Fish Health Newsletter

Fish Health Section/American Fisheries Society

January 2001 **Volume 29, Issue 1**

IDENTIFICATION OF AN IRIDOVIRUS IN CULTURED PALLID (SCAPHIRHYNCHUS ALBUS) AND SHOVELNOSE STURGEON (S. PLATORYNCHUS)

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A new viral pathogen, similar in appearance to the white sturgeon iridovirus (WSIV), has been identified in Missouri River sturgeon. The restoration and recovery plan for endangered pallid sturgeon, *Scaphirhynchus albus*, calls for the stocking of juvenile fish in several upper Missouri River Basin sites. Wild adult pallid sturgeon and shovelnose sturgeon, *S. platorynchus,* are collected in the fall or spring, transported to hatcheries, spawned and eventually returned to the confluence of the Missouri and Yellowstone Rivers. Disease outbreaks and subsequent detection of a new virus in progeny from wild adults occurred in 1999 and 2000 at three hatcheries located in North and South Dakota. Since the development of sturgeon aquaculture significant losses have been attributed to viral infections. Iridovirus infections have been reported in cultured white sturgeon, *Acipenser transmontanus* and Russian sturgeon, *A. guldenstadi* (Hedrick et al. 1990, Adkison et al 1998). To our knowledge this is the first detection of a virus in shovelnose or pallid sturgeon.

In January 1999, the causes of a chronic mortality among juvenile shovelnose sturgeon were examined. The fish were emaciated and had fungal infections in the rostrum and gills. Gill, skin, liver, and kidney tissues were preserved in Davidson's solution, processed by standard histological methods, stained with hematoxylin and eosin, and examined by light microscopy. Microscopic examination of the integument from moribund sturgeon showed the presence of enlarged amphophilic to basophilic staining epithelial cells surrounded by a translucent pericellular space (Figure 1). Characteristic

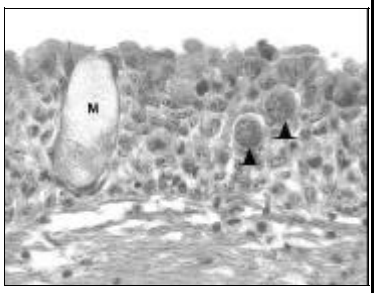

Figure 1. Tissue section of skin from moribund pallid sturgeon showing two enlarged epithelial cells (arrowheads) with distinct pericellular spaces. Mucus cell (M).

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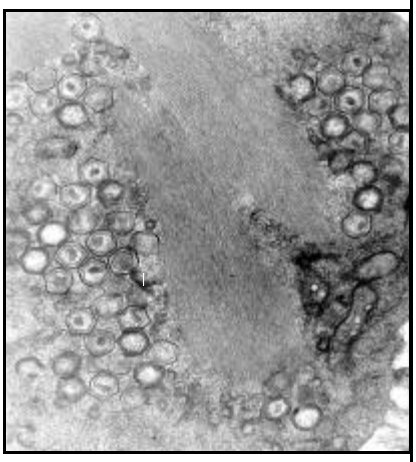
features included nuclear and cytoplasmic enlargement, an eccentric nucleus and intracytoplasmic, refractile, rod-like structures. These cells were distinct in appearance, most numerous in the oral, nasal, barbel and fin epithelia, and strikingly similar to those found in white sturgeon with WSIV infections.



Initially, the presence of virus particles were confirmed in shovelnose sturgeon by examining paraffin embedded tissues prepared for electron microscopy. Tissues obtained in 2000 from pallid sturgeon were fixed in 2.5% glutaraldehyde, post fixed in 1% osmium tetroxide and sections stained with uranyl acetate and lead citrate. The enlarged cells found in both paraffin embedded and glutaraldehyde fixed tissues contained numerous hexagonal, double-enveloped virus particles with a condensed bar-shaped core. Enveloped virions have a mean diameter of 254 nm (side to side). Intracytoplasmic fibrillar structures were also seen in cells containing virions. Based on electron microscopy, the virus particles observed in shovelnose and pallid sturgeon tissues appear to be identical. The shovelnose sturgeon iridovirus (SSIV) shares a very similar morphology to WSIV that possesses a mean diameter of 262 nm with an electron-dense core of 148 nm (Hedrick et al. 1992).

