

TEACHING POINTS

about non-native invasive plants, and native plants, especially in Florida

For teachers who use the UF/DEP photo-murals*

Reviewed by environmental educators, July, 2002

Unfortunately, almost every place on earth is being invaded by plants from other places. Our coontail is invading South Africa. Sri Lanka's salvinia is invading the U.S. Our native and desirable tapegrass is an unwanted invader of Australia's rivers. Burma's reed is growing wildly in south Florida, and we're finding it very difficult to manage.

There are thousands of species of plants in the United States, with more than 4,000 species known to be in Florida. Most plants in Florida are native. They have evolved into their own ecological niches, and they are not invasive.

Native plants provide food and shelter to our animals of all sorts, stability to our shorelines and fields, and visual pleasure of the highest order.

Because a native plant species usually does not take over an area, there is biodiversity - a number of species growing in balance and living together in harmony. Florida is famous for its biodiversity.

Biodiversity exists when species are constrained in their growth by natural factors, so they can't overrun their neighboring species. Such natural growth restraints include:

- 1) competition with other native species,
- 2) diseases,
- 3) feeding by insects and other animals,
- 4) climate, and so on.

Most plants in Florida's wild areas are native terrestrial plants. Florida is also home to hundreds of native plants that live in damp to wet soils, and even underwater. (The *Native Freshwater Plants* photo-mural depicts just a few of Florida's native freshwater wetland and aquatic plants.)

Of the more than 4,000 species in Florida, perhaps 1,000 species (25%) or more are non-native (exotic) plant species. We define "non-native plants" as, in Wunderlin's words, "those that have become part of the Florida flora following the occupation by European man," plants that have made their way to Florida since 1513.

Many of these non-native plants are invasive. "Invasive" here means "a non-native plant that has escaped cultivation and is spreading into natural wildlands and waters." As of 2002, there are at least 100 invasive plants in Florida. (The *Invasive Non-Native Plants* mural depicts some of the least desirable plants now found in Florida and elsewhere.)

"Non-native" usually refers to plants from other countries. For example, kariba weed (*Salvinia molesta*) probably comes from Sri Lanka, and Brazilian pepper (*Schinus terebinthifolius*) comes from South America, and so on. (See list of photo mural plants.) However, "non-native" might also simply refer to another region of a country. For example, the saltwater plant, smooth cordgrass (*Spartina alterniflora*), which is native and desirable on the U.S. Atlantic coast, is invasive, covering oyster beds, when it grows as a non-native on the Pacific coast.

What's the problem?

Invasive non-native plants can outgrow, replace, and otherwise destroy our native plants. That's because non-native plants usually do not have their natural insect enemies, the diseases, insects and other environmental stresses that keep them in check in their native ranges. The destruction and replacement of our native plants has several significant consequences:

- 1) our natural biodiversity is destroyed;
- 2) our native plants can be eliminated;
- 3) the animals that have evolved to use our native plants are not able to make use of non-native plants and leave the area or die off;
- 4) invasive plants can completely fill the water column so that fish are driven from the area;
- 5) boating, swimming, hiking and other uses can be affected in areas with invasive plants.

There is a difference between "non-native" and "invasive." "Non-native" plants are "plants from someplace else"; non-natives are always "exotic." However, some non-natives are also "invasive," "nuisances," "pests," or "noxious," meaning that they negatively affect our native plants and animals, or hinder human use of our waters and lands.

How do non-native plants get here? In all sorts of ways. Any of us could have accidentally introduced non-native plants:

- 1) as seed and plant contaminants in imported nursery plants and soils;
- 2) as misidentified or unknown plants sold to and by aquarium keepers, watergardeners, landscapers and friends;
- 3) as whole plants and growing fragments in ballast water in foreign ships coming to our ports;
- 4) and on those fruits and flowers you brought home in your vacation luggage.

