AQUATIC VET NEWS

WORLD AQUATIC VETERINARY MEDICAL ASSOCIATION

Volume 6, Number 4 Fourth Quarter 2012

First WAVMA Webinar!

Veterinary Anatomy, Structure & Function of Fish Gills: The Powerhouse of Fish (WebCEPD B-1000)

Dr. Rob Jones BVSc(Hons), MACVSc(Aq), MAqua – "The Aquarium Vet" (Victoria, Australia)

On December 19, 2012, Dr. Rob Jones presented the first live Webinar to WAVMA members from around the world. It was a great Program and the recorded presentation is now available to view by all WAVMA members.

To View: http://vimeo.com/56874628;

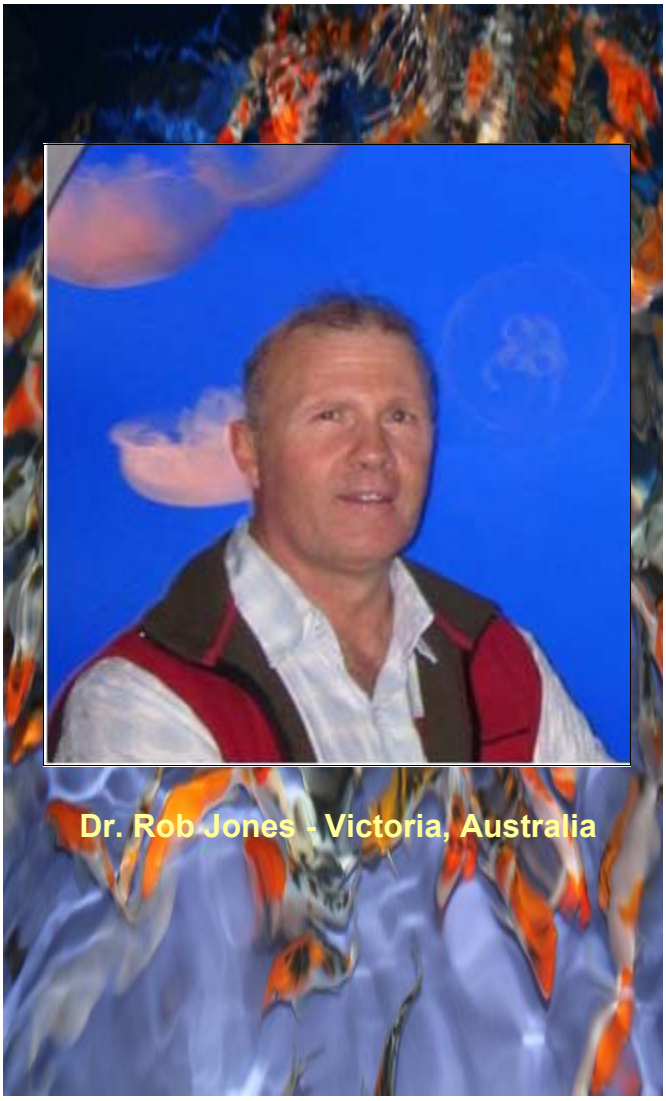
Password: WAVMA-Member (case sensitive)

Learning Objectives: Participants will understand how and why fish breathe underwater, including the key components about gill anatomy, ventilation, gas exchange, metabolic waste excretion, osmoregulation, and how to biopsy gills for examination.

Want veterinary CEPD Credit? After watching the presentation, go to http://tinyurl.com/B-1000-KSA to complete the KSA (knowledge & skills assessment) to receive veterinary CEPD credit, useful for re-registration or licensing requirements. PLEASE NOTE: official WAVMA CEPD Certificate will only be sent to WAVMA members.

Give Us Feedback: Please give us input for improving the WebCEPD Program at http://tinyurl.com/WebCEPDsurvey.

Questions, Problems?
Contact administrators@wavma.org.



Dr. Rob Jones - Victoria, Australia

Inside this issue:

Editor's Note

WAVMA Peer-reviewed Journal?

Is it possible that WAVMA could produce a peer-reviewed journal? This question has been raised by members and discussed by the officers. The answer is: maybe someday, but we currently do not have the resources to produce one. But we can take the first step - with your help.

In next year's *Aquatic Vet News* issues, our 2013 President, Mohamed Faisal, has suggested we have a peer reviewed article in each issue. That would be a great step toward someday producing a reviewed journal about Aquatic Veterinary Medicine. In order to do that, though, we need both articles submitted by members and a panel of experts to review each article.

If you have an article that you are writing for publication, consider submitting it to *AVN*. If you have time to read and critique an article, send me your name and area of expertise or interest and I will create a panel of reviewers. We would need 3 reviewers for each article, with a commitment to read the article and present comments and corrections back to me within 30 days.

In order to get this started in 2013, I would need to have an article to be reviewed by Feb 15. Can we make this happen in 2013? Only with your help! Please send me your articles or offers to review the submitted articles right away!

Nick Saint-Erne, DVM
Newsletter Editor
Saint-Erne@Q.com

Consider supporting the WAVMA/AVMA/AVMF 2013 Aquatic Veterinary Scholarship Program with a tax-deductible charitable donation for 2013

In February 2013 the World Aquatic Veterinary Medical Association, American Veterinary Medical Association and the American Veterinary Medical Foundation will be opening applications for scholarship that will help veterinary students and new veterinary graduates become more involved with aquatic veterinary medicine by offsetting personal costs for participating in programs that occur during 2013, including:

- Travel, accommodation or registration at aquatic veterinary conferences, symposia and other continuing education and professional development (CEPD) meetings;
- Travel, accommodation and other activities directly associated with veterinary student externships that expose individuals to clinical aquatic veterinary medicine; or,
- Equipment and supplies needed for aquatic veterinary research projects not funded by other financial sources.

The WAVMA/AVMA/AVMF Scholarship Program is entirely funded by donors like you. We need your help in reaching our goal of $25,000 for 2013 scholarships. All scholarships are supported by ***tax-deductible charitable donations*** of individuals and organizations that support efforts to increase the number of aquatic veterinarians able to provide services to aquatic animal owners and industries.
Donations can be made online or mailed to:

American Veterinary Medical Foundation
Department 20-1122
P.O. Box 5940
Carol Stream, IL 60197-5940

For online donations click on **http://tinyurl.com/AVMFonlineDonation**
Be sure to indicate your donation is for the Aquatic Veterinary Scholarship Program

All donors will be recognized in the WAVMA quarterly newsletter ***Aquatic Vet News*** and on the WAVMA website (www.WAVMA.org). Additional information is available at www.WAVMA.org or from dscarfe@avma.org.

The American Veterinary Medical Foundation (AVMF) is the charitable arm of the American Veterinary Medical Association (AVMA). For 50 years, the AVMF has been dedicated to embracing and advancing the well-being and medical care of animals. Charitable contributions and support to the Foundation help veterinarians help animals. Initiatives include: Humane Outreach-Animal Welfare, Education and Public Awareness, Research Support, Student Enhancement and Support of the AVMA and its Initiatives.

Executive Reports

Dear Colleagues,

What a great way to end 2012 - the completion of the development process for the Certified Aquatic Veterinary Practitioner program. This has been a program several years in the making - since it was first discussed at the WAVMA Annual General Meeting in Athens, Greece, in July 2010! It is now ready for implementation in 2013. The committee members who helped develop the program are now completing the requirements to qualify for Certified Aquatic Veterinary Practitioners.

In order to be certified as a WAVMA Aquatic Veterinary Practitioner (Cert-AqVP), participants will need to demonstrate the Knowledge, Skills and Experience (KSE) using the WAVMA approved Knowledge, Skills and Assessments (KSAs) process. The participating candidate's KSE will include, but not be limited to the theory, clinical significance, and practical experience in the following areas that are *unique* to aquatic mammals, amphibians, finfish, crustaceans, or mollusks:

Anatomy and physiology; Environmental evaluation (water quality); Industry structure; Pathobiology and epidemiology; Diagnostic techniques; Use of therapeutic and biologic agents; Public health, zoonotic diseases and seafood safety; Legislation; and Aquatic Animal Welfare

Cert-AqVP candidates are required to be familiar with the normal and abnormal aspects of aquatic veterinary practice. Candidates may attain WAVMA credit for the core Cert-AVGP requirements through verification of the satisfactory completion of educational or training programs specifically focused on the KSE subject areas noted above.

The WAVMA Credentialing Committee has developed a set of criteria for evaluating academic and non-academic CEPD courses, externships, internships, residencies and certification programs that fulfill knowledge and skills required for competency in clinical aquatic veterinary practice.

After the initial testing by the Credentialing Committee members, we will open the program up to all WAVMA members. Stay tuned - watch the WAVMA.org website and the next *Aquatic Vet News* for more information about your chance to qualify!

