Wildland Weeds

FALL 2004

New from the Aquatic Prescription Specialists

Renovate® Aquatic Herbicide

Introducing the newest aquatic herbicide development in over 15 years, Renovate aquatic herbicide.

Renovate was designed to be effective on submersed, emersed and floating aquatic plants—a feature that allows Renovate to restore wetlands, marshes and shorelines as well as lakes, ponds and canals. With its highly effective systemic mode of action, Renovate provides selective control to help restore aquatic habitats knotted with nuisance and exotic plants including Eurasian Watermilfoil, Purple Loosestrife, Water Hyacinth, and Alligator Weed among others.

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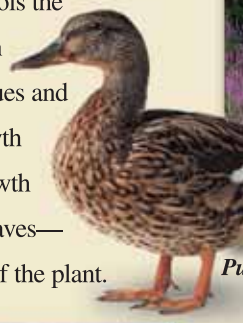

Untreated *1 week after treatment* *4 weeks after treatment*

Eurasian Watermilfoil treated with Renovate (1 ppm), shows the eventual collapse of the plant structure below the surface of the water.

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Alligator Weed

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Wildland Weeds

FALL 2004, VOLUME 7, NUMBER 4

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Visit these websites:
Florida EPPC: www.fleppc.org
Southeast EPPC: www.se-eppc.org

Wildland Weeds (ISSN 1524-9786) is a quarterly publication of the Florida Exotic Pest Plant Council (FLEPPC) and the Southeast Exotic Pest Plant Council (SE-EPPC).

Wildland Weeds is published to provide a focus for the issues and concerns regarding exotic pest plant biology, distribution and control. To become a member of FLEPPC or SE-EPPC and receive the Council newsletter and *Wildland Weeds* magazine, contact the respective Treasurer or website.

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Design by JS Design Studio. Printing by Storter Childs, Gainesville, FL.

On the Cover:

Pretty but perilous, Japanese grass (*Microstegium vimineum*) is ranked as a severe threat by the Tennessee Exotic Pest Plant Council. See their 2004 list of Invasive Exotic Pest Plants starting on page 13. Photo by P.D. Parr.

editor's note

Dear Readers,

On page 6, we report on the recent Lygodium Research Review meeting. You may have noticed that usually there is at least one meeting report in each issue of *Wildland Weeds*. Lest you think that we all spend our time at meetings every day, please know that you could not be more wrong! Exotic pest plants are exactly that: exotic! In most cases, little research has been done on controlling them. Researchers and managers, and future researchers and managers in the form of students, need to put their heads together often to share progress in management techniques, mapping methods, legislative issues, liaison activities with related groups (both like-minded and not), public education, cross-boundary management plans, plant invasion assessment and prediction systems, and so much more. Agricultural pest plants have decades of research and a lot of money behind them, but exotic pest plants in natural areas have only recently been addressed. As Thaddeus Hunt reported in our Spring 2004 issue, we need "…intellectual, practical, and social interactions to help close the race between exotic weed management and exotic weed anarchy." If it takes a few meetings a year to accomplish that, then so be it. Whether we work in the field, a lab, or an office, a change of scenery and a chance to interact with colleagues means progress in the preservation of our natural resources.

Professors, land managers, agency and non-government organization personnel, please see the Request for Proposal (RFP) below and notify students of the research grants available through FLEPPC. Professors, if you have a student looking for a project or for funding, help him or her work on a proposal. Land managers and others, if you have an exotic pest plant problem that needs research, contact a professor and let them know of the problem and the FLEPPC-RFP. Grant money is available and should be put to good use. The deadline is soon, so act quickly!

Please enjoy this Fall 2004 issue of *Wildland Weeds*. I would like to thank our supporters who make this publication possible. Please see the list of those who have sponsored this issue on page 27, and remember that we could not publish a magazine of this quality without them. We greatly appreciate their continued support!

—Karen Brown, Editor

REQUEST FOR PROPOSALS FOR INVASIVE PLANT RESEARCH

Deadline: February 27, 2005

The Florida Exotic Pest Plant Council (FLEPPC) has available funding for a small number of research grants/scholarships for students conducting studies related to invasive exotic plant management in Florida.

The deadline for proposal submission is February 27, 2005. Written proposals should be no more than three pages in length and should request funding for no more than $2,500. The proposal should include a summary of the research project and its relationship with Florida exotic plant management problems. Particular plant species involved in the study should be one or more of the Category I or Category II exotic pest plant species listed by FLEPPC (see web site: www.fleppc.org). In addition, the applicant should provide complete contact information and detailed budget -- with an explanation of how the funding will be used. Examples include (but are not limited to) travel funds for field work, funds for research equipment or supplies (or temporary use of specialized equipment), stipend for applicant's project work time not otherwise supported, travel funds for presentation of the research, etc. In developing the budget, funds requested are to be used for the direct costs of conducting research on the proposed project and are not to be used for indirect costs incurred by the student's university.

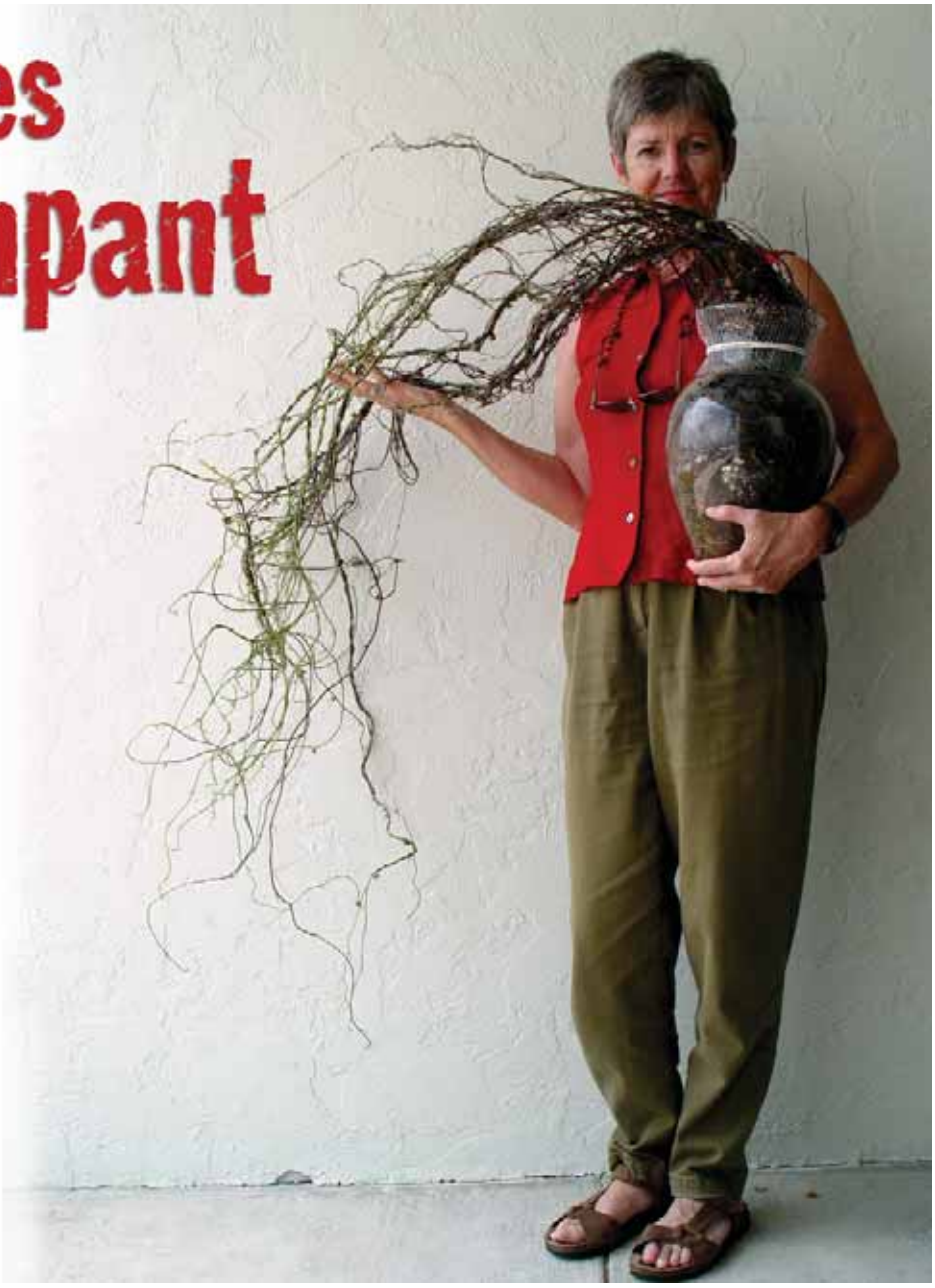
Proposals will be evaluated and ranked on the critical management need for scientific results in the area of study and on the clarity of the submitted request.

