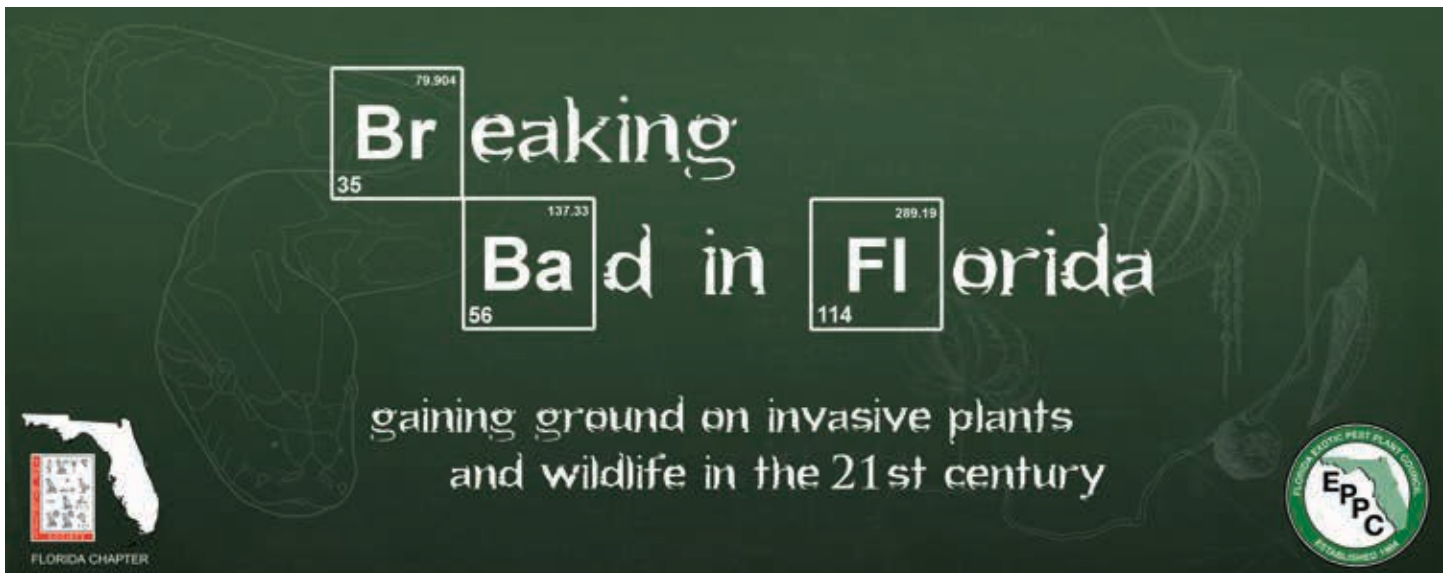


Wildland Weeds

SPRING 2014





The Florida Exotic Pest Plant Council and
The Florida Chapter of The Wildlife Society
will co-host the
2014 Spring Conference April 28th – May 1st, 2014
Safety Harbor, Florida

SAVE THE DATE! The Florida Exotic Pest Plant Council (FLEPPC) and the Florida Chapter of The Wildlife Society (FL TWS) will cohost the annual Spring Conference from April 28th – May 1st, 2014 at the Safety Harbor Resort in the quaint town of Safety Harbor on the west side of Upper Tampa Bay.

The theme for this joint conference is **Breaking Bad in Florida: Gaining Ground on Invasive Plants and Animals in the 21st Century**. Speakers and presentations will be integrated to illustrate the issues surrounding wildlife and their habitats and the advancements in invasive plant and animal control. Individual research and management projects will be a focus during technical sessions. In addition, the conference will provide an opportunity to earn continuing education credits for herbicide applicators.

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Additional details are on the conference page website at fltws.org. All natural resource professionals, researchers, students and educators will benefit from the information exchange and networking opportunities available at this joint conference.

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The mission of the Exotic Pest Plant Councils is to support the management of invasive exotic plants in natural areas by providing a forum for the exchange of scientific, educational and technical information.

An **exotic plant** has been introduced, either purposefully or accidentally, from outside of its natural range. A **naturalized exotic plant** is one that sustains itself outside of cultivation (it is still exotic; it has not “become” native). An **invasive exotic plant** not only has become naturalized, but is expanding its range in native plant communities.

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On the Cover:

Our cover features incised halberd fern (*Tectaria incisa*) which can displace the rare, native broad halberd fern (*Tectaria heracleifolia*). The two ferns bear a strong resemblance and often grow intermingled, making management difficult. See article on page 23. Photo by Patricia Howell.

Invasive Species Plant Lists: A Step Toward Consistency Among SE-EPPC Chapters

By Brian Arnold and Nancy Loewenstein

The creation and maintenance of an “Invasive Plant List,” a list of non-native plants that are invasive or likely to become invasive within a given geographic area, is arguably the most critical function of an Exotic or Invasive Plant Council. In addition to identifying invasive plants, these non-regulatory plant lists often provide additional information such as distribution, type of habitat at risk, economic impacts, and other information that can be used by natural resource professionals and land managers.

As important as plant lists are, their creation and maintenance can be onerous. There are often differing opinions regarding list structure and the myriad of criterion that must be considered. These differences of opinion and the lack of a model plant list have resulted in varying list structures among the SE-EPPC chapters, with each one requiring an expense of time and energy to interpret and comprehend. In addition, the validity and defensibility of lists that have disparate criteria for evaluating plants may be questioned. The lack of a comprehensive structure also gives the appearance of a lack of cohesiveness within the SE-EPPC.

A consistent listing structure among EPPCs and IPCs would facilitate the use of plant lists across multiple regions. It would also suggest a broader acceptance of criteria and methods used and, in so doing, aid in the validity and defensibility of individual lists. Furthermore, establishing a broadly accepted and consistent format should facilitate the creation of new lists where needed.

With this in mind, the SE-EPPC applied for and was awarded a \$7,000 grant in 2011 from the U.S. Forest Service (USFS) Southern Region. A significant portion of the grant was applied toward comparing the methodologies used to create invasive plant lists by SE-EPPC chapters. It was hoped that a byproduct of the grant project would be increased communication and sharing of ideas among chapters regarding plant listing and other aspects of invasive plant management.

Two successive Invasive Species Specialists were hired by SE-EPPC to complete the work specified within the grant. Side-by-side comparisons of chapter plant lists were made, numerous phone interviews with EPPC and IPC list committee members were conducted, and a number of natural resource professionals were interviewed. In addition, an online survey regarding plant list data, as well as the Early Detection and Distribution Mapping System (EDDMapS) and Cooperative Invasive Species Management Areas (CISMAs)/ Cooperative Weed Management Areas (CWMAs), was sent to EPPC and IPC list-servs to gather information from a broader base of the invasive plant community.

First steps may be easy

Though there are differences in chapter plant lists that might require spirited debate to overcome, there are some factors for which a consistent format could likely be achieved with minimal conflict. For instance, there is no consistency in the titles used for the plant lists on the respective chapter websites and the titles of the actual documents (Table 1). However, agreement on standard titles may be something that chapters could easily achieve.

There is also variation in what types of information are included on state chapter plant lists (Table 2). Examples include whether or not to include data such as “growth form” or “current use.” Although consideration of the “ecological impact” of invasive plants may be debatable, a decision on whether or not to include such data could perhaps be agreed upon at the regional level.

The SE-EPPC Invasive Species Grant Report identified key elements that all lists should contain. These include: 1) stated purpose for list, 2) clearly defined structure, 3) transparency, 4) ability to access key data online, and 5) updates every 2-4 years.

Complete information regarding plant listing and other aspects of the grant, such as EDDMapS use and CISMAs in

Table 1. Titles for Plant List website links and documents among SE-EPPC Chapters from the *SE-EPPC Invasive Species Grant Report*.

State Chapter	Name for link / Name on document
Alabama	2012 Updated Plant List Of Invasive Plants
Florida	FL-EPPC List of Invasive Plant Species / FL EPPC’s 2011 Invasive Plant Species List
Georgia	Plant List / List of Non-native Invasive Plants in Georgia
Kentucky	Exotic Plants List / ----
Mississippi	DRAFT Plant List / DRAFT: Noteworthy Exotic Plant Species for Mississippi
North Carolina	North Carolina Invasives / ----
South Carolina	Invasive Plant List / SC-EPPC Terrestrial Exotic Invasive Species List 2011
Tennessee	Invasive Plants / TN-EPPC Invasive Exotic Pest Plants in Tennessee

Table 2. Information included on SE-EPPC State Chapter Plant Lists. Data from the *SE-EPPC Invasive Species Grant Report*.

Information on List	AL	FL	GA	KY	MS	NC	SC	TN	TOTAL
Category rank	✓	✓	✓	✓	✓		✓	✓	7
Scientific name	✓	✓	✓	✓	✓	✓	✓	✓	8
Common name	✓	✓	✓	✓	✓	✓	✓	✓	8
Growth form	✓				✓		✓	✓	4
Physiographic regions		✓			✓		✓		3
Habitats/land uses	✓				✓				2
Current uses	✓								1
Federal/state noxious weed list(s)		✓			✓		✓		3
Other states in which species is listed					✓		✓		2
EDRR (Early Detection/Rapid Response)							✓		1
Link to additional info or maps		✓	✓				✓		3
Management difficulty					✓		✓		2
Ecological impact					✓				1
Economic impact					✓				1

the southeast, can be found in the *SE-EPPC Invasive Species Grant Report* on the SE-EPPC website. The report was authored by Kathryn Wilson, one of the Invasive Species Specialists hired by SE-EPPC. An article summarizing the report can be found on page 6 and the full report may be found on the SE-EPPC website (www.se-eppc.org).

Where do we go from here?

Over the last year, the effort to address consistency in plant list content and structure has also gained momentum at the national level (see article, page 10). A recognized need for standardized invasive plant lists that would be acceptable for use with green building codes led the National Association of Exotic Pest Plant Councils (NAEPPC) to initiate collaboration with the American Society for Testing and Materials (ASTM) to develop an official standard. The proposed standard will “describe the criteria and procedures to develop an invasive plant list for a specific geographic region and will serve as a foundation for creating such lists to support building codes and related applications.” Having an ASTM standard should provide validity to all invasive plant lists that meet the standard criteria.

The SE-EPPC Board of Directors, realizing the logic in considering the national ASTM process and wishing to support it via involvement of SE-EPPC board members, decided to await the outcome of this national effort prior to charting a separate course unique to the southeast.

Though complete consistency between chapter plant lists may require years to

achieve, we can take significant steps by addressing some of the “soft items” discussed here by increasing dialogue, and through participation in the ASTM effort. Though there will no doubt be some argument involved, we will ultimately strengthen our plant lists and our efforts to manage and control invasive plants.

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SE-EPPC Grant Project Wraps Up

By Kathryn Wilson

The Southeast Exotic Pest Plant Council (SE-EPPC) received a U.S. Forest Service grant in 2011 to explore multiple topics related to SE-EPPC chapter processes and the use of available resources. The four tasks associated with the grant included:

1. Collect the methodology used to generate state invasive plant lists from all participating State EPPC organizations.
2. Assist in the development of means to evaluate and enhance data entry into EDDMapS [the Early Detection and Distribution Mapping System] by SE-EPPC participating states and agencies.
3. Develop recommendations for a protocol to better facilitate the annual sharing of new invasive plant listings in SE-EPPC participating states.
4. Provide an analysis of the current status of Cooperative Weed Management Areas (CWMAs) across the Southeast.

All of these tasks are reliant on stakeholder feedback. For this reason, it was decided that a survey would be an excellent means of gathering information about SE-EPPC chapter members' use of tools and resources. In addition, interviews with experts in the field would provide a foundation for background information and further recommendations.

General Survey Results

The stakeholder survey was sent to each of the SE-EPPC Chapter presidents for dissemination to their email lists; it was also sent to the SE-EPPC list-serv. There were 220 complete responses.

Of the 220 respondents, nearly half were from Florida (47%, n=104). Following were Georgia (15.5%, n=34) and Alabama (14.5%, n=32). From there, a marked decline in responses occurred with 8% from South Carolina (n=17), 4% from Kentucky (n=8), 4% from North Carolina (n=8), 4% from Tennessee (n=8), 2% from Mississippi (n=5), and 2% from "other" states. While there were many respondents from Florida (likely due to the large number of active individuals on the FL-EPPC list-serv), all of the SE-EPPC states are at least represented in the survey results.

