

Wildland Weeds

SPRING 2010



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2002 Tucson, Arizona, USA
2004 Minneapolis, Minnesota, USA
2006 Hermosillo, Sonora, MEXICO
2008 Banff, Alberta, CANADA
2010 Shepherdstown, West Virginia, USA

“Plant Invasions: Policies, Politics, and Practices”

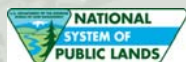
June 1-4, 2010

**National Conservation Training Center
Shepherdstown, West Virginia, USA**

Weeds Across Borders is a biennial international conference covering the interests of professionals and organizations involved in weed management and regulation. It is composed of an affiliation of organizations from Canada, Mexico, and the United States with a common interest in sharing information and promoting weed management throughout North America. Because weeds do not respect human-imposed laws or boundaries, we rely on partnerships, information sharing, and cross boundary program coordination.

The conference provides a forum for educating, sharing, and disseminating knowledge about weed management, regulatory issues, and concerns regarding weed dispersal across and between jurisdictional boundaries in Canada, Mexico, and the United States.

*For more information, visit the WAB 2010 website at:
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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 it is expanding its range in native plant communities.

Wildland Weeds (ISSN 1524-9786) is published quarterly by the Florida Exotic Pest Plant Council (FLEPPC) and distributed to all Southeast Exotic Pest Plant Council (SE-EPPC) members to provide a focus for the issues and for information on exotic pest plant biology, distribution and control. The Charter issue of *Wildland Weeds* was published in Winter 1997.

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On the Cover:

Cogongrass, longleaf pine and fire! Cogongrass (*Imperata cylindrica*) can not be controlled with prescribed fire, but fire is sometimes used to reduce thatch before herbicide treatments. See page 4. *Photo by Nancy Loewenstein, Auburn University.*



NANCY J. LOEWENSTEIN

It Went Up Like Tinder!

by Nancy J. Loewenstein and Stephen F. Enloe, Auburn University

Having frequently heard how hot cogongrass burns, it was with some trepidation that we set out to burn two cogongrass-infested longleaf pine stands. The stands, research sites for a study investigating the impact of cogongrass and its management on the insect communities in pine forests, are located in Mobile and Baldwin counties in Alabama. Although we only needed to burn about one acre (half of our plots) we hired a consultant (Perry Malone Forestry, Inc.) to conduct the burn — because we only wanted to burn one acre! You definitely don't want to burn pine stands infested with thick, waist-high cogongrass unless you truly know what you're doing. Even with rainfall of more than one inch just two days before the burn, it went up like tinder! Flame heights often reached over 10 feet! Something else that was reinforced while observing this prescribed fire was how many cogongrass rhizomes are exposed and potentially spread when a fire line is put in.

Once the cogongrass grows back to about 12 inches in height, we will spray burned and unburned plots with glyphosate.

Soil-active imazapyr will not be used since it can damage longleaf pine and because a portion of the plots will be over-planted with a mixture of native plants. Insect diversity will be monitored on a biweekly basis. One group of insects that we are particularly interested in are root-feeding beetles that vector fungi associated with pine decline.

This research is part of a larger project also investigating possible links between cogongrass and susceptibility of pines to pine decline, and was recently awarded a \$494,000 grant from the U.S.D.A. Institute of Food and Agriculture. In addition to the authors, the Auburn University research team includes David Held (entomologist) and Lori Eckhardt

(forest pathologist and entomologist).



Cogongrass rhizomes exposed from fire line.

NANCY J. LOEWENSTEIN

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Grows Just About Anywhere!

by Karan Rawlins, Dave Moorhead, and Chuck Bargeron

The University of Georgia's Center for Invasive Species & Ecosystem Health (Bugwood.org) has recently received emails regarding plant nurseries advertising, through catalogs and online, several species of invasive plants in their list of spring sale products. Here are the results from a quick, unofficial survey of three online nurseries highlighting the number of invasives offered for sale. The name of the plant is followed by the number of sources which list the plant as invasive. Invasive listing sources include, but are not limited to, various state Exotic Pest Plant Councils, State Departments of Natural Resources, Universities, and WeedUS – Database of Plants Invading Natural Areas in the United States. These groups track invasive species found in natural areas.

- Chocolate vine (*Akebia quinata*), cited as invasive by 11 sources.
- Russian olive (*Elaeagnus angustifolia*), cited as invasive by 27 sources and listed as a noxious weed in at least four states.
- Rugosa rose (*Rosa rugosa*), on 10 lists as invasive and listed as a noxious weed in at least one state.
- Mimosa (*Albizia julibrissin*), found on 19 lists as an invasive plant and listed as a noxious weed in one or more states.
- Common periwinkle (*Vinca minor*); in the advertisement, the nursery claims it “Grows just about anywhere!” Well, it seems this claim is true because periwinkle is on 24 lists across the United States as a significant or severe invasive threat.
- Non-native wisterias (*Wisteria* spp.) are on 23 lists as invasive plants and are listed as significant or severe threats.
- Non-native clematis species such as sweet autumn virgin-bower (*Clematis* spp.) are on 16 different lists and are listed as a significant threat.
- Non-native privets (*Ligustrum* spp.) are listed as invasive in 19 sources and as a Category 1 or severe threat in several states.

This is a great time of year to make responsible choices when purchasing new plants and seeds for garden and landscaping needs. To a large degree the invasive plants in our natural areas originated in our own backyards. One of the simplest and most important things each of us can do is to be aware of the invasive species problem and avoid adding to it. State Exotic Pest Plant Councils or Invasive Species Councils maintain invasive species lists. Links to state councils can be found at the National Exotic Pest Plant Council website: www.naeppc.org.

Also remember that some non-native plants are illegal to sell, move, plant or propagate. You can visit the National Plant Board

PHOTO BY STEVE MANNING. INSET PHOTO BY NANCY FRALEY. BOTH COURTESY OF BUGWOOD.ORG



Chocolate vine (*Akebia quinata*), cited as invasive by 11 sources.

