

# AQUATIC VET NEWS

**WORLD AQUATIC VETERINARY MEDICAL ASSOCIATION**

Volume 6, Number 3

Third Quarter 2012

## The First WAVMA Fellows are selected!

As you are aware, WAVMA has established a fellowship program to recognize those world-renowned veterinarians who have advanced aquatic veterinary medicine as a discipline and devoted their time and efforts to serve WAVMA's mission. Selected fellows are expected to form a council that steers WAVMA scientific activities by providing the Executive Board with guidance on activities and initiatives, mentoring applicants for Aquatic Veterinary Practitioner certification, and reviewing WAVMA publications.

Early this year, WAVMA members nominated 12 outstanding veterinarians for this honor. WAVMA Fellowship Committee used a number of criteria to rank the nominees that included current and past efforts and scholarship in advancing aquatic veterinary medicine. Indeed, it was a tough task for the committee to only select five Fellows since most applicants scored high.

While the five people with the highest rank were selected as 2012-WAVMA Distinguished Fellows, the nomination of the remaining seven will continue to be active for 2013 fellow selection. Please join me in congratulating the following 2012 WAVMA Distinguished Fellows (alphabetically arranged):

**Peter L. Merrill, DVM**

**Ronald J. Roberts, PhD, FRCPath, FSB, FRCVS, PRSE**

**A. David Scarfe, PhD, DVM, MRSSAf**

**Julius M. Tepper, DVM**

**Christopher I. Walster, BVMS, MVPH, MRCVS**

## Meet the Distinguished Fellows:



**Peter Merrill**



**Ronald Roberts**



**David Scarfe**



**Julius Tepper**



**Christopher Walster**

### 2012 WAVMA Fellowship Committee:

**Mohamed Faisal (Chair)**

**Devon Dublin**

**Palic Dusan**

**Nick Saint-Erne**

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## Editor's Note

### Talk About Commitment!

Congratulations to our newly elected Executive Board members, many of whom have served WAVMA since its inception in 2006. (See Secretary's Report, page 4 for more details). It is truly an international conglomeration of wet pet vets. The seven elected EB members represent five countries and four continents. They also have diversified professions in the fields of university education, food fish, ornamental fish, public aquariums, and private veterinary practice. It is fair to say that the EB has an expert in about every field of aquatic veterinary medicine.

In addition to this, we also have approved our first panel of Distinguished Fellows, members who have excelled in advancing the field of veterinary medicine and in the foundation of WAVMA. These five Distinguished Fellows (see list on page 1) hail from three countries and are all founding members of WAVMA. In fact, the Fellows include members number 1 and 2, three past WAVMA presidents, three that are current members of the Executive Board, and three that are current Committee chairs!

Now that's dedication to a cause. Plus, they were all instrumental in the development of aquatic animal medicine as a valid endeavor for veterinarians. For more background information on some of our Fellows, see the *Aquatic Vet News* Colleagues Connection articles in issues 5(2), 5(3) and 5(4). Past issues of *Aquatic Vet News* are available on the [WAVMA.org](http://WAVMA.org) website. In addition to the articles about members, you will find much more great information in our newsletters.

A big thanks goes out to all our current and past Executive Board members, and to the chairs and members of all the WAVMA committees. These veterinarians give freely of their time to make WAVMA work for the benefit of all veterinarians and the aquatic animals in their care. Please help as you can, too, by supporting WAVMA, attending WAVMA sponsored meetings, visiting the website, reading and contributing to the newsletter, and in any other way you can.

**Nick Saint-Erne, DVM**  
Newsletter Editor

## WAVMA membership in the WVA



### IFAH Roundtable to launch White Paper on the Global cost of Diseases

On 4<sup>th</sup> October 2012, Dr. Robert Stevenson (WVA councilor for Europe) and Dr. Zeev Noga (WVA secretariat) participated in the International Federation for Animal Health (IFAH) roundtable meeting in order to discuss the new IFAH's policy White Paper; *The Cost of Diseases*.

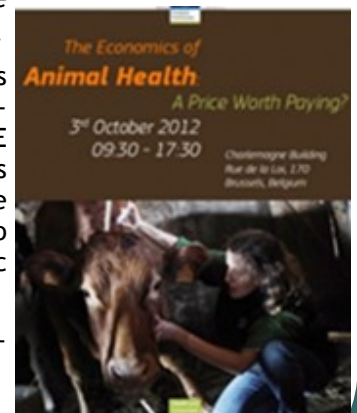
The report concludes that animal diseases have economic impacts much beyond the direct costs caused by disease itself. The White Paper compared the social and economic impacts of highly topical animal health diseases such as rabies, foot and mouth disease and salmonella. The full report is available [HERE](#).



### Conference Notes on the Economics of Animal Health

On 3<sup>rd</sup> October 2012, the WVA secretariat (Dr. Jan Vaarten, Dr. Nancy de Briyne and Dr. Zeev Noga) and the WVA councilor for Europe, Dr. Rafael Laguens participated in the conference on the "Economics of Animal Health" which was organized by the EU Commission in Brussels. Vets, policy makers and experts of EU national and international authorities discussed issues such as the importance of animal health and its role in the economy, allocating resources for improved animal health and how to ensure reasonably priced livestock.

A special platform was given to international aspects. Presentations by OIE and FAO representatives underlined the importance of veterinarians in order to secure animal and public health. Please click [HERE](#) for the conference presentations.



## Executive Reports

Dear Colleagues,

As I transition to my new role of Professor and the Chair of the Fish Disease Department at Ludwig Maximilian University in Germany, I will begin an exciting period in my career as an aquatic veterinarian. WAVMA, too is making some exciting changes. Here are some of the programs the Executive Board members are working on:

Approved guidelines for forming student chapters at veterinary colleges. A Student Chapter should have at least 5 student members, three of whom should be prepared to serve as Chapter Officers, and a full-time faculty or staff member of the veterinary school or college who will serve as the Faculty Advisor. The student members get the benefits of WAVMA membership, and 50% of the dues will be refunded to the Student Chapter for use in their educational programs.

The Board approved a motion that members from economically depressed countries will receive a discounted membership rate. The criteria are still being established, but for new members, or current members renewing their dues for 2013, from developing countries can apply for reduced Full Member dues rate.

The Australian and New Zealand Veterinary Council will become an Allied Veterinary Organization member in WAVMA. This gives members of ANZVC access to membership benefits of WAVMA. If other WAVMA members belong to other veterinary groups, have that group can contact WAVMA to become an AVO also.

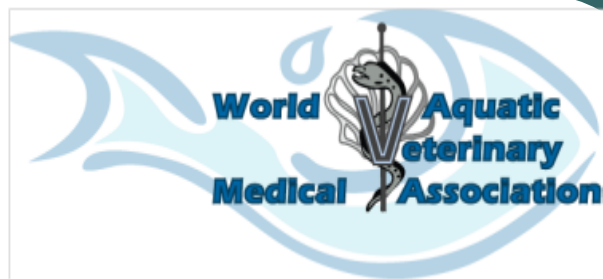
The Fellowship Program has selected our first five Distinguished Fellows. Congratulations to those premier aquatic veterinarians (see page 1).

The Certified Aquatic Veterinary Practitioner Program (CertAqVP) is nearing development completion and should be ready for implementation soon. That means that in 2013 we should have our first candidates for certification.

Finally, our Secretary has been working diligently behind the scenes in improving the functionality of our website. Look for new features there soon.

### Dušan Palić

2012 WAVMA President  
Professor & Chair of Fish Diseases & Fisheries Biology  
Faculty of Veterinary Medicine,  
Ludwig Maximilian University,  
Munich, Germany  
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## Future WAVMA Meetings

**2012 NOVICE Aquatic Vet Program** (Bucharest, Romania - Oct 4-5)

Allows WAVMA to showcase aquatic educational programs through presentations and two workshops. The Board approved funding towards costs of \$2000

**Aquaculture 2013 WAVMA Aquatic Vet Sessions** (Nashville, TN, USA – Feb 21-25)

**2013 AVMA Convention, Aquatic Vet Sessions** (Chicago, IL, USA – July 20-23)

**2013 WVC Aquatic Vet Sessions** (Prague, Czech Republic, - Sept 17-20)

## New WAVMA Members

Members are the life-blood of any professional Association. Please join us in welcoming the following new members:

### Veterinarian Members:

Lori Campbell	Andrea Lafaille
Claudia Venegas	Tracy Peterson
Sheri Kasper	Ann Vitti
Chad Harris	Per Karlsson
Kristina Rudolph	C M Ypelaan
Nicholas Smith	Sharon Tiberio
Jill Yoshicedo	

### Student Members:

Nadia Stegeman	Jayme Jeffries
Nicole Spooner	Lily Parkinson
Diana Jaramillo	Victoria Duggan
Benjamin Yanofsky	Renee Li
Lori Westmoreland	Sabine Wilkins
Brett De Poister	Faheem Noor
Deborah Bannon	

## Secretary's Report

The Executive Board Members for 2013 are:

President	Mohamed Faisal (USA)
President-Elect	Richmond Loh (Australia)
Past-President	Dusan Palic (Germany)
Treasurer	Nick Saint-Erne (USA)
Secretary	Chris Walster (UK)
Director at Large	Devon Dublin (Japan)
Director at Large	Lydia Brown (UK)

The newly elected board members will take up their positions on 1<sup>st</sup> January 2013. Those who are new to the Board are invited to attend the monthly Board meetings as observers prior to the start of the year to familiarize themselves with the workings of the Board. I would like to thank all of those who stood for election and congratulate those who were successful. Without members volunteering to fill positions on the Board and the various committees, WAVMA would grind to a halt.

Unfortunately, I was unable to attend the AGM in San Diego and a report on the AGM is provided elsewhere in this newsletter. However, that does not mean it has been a quiet quarter for your secretary, with a lot of time being spent on IT issues. Much of this will not be noticed by the members, but the changes are intended to make administration and member services easier to run. The e-mail system (Board & Listservs) is migrating to a new service provider, which should be easier to manage, and provide greater security and flexibility.

The e-news system is moving to a new platform which will hopefully make it easier to send out monthly emailed updates for members and non-members. The current system had not proved as good as expected or as easy to use, which is why some of you may have noticed the lack of these this year. There will be a web shop to allow you to buy veterinary books, WAVMA products, and to sign up for WAVMA courses and Webinars. Of course, even though the intent is to make things easier, there is always that initial learning curve and webinars might be a case in point.

Trial any webinar system and they all seem pretty much the same, even to the same advertised price,

but look underneath and the options are bewildering, even when you thought you knew what you wanted! Prices actually vary from virtually free to several thousand dollars a month, you can hold it as a meeting, or an event or it could be part of a course curriculum. I now know what e-learning, m-learning, SCORM compliant and LMS mean, along with how to produce a flash movie and build a curriculum. Not skills I thought I would acquire as WAVMA Secretary!

Despite this complexity (and the need to decide on which modules are required) your Board has come through and selected a system. This has allowed the recording of several presentations which will be used during the Novice conference in Bucharest at the start of October, where WAVMA is a partner in a two day workshop on aquatic veterinary education (for further details see [www.novice-conference.com](http://www.novice-conference.com)).

