

# The NCRAC Newsletter

*-from the North Central Regional Aquaculture Center (NCRAC)*

## From the Director's office

Welcome to the Spring 2001 issue of the NCRAC Newsletter. We have had several exciting experiences in the North Central Regional Aquaculture Center (NCRAC) this past year as we strive to meet the objectives set forth in our Strategic Plan.

First, an alternative project development approach was initiated. In lieu of the 1-day workshop held in Chicago in the past, this year Calls for Statements of Interest for the priority projects which had been identified by the Industry Advisory Council (IAC) and were outlined by the IAC and the Technical Committee were sent to nearly 1,000 individuals and groups in the North Central Region; they were also posted on the NCRAC Web site. All respondents to the Calls for Statements of Interest were sent: (1) a 3-page document summarizing the project planning process; (2) a 4-page document outlining the work group development process and including the format for the Statements of Interest, vita(es), and the peer review form outlining the review criteria for the Statements; and (3) a 1-page flow chart of the entire process. Work groups have been formed and project outlines written for projects on Yellow Perch, Hybrid Striped Bass, Wastes/Effluents, and Extension. If everything goes as planned these new projects should begin September 1, 2001.

With this first year of this approach under our belts, we have learned that we still have a minor administrative wrinkle or two to

iron out, but we are confident this approach will bring us closer to the goals outlined in the Strategic Plan.

Another objective of the Strategic Plan was met with the Environmental Strategies for Aquaculture Symposium held recently in conjunction with the 62<sup>nd</sup> Midwest Fish and Wildlife Conference in Minneapolis, Minnesota (see related story inside). Under the tireless efforts of Ron Kinnunen, with the able assistance of Jeff Gunderson, this groundbreaking opportunity for divergent interests to meet neutrally and begin a constructive, structured dialogue was an unqualified success. It will serve as a foundation for future interactions of these groups and will result in a better understanding for everyone of the benefits and challenges faced by those engaged in this form of agriculture.

Finally, but no less significantly, the post-doctorate position to aide the office of the Associate Director of NCRAC has been filled. Dr. Wendy Sealey has recently been hired at Iowa State University. Broadly her duties are to work towards the enhancement of regional Aquaculture extension programming in the North Central Region as directed in the NCRAC Strategic Plan. Wendy holds an M.S. in fish pathology from Auburn University and a Ph.D. in fish nutrition from Texas A&M. She has produced numerous research and extension publications on various aquaculture topics. During her 2-year appointment Wendy will be visiting NCRAC

extension contacts, regional aquaculture associations, as well as state government officials about aquaculture extension in the region. We welcome Wendy to the NCRAC community and look forward to the results of her efforts.

Each of the above accomplishments brings us closer to meeting the goals and objectives of the NCRAC Strategic Plan which will result in a stronger aquaculture industry in the North Central Region. Your continued inputs into this process are welcome and appreciated.

Sincerely,

Ted R. Batterson, Director

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# National News

## APHIS Published Proposed Rule Changes

After receiving petitions asking them to regulate aquaculture in various ways, on May 4, 1999, the Animal and Plant Health Inspection Service (APHIS) published an advance notice of proposed rulemaking (ANPR) titled "Aquaculture Farm-Raised Fin Fish" in the Federal Register (64 FR23795-23796, Docket No. 98-085-1). Many petitioners asked APHIS to define farmed aquatic animals as livestock. In general, the petitioners seemed to be interested in receiving the same services that domestic producers of livestock receive for animals moving in interstate and foreign commerce. However, based on the petitions alone, it was difficult to determine what segments of the industry want services and exactly what services they want. It was also difficult to determine the objectives sought by the petitioners who were requesting Federal regulation. The ANPR was published in an attempt to clarify the industry's needs, the nature of the services sought, and the concerns the petitioners had with regard to such regulations.

Fifty-five comments were received in response to the ANPR. A majority of the commenters supported the idea of APHIS regulation of cultured finfish. Unfortunately, the commenters generally did not clearly distinguish

between finfish raised for food and ornamental finfish. Commenters who wanted regulation were, however, very clear that they want programs to prevent and control disease and to support increased commerce, both domestic and export.