(www.nationalplantboard.org), a non-profit organization of the plant pest regulatory agencies of each of the 50 states, for listings and regulations to minimize the spread of harmful insects, diseases, and other pests (including plants) from the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine Program (USDA APHIS PPQ). Federal & State Quarantine Summaries provide information to nursery growers, brokers, buyers and others engaged in buying, selling, and interstate transport of nursery and greenhouse plant crops. These regulations are periodically updated and can result in restriction of shipment of listed plants to a state. Georgia recently amended their list to specifically prohibit the sale or distribution of varieties of *Imperata cylindrica* (e.g. ‘Japanese Bloodgrass’, ‘Red Baron’). This listing was recently effective in preventing shipment of Red Baron to Georgia.

Learn about invasives in your state and, most importantly, talk to your neighbors and area gardeners and encourage them to use non-invasive plants. Your local Extension Service Agent, or your state's Department of Natural Resources or Forestry Service has information on invasive plants in your area. Information and links to many sites on invasive species can also be found at www.invasive.org at the Center for Invasive Species and Ecosystem Health at the University of Georgia.

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Tussock Paspalum: A New Invader in the Coastal Plain

by Dave Moorhead, Karan Rawlins, Chuck Bargeron

Tussock paspalum (*Paspalum quadrifarium*) has been observed spreading along highway ditches and riparian fringes in the lower Coastal Plain of Georgia. A perennial grass native to Uruguay, Paraguay, Brazil and Argentina, it was still being sold as an ornamental grass in the United States in 2008. It has been reported in disturbed habitats across the southeastern states and has become naturalized in Miami-Dade County, Florida. Australia lists tussock paspalum as a Class 3 Noxious Weed, defined as “plants that pose a serious threat to primary production or the environment of an area and are not widely distributed in the area but are likely to spread in the area or to another area.” It is considered highly invasive in Australia because of its ability to spread from disturbed areas along roadside edges into the bushland.

In the southeastern United States, tussock paspalum is found in areas along roadside ditches, streams and wetlands and under the shade of forest canopies on wet sites. Numerous infestations have been found in Tift County in the lower Coastal Plain of Georgia that are spreading east and west along major highway roadside ditches. Few of these locations are presently mapped. Tussock paspalum forms large, extremely dense tufts or bunches which allow it to out-compete native plant species in these areas. It reproduces and spreads quickly by seed and rhizomes, forming large, bluish-green bunches or tufts reaching 6 feet in height. It flowers and produces seed at least twice a year. The terminal panicles have from 15 to 44 branches which are 2.4 to 3.1 inches long. Leaves can be up to 15.7 inches long and 0.3 inches wide.

Tussock paspalum is distinctive because of its bluish-green color and large stature. However, along roadsides where it is mowed, new growth may look similar to vaseygrass (*Paspalum urvillei*) and johnsongrass (*Sorghum halepense*), both of which grow in large upright bunches or tufts. Little is published on control of tussock paspalum other than hand pulling of small clumps, and foliar applications of a glyphosate herbicide. Information on herbicides used in the control of other *Paspalum* spp. does not currently include tussock paspalum. The abundant seed production and rhizome mass may require follow-up treatments to eradicate an infestation. Herbicide treatments in wetland areas would require use of an aquatic labeled herbicide.

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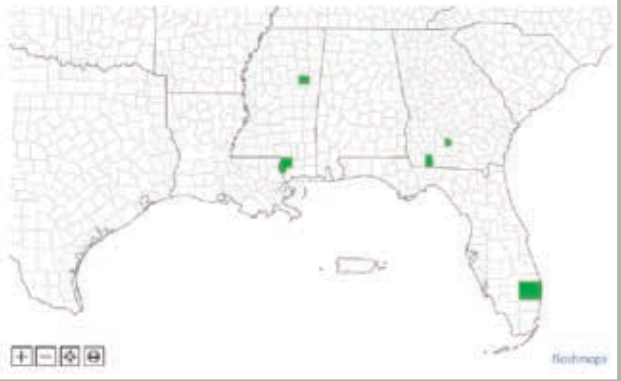
Seedhead of tussock paspalum.

DAVID J. MOORHEAD, COURTESY OF BUGWOOD.ORG

Reported Distribution of Tussock Paspalum

EDDMapS Distribution:

This map is incomplete and is based only on current site and county level reports made by experts and records obtained from USDA Plants Database. For more information, visit www.eddmaps.org



Invasive Potential of Smooth Rattlebox in Southeast Florida

by Richard E. Roberts and Andrew J. Flanner

Many non-native plant species have a substantial lag-time from when first observed to an explosive growth into the environment. Natural disturbance has long been a part of South Florida's environment (Roberts et. al., in press), providing an opportunity for non-native species to spread into new areas. With human activities and multiple plant introductions, non-native plants have invaded these altered sites, often adversely affecting the natural complexity of the community.

In Jonathan Dickinson State Park (Martin and Palm Beach Counties in southeast Florida), there are 180 non-native plants equaling 20% of the total plant species richness (Roberts et. al., 2006). Of these non-native plants, 37 species are targeted for intensive control in the park's Unit Management Plan (FDEP, 2000).

Smooth rattlebox (*Crotalaria pallida* var. *obovata*) was not listed in the park's 2000 plan, but now exhibits the invasive potential (Schmitz, 1994) to expand into disturbed sites as well as natural habitats. This plant is pan-tropical and probably indigenous to tropical Africa, with its original distribution obscure (USFS, 2009). The documented range within the continental United States is the Southeast from North Carolina to Mississippi and Hawaii and Puerto Rico (USDA, 2009). Herbarium specimens of smooth rattlebox from Florida have been collected across most of the peninsula and even in the panhandle (Wunderlin and Hansen, 2009). Although the species has not been listed on the FLEPPC lists of invasive species, it has been assessed by the University of Florida IFAS Assessment of Non-Native Plants in Florida's Natural Areas (2009) and given the "Caution" rating: **Caution — manage to prevent escape** (may be recommended by IFAS faculty and reassess in two years).