Respondents were asked what organization they represented within their SE-EPPC chapter, with the intention of exploring the public vs. private sector make-up of SE-EPPC participants. The most numerous type of organization was a public entity or agency (n=97), which included federal, state, county, city, and municipal governments. Following public agencies was private citizens (n=53). It is important to note that respondents were asked to write in their organization, and many wrote in multiple identities (e.g. "state agency and private citizen," or "interested citizen and business owner"). Thirty respondents indicated that they represent a Non-Governmental Organization (NGO) such as a particular chapter of the Native Plant Society, an EPPC chapter, or conservancies. An additional 26 respondents reported affiliation with a University (e.g., faculty, student, Extension Service). Finally, 22 of the respondents indicated that they were in the private sector, most of which were environmental consulting firms, vegetation management companies, or herbicide applicators.

Regarding how active each respondent reported to be in their SE-EPPC chapter, 28% thought themselves to be "somewhat active" (n=62) followed by 24% being "not at all active" (n=53). While these responses are self-reported and not physically observed by an outside party, the number of those who consider themselves "not at all active" is interesting, given that this organization is largely a volunteer effort. See Table 1 for a breakdown of responses.

Plant Listing

Where purpose statements are included with chapters' plant lists, they consistently emphasize education, management guidance, and a non-regulatory nature. In addition, a companion-document, clearly showing a decision-tree, flowchart, and/or criteria for species lists for each state, has become common. Transparency and defensibility of the listing process follow. It is highly recommended, therefore, that all chapters use these experiences to provide a clear statement of purpose with their lists, to include:

Table 1: Reported level of activity with SE-EPPC chapter.

Individual Level of (self-reported) Activity with SE-EPPC Chapter	Percentage & Frequency
Very active	13.2% (n=29)
Somewhat active	28.2% (n=62)
Neither active nor inactive	16.8% (n=37)
Somewhat inactive	17.7% (n=39)
Not at all active	24.1% (n=53)

- a) Education, management, and non-regulation, and
- b) A publicized ranking protocol that promotes public understanding and list objectivity.

List structure varies from state-to-state. Each chapter approaches the details of its list as their immediate and foreseeable needs require. Some consistency in list structure across the southeast will support a broader scale approach to common problems, while the ability of individual chapters to effectively address their unique issues remains paramount.

A relatively simple way to increase chapter listing methodology transparency would be to prepare and make accessible a guideline for interested parties on the listing process. This guideline should be easy to use and provide the reader with a comprehensive understanding of how species are grouped or listed. A map of different regions in the state is also a helpful way to depict ways in which states categorize different species.

The following attributes have been compiled from the list methods and experiences of all chapters of SE-EPPC: 1) Category (severity of threat); 2) Species' physiognomy, land- and cultural-use significance, and/or general habitat descriptor; 3) Eco-region, physiographic, or climatic province where species occur; 4) Regulatory status of species: federal (if any), home state, and neighboring states; 5) Distribution maps directly accessible as links to EDDMapS; 6) Risk assessment protocol outlines; 7) Management recommendations for species; 8) Criteria worksheets.

The survey respondents were asked their opinion regarding whether or not increased consistency among states' invasive plant listing methodologies (e.g., whether an invasive plant is considered a high, medium, or low risk) would be an improvement. Of the 164 who answered the question, a strong majority reported that they thought states' should have increased consistency in listing methodologies (57%, n=93), followed by 37% believing that "maybe" it would be good (n=61) and only 6% (n=10) indicated that it would not be an improvement.

As a follow up question, respondents were asked to write in the pros and cons of increased consistency among states' invasive plant listing procedures and criteria. Fifty-four respondents wrote in all pros about increased consistency. Those in favor most commonly indicated that consistency was positive, it provided a more defensible list, and raised awareness. Forty respondents wrote in both pros and cons to increased consistency, and while the pros were much like those previously mentioned, the cons included the different conditions associated with different states, economic impacts, and the additional work required to make the methodologies more similar. An additional 25 respondents wrote in only cons, and were not in favor of increased consistency.

Respondents were asked if they thought the invasive plant listing process was controversial in their state. While many who are interested in the issue and on the listserv

may not be very "active" on the board or with listing procedures, the SE-EPPC board thought it would be interesting to measure perceptions of controversial listings. Given that the highest response was "do not know" (47.5%, n=77), it is clear that most of those represented are not active or knowledgeable in the listing process. This was followed by 27% who indicated that there had been listing controversies (n=44) and 25% who thought that there had not been controversies (n=41).

Respondents were asked if, to the best of their knowledge, their state chapter experienced good participation in listing activities. A strong majority of 59% (n=92) indicated that they did not know, followed by 33% believing that they did have good participation (n=52) and 8% that their state chapter did not have good participation in listing activities (n=13).

EDDMapS

EDDMapS is a very valuable tool for reporting new occurrences of invasive species and tracking known populations. Of the 151 survey respondents who answered the question, a strong majority of 58% (n=88) reported that they use EDDMapS. This was followed by 24.5% (n=37) who do not use EDDMapS and an additional 17% (n=26) who "did not know" if they used EDDMapS (which suggests that they do not). The following five questions were answered only by those who responded that they used EDDMapS (n=88). When asked how often they used EDDMapS, 41.5% reported that they use it "sometimes," which was followed by "frequently" and "not very often" (see Table 2).

Respondents were asked an open-ended question about any issues that they have experienced with EDDMapS. Of the 67 who responded, 50 said they had not experienced any problems with the resource. Many of them included comments about how much they appreciated EDDMapS or that they had an issue that was resolved quickly. Seventeen of the respondents did report an issue. These comments were either general such as "a few glitches now and then" or focused on a particular issue such as "yes, specifically with the iPhone app." There were also comments about issues that had been resolved.

Respondents were asked if they provided follow up information to EDDMapS once they reported an infestation. Commonly, follow up information includes updated information or treatment results. Of the 83 respondents

Table 2: Frequency of EDDMapS use

Frequency of Use (EDDMapS) N = 82	Percentage	Frequency
Frequently	34.1%	n=28
Sometimes	41.5%	n=34
Not very often	24.4%	n=20

who answered the question, 36% (n=30) did not know if they provided follow up information (which suggests that they probably did not). See Table 3.

Table 3: Frequency of Respondents Who Provide Follow-Up Information to EDDMapS

Follow up Information to EDDMapS (N=83)	Percentage	Frequency
Do not know	36.1%	n=30
No	22.9%	n=19
Yes	18.1%	n=15

Next, respondents were asked if they or their organization utilized outputs from EDDMapS (most commonly in the form of maps or Excel spreadsheets). Forty-four percent of the 85 who answered the question responded that they did utilize outputs (n=37), compared to 34% who did not (n=29) and 22% that did not know (n=19).

Finally, respondents were asked what three things could be done to increase their use of EDDMapS. This was an open-ended question that all survey respondents were asked to respond to (e.g., not just those who indicated that they use EDDMapS), of which 68 responded. A majority of respondents provided a comment about “finding time to use [EDDMapS]” knowledge, or awareness regarding EDDMapS usage (n=45). Some respondents (n=23) provided specific entry or output suggestions while others mentioned workload or funding (n=14). Finally, comments were provided regarding the EDDMapS app or mobile device (n=10) as well as information related comments (n=10) such as suggestions to send more email updates, alerts, etc.

Many SE-EPPC and state chapter supporters and participants are using EDDMapS as a data entry tool. However, there seem to be barriers regarding available time, perceived work involved in using the tool, and confidence required to ensure that users understand how it works and can take advantage of the resource and its benefits. Although nothing

can really be done about the individuals’ time available to use EDDMapS, it is apparent from the survey results that there are opportunities for enhanced awareness, knowledge, and advertising of the resource. Survey results also indicate that many users are not aware of the outputs available. This may be alleviated by the aforementioned recommendation to both advertise more and provide more training opportunities.

Sharing

While most chapters do share updates to invasive plant lists as well as new listings and Weed Alerts, there is no standard practice yet adopted by SE-EPPC to promote a more coordinated effort for sharing information. In consultation with the *Wildland Weeds* editor, and without creating any additional resources for sharing when there are adequate ones in place, the recommendation is to announce invasive plant updates in issues of *Wildland Weeds*. *Wildland Weeds* is the official publication of the SE-EPPC and all affiliated chapters.

Survey respondents were asked if they thought this would be a good idea to promote more sharing of information. Of the 133 that responded, over 90 indicated that it was a positive idea that would likely lead to better coordination and awareness of invasive plant listing activities. Very few indicated that they did not think this was a positive idea. Other ideas to promote a more consistent sharing process included promoting an online resource or website (n=37) such as listservs, social media, and the SE-EPPC website. An additional 49 provided “other” suggestions including reaching out to other groups such as foresters, partner organizations, land managers, anglers, hunters, legislatures/policymakers, etc.

CWMAs/CISMAs

Based on interviews with experts in the field, the status of Cooperative Weed Management Areas (CWMAs) and Cooperative Invasive species Management Areas (CISMAs) was explored. It was determined that the following 11 factors were important to the status of CWMA-type organi-

Table 4: Measures to Improve Success of CWMAs/CISMAs in the Southeast

Measures (to improve number/success of CWMAs/CISMAs)	Percentage	Frequency
Sustained funding	33.2%	N=73
Increased education/awareness of invasive species issues	31.8%	N=70
Increased education/awareness of CWMAs/CISMAs	31.8%	N=70
Enhanced coordination between states/agencies	28.2%	N=62
Increase in available cost share funds	27.3%	N=60
Developing & maintaining effective leadership	25.0%	N=55
More pilot/demo projects	23.2%	N=51
More volunteers	18.2%	N=40
Better policy	10.0%	N=22

zations in the Southeast (especially compared to the West): 1) Organization: There are no County Weed Supervisors in the Southeast; 2) Lay of the land: Most of the open land in the Southeast is forest; 3) Lack of government ownership/ownership patterns; 4) No motivating sense of crisis; 5) Lack of funding; 6) Lack of leadership; 7) Absentee land ownership; 8) Policy is way behind in the Southeast; 9) Different concepts of CWMA's; 10) Differences in size, circumstances and culture; 11) Florida is different (an exception to the rest of the Southeast).

Survey respondents were asked a few questions about their thoughts and experiences about CWMA's/CISMA's in their respective states. First, they were asked an open-ended question regarding whether CWMA's/CISMA's existed in their home state and if so, if they knew how many. Of the 91 respondents who answered, 60 reported that there were CWMA-type organizations in their state. Respondents were asked what they thought were the three barriers, if any, to implementing successful CWMA's in their state. This was an open-ended question that yielded 69 responses. Of these, the majority suggested that funding or resources were the number one barrier (n=66), which included such comments as "sustained funding," "staff shortages" or "funding for dedicated oversight of program." There were 20 comments regarding a need for enhanced communication or education, which could include simply knowing about the existence of CWMA-type organizations, general awareness of the issues, or related policies. Respondents provided

17 comments focused on leadership, or more specifically, a lack of leadership or "champions" for the cause. There were an additional 16 comments regarding the need for collaboration. Examples of collaboration comments included: "Getting diverse groups to work together," "Lack of inter-agency coordination," and "lack of 'buy-in' with private and local government land owners." In addition, there were 27 comments regarding other topics.

Respondents were asked to select from a number of ideas on how to improve the number and success of CWMA's/CISMA's in their home state. They were also encouraged to write in other ideas. Thirty-three percent (n=73) of respondents indicated that sustained funding would be the most important measure. This was followed by education and awareness of invasive plant issues as well as CWMA's/CISMA's themselves (see Table 4).

Finally, respondents were provided space to write any other ideas they might have to improve the number and success of CWMA-type organizations – not just in their home state, but across the Southeast. The 53 responses were varied, but most were comments and suggestions about funding, outreach and communication, leadership, increased coordination, awareness, and centralized structure.

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This report was written while she was a graduate student at the University of Florida.

WEEDS ACROSS BORDERS
BUILDING BRIDGES ACROSS BORDERS—AN INTERNATIONAL CONFERENCE ON INVASIVE SPECIES

OCTOBER 14-17, 2014
OTTAWA, CANADA

For more information or details on submitting abstracts, contact:

Barry Gibbs
(ed@abinvasives.ca)
or Gail Wallin
(gwallin@bcinvasives.ca),
co-chairs of the
Canadian Council on
Invasive Species.

www.bcinvasives/partners

Weeds Across Borders (WAB) is a biennial conference covering the interests of professionals and organizations involved in North American weed management and regulation.

Bringing together international speakers, this conference will include leading edge information on policy and cross border management for invasive species, along with effective approaches for involvement of indigenous organizations and citizen science. In addition to the two-day event, opportunities for a field trip and special workshops will be held pre- and post-forum.

