Fish Health Newsletter

Fish Health Section / American Fisheries Society

Volume 30 Number 2 April 2002

In this issue:

President's Report:

From the President,

I'd like to take this opportunity to congratulate the newsletter editors – Lora Petrie-Hanson and Beverly Dixon – for meeting the challenge of transition to the electronic format. When the idea was first discussed there were many concerns, but with the first issue we were able to see the potential that this format offers and I'm excited about seeing it develop.

FHS Communications

I have enjoyed hearing from many of you who have responded to my somewhat regular email updates during the past nine months and I hope you will continue to assault me with interesting news, resources and job postings. However, from the numbers of returned messages I receive following each mailing I am aware that our directory needs to be updated. I will begin deleting email addresses that continue to bounce back or send frequent out of the office responses. If you are not receiving these updates and would like to, please email me (bartholj@orst.edu) and request that I add you to the listserv; also let me know if you would like to be removed. At the same time, update your information in the AFS membership directory (http://216.200.67.182/) - you will need your membership number for this.

Progress on the Inspection Manual

The collaborative effort between the FHS and the USFWS to produce the "USFWS/AFS-FHS National Fish Health Inspection Procedures" manual continues to be a major effort for many involved. At this time the document has undergone limited review and is going back to committees for consideration of the comments. I appreciate all of you who responded. Your input is important in making this document as broadly useful as

possible. For those of you who have not yet seen the document, it will be put out for a 30 day comment period beginning May 1 (stay tuned). At that time it will also undergo review by the Technical Standards committee, with a target deadline for adopting the manual as the regulatory portion of Blue Book by July 30.

External Relations and Member Services

Externally, the AVMA and the FHS are jointly exploring ways to collaborate. Some suggested steps are for the AVMA to appoint an official liaison to the FHS, and creation of a joint website for items of mutual interest. We have also been active in collaborating with other societies and sections to increase awareness of the fish health concerns. Examples of this are supporting the 7th Annual Whirling Disease Symposium, associate sponsorship of Aquaculture America 2002, and plans to help co-sponsor a symposium entitled "Propagated Organisms in & for Aquatic Resource Management" proposed by the Fish Culture Section.

Internally, there has also been a lot to offer. The Fish Hematology CE Session was held in conjunction with the Eastern Fish Health Workshop in March, a continuing education workshop on DNA technologies is planned for the Western Fish Health Workshop in June (see information in this newsletter), and a workshop on Fish Necropsy and Introduction to Fish Diseases is planned for the AFS national meeting in August.

I look forward to seeing many of you at these upcoming events and encourage your involvement – we need you!

Sincerely,

Jerri Bartholomew, President

Meetings:
Registration and Call for Abstracts – Fourth International Symposium on Aquatic Animal Health, September 2-6, 2002, New Orleans, Louisiana

The ISAAH will be held at the beautiful Sheraton New Orleans hotel, and will be hosted by the Fish Health Section of the American Fisheries Society and the organizing committee is chaired by Ron Thune.

To be added to the mailing list to receive announcements and the call for papers visit the Symposium web site at www.vetmed.lsu.edu/isaah2002.htm

Requests can also be sent to isaah2002@vetmed.lsu.edu or by regular mail to ISAAH2002, Department of Pathobiological Sciences, School of Veterinary Medicine, Louisiana State University, Baton Rouge, LA, 70803 USA.

ABSTRACT SUBMISSION GUIDELINES

- Print your abstract on an 8.5 x 11-inch (or similar) white paper with a 1-inch (2.5-cm) margin on top and sides using a 12-point Helvetica or courier font.
- Also, **at the time of submittal,** please E-mail the abstract to the symposium office. Attach as a Word or WordPerfect document, and also copy the text in the E-mail message in case the attachments do not open. Alternatively, send the

abstract on a 3.5-inch floppy disk. Label disk with your name and whether the document is Word or Wordperfect, and if it is Macintosh or Windows formatted.

- Check ☑ the box on the registration form that you are submitting an abstract.
- Authors submitting more than one abstract should submit individual pages for each abstract and separate E-mail messages or files on the floppy disk.
- In order to make a presentation you must be registered for the symposium. Therefore, abstracts, registration form and payment, must ALL be received by mail (do not fax) at the symposium office by May 15.

EXAMPLE

Key words: computer, photomicroscopy, parasites, imaging

Desktop Parasites: Application of Computer-Enhanced Photomicroscopy for Imaging Fish Parasites

Andrew S. Kane (1)*, Sarah L. Poynton (2), Jessica Cantanso (3) and William G. Heeger (2)

1 Aquatic Pathobiology Center, University of Maryland School of Medicine, Department of Pathology, 10 South Pine Street, Baltimore, Maryland 21201 USA akane@umabnet.ab.umd.edu
2 Division of Comparative Medicine, Johns Hopkins University School of Medicine, 720 Rutland Avenue, Baltimore, Maryland 21205 USA spoynton@welchlink.welch.jhu.edu;
3 Modern Digital, 2334a Buena Vista Calle, Moderno, Spain ES7679 jcantan@moddig.es

The capture of microscopic images with confocal depth of field is often challenging for histologists and parasitologists. This is particularly true when photographing thick sections or 3-dimensional protozoan or metazoan parasites. Several software programs for personal computers, including Adobe Photoshop™ NIH-Image, permit digital capture and manipulation of photographic images. Different focal plane images may be composed to reveal detail and show sense of depth. As exemplified, organisms such as peritrichous ciliates, and eyespots, cephalic glands, hooks and embryo for monogenetic trematodes. In addition, a variety of digital filters may be applied to images to sharpen, mask, and just brightness, contrast, hue and saturation, and create backgrounds. System requirements, exemplified use of Macintosh software with fish parasite images, and output to printer and Ektachrome slides will be reviewed.

Presentation Topic categories: parasitology, fish, other **[Special Session name here]**

I prefer **POSTER** but will accept oral.

Andrew S. Kane
University of Maryland School of Medicine
Department of Pathology – Aquatic Pathobiology Center
10 South Pine Street
Baltimore, Maryland 21201 USA
Tel: (410) 706-7230; Fax: (410) 706-3526
akane@umabnet.ab.umd.edu

SUBMISSION FORMAT:

1. **Key Words:** List three or four key words to be used in the keyword index of the Proceedings.

2. **Title:** Be descriptive and succinct.

3. **Author List:** List all authors. First name, middle initial, last name. Indicate affiliation by number(s) in parentheses. Place an asterisk (*) after the presenting author's name.

4. **Affiliation List:** Indicate affiliation number, leave 2 spaces, complete mail and E-mail address.

5. **Abstract Text:** 250 word limit. One continuous paragraph.

6. **Presentation Topic:** List the three topic categories to which your abstract should be assigned. Choose one from each the three categories on page 3. Also indicate special session if applicable.