Basic eligibility requirements:
To be eligible for funding, applicants must be an undergraduate or graduate student enrolled at an accredited institution of higher learning anywhere within the United States. However, the research must be on a listed Florida invasive plant (http://www.fleppc.org/Plant_list/list.htm). An accompanying letter of recommendation from a faculty advisor is strongly encouraged.

Send proposals by e-mail, fax, or mail to:
John C. Volin, Chair
Research Committee, FLEPPC
Florida Atlantic University
2912 College Ave.
Davie, FL 33314
jvolin@fau.edu
FAX - (954) 236-1099
office - (954) 236-1115

Proposals are due by 5:00 p.m. February 27, 2005.

Air Potatoes Run Rampant



by Karen Brown

What started as a fun way to gain the attention of festival-goers at a spring garden event turned into an experiment to see just how far these amazing air potatoes would grow without soil, water, or direct sunlight. 236 air potato bulbils (*Dioscorea bulbifera*) were counted into a glass vase as a contest to see who could guess the correct number. It was a popular contest with 83 people participating and a grand prize of a Florida native tree. The event took place on the first day of spring, March 20th, in Gainesville, Florida. Since the vase full of potatoes generated a lot of lively discussion, the contest was repeated at the SE-EPPC/FLEPPC Symposium in late April, using the same batch of bulbils that had been left in the same vase. Following that event, they were left on a filing cabinet under fluorescent office lights until August 2nd, still with no water or soil added. By the end of the experiment, vines were growing into notebooks on a ceiling-level bookshelf and tiny bulbils were forming along the vines. Below are photographs arranged in a time sequence to show the prolific growth of this exotic pest plant. *Photos by Michael Meisenburg.*

Tracking the growth of *Dioscorea bulbifera*

March 20, 2004

April 23, 2004

May 13, 2004

May 28, 2004

June 23, 2004

August 2, 2004

Notes from the *Lygodium* Research Review Meeting

by Jeff Hutchinson, Ken Langeland, and Amy Ferriter

The first day of the Second Lygodium Research Review kicked off with opening remarks by Dr. Patrick Gleason (former SFWMD Governing Board Member), who compared Old World climbing fern (*Lygodium microphyllum*) to "a plague of biblical proportions that is threatening the Everglades." The meeting took place June 1-2 at the South Florida Water Management District office in West Palm Beach. Sixty-four participants represented federal, state and county agencies, universities, private conservation organizations and landowners. The purpose was to bring together land managers, researchers, program directors, funding agencies, industry representatives, and private landowners to review the current state of Old World climbing fern (OWCF) in south Florida and discuss future directions needed to control this invasive fern.

Amy Ferriter followed with a summary of what we did and did not know about OWCF in 1999 at the first Lygodium Research Review. What was not known in 1999 was compared to current knowledge, and work in progress was discussed.

Topics focused on current research and land management activities involving Old World climbing fern and included:

- Pattern recognition of OWCF using remote sensing
- Reproductive biology, community ecology and landscape spread of OWCF
- Modeling the spread of OWCF in the Loxahatchee NWR
- Model development to identify the most effective treatment strategies for OWCF
- Current status of biological control agent releases to control OWCF
- Initiation of surveys to detect OWCF along the Lake Wales Ridge
- Evaluation of Escort herbicide on OWCF
- OWCF problems on Lykes Brothers properties in south Florida
- Perspectives of private contractors
- Funding sources for private and public lands
- OWCF management in Everglades National Park, Loxahatchee National Wildlife Refuge, Jonathan Dickinson State Park, and along the Florida Turnpike
- South Florida Water Management District Lygodium Initiatives
- Management of OWCF on Southwest Florida Water Management District Properties

JEFF HUTCHINSON

Lygodium engulfing cabbage palms.

Questions that emerged from the management talks included: how often can an infestation be sprayed without damaging the integrity of the native vegetation?; What is the best time of year for initial treatment?; How long after initial treatment should re-treatment occur?; How many re-treatments are required for maintenance control?; Are field personnel contributing to the spread of spores from their clothing, shoes and equipment?; and, Is prescribed fire in OWCF areas good or bad for the natural community?

Dr. John Volin's research group at Florida Atlantic University presented results from a predictive model showing that area coverage of OWCF in south Florida may exceed that of the other top invasive plants by 2014.

Dr. Bob Pemberton of the USDA stated that the first release of a biological control agent, a pyralid moth (*Cataclysta camptozonale*), is scheduled for release in the fall of 2004. Several other biological control agents may be released within the next few years.

Drew Leslie of the Florida Department of Environmental Protection's Bureau of Invasive Plant Management (BIPM) stated that from 1998-2003, his agency awarded $6,422,432 to treat OWCF on public lands. New initiatives by BIPM for 2004 include the formation of a Lygodium Quick Strike force for rapid response

continued on page 8

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Table 1. Top five research priorities on Old World climbing fern for the next five years compiled by land managers, researchers, and program directors.

LAND MANAGERS	RESEARCHERS	PROGRAM DIRECTORS
1. Optimal treatment time.	1. What are the limiting factors in OWCF's growth.	1. Control methodologies (what works best) to treat OWCF.
2. Effects of fire as a treatment method.	2. Herbicide efficacy trials.	2. Efficient use of biocontrols.
3. Development of more effective and efficient herbicide(s).	3. Synthesis of management projects (successes vs. failures) to control OWCF.	3. Control methodologies (effects of non-target damage to different communities).
4. Early detection methods.	4. Potential for a rhizome biocontrol agent.	4. Socioeconomic (impacts to landowners).
5. Decontamination of clothes and equipment from spores.	5. Development of an early detection system.	5. Ecological impacts of OWCF on natural communities.

KEN LANGELAND

Fertile fronds on footware?

Notes *continued from page 6*

to OWCF infestations under 10 acres, and hiring a Lygodium Specialist for Florida Natural Areas Inventory to evaluate past projects and serve as a liaison with the University of Florida's Institute of Food and Agricultural Sciences, public land managers and agencies. It appears that the funds needed to maintain control of OWCF will greatly increase in coming years as the plant continues to spread to many of the wetlands of south Florida.

During breakout sessions on the second day, research priorities for the next five years were established. Participants were separated into three groups: land managers, researchers, and program directors. Each group was asked to prioritize research needs based on current knowledge and what we still need to learn to control OWCF. Results are listed in Table 1 and will be used to update the Statewide Lygodium Management Plan over the next year.

Overall, the consensus among the participants was that an integrated approach is needed to combat OWCF that includes the introduction of several biological control agents, determination of the best time of year to treat OWCF for different natural habitats, testing combinations of herbicides to increase mortality of OWCF and decrease damage to native vegetation, collecting data to support special local need herbicide use permits for OWCF control, and the use of mechanical methods and prescribed burning to dispose of dead rachis mats.

The last event was a meeting of the Lake Wales Ridge Ecosystem Working Group's Invasive Species Committee, a group dedicated to controlling the spread of OWCF and other exotic plants along the Lake Wales Ridge. The group discussed the OWCF problem along the Lake Wales Ridge where lands are owned by multiple public and private entities, and a large amount of land is in private ownership with an increasing number of small lot landowners bordering natural areas. Currently there is a void for funding and assistance in the removal of invasive species when working with small lot landowners. Their goal is to find an agency to fund a program of survey and treatment of OWCF for both public and private landowners, and an entity to coordinate activities on all lands (see *Wildland Weeds*, Summer 2004).

Notes from each presentation and the results of each breakout session will be available soon and posted on the FLEPPC list-serve and web site (www.fleppc.org).

A similar meeting will be held within the next year to discuss current and future research on Japanese climbing fern (*L. japonicum*).