Hosted by the Canadian Council on Invasive Species, with the support and guidance of many international advisors, we hope that you will plan to enjoy the beautiful fall colour in Canada's capital city.



National Association of EPPCs Update

By Nancy Loewenstein and Doug Johnson

To paraphrase an old adage, “all weeds are local.” However, it pays to tackle weeds at the landscape scale. And some approaches work best at the national scale. These big picture efforts are the focus of NAEPPC.

NAEPPC, often mistakenly referred to as the National Exotic Pest Plant Council, is actually the National Association of Exotic Pest Plant Councils. The SE-EPPC and all state chapters of SE-EPPC are members. In total, some thirty states are currently represented by member EPPCs. See the NAEPPC website for more information (www.naeppc.org).

NAEPPC has been active in the last year, working on everything from a national standard for listing invasive plants to revising our internal bylaws. As highlighted in the recently revised bylaws, the newly crafted mission statement of NAEPPC is “...to increase awareness about plants invading natural areas in the United States, to support member organizations and partners in their efforts to prevent, eradicate, and manage invasive plants, and to provide a unified voice on invasive plant issues that have national significance.”

At the Natural Areas Association (NAA) annual conference held in October in Chicago, NAEPPC co-organized a well-attended session on innovations in invasive plant management. Dialogue is underway to determine NAEPPC involvement in this year’s NAA conference which will be held October 15-17 in Dayton, Ohio (see announcement on page 5).

Perhaps most importantly, NAEPPC has taken a lead role in the process of developing an American Society for Testing and Materials (ASTM) standard for invasive plant listing. This effort, which was initiated about a year ago, is being coordinated by Susan Gitlin with the Codes, Standards and Sustainable Design Division, Office of Sustainable Communities, US Environmental Protection Agency. The goals are to create a standard that 1) describes the criteria and procedures to develop an invasive plant list for a defined region, and 2) will be useful as the foundation for creating lists of invasive plants to support building codes and related applications. NAEPPC’s involvement focuses on assuring that the proposed standard is scientifically sound and rigorous, and that the standard has wider application than informing building codes, lending validity to current invasive plant lists. To that end, an important consideration during development of the standard was that current EPPC lists be able to meet the standard criteria without a lot of extra work. Board members of the SE-EPPC and state chapters are actively involved on the task force and chapters have had ample opportunity for comment along the way. A draft standard was completed in December and the process for ASTM approval is underway. This is a lengthy and complex process that could take a year or more. If you would like to review a copy of the draft standard, please contact Nancy Loewenstein.

NAEPPC board members are also involved with the National Environmental Coalition on Invasive Species (NECIS), National Invasive Species Awareness Week (NISAW) and the Invasive Species Advisory Committee (ISAC). While NECIS currently tends to focus primarily on invasive animals, it has drafted comments to the Healthy Habitat Coalition Draft Bill that aims to put federal weed dollars “on the ground” for actual management efforts. Due to federal budget cuts associated with sequestration, NISAW activities in Washington, DC were severely curtailed in 2014. Budget cuts also impacted ISAC, which was unable to hold regular meetings in 2013, meeting only once via conference call in December.

Another change to the bylaws is clarification of expectations of member groups, specifically that an organization can be removed as a member of NAEPPC if it has not participated in any NAEPPC meeting by phone or in person within one year, or if its work is not consistent with the mission of NAEPPC.

NAEPPC continues to serve as a forum for topics of interest. Discussions have included biofuel regulations, best practices guidelines for preventing weed spread, coordinated mapping and early detection, and dialogue with the Arbor Day Foundation about their continued use of potentially invasive species. By bringing together the leadership of EPPCs across the country, NAEPPC plans to push forward on work of national importance. As the ASTM standard project moves forward, we will keep you informed. And when we see opportunities for funding on-the-ground work to address priority invasive plants, we are positioned to help coordinate a grassroots campaign to communicate the conservation benefits of such investments. Visit the website often for updates: www.naeppc.org

For additional information on the organizations mentioned in this article, see:

American Society for Testing and Materials (ASTM) –

www.astm.org

Natural Areas Association (NAA) – naturalareas.org

National Environmental Coalition on Invasive Species

(NECIS) – www.necis.net

Healthy Habitats Coalition –

www.healthyhabitatscoalition.com

Invasive Species Advisory Committee (ISAC) –

www.invasivespecies.gov

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Under the Radar?

Ficaria verna quietly naturalizing in the Southeast

By Jane K. Marlow, Jeffery L. Beacham, and William C. Stringer

Photos by Jane K. Marlow at Lake Conestee Nature Park in Greenville, SC

Fig buttercup is not well-known in the Southeast. More accurately, most people have never even heard of it. A few minutes on the internet reveals that fig buttercup — aka lesser celandine (*Ficaria verna*, formerly *Ranunculus ficaria*) is a perennial with origins in Europe and northern Africa; that it has been cultivated in the U.S. for over 150 years; that Wordsworth wrote poems praising it; that it is available in the nursery trade; and that it is reported to be invasive in ten states and the District of Columbia, and is on the noxious weed list in Connecticut and Massachusetts.

In April 2013 it was discovered in Greenville County, SC. After having met the plant, we feel that it is vital to make the Southeast's invasive plants community aware that it is HERE (not just in the Northeast), and that it poses a very serious threat.

An article documenting its discovery in Asheville, NC, in 2011 first brought the plant to our attention:

“Fig buttercup is a vigorously growing herbaceous plant that completes its growth cycle during winter and spring.... Its emergence before most native species gives it a great competitive advantage. Once established, it spreads rapidly, forming a solid green blanket...which native plants are unable to penetrate.... The plant makes numerous tubers and bulblets, each of which can grow into a new plant once separated from the parent plant. These are spread by animals, well-meaning human weed pullers and water events. Because of its short growth cycle [December to May] there is a limited window of opportunity for controlling it....” (Cote 2011).

Two years later we would have the opportunity to see it for ourselves, when a birder spotted a patch of unfamiliar bright yellow flowers in Lake Conestee Nature Park, and on April 4, 2013, was curious enough to ask about them.

Most North American floristic treatments have not emphasized sub-specific differences, but a recent review of herbarium collections has confirmed that all five currently recognized subspecies are present in the United States (Post et al. 2009). The one we found is *Ficaria verna* subsp. *verna* (Weakley 2012).

On April 9th, the newly discovered plants were in full bloom. Flowers are a buttery yellow with a slightly darker center, typically with 8 petals but sometimes more (Swearingen 2010).

The Plant Conservation Alliance states, “When in full bloom, large infestations of lesser celandine appear as



*Once established, *Ficaria verna* forms a solid green blanket which excludes all other vegetation.*



Fig buttercup's flowers are yellow with a slightly darker center, typically with eight petals.

a green carpet with yellow dots, spread across the forest floor” (Swearingen 2010). These mono-cultural “carpets” may cover several acres. By way of comparison, ours were “scatter rugs” — some loosely strung together in furrows channeled by the adjacent Reedy River. The Reedy flows through the city of Greenville, spilling over its banks with some regularity. Lake Conestee Nature Park straddles this river, and we found *Ficaria* scattered throughout 1.5 miles of its floodplain.

Mesic Environment

Ficaria verna thrives in mesic environments on the banks of rivers, streams, lakes, and ponds, as well as in wetlands, and it is most commonly found in (but not



Top: Roots produce abundant finger-like or fig-shaped tubers. Bottom: Subspecies *F. ficariiformis* and *F. verna* are capable of producing axillary bulbils. Any of these reproductive structures, if separated from the parent plant, can grow into a new plant.

limited to) sites adjacent to a water source. In Birmingham, AL, it was found adjacent to a seasonal stream (EDDMapS 2013), and in Chattanooga, TN, at the confluence of the Tennessee River and a local creek (Collins & Shaw 2009). In Wake County, NC, *Ficaria* propagules from a shaded lawn became established along a drainage ditch, and then were dispersed through a culvert to colonize downstream banks of a local waterway (Post et al. 2009, Axtell et al. 2010). A similar scenario played out in Buncombe County, NC, where a creek provided the migration path from landscape plantings to the University of North Carolina at Asheville Greenway, then into the Botanical Gardens at Asheville (Cote 2011, Kranyik 2013).

Fig buttercup is likely to be found in the preferred habitat of many native spring ephemerals, growing in dense patches. We quickly learned to spot these patches, even from a distance, even without flowers.

Isolated clumps required more inspection. Plants consist of a basal rosette; the leaves are petiolate, kidney-to heart-shaped, a dark shiny green, and succulent (Swearingen 2010). To our inquisitive fingers the fleshy leaves felt almost rubbery; the netted venation on leaf undersides looked almost reptilian.

Multiple Reproductive Mechanisms

The roots produce abundant finger-like or fig-shaped tubers, and two of the five subspecies are capable of producing axillary bulbils late in the flowering season. When separated from the parent plant, both bulbils and tubers can produce new plants. Some of the literature states that lesser celandine's achenes are usually abortive, but that's true for only one of the subspecies; in the other four, seeds are apparently viable (Post et al. 2009, Axtell et al. 2010).

Accelerated Growth Cycle

By April 15th, we were hard-pressed to find any flowers, which brought home the fact of the plant's accelerated growth cycle. It emerges in winter (ahead of most natives), flowers in March-April, and then immediately begins to die back. Above-ground portions are mostly gone by June (Swearingen 2010), but axillary bulbils may still be visible.

Its ephemeral nature creates a very short window during which it can be treated. Small populations can be dug up manually (if care is taken to remove, bag, and properly dispose of every bulblet and tuber), but physical removal creates ground disturbance, which in turn encourages further infestations.

Swearingen (2010) recommends application of a 1 to 1.5% concentration of a 53.8% active ingredient glyphosate isopropylamine salt (e.g. Rodeo® labeled for use in wetland areas), mixed with water and a non-ionic surfactant, to be applied prior to flowering and up until about 50% of the plants are in flower. After that, she says, control success declines and the possibility of harming native amphibians and/or plants increases. Hammerschlag et al. (2003) recommends treating two years sequentially with a 1.5% concentration of Rodeo, then perhaps skipping a year or doing subsequent spot treatments. Other

options have been suggested; additional replicated field research is needed.

On May 1, the leaves of much of the Ficaria were already yellow. AquaMaster® (a product equivalent to Rodeo) was applied to plants still possessing green leaves. The new year will reveal the results of these efforts and also, perhaps, offer an opportunity to field test other options.

On June 12th we revisited an untreated site. The dense green blanket of vegetation had vanished, leaving only bulblets on the soil surface. Adjacent knee-high vegetation had not begun to colonize the bare ground.

The Tipping Point

North of the Southeast Exotic Pest Plant Council region, *Ficaria* is certainly behaving like an invasive, but it is not currently listed as invasive by any southeastern state. Each state attempts, individually, to make a fair assessment of a plant's invasive potential in their region. For instance, in some states — to even be considered — a plant must either be listed federally, pose a severe threat in a neighboring state, or be documented in multiple counties within the state. This measured response is partly dependent on timely, accurate range map data.

In December 2013, the USDA PLANTS database site reported 22 states with documented populations of *Ficaria*. Not included were North Carolina (Krings, et al. 2005), Maine (University of Maine 2008), Alabama (EDDMapS 2013) and South Carolina (Clemson University 2013). The USDA PLANTS database welcomes “thorough, verifiable plant distribution information from the public,” but apparently no one has entered these records into the database. **Contributors may update distributions by entering new records at plants.usda.gov/du/DistributionUpdate.html**

The Early Detection & Distribution Mapping System (EDDMapS.org) is capable of real-time tracking of invasive species occurrences, but it relies on people in the field knowing what is significant and taking time to report occurrences using the multiple tools available. In December 2013, EDDMapS.org showed only five southeastern counties with infestations, a surprisingly reassuring picture. Was it accurate? We don't think so. Species occurrences are not being reported enough to provide up-to-date distribution maps and it is up to those in the field to correct this problem (see sidebar).

Studies suggest that *Ficaria* may have transitioned out of the lag phase of population growth and into the rapid expansion phase (Post et al. 2009). About it, Weakley (2013) says, “This seems to be a plant that is seriously ‘on the move’. It is one of those somewhat mysterious plants that seems to have been cultivated (at least in a minor way) in North America for hundreds of years but only recently has become aggressive. Recently, it has been popping up everywhere...”

