

The



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Morning rounds for the Georgia Aquarium Veterinarians and AQUAVET III students.
(See related article on page 28)

Formerly *Aquatic Vet News*

Volume 7, Number 3
Third Quarter, 2013



THE AQUATIC VETERINARIAN

Volume 7, Number 3

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Third Quarter 2013

WORLD AQUATIC VETERINARY MEDICAL ASSOCIATION

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.

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.



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ISSN 2329-5562

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Please send articles, clinical reports, or news items to the editor by the following submission dates:

- Issue 1 – February 15 (published in March)
- Issue 2 – May 15 (published in June)
- Issue 3 – August 15 (published in September)
- Issue 4 – November 15 (published in December)

All submissions should be in 10-point Arial font, single spaced.
Submissions may be edited to fit the space available.

[See page 13 for further instructions to authors.](#)

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EDITORIALS

Third Quarter 2013

Editor's Note

Are the files on your computer backed up? Do you have an external hard drive or online back up? If your answer is 'no' to these questions, then back them up - now! You may have noticed that this Journal issue is late. That is because my laptop computer crashed, losing all the files for the Journal, including the Publisher template I use to lay out the issues. It is possible to recover data off damaged hard disks, but it is not easy, it takes a lot of time, and is sometimes expensive. Lesson: backup all your data in multiple locations!

The good news is that I was able to restore the template and other data, and finished putting this issue together. To prevent future problems, I am backing up my computers on an online backup service: LiveDrive. The backed-up files are not only secure, but can be accessed with my password from any computer with internet access. Even better, is that we are testing LiveDrive to possibly make it available to WAVMA members for use with their own computers to easily back up the data. Each member can get their own account to have unlimited data internet back up in the "cloud." It might even be possible to have a WAVMA Members group folder in which we can share files with other members.

Fortunately, with the recovered template files this issue was completed, and you are now reading the biggest one to date, with lots of news reports. But the biggest news is the special supplement at the end of this issue of *The Aquatic Veterinarian*: The **Certified Aquatic Veterinarian (CertAqV) Credentialing Program** document. This explains the process for becoming a Certified Aquatic Veterinarian. It has taken 3 years for the Credentialing Committee to create, test, and finalize the program. But now that it is completed, it is a great asset to identify those veterinarians with expertise in aquatic veterinary medicine. Read the document and look into getting Certified to let your clients and colleagues know you are an Aquatic Veterinarian!

Nick Saint-Erne
Saint-Erne@Q.com
Editor



Download a QR reader onto your Smart Phone and scan the Quick Response Code to the right. It will take you to the WAVMA.org website page for accessing all of the past WAVMA Newsletters. You will need your WAVMA User ID and Password to access the most recent back-issues of *The Aquatic Veterinarian*.



Cover Photo:



Morning rounds for the Georgia Aquarium Veterinarians and AQUAVET III students. (See related article on page 28)

Ultrasound on a dolphin at AQUAVET III



The first class of the new AQUAVET III Program.

2013 **AQUAVET**® III Class
[See related article on Page 34](#)

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EXECUTIVE REPORTS

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President's Report

September 2013

I am pleased to inform you that the third quarter of 2013 has witnessed many fruitful WAVMA activities. The Certified Aquatic Veterinary Practitioner Program has certified 11 veterinarians from 6 countries during the initial experimental phase. This program is now available to all WAVMA members. The application information is included in this issue of the *Aquatic Veterinarian* (page 43). Through the program, you provide the WAVMA Credentialing Committee documentation that you have acquired the knowledge, skills, and experience needed to be recognized as a Certified Aquatic Veterinarian (CertAqV). Do not miss this opportunity!

The Council of WAVMA Distinguished Fellows (CWDF) has selected three outstanding aquatic veterinarians as 2013 WAVMA Fellows; these are **Professor Dusan Palic** (Germany), **Dr. Marion McLoughlin** (UK), and **Dr. Grace Kerreman** (Canada). Please join me in congratulating them on this honor, as we are looking forward to their upcoming contributions to WAVMA and to the aquatic veterinary medical profession.

The third quarter has also witnessed two well-attended activities in the area of continuing professional development. WAVMA put together outstanding programs at the 2013 American Veterinary Medical Association (AVMA) Annual Convention held in Chicago, Illinois, July 19-23; and the World Veterinary Congress held in Prague, Czech Republic, September 17-20, 2013, where WAVMA offered CEPD opportunities that included both lectures and wet laboratory experience. In addition to the scientific programs, we held social events with current and potential WAVMA members. The attendees expressed their appreciation for WAVMA programs and came up with several constructive comments to improve current programs and launch new ones.

In response to members' wishes, WAVMA Executive Board (EB) decided to immediately launch the *Clinical Corner*, accessible through the WAVMA webpage. The *Clinical Corner* will serve as a forum to discuss clinical cases and related issues. Every week, a new case, or a follow up of a previous case, will be presented. In an essence, the *Clinical Corner* will serve as a weekly grand round for all WAVMA members. Members also recommended that, while WAVMA maintains its focus on aquarium fish medicine, an equal emphasis on

marine mammals, aquaculture, and fishery conservation medicine is urgently needed. I can assure you that the WAVMA EB and committees are working hard to meet the membership's rising needs and expectations in an expedited way. Please do not hesitate to send us any suggestions or feedback to improve our performance and meet your expectations.

As WAVMA continues to serve you and expands its programs, I call on each of you to grasp the moment and join the efforts by volunteering to serve as a committee member, an EB member, a contributor or a reviewer to *The Aquatic Veterinarian* or the *Clinical Corner*, or by simply enriching discussions on the Listserv.

Wish you all a productive fall,

Mohamed Faisal

Mohamed Faisal, DVM, PhD. Doc. Honoris Causa
WAVMA Certified Aquatic Veterinarian (CertAqV)
2013 WAVMA President
SF Snieszko Endowed Scholar and Professor of
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President Faisal addressing members during the WAVMA dinner at the AVMA Convention in Chicago. Dr. Victoria Grant enjoys the meal and the meeting.



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Secretary's Report

How to describe events at Prague and our AGM? Personally I think this was the most exciting week for aquatic veterinary medicine globally for years. It actually felt that the worldwide veterinary profession has finally realized the importance of aquaculture. But before writing about what happened, there are some official notifications to give.

The result of the election for the WAVMA Executive Board was:

President Elect **Chris Walster**

WAVMA Secretary **Devon Dublin**

WAVMA Treasurer **Nick Saint-Erne**

Directors at Large **Lydia Brown & Rob Jones**

Congratulations to the successful candidates who will take over these positions from the 1st January 2014. What was most impressive was the increased member involvement with over 40% of the membership voting. I hope this percentage will increase further in future years. Even when there is only one candidate per position standing for election, by voting, you have the opportunity to endorse that candidate or register your disapproval.

The second notification is the public announcement of the WAVMA Certified Aquatic Veterinarian program. The Credentialing Committee has worked hard on finalizing this for much of this year determining what knowledge, skills and experience are required and how to evaluate them, the necessary paperwork, and the design of the certificate to be awarded. Over the summer members of the committee went through the process to optimize it and form the initial cadre of mentors. The program is now open to all WAVMA members and further details will be uploaded to the WAVMA website as soon as practicable. By completing the program, members will be able to demonstrate their competence in aquatic veterinary medicine to their clients and peers. The program can be started whilst still a veterinary student and is designed to appeal to busy practitioners.

Congratulations to the following veterinarians who have been awarded the CertAqV:

Dr Brian Palmeiro (USA)

Dr Chris Walster (UK)

Dr Colin Johnston (New Zealand)

Dr David Scarfe (USA)

Dr Devon Dublin (Japan)

Dr Dusan Palic (Germany)

Dr Julius Tepper (USA)

Dr Mohamed Faisal (USA)

Dr Nick Saint-Erne (USA)

Dr Richmond Loh (Australia)

Dr Tim Miller-Morgan (USA)

Between them every area of aquatic veterinary medicine is covered as well as providing "local" support for all aquaculture areas.

The third notification is the election of three new WAVMA Distinguished Fellows. Ten nominations for appointment as a 2013 WAVMA Distinguished Fellow were received by the WAVMA Parliamentarian and were forwarded to the Fellows Advisory Council (FAC). Although all ten candidates had substantial or outstanding merit in terms of contributions both to aquatic animal medicine and WAVMA, the FAC had the very difficult task of determining the top three candidates to recommend for approval by the Executive Board as WAVMA Fellows, in keeping with the Council's policy to recommend appointment of no more than three nominees in any year. The Executive Board was asked and agreed to appoint the following veterinarians as 2013 WAVMA Distinguished Fellows:

Dr. Dusan Palic

Dr. Grace Karreman

Dr. Marian McLoughlin

Congratulations to the three of you!

The FAC also stated it would like to congratulate the three successful candidates, as well as the other nominees. It commented that, "Distinguishing among such high caliber individuals was not easy; and the difficulty of the FAC's deliberations indicated the level of excellence demonstrated by all the nominees. All ten nominees can be justifiably proud of their achievements in aquatic veterinary medicine. Those nominees who were not forwarded in 2013 to the Executive Board for consideration as Fellows will be automatically rolled over for additional consideration in 2014."

For those of you wondering what the Fellows do, they are a group of WAVMA members who have significantly contributed to the development of Aquatic Veterinary Medicine either through practice, research, academic achievement or contributions to WAVMA, with a remit to promote WAVMA, act as a "think-tank" and as a learned society. Any WAVMA member is eligible to become a Distinguished Fellow on submission of an application and following consideration by the FAC (see www.wavma.org/WAVMA-Fellows).

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The Annual General Meeting was held at the Glasshouse of the Villa Richter, which turned out to be a superb venue with lovely views over the old city of Prague, coupled with excellent food, drink and company. I would like to thank Dr Tepper for arranging this. As well as WAVMA members, several invited dignitaries also attended and demonstrated the importance attached to aquatic animal medicine. The guests included the President of WSAVA and the Treasurer of WSAVA, colleagues from WSPA, the Dean and the Head of the Aquatics department of the Norwegian Veterinary School, amongst others. It is by meeting and talking to these individuals that WAVMA is able to promote the discipline of aquatic veterinary medicine around the world and to as wide of an audience as possible. Aquatic veterinary medicine is the fastest developing veterinary discipline and it is through these efforts and the contribution made by all WAVMA members that it continues to develop.

So what was so good about Prague? Not only did we gain several new members, but the WAVMA talks were attended by a diverse group from representatives of OIE and FAO, veterinarians and non-vets, with some colleagues travelling from as far afield as Thailand. WAVMA was able to promote aquatic veterinary medicine to a global group of veterinarians through participation in the animal welfare seminar.

Through networking, meetings were held with representatives of WVA, WSAVA, FAVA, WSPA, OIE and FAO. The results of this included preliminary talks on an aquatics stream at the WVC 2015 in Istanbul, the support of WVA and FVE on the development of an aquatic animal welfare symposium either in late 2014 or early 2015, the inclusion of an aquatics stream in the 2014 FAVA conference in Singapore and further development of the International Aquaculture Veterinary Biosecurity Consortium with workshops planned in Adelaide and Munich during 2014. Look out for further announcements either through the WAVMA members listserv, AquaVetMed (www.aquavetmed.info) or IAVBC (www.cfsph.iastate.edu/IICAB/IABC/). Additionally several veterinary students who attended were able to gain valuable guidance on how to develop their passion for aquatic veterinary medicine.

Ignoring the benefits of being able to communicate and network with some of the leading members of the aquatic veterinary community, I have always believed that the cost of WAVMA membership produces a "significant return on investment" of

several hundred dollars per year. This return is set to get even better as WAVMA's educational programs develop further, with some major improvements in delivery coming on-line at the start of next year of which more in the next Secretary's report. Hopefully in the next month or two you will see additional pages added to the WAVMA website called *Clinical Corner*. Here you will find case presentations as well as the ability to publish your own material for review by colleagues. This service has been made available through the kind sponsorship of an anonymous donor. I would like to thank this donor formally for the benefits they will provide us.

We now have five WAVMA Student Chapters either formed or in the process of forming – Tuskegee University, University of Tennessee, University of Prince Edward Island, University of Wisconsin and University of Florida. Student chapters bring several benefits with a few responsibilities and it would be nice to see more form and also in other parts of the world, not just North America. The benefits include partial refunding of membership fees to help promote student activities, support and assistance on selecting topics and speakers for meetings, as well as looking good on your CV should you wish to apply for a WAVMA scholarship. Further details as ever are available from the website www.wavma.org.

I usually finish with a plea for more members to get actively involved. WAVMA is your association and can only fulfill its Mission Statement through the contributions of all members whether in time or money. Developing and introducing new member benefits and programs does not happen without a lot of effort and those who actively promote and develop WAVMA are all volunteers. The Executive Board also needs feedback to tell whether WAVMA is developing in the direction members wish. Delays in the introduction of new benefits invariably are due to the limited time active members can devote to WAVMA. In my opinion, several programs that are near completion could have been finished and available to the membership if more people would step forward. By working together we can do so much more than working as individuals or being "passive consumers". If you have any ideas or comments please email me or make it public and suggest it on the member's listserv.

Chris Walster, BVMS, MVPH, CertAqV
WAVMA Secretary
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COMMITTEE REPORTS

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Meetings Committee Report AVMA Convention – Chicago By Julius M. Tepper, Chair

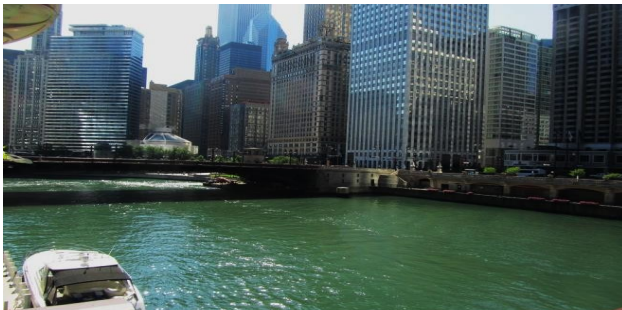
A trip to Chicago in July for the AVMA Convention is a memorable event. Thousands of veterinarians, techs, exhibitors and their families and support staff all converge on the Convention Center. Find the registration area, get your docs then pop into the exhibit hall to walk the rows of all manner of veterinary products and paraphernalia. It can seem almost circus-like to the first-time attendee. Catch your correct bus and settle into your hotel room, grab a bite to eat and prepare for the morning sessions. Relax.

Up at the crack of dawn on Day One. No time for breakfast, Nick Saint-Erne is presenting the first lecture at 7:00 AM, really early, they usually start at 8:00 AM. No biggie, grab a Starbucks on the way to the lecture room. Check the layout map, no surprise, the aquatic medicine room is at the farthest reaches of the complex that is the Convention Center building. Sit, sip, listen, learn.

It was great to see many of my fellow WAVMA friends again. Part of the appeal of going to these meetings is to gain new knowledge of aquatic diseases, learn new techniques and gain some insight on current issues in our veterinary specialty. But also it's very satisfying to meet with old and new colleagues socially. This conference didn't disappoint.

Chicago, as far as modern cities go, has to be right up there with the best of them. As a native New Yorker, I naturally compare every other big city against a backdrop of noise, traffic and a certain ceaseless energy that characterizes the Big Apple.

I found Chicago to be cleaner, neater, more sparkling white. Perhaps it was all the concrete roads instead of the pock-marked asphalt I'm used to seeing in New York. Even the older sections of the city had a certain antique patina.



The downtown riverwalk was pretty nice, especially at night when it was alive with people, boats and street performers. As the "group" walked to a restaurant one early evening, we were assailed with the sound of two helicopter gunships racing above the water between the skyscrapers. The reverberating sound was startling. Later we found out a movie company was filming a scene for a new Channing Tatum movie.



Along with the five full days of scientific programs, we also ran an aquatic wetlab at the Shedd Aquarium. This allowed participants the opportunity to work with several fish species. This was a terrific environment to get one's "feet wet" in aquatic practice.

With excellent staff, instructors, equipment and cleanup materials on hand, participants got the "total emersion" (I couldn't resist...) into active aquatic medicine practice.



Afterwards, Dr. Caryn Poll gave us a behind the scenes tour of the Shedd. A great afternoon.

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Monday night we all converged on the Hyatt Regency Hotel for our Meet and Greet Dinner Reception. It was a pleasure to see my friends Bill and Anna Van Bonn again, after his tenure at the Marine Mammal Center in California. Bill and I worked together on the Executive Board of IAAAM and he is also a founding member of WAVMA. His new position is vice-president of animal health at Shedd Aquarium. His knowledge and opinions about the needs of our profession and specialty were a welcome addition to the lively discussion chaired by our President Mohamed Faisal. Other participants graded the Executive Board on our year's performance and helped guide us into next year. And the food was on a par with any 5-star restaurant.

So how can you leave Chicago without trying deep-dish pizza. You can't. So we hit Giordano's the next night, a local favorite.



The beer flowed copiously, and when the pizza finally arrived, it was all that was promised. Almost as good as New York pizza, but I might just be biased...



Special thanks to Dr Caryn Poll for hosting our AVMA wet-lab at the Shedd Aquarium!

Dr. Caryn P. Poll is a Senior Staff Veterinarian at the John G. Shedd Aquarium in Chicago, IL where she has been for the past 10 years. Prior to working at the Shedd, she completed an internship in aquatic animal medicine at the National Aquarium in Baltimore and one in small animal surgery and medicine at Cornell University, where she also completed her DVM and BS degrees. She is active with the Alliance of Marine Mammal Parks and Aquariums as their invited representative to the AVMA's Aquatic Veterinary Medicine Committee and as a member of the Alliance's Veterinary Advisory Committee. She has been involved in marine research since the 1980s, on projects ranging from walrus visual acuity and dolphin cognition to analysis of benthic mud cores and plankton tows. She greatly enjoys mixing her love of aquatics and medicine in her profession as an aquatic veterinarian.



Caryn P. Poll, DVM
Senior Staff Veterinarian
A. Watson Armour III Center for Animal Health
John G. Shedd Aquarium

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Report on the Annual General Meeting Prague, Czech Republic

This year's AGM was held at the Glasshouse of the Villa Richter, Prague during the World Veterinary Congress. The venue was superb with views over the old town of Prague coupled with excellent company and refreshment. Dr. Julius Tepper, Chair of the Meetings Committee had done an excellent job in organizing the venue.

WAVMA President, Dr. Mohamed Faisal commenced the formal part of the proceedings announcing the results of the 2014 Executive Board elections and the election of three new WAVMA Distinguished Fellows (Full results can be found in the Secretary's Report on page 6).