How do plants spread? Plants reproduce and spread by several means. All flowering plants produce seeds - some even grow flowers and are pollinated under water, like the naiads. Depending on the plant, its location and other circumstances, plants may spread:

- 1) when their seeds are dispersed by wind, water, or birds and other animals; or
- 2) when "vegetative propagules" fall off and form new plants; or
- 3) when the plant is somehow fragmented (such as by a boat propeller) and the plant parts regrow into new plants; or
- 4) when yard waste is taken elsewhere; or
- 5) when the root system expands and gives rise to new plants.

In the past, some species were purposefully spread in order to "improve" our natural areas. For example, melaleuca trees (*Melaleuca quinquenervia*) were introduced to Florida from Australia by spreading their seeds from airplanes over the Everglades. The idea was that the trees would suck up the water and make the Everglades better for human use. The plan resulted in millions of invasive melaleuca trees which are now known to be destructive to Florida's environment and animals. Melaleuca trees now are being removed at huge expense.

Some non-native plants, such as tomatoes, citrus trees and other "economic crops" in Florida are obviously "good" and essential to human health and our economy. These plants are well-managed by the farmers who plant them and sell their valuable products. Rarely do our non-native food crops spread as weeds. No forests are threatened by tomato plants.

Some other non-native plants sold to the public also are benign, not easily spreading on their own, causing no significant problems in the wild; plants such as roses and others which are planted for ornamental purposes in yards, parks and gardens. Usually these

benign non-native plants will not grow if left on their own. For many reasons -- genetics, climate, soil, diseases, insects -- some cultivated non-native plants simply will not survive unless humans take care of them. Therefore, we have little to worry about when it comes to certain non-native plants that will not spread on their own.

Among other duties, state regulatory agencies must decide which plants it will allow to be distributed in the state. **One of the most difficult things an eco-management agency can do** is predict beforehand which non-native plants might become terribly invasive on their own, and which non-native plants would be benign. That's why there sometimes are controversies between government agencies and plant growers or importers. A grower may say there is not enough evidence to show that a plant would be invasive, while the governing agencies might feel that there is reason not to allow a plant into the state.

Undeniably, there are some non-native plants already introduced to Florida that someday will be invasive weeds. We don't want to continue to allow destructive species into the state. The question is, "How far on the side of safety should agencies go in not permitting the importation, growing or selling of non-native plants?"

As is now well known, some nursery-sold and pet-store-sold plants are invasive or are believed by scientists to have the high potential to become invasive: plants such as certain bamboo and grass species, certain tree and vine species, certain aquatic species, and others.

One invasive plant, the Chinese tallow tree (*Sapium sebiferum*), a very pretty shade tree, is an example of an invasive tree that was sold widely before it was discovered to be taking over some of Florida's wetlands. One place where thousands of Chinese tallow trees have spread on their own is Paynes Prairie near Gainesville, where tallow trees are so plentiful that much money and labor is required to destroy them.

Another invasive non-native plant is hydrilla (*Hydrilla verticillata*), which was introduced as an aquarium plant and sold in stores. Hydrilla grows very well, now infesting hundreds of thousands of acres in Florida alone. (It has also spread to nearly 20 states as far away as Massachusetts and California.) Hydrilla requires constant management with chemicals and machines; management costs in Florida for this single species of plant are about \$20 million every year.

By definition, native plants are not invasive. However, sometimes, when a site becomes "disturbed," such as when construction has taken place, a ditch dug, or when water level fluctuations have been altered by man-made drainage or pumping systems, or when much fertilizer enters the water body, then certain native plants will act invasively. Our native cat-tails (*Typha* species) are famous for quickly filling in wet areas that have been disturbed or altered. They are often the dominant plant in man-made ponds and ditches. In the Everglades, for example, cat-tails are crowding out the desirable saw-grass (*Cladium jamaicense*), which produces much food and shelter for native Everglades animals. It is believed that man-made alterations in water level fluctuations as well as nutrient input have given an advantage to cat-tail over saw-grass in certain areas.