Dušan Palić
2012 WAVMA President
Professor & Chair of Fish Diseases & Fisheries Biology
Ludwig Maximillian University,
Munich, Germany
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Future WAVMA Meetings

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

2013 SAVMA Symposium
(Louisiana State U. Baton Rouge, USA - March 21-23)

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

2013 European Association of Fish Pathologists
(Tamper, Finland, September 2-6)

2013 World Veterinary Congress
(Prague, Czech Republic, September 17-20)

2014 WVMA Conference
(St. George's U., Granada, W. Indies)

New WAVMA Members

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

Veterinarian Members:

Chris Shirkey - USA
Andrei Mihai Bordeianu - Romania
Tracy H Vemulapalli - USA
Kathleen Frisch - USA
Marcus Webster - USA
Donna Kelly - USA
James E Bogan - USA
Carolyn Gunn - USA
Rae Knight - UK
Christine K MacWilliams - Canada

Student Members:

Christina Der - USA
Kyriacos Spanoudes - Greece
Jo-Ann S Siew - Australia
Alicia Morse - Canada
Xuan Teo - Australia
Ross Gottlieb - USA
John Shelley - USA
Justin Stilwell - USA
Ashlee Oliver - USA

Secretary's Report

They say time passes quicker as you get older. Something I am in complete agreement with and for once I am late in submitting my report. However, it does allow me to comment on this week's WAVMA webinar, which I thought was brilliant. Those who missed it should make the effort to attend the next one or at least look at the recording once the web administrators have figured out how to put it up on the web site, which is not as easy to achieve as one might think. Not only did the audience appear to appreciate it, but the raw statistics demonstrate the need for WAVMA to offer this service to members. Nearly 300 people clicked on the link to register for the event, 192 completed registration and around 120 people listened to the live webinar. At least ten new member sign-ups to WAVMA can be directly attributed to publicity surrounding the webinar. Not bad for a first attempt and I look forward to the next webinar.

A few months ago the Executive Board agreed on a tentative webinar system. Unfortunately once you get past the advertising blurb life becomes more complex and WAVMA has been offered the use of several systems that are already up and running. There are numerous things you can do with a system from organising meetings, online education, add Moodle or Blackboard integration, make available on smartphones and iPads. There are some basic questions which I would like some feedback on and hope you will find the time to do so:

- Do members only wish a live webinar system or being able to access the recording?
- Do members wish access on smartphones etc.?
- Should the webinar system be available for use with the upcoming CertAqVP?
- Given the time to organise a webinar are members willing for WAVMA to pay more to automate the system?
- Should WAVMA pay more to ensure "concurrent learning" which offers the ability to come back to course material at the place you left off rather than start again?
- Would any members be interested in "hiring" the system for staff training, etc.?

The reason I ask such questions is dependent on the needs and wants of WAVMA members and after all we are talking of spending "WAVMA's" money. The variation in costs per annum is from around $600-800 to several thousand dollars. If you have some comments to make I can be contacted on secretary@wavma.org.

Keeping to the technology theme, the Executive Board approved WAVMA becoming a reseller of Livedrive (www.livedrive.com) products. A nominal charge is included in every member's subscription and additional services can be purchased at very favourable rates. All members will be entitled to back up any computer to their individual account. This will allow access to documents etc. on virtually any device you own and can help prevent those annoying moments when you accidently delete a document you were working on. Livedrive can keep deleted files for up to 30 days after deletion and also save up to 30 variations of the same document. Currently the system is being trialed by a small group so that the administrators can see if there are any unexpected problems, but look out for a full announcement at the start of the New Year.

As can be seen from articles elsewhere WAVMA has been busy in the last quarter. Several members attended the NOVICE Conference on veterinary education (www.noviceproject.eu) and gave a workshop on Aquatic Veterinary Education. Laura Urdes deserves a special mention, not only for the effort she put in to organising this workshop but also in ensuring all the WAVMA members attending received superb Romanian hospitality and all of us have wonderful memories of the week.

The Cert–AqVP is nearing completion and, after a trial period by members who developed the content and requirements, will be offered to all WAVMA members. This is something that has been long in development but clearly is now nearly completed. It will allow WAVMA members to demonstrate their knowledge of aquatic veterinary medicine and provide reassurance to clients and prospective clients that they are using a veterinarian with appropriate knowledge. The committee who has worked so hard on this, have in their enthusiasm to get it completed, decided to work on it through Christmas week.

Secretary's Report - continued

There have never been better times to be a WAVMA member with many of the projects that have been worked on by a dedicated few, finally coming to fruition. Rather like a friend of mine who runs a trade organisation and always reminds his members of the money he has saved their industry over the past years, I would like to remind WAVMA members of the benefits membership provides along with the increasing recognition, availability and standard of aquatic veterinary medicine. Being a WAVMA member works for your chosen professional field and for you personally.

Dr Chris Walster (UK)
WAVMA Secretary
chris.walster@onlinevets.co.uk

Meetings Committee Report

The Meetings Committee is pleased to announce that several interesting events have been organized for 2013. We will kick off the year with our booth and a lecture series at the World Aquaculture Society's Aquaculture America, meeting in Nashville, TN from Feb.21-25, 2013. If you are planning to be there, stop over and say hello. In March, from the 6-9th, the World Small Animal Veterinary Association will be meeting in Auckland, NZ. As a member, WAVMA will have a representative present to convey our perspective on current issues being discussed. Also in March, the Student AVMA will hold its annual conference at Louisiana State Univ., in Baton Rouge, LA from the 21-23rd. Always a great resource to connect interested vet students with our association, we will have a presentation and our information booth there.

In July, the AVMA Conference in Chicago, IL from the 19-23rd, will be an excellent meeting for Continuing Education lectures in aquatic medicine. As we were last year, we will again be an integral part of the program, with 5 days devoted to aquatics! WAVMA will have one day devoted to case reports and other topical issues. New for this year, we have planned an aquatic wet lab. To continue our commitment to the membership, we will again have a dinner meeting free to all members. If you are planning to attend, this will be your chance to let us know in person how we are doing.

Our Annual General Meeting this year will be held in Prague, Czech Republic in conjunction with the World Veterinary Congress, which will run from Sept.17-20. As WVA members and organizers of the aquatic veterinary lecture program, we will be responsible for that portion of the scientific program there. To all our European members, please plan to attend. We will have an evening dinner meeting free to all members and again would invite you to come and meet the Executive Board members and others present from WAVMA.

Julius Tepper, DVM
Meetings Committee Chair
cypcarpio@aol.com

The Aquatic Animal Health chapter of the Australian and New Zealand College of Veterinary Scientists (ANZCVS) joins the World Aquatic Veterinary Medical Association (WAVMA) as an Allied Veterinary Organisation.

The World Aquatic Veterinary Medical Association has welcomed the Aquatic Animal Health Chapter (AAH) of the Australian and New Zealand College of Veterinary Scientists (ANZCVS) as an Allied Veterinary Organisation member.

While the ANZCVS serves as primarily a credentialing body for veterinarians, the WAVMA has a complementary role in serving the discipline of aquatic veterinary medicine through developing CEPD programs, and by identifying, fostering and strengthening professional interactions among aquatic medical practitioners and other organisations around the world.

With the Aquatic Animal Health Chapter joining WAVMA as an AVO, both organisations stand to gain in a multitude of ways in the synergistic partnership. WAVMA members can now access the wealth of experience the Australian and New Zealand counterparts have and vice versa. This will optimally position and advance the discipline of aquatic veterinary medicine, and support the practice of aquatic veterinary medicine globally.

This partnership will foster more discussion between professionals, making it easier to address global issues which affect us all; a larger group will generate more discussions on Listservs and provide greater response to consultations; and it will bring greater visibility within the AVO, which will create greater awareness for WAVMA's activities (e.g. promoting conferences, continuing education opportunities, WAVMA member's business, etc.) and hence influence to the wider veterinary community.

More information about the ANZCVS can be found at http://www.anzcvs.org.au

Communications Committee Report

CONNECTING VETS & VET STUDENTS AROUND THE WORLD TO EDUCATIONAL OPPORTUNITIES IN AQUATIC VETERINARY MEDICINE

By A. David Scarfe, Laura D. Urdeş

Reaching out to veterinarians and veterinary students around the world with information about opportunities to get involved with aquatic veterinary medicine has become a priority for the World Aquatic Veterinary Medical Association. With the increasing demand for aquatic veterinarians to provide service to clients, aquaculture industries, public aquaria, and government agencies, more and more veterinary students, and veterinarians already in practice, are looking for opportunities to increase their aquatic veterinary knowledge and skills, and to networks with others in this field.

To help with this effort, several WAVMA members took the opportunity to link with the organizers of the NOVICE Conference in Bucharest, Romania (October 4th - 5th, 2012) and develop an Aquatic Veterinary Education Programme for attendees from numerous countries in Europe and around the World.

The motivation for WAVMA was simple – using a powerful tool to inform a targeted group of veterinarians, veterinary students and educators about aquatic veterinary medicine. Started in 2010, NOVICE (a **N**etwork **O**f **V**eterinary **I**nformation & **C**ommunication Technology in **E**ducation programme, supported with EU funds) has developed Web 2.0 tools for lifelong learning and a strong international veterinary online community. Leading up to the Conference, with the assistance of several NOVICE administrators and conference organizers, WAVMA developed and tested initial webpages within the NOVICE project website – one for WAVMA members, and one to communicate with almost 3,000 international student, veterinarian and educator NOVICE members. Their appeal and utility were immediately obvious.

Presentations for the Aquatic Veterinary Education Programme were by WAVMA members, some of whom traveled to Romania from as far afield as the USA and Japan, while others prepared recorded audio-visual presentations – all focused on aquatic veterinary education and networking. The WAVMA team that attended the conference, including David Scarfe, Laura Urdes, Dušan Palić, Chris Walster, Mohamed Faisal and Devon Dublin, also provided a "mini booth" exhibit where conference participants could watch videos about aquatic veterinary medicine, or pick up informational items and brochures.