Before passing the floor over to the 2014 President, Dr. Richmond Loh, Dr. Faisal asked everyone present from new and old members of WAVMA to representatives of the World Small Animal Veterinary Association (WSAVA), the Federation of Asian Veterinary Associations (FAVA), the World Society for the Protection of Animals (WSPA), the World Animal Health Organization (OIE) and the Food and Agricultural Organization of the UN (FAO) what they wanted from WAVMA. Whilst the opinions expressed were diverse they can be summed up in that they wished WAVMA to succeed in its Mission Statement. Dr. Faisal directed the proceedings in a very entertaining and inclusive way which will have left everyone with fond memories of the event and a few chuckles.

Dr. Loh, 2014 WAVMA President, then talked about what he hoped to accomplish during his presidential year. He began by stating that WAVMA stood for excellence, was global, multidisciplinary and intergenerational, connecting veterinarians through space and time. That through the work of many volunteers WAVMA had created awareness of aquatic veterinary medicine to colleagues and the public and provided tools such as *The Aquatic Veterinarian*, Web CEPD and the members' listserv, allowing members to reach out and connect to anyone willing to share their wisdom and providing learning tools for any veterinarian interested in aquatic veterinary medicine.

Dr. Loh then posed two questions; What does being a WAVMA member mean to you and how relevant is WAVMA in meeting your needs and daily challenges? In answer, Dr. Loh believed that WAVMA not only needed to increase the awareness of aquatic veterinarians but also to change client perceptions of our area of expertise. And that



Dr Richmond
Loh and
Dr Laura Urdes

by doing these things we can really grow the World Aquatic Veterinary Medical Association.

As such, the three areas he will concentrate on next year are:

Relevance: to satisfy the needs and wants of its members, through support, CEPD, recognition of work experience.

Pre-eminence: about growing the WAVMA brand within our profession and outside the profession.

Reach: is about the beneficial effects of our organization, which is limitless.

To achieve this, Dr. Loh would like more people to come forward and keep WAVMA ahead of the game through recruiting people with a variety of experiences to compliment the strengths WAVMA already has. "WAVMA believes in supporting you in your journey as an aquatic veterinarian. Help us to help you, in investing in experience and engage in lifelong learning".

Dr. Loh finished by stating, "I'm so excited about the road ahead because we are sitting on a gold mine of practical experiences which are not taught at University or at any other educational institution. This gold mine is you, our members. I'd like to finish by paraphrasing what our current President said in an email – You are a role model for every veterinarian, not just aquatic veterinarians and I am proud to be a part of this great organization that has you in our membership."

For more information go to <http://www.wavma.org>.



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The WAVMA and WVC co-organized the Aquatic Veterinary Medicine session in Prague during the Congress that also marks 150 years of the World Veterinary Association. WAVMA is the associate member of the WVA, representing aquatic veterinary medicine worldwide. The speakers at the Aquatic Veterinary Medicine sessions were:

Prof. Dr. Dušan Palić, D.V.M., MVSc, Ph.D.
Chair for Fish Diseases and Fisheries Biology
Faculty of Veterinary Medicine, Ludwig-Maximilians-Universität München

Prof. Dr. A. David Scarfe, Ph.D., D.V.M., MRSSAF
Assistant Director, Scientific Division, American Veterinary Medical Association

Christopher I. Walster, BVMS MvPH MRCVS
The Island Veterinary Associates Ltd

Prof. Dr. Mohamed Faisal, DVM, PhD, Dr. Honoris causa
President, World Aquatic Veterinary Medical Association (WAVMA)
College of Veterinary Medicine,
Michigan State University

Dr Rohana Subasinghe,
Senior Fishery Resource Officer (Aquaculture)
Food and Agriculture Organization of United Nations (FAO)

Dr Gillian E. Mylrea
Deputy Head, International Trade Department
World Organization for Animal Health (OIE)

Dr Laura Daniela Urdeş, D.V.M., Ph.D.
Senior Lecturer, University of Agricultural Sciences and Veterinary Medicine Bucharest



President Mohamed Faisal presenting the Certified Aquatic Veterinarian certificate to Dr Julius Tepper at the Annual General Meeting.

Dr Richmond Loh, BSc, BVMS, MPhil
(Pathology), MANZCVS (Aquatics and Pathobiology)
President-Elect, WAVMA
The Fish Vet

Julius Tepper, DMV
Past-President (WAVMA)
Long Island Fish Hospital

Far Left: Fish Vets at dinner

Left:: Speakers at the WVC aquatic lectures.

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2013 WAVMA/AVMF/AVMA Aquatic Scholarship Awardee Reports

Exploring One Health through an Aquatic Veterinary Scholarship

Kyle Donnelly - 2014 Candidate University of Florida, College of Veterinary Medicine

The One Health concept colored my aquatic externships throughout this summer, and I hope these experiences set the precedent for my future in aquatic medicine as well. Thanks to the funding I received through the AVMF and WAVMA, I explored One Health in a variety of facilities, including the UF Aquatic Pathobiology Lab, the NOAA Beaufort Lab, and Mystic Aquarium.

Within the Aquatic Pathobiology lab at the University of Florida, I used molecular diagnostics to explore the identities of pathogens in immunosuppressed sea turtles. My specific goals were characterizing mycobacterial and dematiaceous fungal species in order to learn more about these disease processes. Important pathogens such as these may represent larger themes, such as an indication poor ecosystem health.

I shifted my focus from the microscopic to a macroscopic scale during my time at NOAA's Beaufort Lab. The population estimate of bottlenose dolphins off the coast of North Carolina was expiring, so I participated in the current survey. This type of research is the starting point for how this important marine resource is conserved. I helped with the mark-recapture methods and got some fun fieldwork time in. Boat launch time was several hours before dawn, and I learned that the North Carolina marsh at sunrise is worth the early wakeup call.

The last facility I spent time with was Mystic Aquarium. This aquarium impressed me with the scope upon which it operated. A population health assessment of wild common snapping turtles was underway during my time there, and I performed physical exams, collected blood, external parasites, and toenails for toxicology studies. This study was particularly interesting to me because of its One Health components. I learned that common snapping turtles have high site fidelity, and so evaluating the comparative health among individual turtles might reflect the health of the ponds and lakes they came from.

Another aspect of Mystic Aquarium I valued was the rescue, rehabilitation, and release program that

operated within the aquarium. I have a large interest in the wildlife and conservation aspect of aquatic medicine and this is the area I have the most background in. The difference, however, was that this was my first pinniped experience, and I got practice performing physical exams, drawing blood, interpreting lab results, and making treatment plans for the current seal pup patients.

Aside from the One Health focus that permeated my summer, I got experience with traditional medicine on the collection animals at Mystic Aquarium as well. The preventative care and patient follow-up is something wildlife medicine does not offer, so my time in this area was a valuable adjunct to my current background in aquatics.

This summer was made possible in part by funding from the AVMF and WAVMA, so I thank you for your support.

Help Give Veterinary Students & New Veterinarians the Opportunity to Experience Aquatic Veterinary Medicine.

Support the Aquatic Veterinary Scholarship Program with a Tax-Deductible Charitable Donation.

Every bit helps – \$10, or as much as you can afford!

Go to:

[www.AVMF.org](http://www.avmf.org) and then click on

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American Veterinary Medical Foundation

THE AQUATIC VETERINARIAN

Volume 7, Number 3

AUTHOR'S INSTRUCTIONS

Third Quarter 2013

Instructions for Authors and Contributors

While any information relevant to aquatic veterinary medicine might be published, we particularly invite contributions for the following regular columns in *THE AQUATIC VETERINARIAN*:

Colleague's Connection

An article explaining why and how a veterinarian became interested in aquatic veterinary medicine and what that veterinarian has done in their aquatic veterinary career.

Peer-Reviewed Articles

Original research or review of any aquatic veterinary topic. Articles will be reviewed by 3 veterinarians and comments and changes referred back to the author prior to publication. The text for an article begins with an introductory section and then is organized under the following headings:

- Materials and Methods
- Results
- Discussion (conclusions and clinical relevance)
- References (cited in the text by superscript numbers in order of citation).

Clinical Cases

Clear description of a distinct clinical case or situation and how it was resolved. These may be submitted for peer-review. Begin with the signalment (species, age, sex, body weight or length) of the animal or animals, followed by a chronologic description of pertinent aspects of the diagnostic examination, treatment, and outcome, and end with a brief discussion.

Book Reviews

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

Publication Abstracts

Abstracts of published veterinary and scientific journals with full citation/reference (authors, date, title, and journal volume and page numbers – ½-1 page).

News

Brief synopsis or information about aquatic veterinary news published elsewhere. List original source of information.

Legislative & Regulatory Issues

Synopsis or description of emerging legislation or regulations with information on how to access further detailed information or a link to website.

Meetings and Continuing Education and Professional Development (CE&PD) Opportunities

Description or synopsis of upcoming aquatic veterinary or (veterinarian-relevant) non-veterinary in-person or on-line educational meetings noting the meeting title, dates, location, and contact person or website.

Jobs, Internships, Externships or Residencies

Description with specific contact information for veterinary student externships and post-graduate internships or residencies at private practices, institutions, universities or organizations. Description of available full or part-time employment for aquatic veterinarians, with contact information.

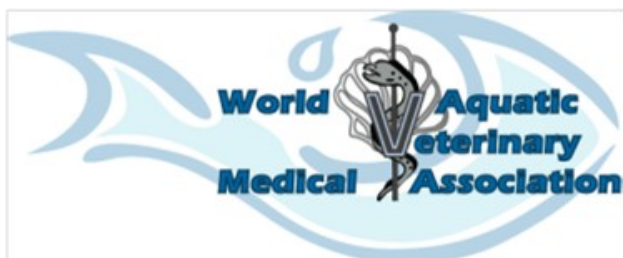
Please send articles, clinical reports, or news items to the editor by the following submission dates:

- Issue 1 – February 15 (published in March)
- Issue 2 – May 15 (published in June)
- Issue 3 – August 15 (published in September)
- Issue 4 – November 15 (published in December)

All submissions should be in 10-point Arial font, single spaced. Submissions may be edited to fit the space available.

We can also use editors to proof-read submissions or review articles. Please contact the Editor if you are interested in assisting.

The World Aquatic Veterinary Medical Association also has opportunities for members to assist with committees. Contact any member of the Executive Board to volunteer to help.



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Getting Involved in Aquatic Veterinary Medicine Meet our President-Elect: Richmond Loh An interview by Peter Werkman

1. Since when and how did you get involved in aquaculture?

I have always been interested in fish since childhood. I used to pester my father and uncles to take me to catch fish in nearby ponds, lakes, streams, rivers or beach. My eldest brother was the one got me interested in fish keeping.

The majority of the veterinary fraternity are not really on board in the field of aquatics and so, going through Murdoch University, it did not occur to me that veterinarians could involve themselves with fish. My parasitology lecturer gave a presentation on diseases of yabbies and marron (freshwater lobsters) in our 3rd year. When I told him how interesting I found that class, in retrospect, he might have thought I was being sarcastic! Since that lecture, it started me on a path towards finding a way to work with fish. I was fortunate enough to have another 'fish-freak' classmate and together with some supportive lecturers, we were able to establish the first, 3-week, Final Year Aquatic Special Topic to be run in 2001. With the yearly small percentage of interested students, this continued to be run for another 10 more years.

Unfortunately, due to the restructuring of the way things were taught, the Special Topics options were discontinued. Fortunately, aquatic animal health is being covered within courses such as Zoo/Wildlife, Animal Ethics and Parasitology. I am hoping that aquatics can be incorporated in other subjects such as Anaesthesia, Pharmacology, Surgery, Animal Production and others.

I was lucky to land my first job as a veterinary fish pathologist intern at the Tasmanian State Animal Health Laboratories. This, to me, was the brains trust of Aquatic Animal Health experts. Its location also allowed me access to the University of Tasmania's Aquaculture Lectures. There I learnt fish histopathology, aquaculture systems and more. I have always had a passion for ornamental fishes and I started treating ornamental fish on a professional basis, making house calls to pet fish owners and fish shops. I started in a small way with the generous help of colleagues at Launceston Veterinary Clinic.

I am also a keen photographer (but more like the "tourist" point & shoot type rather than a pro) and so I documented every fish case I had. This set me up well because I was then able to present materials at conferences and build networks.

2. What education, courses, et cetera did you attend to obtain your aquaculture knowledge?

Initially, I pretty much learnt on the job. I started with piles of oyster histology slides and then graduating to abalone, salmonids and a variety of other fishes. During the non-busy periods, and with the permission of my employer and the lecturers at the University of Tasmania, I sat in on their lectures and purchased course notes for self-study. I was that enthusiastic! I attended several other conferences around Australia.

I benefited a great deal from my colleagues who are some of the nation's experts on veterinary fish health and pathology. With their support and encouragement, in 2006, I sat and passed the Australian and New Zealand College of Veterinary Scientists (ANZCVS) Membership Examinations in Aquatic Animal Health. Studying for exams enabled me to learn more things and in greater depth. More recently, I attended Aquavet II and Seavet in the USA. These recent courses were made possible through the Australian Fisheries Research and Development Corporation and through the International Specialised Skills Institute which were awarded on a competitive basis. I have a great appetite for knowledge and whenever I come across courses, I take note of them. These are now being blogged on my website at thefishvet.com.

More recently, I moved to Western Australia to gain employment as a veterinary pathologist. This was a conscious step to get a better foundation with comparative pathology in order to advance myself in the aquatic field. In 2009, I passed my Membership Examinations in Pathobiology conducted by the ANZCVS. My next challenge is to work towards ANZCVS Fellowship in either or both "Aquatic Animal Health" and "Pathology," as Fellowship is somewhat considered equivalent to being Board Certified in other countries.

But I think an enormous array of knowledge, facts and information that I have gathered have been the real life experiences from my clients. They include the individual pet fish owners to koi experts, retailers who have been in the game for decades, breeders, public aquarium curators and aquaculturists.

3. What kind of aquaculture are you involved in? Foodfish, petfish, others? Full-time, part-time? Can you make a living out of it?

I work full-time as a veterinary pathologist. In addition, I work part-time as a private veterinarian,

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dealing with a wide range of clients: individual pet fish owners, aquarium retailers, ornamental fish wholesalers, breeders, public aquaria, aquaculturists and at educational institutions. I provide advice to several bodies including the Department of Fisheries and the RSPCA.

It is not easy to go full-time on aquatics unless you are willing to travel on a regular basis and if you work with aquaculture fish. However, there are few aquaculture operations near where I am, and with a young family, it is more difficult to be mobile.

4. How are you professionally involved now? Teaching, industry, practice, other?

There are a number of aquatic veterinary activities I continue with, not only to further my own experience and skills, but to help move aquatic veterinary medicine forward. I'll continue my private practice, teaching, and web activities, and be active in a number of WAVMA and other activities. These include the WAVMA Executive Board (2013-2015 as President-elect, President and then immediate Past-President) and serving on WAVMA's Communications, Meetings and Education Committees, serving as Secretary and Treasurer of the Aquatic Animal Health Chapter of the ANZCVS and as an Adjunct Lecturer at Murdoch University.

5. Which aquaculture experience has made an impression on you, that you will share with us?

During the years, I've received calls from 'stranded' veterinary colleagues from around the country needing help with their fish cases. Australia is a vast country with different time zones and sometimes I get calls at 4 or 5 in the morning. I saw the need for reliable information to be made available to veterinarians, and that's why I have formalised all the practical bits of information I have

learned into two books namely, "Fish Vetting Essentials" and "Fish Vetting Medicines – Formulary of Fish Treatments". I don't expect these to make me wealthy, but it will definitely allow me some uninterrupted sleep!

6. Should every veterinary practitioner have some basic knowledge about aquaculture? What knowledge should that be? (first aid, how to euthanize a fish, other?)

Many aquarists have access to most drugs (including some antibiotics) over the counter at the aquarium store. Often, many veterinary practitioners' initiation to fish vetting is when clients ring them to dispense the prescription-only drug, metronidazole. This is the drug of choice to treat intestinal flagellates. It helps for veterinarians to know about the multifactorial causes of hole-in-the-head disease and bloat.

Two years ago, I started a blog (thefishvet.com) in an effort to garner any new and relevant information related to aquatic animal health, and to lay them out in an accessible way. It is a resource that I can very quickly point colleagues and clients to for information I have come across. It is also a useful way of bringing important matters (e.g. endocrine disrupting chemicals, education opportunities, the potential release of KHV and more) to the attention of its readers, which consist of veterinarians, aquaculturists and hobbyists. To reach more readers, it is also publicised on LinkedIn, Twitter and Facebook.

More recently, I realised that the best way to teach someone is not just from texts and pictures, but also by demonstration. This is why I started a YouTube channel (youtube.com/thefishvetdroh), with the most useful videos (e.g. performing gill biopsy and skin mucus scrape) mirrored on my website (thefishvet.com.au). I am also at the final stages of formalising this information into an instructional DVD. Stay tuned!

7. What suggestions can you give to new aquaculture veterinarians or veterinary students?

There are many areas in the field of aquatics, so don't be dismayed and think that you might only want to do one thing. In terms of animal groups covered, they include marine mammals, ornamental fish, food fish, mollusc, crustacean, reptiles and amphibia. In terms of roles, they include private consultancy (aquaculture & ornamental fields), academia (research, teaching, extension), commercial companies (drug development, commercial aqua-

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culture, nutrition), government regulatory agencies and public aquaria. Research roles or technical roles tend to be associated with larger employers such as educational or government sectors.

If you wish to work as a fish veterinary clinician, please go to my Facebook album entitled "Tools of the Trade" (or <http://tinyurl.com/fishvettingtools>) so that you can see what items/books/tools you need to get started. I've also blogged about "how to get a foot in the door", at this link (<http://thefishvet.com/2013/05/08/key-steps-in-how-to-become-a-fish-veterinarian/>).

I strongly encourage you to join the World Aquatic Veterinary Medical Association (<http://www.wavma.org>) if you are not already a member. I can vouch that it is the best network and resource you can ever have for aquatic veterinary activities. The website has a library of useful links and past editions of newsletters/journals.

Another resource that helps veterinarians, veterinary students and veterinary technicians/nurses get connected to clients and get information is to register in the free online Aquatic Veterinary Directory and subscribe to AquaVetMed e-News – simply go to www.AquaVetMed.info, click on "New Vet Signup" and be sure to tick the option to subscribe to e-News. The Directory is global and clients will know how to find you if you tick the option to have you contact information searchable. AquaVetMed e-News distributes information on a wide number of aquatic veterinary issues - from jobs and meetings, to disease outbreaks and regulations. The directory is global and you can add your profile or see if you can hook up with someone who is close by.

