



# Invasive Plant Management Section Research Program Newsletter

Division of Habitat and Species Conservation

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Dr. Bill Overholt conducting biocontrol research at UF's Ft. Pierce Quarantine facility

FWC photo



### 1970-2009 State Funded IPM Research Projects

Aquatic plants  
\$12,383,518

Upland plants  
\$5,135,403

Aquatic & Upland study combos  
\$2,374,905

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**Why a new newsletter?** During the past 400 years, Florida's natural areas have been invaded with mostly tropical and subtropical non-native plants and these invasions increased during the twentieth century with the rise of the ornamental plant industry and through unintentional contaminants of imported commodities. Recognizing that research is the basis of environmentally and economically sound invasive plant management programs, the State of Florida, through the Florida Department of Natural Resources and later the Department of Environmental Protection, began funding invasive plant research in 1970. The Florida Fish and Wildlife Conservation Commission (FWC) now has the responsibility to manage invasive plant species on public conservation lands and waterways as of July 2008.

During its 39 years, Florida's invasive plant management program has contracted for over 190 research projects at a cost of \$19.8 million. These research projects have led to better management techniques and insights into invasive plant control in Florida. However, cutting edge research takes time to filter down to the resource manager's level and this research newsletter hopes to help bridge the information gap between research scientists and resource managers in Florida.

And this research newsletter has become even more relevant because, until recently, resource managers relied upon instate scientific meetings to learn about the latest research news and information from our contracted scientists. But with travel restrictions because of the poor economy, many of Florida's resource managers will not be able to attend these scientific meetings this year.

FWC's Invasive Plant Management Section, along with the Division of Habitat and Species Conservation, hope that you will find this new research newsletter, published at least twice a year, to be informative and easy to read. Research information will be presented in easily digestible bite size bits about current FWC funded research projects by plant species/taxa. **Note: This Research Newsletter presents preliminary data. Please do not cite.**

## Aquatic Plant Research

### Algae

Scientists in St. Petersburg working for FWC are conducting research on the **interaction of physical, chemical, and biological factors** that likely **'trigger'** the occurrence and seasonal proliferation of toxic **cyanobacterial blooms** within Lake Eustis, Florida. They are also surveying representative fish species in the lake's food web to determine if presumptive *Cylindrospermopsis* toxins (e.g. cylindrospermopsin, saxitoxin) are present in their tissues. Preliminary results indicate temporal differences in the phytoplankton assemblage. So far, blooms of cyanophytes have been observed throughout the sampling period. Early results suggest that the lake is a cyanophyte

## The Herbicide World versus hydrilla:

325 EPA Registered herbicides (10 registered for aquatic use)

28 chemical families (11 mode of actions)

50 ALS herbicides

100 too toxic for aquatic use

130 not effective on hydrilla

Only 10-20 new possible herbicides available for hydrilla control

Source: Dr. Bill Haller, University of Florida



The quarantine facility at the USDA-ARS Invasive Plant Research Laboratory in Ft. Lauderdale, Florida

FWC photo

dominated system and the composition of the cyanophyte community being primarily affected by nutrient dynamics. **N-fixing *Cylindrospermopsis raciborskii* seems to dominate the assemblage during the dry season** (November thru April). ***Planktolyngbya* sp. dominates the system during the wet season** (May thru October).

Researchers at the University of Florida are determining the impact of **ultrasound treatments** on the percent cover and estimated biomass of *Lynbya wollei* and examining the changes over time to its basic cell structure during ultrasound treatments using microscopic observations and chlorophyll *a* content analyses in small embayments in Rainbow Springs State Park. Preliminary **results show no significant impact of nine week ultrasound treatment** on the standing crop of *Lyngbya* mats. Similarly, no significant effects of the treatment were observed in the microscopic and chlorophyll *a* content analyses. In addition, the lack of change in the percent coverage of the *Lyngbya* mats over the course of the treatment, combined with the observed increase in mean mat depth, indicate that there was *Lyngbya* growth over the treatment period.

At the University of Georgia, laboratory research is **evaluating chemical compounds that can be used against problematic algae** (*Lyngbya*, *Cylindrospermopsis*, *Microcystis*, *Anabaena*, Stigonematales, and other algae). In addition, this research will also evaluate chemical compounds and their effects on Stigonematales epiphytes on hydrilla and **investigate the significance of Avian Vacuolar Myelinopathy (AVM)**, an emerging avian disease, in Florida's waterways. AVM is hypothesized to be a result of bird ingestion of a cyanobacterial epiphyte (in the Order Stigonematales) usually on submersed aquatic plants such as *Hydrilla verticillata* (hydrilla) and egeria (*Egeria densa*).

