



# WaterWorks

**A Newsletter Highlighting Aquaculture and Pond Management Programs of the University of Florida**

University of Florida Cooperative Extension Service / Institute of Food and Agricultural Sciences Volume 3 Number 1 1999

## Calendar of Events

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

### March 25

#### Annual Hard Clam Meeting

Holiday Inn West / Gainesville, FL

Leslie Sturmer 352/543-5057

### March 25

#### BMP Subcommittee Meeting — Food Fish

Center for Aquatic & Invasive Plants/ Gainesville, FL

Andy Lazar 850/674-3184

### March 26

#### BMP Subcommittee Meeting — Bivalves

DEP Field Station/ Cedar Key, FL

Leslie Sturmer 352/543-5057

### May 13

#### Pond Management Field Day

Sumner's Ranch/ Lakeland, FL

John Brenneman 941/533-0765

### May 15

#### Workshop: "Aquaculture: What's It All About?"

Sam Mitchell Aquaculture Farm / Blountstown, FL

Debbie Britt 850/674-3184

### May 17 - 28

#### Diseases of Warm Water Fish

Tropical Aquaculture Lab / Ruskin, FL

and Whitney Marine Laboratory/ St. Augustine, FL

Dr. Ruth Francis-Floyd 352/392-9617 ext 229

### May 17 - 20

#### Aquatic Weed Control & Revegetation Short Course

Ft. Lauderdale Marriot North / Ft. Lauderdale, FL

Dr. Vernon Vandiver, Jr. 954/475-8990

## Florida Aquaculture Regulation Update



Now that aquaculture permitting and regulatory responsibilities have been transferred to the Bureau of Seafood and Aquaculture (within the Florida Department of Agriculture and Consumer Services, or DACS), aquaculturists should know that changes are taking place in the permitting process.

Instead of permitting based on the traditional multi-agency regulatory approach, a set of Best Management Practices (BMPs) will be used as guidelines for farmers to follow.

If an aquaculture farmer can demonstrate that he/she is employing appropriate BMPs for their specific aquaculture crop or commodity group, they will be provided with an Aquaculture Certificate. All aqua-

culturists in Florida will be required to have an Aquaculture Certificate.

### How are the BMPs being developed?

In an effort to develop BMPs that are acceptable to both farmers and regulators, a state-wide Technical Advisory Committee has been formed. Six subcommittees have been designated to represent Florida's aquaculture commodity groups: aquatic plants, bivalves, food fish, shrimp, tropical fish, and an 'other species' committee. A regulatory subcommittee has also been formed that's comprised of representatives from the various regulatory agencies involved in the process.

"This should save us quite a bit of time in the long run," said Mark Jennings, Environmental Specialist

with the Office of Agricultural Water Policy. "Representatives serving on this committee will ultimately be the ones giving final approval of the BMPs for the various commodity groups. We thought it made sense that they be involved in the process from the beginning."

All aquaculturists are encouraged to participate by communicating their ideas and concerns to their commodity group chairperson. You can also call these individuals for meeting dates, or to be included on the subcommittee's mail list.

**(Continued on page 3.)**



# design team



The Cooperative Extension Service uses State Major Programs to provide guidance and direction to extension efforts in Florida. Each major program has a design team responsible for establishing priorities, implementing extension programs, and evaluating impacts. Aquaculture and Pond Management is a State Major Program, with the following design team members:

## DEPARTMENT OF FISHERIES AND AQUATIC SCIENCES

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## COUNTY EXTENSION FACULTY

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## MITCHELL AQUACULTURE FARM (Blountstown))

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## TROPICAL AQUACULTURE LABORATORY (Ruskin)

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There are many other faculty who assist with extension and research in aquaculture and pond management and we will be periodically focusing on their efforts. We encourage you to become familiar with the design team, its role in our programs, and how the faculty can collectively or individually assist you.

# 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 will be highlighted in each issue of **WaterWorks**.

Erin Bledsoe grew up in Huntington, Indiana and earned her bachelors degree in Biology at Purdue University. A few months later she was at UF in Gainesville, beginning her Master's degree in Estuarine Marine Ecology at the Department of Fisheries and Aquatic Sciences.

Now, after dozens of sampling trips in Florida's renowned Suwannee River basin, followed by countless hours in the classroom, and in the lab with a microscope, Erin has completed her degree.