7. **Preferred Format:** Type **ONE** of the following: "I will accept poster or oral," "I prefer POSTER but will accept oral," or "I prefer ORAL but will accept poster."

8. **Presenting author:** Name, affiliation, address, telephone, fax (include country code if outside North America) and E-mail. That person will receive notification of acceptance/ rejection, and should inform other authors.

Sheraton
New Orleans
HOTEL

Welcomes

AMERICAN FISHERIES SOCIETY

4TH INTERNATIONAL SYMPOSIUM ON AQUATIC ANIMAL HEALTH

SEPTEMBER 1-5, 2002

To ensure accurate reservations, please complete this reservation request and return it before **JULY 31, 2002**. Requests received after this date or after the room block fills will be accepted on availability. RESERVATION REQUESTS MUST BE ACCOMPANIED BY A DEPOSIT EQUAL TO ONE NIGHT'S ROOM RATE PLUS 12% ROOM TAX AND $3.00 OCCUPANCY TAX.

MAIN HOUSE SINGLE OCCUPANCY:	– $135.00
MAIN HOUSE DOUBLE OCCUPANCY:	– $135.00
MAIN HOUSE TRIPLE OCCUPANCY:	– $145.00
MAIN HOUSE QUAD OCCUPANCY:	– $155.00
MAIN HOUSE SUITES:	– $375.00
CLUB LEVEL SINGLE OCCUPANCY:	– $165.00
CLUB LEVEL DOUBLE OCCUPANCY:	– $165.00
CLUB LEVEL SUITE/1 BEDROOM	– $700.00

4 people per room)

___ **I request a non-smoking room**

___ **I request a room equipped for a person with a disability**

EACH ADDITIONAL PERSON: $25.00 (Maximum

SHERATON RESERVATIONS: 1-800-253-6156 **HOTEL PHONE: 504-525-2500**
FAX RESERVATIONS: 504-595-5550

NAME: _____

ADDITIONAL OCCUPANT(S): _____

_____

ADDRESS: _____

CITY/STATE/ZIP: _____

PHONE: _____FAX NUMBER: _____ E-MAIL ADDRESS:_____

- CLUB accommodations offer complimentary continental breakfast, and use of the Executive River Club Lounge.
- No charge for children under 18 when sharing space with parents and using existing bed space.
- Check-in time after 3:00 p.m. Check-out time by 12:00 noon. Late departures will be charged a full night's rate plus taxes.
- Cancellation or modification of reservation must be made at least 72 hours prior to arrival to avoid forfeiture of deposit. Should departure date change, Front Desk must be notified at the time of check-in to avoid an early departure charge equal to one night's room and tax.
- All hotel accounts are subject to credit arrangements at time of registration and payable at departure.
- If requested rate is not available, the next available rate will be assigned.

ARRIVAL DATE: _____ ARRIVAL TIME: _____

DEPARTURE DATE: _____

❑ I have enclosed a check in the amount of one night's room rate plus 12% room tax and $3.00 occupancy tax.
❑ Please charge one night's room rate plus 12% room tax and $3.00 occupancy tax to the following credit card.

CREDIT CARD: _____

NUMBER: _____ EXP. DATE _____

CARD HOLDER: _____

I understand that I am liable for one night's room rate plus room and occupancy taxes which will be covered by my deposit in the event that I do not arrive, cancel less than 72 hours prior to arrival, or depart earlier than scheduled.

_____
SIGNATURE

Western Fish Disease Workshop
Corvallis, OR 24-26 June 2002

The Western Fish Health Workshop will be held at Oregon State University, June 25-26, 2002 (Tuesday & Wednesday). The Continuing Education class will be held on June 24 (Monday).

These events will be at OSU in the Agricultural and Life Science Building, Room 4001, located on Campus Way just East of 30th Street in Corvallis, OR.

June 1, 2002 - Deadline for abstracts (optional) – email to Michael.Kent@orst.edu

June 15, 2002 - Deadline for registration for meeting and workshop - please indicate additional Tuesday dinner guests. You may email or fax the attached form and pay when you arrive.

Tentative Schedule

Monday :	8 am open registration
	9 am Continuing Ed. – Newer Diagnostic Methods for Fish Diseases (see course description below)
Tuesday:	8 am registration
	Sessions from 8:30-5:00
Wednesday:	Sessions from 8:30-noon

Open house at Salmon Disease Laboratory on the 26th afternoon
Additional tours - to be announced (please let us know your suggestions)

See the following websites for additional information.
OSU home page at http://www.orst.edu/, http://oregonstate.edu/visitors/
Corvallis lodging & area maps at: http://www.visitcorvallis.com/lodging.html
Suggested motels: Econo Lodge & Super 8 are near each other and the downtown area. Ask for OSU rates.
OSU maps at http://oregonstate.edu/visitors/tour/campusmap.htm

If you have questions, contact Dr. Michael Kent at Michael.Kent@orst.edu or Peggy Peterson at peterspeg@orst.edu or call 541-737-5045 or fax 541-737-2166

Continuing Education Course
In conjunction with the Western Fish Health Workshop

Newer Diagnostic Methods for Fish Diseases with an emphasis on PCR testing.

The class is intended to 1) improve the understanding of molecular methods as diagnostic tools and how to interpret the results, 2) to stimulate thought and discussion about choosing the appropriate test for various purposes and situations, and 3) to facilitate moving new tests from the development stage to disseminated appropriate and practical field applications.

The class will include insight from several presenters who have developed and adapted tests to specific situations, a review of what uses are practical now and in the near

future for the various fish health laboratories, and a tour of a lab at OSU for those who would like to see PCR equipment and reagents, or who want ideas on logistic requirements for setting up their own lab.
Cost for the one day class ------$40.
Register for the class on the meeting registration form.

Scholarships for Students and Veterinarians to Present at the Western Fish Health Workshop

There are a limited number of scholarships available for travel to the workshop for students who will be presenting papers, and veterinarians who will present case studies. The fund that supports this travel was developed for the 2001 meeting in Victoria B.C., with the hope of encouraging veterinarians in private practice and students to become involved. The amount of funding will depend on the number of applications, but is expected to be approximately $200 USD. To apply for these funds, please send your name, status (student or veterinarian) and title of presentation to me by email or regular mail (address below). After the program is completed I will notify the awardees.