Smooth rattlebox was first collected at Jonathan Dickinson State Park in an area of disturbed sand pine scrub in November 1975. It was vouchered at that time (Fairchild Tropical Garden Herbarium — J. Popenoe #518). It was collected again near the same location in November 1988 (University of South Florida Herbarium — R. Woodbury and R. Roberts). In March 1992, this plant was observed in the yard of a park service employee, located within a mesic flat-wood habitat, indicating this species is not exclusively confined to the xeric community where it was noted in 1975.



Smooth rattlebox along the road shoulder at Jonathan Dickinson State Park in southeast Florida.

In 1992, the plant was only infrequently observed in small disturbed areas and only at the one staff residence site. Recently, with expanded mowing of the park drive and in one campground, there has been an explosive increase of this species in these areas (photograph). It now extends along the park drive road shoulders in scattered to thick stands for 60% cover along 4.3 miles of the road. At present, it is still confined to disturbed habitat and has not invaded into recent prescribed burns in either xeric or mesic pinelands. There is, however, the increased potential

for this to occur due to its enhanced numbers and seed dispersal.

These observations demonstrate the ramifications of soil disturbance within and/or near the perimeter of non-native plants. Land managers in Florida need to realize the importance of early treatment before such species establish and spread. Once they are allowed to flourish, their control or eradication can be a difficult, long-term and expensive process.

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Clell Ford shows the difference in the size of the potato bulbils.

AIR POTATO is a hearty vine native to Asia and sub-Saharan Africa. It came to the sunshine state around 1905. Some believe that it was brought over on slave ships from Africa. However it got here, since the early days of its arrival it has spread throughout Florida, Mississippi, Louisiana, Texas, Hawaii and Puerto Rico.

Air potato is actually a member of the yam family. Because it can displace native species and disrupt natural processes, it has been listed by FLEPPC since 1993 as one of Florida's most invasive plant species. It was placed on the Florida Noxious Weed List by the Florida Department of Agriculture and Consumer Services in 1999, making it illegal to propagate, transport or possess.

Air potato invades a variety of natural areas in Florida including pinelands and hammocks. It grows roughly 8 inches per day and climbs to the tops of trees to form a mat that shades out the native plants in its path. New plants develop from bulbils that form on the plant and serve as a means of dispersal. Once the bulbils fall and are buried under the soil and leaf litter, they are difficult to see and dig up. Even though the stems and foliage die back in the winter, the bulbils remain viable and a new plant can sprout from each one. Even a bulbil the size of a pea can start a new plant.

Braving low temperatures and icy rain, many Highlands County, Florida citizens came out to do some trading on January 9th. “Tame your exotic side – plant native” was the theme of the Highlands Soil and Water Conservation District’s (HSWCD) “Air Potato Exchange Day.” Folks were encouraged to bring a minimum of one bag of air potato bulbils in exchange for a free native plant. Many shapes, sizes and varieties of native plants were offered thanks to the Florida Exotic Pest Plant Council’s Kathy Craddock Burks Education and Outreach Grant. The goal of the event was to educate as many people as possible about the impacts of invasive, exotic plants and, specifically, air potato.

Leading up to the January 9th event were four workshops designed to educate people about invasive exotic species. Many plants and animals were discussed at the workshops, but the main focus was the air potato (*Dioscorea bulbifera*). Door prizes were awarded to attendees and lots of handouts were available.

The day of the big event dawned wet and gloomy. In spite of the weather, staff and volunteers began to show up early to unload a truck with hundreds of native plants at the Bert J. Harris Agriculture Center. Donned in raincoats, hats, gloves and other warm clothing, volunteers and staff members got to work even though everyone thought there wouldn't be much turnout on such a cold and wet day.

But a little bad weather didn't stop our courageous citizens, old and young alike. The first customer of the day was Ray Drury, a friendly guy who had collected a whopping 70 pounds of potatoes. He was excited about the event and said there

Tame Your Exotic Side – Plant Native!

by Corine E. Burgess



Chase, Bradley and Grandfather Jerry Pendarvis won the grand prize for collecting the most air potato bulbils (189 lbs.) The rain barrel was donated by the Master Gardeners and painted by Penny Bucher.

were plenty more bulbils where those came from. Mr. Pendarvis, the grandpa of two young tykes who collected the most bulbils, stated, "I had my grandkids out there with me every day for two weeks collecting these bulbils." Throughout the day, many folks had lots of great questions about invasive plants, took home informative literature and asked if this would be an annual event.

When the event concluded at 2:00 p.m., over 1,000 pounds of air potato bulbils had been collected and hundreds of native plants had been given away. It was encouraging to see the good folks of Highlands County not only take ownership of their natural resources, but come out in such foul weather to join in the exchange day.

The following Monday, judges gathered to decide on the most (by weight), largest, smallest and most unique air potatoes. Prizes were awarded to the winners. The Pendarvis family won for the most air potatoes collected: 189 pounds! Ray Drury won for the most unique potato, which looked like a face. Two awards were given out for the smallest bulbils, each so tiny that it was difficult to determine a winner. Those two prizes went to Joyce Quiel and Patty Lloyd. Finally, the largest potato award was given to Susan Volpitta; her bulbil weighed in at 1 pound 10.9 oz.

Removing bulbils from the ground is a good start to eliminating this invader. Because of the workshops, flyers, posters, news articles, interviews and even a radio spot, all of which credited the Florida Exotic Pest Plant Council's generous grant, citizens began to call and ask questions about not only air potato, but other plants. Neighborhoods and the media began to take an interest.