We have a chance to stop this one,

but we need to increase awareness of this emerging invasive plant problem and report sightings for accurate distribution maps. The Early Detection & Distribution Mapping System (EDDMapS) is a mapping tool used to document the distribution of invasive species across the United States and to help identify leading edges of new infestations. EDDMapS relies on reports from the field to keep their maps current. The two ways to report invasive plant occurrences are at EDDMapS.org using a web-based data entry form, or by using the Southeast Early Detection Network (SEEDN) app available for smartphones at apps.bugwood.org/seedn Karan Rawlins of EDDMapS says, “To me, the absolute easiest way is with a smartphone using the SEEDN app.” The app enables you to submit invasive species observations directly with your smartphone from the field. These reports are uploaded to EDDMapS and e-mailed directly to local and state verifiers for review. Good photos for identification purposes are essential.

Learn more about collecting and reporting data using the EDDMapS Handbook available online at www.eddmaps.org/training/EDDmapS.pdf

With regard to this plant, we suggest that the Southeast is close to a tipping point. We feel that we're already there, but there are those who would like more evidence. If you've read this far, you should have a fair idea of what fig buttercup/lesser celandine looks like, where and when you might expect to see it, and what it can do to a natural ecosystem. To augment what you've read here, you can search the web or read the literature cited herein. Share your knowledge with colleagues, clients, and staff.

Look for it. Take time early this spring to scout likely sites. If you find an infestation, document it! Record the date and exact location, send specimens to regional herbaria, and post it on EDDMapS. You may also provide this information to the USDA PLANTS database. Encourage your state EPPC or Invasive Plant Council board to list the plant, and urge your state Department of Agriculture to prohibit sale of the plant in your state.

To see the list of references, please refer to the full article on the FLEPPC website under Publications or contact the corresponding author.

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Biological Control for Air Potato Has Arrived!

By Min Rayamajhi¹, Eric Rohrig², Ted Center¹, Ellen Lake¹, Melissa Smith¹, Veronica Manrique³, Rodrigo Diaz³, Stephen Hight⁴, Allen Dray¹, Kenneth Hibbard⁵ and William Overholt³



Figure 1a. Adult *Lilioceris cheni*, Chinese.



Figure 1b. Adult *Lilioceris cheni*, Nepalese.



Figure 2. Cluster of *Lilioceris cheni* eggs on the underside of an air potato leaf.



Figure 3. Larvae feeding on the underside of an air potato leaf.

Air potato (*Dioscorea bulbifera*) in Florida may have finally met its match — a voracious leaf-feeding beetle from Asia named *Lilioceris cheni*. The beetle was first discovered in Nepal by scientists from the USDA/ARS Invasive Plant Research Laboratory in Fort Lauderdale (IPRL), and later the same species was found in the Yunnan Province of China. Adult beetles are either bright red (Chinese biotype) or brown (Nepalese biotype), and about 9 mm (3/8") long (Figure 1). They live for up to six months, during which they lay as many as 4,000 eggs. Females lay eggs in clusters on the undersides of young, expanding air potato leaves (Figure 2). Adult females bite the veins of the leaves on which they oviposit, causing the expanding leaves to curl at the edges and cup the eggs, perhaps providing some protection from inclement weather or egg predators. Eggs hatch in about 4 days, and the reddish colored larvae feed on leaves for around 10 days (Figure 3). Late stage larvae and adults occasionally feed on bulbils (aerial tubers). Fully mature larvae drop to the ground and burrow into the soil where they secrete a whitish oral substance that hardens into a cocoon. Several pupae often clump together within this material. Adults emerge from the soil after about 16 days and begin to lay eggs 15 days later (Tishechkin et al. 2011). Larvae are often found feeding in groups on the growing tips, which inhibits vine elongation and reduces the ability of the plant to climb vertical structures. The leaves and vines of air potato die back in the winter, depriving the beetles of a food source. During this time, the adult beetles enter a resting state beneath leaf litter or other debris on the ground. The overwintered adults emerge during spring when air potato vines sprout from bulbils and subterranean tubers, and the adults begin once again to feed and lay eggs.

Host range testing conducted at the IPRL quarantine facility prior to field-release demonstrated that both Nepalese and Chinese biotypes of the air potato beetles would only feed and complete development on *Dioscorea bulbifera* (Pemberton et al. 2010, Center et al. 2013). They do not even feed on other species of *Dioscorea*. Based on this safety data, a permit for field release was granted in February 2011. The first beetle field-releases were made by the IPRL in November 2011 at the Long Key natural area in Broward County and at Kendall Indian Hammock Park in Miami-Dade County. The Florida Department of Agriculture and Consumer Services, Division of Plant Industry (DPI) joined the rearing and release program in 2012, and the combined efforts by the IPRL and DPI resulted in the release of over 145,000 beetles at 175 sites in 32 counties in 2013.

The future is bright! Some beetles released in 2011 successfully overwintered and dispersed to neighboring air potato infestations. Beetle survival and establishment was demonstrated at some of the 2012 release sites while other sites required supplemental releases in 2013. As vines sprouted in the spring of 2013, beetle populations at several sites began increasing rapidly at the beginning of the growing season and this abundance of beetles caused extensive feeding damage (Figure 4). Sites that received beetles in 2012 experienced the greatest impact, including reduced height of vines, decreased bulbil production and, most importantly, an increase in native vegetation. Beetle performance at 2013 release sites will be monitored through 2014.

Long-term research sites have been established at several locations in Florida to investigate the impact of beetles on air potato vine growth and bulbil production. These research sites will also provide information on changes in

vegetation structure and composition as air potato vines are reduced over time. Studies to determine the optimal number of beetles to release at a site and the rate of beetle dispersal are also in progress. These studies will make the project more cost effective and will help formulate release strategies to increase beetle establishment at different air potato infested sites throughout Florida. A collaboration between the IPRL and the University of Florida will further our knowledge of the beetles' biology by investigating overwintering success at several locations across Florida and by examining the influence of temperature on beetle development.

If you are interested in obtaining beetles for release, please contact Dr. Eric Rohrig at the Florida Department of Agriculture and Consumer Services (Eric.Rohrig@freshfromflorida.com). Priority is currently being given to releases on public lands, but it is hoped that a sufficient number of beetles will soon be available to supply private landowners as well. Hopefully, the Florida-wide air potato menace can soon be tamed once and for all!



Figure 4. A patch of air potato vines heavily damaged by beetles in August 2013. Beetles were released at the site in 2012.

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SE-EPPC Award of Excellence presented to Chuck Bargeron

SE-EPPC Award Committee
Members: Karen Brown
Nancy Loewenstein
Lee Patrick

In 2013, the SE-EPPC Award Committee chose Charles T. (Chuck) Bargeron to receive the **SE-EPPC Award of Excellence** for an "outstanding record of service to exotic pest plant research, education, outreach and control in the southeastern United States." The award was presented during the conference via Skype since Chuck was unable to attend in person. Chuck is known literally across North America and has assisted every invasive species organization known to most mortals. Chuck does it all, from the most mundane of website fixes to building EDDMapS, approximately 63 websites (and counting) and 16 phone apps. Chuck has served as president of SE-EPPC, National EPPC, currently serves on the National Invasive Species Advisory Council and is Chair-Elect of the North American Invasive Species Network. He has also been a cover-guy for *Wildland Weeds* magazine (see the Summer 2010 issue at se-eppc.org).

Chuck has been nominated for this award in the past but, as a member of the SE-EPPC Award Committee, always felt that the award should go to worthy colleagues who were closer to retirement. Even though Chuck has plenty of mileage left, we (without consulting him) decided that we could wait no longer. (We can give him another award when he's old and crusty.)

Chuck is one of the most entertaining guys to work with. He is smart, funny, and as unpretentious as they come. He scowls a lot but he laughs more. He often responds to EPPC emails at 11pm, 7am, on weekends, during meetings and conference calls, and from planes, trains and automobiles. If you have benefited from Chuck's assistance in any of your programs, please send him your congratulations. With this award, we say, "Thank you, Chuck!"

“Brushing Up” on Invasive Awareness

By Pat Parr

Literally building on ideas derived from efforts of the Southern Appalachian Cooperative Weed Management Program (SACWMP) to increase awareness of the spread of invasive plants by trail users, Eagle Scout candidate Gerrit Dolislager constructed and installed signs at entrances to a popular greenway in Oak Ridge, TN.

Using the SACWMP sign panel template developed by John Odell, SACWMP Resource Management Coordinator, Gerrit customized the text information and photos to address invasive plants causing problems in the Oak Ridge area. Each sign also includes a boot brush for use before and after walking the greenway to remove invasive plant seeds or materials that may have attached to shoes or boots. The Tennessee Wildlife Resources Agency provided materials for Gerrit's use in the sign construction.

Gerrit chose this project because he “wanted to do something other than building benches that would be outside, informational, and serve a greater purpose. These signs can inform people who use these trails about something they can do to help the local environment.” Gerrit, from Troop 46, Knoxville, TN, used the project to fulfill his Eagle Scout badge.

The scout project was endorsed by the Tennessee Exotic Pest Plant Council. The construction plan for the sign structure, also developed by John Odell, is posted on the TNEPPC website: www.tneppc.org

Why Bootbrushes?

John Odell performed a small experiment to determine if boot brushes were helping to prevent seed dispersal. He collected soil from two boot brushes at Appalachian Trail trailheads in Hot Springs, NC. The soil was placed in sterilized pots, watered, and placed in a sunny windowsill. Within weeks the pots were overflowing with young seedlings including Japanese stiltgrass (*Microstegium vimineum*). Most of the seedlings were native plants, but the experiment did show that our boots do hold and move unwelcome seeds.

This information was drawn from a longer article, “What’s in Your Boots,” printed in the SACWMP newsletter and posted to the TNEPPC website.



The original SACWMP sign has been installed at Appalachian Trail heads in Madison County, North Carolina. Note boot brush at bottom of sign.

Pat Parr, Tennessee Exotic Pest Plant Council Board, Past President; Oak Ridge National Laboratory Natural Resources, Manager; Parrpd@ornl.gov

The Efficacy of Repeated Herbicide Applications on the Control of Guineagrass (*Panicum maximum*)

at Caloosahatchee Regional Park, Lee County Florida

By Annisa Karim, David Mitchell, Laura Estabrook Carr, and Kenneth Langeland

Introduction

It has become abundantly clear that not all plants are created equally. Some plants have evolved successfully to compete with other plants by developing high rates of growth and reproduction, and producing numerous seeds or fruits that are easily dispersed by wind, water, small mammals or birds. Even so, these plants are controlled in their native ranges by natural enemies such as herbivores, pests and diseases. However, when transported to new areas outside of their native range, some of these plants can outcompete the native plants and are said to be invasive. Florida has seen the introduction of non-native plants for decades. *In the early 1900s, botanist and naturalist, Charles Torrey Simpson, warned, “There are the adventive plants, the wanderers, of which we have, as yet, comparatively few species; but later, when the country is older and more generally cultivated, there will surely be an army of them.” (Simpson 1920)*

Caloosahatchee Regional Park (CRP) in northeastern Lee County consists of approximately 768 acres on the north side of the Caloosahatchee River. The park is about 2 miles west of the town of Alva and is managed by the Lee County Department of Parks and Recreation (LCPR). The park is divided by County Road 78 (North River Road). The last time the Caloosahatchee River was dredged, much of the dredge spoil was deposited onto the north side of the park (portion of CRP north of County Road 78), resulting in a highly altered topographic and hydrologic area, and an atypical terrestrial substrate. This portion of CRP has proven to be a serious management problem.

The park contains a diversity of plant communities, many of which have been impacted by invasive plant species. One of the dominant invasive plants is guineagrass (*Panicum maximum*). *P. maximum* is a large, clump-forming panic grass native to Africa. It has been introduced to tropical areas world-wide for fodder and has invaded wetlands, roadsides and disturbed lands in many of these areas. Guineagrass is a weed in natural areas of Florida (designated as a Category

Of the approximately 25,000 non-native plants imported into Florida (most as ornamentals), more than 1,400 have escaped and become established outside of cultivation (Florida Exotic Pest Plant Council 2011). The Florida Exotic Pest Plant Council (FLEPPC) maintains a list of exotic plants that have been documented to (1) have adverse effects on Florida’s biodiversity and plant communities, (2) cause habitat loss due to infestations and (3) impact endangered species via habitat loss and alteration. FLEPPC categorizes the most problematic of these species into two categories. Category I plants are those that alter native plant communities by displacing native species, change community structures or ecological functions, or hybridize with natives. Category II plants have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. Land stewards and managers charged with protecting, preserving and restoring Florida’s remaining native plant communities on public and private lands have found themselves spending increasing amounts of time and money in an attempt to control invasive, exotic plant species.

Table 1. Herbicide mixtures used in this study and cost per acre (September 2012 values) (excluding application costs). All treatments contained 0.05% non-ionic surfactant.

