

WaterWorks

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

University of Florida Cooperative Extension Service / Institute of Food and Agricultural Sciences Volume 4 Number 2 2000

Calendar of Events

See page 7 for more in-depth information concerning these workshops, courses and seminars.

April 4 - 5

Fish Health Management Workshop
Tropical Aquaculture Laboratory/Ruskin, FL
Roy Yanong 813/671-5230

April 7

Fourth Annual Clam Industry Meeting
UF TREEO Center/Gainesville, FL
Leslie Sturmer 352/543-5057

April 19

Baitfish Aquaculture Workshop
Indian River Research & Education Center / Ft. Pierce, FL
Debbie Britt Poudner 850/674-3184

May 6

Lake, Pond and Stream Day
University of South Florida/Tampa, FL
John Brenneman 941/533-0765

May 15-18

Aquatic Weed Control Short Course
Ft. Lauderdale Research Center / Ft. Lauderdale, FL
Vernon VanDiver 352/392-9612

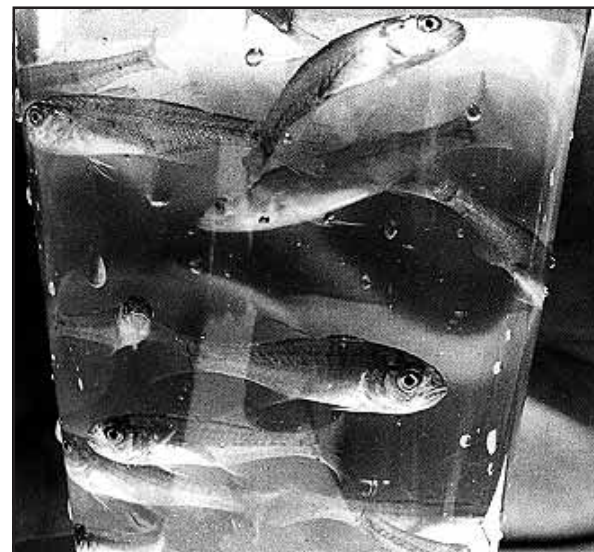
Water Filtering Made Easy

Filtering and cleaning water is a daily necessity for anyone involved in the water recirculating or aquaculture and aquarium industry.

One UF graduate who has taken the problem to heart is Mark Robertson of Gainesville. His is a success story that began over a plate of chicken wings.

As a graduate student back in the 1980s, Mark often sat with faculty members each Wednesday night at a local restaurant and, over platters of chicken wings, discussed fishery issues.

One night, someone tossed a few aquarium magazines on the table, and voiced some critical comments about filtering equipment shown in the advertisements.



Mark swore he could build a better water filtering system in his own home. He did! His fluidized sand filter, which he needed for raising a special species of frog, was soon finished. His filter allowed microscopic algae particles to circulate in the water as tadpole food, while still cleaning the water of unwanted wastes such as ammonia.

On a suggestion from one of the Department's faculty members, Mark advertised his new style of filter in an aquarium magazine. Much to his

surprise, he had orders for 40,000 units that first month.

But building millions of dollars worth of water filters was not the reason Mark had become a biologist, with a background in engineering. The headaches of a manufacturing business was not his calling. So, he licensed out the business and went back to tinkering

Continued on page 3.



Institute of Food and Agricultural Sciences

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

Fisheries and Aquatic Sciences

Gainesville

Frank Chapman

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

Chuck Cichra

Pond Management & Fisheries
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 Pouders

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

Mariculture Engineering
352/392-7728
bucklin@agen.ufl.edu

County Extension Faculty

Max Griggs

Escambia County
850/675-5230
megr@gnv.ifas.ufl.edu

Leslie Sturmer

Shellfish aquaculture
352/543-5075
lnst@gnv.ifas.ufl.edu

Chris Brooks

Dade County
305-248-3311 ext. 230

Don Sweat

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

John Brenneman

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

Bill Mahan

Franklin County
850/653-9337
wtm@gnv.ifas.ufl.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. Involvement of individual students in these programs is highlighted in each issue of **WaterWorks**.

If you happen to see someone tossing a large metal box into shallow waters off Florida's west coast, you needn't look twice.