Contact Jeff Hutchinson at 352-392-9981 or jthutch@ufl.edu

Photos by Jeff Hutchinson, UF-IFAS-Center for Aquatic and Invasive Plants

BUREAU OF INVASIVE PLANT MANAGEMENT LYGODIUM STRIKE TEAM

Since 1998, the Bureau of Invasive Plant Management, Uplands Section, has controlled more than 5000 acres of *Lygodium japonicum* and *Lygodium microphyllum* at a cost of approximately $2.6 million. This acreage does not include work performed by Water Management Districts and federal and local governments.

Effective August 1, 2004, the Bureau of Invasive Plant Management will provide an additional service to public conservation land managers throughout the state. This effort is for populations too large for in-house control efforts but too small to design a formal project and apply for funding at the working group level, and is limited to 10 acres.

If you have a population of either species of *Lygodium* in your management area that is less than 10 acres in size and with areas and access points well-defined and ready to go, the Uplands Section staff will arrange for a qualified contractor to conduct initial herbicidal control of that plant population. This service will include all labor, equipment, herbicide and adjuvants necessary to treat lygodium.

The Lygodium Strike Team will be comprised of experienced weed control specialists under contract with the Bureau. They will provide either foliar applications or “poodle-cuts” (cut vines 4-5 feet up from the ground and apply herbicide to the rooted portion of the plant).

Mr. Andrew Leslie is the Bureau coordinator for this endeavor. He can be reached at (850) 245-2822 or by e-mail at: Drew.Leslie@dep.state.fl.us

Kudzu (*Pueraria montana*) – Rank 1, Severe threat

CHUCK BARGERON, THE UNIVERSITY OF GEORGIA

JAMES H. MILLER, USDA FOREST SERVICE

KERRY BRITTON, USDA FOREST SERVICE

See the Tennessee Exotic Pest Plant Council's Invasive Exotic Pest Plants List for 2004 starting on page 13.

JAMES H. MILLER, USDA FOREST SERVICE

JAMES H. MILLER, USDA FOREST SERVICE

RANDY WESTBROOKS, U.S. GEOLOGICAL SURVEY

Multiflora rose (*Rosa multiflora*) – Rank 1, Severe threat

All photos courtesy of www.invasive.org

TN-EPPC Board of Directors

TN-EPPC Turns 10!

1994-2004
The Tennessee Exotic Pest Plant Council Celebrates 10 years!

The Tennessee Exotic Pest Plant Council (TN-EPPC) is celebrating its 10-year anniversary with events across the state. In April, TN-EPPC coordinated a symposium, "Invasive Plant Awareness and Research: Priority Status" at the annual Association of Southeastern Biologists meeting in Memphis. In middle Tennessee, TN-EPPC sponsored a field day workshop in Dickson County on "Invasive Weed Identification and Control." A fall workshop on invasive plants is planned for September 3 in Knoxville. The council also has prepared a "Tennessee's Most Unwanted" invasive plant poster that will be ready for distribution soon. Check the TN-EPPC website for information on upcoming events and membership information:

www.tneppc.org

The Tennessee Exotic Pest Plant Council was established on March 12, 1994 in Nashville at the first annual Tennessee Exotic Pest Plant Symposium. This initial meeting was attended by approximately 70 participants and had 14 invited speakers, including by Dr. Peter White, Director of the North Carolina Botanical Garden, and Dr. John Randall from the California Exotic Pest Plant Council.

Prior to the first annual symposium, groundwork had been laid that created the opportunity to form TN-EPPC. In November 1993, an exploratory meeting was held at Vanderbilt University that considered the issue of exotic pest plants. This meeting included approximately forty invited participants representing a cross-section of resource managers, scientists, teachers, and others interested in the issue. The event received a small amount of financial support from the Florida EPPC, which also sent a representative to speak about their council. Those who attended agreed that a statewide organization was a desirable approach.

Not unlike other EPPCs, TN-EPPC began by identifying goals and forming committees to accomplish them. One of the first tasks completed was to publish the Spring 1994 *TN-EPPC News*. The newsletter has since been published quarterly. Another significant task completed that first year was to successfully obtain 501(c)3 non-profit status from the IRS.

Since its inception, TN-EPPC has hosted statewide annual symposia and sent representatives to speak at similar conferences. In the spring of 1997, the annual symposium was much wider in scope and addressed exotic pest issues throughout the region. The "*Exotic Pests of the Eastern Forests*" conference was held in Nashville and co-hosted with the USDA Forest Service and numerous other co-sponsors.

TN-EPPC has continued to publish its newsletter and educational brochures, and has presented numerous workshops. The organization also has published the *Tennessee Exotic Pest Vegetation Manual* and the *Tennessee Invasive Exotic Pest Plants List*. TN-EPPC serves as a technical advisory body and has participated in cooperative efforts to convince federal and state government agencies to stop using exotic plants. The council also participates as a member of the National Association of Exotic Pest Plant Councils.

While much remains to be done, the Tennessee Exotic Pest Plant Council has played an important role by addressing a critical issue that no other organization in the state or region recognizes as its mission. In other states or regions where groups are considering forming a council, it should be realized that other EPPCs, including Tennessee, can help facilitate establishment of an Exotic Pest Plant Council. Many of the organizational protocols (bylaws) are already in place and can be shared. TN-EPPC was able to form largely because of this support from other EPPCs.

INVASIVE EXOTIC PEST PLANTS IN TENNESSEE – 2004

This is the first revision of the Invasive Exotic Pest Plants in Tennessee list, originally published in 1995. That list was initiated from the 'introduced taxa' portion of the Checklist of the Vascular Plants of Tennessee (pub. 1993 by B. E. Wofford and R. Kral), and was developed by the research committee of the Tennessee Exotic Pest Plant Council. The development of the list included reviews by professional and amateur botanists, ecologists, and resource managers. All comments were considered, and a consensus approach was accepted.

This revision followed a similar review process; however, a second step was initiated to review the plant list on a regional scale. First, the list was sent to professional and amateur botanists, ecologists, and resource managers for review of recommended changes, including additions, deletions, or changes to current species ranking. The second step established working subcommittees representing the three Grand Divisions of Tennessee: West, Middle, and East. The subcommittees reviewed the 1995 list, considered all reviewers' comments, and made their recommendations to the TN-EPPC Review Committee.

The TN-EPPC Review Committee was organized with at least one subcommittee representative from each region. The Review Committee included Dr. Scott Franklin, Ecologist, UT-Memphis; Kris Johnson, Resource Manager Specialist, Great Smoky Mountains National Park; Geoff Call, Resource Manager Specialist, Arnold Engineering and Development Center; Michele Webber, Botanist, Stones River National Battlefield; and Brian Bowen, Tennessee Department of Environment and Conservation's Division of Natural Heritage. The Review Committee made final additions, deletions, and changes in the species ranking based on consensus. Additions to the list include species discovered in Tennessee since 1995 that have been reported to cause ecological damage, species known to cause ecological damage elsewhere and are considered potential threats, and species that may have been overlooked during development of the 1995 list.

Nomenclature and authorship are taken from Kartesz, J., Synthesis of the North American Flora, August 1999.

The intent of this list is to: 1) rank exotics based on their invasive characteristics; 2) foster early detection of invasive exotics so that resource managers can implement a rapid response action to prevent them from becoming established and spreading; 3) educate the general public and resource managers in an effort to eliminate the use of invasive exotics in landscaping, restoration, and enhancement projects.

This list has no regulatory authority but provides useful information to help guide agencies and private landowners in making responsible decisions about plant use and management decisions. The Council acknowledges that most introduced species are harmless. However, it also realizes that many species do naturalize and have the potential to spread and become ecological disasters.

RON McCONATHY

Autumn olive (*Elaeagnus umbellata*); Rank 1 – Severe Threat

Rank 1 – Severe Threat: Exotic plant species that possess characteristics of invasive species and spread easily into native plant communities and displace native vegetation.

