



Fish Culture Section *of the* *American Fisheries Society*

NEWSLETTER

October 2004

Fall 2004

Table of Contents

President's Message	1
The Department of Fisheries and Allied Aquacultures Auburn University	2
Student Travel Awards	4
Willow Beach National Fish Hatchery	5
Showcase of University Aquaculture Programs and State and Federal Fish Hatcheries	7
Ocean research center has another USD 5 million in damage	8
Storm damages shock local shellfish industry	9
Oxymarine Approved For All Finfish	10
Fish expert dies at age 75	10
The Need for a Zero Withdrawal Fish Anesthetic	11

President's Message **By Anita M. Kelly**

At the AFS annual meeting, our by-laws were finally approved. I wish to thank Bill Shelton for his efforts on getting them up to date. I would also like to note that the two symposia sponsored by the Fish Culture Section were well received and that we look forward to future successes. In order for us to become more visible, I invite anyone to come forward with an idea for a symposium. We also are seeking volunteers to organize and moderate these sessions. The amount of time necessary is usually minimal and the outcome is rewarding. Not only will you have done something to support your section, you will also meet new people and be exposed to new ideas and different points of view. On that note the section will be hosting at least one symposium at the annual meeting to be held in Anchorage, Alaska based on a hot topic. If you have ideas or want to participate, please let me know. We are also currently planning a symposium for the Southeastern Division meeting to be held in February in Virginia Beach. The topic of the symposium is the Asian Carp. We plan on having persons who have scientific data from both sides of the issue present and then have a round table discussion following. If you have published on this issue and are looking for a forum in which to present, I ask that you contact Pat Mazik pmazik@wvu.edu or myself akelly@siu.edu.

The mid-year meeting of the FCS will be held in New Orleans in conjunction with the annual meeting of United States Aquaculture Society. So if you are planning on attending the meeting, please plan on attending the business meeting.

I am once again making the plea for anyone having a student that is graduating to send the newsletter editor or myself a copy of the abstract from his or her thesis or dissertation. We want to publish them in the newsletter to let our members know the types of research being conducted and to get the student more visibility.

The Department of Fisheries and Allied Aquacultures Auburn University

By David B. Rouse

History

Fisheries work at Auburn began in 1933 when Dr. H. S. Swingle prepared the first research project proposal on pond management. Findings of these early experiments provided methods for pond construction and management of sport fishing and aquatic weed control. Results of this early research gave rise to the construction and stocking of thousands of farm ponds throughout the United States. Driven by a desire to increase fish production beyond that obtainable from fertilization alone, Auburn researchers began to experiment on commercial fish production in 1941. Teaching of formal fisheries courses began in 1946. The first M.S. degree in fisheries was awarded in 1948 and the first Ph.D. in 1953.

Facilities

Today the Department of Fisheries and Allied Aquacultures has a broad, comprehensive program in aquaculture, fisheries and aquatic resource management. The Department has 23 faculty plus support staff. The program includes faculty with appointments in research, teaching, and extension. Main campus facilities include office space for faculty and staff, classrooms, and laboratories for fish ecology, nutrition, health, and water quality.

Freshwater research facilities are located four miles north of campus. These facilities include over 1700 acres of forested watershed with 320 acres of ponds and small reservoirs. Ten miles south of campus is another 54-acre research facility with ponds and wet labs. Combined, these facilities provide 344 ponds which range in size from 0.05 acre to 26 acres.



A state-of-the-art genetics research laboratory and greenhouse complex, a fish hatchery, market research building, and laboratories for fish nutrition, fish health and fisheries management are located at the North Auburn Fisheries research unit.



Marine research facilities are located four hours south of campus on the Gulf of Mexico. These facilities include a new shellfish laboratory and office complex on Dauphin Island. Through arrangements with the Alabama Department of Conservation, faculty and students from the Department can also conduct research at the Claude Petet Mariculture Center in Gulf Shores, Alabama. The Mariculture Center has 35, 0.25-acre ponds, a hatchery and four greenhouses with a variety of tanks that are used to conduct research on marine fish and shrimp. Marine



research and extension faculty are located in offices in Mobile and Fairhope, Alabama.

Instructional Programs

The Department offers excellent educational opportunities through its degree programs. A degree in fisheries science is offered at the undergraduate level with four areas of specialization, aquaculture, fisheries management, aquatic resource management, and fisheries pre-professional (pre-veterinary medicine). Graduate degrees include the Master of Science (thesis), Master of Aquaculture (non-thesis), and Doctorate of Philosophy. Departmental faculty teach over 30 courses in freshwater and marine fisheries management, aquaculture production, hatchery management, water quality, nutrition, physiology, aquatic animal health, molecular genetics, and fish breeding.

Over 1400 degrees have been awarded since the teaching program began in 1946. Currently the department has 40 undergraduate students and 70 graduate students.

Associated Programs

The Department has two fisheries Extension Specialists located on main campus, two marine specialists located in the coastal areas and three Area Specialists located off campus in fish farming areas. The Department also has a Fish Farming Center located in west Alabama with a fish health specialist and an Area Extension Specialist.

The International Center for Aquaculture, now the International Center for Aquaculture and Aquatic Environments (ICAAE) was formally established within the department in 1970. Since its beginning, faculty and staff have provided technical assistance for aquaculture and aquatic resource management in over 100 countries providing more than 150 person-years of effort. The ICAAE coordinates global research projects and partnerships with groups in the private sector, and collaborates with governmental agencies, educational institutions and humanitarian organizations.