It's graduate student Tom Glancy with a throw trap — collecting and counting species diversity and densities found within three of the most productive, estuarine habitats on the Gulf Coast: seagrass beds, oyster reefs, and marsh edge habitats.

Under the guidance of UF's Dr. Chuck Cichra, Glancy's graduate work began as a blue crab count and gear efficiency test. However, the project soon transformed into a fish and invertebrate community study.

While the heavy throw trap box proved to be effective at counting crabs, it also turned out to be an efficient way to collect data on other aquatic animals.

Glancy has now found and identified many other commercially, recreationally or ecologically important species within the three chosen habitats including stone crabs, various shrimp, spotted seatrout, black drum, sheepshead, and redfish. This underscores the fact that 75 percent of commercial fish and shellfish species in U.S. waters depend on estuaries at some point in their life history. All are important to the



reef or seagrass community they inhabit.

So far, he's counted 59 species of aquatic animals using the throw trap — and another sampling tool he is testing, the sweep net.

Which habitat has the highest species diversity?

Seagrasses have been the most productive, followed by clumps of dead oyster rubble adjacent to oyster reefs. Surrounding spartina or salt grasses that flood during high tide were ranked third.

Sampling clumps of oyster rubble with the throw trap was necessary because live oyster reef is especially difficult to sample without damaging the reef.

The oyster clump contents collected from the throw trap were transported to the laboratory at the Department of Fisheries and Aquatic Sciences in Gainesville, and carefully counted and identified.

Information gained from Glancy's throw trap efforts have dovetailed nicely with Dr. Tom Frazer's juvenile crab sampling data from the past two years, off Florida's Crystal and Suwannee Rivers.

The two data sets combined provided excellent quantitative data on density and biomass of all animals in estuarine habitats. Glancy and Dr. Frazer recently presented their work at the Blue Crab Symposium 2000 in Wilmington, North Carolina.

However, the fun has only just begun. Glancy and crew still have 245 trap sets (square meters of bottom material) to poke through, identify and sort during each season this year.

Water Filtering Made Easy

(continued from page 1)

with water filters.

Today, his third water filter patent is pending and he is doing water filtration consultant work as far away as Africa. Water filtration is an important field and a growth industry, as the world's population climbs and clean water sources dwindle. "From Johnny's 10-gallon aquarium to commercial sites, they all have a need or responsibility to clean their water after using it. Industries involved with cleaning water include city waste water treatment, bioremediation, aquaculture and the aquarium trade," Robertson says. "Look at aquaculture and their use of water.

"It's the closed systems we keep working on, to clean the water after using it." Robertson is a fan of big public water treatment shows, and says they should be a boon for the aquaculture crowd. People from around the world attend these shows, which are held every year or two. An event in Las Vegas had 750,000 in attendance, with a lot of sophisticated equipment on display, much of it from other countries.

In the meantime, Robertson has grown concerned about the overwhelming amount of information on the Internet. He explains, "Sure, there is a lot of information out there, but how do you find what you need?"

To remedy this, he's created his own free web site, dedicated to information on water filtration from around the world. Publications are listed by topic, along with the names of each author and/or agency.

His site averages between 2,000 and 2,500 visits daily. The web site is called **BioFilter.com** and should make for some interesting reading for anyone dealing with cleaning water.

It's amazing what can be accomplished over a plate of chicken wings.



Bryozoa

Aquatic Visitors of the Gelatinous Kind

Several lakeshore residents have recently contacted the Department of Fisheries and Aquatic Sciences (with some worry) about an unknown organism in their lake or pond.

Is it another new and exotic species? In each instance, the answer was no. Instead, the suspicious "growths" were local populations of bryozoa, of which a number of species are found globally.

A little background information:

Bryozoans are large colonies of invertebrate animals. The colonies often consist of thousands of individuals covering an area of several square feet. This gelatinous species may even become as large as a grapefruit or even a watermelon. Ideal habitats are quiet ponds, backwaters, bays and slow streams—especially where there are sunken logs, twigs, rocks or aquatic plants.

Bryozoa are more commonly seen in saltwater environments, but about 40 fresh water species have been named, with about 14 species reported in the United States.