The focus of her work was to monitor a rich and constant belt of plankton growth she discovered just offshore of the Suwannee River estuary,

Originating in the Okefenokee Swamp, the Suwannee River has an impressive flow rate — emptying its total volume of water about every 10 days, with constant replenishment from the swamp. Such a continual source of fresh water and nutrients has apparently formed the plankton belt, which serves as a source of food for area clam, oyster, and scallop beds, as well as filter-feeding baitfish.

Oddly, this important source of marine food for so many coastal species had never been studied along this part of Florida's west coast.

Initially, Erin's work was to establish baseline water quality data for the Suwannee River and estuary; widespread concerns continue about the potential consequences of high nitrate levels in the river, generally regarded as coming from dairy and poultry farming within that watershed.



Erin uses a Van Dorn water sampler that allows samples to be taken from below the water's surface.

The study was also designed to describe the abundance and composition of primary producers in the river and coastal environments most directly impacted by the river's outflow. Objectives were to:

- Characterize spatial and temporal patterns of phytoplankton within the river and coastal environment during periods of high and low flow. Fortunately El Nino provided



These microscopic diatoms were found in water samples collected as part of Erin's study.

a very high flow. (River residents called it flooding).

- Address the potential for limiting factors of phytoplankton standing crops, specifi-

cally light and nutrient limitation.

Physical, chemical and biological parameters were determined for the Suwannee's estuary. Erin collected water samples from a transect starting four miles upstream, and extending up to 20 miles offshore, during an 18-month period.

Water analysis indicates that nutrients are transported from the river into the Gulf. There is a shifting region of sufficient light and nutrients in the estuary for phytoplankton to bloom. This narrow band of elevated plankton growth is located between the light-limited (dark) river water and nutrient limitation in the open Gulf.

Patterns of nutrients and light appear to be influenced by seasonally dependent variation in the river's flow, nutrient content, and color.

Large centric diatoms in the *Rhizosolenia* group were often dominant during the study period. Small blue-green and green algae were also found in high densities.

So, the next time you enjoy a Gulf oyster, Cedar Key clam, or scallops from Steinhatchee, it's quite likely these tasty shellfish were nourished to some or even a large degree from the rich bloom of plankton now growing and dispersing (via Gulf currents) from the Suwannee estuary.

Erin Bledsoe successfully defended her thesis last summer and is now working under a Ph.D. fellowship on Estuarine Studies of Plankton.

— **Ed Phlips**  
352/392-9617 ext 248



# New Invertebrate Laboratory at UF's Department of Fisheries and Aquatic Sciences

The **Freshwater Invertebrate Resources Unit** of the Florida Game and Fresh Water Fish Commission (GFC) has recently become a new resident at UF/IFAS' Department of Fisheries and Aquatic Sciences.

The move is intended to facilitate cooperative research efforts between UF and the GFC and to provide taxonomic and ecological expertise on aquatic invertebrates to UF faculty, staff, and students. The unit will also be providing assistance to researchers at the USGS Florida Caribbean Science Center, located just across the street from the Department.

The unit is staffed by Gary Warren and Darrie Hohlt. Once the move is complete and facilities are 100 percent operational, as many as six laboratory technicians will be employed.

The primary function of the unit is to evaluate trophic status and food web viability in "problem" lakes and streams throughout Florida; invertebrate community structure is the primary tool used for these evaluations.

In addition, Gary and his staff work to:

- restore invertebrate populations in damaged systems;
- author state regulations aimed at protecting endangered and threatened invertebrate species;
- create and distribute educational resources related to freshwater invertebrates, and
- conduct basic ecological and systematic research on selected species.

The unit moved to Gainesville from Okeechobee, where, from its creation in 1987 until 1996, it focused primarily upon evaluating the biological health of Lake Okeechobee.

Results from that ten year investigation were among the first to show that Lake Okeechobee is segregated into several ecological zones, each characterized by a distinct biological community.

In association with its regulatory role, the Freshwater Invertebrate Resources Unit most recently authored the Florida Mussel Rule, which prohibits the commercial harvest of native freshwater mussels in Florida. Shell fragments from mussels

native to North America are preferred as implants by the 3.5 billion dollars per year Japanese cultured pearl industry. States that have allowed commercial harvest, most notably upper Midwestern states adjacent to the Mississippi River, Tennessee, and Alabama, have experienced substantial declines in their native mussel populations.

The Florida regulation was enacted over the protests of commercial harvesters from Tennessee and Alabama, who depleted easily accessible mussel populations in their own states and conducted trial harvests in Florida prior to enactment of the rule.