Dr Richmond Loh

DipProjMgt, BSc, BVMS, MPhil (Pathology) Murdoch, MANZCVS (Aquatics & Pathobiology).

Cert AqVet

[The Fish Vet](http://www.thefishvet.com), Perth, Western Australia, AUSTRALIA.

Mobile Veterinary Medical & Diagnostic Services for fish and other aquatic creatures.

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

Ph: +61 (0)421 822 383

The Fish Vet



[Before (above) and after (below) photos of Dr. Loh's amazing power of healing!??]



DO YOU HAVE A STORY TO TELL ABOUT HOW YOU BECAME INVOLVED WITH AQUATIC VETERINARY MEDICINE?

Send your article (<1,000 words) with pictures to AVNeditor@wavma.org.

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The Seavet Course at the University of Florida By Richmond Loh

I was lucky enough to attend Seavet Clinical Medicine Course last June at the University of Florida, Gainesville Campus. It is geared to veterinary students and veterinarians interested in learning about aquatic animals. I found the course very practical from a clinical perspective. Many things, whilst known, have not been documented or officially published. Material presented at Seavet is based on the experiences of colleagues. It was beneficial to learn not only about the successes, but also about what did not work. These are the key reasons for attending such workshops and conferences.

The speakers emphasised a shift from memorising facts to learning, for the sake of your clients' health. They stated that many people make decisions based on the choices they know, and commented that sometimes it is essential to challenge these. Everyone progresses by working together toward a common goal.

Animal groups covered include display and wild, bony fishes, rays, sharks, sea turtles, penguins, pinnipeds, cetaceans and manatees. It was heavily lecture-based, which is good for learning a lot in a limited period of time. All the information given was very practical and useful, dealing with diseases, diagnosis, treatment (including drug dosage rates), management options, rehabilitation and strandings. There were 3 practical/lab sessions to Lowry Park, Clearwater Marine Aquarium, and a behind the scenes special tour and swim program at MarineLand designed to introduce the student to husbandry, behaviour and medicine of cetaceans.

I've included some pictures from our adventures.



This fact-finding trip was made possible through the George Alexander Foundation International Fellowship awarded to me, on a competitive basis, by the International Specialised Skills Institute.

Details of my full trip, including the visitation of several other premises (Department of Agriculture in Hawaii, the University of Hawaii at Hilo, an aquaponics conference in Honolulu, and several aquaculture farms, ornamental fish farms and the University of Florida's Tropical Aquaculture Laboratory in Ruskin, Florida), will be formalised in a Fellowship Report. Details will become available when it is finalised.



More pictures can be found at:
<http://tinyurl.com/seavet>.

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REVIEW PAPERS

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Salmon Poisoning Disease in Dogs

[Reproduced from the Oregon Veterinary Medical Association, with permission]

Salmon poisoning disease is a potentially fatal condition seen in dogs who have ingested certain types of raw fish found in the US Pacific Northwest – from San Francisco to the coast of Alaska. It is most prevalent from northern California to the Puget Sound. It is also seen inland along the rivers of fish migration.

Fish That May Be Infected

Salmon, trout, and other fish such as the lamprey, sculpin, redbreast shiner, shad, sturgeon, candefish and the large-scale sucker that spend their lives in coastal streams and rivers in the Pacific Northwest can be infected with the etiologic organism *Neorickettsia helminthoeca*.

Life Cycle

The rickettsial organism *Neorickettsia helminthoeca* infects the trematode fluke, *Nanophyetus salmincola*, which is embedded within raw fish. Once in the dog's intestinal tract, the larval flukes excyst and release the rickettsiae. The rickettsial organisms then hematogenously spread to the dog's liver, lungs, brain, and lymphoid tissues causing necrosis, hemorrhage, and hyperplasia.

The life cycle begins when the eggs of the fluke *Nanophyetus salmincola* are released in the feces of the host mammal or avian. Those eggs may find their way into a freshwater snail, *Oxytrema sillicula*, found only in coastal streams and rivers. Inside the snail these forms reproduce many times and then leave to enter fish tissues, which if eaten, can cause illness in canines.

Symptoms to Watch For

If not treated, salmon poisoning disease in dogs is usually fatal within 2 weeks after exposure. The symptoms of salmon poisoning disease are similar to other gastrointestinal diseases such as canine parvovirus. If infected, the dog would likely show some or all of the following symptoms about 6 to 10 days after ingesting raw fish that was carrying the bacteria.

Symptoms may be of variable severity but generally consist of:

- Fever, often greater than 104 F
- Depression

- Anorexia
- Vomiting
- Diarrhea
- Nasal or eye discharge
- Weight loss



Salmon poisoning in a Beagle – the attending veterinarian should check for enlarged lymph nodes and weight loss.

Diagnosis & Treatment

Clients should be cautioned that if their dog has ingested raw fish and it exhibits any of the symptoms listed above, that they should contact their veterinarian immediately. If identified in time, salmon poisoning disease is treatable. Dogs that roam and raid trash cans may be more prone to consuming infected discarded fish.

The disease is diagnosed with analysis of a fecal sample to detect the trematode parasite's eggs or by detecting the bacteria through a needle aspirate sample from a swollen lymph node. Treatment involves administration of an antibiotic to kill the bacteria and a de-wormer (Praziquantel, 20 mg/kg BW, TID) to kill the parasite. If a dog is vomiting at the time of evaluation, it may need to be hospitalized for IV fluid administration. Many dogs respond to treatment quickly, showing improvement in just a few days. Once recovered, many dogs have a permanent immunity to the disease.

Prevention – the best cure

- Control what the dog eats while on fishing trips.
- Keep dogs on a leash at the beach or river so that you can monitor its activities.
- Wrap garbage, especially fish entrails, and dispose in well-secured cans.
- Don't feed raw fish to your dog. Cook fish thoroughly or deep-freeze it for a minimum of 2 weeks to destroy the parasite before feeding it to your dog.

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CLINICAL REPORTS

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Non-chemical solution to water particulate problem causing gill disease By Myron Kebus

This case involves a trout farm. To meet their goal of increasing production, they needed to hatch more eggs and raise more fry (very young fish) and fingerlings using the existing concrete rearing tanks. They were stocking more fish, feeding more feed, and all was going well until the fish went off feed (decreased their feed consumption) and started to die. When they were ill, the fish preferred to swim near the surface and cluster at the sides and tail end of the tanks. The cumulative mortality rates rose to approximately 50%.

The facility had a history of pushing the rearing densities of the tanks, resulting in the young fish developing bacterial gill disease. They attempted to treat these fish with Chloramine-T, salt and formalin, treatments that had worked in the past. None of the treatments lead to satisfactory results.

Trout Gill Disease



Gross and microscopic view of trout gills

I visited the farm to determine the cause of the problem. I leaned over the edge of the tank, put my face near the surface of the water and carefully observed the fish and water move by.

What I saw was trout that varied considerably in size. They were generally emaciated with flared gills and - very importantly - many suspended particles of uneaten feed and fecal matter were visible in the water column. I felt that the levels of suspended solids were so high that they were physically irritating the gills, leading to gill disease. The trout with gill disease were the ones that lost their appetites and lost the ability to continue to grow.

By the way, I checked the primary water quality parameters and they were unremarkable.

My recommendation was to put baffles in the tanks. The farmer was very good at designing and building these baffles, as seen in photo below. The baffles cause the water to move more quickly through the tank, ridding the water column of suspended solids more efficiently. Within a week mortality dropped, feed consumption increased, and a non-chemical solution to a disease problem was found.

Myron Kebus, MS, DVM
State Fish Health Veterinarian
WDATCP, Division of Animal Health
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Below: Photo of baffles in water suspended from bar above concrete rearing tank.



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GRAND ROUNDS CASES

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Dear all,

A client called me, he has a 600 liter marine tank with fish, corals, sea urchins and now sees white spots on his fish after introducing a crab species. My collaborator is going to check the fish later today.

What could he use to treat the tank without killing off the corals? Does he have to treat the fish in a separate quarantine-tank? What would you recommend to use?

Thanks a lot

Ralph Knüsel, Dr. med. vet.

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Hi Ralph,

I've travelled all over the place to find if there was such a cure that's reef safe. To date, the answers have been a resounding 'no'. However, I came across a product on the shelves of a pet shop during my fellowship trip (to attend Seavet and visit fish farms and experts) that claims to be effective and reef safe.

The product on the shelves of a local pet store is called 'Kordon Ich-Attack 100% Natural Ich Treatment'. It contains naphthoquinone and other herbs. The product description states it is safe for use in all kinds of freshwater and saltwater aquariums, including reef and live-rock marine aquariums and is effective against white spot disease (Ich), other protozoa, amoebae, ciliates and dinoflagellates and safe to use with most aquatic invertebrates, including snails, shrimp and crabs.

Coelenterates (coral, anemones, polyps) may shrivel-up during use, recovering days after treatment. Some specimens that are not in adequate health may not survive treatment. It is non-toxic to humans, pets and aquatic life. More information can be found at <http://www.petsmart.com/product/index.jsp?productId=1106625>

Provide good sustainable, dissolved oxygen and water quality. If they can tolerate, drop salinity by 1-2 g/L to reduce dehydrating effects of the 'pock marks' left behind when the critters pop off the fishes.

Yours sincerely,

Dr Richmond Loh, DipProjMgt, BSc, BVMS, MPhil
(Pathology) Murdoch, MANZCVS
(Aquatics & Pathobiology), CertAqV.
thefishvet@gmail.com

Hello WAVMA,

Has anyone seen research on seaweed extracts on monogenean eggs? I am trying to find an effective treatment for *Neobenedenia* in an aquarium that houses teleosts, elasmobranchs, mollusks, echinoderms, and sponges all on the same system.

The owner is considering the needed separation of species but for now I have a system that needs treatment. Hyposalinity and praziquantel have been recommended but I believe they will both damage the echinoderms and sponges. The small amount of research I have seen on seaweed extracts say that some will prevent the eggs from embryonation but will not kill the adults.

Any other suggestions?

Sherri Kasper, DVM

skvet98@yahoo.com

Hi Sherri,

A very hard parasite to get rid of. A system like yours also is very hard to treat, since multiple species & types of animals (invertebrates & vertebrates). There are also numerous different species of *Neobenedenia*. There are many papers on fish & various treatments tried/used, so do a Google search. Hudson et al. 2012; Militz et al 2013, Mueller et al, 1992; Ellis & watanabe, 1993 etc..

They will need to be treated promptly as Monogenean parasites attach to epidermis & graze on skin mucous & crawl all over the body & infection can lead to severe skin, fin & tail erosion, eye lesions (corneal irritation) often then leading to severe keratitis, cloudy eye & exophthalmoses (often from secondary bacterial infections etc..). Skin also then open to secondary fungal and bacterial pathogens in the water, hence the need to get on top of it quickly.

To treat the fish & sharks I suggest removing fish to a separate tank & moving sharks to another tank if possible & treating in the separate tank systems, since eggs on substrate will embryonate & larvae will emerge seeking out new hosts.

What is the temperature of your water in tank? This will effect embryonation period. Very important to know, since this will dictate your re-treatment intervals. Capsalid Monogeneans continuously lay eggs into the water, so you need to do extended treatments, or re-treatments. Freshwater baths (or some people use formalin baths) are effective for juveniles and adults, but eggs are often resistant. You will need to treat the fish several times.

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Hyposalinity is effective, if fish will tolerate to a low a salinity as you can get (if euryhaline fish, then that helps). 10 days at least for a euryhaline species. That way you will kill all the emerging ciliated larvae before they can actively seek out their new host.

Praziquantel works as a bath at 2-10 mg/L (depending on fish species), for 30-48 hours bath, but do not let water get cloudy, and you will need to re-treat for emerging larvae from eggs (when depends on hatching rates & temp), e.g., at 7 days then at 14 days. Also need to treat filtration system as well for eggs. Oral Prazi is not very palatable to most fish & sharks (regurgitate), but you could try hiding it as Richmond suggests in pellets, inside the fish fed as diet etc...

Dr Kate Hudson is an expert on *Neobenedenia*, did her PhD on it and she & her students are now doing some great research on seaweeds and garlic and other natural, alternative compounds to treat fish (mainly barramundi), at James Cook University, North Qld, Australia email: kate.hudson@jcu.edu.au.

I am not sure if she has treated invertebrates such as in your system, but contact her as I am sure she would be interested in this case & assisting you with various natural compounds/ treatments to try on the invertebrates (if they are infected?). You may have to re-set up a new tank with all your invertebrates, though.

Good luck,

Rachel Bowater

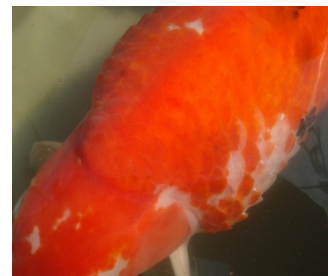
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Hello,

I have a client with a 14" koi that is showing signs of edema in his skin (aka "dropsy") over the cranial half of his body. The caudal half of his body is unaffected. Any thoughts on what this may be?

Dr. Jessie M. Sanders

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Santa Cruz, CA 95061
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<http://AVSNCA.com>



Hi Jessie,

When there is localised oedema, I think of a space occupying mass in their coelom that is preventing proper vascular function.

Yours sincerely,

Dr Richmond Loh

I agree with Richmond. Sometimes you can feel tumor masses in their body cavity. Aspiration with a syringe may show liquid from cysts.

Ralph Knüsel, Dr. med. vet.

Radiographs or ultrasound are good methods to identify if there is an abdominal (coelomic) mass in koi. Many of these can be successfully removed surgically if they are diagnosed early. Gas bladder abnormalities can also cause distension of the abdomen.

Bacterial infections are another differential for the cause of ascites or edema. Microscopic examination of aspirated fluid and a culture and sensitivity test will confirm bacterial presence. It is important to use an antibiotic that the bacteria tested sensitive to, and at the correct dosage, frequency and duration of treatment to prevent antibiotic resistance.

Nick Saint-Erne, DVM, CertAqV



ANTIBIOTICS AND BACTERIA ABSTRACTS

Antibiotic-Resistant Enterococci in Seawater and Sediments from a Coastal Fish Farm

Di Cesare A, C Vignaroli, GM Luna, S Pasquaroli & F Biavasco (2012). *Microbial. Drug Resistance*, 18 (5): 502-509. (Open access publication available at <http://online.liebertpub.com/doi/pdf/10.1089/mdr.2011.0204>.)

Abstract

The aim of this study was to detect and characterize antibiotic-resistant enterococci in seawater and sediment from a Mediterranean aquaculture site where no antibiotics are used.

Colonies (650) grown on Slanetz-Bartley (SB) agar were amplified on antibiotic-supplemented SB, and erythromycin (ERY), tetracycline (TET), and ampicillin (AMP) MICs were determined. Of 75 resistant isolates (17 to TET, 5 to ERY, and 45 to AMP), 5 *Enterococcus faecalis*, 25 *E. faecium*, 5 *E. casseliflavus*, 1 *E. gallinarum*, 1 *E. durans*, and 23 *Enterococcus* spp. were identified by genus- and species-specific polymerase chain reaction (PCR). *tet(M)*, *tet(O)*, *tet(L)*, *tet(K)*, *erm(B)*, *erm(A)*, *erm(C)*, *mef*, *msr*, *blaZ*, and *int(Tn916)* were sought by PCR, including an improved multiplex PCR assay targeting *tet(M)*, *tet(L)*, and *erm(B)*. *Tet(M)* was the most frequent TET resistance gene; *msr(C)* was the sole ERY resistance gene detected. *blaZ* was found in 29/45 AMP-resistant isolates; however, no β -lactamase production was detected. Antibiotic-resistant enterococci were recovered 2km off the coast despite the absence of selective pressure exerted by antibiotic use. The occurrence of resistant strains in the absence of the tested genes may indicate the presence of less common resistance determinants.

This first evidence of resistant enterococci at a Mediterranean aquaculture site suggests the existence of a marine reservoir of antibiotic resistances potentially transmissible to virulent strains that could be affected by mariculture in an antibiotic-independent manner.

Antimicrobial Use and Resistance in Aquaculture: Findings of a Globally Administered Survey of Aquaculture-Allied Professionals

N. Tuševljak N, L Dutil, A Rajić, FC Uhland, C McClure, S St-Hilaire, RJ Reid-Smith & SA McEwen (2012). *Zoonoses & Pub. Health*, 60(6): 426-436.

Abstract

There is limited published information regarding antimicrobial use (AMU) and antimicrobial resistance (AMR) in aquaculture. Our objective was to determine the opinions of aquaculture-allied professionals around the world on the frequency of AMU and AMR in common aquatic species.

The study questionnaire included five sections: respondent demographics, extent of AMU in aquaculture, frequency of observations of AMR in aquaculture, AMR monitoring and surveillance and antimicrobial susceptibility testing in various jurisdictions. It was administered in English and Spanish to 604 professionals in 25 countries and with varying expertise in aquaculture.

The response rate was 33% (199/604). Over half of the participants had >10 years of experience in aquaculture: 70% (140/199) were involved in fish health/clinical work and their primary experience was with salmon, tilapia, trout, shrimp (including prawn) and/or catfish. Tetracycline use was reported by 28%, 46%, 18%, 37% and 9% of respondents working with catfish, salmon, tilapia, trout and shrimp, respectively. Resistance to tetracycline in one or more species of bacteria was reported as 'frequent-to-almost always' for the same aquaculture species by 39%, 28%, 17%, 52% and 36% of respondents, respectively. 'Frequent-to-almost always' use of quinolone was reported by 70% (32/46) and 67% (8/12) of respondents from the United States and Canada, respectively, where quinolone products are not approved for aquaculture, and extra-label fluoroquinolone use is either prohibited (United States) or discouraged (Canada). Similar frequencies of quinolone use were also reported by the majority of respondents from Europe [70% (7/10)] and Asia [90% (9/10)] where labelled indications exist.

This baseline information can be used to prioritize research or surveillance for AMU and AMR in aquaculture.

Evaluation of the aquatic toxicity of two veterinary sulfonamides using five test organisms.

De Liguoro M, et al (2010). *Chemosphere*, 81(6): 788-793.

Abstract

The aquatic toxicity of sulfaquinoxaline (SQO) and sulfaguanidine (SGD) was evaluated on the following test organisms: *Daphnia magna* (reproduction test), *Pseudokirchneriella subcapitata*, *Scenedesmus dimorphus*, *Synechococcus leopoliensis* (algal growth inhibition test) and *Lemna gibba* (duckweed growth inhibition test). Furthermore, the additivity of the two compounds was measured on *D. magna* (acute immobilisation test) and *P. subcapitata* (algal growth inhibition test) using the isobologram method.