The shovenose sturgeon iridovirus (SSIV) or a very similar agent was subsequently observed by histology in juvenile pallid sturgeon held at a different facility but originally from the hatchery with the virus positive shovelnose sturgeon. These fish were emaciated and had exhibited poor growth. Additional testing of hatchery stocks including pallid sturgeon, shovelnose sturgeon, and paddlefish (*Polyodon spathula)* was negative. Following discovery of this virus infected lots of pallid and shovelnose sturgeon were destroyed.

Yearling pallid sturgeon at a third facility experienced a disease outbreak in 2000 that resulted in >60% mortality. Initially, affected fish were difficult to distinguish and appeared to be in good condition. Fish showed mild reddening in the area of the mouth and at the base of the pectoral fins but no obvious hemorrhagic skin lesions that can be observed with WSIV infections. Infected fish eventually went off feed, became lethargic and died. Disease outbreaks also occurred in young-of-the-year pallid sturgeon at the same hatchery. In some groups an acute mortality of up to 100% of the fish occurred. Viral outbreaks and mortality began in July and continued through October 2000. Sturgeon culture at this facility relies on an open water supply. Amoeba infections that caused a severe gill disease contributed to the mortality during the summer months. Captive pallid sturgeon adults used for broodstock were examined but showed no signs of viral infection.

To date, attempts to isolate SSIV in cell culture at several laboratories have been unsuccessful. Initially, white sturgeon cell lines were used for virus isolation. Additional attempts to isolate the virus on newly established cell lines from pallid and shovelnose sturgeon have also failed. Unfortunately, the inability to isolate the virus in cell culture has hindered further characterization of the virus.

Extensive surveys were conducted in the upper Missouri River in 1999 and 2000 to

determine the prevalence of this virus in wild sturgeon populations. Several hundred juvenile and adult sturgeon, mostly shovelnose, were sampled by collecting fin and barbel tissues. To enhance virus expression, fish were often held in live cages for 72 hr prior to sample collection. Currently, diagnosis of this virus relies on the presence of the pathognomonic enlarged, eosinophilic epithelial cells as detected in stained tissue sections. Such cells were not seen in any wild fish examined. In addition, several hundred young-of-the-year were collected, shipped live to the Fish Health Laboratory at the University of California Davis, subjected to additional stressors, and then examined for the presence of virus. Tissue sections and cell culture results to date have been negative for SSIV.

Pallid sturgeon and paddlefish challenged with WSIV showed complete resistance to the virus. There was no mortality and WSIV was not isolated from tissues of exposed fish. In contrast, exposure of pallid sturgeon to the white sturgeon herpesvirus type 2 (WSHV-2) resulted in 100% mortality and consistent virus recovery from dead fish.

Similar to WSIV, the new iridovirus (SSIV) was first detected in cultured sturgeon progeny of wild adults and has the capability to cause debilitating disease and catastrophic mortalities. Clinical signs of WSIV infections in white sturgeon, anorexia and skin lesions, are not typical of pallid or shovelnose sturgeon infected with this new iridovirus. The morphological properties of SSIV however, closely resemble those described for WSIV and the Russian sturgeon iridovirus (Watson et al. 1998, Adkison et al 1998).

Detection of SSIV virus and associated mortality has caused significant concern regarding movement and propagation of endangered pallid sturgeon. Releases of valuable cultured sturgeon have been postponed. Efforts to understand this disease, identify the source of infection or carrier fish and determine virus distribution have been hampered by diagnostic tools that lack sensitivity and specificity. Examination of hundreds of wild sturgeon above the infected hatcheries has not yielded any evidence that this new iridovirus is widespread among wild fish in their native Missouri River basin habitat. In contrast, the WSIV has been identified in tissue sections from wild sturgeon populations and is now believed to be widespread throughout the Columbia River basin (LaPatra et al. 1994). Before sound management decisions can be made, highly sensitive and specific diagnostic tools are needed to determine the potential significance of this new viral pathogen to wild sturgeon stocks.

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CHARACTERISTICS OF THE KOI HERPESVIRUS (KHV) AND DEVELOPMENT OF A POLYMERASE CHAIN REACTION (PCR) ASSAY TO DETECT THE VIRUS IN KOI *CYPRINUS CARPIO KOI*

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Since 1998 episodes of mass mortality have occurred in populations of common carp *Cyprinus carpio carpio* in Israel and in populations of koi *Cyprinus carpio koi* in Israel and the U.S.A. A herpesvirus isolated from infected fish has been shown in experimental studies to induce a disease and mortality similar to that observed in outbreaks at infected farms (Hedrick et al. 2000).