As part of its educational role, the unit most

recently produced a zebra mussel information sheet and slide presentation. Zebra mussels are native to eastern Europe and were accidentally introduced into the Great Lakes in the mid 1980s; they reproduce in extremely large numbers and cause

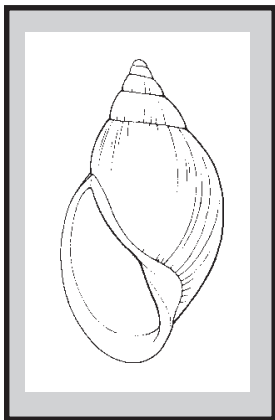
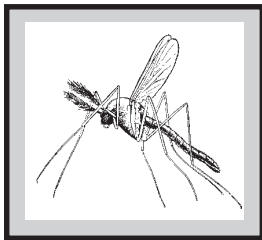
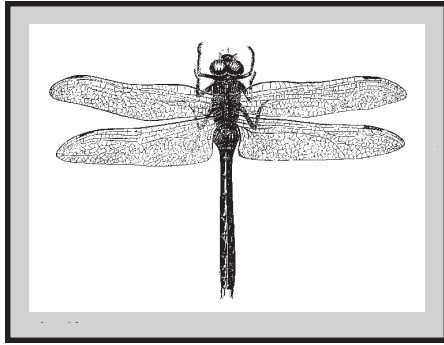
economic damage by forming thick mats on submerged surfaces including intake piping, piers, pumps, and boat hulls. They also colonize native mussels and crayfish.

Since their introduction, zebra mussels have spread throughout the Midwest and down the entire length of the Mississippi River. Their closest known proximity to Florida is the Tombigbee system in Alabama. The GFC invertebrate unit responds to reports of zebra mussels in Florida, and, in August 1998, identified zebra mussels from an aquarium in a bait and tackle shop in Eustis. The proprietor of the shop intended to introduce the mussels into his pond to increase water clarity.

Ongoing projects include invertebrate community evaluations and snail population restoration in Lake Panasoffkee in Sumter County, and Merritt's Mill Pond in Jackson County. Popular bream fisheries in these lakes declined after important invertebrate food web components disappeared.

The unit's staff are excited about working closely with UF faculty, staff, and students and welcome the opportunity to contribute through cooperative projects and by providing taxonomic and ecological expertise and support.

**Gary Warren**  
352/392-9617 ext. 279



*Continued from page 1*

## **Aquatic Plants**

Brad McLane  
954/472-5120

## **Bivalves**

Leslie Sturmer  
352/543-5057

## **Food Fish**

Andy Lazur  
850/674-3184

## **Other species**

Alan Maxwell  
305/367-2672

## **Shrimp**

Mike Ednoff  
561/465-8886

## **Tropical Fish**

Craig Watson  
813/671-5230

## **Regulatory Subcommittee**

Mark Luchte  
941/486-1212

## **Interim Measures to be followed while BMPs are being developed:**

The development of BMPs is a lengthy process, and so until they are complete, a series of interim measures are being drafted. A final draft is expected to be complete in the next few weeks. If you have any questions regarding certification, permits or progress of BMP development, contact:

## **Office of Agricultural Water Policy**

Frank Leteux or Bill Bartnick  
850/414-0200

## **DACS / Bureau of Seafood and Aquaculture**

Kal Knickerbocker  
850/488-0163



# UF/IFAS Aquaculture and Pond Management Update



Dr. Mike Allen poses with a shoal bass, a threatened species in the Chipola River.

## Department of Fisheries and Aquatic Sciences

Gainesville

### Researchers Identifying Critical Habitats for Threatened Shoal Bass

The shoal bass is an undescribed black bass *Micropterus spp.* endemic to southwest Georgia, southeast Alabama, and a very limited distribution in the Florida Panhandle. Its distribution in Florida is limited to a stretch of the Chipola River from Marianna to Clarksville. Due to its limited distribution in Florida, the shoal bass is listed as threatened.

Dr. Mike Allen recently began a study to identify critical habitats for the shoal bass in the Chipola River. This project is funded by the Florida Game and Fresh Water Fish Commission, Division of Wildlife.

The purpose of the study is to identify important microhabitats for juvenile and adult shoal bass in the Chipola River from Marianna south to Clarksville.

The project will develop a model to predict the

occurrence of juvenile and adult shoal bass based on microhabitat characteristics (e.g., specific depth, substrate, and flow characteristics) within the Chipola River.

