of the steephead ravine. Over the lip, one hundred feet below, were the leafy tops of magnolias, sweetbay and oaks. Cicadas buzzed in the trees beneath us. Black-winged dragonflies darted into the valley.

"Is this it?" We plunged into the deep, narrow ravine, grasping for handholds on the sheer sidewalls, disturbing spiders’ silk strands hung across the path. Over millennia a crystal clear creek had undercut the slope to the hidden canyon. At the place where it sprang from the toe of the valley I crouched down to dip my fingers in the fresh water. There were newts and dusky salamanders in its sandy shallows. Water beetles pushed against its current. Underfoot were soft moseses and minute delicate ferns.

I didn’t ask again if we’d arrived.

The ravine was shaped like a natural amphitheatre, the tiers of lush vegetation rising above us on all sides. A chestnut-brown wren flew off from its feeding. We walked on through the fragile valley watching for diamondbacks and Indigo snakes, maybe even for a serpent. The track rose out of the basin of sweet air and toward the Apalachicola, climbing up between the hickory and the oaks, back into the sultry afternoon.

The Garden – or Apalachicola Bluffs and Ravines Preserve – supports a remarkable range of plant life, a paleoefugia of ancient flora and fauna stranded during the retreat of glaciers and unchanged for millions of years. There are subtropical pines on its sandy uplands, mountain laurel on the steepheads and northern hydrangea in the depths of the primeval ravines. Its river system sustains the greatest variety of amphibians and reptiles in North America. As far back as the 1830s, botanists puzzled over the valley’s strange mix of native, northern and rare plant species, many of which were extinct elsewhere.

Up on the crest of the bluff, the gentleman led on. There were gopher tortoises here and above us swallow-tailed kites. One hundred feet below the broad, khaki Apalachicola meandered from the Appalachians to the Gulf of Mexico. Under the sun it occurred to me that what was special was not whether Eden was here, but that locals believed in its existence. Or wanted to believe in it.
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We sincerely thank our sponsors and exhibitors for their support here in Pensacola Beach and added thanks for all of their ongoing help back home:

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- UAP Timberland LLC
- TAME (The Area Wide Mgmt. and Evaluation of Melaleuca)
- University of Florida IFAS Bookstore