In this study we compared two isolates of the koi herpesvirus (KHV) from the U.S.A. and Israel to *Herpesvirus cyprini* (CHV) and channel catfish virus (CCV). Both virion polypeptide analyses and restriction fragments polymorphisms (RFLP) of genomic DNA demonstrated that the first KHV isolates from Israel and the U.S.A. were identical. Restriction fragments of KHV however, were clearly different from those of CHV and CCV. An examination of the virion polypeptides of KHV demonstrated the presence of 31 virion polypeptides, 8 shared a similar molecular weight to those of CHV and 4 with those of CCV. We conclude that KHV is a new agent with some but not a close relationship to CHV.

A polymerase chain reaction (PCR) assay was developed with sequences obtained from one restriction fragment of KHV DNA. The PCR assay effectively detected KHV but did not amplify genomic DNA from either CHV or CCV. The PCR assay detected as little as 1 pg of KHV DNA as mixed with 100 ng of host DNA. Viral sequences were amplified from koi obtained from field collections and koi experimentally exposed to 10^2 50% end point tissue culture infective doses ($TCID_{50}$)/ml of KHV via the waterborne route. All KHV exposed fish dying of infection between 8 and 10 d post-exposure or surviving to 14 d post exposure were found to be positive by PCR while unexposed control koi were all negative. Initial sampling of fish from farms in Israel has also shown the efficacy of the test. The PCR assay should complement virus isolation as an effective diagnostic method for KHV. The need for specific cell lines and low recovery rates of virus by isolation procedures may be overcome by use of the PCR assay. Current studies are examining the possibility of using the PCR on nonlethal samples collected from koi and the relative sensitivity and specificity of the PCR assay as compared to virus isolation on KF-1 cells.

Hedrick RP, Gilad O, Yun S, Spangenberg JV, Marty GD, Nordhausen RW, Kebus MJ, Bercovier H, Eldar A (2000) A herpesvirus associated with mass mortality of juvenile and adult koi, a strain of a common carp. J Aquat An Health 12:44-57.

A *KUDOA* SPECIES IN PEN-REARED ATLANTIC SALMON (*SALMO SALAR*) FROM CHILE

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A considerable problem in salmonid aquaculture is the loss or downgrading of marketable product due to soft-flesh syndrome. The most significant player in this problem is the marine myxozoan parasite *Kudoa thyrsites*. A cosmopolitan parasite, *K. thyrsites* is found in oceans around the world and infects the musculature of many marine fishes (Moran et al. 1999). These infections are not known to cause mortality, but when the fish dies, by harvesting or otherwise, the parasite releases proteolytic enzymes that degrade the fish muscle tissue. The softening of flesh and, in extreme cases, myoliquefaction of the tissue seriously lowers the market value of the fish. *K. thyrsites* has been identified as a problem in pen-reared Atlantic salmon in Ireland, France, the United States and Canada.

Due to the broad distribution of the parasite, it is unclear whether *K. thyrsites* is a single species found globally or an assemblage morphologically similar species, each specific to certain hosts and locations. We have started to examined isolates from different regions of the world, and analyses of small subunit rDNA sequences conducted thus far have revealed very few basepair differences in *K. thyrsites* isolates from different locations and hosts. Isolates from the same region and from different fishes (Atlantic salmon versus tubesnout) showed no DNA sequence differences (Hervio et al. 1997; Shaw et al, 1997). In contrast, isolates from different locations (British Columbia versus South Africa) and different fish (Atlantic salmon versus snoek, *Thyrsites atun*) showed minor differences in the small subunit rDNA sequence (99.4% similarity) (Kent and Poppe 1998).

In Chile, Castro and Burgos (1996) identified *K. thyrsites* as the cause of softflesh in fine flounder (*Paralichthys adspersus*). Recently a *Kudoa* species was reported in pen-reared Atlantic salmon from Chile, which was associated with post-harvest tissue damage (Lopez and Navarro 2000). We obtained one sample of Atlantic salmon tissue from Chile infected with a *Kudoa* species morphologically indistinguishable from *K. thyrsites*. Giemsa stains revealed spores (Fig. 1) that looked like those of *K. thyrsites* - i.e. there were four unequal polar capsules, one being larger than the other three.