This model will hopefully allow resource managers to identify critical habitats for preservation of the shoal bass in Florida. Mr. Powell Wheeler, a recent graduate from Virginia Tech University, began pursuit of a Master's Degree related to the study in January.

**Mike Allen**

352/392-9617 ext. 252



### Shellfish Aquaculture

Cedar Key

After crop losses and seed shortages associated with last year's adverse weather conditions, the new year has brought fresh prospects for Florida clam farmers:

◆ A relatively mild winter resulted in phenomenal growth rates — encouraging news to many farmers on Florida's west coast where clams were dormant after

heavy rains brought extended periods of low salinities, in 1998.

◆ Seed production is expected to rebound as several new private hatcheries come on line this year and existing hatcheries around the state expand their efforts. Harbor Branch Oceanographic Institution's new clam hatchery will also be in operation this year. Call me for a list of seed suppliers.

◆ The U.S. Department of Agriculture Farm Service Agency approved the Non-insured Crop Assistance Program (NAP) area designation for Levy and Dixie Counties — farmers with a qualifying clam loss related to last year's excessive rainfall will be eligible for NAP payment. A workshop conducted in January with the USDA Risk Management Agency initiated the development of a crop insurance program for clams. Presently the agency is working on an insurance policy with a pilot program planned for several coastal counties in Florida as early as this year.

◆ The development of Best Management Practices for bivalve facilities will move forward this year. Feel free to contact me for meeting dates and progress reports.

◆ Also effective next month will be the revised management plan for the Horseshoe Beach shellfish harvesting area, put forth by the Department of Environmental Protection, and affecting leases in Dixie County. The new plan will significantly decrease the number of closure days — allowing farmers in that area the ability to develop long-term marketing strategies

◆ Marketing is being aggressively addressed this year; the Department of Agriculture and Consumer Services kicks off an exciting

marketing campaign for Florida farm-raised clams this month with promotions in several restaurant chains. Highlights include in-store publications at a grocery chain, color ads in culinary publications, presentations to culinary associations, and segments on a food network.

◆ Product quality is also being addressed. At industry's request, the DEP has initiated the rule amendment process to consider incorporating a dry tempering regime into the shellfish code.

According to research conducted at the UF Aquatic Food Products Lab over the past three years, this will enhance shelf life of clams during the summer months.

This will be a major item for discussion at our annual hard clam meeting hosted by the Aquatic Food Products Lab scheduled on March 25 at the Holiday Inn West in Gainesville.

Other product quality-related topics include the development of a quality assurance program. If you have suggestions for other topics to be included in the agenda, please give me a call. Looking forward to a productive and prosperous year!

**Leslie Sturmer**

352/543-5057

### Miami-Dade County Cooperative Extension Service

Homestead

The aquaculture industry is no different from any other industry; success is heavily dependent on its employees.

With this in mind, the Miami-Dade County Cooperative Extension Service recently held an all-day aquaculture training session for

teachers — the key to a well-trained future work force.

The session was held at Coral Reef High School where a fish tank has been installed and is currently being used for tilapia production.

Twenty-six teachers from all grade levels and both Broward and Miami-Dade Counties, attended the training. Since most teachers do not have a background in aquaculture education, Training for Teachers Part 1 provided participants with the basics:

- why aquaculture is important;
- a brief history of aquaculture;
- a description of species;
- aquaculture systems;
- answers to the question, "What do I need?," and
- additional sources for information.

In the session "What do I need?" each teacher constructed mini recirculating systems built with materials from a local hardware store.

In the Aquaculture Basics segment, they dissected fish to learn more about fish physiology and anatomy. The fish were donated by Mr. Pablo Tepoot, New Life Exotic Fish, Inc.

Future training sessions are being planned to expand on the basics. Training Phase Part II has been tentatively scheduled for April (exact date to be announced). This training will include Water Quality Management and Fish Health Management. Teachers that have water quality testing kits should bring them.

If you are an aquaculture producer in Florida and interested in supplying small orders of fry or fingerlings to school programs please give us a call.

**Molly A. Sandfoss**

305/248-3311 ext. 230





An aerial view of UF/IFAS' Tropical Aquaculture Laboratory in Ruskin, Florida — near Tampa.

## Tropical Aquaculture Laboratory

Ruskin

### Pond Repair to Begin in March

Repair of the ponds and ditches at the Tropical Aquaculture Laboratory will begin in early March, and is slated to be completed in April. Many of the ponds have filled in over the years, and all of the ditches need repair work. Following this time table, we hope to start stocking ponds this Spring. Anyone interested in seeing the operation in progress is more than welcome to come out and see us.

