

**Highlighting UF/IFAS Programs in Fisheries and Aquatic Sciences, Aquaculture, and Pond Management**

University of Florida Cooperative Extension Service / Institute of Food and Agricultural Sciences Volume 5 Number 2 2001

## Calendar of Events

### April 24

*Managing Ponds for Fishing Workshop*  
Agriculture Center/Bronson, FL  
Anthony Drew 352/486-5131

### May 12

*Annual Eco-Gardening Conference*  
USF Campus/ Tampa, FL  
Sydney Brown 813/744-5519 ext 145

### May 14-18

*Aquatic Weed Control Short Course*  
*Ft Lauderdale Research & Education Center*  
Vernon Vandiver, Jr. 954/577-6316

### May 14-25

*Diseases of Warmwater Fish*  
Ruskin/St. Augustine, FL  
Ann Groover 352/392-5930

### Nov 27 – Dec 1

*Marine Ornamentals Conference 2001*  
Walt Disney Resort/  
Buena Vista, FL  
Beth Miller Tipton  
352/392-5930



## Creating A Neighborhood Pond

Neighborhood retention ponds are normally not a thing of beauty—unless someone puts some serious work into getting rid of the cattails, and making improvements. But how? Just ask Jack Kennedy of Hillsborough County, who has helped turn his neighborhood pond into a work of art.

“Before, you couldn’t even tell it was a retention pond, it looked so bad,”

says Kennedy. “It was solid weeds before we started, with no visible water. When we were through, it looked so nice, the county commissioners presented us with a certificate of appreciation. They also gave us a metal park bench for the pond.”

The pond is perhaps an acre in size, and suffered from years of neglect. It was a lot of hard and dirty work.

“Three of us worked diligently at it, although one of the guys recently moved away,” said Kennedy. “It was hard to get the neighbors to help.”

“Hillsborough County is good about providing dumpsters on request for this kind of work. They

**Continued on page 3.**



The following UF/IFAS faculty and staff are available to answer questions or provide technical support for aquaculture, fisheries and aquatic sciences, and pond management. Feel free to contact them.

### Fisheries and Aquatic Sciences Gainesville

**Frank Chapman**  
Reproductive Biology  
352/392-9617 ext 247  
fac@gnv.ifas.ufl.edu

**Chuck Cichra**  
Pond Management & Fish Biology  
352/392-9617 ext 249  
fish@gnv.ifas.ufl.edu

**Ruth Francis-Floyd**  
Fish Health/Aquaculture  
352/392-9617 ext 229  
rff@gnv.ifas.ufl.edu

**Ruth Ellen Bowen**  
Fish Health  
352/392-9617 ext 230

### Sam Mitchell Aquaculture Demonstration Farm Blountstown

**Andy Lazur**  
Food & Bait Aquaculture  
850/674-3184  
aml@gnv.ifas.ufl.edu

**Debbie Britt Poudel**  
Food & Bait Aquaculture  
850/674-3184  
dcb@gnv.ifas.ufl.edu

### Tropical Aquaculture Laboratory Ruskin

**Craig Watson**  
Research Coordinator  
813/671-5230  
caw@gnv.ifas.ufl.edu

**Roy Yanong**  
Fish Health/Aquaculture  
813/671-5230  
rpy@gnv.ifas.ufl.edu

**Eric Curtis**  
Fish Health  
813/671-5230

### Center for Aquatic & Invasive Plants

**Ken Langeland**  
Aquatic Plants  
352/392-9614  
kal@gnv.ifas.ufl.edu

### Food & Resource Economics

**Chuck Adams**  
Marine Economics  
352/392-1826 ext 223  
adams@fred.ifas.ufl.edu

**David Zimet**  
Freshwater Economics  
850/875-7125  
djz@gnv.ifas.ufl.edu

### Agricultural & Biological Engineering

**Ray Bucklin**  
Aquaculture Engineering  
352/392-7728  
bucklin@agen.ufl.edu

### County Extension Faculty

**John Brennehan**  
Polk/Hillsborough Counties  
941/533-0765  
jsbn@gnv.ifas.ufl.edu

**Chris Brooks**  
Dade County  
305/248-3311 ext 230

**Max Griggs**  
Escambia County  
850/475-5230  
megs@gnv.ifas.ufl.edu

**Bill Mahan**  
Franklin County  
850/653-9337  
wtm@gnv.ifas.ufl.edu

**Leslie Sturmer**  
Shellfish Aquaculture  
Multi-County  
352/543-5057  
LNST@gnv.ifas.ufl.edu

**Don Sweat**  
Pasco County  
813/553-3399  
dsweat@seas.marine.usf.edu

# Student Involvement at UF

Undergraduate and graduate students are an important part of the teaching, research, and extension programs at the University of Florida. Student involvement is highlighted in each issue of *WaterWorks*.