Results show that SQO and SGD are more toxic to green algae and daphnids, respectively, than other veterinary sulfonamides (SAs) and that their mixtures have a less than additive interaction. Taking into account the highest concentrations detected so far in surface waters for SQO (0.112µg/L(-1)) and for SGD (0.145µg/L(-1)) and the lowest NOECs obtained with the five test organisms, divided by an assessment factor of 10, the following PNECs and risk quotients (RQs) were calculated. SQO: PNEC 2µg/L(-1); RQ 0.056. SGD: PNEC 39.5µg/L(-1); RQ 0.004.

Consequently, at the concentrations actually detected in the aquatic environment, the two SAs alone should not harm the freshwater organisms. However, it seems advisable, for veterinary mass treatments, the use of other SAs that have a lesser impact on the aquatic environment. Furthermore, considering the high probability of having complex mixtures of different SAs residues in water, each individual contamination should be evaluated by applying to the SAs mixtures the conservative criteria of additivity.

Efficacy of Florfenicol for Control of Mortality Caused by *Flavobacterium columnare* Infection in Channel Catfish

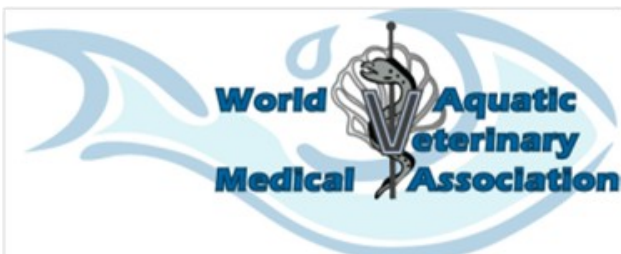
Gaunt PS, D Gao, F Sun & R Endris (2010). *J. Aqua. Anim. Health*, 22(2):115-122.

Abstract

The efficacy of florfenicol against infection by the bacterium *Flavobacterium columnare* was studied in channel catfish *Ictalurus punctatus* fingerlings held in 80-L aquaria. Nonabraded fish were challenged by immersion on day 0. Thirty 80-L tanks were randomly assigned in equal numbers to two treatment groups, one in which fish were fed a commercial diet without florfenicol (unmedicated feed) and one in which they were fed a diet containing 10 mg of florfenicol/kg of body weight (medicated feed) for ten consecutive days. Mortality was monitored during the treatment period and a 14-d posttreatment observation period. At the end of the posttreatment period, all fish were euthanized, examined for gross lesions, and cultured for *F. columnare*.

Significantly fewer fish fed the medicated diet died (8.0%) than fish fed the unmedicated diet (54.2%). *Flavobacterium columnare* was cultured from 15.0% of the medicated fish, compared with 68.9% of the unmedicated fish. The gross lesions in the fish were consistent with columnaris disease, and *F. columnare* was cultured from 99.5% of the dead fish. No differences were observed in weight gain and appetite between the medicated and unmedicated groups.

For the *F. columnare* strain used in this study, the minimal inhibitory concentration of florfenicol ranged from 0.5 to 1.0 mg/mL in the 30 bacterial cultures obtained from infected fish, and the mean disk diffusion zone of inhibition was 40 mm. There were no adverse effects among the medicated fish. Administration of florfenicol at a dosage of 10 mg/kg body weight for 10 d was efficacious and safe for the control of mortality from *F. columnare* infection in channel catfish.



Determination of Florfenicol Dose Rate in Feed for Control of Mortality in Nile Tilapia Infected with *Streptococcus iniae*

Gaunt PS, R Endris, A McGinnis, W Baumgartner, A Camus, J Steadman, D Sweeney & F Sun (2010). *J. Aqua. Anim. Health*, 22(3):158-166. Article

Abstract

A dose titration study was conducted to determine the dosage of florfenicol (FFC) in feed to control *Streptococcus iniae*-associated mortality in Nile tilapia *Oreochromis niloticus*. Six tanks were assigned to each of five treatments: (1) not challenged with *S. iniae* and fed unmedicated feed; (2) challenged with *S. iniae* by injection and fed unmedicated feed; (3) challenged with *S. iniae* and given FFC at 5 mg/kg of body weight (bw) in medicated feed; (4) challenged with *S. iniae* and given 10 mg FFC/kg bw; and (5) challenged with *S. iniae* and given 15 mg FFC/kg bw.

Treatment was initiated the day after inoculation, and feed was administered for 10 d. Cumulative mortality was 0% in the unchallenged, untreated group; $35.8 \pm 4.4\%$ (mean \pm SE) in the challenged, unmedicated group; $19.2 \pm 2.7\%$ in the 5-mg/kg treated group, $12.5 \pm 3.8\%$ in the 10-mg/kg group, and $2.5 \pm 1.1\%$ in the 15-mg/kg group. The cumulative mortality was significantly less in each challenged, FFC-treated group than in the challenged, unmedicated controls (5 mg/kg: $P = 0.0156$; 10 mg/kg: $P = 0.0007$; 15 mg/kg: $P < 0.0001$).

The efficacy of the 10- and 15-mg/kg FFC dosages was studied in a separate dose confirmation study. Fish in all tanks were injected with *S. iniae*. At 4 h postinoculation, 10 tanks were assigned to each of three feed treatments: (1) unmedicated feed; (2) 10 mg FFC/kg bw; and (3) 15 mg FFC/kg bw. Cumulative mortality was $20.5 \pm 2.0\%$ in the challenged, unmedicated group; $11.0 \pm 2.1\%$ in the 10-mg/kg group; and $5.5 \pm 2.4\%$ in the 15-mg/kg group. Mortality was significantly less in the medicated groups than in the challenged, unmedicated control group (10 mg/kg: $P = 0.0270$; 15 mg/kg: $P = 0.0007$). Fish in both studies were necropsied, cultured for bacteria, and examined for gross lesions. The minimum inhibitory concentration of FFC against *S. iniae* in both studies ranged from 0.5 to 1.0 $\mu\text{g/mL}$. Florfenicol was palatable, safe, and efficacious for control of Nile tilapia mortality due to *S. iniae* infection.

Safety of Florfenicol in the Adult Lobster (*Homarus americanus*)

Basti D, D Bouchard & A Lichtenwalner (2011). *J. Zoo Wildlife Med.*, 42(1): 131-133.

Abstract

Aerococcus viridans, the causative agent of the disease gaffkemia, was a major cause of mortality in lobsters (*Homarus americanus*) held in tidal impoundments during the 1970s and 1980s. Despite reports of an increase in the mortality of lobsters during impoundment, and the widespread prophylactic use of oxytetracycline against *A. viridans*, this bacterium has not been detected in active disease surveillance of the Maine postcapture lobster population. However, *Photobacterium indicum* may be an emerging opportunistic pathogen of stressed lobsters.

An acute toxicity trial was conducted as a rapid screening procedure for the potential future use of the antibiotic florfenicol. Based on the results of this experiment, florfenicol appears to be well tolerated in adult *H. americanus* by intrapericardial injection at the 10–100 mg/kg dose. Oxytetracycline dihydrate is contraindicated by intrapericardial injection at the 10–100 mg/kg dose.

Introduced Pathogens and Native Freshwater Biodiversity: A Case Study of *Sphaerothecum destruens*

Andreou D, KD Arkush, J-F Guégan & RE Gozlan (2012). *PLoS ONE* 7(5): e36998. (An open access publication available at <http://tinyurl.com/7bjrk8q>.)

Abstract

A recent threat to European fish diversity was attributed to the association between an intracellular parasite, *Sphaerothecum destruens*, and a healthy freshwater fish carrier, the invasive *Pseudorasbora parva* originating from China. The pathogen was found to be responsible for the decline and local extinction of the European endangered cyprinid *Leucaspis delineatus* and high mortalities in stocks of Chinook and Atlantic salmon in the USA. Here, we show that the emerging *S. destruens* is also a threat to a wider range of freshwater fish than originally suspected such as bream, common carp, and roach. This is a true generalist as an analysis of susceptible hosts shows that *S. destruens* is not limited to a phylogenetically narrow host spectrum. This disease agent is a threat to fish biodiversity as it can amplify within multiple hosts and cause high mortalities.

Francisella infections in farmed and wild aquatic organisms (Review)

Colquhoun, DJ & S Duodu (2011). *Vet. Res.*, 42:47. (An open access publication available at www.veterinaryresearch.org).

Abstract

Over the last 10 years or so, infections caused by bacteria belonging to a particular branch of the genus *Francisella* have become increasingly recognised in farmed fish and molluscs worldwide. While the increasing incidence of diagnoses may in part be due to the development and widespread availability of molecular detection techniques, the domestication of new organisms has undoubtedly instigated emergence of clinical disease in some species.

Francisellosis in fish develops in a similar fashion independent of host species and is commonly characterised by the presence of multi-organ granuloma and high morbidity, with varying associated mortality levels. A number of fish species are affected including Atlantic cod, *Gadus morhua*; tilapia, *Oreochromis* sp.; Atlantic salmon, *Salmo salar*; hybrid striped bass, *Morone chrysops* x *M. saxatilis* and three-lined grunt, *Parapristipoma trilineatum*. The disease is highly infectious and often prevalent in affected stocks. Most, if not all strains isolated from teleost fish belong to either *F. noatunensis* subsp. *orientalis* in warm water fish species or *Francisella noatunensis* subsp. *noatunensis* in coldwater fish species. The disease is quite readily diagnosed following histological examination and identification of the aetiological bacterium by culture on cysteine rich media or PCR.

The available evidence may indicate a degree of host specificity for the various *Francisella* strains, although this area requires further study. No effective vaccine is currently available. Investigation of the virulence mechanisms and host response shows similarity to those known from *Francisella tularensis* infection in mammals. However, no evidence exists for zoonotic potential amongst the fish pathogenic *Francisella*.

Major bacterial diseases in aquaculture and their vaccine development

Pridgeon JW & PH Klesius (2012). *CAB Reviews*, 7(048): 16 pg. (An open access publication available at <http://tinyurl.com/fishvaccines>.)

Abstract

Aquaculture is emerging as the fastest growing food-producing industry in the world because of the increasing demand for food fish consumption. However, the intensive culture of food fish has led to outbreaks of various bacterial diseases, resulting in annual economic losses to the aquaculture industry estimated at billions of dollars worldwide. Feeding infected fish with antibiotic-medicated food is a general practice but has led to antibiotic resistance development in bacterial pathogen, resulting in a higher dose requirement for effective control, a matter of increasing public concern. Therefore, alternatives to antibiotics that give similar or enhanced protection to aquatic animals are urgently needed. Various vaccines have been developed recently to combat bacterial diseases in aquaculture. The purpose of this review is to summarize the major bacterial pathogens in aquaculture and the development of vaccines as alternatives to antibiotics to protect aquatic animals from these bacterial diseases.



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Ocean Genome Legacy Seeks Samples for Marine Mammal Genome Archive

A variety of marine mammal tissue collections exist in the U.S., however, significant obstacles limit widespread scientific use of the materials including strict national and international regulations on the collection, use, transfer, and holding of marine mammal parts and DNA; inconsistencies in the quality, condition, and storage of specimens; and limitations of each program's mission-specific funding. Ocean Genome Legacy (OGL) is asking for your help in solving these problems.

To improve research access to materials from marine mammals suitable for molecular biology and genomic research, OGL created the Marine Mammal Genome Archive (MMGA). MMGA samples are obtained from the byproducts of routine veterinary care, captive animal mortality, strandings, and ongoing research projects. OGL utilizes the latest methods of gene and genome amplification to legally facilitate broad access to MMGA materials by providing researchers with accurate synthetic replicas of individual genes or complete genomes that contain no detectable material from the original specimen. They are suitable for most types of molecular research, but are not subject to existing national and international regulations and so may be distributed and used for research without need for special permits. With respect to research use, these replicas are the legal equivalent of photos, sound recordings or digitized data. They are also more stable and resistant to decay, less expensive to store and maintain, and extend the usable quantity of materials by orders of magnitude.

How can you help this important effort?

OGL relies on external scientists, aquarium staff, and aquatic veterinarians to provide the majority of its holdings. We are asking you to join us as collaborators in building this important community resource by contributing samples from your own work with marine organisms. (Yes, OGL archives DNA from all marine species, not just marine mammals.) Contributing samples is easy and OGL provides all collection materials. For mammals, simply place small (quarter-sized) pieces of muscle, skin, brain, heart, or kidney tissue or a small volume of blood in the provided pre-labeled tubes or Whirl-Pak bags and add the provided non-flammable, nontoxic fixative. Preserved samples may be stored and shipped at room temperature.

How will my samples be used?

All genomic materials and data in the MMGA are available for use by the broader scientific community under appropriate permits and in compliance with all existing laws, rules and regulations under material transfer agreements that authorize only non-commercial research. Current holdings are accessible online (www.oglf.org/catalog). OGL has loaned ~2,000 DNA samples to date. As a member of the International Society of Biological and Environmental Repositories and the Global Genomic Biodiversity Network, OGL works to ensure that current best practices are maintained in collection, archival storage, and dissemination of biomaterials and associated data.

Because we are a publicly funded nonprofit organization, OGL does not authorize, license, or obtain revenue from commercial use of materials in its collections. There is no charge for use of archived materials, although in most cases fees are required to recover part of the costs of processing, storing, and distributing samples. OGL's mission is to facilitate research that can help improve scientific understanding and that can contribute to the successful protection and management of marine species and environments. By providing open-access to materials and data, ensuring proper handling and long-term storage of materials for genetic and genomic analyses, and creating off-site redundancy to improve the physical security of invaluable collections, OGL hopes to help preserve irreplaceable biodiversity that is rapidly disappearing from the wild oceans.

We hope you will support the development of this scientific resource by depositing samples into this special collection! Request a sampling kit by email (info@oglf.org) or online from (<http://www.oglf.org/Deposit.htm>). For questions or more information on this project, please contact OGL's Biorepository Manager at deboer@oglf.org.

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How Does Slaughter Affect Fish Welfare?

Hannah Chilvers, writing for TheFishSite.com discusses different slaughter techniques and their impact on fish welfare.

The sustainability of fisheries and aquaculture is becoming a much talked about issue, but how often do we think about how fish is slaughtered? The methods behind aquaculture slaughter and the issues of welfare associated with them are set to become the next big thing in the world of fishing and aquaculture. A number of charities are also becoming increasingly concerned with the impacts that such techniques can have on animal welfare and are releasing a series of recommendations in an attempt to address them.

Slaughter Methods

The methods of slaughter traditionally used in aquaculture can largely be divided into two main types; those causing the immediate loss of sensibility, and those that achieve this in a slower way. The first of these two methods is preferred in terms of both animal welfare and meat quality.

Of those methods that cause the slow loss of sensitivity, the most commonly used techniques include:

- asphyxiation - both in air and ice
- decapitation (eels)
- electrical immobilisation
- the use of salt or ammonia baths (eels)
- carbon dioxide narcosis
- the process of exsanguinations (blood loss)
- evisceration of live fish

For all the above mentioned techniques, recent guidelines on aquatic animal treatment by the World Organisation for Animal Health (2011) stated that they result in poor fish welfare.

The decapitation of fish, for example, commonly used in the treatment of eels, is known to take between 13-30 minutes to cause the loss of brain function, whilst the evisceration of live fish is thought to take even longer, with death occurring between 20-40 minutes, depending on the species.

The use of electrical immobilisation is also thought to be just as inhumane. The treatment is known to cause paralysis, pain and exhaustion of animals. The process of blood loss is similarly considered cruel. Death by carbon dioxide application is also thought to be very aversive. A number of species, including carp, trout, eels and salmon, are

known to make vigorous attempts to escape during the process. So much so, the use of carbon dioxide to stun fish has consequently been banned in Norway since 2008. In a comparative situation, the use of salt or ammonia baths is also thought to be similarly punishing. Once commonly used, the technique has now been banned in Germany.

Methods causing the immediate loss of sensibility, in contrast, are much more preferred for their increased humane animal treatment. For that reason, they are now the recommended practices of all fish welfare groups. The most ethical of those techniques is the process of electrical stunning. For this method, an adequate current passes through the water causing death almost instantly – this is a distinct contrast to the often drawn-out techniques highlighted above. The process of percussive stunning is also favoured as a manual or automatic blow to the skull causing death instantaneously and with, generally, the fish only being out of the water for around 10 seconds, substantially reducing stress and fear.

For the slaughtering of larger fish like tuna or salmon, the process of spiking or shooting can also be used; again both techniques are greatly preferred in terms of welfare recommendations as they give instant death if done properly.

The type of slaughtering method not only affects welfare, it also impacts the quality of the flesh. A number of recent reports have found fish meat quality and taste to be noticeably reduced when animals are stressed prior to and during death, making the meat less appealing to the consumer.

For more information, see the full article on the website: <http://www.thefishsite.com/articles/1751/how-does-slaughter-affect-fish-welfare>.



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AQUAVET® III – An Introduction to Clinical Aspects of Captive Aquatic Animal Medicine

By Donald W. Stremme VMD (AQUAVET® Director, University of Pennsylvania, USA), **Ben Yanofsky** (University of Pennsylvania, Class of 2014) & **Ari Fustukjian** (Cornell University, DVM Candidate 2014)

For the first time, in June and July of 2013, AQUAVET® offered a new 5 week course focused on aquarium medicine – AQUAVET® III: Clinical Aspects of Captive Aquatic Animal Medicine. The course is specifically designed for veterinary students and veterinarians who have specific interest in working in an aquarium or dolphinarium.

This first class was limited in size to 6 students to make this a more hands-on experience and was presented in three different venues. The first two weeks are focused on all of the animals found in a typical aquarium and is held at the Georgia Aquarium in Atlanta, USA. The next week focuses on endoscopy and surgery of reptiles and fish taking place at the University of Georgia. The final two weeks take place at Dolphinaris in Cancún, México. The details of what was covered in this 5-week course are available at www.aquavet.info.

Participants of the 2013 AQUAVET® III expressed excitement for this new program. From the perspective of some of the WAVMA veterinary students who participated

Ben Yanofsky: “As a student of the AQUAVET® III program, I cannot overstate how much this program improved my knowledge base and experience in the field of aquatic veterinary medicine. The two weeks at the Georgia Aquarium provided a wealth of knowledge that will be extremely useful going forward with my career. The case based approach also improved my ability to work through problems involving species that are rarely mentioned in a normal veterinary school curriculum.