Making these recordings has allowed speakers from all corners of the world to participate without the need for expensive travel and ensured top-notch presentations will be available after the conference. Thanks should be given to Laura Urdes and Dave Scarfe for organizing the workshop and Greg Lewbart and Richmond Loh for their recordings. From my perspective it has been an interesting learning curve.

So in the next month or so, look out for live or pre-recorded webinars being available from the WAVMA website, which will contribute to your Continuing Education and Professional Development (CEPD). Remember that WAVMA membership not only offers great value, but that by being a member you are promoting aquatic veterinary medicine.

**Dr Chris Walster (UK)**  
WAVMA Secretary  
[chris.walster@onlinevets.co.uk](mailto:chris.walster@onlinevets.co.uk)



## Committee Reports

### Meetings Committee Report

As of writing this, I'm just back from San Diego after spending 5 days with many WAVMA vets, including most of our Executive Board. It was a great opportunity to get to see socially and professionally many of my colleagues that I have come to know over the years.

The AVMA Conference is always the highlight for continuing education for the American veterinary community. I am very pleased to have collaborated with Scott Weber, our Aquatic Education Chair, as well as the 2011-2012 Chair for the AVMA Aquatic Veterinary Medicine Committee, in modifying the program to allow for a day of WAVMA generated talks and case reports. We also ended the day with a roundtable discussion that allowed participants to discuss clinical cases and concerns off topic. From my perspective, it afforded me the opportunity to ask those same participants if this new approach to aquatic CE was what was desired. The response seemed to indicate we were on the right track. As such, Scott and I, with the input of fellow WAVMA members Helen Roberts and Nick Saint-Erne, have just completed an even more progressive program for the 2013 AVMA Conference in Chicago. More news soon. Mark your calendar for July 19-23, 2013!

Also held on the evening of August 6 in San Diego was our Annual General Meeting. Members from around the world came to the AGM for education and fun. The night kicked off with a wonderful array of delicious food sponsored by Novartis Animal Health. We were then treated to a magic show presented by the amazing Nick Saint-Erne, who also practices aquatic medicine full time and is our WAVMA Treasurer in his spare time! The meeting was an ideal occasion to meet



some new members and to ask for feedback from all present as to what member services we should prioritize for the coming year. I was encouraged to hear we seem to be going in the right direction.

Our current President Dusan Palic gave a motivating synopsis of our progress for the year to date. He also tried to convince us that we could fly if we flapped our arms fast enough!

Our President Elect, Mohamed Faisal, talked to us about his priorities for the year ahead. We will again be responsible as Associate Sponsors, along with the AVMA, for the aquatic veterinary lectures planned for the next World Aquatic Society's Aquaculture 2013, to be held Feb. 21-25 in Nashville, Tennessee. We invite the membership to join us there.



Plans are now under way for our 2013 Annual General Meeting, to be held in conjunction with the World Veterinary Congress in Prague, Czech Republic from September 17-20, 2013. WAVMA will be organizing the aquatic strand of lectures again next year for the Congress and the AGM to be held there will be our return to Europe after the past two years in the US. This will allow all our European members to easily and affordably join us and experience both the excellent continuing education and professional camaraderie WAVMA has become known for. I hope to see you there.

**Julius Tepper, DVM**  
Meetings Committee Chair  
[cypcarpio@aol.com](mailto:cypcarpio@aol.com)

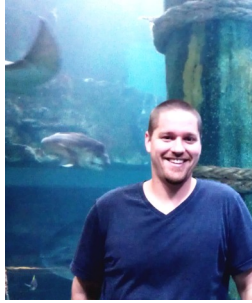


The WAVMA Executive Board members present: (Left to right): Dusan Palic, Mohamed Faisal, Nick Saint-Erne, Julius Tepper, Devon Dublin.

## Student Committee - WAVMA Student of the Month

### Meet Brett De Poister

I am a final year vet student at Murdoch University in Western Australia and a new student member of WAVMA. Originally from Reading, Pennsylvania, I started my University academic career early in life by travelling to Australia to study frogs at the University of Adelaide at the age of 15. During this time I developed a project studying the effects of environmental pollutants on the embryonic development of aquatic frogs. This research received various accolades, including representing North America at the International Junior Water Prize in Stockholm, Sweden and a finalist for the Intel Science Talent Search.



In 2003, I completed my Bachelor of Science in biology from Stony Brook University in New York. I continued research throughout my studies and completed two internships at Merck Research Laboratories in Animal Pharmacology and was involved in researching nerve regeneration in zebra fish at Stony Brook, which led to a co-authorship in the publication *Science*.

After completing my bachelor degree, I worked as a project manager for a start-up company that created customized educational software for university level science courses. After several years in the education industry, I missed being involved with animal work, so a career change was in order. In 2007 I received the Dr. Jerry Thornton Academic Scholarship and moved to Grand Cayman, Cayman Islands to attend St. Matthew's School of Veterinary Medicine.

After a year of study and lots of SCUBA diving the opportunity to move to Australia arose and in 2008 I returned to Australia to study veterinary medicine at Murdoch University in Western Australia. During my time at Murdoch, my interest in ornamental fish medicine and propagation developed. While studying I worked at an AQIS approved ornamental fish import facility and retail aquarium shop. I also started breeding several species of freshwater and marine fish in my 15,000 litre setup.

Now in my final year, I am enrolled in the Advanced Topics in Wildlife Conservation and Zoological Medicine stream where I will partake in practical experience with Dr. Robert Jones, The Aquarium Vet, at the Melbourne Aquarium and with the WA Department of Fisheries Pathology Laboratory. Upon completion of my degree, I would like to pursue a career in ornamental fish medicine and ornamental fish aquaculture.

### Veterinary Students,

Please assist us in identifying a faculty member at your veterinary school to serve as the primary contact with WAVMA. Good candidates may include: a mentor for your aquatics club, or a professor who teaches a fish medicine course or any individual with an interest in aquatic animal medicine.

Please provide us with the faculty contact information or have the faculty member contact us directly at:

[WAVMA\\_Student\\_Cmte@mailhost.wavma.org](mailto:WAVMA_Student_Cmte@mailhost.wavma.org).



**Brett De Poister drawing blood from a fish in lab.**

### Student Chapter Incentives

For every group of five or more student members at a specific veterinary school, the WAVMA Board, agreed to rebate 50% of student membership fees to run the chapter programs

WAVMA must be informed of the programs and the school officials. At least one faculty member at the school must be a full WAVMA member to act as a mentor.

If the faculty member can show active mentorship they will receive complimentary membership in the following year.

## Listserv Letters

Dear WAVMA Members,

Recently, **Dr Mike Corcoran** published a **List of items for a fish practice** on the WAVMA Listserv, which garnered a good bit of discussion. Below is the compiled list of items contributed by members to Mike's original list. Thanks for all those who offered suggestions, who are also mentioned at the end of the list.

### General medical supplies

Gloves  
 Microscope  
 Slides and slide covers (preferably plastic cover slips)  
 Small suture scissors (best choice for gill clips)  
 Dissecting kit / Microsurgery kit  
 Syringes- 1cc and 3cc  
 Syringes - 6ccs/10ccs for aspirations  
 Large feeding syringes  
 Red rubber catheters  
 Needles – 22, 23 gauge, including 1½ inch long for koi  
 Blood tubes - preferably lithium heparin  
 Culture Swabs and tubes  
 Refractometer  
 Oxygen tank with regulator and small diameter hose  
 Diff Quik, Gram Stain and Acid Fast Stain  
 Fluorescein stain

### Some medications

MS-222 for sedation and anesthesia  
 Sodium bicarbonate to buffer the pH of MS-222  
 Hydrogen peroxide – 3% and 35%  
 Betadine solution  
 Ceftazidime  
 Dimilin  
 Doxycycline  
 Fenbendazole  
 Florfenicol  
 Formalin  
 Metronidazole  
 Praziquantel- injectable and powder  
 Silver Sulfadiazine  
 Vitamin C injectable

### Books

*Fish Medicine*, Michael Stoskopf  
*Fish Pathology, 4th Edition*, Ronald J. Roberts  
*Fundamentals of Ornamental Fish Health*, Helen Roberts  
*Fish Disease: Diagnosis and Treatment*, Edward Noga  
*Advanced Koi Care for Veterinarians and Professional Koi Keepers*, Nicholas Saint-Erne

*Marine Chemistry: a Complete Guide to Water Chemistry in Marine Aquariums*, Brightwell  
*Fish Vetting Essentials*, Richmond Loh & Matt Landos  
*Systemic Pathology of Fish*, Hugh Ferguson  
*British Small Animal Veterinary Association Manual of Ornamental Fish*, Edited by William Wildgoose

### Fish Items

Aerator (aquarium type) – air pump, hose, air stones or diffusers  
 Water proof containers of various sizes for sedation (2 of each size, one for clean water as well)  
 Nets - small aquarium ones for in clinic and large koi nets for ponds  
 Disinfectant for nets and containers – Benzalkonium chloride

### Suggested items for koi (especially for high end clients)

Koi sock  
 Koi pan net or fluke landing net (long handled)  
 Round koi viewing tubs  
 6'x20' seine net  
 8'x20' seine net  
 Water quality test kit of professional quality similar to HACH FF1A (Hach.com)

### For Surgery

Anesthesia setup: described well in Helen Roberts text  
 Doppler / Pulse oximeter  
 ECG machine

### Other items for more advanced care

Portable digital radiography  
 Portable ultrasound  
 Electronic probes for ammonia, DO, pH, Salinity, etc such as HACH HQ40d

Carrying bag or kit for making pond calls

Contributors to the list:

**Mike Corcoran, DVM**  
**Julius M. Tepper, DVM**  
**Ron Roberts, BVMS, PhD**  
**Richmond Loh, BSc BVMS MPhil MANZCVS**  
**Marian McLoughlin, MVB PhD MRCVS**  
**Nadia Stegeman, DVM, MPH**  
**Nick Saint-Erne, DVM**  
**Allen Riggs, DVM, MS**

## Literature Review



Biosecurity Abstracts compiled by **David Scarfe**

ently complex because of the variety of species, environmental requirements, and facilities. To examine current practices, questionnaires were submitted to 60 public zoos and aquaria, predominantly in North America. Questions reviewed system type (closed, flow-through), quarantine length, diagnostics, treatments, and cleaning and disinfection.

Forty-two of the 60 institutions responded. Most institutions had separate quarantine protocols for freshwater teleosts, marine teleosts, and elasmobranchs. Ninety-five percent of institutions had a minimum quarantine period of 30 days or more. Sixty-four percent of institutions used isolated areas for some or all of their fish quarantine. Twenty-five percent had designated fish quarantine staff. All institutions used regular visual examinations to assess animal health. Fifty-four percent of the institutions carried out routine hands-on diagnostics on some fish; this was more common for elasmobranchs than teleosts. All institutions carried out necropsies on mortalities. Fifteen percent of institutions performed histopathology on almost all fresh mortalities; 54% percent performed histopathology on less than 10% of mortalities.