The commenters also suggested that any rulemaking initiated by APHIS be a negotiated rulemaking. In negotiated rulemaking, industry representatives and other interested persons meet with APHIS officials and draft proposed regulations together. The proposed regulations are then published for public comment. Negotiated rulemaking is designed to ensure that all interested persons are involved together from the start to develop regulations.

Unfortunately, negotiated rulemaking is not suitable for all situations. It works well when there is a small number of interested parties and the parties are easy to identify. This is not the case with regard to aquaculture. The aquaculture industry is very large and diverse. It would be difficult to identify everyone who should be represented in a negotiated rulemaking. In addition, there are many parties outside aquaculture that would have a substantial interest in such a rulemaking.


It is APHIS's view that the number of people who would need

to participate in a negotiated rulemaking would be too large and they suggest that negotiated rulemaking is not appropriate. Furthermore, a large negotiated rulemaking would be expensive and APHIS does not have adequate funds. Therefore, they have concluded that it would not be appropriate to pursue an aquaculture negotiated rulemaking. They have not, however, decided whether to pursue aquaculture rulemaking by other means. Before that decision is made, APHIS wants to have as much information as possible from all interested persons, and they want to provide the aquaculture industries and other interested persons with as much opportunity as possible to discuss with them and inform them regarding the relevant issues.

Therefore, APHIS is planning to hold a series of public meetings. Public meetings will allow anyone who is interested industry representatives, producers, consumers, and others to present their views and to exchange information among themselves and with APHIS.

There will be not set agendas for the meetings. Any issues and concerns related to aquaculture and possible APHIS regulatory action can be discussed. However, there are three specific issues on which APHIS would like more informa-

*(continued next page)*

**A**nnual  
 calendar  
**2001**

**February**  
Board of Directors meeting to approve NCRAC's FY01 projects for funding; joint session of Industry Advisory Council and Technical Committee to align priorities for FY02.

**May**  
USDA issues NCRAC's FY 01 grant. Effective start date June 1.  
  
Revisions of board approved FY01 projects due in NCRAC.

# National News

*(from previous page)*

tion. These are issues that the people and organizations who commented on the ANPR either did not address or were unclear about. Specifically, if APHIS does propose regulations: (1) should the program be mandatory or voluntary, (2) should it cover shellfish, and (3) should it cover ornamental finfish?

Information elicited at the meetings could result in a new APHIS regulatory program, or in changes to aquaculture-related services currently provided by

APHIS. The first public meeting was held on Thursday, January 25, 2001, at Disney's Coronado Springs Resort in Lake Buena Vista, Florida in conjunction with the annual meeting of the World Aquaculture Society.

This meeting was the first in a planned series of public meetings; additional meetings are planned in Idaho, Illinois (Chicago), Maine, Mississippi, Ohio, Pennsylvania, and Washington. Notice or notices will be published in the Federal Register announcing the dates,

times, and locations of the meetings.

Transcripts of the meetings can be found at the APHIS Web site: <http://www.aphis.usda.gov/ppd/rad/aquaculture.html>.

(Source: Email from Maxwell H. Mayeaux, Aquaculture Program Specialist, USDA/CSREES/PAS.)

## EPA-NAA Agreement on Enterprise Budgets

After several meetings with the National Aquaculture Association (NAA) Executive Director Betsy Hart, EPA staff has agreed that all enterprise budgets being submitted to EPA will channel through the JSA Task Force Economics Subgroup Chairman Carole Engle and that the budgets will be "industry reviewed" by NAA before being used by EPA economists in determining economic achievability on the proposed effluents guidelines rulemaking. Since enterprise budgets are based on sets of assumptions, it is critical that industry make certain that EPA has

complete information on the range of values and assumptions so that the analysis done will be as accurate as possible.

Some of the questions that will be addressed by the industry reviewers include: Are the budgets representative? If not, what other regions need to be represented and/or what other types of farm sizes/production systems/stocking rates/intensity levels should be used? What production parameters (such as feed conversion ratios, yields, prices, etc.) need to be used in sensitivity analyses? What ranges need to be used for each parameter? And what other changes, additions,

or deletions are necessary for the budgets to provide an accurate basis for EPA's economic analyses? Industry review committees established by NAA will review budgets for the various species, i.e. trout, catfish, baitfish, crawfish, hybrid striped bass, shrimp, etc.