Although they are common in stagnant water, bryozoans are never found under polluted conditions, and only sparingly occur where dissolved oxygen falls below 30 percent saturation.

However, they can occasionally become problematic. Summer events of large, floating gelatinous colonies of bryozoa (*Pectinatella magnifica*) can clog the screens of water intakes and the grates of hydroelectric plants so effectively, that it requires a full-time employee to keep them clear.



Bryozoa shun bright light, thus the problem with water pipes and closed conduits. Most species attach to the underside of rocks, logs, vegetation and boards. In dim light of deeper water, they can prosper on the upper side of objects as well.

Most bryozoans are collected from water less than one meter deep. Some species, however, have been found nearly 130 feet deep. Most Florida species peak in summer with a fairly rapid growth rate, and then begin dying off in winter when water temperatures drop.

Bryozoans can be quite hardy and travel from one lake to another. There are records of statoblasts (resting eggs) occurring in mud on the feet of waterfowl.

Some species are capable of passing through the digestive system of waterfowl, turtles, and salamanders. Since they are adapted to travel, there is no need to panic when this organism appears in your lake or aquaculture pond. The process is natural, unavoidable and probably cyclical.



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Institute of Food and Agricultural Sciences

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Editor Joe Richard
352/392-9617 ext 290

Faculty Advisor Chuck Cichra
352/392-9617 ext 249

UF/IFAS Aquaculture and Pond Management Update



Shellfish Aquaculture Cedar Key

Determining Economic Impacts of Florida's Clam Culture

The University of Florida is planning to conduct an assessment of the contribution the hard clam industry is making to the state's economy.

Dockside sales have increased from \$40,000 in 1987 to \$12.7 million in 1997, according to the Florida Agricultural Statistics Service. However, these dollar amounts shortchange the actual contribution the industry makes to local and regional economies in Florida. For example, the industry also provides local employment to clam farmers, seafood wholesalers, distributors and related businesses.

Suppliers of clam bags, harvest and processing equipment, and related

materials benefit Florida's economy directly.

Retail seafood and restaurant establishments also are supported through sales of clams to customers. Given that most of the cultured clams are shipped out of the harvest area, a lot of new dollars are brought into the local economy. Thus, the economic footprint that cultured hard clams make on the Florida economy is likely to be much bigger than often-quoted dockside sales figures.

Wholesalers of cultured hard clams will soon be contacted by mail or phone by the UF Food and Resource Economics Department to gather information on the 1999 season. Information such as clam sales, percentage of harvest shipped out of the region and state, and wholesale markup, will be requested from participating firms.

The economic impact of

the clam culture industry will be determined by using the IMPLAN model, a tried-and-true method for assessing how the sales of seafood, such as cultured clams, is multiplied throughout various economies.

Results from this study will be useful in providing a more accurate measurement of the contribution that clam aquaculture is making to Florida's economy. This will allow state resource managers and local decision-makers to make more informed regulatory and economic development decisions.

They will also be able to understand the trade-offs associated with future changes in water quality conditions in areas where clam farming exists or has the potential to become established.

Leslie Sturmer
352/543-5057

Mitchell Aquaculture Demonstration Farm Blountstown

Kids Fishing Event

The Florida Fish and Wildlife Conservation Commission (FWC) and the University of Florida's Sam Mitchell Aquaculture Demonstration Farm are working together to accommodate 400 youngsters for a Kids Fishing Day on April 1.

FWC fisheries biologist Bill Pouder said kids 15 years of age and younger can participate, but they must be preregistered by a parent or guardian by calling the Commission's Panama City office beginning March 20.

Pouder said that a total of 200 kids will be allowed to fish in the morning from 9 -11 a.m. and another 200 kids from 1-3 p.m.

Channel catfish have been stocked in the ponds and each child that fishes will be allowed to take home five fish. Families should bring along coolers with enough ice to preserve their catch. Anglers will need a rod-and-reel and whatever type of bait they want to use, Pouder said.

Recommended baits are frozen shrimp, chicken livers and live worms. He said a parent or guardian must be present at all times and they can be responsible for no more than two youngsters at a time. As a safety precaution, no one will be allowed to fish with multiple hooks, such as treble hooks.