Prophylactic treatments were common in closed systems, in particular, formalin immersion for teleosts, freshwater dips and copper sulfate immersion for marine teleosts, and praziquantel immersion for marine teleosts and elasmobranchs. Institutions using dips generally did so at the start or end of quarantine. Fenbendazole- and praziquantel-medicated foods were used commonly in teleosts, but dosages varied greatly. Cleaning and disinfection of systems and equipment increased in response to known pathogens. These results can be used to compare and discuss fish quarantine practices at display facilities in order to improve quarantine success.

**Fish Quarantine: Current Practices in Public Zoos and Aquaria**  
Hadfield CA & LA Clayton (2011). *J. Zoo Wildlife Med.*, 42(4): 641-650.

### Abstract

The primary goal of quarantine is to reduce the risk of introducing infectious diseases into established collections.

Fish quarantine is inher-

**The application of epidemiology in aquatic animal health – opportunities and challenges**

Peeler EJ & NGH Taylor (2011).

*Vet. Res.*, 42:94 (An open access publication available at [www.veterinaryresearch.org](http://www.veterinaryresearch.org)).

### Abstract

Over recent years the growth in aquaculture, accompanied by the emergence of new and trans-boundary diseases, has stimulated epidemiological studies of aquatic animal diseases. Great potential exists for both observational and theoretical approaches to investigate the processes driving emergence but, to date, compared to terrestrial systems, relatively few studies exist in aquatic animals. Research using risk methods have assessed routes of introduction of aquatic animal pathogens to facilitate safe trade (e.g. import risk analyses) and support biosecurity. Epidemiological studies of risk factors for disease in aquaculture (most notably Atlantic salmon farming) have effectively supported control measures.

Methods developed for terrestrial livestock diseases (e.g. risk-based surveillance) could improve the capacity of aquatic animal surveillance systems to detect disease incursions and emergence. The study of disease in wild populations presents many challenges and the judicious use of theoretical models offers some solutions. Models, parameterised from observational studies of host pathogen interactions, have been used to extrapolate estimates of impacts on the individual to the population level. These have proved effective in estimating the likely impact of parasite infections on wild salmonid populations in Switzerland and Canada (where the importance of farmed salmon was investigated).

A lack of data is often the key constraint in the application of new approaches to surveillance and modelling. The need for epidemiological approaches to protect aquatic animal health will inevitably increase in the face of the combined challenges of climate change, increasing anthropogenic pressures, limited water sources and the growth in aquaculture.



## Book Review

### Aquaculture and Behavior

**Felicity Huntingford, Malcolm Jobling, Sunil Kadri**

Published by Wiley-Blackwell Publishers,  
February 2012. 358 pages. ISBN: 978-1-4051-3089-9.

**US \$79.99**

**Online review by 'Research & Markets**

<http://tinyurl.com/c4fxezq>.



Modern aquaculture is faced with a number of challenges, including public concern about environmental impacts and the welfare of farmed fish. A fundamental understanding of fish biology is central to finding ways to meet these challenges and is also essential for maintaining the industry's sustainability.

*Aquaculture & Behavior* provides a fundamental understanding with reference to behavioral biology, describing how to avoid problems caused by the natural behavior of farmed fish and providing information that, when properly applied, results in significant benefits for both the fish and the farmer.

Written and edited by an authoritative team, *Aquaculture & Behavior* provides a clear and concise account of aspects of fish biology that are central to aquaculture, gives expert guidance on the behavioral biology of farmed fish and explains how this can be applied to improve aquaculture practice. Special consideration is given to the role of behavior, why biologists are interested in behavior, and how they study and explain it. The authors focus on the techniques that have been developed for investigating the behavior of fish on farms and the behavior that we require of fish that are cultured for food, for science, for the ornamental trade and for release. The book also discusses and explores the issue of fish welfare and how it can be defined, identified and measured and features strategies for improving the welfare of farmed fish.

Informative and engaging, *Aquaculture & Behavior* brings the reader up-to-date with major issues pertaining to aquaculture. Everyone from fish farmers to upper level students will find this book a valuable and practical resource. Libraries in universities and research establishments where animal behavior, aquaculture, veterinary and biological sciences are studied and taught should have copies of this work on their shelves.

### Prebiotics in aquaculture: a review

**Ringo E, RE Olsen, TØ Gifstad, RA Dalmo, H Amlund, G-I Hemre & AM Bakke (2010).**

*Aquaculture Nutrition*, 16 (2): 117-136.

(An open access publication available at <http://tinyurl.com/3m6sh5q>.)

#### Abstract

A prebiotic is a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or the activity of one or a limited number of bacteria in the colon. Despite the potential benefits to health and performance as noted in various terrestrial animals, the use of prebiotics in the farming of fish and shellfish has been less investigated.

The studies of prebiotics in fish and shellfish have investigated the following parameters: effect on growth, feed conversion, gut microbiota, cell damage/morphology, resistance against pathogenic bacteria and innate immune parameters such as alternative complement activity (ACH50), lysozyme activity, natural haemagglutination activity, respiratory burst, superoxide dismutase activity and phagocytic activity.

This review discusses the results from these studies and the methods used. If the use of prebiotics leads to health responses becoming more clearly manifested in fish and shellfish, then prebiotics might have the potential to increase the efficiency and sustainability of aquaculture production. However, large gaps of knowledge exist. To fully conclude on the effects of adding prebiotics in fish diets, more research efforts are needed to provide the aquaculture industry, the scientific community, the regulatory bodies and the general public with the necessary information and tools.

### AQUATIC ANIMAL DISEASES SIGNIFICANT TO AUSTRALIA: IDENTIFICATION FIELD GUIDE – 4th EDITION

The Australian Government Department of Agriculture, Fisheries and Forestry is pleased to introduce the fourth edition of this field guide. The field guide aims to help people recognise diseases significant to aquaculture and fisheries in Australia. The field guide is now available for viewing and downloading from on the DAFF website at <http://tinyurl.com/AU4th-AA-DZGuide>.

## Colleague's Connection

### How I Stumbled Upon Aquatic Veterinary Medicine

**Stephen Reichley**

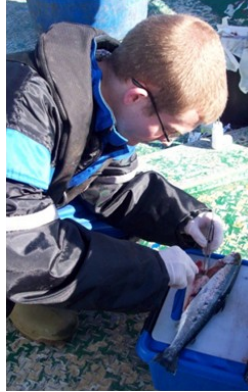
(Student Member, The Ohio State University – DVM 2013)

I first developed an interest in veterinary medicine after a few years in the horse world. I helped an equine vet occasionally during his visits to the barn where I rode horses and gradually started paying closer attention to what he was doing. After expressing an interest in veterinary medicine during high school, I was invited to participate in a Veterinary Explorers Program at a local animal hospital. That led to additional shadowing which blossomed my interest in small animal medicine and orthopedics. Next thing I knew I was working at the local clinic getting a taste of general practice. I continued working there over the summers throughout my undergraduate studies and decided that veterinary medicine was what I wanted to do as a career.

Before I knew it, I was starting at The Ohio State University College of Veterinary Medicine, answering "small animal" to the daily question of what I wanted to do with my DVM. During the first quarter of my first year I attended a lecture by Dr. Luke Heider on consumer issues related to agriculture in our epidemiology course. About half way through his presentation a slide came up with the word "aquaculture" on it. I remember being intrigued, never before hearing that term in veterinary medicine. Interested in this new concept, I started to research aquaculture, reading everything I could get my hands on. I eventually approached the state veterinarian and asked him if there was a fish vet I could shadow for a day.

It turns out there was not a vet specializing in fish health in the area but instead I was offered an internship at the Ohio Department of Agriculture's Aquaculture Department. I spent the summer between first and second year traveling Ohio visiting with fish farmers and learning about their operations, the challenges they faced, and the questions they had. I began to look for additional opportunities to gain experience with fish and learn about the industry I was starting to explore. Fortunately I was able to arrange some great experiences during my second summer break.

During the first part of the summer I interned in Mississippi at the Thad Cochran National Warmwater



Aquaculture Center. This internship provided my first exposure to clinical aquatic veterinary medicine. It was fascinating to work in the Aquatic Diagnostic Lab. I cannot thank Dr. Lester Khoo and his staff enough for their tremendous patience and so diligently working to provide a great learning experience. When I wasn't watching the workup of clinical cases I was in the lab honing my molecular techniques by participating in a validation of a Real Time PCR assay for *E. tarda*. It was a phenomenal experience and led to the realization aquatic veterinary medicine was the career for me.

After Mississippi, I spent the rest of my summer break in Idaho working for the Department of Fish and Game. During my eight weeks there I traveled more than 9,000 miles with fish pathologist Doug Munson. I was able to participate in multiple disease surveillance programs during the Chinook salmon spawning and do diagnostic work at various hatcheries. Learning about the extensive efforts that go into rearing salmon and trout was an eye-opening experience.

As I finished up the summer and returned to Columbus for my third year of vet school, I started planning the rotations for my clinical year. This option allows students with specialized career paths to design their own clinical year in consultation with a faculty advisor. I am very fortunate this is part of the curriculum at OSU as it enabled me to better explore aquatic veterinary medicine; an opportunity that would not have been an option at many other veterinary schools.

I am now in the middle of my clinical year and have had the great fortune of participating in externships related to fish health at the Norwegian School of Veterinary Science and Havbruktstjenesten AS in Norway; Marine Scotland, University of Stirling, and Fish Vet Group in Scotland; Vet Aqua International in Ireland; and the Food and Agriculture Organization of the United Nations in Italy. This fall I will be in Idaho again for an internship at Clear Springs Foods. Next spring I will be with USDA APHIS in Ruskin, FL and Riverdale, MD. I am very appreciative to all those who have graciously hosted me thus far and look forward to continuing my experiences as I head toward graduation in May 2013.

It has been quite a journey these past three years. I have been amazed and humbled at how welcoming and helpful all those in aquatic veterinary medicine have been. I have learned a great deal about the industry in the past three years and continue to get more excited about the field. I look forward to exploring the many possibilities for a career in aquatic veterinary medicine available after graduation.



## Dear Colleagues,

We invite you to the **31st World Veterinary Congress** that will take place next year in Prague. Each year is very important for the **World Veterinary Association (WVA)**, but the year **2013 is a special year**, the WVA is looking forward to celebrating **150th anniversary** in Prague with you.

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You may participate at **Opening Ceremony, Welcome Cocktail, Congress dinners** and/or **1st World Veterinary Golf Championship**. For more information click [HERE](#)

## Contact

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## Clinical Reports

### Shrimp Early Mortality Syndrome (EMS) / Acute Hepatopancreatic Necrosis Syndrome (AHPNS): NACA/DAFF Asia Pacific Emergency Regional Consultation

**C.V. Mohan, Eduardo Leano and Simon Wilkinson**  
(Network of Aquaculture Centres in Asia--Pacific, Bangkok, Thailand – [mohan@enaca.org](mailto:mohan@enaca.org)).