Jeff Wilcox has been interested in wet slipper sea creatures since his first fishing trip to the Gulf of Mexico at age four. A late bloomer, he got his Bachelor of Science in Marine Biology from Florida State University under Dr. Bill Hermkind in 1971.

He earned his Master of Education from Florida A&M University, taking cooperative course work in Mariculture and Oceanography under Winston Menzel at FSU in 1976.

There he stayed for 20 years, teaching science and aquaculture at the School for Applied Individualized Learning, a nationally recognized alternative high school, and later serving as an Aquaculture Extension Specialist at Florida A&M University. While doing this, he also owned and operated Fossil Fish Farm and served as secretary on the board of directors for the Florida Aquaculture Association for ten years.

Late in life, he decided that what he really wanted to do was fundamental research in the marine sciences, which brought him to the University of Florida to obtain his Ph.D. in Fisheries and Aquatic Sciences.

Jeff works with *Nematostella vectensis*, an estuarine sea anemone,



Joe Richard

known as the Starlet or Dwarf Mud Anemone. Small, easy to raise and reproductive both sexually and asexually throughout the year, the *Nematostella* is serving as Jeff's model for answering fundamental questions about reproduction and early embryonic cell division.

Under the tutelage of Dr. Wally Clark, Jeff added this species to the short list of Anthozoans (anemones and corals) known to release eggs that have finished meiosis before ever meeting a sperm. The egg of nearly every other sexual animal must be activated by spermatozoa before it can complete reduction of the female chromosome set to a haploid state.

Throughout the animal kingdom, the norm is for the male sperm to arrive, activate the egg, and then wait for the female egg to get ready for the main event: fertilization. Jeff has shown that this is not so with the *Nematostella*. The female is ready for

fertilization as soon as the male arrives.

He has also determined that this little anemone regulates early embryonic division the same way humans do. When he splits the first two cells apart, they become identical twins; if he splits the four cell stage apart, they become identical quadruplets. Octuplets are harder to get to survive, just like humans, but he has succeeded a few times even with this.

Jeff's most exciting work has shown that *Nematostella* embryos can be manipulated to get the division of the cell without a preceding duplication and division of the nucleus. Since it has long been thought that cell division was merely the result of nuclear division, it has been presumed that they were part of a single regulatory pathway. While this work builds on the preceding work of other scientists, it serves as proof that these are two separate and distinct pathways.

Two pathways rather than one means that now there should be twice as many opportunities for researchers to discover a means to intervene when cell division goes wrong (the result of which we call cancer).

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left it, we filled it.

“They also showed us the ‘good’ and the ‘bad’ vegetation, and what species to plant. They’ve been wonderful, especially John McGee and Julie Palaschak at the Hillsborough County Adopt-a-Pond program.” Funding assistance was provided by the Southwest Florida Water Management District.

Some species of plants were already in the pond when they started. The white lilies, for instance, were growing but had to be thinned and were relegated to the pond’s center, where they protect the fish from birds. Pickerelweed and swamprush was also already there.

“It was all low-tech work, lots of shovel work,” said Kennedy. “We had to remove all the cattails. We used a menzi machine provided by the county to get the cattails out. Initially, we hauled off eight or 10 pickup truckloads, but that didn’t make a dent. So we called the county and asked about the dumpsters.”

Last year the water got very low. However, the nice thing about retention ponds

is that an inch or so of rain will often raise the water level at least a foot.

Last summer, the pond dropped down to only two feet deep at the center. During low water, Kennedy’s group, called the Cumberland Manor Swamp Rats, worked on the edges of the pond, which could be mowed. Last winter’s freezes killed a lot of the vegetation. They raked and gathered the dead stuff. Out deeper, they removed the lilies except in the middle. When they received a merciful two inches of rain in March, the pond level rose at least two feet. Their work each year is generally done before it gets too hot in summer.

Early on, they tried putting triploid grass carp into the pond to eat hydrilla. But blue herons killed the carp, which were actually two feet long, too big for the herons to eat. Today, the pond has bass and bluegill, snakes, frogs and turtles. It’s a pretty diverse wildlife population for a small pond.