The UF Sam Mitchell Aquaculture Demonstration Farm is located about eight miles north of Blountstown, on State Road 69. For more information, contact:

Bill Pouder
850/265-3676



News from the Department of Agriculture and Consumer Services

Safety Protocols for Aquaculture

One problem with the aquaculture industry is that it creates opportunities for diseases to be carried from one location to another. Plans to minimize such outbreaks requires making shipments declared free of significant diseases, through accredited veterinarian and state labs.

Several months ago, before the new Division of Aquaculture was formed (within the Department of Agriculture and Consumer Services — or DACS), two state diagnostic labs set out to acquire certification from the USDA to evaluate samples from clams, farm-raised shrimp, and catfish that were destined for interstate movement.

The goal was to gain certification for addressing problems of highest priority. As the industry grows, DACS' protocol will expand to include more disease detection. They are currently certified to evaluate:

- ◆ Catfish for *Edwardsiella ictaluri* (at the Live Oak and Kissimmee labs),
- ◆ Various shrimp virus diseases,

- ◆ Clams for the presence of *Perkinsus marinus*.

Shrimp and clam evaluations are currently done at the Kissimmee lab only. The number of species involved is currently a short list. Diseases chosen were those of the highest concern, but the lab bureau is growing and services to the aquaculture industry are also growing.

Lab certification is handled through a federal agency. That agency requires all lab submissions be routed through an accredited veterinarian. (Laboratories being sent samples would appreciate a phone call a day or two in advance.)

Catfish specimens will consist of pooled samples of kidney and spleen in sterile containers, each container representing a group of ten fish. These organs will be shipped to the Live Oak or Kissimmee labs in chilled state (not frozen).

Total sample size depends on the lot size and is depicted graphically in the protocol. Choose a day and courier which will allow the labs to receive the sample and begin the evaluation within 24 hours of collection. Both

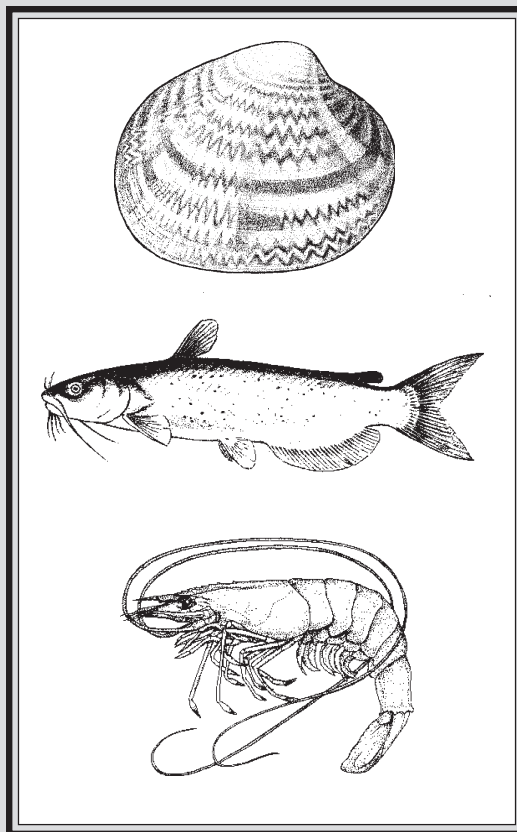
labs are closed Saturday and Sunday.

Clam diseases of any significance are few. *Perkinosis* was chosen because of environmental concerns that this particular disease poses to oysters (currently a major problem on the Atlantic and Gulf Coasts). The intent is to prevent exporting the disease into areas which may be currently under disease reduction efforts.

As with all aquaculture samples submitted, total sample size depends on

the lot size being shipped. The total sample is divided into groups of ten and submitted live to the Kissimmee lab. Include one additional group of ten for bacteriological culture.

Farmers are advised to choose a means of transport which will allow the clams to arrive alive and be examined no more than 5-6 hours after collection. Consider the time of day, also. There is difficulty in dealing with samples that arrive after 3 PM.



Shrimp submissions require that half the sample be shipped live, the other half fixed in Davidson's fixative.

The formulation of this fixative is simple and spelled out in the protocol. Those using this fixative are cautioned to wear rubber gloves and eye protection when mixing and using it. On an individual basis, the Kissimmee lab would be glad to furnish the veterinarians with this fixative, but it must be picked up in person.