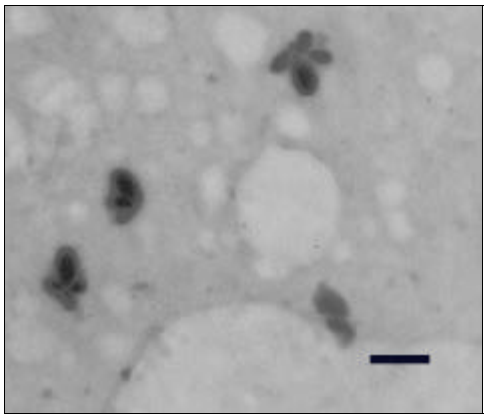

FIGURE 1.
Giemsa stain of *Kudoa* sp spores of pen-reared Atlantic salmon in Chile. Note 4 polar capsules with one larger (arrow) than the other three. Bar = 10 mm.

We are attempting to identify the parasite using molecular analysis. The infected tissue, however, was fixed in formalin making this approach problematic due to extensive DNA fragmentation and crosslinking. Therefore, we used a

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boil/freeze DNA extraction method adapted from Whittington et al (1999) to obtain sufficient amounts of DNA for PCR analysis and sequencing. To date, we have sequenced and analyzed approximately 750 bases of small subunit ribosomal DNA from the Chilean *Kudoa* sp. sample. Sequences were aligned with Clustal W and a bootstrap analysis performed using PAUP 4.03.

From this analysis it appears that the presumptive *K. thyrsites* from Chile is more closely related to other *Kudoa* species than it is to other *K. thyrsites* isolates that we have sequenced thus far (Fig. 2). The limited molecular data described here , therefore, suggest that this Chilean isolate is not *K. thyrsites*.

FIGURE 2. Neighbor-joining analysis comparing partial small subunit rDNA sequences of *Kudoa* sp. isolates, numbers at nodes indicate bootstrap confidence levels. Chile, *Kudoa* sp. from Chile; Kama, *K. amamiensis* (Genbank AF034638); Kcru, *K. crumena* (Kent et al. in press); Kmin, *K. miniauricualata* (Genbank AF034639); Kpan, *K. paniformis* (Genbank AF034640); Ktas, *K. thyrsites* from Atlantic salmon (Genbank AF031412); Ktts, *K. thyrsites* from tubesnout (Genbank AF031413); KtSA, *K. thyrsites* from snoek (Kent et al. in press); Poly, *Polypodium hydriforme* (Genbank U37526).

Considering this, it is important to collect and analyze other isolates from Atlantic salmon in Chile, as well as from other hosts and locations, to resolve the relationships among these myxozoans. This study, underway in our laboratory, should include detailed spore descriptions from fresh material and preservation of specimens in ethanol, which is more amiable for use in molecular biological techniques. We welcome receiving other samples of "*K. thyrsites*" from any location around the world.

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EMPLOYMENT/EDUCATIONAL OPPORTUNITIES

Educational Opportunities

The University of Florida is offering an intensive two-week course, "Diagnosis and Treatment of Warmwater Fish Diseases." This class is designed to provide instruction in the methodology of diagnosis and treatment of parasitic, fungal, bacterial, viral, nutritional and environmental diseases of warmwater food fish and aquarium species.

When	May 14-25, 2001
Where:	Tropical Aquaculture Laboratory, Ruskin, Florida (May 14-18, 2001) The Whitney Laboratory, St. Augustine, Florida (May 19-25, 2001) Transportation provided from Ruskin to St. Augustine
Sponsors	University of Florida, College of Veterinary Medicine, Department of Fisheries and Aquatic Sciences, The Whitney Laboratory, and Tropical Aquaculture Laboratory; Sea World of Florida; The Florida Aquarium, Segrest Farms; All Florida Veterinary Laboratory
Topics	Water quality, freshwater and marine systems; fish necropsy procedures, bacterial, viral, fungal, parasitic and environmental diseases of fish; treatment protocols; nutrition; preventative medicine; anesthetic and surgical protocols
Cost	$800.00 U.S. ($850.00 after April 1, 2001)
CEUs:	Participants may earn up to 20 hours of Continuing Education Units by attending this course.
Contact:	Dr. Ruth Francis-Floyd, Dept. of Fisheries and Aquatic Sciences, University of Florida, 7922 NW 71st St., Gainesville, FL 32653. Telephone: (352) 392-9617 ext 229 FAX: (352) 846-1088 E-mail: rff@gnv.ifas.ufl.edu Website: http://www.ifas.ufl.edu/~conferweb/

Fish Parasitology Course on the Great Barrier Reef and Coral Sea, 3-9 Nov. 2001

The University of Tasmania and Undersea Explorer (see web page at: www.undersea.com.au) will be conducting a 6 day field course in marine fish parasitology. The course offers a series of lectures, hands on laboratories, and opportunities to SCUBA or skin dive aboard the "Undersea Explorer" research vessel.