Our inaugural air potato exchange was so successful that we hope to make it an annual event. Approximately 100 people attended the workshops and thousands have been informed through articles and media coverage. If we can continue to educate our citizens, motivate them with free plants and prizes, get them excited about competitions and cleaning up their environment, perhaps we can truly make a difference and stop, or at least slow down, these aggressive invaders!

As with any successful event, the folks that put it all together are the ones who deserve the credit. Thanks go to the Ridge Rangers, Earth Team volunteers, and HSW-CD staff. Special thanks to Ridge Rangers Jeanne Gossman, Patty Lloyd, Kenneth Merop and Daniel Wilson, Earth Team volunteers Edward Cunningham, Eric Maron, Gerald and Pat Hibbs, and participating staff from the Highlands Soil and Water Conservation District, Corine Burgess, Jackie Bailey and Clell Ford.

Corine E. Burgess, Highlands Soil and Water Conservation District, (863) 402-6545, cburgess@hcbcc.org



Staff and volunteers sit on air potatoes collected during the Air Potato Exchange Day on January 9, 2010. Back row from left to right: Daniel Wilson, Clell Ford, Ken Merop, Jeanne Gossman Front row from left to right: Jackie Bailey, Corine Burgess, Gerald Hibbs and Patty Lloyd

Way to go G'ville!

Nearly 1,200 eager participants braved the rain to remove 13,270 pounds of air potatoes, 1,740 pounds of other invasive plants, and one full 20-yard construction dumpster of trash from sites throughout Gainesville, Florida at the 11th Annual Great Air Potato Roundup!

Volunteers that helped in the Great Air Potato Roundup made a positive difference by helping to create healthier, more balanced ecosystems and therefore a healthier and more balanced planet.

Ludovica Weaver, City of Gainesville, Department of Parks, Recreation and Cultural Affairs, Nature Operation Division, (352) 334-3326, weaverl@cityofgainesville.org



Participants display tee-shirts given away at the Great Air Potato Roundup in Gainesville, Florida.

How to Avoid Drift in Natural Area Herbicide Applications

by Ken Langeland and Bill Kline

For the natural area herbicide applicator, pesticide drift is a major concern. Drift, as it applies to pesticide application, refers to the airborne movement of a pesticide away from the application site. Pesticide drift can cause unwanted effects that result in health risks, crop damage, and environmental damage. According to Florida Pesticide Law, it is unlawful to “cause any pesticide to drift onto any person or area not intended to receive the pesticide” (487.031 (13) (e) FS). Herbicides can move offsite as either particles (from dry formulations), droplets (from liquid applications) or vapors (vapor drift). Drift can, and should, be avoided. Many conditions affect drift including droplet size, application methods, weather conditions, vaporization and surface area.

Drift of spray droplets

Drift of spray droplets is minimized by managing droplet size. The smaller (lighter) the droplet, the more likely it is to drift (see Table 1). This is particularly important for agricultural and aerial applications where multi-nozzle booms are used, but it is also important for applications using a hand gun and single nozzle. Droplet size is maximized by using low pressures and large orifice nozzles (spray tips), which reduce shear upon the spray solution as it leaves the nozzle. Because large droplets are not as effective for coverage, a tradeoff in pressure/nozzle combinations must be made to maximize coverage and minimize drift.

Other factors that can affect drift of droplets are nozzle height and orientation. Applying the spray solution closer to the ground and with a side to side movement of the wand or handgun instead of up and down movement will minimize drift potential.

Weather conditions

Low humidity can increase drift because droplets can be reduced in size by evaporation. Drift potential also increases with wind speed because the distance that a droplet can travel is proportional to the wind speed. Wind, especially spraying into the wind, can also increase drift by causing shear at the spray tip.

With experience and using common sense, natural area herbicide applicators will learn to use the right combination of pressure and spray tips to maximize coverage and minimize particle drift as well as avoid conditions that will cause drift.

Fog	15,840
Very fine spray	1,100
Fine spray	44
Medium	28
Course	9
Fine rain	5

Table 1: Lateral distance (feet) that droplets can travel in falling 10 feet in a 3 mph wind.

Vapor drift

Vapor drift occurs when a herbicide active ingredient is transformed into a vapor and becomes airborne. Different types of herbicides vaporize at different rates. For example, triclopyr triethylamine is practically non-volatile, while triclopyr butoxyethyl ester will volatilize under conditions that favor volatilization and vapor drift. One or the other of these forms of triclopyr is the active ingredient in herbicide products commonly used for control of invasive plants in natural areas.

Factors that can affect vapor drift include concentration of the herbicide solution, the type of surface that the solution contacts (foliage vs bare soil, rock/hard surfaces, etc), the amount of herbicide applied, air movement, and temperature. Vaporization will be greater from a more concentrated solution; and more herbicide applied to an area (e.g. the denser the stems of a target species that are treated) means that more herbicide vapor will be available, which increases the potential for non-target damage. Spray solution that lands on inert surfaces such as rocks, is more likely to vaporize than if it lands on the target plants and is absorbed.

While wind can move vaporized herbicide away from the application site where it may cause damage, lack of air movement may cause more serious damage. Very still air can indicate a thermal inversion, which occurs when a layer of warm air is stratified above a layer of colder air near the earth's surface. Thermal inversions usually occur during early morning hours and are characterized by still air and a layer of fog above the ground. Under these conditions, vapors (and small droplets suspended in the air) can be more concentrated than those transported by wind. Because non-target species are often in close proximity to target plants, vapor drift under thermal inversion can be a major concern to natural area herbicide applicators.

Volatilization increases at higher temperatures. Therefore, the potential for vapor drift increases as temperature increases. Temperature is the most important factor relative to vapor drift because if volatilization does not occur or is minimized, other factors do not come into play.