Organized under two themes, *"Supplementing Veterinary Curricula & CEPD with Aquatic Veterinary Medicine"* and *"Promoting Aquatic Vet Education through NOVICE & Other Social Media",* the selection of presentation topics fitted the NOVICE Conference objectives perfectly, and drew a number of the 100 plus attendees, stimulating good discussions. Because of strong encouragement to carry these messages to other NOVICE members unable to attend the conference, WAVMA is planning to upload videos of the following presentations videos on the NOVICE (www.noviceproject.eu) and WAVMA websites (www.WAVMA.org):

- ***"International Approaches to Expanding Aquatic Veterinary Educational and day-One Competency"***(David Scarfe)
- ***"WAVMA Aquatic Veterinary Day-One Competency Program"***(Dušan Palić)
- ***"Aquatic Veterinary Board Certification & Specialization Programs"***(Richmond Loh)
- ***"Encouraging Aquatic Courses in Veterinary School Curricula"***(Greg Lewbart)
- ***"Promoting Aquatic Vet Education through NOVICE & Other Social Media"***(Laura Urdeş)
- ***"Michigan State University On-line Fish Health Management Course"***(Mohamed Faisal)
- ***"Using NOVICE and Social Media to Promote Aquatic Veterinary Medicine"***(Devon Dublin)
- ***"WAVMA WebCEPD (Webinars) for Global Aquatic Veterinary Education"***(Chris Walster)

Left to right: Jean de Gooijer, David Scarfe, Chris Walster, Devon Dublin, Laura Urdeş, and Dušan Palić

WAVMA Mini-booth

NOVICE Administrators and the WAVMA team discussing future collaborations

All in all, discussion provided WAVMA, NOVICE and the attendees with important information on identifying future directions and needs for use in NOVICE, social media and other web-based platforms useful for expanding aquatic veterinary education. These are going to be very useful as WAVMA and others develop programmes for supplementation in veterinary schools, and for developing Continuing Education and Professional Development in Aquatic Veterinary Medicine.

In addition, the WAVMA team met separately with the NOVICE project administrators and began planning strategies for 2013 to possibly utilize the NOVICE platform for introducing members to WAVMA Aquatic Vet Medicine Training Programmes. Of strong interest during the discussions were the WAVMA Aquatic Vet WebCEPD Programmes, where students and practicing veterinarians can participate in educational webinars, and receive CEPD credit useful for veterinary re-licensure/registration to practice, and other purposes. In addition, preliminary discussions indicated a strong interest in opening the new WAVMA Cert-AqVP Programme (a programme that identifies core subject matter necessary for Day-one competency in aquatic veterinary medicine, and certifies individuals that have attained the necessary knowledge, skills and experience) to NOVICE members in 2013.

There is no question that both the efforts of WAVMA to support the NOVICE programme and conference were extremely fruitful, so stay tuned for more developments in 2013.

http://www.noviceproject.eu/

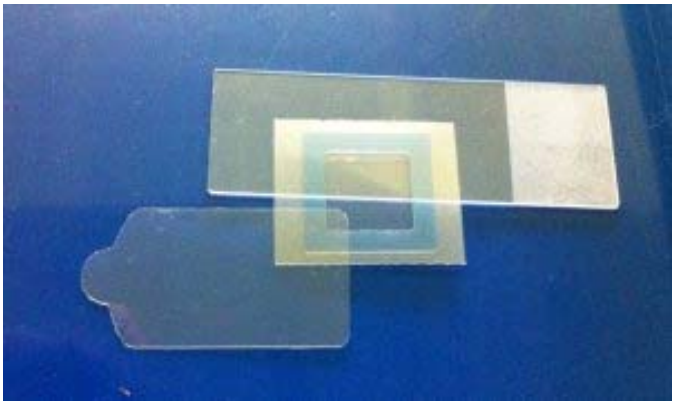
novice
Network Of Veterinary ICt in Education

Listserv Letters

Frame seal slides: ideal to keep that wet prep sample for 'eternity'!

Frame slides are fantastic for preserving wet preparations for future teaching purposes. The specimen will need to be fixed first in formalin and then mounted onto the frame slides. It gives students the benefit of examining the 3D wet preps of skin scrapes and gill biopsies, looking for ectoparasites. Check it out on my YouTube Channel - http://youtu.be/dR5yv2FR-2Y

Dr Richmond Loh
BSc, BVMS, MPhil (*Vet Path*), MANZCVS (*Aquatics*), MANZCVS (*Pathobiology*), DipPM.
Veterinarian | Adjunct Senior Lecturer Murdoch University | WAVMA Communications Committee Member |



Hi WAVMA members,

Just wondering if anyone has some histological pictures of gills affected by the dinoflagellate *Karlodinium*? I think we can identify the agent in a gill section, but it looks very different in an archive slide that we have, which is suppose to be affected by *Karlodinium*. Your help is most appreciated.

Thanks,

Dr. Jo Bannister, BSc.BVMS, BSc.Ans (Hons)
jo.bannister@bigpond.com

Literature Review

Abstracts compiled by **David Scarfe**

The pathology of 'scale drop syndrome' in Asian seabass, *Lates calcarifer* Bloch, a first description.

Gibson--Kueh S, D Chee, J Chen, YH Wang, S Tay, LN Leong, ML Ng, JB Jones, PK Nicholls, HW Ferguson (2012). J. Fish Dis., 35:19–27.

Abstract

'Scale drop syndrome' (SDS) was first reported in *Lates calcarifer* Bloch by farmers in Penang, Malaysia in 1992. Cases with similar gross lesions and clinical presentations were observed in 100–300 g *L. calcarifer* in sea cages in Singapore in 2002, 2006 and 2009.

Fish were usually reported as eating well with no signs of disease until onset of SDS. The disease appeared to progress within a few index cages and spread onto surrounding cages. The disease did not affect other fish species stocked in the same farm or vicinity. Daily mortality of 1–2%, and average cumulative losses of 40–50% of stocked fish were observed. Severely affected fish stopped schooling and occasionally showed abnormal nervous behaviour characterized by spiral swimming, darkened bodies, and scale loss over extensive areas. Scale loss is a non-specific clinical sign, and this must be accompanied by histopathological examination of other tissues to diagnose SDS. The cause of SDS is unknown, but it appears to be infectious.

Histopathological changes and the presence of enveloped hexagonal virions in the absence of other consistent causal agents support the possibility of a viral aetiology. Attempts at viral isolation or PCR using published primers have not been successful. The case definition for SDS is proposed as 'a systemic vasculitis in *L. calcarifer* associated with tissue necrosis in all major organs including the skin, with apparent targeting of cells of epithelial origin'. There is a need to increase recognition of this serious disease to prevent inadvertent spread to new areas, in an *L. calcarifer* aquaculture industry of increasing importance.

An intestinal *Eimeria* infection in juvenile Asian seabass (*Lates calcarifer*) cultured in Vietnam – A first report

Gibson-Kueh S, NTN Thuy, A Elliot, JB Jones, PK Nicholls & RCA Thompson (2011). *Vet. Parasitol.*, 181 (2-4): 106-112.

Abstract

This is the first report of an intestinal *Eimeria* infection in Asian seabass (*Lates calcarifer*) at the histopathological and ultrastructural levels. The *Eimeria* infection was often associated with severe pathology and significant mortality. This showed that it is an important disease of juvenile *L. calcarifer* in Vietnam. Heavy infection and high prevalence levels of the *Eimeria* infection are suspected to be linked to the low daily water exchange rates practiced in these nurseries. Although systemic iridovirus infection was concurrently observed in some of the fish examined, it was not as consistently present in diseased fish as the *Eimeria* infection.

Phenotypic and genotypic characteristics of *Mycobacterium* isolates from fighting fish *Betta* spp. in Malaysia

Najiah M, KL Lee, H Noorasikin, M Nadirah & SW Lee (2011). *Res. Vet. Sci.* 91(3): 342-345.

Abstract

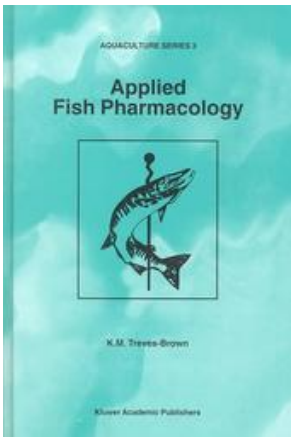
Mycobacteriosis due to mycobacteria is one of the most common bacterial diseases in ornamental fish. We describe here the phenotypic and genotypic characteristics of *Mycobacterium* isolates from fighting fish *Betta* spp. using ATCC *Mycobacterium marinum, Mycobacterium fortuitum* and *Mycobacterium chelonae* as references. A total of four isolates (M1, M2, M3, M4) were obtained from four out of 106 fish samples using selective agar, and identified to *Mycobacterium* genus using acid-fast staining and 16s rRNA gene-based genus specific polymerase chain reaction. DNA sequencing and NCBI-BLAST analysis further identified isolate M1 as *M. marinum* and isolates M2, M3, M4 as *M. fortuitum*. Morphological, physiological and biochemical tests were carried out for phenotypic characterizations. Universal M13 and wild -type phage M13 RAPD dendogram was generated to illustrate the genetic relationship of the isolates and reference strains.

Book Review

Applied Fish Pharmacology.

Keith M. Treves-Brown MA, VetMB, MRCVS (2000)
Published **by Kluwer Academic Publishers/Springer-Verlag, 310pp. ISBN 0-412-62180-0.**

Reviewed by John F. Burka, PhD & Gerry Johnson, DVM (originally published in Can Vet J. 2002 June; 43 (6): 468).