(Source: NAA Close-Up Newsletter, February 2001)

### August

USDA issues approval of FY01 plan of work; NCRAC issues subcontracts to participating institutions.

### September

FY01 projects begin.

## National News

### National Organics Standards Evaluation

The Aquaculture Working Group, established by the National Organics Standards Board (NOSB), has completed its evaluation of the appropriateness and suitability of organic standards aquatic animal production systems. In October, the NOSB established an Aquatic Animal Task Force and two related working groups to advise the NOSB in the consideration of organic certification standards for operations that produce aquatic animals. Richard Nelson of Silver Cup Feeds serves as the NAA representative on the Aquaculture Working Group.

The NOSB defines aquatic animals as any finfish or shellfish used for human consumption, whether taken from regulated but free roaming marine and fresh water populations (wild harvested) or propagated and raised in a

controlled or selected environment (aquaculture). The Task Force includes six members of the NOSB and two non-NOSB members who serve as chairs of working groups on wild harvest and aquaculture production systems. Working independently, the wild harvest and aquaculture working groups evaluated the appropriateness and suitability of organic standards for aquatic animal production systems. The report summarizes the conclusions, including majority and minority positions, of the aquaculture working group.

The Task Force will consider all analyses forwarded by the working groups, and prepare its own recommendation to submit to the NOSB. At the time that the Task Force forwards its conclusions to the NOSB, those recommendations will be made available for public

review and comment. The NOSB will take the Task Force recommendations and public comment under consideration while developing its own recommendations for the National Organic Program.

The Task Force intends to release its recommendations in time for public review and comment at the NOSB meeting scheduled for March 2001. This schedule should allow the full NOSB to make its recommendation on the certification of operations that produce aquatic animals at its meeting tentatively scheduled for June 2001. The Aquaculture Working Group report is available by contacting the NAA office at [naa@intrepid.net](mailto:naa@intrepid.net).

(Source: NAA Close-up Newsletter, February 2001)

## Regional News

### Ohio Aquaculture: The Wave of the Present

As aquaculture continues its booming development in the State of Ohio, the Ohio Aquaculture Association (OAA) has identified a need to develop a framework to enhance this growth. The OAA has teamed up with the Ohio Department of Agriculture in creating the Ohio Aquaculture Task Force. In addition, there are eight other core participants including the Ohio State University's Centers at Piketon, OSU, School of Natural Resources, OSU Extension Program, Ohio Agriculture Research and Development Center, Ohio Sea Grant Program, Ohio

EPA, Ohio Dept. of Natural Resources and the Ohio Farm Bureau Federation. Additional resource people include legislators, agriculture teachers, Department of Education personnel, veterinarians, processors, bankers, OSU Department of Animal Science, USDA Rural Development, and Ohio Department of Development.

The purpose of the Task Force was to formulate strategies/recommendations for developing and expanding Ohio's Aquaculture industry. This was accomplished by creating six subject-specific committees, education, aquatic

health, research, marketing, finance and regulations, whose charge will be to identify industry needs and provide recommendations to meet those needs. All recommendations are currently being compiled in a report expected to be published by January 2001. This report will guide the OAA and other participants in activities for enhancing our industry. (For more information contact [Laura Tiu. tiu.2@osu.edu](mailto:laura.tiu.2@osu.edu))

(Courtesy of Laura Tiu, Ohio State University)

# Regional News

## Roz Schnick Wins FDA Award



Rosalie (Roz) Schnick of La Crosse, Wisconsin, received the US Food and Drug Administration (FDA) Commissioner's Special Citation Award at the FDA Honor Awards Ceremony in Rockville, Maryland on June 9. The award is for outstanding

leadership, teamwork, and sustained efforts as the national coordinator for Aquaculture New Animal Drug Applications (ANADA). Roz was chosen for this award because she has provided invaluable assistance to the FDA and has positively impacted the well-being of the public. FDA Commissioner Jane Henney presented the award.

Roz was selected as the first national coordinator for ANADA in May 1995, shortly after retiring from 28 years of service at the Upper Midwest Environmental Sciences Center in LaCrosse. This position was established by the Joint Subcommittee on Aquaculture's Working Group on Quality Assurance in Aquaculture Production. The aquaculture industry, both public and commercial, is too small to justify the major

expenditures and efforts necessary to prove that a drug is safe and effective. The national coordinator helps producer groups and pharmaceutical and chemical companies work in partnership to gain approvals that would not otherwise be achieved.

