

Aquatic Vet News



Vol. 2, No. 4

Fall 2008

Newsletter of the World Aquatic Veterinary Medical Association

One Profession; One Discipline; One Voice – Cohesive & Inclusive!

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, AND TO SUPPORT THE VETERINARY PROFESSION, AQUATIC ANIMAL OWNERS, ALLIED INDUSTRIES, AND OTHER ASSOCIATED STAKEHOLDERS.

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It has been suggested that the following Image is utilized as a masthead for the next Volume (2009) of *Aquatic Vet News*

Please send your comments and suggestions for the best layouts to:
Dr. Nick Saint-Erne (AVN Editor)
nsainterne@gmail.com



or, ð ð . open discussion on this issue through the WAVMA Members Listserv (see page 2 of this newsletter for instructions how to join WAVMA Members-L).

EDITOR'S NOTE

As I write this, the American spooky holiday of Halloween (All Hallow's Evening) is coming up at the end of the week, and an even scarier day . U.S. Election Day . is just one week away. Who knows what frightening events will have occurred by the time you read this newsletter? With so many serious issues facing the world's governments, this is certainly a trying time. But hopefully it will all work out for the best, and the whole world will be better off with the next President's administration.

One way to make the veterinary community better is to solicit help from other WAVMA members on issues you are facing in your aquatic veterinary practice. Read below on how to use the WAVMA Member's Listserv to ask for help on issues you are seeing, or to help other veterinarians by offering your advice and suggestions on cases they submit on the listserv for comments.

The **WAVMA Members Listserv** is also intended to provide all members with the opportunity to have frank and open dialogue on any issues concerning WAVMA and aquatic veterinary medicine. So once you have subscribed, feel free to start discussion on any topic of interest.

In order to subscribe, send an email message to imailsrv@wavma.org . . copy and paste the following into the body of the message:

**Subscribe WAVMA_Members-L YourFirstName
YourLastName**

You would use your actual first name, followed by a space and then your last name, all on one line. You don't need any other information in the body of the email, and leave the subject line blank. You will receive an email back from the listserv Moderator informing you when you have successfully subscribed to the listserv. You can then immediately start using the listserv.

So don't miss out on important WAVMA news and information! If you haven't already subscribed to WAVMA Members-L we suggest you do so at your earliest convenience. WAVMA Members-L is YOUR list-server.

WAVMA Members-L will be moderated only to ensure only members are subscribed, and that the etiquette and rules are upheld; the topics of discussion are up to you. If at anytime you need help

or information concerning WAVMA Members-L, or need a copy of the Rules & Instructions, simply send an e-mail to the Moderators at:

WAVMA-L.Moderators@mailhost.wavma.org.

We hope to start using **WAVMA Members-L** for communications with all members . including sending out the Newsletters, meeting information, what's developing in Committees, new WAVMA programs, etc, so, it can be used by individuals to ask for help from the rest of the members, or by Committees to rapidly send information to all WAVMA members. Remember, this is a members-only communications (no secret handshake necessary . but you do need to sign up for it!).

To Post a Message to WAVMA Members-L, just type out your message or question and e-mail the message to:

WAVMA_Members-L@mailhost.wavma.org

Your message will immediately be received by all subscribers. Be sure that the subject line provides a clear description of the discussion topic. This will also help when multiple e-mails about different topics are being discussed simultaneously.

Replying to WAVMA Members-L is easy; simply click Reply+. The list-server is set up to reply to WAVMA_Member-L@mailhost.wavma.org and your reply message will go to all subscribers.

If you wish to reply to the sender *only*, simply copy that person's e-mail address into the To+line of your response e-mail. The original messages are automated to come from WAVMA_Members-L-owner@mailhost.wavma.org On Behalf Of (Person's Name) [e-mail address]. From this line you can copy just the one e-mail address you need to reply only to the original sender.

So now, you too can use one of the significant benefits of being a member of WAVMA. Sign up for the listserv today and keep in touch with fellow Aquatic Veterinarians. After all, that's what this group is all about . aiding communications to benefit veterinarians, and the animals we treat!

Nick Saint-Erne, DVM AVN Newsletter Editor

To renew your Membership, please complete and return the Membership Renewal Application form available at the end of this Newsletter, or on WAVMA's website (www.WAVMA.org) – full instructions are on the form.