The time spent at University of Georgia provided me with the opportunity to perform two endoscopies and a fish celiotomy. Prior to the AQUAVET® program, these procedures were completely alien to me. Being able to sit in on an endoscopy of an exotic species is a rarity, let alone being able to perform the endoscopy. Having performed these procedures, I feel that I have exposure to an important aspect of aquatic veterinary medicine that few students can experience so early in their careers. In addition to this, these proce-

dures were preceded by fantastic lectures that provided a good basis for surgical techniques in a variety of species.

Finally, the time spent in Mexico was absolutely fantastic. It is often extremely difficult to have close hands on training with marine mammals due to the complexity of maintaining training consistency while introducing new, less-experienced students into the environment. However, the Dolphinaris facilities provided excellent instruction in diagnostic techniques including 3 days of hands-on ultrasound training. After this extensive training, I feel comfortable locating and assessing major anatomical structures on ultrasound as well as preparing and reading chuff, gastric, blood and fecal cytology samples. Due to the experience and knowledge I gained through this program, I whole-heartedly recommend the program, without reservation, to any student pursuing a career in aquarium medicine.”

Ari Fustukjian: “It’s one thing to sit through a lecture on ectoparasites of tropical fish, or to watch a video of a stingray ultrasound. It’s an entirely different experience to collect a non-lethal gill clip from a tiny, delicate Anthias, or to climb into a little rubber raft and be handed a \$60,000 ultrasound unit while a giant manta ray is coaxed onto the stretcher in front of you.

The AQUAVET® program, established in 1977, has made a name for itself by providing veterinary students with intensive education in the field of aquatic animal medicine. We’re not just talking fish and dolphins here. Topics run the gamut from ocean chemistry and its effects on coral health, to elasmobranch hematology, to oyster farming, to beluga training and husbandry. The opportunity to meet and interact with instructors from a range of aquatic animal-related professions, (many of whom are leaders in their respective fields – and who are often AQUAVET® alumni themselves), provides unique insight, boundless inspiration, and invaluable contacts to students who dream of one day making their passion into a career.

However, even 12 hours of lecture a day, 6 days a week, for a month straight, (with a field trips and wetlabs thrown in for good measure), can’t fully convey the breadth and scope of aquatic animal medicine. Enter the first AQUAVET® III program, and aimed to provide the “next step” to veterinary students who desire to find jobs in aquatic animal medicine with an emphasis on public aquaria. The program first took 6 of us to Atlanta,

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GA, where we spent two weeks at the Georgia Aquarium. About half of the time was spent in lecture, (12-14 hour days in true AQUAVET® fashion), often ordering lunch in so that we could get through all the material. Presentations were given primarily by the 5 aquarium veterinarians, with relevant lectures given by department heads from the fields of nutrition, quarantine and acquisitions, water quality, life support, behavior and training, and collections management. The rest of our time was spent shadowing the aquarium vets.

Unlike a traditional program where everything is tightly scheduled, there's no such thing as a "typical" day in the life of an aquarium vet. In spite of this, the staff at the Georgia Aquarium did a phenomenal job of involving us in a number of hands-on procedures. We drew blood from a number of bamboo and epaulette sharks, performed PEs on penguins, and radiographed seahorses, frogs, and turtles. We also got to assist in ultrasounding many of the aquarium's numerous stingrays, endoscoped a zebra shark, removed papillomas from an Asian small-clawed otter, and as a highlight I drew the lucky number that put me in a rubber raft, holding the ultrasound unit while one of the aquarium's adult manta rays was given a routine physical. We were also given a real appreciation for the incredible level of teamwork required to provide quality health care to a collection of very large, potentially very dangerous animals. Performing endoscopy, ultrasound, or simply managing a skin abrasion becomes a complicated and potentially harrowing process when your patient is a 200 pound grouper, a 400 pound stingray, or a 10 foot long sawfish, further complicated by the fact that these animals are "confined" to an area of 800,000 cubic feet and are significantly faster than your average veterinarian when in their element.

After our time in Atlanta was up, we made the hour-long trek east to Athens, GA and the University of Georgia's College of Veterinary Medicine, where we spent 3 days with Dr. Steven Divers, one of the world's leading experts on endoscopy and surgery of reptiles, fish, and other exotic animals.

Following morning lectures, the rest of each day was spent working with our own animals. On day one we anesthetized red-eared sliders, performing coloemic exams and taking biopsies using rigid endoscopes. Dr. Divers hosts similar workshops for veterinarians on a yearly basis, and his instruction and advice in how to make the best ap-

proach or obtain the best view of an organ was invaluable. At the same time, we had the opportunity to spend hours driving the scope ourselves. Day two was similar to the first, but with our subjects being 3-foot long sturgeon. The equipment we were using included high-definition cameras; it was an incredible experience to be able to magnify to the point that you could actually visualize individual erythrocytes squeezing their way through capillary beds! Day three consisted of more sturgeon, this time approaching the coloemic cavity surgically to perform number of procedures, including splenectomy, gastrotomy, and liver biopsy.

After a week in Athens, it was time to head off to the final part of the program in Cancun, Mexico, home to one of the highest density populations of captive dolphins in the world. In total we spent two weeks at three of the five Dolphinaris facilities: Cancun, Rivera Maya, and Cozumel. Like the rest of the program, we had a combination of lectures and hands-on training – something that is incredibly difficult for a veterinary student to find in the US. We learned about the techniques used to train medical behaviors (the only way to really manage dolphins without a team of 10 people, a net, and a lot of stress). We collected blowhole chuff samples, ran blood and gastric samples, and checked fecal coliform counts. Then we started working with endoscopy again, this time with a flexible scope. Also worth mentioning was the day trip we took out of Quintana Roo to swim with whale sharks and manta rays. Obviously it's important to have an understanding of how these animals behave in the wild in order to manage them appropriately in captivity, right? The last week was spent at the Dolphinaris facility in Cozumel, where we spent 8 hour days standing in waist-deep water with our heads under a tarp as a parade of dolphins submitted to ultrasound under the watchful gaze of some very, very patient trainers.

This kind of lengthy, intense exposure is exactly the sort of thing that makes AQUAVET® so special. The difference between what is taught in school (a few hours of lecture and an hour spent in an ultrasound lab with 20 other students), and spending several hours a day doing nothing but ultrasounding live animals is immense. In short, the five-week program was over far too quickly. The experiences we received were the next best thing to actually working in an aquarium, and hopefully will serve as a prelude to the same."

EFSA guidance outlines approach for environmental risk assessment of Genetically Modified animals

October 5, 2013

Brussels –

New guidance from the European Food Safety Authority (EFSA) provides applicants and risk assessors with a clear framework to evaluate the potential adverse effects of living genetically modified (GM) animals on the environment, including those on human and animal health. While no applications for GM animals have yet been received in the European Union (EU), scientific developments suggest future submissions may be made for a number of species. Therefore, the European Commission requested that EFSA develop environmental risk assessment (ERA) guidance for GM fish, insects, mammals and birds.

The vast majority of the GM animal ERA guidance has been newly developed by EFSA's GMO Panel, and its publication is the culmination of several years' work. It was finalised following the consideration of more than 700 comments received from stakeholders and interested parties during a public consultation held last year. This work complements previous guidance by EFSA on the safety of food and feed from GM animals published in 2012 and completes the mandate from the Commission for comprehensive risk assessment guidelines on GM animals.

Data requirements and monitoring

Environmental risk assessments of GM animals must be carried out on a case-by-case basis which means the information required in applications may vary depending on aspects such as the animal type, the new trait being introduced and the intended use of the GM animal.

The guidance document lays down requirements for collecting, evaluating and generating key information to complete an ERA for a GM animal. These data would form an essential part of an application for a living GM animal to enter the EU market. The document also offers guidance for continuous post-market environmental monitoring (PMEM) and addresses animal health and welfare.

"The core of the guidance is that ERAs for GM animals must be carried out in a scientifically sound and transparent manner," said Elisabeth Waigmann, head of EFSA's GMO Unit. "They must be based on sufficient scientific and technical data that

enable conclusions to be drawn on possible environmental risks posed by a living GM animal. The inclusion of a comprehensive uncertainty analysis is of central importance given the current limitations in the availability, relevance and quality of data relating to GM animals."

The guidance details three broad aspects that should form part of a rigorous ERA of GM animals. The first is the mandatory six-step evaluation procedure enshrined in EU legislation that forms the basis of the GMO Panel's approach to environmental risk assessment. This approach should be followed by an assessment of seven areas of potential risk from GM fish, insects, mammals or birds that applicants are legally obliged to consider.

Thirdly, the GMO Panel has introduced a number of cross-cutting considerations that should be factored into the full GM animal ERA process. One of these is the use of so-called comparators – non-GM animals that serve as a baseline in the comparative risk assessment of GM animals.

Another element is the use of appropriate surrogates, when this is considered necessary. A surrogate animal is one that does not bear the same genetic modification at issue but shares enough traits with the GM animal to act as its substitute in risk assessment tests and experiments. The guidance also describes methods for the identification and characterisation of environments into which GM animals might be released.

Crucially, EFSA specifies the methodology and reporting standards that should be observed in application data. The importance of clear guidance on experimental design, general statistical principles to be employed, the assessment of long-term effects and a detailed breakdown of several aspects of the uncertainty analysis are all emphasised.

For media enquiries please contact:

EFSA Media Relations Office

Tel. +39 0521 036 149

E-mail: Press@efsa.europa.eu

[The full guidance on the environmental risk assessment of genetically modified animals can be accessed at <http://www.efsa.europa.eu/en/efsajournal/pub/3200.htm>. ADS-Mod.]

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Volume 7, Number 3 LEGISLATIVE & REGULATORY ISSUES Third Quarter 2013

Fukushima Fallout Not Affecting U.S. Fish

Posted by [Michael Conathan](#) of [Center for American Progress](#) in [Ocean Views](#) on September 11, 2013

Recently, there has been a significant uptick in news from Fukushima, Japan. Officials from the Japanese government and the Tokyo Electric Power Company admitted that [radioactive water is still leaking](#) from the nuclear plant crippled by the 2011 earthquake and tsunami.

The new revelations about the amount of water leaking from the plant have caused a stir in the international community and led to additional scrutiny of Pacific Ocean seafood. Last week, South Korea announced it had [banned all imports](#) of Japanese seafood from a large area around Fukushima. And Al Jazeera reported that the cost to the region's fishing industry over the past two years exceeds \$3.5 billion.

Now, fears are mounting that the radiation could lead to dangerous contamination levels in seafood from more of the Pacific Basin. Numerous blog posts and [articles](#) expressed concern about the potential for higher concentrations of radioactive particles, particularly in highly migratory species such as tuna that may have encountered Fukushima's isotopes—including highly dangerous and toxic materials such as [cesium-137, strontium-90, and iodine-131](#)—on their transoceanic travels.

The lead U.S. agency testing seafood for contamination is the Food and Drug Administration, or FDA. As of June 20, the FDA has [tested 1,313 samples of food imported from Japan](#), including 199 seafood samples. Of those, just one—a sample of ginger powder—exceeded the level considered safe for consumption.

For full article, go to:

[http://
newswatch.nationalgeographic.com/2013/09/11/
fukushima-fallout-not-affecting-u-s-caught-fish/](http://newswatch.nationalgeographic.com/2013/09/11/fukushima-fallout-not-affecting-u-s-caught-fish/)



Bluefin tuna is among the species that have been found to contain trace amounts of radioactive particles. (Photo by Stewart Butterfield)

California game operator faces fine over baby turtle prizes

Published: July 26, 2013

By **Tonya Strickland**

tstrickland@thetribunenews.com

A Napa man will face up to a \$1,000 fine and possible probation for giving away illegally sized baby turtles as a carnival prize at the California Mid-State Fair, authorities said Friday.

Steve John Lopez, 41, will face penalties in San Luis Obispo County Superior Court for violating state health code, said Lt. Todd Tognazzini with the state Department of Fish and Wildlife. "We are pursuing this as a criminal complaint," Tognazzini said, "We would likely file it as a misdemeanor because (the turtles were) distributed in mass to children. The judge will ultimately decide."

Lopez, who owns "The Buoy" game — in which players throw Ping-Pong balls into small rings floating in water — reportedly told state officers Thursday that he traveled to downtown Los Angeles to purchase the small reptiles. He then brought them back and gave them away as game prizes in 4-by-6-inch terrariums with printouts on how to care for the baby red-eared sliders.

The game vendor reported having 100 of the baby turtles to distribute. He had some in a 5-gallon bucket, some in the small plastic habitats around the game booth and others in his trailer. The state seized 65 of the remaining turtles. The game remained open, sans turtles.

Those who received the turtles as prizes are not in violation of the law. But officials with San Luis Obispo County Public Health Services are encouraging anyone who received a turtle to bring it to the county's [Division of Animal Services](#) in San Luis Obispo so they can go to a turtle rescue.

It is illegal in the United States to distribute baby turtles with shell lengths less than 4 inches because they're linked to salmonella infection. While all turtles — and other reptiles — pose the risk of spreading salmonella infection to humans via their droppings, the babies are considered more of a health risk because they're typically handled more frequently. The bacteria are commonly found on the outer skin and shells and in the turtles' water.

For full story, see:

[http://
www.sanluisobispo.com/2013/07/26/2601076/
turtles-carnival-game-prize.html](http://www.sanluisobispo.com/2013/07/26/2601076/turtles-carnival-game-prize.html)

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MARVET 2014

Veterinarians and veterinary students interested in marine conservation medicine are invited to participate in an exciting program for 2014. MARVET is a workshop series offered by the non-profit Institute for Global Health and Health Policy (www.ighhp.org) designed to introduce veterinary students and veterinarians to the emerging field of Marine Conservation Medicine, which promotes an interdisciplinary, systemic approach to global wellness by investigating the links between human, animal and ecosystem health.

Workshops consist of lectures, group discussions, hands-on and observational opportunities in both managed and natural marine environments, with a focus on marine mammals, sea turtles, fish and corals. Workshop activities can be applied toward externship credit as permitted by respective veterinary schools.

MARVET will offer two workshops during summer 2014, with limited enrollment to ensure the most effective learning experience. Applications for both workshops are now being accepted at www.marvet.org. Please visit the website for further information or contact us at info@marvet.org.

MARVET México (June 1-13, 2014)

MARVET México, based in Playa del Carmen on México's Yucatán Peninsula and hosted by Dolphin Discovery and Xcaret Archaeological Park, offers veterinary students and veterinarians a two-week interactive workshop exploring aspects of biology, pathology, husbandry, clinical care and conservation medicine of selected marine species, including dolphins, manatees, pinnipeds, sea turtles, crocodiles, rays, nurse sharks, fish and coral reefs. Lectures and fieldwork instruction will be conducted by leading veterinarians, trainers and biologists working with these species in marine parks and in natural environments. Instructors will come from both the U.S. and Mexico.

Dolphin Discovery parks at Puerto Aventuras and on Cozumel will serve as venues for lectures from animal care veterinarians and for in-pool physical examinations of Atlantic bottlenose dolphins and West Indian manatees. Demonstrations of dolphin ultrasound and endoscopic procedures will be presented by park veterinarians and trainers. Students will be introduced to the importance of dietary protocols in managed marine mammal



care facilities and will participate in food preparation activities for the park's marine mammals.

The workshop will continue at Xcaret, an archaeological park, which maintains a collection of indigenous marine and terrestrial wildlife. Lectures will be presented by park and visiting veterinarians on marine animal care, conservation programs and marine mammal and fish pathology. Planned interactive opportunities include capture, restraint, physical exam and blood sampling of mature green sea turtles, physical exams and blood sampling from stingrays, fish anesthesia, biopsy and blood sampling and nurse shark physical exams. As opportunity provides, necropsies on sea turtles and stingrays will be conducted by students under supervision of park veterinarians and a board-certified pathologist. If time allows, students will also be introduced to the park's macaw aviary and breeding program.

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Other activities will introduce students to natural ecosystems through lectures and field events. Under leadership of an experienced marine ecologist, students will survey and collect environmental samples from a coastal coral reef and river system through snorkeling and kayaking excursions in the Sian Ka'an Biosphere Reserve - a 1.3 million acre United Nation's World Heritage Site.

On the last day of the workshop, student teams will deliver brief Powerpoint presentations on an assigned topic in marine conservation medicine, followed by a wrap-up lecture, and a MARVET-sponsored dinner. Workshop lodging throughout the course will be at Hotel Cielo in Playa del Carmen, a small, quaint hotel set in the midst of a pedestrian shopping village near the beach.

The Yucatán Peninsula is extremely rich in archaeological artifacts of the ancient Mayan civilization, as well as incredible arrays of subterranean, water-filled limestone caverns and cenotes. For those interested, MARVET will be a good opportunity to extend your visit in this region before or after the workshop to explore what it has to offer, both culturally and geologically.

MARVET Cayman (June 14-25, 2014)

MARVET Cayman, conducted in Grand Cayman, British West Indies and hosted by St. Matthew's University School of Veterinary Medicine (SMU), offers veterinary students lectures and hands-on workshops in the emerging professional field of Marine Conservation Medicine with focus on veterinary care of sea turtles, marine fish, dolphins, and other marine species; the course also explores coral reef and mangrove health and disease.

Lectures will address contemporary concepts in conservation medicine, One Health, anatomy and physiology of marine species (mammals, reptiles, fish, invertebrates), emerging diseases in marine mammals, reptiles and amphibians, sea turtle medicine, fish medicine, wildlife ecotoxicology, diagnostic surveillance of wildlife morbidity and mortality, coral reef biology and restoration, mangrove ecosystem biology, wildlife law, aquaculture water quality assessment and marine wildlife medicine career opportunities for veterinarians.

Students will participate in diagnostic wetlabs at SMU, the Cayman Turtle Farm, and Dolphin Discovery with an emphasis on physical examination, hematology, biopsy, anesthesia, and necropsy tech-

niques, under the direction of veterinarians and biologists active in aquatic medicine and conservation. Visits to local facilities will provide opportunities for handling and veterinary procedures, and in-depth discussions about husbandry, collection management and production, and health assessments of marine turtles, fish, dolphins, aquatic birds and tropical reptiles.

Field activities will orient students toward key ecologic components of marine ecosystem health, including mangrove forest kayaking and coral reef snorkeling/disease surveillance and research (with diving opportunities if desired). A visit to "Stingray City" will allow hands-on interaction with wild stingrays on a shallow sandbar. A site visit will also be made to the Blue Iguana Habitat to investigate this rare species and the conservation strategies being employed to preserve it. Tuition includes lodging at Sunshine Suites and most course activities (for those interested in diving, the course covers tank rental, but not other required scuba equipment).