Granted, some of these protocols may encompass tasks not commonly used in the past. As with any change of procedure, there will be a period of adjustment. This applies to producers, veterinarians, and lab staff. The ultimate goal is that Florida products will be viewed as safe and reliable.

Copies of the entire protocol are available to accredited veterinarians. Call: **407/846-5200**.

For more information, contact:

Mike Slayter
Florida Department
of Agriculture and
Consumer Services
850/488-4033

Fish Handling and Transport

By Michael McGee, Chuck Cichra, and Jeffrey Hill

Whenever fish are stressed during handling or transport they become vulnerable to injury and disease. Fish farmers know that fish will often “break down” from being poorly handled and for this reason, proper care during harvest and transport is important. Although most fish farms have established procedures for handling fish, it pays to remain aware of what situations can later lead to fish disease outbreaks and mortality.

Causes of Stress

Fish crowded in a trap, net, or hauling box can rapidly deplete the oxygen supply in a localized area. In warm water, oxygen is less soluble and fish respiration is higher. Sublethal oxygen stress often leads to later disease outbreaks.

Fish that get scraped or bruised during handling can lose their protective slime coating, thereby reducing their natural defense against pathogens (bacteria, fungi, and viruses). Abrasions or loss of scales are even more dramatic invitations to infection or direct mortality due to injury.

Sudden water temperature changes are a well-known cause of fish stress. Try to avoid direct water temperature changes of greater than 5 degrees Fahrenheit when moving fish from one environment to another. If large differences in water temperatures exist, then gradual tempering to acclimate them is important. Fish can be acclimated to a 10-degree change in about 20 minutes by slowly mixing waters to equalize temperature.

A sudden pH shock may also be harmful, especially to young fish. Within the range of pH 6 to 9, a pH shift of less than 2 units can be tolerated by most fish. As with temperature, water can be mixed to gradually acclimate fish to pH differences.

When possible, it is better to harvest and move fish during the cooler parts of the day (and year), and avoid long exposure to strong sunlight. Avoid leaving fish in the sun if they are in small containers, as the water will warm quickly.

Useful techniques to reduce stress

Aeration and pure oxygen supplied to hauling tanks can help prevent oxygen stress and allow more fish to be safely transported. Water in hauling tanks should be kept cool and clean. Some medications may be added to the



water to reduce risks of infection. Salt at 0.5% [5000 ppm (mg/l)] is sometimes added to increase the tolerance of fish to handling.

Small fish are usually more sensitive to handling and environmental stress than larger ones. For this reason, special precautions should be taken when transporting or stocking fry.

Fish harvested from ponds and moved to indoor holding tanks often carry parasites and disease organisms with them. As a result of the stress of handling and crowding of fish into vats, the fish's resistance is lowered and a disease outbreak may occur. As a preventative measure, fish are often given a prophylactic treatment shortly after they have been brought in.

Common treatments include a 2-hour bath of potassium permanganate at 3 ppm (mg/l), or a 1-hour formalin bath at 50 -100 ppm (mg/l). Alternately, short-term dips (30 - 60 seconds) may be used (e.g., salt at 3 % or 30,000 ppm or potassium permanganate at 500 ppm). These treatments will eliminate most external parasites. However, when using treatments for the first time, it is important to be certain the dosage is not too stressful to fish.

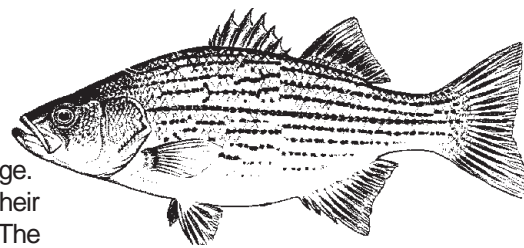
If a bacterial disease is anticipated, bath treatments with antibiotics for 4 to 8 hours can be used. Most antibiotics are not approved for use on fish — contact the Florida Department of Agriculture and Consumer Services for more information. Occasionally, as a result of severe stress during harvest or transport, fish will become sick and not respond to treatment. If this appears to be the case, the best solution often is to return the fish to the pond. Sometimes, although losses will occur, many fish will recover in the pond.