EXECUTIVE REPORTS

PLEASE FEEL FREE TO CONTACT ANY OF THE WAVMA EXECUTIVE BOARD MEMBERS OR COMMITTEE CHAIRS ON ISSUES INVOLVING THE ASSOCIATION.

PLEASE REFER TO THE "CONTACT CORNER" AT THE END OF THE NEWSLETTER FOR BOARD AND COMMITTEE CHAIR'S CONTACT INFORMATION.

PRESIDENT'S REPORT

Being elected the President of a World Association is a signal honour, but it is also rather daunting. It is also even more daunting when the organisation is a new one just starting to recognise its role and working out that role in the context of the present and its aspirations for the future. What is the role of any worldwide organisation? The world is a very big place and divided into separate countries each with their own concerns agendas and rules.

Each member expects the association to serve their needs and support their concerns and sometimes that is rather difficult. In the USA, for example, there is concern about the relationship between Veterinarians and the cadre of so-called Fish Health Professionals+peculiar to the US, which has grown up by default in response to the failure of the veterinary profession in the US (with some honourable exceptions) in the past to realize its responsibilities to all vertebrates. In Europe there are equal concerns about the unworkability of the new legislation regarding notifiable diseases which takes no cognisance of the ubiquity of non-pathogenic variants of many of the viruses, which are, of course, of legitimate concern in their virulent forms.

My own view, and I have to stress this is a personal one, is that there is a need for WAVMA to encompass both local groups to serve local national needs, and to serve an overarching World+ Association role alongside and even allied with the World Veterinary Association. The two can be readily accommodated under one banner, with National or Regional Chapters for local issues, and the World Association per se concerning itself at the higher level regarding Veterinary aspects of World Trade Rules, inputting into OIE and FAO areas, ensuring equality of standards of fish welfare across international boundaries, including standardisation of veterinary certification where required for biosecurity or welfare certification demanded by, for example, international supermarket chains or welfare bodies, and acting in support of local groups (affiliates or chapters) in relation to general services, provision of international conferences and workshops and support for local conferences and training courses, as

well as generally representing the profession on the world stage.

I must emphasise, however, that in promoting this viewpoint, I do not wish in any way to dissociate myself from the wider group of my other non-veterinary scientific colleagues, specialist virologists, parasitologists and nutritionists, for example, with whom I have worked well for forty years, and who, along with veterinary scientists like myself, actually generate the scientific data which we as a profession then put to use in support of the commercial and pet fish areas.

Both are necessary in the interests of fish health and welfare and human food safety, but the role of the Veterinarian is at the organised, clinical and professional end of this spectrum. To act in a veterinary context we have to provide a professional service, we have to carry professional indemnity insurance; we have to be responsible to licensing boards, Royal Colleges and the many bodies and legislative rules which regulate the Profession world wide. We are, for good control reasons, the only people who are entrusted, subject to severe sanctions, with the dispensing of important medicines, which experience has shown, to Governments the world over, must be carefully controlled for human health reasons. We are also the only people in the field of fish health whose certificates are backed by the severest disciplinary constraints. In all other animal production and health situations the unique role of the veterinarian is recognized, and as fish farming, shrimp farming and fish as pets have all become major international industries, with associated international trade issues, so the requirement for an international availability of such a trained, clinically qualified and professionally disciplined cadre of veterinarians is also recognised.

My term of office as President is now moving to a close. During that period, I believe that the Association has made major progress. Much of this is, rather like the iceberg, well below the surface, but this newsletter, which I believe will become increasingly important, is one very fine contribution. We have also made significant inputs at Governmental and International levels into current and pending legislative issues, in a way which only an organisation with the weight of an international body can do. Our contributions to the American Fisheries Society and the World Veterinary Association conferences, both of which, this year, had, for the first time, major specifically veterinary inputs in dedicated fish sections, were also for me highlights.

There is much however, for us still to do. In particular I believe that we have to act persuasively both internationally and nationally for better availability of treatments for farmed and pet fishes, under appropriate controls. We also have to take a more pro-active stance in relation to sensible fish welfare, and I believe that the contribution that several members have made to the recent EU deliberations on these matters which will soon be available.