The number of position for participants is limited and we encourage application by December 2013 with a final commitment and tuition deposit in January 2014. Online application and additional information is available at <http://www.marvet.org/workshops>.

Don't hesitate to contact IGHP for information on its mission and programs.

info@ighhp.org

IGHP

P.O. Box 882

College Station, TX 77841

USA



Institute for
Global Health & Health Policy

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CALL FOR SPEAKERS:

AQUACULTURE AMERICA 2014 -

Aquatic Veterinary Medicine Program

February 9 - 12, 2014 - Seattle, Washington, USA

Submission Deadline - November 15, 2013

**** Intent to Present ****

To ensure inclusion in this session, speakers should e-mail the following to the Session Coordinator:

- author/s name/s;
- presentation title; and,
- indicate whether a 15 or 30 minute presentation

Send to: Dr. David Scarfe (dscarfe@avma.org)

NOTE: Oral presentations for this program will be accepted on a first-come, first-served submission of suitable presentation titles and/or abstracts. Other presentations may be assigned to posters or other sessions.

Presentations pertinent to practicing veterinarians and aquaculture producers are particularly encouraged, including:

- 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 & case studies of important food and ornamental finfish, crustacean and molluscan diseases

Should this program be suitable for veterinary Continuing Education, veterinarians attending will receive a veterinary CE certificate of participation.

All abstracts must be submitted online through www.WAS.org. Deadline for Abstract Submission is November 15, 2013

AQUACULTURE AMERICA 2014, 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.

AQUACULTURE
AMERICA



2014

WORLD
AQUACULTURE
Society

WAS
Adelaide,
South
Australia
June 7 -
11, 2014



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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 to see if CE/CPD certificates are provided.

ASLAP Aquatic Veterinary CE Seminar & Networking Event October 27-31, 2013

The American Society of Laboratory Animal Practitioners (ASLAP) is offering the following exciting continuing educational and networking events as part of the 64th American Association for Laboratory Animal Science (AALAS) National Meeting (October 27-31, 2013) in Baltimore, Maryland, USA.

CE Seminar: "Aquatics: The Ultimate Wet Lab for Veterinarians"

When: Saturday Oct 26 from 12:30-5:30 pm.

Where: Institute for Marine & Environmental Technology (IMET).

Course meets the requirements for 4 hours of continuing education credit in jurisdictions which recognize AAVSB RACE approval; however, participants should be aware that some boards have limitations on the number of hours accepted in certain categories and/or restrictions on certain methods of delivery of continuing education.

Program

Research Applications: The Scope and Uses of Aquatic Models in Research Applications (Renate Reimschuessel, VMD, PhD - FDA Center for Veterinary Medicine)

General Overview of Research Considerations and Guide Topics Relative to Aquatic Species (Brent Whitaker, MS, DVM - National Aquarium)

Biosecurity and Environmental Management in Closed Containment Water Recirculation Aquaculture Facilities (Christopher Good, DVM, PhD - Freshwater Institute)

Pain Perception in Fish and Other Welfare Considerations (Stephen A. Smith, DVM, PhD - Virginia-Maryland Regional College of Veterinary Medicine)

The Science of Learning and Implications for Training and Enrichment in Captive Fish Management (Leigh Clayton, DVM, DABVP - National Aquarium)

Panel Discussion on IACUC and Humane Issues and Challenges Related to the Use of Aquatics in Research (IACUC Representatives from Various Large Aquatic Programs)

Cost: \$75 for ASLAP Members, \$125 for Nonmembers (by October 18th). Onsite Registration: \$100 for ASLAP Members, \$150 for Nonmembers.

Networking Event – National Aquarium

When: Saturday Oct 26 from 6:00-8:30 pm

Where: National Aquarium. We will have a private tour of the aquarium followed by light refreshments and drinks.

Come join us for a private tour of the National Aquarium, Baltimore on Saturday October 26th following the CE Seminar! Tour starts promptly at 6 pm and follows with light refreshments and drinks. Considered one of the world's best aquariums, the National Aquarium's mission is to inspire conservation of the world's aquatic treasures. The National Aquarium, Baltimore features three pavilions of exciting attractions and a living collection including more than 16,000 animals from more than 660 species of fish, birds, amphibians, reptiles and marine mammals.

Cost: \$50 for ASLAP Members & Nonmembers.

For additional details about the ASLAP events, speakers and topics, and to download a registration form, visit www.aslap.org/events. For more information on the full AALAS National Meeting, visit www.nationalmeeting.aalas.org. For more information about IMET, visit <http://www.umces.edu/imet>.



The American Society of
Laboratory Animal Practitioners

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REPTILE AND AVIAN ENDOSCOPY COURSE

DEC 7-8 2013

UNIVERSITY OF GEORGIA, ATHENS, GEORGIA,
USA

(1.5 shuttle ride from Atlanta International Airport)

INSTRUCTORS:

Dr Stephen J. Divers BVetMed, DZooMed,
DZooMed, DACZM, DECZM(HERP, ZHM), FRCVS
Dr Joerg Mayer DVM, MSc, DABVP(ECM)

One of the internationally acclaimed endoscopy training programs from the University of Georgia, this 15 hour continuing education course is designed to teach the theory and practical applications of diagnostic endoscopy in birds and reptiles.

Whether you are a private practitioner, zoo/aquarium/wildlife veterinarian, or researcher this course will train you to perform minimally-invasive endoscopic procedures including biopsy techniques. This is a basic to intermediate level course, and fundamental knowledge of avian and reptilian anatomy is assumed. You will be trained using PowerPoint lectures and video presentations in equipment choice and care; coelioscopy, gastro-intestinal and respiratory endoscopy of reptiles; coelioscopy, gastro-intestinal endoscopy and tracheoscopy of birds; biopsy and sampling techniques; and endoscopy fee structure and practice management. In addition, there will be 9 hours of practical lab time in which you will be able to practice and develop your skills in anesthetized research turtles or iguanas and pigeons, scheduled for euthanasia. All procedures approved by the UGA Institutional Animal Care and Use Committee.

Refreshments, lunches, certificate of training, and full color printed course notes containing all tutorial materials will be provided.

SATURDAY DEC 7

08:00-08:30 Registration & continental breakfast

08:30-08:45 Introductions and course overview

08:45-09:15 Endoscopy: equipment, care & use

09:15-09:45 Endoscopy fees & practice management

09:45-10:30 Avian and reptile anesthesia for endoscopy

10:30-10:45 Refreshment break

10:45-11:15 Reptile gastro-intestinal & respiratory endoscopy

11:15-12:00 Reptile coelioscopy

12:00-12:45 Lunch

12:45-16:45 Practical reptile endoscopy wet-lab
16:45-17:00 Questions and answers.....what did I learn?

SUNDAY DEC 8

08:00-08:30 Continental breakfast

08:30-08:45 Day 1 Review

08:45-09:30 Avian tracheoscopy & gastro-intestinal endoscopy

09:30-10:30 Avian coelioscopy

10:30-10:45 Refreshment break

10:45-11:30 Case reports

11:30-12:15 Lunch

12:15-16:45 Practical avian endoscopy wet-lab

16:45-17:00 Questions and answers.....what did I learn?

For registration details

Tel 1-706-542-1451

Email: melissak@uga.edu

www.vet.uga.edu/ce/conferences/exotics.php

(ON LINE REGISTRATION AVAILABLE)



Endoscopy course during AQUAVET III at UGA .

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2014 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 2014 AQUAVET® I, II & III course offerings. 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 2014 and one on aquarium medicine which is at three venues.

AQUAVET® I: An Introduction to Aquatic Veterinary Medicine is a 4-week course (25 May - 21 June 2014) intended primarily for veterinary students.

AQUAVET® II: Comparative Pathology of Aquatic Animals is a 2-week course (27 May - 7 June 2014) 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 (following AQUAVET® I) and is limited to a small number of students. The venues include Georgia Aquarium, U of GA (Athens, 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, 2014) are available on the web site www.aquavet.info.

PHOTOS from AQUAVET III—2013



See AQUAVET III article on page 28.

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2014 INTERNATIONAL SYMPOSIUM ON AQUATIC ANIMAL HEALTH

Aug 31 – Sept 4, 2014

Portland, Oregon

I am pleased to announce that this meeting will be held in Oregon! Late summer is a beautiful time to be here and Portland is a wonderful city with lots to offer.

Stay tuned for details as meeting planning progresses. I do promise a great venue and fun events – of course the scientific program will be outstanding.



Sealice 2014

August 31-September 3, 2014

Portland, Maine, USA

Hosted by University of Maine, Aquaculture Research Institute & University of Stirling. Holiday Inn By The Bay & Westin Portland Harborview Hotel in Portland, Maine, USA.

For more information visit:

<http://sealice2014.businesscatalyst.com>.

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.

9th Symposium on Diseases in Asian Aquaculture (DAA9)

November 24-28, 2014

Ho Chi Minh City, Vietnam

The Fish Health Section of the Asian Fisheries Society was founded in May 1989 with the goal to improve regional knowledge on fish health management and to support sustainable aquaculture development in Asia Pacific. FHS strives to promote interaction by bringing together fish health researchers to share their knowledge and experience. The FHS is credited with holding triennial symposia on "Diseases in Asian Aquaculture" (DAA) where members and aquatic animal health professionals meet to discuss broad issues and specific topics related to aquatic animal health. FHS has conducted earlier symposia in Bali, Indonesia (1990); Phuket, Thailand (1993); Bangkok, Thailand (1996); Cebu, The Philippines (1999); Gold Coast, Australia (2002); Colombo, Sri Lanka (2005); Taipei, Taiwan (2008) and Mangalore, India (2011). Each of these symposia brought together more than 300 aquatic animal health scientists, students, government researchers and industry personnel from over 30 countries to discuss issues pertaining to aquatic animal disease, their diagnosis, prevention and control. In keeping with the tradition of previous DAA symposia, DAA9 in Vietnam is going to be a unique experience that you don't want to miss. For more information on DAA9 and FHS, go to <http://www.fhs-afs.net>.

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Volume 7, Number 3 **INTERNSHIPS, EXTERNSHIPS & RESIDENCIES** Third Quarter 2013

SeaWorld (3-4 weeks)

SeaWorld offers externships at each of its 3 locations. There is one common application where you rank each park. Externs get to work with the wild birds that are brought for rehabilitation, even surgery! You are required to give a small presentation to the veterinary staff on the last week of your rotation. Housing is not provided, but there are lots of hotels in the area, including an extended stay hotel with a small kitchenette for around \$50/night.

The Marine Mammal Center (3-4 weeks)

Located in Sausalito, CA, the Marine Mammal Center is in the front-running for marine mammal rehabilitation and research. It is very seasonal, with more animals in the spring and summer. You will work with the veterinary staff 3-4 days per week, and then on crew, doing basic husbandry and feeding once or twice a week. Housing is provided with the veterinary intern and any other externs at one of the old fort houses nearby. It is highly recommended that you get a car for driving around. It is a beautiful area with lots of beach coast and hiking.

Mystic Aquarium

Mystic Aquarium in Mystic, CT, right near the coastal Rhode Island border, houses a large collection of marine mammals, fish and invertebrates. You work primarily with the veterinary intern, shadowing and assisting on procedures. You will also get very proficient in taking and processing analog radiographs. A presentation is required during this externship. No housing is provided, but you may want to ask if they know of anyone working at the aquarium who can provide you with a room for the time you are there. This is another rotation where you'll want a car to check out all the beaches nearby.

Georgia Aquarium

Georgia Aquarium is one of the newest aquariums in the US. It has a new procedure suite and one of the most outstanding tanks in the world. Housing is not provided. You may not need a car since the aquarium is located in downtown Atlanta, GA.

Navy Marine Mammal Program (4 weeks)

The US Navy trains marine mammals to perform tasks underwater that cannot be performed by humans. This is a high priority for those interested in marine mammal medicine. This program is based in San Diego, CA and is highly competitive.

Vancouver Aquarium (2-4 weeks)

Located in Stanley Park of Vancouver, Canada, Vancouver Aquarium takes externs to work with their collection of mammals, birds, amphibians, reptiles and fish. A literature review project is required. Housing is not provided but they provide a guide on their website. Make sure your passport is up to date!

Georgia Sea Turtle Center (2-6 weeks)

The Georgia Sea Turtle Center is located on Jekyll Island along the southern coast of Georgia. They rehabilitate both sea turtles and native land turtles at their center. If turtles are your interest, this is one of the best facilities to participate in the latest research and rehabilitation techniques. A research project is required for non-4th year students that is financed by funding through your school. Housing available based on seasonality. A car is recommended.

National Aquarium

Baltimore, MD (6-8 weeks)

National Aquarium is located in Baltimore, MD and houses a large collection of fish, mammals, amphibians/reptiles and birds. This rotation gives hands-on experience with fish, birds, reptiles and amphibians. There is some work with mammals and other critters, but it is largely observational. Applications are accepted year round. A small presentation is required. No housing is available but there are lots of hotels in the area.

New England Aquarium

Boston, MA (6-8 weeks)

Located in Boston, MA, the New England Aquarium hosts a large collection of fish, birds, marine mammals and turtles. Their chief veterinarian, Dr. Charles Innis, is one of the most knowledgeable about cold stun in turtles and has made a significant contribution to researching their rehabilitation. Externs are required to prepare a case report and research paper with presentations for both. No housing is available, but there are lots of options nearby.

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JOB OPPORTUNITIES

Third Quarter 2013

Veterinary Internship and Master's Degree in Aquatic Animal Health - Tampa's Lowry Park Zoo, Tampa, FL

The University of Florida's College of Veterinary Medicine (U-FL CVM) and Tampa's Lowry Park Zoo (TLPZ) have developed a two-year post-DVM training opportunity which combines clinical training in zoological and aquatic medicine with graduate study in manatee health and conservation. The program requires a two-year commitment with a starting date of January 2, 2014. Upon completion of the training, the incumbent will have two years of clinical training in zoological and aquatic medicine (24 hrs/week) from TLPZ, and a Master of Science degree from the University of Florida. It is expected that the trainee will produce at least one scientific publication each year, including original research related to graduate study. Research findings will be presented at a national scientific meeting. The incumbent will be expected to present at least one lecture per year in one of the aquatic animal health program courses and may have an opportunity to serve as a teaching assistant for one on-line course if desired.

The trainee will serve as a clinical intern and work under the supervision of veterinarians at Tampa's Lowry Park Zoo for a maximum of 24 hours per week. Job responsibilities at TLPZ include:

- Providing professional medical care and oversight of the husbandry care and well-being of the animal collection.
- Helping to implement and maintain the minimum standards of veterinary care as required by the Animal Welfare Act and APHIS-USDA.
- Will be expected to develop to become proficient enough to provide a full range of medical care for the collection in the absence of the Senior Veterinarian/Medical Science Director and or the Associate Veterinarian.
- Assist in the management of the long term preventative medicine program to include parasite surveillance procedures and control, immunization, infectious diseases screening such as using serology and tuberculosis testing, and dental prophylaxis, birth control, humane euthanasia standards and regular physical examinations.
- Assist in overseeing the quarantine program to include clinical and laboratory tests for disease.

Simultaneously, the trainee will pursue a master of science degree through mentorship from faculty in UF's aquatic animal health program. The graduate research component of this program will focus on a defined aspect of manatee health. For the 2014-2016 program, the emphasis of study will be coagulation disorders and the potential role these may have in cold stress syndrome (CSS) of the Florida manatee.

As a graduate student at the University of Florida, the trainee will be required to complete requirements for the Master of Science degree. This includes 30 credit hours of graduate course work, some of which may be transferrable from prior veterinary education. Although it is expected that most course work may be completed without travel to main campus, the successful incumbent must be able to travel to Gainesville (approximately 2 hrs away) as needed for course work and to support research activity. The trainee is expected to fulfill the requirements of the Master of Science degree by Dec 2016, with proper support from his or her mentoring committee.

A DVM or equivalent degree is required. A minimum of one year clinical experience, either in private practice or clinical internship is required. Demonstrated research experience and a demonstrated track record in publication of research or clinical reports is highly desirable. Candidates with demonstrated clinical proficiency with non-domestic species will be viewed favorably. The ability to work well with UF and LPZ personnel is essential.

Interested persons are requested to dually apply to the University of Florida and Tampa's Lowry Park Zoo. Only online applications will be accepted at Tampa's Lowry Park Zoo.

For the University of Florida, please send application materials to Dr. Ruth Francis-Floyd, Search Committee Chair, Dept of Large Animal Clinical Sciences, College of Veterinary Medicine, PO Box 100136, University of Florida, Gainesville, FL 32610-0126; phone 386-643-8904, e-mail: Rffloyd@ufl.edu. Required materials include a letter of application, curriculum vitae, and contact information (names, addresses, and email and telephone numbers) for three professional references from whom recommendations may be requested. The University of Florida is an Equal Opportunity Employer.

All of the above must be post-marked by November 1, 2013 to be considered for initial screening.

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JOB OPPORTUNITIES

Third Quarter 2013

The University of Florida's Aquatic Animal Health Program (UF AAHP) is hiring a biological scientist and postdoctoral researcher to assist in the discovery and characterization of emerging aquatic animal pathogens (EAAPs). Both positions involve research and diagnostic work involving EAAPs (e.g. virology, microbiology, parasitology, and mycology). Knowledge of aquatic animal diseases is critical to the satisfactory performance in these positions.

The biological scientist will be responsible for coordinating the research and service activities of the UF Wildlife and Aquatic Animal Veterinary Disease Laboratory (WAVDL); act as liaison between the WAVDL, the UF AAHP, and other interdisciplinary research and service projects. Laboratory research coordination includes organizing, guiding (e.g. other laboratory staff or students), and conducting aquatic animal infectious disease trials. Coordination of laboratory service activities includes organizing, guiding (e.g. other laboratory staff or students), and conducting aquatic animal disease diagnostics. The position requires working independently to perform diagnostic work in aquatic animal virology and microbiology including, but not limited to, identification and susceptibility testing of aquatic animal viruses, bacteria, parasites, and fungi. Further details of this position including how to apply can be found at <https://jobs.ufl.edu/>. Interested parties are also encouraged to contact Dr. Thomas Waltzek (see below).