### New Label for Diuron Expected Soon

Diuron is an herbicide known to have algicidal properties, but has not had an aquatic label allowing its use in ponds. As a result of the University of Florida's research, the Florida Tropical Fish Farms Association anticipates the issuance of a 24C, Special Local Need label in March.

The product will be a restricted use pesticide labeled to control macroalgae

in commercial, freshwater ornamental fish production ponds, and will be packaged under the new product brand name Nautilus, produced by Griffin LLC.

The Florida Department of Agriculture and Consumer Services' Pesticide Review and Evaluation Committee forwarded the application package to IFAS for review in early February. The label will also require review by the federal Environmental Protection Agency.

The label will allow for dosages up to 1.0 mg/l active ingredient. Nautilus, which will be an 80% Dry Flowable Diuron. The target species of macroalgae, *Chara sp.*, is a major weed problem in many ornamental fish production ponds, and currently there is no good alternative treatment available, especially since the discontinuance of dichlobenyl (Casoron).

Chance Debose, a graduate student working for Dr. Ken Langeland at the Center for Aquatic and Invasive Plants in Gainesville, conducted the primary research used for this labeling effort. Griffin LLC's laboratory in Valdosta, Georgia, and the Tropical Aquacul-

ture Laboratory in Ruskin were also involved in the process. Chance's research was funded by the Florida Tropical Fish Farms Association.

The label will state that Nautilus should be used in one treatment, with no more than three treatments per year, per pond, when macroalgae are present. It will also require a 30 day interval, after treatment, before any off-site discharge of pond water.

Nautilus will only be available to commercial, freshwater, ornamental fish producers in Florida who possess a Restricted Use Pesticide Applicator License. For more information, please contact the Tropical Aquaculture Laboratory.

### Welcome to Two New Staff Members

In late October, two new biologists were hired at the Tropical Aquaculture Laboratory, with funds provided by the Florida Legislature.

Scott Graves will be primarily in charge of activities on the fish farm portion of the facility. Scott was recently an aquarist at the Lowery Park Zoo in Tampa, and has a wealth of knowledge about general husbandry techniques, systems management, and fish biology. He has a B.S. in Biology, with a minor in Chemistry, from Florida State University.

Eric Curtis will be working primarily in our fish health section, assisting Dr. Yanong with the diagnostic lab and research. His most recent experience was with the Hartz Mountain Corporation in their Gibsonton Aquatic Technology lab. Eric is in the process of completing his Masters degree in Aquaculture with Texas A&M Univer-

sity. He has a B.S. from the University of Texas. Eric also comes to us with a great deal of practical experience in building and managing closed, aquatic systems.

Please join us in welcoming both of these new members to the team in Ruskin.

### Travis Carpenter Leaving USDA Wildlife Service

Travis Carpenter, wildlife biologist for USDA's Wildlife Service, has taken a position with the US Fish and Wildlife Service in Mississippi.

Bernice Constantine, director for Wildlife Services has assured us that he plans to fill the position, but there may be a temporary time between Travis' departure and a suitable replacement.

Travis has not only been extremely responsive to any requests for assistance, but a real team player at the Tropical Aquaculture Laboratory. We wish him the best in his new job.

**Craig Watson**  
813/671-5230



Goldfish tanks at the Mitchell Aquaculture Demonstration Farm.

## Mitchell Aquaculture Demonstration Farm

Blountstown

### Aquaculture: What's It All About?

Beginning aquaculturists won't want to miss our all-day introductory workshop on Saturday, May 15. Sponsored by the Tri-State Aquaculture Committee, this event will cover a variety of topics relevant to aquaculturists from the tri state area including:

- fish species overview,
- production systems and infrastructure,
- marketing,
- economics,
- water quality,
- fish health,
- nutrition and feeding,
- information sources, and
- regulations for Florida, Georgia and Alabama.

Space is limited and registration is on a first-come, first-served basis. Payment must be received no later than April 23, and no registrations will be taken at the door. Call for more information or a registration form.

Lunch and refreshments will be provided. Cost is \$30 per person for the entire event.

**Debbie Britt**  
850-674-3184

# Submitting A Sample for Fish Kill Investigation

R.W. Rottmann, R. Francis-Floyd, P.A. Reed and R. Durborow

***Fish kills occur both in natural population and under aquaculture conditions. When fish kills or disease outbreaks occur on a fish farm or private pond or lake, it is usually an emergency situation. To optimize the response to a fish kill, producers should be prepared in advance.***

## How can I determine if I have a water quality problem?

Poor water quality can cause massive fish kills and is often a major factor contributing to fish disease and parasite infections.