As the national coordinator, Roz has been involved in efforts to obtain approval of over 25 drugs for use in the culture of aquatic species such as catfish, trout, hybrid striped bass, and salmon. She has also been involved in national and international issues and efforts to ensure that safe and effective drugs are available to aquaculture producers worldwide. Those efforts have taken her to all parts of the United States as well as to Scotland, England, France, Australia, New Zealand, and Greece.

## Kinnunen Receives Award



Ron Kinnunen has been selected to receive Michigan State University's Distinguished Academic Staff Award for 2000-2001. It is quite an honor to be selected for this award and the recipient receives a \$2,500 stipend. Ron and other recipients were honored at the President's State of the University Address and Awards Convocation which was held on Tuesday, February 13, 2001. Ron has been an extension contact for NCRAC since the inception of the Center in 1988.

*Ron presenting information at the 2001 NCRAC annual conference in Cincinnati, OH.*

## Aquaculture Task Force Web Page Additions

The aquaculture effluents task force has recently added a "What's New?" section to their web page located at:

<http://ag.ansc.purdue.edu/aquanic/jsa/effluents/index.html>

Some of the new items included in this section are the EPA's responses to the Frequently Asked Questions (FAQs) posed by the JSA.

# Regional News

## Fisheries Celebrates 50 Years of Excellence

The SIUC fisheries program celebrated its fiftieth anniversary at a gala gathering of nearly 200 former and current students and staff at Touch of Nature on August 20, 2000. The occasion also provided an opportunity to present an "award of appreciation for dedicated service and visionary leadership" to the program's founding director, William M. Lewis. First called the Cooperative Fishery Research Laboratory, the program has undergone a number of name changes, and is now called the Fisheries and Illinois Aquaculture Center.

The program, a brainchild of then-president Delytte Morris, has graduated in the past fifty years more than 500 B.S./B.A., 130 M.S./M.A. and 31 Ph.D.

students specializing in fisheries through the College of Sciences' Department of Zoology. The expressed mission of the Fisheries



***Picture left to right are Roy Heidinger (former director, professor emeritus), Chris Kohler (director, professor), and Bill Lewis (founding director, professor emeritus)***

and Illinois Aquaculture Center is the achievement of excellence in research and student training in fisheries and aquaculture sciences. Based on the achievements of the alumni present at the reunion (university department chairs, agency directors, hatchery managers, etc.), it is abundantly clear the Center has been meeting its mandate. The Center, now directed by Dr. Christopher C. Kohler, boasts one of the finest university fisheries and aquaculture facilities to be found anywhere.

For more information visit the Center's website. <http://131.230.57.1/fishweb/coopfish.htm>

## Environmental Strategies for Aquaculture Symposium

In recent years, aquaculture has come under scrutiny by environmental regulators and environmental interest groups. A contentious situation has developed between environmental regulators, environmental interest groups, and those involved with aquaculture.

Four main areas for which aquaculture has come under scrutiny are: (1) the role of aquaculture in the spread of non-indigenous aquatic nuisance species, (2) the movement of various fish diseases and parasites to new geographic locations through aquaculture practices, (3) the escapement of cultured fish into the environment which could affect the genetic makeup of native



***Attendees discussing issues of the symposium.***

stocks, and (4) the discharge of aquaculture effluents into the environment. To address these issues a symposium entitled, Environmental Strategies for Aquaculture, was held on December 5 and 6 in conjunction with the 62<sup>nd</sup> annual Midwest Fish and Wildlife conference in Minneapolis, MN.

On the first day of the Sympo-

sium papers addressed real and perceived areas of concern with aquaculture. This allowed aquaculture industry, resource managers, and environmental interest group representatives to learn about these issues in an objective, scientific format. The second day of the Symposium was structured around discussion papers that fleshed out common concerns of all interested parties.

(Courtesy of Ron Kinnunen, Michigan State University)

# Regional News

## Annual NCRAC Meeting Held in Cincinnati

The North Central Regional Aquaculture Center held its 2001 annual meeting on February 16-18 at the Radisson Hotel Cincinnati Airport. The annual meeting was "kicked off" on Friday, February 16 by a Animal and Plant Health Inspection Service (APHIS), USDA, Aquaculture Public Meeting. These public meetings are scheduled to seek input from aquaculture producers, researchers and extension personnel as to how and to what extent APHIS should regulate aquatic species. For additional information on the APHIS public meetings, please see the related article in this newsletter.