Questions about non-target damage during hot summer weather can often be attributed to herbicide drift.

Q: “I believe that we may have had some correspondence about problems with volatilization of triclopyr (ester) in the past, and this has come up again, to the point of our considering an ‘in house’ restriction on an upper temperature range for usage. We have had another incident of minor damage to mangroves adjacent to some Brazilian pepper cut-stump/re-sprout treatment we did. We are using an ester formulation (Element 4) with Diluent Blue as the carrier/diluent. We are using it at 10%, and have been very careful not to exceed this.

I just read through all the MSDS and label materials and looked on-line at various sources, but can find no specific recommendations on hot-weather.

My questions to you are:

- 1) Do you know of any organizations that have devised ‘hot weather’ specs?
- 2) Would the addition of a surfactant to our delivery reduce volatilization?
- 3) Any other tips?

Many thanks!!”

A: Vaporization can be thought of as a material evaporating (vaporizing). It always happens, but less when temperature is lower. No one that we know of has “devised hot weather specs” for when to or when not to apply triclopyr ester. Experience, however, has shown that little or no symptoms have been observed to non-target vegetation when temperatures are in the 70s or below. In the 80s, sensitive plants can show some effects, especially when they are actively growing, with a flush of growth, and with young sensitive growth. In the 90s, vapor movement is likely and is not recommended if your application is in proximity to sensitive non-target species such as mangroves, especially if a dense population of Brazilian peppers is to be treated. Additional precautions should be taken such as avoiding application when a thermal inversion is indicated by still air and/or a layer of fog. Thermal inversions can also be detected by creating a column of smoke and noting its dispersion pattern. (Smoke generators can be purchased from various trade retailers.) Also, the less herbicide you use, the less vaporization there will be.

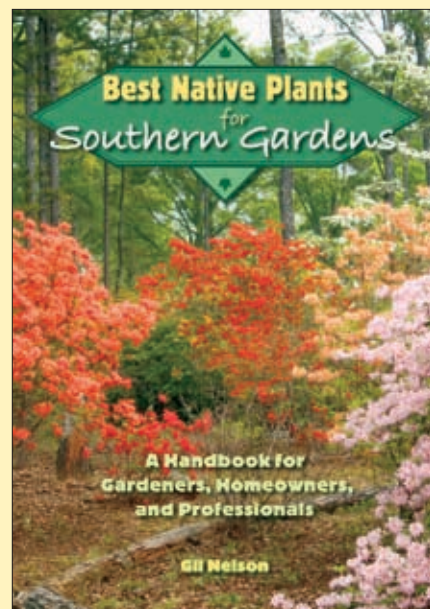
Surfactants or other adjuvants will not affect vapor pressure or vaporization - soapy water evaporates at the same rate as plain water and the same principal applies to surfactants (basically a soap-like product) mixed in herbicide solutions.

When using triclopyr ester to control Brazilian pepper and other invasive plants in proximity to sensitive, non-target vegetation such as mangroves, we recommend making applications during cooler weather – IT’S A LOT MORE COMFORTABLE, ANYWAY. If applications must be made during the warm months, cut the stems as close to the ground as possible and use a water soluble, non-volatile herbicide such as triclopyr amine to treat the cut surfaces. Concentrate the herbicide solution near the cambium, just inside the bark, and apply as soon as possible (no longer than 15 minutes) after cutting.

For additional information on pesticide drift see: Agricultural Chemical Drift and its Control, Cir1105, by Richard Cromwell (<http://edis.ifas.ufl.edu/AE043>).

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New Candidate for Biological Control of Brazilian Peppertree?

by Lindsey R. Christ¹, James P. Cuda², William A. Overholt³, and Marcelo D. Vitorino⁴

Several exotic plants introduced into Florida are wreaking havoc on native plant and animal communities. One such plant is the perennial, woody Brazilian peppertree, *Schinus terebinthifolius*. Dr. James Cuda, Associate Professor in the Department of Entomology and Nematology and Lindsey Christ (Fig. 1), an entomology graduate student in the School of Natural Resources and the Environment, believe insects are the key to controlling this invasive plant. Native to Brazil, Argentina, and Paraguay and related to poison ivy and poison oak, Brazilian peppertree is one of the worst offenders. This woody shrub out-competes native species because of its fast growth, prolific seed production, vigorous resprouting, and tolerance to various growing conditions including salt, moisture, and shade. Also called Florida Holly or Christmasberry, Brazilian peppertree was planted as an ornamental because of its attractive green leaves and red fruits that ripen in December. It became naturalized in Florida during the 1950s, and began invading disturbed sites, natural communities, and environmentally sensitive areas such as the Everglades



Fig. 1 [above]: University of Florida graduate student Lindsey Christ examining plants at the LAMPE, Santa Catarina, Brazil, for the presence of psyllid pit galls.



Fig. 2 [right]: Pit galls of the psyllid *Calophya terebinthifolii* on Brazilian peppertree leaflets in the field.

National Park. It wasn't until 1990 that the plant was banned for commercial sale in Florida.

Now that Brazilian peppertree is firmly established in Florida plant communities, measures have been taken to try and control the plant and keep it from spreading. It is currently controlled by herbicides, mechanical, and physical methods. A more sustainable approach for managing exotic invasive plants is integrating conventional control measures with classical biological control. Biological control is the use of living organisms to control another living organism, usually arthropod pests and weeds. Highly specific biological control organisms are found in the native range of a pest organism. In the case

of Brazilian peppertree, previous studies identified a psyllid, *Calophya terebinthifolii* (Hemiptera: Psyllidae), attacking Brazilian peppertree in Brazil. These psyllids are very small insects (< 2 cm in length) that feed on plant phloem with their sucking mouthparts; the nymphs produce pit galls on the leaflets as they develop (Fig. 2). Psyllids can be effective biological control agents because they are known for being very damaging to plants and tend to be highly host specific, e.g., the melaleuca psyllid. The combination of the feeding damage by the adults



Fig 3: Map showing locations in Santa Catarina, Brazil, where research and field collections of the psyllid *Calophya terebinthifolii* were conducted during the 2009 Summer C Semester.

and gall formation by the nymphs makes *C. terebinthifolii* a good candidate for biological control of Brazilian peppertree.