### Hydrilla

In 2008, scientists working for the U.S. Army Corps of Engineers (Corps) at Vicksburg, MS, conducted a literature review on the **hydraulic resistance** or flow blocking effects of **hydrilla** on the movement of water. Although much of the information available on this subject was not directly applicable to hydrilla, the scientific literature did provide insight into the theoretical description of the blocking effects induced by flexible vegetation. Laboratory experiments will commence on this topic next year. The Corps also conducted research on integrating aquatic herbicides with the **native fungal pathogen, *Mycocleptodiscus terrestris* (MT)**, that, once operational, would likely improve hydrilla control in areas where contact time is influenced by water exchange. The United States Department of Agriculture, Agriculture Research Service (USDA-ARS) is now working on the optimization of nutritional and environmental conditions for MT production to scale-up to the commercial fermentation level making it practical for large-scale production.

Corps scientists are also evaluating laboratory tests on the new aquatic herbicides **flumioxazin** and **bispyribac-sodium** and their **combinations** and determining the **growth regulating properties** of **flurprimidol**, **imazamox**, and **bensulfuron-methyl** against hydrilla. Results of these studies should be available in late spring.

During the past several years, research scientists at the University of Florida have **screened nearly 200 herbicides or herbicide combinations** for use to **control hydrilla**. Partially as a result of this work, several new herbicides are in various phases of registration for aquatic weed control. Penoxsulam and imazamox have received full Section 3 Aquatic Use Labels by the U.S. EPA while bispyribac-sodium, flumioxazin, and quinclorac have been evaluated under an Experimental Use Permit (EUP) for the last two years. Recently, a new herbicide, topramezone has also received an EUP for evaluation for hydrilla management. **Topramezone**, a bleaching herbicide **similar to fluridone**, is **effective on fluridone tolerant hydrilla**. It currently has an EUP and is



Aquatic herbicide testing at UF's Center for Aquatic and Invasive Plants

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## Highlighted Plant Species:

### Hygrophila

**Scientific name:**  
*Hygrophila polysperma*

**Origin:** India, Malaysia

**Introduction:** Mid 1940s, aquarium trade

**Aquatic community:**  
Submersed, emergent

**Habitat:** Wet soils to water 15 feet deep

**Distribution:**  
Central / South Florida, many canals

**FWC Management effort:**  
Complaint management

**2007 public waters / plant acres:**  
25 / 254

being tested for efficacy and selectivity in retention ponds throughout the state.

A study at the University of Florida is **determining the comparative baseline susceptibility concentrations (via enzyme assays) for numerous hydrilla populations throughout Florida to acetolactate synthase (ALS) inhibiting herbicides.** In addition, laboratory and greenhouse research are being conducted to determine threshold concentration and exposure requirements for hydrilla when it is exposed to the ALS herbicides, bispyribac-sodium, imazamox, penoxsulam, and bensulfuron-methyl.

Field studies conducted by the University of Florida with ALS herbicides indicate that hydrilla treatment strategies for penoxsulam and imazamox continue to diverge. Recommendations for **penoxsulam** seek to **maintain concentrations** (~5 to 20 ppb) for three months or greater for control of hydrilla while **imazamox** is being evaluated as a one-time treatment application for initial biomass reduction and **extended growth regulation** of hydrilla. Recent work with combinations of penoxsulam and the contact herbicide endothall have shown promise in providing quick initial knockdown of hydrilla biomass and extended selective control.

**Mesocosm trials** conducted with **penoxsulam** have recently focused on sensitivity of the native emergent plants giant spikerush (*Eleocharis interstincta*), hard-stem bulrush (*Scirpus californicus*), white water lily (*Nymphaea odorata*), Mexican water lily (*Nymphaea truncate*), and spatterdock (*Nuphar advena*). **Preliminary data** suggests **giant spikerush** was highly **sensitive to all concentrations** (5, 10, 20, and 40 ppb) and **spatterdock and white water lily growth rates were impacted at concentrations of 10 ppb and greater.** Hard-stem bulrush and Mexican water lily were generally tolerant to all concentrations evaluated. These mesocosm selectivity studies allow researchers to determine species that warrant increased monitoring when conducting field trials.