Jerri Bartholomew
Center for Fish Disease Research
Department of Microbiology, Nash Hall 220
Oregon State University
Corvallis, OR 97331-3804
Phone: 541-737-1856
Fax: 541-737-0496
Email: bartholj@orst.edu

THE POLYCLONAL BKD-ELISA REVIEW

An update session on the polyclonal BKD-ELISA will be held at the Western Fish Disease Conference in Corvallis, Oregon, June 24-26. This session will follow the presentations on the last day. New ELISA information will be presented at the conference and expounded on during the review session. Ron Pascho, Western Fisheries Research Center, Seattle, WA, will lead the session with a background of what has happened over the years, where we stand now with the development of new commercially available antibody sets, and recommendations on a standard protocol. If there are any questions, please contact Roberta Scott, Idaho Fish and Game Department, Eagle Fish Health Lab, (208) 939-2413 or email: rscott@idfg.state.id.us

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AFS/FHS Western Fish Disease Workshop

June 24 – 26, OSU, Corvallis, OR

Registration Form, DUE June 15, 2002

Name: _____

Organization: _____

Address: _____

City/State/Zip: _____

Phone/Fax: _____ Email: _____

Title of presentation: _____

_____

Paper _____ Poster _____ Case Report _____ Student presentation: _____

Note: Abstracts (optional) are due June 1 and should be sent separately by email to: Michael Kent: kentm@orst.edu

Fees

FHS/AAVBC members	$30	_____
Additional adults for dinner	$15/person	_____
Additional children for dinner	$10/person	_____
Continuing Ed. session on Mon.	$40	_____

Mail this form with payment to:

Michael Kent
220 Nash
Oregon State University
Corvallis, OR 97331-3804

OR register via email and pay when you arrive.

Third Announcement
Please Note New Dates

The 5th International Symposium on Viruses of Lower Vertebrates: Comparative Virology of Amphibians, Reptiles and Fish
Seattle, Washington, USA
August 27 - 30, 2002

The 5th International Symposium on Viruses of Lower Vertebrates will build upon the successes of earlier Symposia held in Munich, Germany (1988), Corvallis, USA (1991), Jouy-en-Josas, France (1995), and Weymouth, England (1998). The main purpose of the 5th International Symposium is to bridge the gaps between classical "host-oriented" research on the viruses of amphibians, reptiles and fish, and to provide ample opportunity for discussions of a comparative nature. The event will give scientists interested in viruses of amphibians, reptiles and fish the opportunity to discuss recent research findings in a fruitful, friendly atmosphere. The 3day scientific program will include sessions on pathogenesis, immunity, structural biology, molecular biology, virus evolution, and emerging viruses of lower vertebrate hosts.

The Symposium, originally planned for May, will be held at the Bell Harbor International Conference Center in Seattle, Washington on August 27 - 30, 2002. The new dates were selected to ensure that travel disruptions following the events of September 11, 2001 had subsided and to allow international scientists to attend the Seattle meeting just prior to the International Symposium on Aquatic Animal Health in New Orleans.

Registration for the Symposium is being managed by Convention Services Northwest. Conference registration and complete information about the Symposium are available via the Web at http://www.regweb.com/csnw/isvlv. The cost of the meeting will be $325.00 per person ($375.00 after August 1, 2002) and includes an opening reception, all lunches, and a traditional northwest Native American dinner and show at Tillicum Village. Abstracts are due July 31, 2002.

For more information please contact:
James Winton or Gael Kurath
Western Fisheries Research Center
6505 NE 65th Street
Seattle, WA 98115 USA
E-mail: jim_winton@usgs.gov; gael_kurath@usgs.gov
Phone: 1-206-526-6587; FAX: 1-206-526-6654

CONTINUING EDUCATION OPPORTUNITY: INFECTIOUS DISEASES OF FISHES

American Fisheries Society's 132nd Annual Conference, Baltimore, Maryland August 17th
Instructors: Jerri Bartholomew, Beth MacConnell, Paul Bowser

This course is designed to provide a general education in the areas of fish health for individuals who work as field biologists, fish culturists, and managers. It is important that, in addition to fish health professionals, persons involved in fish culture or in the management of wild fisheries be able to recognize the signs of disease and properly prepare samples for clinical assay. As a basis, this course will rely on a video to demonstrate techniques for necropsy and the collection of samples; the video will also introduce bacteriology, virology and parasitology. Although the video portion of this course illustrates these topics using salmon, the course will include other cultured and wild species of fish. Time will be devoted to lecture and discussions expanding on the following topics :

- The proper collection of samples and preparation of samples for clinical assay, including necropsy, aseptic methods, and sample storage.
- The different pathogen groups and how they are diagnosed, including discussion of both salmonid and non-salmonid pathogens of regional and national significance.
- How to respond to field and culture situations where a disease outbreak is in progress.
- The role of water quality in relation to fish health.

Announcement of an AFS symposium entitled "Propagated Organisms in and for Aquatic Resource Management"

This proposed symposium will be held during the summer or fall of 2003, but the date and location are pending. This 2003 symposium will be the third AFS symposium related to "appropriate use of cultured fishes"; the earlier symposia published by AFS were Stroud (1986) and Schramm and Piper (1995). An official "call for papers" will be issued during the next few weeks.

The purpose of this symposium is to describe effective roles of cultured fishes in aquatic resource management. This will include identification of major issues and review of current status and trends in fisheries and aquatic resource management. The goal is to bring resource management issues before a body of scientists and resource managers with a full spectrum of professional perspectives. The target audience includes resource managers, educators, planners, scientists, and environmentally concerned citizens.

Why is another symposium needed? The 1994 symposium ("Uses and Effects of Cultured Fishes in Aquatic Ecosystems") delineated a myriad of issues pertinent to responsible fisheries and aquatic resource stewardship. While the 1995 publication has served as the best reference to date, it nevertheless has some weaknesses (e.g., fish health issues were not presented). Additionally, science-based fisheries management findings have continued to provide new information to strengthen the decision making of natural resource agencies.

This symposium provides an opportunity for presentation and discussion of fish health issues related to use of cultured organisms in aquatic resource management. If you would like to present a paper, have suggestions for topics to be included, or have questions, please contact John Grizzle (jgrizzle@acesag.auburn.edu; phone 334 844 3474), who is the FHS representative to the organizing committee.

Call for Fish Health Section Awards

S.F. Snieszko Distinguished Service Award - the highest award of the FHS. Dr. S.F. Snieszko stands as one of the most prominent figures in the establishment of the modern fish health sciences in the U.S.A. and internationally. This award is presented to individuals to honor their outstanding accomplishments in the field of fish health. This is a career achievement award. The nomination must be made by a current member of the FHS to the awards committee. The nomination should consist of a current curriculum vitae of the nominee, a letter of nomination and six letters of recommendation that support the nominee's dedication and contributions to research, teaching and/or service in fish health.
Nominations will be accepted until May 15, 2001. For a list of previous awardees, go to the FHS website at: http://www.fisheries.org/fhs/sniezko.htm

Special Achievement Award - award for a significant accomplishment in the field of fish health. This award is presented to a FHS member who has in the past year made a significant accomplishment in basic or applied fish health. The achievement must meet a high standard of science as determined by peer review. Candidates for this award must be nominated by a current FHS member. The letter of nomination should state the accomplishment, its importance to the science of fish health, and the implications of the accomplishment (regional, national or international). Copies of articles and other supporting documents should be submitted with the nomination. The nomination may be submitted any time within one year of the accomplishment to the awards committee.