Drs. Barbara Nowak (University of Tasmania), Robert Adlard (Queensland Museum), and Michael Kent (Oregon State University) will teach the course.

Space is limited to 15 persons. Contact Dr. Barbara Nowak, University of Tasmania B.Nowak@utas.edu.au.

The cost is A$3,500 (about US $2,000), which includes 6 days aboard ship accommodation (including meals), the course, certificate of completion, and diving (including weights, tanks, airfills).

Non-refundable A$1000 due 3 Sept. 2001.

EMPLOYMENT/EDUCATIONAL OPPORTUNITIES

MICROBIOLOGIST SENIOR
MADISON (AREA 8)
JOB ANNOUNCEMENT CODE: 05266

HIRING ORGANIZATION: UW-Madison, Wisconsin State Laboratory of Hygiene (WSLH). Environmental Health.
SALARY: Starting salary is between $37,124 and $55,686 per year depending on qualifications, plus excellent benefits. A six-month probationary period is required. This classification is represented by the Wisconsin Science Professionals Bargaining Unit.

JOB DUTIES: Work with the Department of Natural Resources (DNR) Fish Health Specialist in performing fish health inspections at 17 DNR fish hatcheries and spawning weirs including coordinating the preparation of appropriate media and sample collection kits; collection of bacterial, viral and parasitological samples; screening the resulting samples for bacterial pathogens and coordinating the shipment of other samples to various labs as needed. Provide diagnostic bacteriology services including performing necropsies on moribund fish, isolating and identifying significant microorganisms and determining antibiotic sensitivities. Coordinate the flow of sample processing with other staff at the WSLH. Implement QA/QC protocols in the fish health lab. Assist in writing research proposals and performing research to meet the needs of the DNR fish health program. Attend appropriate training sessions to remain current regarding diagnostic methods and fish health theory. This is a full time position. Some overnight travelmay be required and work hours may be variable.
WELL QUALIFIED APPLICANTS: Well qualified applicants will have a minimum of three years of professional laboratory experience specializing in fish health or microbiology. Additionally, applicants must possess or be able to obtain a Wisconsin Driver's license and be acceptable as a driver to the UW risk management office.

SPECIAL NOTICE: For UW Madison campus safety information and crime statistics/annual Security Report see www.wisc.edu/students/safety/clery.thml, and for drug and alcohol information see www.wisc.edu/students/safety/alcohol.html, or call the Equity and Diversity Resource Center at 608;263-2378 for a paper copy.

KNOWLEDGE AND SKILLS REQUIRED: Procedures for inspecting fish hatcheries; specialized procedures associated with the microbiological analysis of the fish pathogens such as *Aeromonas* sp., *Renibacterium salmoninarum, Yersinia ruckeri, Flavobacterium* spp. or other waterborne bacteria; fish necropsy techniques; effective written and oral communication skills; and strong interpersonal skills.

APPLICATION INFORMATION: NOTE: A background check will be conducted prior to an offer of employment. Apply by January 31 with an Application for State Employment (DER-MRS-38) which can be obtained on the internet at www. der.state.wi/us/static/appmat. htm, letter of application, a current resume, two pages highlighting your specific experience in 1) fish health inspection; 2) diagnostic pathology and bacteriology services pertaining to fish heath; 3) fish health research; and 4) involvement in directing projects to validate, develop or adapt new advanced technologies used in diagnosing fish pathogens. Send above materials to Nancy Shaker Marty (608) 262-4658; UW-Madison, Wisconsin State Laboratory of Hygiene; 465 Henry Mall; Madison, WI 53706. Materials will be evaluated and the most qualified applicants will be invited to participate in the next step of the selection process.

The Fish Health Microbiologist at the WI State Lab of Hygiene works side by side with the WI Department of Natural Resources' Fish Health Specialist, Sue Marcquenski. If you are interested in applying for this vacancy and have questions about the position (i.e. the actual work that we do), please contact Sue directly - phone is 608.266.2871 or e-mail is marcqs@dnr.state.wi.us.

AQUAVET 2001:

"AQUAVET I - A Program in Aquatic Veterinary Medicine" will be presented in Woods Hole, MA beginning on May 13 and ending on June 9, 2001. This four week course is designed for veterinary students and veterinarians seeking introductory training in the field of aquatic animal medicine.