For the last six years, scientists working for the USDA-ARS have conducted extensive searches for suitable **biological control agents of hydrilla** in Southern China, Australia, and Southeast Asia. Several insects have been collected and thus far those tested for suitability as biological control agents are unlikely to be released in the U.S because of various reasons. Extensive work conducted by scientists at the University of Florida that looked at East Africa for promising biological candidates for hydrilla also failed to find potentially suitable candidates.

An interesting derivative of this biological control work that may have significant implications for herbicide control operations in the future indicates **hydrilla** in Florida may be **more genetically diverse** than previously thought. Hydrilla infestations in Florida are thought to be a result of a single introduction that spread vegetatively after fragments were dispersed by human or animal vectors. This suggests Florida should be composed of a single clone and that any genetic variability we observe should be due to somatic mutations arising from its vegetative spread. However, out of 205 samples collected from across Florida, there were at least 127 unique genotypes. Hydrilla samples located close to each other were more similar to each other than expected if individuals were compared to each other at random. **At increasing distances, hydrilla samples were less similar** than expected suggesting a gradual change in inherited characteristics across the geographic range of hydrilla in Florida.

### Hygrophila

Research scientists at the University of Florida have **surveyed hygrophila (*Hygrophila polysperma*) populations at 34 sites in Assam and West Bengal provinces of northeast India.** Organisms found feeding on hygrophila or causing disease symptoms were collected and preserved for identification. The larvae of three different moth

species (Order Lepidoptera), a mite (Order Acarina), a leaf mining beetle (Order: Coleoptera) and a rust fungus were collected at several of the sites. In addition, approximately 8 species of plant parasitic nematodes were extracted from the roots/rhizosphere of hygrophila. Detailed soil (percent Organic C, available nitrogen, phosphorous & potassium) and water (pH, EC & DO) analyses were conducted to characterize the native habitat of hygrophila. In a related experiment, simulated herbivory mesocosm tests (50 and 100% manual defoliations of plants over time) were conducted to determine the effects of an insect defoliator on hygrophila growth and biomass development. **Plant height and biomass were significantly reduced when plants were defoliated twice a week and weekly.**

### Water hyacinth and water lettuce

USDA-ARS scientists **discovered three potential candidates for the biological control** of waterhyacinth (*Eichhornia crassipes*) in South America. A fly, *Thrypticus truncates* Bickel & Hernández, and a planthopper, *Taosa* sp.1, have received preliminary host-range testing. **Quarantine host range studies** have been **completed** in Ft. Lauderdale for another planthopper, *Megamelus scutellaris*, and the Technical Advisory Group (TAG) for the biological control of weeds has just recommended the field release of this insect to the USDA Animal and Plant Health Inspection Service (USDA-APHIS) - the final authority on general release permits on the safety of potential weed biocontrol agents in the U.S. The next regulatory step, the environmental assessment, is conducted by USDA-APHIS and may take up to a year. Future research on *T. truncates* and *Taosa* sp.1 may focus on taxonomy, efficacy, and rearing methodologies.

Researchers have also **retargeted water lettuce** (*Pistia stratiotes*) and begun surveying this year for new biological control agents. Scientists are concentrating initially on collecting large samples of the plant along the Paraná basin. The objective is to assess the number of species that feed on this plant, and their geographical and seasonal distribution. In addition, scientists are currently starting water lettuce cultures in walk-in cages in Buenos Aires where they will colonize different insect species for laboratory research. A total of five sites have been sampled so far. The initial **investigation will focus on seasonal population dynamics** and parasitism of a group of potential agents including **three weevils**: *Argentinorhynchus breyeri*, *A. bruchi*, and *Onychylis cretatus*.

### West Indian marsh grass

Previous research funded by FWC at the University of Florida discovered that **West Indian marsh grass** (*Hymenachne amplexicaulis*) can be controlled with glyphosate, imazapyr, or a combination of these two herbicides. However, these herbicides are non-selective and often remove desirable native species. Graminicides may be an option in some areas, which will not injure native broadleaf plants and, in some cases, native grasses. However, these graminicides may only be applied during the dry season when water is not standing and it is not known if these herbicides will effectively control West Indian marsh grass. Scientists are now **investigating which graminicides are most effective** on West Indian marsh grass under greenhouse conditions, and evaluating the most effective graminicides under field conditions.