Water quality does not remain constant. In ponds, it can change dramatically over a few hours. Even water from deep wells and springs can change over time.

Commercial fish farmers should not rely on diagnostic laboratory results to identify water quality problems. It's extremely important and cost effective to have a water quality test kit, know how to use it, and be able to interpret the results.

Water quality should be monitored routinely to identify problems before fish kills occur. In addition, any time fish appear stressed or fish mortalities are observed, water quality should be evaluated immediately for temperature, dissolved oxygen, total ammonia, pH, and nitrite. Other tests may be appropriate depending on results of the initial screen.

## What type of sample should be submitted for evaluation?

In most instances **live, sick fish** and a **water sample** are required to have a high probability of determining the cause of a fish kill. An excellent sample would include several (three to six) live fish that exhibit obvious physical signs of diseases such as:

- open sores;
- yellowish or light-colored, slightly eroded areas on the body, fins, gills, or in the mouth;
- swollen, fused, or clubbed gills; or
- eroded or bloody fins.

An excellent sample would also include fish exhibiting abnormal or unusual behavior such as lying listlessly in shallow water or at the water surface or swimming erratically or in circles. Recently dead fish that have gills, eyes, color and mucus that still appear as those of live fish are a fair sample, if live sick fish are unavailable. Dead fish that have floated to the surface of a pond are useless for diagnostic purposes. It's difficult to tell if the bacteria found in the dead fish were responsible for its disease condition.

A water sample without fish is usually of little value in determining the cause of a fish kill. Some-

times, however, toxic fish waste products such as ammonia and nitrite are responsible for the death of the fish. Toxic chemicals entering ponds from outside sources may be the cause of fish mortalities. Therefore, a water sample should be submitted to the diagnostic laboratory along with the fish sample.

Special sampling and handling procedures may need

## How can I be prepared for a fish kill or disease problem?

**To minimize fish losses, the following preparations should be made:**

- ◆ Have a water quality test kit and know how to use it;
- ◆ Know the telephone number and address of the fish disease diagnostic laboratory in your area;
- ◆ Call the laboratory and inquire as to how they prefer samples be shipped, and what days and times samples can be delivered;
- ◆ Know how to collect appropriate samples;
- ◆ Have the type of container(s) needed to ship samples; and
- ◆ Determine the best method of transportation (personal delivery, bus, air freight, overnight express) and schedule that will ensure prompt delivery.

to be taken if a toxic substance is suspected in a fish kill. In many states, very specific instructions must be followed if any legal action is to be taken. Request approved procedures from the diagnostic laboratory in your area (see list on page 8) before collecting samples.

## What is the best method to collect sick fish?

The best method for collecting sick fish is to walk the pond bank with a dip net or cast net and selectively remove fish which are at the surface, at the water's edge, or otherwise appear abnormal.

It may take extra effort to find and catch sick fish in this manner, but the quality of the resulting information will be well worth it. A random sample of fish taken from a seine has a poor probability of identifying the cause of the fish loss, because many of the fish in the pond may be healthy.

The worst way to collect sick fish is by hook and line. Sick fish usually do not eat; the healthiest fish in the pond will still be actively feeding. Therefore, the use of a rod and reel to collect fish will result in a sample of little or no diagnostic value.

## How many fish and how much water should be included in the sample?

Ideally, a minimum of three to six sick fish should be submitted for examination. If only one fish is submitted, it is possible that an inaccurate or incomplete diagnosis will result; one fish is usually not completely representative of a population. Most fish disease outbreaks involve more than one problem. Therefore, a representative sample is essential for good management decisions.

In ponds larger than one surface acre, a minimum of two one-pint water samples should be collected from opposite ends of the pond for analysis. Dissolved oxygen should be checked at the pond bank; this parameter cannot be accurately measured in the laboratory.

**\*Note: Do not combine fish and water in the same container.**

## What containers are best for shipping samples to a diagnostic laboratory?

Ideally, sick fish should be transported live. If the diagnostic lab is within an hour's drive, sick fish can be transported in a container of water.

Sick fish can also be shipped live in a plastic bag with water and oxygen for several hours. The bag is sealed and is placed into an insulated shipping box with ice to keep water temperature cool.