S.F. Snieszko Student Travel Award - award to provide funding for a student to attend and to present a research paper at the annual national FHS meeting. Student should sent the abstract of the paper to be presented, a travel budget, and a letter of support from the sponsoring faculty member.

Send nominations for all awards by May 15 to:
Dr. Beverly A. Dixon, FHS Awards Committee,
Department of Biological Sciences
California State University
Hayward, CA 94542
E-mail: bdixon@csuhayward.edu

FHS Student Paper Award - an award will be presented to a student whose paper is being presented at the International Meeting held in New Orleans. Selection will be made by 3 judges, based on (a) scientific content, (b) scientific merit of the research, (c) originality and (d) quality of presentation. Please note on your application if you wish to have your paper judged.

WHIRLING DISEASE REVIEWS AND CURRENT TOPICS

Symposium Number 29
Edited by Jerri Bartholomew and Chris Wilson
(Release date: May 2002)

This book is a compilation of the latest whirling disease research findings, along with seven invited review papers. It represents a peer-reviewed version of the proceedings of the seventh annual Whirling Disease Symposium held in February 2001, in Salt Lake City.

It is also much more than that, given the value of its extensive and thoroughly-researched review papers.
The volume will be a valuable resource for researchers in the field as well as a reference volume for managers who have to make decisions on controlling whirling disease. This volume includes chapters on:
The History of the Dissemination of Whirling Disease
The Ecology of Myxobolus cerebralis
Whirling Disease Prevention, Control, and Management
Effects of Myxobolus cerebralis on the Salmonid Host
Critique of Methods of Sampling and Reporting Pathogens in Populations of Fish
Effect of Water Quality Variables on Viability of the Myxobolus cerebralis Actinospore

List Price: $69
Member Price: $48
Members Save: $19
ISBN# 1-888569-37-9
Stock Number: 540.29
After May 1, please look for this book on the AFS Online Bookstore at:
www.fisheries.org/cgi-bin/hazel-cgi/hazel.cgi

American Type Culture Collection

If you're looking for a microbe, cell line, or clone to use in your research, ATCC may have what you need. ATCC (American Type Culture Collection) is the world's largest biological resource center, whose mission is to store and distribute cell lines, microbes, and genomic materials to scientists around the world. ATCC now has a list of products useful to aquatic biologists. See the Web site at www.atcc.org to download this brochure.

FHS Nominations:

The following members were contacted by the Nominations Committee, and have agreed to serve the FHS in the positions listed:

Vice-President: John Grizzle

John M. Grizzle is a Professor in the Department of Fisheries and Allied Aquacultures at Auburn University, Auburn, Alabama. He received a B.S. and M.S. in Zoology from Oklahoma State University and received a Ph.D. in Fish Pathology from Auburn University. John was certified in 1982 as a Fish Pathologist by the Fish Health Section, and his certification was renewed in 1987, 1992, and 1997. His primary research interests include fish pathology, histology, and environmental effects on fish health, and he has published over 100 journal articles. He teaches graduate courses in fish pathology and fish anatomy and physiology. John's service activities for Auburn University include directing the Fish Disease Diagnostic Laboratory, and presenting continuing education courses. From 1983-1990, John was faculty advisor to the Auburn University Student Chapter of AFS, and he has served as President of the Alabama Chapter of AFS (1994-95). His AFS activities also include co-editing the Journal of Aquatic Animal Health from its founding in 1988 to 1995 and serving on several Fish Health Section committees. Most recently, he was a member of the FHS Professional

Standards Committee (chair, 2000-2001). Other recent AFS activities include chair of the Publications Awards Subcommittee for the Journal of Aquatic Animal Health (2001) and member of the AFS Book Editorial Advisory Board (1997 to present).

Secretary/Treasurer: Ken Cain

My education background includes a B.S degree in Fisheries and an M.S degree in Aquaculture (fish nutrition) from Michigan State University. After working for a period of time in private aquaculture I returned to pursue graduate school and received a Ph.D. in Fish Health/Immunology from Washington State University in 1997. Following this I accepted a postdoctoral position at the University of Technology in Sydney, Australia where I worked on defining specific aspects associated with stimulating a mucosal immune response in fish. I am currently an assistant professor in the Department of Fish and Wildlife at the University of Idaho. My primary research interests focus on enhancing immunity in relation to aquaculture vaccine development. I have a strong interest in identifying underlying mechanisms required to stimulate a protective immune response in fish. In addition, I am involved in projects aimed at better managing fish populations in relation to disease threat, and in devising fish health management strategies that limit disease incidence among cultured species. I have been a member of the Fish Health Section for approximately 10 years, and would welcome the chance to serve as Secretary/Treasurer for the section.

Nominations Committee: Gael Kurath

Gael Kurath is a research microbiologist with the USGS Western Fisheries Research Center in Seattle Washington. Her research involves molecular biology of fish viruses, focusing on molecular epidemiology, evolution, and DNA vaccines for control of infectious hematopoietic necrosis virus. She received her Ph.D. in 1984 from the Oregon State University Department of Microbiology, and she looks forward to an opportunity to get more involved with the AFS Fish Health Section.

Technical Standards: Vote for One

Diane Elliott: Diane Elliott works as a Research Microbiologist for the Western Fisheries Research Center (Biological Resources Discipline, U.S. Geological Survey) in Seattle, Washington. The majority of her research at the WFRC has concerned the diagnosis, pathogenesis, and control of salmonid bacterial kidney disease caused by *Renibacterium salmoninarum*. Diane received her Ph.D. degree from the University of Washington School of Fisheries, and is a Certified Fish Pathologist (FHS/AFS). She has held various committee assignments within the FHS, including a Blue Book revision committee (4th edition).

John Wood: John Wood is the founder and president of Pisces Molecular, a fish health products and diagnostic services company in Boulder, CO. He received a B.S. in Biology from Stanford in 1975 and a Ph.D. in Molecular Genetics from the University of Washington in 1981. Prior to switching focus to fisheries and fish diseases in 1995, much of his career has been in human molecular biology at both large pharmaceutical and small biotechnology companies. Since its founding in 1996, Pisces has become one of the leading commercial enterprises focused on developing and applying molecular techniques to problems of fish health. Pisces was instrumental in proving the reliability and accuracy of PCR testing for detecting trout Whirling Disease and is the leading provider of PCR testing services to state agencies, environmental groups, and private hatcheries with more than 30,000 samples tested to date. Through Pisces, Dr. Wood continues to develop and validate molecular assays for infectious diseases in a wide variety of aquatic species.