Following the APHIS public meeting the NCRAC Board of Directors met. In attendance were Board of Directors Chairman, Bill Taylor who serves as the host institution (MSU) representative; Board members: Dick Warner who serves as Agricultural Experiment Station Representative and Jerry Miller who serves as the host institution (ISU) representative. Industry Advisory Council Board Members in attendance were: Richard Ying Ji, Curtis Harrison, and Dave Smith. Extension Technical Committee Chair, Ron Kinnunen; Research Technical Committee Chair, Jeff Malison for Chris Kohler; NCRAC staff: Director, Ted Batterson, Associate Director, Joe Morris, Wendy Sealey and Liz Bartles, and USDA CSREES representative Gary Jensen also were in attendance.

Topics discussed included an update by Gary Jensen on things of interest in regards to aquaculture and the USDA. Ted Batterson gave a synopsis of the annual report, discussed requesting fully authorized funding levels for the center and the new project review policy. Joe Morris presented an update on new publications and other resources which are currently available through the center. Jeff Malison discussed scheduling and organization of the upcoming Percid Workshop, which is tentatively set for July 20-24, 2003 in Madison, WI. Ron Kinnunen presented information about the Environmental Strategies In Aquaculture. The Board then discussed and voted on the four proposed projects; Extension, Hybrid Striped Bass, Yellow Perch and Wastes and Effluents.

Following the Board Meeting a mixer for all meeting attendees was held. This event, graciously sponsored by the Ohio Aquaculture Association, included NCR produced yellow perch, tilapia and smoked trout as well as other fine foods and beverages. The mixer provided an opportunity for conference attendees to network in a relaxed setting and facilitated discussion between producers, researchers and extensionists. Thanks OAA.

The general meeting started Saturday morning and consisted of an overview of completed NCRAC Projects, updates on current projects, and the Board's decisions regarding funding of the four proposed projects. The afternoon session focused on environmental issues facing aquaculture with presentations by Ron Kinnunen, Gary Jensen, and Kristen Strellec, from the US Environmental Protection Agency.

Sunday's session addressed the issue of aquaculture development. Jim Tidwell discussed the Kentucky approach to enhancing state support for aquaculture. Betsy Hart discussed the role of the NAA in aquaculture development.

The final topic of discussion prior to concluding Sunday's meeting was addressing issues raised in a presentation by Wendy Sealey on Saturday regarding perceptions of NCRAC within the region. Ted Batterson opened discussion to conference attendees on ways of improving communication between research, extension, and producers in the region. The input received by conference attendees was informative and appreciated.

The meeting concluded with closing remarks by Don Garling, meeting organizer. Conference attendees then had the option of visiting the Cincinnati Aquarium.

## Regional News

### NCRAC Announces Two New Extension Videos

The North Central Regional Aquaculture (NCRAC) has two new extension videos available for distribution.

The first video, *Fish Processing Plant Sanitation*, is an easy-to-follow video that illustrates the key components of a good sanitation program. Written by Steven C. Ingham (University of Wisconsin – Madison), Food Safety Extension Specialist, this video will help fish farmers learn to improve the safety, quality and profitability of their products. From the basics of hand washing, to mixing a batch of cleaning chemicals and sanitizers, and even organizing your walk-in cooler, this video demonstrates some effective ways to control the spread of germs.

The second video, *Fish Farming: Some Industry Perspectives*, features interviews with established fish farmers and natural resource agency personnel to obtain their perspective about this emerging industry. Written by William A. Swenson (University of Wisconsin – Superior), Fisheries Extension Specialist, this video explains how fish farming involves capital investment, labor, management and risk as well as knowing how and where to sell their products to make a profit.

Learn how regulations are important for both the success of

the aquaculture operation and the protection of the environment. Shot on location at established fish farms in Wisconsin, viewers can hear fish farmers describe how they practice this alternative form of agriculture and the rewarding lifestyle it brings. The realistic view of the fish farming portrayed by this video will be useful to individuals interested in this emerging industry.