One internationally important area where the Profession must lead is in the development of better biosecurity standards. This is the most important means of keeping our fish health profile high in the face of increasing trade. Currently, standards are poor and we must lead the way in their improvement. I hope that our plans for involvement in promotion of a major conference on this issue next year come to fruition, as it is a real need.

Finally, I would like to point out to readers the great amount of effort which the office bearers of WAVMA put in to make the concept work. If we are to be international we need to have international office bearers and this means that we must meet. We have managed three meetings face to face this year, which makes a great difference in our progression, but there are monthly meetings via the remarkable and sometimes far from amenable Skype system, which involve directors in five very different time zones, in Australia, Scotland, England East US and West US, all being not only awake, but lucid at the same time.

I believe that WAVMA has an important role for the future. I am confident that I hand over to my successor, Hugh Mitchell, an organisation which is growing and dynamic and will contribute to aquatic animal health and welfare, to managing aquatic biosecurity, to medicine and vaccine development and availability for the sector, to safe food production and to enhancing the contributions made by the veterinary profession to aquatic medicine. The aquatic sector is the most rapidly expanding area of food production, the largest area of conservation concern and the least developed area for animal welfare that we have. The veterinary profession has an outstanding reputation in these areas in all other systems. I feel sure that WAVMA will play a leading role in ensuring we also play our part in this one.

Ronald J Roberts
WAVMA President

"There are risks and costs to a program of action. But they are far less than the long-range risks and costs of comfortable inaction." John F. Kennedy

PRESIDENT ELECT'S REPORT; 2009 – LOOKING FORWARD

As an eventful 2008 for the world's economy comes to a close, I wanted to take the opportunity to lay out my own vision for the WAVMA in 2009. We have just had a strategy meeting in Chicago, and although the report and recommendations are not yet done, and everyone has agreed to a follow-up conference call, I will still sketch out where I think we should go in order to have something in time for this newsletter.

In short, I believe that we need to focus on a few deliverables. The founding board has worked hard to set up an infrastructure and initiate a website and a newsletter, so now we need another high-profile win+ or two, and directly address some of the needs of aquatic veterinarians around the world. We have to be careful not to try and be too encompassing and flounder (note the fish reference) with trying to be everything to everyone (i.e., K.I.S.S.).

The membership survey that went out earlier this year, although limited in scope and response, gives us direction that I believe is sound. The prime areas of foci should be (in order):

- 1) *Enhancing communication between aquatic veterinarians around the globe*
- 2) *Concentrating on finfish (not to the exclusion of the other species groups, but that is where the strength and need is)*
- 3) *Providing/sharing more clinically relevant information on finfish*
- 4) *Improving the viability of private aquatic veterinary practice*
- 5) *Addressing the regulatory issues of aquatic veterinary practice (fish health regulations, practice acts, and pharmaceuticals).*

(And these might be a little too much to take on in 2009).

As to better communication, the website has to be made more dynamic, so that we are all more compelled to look at it on a regular basis (Make it each of our internet home page?). This takes a lot of work and we must find a cost-effective solution to more regular updating and management. We need to develop a better communication tool within the website (or perhaps a Facebook page) so that aquatic vets can chat around the globe. Perhaps the WAVMA Member's Listserv will serve that function?

We also must get more feedback on the newsletter. Lots of positive comments (for Dr. Walster, who has handed the reigns to Dr. Saint-Erne), but we need to fine-hone its usefulness.

Some comments that I have received are that it is often not read. Is this because it is sent via an email announcement and gets lost in the electronic barrage? Would hard copies garner greater readability? We need to look into this and continue to find ways to make the publication a **must read** by aquatic veterinarians. What do YOU want to see more of?

Finfish aquatic veterinary medicine is the most mature aquatic subspecialty and its needs are the most unmet (by my read, anyway). The salmon farming industry in Chile, Norway, Scotland and Canada employs more practicing aquatic vets than any other sector. In 2009, we must find a way to get them involved with WAVMA. They should all be members and we should be paying close attention to their needs in finding direction for WAVMA. Finfish veterinary medicine struggles because BOTH our profession and the lay public all too often do not recognize fish as a **veterinary animal**. It is still too often a novelty. WAVMA must develop strategies and tactics to get the message across that **fish is a veterinary animal**. The field of fish health will greatly benefit from this. This doesn't mean that we ignore other species groups, but the finfish sector should initially be a prime focus. Getting stronger by them and what we learn doing so, will help us better represent the other groups in the future.