With assistance from a Florida Exotic Pest Plant Council research grant, Lindsey spent the summer in Brazil studying the psyllid to learn more about its life cycle and how it could best be used in the overall management strategy for Brazilian peppertree. Collaborating with Dr. Marcelo Vitorino, an Entomologist from Fundação Universidade Regional de Blumenau, Lindsey conducted her research at the Laboratory of Monitoring and Forest Protection (LAMPF) in Gaspar, Santa Catarina, Brazil (Fig. 3) from May-August 2009. Using psyllids collected from field sites near the Atlantic coastal region near Santa Catarina, her studies focused on establishing a laboratory colony, and investigating pit gall orientation, female fecundity, adult longevity, sex ratios, and development of the nymphal stage. With very little research conducted on this particular psyllid species, Lindsey discovered adult mating and juvenile behaviors not previously published. Studying the psyllid's life cycle parameters in Brazil rather than under quarantine conditions in Florida proved to be easier because of unlimited access to the insects and without the restrictions required in quarantine. With base-line data collected on the basic biology of the insect, Lindsey expects to establish a colony in quarantine at the Florida Biological Control Laboratory in Gainesville in order to identify which of the two Florida Brazilian peppertree genotypes the psyllid prefers. Hopefully, Lindsey's research on the psyllid *C. terebinthifolii* will pave the way for risk assessment studies required for candidate biological control agents of Brazilian peppertree.

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NC EPPC Hosts Annual Conference

The North Carolina Exotic Pest Plant Council teamed with NC State University and the NC Botanical Garden (the University of North Carolina at Chapel Hill) to host more than 100 participants on Dec. 2–3, 2009 at the NC EPPC annual conference and invasive non-native plants workshop.

The 2009 meeting offered a valuable mix of presentations and field activities that included: 1) examples of invasive plant control programs in Canada, the NC Sandhills Weed Management Area and the North Carolina State Parks; 2) a primer on the environmental fate of herbicides; 3) an overview of USDA, PPQ's new Weed Risk Assessment Model to Identify Potential U.S. Noxious Weeds; 4) an update on the impacts to herbicide application from proposed new regulations in the National Pollutant Discharge Elimination System; 5) highlights on the biology, ecology and control of several important invasive weeds; 6) a workshop on plant identification; 7) a primer on herbicide application equipment; and, 8) field trips to show examples of invasive plant management in action.



▲ Tips and other information on herbicides, application equipment and nursery products were offered by NC EPPC meeting sponsors and vendors that included BASF, Cure Nursery, Foggy Mountain Nursery, Invasive Plant Control, Inc., Mellow Marsh Farm, Niche Gardens, Nufarm and River Works, Inc., Goat Patrol, Dow Agrosiences, Helena Chemical Company and Southeastern Native Plant Nursery.



▲ NC EPPC conference participants enjoy the music of The Tim Stambough Band during the meeting reception.

NC EPPC Gets a “Shout Out” in USA TODAY to Bolster Invasive Species Awareness

The North Carolina Exotic Pest Plant Council (NC EPPC) used invasive species awareness week as an opportunity to raise invasive species awareness in North Carolina. With the help of Debbie Crane, Director of Communications with the NC Chapter of The Nature Conservancy and the NC EPPC board, a press release was composed and distributed to media contacts. The release resulted in a radio interview with Johnny Randall, NC EPPC board member, a radio and live television interview with Rick Iverson, NC EPPC president, and news clips in the North Carolina News Network, the Winston Salem Journal, the Salisbury Post, the Myrtle Beach Sun News, The Rock Hill (SC) Herald and USA TODAY. The clip in USA TODAY made the NC state highlight news with the following:

“Raleigh — The North Carolina Exotic Plant Pest Council wants people to focus this week on invasive species, foreign plants that are spreading and changing the environment. Council President Rick Iverson said kudzu is probably the invasive plant that most people know best. He said it’s time to look out for the next kudzu and stop it from spreading.”

EDRR Final Plan Nears Completion in North Carolina

A core mission for NC EPPC in 2010 is to finalize and launch a plan for Early Detection and Rapid Response (EDRR) of Invasive Plants. Thanks to Dr. Randy Westbrook, the elements of an EDRR plan have been assembled with input by the NC EPPC Board of Directors. The target weed list is currently under review by the NC EPPC Board and the members they represent. Several training workshops have already been planned around the state to train volunteers and stakeholders.

Texas Launches New Invasive Species Website – www.texasinvasives.org

by Damon Waitt and Travis Gallo

Texasinvasives.org is sporting a new user-friendly interface and new features like *Eco Alerts by Region*, where you can search Texas Ecoregions to see what species are a problem in your area; a *Report It* feature to help keep the worst of the worst out of Texas, and social media like You Tube and FaceBook. The site is still home to the Texas Invasive Plant & Pest Council (TIPPC), the statewide invasive species conference, the *Invasiders of Texas* citizen science program, and an invasive plant database. The website also contains an interactive mapping application, downloadable invasive species publications and links to national, regional, and state invasive species resources. The new and improved website was made possible by funding from the Texas Parks and Wildlife Department and in-kind support from the Lady Bird Johnson Wildflower Center in Austin, Texas.