### Wetland nightshade

A petition for the field release of the flower bud weevil *Anthonomus elutus* was submitted to the University of Florida-Institute of Food and Agricultural Sciences Biological Control Review Committee in July 2008. Additional host-specificity tests recommended by the University of Florida reviewers were conducted exposing the



### **Water lettuce Facts:**

Has a growth rate similar to water hyacinth:

- Harbors mosquitoes
- Mats prevent air & light diffusion into water, killing native plants, fish & wildlife
- Speeds sedimentation by shedding roots & shoots
- Dense mats dam against bridges & reduce water flow at flood control structures

FWC photo

flower-bud weevil to eight additional plant species in the Solanaceae Family. Results corroborated that this insect species feeds and develops only on wetland nightshade (*Solanum tampicense*). The **petition to release *A. elutus* was submitted** to USDA-APHIS TAG Committee in December 2008.

## Upland plants

### Air potato

In 2008, the host range testing of *Lilioceris* sp., a leaf beetle discovered in Nepal as a candidate biocontrol agent for air potato (*Dioscorea bulbifera*), was completed. This research, which began in 2005 by the USDA-ARS, demonstrated the beetle's host range is exceptionally narrow. It can develop only on air potato. This research also showed that a single beetle can consume, on average, almost three square meters of leaves during its life (almost one square meter during its larval development). Taxonomists have been unable to give the beetle a name other than *Lilioceris* near *impressa*, but research is underway to identify or describe the species. This beetle has just been petitioned to the USDA-APHIS (TAG) for review, the first step in obtaining permission from the USDA-APHIS for its release in Florida (the TAG review and USDA-APHIS permit process can be up to two years).

### Brazilian pepper

Extensive **surveys for Brazilian pepper (*Schinus terebinthifolius*) herbivores** were conducted by USDA-ARS scientists along the Atlantic coast of Brazil. The area surveyed included the entire native range of the plant along the Atlantic coastal areas of Brazil from Natal to Uruguay and into northern Argentina. Many insects are targeted for development including a **complex of Gracillariidae leaf miners** of which several were collected during previous surveys but all are unnamed new species. Additionally, stem borers and defoliators are being studied. The results of these surveys include the importation of four species of these leaf miners and colony establishment of at least two species. All of these species will be tested for host specificity. Possibly a third species is established within this group but still is unconfirmed. The University of Florida collected and imported a stem boring weevil (Coleoptera) from Paraguay. A laboratory colony was established and the first phase of host range testing was completed. Host specificity testing of a leaflet rolling moth native to Argentina, Brazil, and Paraguay also was completed and a release petition is in preparation.

**Complicating matters** in finding suitable biological control candidates in South America is the **discovery that two different Brazilian pepper haplotypes were introduced into Florida** (plant haplotype - a group of plant genes found in chloroplast DNA that change very slowly over time, are maternally inherited and are not subject to change during sexual reproduction). These two haplotypes have since extensively hybridized and that the vast majority of plants in Florida are now hybrids. The same hybrids are not known to occur in South America due to the allopatric distribution of the source populations. These subtle but quantifiable molecular differences have been shown to impact insect feeding preferences, growth, and survival in some species. Although morphologically indistinguishable to humans, insects show a distinct preference and improved performance for one haplotype over another. **There are at least fourteen different Brazilian pepper haplotypes in South America** according to research from Texas Christian University. Given this genetic landscape, a thrips species collected from one of the two haplotypes that occurs in Florida, and compatible with the Brazilian pepper plants that infest Florida, has been located and has been colonized in quarantine by the USDA-ARS. This species, though morphologically similar to the thrips species tested previously by the University of Florida, is different and is now undergoing testing in USDA-ARS quarantine to determine suitability for



Photo of *Lilioceris* sp. larva, a beetle obtained from Nepal, and if released, will target air potato in Florida

USDA-ARS photo



Photo of thrips nymphs and adults found on a Brazilian pepper stem.

USDA-ARS photo

release. In addition, the University of Florida recently imported yet another thrips from Brazil which was collected from Brazilian pepper trees closely related to the second Florida haplotype, and will soon begin testing this thrips for compatibility with Florida trees. Preliminary genetic analyses suggest that this thrips may represent a new species associated with Brazilian pepper.

### Chinese tallow

In 2006 and 2007, the USDA-ARS, in partnership with the Invasion Biology and Biocontrol Lab at the Wuhan Botanical Institute in China, conducted laboratory tests and field surveys in China and **found three insect species to be the most promising potential biological control agents** that might be released against Chinese Tallow (*Triadica sebifera*) in Florida. These species are the leaf-rolling weevil, *Apoderus bicallosicollis*, a weevil, that is a specialist with a narrow host range in the genus *Triadica* but prefers Chinese Tallow, the noctuid moth, *Gadirtha inexacta*, that laboratory tests indicate its larvae significantly defoliate tallow seedlings, and *Bikasha collaris*, a flea beetle, that in adult feeding and survival tests appears to be host specific. The Chinese scientists are also pursuing fruit- and stem-feeders to compliment the control exerted by the other species.