Invasive non-native plants must be controlled. Because it's very unlikely that an established non-native plant species can be eradicated from wild areas, then we must settle for the goal of "maintenance control": we must use all available tools to control the plants at the lowest level possible.

There are several control methods that might be used to achieve maintenance control, depending on the plant and its habitat. *Chemical control* is the use of specially formulated herbicides (registered with the U.S. EPA) to kill plants. *Biological control* is the use of imported insects, fish and other organisms which eat or infect or otherwise keep the invasive plants at low levels indefinitely. *Mechanical control* is the use of specially-made machines to "harvest" invasive plants by cutting and collecting them and transporting them to a place to decompose. *Physical control* includes using hands, drawdowns (water removal), flooding, burning, dredging and shading to control invasive plants. *Integrated control* is the use of two or more of the above methods.

Stewardship/Citizenship

When buying plants, choose a legitimate nursery, and confirm that the vendor is aware of what species are restricted, both regionally and federally. Be sure to verify the correct plant identification and common names. For aquatic plants, rinse them in a bucket of tap water to remove unwanted sediments and/or bugs.

When disposing of plants that have the potential to spread into nearby woods or waterbodies, completely dry or freeze the plants to kill them, and add them to household garbage that will not be composted. Incineration is a possible alternative.

Learn how to identify invasive non-native plants, as well as our native plants. It's not so difficult to learn a few plants that are interesting or important to you.

Plant common names are not very meaningful since they often are different from region to region, and often are changed by personal and marketing whim. For example, *Nuphar advena* is commonly known as spatterdock, cow lily, pads, flags and bonnets. So try to know plant scientific names.

What is a species and what is a genus? Taxonomy is the scientific classification of organisms. Plant and animal taxonomy is arranged in a hierarchy, from phylum down to species.

Phylum or division
Class
Order
Family
Genus
Species

A **species** is a population of one kind that does not successfully interbreed with populations of other kinds. A **genus** is a group of closely related species. In scientific names, the first word is the genus name and the second word denotes the species. Thus, in the example *Eleocharis baldwinii*, **Eleocharis** is the genus name, and **baldwinii** is the species name. The term **Eleocharis sp.** refers to any of the 150 species in the *Eleocharis* genus.

*** - Photo-murals**

These **Teaching Points** were created to accompany the photo-murals. We provide classroom size, laminated photo-murals of native plants and non-native invasive plants to any individual K-12 teacher in the U.S. who makes a request in writing, on letterhead. See the following web site for further instructions.

A USEFUL WEB SITE

<http://plants.ifas.ufl.edu>

This web site was created and is maintained by those who brought you the plants photo-murals and this collection of **Teaching Points**. This web site includes pictures and descriptions of more than 300 species of native and non-native plants. Click on *Basic Info/Images...* This web site also includes plant drawings, online books, management manuals, freshwater scenics and other relevant materials.

These Teaching Points were authored by Vic Ramey (U.F.) and Jeff Schardt (D.E.P.) and reviewed by environmental educators and scientists.

SOME INVASIVE PLANTS

This list indicates plant origins and locations in Florida (in 2002)

S=south C=central N=north

Learn more about these and other native and non-native plants at

<http://plants.ifas.ufl.edu>

click on *Basic Info/Images...*

Species that are underlined have been processed through the University of Florida's *IFAS Assessment of Non-Native Plants in Florida's Natural Areas*, and information about recommended use or exclusion of these species is available at: <http://agronomy.ifas.ufl.edu/IFASassessmt.HTML>