Scientific Name	Common Name
Ailanthus altissima (Mill.) Swingle	Tree of Heaven
Albizia julibrissin Durz.	Mimosa
Alliaria petiolata (Bieb.) Cavara & Grande	Garlic-mustard
Celastrus orbiculata Thunb.	Asian bittersweet
Dioscorea oppositifolia L.	Air-potato
Elaeagnus umbellata Thunb.	Autumn olive
Elaeagnus pungens Thunb.	Thorny-olive
Euonymus fortunei (Turcz.) Hand. – Mazz.	Winter creeper
Hedera helix L.	English ivy
Lespedeza cuneata (Dum.-Cours.) G. Don	Sericea lespedeza
Ligustrum sinense Lour.	Chinese privet
Ligustrum vulgare L.	Common privet
Lonicera fragrantissima Lindl. & Paxton	January jasmine
Lonicera japonica Thunb.	Japanese honeysuckle
Lonicera maackii (Rupr.) Maxim.	Amur bush honeysuckle
Lonicera morrowii A. Gray	Morrow's bush honeysuckle
Lonicera tatarica L.	Tartarian honeysuckle; twin sisters
Lonicera x bella Zabel	Bush honeysuckle
Lythrum salicaria L. [all varieties and cultivars]	Purple loosestrife
Microstegium vimineum (Trin.) A. Camus	Nepalgrass; Japanese grass
Myriophyllum spicatum L.	Eurasion water milfoil
Paulownia tomentosa (Thunb.) Sieb.& Zucc. *ex* Steud.	Princess tree
Phragmites australis (Cav.) Trin. *ex* Steud.	Common reed
Polygonum cuspidatum Seib. & Zucc.	Japanese knotweed; Japanese bamboo
Pueraria montana (Lour.) Merr.	Kudzu
Rosa multiflora Thunb.	Multiflora rose
Solanum viarum Dunal	Tropical soda apple
Sorghum halepense (L.) Pers.	Johnson grass
Spiraea japonica L.f.	Japanese spiraea

RON McCONATHY

Chinese privet (*Ligustrum sinense*)

KEN LANGELAND

Nandina (*Nandina domestica*)

Rank 2 – Significant Threat: Exotic plant
invasive species but are not presently con
communities as those species listed as R

Scientific Name
Alternanthera philoxeroides (Mart.) Griseb.
Artemisia vulgaris L.
Arthraxon hispidus (Thunb.) Makino
Berberis thunbergii DC
Bromus commutatus Schrad.
Bromus japonicus Thunb. *ex* Murray
Bromus secalinus L.
Bromus tectorum L.
Carduus nutans L.
Centaurea biebersteinii DC
Cirsium arvense (L.) Scop.
Cirsium vulgare (Savi) Ten.
Clematis ternifolia DC
Conium maculatum L.
Coronilla varia L.
Daucus carota L.
Dipsacus fullonum L.
Dipsacus laciniatus L.
Euonymus alata (Thunb.) Sieb.
Festuca arundinacea Schreb.
Festuca pratensis Huds.
Hesperis matronalis L.
Hydrilla verticillata (L.f.) Royle
Lespedeza bicolor Turcz.
Ligustrum japonicum Thunb.
Lysimachia nummularia L.
Mahonia beali (Fortune) Carriere
Melilotus albus Medik.
Melilotus officinalis (L.) Lam.
Miscanthus sinensis Andersson
Murdannia keisak (Hassk.) Hand.-Mazz.
Myriophyllum aquaticum (Vell.) Verdc.
Nandina domestica Thunb.
Rorippa nasturtium-aquaticum (L.) Hayek
Polygonum caespitosum Blume
Populus alba L.
Potamogeton crispus L.
Setaria faberi R.A.W. Herrm.
Setaria italica (L.) P. Beauv.
Setaria pumila (Poir.) Roem. & Schult.
Setaria viridis (L.) P. Beauv.
Torilis arvensis (Huds.) Link
Tussilago farfara L.
Verbascum thapsus L.
Vicia sativa L.
Vinca minor L.
Wisteria sinensis (Sims) DC
Wisteria floribunda (Willd.) DC
Xanthium strumarium L.

t species that possess characteristics of nsidered to spread as easily into native plant ank 1.

Common Name
Alligatorweed
Mugwort, common wormwood
Hairy jointgrass
Japanese barberry
Meadow brome
Japanese bromegrass
Rye brome
Thatch bromegrass, cheat grass
Musk thistle, nodding thistle
Spotted knapweed
Canada thistle
Bull thistle
Leatherleaf clematis
Poison hemlock
Crown vetch
Wild carrot, Queen Anne's-lace
Fuller's teasle
Cutleaf teasle
Burning bush
Tall fescue
Meadow fescue
Dame's rocket
Hydrilla, water thyme
Bicolor lespedeza, shrubby bushclover
Japanese privet
Moneywort, creeping Jenny
Oregon grape
White sweet clover
Yellow sweet clover
Zebra grass, Chinese silver grass
Asian spiderwort
Parrot's feather, water milfoil
Nandina, sacred-bamboo
Watercress
Bunchy knotweed, oriental ladies-thumb
White poplar
Curly pondweed
Nodding foxtail-grass
Foxtail-millet
Yellow foxtail, smooth millet
Green millet
Spreading hedge-parsley
Coltsfoot
Common mullein
Garden vetch
Common periwinkle
Chinese wisteria
Japanese wisteria
Common cocklebur

Rank 3 – Lesser Threat: Exotic plant species that spread in or near disturbed areas, and are not presently considered a threat to native plant communities.

Scientific Name	Common Name
Allium vineale L.	Field Garlic
Arundo donax L.	Giant reed, elephant grass
Bromus catharticus Vahl	Bromegrass, rescue grass
Bromus inermis Leyss.	Smooth bromegrass
Broussonetia papyrifera (L.) L'Her. *ex* Vent.	Paper mulberry
Buglossoides arvense (L.) I.M. Johnston	Corn gromwell
Cardiospermum halicacabum L.	Balloonvine, love-in-a-puff
Centaurea cyanus L.	Bachelor's button, cornflower
Chrysanthemum leucanthemum L.	Ox-eye daisy
Chicorium intybus L.	Chicory
Egeria densa Planch.	Brazilian elodea, Brazilian water-weed
Elaeagnus angustifolia L.	Russian olive
Eschscholzia californica Cham.	California poppy
Fatoua villosa (Thunb.) Nakai	Hairy crabweed
Glechoma hederacea L.	Gill-over-the-ground, ground ivy
Iris pseudoacorus L.	Pale-yellow iris
Kummerowia stipulacea (Maxim.) Makino	Korean clover
Kummerowia striata (Thunb.) Schindl.	Japanese clover
Melia azedarach L.	Chinaberry
Ornithogalum umbellatum L.	Star of Bethlehem
Pastinaca sativa L.	Wild parsnip
Polygonum persicaria L.	Lady's thumb
Rubus phoenicolasius Maxim.	Wineberry
Senna obtusifolia (L.) H.S. Irwin & Barneby	Sicklepod senna
Tragopogon dubius Scop.	Yellow goat's-beard
Tribulus terrestris L.	Puncturevine
Urtica dioica L.	Stinging nettle
Xanthium spinosum L.	Spiny cocklebur

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Chinaberry (*Melia azedarach*)

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Japanese honeysuckle (*Lonicera japonica*)

Watch List A: Exotic plants that naturalize and may become a problem in the future; includes species that are or could become widespread in Tennessee. At this time more information is needed, and there is no consensus about their status.

Scientific Name	Common Name
Agrostis stolonifera L.	Weeping love grass
Alnus glutinosa (L.) Gaertn.	Sticky alder
Bromus hordeaceus L.	Soft brome
Bromus sterilis L.	Poverty brome
Buddleia davidii Franch.	Butterfly bush
Bupleurum rotundifolium L.	Hound's-ear, hare's-ear
Cosmos bipinnatus Cav.	Garden cosmos
Cosmos sulphureus Cav.	Sulphur cosmos
Echium vulgare L.	Viper's bugloss
Hibiscus syriacus L.	Rose of Sharon
Hypericum perforatum L.	Goatweed, St. John's-wort
Mentha spicata L.	Spearmint
Mentha x piperita L.	Peppermint
Muscari atlanticum Boiss. & Reut.	Grape hyacinth
Muscari botryoides (L.) Mill.	Common grape hyacinth
Najas minor All.	Water nymph
Phalaris canariensis L.	Canary grass
Pyrus calleryana Decne.	Bradford pear
Rhamnus frangula L.	Alder buckthorn
Rhodotypos scandens (Thunb.) Makino	Jetbead
Senecio vulgaris L.	Ragwort
Seteria verticillata (L.) P. Beauv.	Bur-foxtail
Solanum dulcamara L.	Bittersweet
Stachys floridana Shuttlew. *ex* Benth.	Hedge nettle

PHOTOS BY KEN LANGELAND

Chinese tallowtree (*Sapium sebiferum*) with fall foliage

Chinese tallowtree (*Sapium sebiferum*)

Watch List B: Exotic plant species that are severe problems in surrounding states but have not been reported in Tennessee.