Several associated programs expand the

research and teaching activities for the department. These programs include the Alabama Cooperative Fish and Wildlife Research Unit, a division of the U.S. Geological Survey, and the Aquatic Animal Health Research, a division of the U.S. Department of Agriculture, Agricultural Research Service. Scientists with both federal agencies collaborate with departmental faculty and offer research opportunities for graduate students. Auburn University is also a Sea Grant University and Alabama Sea Grant activities are administered through the Department.

Current Faculty and Key Staff

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The Fisheries faculty and staff at Auburn University are active in all areas of warm-water aquaculture, fisheries management and aquatic resource management. The department offers a comprehensive program in instruction, research and outreach. For more information visit our website at:

<http://www.ag.auburn.edu/dept/faa>

or write to:

Department of Fisheries and Allied Aquacultures
Auburn University
Auburn, Alabama 36849
(334) 844-4786

Student Travel Awards Offered by Fish Culture Section

The Fish Culture Section of the American Fisheries Society is pleased to announce the availability of two student travel awards to help cover the expenses of attending the AFS meeting in Anchorage, Alaska, in September 2005. Each award will be for \$250. To qualify, the individual must: 1) be a student member in good standing with both AFS and the Fish Culture Section at the time of their abstract submission to the contest and at the time of the meeting, 2) have an abstract submitted and accepted for the meeting, and 3) attend and present (oral or poster) at the meeting. The abstracts will be judged by a panel of the Fish Culture Section members. Please submit three copies of your submitted abstract by **April 1, 2005**, to:

Dr. Sue Kohler, Associate Director
Dunn-Richmond Economic Development Center
Southern Illinois University
Carbondale, IL 62901-6891

Decisions will be made by June 1, 2005.
E-mail submissions WILL NOT be accepted.

Willow Beach National Fish Hatchery

By Chester R. Figiel, Jr.

History and Background

The U.S. Fish and Wildlife Service (Service) Fisheries Program embraces a balanced approach toward aquatic resource stewardship that recognizes the need to conserve and manage self-sustaining populations, and at the same time, provides quality opportunities for responsible fishing. The Willow Beach National Fish Hatchery actively carried out these resource priorities and mandated Federal Indian Trust responsibilities by producing rainbow trout for recreational fishing and economic development, and by developing culture protocols for the rearing of endangered razorback suckers and bonytail chub. In 1962 the hatchery began producing rainbow trout (*Oncorhynchus mykiss*) for distribution in the lower Colorado River basin and as mitigation for changes to the Colorado River with the impounding of Lakes Mead (created by Hoover Dam - 1934) and Mohave (created by Davis Dam - 1952). In the 1960s and early 1970s, up to 700,000 (90,000 kg) rainbow trout were stocked annually by the Willow Beach NFH and the Nevada Department of Wildlife into Lake Mohave. These fish provided a trophy-class, put-grow-and-take tailwater fishery below Hoover and Davis dams. However, little remains of those tailwaters trout fisheries because of striped bass predation and a decreased forage base. Currently, the Willow Beach NFH distributes 66,000 kg (200 mm - 350 mm fish) of trout annually to fishery management areas along the lower Colorado River including upper Lake Mohave, the tailwaters below Davis dam, the Colorado River Indian Tribes Reservation, Fort Yuma Indian Reservation, and the Hualapai Indian Reservation. Stocked trout support angler-oriented recreation for the approximately five million people that live within a 300-km radius of Willow Beach. In 1973, the Endangered Species Act directed the Service to work for the recovery of listed species through Federal actions. As a result, the hatchery modified existing facilities to rear threatened and endangered fishes. In the early 1980's, changes to existing trout raceways included connecting two

raceways together to allow water to recirculate between the two. Water was pumped to the upper end from the adjacent raceway, flowed to the lower end, and returned by gravity. A liquid propane gas heater warmed water to obtain the appropriate spawning and rearing temperatures for native endangered fishes. In addition, boulders and cobble were added to raceways to create artificial spawning areas for humpback chub *Gila cypha* and bonytail *Gila elegans*. Since that time, the hatchery has retained at least one of four endangered Colorado River fishes on station. Currently the razorback sucker *Xyrauchen texanus*, bonytail, and humpback chub are on station. In the wild these species survive as adults but have little or no successful recruitment to maturity. For the razorback sucker, a multi-agency effort captures up to 100,000 larval razorbacks annually from spawning sites and are brought to the hatchery in an effort to retain genetic diversity in this population. These fish are grown in solar-heated water recirculating systems to 325 mm, PIT-tagged, and release back into the river. Bonytail, which are also reared in these recirculating systems, are grown to 250 mm before their release into the River. Additionally, Service personnel spawn adult razorbacks and bonytail, and produce up to 300,000 larvae for distribution to other areas of the Colorado River system. Warmwater fish culture techniques have been developed at the hatchery over the last ten years for spawning, rearing and production of these species. Following are the modifications made to the hatchery and outside raceways to accomplish this mission.





Hatchery Building

Water for native fish production is pumped from the river (12 - 14°C) into four connected concrete tanks creating an 8000-L capacity reservoir. A submersible pump (95 L/min. ½ hp) lifts water to solar collectors on the roof of the building where water is heated and returned to the reservoir. Two electrical portable heaters maintain temperature in the reservoir at night.

Another submersible pump (95 L/min. ½ hp) supplies this warmer water to an array of eighty-five 35-L aquaria used for egg hatching and larval growth.