The University of Wisconsin – Extension, and University of Wisconsin – Superior, produced these two videos; partial support was supplied by NCRAC. Both videos are available from the NCRAC Publications Office located at Iowa State University. Cost for the tape is \$20 each, which includes shipping and handling.

### Managing Wisconsin Fish Ponds Publication Now Available

If you're planning to build or manage a fish pond, a new publication from University of Wisconsin-Extension can give you the information you need.

*Managing Wisconsin Fish Ponds* explains how to manage ponds for different goals, and outlines the responsibilities, potential problems and rewards involved, whether your interest lies in sport fishing or commercial aquaculture. Topics covered in this 82-page manual include designing and constructing

ponds, the best types of fish to raise, how to manage cold and warm water ponds for sport fishing, optimizing fish health, pond safety, and ways to control aquatic plants.

It also contains a comprehensive list of resources and contacts, including web sites, publications and videos from aquaculture associations, the University of Wisconsin-Extension, the Wisconsin Department of Agriculture, Trade and Consumer

Protection and more.

*Managing Wisconsin Fish Ponds* (G3693) retails for \$10 per copy (plus \$1.13 for shipping). To order, contact:

Cooperative Extension Publications, 45 N. Charter St., Madison, WI 53715. Or call toll-free 1-877-947-7827 (Wis Pubs) or Fax 608-265-8052. Make checks payable to University of Wisconsin-Extension.

# Project Updates

## Sunfish

For producers in the NCR who rear sunfish for the food fish market there is considerable interest in knowing whether the bluegill, *Lepomis macrochirus* or the BxG hybrid (F<sub>1</sub>; male bluegill x female green sunfish *L. cyanellus*) can be grown faster to market sizes of 225-330 g (0.50-0.75 lbs). The predominant opinion is that the hybrid grows faster although there are few published studies to support this view. Research recently conducted at the University of Missouri-Columbia may shed some additional light on the question, “Bluegill or BxG Hybrid; Which fish really grows faster?”

In a series of trials conducted by Dr. Rob Hayward and Dr. H.P. Wang it was found that while growth rates are higher for the

hybrids as young of the year and early age 1 fish, growth rates for bluegills surpass those of hybrids at a weight near 30 g and that bluegills became substantially heavier (> 25 g) by year's end. The shift to higher growth rates for bluegills was related to hybrids reaching more advanced reproductive states as age 1 fish. The substantial weight advantage observed for age 1 bluegill suggests that they will remain larger than hybrids and reach food-market sizes sooner. These results were obtained by examining the inherent growth rates (IGRs) of age 1 bluegills and hybrids over successive 25-d periods. For the purpose of the study fish were held individually and fed three times daily to apparent satiation. By conduct-

ing the study in this manner the researchers were able to remove the effects of social interaction among the fish.

In a separate study, social interactions, which occur during grouping, were shown to reduce growth rates of grouped bluegills more so than for hybrids, causing them to grow slower than grouped hybrids. Therefore reduction of social costs for bluegills in culture settings, for example, by maintaining appropriate densities, may allow these fish to reach their higher IGR and grow to food market sizes faster than hybrids.

For more information about the results of this study contact Dr. Rob Hayward, University of Missouri - Columbia. Phone number: (573) 882-2353, Email: HaywardR@missouri.edu

## Yellow Perch

Research conducted at Purdue University may be good news for the region's yellow perch producers. Results indicate that voluntary consumption of feed by 50-60 g yellow perch can be increased through dietary inclusion of flavor additives and manipulation of culture temperature. Further, increased consumption results in increased weight gain without decreasing feed conversion ratio.

In a large scale laboratory study, Dr. Paul Brown and colleagues raised two genetically different groups of yellow perch (Lake Mendota all-female and Lake Mendota mixed sex) at three different temperatures (16, 22, or 28 C). Fish were fed one of four diets consisting of a control diet

containing practical feed ingredients, or the same control diet supplemented with the flavor additives squid meal, krill meal, or betaine.

Fish fed the control diet supplemented with either flavor additive consumed more feed and gained more weight than fish fed the unsupplemented control diet. Temperature also significantly affected feed consumption, feed conversion, and weight gain. Feed consumption increased with culture temperature. However, fish reared at 22 C gained more weight than fish reared at 28 C, or those reared at 16 C. Feed conversion ratio also was better in fish reared at 22 C, compared to fish reared at 28 C and both values were better than in fish

reared at 16 C. The researchers also observed some differences between the two genetic groups. Although feed consumption between the groups was not different, all-female fish converted feed more efficiently than the mixed sex group resulting in greater weight gain of all-female fish.