As for birds, they now have mallards, moor hens and grebes that utilize the shoreline vegetation for cover. Daily visitors include various herons, storks, and the

occasional roseate spoonbill.

Mosquitofish, which eat mosquitos, were already there and have proliferated. No one complains about mosquitos.

Today, the water is clear. The shoreline plants, which provide cover for wildlife, also filter nutrients washing in from stormwater runoff. They’ve had no nuisance algae blooms.

“It all has to be maintained,” says Kennedy. “We have several garbage bags of trash washing into the pond after each storm. The trash has to be cleaned up. We’re proud of the pond and working on it, like a garden, it’s good therapy. It’s good low-tech work, sometimes hot and dirty, and with no computer skills necessary.”

The best way to get started?

“You begin with the county, see if they will provide a grade-all, a boom excavator, something to take out the undesirable vegetation with a minimum of back work. Somebody in the neighborhood has to be motivated, make the phone calls, and be in charge. It helps to have someone there to organize.”



**For more information on pond management check out the following UF/IFAS publications and web sites:**

• UF/IFAS Circular 912  
Aquascaping: Planting and Maintenance  
[http://edis.ifas.ufl.edu/MENU\\_FA](http://edis.ifas.ufl.edu/MENU_FA)

• UF/IFAS Circular 707  
Weed Control in Aquaculture and Farm Ponds  
[http://edis.ifas.ufl.edu/MENU\\_FA](http://edis.ifas.ufl.edu/MENU_FA)

• UF/IFAS' Center for Aquatic and Invasive Plants  
For a wealth of information and photos of aquatic plants see:  
<http://plants.ifas.ufl.edu>

# UF/IFAS Aquaculture and Pond Management Update

## Shellfish Aquaculture

Cedar Key

### UF Teams Up With USDA To Address Shellfish Research Needs

A research grant was recently awarded to the University of Florida Agricultural Experiment Station by the U.S. Dept. of Agriculture, Cooperative State Research, Education, and Extension Service. These federal funds were allocated to address priority needs of the shellfish and food fish aquaculture industries in Florida and should continue for several years. Congressman Allen Boyd, Jr., a friend of aquaculture, was instrumental in securing this federal commitment and partnership.

Also in support of aquaculture, UF/IFAS has identified program areas that warrant special attention in the years to come. They include: water quality and management, global competitiveness, and food technologies. In addition, aquaculture advisory committees have identified areas of immediate concern. The following research projects addressing shellfish aquaculture will be initiated this year:

- ◆ Expert Assistance and Distance Identification Network (EADIN). A system and protocol for rapid distance identification of biological samples, in particular phytoplankton,

will be developed. This will link shellfish aquaculture industry members with experts on the ecology and biology of their region.

- ◆ Preliminary Investigation of Blood Ark and Ponderous Ark Culture - Procedures for hatchery seed production of two potential commercial bivalve species will be developed. Their growth and survival under commercial conditions will be evaluated.

- ◆ Genetic Issues in Hard Clam Aquaculture: Molecular genetic techniques will be developed and used to examine the issue of hard clam stock diversity.

Impact of Temperature Acclimation on Clam Shelf Life and Bacterial Content during Summer Harvest. Previously developed dry tempering methods will be refined to increase clam survival in refrigerated storage.

The microbial consequences of tempering will be assessed to ensure a safe and high quality product.

This collaboration presents an opportunity for UF and USDA to make a long-term commitment in addressing pertinent research needs of the shellfish culture industry. Industry participation and involvement is critical in all phases. Information generated from these research projects will be made available through the shellfish aquaculture extension program.

**Leslie Sturmer**  
352/543-5057

## Sam Mitchell Aquaculture Farm

Blountstown

### Teachers, Just Point and Click!

Aquaculture is increasingly being incorporated into the classroom at all grade levels—not only as vocational training but also as an excellent teaching tool that integrates math, science, art, social science, language arts, environmental awareness, life skills, and more.

Students practice theory through hands-on applications that increase understanding and skill levels. However, integrating aquaculture into the classroom can be a daunting task for teachers new to the subject. Fortunately, with the growth of the Internet, great information is at your fingertips. Here are a few good websites to check out.

- ◆ UF/IFAS aquaculture publications can help in the technical aspects of planning and operating an aquaculture facility. They can be downloaded for free from the web. (Feel free to make copies for your students.)