Herbicide Mixture	Rate/Acre	Cost/Acre
Alligare Glyphosate 4 Plus	6 qt	\$34.95
Clearcast	2 qt	\$21.00
Pendulum	2.4 qt	\$14.72
Sahara	19 lb	\$117.12
Alligare Glyphosate 4 Plus + Pendulum	6 qt + 2.4	\$49.67
Alligare Glyphosate 4 Plus + Sahara	6 qt + 19 lb	\$152.07
Alligare Glyphosate 4 Plus + Pendulum + Sahara	6 qt + 2.4 qt + 19 lb	\$166.79

Table 2. Characteristics of herbicide active ingredients used in this study.

Active ingredient	Absorption/Translocation (predominant) ¹	Mechanism of Action ¹	Product used in this study
diuron	Root/Upward	Photosynthesis inhibitor (PS II)	Sahara
glyphosate	Foliar/Downward	Aromatic amino acid inhibitor (EPSP synthase)	Alligare Glyphosate 4 Plus
imazamox	Foliar/Upward and downward	Branched chain amino acid inhibitor (ALS)	Clearcast
imazapyr	Foliar and root/Upward and downward	Branched chain amino acid inhibitor (ALS)	Sahara
pendimethalin	Root and emerging seed root/Not translocated	Inhibits cell division and thus root growth	Pendulum

¹Weed Science Society of America. 2007. Herbicide Handbook, Ninth Edition. WSSA Lawrence, KS

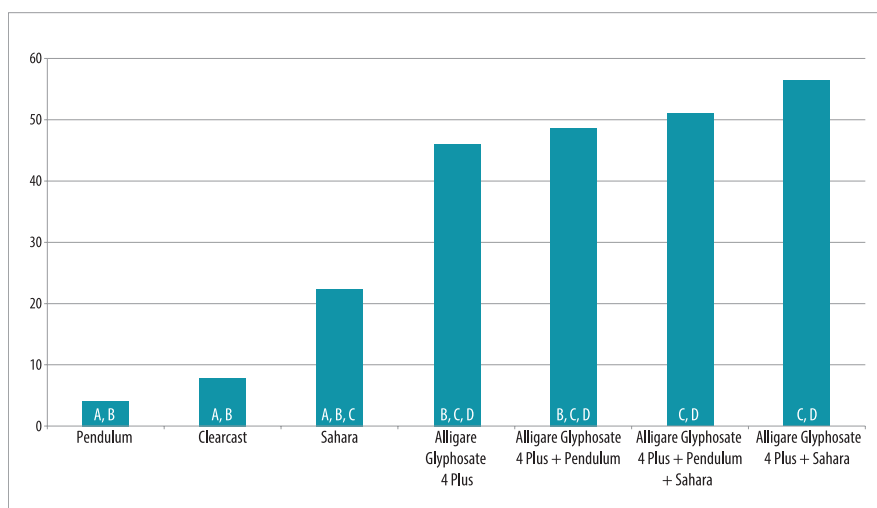


Figure 1. Percent control of guineagrass and Tukey’s HSD post-hoc test results for each mixture tested (see Table 1 for rates per acre). Control is not significantly different among treatments with the same letter.

In an effort to maximize the efficiency of the herbicides, time and funds used to control guineagrass, LCPR staff partnered with the University of Florida’s Institute of Food and Agricultural Sciences (UF/IFAS) to evaluate the efficacy of seven herbicide treatments (Table 1). Treatments included herbicide active ingredients with different modes of action (Table 2). Use of herbicides with different modes of action is important in preventing herbicide resistance in a management program. Herbicide resistance can develop in a weed population when herbicide sensitive plants are killed using repeat treatments with herbicides with the same mode of action. Some plants develop

herbicide resistance and these plants will become dominant. “The single most important factor leading to the evolution of herbicide resistance is over-reliance on a single herbicide or group of herbicides with the same mode of action without using other weed management options” (Trujillo 2013).

II invasive species by the Florida Exotic Pest Plant Council). It has been documented in 37 of Florida’s 67 counties (Wunderlin and Hansen 2008) and is “commonly found as a weed in citrus groves and other disturbed and cultivated sites in the state” (Futch and Hall 2012).

On the north side of the park, guineagrass creates a monoculture over much of the dredge spoil from the river bottom. The south side (portion of CRP south of County Road 78) remains fairly intact with typical terrestrial soils, but continues to be impacted by invasive, exotic vegetation including guineagrass. Past land stewardship endeavors at CRP have resulted in minimal control of *P. maximum*. Traditional control methods included mowing the grass (if possible) and then spraying the re-growth at 6 to 8 inches in height with a 3% glyphosate (amino acid inhibitor) + 0.5% surfactant solution. While this method worked well in controlling plant matter above ground, the seeds of the guineagrass were not affected.

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Methods

An all terrain vehicle (ATV) equipped with a spray tank and spray boom was used to spray all plots. The sprayer was calibrated to deliver 50 gallons of solution per acre. All treatments contained 0.05% non-ionic surfactant in addition to the herbicides. Plots were sprayed in April 2010, October 2010, April 2011 and April 2012. October 2012 was too wet and windy for spraying to occur. A prescribed fire in December 2010 burned through one of the groups on the north side of CRP. The stakes delineating the plots were not burned and this group continued to be used in the study. Approximately five months after each spray event,

guineagrass control was estimated by four individuals by comparing guineagrass in treated plots to untreated plots on a 0 to 100 scale (expressed as percent) where 0 represented no control and 100 represented complete control (Camper 1986). A final evaluation was conducted in October 2012.

Results and Discussion

A one-way repeated measures ANOVA indicated a significant [$F(6, 20) = 11.821$, $MSE = 847$, $p < 0.0001$] treatment (herbicide mixture) effect. A post-hoc Tukey's Honest Significant Difference (HSD) test was used to test for differences between guineagrass control means (Figure 1).

After four applications of each herbicide mixture and twenty-five months after the initial application, the highest average control observed for all herbicide mixtures was only 56%, which demonstrates the difficulty of controlling guineagrass at CRP. The highest control was observed for those herbicide mixtures that contained glyphosate and there was no statistical difference among any of the glyphosate-containing mixtures, suggesting that there is no advantage to applying any of the other herbicides tested. This is especially true when considering the added expense of including the other herbicides (Table 1). Nor did pendimethalin, imazamox, or the mixture of imazapyr and diuron provide better control than glyphosate by itself. It can be concluded that repeat applications of a 3% glyphosate-containing product, which is equivalent to the six qt/ac rate used in this study and historically used for guineagrass control at CRP, should be continued as the management practice.

The development of herbicide resistance has been expressed as a threat to management of natural area weeds (Hutchinson et al. 2007). Globally, twenty eight weed species have developed resistance to the mechanism of

In the early 1900s, botanist and naturalist, Charles Torrey Simpson, warned, "There are the adventive plants, the wanderers, of which we have, as yet, comparatively few species; but later, when the country is older and more generally cultivated, there will surely be an army of them." (Simpson 1920)

action of glyphosate, ESPS synthase inhibition (Heap 2014). Already somewhat tolerant to glyphosate, guineagrass has the potential to develop increased resistance to glyphosate in response to repeated applications over time. To minimize the potential for resistance development, herbicides with different modes of action should be alternated. The herbicides with different modes of action tested in this study did not provide sufficient control to justify alternating with glyphosate. Therefore, further research is needed to find herbicides with different modes of action for control of guineagrass.

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ADRIENNE SMITH

Mexican-petunia invasion at Lake Jesup Conservation Area (Sanford, FL).

Mexican-petunia (*Ruellia simplex*) Invasions: Management Challenges and Research Opportunities

By Adrienne M. Smith, Carrie Reinhardt Adams, and Sandra B. Wilson

Mexican-petunia (*Ruellia simplex*), known for its prolific purple flowering in a range of conditions, is a commonly planted herbaceous perennial used in many landscape settings. Native to Mexico and South America, Mexican-petunia was presumably introduced as an ornamental (Bailey and Bailey 1976). It was first noticed as naturalized along the Florida through Louisiana coastlines in 1933 (Small 1933). Presently, this species is invading natural areas throughout the southeastern United States (EDDMapS 2013), including 29 counties in Florida (Wunderlin and Hansen 2012) (Figure 1). In Florida, Mexican-petunia was first listed in 1999 as a Florida Exotic Pest Plant Council (FLEPPC) Category II Invasive (classified as increasing in abundance but not displacing native plant communities). In 2001, it was promoted to a FLEPPC Category I Invasive as displacement of native plant communities by Mexican-petunia was recurrently observed (FLEPPC 2011). In addition to its FLEPPC ranking, the UF/IFAS Assessment does not recommend its use for North, Central, and

South Florida due to its invasiveness and rapid spread in these regions (IFAS Invasive Plant Working Group 2013).

It has been shown that Mexican-petunia has a competitive advantage over the native Carolina wild-petunia (*Ruellia caroliniensis*) for resource utilization and efficiency (Wilson et al. 2004). In addition, Mexican-petunia seeds germinate readily under a range of temperature and light conditions (Wilson and Mecca 2003). In natural areas, Mexican-petunia propagules often travel through stormwater runoff deposited in floodplain forests. Upon germination and establishment in these floodplains, Mexican-petunia increases in abundance and ultimately dominates the aboveground cover, creating monotypic invasions (Figures 2a and 2b). Continued propagule introduction into floodplains contributes to the capacity for Mexican-petunia to alter ecosystem processes and successfully compete with native species for available resources (Gordon 1998; Mack et al. 2000). Control of existing propagule sources (i.e. seed from surrounding landscapes) is required to limit invasions.

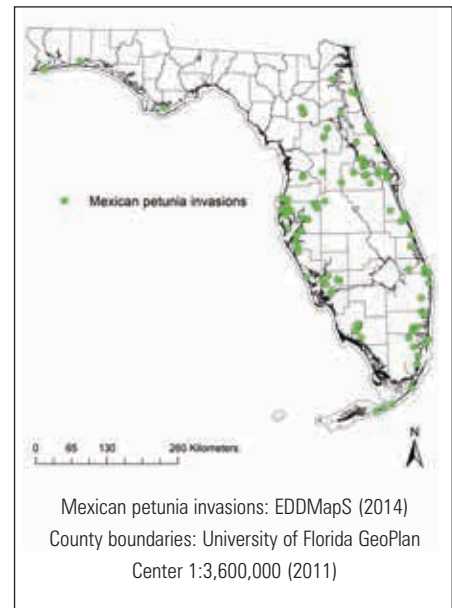


Figure 1. Documented invasions of Mexican petunia in Florida (EDDMapS 2014).

The same plant characteristics that are desirable for the ornamental market of plants often increase the probability for invasion (repeat blooming, low maintenance, wide adaptability, ease of propagation, stress tolerance, short juvenile period, consumer demand) (Wirth et al. 2004; Drew et al. 2010). Since Mexican-petunia is

an ornamental invasive that is still in commercial production, it presents unique challenges as future invasions and reinvasions are likely. A number of cultivars of Mexican-petunia are available commercially and most are fertile (Wilson and Mecca, 2003; Hupp et al. 2009). The University of Florida Ornamental Breeding Program (Gainesville, FL) has recently released two sterile cultivars as alternatives for growers and homeowners (Freyre et al. 2012; Freyre et al. 2013). A second approach to reducing propagule pressure of invasives is to suggest the use of native species that have similar ornamental value (Wilson et al. 2009).

Initial control of Mexican-petunia is relatively straightforward. Experiments for developing control methods for Mexican-petunia tested four readily available herbicides and found that glyphosate effectively reduced Mexican-petunia cover (R. Stocker, personal communication; Wiese et al. 2013). Adams et al. (2013) further examined the effect and number of glyphosate applications on Mexican-petunia when sprays were initiated in the fall or spring. Sixty to seventy percent reductions in cover of Mexican-petunia resulted, regardless of the number of applications and application season, thus concluding that a single glyphosate application in the fall or spring is sufficient to control Mexican-petunia (Adams et al. 2013).

Effective control and management of invasive plants is critical to restoration of degraded urban lands, yet in some cases, relying on natural recolonization of native species after initial control is not sufficient (Kettenring and Adams 2011). Planting natives for revegetation has been shown to facilitate restoration of the native plant community and simultaneously limit reinvasion (Blumenthal et al. 2003). This has been well-demonstrated for prairie vegetation (Blumenthal et al. 2003) and has shown promise in wetlands, but research is lacking (Kettenring and Adams 2011).



Figure 2a. Mexican-petunia invasion at Hogtown Creek (Gainesville, FL).