Scientific Name	Common Name
Ampelopsis brevipedunculata (Maxim.) Trautv.	Amur peppervine
Polygonum perfoliatum L.	Mile-a-minute
Rhamnus cathartica L.	European buckthorn
Rottboellia cochinchinensis (Lour.) Clayton	Itchgrass
Salvinia molesta Mitchell	Aquarium water-moss
Sapium sebiferum (L.) Roxb.	Chinese tallowtree

What the TN-EPPC Does:

- Raises public awareness about the spread of invasive exotic plants into Tennessee natural areas;
- Facilitates the exchange of information concerning management and control of invasive exotic plants;
- Provides a forum for all interested parties to participate in meetings, workshops, and an annual symposium, and to share the benefits from the information provided by TN-EPPC;
- Serves as an educational, advisory, and technical support council on all aspects of exotics;
- Initiates campaign actions to prevent further introductions

Please visit the TN-EPPC web site at www. tneppc.org

National Park Service Exotic Plant Management Teams Invade the Southeast

by Nancy Fraley, National Park Service

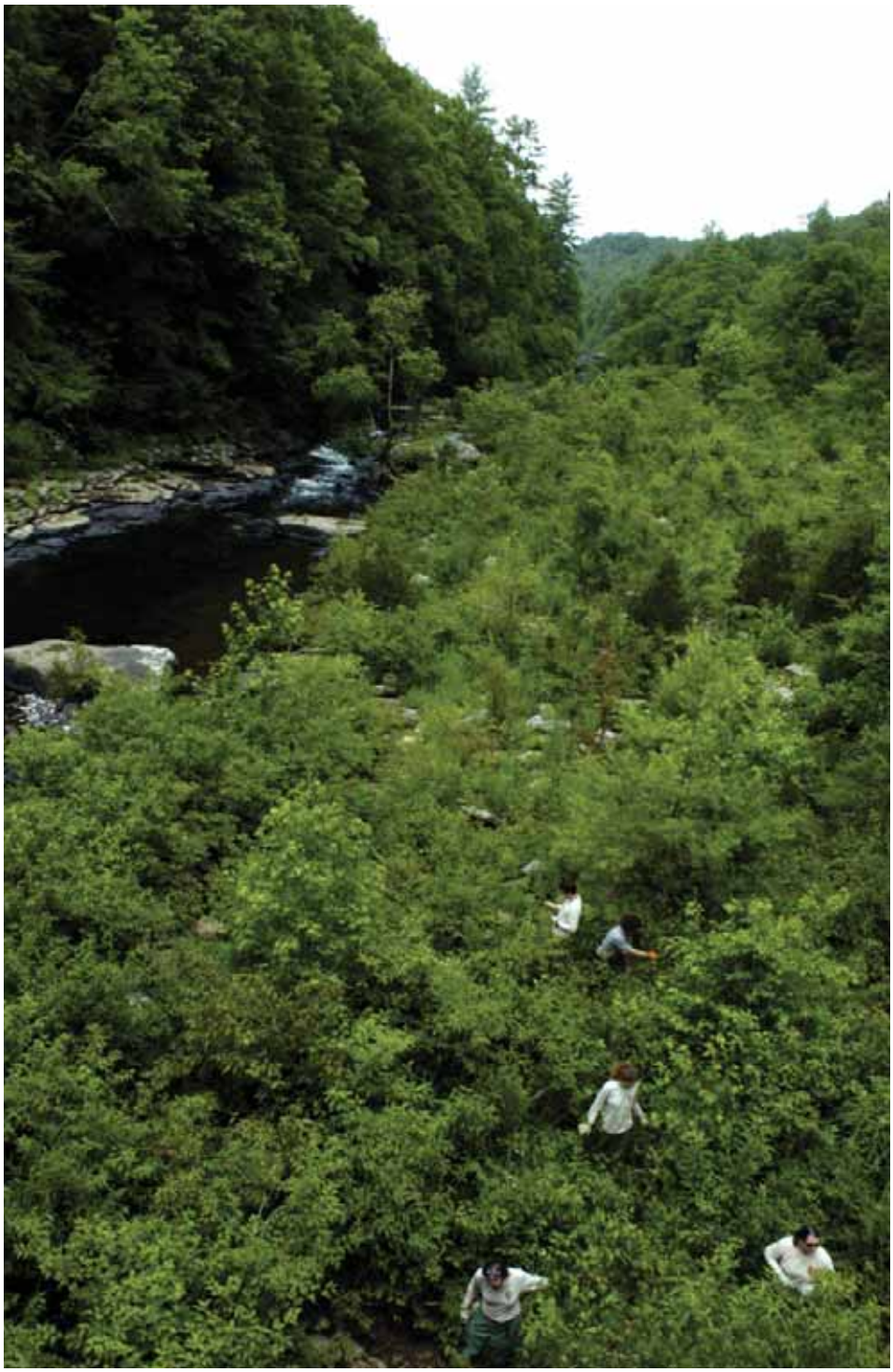
Modeled after the approach used in wildland fire fighting, Exotic Plant Management Teams (EPMTs) provide highly trained, mobile strike forces of plant management specialists to assist national park units in the control of invasive, exotic plants. Each Exotic Plant Management Team employs the expertise of local experts and the capabilities of local agencies. Each sets its own work priorities based on the following factors: severity of threat to high-quality natural areas and rare species; extent of targeted infestation; probability of successful control and potential for restoration; opportunities for public involvement; and park commitment to follow-up monitoring and treatment. In the southeastern United States, 40 national park units now can call upon the resources of an EPMT. The success of this initiative derives, in part, from the ability of these teams to adapt to the needs and conditions of the individual parks they serve.

As of January 2004, the National Park Service (NPS) has established three EPMTs in the southeastern US. Nationwide there are 17 EPMTs serving national park units. These teams are funded through the NPS Natural Resource Challenge, a multidisciplinary five-year program established in 1999 to strengthen natural resource management within the national park system. The teams represent a formidable tool for invasive, exotic plant control and play an integral role in reaching the goals identified in the NPS Natural Resource Challenge.

Today, exotic plants infest some 2.6 million acres in the National Park System, reducing the natural diversity of these great places.

The Florida Exotic Plant Management Team was established in 2000 as a result of the partnership between the National Park Service and the Florida Department of Environmental Protection

continued on page 18



Weeding the wilderness…

*The Southeast Exotic Plant Management Team works to eradicate multiflora rose (*Rosa multiflora*) in the Obed Wild and Scenic River in Tennessee. The Obed River contains one of only three naturally occurring populations of the federally protected Cumberland rosemary (*Conradina verticillata*) in the world.* Photograph reprinted by permission of The Knoxville News-Sentinel Company.

Today, exotic plants infest some 2.6 million acres in the National Park System, reducing the natural diversity of these great places.

(FL-DEP). Through a cooperative agreement with the University of Florida under a grant from the U.S. Department of Agriculture Subtropical Agricultural Research Program, the Florida EPMT expanded in 2003 to include the U.S. Virgin Islands. It now is recognized as the Florida/Caribbean Exotic Plant Management Team (FLC-EPMT).

The FLC-EPMT serves 14 national park units and is well known for implementing successful partnerships and effectively utilizing contractors to address invasive plant problems. These include Melaleuca (*Melaleuca quinquenervia*), Australian pine (*Casuarina equisetifolia*) and Old world climbing fern (*Lygodium microphyllum*). The South Florida Water Management District, the US Fish and Wildlife Service and the FLC-EPMT began a partnership in 2003 to conduct biennial aerial surveys for invasive plants on 8 million acres of south Florida natural areas. Most recently, the FLC-EPMT conducted aerial surveys of two million acres in the Bahamas.

The Gulf Coast Exotic Plant Management Team (GC-EPMT) was established in 2003 to serve 10 national park units in Texas, Louisiana, and Mississippi. Based at Big Thicket National Preserve in Texas, the GC-EPMT has been battling acres of kudzu (*Pueraria montana*) in Mississippi, especially at Vicksburg National Military Park and along the Natchez Trace Parkway. Some of these plots are over 40 acres in size and have provided the team with a welcomed challenge. Other species vying for their attention include Cogon grass (*Imperata cylindrica*), which is fast becoming the number one weed control priority in many of the parks assisted by the GC-EPMT.