Professional Standards: Vote for one

Becky Lasee: Becky Lasee works as a Fishery Biologist (Assistant Project Leader) for the La Crosse Fish Health Center (U.S. Fish and Wildlife Service) in Onalaska, Wisconsin. Principle duties of her position include performing and supervising fish health inspections, diagnostics, histopathology, parasitology and overseeing the National Fish Health Survey in the Midwest. She also instructs U.S. Fish & Wildlife courses in Fish Health Management and serves as Adjunct Graduate Faculty for the University of Wisconsin-La Crosse where she co-instructs Aquatic Animal Health and Parasitology courses. Her research interests are on histopathological effects of parasites on fish, community structures of helminths and nonlethal detection methods. Becky received her Ph.D. degree in Fisheries from Iowa State University.

J. Scott Foott: I am the project leader at the U. S. Fish & Wildlife Service California – Nevada Fish Health Center, a member of the Service's Fish Health Policy Committee, and have been a fish health biologist for 15 years. I am an AFS-FHS certified Fish Pathologist and have served on the FHS Professional Standards Committee from 1994 – 1999. My research interests include physiological evaluation of fish exposed to adverse water quality, histopathology, and diagnostics.

Submitted : Beverly Dixon, Chair
Nominations Committee

FISH HEALTH SECTION **Election 2002** **Ballot of Candidates**
Please signify your choice with an **X**

Vice-President
John Grizzle _____
Other _____

Secretary/Treasurer
Ken Cain _____
Other _____

Nominations Committee
Gael Kurath _____
Other _____

Technical Standards Committee (vote for one)
Diane Elliot _____
John Wood _____

Professional Standards Committee (vote for one)
Scott Foott _____
Becky Lasee _____

Please download the ballot, vote, and mail or email the ballot to:
Beverly Dixon
Department of Biological Sciences
California State University
Hayward, CA 94542
bdixon@csuhayward.edu
THANK YOU for your participation.

FHS PARTICIPATION IN THE AAVLD / USAHA ANNUAL MEETINGS

Scott LaPatra

As reported in the last issue of the newsletter, for the last five years I attended and participated in the United States Animal Health Association (USAHA) and the American Association of Veterinary Laboratory Diagnosticians (AAVLD) annual meeting. Last year the meeting was held in Hershey, Pennsylvania and the AAVLD and the USAHA Aquaculture Committees met jointly and were chaired by Dr. Randy White representing the AAVLD and myself representing USAHA. Three resolutions were supported by the committee and were also approved by the Executive Committee of the USAHA. The resolutions and the responses from the appropriate agency or organization are listed below. The next annual AAVLD/USAHA Meeting is scheduled for October, 2003 in St Louis, Missouri. If you have any ideas, questions or need for additional information please don't hesitate to contact myself or any of the other members of the FHS Executive Committee.

UNITED STATES ANIMAL HEALTH ASSOCIATION - 2001

RESOLUTION NUMBER:	**2**
COMMITTEE:	**AQUACULTURE COMMITTEE**
SUBJECT:	**SIGNIFICANCE OF AQUATIC ANIMAL PATHOGENS IN AQUACULTURE EFFLUENTS**
DATE:	Hershey, Pennsylvania - November 1- 8, 2001

BACKGROUND INFORMATION:

On January 21, 2000 the United States Environmental Protection Agency (EPA) announced its decision to promulgate national effluent standards for aquaculture operations. Included within this decision, EPA was to evaluate aquatic animal pathogens in effluents. Guidelines and regulations are needed to safeguard human health, habitat, and native species, however, there are no standardized procedures to determine the presence and/or the concentration of aquatic animal pathogens (if present) in effluents and there are no practices currently in use to control the discharge of aquatic animal pathogens in effluents of commercial or public aquaculture facilities. In assessing the risks of aquatic animal pathogens that may occur in aquaculture effluents, the characteristics of the pathogen must be considered including their abilities to multiply and remain viable in water, survival times outside the host, and the numbers of infectious units required to cause disease. In addition, fish species present in waters receiving discharged effluents, and their inherent susceptibility to agents present in effluents (if any) should be considered. Environmental considerations also must be included such as the effects of season, hydrography and water quality on the survivability of potential pathogens and risks of transmission to susceptible species. Hence, a complete and likely complex analysis is required to assess environmental impacts of potential pathogens in effluents. Such an analysis will be difficult given the lack of available credible scientific information and the inherent variation in agent types and numbers, aquatic animal hosts present, and the type of natural ecosystem or artificial culture environment present.

RESOLUTION:
United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS) to seek authority and funding to work with the Environmental Protection Agency (EPA) and federal and state natural resource agencies to define risk-assessment procedures to determine the significance of aquatic animal pathogens in aquaculture effluents. Additionally, USAHA encourages USDA, APHIS, VS to utilize data generated by the United States Fish and Wildlife Service's national survey of pathogens present in free-ranging aquatic animals.

REPSONSE:
The Animal and Plant Health Inspection Service (APHIS) currently has authority and responsibility to address animal diseases, and animal pathogens of livestock and poultry. This authority and responsibility includes aquaculture. APHIS would need additional funding to define risk assessment procedures for determining the significance of aquatic animal pathogens in aquaculture effluents. However, APHIS does not agree that a pathogen should be considered a pollutant. APHIS will provide comments to the Environmental Protection Agency's proposed health management plan for human pathogens associated with flow-through and recirculating systems as they may relate to animal diseases. Any data that the United State Fish and Wildlife Service (ISFWS) would choose to provide to APHIS regarding aquatic pathogens in the wild would be appreciated and reviewed.

UNITED STATES ANIMAL HEALTH ASSOCIATION - 2001

RESOLUTION NUMBER:	**3**
COMMITTEE:	**AQUACULTURE COMMITTEE**
SUBJECT:	**DEVELOPMENT OF A NATIONAL AQUATIC ANIMAL HEALTH PLAN**
DATE:	Hershey, Pennsylvania - November 1- 8, 2001

BACKGROUND INFORMATION:
There are three major reasons to develop a national plan prioritized as follows: to prevent introduction of economically damaging foreign animal diseases and control of economically significant emerging infectious diseases, to facilitate export of US aquatic animals and products, and to facilitate interstate movement of aquatic animals and products while protecting our natural resources. Prevention of exotic economically damaging diseases is the most significant need. Changes in the international movement of aquatic animals, greater diversity of aquatic animals raised for commercial purposes and greater intensification have seemingly increased the possibility that exotic pathogens (either foreign animal disease or those arising for the first time from US aquacultured animals) could significantly impact one or several aquaculture industry sectors and our natural resources. Recent detection of several shrimp viruses, a rickettsial agent affecting tilapia, and infectious salmon anemia virus highlight this possibility. Discrimination of which pathogens meet the criteria for significant economic impact and selection of appropriate methods of control will require a carefully constructed framework, which relies on risk-based analysis. A health plan should be

developed that provides for flexibility as scientifically sound data accrues. This flexibility is particularly important for new emerging diseases where little information is available.