Planting native species for control of invasive species may be particularly important in landscapes where reinvasion is likely; for example, if the invasive plant is ornamental and still in commercial production. As noted by Adams et al. (2013), the next step in management is to determine possible mechanisms that prevent native species establishment. Current research is underway for 1) determining revegetation methodology, and 2) determining abiotic factors that may promote Mexican-petunia dominance.

While active revegetation is commonly needed to fully restore the native plant community following invasive species control, specific strategies for revegetation are limited. Determining which natives are appropriate for revegetation is one of the first steps. Appropriate criteria are presented in Table 1. We applied these criteria to identify candidate native species for active revegetation of managed Mexican-petunia floodplain sites. Using a broad survey of vendors with seed availability, the candidate list was narrowed to the following 4 species: bushy bluestem (*Andropogon glomeratus*), soft rush (*Juncus effusus*), redtop panicgrass (*Panicum longifolium*), and pinebarren goldenrod (*Solidago fistulosa*). Germination studies were conducted under

varying light and temperature regimes to compare the rate of germination of these natives compared to Mexican-petunia. Natives had a slower germination rate than Mexican-petunia (data not presented). For an effective revegetation strategy, this suggests the potential need for sowing natives at higher densities to compensate for the slower germination, thus allowing them to better establish and suppress Mexican-petunia. Current research is in progress to test this theory, both in greenhouse competition studies and field studies (conducted at the Lake Jesup Conservation Area).

Another barrier to Mexican-petunia control and native species establishment may be related to plant-soil interactions. Monotypic invasions are commonly characterized by having little to no other species (native or invasive/exotic) present in the aboveground cover (Eliason and Allen 1997; Brewer 2008; Spyreas et al. 2010). Despite our observations of bare ground that should represent microsites for other species to establish, there are no co-occurring species within Mexican-petunia invasions. The lack of additional species in the cover is particularly unexpected, especially given the native species detected in the seedbank beneath Mexican-petunia invasions. In fact,



Figure 2b. Mexican-petunia invasion at Paynes Prairie Preserve State Park (Gainesville, FL).

seedbank studies conducted on Mexican-petunia invasions at Paynes Prairie Preserve State Park (Gainesville, FL) (Mazzota et al. 2012) and the Lake Jesup Conservation Area (Sanford, FL) (Smith et al., unpublished data) show that the majority of species present in the seedbank are natives. It may be that degraded soils suppress native species establishment and promote invasive species (Brown et al. 2008).

Our research also shows differences in soil characteristics between invaded and uninvaded areas. This may suggest that altered soil nutrients related to stormwater runoff promote Mexican-petunia dominance and limit establishment of these native species. Other research has demonstrated that degraded soils promote invasion, but this link has yet to be established for Mexican-petunia. Current research is

underway to determine how native soil changes over time in the presence of Mexican-petunia.

To see the list of references, please refer to the full article on the FLEPPC website under Publications or contact the corresponding author.

Acknowledgements

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Table 1. Criteria for species selection and justification for revegetation of formerly invaded Mexican-petunia floodplains.

Criteria	Justification	Reference
Select species presence in local ecosystem	To ensure greatest chance of site-level adaptation	Garbisch 1986; Fischenich 2001
Characteristic of vegetation present at the reference ecosystem	To ensure greatest chance of abiotic and biotic characteristics	White and Walker 1997
Common, dominant, or early successional	To ensure characteristic primary succession of site	Corr 2003; McClain et al. 2011
The ability to withstand a wide range of water depths	To ensure survivability under seasonal flooding and drought conditions	Sheley et al. 2006
Low maintenance species	To ensure minimal human intervention	Stark 1972
High survival and growth rates in degraded systems	To ensure high survivability in disturbed areas	“framework species method” for tree species, Goosem and Tucker 1995
Species that are competitive under current site conditions	To ensure species competitiveness in current conditions	Fischenich 2001
Species that are competitive in disturbed environments	To ensure greatest chance of competitiveness in altered habitats, including competition with invasive or exotic species	McClain et al. 2011
Species that are readily available	To ensure practicality and availability for future use in restoration programs	Kettenring et al. 2013

PRECISION PULLING:

Federal Invasive Plant Research Lab Helps Broward County Remove Invasive Ferns

By Melissa Smith, Ellen Lake and Patricia Howell

Tucked away between Florida's Turnpike and the burgeoning urban sprawl of Fort Lauderdale lies Broward County's Fern Forest Nature Center, 247 acres that form the flagship of Broward's urban preserve system. Established in 1978 through a municipal bond, Fern Forest preserves 10 distinct plant communities and was designated as an Urban Wilderness Area. Cypress and maple forest communities crop up out of the marl limestone with dozens

of fern species inhabiting the shady, wet understory. Within the abundance of native ferns though, lies an inconspicuous invader that threatens a rare and endangered native fern.

Tectaria incisa (Dryopteraceae), or incised halberd fern, was introduced from South America through the horticulture plant trade in the late 1920s (Gordon and Thomas 1997). It displaces native ferns in cypress understories; in particular, the native and rare broad halberd fern, *Tectaria heracleifolia*. However, *T. incisa* bears a strong resemblance to the congener, *Tectaria heracleifolia*, and often grows intermingled

with it and other ferns in cypress-maple communities. The close resemblance and proximity of *T. incisa* to *T. heracleifolia* makes manual and chemical removal extremely difficult and requires that practitioners have a far higher plant identification skill set than most contractors.

The USDA's Invasive Plant Research Laboratory (IPRL) in Fort Lauderdale, Florida investigates major plant invasions and how to employ biocontrol as part of a comprehensive



Incised halberd fern (*Tectaria incisa*) can displace the rare native broad halberd fern (*Tectaria heracleifolia*), to which it bears a strong resemblance. The two ferns often grow intermingled, making management difficult. Here the larger, lighter fronds of *T. incisa* grow above the smaller, darker fronds of *T. heracleifolia*.

management plan for plant invasions in Florida. The IPRL and its scientists cooperate extensively with Broward County Parks on several Florida Exotic Pest Plant Council (FLEPPC) Category 1 invasive species (e.g. *Lygodium microphyllum*, *Dioscorea bulbifera*, *Rhodomyrtus* sp.) and sought out Broward County Parks as a site for a volunteer project to commemorate Earth Day 2013. Broward County Parks, under the direction of resource manager, Patricia Howell, identified this as a potential project particularly due to the strong botanical ID skills of IPRL staff.

IPRL staff correctly identified, pulled and removed fifteen 50-L garbage bags of *T. incisa* from an approximately one-acre parcel within Fern Forest Nature Center. Removing *T. incisa* within this patch will allow *T. heracleifolia* to re-establish from pre-existing ferns within the area. Additionally, the skills and effort put forth by IPRL to differentiate between these ferns and to remove *T. incisa* with minimal impact to native species highlights the importance of cooperation between agencies.

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Tectaria incisa infestation.

Use of Milestone Herbicide to Target Invasive Skunk Vine and Restore Native Vegetation in Florida: Implications for Future Forest and Range Management

By Nathan P. Lovstrand



Nathan Lovstrand applies Milestone™ herbicide.

Resource managers are often tasked with maintaining or restoring land to native plant communities. Removal of invasive plants is key to the success of restoration efforts because these exotics can displace native flora. Managers must decide how to remove these invasive plants while not impacting the native flora. Herbicides are often used to accomplish this goal.

When using a herbicide it is just as important to know which plants the product will not harm as which plants it will effectively control. The purpose of this project was to gain more information about the effects of Milestone™ herbicide on local forest and range plant species while treating skunk vine (*Paederia foetida*).

Skunk vine was brought to the Brooksville, FL area from Asia prior to 1897 as a potential fiber crop (Morton 1976) and is now found in many areas of the southeastern United States including Texas, Louisiana, North and South Carolina, Georgia and Florida (EDDMapS 2014). Large areas of forest are currently infested with this species. It is found creeping across the ground, covering small shrubs and climbing large trees. It spreads out after reaching the canopy and robs native vegetation of sunlight. Milestone™ is registered in Florida by the EPA and Florida Department of Agriculture and Consumer Services for use in forest and range plant control. Early trials with this product have shown promise for the control of skunk vine (Nelson 2010).

Methods

Areas were chosen where skunk vine was growing in abundance over and among other plants. Corner stakes were set to mark four 1,000 sq. ft. study plots (25' x 40' each). Two of the study plots were on a forested plot of private property five miles north of Brooksville that had been partially cleared ten years prior and selectively mowed of small trees and shrubs one year prior. Because this area was slated for fairly high picnicking and camping use, other native plants that were considered undesirable included poison ivy, and dog fennel (see Table 1 for botanical names). Selective removal of green briar, wild grape, Virginia creeper, Carolina jessamine, passion vine, trumpet creeper, and false pennywort (a common yard weed) was also desired. These plants were targeted only where they caused access problems in high use areas or impacted other, more desirable, species.

Most other native plant species were considered desirable. Many ground cover and herbaceous species are found on the parcel, including partridge berry, bracken fern, sedges, milkwort, dewberry and grasses (*Panicum* spp. and wiregrass).

Tree and shrub species found on the property include wild cherry, water oak, laurel oak, live oak, pignut hickory, sweet gum, loblolly pine, and cabbage palm, yaupon holly, gallberry, arrowwood viburnum, Walter's viburnum, American beautyberry, sparkleberry and saw palmetto.

Table 1: Sensitivity of plant species to Milestone™ herbicide based on visual observations.

VINES		
Common Name	Scientific Name	Sensitivity
Skunk vine	<i>Paederia foetida</i>	4
Creeping cucumber	<i>Melothria pendula</i>	4
Morning glory (3 species)	<i>Ipomoea</i> spp.	4
Passion vine	<i>Passiflora incarnata</i>	4
Virginia creeper	<i>Parthenocissus quinquefolia</i>	4
Poison ivy	<i>Toxicodendron radicans</i>	4
Wild grape vine	<i>Vitis</i> spp.	3
Carolina jessamine	<i>Gelsemium sempervirens</i>	0
Trumpet creeper	<i>Campsis radicans</i>	0
Green briar	<i>Smilax</i> spp.	0
GROUND COVERS		
Milkwort	<i>Polygala nana</i>	4
Dichondra	<i>Dichondra caroliniana</i>	0
Partridge berry / Twinberry	<i>Mitchella repens</i>	0
GRASSES & SEDGES		
Basketgrass / Woodsgrass	<i>Oplismenus hirtellus</i>	1
Nutsedge	<i>Cyperus</i> spp.	1(a)
Panicum grass	<i>Panicum</i> spp.	0
Tall nutgrass / whip nutrush	<i>Scleria triglomerata</i>	0
Thin paspalum	<i>Paspalum setaceum</i>	0
Wiregrass	<i>Aristida</i> spp.	0
HERBACEOUS ANNUALS / PERENNIALS		
Beggarticks	<i>Bidens alba</i>	4
Spanish needle	<i>Bidens bipinnata</i>	4
Bloodleaf	<i>Iresine diffusa</i>	4
Ciliate wild petunia	<i>Ruellia ciliosa</i>	4
Coastal bedstraw	<i>Galium hispidulum</i>	4
Florida hedgenettle / betony	<i>Stachys floridana</i>	4
Hitchhikers/Creeping beggarweed	<i>Desmodium incanum</i>	4
Germander	<i>Teucrium canadense</i>	4
Stinging/Bull nettle	<i>Cnidocolus stimulosus</i>	4
Spotted beebalm	<i>Monarda punctata</i>	4
Tropical bushmint	<i>Hyptis mutabilis</i>	4
Wild tantan	<i>Desmantus virgatus</i>	4
Goldenrod	<i>Solidago</i> spp.	0

FERNS		
Common Name	Scientific Name	Sensitivity
Bracken fern	<i>Pteridium aquilinum</i>	2
Downy maiden / shield fern	<i>Thelypteris dentata</i>	1
Spleenwort	<i>Asplenium</i> spp.	0
Southern grape fern	<i>Botrychium biternatum</i>	0
SHRUBS		
American beauty berry	<i>Callicarpa americana</i>	4
Common buttonbush	<i>Cephalanthus occidentalis</i>	4
Dog fennel	<i>Eupatorium capifolium</i>	4
Dewberry	<i>Rubus trivialis</i>	4
Wax myrtle/Southern bayberry	<i>Myrica cerifera</i>	4
Winged sumac	<i>Rhus copallinum</i>	4
Sesbania	<i>Sesbania drummondii</i>	4
Sparkleberry	<i>Vaccinium arboreum</i>	4
Arrowwood viburnum	<i>Viburnum acerifolium</i>	4
Flatwoods plum / Hog plum	<i>Prunus umbellata</i>	3
Mock buckthorn	<i>Sagetetia minutiflora</i>	3
Coralbean / Cherokee bean	<i>Erythrina herbacea</i>	2
Gallberry	<i>Ilex glabra</i>	1
Yaupon holly	<i>Ilex vomitoria</i>	1
Walter's viburnum	<i>Viburnum obovatum</i>	1
Saltbush	<i>Baccharis halimifolia</i>	0
Saw palmetto	<i>Serenoa repens</i>	0
TREES		
Red bay	<i>Persea borbonia</i>	4
Loblolly pine	<i>Pinus taeda</i>	4
Carolina laurelcherry	<i>Prunus caroliniana</i>	4
Wild cherry	<i>Prunus serotina</i>	4
Red cedar	<i>Juniperus virginiana</i>	2
Laurel oak	<i>Quercus laurifolia</i>	0
Live oak	<i>Quercus virginiana</i>	0
Pignut hickory	<i>Carya glabra</i>	0
Sweetgum	<i>Liquidambar styraciflua</i>	0
Water oak	<i>Quercus nigra</i>	0
Cabbage palm	<i>Sabal palmetto</i>	0