Applied Fish Pharmacology was written to provide veterinarians and fish farm management personnel with basic information on the different drugs used in Aquaculture. The book gathers together a wide variety of information from many of the disciplines involved in the approval and use of drugs in fish, enhancing the readability for those wanting to gain a comprehensive view in a rather concise format.

For the most part, the difference between factual studies and the author's summary opinion is readily distinguished. The book offers a mix of facts and informed opinions that are only intermittently referenced. It is difficult to determine why some points are referenced and others that seem equally important lack references. Many references are dated and, considering that aquaculture is a rapidly emerging industry, this presents a problem that will age the book more quickly than normally would be the case.

Recognizing differences in the physiology of fish is essential to understanding the problems associated with drug approval for the aquatic environment. Ectothermic animals change body temperatures through a wide range, affecting both the uptake and distribution and biotransformation of drugs. The book does a credible job of summarizing both complications and proposed solutions. The reader unfamiliar with fish or with the aquatic environment can review the subject easily and quickly, in a manner that has not been available in a consolidated form.

Antibacterial and antiparasitic drugs and anaesthetics are well presented with overviews of the pharmacokinetic and pharmacodynamic parameters. Some drugs, such as the tetracyclines, quinolones, and sulfonamides, are covered in good detail with species comparisons, whereas details for others, including penicillins, macrolides, and antiparasitic agents, are sparse. Resistance concerns are discussed for the antibacterial, but not the antiparasitic, agents. It would have been useful to have had more information on emerging new drugs, such as AQUI-S® and emamectin. It was nice to see chapters on breeding induction agents, immunostimulants, and vaccines, all used in new husbandry and therapeutic strategies in aquaculture.

The author qualifies the need to view the subject broadly, including both approved and unapproved products, due to the differences in regulations within various countries. Good overviews of legislation in the European Union and the USA are provided, with some information from the Far East and New Zealand. Canadians should not expect any particular national reference as this country is not included in the regulations discussed.

So does everyone dealing with fish treatment need to have this book at their fingertips? There are times when a review or a better understanding will solve a problem or change thinking on the choice and use of drugs. The format allows accessible information to be read easily by veterinary and graduate students not familiar with the complexities of fish pharmacology. For the academic and practicing fish veterinarian, frustration may occur with the lack of references. The world of fish pharmacology and regulations changes quickly and this book may have a limited life as a reference.

With acknowledgements, preface, an index and references the chapters are organized in four parts, including:

Part One: General Considerations – 1) Methods of Drug Administration, 2) Safety of Fish Medicines, 3) The Law;

Part Two: Antibacterial Drugs – 4) Comparative Aspects, 5) Tetracyclines, 6) Penicillins, 7) Macrolides, 8) Sulfonamides, 9) Potentiated sulfonamides, 10) Quinolones and Fluoroquinolones, 11) Other Systemic Antibacterial Agents;

Part Three: Other Chemotherapeutic Agents – 12) Systemic Anti-protozoal Agents, 13) Externally applied antimicrobial agents, 14) Ectoparasiticides, 15) Anthelmintics; and,

Part Four: Pharmacodynamic Agents – 16) Anaesthetics, 17) Breeding induction agents, 18) Sex control, 19) Immuno-stimulants, 20) Vaccines, 21) Osmoregulators, 22) Disinfectants.

Colleague's Connection

Getting involved in Aquatic Veterinary Medicine: E. Scott Weber III, MSc, VMD, PhD

I was born and lived in Northeast Philadelphia until the age of nine. Despite living in the inner city of Philadelphia, my grandfather planted the seeds of conservation in my mind at a young age and fostered environmental awareness by supporting my love for animals and nature in every way possible. We traveled together to Germany, and I worked on our family owned dairy, beef, and swine farms. He nurtured my dream of becoming a veterinarian unwaveringly, even when everyone else doubted this was a possibility. Most importantly, he gave me my first pet fish, a goldfish named Sharky, which was won with the toss of a Ping-Pong ball into a fish bowl, when I was 5.

Another influence was my next-door neighbor in Philadelphia, Mary Duffy, who was studying to get admission to veterinary school. She introduced me to the care required for orphaned and abandoned stray animals, and to understanding tropical aquarium fish husbandry. From the age of 6, I then decided to become a veterinarian, and also started to raise freshwater tropical fish. My family then moved to various places in New Jersey and Pennsylvania, and at 12, after needing to find a home for a half dozen chickens after a successful embryology experiment conducted for the school science fair, I landed my first farm type job. At age 14, I worked a second job in a local pet store.

My lack of exposure to animals while living in Philadelphia had cultivated an intrigue and fascination with all types of animals, especially exotic, zoo and wildlife. I had a special appreciation for farm animals as well. In high school we relocated to Marietta, Georgia. In Georgia, I continued developing my interest in agriculture and was selected to attended an agricultural youth forum at Virginia Tech.

I graduated from high school and attended Colorado State University as an Honors Biology major. At Colorado State, I worked as a milker in the University dairy and also volunteered at the raptor rehabilitation center to help veterinarians rehabilitate locally injured birds of prey. I transferred my sophomore year to University of California, Davis. In California, I worked at the California Primate Research Center as a husbandry attendant for several species of monkey. I volunteered at the California raptor center, Sacramento Zoo, and the Sutter General Hospital Emergency Room. Every summer I explored unique work experiences and spent my summers working construction in Southern California, ranching in Wyoming, and my greatest adventure, working for the commercial fishing industry in Alaska for two summers. My final semester at Davis was spent studying marine biology at the school's Bodega Bay Marine Laboratory.

After graduating, I substitute taught science and math, and bartended at night. I was an adult adviser for a Marine Biology Explorer Post for high school students, building and establishing an artificial reef and having all the students get scuba certified with my co-adviser Dr. Richard Robertson. During this year I also applied to veterinary school, and was accepted and attended the University of Pennsylvania Veterinary School, while still maintaining several aquaria and also rehabilitating reptiles with metabolic bone disease from a local pet store.

I continued to keep my mind and doors open by taking a variety of elective classes and participating in several research opportunities. My interests and personal goals for research have been long seated in my academic experiences, tracing roots as far back as my undergraduate days traipsing about in scuba gear at Bodega Bay. A PhD in marine biology was an unrealized fallback position, should my entrance into veterinary school not come to fruition. My veterinary training, through the opportunity of two Merck fellowships, gave me insight into research of infectious disease through studying invasion of *Salmonella enteritidis* in poultry and by investigating the immune response of cattle to Johne's disease. While in the clinics I did research in the Turkana region of Kenya/Sudan to help identify the zoonotic disease, *Echinococcus granulosus*, working with the African Medical Research and Education Foundation.

I also completed several elective classes in fish medicine, including a career-guiding elective an NC State with Dr. Greg Lewbart. Dr. Lewbart exposed us to practical cases at the Veterinary College and then embarked on a weeklong field trip through Florida introducing us to professional colleagues at the University of Florida Tropical Aquaculture Laboratory (Drs. Craig Watson and Roy Yanong), SeaWorld (Dr. Sam Dover), and Mote Marine Laboratory (Dr. Charles Manire). Prior to veterinary graduation, I was awarded a Thouron fel-

Colleague's Connection - continued

lowship to continue postgraduate study in the UK. These experiences afforded me skills and confidence to pursue postgraduate research at the Centre for Tropical Veterinary Medicine (CTVM) at the Royal Dick Veterinary College in Edinburgh with hopes of completing a PhD in immunology studying the immune response of ruminants to tropical infectious diseases.

This goal was thwarted by the pending closure of the CTVM, but whilst overseas I was able to transfer graduate programs, and use my newly acquired immunology skills to complete an MSc (with Distinction) in Aquatic Pathobiology/Aquatic Veterinary Sciences, investigating the role of melatonin on the innate immune response of rainbow trout, thus beginning my current narrative in aquatic animal health. Although never interested in a small animal medicine career, I did not know what I would do or where I would go in the field of veterinary medicine. Despite having a strong background with a variety of exotic and aquatic animals, at the time aquatic animal medicine was barely a professional discipline in veterinary medicine. The professional and familial experiences afforded me by the Thouron award gave me the courage to attempt making a career in the field of aquatic animal health. John J. "Tiger" Thouron not only supported the Thouron fellows financially, but also personally invested his time to develop personal relationships, and I had the great fortune of sharing with him a love of fishing and Scotland. Tiger invited me to fish on several occasions on the river Deveron. These experiences and our long chats and friendship solidified my career goals. He is greatly missed.

Since successful completion of the MSc, I served briefly as a Fish Health Specialist at the University of Arkansas at Pine Bluff for the aquaculture industry, working on baitfish and ornamentals, and then worked as the Animal Health Manager at the New Jersey State Aquarium. During this time in Camden, NJ, I performed surgery on numerous koi with gonadal tumors and was featured on the Discovery Channel show "A Pet Story". "A Pet Story" focused on diagnostics and imaging for a koi patient named Four Step Rose. I also had several opportunities to work on a large number of sharks in our collection, including sandtiger, brown, tiger, and mako sharks.