**[http://edis.ifas.ufl.edu/MENU\\_FA](http://edis.ifas.ufl.edu/MENU_FA)**

- ◆ At the AquaNIC website you'll find discussion groups, publications, and links to more aquaculture sites than you can imagine: **<http://www.aquanic.org>**

- ◆ Over 150 aquaculture publications can be found at the USDA's Regional Aquaculture Center site. Click on the Southern region for publications most applicable to our region. Materials are free and can be copied:

**[http://ag.ansc.purdue.edu/aquanic/publicat/usda\\_rac/racpubs.htm](http://ag.ansc.purdue.edu/aquanic/publicat/usda_rac/racpubs.htm)**

- ◆ The University of Arizona in Tucson has developed many aquaculture programs and materials for teachers and students including an Aquaculture in the Classroom website:

**<http://ag.Arizona.edu/azaqua/extension/Classroom/home.htm>**

- ◆ The table of contents and ordering information for **Aquaculture and Fisheries Management: Renewable Natural Resources Student Reference** (Dept. of Ag. Education/Univ. of Arizona) can be found at the following site. The book includes sections on external fish anatomy, fish pathology, water quality, fisheries management, aquaculture systems, hydroponics, production management, and more:

**<http://ag.arizona.edu/azaqua/extension/STUDREFR.HTM>**

- ◆ The National Council for Agricultural Education has many publications available for aquaculture in the classroom, some of which can be downloaded for free! Ordering

information for other publications by the Council such as the hefty Aquaculture Curriculum Guide and Aquaculture "How To" manuals can also be found:

**<http://ffa.agriculture.com/aero/council/index.html>**

- ◆ Be sure to incorporate information specific to Florida by visiting two Florida Dept. of Agriculture and Consumer Service sites. Learn about our recently streamlined permitting process including Best Management Practices and the Aquaculture Certification program at the Division of Aquaculture

**<http://www.floridaaquaculture.com>**

- ◆ You'll find colorful Florida promotional and marketing materials, a product suppliers directory, terrific recipes (get the culinary arts class involved!) and species brochures with nutritional, information, buying and preparation tips at the Bureau of Seafood and Aquaculture Marketing site:

**<http://www.fl-aquaculture.com>**

- ◆ Find out the who, what, and where of Florida's aquaculture products by checking out the latest review of the industry conducted by the Florida Agricultural Statistics Service:

**<http://www.nass.usda.gov/fl/rtoc0a.htm>**

**Debbie Britt-Pouder**  
850/674-3184

## UF/IFAS Extension

Miami

### Miami Fishing Clinic

Last winter, Florida Sea Grant Extension Agent Marella Crane helped organize a Youth Fishing Foundation Clinic on Virginia Key in Miami.

An estimated 72 youth from the Catholic Charity/Boys Town and various 4-H clubs from Broward and Miami-Dade counties had the opportunity to fish in a pond full of red drum. Also present were five representatives from the District 11 juvenile justice system, to observe and interact with the children.

Youngsters, aged 15 and younger, gained experience on how to tie a knot, bait a hook, and cast a line—in addition to catch and release fishing. Marella Crane and Cliff Kunde, Executive Director of the Atlantic Gamefish Foundation, gave a brief talk about grouper and snapper.

The event was a great success. For some children, it was their first fishing experience. Each child went home with a free fishing rod and reel, plus a handful of educational coloring books and stickers. All participants went on a guided tour of the University of Miami's Research Aplysia Facility/Hatchery.

Participants were able to observe sea slugs, long-spine sea urchins,



flounder, red drum, and nurse sharks. In addition, a special ceremony took place recognizing Ellen Prager, assistant dean and Tom Capo, senior research associate from the University of Miami, for their support and contributions to the Youth Fishing Foundation.

**Sam Porco**  
305/285-8676

## Department of Fisheries and Aquatic Sciences

Gainesville

### Fishing For Success

For the past few months, Fishing For Success (FFS) has been hosting Family Fishing days for various

groups from the Gainesville community. On Feb. 10, FFS held the Third Annual Law Enforcement Family Fishing Day, open to all area law enforcement personnel and their families.

More than 100 people, representing five different law enforcement agencies attended the event. Participants fished from stocked "catching" ponds of the UF/IFAS Department of Fisheries and Aquatic Sciences (FAS), and stayed quite busy catching sunshine bass, bluegill, channel catfish and largemouth bass.