0=None 1=Slight 2=Weak 3=Strong 4=High (a)=growth regulation

The other 2 study plots were located within Fort Cooper State Park in Inverness, Florida. The park has had an ongoing skunk vine removal program for several years and 2 plots were set in the worst areas of the infestation, up from a lake edge in a relatively undisturbed oak hammock. The Fort Cooper plots included many different native plant species from the previous site. Species tested here included three morning glory species, wild petunia, wild tantan, spleenwort fern, creeping cucumber, saltbush, Florida hedgenettle, coralbean, beggarticks, Spanish needle, spotted beebalm, tropical mintbush, germander, goldenrod, downy maiden fern, common buttonbush, Sesbania, bloodleaf, basketgrass, coastal bedstraw, tall nutgrass, thin paspalum, mock buckthorn, red cedar, red bay, Carolina laurelcherry, winged sumac, flatwood plum/hog plum.

A solution of 4.8ml Milestone™ herbicide /4gal water (7oz/acre) with 5oz of a non-ionic surfactant was evenly applied over each plot. The private property plots were treated during the spring season while the state park plots were treated during the summer to increase the number of species tested. Also, to test the product on yet additional species, certain species outside of the plots were spot treated with the same mixture. They were flagged so they could be located for evaluation at later dates.

Observations were noted and photography was used to document any changes in plant condition. The plots were monitored on a weekly basis through the first 28 days and a final evaluation was made 40 days after application. Photos taken on day 0, day 7, day 14, day 21, day 28, and day 40 were used to verify observations. These photos were used to analyze the effect of Milestone™ on each plant species. Plants were allowed to grow throughout the spring and summer and then evaluated to assess plant recovery

Results and Discussion

Table 1 shows the effects of Milestone™ herbicide on each plant species after a forty-day time period. A rating of 0 to 4 was used to describe the effectiveness of the herbicide. The numbers indicate an even progression of effectiveness from 0 to 100%.

Approximately half of the plant species showed a response to the Milestone™ treatment of none, slight or weak (a rating of 0 to 2) including trumpet creeper, Carolina jessamine, dichondra, all grasses, nut sedge, goldenrod, spleenwort, partridge berry, green briar, saw palmetto, saltbush, gallberry, Walter's viburnum, youpon holly, sweet gum, all the oak trees, pignut hickory and cabbage palm. Milestone™ acted as a growth regulator on nut sedge which turned darker green and stopped growing for approximately one month. Southern grape fern, by day 28, seemed to be showing signs of decline. However, when the plant was compared with other southern grape ferns outside the plot, they appeared very similar. It is therefore assumed that the poor plant condition noted was associated with a

normal seasonal die back of the above ground portion of this species. The mock buckthorn was completely defoliated by day 14 but was beginning to leaf out on the larger stems by day 40.

Plant species that were considered effectively controlled (a sensitivity rating of 3 or 4) included skunk vine, poison ivy, Virginia creeper, wild grape, passion vine, creeping cucumber, three morning glory species, all the herbaceous annuals/perennials (except goldenrod and dog fennel), American beauty berry, common buttonbush, *Lantana*, *Sesbania*, sparkleberry, blackberry, arrowwood viburnum, winged sumac, hog plum, red bay, loblolly pine, redbud, wax myrtle, Carolina laurelcherry and wild cherry. Milkwort was showing a very slow but continuous decline beginning at day 28 and continuing through day 40. It was checked again on day 55 and pronounced dead.

One confounding situation in the study was that since two plots had been mowed a year earlier, several of the tree and shrub species were re-growing from substantial root bases. With reduced foliage-to-root ratio to absorb the herbicide, these plants had a better chance of survival. For example, at the end of the 40 day observation period, the arrowroot viburnum plants that had been mowed still showed some green, but withered and curled, foliage. However, the plants that had not been mowed were found to be without foliage, and completely dead by day 40.

Of the 4,000 square feet represented within the plots at six months post-treatment, skunk vine occupied less than 3% of the area, and non-susceptible native plants were thriving.

Conclusion

Milestone™ herbicide is effective in controlling skunk vine and several other species. The herbicide is selective and can be used to control skunk vine without harming many desirable plant species that skunk vine uses for structural support. Even where skunk vine grows within the canopies of tree and shrub species, it can be killed without harming many of the supporting species. However, managers must still use caution to avoid overspray on susceptible neighboring plants they wish to keep.

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Nathan Lovstrand (18) is the son of Florida Fish and Wildlife Conservation Commission – Invasive Plant Management Section Biologist Robert Lovstrand, who oversaw Nathan's study. Contact Robert at 352-726-8622; Robert.Lovstrand@myFWC.com



Alabama IPC

On October 17, 2013, the Alabama Invasive Plant Council held its first Coastal Invasive Plant Management Workshop at Gulf State Park in Gulf Shores, Alabama. The meeting highlights included an excellent overview of beach vitex (*Vitex rotundifolia*) ecology and control by Dr. Ted Whitwell from Clemson University, and a field trip to observe some of the unique plant communities within the park as well as the invasive species impacting these communities. The conference would not have been a success without the support of Gulf State Park and Weeks Bay Preserve. Many thanks to them and the

ALIPC Board for a great effort!

SAVE THE DATE! The 2014 ALIPC annual meeting will be held on May 20 in Monte Sano State Park in Huntsville, Alabama. Topics will likely include bush honeysuckle, tree of heaven, and purple loosestrife ecology and management. Look for meeting updates on the ALIPC website.

ALIPC has supported two invasive plant workdays. The first took place on February 22 at the Auburn University Davis Arboretum. ALIPC has supported invasive plant removal efforts by the arboretum for several years and much progress has been made at several sites around the area.

The second workday will be held at Haines Island Park on the Alabama River in Monroe Co., on March 22. Haines Island Park is 480 acres of land owned and managed by the U.S. Army Corps of Engineers as part of the Alabama River Lakes Water Resources Development Project. The park is situated in the Southern Red Hills region of the East Gulf Coastal Plain and is home to some rare plants and animals, including the Red Hills salamander, a federally-listed species. ALIPC is partnering with the Alabama Plant Conservation Alliance (APCA) to improve the ecological integrity within the park through control of invasive exotic plants including silk tree (*Albizia julibrissin*), Chinese privet (*Ligustrum sinense*), thorny olive (*Elaeagnus pungens*), Japanese climbing fern (*Lygodium japonicum*), kudzu (*Pueraria montana*), and Chinaberry (*Melia azedarach*). We have had several workdays since 2009 and have made great progress, but there is more work to be done. For more information, contact Gena Todia at jaget@zebra.net

Florida EPPC

FLEPPC recently released the *FLEPPC 2013 List of Invasive Plant Species*. The plant list is reviewed and revised every two years. The 2013 list includes five new species. Category I documents invasive exotics that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. This definition does not rely on economic severity or geographic range but on documented ecological damage caused. One new addition was made to this category: *Ludwigia hexapetala*, Uruguayan waterprimrose, which currently occurs in the central region of Florida. Category II documents invasive exotics that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. New additions to this category are *Macroptilium lathyroides* (phasey bean or wild bushbean) occurring in all regions of the state; *Eulophia graminea* (Chinese crown orchid) in the southern region; *Richardia grandiflora* (large flower Mexican clover) in all regions; and *Momordica charantia* (balsam apple, balsam pear) in all regions. Read more about these newly listed species on the FLEPPC website under **FLEPPC Invasive Plant Lists**.



FLEPPC continues to award annual Education & Outreach grants and graduate student Research Grants. Grants awarded last year included:

- Two short educational videos produced by Anglers for Conservation. These public service announcement style videos describe Australian pine and air potato on a website. See www.anglersforconservation.org/learn-about-invasive-plants/
- A multi-agency partnership to combat air potato in a Miami-Dade County preserve by Eduardo G. Salcedo, a biologist with the Natural Areas Management Division of Miami-Dade County Parks, Recreation and Open Spaces.
- Teaching Landowners about Invasive Species in North Florida: an Evolving Cooperative Endeavor by Judy Ludlow, Agriculture and Natural Resources Agent, University of Florida/IFAS Extension Calhoun County.

FLEPPC also funds an annual graduate student research grant and the most recent awardee was Adrienne Smith, a Ph.D. candidate in the Department of Environmental Horticulture at the University of Florida. Her research study on Mexican-petunia (*Ruellia simplex*) is described on page 20.

Read the full reports of these grants at the FLEPPC website, www.fleppc.org under **Research and Educational Grants**.

Kentucky EPPC

By Jody Thompson, President



KY-EPPC recently elected officers Jody Thompson (President), Kris Stone (Vice President), and Beverly James (Secretary). KY-EPPC has begun an initiative to develop new partnerships through the establishment of regional advisory groups. These groups initially met to discuss the plants included on the now updated *Exotic Invasive Plants of Kentucky*

list. Future meetings, such as our next quarterly board meeting on June 2nd at the Cincinnati Zoo, will be scheduled to accommodate their attendance in an effort to enhance and develop services that KY-EPPC can provide.

Activities from last year include finalizing the now published

Kentucky's Native Alternatives to Invasive Plants brochure which is available online at http://www.se-eppc.org/ky/KY_native_alternatives.pdf

We also began work on a short publication that will describe the dangers of invasive plants to different audiences. It will use a format similar to the Midwest Invasive Plant Network (MIPN) publication, *Why Should I Care About Invasive Plants?* (view at mipn.org/publications)

Kentucky's Least Wanted Plant poster for 2014 features porcelain-berry (*Ampelopsis brevipedunculata*). These colorful posters are produced each year and are on the KY-EPPC website going back to 2000. A minimal number are printed for local use.

Georgia EPPC

By Karan Rawlins, President



The Georgia Exotic Pest Plant Council (GA-EPPC) 2013 Annual Meeting and Conference was held at the Middle Georgia State College in Macon. The keynote speaker, Dr. Julie Lockwood of Rutgers University, spoke about "The Population Biology of Exotic Species: Implications for Management." Dr. Doria Gordon of The Nature Conservancy spoke on "Screening out the Invaders;" Dr. Leslie Edwards spoke on the new work "Natural Communities of Georgia;" Eamonn Leonard spoke on "CISMAs in Georgia;" and Dr. Kris Braman of the University of Georgia spoke on "Integrated Pest Management." Vendors were a popular part of the program, not only with conference attendees but with passersby. Having vendors set up in the hallway of a busy college campus helped get our message across to many people.

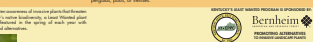
During the business meeting, J. Mincy Moffett, Jr., Ph.D., a botanist with the Georgia Department of Natural Resources, Nongame Conservation Section, was elected as treasurer for GA-EPPC.

For the past four years at least, GA-EPPC has had the opportunity to communicate its message of fighting invasive species at the Georgia Green Industry Association's (GGIA) WINTERgreen Tradeshow & Conference held in January. GA-EPPC Past President Brian Arnold of Songbird Landcare presented "The Problem of Invasive Plants," an overview of the environmental harm caused by invasives. Joanne Baggs, Forest Botanist/Ecologist at Chattahoochee-Oconee National Forest, presented "Managing Invasive Plants," covering integrated management strategies and the safe use of herbicides. Joanne also explained some of the special issues considered when planning invasive species management in a National Forest. Great care is taken to protect wildlife and native habitats. The workshop concluded with a presentation on "New Invasive Plant Threats," including a discussion on EDDMapS by GA-EPPC President Karan Rawlins of the Center for Invasive Species and Ecosystem Health, University of Georgia.