One 3-cm hole is drilled in each aquarium (3 cm from the top) and bulkhead fittings are attached allowing water to flow out of the aquaria back to the river. Similarly, water flows from the reservoir through 200-L fiberglass tanks for the rearing of larger larvae. As fish grow, they are placed into four recirculating systems (4000-L each) which allows the conservation of warm water from the reservoir and provides space for fish to grow. These systems were modified from existing trout flow-through raceways (6 m x 0.75 m x 0.75 m deep) by cutting a slot (50 cm x 30 cm) in the concrete at the top of two parallel raceways at the head end to permit water flow between the two. At the tail end, a submersible pump (225 L/min. ½ hp) lifts water from one raceway to the other. Excess water flows out through standpipes and system turnover rates vary based on water inflow (generally 3 to 4 days). Biological filter material (1.75 m³) is placed in one raceway and used to provide a substrate for the bacteria that reduce ammonia to nitrates and nitrites. Water flow rates to the solar panels, aquaria, tanks, and recirculating systems are controlled using timers and pumps. In-line ultra-violet sterilizers (120 or 240 watts) are used for parasite control. A regenerative blower (½ hp)

provides air via PVC, tubing, and air stones to all aquaria, tanks, recirculating systems and biofiltration material. Well water (~18°C) has been plumbed into the hatchery building and can be provided to all aquaria, tanks and systems and in conjunction with solar panels for water temperature control. Larval fish rearing procedures are labor intensive and require siphoning excess feed and waste from the bottom of tanks. The hatchery has 850 square feet of laboratory space dedicated to studies on tagging methodology, feed, and growth of endangered fish.



Outside Raceways

Water for rearing rainbow trout is pumped from the river to the head boxes of the first ten of forty raceways. It then gravity feeds through the rest and discharges back into the river. Twelve of these raceways (2.4 m wide x 30.5 long x 1.2 m-deep) have been modified to grow endangered warm water fish. The systems were isolated from the gravity feed system by adding concrete to the head and tail ends of two parallel raceways to prevent river water from entering recirculating systems (raised ~ 3/4 m). A 3/4 hp pump (112 L/min.) transports water from the head box to a diatomaceous earth filter and an in-line ultra-violet sterilizer (120 watt) and then to solar panels (223 m²) placed atop the raceway sun canopy where water is heated before flowing to the raceways. Slots were cut between these two raceways at the tail end (0.5 m from the tail box) to allow water to flow freely between the two. Water is circulated between the two raceways via a 1 hp pump placed at the head end (0.25 m from the head box). Water height is

maintained by standpipes and water turnover rate is 3 to 4 days depending on temperature and water quality. Plastic biological filter material (72 m³) is placed in one section of a raceway and used for substrate by bacteria which reduces ammonia to nitrates and nitrites. Solar blankets (i.e., swimming pool covers) are placed on the filter side to prevent heat loss and algae growth. Water flow rates to the solar panels are controlled using timers. A regenerative blower (½ h.p.) provides air via PVC, tubing, and air stones to water and biofiltration material. Well water (~18°C) is used in conjunction with solar panels to regulate water temperature. Further, well water is currently being used in single-use flow-through raceways in winter months to provide additional space for fish growth.

Personnel

Dr. Chester R. Figiel, Jr. is the Project Leader at the hatchery. He works closely with partners and scientists from Federal, State, and tribal agencies to ensure that species recovery goals are met. He has a diverse background in aquatic ecology and population biology and his interests include reproductive biology and fish physiology.

John R. Scott, Assistant Project Leader, has worked with eight species of salmonids including Bull Trout, Steelhead Trout, Kokanee Salmon, and Chinook Salmon. He has worked on natural rearing methods, mass marking techniques, and spawning protocols for fish reared in earthen ponds, raceways, and recirculating systems.

Gene J. “Geno” Sprofera, Fishery Biologist, has experience that includes both wild fish health and hatchery fish health surveys. His fish culture background encompasses salmonids and his interests include water recirculating systems, water quality, and methods for improving survival of stocked fish.

The hatchery is committed to strengthening production and management strategies and acknowledges that sound science and solid partnerships are keys to our success. Our efforts complement others in the fisheries conservation community and produce significant economic and social benefits. We recognize that native endangered

fish and recreational fish are important to American communities which rely upon healthy, sustainable natural resources to meet subsistence, economic, ceremonial, religious, and medicinal needs. For more information on the Willow Beach National Fish Hatchery visit our website at:

<http://fisheries.fws.gov/>

Willow Beach National Fish Hatchery
HC 37 Box 17
Willow Beach, Arizona 86445
928-767-3456

Showcase of University Aquaculture Programs and State and Federal Fish Hatcheries

Future FCS newsletters will continue to showcase university aquaculture programs and state and federal fish hatcheries. The newsletter editors will be soliciting contributions from individuals at universities and hatcheries to write articles summarizing various aspects of their programs.

If you would like to volunteer to submit an article for your university aquaculture program or state or federal fish hatchery please contact the newsletter editors.

Newsletter Editors:
Cortney Ohs at cohs@siu.edu
Craig Kasper at ckasper@siu.edu

The new FCS website is located at:
<http://ws3.coopfish.siu.edu/fcs>

Newsworthy to Fish Culturists



Ocean research center has another USD 5 million in damage

Source: Fort Pierce Tribune (<http://www.sun-sentinel.com/>)

Fort Pierce, Florida, 30 September 2004 - Hurricane Jeanne added about USD 5 million to the USD 30 million in damage and lost revenue to that which Harbor Branch Oceanographic Institute sustained in Hurricane Frances.