At Gulf Island National Seashore in Mississippi the major priority for the GC-EPMT has been to halt the spread of Chinese tallow (*Sapium sebiferum*) into a freshwater marsh on Horn Island. One of the only such marshes managed by the National Park Service, it is home to alligators and a diversity of migratory and breeding bird species such as the White pelican and the Least tern. At Jean Lafitte National Historic Park and Preserve in Louisiana, the GC-EPMT is looking forward to working more closely with other agencies on the restoration of the Barataria-Terrebonne estuary system. This system recently was added to the National Estuary Program administered by the U.S. Environmental Protection Agency. This multi-agency effort will focus on restoring the severely eroded floodplain and halting the aggressive movement of Chinese tallow into bottomland hardwood and floating marsh communities.

The Southeast Exotic Plant Management Team (SE-EPMT) became fully staffed in February of 2004 and in March began serving 16 national park units in North Carolina, South Carolina, Georgia, Alabama, Tennessee and Kentucky. Based at the Blue Ridge Parkway in North Carolina, the team has focused on developing a familiarity with

the invasive plant problems in their assigned parks and working with the park Resource Managers to develop and implement management strategies. Exploring partnership opportunities and supporting educational efforts also are high priorities for the team.

Species that have presented some of the greatest challenges to the SE-EPMT include Multiflora rose (*Rosa multiflora*), Garlic mustard (*Alliaria petiolata*) and Callery or Bradford pear (*Pyrus calleryana*). Recently the SE-EPMT worked in the rugged Obed Wild and Scenic River gorge carefully removing multiflora rose from areas containing the federally protected Cumberland rosemary (*Conradina verticillata*). Located in Tennessee, this park boasts one of the richest floras in the southeastern US including, unfortunately, many invasive plants. In March and April at the Big South Fork National Recreation Area in Kentucky and Tennessee, the team attempted to gain a foothold against garlic mustard, hand-pulling over 20,000 plants threatening an area of rich riverine flora. Cumberland Gap National Historic Park, also in Kentucky, provided an unexpected foe, the Callery pear. Work in this park had focused on the treatment of coltsfoot (*Tussilago farfara*), tree of heaven (*Ailanthus altissima*) and lespedeza (*Lespedeza cuneata*), when a thicket of Callery pear was found down slope of an old home site.

*Members of the Gulf Coast EPMT treating kudzu (*Pueraria montana*) on the Natchez Trace Parkway in Mississippi.*

For more information on the EPMTs, the Natural Resource Challenge and invasive species, see: http://www.nature.nps.gov/biology/invasivespecies/index.htm and http://invasivespecies.gov/ or contact Nancy Fraley, Liaison, Southeast Exotic Plant Management Team, 51 Ranger Drive, Asheville, NC 28805, 828-350-3821 x213, Nancy_Fraley@nps.gov

Exotic Plants Pose Serious Threat to City's Parks and Greenways

By Morgan Simmons,
simmonsm@knews.com
November 24, 2003

Jack Ranney was strolling along the Third Creek Greenway when a vine with round, glossy leaves caught his attention. The plant was an East Asian import called oriental bittersweet, and Ranney, a research ecologist with the University of Tennessee's Energy, Environment and Resources Center, homed in on it like a heat-seeking missile.

"I don't like this stuff," he said, yanking the vines out of the ground. "You can see it for miles and miles along the highways in Asheville, moving out in all directions. I'm really scared of what it can do."

Each year non-native, invasive plants cost the United States billions of dollars in agricultural losses and control measures. As vice president of the Tennessee Exotic Pest Plant Council, Ranney has seen firsthand how these exotics spread from cities into natural areas like the Great Smoky Mountains National Park, which employs a full-time vegetative management crew to keep species like kudzu, multiflora rose and Japanese stilt grass in check.

To prove this point, Ranney recently surveyed 13 parks and greenways in Knoxville looking for 20 of the worst invasive, exotic plants. He found an average of 10 species per park, and what bothered him most was that a few of the species occurred in large enough quantities to significantly affect the parks in coming decades.

"Some of these invasives spread in such dense layers nothing can grow under them," Ranney said. "As the trees around them age and die, what will replace them? There's nothing coming up in the understory."

The worst urban invader Ranney saw in his survey was bush honeysuckle, followed by privet, Japanese honeysuckle and multiflora rose.

Oriental bittersweet was much more prevalent than Ranney had anticipated, and along the Third Creek Greenway not far from West High School, he came across the largest patch of winter creeper he has seen in the Southern Appalachians.

Ranney said he repeatedly saw where bush honeysuckle and privet were outcompeting wildflowers, native herbs, shrubs and native tree seedlings, especially along streams and in low-lying areas.

"In general, the situation was worse than I expected," he said.

According to Ranney's inventory, Sharps Ridge is teeming with invasive plants, especially bush honeysuckle and privet. Of the 20 invasive plants on his checklist, Sharps Ridge had 14.

"The birds are still coming through and that park is still pretty, but as these species take over, this won't be the case," Ranney said.

While most foreign plants introduced into the United States are not aggressive invaders, the problem species are exacting a heavy toll by displacing native plants and reducing biodiversity.

According to the U.S. Department of Agriculture, invasive plant infestations cover about 100 million acres and are spreading at a rate of 14 percent a year, an area twice the size of Delaware.

During a recent walk along Knoxville's Third Creek Greenway, Ranney stopped at a junction where the railroad tracks, the path and Third Creek converged. The list of exotics at this site included mimosa trees, privet, Japanese honeysuckle and kudzu, just to name a few.

"These plants appear to be spreading out to forests along urban corridors such as roads, rivers and utility rights of way," Ranney said. "We can't control them all, so we have to pick our battles."

Knoxville has 30 miles of greenways. Donna Young, the city's greenways coordinator, said the city landscapes almost exclusively with native plants and that a native plant nursery, as well as plenty of volunteers, are the initial steps needed to restore native plants to their rightful place in the ecosystem.

JAMES H. MILLER, COURTESY OF WWW.FORESTRYIMAGES.ORG

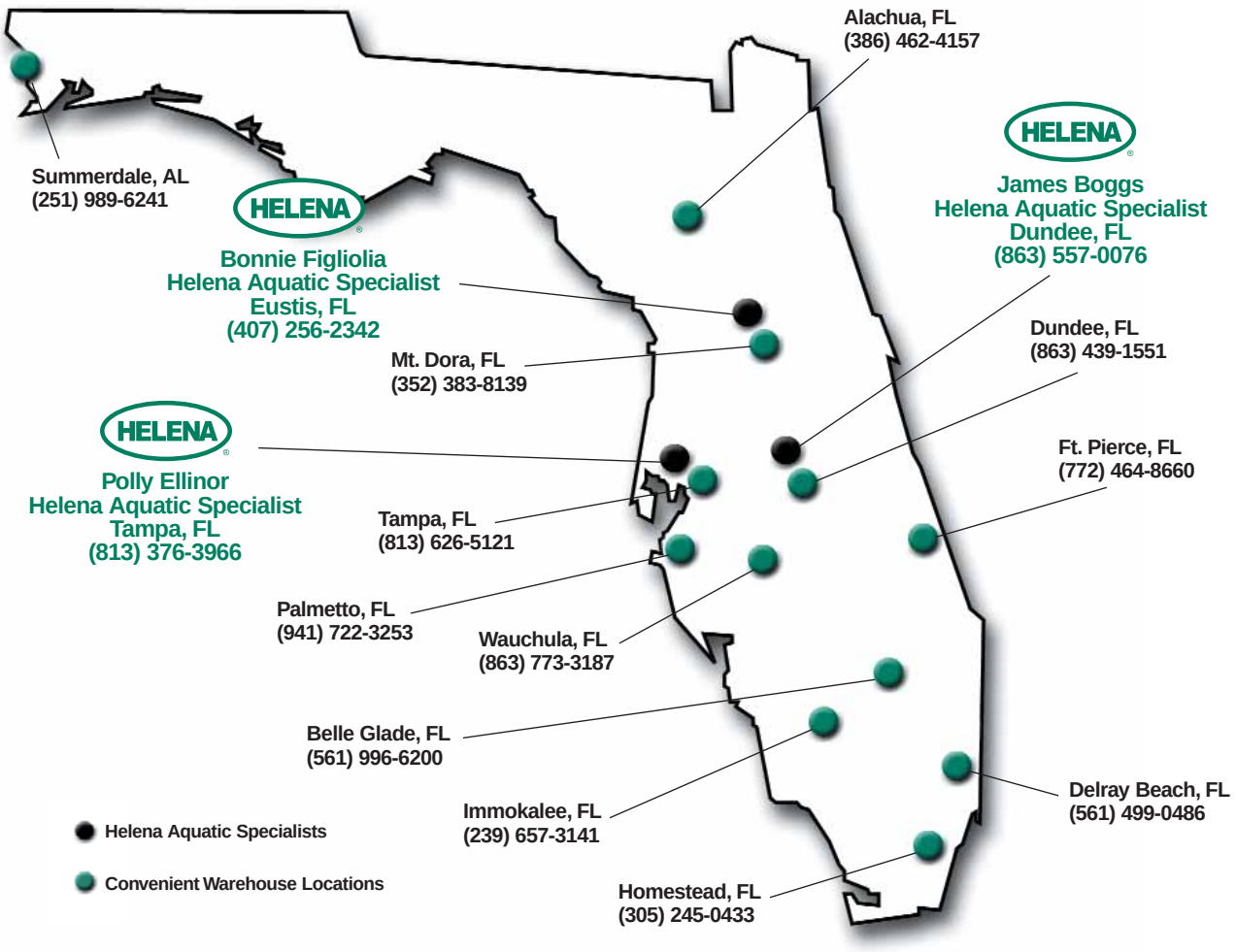
Oriental bittersweet (*Celastrus orbiculatus*)