An emergency regional consultation on "Early Mortality Syndrome" of shrimp, or "Acute Hepatopancreatic Necrosis Syndrome" concluded on Friday, 10<sup>th</sup> of August 2012, in Bangkok, Thailand. The consultation brought together over 87 participants including international shrimp health experts, regional governments and industry to share information on this emerging disease, its occurrence, pathology and diagnosis, and to develop a coordinated regional response to the issue. The consultation was jointly organised by NACA, an inter-governmental organization of 18 governments in Asia Pacific and Department of Agriculture, Fisheries and Forestry (DAFF), Australia.

#### History & Clinical Signs

Heavy mortalities during the early stages of a shrimp crop are not unusual and there are a variety of management and pathogen related factors that can cause such losses, which are often described by the catch-all term "early mortality syndrome." However, in 2009 a new and distinctive pattern of mortalities began to be noticed, affecting both *Penaeus vannamei* and *P. monodon*.

The syndrome involves mass mortalities of up to 100% during the first 20-30 days after stocking. Affected shrimp consistently show an abnormal hepatopancreas, which may be shrunken or discoloured; loose shells, corkscrew swimming, pale colouration and slow growth. Given that these signs appear to be distinctive, the name "acute hepatopancreatic necrosis syndrome" has been proposed as a more appropriate term, to distinguish this condition from other causes of early mortalities.

The syndrome was first reported from China and Vietnam in 2010, followed by Malaysia in 2011, and in 2012 it has also been reported in Thailand. The syndrome has caused severe economic losses throughout the region. The cause is not yet known.

#### Etiology & Pathobiology

This new/emerging shrimp disease has been reported to cause significant losses among shrimp farmers in China and Vietnam (2010) and Malaysia (2011). It was also reported to affect shrimp in the eastern Gulf of Thailand (Flegel, 2012). The disease affects both *P. monodon* and *P. vannamei* and is characterized by mass mortalities (reaching up to 100% in some cases) during the first 20 to 30 days of culture (post-stocking in grow-out ponds). Clinical signs observed include slow growth, corkscrew swimming, loose shells, as well as pale coloration. Affected shrimp also consistently show an abnormal hepatopancreas (shrunken, small, or discolored).

The primary pathogen (considering the disease is infectious) has not been identified. Lightner et al. (2012) described the pathological and etiological details of this disease. Histological examination showed that the effects of EMS in both *P. monodon* and *P. vannamei* appear to be limited to the hepatopancreas (HP) and show the following pathology:

- 1) Lack of mitotic activity in generative E cells of the HP;
- 2) Dysfunction of central hepatopancreatic B, F and R cells;
- 3) Prominent karyomegaly and massive sloughing of central HP tubule epithelial cells;
- 4) Terminal stages including massive intertubular hemocytic aggregation followed by secondary bacterial infections.

Similar histopathological results were obtained by Prachumwat et al. (2012) on Thai samples of *P. vannamei* collected from Chantaburi and Rayong provinces in late 2011 and early 2012 (Figure 1). The progressive dysfunction of the HP results from lesions that reflect degeneration and dysfunction of the tubule epithelial cells that progress from proximal to distal ends of HP tubules. This degenerative pathology of HP is highly suggestive of a toxic etiology, but anecdotal evidence suggests that disease spread patterns may be consistent with an infectious agent.

Added to this is the standing threat of infections myonecrosis (IMN) on *P. vannamei* culture, which is now somehow contained within Indonesia. Rumors of disease outbreaks caused by IMNV from other countries in Asia have so far been false (Senapin et al., 2011).

## Clinical Reports - continued

Identifying the primary cause of the disease is necessary, but while this information is still not yet available, increased disease awareness and preparedness should be implemented by every shrimp-producing country in the region. Considering the great economic loss that EMS will cause in the region's shrimp industry, ways of preventing the spread and/or occurrence of this disease should be formulated by concerned experts, officials and other regulatory bodies. Farmers, on the other hand, should also properly cooperate with the concerned agencies by promptly reporting any suspected mortalities among cultured shrimp that appear to be similar to the clinical description of EMS/AHPNS. It is important that histological examination be carried out to confirm that suspected cases fit the AHPNS case definition devised by Dr. Lightner.

### Seeking an AHPNS Case Definition

Reporting of AHPNS has been confounded by the lack of a clear case definition, which has led to many different disease problems being incorrectly reported as "EMS". Prof. Don Lightner proposed the following animal level case definition for AHPNS, which was generally agreed on by the consultation:

Idiopathic - no specific disease causing agent (infectious or toxic) has been identified.

Pathology: Acute progressive degeneration of hepatopancreas from medial to distal with dysfunction of B, F, R and E cells, prominent karyomegaly and necrosis and sloughing of these tubule epithelial cells. The terminal stage shows marked inter- and intra-tubular hemocytic inflammation and development of secondary bacterial infections that occur in association with necrotic and sloughed hepatopancreas tubule cells.

At the pond level, the following clinical signs could be used for presumptive diagnosis which can be further confirmed by histopathology at the animal level:

Often pale to white within HP connective tissue capsule.

Significant atrophy of HP.

Often soft shells and partially full to empty guts.

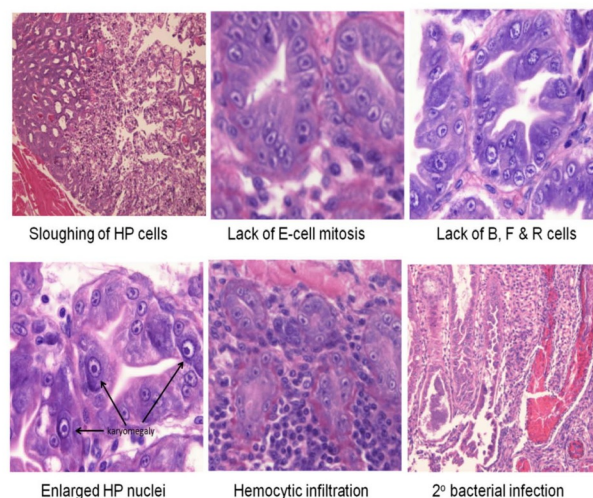
Black spots or streaks within the HP sometimes visible.

HP does not squash easily between thumb & finger.

Onset of clinical signs and mortality starting as early as 10 days post stocking

Moribund shrimp sink to bottom.

For a more thorough discussion of the case definition



**Figure 1.** Histopathology of *Penaeus vannamei* hepatopancreas from Thailand affected by EMS/AHPNS. Photos courtesy of T.W. Flegel.

and research progress on the causes of AHPNS, please listen to Dr. Lightner's presentation dealing with characterisation, distribution, impacts and case definition (<http://www.enaca.org/modules/podcast/programme.php>). A 'disease card' including diagnostic information and photographs is in preparation and will be made available for download shortly.

### Epidemiology

While the apparent spread of AHPNS throughout the region suggests an infectious or at least biological agent may be involved, thus far, laboratory challenge tests have failed to demonstrate that the disease is transmissible and no infectious agent or toxin has been identified. Testing of feeds from affected farms and two crustaceacides including cypermethrin have similarly failed to reproduce the disease. At this stage the cause is unknown, and the possibility of an infectious agent or toxin cannot be discounted. For a detailed discussion, please listen to Dr. Tim Flegel's presentation on research progress on bacterial and viral causes of AHPNS, and Dr. Chalor Limsuwan's presentation on the management of EMS – what works and what does not?

### Preparing for the Future

As the emergence or discovery of new diseases is a regular occurrence in aquaculture, the consultation also discussed arrangements to improve response to future disease emergencies. At present, obtaining extra-

## Clinical Reports - continued

budgetary funding to deal with a disease emergency often requires lengthy approval processes and funds may not be granted until the situation is sufficiently 'hot' to persuade administrators of the need.

As successful containment of a disease is only possible during the early stages of an outbreak, participants indicated the need to develop a 'fast response' mechanism that would allow rapid deployment of investigatory or response teams. One possibility proposed was the establishment of a regional emergency aquatic animal disease fund and pre-agreed procedures for activating an investigation or response to be coordinated by a regional mechanism such as NACA.

While governments were seen as the main parties responsible for contributing to such a fund, industry representatives indicated they also made substantial private investments in investigating AHPNS and other serious disease issues, and were open to the possibility of contributing to the fund when a need arose.

NACA has released a Disease Advisory which was widely circulated among member countries, regional and international organisations, as well as the private sectors. The disease advisory is available for free download at NACA website (<http://library.enaca.org/Health/DiseaseLibrary/disease-advisory-ems-ahpns.pdf>).

### Acknowledgements

NACA wishes to sincerely thank the Australian Department of Agriculture, Fisheries and Forestry for funding the emergency consultation, and for their rapid and timely response to this issue, which has been of great assistance to the region. OIE support for the participation of OIE Crustacean disease experts is gratefully acknowledged. Finally NACA wishes to thank all the resource experts, national participants representing the CA and lead research institutions, regional and international organizations and private sector for their contribution to the regional consultation.

NACA will greatly appreciate receiving any relevant information pertaining to EMS/AHPNS from all member countries in the region.

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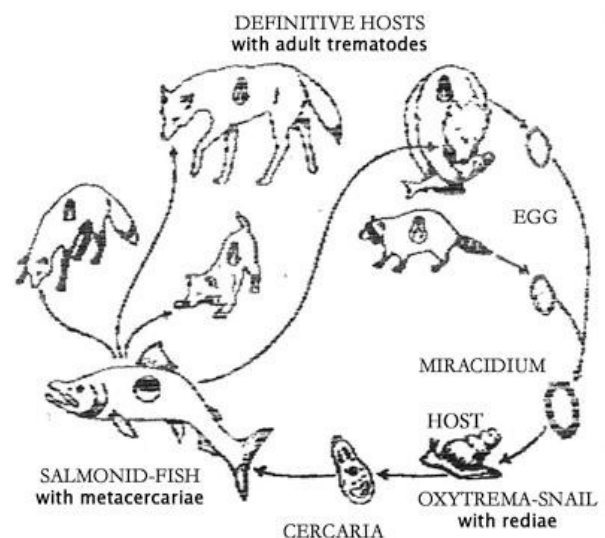
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More information and audio recordings of 19 technical presentations at the August Bangkok Consultation, are available at [http://www.enaca.org/modules/news/article.php?article\\_id=1952](http://www.enaca.org/modules/news/article.php?article_id=1952) and <http://www.enaca.org/modules/podcast/programme.php>.

A more extensive report on this issue is available at <http://www.enaca.org/modules/wfdownloads/singlefile.php?cid=11&lid=1059>.

### Salmon Poisoning Disease (SPD) Hosts



## Clinical Reports - continued

### Salmon Poisoning Disease (SPD) & Elokomin Fluke Fever (EFF) – Ever heard of them?

A. David Scarfe PhD, DVM, MRSSAF

Salmon poisoning disease (SPD) and Elokomin fluke fever (EFF) are not known to cause disease in fish. SPD is an acute, usually fatal, rickettsial disease of canids, in which the infective agent is transmitted through the various stages of a fluke in a snail-fish-dog life cycle. SPD as the name of the disease is misleading because no toxins or poisons are involved.

Elokomin fluke fever (EFF) resembles SPD but has a wider host range. However, while the infectious agent also produces acute, but less fatal rickettsial disease of canids, it also affects several wildlife species including otters, ferrets, weasels, raccoons, skunks, bears and several fish-eating birds.