RESOLUTION:
The United States Animal Health Association (USAHA) encourages the Joint Subcommittee on Aquaculture, National Aquatic Animal Health Task Force on Aquaculture to develop a national aquatic animal health plan.

RESPONSE:
The National Aquaculture Association supports USAHA position to develop a national aquatic animal health plan and encourages USAHA to forward this resolution to Mr. Bobby Acord or Dr. John Clifford at APHIS. Dr. Clifford is the chairman of the JSA effort.

UNITED STATES ANIMAL HEALTH ASSOCIATION - 2001

RESOLUTION NUMBER:	**4**
COMMITTEE:	**AQUACULTURE COMMITTEE**
SUBJECT:	**CONTROL STRATEGIES FOR INFECTIOUS SALMON ANEMIA IN THE NORTHEASTERN UNITED STATES**
DATE:	Hershey, Pennsylvania - November 1- 8, 2001

BACKGROUND INFORMATION:
Aquaculture is agriculture and salmon aquaculture is a multi-million dollar industry in the United States. The reported farm gate value of Maine aquaculture is $ 100 million annually. Infectious Salmon Anemia (ISA), a disease caused by Infectious Salmon Anemia Virus (ISAV), is economically devastating to salmon aquaculture. ISA is recognized as a foreign animal disease and has been diagnosed on Maine salmonid fish farms.

RESOLUTION:
The United States Animal Health Association (USAHA) requests United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to:

1) Define its regulatory authority in aquaculture with respect to aquatic animal health.
2) Consider a response to the diagnosis of Infectious Salmon Anemia (ISA) in the United States similar in to the response to the diagnosis of a foreign or emerging livestock or poultry disease.
3) Endorse, modify or prepare an alternative to Maine Department of Marine Resources and the Maine Department of Inland Fisheries and Wildlife ISA Action Plan.
4) Provide financial, logistic and personnel resources to support Maine's ISA surveillance and biosecurity efforts.

5) Implement an indemnity plan.
6) Provide additional diagnostic laboratory support and training to existing United States laboratories for ISA and other aquatic animal diseases.
7) Address the issue of importation of potentially infected waste and fresh/frozen product from known infected areas.

RESPONSE:

The Animal and Plant Health Inspection Service (APHIS) agrees that prevention of exotic economically and ecologically damaging diseases is the most significant need facing the aquaculture industries and natural resources. APHIS agrees that a national aquatic animal health program should address: the prevention of the introduction of economically and ecologically damaging foreign animal diseases and significant emerging infectious diseases; the facilitation of exportation of U.S. aquatic animals and animal products; and the facilitation of interstate movement of aquatic animals and animal products. APHIS' authority with respect to aquatic animal health is being further clarified in the Animal Health Protection Act that is now before Congress. APHIS has responded to the diagnosis of infectious salmon anemia (ISA) through publishing a notice in the Federal Register on December 20, 2001, from the Office of the Secretary, that an emergency threatens the aquatic livestock industry of this country. As a result, United States Department of Agriculture funds were made available to establish an ISA program to address the threat to the U.S. salmonid industry.

Approximately $8.3 million has been authorized for APHIS, Veterinary Services (VS) to implement an ISA control and indemnity program for farm-raised salmon in the United States, effective as of December 13, 2001. In addition to the payment of indemnity, these funds are to be used to assist the State of Main with program activities such as: depopulation and disposal; clean up and disinfection; establishment of surveillance programs; epidemiology and diagnostic support; and training for producers and veterinarians. Maine has taken steps to prevent the spread of ISA; however, Federal assistance is deemed necessary to effectively control this disease, which poses a threat to animal health and the U.S. economy.

As of December 2001, 14 marine netpen sites in Maine were confirmed to have been infected. Currently all of the infected netpen sites have been depopulated of fish from Cobscook Bay. Cleaning and disinfection in now in progress at the netpen sites.

Our goal is to control and contain the ISA virus through rapid detection and depopulation of salmon that have been infected with or exposed to ISA. It is believed that the virus can be controlled within high-risk zones through surveillance, vaccination, and best management practices. ISA control requires depopulation of all pens holding infected fish. Indemnification is necessary to provide an incentive for salmon farmers to report diseased fish and to continue testing.

APHIS, VS is publishing an interim rule amending Part 53 of our regulations to detail this new ISA Control and Indemnity Program. APHIS, VS has an approved APHIS lab to perform diagnostics for ISA. The National Veterinary Services Laboratories is performing confirmatory testing on the approved lab results. APHIS, VS has written a final draft of the ISA Standards Plan with assistance of the Maine Department of Marine Resources, Maine Department of Inland Fisheries and Wildlife, and the Main Aquaculture Association.

Elevated temperature exacerbates *Ichthyophonus* infections in buffalo sculpin

C.M. Halpenny, R.M. Kocan, J.R. Winton, J.A. Perry, and P.K. Hershberger

High incidences of *Ichthyophonus hoferi*, a parasite primarily of marine and estuarine fishes, have recently been reported in rockfishes and Pacific herring from the eastern North Pacific (Kent et al 2001, Hershberger et al 2002). Taxonomic position of *I. hoferi* remains unresolved, but recent phylogenetic studies have grouped the organism with *Dermocystidium, Psorospermium,* the rosette agent of salmonids, and *Rhinosporidium* in the Mesomycetozoa, a novel clade of protists near the animal-fungal divergence (Herr et al 1999). Genetic differences among isolates from the east coast of North America indicate that more than one species of *Ichthyophonus* exist (Rand et al 2000), and different species have likely been assigned the same name based on morphological characteristics. Therefore, hereafter in this manuscript, the organism will be referred to as *Ichthyophonus*.

Due to the chronic nature of the disease, *Ichthyophonus*-infected hosts may survive for extended periods with little or no deleterious effects; however, *Ichthyophonus* infections can cause significant pathological changes and mortality in the host. Among wild fishes, epizootics have been reported in Atlantic herring (*Clupea harengus*), alewife (*Alosa pseudoharengus*), Atlantic mackerel (*Scomber scombrus*) and yellowtail flounder (*Pleuronectes ferrugineus*) (McVicar 1999). Environmental and/or physiological conditions responsible for exacerbating chronic infections to become overt disease, culminating in mortality to the host, remain undetermined.