"AQUAVET II - Comparative Pathology of Aquatic Animals" will be presented in Woods Hole, MA beginning on May 13 and ending on May 26, 2001. This two week course is designed for veterinary students, veterinarians, fisheries biologists, and pathologists seeking advanced training in the comparative pathology of aquatic species encountered in aquaculture, laboratory animal medicine, and aquarium environments.

Admission to both courses is by competitive application. Applications must be received not later than January 15, 2001. For application forms and additional information contact:

Donald A. Abt, V.M.D. PHN: 508-457-7969
Director of AQUAVET FAX: 508-457-7982
230 Main Street EMail: abtda@aol.com
Falmouth, MA 02540

WANTED! All AQUAVET alumni and faculty. The year 2001 marks the 25th anniversary of AQUAVET. As was the case with the 20th Anniversary, an Anniversary Conference and Reunion is planned for October 26 - 28, 2001 at the Marine Biological Laboratory in Woods Hole. With more than 700 alumni "out there" now we need your assistance in locating you and obtaining your mailing addresses that we may send out the Conference Announcements and registration forms. Please send your current mailing address, email address, and phone number ASAP to:

Donald A. Abt, V.M.D. PHN: 508-457-7969
Director of AQUAVET FAX: 508-457-7982
230 Main Street EMail: abtda@aol.com
Falmouth, MA 02540

We look forward to seeing you all in Woods Hole for some good science, good fellowship, and a re-awakening of fond memories. Please plan to join us.

INTERNATIONAL SOCIETY OF AQUATIC ANIMAL EPIDEMIOLOGY

The International Society for Aquatic Animal Epidemiology (ISAAE) was recently created at the 9th International Society for Epidemiology and Economics meeting in Colorado. The new society, ISAAE, was established to:
1) promote the discipline of aquatic animal epidemiology;
2) support cooperative training of epidemiologists interested in working with aquatic animal species;
3) provide a conduit for the exchange of ideas and information of interest to aquatic animal epidemiologists;
4) support cooperative research and graduate education;
5) serve as a sounding board for epidemiologists working with aquatic animal species and
6) provide collegial support for solving complex problems that impact aquatic species.

Please contact Jay Levine at: Jay_Levine@ncsu.edu, College of Veterinary Medicine, North Carolina State University, 4700 Hillsborough St. Raleigh, NC 27606, if you are interested in joining or learning more about the ISAAE.

There are no dues, and we welcome the participation of anyone interested. Please contact Jay Levine if you are interested in joining ISAAE.

26th ANNUAL EASTERN FISH HEALTH WORKSHOP SHEPHERDSTOWN, WEST VIRGINIA, 23 - 26 APRIL 2001

The National Fish Health Research Laboratory announces the 26th Annual Eastern Fish Health Workshop from 23 - 26 of April 2001, and we are extremely proud to host this meeting in our own backyard at the Clarion Hotel and Conference Center in historic Shepherdstown. Registration will begin on Monday, 23 April from 4:00 - 7:00 pm, and will be followed by three full day sessions, 24, 25, and 26 April.

PLEASE NOTE: Not only will there be a complete session on the final day (Thursday, 26 April) but that evening will also feature our Banquet with a presidential visit that is bound to be both historical and hysterical.

Sessions will include oral presentations of research studies and clinical reports as well as workshops on current trends and issues in fish health.

- Edwardsiella ictalurii: a review (Drew Mitchell - chair)
- Lobster health and disease (Gretchen Messick, chair)
- New and Emergent diseases: regulatory hurtles to management (Paul Bowser - chair)
- Imunnogenetics and the development of disease resistant fish (Steve Kaattari - chair)

Featured International Guest Speakers:

- Professor Ronald J. Roberts, Institute of Aquaculture, University of Sterling - Scotland
- Professor Willem B. vanMuiswinkel, Cell Biology and Immunology, Wageningen University - The Netherlands

Lodging accommodations must be made with **The Clarion Hotel and Conference Center** at (304) 876-7000. The Clarion is a new hotel with excellent meeting facilities, rooms and a great tavern! Check-in time is 4 pm and check out time is noon. The Inn has graciously provided us with the government per diem rate of $65.00 + tax/night for either single or double occupancy, which is well below the usual conference rate. Should the government rate change between now and the conference, it would not do so by more than a few dollars. A block of 45 rooms has been reserved for the conference. Reservations must be made with the Clarion before 1 March 2001 . The Clarion Hotel is also associated with the U.S. Office of Personnel Management (OPM). All rooms that are not booked by 1 March will revert back to the use of OPM. Therefore, please do not let this deadline pass without making your room reservations. The Days Inn and Bavarian Inn in Shepherdstown and the Comfort Inn in Kearneysville could be used as overflow sites. However, room rates will not be less expensive than the Clarion. Visit the Clarion at www.clarion-shep.com or review the sites and attractions that abound throughout this historic and picturesque area at www.intrepid.net/~austin/where.htm.