**Confusing Etiology** – SPD is caused by *Neorickettsia helminthoeca* and diagnostics are sometimes complicated by a second agent, *N. elokominica* which causes EFF, both of which are carried by a small fluke, *Nanophyetus salmincola* that serves as a vector. Dogs and other animals become infected by ingesting primarily trout or salmon that contain encysted metacercariae of the rickettsia-infected fluke. Other fish such as the lamprey, sculpin, redbreast shiner, shad, sturgeon, candlefish, large-scale suckers and Pacific giant salamanders, all of which spend their lives in coastal streams and rivers in the Pacific Northwest, can be infected with *N. helminthoeca*.

When fish or fish offal is ingested by the mammalian or avian host, the larval flukes excyst in the GI tract, in particular the mucosa of the duodenum, and release the rickettsiae. Fluke infection itself produces little or no clinical disease. There is also a Siberian variety of the disease caused by *Nanophyetus schikhobalowi*. Its reservoirs and hosts follow the same pattern as the North American disease, going from snail to fish to mammal or bird, only differing in the actual species involved. (See illustration on page 14.)

**Epidemiology** – The life cycle is maintained by the passage of infected fluke eggs in the feces of the mammalian host. Miracidia emerge from these eggs and infect *Oxytrema plicifer* snails. The miracidia develop into redia, and then cercaria that are released from the snail. Cercariae that infect salmon or trout develop into encysted metacercariae. The cycle is completed when a dog eats the fish, the metacercariae become flukes that carry and release the rickettsia.

Infected fish are found in the Pacific Ocean from San Francisco to the coast of Alaska, but SPD is more prevalent from northern California to Puget Sound. It is also seen inland along the rivers of fish migration. Apparently, the snail is the geographically limiting factor.

**Clinical Findings, Diagnostics, Prevention and Treatment in Dogs** – In canids, SPD clinical signs typically appear suddenly in 5-7 days after eating infected fish, but may be delayed as long as 33 days. They persist for 7-10 days before culminating in death in up to 90% of untreated animals.

A dog's body temperature usually peaks at 104-107.6°F (40-42°C) 1-2 days later, then gradually declines for 4-8 days and returns to normal. Frequently, animals are hypothermic before death. Fever is accompanied by depression and complete anorexia in almost all cases. Persistent vomiting usually occurs by day 4 or 5. Diarrhea develops by day 5-7, often contains blood and may be severe. Dehydration and extreme weight loss occur.

Infection appears to chiefly affect the lymphoid tissues and intestines. There is enlargement of the GI lymph follicles, lymph nodes, tonsils, thymus, and to some extent, the spleen, with microscopic necrosis, hemorrhage, and hyperplasia. Variable but often severe hemorrhagic enteritis, which seems to arise from damaged lymph follicles, is seen throughout the intestine. Flukes embedded in the duodenum account for little tissue damage. Nonsuppurative meningitis or meningoencephalitis has also been identified in some dogs.

Fluke ova are found on fecal examination in ~92% of cases, which supports the diagnosis. The eggs are oval, yellowish brown, rough-surfaced, and ~87-97 × 35-55 µm, with an indistinct operculum and a small, blunt point on the opposite end. After initial exposure to *N. salmincola* it takes about one week for eggs to be detected in the stool. Intracellular organisms have been demonstrated via lymph node aspiration in ~70% of the cases. Other causes of fever of unknown origin, generalized lymphadenopathy, vomiting, and diarrhea are differential diagnoses. When diarrhea and exudative conjunctivitis occur, distemper should be considered.

Currently, the only means of prevention is to prevent the ingestion of uncooked salmon, trout and similar freshwater fish. EFF infections produce less severe clinical signs than SPD, but lymphadenopathy may be a more pronounced finding. Fatality rates are lower with EFF and occur in ~10% of untreated cases.

For more information – see the Merck Veterinary Manual at [www.merckmanuals.com/vet/index.html](http://www.merckmanuals.com/vet/index.html).

## Clinical Reports - continued

### Novartis CAVOY KHV Vaccination

#### Jena Questen DVM

Veterinary Care with an Eastern Flare

[www.eastwestvet.com](http://www.eastwestvet.com)

[www.drquesten.com](http://www.drquesten.com)

The first and only USDA approved vaccine for immunization against Koi Herpes Virus (Cyprinid Herpesvirus - 3) is now available! The new vaccine, called Cavooy, is brought to the US by Novartis Animal Health and is manufactured by Kovax in Israel. In clinical trials where koi were vaccinated with CAVOY then intentionally infected with KHV, an average of 88% of the koi survived exposure to virulent Koi Herpes Virus.

Koi herpes virus (KHV) causes a highly contagious, usually fatal disease of koi and common carp. Experts consider it to be the single biggest threat to koi ponds and the koi industry as a whole. The first case of disease related to KHV was reported in England in 1996, and the Koi Herpes Virus was isolated and identified two years later. KHV consists only of genetic material (DNA) and other basic molecules that enclose the DNA.

Koi Herpes Virus is a devastating disease that leads to substantial losses of koi fish. Transmitted in water droplets or through fomites or direct contact between fish, KHV causes gill and kidney necrosis as well as skin lesions, and leads to mass mortalities in often as quickly as 7 days. The disease affects koi fish in backyard ponds, as well as commercial fish producers, but has also killed thousands of common carp (*Cyprinus carpio*) in lakes and open waterways. KHV is an OIE reportable disease, and is a potential threat to every keeper of koi fish.

The vaccine, available only through veterinarians, has been used successfully in Israel for the past several years. The virus in the vaccine has been modified to reproduce very slowly in koi without causing disease symptoms. When a healthy koi is vaccinated, CAVOY triggers the fish's immune system into action and trains the system to recognize and attack infecting KHV virus. So when the fish encounters disease-causing KHV, the fish's immune system knows what the virus is and knows what to do with it.

CAVOY is an immersion vaccine, so no injections are required. To administer the vaccine, no needles, syringes or sedatives are needed. Koi are simply placed into a clean, aerated tank containing CAVOY

for 45 minutes to an hour. Vaccinate koi in water temperature of 71-79 degrees Fahrenheit (22-26 C).

Koi properly vaccinated with CAVOY experience no adverse events or side effects. The vaccine poses no known risk to other species of fish or animals, humans or the environment. Vaccination of koi is recommended for hobbyists who show their fish, have had previous experience with KHV, or who wish to obtain new fish. Vaccinating their fish will help to protect their stock. Many dealers and breeders as well are now vaccinating their fish before sale, as a way to protect their fish and those of their customers, and to differentiate themselves from the competition.

For more information please visit [cavooy.com](http://cavooy.com). Just one more way that Novartis Animal Health is providing products to help advance aquatic animal medicine.



Dr Jena Questen releasing a vaccinated shiro utsuri koi.





## Clinical Reports - continued

### Extracting the Amphibian Chytrid Fungus from Formalin-fixed Specimens.

*Methods in Ecology and Evolution*, 2012

Katy Richards-Hrdlicka.

Katy Richards-Hrdlicka, a doctoral candidate at the Yale School of Forestry & Environmental Studies, examined 164 preserved amphibians for the presence of *Batrachochytrium dendrobatidis*, or Bd, an infectious pathogen driving many species of amphibians toward extinction. The pathogen is found on every continent inhabited by amphibians and in more than 200 species. Bd causes chytridiomycosis, which is one of the most devastating infectious diseases to vertebrate wildlife.

Richards-Hrdlicka swabbed the skin of 10 species of amphibians dating back to 1963 and preserved in formalin at the Peabody Museum of Natural History. Those swabs were then analyzed for the presence of the deadly pathogen.

"I have long proposed that the millions of amphibians maintained in natural-history collections around the world are just waiting to be sampled," she said.

The samples were then analyzed using a highly sensitive molecular test called quantitative polymerase chain reaction (qPCR) that can detect Bd DNA, even from specimens originally fixed in formalin. Formalin has long been recognized as a potent chemical that destroys DNA.

"This advancement holds promise to uncover Bd's global or regional date and place of arrival, and it could also help determine if some of the recent extinctions or disappearances could be tied to Bd," said Richards-Hrdlicka. "Scientists will also be able to identify deeper molecular patterns of the pathogen, such as genetic changes and patterns relating to strain differences, virulence levels and its population genetics."

Richards-Hrdlicka found Bd in six specimens from Guilford, Conn., dating back to 1968, the earliest record of Bd in the Northeast. Four other animals from the 1960s were infected and came from Hamden, Litchfield and Woodbridge. From specimens collected in the 2000s, 27 infected with Bd came from Woodbridge and southern Connecticut. In other related work, she found that nearly 30 percent of amphibians in Connecticut today are infected, yet show no outward signs of infection.

Amphibian populations and species around the world are declining or disappearing as a result of land-use change, habitat loss, climate change and disease.

Since Bd's identification in the late 1990s, there has been an intercontinental effort to document amphibian

populations and species infected with it. Richards-Hrdlicka's work will enable researchers to look to the past for additional insight into the pathogen's impact.

Katy Richards-Hrdlicka's paper, "Extracting the Amphibian Chytrid Fungus from Formalin-fixed Specimens," appears in the journal *Methods in Ecology and Evolution*.

Edited from original source:

<http://www.sciencedaily.com/releases/2012/06/120620113244.htm>

### Australia to bait and trap cane toads

SYDNEY, June 13 (UPI)

Australian scientists say the poison invasive cane toads use to devastate native species could be turned into a weapon against the toads themselves. Researchers at the University of Sydney, in collaboration with the University of Queensland, have determined the poison can be used as 'bait' in traps set in bodies of water to catch toad tadpoles. The biggest hurdle to eliminating cane toads is that a single clutch of eggs laid at a time by one female can number 30,000 or more, they said.

"This means that even if you catch and kill 99 percent of the adult toads in an area, the few that are left can produce so many offspring that before you know it you are back to where you started -- just as many cane toads as ever," Sydney researcher Rick Shine said.

The scientists found secretions from the shoulder glands of dead toads can be used to bait traps, as it is cheap, easy to obtain and highly attractive to cane toad tadpoles but repels the tadpoles of native frogs.

"A chemical 'bait' created from the toads' poison is a real magnet for [cane] toad tadpoles," Shine said.

"When we use this chemical as bait in a funnel-trap we catch thousands of toad tadpoles and almost nothing else," he said. "In one natural pond, we collected more than 40,000 toad tadpoles in less than a week. And I think we got them all -- over the next few weeks, not a single toad emerged from that pond."

Cane toads, initially brought into the country to control beetles threatening sugar cane plantations, are spreading through tropical Australia with a devastating impact on native species, researchers said.

[http://www.upi.com/Science\\_News/2012/06/13/Australia-to-bait-and-trap-cane-toads/UPI-39571339621575/#ixzz1xxeNOMVP](http://www.upi.com/Science_News/2012/06/13/Australia-to-bait-and-trap-cane-toads/UPI-39571339621575/#ixzz1xxeNOMVP)

## Emerging Issues

### Norwegian Auditor General's investigation into the management of aquaculture September 16, 2012

Oslo, Norway – The aquaculture industry is facing significant environmental challenges, among other things in the form of high figures for escaped fish, salmon lice and extensive losses due to disease. The extent of these and other environmental challenges is so great that it is necessary to strengthen the management of aquaculture in order to ensure environmental sustainability and the possibility of future growth in the industry, says Auditor General Jørgen Kosmo.