For longer shipping times, sick fish or fish that have just died should be wrapped in a moist paper towel, placed in a plastic bag (without water), and transported on crushed ice in a cooler or styrofoam lined shipping box. A sample handled in this manner should be of diagnostic value for up to 48 hours. Sick or recently dead fish can be frozen and used for bacterial cultures but are of little value for parasite identification on skin, fins, and gills.

Water samples can be collected in any clean glass or plastic jugs or jars. The water sample, of at least a pint in volume, should be transported on ice with the fish sample. As previously mentioned, special instructions must be followed in cases where a toxic substance may be involved.

*(continued on page 8)*

# Calendar of Events

## March 25

### *Annual Hard Clam Meeting*

Holiday Inn West / Gainesville, FL  
The UF/IFAS Aquatic Food Products Laboratory will be hosting this year's meeting. Product quality and quality assurance will be major topics. Marketing ideas will also be discussed. Meeting starts at 10 a.m.  
Leslie Sturmer 352/543-5057

## March 25

### *BMP Subcommittee Meeting — Food Fish*

Center for Aquatic And Invasive Plants; Dept of Fisheries and Aquatic Plants (Conference Room)/ Gainesville, FL  
Best Management Practices for the food fish commodity group will be discussed and considered for inclusion in the permitting and regulatory BMPs that will ultimately be used for the industry. If you can't make the meeting, call with ideas or comments. 10 am - 2 pm  
Andy Lazur 850/674-3184

## March 26

### *BMP Subcommittee Meeting — Bivalves*

DEP Field Station/ Cedar Key, FL  
The development of Best Management Practices for bivalves will be developed for inclusion in the final permitting and regulatory BMPs for the entire bivalve industry. If you can't make the meeting, call with ideas, questions or comments. Feel free to contact me for future meeting dates. Starts at 10 a.m.  
Leslie Sturmer 352/543-5057

## May 13

### *Pond Management Field Day*

Sumner's Ranch/ Lakeland, FL  
Basic pond management field day to highlight pond maintenance, fishery management, aquatic plant management, and water quality — held at a pond site. Program begins at 1:30 p.m. Cost: \$ 5 to cover cost of printed materials and notebook. Pre-registration required. Details and directions to ranch are available. Contact:  
John Brenneman 941/533-0765

## May 15

### *"Aquaculture: What's It All About?"*

UF Mitchell Aquaculture Farm / Blountstown, FL  
This is an introductory workshop that covers a fish species overview, production systems and infrastructure, marketing, economics, water quality, fish health, nutrition and feeding, regulations for Alabama, Georgia and Florida, and information sources.

Advanced registration is required, and the deadline is April 23. Space is limited. Cost is \$30 per person. Lunch and refreshments provided. 9 am - 4 pm.  
Debbie Britt 850/674-3184

## May 17-20

### *Aquatic Weed Control, Aquatic Plant Culture and Revegetation Short Course*

UF/IFAS Research and Education Center  
Ft Lauderdale Marriot North, Ft Lauderdale, FL  
This short course will provide participants with training and advanced research updates in aquatic plant culture and new techniques for aquatic plant propagation; revegetation; aquatic weed and aquatic plant ID and biology; biological weed control techniques, herbicide application and technology; herbicide characteristics and regulatory information.

Continuing Education Units (CEU's) may be earned in such categories as aquatic pest control, right of way, CORE, ornamental and turf.  
Vernon Vandiver, Jr. 954/475-8990

## May 17-28

### *Diseases of Warm Water Fish*

Tropical Aquaculture Laboratory / Ruskin, FL and Whitney Marine Laboratory / St. Augustine, FL  
This is a two week course short course to provide instruction in the diagnosis and treatment of parasitic, bacterial, fungal, viral, nutritional and environmental diseases of warmwater food fish and aquarium species. Recommended for veterinarians, professional biologists, aquarists and aquaculturalists, the class is internationally attended and generally fills quickly.

The first week will be taught at the Tropical Aquaculture Laboratory and the second week will be held at the Whitney Laboratory in St. Augustine.  
Dr. Ruth Francis-Floyd 352/392-9617 ext 229



### *Shrimp Farming Opportunities in Florida — 1999 Workshop Lecture Series*

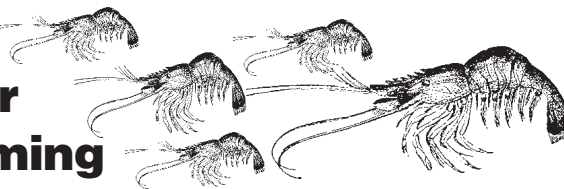
Harbor Branch Oceanographic Institution is presenting four one-day workshops on shrimp aquaculture opportunities for Aquaculture Producers, Agriculture Growers and Ranchers, and Business Entrepreneurs. For the past three years, HBOI has been designing and testing new culture technologies for farming marine shrimp in recirculating systems using freshwater.