On hand to assist were volunteers from the Alachua County Sheriffs Office, FAS graduate students/staff, and members of the UF Marine Biology Club (who set up a marine petting pond).

Trophies and prizes were awarded for various categories, and everyone who participated in the casting contest won a small pack of fishing tackle.

On March 7, FFS hosted IFAS employees and their families for more fishing. Nearly 200 people attended that event, and after a bit of a slow start in the morning, the fishing was fast, furious, and fun. Judging from the smiles of the participants, both of these events were enjoyable and memorable events. One parent exclaimed, "this is the best family day we've ever had."

FFS plans to host one large event a month throughout the year, targeting a different group each time, so stay tuned for more fishing opportunities.

**Tom Glancy**  
352/392-9617 x236



Some thirty UF/IFAS graduate students from the Department of Fisheries and Aquatic Sciences gave their oral presentations at the Fourth Annual Graduate Symposium Program on April 16-17. Topics ranged from the shallow water octopii of Fiji to the viability of highway barrow pits for rearing largemouth bass. Pictured here are FAS graduate students, faculty, staff and visitors that came to hear the talks.

Joe Richard

# Native and Exotic Catfish in Florida Part II

by Jeff Hill

This is the second of a two part series covering how to differentiate native and exotic catfish and providing information on exotic catfish in Florida.

## Armored Catfish/Plated Catfish (Family Callichthyidae)

A single species of the plated catfish family is currently established in Florida. The **Brown Hoplo** *Hoplosternum littorale* is found in the upper Kissimmee and St. Johns rivers and in coastal areas bordering the Indian River Lagoon in central Florida. Its appearance was first noted in ditches near the Indian River Lagoon in 1995 and its range is spreading. The origin of its introduction is unknown.

The Brown Hoplo is native to much of tropical South America east of the Andes Mountains and the island of Trinidad. It is a small species only reaching lengths of about 9.5 inches. Its body is covered by rows of interlocking armor plates which provide protection. There is a stout spine in each pectoral (side) fin and a somewhat smaller spine in the dorsal (top) fin. As the name suggests, the overall color is brown with numerous dark spots on body and fins. There are two pairs of prominent barbels around the mouth.

Brown Hoplos feed on invertebrates (e.g., insects and worms) and detritus (organic matter) found on the bottom. It reproduces in an unusual way. The male builds a floating nest of bubbles to protect the eggs. He secretes a sticky mucus which makes the bubbles last a long time and continually adds to and repairs the bubble structure.

Mating with the female occurs under the nest. She expels a small number of eggs at a time which the male fertilizes. He then takes the eggs into his mouth and blows them up into the nest. After laying her eggs, the female leaves and takes no further part in caring for the offspring. The male guards the nest until the eggs hatch and the young are free swimming.

Brown Hoplos live in shallow, weedy, mud-bottomed waters in their native range. In Florida, they have invaded similar habi-



**Brown Hoplo** *Hoplosternum littorale*



**Orinoco Sailfin Catfish** *Pterygoplichthys multiradiatus*

tats such as marshes, ponds, and ditches. Brown Hoplos are also found in canals. This species has the ability to breath air, allowing it to survive in stagnant, low oxygen waters that would kill many other fishes. It may even crawl across the ground for short distances to find water if its habitat goes dry and to colonize new areas.

The effect of Brown Hoplos on native fishes in Florida is unknown. Their range is expanding and they may reach high densities in certain habitats.

Although fairly small, Brown Hoplos are eaten in South America and by a few people in Florida. The meat is said to be of high quality. Most Brown Hoplos are collected with a cast net rather than hook and line.

## Suckermouth Armored Catfishes/Plecos (Family Loricariidae)

At least three species of suckermouth armored catfishes (plecos) are established in Florida. (As a group, members of this family are also commonly called plecos or plecostomus catfish in the tropical ornamental fish trade.) Two established species are in the genus *Pterygoplichthys*, commonly called **sailfin catfish**.

The **Vermiculated Sailfin Catfish**

*P. disjunctivus* – is established in coastal streams of Florida's Gulf coast north and south of Tampa and in some inland areas in the central part of the state.

The **Orinoco Sailfin Catfish** *P. multiradiatus* is found in Broward, Dade, and Palm Beach counties of south Florida. This species has been in Florida since about 1971. Plecos of this genus have also been found in the upper Kissimmee and St. Johns rivers.