A $110.00 registration fee (U.S. currency equivalent) includes workshop proceedings, refreshments at breaks, three complete buffet breakfasts (no continental breakfasts this year), three complete luncheons, and the banquet on Thursday night.

Please make checks payable to the "Eastern Fish Health Workshop c/o Rocco Cipriano" and return payment with your completed registration form by 1 March 2001. Contracts for food services necessitate a late registration fee of $130.00 if mailed after 1 March 2001.
For additional information, contact:
Dr. Rocco C. Cipriano
National Fish Health Research Laboratory
1700 Leetown Road, Kearneysville, WV 25430
P: 304/724-4432
F: 304/724-4435
E: rocco_cipriano@usgs.gov

CALL FOR PAPERS:
THE AFS/FHS/WESTERN FISH DISEASE 2001 ANNUAL MEETING; VICTORIA, B. C., CANADA

JUNE 26 – 28, 2001
June 29 – Continuing Education Session

Hosted by: Pacific Biological Station
Association of Aquatic Veterinarians of British Columbia

Schedule: Mon, June 25 – Executive Committee meetings
Tues, June 26 –Technical Sessions
Evening Mixer and Poster Session
Wed, June 27 – Technical Sessions
Banquet
Thurs, June 28 – Technical Sessions; FHS Business Meeting
Fri, June 29 – Continuing Education Workshop

Paper/Poster topic due by MAY 25, 2001
We encourage talks/posters on infectious and non-infectious diseases of salmonid and non-salmonid fish, diseases of shellfish, and on fish health related topics

Email abstracts by May 25: bartholj@bcc.orst.edu
We also encourage presentation of case reports for an informal session. Abstracts will not be required for this session, but please tell us if you have a case for discussion.

Hotel Accommodations: Rooms have been reserved until May 25 at the Laurel Point Inn, 680 Montreal St., Victoria BC. The hotel is in downtown Victoria, on the waterfront. Cost for rooms is $150 Can./$97 US for either a single or double. Contact information: phone: (250) 386-8721 or 1-800-663-7667; www.laurelpoint.com or reservations@laurelping.com

Students: You are eligible for a reduced registration fee and for the award for student presentations (please indicate on the attached registration form). Members of the FHS are also eligible for the Snieszko student travel award – see the awards section of the newsletter.

Continuing Education Session: The Friday following the meeting, a one-day workshop on neoplasia in fishes will be conducted by Jack Fournie of the U.S.EPA, Gulf Breeze, FL and Mark Myers of NMFS in Seattle, WA. Lectures will cover neoplasms in multiple tissues and organ systems from fishes. A portion of the afternoon session will involve microscopic examination of representative examples of a variety of fish neoplasms. Fish Health Section CE credit certificates will be awarded for attending this class. Both this session and the workshop may be recognized for CE credits by your state or provincial veterinary association.

Contact information: If you have questions, please contact
Garth Traxler (250-756-7068;traxlerg@pac.dfo-mpo.gc.ca)
Dorothee Kieser (250-756-7069; KieserD@pac.dfo-mpo.gc.ca)
Jerri Bartholomew (541-737-1856; bartholj@bcc.orst.edu)Check web page at http://www.fisheries.org/fhs/meeting.htm for meeting updates.

INTERNATIONAL ASSOCIATION FOR AQUATIC ANIMAL MEDICINE

32ND ANNUAL CONFERENCE
April 28 – May 2, 2001 Tampa, Florida
Hosted by The Florida Aquarium
and the Tropical Aquaculture Laboratory, University of Florida

The International Association for Aquatic Animal Medicine (IAAAM) was founded in 1969 to advance the art and science of aquatic animal medicine and health. The IAAAM membership includes international professionals engaged in clinical care, research, academics, and husbandry of aquatic animals. At this year's meeting, the scientific program will start with a plenary session on aquatic health and conservation issues in Florida. Subsequent presentations will include submitted to papers, case reports and a poster session. Saturday afternoon workshops offer sessions on shark hematology, sea turtle medicine, and manatee biology and pathobiology. Casual evening discussions (clinical conundrums, video night) are planned for Sunday evening. Ecotour boat trips in upper Tampa Bay and visits to tropical fish farms will be scheduled for Monday afternoon with an evening buffet at The Florida Aquarium. Post-conference tours will offer visits to Busch Gardens, SeaWorld Adventure Park of Orlando, Disney's Animal Kingdom, Mote Marine Laboratory, Lowry Park Zoo and Clearwater Marine Aquarium.