In 2001 I left to become the head veterinarian and a research scientist at the New England Aquarium with responsibility for the veterinary care of the collection, rehabilitation, and research animals; a collection greater than 20,000 animals. I was featured in the PBS documentary "Windows to the Sea" for the New England Aquarium. My research experiences largely consisted of clinical studies and trials such as: investigating the pathogenesis and treatment of head and lateral line erosions (HLLE) in marine and freshwater fish using platelet derived growth factor; understanding the pathogenesis of angioinvasive fungal infections in marine fish; employing molecular diagnostics for parasitic, fungal, bacterial, and viral diseases in fish; using laparoscopy for non-lethal sampling in fish; examining normal enteric flora in wild and captive fish populations; creating baseline CBC and chemistry panels for various fish species; examining the pharmacokinetics for injectable and oral medications in fish; vitamin D requirements for rehabilitated sea turtles; blood gas analysis for respiratory compromised sea turtles; medical management and treatment for hypothermia in sea turtles; enteric flora of rehabilitated sea turtles with antibiotic sensitivity; pharmacokinetics of fluconazole and ceftazidime in convalescent sea turtles; pathogenesis of pneumonia in sea turtles; using nuclear scintigraphy to diagnose joint swelling in sea turtles; interpretation of ionized calcium and magnesium as prognostic indicators for successful rehabilitation in hypothermic sea turtles; and investigating vitamin D and calcium levels as related to reproductive success for an indoor flock of little blue penguins. Our work also included doing health surveys on stranded seals and dolphins using a mobile laboratory and satellite tagging to monitor animals when returned to the wild.

In June 2007, I took a position at the UC Davis School of Veterinary Medicine to start a clinical Aquatic Animal Health program with an emphasis on fish to compliment work performed in the fish health laboratory by Dr. Ron Hedrick. I also provided coverage for the Companion Avian and Exotic Pet practice at UC Davis, and in 2009 contracted with the Micke Grove Zoo to

Colleague's Connection - continued

provide veterinary care for their zoological collection. My current appointment at Davis has allowed me to go beyond clinical research, and to investigate some of these clinical questions in a more hypothesis driven manner, focusing on infectious disease of fish.

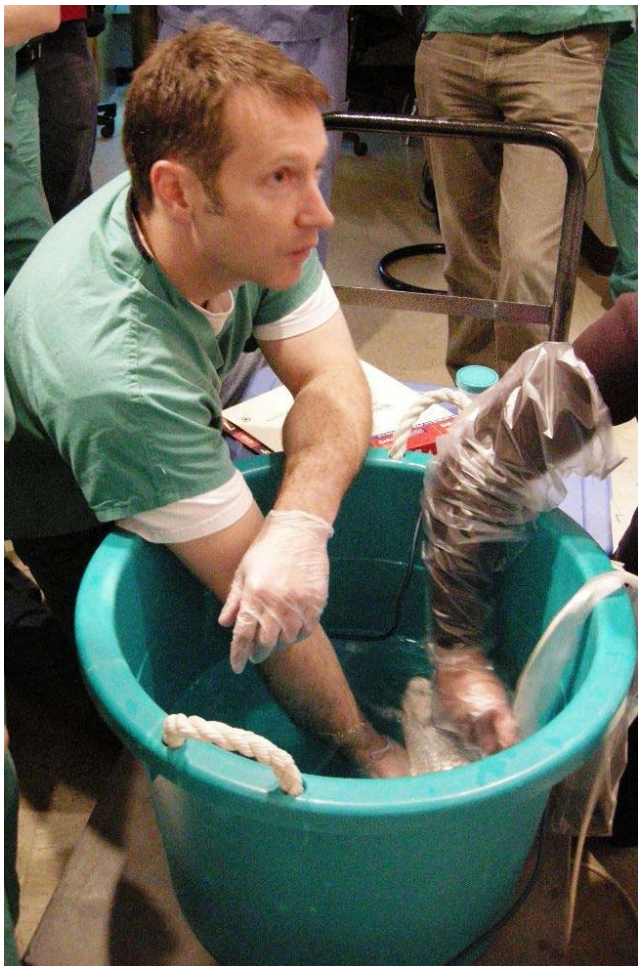
A great example of this evolution is my role in co-training Dr. Akinyi Nyaoke. Dr. Nyaoke's PhD training arose from clinical cases of leafy and weedy seadragons becoming infected with a novel angioinvasive mycotic infection. Although we were able to obtain histopathology from known clinical cases, and thoroughly complete an environmental sampling protocol, we were unable to conduct laboratory-based infections using this pathogen at the aquarium. While conducted research on this pathogen, we were able to investigate a potential emerging disease, examining routes of infection, and identifying environmental factors such as temperature.

Another area of interest is the lack of clinical and hematological data to support infections in fish, making clinical chemistry an unused diagnostic tool in aquatic animal health. Working with Dr. Sean Owens, we are trying to establish baseline hematologic and chemistry values for several species including koi, Western Pacific pond turtles, *Serioala* sp. of fish, bearded dragons, and cow-nosed rays. We also work collaboratively on a great white shark project with Dr. Michael Murray at Monterey Bay Aquarium, investigating pathology and abnormal baseline histopathology for young-of-the-year great white sharks that have been accidently caught in fishing gear. I have published over 45 peer-reviewed articles, reviews, and book chapters on aquatic animal medicine, and given over 100 lectures.

Outside service has included diverse experiences historically. After giving a lecture at the MIT Seagrant Conference on Bio-Invaders on May 22, 2002 called 'Bio-invaders in the Aquatic Realm - Cichlids to Lionfish", I was appointed as a member of the Northeastern Aquatic Nuisance Species (NEANS) panel in 2003. In 2005, I was named co-Chair of the Science and Technology committee and serve on the steering committee for the NEANS panel until 2007. While serving on the panel I co-hosted a meeting on Citizens Monitoring of Marine Invasive Species with the MA Department of Coastal Zone Management sponsored by the NEANS Panel. Other past activities have included being chair of the science committee for the Associated Koi Clubs of America (AKCA) Project Koi Herpes Virus (KHV); hosting and participating on the Diamond Terrapin Working Group; acting as a grant reviewer for NOAA's Prescott Grants in 2005 and 2006; participating in a Toxicology

Dr. Scott Weber observes a client's fish as it receives anesthesia before treatment at the Aquatic Fish Service. (photo by Don Preisler)

Colleague's Connection - continued



Dr. Scott Weber comments that this beats putting your hand in the rear end of a cow...

Collaborative Workshop at U Conn in Storrs, CT; and serving as an aquatic health specialist on MWRA Flounder Disease Panel in Woods Hole, MA. While in MA I acted as a consultant for aquatic animal concerns in the development of state emergency practices for protecting animals in times of disaster since 2003-present with the Massachusetts Emergency Management Agency (MEMA). During this time I was appointed Co-Chair (2005) of the State of Massachusetts Animal Response Team (SMART) Specialized Animal Services Team, comprising specialists in aquatic and zoo animal medicine and husbandry, wildlife disease surveillance and rehabilitation, exotic animal veterinary care, and laboratory animal medicine.

Presently, I have an active Federal appointment with the Veterinary Medical Assistance Team (VMAT-1), now the National Veterinary Response Team (NVRT), to respond to veterinary needs in times of national disaster or crises since 2003, and was deployed as a member of VMAT to Gulfport, MS after hurricane Katrina. I serve as an advisor to the American Association of Zoos and Aquarium (AZA) Animal Health Committee and am a veterinary advisor for the African Cichlid Tag; continue working with the American Veterinary Medical Association (AVMA) on the Aquatic Veterinary Medicine Committee (AqVMC) and Euthanasia Committees, and I was recently appointed to the AVMA Antimicrobial Use Task Force, served as vice-chair AqVMC 2010-2011, and chair AqVMC 2011-2012; am the Education Committee Chair for World Aquatic Veterinary Medical Association (WAVMA); participate as a California Department of Fish and Game (CDFG) Aquaculture Disease Committee member; and serve as a member of the Professional Standards Committee and the Awards Committee for the American Fisheries Association.

Having been appointed to Associate Professor of Aquatic Animal Health in May 2010, I have successfully learned how to bridle my previous clinical experience as director of animal health for a nationally recognized public aquarium into a more balanced academic career through research, teaching, and service. My dream going forward would be to create an academic Center for Aquatic Animal Conservation Health through an aquatic animal clinical medicine and research program working with privately owned pets and livestock, zoological and aquarium collections, laboratory research animals, and wild populations.

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Clinical Reports

Asian Tapeworm *Bothriocephalus acheilognathi* in Israel

Natan Wajsbortm MSc, Allan Heres PhD & Ra'anan Ariav DVM
Aqua-Vet Technologies Ltd.,
Zichron-Ya'akov, Israel

As part of Aqua-Vet's veterinary service in the Israeli earth pond farms, a dramatic outbreak of *Bothriocephalus acheilognathi* in cyprinids juveniles was observed. Even though *B. acheilognathi* is a common parasite in fresh water culture systems and has been diagnosed occasionally by Aqua-Vet's staff, several cases of an extremely high infection rate of the parasite were seen during the last two years.

Also known as the Asian tapeworm, *B. acheilognathi*, is a freshwater fish parasite that originated from China and Eastern Russia. It is a generalized parasite that affects a wide variety of fish hosts, particularly cyprinids, contributing to its overall success. The natural host of *B. acheilognathi* is the grass carp, which is native to the Amur River in China and eastern Russia. But it has become widespread throughout the world by means of introductions of the grass carp. Even the type specimens were not native. It is now known to exist in Europe, Australia, Mexico, the United States, Canada, and Puerto Rico. It can infect species of fish that belong to the families Cyprinidae, Poecilidae, Cichlidae and Centrarchidae.