Shirley Pomponi, acting managing director of the research center, said Wednesday that because the post-Frances reconstruction got under way quickly, Harbor Branch was able to "hit the ground running" after Hurricane Jeanne. "We were fortunate that a contractor and his equipment was here," Pomponi said. Insurance, she said, will not cover USD 15 million to USD 20 million of the USD 35 million in damages. "Obviously, we'll be seeking support from the state, from [the Federal Emergency Management Agency] and from private donations," she added.

The Harbor Branch campus, which was still without electricity Wednesday morning, is closed this week to all but employees directly involved in cleanup and repairs. Pomponi said most of the institution's programs should be up and running in two to three weeks. The most significant damage from Jeanne was to the administration building, which houses laboratories used in the drug discovery program.

Equipment throughout the labs had been sheathed in plastic before the storm and should be OK, said Mark Shrope, the institution's public information officer. "Some of that stuff is pretty delicate," Shrope said, "so we can't say that it won't be affected by the moisture, but so far we haven't found any major equipment that's been messed up."

More dramatic damage was done to the J. Seward Johnson Education Center, where what was a glassed-in atrium before Frances is now an open-air lobby. Wind from Jeanne also tore a huge replica of a great white shark off the wall, its toothy head landing on the sidewalk leading to the building to greet visitors. Pomponi expects the education center, which contains classrooms and the Harbor Branch associates program, to reopen by January.

The institution's aquaculture programs that produce fish for food and aquarium pets lost about half their fish in Frances, Pomponi said, but there were no further losses in Jeanne. And on Wednesday the Marine Mammal Research and Conservation Division resumed its dolphin photo-identification program on the Indian River Lagoon. "It's important that they be able to document changes in the [lagoon] because of the hurricanes and the effect those changes will have on marine mammals," Pomponi said.

Also, both of the institution's ocean-going ships, the J. Seward Johnson and the J. Seward Johnson II, were out to sea when Jeanne hit and were undamaged.

"The silver lining here," Pomponi said, "is that we now have an opportunity to streamline our operation, to reconfigure the spaces we have into the spaces we need. We've been putting Band-Aids on our growth problems, but now we may end up with a much better and a much more efficient use of space."

A hurricane relief fund has been established to accept donor gifts. For information, call 772-465-2400, ext. 204, or go to <http://www.hboi.edu/Frances> once power is restored and Harbor Branch Web sites are up.

Storm damages shock local shellfish industry

Source or related URL: <http://www.tcpalm.com>

By Ed Bierschenk

The area's shellfish industry may be permanently crippled as a result of Hurricane Frances and the large influx of freshwater it put into the Indian River Lagoon. "The shellfish industry is gone, not there, wiped out," said Charles Sembler III, of Sembler & Sembler Inc., of Sebastian.

The Florida Department of Agriculture estimated Frances and Hurricane Charley caused \$8.7 million in crop losses for clam and oyster farmers, with \$7.2 million of that caused by Frances. The state's shellfish industry is primarily comprised of clam farmers. This number does not include infrastructure losses, such as buildings, docks, vessels, and nursery and hatchery facilities.

The industry is concentrated in three regions, according to Mark Berrigan, bureau chief in the agriculture department's aquaculture division. These include the north Indian River and South Brevard area; the Port Charlotte region, and the Cedar Key region. All three of these areas sustained serious damage as the result of the two hurricanes hitting the state.

A 2001 Florida Sea Grant study out of the University of Florida estimated the clam industry had an annual economic impact of \$34 million. In 2003, there was an estimated 200 clam farmers statewide. The state's shellfish industry is primarily comprised of clam farmers. Losses for other commercial fisheries were still being assessed, but preliminary estimates were that losses to shrimp, lobster and other commercial fishermen would exceed \$2 million. In addition to the freshwater brought into the system by Frances, the St. Johns River Water Management District began releasing freshwater out of the C-54 canal into the Sebastian River and thereby into the Indian River Lagoon on Friday evening, according to district spokesman Ed Garland.

The agency expected to continue the release for the next few days and by Monday, tens of millions of gallons of fresh water had been pumped out of the canal. The influx of freshwater from the hurricane and the canal has a detrimental impact on the environment of the lagoon, which is a mix of salt and fresh water. The district tries to avoid releases out of the canal for this reason and Garland said Friday's was the first significant one since Hurricane Irene hit the state in 1999.

Garland said the district is federally required to make releases when water in 6,500-acre Stick Marsh in northwestern Indian River County, reaches a certain level. By Friday, the water was about a half of foot above that level. Water was flowing into the Stick Marsh this weekend at a rate of 1,800 cubic feet a second and leaving the marsh only at a rate of about 600 cubic feet a second, according to Garland. The Stick Marsh, St. Sebastian River State Buffer Preserve, and other district lands remained closed as of Monday.

Garland said officials with the shellfish industry were notified of the release from the canal. According to Garland, he said representatives of the shellfish industry said they were so heavily impacted by Hurricane Frances that the additional fresh-water releases by the district would not effect them.

Sembler said the release only exacerbates the problem for the industry, which was already being adversely impacted by free trade policies prior to the hurricane. "This was just the final nail in the coffin. I think you will see people bailing out in droves," he said of the shellfish industry.

Berrigan said he believed this sentiment was common among people in the industry. "A lot of them are not going to go back and start over," he said.