Georgia celebrated National Invasive Species Awareness Week (NISAW) by creating a group of educational posters and flyers on invasive species. These materials were distributed across the state to schools, libraries and approximately 50 state parks.

Lakeville, a classroom-ready unit to teach students about invasive species and ecosystem functions in a fun and engaging way, was successfully presented to a group of 14 teachers in Georgia this past summer. Kitty Lane of the University of Florida/IFAS Center for Aquatic and Invasive Plants (creators of *Lakeville*) instructed teachers on how to use the game to teach students about ecosystems, natural resource management (i.e., invasive species), sustainability and civic responsibility. Each teacher was provided with a *Lakeville* game kit to use in their own classroom. Additional *Lakeville* kits were purchased for other teachers to borrow so more students can be prepared for their role as future citizens and environmental stewards.

Finally, Georgia is proud to be hosting the **2014 Joint Annual Symposium for SE-EPPC** (see announcement on next page). It will be held November 12-14, 2014 at the Georgia Center in Athens. Look for more information on the SE-EPPC and GA-EPPC websites. We hope to see you there!



Southeast EPPC

By Brian Arnold - President



It's hard for me to believe that nearly two years have passed since becoming SE-EPPC President. It's been an honor to serve and I sincerely appreciate the opportunity, though the job merits more time than I've afforded. With such a need to build upon what we have, it's sometimes stressful seeing opportunities for growth go by unaddressed. For from growth comes strength and an ability to pursue our mission on a larger scale. Soon it will be time to hand the reins to our President Elect, Stephen Enloe, who I believe will make a great leader for our organization.

If you missed the 2013 Annual Meeting in Panama City Beach, Florida, then you missed a terrific conference. Hats off to FLEPPC for putting together such a well-rounded event. Damon E. Waitt, PhD., Senior Director of the Lady Bird Johnson Wildflower Center, provided an effective keynote presentation and was followed by numerous quality presenters.

The social events were not lacking either, and were facilitated by great weather and a relaxing beach environment, highlighted by some fantastic dancing on the part of some of our members.

I suspect that all who attend the annual meetings will agree that doing so is an invaluable experience, partly due to learning of science being applied to the understanding of exotic invasives, and partly because attendance affords a great opportunity to hear about the field work being done by others. Also, an opportunity to occasionally relax with like-minded folks, and even show your dance moves if you so desire, is good now and then.

With all the above being said, I hope to see you at this year's Annual Meeting in Athens, Georgia, as the GA-EPPC Board is working on a program that will feature Dr. Doug Tallamy, Professor of Entomology and Wildlife Ecology at the University of Delaware, as the keynote speaker. His book "Bringing Nature Home" has become an influence regarding the fate of native plants and the ensuing impact upon native arthropods, which of course impacts all of the species that eat them. Like the effect that his book had upon me, I'm confident that you will hear a rarely discussed side to the invasive plant phenomenon that shakes you. This year's Annual Meeting will be in November, which deviates from the tradition of May. If you will benefit from a November meeting, I'm glad. However, if May is better for you, then rest in knowing that the meeting will resume in May for 2015.

Regarding accomplishments during the past year, SE-EPPC has participated in a process spearheaded by NAEPPC that will help ensure that invasive plant lists are credible and defensible. Nancy Loewenstein, our NAEPPC liaison, and I have been participating in the respective committee. As

the completion of a national format nears, we hope that SE chapters will work together in such a way that will strengthen our lists. Doing so will be in line with a project begun in 2011, and discussed elsewhere in this issue.

In closing, I entered as president seeing far more opportunity than I'd be able to address during my term — partly because of the time that would be required, but mostly, I thought, because I'd be viewed as nuts once I shared some of my ideas. An idea that I'd hoped to bring to the table as president is the consideration of an Executive Director who works at the direction of the Board. With so much that could be achieved, if not for volunteers that have little time available in their schedules, it would sure help keep things moving. Interestingly, while on our website I stumbled onto a document, "SE-EPPC 2005-2010 Platform," in which the hiring of a full time executive director was envisioned by early framers of our organization. So maybe it's not a crazy idea on my part, and something that we need to consider. In the meantime, I encourage you to get involved with your chapter for there are numerous opportunities, and the need is spreading.

I hope you have a great spring, and thank you for supporting SE-EPPC.

Southeast Exotic Pest Plant Council & Georgia Exotic Pest Plant Council A Joint Annual Symposium

November 12-14, 2014 • Georgia Center, Athens, GA

KEYNOTE SPEAKERS:

- Douglas Tallamy:** Bringing Nature Home: How You Can Sustain Wildlife with Native Plants
- Charles Barger:** Using Technology to Fight Invasive Species: Past, Present and Future
- Nancy Loewenstein:** Creating National Guidelines for Listing Invasive Plants

REGISTRATION INCLUDES:

- Student Poster Competition (Cash Prizes)
- Professional Certification Credits
- GA-EPPC Membership
- Field Trips
- Vendor Displays
- Lunch & Networking Breaks

Registration, Call for Papers and Student Applications are now online!

Learn more about Exotic Pest Plant Councils in the Southeast and the upcoming conference at SE-EPPC.org



North Carolina IPC

By Jim Burke, President

At our last annual meeting in 2013, members of the NC Exotic Pest Plant Council (NC EPPC) voted to change the name of our organization to the North Carolina Invasive Plant Council (NC-IPC). Our new website address is nc-ipc.org

Our 2014 annual meeting, originally scheduled for February 11-12, 2014, had to be postponed due to the big snow storm that swept through the area and made travel pretty treacherous for a day or two. We rescheduled our meeting for March 4-5, 2014. Fortunately, most of our speakers were able to accommodate the new dates. This year's theme, "It's A Zoo Out There", reflects the level of the onslaught we are all facing from invasive plants, and this year's meeting host, the North Carolina Zoo in Asheboro, NC. We covered a diverse range of topics during our meeting. Attendees learned how county parks and nature preserves are dealing with invasive challenges. They also heard presentations from NC Dept. of Agriculture & Consumer Services personnel on monitoring and mapping invasive insects and pathogens and the department's Biological Control Program, one of a variety of management tactics utilized to combat infestations that are widespread, hard to access and/or associated with sensitive areas. Attendees also got a first-hand look at the unique invasive issues encountered by staff at the NC Zoo and the management program they have developed to address these challenges. In addition to these and other presentations, NC-IPC board members also conducted a session on the NC Invasive Species Awareness Week. NC-IPC was also pleased to present an "Excellence in Action Award" to Tom White, Service Forester, and Jeremy Callicutt, both with the NC Forest Service, for discovering a small patch of cogongrass in Stanly County, NC. This is the second report of cogongrass found in natural habitats in NC. The first sighting, located in Pender County, was reported in spring 2012 by Pender County Cooperative Extension agent Charlotte Glenn.

This year's NC Invasive Species Awareness Week took place during the first full week in April, April 6-12, 2014, and provided an opportunity for groups and agencies across North Carolina to educate the public on invasive species and their impact on our native habitat. NC-IPC recently created new roll-up banner signs to be used in our outreach events to better communicate the impact of invasive plants to the public. These signs were featured at our booth at the NC Nursery and Landscaping Association's annual Green & Growin' Trade Show held in January in Greensboro, NC (Figure 1). Board members have also made invasive plant presentations to several ornamental and turf groups this year.

This year, NC-IPC members have also provided input to SE-EPPC and NAEPPC on the ASTM project detailing criteria for invasive plant lists (see article on page 4).



Left to right: Johnny Randall, Pete Schubert and George Morris, members of the NC-IPC Board of Directors, with the new NC-IPC banner.

South Carolina EPPC Update

By Ben Powell, President

Since our last update, the South Carolina chapter of EPPC has grown and evolved to meet the ever-growing need for invasive plant outreach across the state. We have several new folks to fill the leadership of the organization. Ben Powell, with the Clemson Extension Service, has taken the helm as president, and Lauren Pile, also with Clemson University, is serving as vice president. The board also welcomed new members: Lauren Serra (National Park Service – Congaree National Park), Dan Hill (Coker College), and Bill Steele (Anne Springs Close Greenway).

The organization has been involved with several successful events and remains vigilant for new invasive species. We continue to be involved with the annual Cogongrass Workshop and Survey. Board member Sudie Thomas (USDA-NRCS) was instrumental in the completion of a Chinese privet workshop and the production of a video on Chinese tallow control. The video is available at <https://vimeo.com/59610808>. Last year's annual meeting was moved upstate to the Anne Springs Close Greenway, a beautiful green space near the greater metro Charlotte area. The focus of the meeting was "Restoration After Removal" and featured discussions of kudzu site restoration, replacement of native cane patches, and monitoring restoration sites for wildlife use. The meeting included a guided tour of the

(see next page)



South Carolina EPPC Update continued

property where they actively manage several invasive species and have restored a piedmont prairie. Most recently, SC-EPPC was involved with a workshop on fig buttercup (*Ficaria verna*), one of the most recent invaders to the state (see article page 11).

The Chapter is currently reviewing its invasive plant list and considering several new species that have been found in the state including fig buttercup (*Ficaria verna*), itchgrass (*Rottboellia cochinchinensis*), Benghal dayflower (*Commelina benghalensis*), and air yam (*Dioscorea bulbifera*).

The most notable achievement of the South Carolina chapter was the initiation of a Community Grant Program. The program provides competitive small block grants for South Carolina residents for the control of invasive plants on private or public properties. Each year the Program funds two projects to the tune of \$500 each. These funds can be used for equipment and materials necessary for control of invasive species. Preference is given to projects that seek to control SC-EPPC listed plants, involve restoration efforts, make use of partnerships and matching funds, and include some form of outreach. In line with the chapter's mission to provide outreach, recipients will be required to write an article describing the project and submit it to local news media and to publications such as *Wildland Weeds* and the *South Carolina Nurseryman*. The program has just begun, and the chapter is currently reviewing applications for this year.

We are beginning to plan our next annual meeting and anticipate returning to the low country in September. This year's meeting likely will center on the topic of monitoring and preventing new introductions. All are welcome — we hope to see you there.

Tennessee EPPC Community Invasive Plant Workshops: TNEPPC Pilot Model



By Pat Parr, Past-President

The Tennessee Exotic Pest Plant Council initiated development of a model to use in preparing invasive plant workshops for use in local communities. The objective is to partner with organizations within local communities and draw support from state or regional organizations (such as TNEPPC) to provide information about invasive plants specific to the community's needs. Basic PowerPoint™ presentations, along with a template for an agenda, were developed that can be customized as needed for use in different communities. The agenda template and PowerPoint™ presentations are on the TNEPPC website: www.tneppc.org.

Oak Ridge community, state, and regional organizations worked together to develop the first pilot community workshop: “Dealing with Invasive Plants.” More than 50 individuals ranging from homeowners to land management professionals participated in the workshop. Goals were to provide homeowners and gardeners, as well as professional grounds maintenance staff, with information to identify, manage, and prevent invasive plant problems. Professional certification points were offered.

Displays were set up with various resource experts available to provide information and answer questions. An invasive plant display included specimens of the many invasive plants found in the area, along with identification markers. A local native plant nursery brought examples of native plants. The TNEPPC display had an informational poster along with handouts, including brochures on landscaping with native plants, plant alternatives, and other items of interest.

Morning topics included:

- Invasive Plants 101
- Developing a Plan
- Prevalence of Invasive Plants in Urban Areas
- Controlling Invasives Using Products Off the Shelf
- Native Plant Alternatives

Afternoon breakout sessions allowed professionals dealing with invasive plant issues at a broader level to discuss challenges and possible approaches to leverage resources, and to develop networking contacts. A separate breakout session focused on identifying concerns with respect to invasive plants within the community. Issues were shared and recorded for follow up.

An afternoon field session was held at the UT Arboretum with a walking tour to identify invasive plants and a demonstration of how to treat them.

Two additional pilot community workshops were held at Warner Park Nature Center in November 2012 and at Big South Fork in June 2013.

The Oak Ridge Community Workshop Planning Committee included individuals from City of Oak Ridge; City of Oak Ridge Environmental Quality Advisory Board; Keep Anderson County Beautiful; Oak Ridge National Laboratory, Natural Resources Conservation Service; Tennessee Citizens for Wilderness Planning; Tennessee Exotic Pest Plant Council; University of Tennessee; and University of Tennessee Forest Resources AgResearch and Education Center. Presenters included individuals from these organizations and the National Park Service, Tennessee Naturescapes, and Tennessee Valley Authority.



The USDA's Invasive Plant Research Laboratory in Fort Lauderdale, Florida pulled the invasive fern, *Tectaria incisa*, as a volunteer project to commemorate Earth Day 2013. See article on page 23. Photo by Patricia Howell.