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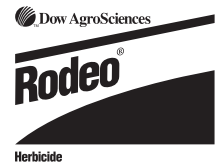


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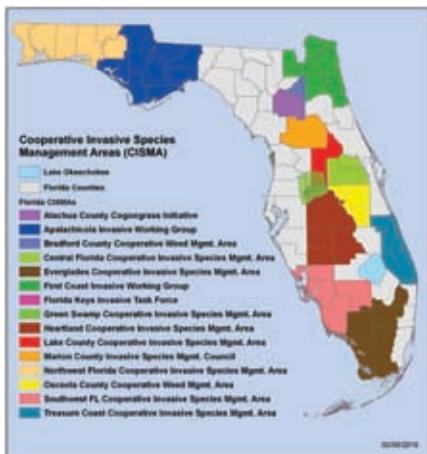
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FLEPPC 25th Annual Symposium Held in Crystal River

In spite of tough travel restrictions and shrunken budgets, more than 120 diehard land managers turned out for the 25th Annual FLEPPC Symposium. Held in beautiful Crystal River, Florida, the meeting was packed with papers, posters, workshops, field trips and fun. FLEPPC members are notorious for having a good time while working hard in tough conditions and this was proven when the crowd braved an air raid of no-see-ums at the poolside banquet that had the band, The Big Wiggler, wiggling more than usual. The grand prize for the chance drawing that benefits the Kathy Craddock Burks Memorial Scholarship Fund was floating in the hotel pool – a bright yellow Emotion Comet kayak that hopeful winners were taking for a spin. The winning ticket was drawn by Able Otter who made a poolside appearance half-way through the festivities. Able Otter is the official mascot for the Nurture Nature program in East County Water Control District, which received a FLEPPC Education and Outreach grant last year. The program was described by Carla Ulakovic during the Collaboration: The Key to Success session of the symposium. Other sessions were Invaded Landscapes, Invasive Plant Management Strategies, and Invasive Grasses. Keynote speaker Dr. Jeffrey Dukes, assistant professor in the Department of Forestry and Natural Resources at Purdue University and director of the Boston-Area Climate Experiment, opened the Climatic Influence on Invasive Species session by exploring how the impacts of invasive species are expected to change in a warmer, more CO₂-rich world and what measures can be taken to prepare for these scenarios. Symposium workshops followed including a training session on the Early Detection and Distribution Mapping System (EDDMapS) led by University of Georgia's Karan Rawlins, an Invasive Plant Field Identification session led by University of Florida (UF) Drs. Colette Jacono and Kenneth Langeland, and a preparation class for those planning to take the Natural Areas Weed Management Certified Pesticide Applicator examination led by UF Extension Agent Ken Gioeli. A panel discussion that included 12 of Florida's 15 Cooperative Invasive Species Management Area (CISMA) leaders reviewed the strengths and strategies of the different groups and was informative to all. During the FLEPPC business meeting, the general membership approved the slate of incoming board nominees: Mike Renda (The Nature Conservancy), Dan Bergeson (SePro Corporation), Erin Myers (USFWS), and Michael Yustin (Martin County Parks and Recreation). Jim Burch of Big Cypress National Preserve took the helm as our incoming Chair, welcomed by now Immediate Past Chair (finally) Jim Burney, who served one full-term and then completed the remaining terms of other chairs who left Florida for weedy pastures elsewhere (it's a long story). The business meeting also included the award of \$5,000 in FLEPPC Education/Outreach grants for 2009/2010 (see next page). Please join us next year when we partner with the Florida Native Plant Society for our annual meeting in Maitland, Florida. —Karen Brown

Florida Invasive Species Partnership Formalized



The Florida Invasive Species Partnership's (FISP) statewide efforts, and local efforts by fifteen Cooperative Invasive Species Management Areas (CISMAs), continue to demonstrate the effectiveness and efficiency of the partnership approach in reducing and controlling invasive, non-native species in Florida. FISP has no formal authority and does not exert control over the work

of any individual or institution; it exists to improve the efficiency and effectiveness of invasive species management through communication, coordination and shared resources in order to protect wildlife habitat, working agricultural and forest lands, natural communities and biodiversity in Florida.

A FISP Resolution was drafted in 2009 to solidify support from all agency and organization partners. While not as formal as a Memorandum of Understanding, it is intended to accomplish the following:

- give formality to FISP, and show that it has broad support from the respective agencies and organizations;
- keep FISP moving forward - with agency/organization support, the effort can continue;

- provide a mechanism for other agencies or organizations to sign on and show support of FISP and CISMAs;
- demonstrate the strength of the partnership when seeking funding, future participation, and/or endorsement of recommendations that the group may formulate for adoption in the future; and
- provide a widespread partnership agreement that covers CISMAs throughout the state.

To date, the FISP Resolution has been signed by the following entities:

- US Fish and Wildlife Service
- National Park Service
- USDA-Natural Resources Conservation Service
- Florida Division of Forestry
- Florida Dept. of Environmental Protection
- Florida Dept. of Transportation
- Florida Fish and Wildlife Conservation Commission
- Southwest Florida Water Management District
- University of Florida – Institute of Food and Agricultural Sciences (IFAS)
- University of Georgia – Center for Invasive Species & Ecosystem Health
- National Audubon Society
- Florida Native Plant Society
- The Nature Conservancy
- Florida Exotic Pest Plant Council (FLEPPC)

To visit the FISP website and view the Resolution, go to www.floridainvasives.org. To contact members of FISP, email chair@floridainvasives.org