Oxymarine Approved For All Finfish

Source: Aquacontacts Mail Group News

SUMMARY: The Food and Drug Administration (FDA) amended the animal drug regulations (i.e., Code of Federal Regulations) on January 30, 2004 to reflect the approval of a supplemental new animal drug application (NADA # 130-435) filed by Alpharma, Inc. (One Executive Drive, PO Box 1399, Fort Lee, New Jersey 07024). The supplemental NADA was approved December 24, 2003. The supplement provides for use of OXYMarine (oxytetracycline hydrochloride soluble powder) for skeletal marking of finfish fry and fingerlings by immersion.

Conditions for use in finfish:

- (1) Amount. Immerse fish in a solution containing 200 to 700 mg oxytetracycline hydrochloride (buffered) per liter of water for 2 to 6 hours.
- (2) Indications for use. For skeletal marking of finfish fry and fingerlings.

Tolerances for residues of new animal drugs in food (Part 556.500):

- (1) Acceptable daily intake (ADI). The ADI for total tetracycline residues (chlortetracycline, oxytetracycline, and tetracycline) is 25 micrograms per kilogram of body weight per day.
- (2) Tolerances. A tolerance for the sum of residues of the tetracyclines including chlortetracycline, oxytetracycline, and tetracycline, in tissues for finfish and lobster is 2 parts per million (ppm) in muscle.

U.S. Food and Drug Administration. 2004. Certain other dosage form new animal drugs; oxytetracycline. Code of Federal Regulations, 21 CFR Part 529.1660 and Part 556.500, February 11, 2004.

Fish expert dies at age 75

Source: Corvallis Gazette - Times
World News 09/04/2004

John Fryer, a distinguished professor emeritus of microbiology at Oregon State University and one of the world's pioneers in diseases of salmon and other fish, died Tuesday. He was 75.

Fryer earned his doctorate from OSU in 1964, was on the OSU faculty for more than 40 years, and served a long tenure as chair of its department of microbiology. He was widely recognized at the university and internationally for his work on the infectious diseases of fish, especially salmon in the Northwest. His research helped train generations of students. He isolated viruses that were serious threats to salmon health, developed vaccines, improved salmon aquaculture and characterized important disease-causing organisms.

"John Fryer was the father of the modern science of infectious diseases of salmon, he built the foundation for much of what we know today in this field," said Ron Hedrick, who earned his doctorate under Fryer 25 years ago and now serves as a professor in the department of medicine and epidemiology at the University of California, Davis. "We just called him Doc," Hedrick said. "But he was the one that brought the knowledge and advances in microbiology to bear on infectious disease

problems in salmon and other fish, and in so doing trained many people throughout the world who are now considered leaders in this field."

In 1994, Fryer was instrumental in creating the Center for Fish Disease Research at OSU, a \$1.5 million, 9,300-square-foot facility focused on the study of diseases of young salmon. Fryer served as its first director, and the center has helped train many of the nation's professional fish health researchers, identified the causes of many diseases and developed vaccines. Its work has been expanded to include wild marine fish, ornamental species and fish used as research models.

When he was honored in 2002 by the American Fisheries Society, officials noted that his work had "achieved international acclaim ... and spanned the disciplines of virology, parasitology, bacteriology, cell biology, immunology and fish physiology, resulting in more than 200 publications, two patents and recognition as one of the world's leading centers for research on infectious diseases of salmonid fish."

As an educator, Fryer's courses were taken by thousands of undergraduate students and more than 50 master's and doctoral students. He received the F.A. Gilfillan Memorial Award for Distinguished Scholarship in Science from the OSU College of Science, the Carter Award for outstanding teaching, and other international career awards and honors. In 1991 he earned the prestigious Alexander von Humboldt Award. His research took him to Chile, Japan, Korea, Spain, Taiwan, Thailand, Great Britain, Canada and many other nations. When he "officially" retired in the 1990s — aside from the fact his research programs continued in full swing — colleagues from all over the world flew to Corvallis to honor him.

The Need for a Zero Withdrawal Fish Anesthetic

Source: Aquacontacts Mail Group News

November 5, 2004

Many agencies, organizations, and companies have identified the need for an anesthetic that allows for immediate release of treated fish (i.e., a zero withdrawal time anesthetic). Such an anesthetic would benefit numerous management, cultural, and research activities including rested harvest, spawning of wild populations, marking captured and cultured fish, and population assessments. This fact sheet provides information on what is and is not allowed regarding certain aquaculture anesthetics, and what can be done to help gain the approval for a zero withdrawal time anesthetic.

WHAT YOU CANNOT DO

- Use clove oil under any circumstance. See Guidance Document # 150 for details (<http://www.fda.gov/cvm/guidance/guide150.pdf>). Contact Fran Pell at the Center for Veterinary Medicine (CVM) for direct information (phone: 301-827-0188; E-mail: frances.pell@FDA.hhs.gov).
- Use MS-222 for immediate slaughter of market-sized fish or release of treated fish that can be legally harvested for food. MS-222 is approved as a fish anesthetic (tricaine methanesulfonate=Finquel® or Tricaine-S®) but use of MS-222 requires a 21-day withdrawal period before fish can be slaughtered for food or harvestable fish can be released or stocked.

- Use AQUI-S® **without** an Investigational New Animal Drug (INAD) exemption for use in any management, aquaculture, or research activity. The U. S. Fish and Wildlife Service’s Aquatic Animal Drug Approval Partnership Program (AADAPP) holds an INAD for AQUI-S® that has a temporary 21-day withdrawal period. Contact David Erdahl for participation details (phone: 406-587-9265, extension 125; E-mail: Dave_Erdahl@fws.gov).