The aquaculture industry in Norway has grown considerably for several years and it is an important industry and employer. The Office of the Auditor General's investigations shows that the strong growth also has a significant environmental impact, particularly in areas with extensive, high density aquaculture production. There is now a high proportion of escaped farmed fish among wild fish. This represents a threat to the wild fish's ability to survive, and in some areas it has also affected the genetic distinctiveness of wild salmon. The goal of reducing impacts that threaten the genetic diversity of salmon to a non-harmful level by 2010 has not been achieved.

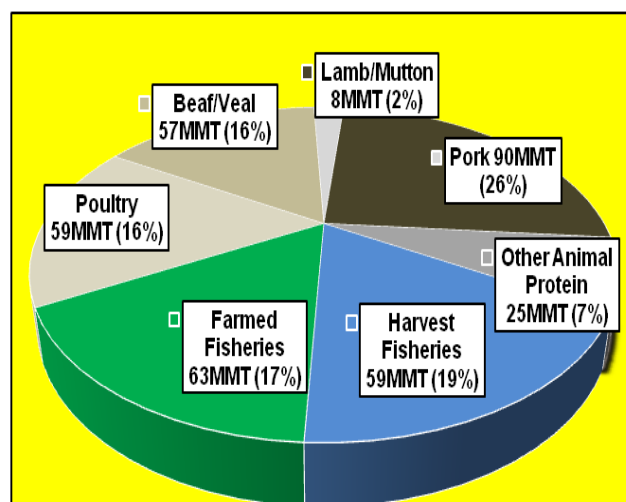
There are substantial losses of farmed fish, particularly as a result of disease. The disease situation has not improved since 2000, and the extensive losses mean large financial losses for the industry and inefficient use of marine areas. The prevalence of lice remains at a high level along large parts of the coast. For farmed fish, this primarily means poorer fish welfare, and the ability to survive is also reduced, particularly for sea trout. Aquaculture contributes to discharges of large amounts of nutrient salts, organic material and chemicals in the areas around fish farms. The consequences of the total discharges from the aquaculture industry have yet to be clarified, but chemicals, primarily from the treatment of lice, are discharged untreated into the water, and such agents have been shown to harm nature.

The aquaculture industry is dependent on large quantities of wild fish for fish feed. The fishing pressure on some of these species has been great, and it is important that the Ministry of Fisheries and Coastal Affairs continues its work of ensuring that all wild resources that are part of the feed for farmed fish come from sustainable fisheries. It is also important to ensure efficient utilisation of by-products from the production of fish for human consumption, says AG Jørgen Kosmo.

Breaches of the regulations are often uncovered during inspections of aquaculture facilities, and the use of sanctions varies at the regional and local levels in the Directorate of Fisheries and the Norwegian Food Safety Authority. It is also pointed out that, in connection with inspections, there is a lack of sufficiently precise tools to gain an overview of the total amount of farmed fish in the fish farms. The Ministry of Fisheries and Coastal Affairs is responsible for setting the maximum amount of farmed fish that can be produced. The investigation shows that, in recent years, the ministries involved have placed greater emphasis on the environment when considering whether the production of farmed salmon can be increased.

According to the ministry, several of the issues mentioned will be considered in connection with the work on a new report toward the end of 2012. Following up the Office of the Auditor General's remarks will be a priority task in the time ahead.

[More information and documentation on the Office of the Auditor General's investigation into the management of aquaculture, (Document 3:9, 2011-2012 - in Norwegian) is available at [www.riksrevisjonen.no/en/Reports/Pages/aquaculture.aspx](http://www.riksrevisjonen.no/en/Reports/Pages/aquaculture.aspx). ADS-Mod.]



**Figure 1. 2011 Global Animal Protein Production**

Current global production of animal protein from primary livestock and fisheries sources (in millions of metric tonnes - MMT). Data estimated from FAO production statistics ([www.fao.org/corp/statistics/en](http://www.fao.org/corp/statistics/en)).

## Emerging Issues - continued

### US Harvest Fisheries & Aquaculture Seafood Production Perspectives

**A. David Scarfe** PhD, DVM, MRSSAf.  
American Veterinary Medical Association, Schaumburg, IL 60173

Being faced with an increasing number of diseases that affect animal health and welfare, seafood safety and public health (APHIS 2012), below are some factoids of possible use to aquatic veterinarians – from a 2012 United States perspective.

#### *Fisheries and aquaculture on the global scale* (FAO 2011)

Together, fisheries and aquaculture provide the world with ~122 million metric tons of fish every year.

Worldwide, seafood provides more than 1.5 billion people with almost 20% of their average per capita intake of animal protein.

Though global aquaculture production was less than 1 million metric tons in the 1950s, farmed fisheries (aquaculture) now produces an estimated over 60 million metric tons per year, at a value of over US\$100 billion; however, a vast majority of this growth is occurring outside the U.S.

The number of fish stocks currently identified as over-exploited, depleted, or recovering from depletion is the highest recorded to-date.

Seafood consumers, particularly in more prosperous regions, are increasingly demanding that seafood be guaranteed as sustainably harvested or raised.

In many cases seafood production is greater than many traditional livestock industries (Figure 1, page 18).

#### *Aquaculture and seafood demand in the United States* (NOAA 2012)

The U.S. (a little behind Europe and Japan) is a major consumer of aquaculture products, importing 84% of all the seafood we consume, about half of which is farm-raised.

Domestic aquaculture industry only supplied about 5% of domestic demand, and only 1.5% of domestic demand for marine species consumed in the U.S.

Despite meager contributions of our domestic aquaculture industry, U.S. demand for seafood continues to grow – the U.S. seafood trade deficit is currently at a record high of US\$9 billion per year.

Many other countries are investing more heavily in aquaculture than the United States; the U.S. is a distant 13<sup>th</sup> in global aquaculture production (FAO, 2010).

Current U.S. investments in aquaculture appear to be falling behind growing demand and opportunities in developing the U.S. aquaculture industry. Whereas mature, terrestrial livestock industries have well-established management practices for virtually every aspect of production, the U.S. aquaculture industry currently struggles with:

Dramatically increasing feed costs and large gaps in our understanding of nutrient requirements and optimal feeding of most fishes.

Ineffective disease management strategies, associated with limited access to safe and effective drugs and biologics.

An unclear and uncertain regulatory environment, particularly with respect to aquaculture, animal health and seafood safety.

Inaccurate and ineffective public education and media coverage of industry and the importance of seafood to domestic and global food security.

Relatively limited investment in U.S. aquaculture business interests and investment by government and private producers.

#### References

APHIS (2012). Aquaculture Disease Information. Animal & Plant Inspection Service, US Department of Agriculture, Riverdale, MD, USA. Accessible at [www.aphis.usda.gov/animal\\_health/animal\\_dis\\_spec/aquaculture](http://www.aphis.usda.gov/animal_health/animal_dis_spec/aquaculture).

FAO (2010). State of World Fisheries and Aquaculture 2010. United Nations Food & Agriculture Organization, Rome, Italy. 197 pp. Accessible at <http://www.fao.org/docrep/013/i1820e/i1820e00.htm>.

NMFS (2012). Aquaculture in the United States. National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Washington DC, USA. Accessible at [www.nmfs.noaa.gov/aquaculture/aquaculture\\_in\\_us.html](http://www.nmfs.noaa.gov/aquaculture/aquaculture_in_us.html).

## Legislative and Regulatory Issues

### The Use of Koi Herpes Virus as a control agent for common carp in Australia

Reported by **Richmond Loh**  
<http://www.thefishvet.com.au/>

On Wednesday the 25th of July, I attended a webinar about the research that has been conducted with koi herpesvirus (KHV). It was provided courtesy of the Australian Biosecurity Intelligence Network (ABIN). Veterinary virologist, Dr Ken McColl, provided some background, and recent progress, on an Invasive Animals Co-operative Research Centre project entitled "Koi Herpesvirus – a potential biological control agent for carp in Australia".

Dr McColl provided a brief history of the KHV, with first reports occurring in Israel in 1998 and it now has a worldwide distribution. Currently Australia is one of the few countries that remains free of KHV. Dr McColl stated that in some water bodies, carp can account for up to 90% of the biomass. For this reason, carp are touted as pests and scientists are investigating utilising KHV as means to control the non-native, feral carp population. The principal researcher confides that funding for the work continues for another 5 years and so release of the virus would be scheduled before funding ceases and with a statement, "A lot of recreational fisherman say we need to have carp control."

The pathogenesis of KHV is uncertain, but it is thought that it interferes with osmoregulation and causes damage to the gills, kidney and gut. Research has shown that the virus is highly host-specific and it should have 70-100% kill rate of all age groups of carp (common carp [*Cyprinus carpio carpio*] and koi carp [*Cyprinus carpio koi*]). Only low levels of virus is required and it can be horizontally transmitted through infected water, fish faeces, plankton, mussels and crustaceans. In addition, infected fish were shown to excrete the virus well before they showed signs of disease.

Work was conducted using 4-10cm common carp and the Indonesian isolate (KF-1 Cell line). Clinically infected fish will have increased gill mucus production and early signs in affected aquaria include froth formation at the water surface. Gill and skin necrosis follow and the skin may take on a "sand paper" appearance.

Mortality rate was dependent on viral dose, size of

the fish and water temperature. At a bath dose rate of 30 TCID<sub>50</sub>/mL, deaths appeared 2 days post-exposure and mortalities reached 95%. At a bath dose of 6 TCID<sub>50</sub>/mL, deaths appeared 4 days post-exposure and mortality rate reached 40%. In terms of fish size, work conducted by the Japanese showed that larvae <1cm in length experienced no mortality. Carp between 1-2cm will have 60-70% mortality and fish >2cm will have 100% mortality rate. The differences in susceptibility is unknown it is thought that it may be due to innate resistance or maternal antibody. The course of disease is temperature dependent and it will take 3 weeks to kill at 17°C and only 1 week at 26°C.

The researcher was aware that carp-goldfish hybrids had variable susceptibility and may be only as high as 40%. This could potentially interfere with the success of carp eradication using KHV. It was found that hybrids account for only 1-3% of total "carp" populations.

There was a question about whether other related viruses (e.g. CyHV-1 and -2) conferred protection. From over 800 samples tested, no cross reactivity was found.

The presenter concluded that KHV could be used as a biological control agent for carp in Australia, provided we understand the biology of carp in Australia, understand the epidemiology of KHV and that we use a targeted, strategic release of KHV in an integrated pest management program.