A laboratory study was conducted to determine whether elevated temperatures result in increased intensity of infection among *Ichthyophonus*-infected buffalo sculpin (*Enophrys bison*). The *Ichthyophonus* cultures used in the challenge study were initially isolated from Pacific herring (*Clupea pallasi*) captured from Puget Sound, WA on September 24, 2001. Prior to experimental challenge, spore viability was demonstrated by initiating hyphenation and re-sporulation; spores were passed through one pH cycle of 7.6→3.5→7.6 in Eagle's Minimum Essential Medium supplemented with 5% fetal bovine serum, 100 IU/mL penicillin, 100 µg/mL streptomycin, and 100 µg/mL gentamycin (MEM). Each of 60 buffalo sculpins were infected by intraperitoneal (IP) injection of approximately 1250 transparent *Ichthyophonus* spores suspended in 0.05 mL phosphate buffered saline (PBS). Forty additional sculpins served as controls and were injected (IP) with PBS. All fish were then acclimated in flow-through tanks supplied with ambient (10°C) seawater for 7d, after which 20 PBS-control sculpins and 40 *Ichthyophonus*-challenged sculpins were transferred to a tank maintained at 16°C - 18°C. The remaining 20 sculpins in each group were maintained in a tank supplied with 10 °C seawater.

Subsamples of fish from each treatment group were euthanized with an overdose of tricaine methanesulfonate (MS-222), necropsied, and assayed for *Ichthyophonus* 14 d and 20 d post-challenge. The experiment was terminated 26 d post-challenge when all remaining fish were similarly sampled. Mortalities that occurred within 7 d post-challenge were considered a result of handling stress and omitted from the data; those

that occurred after 7 d were included. Upon necropsy, infections were characterized as clinical if *Ichthyophonus* spores / nodular lesions were detected on the surface of the heart and / or liver (50X magnification). Heart and liver from all necropsied fish were cultured in MEM, scanned at 50X magnification, and verified *Ichthyophonus*-positive at 100X magnification after 5, 10, and 15 d. Infections were characterized as sub-clinical if no clinical signs were detected at time of necropsy but *Ichthyophonus* was detected in primary organ cultures.

Comparisions of proportions were conducted using a binomial comparison of proportions followed by the Tukey test; significance was assigned to comparisons with $p \leq 0.05$.

Prevalences of clinical infection and total infection (clinical + subclinical) were significantly greater ($p<0.05$) among *Ichthyophonus*-challenged buffalo sculpins maintained at 16-18°C (48%, 16/33 and 76%, 25/33; respectively) than among those maintained at 10 °C (11%, 2/19; and 47%, 9/19 respectively). Clinical signs of infection were not detected, nor was *Ichthyophonus* isolated from PBS-injected, control sculpins maintained at 10 °C or 16-18 °C (Figure 1). Among challenged buffalo sculpins maintained at 10 °C, prevalence of *Ichthyophonus* decreased from 60% at day 14 d to 29% at day 26; however, among those maintained at 16-18 °C, prevalence of *Ichthyophonus* remained between 67-100% throughout the study period (Table 1).

Reasons for elevated prevalence and severity of infection with increasing temperature were likely the result of differences in the host immunological responses and / or increased parasite growth rates. Normal host inflammatory response to *Ichthyophonus* infections consists of fibroblasts, macrophages, and eosinophilic granular cells forming well-defined, focal granulomas around single or multiple spores (McVicar 1999, Hershberger et al 2002). In response to ambient temperatures above their normal optima, fishes often produce elevated levels of circulating hormones, including corticosteroids and heat-shock proteins that can have a suppressive effect on the cellular immune system. Preliminary studies from our laboratory indicate increased intensities of infection among *Ichthyophonus*-infected starry flounders (*Platyichthys stellatus*) exposed to synthetic corticosteroids compared to the control groups not exposed to corticosteroids. Alternatively, it is possible that the growth rate of *Ichthyophonus* is directly related to temperature, allowing faster parasite germination in fish maintained at warmer temperatures. The apparent decrease in infections among *Ichthyophonus*-challenged buffalo sculpins maintained at 10 °C throughout the study period (Table 1) was either a result of sufficient host response to clear the parasite or an artifact of small sample sizes (n=5-7).

Although buffalo sculpin have not been reported as natural hosts for *Ichthyophonus* to date, we have demonstrated that they are susceptible to infection. Buffalo sculpin likely come in contact with known carriers in the eastern north Pacific region including Pacific Ocean perch (*Sebastes alutus*), yellowtail rockfish (*S. flavidus*), canary rockfish (*S. pinniger*), yellowmouth rockfish (*S. reedi*), Puget Sound rockfish (*Sebastes emphaeus*), staghorn sculpin (*Leptocottus armatus*), longhorn sculpin (*Myoxocephalus octodecemspinosus*), speckled sand dab (*Cithanichthys stigmaeus*), tom cod (*Microgadus proximus*), surf smelt (*Hypomesus pretiosus*), and Pacific herring (*Clupea pallasi*) (Olson 1986, Kent et al 2001, Hershberger et al 2002). If *Ichthyophonus* were to become established in buffalo sculpins and other tidepool or intertidal fishes, it would likely have a detrimental effect on the overall health of the host due to the temperature extremes encountered in these habitats.

Additional studies are currently underway to examine the effects of elevated temperature on disease progression and cellular immune response in *Ichthyophonus*-infected salmonids.

Acknowledgements

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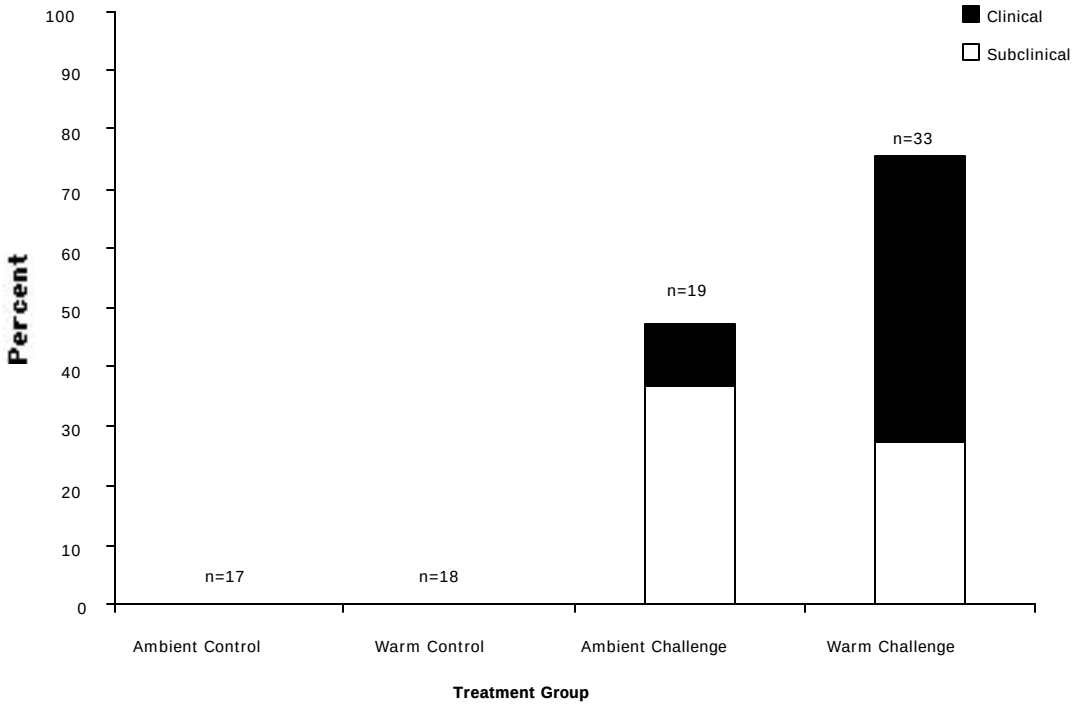