The postdoctoral research position will support the WAVDL and the UF AAHP in the discovery and characterization of EAAPs. The researcher will be exposed to UF faculty utilizing the latest phylogenomic approaches to study the epidemiology and evolution of EAAPs. The position will assist in the development and orchestration of molecular diagnostics (e.g. PCR, qPCR, and metagenomics) to track EAAPs. Applicants are expected to have a strong publication record and individuals with grant writing experience are strongly encouraged to apply. Interested postdoctoral candidates should email a statement of interest, curriculum vitae, and a list of three references to Dr. Thomas Waltzek (tbwaltzek@ufl.edu).

2014 Fish Transportation Welfare Scholarships

The Humane Slaughter Association (HSA) is calling for applications for its 2014 Dorothy Sidley Memorial Scholarships. The scholarships were established in 1986 as a memorial to the late Dorothy Sidley MBE, who was General Secretary of the HSA for 48 years. They support students and industry trainees undertaking research projects that are aimed at improving the welfare of food animals during transport, in markets or at slaughter.

Undergraduate and postgraduate students in agricultural, veterinary or meat sciences, or trainees in the livestock, meat and fish industries in the UK, are eligible, as are students registered at universities outside the UK that have a UFAW/HSA University 'LINK' person. See www.ufaw.org.uk/links-news-events.php for LINKs.

For 2014 the HSA offers the following suggestions for research areas, including the associations between transport variables and fish welfare, and the constraints to the adoption of modern methods of stunning livestock at slaughter in countries that have not done so.

Each Scholarship is for up to £2,000. Applicants are encouraged to design research projects in areas they are particularly interested in. Projects now being undertaken by current scholars include: examining the pathophysiology of captive-bolt stunning of alpacas; investigating reasons for carcass rejection during religious slaughter; and a study of the effect of handling methods on broiler hip joints.

Applications & More Information

Closing date for applications is 28th February, 2014.

- For more information on the award: <http://tinyurl.com/m5jtyny>.
- To download an application form: <http://tinyurl.com/mc39pxt>.
- For more information on the Humane Slaughter Association: www.hsa.org.uk.



THE AQUATIC VETERINARIAN

Volume 7, Number 3

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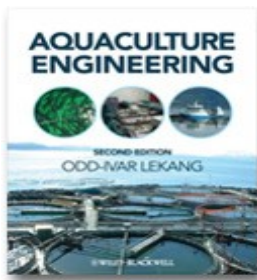


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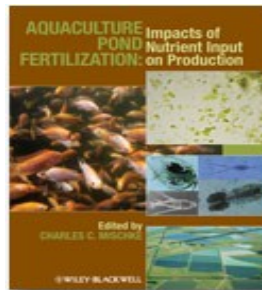


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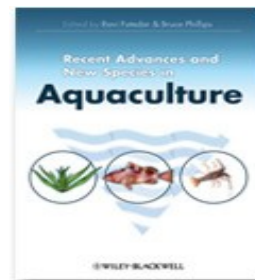
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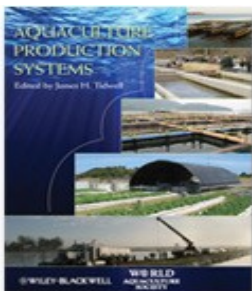
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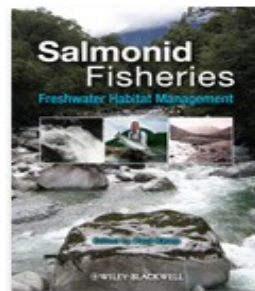
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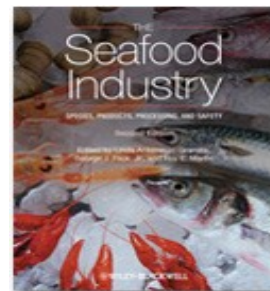
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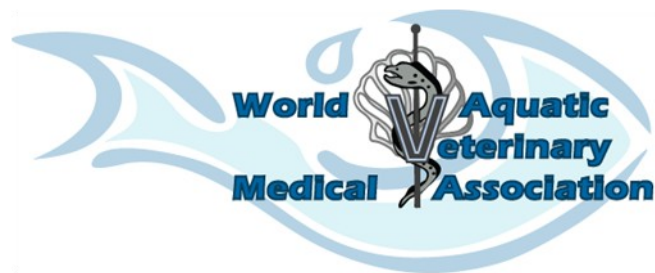
THE AQUATIC VETERINARIAN

Volume 7, Number 3

SPECIAL SUPPLEMENT

Third Quarter 2013

World Aquatic Veterinary Medical Association Certified Aquatic Veterinarian (CertAqV) Credentialing Program



A WAVMA Member Program

Version 1 (10/2013)

World Aquatic Veterinary Medical Association

Certified Aquatic Veterinarian (CertAqV) Credentialing Program

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Certified Aquatic Veterinarian (CertAqV) Credentialing Program

Background

The need for an adequate and well-trained aquatic veterinary workforce that provides services to the aquaculture and seafood producing industries, aquatic animal owners, private industries, government agencies and others has become a global imperative – particularly in light of increasing concerns for combating disease, seafood safety, public health and other issues.

Because of their training in multiple species of animals and disciplines of medicine veterinarians are uniquely qualified to deal with most of these issues. However, many academic veterinary curricula around the world may not currently have a sufficient focus on aquatic veterinary medicine to fully prepare graduates for practices in aquatic veterinary medicine. Fortunately, there are numerous other educational opportunities for veterinary students and veterinarians to obtain the knowledge, skills and experience necessary to provide adequate aquatic veterinary services.

The WAVMA Aquatic Veterinarian Certification Program seeks to identify the core competency areas or subject matter needed to practice aquatic veterinary medicine, and to recognize those veterinarians that have acquired the necessary knowledge, skills and experience through a variety of sources.

It is **not** the intention of the WAVMA CertAqV Program to duplicate, supersede or replace the need for any aquatic veterinary courses, curricula or Board Certification programs in aquatic veterinary medicine. However, recognizing that developing veterinary school curricular, Board Certification and other education and credentialing programs are both complex tasks and will take many years to develop, the CertAqV Program is seen as one that supports and supplements current and future efforts to ensure an adequate and well-trained global aquatic veterinary workforce.

Program Administration

The WAVMA CertAqV Program is administered by the WAVMA Credentialing Committee, along with the assistance of other Certified WAVMA members who serve as mentors and adjudicators (see Appendix 1 for mentor and adjudicator responsibilities and CertAqV individuals).

The WAVMA Credentialing Committee will review the program at least annually and may revise the description and needs for any KSE Module or subject area, as necessary.

CertAqV Process

To be credentialed by WAVMA as a Certified Aquatic Veterinarian and utilize the CertAqV honorific, individuals must be a WAVMA member, have a veterinary degree from a nationally recognized veterinary school, college or university and have demonstrated general knowledge and competency in core subject areas noted below that are currently considered necessary to practice aquatic veterinary medicine. Students of a nationally recognized veterinary institution of higher education can register for the program, but will not be certified or entitled to utilize the CertAqV honorific until they graduate.

Individuals that desire to participate in the WAVMA CertAqV Credentialing Program are required to:

- Be a current member of the World Aquatic Veterinary Medical Association
- Register for the Program (application at www.wavma.org or contact the WAVMA Secretariat).
- Identify a mentor to assist the registrant through the Program. The potential mentors would be any available WAVMA Certified Aquatic Veterinarians (see Appendix I).
- Provide the mentor with written evidence of satisfactory completion of each of the core Knowledge, Skills and Experience (KSE) subject areas.
- Petition the Credentialing Committee for recognition of completion of all KSE requirements after the mentor has approved the documentation.

Registration & Petitioning for CertAqV

Individuals wanting to participate in the WAVMA CertAqV Program will submit an application form along with a registration fee of US \$250. The application for CertAqV will remain active for two years from the date of initial registration. If a candidate does not petition by providing the Credentialing Committee with the evidence of satisfactory completion of KSE requirements for all 9 subject areas within 2 years, the candidate will be required to submit a new application and fee. Once the applicant has worked with the mentor to produce the documents required to assess the applicant's KSE, the documentation will then be reviewed by at least two members of the Credentialing Committee to approve the petition for certification, or the committee may request further documentation from the applicant before approving the petition. The approved petition is then forwarded to the WAVMA Executive Board for issuing of the Certification.

CertAqV Re-certification & CEPD Requirements

The CertAqV credentials are limited to 5 years from the date of issuance. The certified veterinarian must submit a renewal form every 5 years along with a recertification fee of \$50.00 US. To renew the CertAqV credentials, evidence of at least 50 credit hours of aquatic veterinary Continuing Education and Professional Development (CEPD) over 5 years is required (i.e., an average of 10 hours per year). Continued WAVMA membership is also a requirement to maintain the CertAqV status.

Mentors & Adjudicators

Individuals that have been awarded WAVMA CertAqV credentials may be available to serve as mentors to help guide new candidates through the CertAqV program (see Appendix 1 for a list of potential mentors).

At least two individuals awarded WAVMA CertAqV (but not the mentor) will serve as adjudicators to evaluate an individual applicant's petition for CertAqV and recommend certification or request additional information or documentation from the applicant to fulfill the certification requirements.

The Credentialing Committee members that have been awarded WAVMA CertAqV credentials will also be responsible for evaluating non-WAVMA courses and programs as suitable for CertAqV credit.

Core Knowledge, Skills & Experience (KSE) Requirements

In order to be certified as a WAVMA Certified Aquatic Veterinarian (CertAqV), applicants will need to demonstrate the Knowledge, Skills and Experience (KSE) using WAVMA approved programs or processes. 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, reptiles, finfish, crustaceans, or molluscs. CertAqV candidates are required to be familiar with, and be able to, describe the normal and abnormal aspects of each specific subject that are encountered in general aquatic veterinary practice, and know where to locate additional information on the subject. Each specific area is assigned a minimum number of KSE credits needed in brackets [], for a total of at least 150 credits.

PRE-CLINICAL KSE:

1. Aquatic Environment and Life Support Systems [25 credits minimum]

Water quality includes all the physical, chemical and biological characteristics of water that regulates its suitability for the health of aquatic organisms and their ecosystem. Poor water quality is often the cause of morbidity and mortality in aquatic animals. Knowledge, skills and experience in this subject matter are critical for practicing aquatic veterinary medicine. Given the intimate relationship that aquatic organisms have with the surrounding environment, a candidate should demonstrate thorough understanding of this environment.

Examples are:

- Chemical stressors and their effect on aquatic animal health/environment
 - Common chemical water quality abnormalities
 - Techniques for the assessment/monitoring of water quality parameters
 - Interpretation of water quality parameter results
 - Appropriate treatment of water quality abnormalities
 - Toxins and pollutants
 - Effects of medications and therapeutics on water quality
- Physical stressors in the aquatic environment and their effect on aquatic animal health/environment. Including: stocking density, improper husbandry/life-support system, tank/pond design, inter/intra-species aggression, handling and transport
- Biological stressors in the aquatic environment and their effects on aquatic animal health
- Species differences in regards to their water quality requirements
- Interaction of various species in the aquatic ecosystem and its effect on aquatic animal health
- Environmental factors that affect the development of disease

2. Taxonomy, Anatomy and Physiology [10 credits minimum]

Candidate should demonstrate knowledge, skills and experience necessary for the practice of aquatic veterinary medicine and surgery of the basic anatomy and physiology of major aquatic animal taxa.

Examples are:

- Taxonomic relationship of aquatic Phyla
- Scientific and common names of significant aquatic animal species
- Anatomy and physiology of organ systems including:
 - Musculoskeletal and integumentary
 - Digestive (gastrointestinal), nutritional physiology
 - Circulatory and Respiratory
 - Osmoregulatory and waste excretion
 - Reproductive and Endocrine
 - Reticuloendothelial and Immune
 - Nervous

3. Husbandry and Industries [25 credits minimum]

Candidate should demonstrate an understanding of the key industry sectors, economics, health issues and husbandry practices associated with the captive maintenance of aquatic animals (e.g., aquaculture, ornamental pet trade, public aquaria exhibits,) and with wild harvest of aquatic animals for food and pets.

Examples are:

- Aquaculture Industry – Food sector and Ornamental sector
- Wild Harvest – Food and Ornamental Sectors
- Public Aquaria and Zoo Aquatic Animal Exhibition
- Conservation/Resource management captive breeding programs
- Animal Handling Techniques
- Animal Holding System Design and General Management
- Collection, Transport, Acclimation
- Biosecurity/Quarantine
- Life-Support System Components, Function and Management

- Water Quality Assessment and Interpretation
- Nutrition and Feeding
- Record Keeping and Standard Operating Procedures

CLINICAL KSE:

4. Pathobiology and Epidemiology of Aquatic Animal Diseases [25 credits minimum]

Candidate should demonstrate an understanding of environmental conditions and pathogens that cause diseases in aquatic animals, the pathological changes that occur in the animals, and the clinical signs of important aquatic animal diseases in order to determine the cause of the disease and the course of action or treatment, and assess the risk of contagion.

Examples are:

- Disease identification, prevention, control, treatment, eradication decisions.
- Non-infectious diseases:
 - Nutritional deficiencies
 - Water quality/temperature abnormality
 - Toxicity
 - Traumatic injuries
 - Genetic disorders
 - Neoplasia
- Infectious diseases:
 - Viruses
 - Bacteria
 - Fungi
- Parasitic diseases:
 - Protozoa
 - Metazoa
- Epidemiology
- Biosecurity, pathogen exclusion or containment methods.

5. Diagnostics and Treatment of Aquatic Animal Diseases [25 credits minimum]

Candidate should demonstrate a good understanding of the diagnostic procedures and treatments, including fundamental theoretical knowledge, as well as practical experience with clinical and laboratory disease diagnosis and treatment of infectious diseases and pathological conditions.

Examples are:

- Principles of Laboratory Diagnosis:
 - Sample collection for laboratory examination
 - Proper shipment of samples for diagnostic purposes
 - Principles of sample custody
 - Quality Assurance and Quality Control (QA and QC)
 - Diagnosis of bacterial infections
 - Diagnosis of viral infections
 - Diagnosis of mycotic infections
 - Diagnosis of parasitic diseases
 - Diagnosis of neoplasia
 - Diagnosis of traumatic injuries
 - Diagnosis of toxicities
- Principles of Prophylaxis and Disease Control
- Therapeutics, Biologics, Vaccines and other treatment approaches

6. Clinical Veterinary Experience and Client Communications [25 credits minimum]

Candidate should demonstrate competency with basic clinical procedures, diagnostic tools and techniques, and with client or industry communication.

Examples are:

- Clinical Examination, including:
 - Taking a case history adapted to aquatic animals (e.g., include water quality)
 - Physical examination techniques
 - Blood collection and analysis
 - Examination of cytology & biopsy wet mounts
 - Postmortem examination
- Sedation/Anesthesia
- Basic imaging techniques
- Basic surgical procedures
- Common therapeutic approaches
- General Case management
- Client Communications with aquarists, aquaculture producer/farmers, wild animal collectors, facility managers, exporter/importer/wholesaler, retailer and hobbyist/pet owners.

7. Public Health, Zoonotics and Seafood Safety [5 credits minimum]

Candidate should demonstrate knowledge of aquatic zoonotic diseases pertinent to their field of practice. Candidate should also demonstrate understanding of the role of the veterinarian in public health through education and knowledge of the food-chain and seafood safety methodology.

Examples are:

- The etiology, transmission, treatment and control of aquatic zoonotic diseases
- Benefits and disadvantages of aquatic animals in public health
- Food-chain practices and legislation pertinent to their locality (including methods used to ensure product safety from the source to the consumer).

8. Legislation, Regulations, and Policies [5 credits minimum]

Candidate should demonstrate a good understanding of the laws, regulations and policies that directly impact the practice of aquatic veterinary medicine in areas relevant to the candidate.

Examples are:

- International bodies and guidance, codes or standards that address aquatic animal health and welfare, public health and seafood safety
- National and state/provincial/local governmental authorities responsible for, and statutory and non-statutory legislation, regulations and/or policies
- National and state/provincial/local veterinary organizations, their policies and codes or principles of veterinary medical ethics
- Development of a regional, national, or international health plan that includes list of reportable diseases, certification, zoning, risk assessment, and quarantine.

9. Principles of Aquatic Animal Welfare [5 credits minimum]

Candidate should demonstrate knowledge of current issues related to aquatic animal welfare and an ability to assess the welfare status of key aquatic species.

Examples are:

- General topics in aquatic animal welfare that are of concern to aquaculture industry, ornamental industry and hobbyists, research, resource management, zoos and aquariums
- Key legislation, regulations, policies, and professional societies' statements about aquatic animal welfare.
- Humane handling and euthanasia methods of aquatic animal species associated with the fishing industry, wildlife, aquaculture, ornamental trade, zoos, public aquaria and research.

Assessing the Necessary KSEs

Individuals may attain WAVMA credit for the core CertAqV requirements through verification of the satisfactory completion of educational or training programs specifically focused on the above KSE subject areas. This education can be from academic training programs, lectures, seminars, self-study, publication or additional methods listed below, or from other relevant experiences of the candidate upon approval of the WAVMA Credentialing Committee.

The candidates will document the necessary KSEs obtained from their education and training by compiling a list of classes, lectures, education and other training or experience for assessment by their mentor. Once sufficient evidence of knowledge and skills in each subject area is compiled and reviewed by the candidate's mentor, it will be presented to members of the Credentialing Committee for review. If the committee determines that additional training or documentation is necessary, that information will be provided to the candidate to allow completion of the certification process. Candidates that provide complete documentation of sufficient knowledge, skills and experience will be certified as an Aquatic Veterinarian.

Candidates may obtain credit points from any combination of the educational sources listed below. This will help ensure that a wide variety of skills and experiences are obtained in each KSE subject area. A minimum of 150 credit points from the listed subject areas will be necessary for certification. A combination of KSEs obtained from the below educational sources to reach a minimum of 150 points will be adequate for certification, however, the minimum number of credit points must be met for each KSE subject area, as described in the KSE section.

A. Continuing Education and Professional Development (CEPD)

The candidate will receive 1 point per hour of CEPD toward certification requirements. CEPD must be in the field of aquatic veterinary medicine, and preferably from a WAVMA-approved CEPD program. A copy of the CEPD certificate and course information needs to be included in the certification documentation.

EXAMPLE: If a candidate received a total of 8 CEPD hours during a veterinary conference, the list of topics presented at the lectures is required. Given that a sum of CEPD hours may encompass more than one KSE subject area (e.g. Pathobiology or Aquatic Environment) the candidate should suggest the KSE subject areas to apply the CEPD credit to (e.g. 5 points to Pathobiology and 3 points to Aquatic Environment KSE subject area).