I have also blogged my thoughts on the matter which can be found by following this link –

<http://wp.me/p1BQjt-E5>

**Do you have some concerns about releasing KHV virus into the wild in the only inhabited continent where it is not currently found?**

**If so, please forward your thoughts to:**

**Dr. Richmond Loh**

[thefishvet@gmail.com](mailto:thefishvet@gmail.com)

<http://www.thefishvet.com.au/>



# Aquatic Veterinary News

The Quarterly Newsletter of the World Aquatic Veterinary Medical Association

**Consider promoting your products, services or programs to aquatic veterinarians, veterinary students, nurses and paraveterinary professionals throughout the world**

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## Aquatic Veterinary CE & PD



### MEETINGS OF INTEREST TO AQUATIC VETERINARIANS

Veterinarians attending these meetings may be awarded veterinary CE/CPD credit towards annual re-licensure or re-registration to practice veterinary medicine. Individuals should check with the organizers if CE/CPD certificates are provided.

**WAVMA / NOVICE International Conference - Aquatic Veterinary Education Programme**   
**October 4-5, 2012**  
Faculty of Veterinary Medicine, Bucharest, Romania.

NOVICE is the Network Of Veterinary Information & Communication Technology in Education, an EU funded Project which aims to investigate the use of Web 2.0 tools for lifelong learning and the development of a veterinary online community, see [www.noviceproject.eu](http://www.noviceproject.eu) for more information.

The conference and aquatic programme seek to bring together individual involved with, or interested in current and future aquatic veterinary education throughout the world. In particular, interactive and didactic workshops will focus on new approaches and models for supplementing veterinary curricula, continued education & professional development, and life-long learning.

Attendees will have the opportunity to discuss and conclude innovative approaches using Web 2.0 and other e-media, to fulfill a rapidly growing need for well qualified aquatic veterinarians, with the following objectives:

- To increase awareness and emphasize important developments in global aquatic veterinary education
- To illustrate advances in using NOVICE for training future aquatic veterinary practitioners

For more information on the full NOVICE Conference, housing & registration go to [www.novice-conference.com](http://www.novice-conference.com).

Future Meetings	Date and Location
2013 SAVMA Symposium	March 21-23, 2013 Louisiana State U, Baton Rouge, LA
AVMA Convention	July 20-23, 2013 Chicago, IL

### AQUACULTURE 2013

February 21-25, 2013

Nashville, Tennessee

As Associate Sponsors of **Aquaculture 2013**, the AVMA and WAVMA invite aquatic veterinarians, veterinary students & paraveterinary professionals to submit abstracts for 15 or 30-minute presentations on any issues or strategies that have advanced aquatic veterinary medicine.

#### Presentations topics useful to veterinarians and aquaculture producers include:

- Pathophysiology and impact of important and emerging diseases affecting aquaculture production, public health and seafood safety;
- Biosecurity, surveillance and other strategies & approaches for the prevention, control and eradication of disease;
- Legislative and regulatory issues addressing disease outbreaks;
- Optimal and judicious use of biologics therapeutic agents in disease outbreaks
- Clinical management of important food and ornamental finfish, crustacean and molluscan diseases.

For more information on Aquaculture 2013 go to [www.WAS.org](http://www.WAS.org). AQUACULTURE 2013, AVMA and WAVMA are unable to subsidize registration fees, travel or hotel costs. All presenters are required to pay their own registration, accommodation and travel expenses. AVMA & WAVMA members receive discount registration rates.

The Official Conference Hotel will be the Renaissance Nashville – it is connected to the Nashville Convention Center – the site of AQUACULTURE 2013. A great rate of US\$175 single or double has been reserved for our attendees. Here is how to reserve your room. We only have a limited number of rooms so book early.

Reservations Toll Free Tel: +1 877 901 6632

Reservations Local Tel: +1 506 474 2009

Reservations by Fax: +1 615 525 4103

Be sure to identify yourself as an attendee of AQUACULTURE 2013

Reservation Online: Go to the link below and you can access the online reservation system to make reservations, modify your reservation and see special offers from the hotel for upgrades and amenities.

[https://resweb.passkey.com/Resweb.do?mode=welcome\\_ei\\_new&eventID=9684011](https://resweb.passkey.com/Resweb.do?mode=welcome_ei_new&eventID=9684011)

## Aquatic Veterinary CE & PD - continued

**The Terrapin, Tortoise & Freshwater Turtle Meeting** in cooperation with the ISTS Annual Symposium on Sea Turtle Biology & Conservation. **February 2-4, 2013**, Baltimore MD.

Each year a non-marine turtle session is convened in cooperation with the ISTS Annual Symposium on Sea Turtle Biology & Conservation. We are excited to announce that our program for the 2013 meeting has been expanded to three days and hope you will plan to join us. The Terrapin, Tortoise & Freshwater Turtle Meeting will take place 2-4 February 2013, at the Baltimore Marriott Waterfront Hotel, 700 Aliceanna Street, Baltimore, Maryland.

There will be opportunities for video presentations on Saturday and Sunday evening. All participants of the Freshwater and Terrestrial Meeting are eligible to submit an abstract for the Sea Turtle Symposium Poster Session during online registration.

All attending the Terrapin, Tortoise & Freshwater Meeting must [register](#). Registering will admit you to the Terrapin, Tortoise & Freshwater Meeting and the 33<sup>rd</sup> Annual Symposium on Sea Turtle Biology & Conservation and you'll also have the opportunity to purchase tickets to the ISTS Opening Social and Banquet.

The Terrapin, Tortoise & Freshwater Meeting is a part of the larger Annual Symposium on Sea Turtle Biology and Conservation which runs 2-8 February 2013, also at the Baltimore Marriott Waterfront Hotel, so make plans to connect with new and old colleagues and friends at the ISTS Symposium after the pre-meeting. We are encouraging all attendees to make their [hotel reservations](#) early. The special group sleeping room rate is \$155 per night. For additional information on the Terrapin, Tortoise & Freshwater Meeting, please contact [Chuck Schaffer](#).

**The 33<sup>rd</sup> Annual Symposium on Sea Turtle Biology & Conservation, 04-08 February 2013**, is offering a variety of extremely informative workshops – Sea Turtle Medicine, Dive Behavior, and Statistics & Data Analysis – and we kick off the start of the Symposium with our Opening Social held Monday evening. Our main session includes *Sea Turtles 101* and *Sea Turtle Conservation Success Stories* which will be live webcast to Baltimore City public schools! You'll have an opportunity to visit the Harborside Ballroom where a diverse group of Exhibitors and Vendors will be offering unique products. Click here to [register](#).

**2<sup>nd</sup> Australian Scientific Conference on Aquatic Animal Health – July 8-12, 2013**  
Pullman Reef Hotel, Cairns, QLD

The Second Australasian Scientific Conference on Aquatic Animal Health will be held in Cairns (<http://www.pullmanhotels.com/gb/hotel-2901-pullman-reef-hotel-casino/index.shtml>), Queensland, Australia. The conference provides a forum for presentation of diagnostic, research, management and policy issues encompassing all areas of aquatic animal health and biosecurity.

The FRDC Aquatic Animal Health Subprogram is pleased to announce that Prof Hugh Ferguson (Head of the Department of Pathobiology, Director of the Marine Medicine programme, Professor of Pathology, School of Veterinary Medicine, St George's University, Grenada, West Indies), and Prof Don Lightner (Aquaculture Pathology Laboratory, Department of Veterinary Science and Microbiology, University of Arizona, OIE Reference Laboratory for Crustacean Diseases) have accepted invitations as Conference Keynote Presenters.

To submit a presentation abstract, or receive further announcements and information on the program, please contact Joanne Slater (email: [joanne.slater@csiro.au](mailto:joanne.slater@csiro.au)).

**EAFP 16<sup>TH</sup> INTERNATIONAL CONFERENCE ON DISEASES AND SHELLFISH**  
**SEPTEMBER 2-6, 2013**

Tampere Finland

The 16th International Conference on Diseases of Fish and Shellfish will be held at the Tampere Hall Conference Centre in Tampere, Finland. Scientific and technical sessions consisting of invited talks, keynotes, oral presentations, poster presentations and workshops. An EAFP General Assembly will take place during the Conference. Planned social events include a Welcome Cocktail, Civic Reception and the traditional Conference Banquet.

More information will be available on the EAFP website as well. Feel free to contact our Meeting Secretary if you have any questions or need additional information.

Jose A. Garcia, EAFP Meeting Secretary, Dept. Sanidad Animal, Fac. Veterinaria, Universidad Complutense de Madrid, Avda. Puerta de Hierro s/n, 28040-Madrid, Spain.

Tel.: +34 (91) 394-3845, Fax: +34 (91) 394-3908.

E-mail: [gcabrera@vet.ucm.es](mailto:gcabrera@vet.ucm.es).

## Aquatic Veterinary Opportunities

### University of Stirling, Stirling, UK PhD studentship in aquatic epidemiology

A PhD studentship is available at the Institute of Aquaculture (University of Stirling) in epidemiology and modeling, specifically with regards to the Scottish salmonid industry. The goal is to develop models for optimal surveillance of salmon diseases with the most efficient use of sampling effort. The student will assess associations between mortality and the presence of infectious disease under different seasonal and environmental conditions and continue development of epidemiological models for the spread of infection due to fish transport between sites.

Based at the Institute of Aquaculture at Stirling University, this project would be suitable for a biologist or veterinarian with an interest and background in aquaculture, and epidemiological modeling, or statistics. The three-year studentship will cover "home" fees and stipend for EU/EEA students at the standard research council level.

For informal enquiries, please contact Dr Darren Green [darren.green@stir.ac.uk](mailto:darren.green@stir.ac.uk). A longer description of the project aims can be found at [www.aqua.stir.ac.uk/news/2012/darren](http://www.aqua.stir.ac.uk/news/2012/darren). Online applications can be made at [www.stir.ac.uk/postgraduate/research-degrees/school-of-natural-sciences](http://www.stir.ac.uk/postgraduate/research-degrees/school-of-natural-sciences). Applications should be submitted by the end of October, 2012.

### University of Prince Edward Island, Atlantic Veterinary College, Department of Health Management, Charlottetown, Canada

#### Post-doctoral Position: Aquatic Epidemiology (Infectious Diseases)

The Atlantic Veterinary College (AVC) at the University of Prince Edward Island (UPEI) is seeking a highly-qualified applicant for a post-doctoral position in aquatic epidemiology with a focus on infectious diseases of finfish. The position is for 1 year and is renewable contingent on obtaining additional funding.

The successful applicant will be a member of the Canada Excellence Research Chair (CERC) program in Aquatic Epidemiology awarded by the Canadian Government to UPEI. The goal of the CERC program is to make UPEI and Canada the global leader in applied aquatic epidemiology research (with an ecosystem health focus). The suc-

cessful applicants will join a multi-disciplinary team of epidemiologists, statisticians, finfish, crustacean and mollusc clinicians, ecosystem health and regulatory veterinary medicine specialists whose work focuses on holistic approaches to assist the Canadian and international aquaculture industries improve the productivity, sustainability and health of aquatic food animal stocks. Applicants must have a DVM degree and a PhD in epidemiology, or related discipline. Expertise in aquatic food animal diseases and aquaculture is strongly preferred. Individuals must be self-motivated and able to work both independently and as an effective partner in the expanding UPEI CERC team. Salary will be commensurate with qualifications and experience of the individual. Interested applicants are encouraged to contact Dr. Ian Gardner (phone: 902-620-5059; e-mail: [iagardner@upepei.ca](mailto:iagardner@upepei.ca)) for further information about the position.