### Coral ardisia

University of Florida scientists report that treatments containing, imazapic either alone or in combination with triclopyr and glyphosate containing products, were effective at controlling Coral ardisia (*Ardisia crenata*). The imazapic/triclopyr treatment has been effective at reducing leaf cover of mature plants and had the least variation among plots. Similarly, the **single application containing both imazapic and glyphosate resulted in excellent control.**

### Lygodium

There are approximately 20 herbivorous insects (specialists and generalists) that feed on *Lygodium microphyllum*, or Old World climbing fern, in its native range. USDA-ARS scientists have screened the majority of the specialists for potential biological control agents. Of these species, three have been released, and two have become established - an eriophyid mite, *Floracarus perrepae*, is considered to be minimally established, while the pyralid moth *Neomusotima conspurcatalis* appears to have become well-established. **Populations of the *Neomusotima* moth are increasing at the cypress release sites** at Jonathan Dickinson State Park, and are causing impressive damage to this fern. If they overwinter successfully, this moth may provide another and important tool in managing Old World climbing fern in Florida.

In its native range, USDA-ARS research scientists have **discovered three stem boring moths that kill the *L. microphyllum* shoot above the boring.** Of these three species, an unknown pyralid species in Hong Kong appears to have the greatest potential to control *L. microphyllum* in Florida. Difficulties have been encountered in establishing viable laboratory colonies of this moth but more progress has been made on this moth than the other two species. Establishing viable laboratory colonies is needed before host-specificity tests can be conducted. Cooperating scientists in Australia are working on solving these problems.

At the University of Florida, research is looking into the effects of prescribed fire, after aerial herbicide treatment on reducing *L. microphyllum* and increasing native plant cover on tree islands at A.R.M. Loxahatchee NWR. The use of herbicide and **prescribed fire on Everglade's tree islands resulted in a complete change in the structure and composition,** at least temporarily, of the islands. Initial observations at



Dr. Bob Pemberton, a USDA-ARS scientist, surveying the damage caused by the *Neomusotima* moth at Jonathan Dickinson Park during the fall of 2008

SFWMMD photo

one month post treatment indicate that prescribed fire should only be used on tree islands in which the canopy layer of shrubs and trees has already been eliminated by *L. microphyllum* or hurricanes. In another study, preliminary **results of the effects of selected herbicides on *L. microphyllum* spore germination** and survival may **indicate that, one herbicide, metsulfuron-methyl, can inhibit spore development** and germination if the herbicide is translocated into the sporangia and the individual spores. This may explain why *L. microphyllum* treated with metsulfuron-methyl results in less new growth 6-12 months following treatment compared to glyphosate.

For **Japanese climbing fern** (*L. japonicum*), University of Florida scientists in North Florida are determining the **one-year herbicide rate response** for glyphosate, imazapyr, and metsulfuron herbicides applied alone and in combination for control of this fern. Preliminary results suggest the most effective treatments are: (1) 2% Glyphosate + 0.25% imazapyr + 0.05 oz metsulfuron (2) 2% Glyphosate + 0.5% imazapyr and (3) 4% glyphosate.

### Skunkvine

The many enemies of skunk vine (*Paederia foetida*) in its native region, the sulfur containing defensive compounds in the plant's leaves (indicating the likely evolution of specialist natural enemies), and the relative taxonomic isolation of the weed (no members of its Tribe, the Paederiae, occur as native plants in Florida) suggested that skunk vine would be a good target for biological control. Four enemies of skunk vine have undergone host specificity screening to determine their suitability as biological control agents of the weed in Florida. The tested enemies included a lace bug (*Dulinius conchatus*), native to India but naturalized in Japan, where it is very damaging to skunk vine; a Nepalese leaf beetle (*Sphenoria rutilens*); a Japanese flea beetle (*Trachaphthona nigrata*); and a gall rust (*Endophyllum paederiae*) from Thailand. Host specificity research indicated that all three insects are specialist herbivores limited to the family to which skunk vine belongs (the coffee family or Rubiaceae), but all, nevertheless, have the potential to use and damage some of the many native Florida plants in this family. These **insects therefore lack the needed specificity to be safely used as biological control agents** for skunk vine in Florida. The gall rust disease, which was obtained from a related *Paederia* species, would not accept skunk vine as a host in the testing, apparently having too narrow a host range. Other natural enemies of skunk vine appear to have promise as potential control agents. They include an unidentified gall mite (Eriophyidae) from Thailand, another Japanese flea beetle (*Trachyaphthona sordida*), and rust diseases from Asia.