Summary

Experience and observations are the best teachers when learning how to avoid stressing fish during handling and transport. Since the outcome of poor handling is generally sick or dying fish, it doesn't make sense to take chances. Establish and follow a set of procedures that minimize stress and risk of injury to fish when they are handled. Use appropriate preventative treatments to ward off disease outbreaks before they occur. Look for patterns in the type and extent of diseases that occur, compared with the type of handling the fish have received and under what conditions.

These guidelines should help prevent unnecessary losses for fish farmers.

Florida's Sunshine Bass



What do you get when you cross a female white bass with a male striped bass?

Answer: The sunshine bass, a fish with multiple possibilities for pond-raised revenue, much like the channel catfish.

According to the Southern Regional Aquaculture Center (SRAC), the sunshine bass "has become a highly desirable substitute for the declining striped bass seafood industry." At the same time, the sunshine has become quite attractive to recreational anglers as well, a good fighter that attacks artificial baits. Sunshines also have a mild taste and firm texture.

Aquaculturists have found these hybrids well-suited to pond culture. Fry are raised in ponds, and grow to market size in 15 to 18 months. Most are commercially harvested at

1.5 to 2.5 pounds and up to two years of age. Sunshines grow to about 15 pounds, and their normal life span is a short five to six years. The highest reported weight has been 22 pounds.

Sunshine bass do well in a variety of water bodies, especially moving streams, lakes, ponds and reservoirs—almost anywhere except extremely shallow water or ponds filled with plants. Small sunshine bass eat aquatic invertebrates such as insects and grass shrimp. They switch to a diet of fish while still quite young, if suitable baitfish are present. They can also be trained to eat pelleted fish feed. Their growth rate in production ponds is determined by water temperature, quality and quantity of food, palatability of food, frequency of feeding and water quality.

The sunshine bass has good potential, both as a commercial food species, and as a

recreational item for put-and-take or catch-and-release fishing. **For more information:**

◆ Print a copy of SRAC Publication #300 (Southern Regional Aquaculture Center) from their web site –

<http://www.msstate.edu/dept/srac/publicat.htm>

◆ Contact your Florida County Cooperative Extension Office for a list of fingerling suppliers or print out a list from the web: <http://edis.ifas.ulf.edu/index.html>

Calendar of Events

April 4 – 5

Fish Health Management Workshop

Tropical Aquaculture Laboratory / Ruskin, FL

Offered approximately twice a year, this two-day workshop is designed for fish farmers, biologists and veterinarians.

Topics to be covered, from 8:30 a.m. to 4:30 p.m. each day, include an introduction to fish health management, including a review of water quality, an overview of common parasitic, bacterial and viral diseases, and treatment/management options. Wet labs during the workshop will provide hands-on experience on water quality testing, necropsy procedures and parasite identification. Contact:

Roy Yanong 813/671-5230

April 7

Florida Hard Clam Industry Meeting

UF TREEO Center / Gainesville, FL

The fourth annual meeting of this group will be held at the UF TREEO Center off Tower Road (SW 75th Street) in west Gainesville, starting at 10 a.m. Hosted by UF's Aquatic Food Products Lab, this is an opportunity for all industry participants to discuss programs for regulation, product quality, and marketing. It's also a chance to share concerns and plans for future hard clam commerce in Florida.

All growers, harvesters, shellfish wholesalers and retailers are encouraged to attend. Representatives from all regulatory, research and marketing programs are invited to lend their expertise and advice and assist the commercial interests.

Keynote speaker will be Don Bishop, founder of Fukui North America out of Ontario, Canada, with over 20 years of experience in shellfish distribution. Don will bring a global perspective on marketing, packaging and quality trends in the shellfish aquaculture industry. Registration is free, but participants must preregister before April 4. Lunch is \$10.