The parasite has a fleshy, arrow-head scolex (head region) with an undeveloped terminal disc, a ribbon-like segmented body called proglottid, and two long attachment grooves called "bothria." It attaches near the anterior portion of the intestine. When attached, *B. acheilognathi* envelopes parts of the intestines and induces an acute inflammatory response. The inflammation may lead to severe hemorrhage and necrosis. Symptoms include: anorexia, weight loss, anemia, and mortality.

Studies have shown that *B. acheilognathi* decreases the host's feed absorption, increases FCR ratios and leads to decreased size of fish worldwide, causing great economic loss in hatcheries and fish farms. In addition, presence of *B. acheilognathi* will often lead to decreased resistance to secondary bacterial and parasitic disease of fish.

Adult B . *acheilognathi* within Intestinal tissue

Scolex of B . *acheilognathi*

Life Cycle

The life cycle of *B. acheilognathi* involves a definitive host, a fish, and an intermediate host, a copepod. The adult tapeworm is hermaphroditic; each proglottid has a complete set of both male and female reproductive organs and produces eggs via self-fertilization. When the free-swimming larvae, called coracidia, are eaten by copepods (intermediate host), it penetrates into the gut wall, travels to the coelom, and develops into a second larval stage called a procercoid (infective form) all within 6–10 days. Once the infected copepods are eaten by the fish hosts, the procercoid rapidly transform into the plerocercoid stage and attaches to the intestinal gut wall, where it develops into the adult parasite over the course of 21–23 days.

Treatment

As in other parasite infection events, the approach for a suitable treatment is an outcome of the life cycle and ecology of the organism, and since fish infection involves an intermediate host it is possible to treat both the parasite and the intermediate host.

Reduction of the copepod density in the water will indirectly reduce the infection rate of the fish. As such, Bromex (Naled) will commonly be used by Israeli fish farmers to reduce the numbers of copepods in the ponds. Copepods are effectively treated through repeated bi-weekly applications of 0.125–0.150 ppm Bromex; the efficacy of each application is in the range of 80% - 90%.

A direct elimination of the parasite can be effectively performed with oral medication of praziquantel. However, praziquantel based products are not registered for use in Israeli aquaculture industry.

Dear Colleagues,

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The on-line registration **will be open on** January 1, 2013.

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Social Events

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To get an idea what to expect in Prague you can watch some **videos HERE**

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

Contact

For any queries, questions or requests do not hesitate to contact the Congress Secretariat at wvc2013@guarant.cz

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Emerging Issues

Transgenic fish wins US regulatory backing - A fast-growing salmon moves closer to approval after a fishy delay.
Amy Maxmen
22 December 2012

The first genetically engineered (GE) animal for human consumption — a fast-growing salmon — has come a step closer to the dinner table, with a piece of paperwork posted online by the US Food and Drug Administration (FDA). The FDA's draft environmental assessment concludes that the fish poses no foreseeable risk to nature. After 60 days of public comment, the FDA may issue a final assessment and approval — at which time AquaBounty, of Maynard, Massachusetts, can begin selling the fish.

However, the draft assessment was dated 4 May, suggesting that the FDA had kept its conclusions under wraps for several months. Advocates on both sides of the issue speculate that political interference may be responsible. "I think it was controversial, and it was an election year," says Patty Lovera, assistant director of Food and Water Watch, a Washington DC group opposed to GE food animals. An FDA spokeswoman, Morgan Liscinsky, declined to comment on accusations that the process had been politicized, and says it's possible that the agency could request further studies after the public comment period.

Delays would not shock AquaBounty's CEO, Ron Stotish, whose company has been seeking FDA approval for the fish since 1995. When he was alerted to the decision today, he didn't initially believe it. "I said, 'I'll wait until I see it because I've received calls like this before and it never happened,'" he says. The FDA has reviewed more than 50 safety studies, including one that shows the engineered salmon poses no more of an allergic potential than a wild salmon. The engineered Atlantic salmon contains an active growth-hormone gene from a Chinook salmon that allows it to reach market weight in 18 months rather than three years.

The GE salmon are currently kept within enclosed, inland tanks to prevent the small risk that the nearly sterile females will breed with wild salmon. AquaBounty has promised to not sell the fish to farmers who do not have enclosed, inland tanks. After 17 years and $60 million spent trying to win FDA approval, Stotish is still cautious. "We are not so foolish to think that this process will suddenly be normal for us," he says.
For full article, see:
Nature - DOI: 10.1038/nature.2012.12130
http://www.nature.com/news/transgenic-fish

Glowing zebrafish shed light on metabolism
"Whole-organism screening for gluconeogenesis identifies activators of fasting metabolism," by Philipp Gut, Bernat Baeza-Raja, Olov Andersson, Laura Hasenkamp, Joseph Hsiao, Daniel Hesselson, Katerina Akassoglou, Eric Verdin, Matthew D Hirschey and Didier Y R Stainier.
Nature Chemical Biology, Dec. 2, 2012.

A tiny, translucent zebrafish (*Danio rerio*) that glows green when its liver makes glucose has helped an international team of researchers identify a compound that regulates whole-body metabolism and appears to protect obese mice from signs of metabolic disorders. Led by scientists at the University of California, San Francisco (UCSF), the work demonstrates how a fish smaller than a grain of rice can help screen for drugs to help control obesity, type 2 diabetes and other metabolic disorders, which affect a rising 34 percent of American adults and are major risk factors for cardiovascular disease.

The test was designed to identify key regulators of "fasting metabolism"— a state most people face every day after the lingering remnants of their long-digested meals pass slowly down their digestive tract. Some screens can be conducted in cell culture by taking living cells grown in the laboratory and exposing them to various drugs. The ability to rapidly test large libraries of compounds in the last few decades through such screens has revolutionized biomedical science. But looking for drugs that regulate biological processes like metabolism, which involves multiple interacting organs in the body, and even more types of cells, cannot be done in cell screens because they lack the same complexity. Mice are often used to test pharmacological compounds, but screens of this magnitude would require thousands of mice, which would be ethically impossible to justify and prohibitively expensive.

Gut and his colleagues set out to develop the zebrafish screen as an ethical and inexpensive solution, and the new paper demonstrates the validity of this approach, he said. Furthermore, this study illustrates the fact that model organisms should be an integral part of the new roadmap defined by the NIH and other medical research organizations around the world to translate the most advanced laboratory science into benefits for patients, Stainier said.
See full article at:
http://phys.org/news/2012-12-zebrafish-metabolism.html

Emerging Issues - continued

Mystery of Mass Squid 'Suicides' Possibly Solved
Tia Ghose, LiveScience Staff Writer
Date: 15 December 2012

Thousands of jumbo squid have beached themselves on central California shores this week, committing mass "suicide." But despite decades of study into the phenomenon in which the squid essentially fling themselves onto shore, the cause of these mass beachings have been a mystery. But a few intriguing clues suggest poisonous algae that form so-called red tides may be intoxicating the Humboldt squid and causing the disoriented animals to swim ashore in Monterey Bay, said William Gilly, a marine biologist at Stanford University's Hopkins Marine Station in Pacific Grove, Calif.

For decades, beach lovers have reported bizarre mass strandings where throngs of Humboldt squid (*Dosidicus gigas),* also called jumbo squid*,* fling themselves ashore, said Hannah Rosen, a marine biology doctoral candidate at the Hopkins Marine Station.

"For some reason they just start swimming for the beach," Rosen told LiveScience. "They'll asphyxiate because they're out of the water too long. People have tried to throw them back in the water, and a lot of times the squid will just head right back for the beach."

Before this, scientists in 2002 and 2006 noticed mass squid strandings from the Gulf of Mexico all the way to Alaska, Gilly said. But the cause of the mass squid deaths was an enigma. The strandings seem to happen whenever schools of squid invade new territory, leading some to suggest the creatures simply get lost and don't realize they are out of the water until it is too late. The squid washing ashore are juvenile size, about 1 foot (0.3 meters) long, and hadn't traveled to Monterey Bay before this fall. This season's stranding, which started Oct. 9, happened around the time Humboldt squid entered the bay.

Other scientists have proposed that red tides that release a lethal toxin called domoic acid may be intoxicating the squid and disorienting them. But when researchers tested the stranded squid for domoic acid, they found only trace amounts of the chemical, Gilly said. The poisonous chemical mimics a brain chemical called glutamate in mammals, though domoic acid is 10,000 times more potent than glutamate. The similar structure means domoic acid can bind to glutamate receptors on neurons. In turn, the receptor opens channels that let calcium into the cell. At high levels the poison causes brain cells to go haywire and fire like crazy, so much that they fill up with calcium, burst and die, Gilly said.

Squid on the beach
Photo by: Jennifer O'Leary, Hopkins Marine Station

But new evidence points to the red tide as at least one cause of the mass strandings. While most sea life follows daily tidal or lunar cycles, the mass deaths seem to be happening every three weeks. That led one of Gilly's graduate students, R. Russell Williams, to see if something in the environment was leading them astray. Russell found that red tides occurred every three weeks, around the same time as the squid strandings, suggesting a link, Gilly said.