A third established species belongs to the genus *Hypostomus* and is found in relatively low numbers in canals in south Florida. A few other species in this family have also been collected in Florida, but they are not known to have established populations. The introduction of these species is believed to be the result of aquarium releases or escape from ornamental fish farms. Suckermouth armored catfishes are native to tropical South America.

The nomenclature (i.e., technical aspects of names) of this family is complex. Additionally, the species are often difficult to distinguish. These factors confuse the issues of which species are present in Florida and where are they found.

At one time in the literature, the genus name *Pterygoplichthys* was replaced by *Liposarcus*, but *Liposarcus* actually does not refer to the species we have in Florida.

There is also some confusion concerning records of the genus *Hypostomus* in Florida. Some records were probably based on misidentifications. However, individuals and populations of *Hypostomus* apparently turn up in various places in Florida, persist for some time, and then seemingly disappear. Nevertheless, *Hypostomus* occur in south Florida and have for several years. *Plecostomus* has also been used as a genus name for members of this family, but it is not a valid name.

Sailfin plecos are readily distinguished from other fishes in Florida by their hard, rough, armored skin, sucker-like mouth with a prominent barbel on each side, and

large, sail-like dorsal fin. These are relatively large fish, growing to about 27 inches in length. The basic color pattern is numerous brown or dark gray spots on a lighter background. There is a single large spine in the dorsal fin, each pectoral fin, and the anal (bottom) fin. The pectoral spines may be covered with numerous smaller spines that are larger in the males and are most prominent during breeding. The head is large and wide and the eyes are very small.

These species are difficult to tell apart except by a specialist. *Hypostomus* is similar to *Pterygoplichthys*, but differs in having only 7 dorsal fin rays as opposed to 10 or more in the sailfin catfish.

Plecos feed along the bottom or submerged objects using their sucker-like mouth to hold onto the substrate. Their diet includes algae, detritus, and small invertebrates. They dig holes for shelter in canal banks or under rocks or logs. The male uses a hole to serve as a nest for the eggs and fry. The female deposits her eggs inside the hole (sometimes on the top of the cave) and the male guards the nest.

In South America, plecos live in a variety of habitats including rivers and marshes. In Florida, they live in canals, rivers, lakes, and ponds. Although they may reach high densities, the effects of plecos on native species in Florida are little known. They may damage canal or levee banks by burrowing, resulting in increased siltation.

Although eaten in their native range, plecos are not generally valued as food fish in Florida. A few people, however, do eat them and their meat is said to be of high quality.

## The Invaders: **Azolla pinnata**

There's a new little invasive plant popping up in the United States and Florida which could become more prevalent here without some vigilance. This latest menace, *Azolla pinnata*, actually resembles tiny Christmas trees growing in water. It's common name is the feathered mosquito fern.

Occurring from Africa to Australia, this plant has been cultivated for centuries in rice fields of Southeast Asia and southern China, where it acts as a fertilizer while decomposing. Listed as a weed in seven countries, *Azolla* has been designated a principal or common weed in India, Thailand and the Philippines.

In the United States, it has earned a rather bad reputation and is now ranked as a Federal Obnoxious Weed. Quick-growing, this "water velvet" will easily blanket the surface of a water body in a short period of time under the right conditions.

Growth requirements include slow or still water, mild temperatures and a lack of insect predators. Preferred temperature range is 59 to 86 degrees, but it can reportedly survive from 23 to 92 degrees. Most of Florida fits nicely into this range.

How does it feed? *Azolla* obtains nitrogen internally via a symbiotic relationship with the blue-green alga harbored in its leaves. The fern's growth is quickly enhanced by the presence of phosphorous.

In the past year, the plant has turned up in the United States as an incidental in nursery cultivation at scattered locations, including on spot in Florida. Last spring it was found by a Florida Department of Environmental Protection (FDEP) regional biologist in a few bird-baths at a nursery in the Stuart area. Once identity was confirmed, the plant was destroyed by the nursery, in cooperation with federal and state obnoxious weed staff. Other small colonies have been discovered and destroyed in North Carolina, Indiana and Tennessee.

Our native mosquito fern, *Azolla caroliniana*, looks much like this new invader. However, the exotic fern's shape is usually deltoid, or triangular.

The shape derives from the plant's pin-



Bill Haller

nate-type branching system, a distinctive feature among the six or seven *Azolla* species known world-wide. Our native species has two nearly equal branches arising from each growth point. This pattern of branching makes the overall shape of a mature plant irregular, instead of geometric.