Internodes

Mark Your Calendar

- **Weeds Across Borders 2010**, Shepherdstown, West Virginia. June 1-4, 2010. A biennial conference gathering people from Canada, the U.S., and Mexico to focus on “Plant Invasions, Policies, and Politics.” <http://www.fs.fed.us/ficmnew/wab10.shtml>
- **50th Annual Meeting of the Aquatic Plant Management Society (APMS)**, Bonita Springs, FL. July 11-14- 2010. www.apms.org
- **Research and management summit on the invasive Japanese stiltgrass (*Microstegium vimineum*)**, Southern Illinois University in Carbondale. August 11-12, 2010. Hosted by the River to River Cooperative Weed Management Area. www.rtrcwma.org/stiltgrass
- **65th Soil and Water Conservation Society Annual Conference**, St. Louis, Missouri. July 18-21, 2010. Will include a symposium on “Ecosystem services: the unwarranted, undeniable contribution by invasive plant species.” Visit: <http://www.swcs.org/en/conferences/>
- **2nd International Workshop Invasive Plants in the Mediterranean Type Regions of the World**, Trabzon, Turkey. August 2-6, 2010. Hosted by the European and Mediterranean Plant Protection Organization (EPPO). http://archives.eppo.org/MEETINGS/2010_conferences/mediterranean_ias.htm
- **17th International Conference on Aquatic Invasive Species**, San Diego, California. August 29-September 02, 2010. <https://www.icaais.org>

Grants – RFPs & Awards

The **2010 Pulling Together Initiative (PTI)** Request for Proposals has been posted on the National Fish and Wildlife Foundation website. The PTI seeks proposals that will help control invasive plant species, mostly through the work of public/private partnerships such as Cooperative Weed Management Areas. PTI applications are accepted from private non-profit (501)(c) organizations, local, county, and state government agencies, and from field staff of federal government agencies. The deadline dates are as follows:

- **Pre-Proposal Deadline: June 30, 2010**
- **Full Proposal Deadline: Sept. 30, 2010**
- **Award Notification: January 31, 2010**

Go to www.nfwf.org and click on Grant Programs, then Funding Opportunities, then Charter. View the list of Charter Programs, which are sorted alphabetically.

Congratulations to the 2010 recipients of the **FLEPPC Kathy Craddock Burks Education and Outreach Grants**:

- Seminole County Natural Lands Program Non-native Plant Student Outreach (Seminole County Natural Lands)
- The Green Thumb Nursery Certification Program (The Nature Conservancy - Florida)
- Student-aided Brazilian Pepper Education & Eradication (Friends of the Guana Tolomato Matanzas National Estuarine Research Reserve)
- City of Sanibel air potato exchange day (City of Sanibel)
- “Weed or Wildflower?” flyer (Conway Conservation)
- Critical Habitat Education & Restoration and Oakland Nature Preserve (Oakland Nature Preserve)
- The Volunteer Youth Corps Invasive Exotic Initiative (Camp Fire USA Sunshine Council)

Websites, Programs and Publications

Federal Noxious Weed Disseminules of the U.S., Edition 2.0, a tool for the identification or verification of plant disseminules (seeds and fruits) of taxa on the U.S. Federal Noxious Weed List. FNW E2 features:

- 11 new taxa added to the list since 2005
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Lucid keys are easy-to-use matrix-type keys in which users can select characters to examine—they are not constrained as in traditional dichotomous keys, and identification is facilitated by multimedia (images, html pages, video) associated with the taxa and characters. Available on the Internet at: <http://keys.lucidcentral.org/keys/v3/FNWE2/>

The **Centre of Excellence for Invasive Biology (C-I-B)** is an inter-institutional Centre of Excellence established in 2004 within the Department of Science and Technology and the National Research Foundation (DST-NRF) Centres of Excellence Programme in South Africa. Members undertake research on the biodiversity consequences of biological invasions, largely through post-graduate student training. The principal aims of the Centre’s work are to reduce the rates and impacts of biological invasions by furthering

scientific understanding and predictive capability, and by developing research capacity. The C-I-B is housed at the University of Stellenbosch, but comprises a network of senior researchers and their postdoctoral associates and graduate students throughout South Africa. Visit them at <http://academic.sun.ac.za/cib/index.asp>

Global indicators of biological invasion: species numbers, biodiversity impact and policy responses, by M. A. McGeoch, S. H. M. Butchart, D. Spear, E. Marais, E. J. Kleyhans, A. Symes, J. Chanson and M. Hoffmann. *Diversity and Distributions* (2010) 16:95-108. “The Convention on Biological Diversity’s 2010 Biodiversity Target, and the associated indicator for IAS [Invasive Alien Species], has stimulated globally coordinated efforts to quantify patterns in the extent of biological invasion, its impact on biodiversity and policy responses. Here, we report on the outcome of indicators of alien invasion at a global scale.”

Enhancing early detection of exotic pests in agricultural and forest ecosystems using an urban-gradient framework, by M. Colunga-Garcia, R. A. Magarey, R. A. Haack, S. H. Gage, and J. Qi. *Ecological Applications* (2010) 20:303–310. “Assuming that the exotic species we analyzed represent typical invaders, then early detection efforts directed at 21–26% of U.S. agricultural and forest land would likely be able to detect 70% of invaded counties and 90% of the selected species.”

*Molecular evidence of hybridization in Florida’s sheoak (*Casuarina* spp.) invasion*, by J.F. Gaskin, G. S. Wheeler, M. F. Purcell and G. S. Taylor. *Molecular Ecology* (2009) 18:3216–3226. “We collected tissue from over 500 trees from Australia and Florida and genotyped these using amplified fragment length polymorphisms. Our goal was to determine the exact identity of the Florida species, including any putative hybrid combinations.... Novel *Casuarina* hybrids in Florida have no coevolutionary history with any insects or diseases, which may be problematic for biological control efforts.”

Quote of Note

“With sufficient funds and political will, invasive species can be controlled or eradicated,” says Dr. Bill Jackson, chairman of the Global Invasive Species Programme (GISP) and deputy director general of the International Union for the Conservation of Nature (IUCN). “This will allow native species to be saved from extinction, but countries need to dramatically improve the way they deal with the problem.” From *Winning Battles But Losing the War on Invasive Alien Species*: <http://www.ens-newswire.com/ens/feb2010/2010-02-04-01>.



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