For conference information please contact the address below or visit our website at www.iaaam.org. Student and individual day conference rates are available.

Ilze K. Berzins
The Florida Aquarium
701 Channelside Drive
Tampa, FL 33602

phone: (813) 273-0917
fax: (813) 209-2067
Email: IBerzins@FLAquarium.org

7th Annual Whirling Disease Symposium
"Whirling Disease: A Decade of Discovery"
February 8 and 9, 2001
At the West Coast Salt Lake Hotel, Salt Lake City, Utah
Whirling Disease Foundation, P.O. Box 327, Bozeman, Montana 59771
(406) 585-0860 (phone)
(406) 585-0863 (fax)
whirling@mcn.net
www.whirling-disease.org
Hosted by:
Whirling Disease Foundation, Bozeman, Montana and Utah Division of Wildlife Resources, Logan, Utah

NATIONAL WILD FISH HEALTH SURVEY UPDATE

Ken Peters
Bozeman Fish Health Center
ken_peters@fws.gov

The National Wild Fish Health Survey (NWFHS) is a cooperative project of national scope and importance initiated and funded by the U.S. Fish & Wildlife Service (FWS). The purpose of the NWFHS is to develop a readily accessible, reliable, and scientifically-sound database that documents the national distribution of specific pathogens in free-ranging fish. The program is comprised of two major components. The first is a partnership of natural resource management organizations, including other Federal, Tribal, and State agencies, to collect and submit free-ranging fish or their tissues to one of the nine FWS Fish Health Centers for pathogen testing. The second component centers around the NWFHS Database. This is where results of pathogen tests are stored, accessed, analyzed, and ultimately factored into aquatic resource management decisions.

As of November 2000, sampling partnerships have been made with more than 80 agencies and organizations which has resulted in the analysis of more than 26,000 fish representing nearly 2000 cases. New cases are added on a continuous basis as they become available. The Database is progressing significantly relative to making it usable to those outside the FWS and several new features have been added. Among those is a double query function and an option to view Aup stream@ and Adown stream@ pathogen information relative to a particular query result. A page entitled AGlossary and Warnings About Data Use@ (similar to a disclaimer statement) has also been added and is designed to assist users with data queries and interpretation of results. The standardized methods used by all FHC=s to generate fish pathogen data has been assembled into the NWFHS Laboratory Procedures Manual which contains 15 chapters of detailed assay protocol with references. Upon final review, the manual will be available to fisheries professionals and students in the field of fish health.

As part of an outreach plan, the USFWS is considering an education and information exchange with other agencies that will be announced in the near future. Since it=s inception in 1997, the NWFHS has been operating in a Aproof of concept@ phase. However, now that we know we can successfully partner, that our standardized methods work, and that we can successfully organize and maintain the collected information in a usable database, we can shift our efforts to be aligned with a more predefined national survey sampling scheme. To address these issues, the FWS is formulating a NWFHS Outreach Plan that will support public release of the Database and help guide future program directions. As part of the outreach plan, the FWS is considering regional Database Workshops and Partnership Forums for education and information exchange. We would like to provide formal opportunities for our partners to learn first-hand the system=s capabilities and potentials and to help optimize the system for resource management. FWS fish health personnel will be attending their annual meeting in early-March where these and other action items will be addressed.

Log onto the NWFHS web page at **http://wildfishsurvey.fws.gov** for more information and to find the FHC in your area.

Fish Health Section Newsletter
American Fisheries Society
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Olympia, WA 98501-2192

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Deadline for next issue:
March 31, 2001

Fish Health Newsletter - Editorial Policy

The *Fish Health Newsletter* is a quarterly publication of the Fish Health Section of the American Fisheries Society. Submissions on any topic of interest to fish health specialists and preliminary case reports are encouraged with the understanding that material is not peer reviewed. Abstracts submitted to the *Journal of Aquatic Animal Health* are also encouraged. Articles should not exceed two newsletter pages and should not have more than five references. Submissions *must* be formatted in Microsoft Word, WordPerfect 6.x or other major Windows word processors, 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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