WHAT YOU CAN DO

- Use MS-222 on fish that are held for 21 days or for immediate release of treated fish that are of sublegal size (i.e., sizes of fish that are not utilized for food). Fish treated with MS-222 cannot be available for human consumption for 21 days after treatment. See Table 1 below for examples from the MS-222 product insert.

Table 1. MS-222 Product Insert: Sublegal sizes of fish species not used as food immediately after anesthesia

Species	Size (in.)	Species	Size (in.)
Pink salmon	6	Splake trout	6
Chum salmon	6	Grayling	6
Coho salmon	6	Northern pike	12
Sockeye salmon	6	Muskellunge	12
Chinook salmon	6	Channel catfish	6
Cutthroat trout	6	Flathead catfish	6
Steelhead trout	6	Bluegill	3
Rainbow trout	6	Redear sunfish	3
Atlantic salmon	10	Smallmouth bass	5
Brown trout	6	Largemouth bass	5
Brook trout	6	Walleye	6
Lake trout	5		

States and other agencies can also establish certain fishing regulations that classify specific species or sizes of fish as “Not Legally Catchable” (i.e., harvestable). An example of this kind of regulation would be largemouth bass ≤ 16 inches are not catchable but those >16 inches are catchable and can be kept for food. Check with the agency with fishing regulation authority for details. Obviously, fry and certain life-stage fingerlings of food fish, threatened or endangered species, or certain broodfish would fall in the category of as “Not Legally Catchable”. See Program Policy and Procedures Manual # 1240.4260 for details on the classification of food and nonfood fish species (http://www.fda.gov/cvm/index/policy_proced/4260.pdf).

- Use AQUI-S® under an INAD on fish that are held for 21 days or for immediate release of treated fish that are of sublegal size (see Table 1 above for examples from the MS-222 product insert). The same regulations as stated above for MS-222 apply to AQUI-S®.
- Use sodium bicarbonate or carbon dioxide gas for immediate release of treated fish. See Program Policy and Procedures Manual # 1240.4200, Part B (http://www.fda.gov/cvm/index/policy_proced/4200.pdf) for information on the use of these drugs through “Regulatory Discretion” by CVM under the category of “Low Regulatory

Priority Aquaculture Drugs”. Although available for use, these unapproved drugs (1) are still unapproved drugs, (2) do not have formulations that are properly manufactured for this use, (3) produce inconsistent results, (4) are difficult to use, (5) are easily toxic to fish, (6) have no drug company sponsors, and (7) have no investigations ongoing that would help them gain approvals.

WHY YOU SHOULD SUPPORT THE APPROVAL OF AQUI-S® AND ITS USE UNDER AN INAD

- Only candidate zero withdrawal time anesthetic that is currently being pursued for approval by the Federal-State Aquaculture Drug Approval Partnership Project under the International Association of Fish and Wildlife Agencies
- Immediate funding available to Federal research partners to generate all the data needed for a label claim for short-exposure handling on all salmonids
- Active drug company sponsor who is funding some of the data generation
- Product formulation that will meet CVM requirements for Good Manufacturing Practices
- Preliminary results from generated data indicating that the drug is safe to fish, humans, and the environment
- Effectiveness proven through controlled clinical studies and accepted by CVM
- Additional efficacy and safety data generated under an INAD under “field conditions” needed to support broad label claims (e.g., “all coolwater fish” and “all warmwater fish”)

WHAT YOU CAN DO TO HELP AQUI-S® GAIN BROAD APPROVALS

- Encourage all agencies, organizations, and universities to support the approval of AQUI-S® and to use only those drugs currently allowed under “Regulatory Discretion”, INAD exemption (i.e., AQUI-S®) or approval (i.e., MS-222). Contact Rosalie (Roz) Schnick, National Coordinator for Aquaculture New Animal Drug Applications for details on what you can do (phone: 608-781-2205; E-mail: RozSchnick@centurytel.net).
- Support immediate funding of AQUI-S® to generate the data needed for label claims for short-exposure handling on all coolwater and warmwater fish. Short-exposure handling includes such activities as artificial spawning and marking. [Note: Studies needed to gain approval of AQUI-S® for short-exposure handling on all salmonids are funded and currently underway.] Contact Rosalie (Roz) Schnick, National Coordinator for Aquaculture New Animal Drug Applications for details on what you can do (phone: 608-781-2205; E-mail: RozSchnick@centurytel.net).
- Assist in determining if a zero withdrawal label claim for use of AQUI-S® for fish transport is important to your agency, organization, or company by completing a survey to be issued in the near future. Contact Rosalie (Roz) Schnick, National Coordinator for Aquaculture New Animal Drug Applications for details (phone: 608-781-2205; E-mail: RozSchnick@centurytel.net).

PCB Levels in Wild and Farmed Salmon Essentially the Same

Source: Aquacontacts Mail Group News

New Jersey, 3 November 2004

New information on PCB levels in wild and farmed salmon was recently reported by the Alaska Department of Environmental Conservation (ADEC) and Salmon of the Americas (SOTA). This data show farmed and wild salmon to be essentially the same with regard to PCB levels and both are a small fraction of the FDA tolerance.

This is especially important news in light of the stream of news about mercury which is a problem in some fish, but not in salmon. Consumers are confused about this issue.

The continuing good news about the role of omega-3 fatty acids which are found in salmon underscores the need to inform consumers about the need to include salmon in their diet without fear of contaminant issues.