B. Academic Programs or Courses (University Level)

The candidate will receive 20 points per week of a of FULL-TIME (40 hours) clinical academic veterinary externship rotation in the field of aquatic veterinary medicine or for an extensive laboratory and lecture based course in an area of aquatic veterinary medicine. Shorter University based courses will be treated as CEPD (see above). The candidate's mentor will assist in evaluating the credit points for each program.

EXAMPLE: A 3-week full-time clinical rotation in any area of aquatic animal medicine during veterinary curriculum will provide a candidate with a total of 60 points. A copy of the syllabus and the number of points to be applied to each KSE subject area needs to be included in the documentation package.

A WAVMA recognized extensive course in aquatic animal medicine that involves lectures, diagnostic laboratory and clinical experience can earn up to 20 points per week of full-time courses. University courses such as the 4-week long AquaVet Program will provide 20 points per week.

Veterinary students performing externships in aquatic veterinary medicine while in Veterinary School will receive 20 points per week of full-time externships in aquariums or other programs of aquatic veterinary medicine.

C. Post-Veterinary Academic Training (University Degrees, Internships, Residencies, Board Certification & Other Programs)

The WAVMA Credentialing Committee will review the aquatic veterinary medicine relevance of post-veterinary academic degrees (MSc/PhD) and training information (Internship, Residency, Board Certification) provided by the candidate and the mentor will assist the candidate in determining the credit points based on the relevance of the program to fulfill the KSE subject area requirements. The candidate will need to provide a description on the KSE subject areas that were part of the post-veterinary academic training.

EXAMPLE: The candidate may receive up to 50 points for one year of full-time veterinary internship or residency in a public aquarium focused on aquatic animal medicine. The candidate may receive up to 75 points for completion of a Master's program with a focus on aquatic animal medicine. The candidate may receive up to 100 points for completion of a PhD program with a focus on aquatic animal medicine. The candidate may receive up to 100 points for board certification in a specialty area with significant focus on aquatic animal medicine.

D. Literature Self-Study and Online Education

One point will be given for each journal article read or online webinar watched. The journal article or program title and author will be listed in the candidate's documentation. Books or book chapters will be given points based on 1 point per book chapter, up to 10 points per book studied. List the book title, chapter and author in the appropriate KSE section of the documentation.

E. Clinical Experience & Case Logs

The WAVMA Credentialing Committee will review the candidate's clinical experience based on the candidate's written description of experiences in aquatic veterinary medicine, case logs or reports. A letter of reference from an employer, client or co-worker can be used as documentation for the candidate's clinical experience. The candidate will need to provide a description of the KSE subject areas that were part of their clinical experience. The candidate's mentor will assess the experience and help determine the appropriate KSE area. Written case reports describing the candidate's involvement with examining, diagnosing and treating an aquatic animal can also be used to obtain credit for clinical experience. Five credit points will be given for each case log or report.

EXAMPLE: The candidate was employed full-time in a private practice. Candidate presents a total of 5 clinical case reports to the WAVMA Credentialing Committee as part of the application. After review for acceptance, the candidate would receive 25 points for these case reports toward certification.

F. Publications & Presentations in Professional Meetings

The candidate will receive points for publication of peer-reviewed journal articles, reviews, case reports, books or book chapters, and oral presentations at professional meetings. The candidate will provide copies of publications to the WAVMA Credentialing Committee for evaluation. Publications will be given 5 points per published article, review, or case report; 10 points per published peer-reviewed journal article, or for editing a multi-author book or writing a book chapter; and up to 40 points for authoring a complete aquatic medicine related book.

Professional presentations will be given 1 point per 15 minutes for brief presentation times, and 5 points per hour for longer presentations. Educators can use their teaching of classes related to aquatic veterinary medicine as professional presentation for credit (i.e., 5 points per hour for each unique lecture; repeating the lecture multiple times does not confer additional credits). Describe which KSE subject area each point would be attributed to in the credentialing documentation.

Summary of KSE Sources and their Credits

- A. Continuing Education and Professional Development (CEPD) classes/lectures**
Veterinary Conferences; University-based short courses
1 hour = 1 credit

- B. Academic Programs or Courses (University Level)**
Full-time clinical academic veterinary externship rotation
WAVMA recognized extensive course in aquatic animal medicine
2 class hours = 1 credit; or 20 points per week (e.g., 40 hour week = 20 credits)

- C. Post-Veterinary Academic Training (Degrees, Internships, Residencies, Certification)** Intern/
Residency= up to 50; MS=up to 75; PhD/Board Certification=up to 100 credits

- D. Journal / Literature Self-Study and Online Education**
Journal Article/Webcast lecture=1 credit; Book=1 credit/chapter up to 10 credits/book

- E. Clinical Experience & Case Logs**
Case Report =5 credits per case
Documentation/Letter of Clinical Experience=up to 50 credits (evaluate with mentor)

- F. Publications & Presentations in Professional Meetings**
Published article=5 credits; Published Peer-reviewed article=10 credits;
Published case report or review=5 credits
Editing a multi-author book=10 credits; Writing a Book Chapter=10;
Writing a Complete Book=10 per chapter up to 40 credits;
Short oral presentations at professional meetings=1 point per 15 minutes
Long oral presentations at professional meetings=5 points per lecture hour
Teaching University-level Academic classes=5 credits per lecture hour

For additional information contact the WAVMA Credentialing Committee (below).

Appendix 1 –Mentors & Adjudicators

Members of the Credentialing Committee will evaluate all applications for certification. A mentor will be assigned to the applicant, or one can be requested by the applicant. The mentor will review the applicant's KSE documentation and when it meets the minimum requirements it will be presented to the Credentialing Committee for adjudication by at least two other members. Once approved, the WAVMA Executive Board will be notified to confer the Certified Aquatic Veterinarian title to the applicant. On a periodic basis, certified individuals will also be asked to evaluate the Program and revise the description and needs for any KSE Module or subject area.

WAVMA Credentialing Committee

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Colin Johnston, BVMS, MACVSc, CertAqV	New Zealand
Julius Tepper, DVM, CertAqV	United States

Appendix 2 –Resources

This is a preliminary list of resources suggested for use in obtaining KSEs for CertAqV credentialing. It will be revised periodically to correct some errors, but also to ensure inclusiveness and appropriateness of the resources listed. If members are aware of resources that are not listed and they consider suitable, then please let us know through the members listserv and we will continue to add to this list.

1) Academic clinical rotations focused on aquatic animal medicine

- a. Veterinary schools
- b. Public aquaria

2) Academic programs or courses (University Level)

- a. AquaVet I and II: University of Pennsylvania/Cornell University
AQUAVET I ® ~ 4 weeks; AQUAVET II® ~ 2 weeks: <http://www.vet.cornell.edu/aquavet/generalinfo.cfm>
- b. Seavet: Univ of Florida. <http://conference.ifas.ufl.edu/ame/seavet/>
- c. Marvet: <http://www.marvet.org/>
- d. Aquamed : Baton Rouge, LA) (Gulf States Consortium, CsVM) (~4 weeks): <http://www.vetmed.lsu.edu/aquamed.htm>
- e. Diseases of Warm Water Fish: Ruskin, FL & St. Augustine, FL) (~ 2 weeks): <http://conference.ifas.ufl.edu/ame>
- f. University of Florida, Advanced Fish Medicine (Gainesville, FL & Orlando, FL) (~ 1 week): <http://conference.ifas.ufl.edu/ame>
- g. Envirovet (University of Illinois, Urbana-Champaign, CVM): <http://www.cvm.uiuc.edu/envirovet>
- h. Annual Aquaculture Water Reuse Systems Short Course: Cornell University
- i. Salmon Disease Workshop: Oregon State University
- j. North Carolina State University: Fish Medicine Short Course, Raleigh, NC: Contact S. Hartford at 919-513-6421 (samantha_hartford@ncsu.edu) for more information.
- k. State of Wisconsin, Aquaculture Veterinary Medicine for Practitioners, Short Course, Contact Karen Meinholz, phone: 608-265-5206, for more information
- l. Atlantic Veterinary College: Fish Disease Diagnostics for Practicing Veterinarians (Prince Edward Island) <http://www.upei.ca/avc/html/fish.html>
- m. US Fish and Wildlife Service <<http://training.fws.gov>>:

- (i) Fish Histology and Histopathology (course #FIS1350)
 - (ii) Coldwater Fish Culture (course #FIS1100).
 - (iii) Warm and Coolwater Fish Culture (course #FIS1140)
 - (iv) Introduction to Fish Health (course #FIS1150)
 - (v) Fish Disease Diagnostic Techniques (course #FIS1250)
- n. Harbor Branch Oceanographic Institute: Aquatic Animal Health Management (Fort Pierce, FL) (3 days): <http://www.aquatichealth.org/courses.html>
 - o. Mote Marine Laboratory, Diseases of Corals and Other Reef Organisms, Summerland Key, FL (9 days). For the 2011 course: http://isurus.mote.org/Keys/disease_workshop_2011.phtml
 - p. University of Arizona, Shrimp Pathology Short Course, Tucson, AZ (2 weeks): <http://microvet.arizona.edu/research/aquapath/index.htm>
 - q. Harbor Branch Oceanographic Institute, ShrimpMed, Fort Pierce, FL (3 days): General course information available at <http://www.fau.edu/hboi/Aquaculture/AQacted.php>
 - r. University of Queensland, Australia, Aquaculture Courses http://www.uq.edu.au/study/plan.html?acad_plan=AQUACX2200
 - s. University of Florida, Two-Day Fish Health Management Workshops (Ruskin, Gainesville): contact Roy Yanong (Ruskin) (rpy@ifas.ufl.edu) or Denise Petty (Gainesville) (pettyd@ufl.edu) for more information
 - t. VIN (www.vin.com): Basic and intermediate fish medicine
 - u. University of Wisconsin's Fish Health Medicine Certificate Program
 - v. www.vetmede.org?Fish_Disease_Courses
 - w. Kentucky State University offers five online courses in aquaculture including Water Quality Management and Fish Diseases. (<http://www.ksuaquaculture.org/>).
 - x. Michigan State University, College of Veterinary Medicine: Aquatic Animal Medicine Clerkship, PDI636

3) Continuing education/veterinary meetings

- a. American Fisheries Society, Fish Health Section (AFS/FHS): <http://www.fisheries.org/units/fhs/meeting.php>
- b. AVMA annual conference: <http://www.avma.org/convention/>
- c. Eastern Fish Health Workshop (hosted by National Fish Health Research Laboratory, USGS): <http://www.fws.gov/fisheries/aadap/PDF/2011%20EFHW/36%20th%20Eastern%20Fish%20Health%20Workshop.pdf>
- d. IAAAM: www.iaaam.org

- e. Fish Veterinary Society (UK): <http://www.fishvetsociety.org.uk/>
- f. EAAP :<http://eaap.org/split-workshops/>
- g. International Conference on Recirculating Aquaculture, offered by USDA, Virginia Tech, Aquacultural Engineering Society, and the Freshwater Institute. (<http://www.recircaqua.com/icra.html>).
- h. Louisiana State University, International Symposium on Aquatic Animal Health: <http://www.vetmed.lsu.edu/pbs/Meetings.html>
- i. North American Veterinary Conference: Aquatic Animal Medicine sessions: <http://www.tnavc.org/>
- j. Western Fish Health Workshop (hosted annual by various western fish resource agencies): <http://www.fisheries.org/units/fhs/meeting.php>
- k. World Aquaculture Society (Aquaculture America and World Aquaculture meetings): <http://was.org/>
- l. Worldwide Association of Veterinary Medical Association (WAVMA): Aquatic Veterinary conference: <http://www.wavma.org/>
- m. Veterinary Information Network (online CE courses on Aquatic Medicine)
- n. Veterinary Workshop on Fish Regulatory Medicine:
 - Funded by the U.S. Department of Agriculture and the Wisconsin Department of Agriculture, Trade and Consumer Protection.

4) Post-Veterinary Academic Training (Internships, Residency, Masters, PhD, Certificates, Board Certification)

- a. Aquatic internship
 - i. Mystic Aquarium & Institute for Exploration, Mystic, CT:<http://www.mysticaquarium.org>
 - ii. National Aquarium, Baltimore, MD: <http://www.aqua.org/>
 - iii. The Florida Aquarium, Tampa, FL, and University of Florida, IFAS Tropical Aquaculture Laboratory, Ruskin, FL (joint program): <http://fishweb.ifas.ufl.edu/index.htm>
 - iv. Shedd Aquarium/Brookfield Zoo/Lincoln Park Zoo, Chicago, IL: <http://www.sheddaquarium.org>
 - v. Georgia Aquarium
 - vi. Various other aquaria
- b. Aquatic Residency (2-3 years)
 - i. North Carolina State University College of Veterinary Medicine, Raleigh, NC: Zoological Medicine residency (includes aquatic animals):
 - ii. University of Florida College of Veterinary Gainesville, FL: residency in aquatic animal health: <http://>
 - iii. Various aquaria

- c. Masters or PhD in aquatic animal health
 - i. University of Stirling
 - 1. <http://www.aquaculture.stir.ac.uk/training/masters/aquatic-veterinary>
 - 2. <http://www.aquaculture.stir.ac.uk/training/masters/aquatic-pathobiology>
- d. Certificates/Board Certification
 - i. Diplomate of ACZM (Aquatics)
 - ii. Member of ACVSc (Aquatic Animal Health)
 - iii. Fellows of ACVSc (Aquatic Animal Health) - 85 points
 - iv. RCVS CertAVP (Fish) certificate
 - v. Aquatic Animal Health Certificate from University of Florida (Seavet required for completion): <http://aquatic.vetmed.ufl.edu/education/programs/aah-certificate/>
 - vi. University of Wisconsin's Fish Health Medicine certificate program. http://www.vetmedce.org/Fish_Disease_Courses. The full course includes a hands-on lab/fish farm visit in Wisconsin. Modules can be taken separately

5) Fact Sheets/Circulars

- a. University of Florida (UF), Institute of Food and Agricultural Sciences (IFAS) Electronic Data Information Source (EDIS): <http://edis.ifas.ufl.edu/deptlist.html> (aquatic animal medicine related fact sheets can be found by entering through the Veterinary Medicine link and the Fisheries and Aquatic Sciences link).
- b. University of Florida Circular: Florida Aqua News (for aquatic animal veterinarians): <http://www.sfrc.ufl.edu/FAS-Programs/AquaticAnimalHealth/index.html>
- c. Oregon Sea Grant, Ornamental Fish Health Newsletter: <http://seagrant.oregonstate.edu/extension/fishhealth/index.html>
- d. Commercial Fish and Shellfish Technology (CFAST): <http://www.cfast.vt.edu/publications.shtml?2#ph2>
- e. USDA APHIS, Veterinary Services: http://www.aphis.usda.gov/animal_health/animal_dis_spec/aquaculture/
- f. Regional Aquaculture Centers:
 - Southern Regional Aquaculture Center (SRAC): <http://www.msstate.edu/dept/srac/fslist.htm>
 - North Central Regional Aquaculture Center (NCRAC): <http://www.ncrac.org/>
 - Western Regional Aquaculture Center: <http://www.fish.washington.edu/wrac/>
 - Northeastern Regional Aquaculture Center: <http://www.nrac.umd.edu/publications/factSheets.cfm>
 - Tropical and Subtropical Regional Aquaculture Center: <http://www.ctsa.org/>

6) Other Useful Websites

- a. FishBase: A global Information System on Fishes:
<http://www.fishbase.org/home.htm>
- b. Coral Health and Monitoring Program (CHAMP)
<http://www.coral.noaa.gov/>
- c. Shellfish Diseases
http://www.pac.dfo-mpo.gc.ca/sci/shelldis/toc_e.htm
- d. Trout Histology Image Collection, USFWS online at:
<http://training.fws.gov/BART/fish/histo1.html>
- e. Atlas of Normal Fathead Minnow Histology:
<http://aquaticpath.umd.edu/fhm/index.html>
- f. Diseases of Zebrafish in Research Facilities:
<http://zebrafish.org/zirc/health/diseaseManual.php>
- g. Information Resources on Fish Welfare
<http://www.nal.usda.gov/awic/pubs/Fishwelfare/fishwelfare.htm>

7) Journals

- a. Bulletin of The European Association of Fish Pathologists
- b. Journal of Aquatic Animal Health (American Fisheries Society, Fish Health Section)
- c. Journal of Fish Diseases
- d. Diseases of Aquatic Organisms
- e. Fish and Shellfish Immunology
- f. Gyobyu Kenkyo - Fish Pathology
- g. Journal of Aquatic Animal Health
- h. Journal of the Fish Veterinary Society (UK)
- i. Annual Review of Fish Diseases
- j. Aquaculture
- k. Aquaculture & Husbandry
- l. Fisheries
- m. Journal of Aquaculture & Aquatic Sciences
- n. Journal of Fish Biology
- o. Journal of the World Aquaculture Society
- p. Progressive Fish Culturist
- q. Journal of Small Exotic Animal Medicine
- r. Journal of Wildlife Diseases
- s. Journal of Zoo and Wildlife Medicine
- t. Marine Mammal Science
- u. Seminars in Avian and Exotic Pet Medicine (contain fish specific review articles)
- v. The Aquatic Veterinarian (WAVMA quarterly journal)

- w. Veterinary Clinics of North America, Exotic Animal Practice (contain fish specific review articles)

8) DVD/CD/Videos

- a. Durborow, R. Diseases of Warmwater Fish and Trout Diseases. Kentucky State University Aquaculture Program and the U.S.D.A. 2001. DVD available through The World Aquaculture Society (www.was.org).
- b. Kane A. FishGuts: A Multimedia Guide to the Art and Science of Fish Anatomy, Health and Necropsy. Aquatic Pathobiology Center, University of Maryland, Baltimore, MD, 1996. <http://aquaticpath.umd.edu/fg/>
- c. Strange R. Fish Physiology on CD-ROM. Professor Richard Strange, University of Tennessee, 2003. <http://bellsouthpwp.net/r/s/rstrange/>
- d. Strange R. Recirculation Aquaculture on CD-ROM. Professor Richard Strange, University of Tennessee, 2004. <http://bellsouthpwp.net/r/s/rstrange/>
- e. Watson, CA. Fish Health Management. Six video series. University of Florida, Cooperative Extension Service (in conjunction with the FTFFA and the Pet Care Trust): <http://www.petsforum.com/petcaretrust/PCTE2.htm>.
- f. Faisal, M. 2013: Fish Health Management. Michigan State University A series of narrated lectures (150) dealing with all clinical and basic aspects of fish health. <http://aquaticanimalhealth.msu.edu/fishhealth>

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