Interested candidates should submit their curriculum vitae, a statement of interest and the names and contact information of two referees. Review of applications will begin on September 1, 2012 and the position will remain open until filled.

Applications should be sent to: Leanne Newson, Centre for Veterinary Epidemiological Research, Department of Health Management, Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, PEI C1A 4P3; [cver@upepei.ca](mailto:cver@upepei.ca); ph: +1 (902) 620-5049, Fax: +1 (902) 620-5053.



Dr. Mark Fast, Atlantic Veterinary College



## Aquatic Veterinary Opportunities

### PhD Position in Veterinary Epidemiology (Aquaculture) - 36 month contract

Marine Harvest Ireland wishes to recruit a PhD student in Veterinary Epidemiology (aquaculture) to investigate the role of Infectious Pancreatic Necrosis (IPN) in Irish salmonid aquaculture. The PhD project will be managed by a small steering group which will consist of representatives from Marine Harvest (Ireland); the Marine Institute; the Department of Agriculture, Food and the Marine; the Centre for Veterinary Epidemiology and Risk Analysis (CVERA) at UCD, and two internationally recognised experts in the area of fish health. Prof. Simon More from CVERA will be the main PhD supervisor.

The successful candidate will be responsible for reviewing the role of IPN in aquaculture, in addition to elucidating the following questions:

Why IPN has emerged as a significant health issue for sea-reared salmon in Ireland, over the past few years?

Why the number of isolations of the non-virulent "house-strain" of IPNV in Ireland has decreased over time concurrent with a steady increase in the number of isolations of the virulent strain?

What are the likely transmission routes of the virulent strain?

What are the risk factors for the persistence of this virus in Ireland, with particular reference to valuable Broodstock selection programmes?

Whether cost-effective mitigation measures can be put in place to minimise the impact of this disease on the Irish aquaculture industry?

As part of the PhD programme, the candidate will be supported to complete an MSc in Veterinary Epidemiology and Public Health by distance learning at the Royal Veterinary School in London. The candidate will spend no more than an average 15% of their time on this aspect of their work.

#### Essential Requirements:

Minimum of a 2.1 degree in a Biological Science or a degree in Veterinary Medicine

Knowledge of/a strong interest in the area of veterinary epidemiology

A proven strategic thinker

A track-record in achieving results, through hard work, excellent time management, high-level attention to detail and strong organisational skills

Very strong interpersonal skills, with a proven ability to cultivate productive working relationships

An effective communicator, verbally, in writing and through audiovisual media

A high level of computer literacy including Word, Excel, PowerPoint

An interest in, and willingness to enthusiastically contribute to, and successfully complete, the RVC's MSc in Veterinary Epidemiology and Public Health as part of their PhD programme

Full driving license

Applicants must be highly motivated, reliable and dynamic and who are self-sufficient whilst still being a good team player. A high level of personal organisation and a methodical approach to record keeping and archiving data is essential.

#### Desirable Requirements:

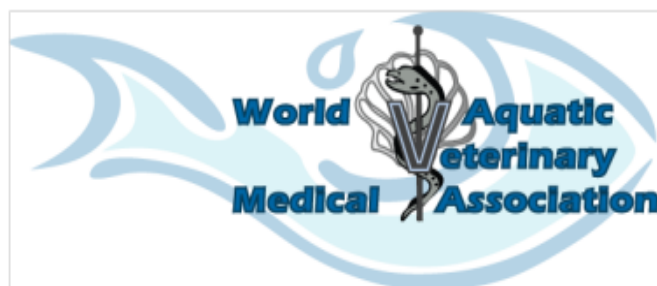
Knowledge of the structure of the Irish aquaculture industry and of the issues of importance to it, including relevant diseases

Knowledge of/experience with molecular biology techniques

Potential candidates are invited to submit a letter of application and CV to Catherine McManus, Marine Harvest Ireland, Rinmore, Fanad, Letterkenny, Co. Donegal, or email to [catherine.mcmanus@marineharvest.com](mailto:catherine.mcmanus@marineharvest.com). The closing date for receipt of applications is October 19th 2012.

For more information on Marine Harvest Ireland go to <http://www.marineharvestireland.com/Home.aspx>.

For more information on the University of London, Royal Veterinary College's Veterinary Epidemiology and Public Health by Distance Learning programme, go to <http://www.rvc.ac.uk/Postgraduate/Distance/MScVetEpiPublicHealth/Index.cfm>



## Aquatic Veterinary Opportunities

### Tenure-Track Faculty Position Fish Disease/ Aquaculture/Fisheries Biology, Humboldt State University, California, USA

Humboldt State University's Department of Fisheries Biology invites applications for one full-time tenure-track position in, starting August 2013. Humboldt State University is committed to achieving the goals of equal opportunity and endeavors to employ faculty and staff of the highest quality reflecting the ethnic and cultural diversity of the State.

We seek to fill this position at the Assistant Professor level. Rank and salary are dependent upon the appointee's qualifications and experience. The current California State University Salary Structure is available at: <http://www.humboldt.edu/aps/docs/Salary-Schedule.xls>. Humboldt State University provides an excellent benefits package for faculty. Information about the benefits plans can be found at: [http://www.calstate.edu/Benefits/Summaries/2007\\_Faculty-Unit%203.pdf](http://www.calstate.edu/Benefits/Summaries/2007_Faculty-Unit%203.pdf).

A Ph.D. or equivalent in Fisheries Biology or a related discipline from an accredited college or university is required at the time of appointment. Applicants must have specialized expertise in fish disease and the ability to develop a research program related to conservation or fisheries management. Preference will be given to applicants with research interests and coursework relevant to aquaculture or mariculture. The successful candidate will complement existing strengths in freshwater and marine fish ecology, genetics, and ichthyology.

Candidates should be committed to teaching excellence and to building a strong research record. Instructional assignments in the first year include upper division lecture/lab courses in Fish Disease and Aquaculture, a class in scientific writing/communication, and an introductory course in fisheries biology for non-majors. Future instructional assignments will be consistent with the programmatic needs of the department and students. Teaching and research for this position should take advantage of the unique facilities available at Humboldt State University, including the on-campus fish hatchery and Fish Pathology Laboratory. The hatchery includes a 3,000 square foot building housing a small laboratory, egg incubators, tanks for rearing fry and research projects, and pumps and filters. Two raceways, six 10 ft. circular tanks, and a large pond are also located on the grounds. Additional facilities for rearing of marine organisms

can be found at the HSU Marine Lab located 12 miles north of campus. The Fish Pathology Laboratory includes wet laboratory space, an autoclave, a tissue culture enclosure, incubators, histology preparation equipment, and variety of scopes and imaging devices.

The primary professional responsibilities of instructional faculty members are teaching, research, scholarship, creative activity, and service to the University, profession and to the community. These responsibilities include: advising students, participation in campus and system-wide committees, maintaining office hours, working collaboratively and productively with colleagues, and participation in traditional academic functions. Humboldt State University offers outstanding undergraduate and graduate (MS) programs in Fisheries Biology. Few, if any, academic programs provide such a strong interplay between classroom theory and field laboratory practice. The Pacific Ocean, Humboldt Bay, coastal lagoons, major coastal rivers, commercial fishing fleets, and commercial aquaculture operations are nearby and easily accessible for research and teaching opportunities. Additional information about the department can be found at <http://www.humboldt.edu/fisheries/>.

Qualified candidates must submit electronically the following materials: letter of application; curriculum vita; application for Academic Employment ([http://humboldt.edu/aps/docs/forms/download.php?f=Academic\\_Employment\\_Application](http://humboldt.edu/aps/docs/forms/download.php?f=Academic_Employment_Application)); graduate transcripts (unofficial copies are sufficient for initial review); statement of teaching and research interests; and, three letters of recommendation. Signed letters of recommendation may be emailed or mailed separately. Remaining application materials should be sent as a single PDF document, in the order listed above to [fisheries7542@humboldt.edu](mailto:fisheries7542@humboldt.edu). In letter of application, please refer to Job #7542.

Please direct any other questions pertaining to this position to Dr. Darren M. Ward, Search Committee Chair, Department of Fisheries Biology, Humboldt State University, One Harpst Street, Arcata, California 95521-8299; Ph (707) 826-3953; [fisheries7542@humboldt.edu](mailto:fisheries7542@humboldt.edu);

This position is open until filled. First consideration will be given to completed applications received no later than 23 November 2012. Evidence of required degree(s), certifications(s), or licenses(s) will be required prior to the appointment date. Finalists for this position are required to be fingerprinted through the Humboldt State University Police Department. The cost of fingerprinting is borne by the university.

## Contact Corner

### 2012 WAVMA Executive Board

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**One Profession; One Discipline; One Voice—Cohesive & Inclusive!**

## **WORLD AQUATIC VETERINARY MEDICAL ASSOCIATION**



**We are on the Web!**

**WAVMA.ORG**

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### **WHO ARE WE**

The mission of the World Aquatic Veterinary Medical Association is to serve the discipline of aquatic veterinary medicine in enhancing aquatic animal health and welfare, public health, and seafood safety, in support of the veterinary profession, aquatic animal owners and industries, and other stakeholders.

The purpose of the World Aquatic Veterinary Medical Association is:

- To serve aquatic veterinary medicine practitioners of many disciplines and backgrounds by developing programs to support and promote our members, and the aquatic species and industries that they serve.
- To identify, foster and strengthen professional interactions among aquatic medical practitioners and other organizations around the world.
- To be an advocate for, develop guidance on, and promote the advancement of the science, ethics and professional aspects of aquatic animal medicine within the veterinary profession and a wider audience.
- To optimally position and advance the discipline of aquatic veterinary medicine, and support the practice of aquatic veterinary medicine in all countries.

### **Aquatic Vet News**

#### **Instructions for Contributors**



Do you want to make an impact and a contribution to aquatic veterinary medicine? If so, consider becoming a regular or periodic contributor to the quarterly *Aquatic Vet News*.

Help make the *Aquatic Vet News* the source for pertinent and important news. If you would like to be an Associate Editor or have material published in AVN, contact the Editor, Nick Saint-Erne: ([Saint-Erne@Q.com](mailto:Saint-Erne@Q.com)).

We particularly invite contributions for (and Associate Editors to assist with) the following regular columns:

#### **Clinical Cases**

Clear description of a distinct clinical case or situation and how those were resolved.

#### **Book Reviews**

Brief review of a published book, including an overview and critique and where to obtain the book.

#### **Legislative & Regulatory Issues**

Description of legislation or regulations with information on how to access further details.

#### **Externships, Internships & Residencies**

Description with specific contact information for veterinary student externships and post-graduate internships or residencies at private practices, institutions, universities or organizations.

#### **Meetings & CEPD Opportunities**

Description of upcoming aquatic veterinary educational meetings noting the meeting title, dates, location, and contact person or website.

#### **Jobs Available**

Description of available full or part-time employment for aquatic veterinarians.