SOTA has developed a new fact sheet which answers some commonly asked questions about these studies:

1. What are the most recent tests and when were they done?

Testing of wild salmon was conducted by the Alaska Department of Environmental Conservation (ADEC). These salmon were caught in 2002 and the study was published in 2004.

Farmed salmon were collected and tested in 2004. Salmon of the Americas (SOTA) paid for the testing, which was conducted by an independent, non-profit laboratory, Southwest Research Institute (SWRI www.swri.org) and verified by Cantox Environmental (www.cantoxenvironmental.com).

The procedures and testing methodology for the two studies are available in the ADEC report available online at www.salmonoftheamericas.com/adece_report.pdf and on the SOTA website at www.salmonoftheamericas.com/pcb_testing.html.

2. How comprehensive was the testing?

ADEC sampled 41 fish from multiple locations in the Gulf of Alaska and the Bering Sea.

SOTA sampled 90 fish from locations in Chile, and east and west Canada. This represents sampling of fish from locations that account for 95 percent of the farmed salmon sold in the United States and Canada.

3. Is this testing more accurate than that previously done?

The last large scale study to sample farmed and wild salmon for PCBs was published in January 2004 in Science by Hites, et al. A review of the various testing methods used by Hites, ADEC and SWRI reveals almost identical procedures. In fact, the SWRI results were verified at the same laboratory that did the Hites analysis.

4. If the testing methods are identical, why are the results different and which ones are correct?

From the standpoint of PCB levels in the fish sampled, all studies are correct. The main difference is that the wild and farmed salmon sampled in the Hites study and in the ADEC/SOTA studies are different.

Wild-Hites included species of wild salmon not found on sale as fresh salmon in his sampling. This distorted the average for wild salmon. The ADEC study separates sockeye and Chinook salmon; the principal species sold as fresh, and is representative of what consumers buy in stores.

The ADEC study results are more in line with results from other independent studies of wild salmon.

Farmed-The fish tested in the Hites study were collected almost two years before the actual publication of the study and about 30 months before the fish tested by SWRI in the current farmed salmon testing.

Salmon farming is a dynamic operation, especially with regard to feeding practices. During the time between the collection of the fish and the publication of the Hites study, significant changes in PCB levels had already occurred.

This was demonstrated by farmed salmon's declining PCB levels in FDA market basket studies during the two years preceding the publication of the Hites study, a point unfortunately lost as the Hites report was publicized. The SWRI tests just completed show further declines, as expected.

5. What is the significance to consumers?

Fresh and frozen wild and farmed salmon contain essentially the same amount of PCBs. The levels in both are about 1/200 of the FDA tolerance and, as stated by the leading public health organizations in the U.S., Canada and Europe, pose no risk to consumers.

For a good explanation of why the levels currently found in wild or farmed salmon should not be used to limit consumption to any specific level see pages 14 and 15 of the ADEC report, an analysis supported by public health and medical professionals in the U.S., Canada and Europe.

The practical significance is that consumers can feel free to choose the type of salmon-wild or farmed-based on other points of preference and concentrate on the significant benefits of the vital omega-3 fatty acids in these fish.

6. What are the differences in the PCB congeners reported in the ADEC study and the Hites and SWRI analyses?

The Hites and SWRI analyses were done for all 209 congeners (types) of PCBs that exist. The ADEC study tested for 44 of the congeners that are of most interest in food safety issues, and which also represent most of the PCB content.

Since the SWRI analysis of farmed salmon reveals the level for each congener, it is possible to adjust the SWRI analysis of 209 congeners to the ADEC level for 44.

In farmed the level is 11.5 ppb for the 44 congeners. This compares with 8.2 ppb for wild Chinook and 10.0 for wild sockeye salmon, using 44 congeners. For reference, the level for all 209 congeners in farmed salmon is 13.8 ppb. This is about one-third the level reported by Hites.

The supporting information on the analysis for the Hites study is unavailable so the comparison to the same 44 congeners in their study cannot be made.

Interesting Websites

Aquatic Animal Drug Approval Partnership Program <http://fisheries.fws.gov/aadap/>

The Aquatic Animal Drug Approval Partnership (AADAP) Program is a broad, partnership-based program of national scope located in Bozeman, MT. The mission of the AADAP Program is: “Working with our partners to conserve, protect, and enhance the Nation’s fishery resources by coordinating activities to obtain U.S. Food and Drug Administration (FDA) approval for drugs, chemicals, and therapeutants needed in aquaculture and fisheries management programs.”

Aquafind <http://www.aquafind.com>

The No Membership Required Resource for the Aquaculture Industry. Aquafind is an aquatic directory that allows users unrestricted access, free of charge, to search for aquatic species suppliers, aquaculture equipment suppliers, or aquaculture service suppliers. There are four different trading boards available providing an open forum for the exchange of aquacultural related messages, free of charge. In addition, we have provided links to fish markets and auctions, species links, educational resources, book resources as well as an aquaculture events calendar.

North American Farmers' Direct Marketing Association <http://www.nafdma.com/>

The North American Farmers' Direct Marketing Association (NAFDMA) will provide an organization and environment which promotes and fosters the growth of farm direct marketing by offering opportunities for education, networking, and fellowship to its members. The NAFDMA is the perfect place for family farmers, extension agents and farm market managers to network with each other on the profitability of direct marketing. Members increase their farm income by learning from each other through conferences, farm tours, workshops, newsletters, trade publications and this web site's Member's only section.