**Leslie Sturmer
352/543-5057**

April 19

Baitfish Aquaculture

Indian River Research & Education Center Fort Pierce, FL

Overview of baitfish culture, marketing, and economics. Speakers will be from UF's Department of Fisheries and Aquatic Sciences, UF's Food and Resource Economics Department, and the Florida Department of Agriculture and Consumer Services Division of Aquaculture. Contact:

**Debbie Britt Pouder 850/674-3184
St. Lucie County 561/462-1660**



May 6

Lake, Pond and Stream Day

University of South Florida/Tampa, FL

LAKEWATCH staff will have aquatic plant specimens available, as well as frozen specimens of common Florida fish, to help people become familiar with them. State and environmental groups will have exhibits. Desirable aquatic plants will be given away to those interested in aquascaping. Free use of canoes will be available (with a possible race). Lunch will be on the water, and a kid's fishing derby is scheduled.

John Brenneman 941/533-0765

May 15-18

Aquatic Weed Control Short Course 2000

Fort Lauderdale Research Center/ Fort Lauderdale, FL

This is a four-day course covering many aspects of aquatic weed control, upland and invasive weed control, aquatic plant culture and revegetation. Earn up to 24 Continuing Education Units in aquatic, right-of-way, CORE, and many other categories toward renewal of commercial, public and private pesticide applicator licenses.

Vernon VanDiver 954/475-8990

The Invaders

Zebra Mussel Alert

Florida residents are reminded to be on the lookout for zebra mussels, which represent a threat to water interests in the Sunshine State. These small, striped bivalves now cause billions of dollars of damage annually in northern states. Biologists say it's inevitable that zebra mussels will invade Florida waters — it's just a question of when.

Introduced to the Great Lakes from East European ship ballast water in the mid-1980s, zebra mussels can encrust anything that is hard enough for them to grow on — outboard motors, docks, water pipes, pumps, condenser screens, flooded timber, native clams and crayfish, even boat hulls.

Adult zebra mussels can even grow inside cooling systems of outboard motors, if water temperatures don't exceed 110 degrees F. Barge traffic, in the Mississippi and Ohio Rivers has spread the problem quickly. The nearest confirmed infestation to Florida is north Alabama.

A female zebra mussel can produce hundreds of thousands of eggs in a reproductive season. The offspring, called veligers, move little but are almost nearly impossible to see. They can live for three days out of water, which means that a dry boat trailer or boat can carry them around, as can fishing tackle or reused live bait. In equipment with puddled water, such as bait



While zebra mussels were named for their stripes, they can sometimes appear brown.

buckets, live wells, bilge water and scuba gear, they can survive for seven days. Even a wading heron or migratory duck can spread the veligers from lake to lake, especially during mussel spawning season, normally in March.

Biologists predict that a boat trailered down from northern states will eventually be the cause of the first infestation in Florida waters. One tackle shop owner in Lake County brought some zebra mussels down from New York two years ago because they filter water, making it clearer, and he thought they'd be pretty in his aquarium. They were spotted by a biologist and promptly destroyed.

A study made by the Mote Marine Lab demonstrated that the limestone-rich waters of Florida are ideal for mussel and shell growth, especially in freshwater springs and Lake

Okeechobee. While they may be efficient at filtering phytoplankton (algae) from water, this means less food for native species and a disruption of the entire aquatic food chain. Unlike Eastern Europe, zebra mussels have no natural predators in the United States.

Currently, signs warning about zebra mussels have been set up on interstate highways entering Florida, with a radio broadcast giving advice. Knowingly carrying these mussels into Florida is a second degree misdemeanor that carries a \$500 fine and up to 60 days in jail.

Equipment used in suspected zebra mussel-infested waters should be treated with bleach, hot water above 120 degrees, or very salty water—a half cup of table salt per gallon of water. Even a boat motor's cooling system should be flushed out. If boating equipment feels gritty, it may be young, microscopic mussels beginning to grow. Boats used in infested waters should be cleaned and not used in another lake for at least three or four days.

For information on how to identify them or how to prevent their spread, contact:

Gary Warren
Florida Fish & Wildlife
Conservation Commission
(352) 392-9617, ext. 279
E-mail: warren@gfc.state.fl.us

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Editor / WaterWorks

University of Florida
Department of Fisheries and Aquatic Sciences
PO Box 110600
Gainesville, FL 32611-0600
Phone: 352/392-9617 ext. 290 Fax: 352/846-1088
E-mail: fishweb@gnv.ifas.ufl.edu



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