Figure 1- Total *I.hoferi* infection (clinical and subclinical) in each treatment group at the end of the challenge study.

Table 1. Time series of *Ichthyophonus* prevalence and intensity in challenged sculpins.

Days post-challenge	Temperature Group	% with Clinical Infection	% Total Infection (Clinical + Subclinical)
14	Ambient (10 °C)	20% (1/5)	60% (3/5)
	16-18 °C	14% (1/7)	71% (5/7)
20	Ambient (10 °C)	14% (1/7)	57% (4/7)
	16-18 °C	75% (6/8)	100% (8/8)
26	Ambient (10 °C)	0% (0/7)	29% (2/7)
	16-18 °C	50% (9/18)	67% (12/18)

rDNA sequence analysis indicate that *Ichthyophonus* from rockfishes is different from Pacific herring and chinook salmon isolates

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Ichthyophonus hoferi (sensu lato) has very broad host specificity, and the disease has been reported from a wide variety of marine fishes (McVicar 1999). Perhaps *Ichthyophonus* from various hosts and regions actually represent an assemblage of many morphologically similar species. Rand et al. (2000) described a new species, *I. irregularis*, from the yellowtail flounder (*Limanda ferruginea*) based on rDNA sequence comparisons and certain developmental characteristics. A better understanding of the phylogenetics and taxonomy of *Ichthyophonus* would be useful for elucidation of the pathogenecity, host range, and geographic distribution of the organism. In addition, as *Ichthyophonus* can be transmitted by eating infected tissues (Kocan et al. 1999), an understanding of hosts ranges within an area might elucidate possible reservoirs of the infection and routes of transmission.

We are interested in *Ichthyophonus* of Pacific rockfishes (*Sebastes* spp.) because some rockfish species show prevalences around 50% (Kent et al. 2001). As morphological criteria offer little information for distinguishing strains of *Ichthyophonus*, we utilized 18S rDNA sequence analysis to compare the isolates of *Ichthyophonus* from the following hosts: two Pacific Ocean perch (*Sebastes alutus*) from Oregon; a yellowtail rockfish (*Sebastes flavidus*), a Pacific Ocean perch, and three Pacific herring (*Clupea pallasi*) from British Columbia; and three adult chinook salmon (*Oncorhynchus tshawytscha*) from the Yukon River. Also included in the analysis were north Atlantic Ocean isolates of *Ichthyophonus* obtained from GenBank (*I. hoferi* from yellowtail flounder # U25637, and Atlantic herring, *Clupea harengus*, # U43712; *I. irregularis* from yellowtail flounder # AF232303).

Results to date (based on comparisons of about 1,200 bp) showed that the rockfish isolates from both B.C. and Oregon were all identical and distinct from the Pacific herring isolates. Furthermore, the Pacific herring isolates were identical to those from salmon, and interestingly, very similar to the sequences in GenBank from the Atlantic Ocean. This suggests that *Ichthyophonus* from rockfish may be a distinct species, or at least a different strain, from *I. hoferi* of herring.

Although the rockfish species, Pacific herring, and chinook salmon might be considered sympatric as they all occur in the northeastern Pacific Ocean, ecological separation of the host species may have allowed genetic differences between the isolates of *Ichthyophonus* to accumulate over time. This explanation seems plausible in light of the fact that chinook salmon feed extensively on Pacific herring (Heal 1991). In contrast, the main diet of Pacific Ocean perch and yellowtail rockfish is euphasids. *Ichthyophonus* has been observed in many fishes, and other vertebrate classes (including fish eating birds) (McVicar 1999). It would be useful to expand the molecular analysis to other hosts and geographic regions, and we welcome collaborations with researchers or diagnosticians with access to other isolates.

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Clarification of the Systematics of Piscirickettsia salmonis

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Bergey's Manual of Systematic Bacteriology, Second Edition, Volume One became available in 2001. It contains a complete taxonomic outline of the bacteria that will be used in each volume of the Second Edition and includes *Piscirickettsia salmonis*. Volume Two will appear approximately September 2002. In Volume Two the systematics of *Piscirickettsia salmonis* is reviewed and the changes in classification are described. The reclassification is presented in two chapters submitted by J.L. Fryer and C.N. Lannan. The first titled Family Piscirickettsiaceae describes a new family that contains *Piscirickettsia* and four other genera. The second chapter is titled *Piscirickettsia* and describes the genus and the only species, *salmonis*. *Piscirickettsia salmonis* is the etiological agent of the disease Piscirickettsiosis in fish. Classification of *P. salmonis* is based on the 16S rRNA gene sequence which conforms to the secondary structural models for the Gammaproteobacteria. Members of the *Rickettsia* belong to the Alphaproteobacteria.

This change places *Piscirickettsia* in the Order Thiotrichales and Family Piscirickettsiaceae. Its nearest relatives, although somewhat distantly related, are *Francisella*, *Legionella* and *Coxiella* all three are important human pathogens. These alterations in taxonomy confirm that *Piscirickettsia salmonis*, while "rickettsia-like," **is not a *Rickettsia***.

Fish Health Newsletter – Editorial Policy

The *Fish Health Newsletter* is a quarterly electronic publication of the Fish Health Section of the American Fisheries Society and is available for downloading in Adobe pdf file format. Submissions on any topic of interest to fish health specialists and preliminary case reports are encouraged with the understanding the material is not peer- reviewed. Abstracts submitted to the *Journal of Aquatic Animal Health* are also encouraged. Submissions must be formatted in Microsoft Word, WordPerfect, or Rich Text Format, and can be sent by electronic mail or via 3.5" floppy disk to the editor's address below. **Graphics files should be sent separately in jpeg format.**

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