**Visit the new FCS
website:**

ws3.coopfish.siu.edu/fcs



Minutes



**Fish Culture Section
AFS Annual Meeting
August 22, 2004
Madison, Wisconsin**

Minutes recorded by Mary Nickum, AFS/FCS Appointed Member

In Attendance:

Anita Kelly
Chris Kohler
Mary Nickum
Jennifer Nielsen
Tommie Crawford
Jerry Ludwig

Gary Saul
Phil Durocher
John Nickum
Pat Mazik
Roz Schnick

Call to Order

The meeting was called to order at 1:10 PM by President Anita Kelly. Sufficient members were present for a quorum.

Introductions – Past Presidents Chris Kohler and John Nickum were recognized.

Minutes of FCS

Minutes from the semi-annual meeting in Honolulu, Hawaii, March 3, 2004, were presented by Anita Kelly as printed in the newsletter. A motion was made by Pat Mazik and seconded by Mary Nickum to approve the minutes. Motion passed.

Membership

The current number of members is 400 ± 10 . Various topics discussed were the new terms of office, the bylaws, which were updated and approved (copy in newsletter), the past Presidents' retreat in Hawaii, a joint sponsored symposium in Alaska, and student involvement in the organization.

Treasurer's Report

A monetary loss occurred from the triennial meeting in Hawaii. The treasurer's report was submitted by Sue Kohler and presented by President Anita Kelly. Anita also presented the projected budget for 2004-2005.

Symposium

Subject matter on the use of propagation in restoration and physiology of captured fishes was discussed. The next Symposium is to be held in New Orleans, LA (WAS).



Minutes



Committee Reports

Hall of Fame – Brimm submitted Jim Avault as an inductee. Jim Kahr donated \$500 for the use on HOF enhancement. A motion was made by Pat Mazik and seconded by Mary Nickum to allow S. Brimm to take \$1500 out of the Brickwalk account to use as needed. Motion passed unanimously.

Student stipend – The section is setting up a student stipend to enable student members of the section to attend the annual meeting. A committee will set up qualifications and requirements for students receiving the stipend. Please send suggestions to Sue Kohler or Anita Kelly by e-mail.

FCS Display – Mary Nickum is the chair of this committee. The display will be placed at the annual and midyear meetings and at other meetings as deemed appropriate. The display will be updated with the mission statement of the FCS. The use of students to be at the display was discussed as well as the sale of several FCS items currently housed at Spearfish was discussed.

Triennial Meeting – Pat Mazik discussed the MOU. The budget for Hawaii was \$174,000. There was a \$65,000 deficit. FCS costs were \$5,000. Many questions were brought up such as, what exactly is the job of FCS, what is the consensus, is the debt forgiven for 2003, and if we go back to HI what's happening. Decisions need to be in writing. If the section does not want to be involved in the 2009 meeting, we can opt out, however, the portion that we will be required to cover for the deficit in Hawaii will increase. Since WAS and NSA voted to return, the conference managers in Hawaii gave us an \$8,000 deduction on the use of the center for the 2003 meeting. The FCS would not be eligible to receive any of the \$8,000 deduction if we do not participate in the 2009 meeting.

For Hawaii – There was no warning. Pre-registration was high but some people didn't show. John Nickum commented on the WAS and FCS involvement. Things have changed now that John Cooksey is the conference manager and the executive director of WAS. We should have major say in what WAS chooses. Pat Mazik recommends getting the job description of the Chair of Steering Committee in writing and that all three groups understand how decisions get made. The organizations should all audit books after the triennial.

Action – ad hoc meeting group has to find out the costs of a meeting place for the Culture section, determine the amount of participation in future triennials, and find where we do the best and determine where we can best go in the future.

PFIRM – New book edition. The symposium in Idaho last June was discussed. In San Antonio, issues from different sessions were brought to the workshop such as the results of the survey. After the new guidelines come out for input, they will then be published. A group solution was discussed to contract to them for development of the guidelines. Vince Mirdrok is responsible for bringing this together.



Minutes



Mid-year meeting in New Orleans

Old business

The page proofs to authors for the book *Aquaculture in the 21st Century* are currently being made available to the authors on line. The AFS office will contact the authors when their proofs are ready. The membership for the culture section may be available on-line. We are currently examining ways to make the website secure.

New business

NAJA - The submissions are up as reported by Shelton. We need to improve visibility and now have a Development Editor, Chris Kohler, for the journal.

Anita Kelly is currently assembling procedures Manual. The procedures manual will have all of the duties of the officers so that we do not have them in the by-laws.

Donating \$2,000 to Aquaculture without Frontiers was debated. A motion was made by Pat Mazik to donate \$1,000. Motion opposed. For further information on Aquaculture without Frontiers please visit their website.

National Drug Coordinator Contribution- Anita Kelly made a motion that the section donate \$1500 toward the Aquaculture Drug Coordinator's position. No second was received. Roz Schnick was at the meeting and stated that at this time sufficient funds had been procured to fund her salary and that this year the section would not need to donate to her salary.

The budget, as discussed by President Kelly, income \$4,000, expenditures \$15,000, and must maintain at least \$55,000 as a mutual fund 'baseline'. With the budget not receiving any large income burst President Kelly urged the membership to be frugal with their spending of funds.

Pat Mazik – Southern Division Meeting Symposium. Southern Division meeting will be held in Virginia Beach in February. The FCS will hold a symposium on the Asian Carp issue.

Adjournment

The meeting was adjourned at 2:40 PM.



The mid-year business meeting for the Fish Culture Section will be held at the Aquaculture America Conference in New Orleans

January 17-20, 2005

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