"We're at the point where we have to start looking at plant invasions as a serious threat," Young said. "I feel strongly that over the years we can make a huge dent in the problem on our parks and greenways, but it's going to take a concentrated effort."

Ranney said the problem with invasive species is that they're often pretty, as with mimosa trees, and sometimes even useful, as with kudzu's effectiveness in erosion control. He said he wants people to realize that for every invasive they plant as an ornamental or hedge, there's a native species - or at least a noninvasive exotic - that works just as well.

"We have to stop planting these bad plants, or we'll never make any headway," Ranney said.

Morgan Simmons may be reached at 865-342-6321.



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- 12th Annual NAWMA (North American Weed Management Association) Conference and Trade Show, September 20-23, 2004, Rushmore Plaza Holiday Inn, Rapid City, SD, http://www.nawma.org/
- 3rd International Conference on Biological Invasions NEOBIOTA – From Ecology to Control. September 30th – October 1st, 2004, University of Bern, Switzerland. Invasive alien species of all taxa (plants, animals, fungi) will be discussed, with a focus on ecology of neobiota, environmental, socio-economic and human health impacts, risk assessment, pathways and prevention, and control. Geographic focus is on Central Europe. www.neobiota.unibe.ch
- 14th Annual Cal-IPC Symposium: Invasive Plants and the Wildland-Urban Interface/California. October 7-9, 2004, Ventura Holiday Inn, Ventura, California. Sessions will explore the migration of ornamental plants across the wildland-urban interface (WUI), fragmentation and edge effects, invasive plants and fire at the WUI, volunteer weed control efforts, current academic research, funding strategies for urban projects, and new treatment methods. Field trips include Santa Monica Mountain restoration sites and Channel Islands National Park. http://www.cal-ipc.org
- 31st Natural Areas Association Conference: *Emerging Issues: Possibilities and Perils*, October 13-16, 2004, Holiday Inn Mart Plaza, Chicago, IL Symposia and plenary sessions will focus on emerging problems and creative strategies to preserve biological resources for the future. Co-hosted by the Natural Areas Association, Illinois Nature Preserves Commission, and Illinois Department of Natural Resources with participation of the University of Illinois and other state and private educational institutions, federal resource agencies, the Illinois Chapter of The Nature Conservancy, several conservation, forest preserve and park districts, Chicago's world class museums, botanical and zoological institutions and the Chicago Wilderness coalition. The NA-EPPC meeting will be held here, as well.
- 28th Annual Conference of the Florida Aquatic Plant Management Society, October 17-20, 2004, Hilton Hotel Deerfield Beach. Earn CEUs in Aquatics, Natural Areas, Right of Way and Core. Join other plant managers and share ideas and concerns related to aquatic plant management. Equipment demonstration on site. www.homestead.com/fapms/meeting.html
- 3rd International Conference on Invasive *Spartina*/California, November 8-10, 2004, San Francisco, California. *Spartina* research from around the world, plus an opportunity to hear and discuss the experiences of a wide range of marsh managers and technical experts. Ground and aerial tours to view the *Spartina* "hybrid swarm" (*S. alterniflora* x *foliosa*) that threatens the San Francisco Estuary. http://www.spartina.org
- 9th Annual Exotic Species Workshop for Southwest Florida, Florida Panther and Ten Thousand Islands National Wildlife Refuges, December 1, 2004. Dennis Giardina, 239-657-7637 x 29, Dennis_Giardina@fws.gov
- 66th Annual Meeting of the Association of Southeastern Biologists (ASB), April 13-15, 2005, University of North Alabama, Florence, AL. Scott Jewell, 336/421-0034, A2ZConvention@yahoo.com or www.asb.appstate.edu/
- 20th Annual FLEPPC Symposium, May 9-11, 2005, Casa Marina in Key West, Florida. Details to be announced at www.fleppc.org
- 2005 Aquatic Weed Control Short Course, May 16-20, 2005, Fort Lauderdale, Florida. Aquatic, upland and invasive weed control; aquatic plant identification. A new concurrent session will focus on first time attendees with a morning of equipment calibration training and an afternoon of aquatic and natural area weed control training. Tyler J. Koschnick, University of Florida, IFAS, Center for Aquatic and Invasive Plants, 352/392-5126, FAX: 352/ 392-3462, tjkoschnick@ifas.ufl.edu or http://conference.ifas.ufl.edu/aw/

Publications

- *Harmful Invasive Species: Legal Responses*, edited by M.L. Miller and R.N. Fabian. 2004. 236 pp. Environmental Law Institute, 1616 P Street NW, Washington, DC 20036. ISBN 1-58576-073-0. $69.95. http://www.eli.org This book covers the law and policy, described by the editors as 'not coherent', regarding harmful non-indigenous species in six countries: New Zealand ("the only country that has even tried to implement a comprehensive policy…"), Germany, South Africa, Argentina, Poland and the U.S. The editors suggest that common issues regarding law and policy exist in these countries: 1) "varying degrees of recognition at the level of law and policy that harmful non-indigenous species are an environmental problem"; 2) "most countries have not conducted a comprehensive assessment of the status of non-indigenous species"; 3) most "continue to rely on fragmented and incomplete legal authorities"; and 4) most "do not seem to be pursuing dramatic changes in their laws and policies." The editors state, "We hope this volume provides a substantial push toward recognizing this serious problem, and toward finding policies that begin to deal with it."
- *Everglades Consolidated Report* - 2004 Executive Summary, by the South Florida Water Management District and the Florida Department of Environmental Protection. 2004. 33 pp, plus CD. South Florida Water Management District, PO Box 24680, West Palm Beach, Florida 33416-4680. Also on the WWW: http://www.sfwmd.gov/org/everglades This report reviews the work completed to date on the Everglades Restoration project, and presents the Everglades Forever Act.