While past researchers have only found trace levels of the toxic red-tide chemical in stranded squid, low doses of domoic could essentially be making the squid drunk. Combined with navigating unfamiliar waters, that could cause the mass die-offs. This isn't the first time Gilly and his colleagues have been led on a CSI-like hunt for Humboldt squid. In 2011, they figured out why the elusive jumbo squid left their usual feeding grounds off the Baja California coast in the winter of 2009 to 2010. Apparently, the squid had moved north, following their prey, small, bioluminescent fish called lantern fish, which had also moved north due to El Niño weather patterns.

For full story see:
http://www.livescience.com/25550-mass-squid-suicide.html

Legislative and Regulatory Issues

Update on latest ISA virus in Coast of Bays

The Canadian Food Inspection Agency (CFIA) confirmed on December 17, 2012 that an Infectious Salmon Anaemia virus (ISAv) was discovered at a commercial aquaculture site in the Coast of Bays. The confirmation was made following a series of internationally recognized test for ISA at a Department of Fisheries and Oceans (DFO) laboratory in Moncton, New Brunswick.

Dr. Daryl Whelan, Director of Aquatic Animal Health with the provincial Department of Fisheries and Aquaculture (DFA), said that analysis conducted to date (December 19) did not point to this new case of ISA being related to the first presence of the virus in the COB last summer. He said that the virus is a normal risk associated with fish farming. "Our veterinarians and technicians perform regular testing and it is through such a proactive testing regime again that this second occurrence of ISA was found", he said.

"The new virus is not due to a breach in biosecurity protocols put in place to protect the industry. The isolates or samples we took and tested are actually different from the earlier virus this past summer. They do not look the same, they do not act the same and they don't have the same sort of makeup. If the new samples at Port Harbour were like those at Butter Cove, I would tell you that biosecurity breaches must have occurred and that the virus travelled from one site to another, a distance of approximately 12 km. But because these new samples are distinct, then that's the evidence we use to say that this new case is definitely not due to a biosecurity breach – that this is something that has to be within the environment" he added.

"The type of ISA doesn't really matter in that the proven scientific way to stop the spread of the virus is to depopulate a site and leave it fallow for a period of time. From the DFA's point of view that fallow period will be at least a year and could be longer."

A spokesperson for the CFIA said on December 18 that the Agency will order the 300,000 to 350,000 salmon from the affected four cages to be humanely destroyed and disposed of. Pens, cages and equipment will be cleaned and disinfected. Once cleaning and disinfecting is complete, the Agency will evaluate the facility to determine when the quarantine may be removed.

See the source (http://tinyurl.com/ba7g38s) for the full story.

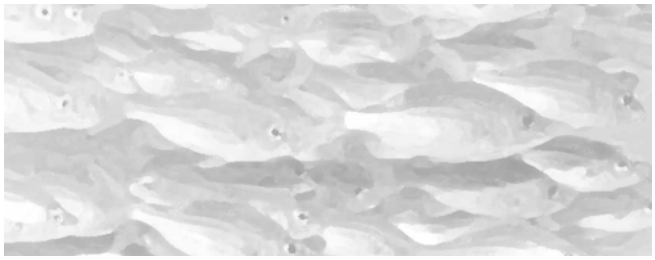
Confirmed Designation Notice for Viral Haemorrhagic Septicaemia

Edinburgh, UK – The presence of Viral Hemorrhagic Septicaemia (VHS) virus has been confirmed, in a group of 9,393 wrasse held in tanks at the land based aquaculture research unit at the North Atlantic Fisheries College, Scalloway, Shetland. All the wrasse at the site have been culled voluntarily. Statutory controls to contain VHS have been placed on the college and fish farm sites linked by movements of wrasse. The controls have been placed to minimise the risk of disease spread.

VHS is a disease listed under the European Directive 2006/88 which concerns fish diseases. Atlantic salmon are not listed as a species susceptible to the disease under the European Directive 2006/88.

Marine Scotland's Fish Health Inspectors have been working in Shetland and in other parts of Scotland as part of the investigation and to advise industry on their operations under control arrangements. Marine Scotland has also been investigating the potential source and spread of VHS

See the source (http://tinyurl.com/d5v69jg) for additional information.



Taking Stock:
World Fish Catch Falls to 90 Million Tons in 2012

The U.N. Food and Agriculture Organization (FAO) projects that the world's wild fish harvest will fall to 90 million tons in 2012, down 2 percent from 2011. This is close to 4 percent below the all-time peak haul of nearly 94 million tons in 1996. The wild fish catch per person has dropped even more dramatically, from 17 kilograms (37.5 pounds) per person at its height in 1988 to 13 kilograms in 2012—a 37-year low.

See full report at:
http://www.fao.org/docrep/016/i2727e/i2727e00.htm

Legislative and Regulatory Issues

Investigation into the aquatic animal health problems in the Gladstone Harbour and the nearshore waters, Queensland, Australia.

Dr Matt Landos, BVSc(HonsI)MACVS
Director, Future Fisheries Veterinary Service Pty Ltd
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In the recent past, there has been a spate of aquatic animal health problems in the Gladstone Harbour and the nearshore waters. There has been much debate over whether it is related to the activities of basin dredging and disposal projects or whether it was just a mere coincidence. Future Fisheries Veterinary Service (FFVS) was commissioned by the Gladstone Fishing Research Fund to undertake a veterinary investigation into the health problems reported, from May 2011 to the present, in aquatic animals around Port Curtis, Gladstone, Queensland Australia.

The aim of the study was to undertake a veterinary disease investigation of aquatic animals in and around Gladstone Harbour, with comparison to a remote reference site; and to assess the likely causes of observed diseased aquatic animals using field and laboratory diagnostic tools.

The report concludes that the re-suspension of contaminated sediments by the Western Basin Dredging and Disposal Project has had significant consequences including:

- resuspension and mobilisation of contaminants from sediments causing toxic exposures in aquatic animals;
- increased parasitism of aquatic animals due to stress, immunosuppression and external irritation from poor water quality and toxicosis;
- generation of toxic algal blooms due to disturbance of sediments and release of nitrogen, iron and other nutrients.
- increased boat traffic increasing risk of boat strike to turtles and marine mammals;
- increased noise stress from increased boat traffic, pile driving, drilling and dredging.

Currently, resuspension is spreading sediments over tens of kilometres around the dredging and disposal operations. Some of these sediments contain high loads of metals, metalloids and nutrients. These sediments and associated contaminants are likely to be harming reproduction of a range of local species including seagrass. Seagrass meadows are vital habitats for a suite of important species and are also fish nurseries. Ongoing harm is being reported by local media outlets and commercial fishermen.

The contrary view that a freshwater influx led to the observed impacts on aquatic animal health is scientifically unsupportable. The reality is that Queensland coastal estuaries have for centuries received large freshwater influxes. The types of diseases observed recently in Gladstone have not been a feature of previous freshwater influxes. The timing of onset of disease is consistent with the ramp-up of Australia's largest ever dredging project for Harbour development from May 2011 (dredging 25 million cubic metres of sediment, and ocean spoil disposal of 5 million cubic metres of sediment).

The spatial distribution of disease in Gladstone Harbour is consistent with the distribution of resuspended sediments from dredging and disposal based on interpretation of satellite images. There was a synchronous outbreak of disease in a wide range of aquatic species (fish, sharks, rays, crabs, shellfish, turtles, dolphins and dugong) as well as humans, from May 2011 onwards. The health of aquatic animals in Gladstone Harbour was compared to those from a reference site, 250km to the north. The extent and intensity of disease did not, and is not, occurring at the reference sites of FFVS, nor those of Fisheries Queensland.

This report uses examples gathered from peer reviewed scientific literature to identify the likely mechanisms through which various risk factors have impacted the health of aquatic animals in Gladstone Harbour. There is sufficient evidence presented, and available, to ascribe likelihood to the roles various factors have played. The author would appreciate comments on the report, which can be sent to his email address above.

The final report is now available and can be downloaded from:
http://media2.apnonline.com.au/img/media/pdf/FFVS_Gladstone_FINAL_trustee_version.pdf

A related news story can be seen at:
http://www.gladstoneobserver.com.au/news/report-accuses-dredges/1706828/

There is also a 25 minute interview where aspects of the report are discussed at this website.

Aquatic Veterinary CE & PD

MEETINGS OF INTEREST TO AQUATIC VETERINARIANS

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

38th Eastern Fish Health Workshop

April 29 – May 3, 2013
Eisenhower Inn and Conference Center
Gettysburg, Pennsylvania

Important Due Dates:
General Session Titles: Currently accepting
Abstract: due by 21 March 2013
Early Registration: until 29 March 2013 ($225)
Late Registration: after 29 March ($250)
Hotel Reservation: must be made by 29 March 2013
Presentations: due by 15 April 2013

Lodging Accommodations: Accommodations must be made with The Eisenhower Inn and Conference Center at (717) 334-8121. You must identify your affiliation with the Eastern Fish Health Workshop and call before 29 March 2007 to secure a room at the convention rate ($98.00 per night plus tax).

For more information, contact:
Rocco C. Cipriano
National Fish Health Research Laboratory
USGS/Leetown Science Center
11649 Leetown Road
Kearneysville, WV 25430
P: 304-724-4432
F: 304-724-4435
E: rcipriano@usgs.gov

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. 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

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 33rd 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 33rd 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.

2nd 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).

EAFP 16TH 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.

Aquatic Veterinary CE & PD - continued

2013 AQUAVET® I & II & III

The University of Pennsylvania School of Veterinary Medicine and the College of Veterinary Medicine at Cornell University are pleased to announce the 2013 AQUAVET® I & II Programs as well as the new AQUAVET® III offering. They are aquatic veterinary medicine education programs that currently consist of two courses that will be presented at Roger Williams University in Bristol, RI in June 2013 and one on aquarium medicine which is at three venues.