Veterinarians are clinicians and trained to intervene. This is what differentiates us from other fish health sectors. We also would like to be paid for our knowledge, expertise and problem solving abilities. WAVMA's niche amongst fish health organizations is on both the clinical medicine AND the business of aquatic medicine practice fronts. To that end, we will have a major meeting in 2009 (either in conjunction with Aquaculture America or with the American Veterinary Medical Association). PAID speakers will lead presentations and discussions on the business of aquatic veterinary practice (pet and food fish), clinical case studies, and what fully defines the practice of fish medicine. This will set the tone for years to follow and provide what I think most of you feel is a sorely lacking dimension in the aquatic medicine field.

Finally, the above ties together with Area #5, the fish health, fish practice and pharmaceutical regulations affecting the practice of fish medicine. In 2009, we need to inventory and report on how fish are dealt with across the globe and then come up with a plan of action to review and address where the model systems and deficits are.

In conclusion, there are some concerns that WAVMA tends to be too American-centric. We have

to be very mindful of this. Myself, I am bi-national: Canadian and American, so I think I understand where this is coming from and will work very hard to make sure that US concerns do not dominate time and resources. The US has needed a **fish vet** association for several years. This is not the case for other countries, so please forgive the dominating enthusiasm of some of our American colleagues. WAVMA will represent and bring together ALL aquatic veterinarians around the globe. Where there are strong national and regional associations already, WAVMA will look to where they can assist and provide services to these associations. Where these don't exist, WAVMA will be a primary association or help to foster a regional group.

I look forward to serving you in 2009. Please contact me with your comments frequently (email preferred: hugh.mitchell@novartis.com), whether it is about concerns, catcalls, or any suggestions. I also look forward to hearing from you on how we can help make WAVMA an important asset to your career. In addition, some of my favorite people are fish veterinary colleagues. One of the best things is the collegiality and interaction we share. In the end, it's no fun if it isn't fun, and I have never been one to confuse lack of seriousness with lack of solemnity.

Hugh Mitchell, MSc, DVM
WAVMA President Elect

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Anemone collection—photograph by Nick Saint-Erne,

In any moment of decision, the best thing you can do is the right thing, the next best thing is the wrong thing, and the worst thing you can do is nothing.  
Theodore Roosevelt

## SECRETARY'S REPORT

Well, it does not seem long since the last time I wrote, shortly after our meeting in Vancouver. On the 18<sup>th</sup> of October the Executive Board held a meeting in Chicago to discuss WAVMA's strategic plans, to which several members attended in person and after some minor hiccups with the technology, members from around the world were connected through Skype. The day was very long and a lot of topics were discussed and a brief report on the meeting can be found elsewhere in this newsletter. A more formal report will be produced in due course.

Preparations are already being made for next year's meetings. I have been in Ames, Iowa, for the past month or so working on an aquaculture biosecurity manual which will complement material to go on the web and possibly a textbook. This is all part of preparations for an International Aquaculture Biosecurity Conference (IABC) to be held August 13-18, 2009 in Trondheim, Norway. The IABC is scheduled the week before AquaNor, which is a large European aquaculture trade show and should attract a large number of participants.

Along with WAVMA, several leading entities are helping organize the IABC, including the American Veterinary Medical Association, Atlantic Veterinary College - University of Prince Edward Island (AVC-UPEI), the Center for Food Security and Public Health at Iowa State University (CFSPH), the College of Veterinary Medicine - Iowa State University (CVM-ISU), the Institute for International Cooperation in Animal Biologics (IICAB), the Norwegian National Veterinary Institute (NVI), and the Norwegian Veterinary Medical Association (NWMA) are all involved. In addition, a large number of sponsors have stepped forward to ensure there is sufficient funding for the conference.

Further information can be obtained at [www.iabconference.org](http://www.iabconference.org), where you can also register your interest in participating.

As well as the IABC, WAVMA will also be in attendance at the AVMA Convention in Seattle next July and may well put on some further events. Unfortunately, WAVMA was unable to contribute to Aquaculture America in February where it was hoped to give a full day of aquatic veterinary CE. Another project is to set up a full day of lectures and wet labs at the Student American Veterinary Medical Association (SAVMA) convention in Ohio in March 2009. If you have some other venues you would like WAVMA to attend or assist with, then please let me know. WAVMA also has banners and other

promotional material if you would like to promote WAVMA at a meeting.