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- *The Measurement of Environmental and Resource Values – Theory and Methods,* by A.M. Freeman III. 2003. 491 pp. Resources for the Future, 1616 P Street, NW, Washington, DC 20036-1400. ISBN 1-8918532-63-5. http://www.rff.org The publishers state that they "pioneered the application of economics as a tool to develop more effective policy about the use and conservation of natural resources" and that they "improve environmental and natural resource policymaking worldwide through independent social science research of the highest caliber." This book, full of economic equations, was written to help assign economic values to natural resources and the activities within them.
- *Alien Species and Evolution - The Evolutionary Ecology of Exotic Plants, Animals, Microbes, and Interacting Native Species,* by G.W. Cox. 2004. 379 pp. Island Press, 1718 Connecticut Avenue NW, Suite 300, Washington, DC 20009-1148. ISBN 1-55963-009-4. $40.00 (paper). http://www.islandpress.org Hundreds of primary sources are reviewed on the subjects of evolution, hybridization and adaptation, especially in relation to invasive species. This book examines "evolutionary issues of exotic species, drawing examples from all parts of the world and all major ecosystem types." Part I examines basic aspects of the evolutionary biology of alien species. Part II looks at basic relationships that determine the evolutionary potential of alien species in their new homes. Part III gives examples of rapid evolution documented in recent decades. Part IV looks into the future, as alien invasions are a major component of global environmental change.
- *MAKING A LIST: Prevention Strategies for Invasive Plants in the Great Lakes States.* Environmental Law Institute, 1616 P St., NW Suite 200, Washington, DC 20036 Phone: (202) 939-3800, Fax: (202) 939-3868, E-mail: law@eli.org Surveys plant listing programs in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin to assess the effectiveness of listing as a tool to prevent the proliferation and spread of invasive plant species. The report costs $20, or free electronic copies can be downloaded from: www.elistore.org/reports_detail.asp?ID=10990

Web Sites

- View presentations from the Japanese stiltgrass *(Microstegium vimineum)* Ecology and Management Workshop from the Northeastern Weed Science Society 2004 Symposium at: http://www.newss.org/default/publication/microstegium/index.htm Contains links to Abstracts and PowerPoint presentations. Created by Dr. Joe Neal at North Carolina State University.

Nodes of Interest

- Japan passed an Invasive Alien Species Act on June 2, 2004. See http://www.env.go.jp/en/topic/as.html
- 2004 Pulling Together Initiative Awards are announced at: http://www.nfwf.org/programs/pti_projects.htm The National Fish and Wildlife Foundation includes federal partners such as the U.S. Fish and Wildlife Service, the USDA Forest Service, the National Park Service, and more. The initiative supports local communities in their efforts to control invasive or noxious weed infestations. 45 grants were awarded for 2004, including one for the SC-EPPC beach vitex project (see *Wildland Weeds,* Summer 2004).
- 2005 Pulling Together Initiative Awards may be applied for at: http://www.nfwf.org/programs/pti.htm
- NatureServe announces the release of a new scientific methodology evaluating the impacts of non-native plants on native species and conservation areas: An Invasive Species Assessment Protocol: Evaluating Non-Native Plants for Their Impact on Biodiversity. The protocol, created in collaboration with The Nature Conservancy, is designed to make the process of assessing and listing invasive plants objective, systematic, and transparent and will help set priorities focusing scarce management resources on the very worst invaders. The protocol has been implemented at a national level in the U.S. View it at: ww.natureserve.org/getData/plantData.jsp

notes from the disturbed edge - chapter 13

He spun the globe, and watched the colors meld into one. Caspian and Indian blue melded with Madagascar yellow, Australian ochre and the mauve of Paraguay. Mountain ranges diffused across vast planes, as radical topography averaged into a monochromatic smoothness. Geopolitical lines, tracing natural features or drawn arrow-straight across cultures, that had seemed imposing in the torpor of static inertia, faded and became indiscernable under the influence of centripetal force. Continents, once separated by vast seas, were bridged by narrow bands of hybridized shades.

His binocular fusion dissolved as he focused on the resultant blur, and he saw faces of every shape and color looking back at him, from every clime and corner of the world.

He saw mankind, confronted by the same demons and dilemmas across the face of the earth. Islands, once isolated, were now joined by jet contrails and diesel flavored wakes, and once-distinct cultures interacted in the forums of economics, education and intimacy.

He knew the monochrome effect extended to the plant kingdom, with exotic plant invasions marching on across insidious transoceanic tendrils. As mankind was connected, and the floral kingdom blended, Mother Earth's palette was defiled, and a grey curtain was pulled across the intricate tapestry of biodiversity.

He saw white and black and red and yellow and maybe even chartreuse faces, united by an issue that rendered their collective eyesight kaleidoscopic, and urged them to peer through a great equalizing prism that permeated the barriers of color, creed and language, just as seeds now defeated geography.

He spun the globe again, and allowed his thoughts to pirouette until friction took its toll, the rate of revolution slowed, and the truth devolved. The colors once again segregated into a cartographer's view of our planet, but the connections remained. He strode outside, to mingle with his brethren and continue his work as a citizen of earth.

- J.A.

An excerpt from "*The Adventures of Hack Garlon & His Buxom Sidekick Squirt*"

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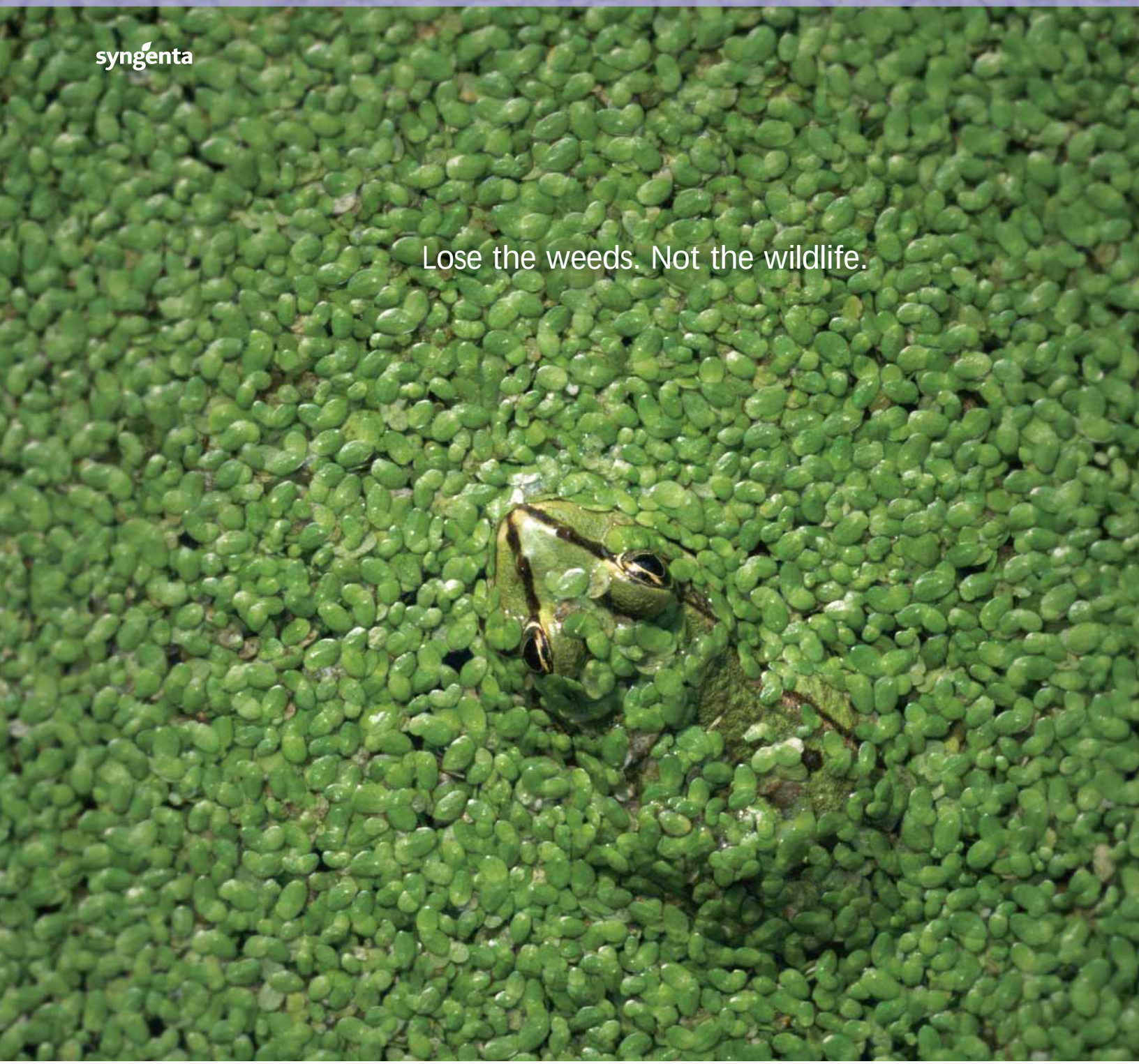

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