AQUAVET® I: **An Introduction to Aquatic Veterinary Medicine** is a 4-week course (26 May - 22 June 2013) intended primarily for veterinary students.

AQUAVET® II: **Comparative Pathology of Aquatic Animals** is a 2-week course (26 May - 8 June 2013) that is oriented toward the pathology of diseases of aquatic invertebrates and fish that are used in biomedical research, encountered in display aquaria and are of importance in commercial aquaculture.

AQUAVET® III: **Clinical Aspects of Captive Aquatic Animal Medicine** is a 5 week course (24 June – 27 July, 2013) and is limited to a small number of students. The venues include GA Aquarium, U of GA and Dolphinaris, Cancún, México.

Veterinary students can receive credits for the course and graduate veterinarians can receive CE credits.

More detailed information and applications for admission (due by January 15, 2013) are available on the web site www.aquavet.info.

International Conference on Diseases of Zoo and Wild Animals 2013

8-11May 2013
Vienna, Austria

Please register at **www.bayceer.uni-bayreuth.de/zoovet2013/** or follow the links at the conference website: **http://www.zoovet-conference.org/**. After registration, you will receive an e-mail confirmation.

If you would like to actively participate in the conference by an oral or poster contribution, we are looking forward to receive your abstract/manuscript by the 31st of January 2013. Further information can be found **here**.

The following seven workshops will be held at the International Conference on Diseases of Zoo and Wild Animals 2013. Please find further information on these workshops **here**.

- Emergency evacuation anaesthesia
- Expeditionary wildlife capture and telemetry
- Scientific writing
- Animal training
- ACZM / ECZM - short course
- Field necropsy and sampling
- Media training for zoo veterinarians

Please note that workshop places are limited, so if you would like to attend one of these workshops, we recommend registering as soon as possible!

At next year's conference, the fourth "Rudolf Ippen Young Scientist Award" will be awarded. The Award will honour a young scientist whose scientific output, particularly the papers published in the past 12 months, document the beginning of a promising career in wildlife veterinary science, conservation medicine, or zoo animal medicine. Candidates can apply by themselves or can be proposed by somebody else. Deadline for applications: 15th March 2013 Further information can be found **here**.

Hotels in Vienna can be well booked, we would like to remind you to make your hotel reservation as soon as possible. A list of recommended hotels can be found **here**.

THE ORGANISING COMMITTEE:
Tiergarten Schönbrunn: Thomas Voracek, Hanna Vielgrader, Claudia Slond, Dagmar Schratter
EAZWV: Gerry M. Dorrestein, Christian Wenker, Alexis Lécu; IZW: Alex D. Greenwood, Gudrun Wibbelt, Anke Schumann, Steven Seet, Dagmar Boras, Heribert Hofer
Email: **2013@zoovet-conference.org**
Website: **www.zoovet-conference.org**

Aquatic Veterinary CE & PD - continued

Disease Diagnosis and Control in Marine Shrimp Culture
June 3-14, 2013
Sponsored by the Aquaculture Pathology Laboratory, Department of Veterinary Science and Microbiology, University of Arizona, Tucson, AZ 85721 USA.

Registration Information: Registration is limited to 30.
Deposit and Early Registration Deadline: $100.00 (USD) by April 1, 2013.
Mailing address:
The University of Arizona
Department of Veterinary Science & Microbiology
Aquaculture Pathology Laboratory
1117 E. Lowell Street, Room 102
Tucson, Arizona 85721 USA
Phone: 520-621-4438
FAX: 520-621-4899
Email: ritar@email.arizona.edu or dvl@email.arizona.edu
Cost:
$1,500.00 (USD) if the deposit is received on or before April 1, 2013.
$2,000.00 (USD) if the deposit is received on or after April 2, 2013.
Accommodations:
Both single and double rooms are available at the nearby Tucson Marriott University Park Hotel at $75.00 (plus applicable taxes) per night for a single or double room. Dormitory rooms are available for $31.00 per night for a single room and $54.00 per night ($27.00 per person) for a double room.
International Travelers:
Due to more stringent U.S. entry requirements, allow a minimum of 4-6 months for visa processing.

Program
Lectures: At least two lectures are scheduled each day. The following topics will be covered:
1. Course introduction, purpose, scope and schedule.
2. Introduction to gross anatomy and normal histology.
3. White Spot Disease (WSSV).
4. The baculovirus and baculo-like virus disease including MBV, BP and BMN.
5. Infectious hypodermal and hematopoietic necrosis virus, hepatopancreatic virus and other parvovirus caused diseases.
6. Taura syndrome, Infectious myonecrosis, Yellowhead and other RNA virus caused diseases.
7. Bacterial, rickettsial and fungal diseases.
8. Surface fouling diseases.
9. Nutritional diseases.
10. Toxic and environmental disease syndromes.
11. Diseases of unknown or uncertain etiologies.
12. Parasitic diseases.
13. Methods of disease prevention and/or treatment.
14. New diagnostic procedures.
Labs and Demonstrations: Two lab sessions per day. Topics to be covered in the labs include:
1. Fixation procedures for routine histology.
2. Standard histological techniques.
3. Normal histology and post-mortem change of principal organs and tissues.
4. Wet mount diagnostic procedures.
5. PCR/RT-PCR and gene probes for diagnosis of viral diseases.
6. Antibody-based methods for diagnosis of viral and/or bacterial diseases.
7. Isolation, culture, identification and antibiotic sensitivity of bacterial isolates.
8. Histopathology of viral, bacterial, rickettsial, fouling, parasitic, toxic and nutritional diseases.
University Graduate Course Credit:
Three graduate credits are available for VSC565 (US residents only) through The University of Arizona Summer Session.
Lectures, Labs and Demonstrations:
By Staff from the Department of Veterinary Science and Microbiology
D.V. Lightner, Ph.D.: Professor, Specialist in diseases of cultured shrimp
C.R. Pantoja, Ph.D.: Associate Research Professor, Shrimp Pathologist
K.Tang-Nelson, Ph.D.: Associate Research Professor, Molecular Virologist
L.L. Mohney, M.S.: Microbiologist
L.M. Nunan, M.L.A.: Molecular Biologist
S.A. Navarro, B.S.: PCR techniques, Microbiologist
R.M. Redman, H.T.: Histotechnologist

Need more information?
Contact Rita Redman or Dr. Donald Lightner:
The University of Arizona
Department of Veterinary Science & Microbiology
Aquaculture Pathology Laboratory
1117 E. Lowell Street, Room 102
Tucson, Arizona 85721 USA
Phone: 520-621-4438; FAX: 520-621-4899
Email: ritar@email.arizona.edu or dvl@email.arizona.edu

Aquatic Veterinary CE & PD - continued

31st World Veterinary Congress
17–20 September 2013
Prague, Czech Republic

150th Anniversary of the World Veterinary Association

Detailed program, abstract submission form as well as information about registration, social events etc. are available on the website:
www.wvc2013.com
We look forward to meeting you in Prague in 2013.

WORLD VETERINARY ASSOCIATION

39th World Small Animal Veterinary Association Congress
16-19 September, 2014
Cape Town, South Africa.

Abstract Submission Opens: November 1, 2013

http://www2.kenes.com/wsava/pages/home.aspx

Join us for both the stimulating sessions and the special flavor of Cape Town, a city filled with unique flora and surrounded by beautiful beaches, vineyards and natural beauty.

Cape Town is one of the world's most stunning locations, and is a popular tourist destination filled with natural beauty and a rich variety of stimulating activities. Safari adventures depart regularly from the area.

Kevin Stevens
Local Host Chairman

2-Day Virtual Lab Animal Science Conference
13-14 Feb 2013

BioConference LIVE

The theme of this conference is Animal Well-being and Welfare Science. LAS BioConference Live will bring together scientists, veterinary technicians, veterinarians, technical support staff, IACUC administrators and support staff, as well as training and compliance personnel from around the world to learn about recent advances in the field of laboratory animal medicine.

This FREE conference offers an amazing opportunity as it is complimentary to participants, and there will be no out-of-pocket expenses for travel. However, participants will still benefit from interacting with a global community of like-minded colleagues, without leaving the comfort of their office or home.

Conference participants will be able to:

§ Search and attend session(s) of their choice

§ Have their questions answered in real-time by experts via live videos

§ Receive Free Continuing Education Credits

§ Chat live with peers and speakers

§ Browse a virtual exhibit floor for solution providers

The aim is to bring together leading authorities from around the world to present on the science of animal wellbeing and welfare. This conference will stimulate discussion with a view to identifying future priorities for research, education, and practical/policy developments.

View Confirmed Speakers Here:
www.bioconferencelive.com/events.php?event_id=2&layout=speakers

Register at www.bioconferencelive.com/register.php

Contact Corner

2012 WAVMA Executive Board

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Dr Ron Roberts (UK) 2008
Dr Hugh Mitchell (USA) 2009
Dr Fotini Athanassopoulou (Greece) 2010
Dr Julius Tepper (USA) 2011

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The ideas presented in this publication express the views and opinions of the authors, may not reflect the view of WAVMA, and should not be implied as WAVMA recommendations or endorsements unless explicitly stated. Information related to the practice of veterinary medicine should only be used within an established valid Veterinarian-Patient-Client Relationship.

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).

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.