Workshops are sponsored by the Florida State Department of Agriculture and Consumer Services. Dates and locations are as follows:

March 5	Fort Pierce, FL
March 20	Ruskin, FL
April 9	Port Charlotte, FL
June 18	Fort Pierce, FL

Registration is limited. Contact  
**HBOI Aquaculture Division**  
5600 U.S. 1 North  
Ft. Pierce, FL 34946  
561/465-2400 ext. 400  
E-mail: aqua@hboi.edu

## Free Water Analysis for Shrimp Farming



Harbor Branch Oceanographic Institution is performing a limited number of water quality analyses, at no cost, to individuals or businesses located in various areas around the state of Florida. The information gathered through this water testing program will determine the suitability of those sites for shrimp culture using freshwater.

Water samples will be analyzed for a series of physical and chemical parameters and will also be used to conduct a bioassay with the Pacific white shrimp, *Penaeus vannamei*, to determine if shrimp survive in the water sample. Water analyses will be completed

for locations around the state to identify the areas that are suitable for shrimp farming.

This work is supported by a grant from the Department of Agriculture and Consumer Services entitled "Farming Marine Shrimp in Freshwater Systems: An Economic Development Strategy for Florida". For more information on water analysis, contact:

**Dr. John Scarpa**  
(561) 465-2400 ext. 404  
E-mail: aqua@hboi.edu



**What information should be provided with the samples?**

The following information should be included with each sample submitted to a fish disease laboratory:

- ◆ Name, address, and phone number of the owner of the fish.
- ◆ Name or designation of pond or tank from which fish were removed (Note: Fish collected from different ponds or tanks should be labeled and shipped in separate containers and accompanied by a water sample from each unit).
- ◆ Dimensions of pond/ tank, including depth.
- ◆ Species, number and average size of fish stocked.
- ◆ Date when fish were last stocked (include number, species, and size stocked).
- ◆ Amount fed per day (Are fish still eating? if not, when did they stop eating?).
- ◆ Date when mortalities were first noticed.
- ◆ Number of fish that have died per day since mortalities were first noticed.
- ◆ The most recent treatment used, including treatment date and amount of chemical used.
- ◆ Condition of the plankton bloom, determined by the maximum depth that a pie plate attached to a yardstick can be seen.
- ◆ Any water quality data collected by the owner.

**What steps can be taken to control losses while awaiting results?**



**Fish Health Diagnostic Laboratories in Florida**

**UF/IFAS Department of Fisheries and Aquatic Sciences**

7922 NW 71st Street  
Gainesville, FL 32653-3071  
Dr. Ruth Francis-Floyd  
352/392-9617 ext 229

**Tropical Aquaculture Laboratory**

1408 24th Street SE  
Ruskin, FL 33570  
Dr. Roy Yanong  
813/671-5230

**Sam Mitchell Aquaculture Farm**

Route 2 Box 754  
Blountstown, FL 32424  
Debbie Britt  
850/674-3184

Individual laboratories vary in the time period required to process the sample and communicate

the results to the producers. In most cases, water quality data and results of the necropsy and parasitology examination should be available within 24 hours of receipt of the fish.

Depending on circumstances and the degree of fish loss, a preliminary assessment may be made at that time.

Microbiology (bacterial isolation and sensitivity), virology (identification of virus), and histopathology (microscopic examination of specially prepared tissues) take more time. Bacterial isolation and sensitivity are usually complete within 48 to 96 hours, but virology and histopathology may take one to two weeks for completion.

The best approach is to improve water quality while waiting for diagnostic results. Increased aeration and a fresh water flush can help alleviate many problems.

**Conclusions**

Fish kills occur both in natural populations and under aquaculture conditions. In aquaculture facilities, good management and nutrition practices, however, can help prevent fish kills. When fish kills do occur on a fish farm or private pond or lake, it is usually an emergency situation.

To optimize the response to a fish kill, producers must be prepared to check water quality parameters, obtain a proper fish and water sample, and transport them as quickly as possible to a diagnostic laboratory. While waiting for diagnostic results, the best approach is to improve water quality.

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Department of Fisheries and Aquatic Sciences

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