Abrus precatorius - rosary pea - Old World - S,C
Acacia auriculiformis - earleaf acacia - Australia - S
Albizia julibrissin - mimosa tree - Asia - N,C
Alternanthera philoxeroides - alligator weed - trop. Amer. - S,C,N
Ardisia crenata - coral ardisia - Japan, S. Asia - C,N
Ardisia elliptica - shoebutton - Asia - SE
Arundo donax - giant cane - Old World - S,C,N
Bauhinia variegata - orchid tree - trop. Asia - C,S
Bischofia javonica - bischofia - S. Asia - SE
Calophyllum antillanum - Santa Maria - W. Indies - S
Casuarina cunninghamiana - Australian pine - Australia - S,C,N
Cinnamomum camphora - camphor tree - Asia - C,N
Cupaniopsis anacardioides - carrotwood - Australia - S,C
Cyperus alternifolius - umbrella flat sledge - Africa - S,C
Dioscorea bulbifera - air potato - trop. Asia - S,C,N
Eichhornia crassipes - water hyacinth - Brazil - S,C,N
Egeria densa - waterweed - S. America - N,C
Eugenia uniflora - Surinam cherry - S. America - S,C
Ficus microcarpa - laurel fig - Old World - S,C
Hydrilla verticillata - hydrilla - Asia - S,C,N
Hygrophila polysperma - hygrophila - East Indies - S,C,N
Hymenachne amplexicaulis - W. Indian marsh grass - W. Indies - S, C
Imperata cylindrica - cogon grass - Old World - S,C,N
Ipomoea aquatica - water spinach - East Indies - S
Jasminum dichotomum - Gold Coast jasmine - trop. Africa - S
Jasminum fluminense - Brazilian jasmine - trop. America - S
Leucaena leucocephala - lead tree - West Indies - S,C
Ligustrum sinense - Chinese privet - China - N,C
Limnophila sessiliflora - limnophila - Old World tropics - S,C,N
Lonicera japonica - Japanese honeysuckle - Asia - N, C
Ludwigia grandiflora - largeflower primrose-willow - trop. America - N
Lygodium japonicum - Japanese climbing fern - Old World - N,C
Lygodium microphyllum - Old World climbing fern - Old World - S,C
Lythrum salicaria - purple loosestrife - Not yet in Florida

Macfadyena unguis-cati - cat's-claw vine - trop. America - N
Melaleuca quinquenervia - melaleuca tree - Australia - S,C
Melia azedarach - Chinaberry tree - Asia - S,C,N
Mimosa pigra - giant sensitive plant - trop. America - S
Myriophyllum aquaticum - parrot feather - S. America - S,C,N
Myriophyllum spicatum - Eurasian water milfoil - Eurasia - S,C,N
Nephrolepis cordifolia - Boston fern - ? - N,C,S
Neyraudia reynaudiana - Burma reed - Old World - C,S
Paederia cruddasiana - sewer vine - S. Asia - S
Paederia foetida - skunk vine - Asia - S,C,N
Panicum repens - torpedo grass - S. America - S,C,N
Pennisetum purpureum - elephant grass - Africa - S,C,N
Pistia stratiotes - water lettuce - S. America - S,C,N
Psidium cattleianum - strawberry guava - Brazil - C
Psidium guajava - guava - trop. America - C,S
Pueraria montana - kudzu - Asia - S,C,N
Ricinus communis - castor bean - Africa - S,C,N
Rhodomyrtus tomentosa - downy rose myrtle - Asia - S,C
Salvinia molesta - giant salvinia - southern Brazil - S
Sapium sebiferum - Chinese tallow - China, Japan - S,C,N
Scaevola sericea - half-flower - Indian and Pacific Ocean - S
Schinus terebinthifolius - Brazilian pepper - trop. America - S,C
Senna pendula - climbing cassia - S. America - S,C
Sesbania punicea - Spanish gold - S. America - N,C
Solanum tampicense - wetland night shade - West Indies - S
Solanum viarum - tropical soda apple - S. America - S,C,N
Syngonium podophyllum - arrowhead vine - C. America - C,S
Syzygium cumini - jambolan - SE Asia - S
Tradescantia fluminensis - white-flowered wandering jew - trop. America - N,C
Thespesia populnea - seaside mahoe - world tropics - S
Urochloa mutica - para grass - Africa - S,C,N
Wedelia trilobata - wedelia - West Indies - S,C,N
Wisteria sinensis - Chinese wisteria - China - N,C