(For more information about the results of this study contact Dr. Paul Brown, Purdue University. Phone number: (765) 494-4968 Email: pb@fnr.purdue.edu

# Aquaculture Activities

## Calendar

### June 6-8

Practical Approaches for  
Conserving Native Inland  
Fishes of the West

Missoula, MT

Contact: bshepard@montana.edu

### June 17-20

Open Ocean Aquaculture IV  
St. Andrews by-the-Sea,  
New Brunswick, Canada

Contact: Chris Bridger

Telephone: 228-875-9341

[www.org.usm.edu/'ooaooa\\_iv.html](http://www.org.usm.edu/'ooaooa_iv.html)

### June 20-24

Atlantic Aquaculture Expo,  
Conference & Fair

St. Andrews by-the-Sea, New  
Brunswick, Canada

Contact: Sydney Peacock

Telephone: 506-658-0018

[show@nbnet.nb.ca](mailto:show@nbnet.nb.ca)

### June 22-23

Process Control for the  
Food Processing Industry  
New Orleans, LA

Contact: Institute of Food

Technologists

Telephone: 708-786-4120

### June 22-23

Food Engineering Fundamentals  
for R&D

New Orleans, LA

Contact: Institute of Food

Technologists

Telephone: 708-786-4120

### July 8-13

4<sup>th</sup> International Symposium  
on Sturgeon

Oshkosh, WI

Contact: bruchr@dnr.state.wi.us or

<http://www.sturgeonsymposium.org>

### July 17-20

Hands On or Distant Learning;

7<sup>th</sup> Annual Aquaculture Water

Reuse Systems Short Course

Shepherdstown, WV

Contact: Brenda Snowberger

Telephone: 607-255-2495

Email: bls19@cornell.edu

### August 4

Fish Fest 2001-A Fish Odyssey

Corvallis, OR

Contact: 503-244-6922

Email: mkeefe@harza.com

### August 19-23

131<sup>st</sup> American Fisheries Society

Annual Meeting

Phoenix, AZ

Contact: 301-897-8616

Email: bfritz@fisheries.org

<http://www.fisheries.org/aznm/>

[annual2001/default.htm](http://www.fisheries.org/aznm/annual2001/default.htm)

### August 26-31

Aquaculture Feed Preparation,

Nutrition and Feed Management

College Station, TX

Contact: Mian Riaz 979-845-2774

Email: mnriaz@tamu.edu

[www.tamu.edu/extrusion/](http://www.tamu.edu/extrusion/)

[short.html](http://www.tamu.edu/extrusion/short.html)

### October 1-4 11<sup>th</sup> International

Conference on Aquatic

Invasive Species

Alexandria, VA

Contact: 800-868-8776

Email: profedje@renc.igs

### October 17-19

28<sup>th</sup> Fish Feed and Nutrition

Workshop

Baton Rouge, LA

Contact: mbwilliams@agctr.lsu.edu

### October 18-21

Worldwide Food Expo 2001

Chicago, IL

Contact: Anne Kane 703-876-0900

Email: ami@cmgexpo.com

### October 24-26

4<sup>th</sup> World Fish Inspection and

Quality Control Congress

Vancouver, British Columbia,

Canada

Contact: info@cmgexpo.com

### Nov 27-Dec 1

Second International Conference

on Marine Ornamentals

Lake Buena Vista, Florida

Contact: Beth Miller-Tipton

Telephone: 352-392-5930

Email: bamt@gnv.ifas.ufl.edu

## Talk To Us

NCRAC wants to hear from you. Tell us who you are and what you would like to see in the NCRAC Newsletter. If you are a new reader and want to be added to our mailing list, complete the form below and mail to:

NCRAC Newsletter  
Attn: Joseph E. Morris  
Department of Animal Ecology  
124 Science II  
Ames, IA 50011-3221

Or forward via email: [bartels@pilot.msu.edu](mailto:bartels@pilot.msu.edu)  
or fax: (517) 353-7181

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# Board of Directors and Staff

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