One can also look at the plant's roots as they float in a bit of clear water. For *Azolla pinnata*, note that each root has many extremely fine lateral branches, making the roots appear feathery. The native species has lateral root branches, but they are sparse and harder to see. *Azolla pinnata* is often described as much larger in size when compared to Carolina mosquito fern. However, this character can vary a lot depending on the local growing environment.

The color of mature plants can be a clue as well, but don't count on this aspect to be a clinching feature. Generally, *Azolla pinnata* is a lighter green than *Azolla caroliniana*. Both can be affected in color by local growing conditions. In addition, each may turn reddish-brown when ambient temperatures are too high or too low, light is too bright, and/or nutrients too low.

Keep a wary eye out for this little tree-shaped "ornament" invader. It may lurk in water gardens, aquatic plant nurseries, ponds, canals, and any other pool of water, large or small.

**To confirm the identity of a suspicious-looking mosquito fern, contact your local FDEP regional biologist or the FDEP Tallahassee office at 850/487-2600.**

*With thanks to Kathy Craddock-Burks, FDEP.*



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Editor Joe Richard  
352/392-9617 ext 290  
joerich@ufl.edu

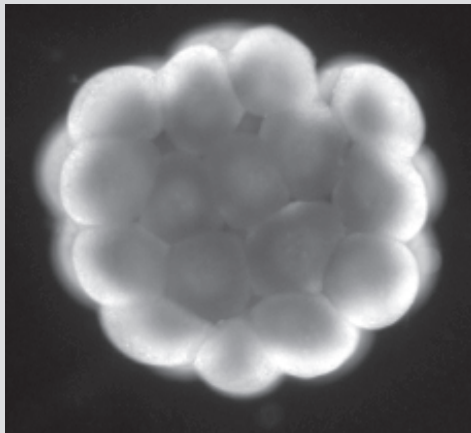
Faculty Advisor Chuck Cichra  
352/392-9617 ext 249

This diminutive relative of the corals has a great future as a research model. It can serve as a biomedical model for early human development, since it divides the same way we do (i.e., indeterminate cleavage). It forms muscles, nerves, and digestive tissue from a single cell, just as we do, and with similar genes to those humans use (e.g. Hox genes).

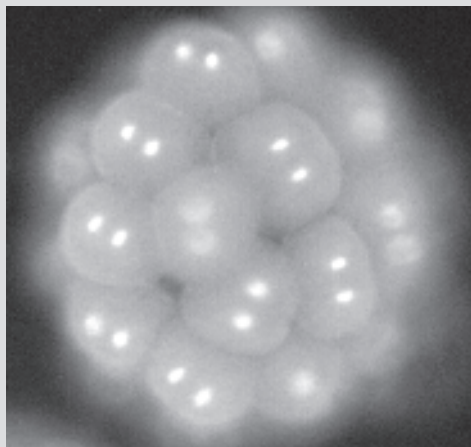
The anemone can also serve as a bioassay organism for estuaries, where there are only a few other non-migratory species available for this task. They can be raised as clones under controlled conditions, sampled for baseline chemical data, put in the field, and resampled later, to identify pollutants which might be missed by other monitoring protocols.

Most importantly, this close relative of the corals may serve as a model to illuminate how corals regulate their reproductive cycles, what chemicals and which environmental cues trigger spawning, and how corals regulate their early development.

While most people are unaware of the Starlet Anemone, despite its occurrence



Jeff Wilcox



Jeff Wilcox

from Portsmouth UK to Vancouver BC, nearly everyone has heard of corals, known for their beauty and also home to a wondrous assortment of fishes and invertebrates.

Jeff hopes that the work he is doing now, and in the future, will help both corals and people long after he is gone.

**Top Photo:**

*Cell division in a sea anemone embryo with nuclear replication suppressed (i.e., no nuclei in the embryo). Further nuclear division would fragment chromosome sets. The fluorescent stain shows that this does not occur. Cell division proceeds in the absence of nuclear division, independently, many times. The glow from the DNA of the mitochondria is all there is to see.*

**Bottom photo:**

*Cell division in a sea anemone embryo. Dividing nuclei are at Anaphase and are fluorescently stained for DNA. Cell division only occurs after nuclear division, and was presumed to be dependent upon nuclear division for proper results. Note the background glow of the DNA in the mitochondria.*

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