## General Research

### Barcoding the invasive plants of Florida

Scientists at the University of Florida are DNA **barcoding invasive plant species** in Florida. The central premise of DNA barcoding is that each plant species has a distinctive set of DNA, of which a carefully chosen subset (a "DNA barcode"), can serve as a unique baseline reference for identification. Bar-coding has potential use as a tool for a wide variety of research issues such as developing a baseline of genetic barcodes for 136 of the Florida Exotic Pest Council's most invasive plant species. This barcoding can **provide a database** for comparative identification, with potential research and management implications, the strongest of which is being able to positively identify even tiny sterile fragments in the future.



FWC has funded 6 universities and 3 government agencies for 40 research projects in FY 08-09 to find more cost-effective means of controlling invasive plant species in Florida

FWC photo

State Funded  
Biocontrol  
Research for  
invasive plants in  
public lands and  
waters 1970-09

12 Plant species  
targeted

~ 942 insects/  
pathogens  
evaluated

~ 83 insects/  
screened

17 insects/  
pathogens  
released

~ 15 insects in  
quarantine

~ 3 insects to be  
released in  
2009-10

**FWC Invasive Plant  
Management  
Section Research  
Program Newsletter**

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### Climate change in Florida

A University of Central Florida scientist is testing the hypothesis that **global warming has altered the reproductive phenologies of populations of nonnative plant species** found in more northern parts of Florida so that their reproductive periods have become more like those found in southern Florida populations. This research will aid in the prediction of the northward expansion of nonnative plants with global climate change. A greater understanding of the likelihood of northward expansion of nonnative species occupying southern Florida will assist land managers in northern and central Florida in preparing for likely future invasions.

### Parasites of native and non-native apple snails in Florida

At Florida International University, research is looking at the parasites infecting the non-native **island apple snail *Pomacea insularum*** in Florida and whether if any of these **parasites might negatively affect native species or human health**. Apple snails are the intermediate hosts for many parasites, and these parasites may have effects on apple snail populations themselves, on the animals that prey on apple snails, and on humans.

### A Proactive Approach to Invasive Plant Management of FLEPPC Category I and II Ornamentals

Research at the University of Florida is characterizing the **potential invasiveness of highly cultivated FLEPPC Category I or II plant species used in Florida's landscapes**. The growth rate, flowering period, seed production, and germination requirements of cultivated varieties and the wildtype form (resident species) of *Nandina domestica*, *Stachytarpheta* spp., *Ligustrum* spp., *Ruellia tweediana*, and *Lantana camara* are being evaluated in north and south Florida field trials. In addition, concurrent greenhouse and laboratory studies are being conducted to assess potential pollen contamination to closely related native genera, and for devising effective approaches for genetic sterilization of high risk species. Preliminary results show wide variability among cultivars of each species and between the north and south FL sites. Sterile forms of violet purple porterweed (*Stachytarpheta mutabilis* 'Violacea'), Mexican petunia (*Ruellia tweediana* 'Purple Showers'), heavenly bamboo (*Nandina domestica* 'Firepower'), red fountain grass (*Pennisetum setaceum* 'Rubrum') and lantana (*Lantana camara* 'New Gold') were identified. In addition, **hybridization potential between *R. caroliniensis* (native) and *R. tweediana* (invasive) was confirmed**.

### Testing the New Zealand Aquatic Weed Risk Assessment in Florida

The University of Florida in cooperation with The Nature Conservancy are evaluating whether a modified **New Zealand Weed Risk Assessment model (WRA) for aquatic species can be used to distinguish invasive, established, and non-invasive aquatic species in Florida**. The Florida scientists are collaborating with scientists assessing aquatic species in the Great Lakes region using the same modified model to determine whether accuracy is equivalent in the two regions thus permitting it to be used at the national scale. Preliminary results suggest that the species tested will result in a wide range of scores, from which University of Florida scientists will derive thresholds for the New Zealand Aquatic Weed Risk Assessment system use. To test whether the New Zealand WRA more accurately predicts aquatic plant invaders than would the Australian WRA tested in previous work funded by FWC, preliminary data indicates that all but one of the species would have been rejected by the Australian WRA. These results suggest that the New Zealand WRA system may be more useful for aquatic species.