One of the main recurrent themes from members is the need for provision of clinical aquatic veterinary medicine CE. With WAVMA being a worldwide organisation this is somewhat of a problem to provide. If you are in the northern hemisphere would you be prepared to travel to Australia or vice versa? Or, if in the USA, to Europe?

There are ways of getting around this, either by publishing a journal or placing educational material on the website, and these are certainly the aim. The issue, though, is acquiring sufficient material to make it worthwhile and it must be of sufficient range to be useful to veterinarians who are just starting out in aquatics and to those of a specialist bent. As ever, WAVMA can only do so much without the involvement of more people. There is a lot of knowledge and experience out there and you might like to contribute some of it to WAVMA either in time or materials. The more people who are actively involved in WAVMA, the sooner WAVMA can achieve its aims.

Chris I. Walster BVMS, MVPH, RCVS  
WAVMA Secretary

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WAVMA COMMITTEE REPORTS

COMMUNICATIONS COMMITTEE

The monthly Communications Committee conference call occurred on October 4th via Skype internet telephone service. At that meeting, committee members David Scarfe, David Pasnik, Chris Walster, and Nick Saint-Erne discussed the WAVMA Member's listserv, which is up and working . but not often used. We discussed how to get members to use it more. We decided to include information about using the membersqlistserv in the next newsletter . see Editor's Note, page 2!

Also, we decided to have Chris Walster send an e-mail to all WAVMA members with instructions on how to subscribe to the membersqlistserv . if you need that information again, send an email to: WAVMA-L.Moderators@mailhost.wavma.org

Distribution of the AVN Newsletter was discussed . currently the newsletters are on the WAVMA.org website and an e-mail is sent to members each quarter when AVN is published linking them to the site. It is possible that members are not taking advantage of the link and therefore failing to open

and read the newsletters. Is there an alternate way of economically distributing the newsletter?

A color printed copy of the AVN may need to be produced to send to veterinary schools and to potential sponsors. A list of veterinary schools is available through the World Veterinary Association website . worldvet.org. There are hyperlinks to some of the veterinary schools. We would like to e-mail AVN copies to all veterinary schools worldwide. The goal is to make contact with aquatic veterinarians in other countries and increase WAVMA membership.



Nick Saint-Erne, DVM
Communications Committee Chair
nsainterne@gmail.com

What other ideas do members have? Please e-mail me with any ideas, or let me know if you are interested in joining the Communications Committee or helping with the AVN newsletter or website.

When you are asked if you can do a job, tell 'em, "Certainly I can!" Then get busy and find out how to do it. Theodore Roosevelt

MEETINGS COMMITTEE

A decision for the location of our 2009 Annual General Meeting has still not been made. Discussions took place with the Association of Avian Veterinarians, who are hosting a combined meeting with the Association of Reptilian and Amphibian Veterinarians and Association of Exotic Mammal Veterinarians in both '09 and '10.

This approach was favored by the Meetings Committee as being both cost-effective and likely to attract new members from the pool of interested exotic animal vets attending. Unfortunately, the Executive Board of the AARV failed to give us a firm commitment for a joint meeting in either year. The consideration of holding the meeting in Prince Edward Island, in conjunction with the Aquaculture Biosecurity Conference, which was planned for that venue, ended when plans for that location were changed. We are hoping, through discussions with the WAVMA Executive Board, to recommend a location for 2009 by the end of this year.

Julius M. Tepper, DVM
Meeting Committee Chair

ASSOCIATION'S ENDEAVORS

STRATEGIC PLANNING MEETING

The WAVMA Leadership Meeting was held in Chicago on the 18th of October, and as well as members attending in person others were connected through Skype. A full meeting report will be produced later but below is a summary of some of the main points. Probably what was most impressive was realising all that had been achieved when one sat down and thought about it, and also the level of agreement on the needs of members and the way forward for WAVMA. Admittedly, there was some disagreement on the way to achieve this, but then that was what the meeting was for . to make sure all those present were aware of all of the information on which to make decisions.

The need for WAVMA is worldwide and we must be inclusive. WAVMA's strengths were seen as being our global reach and passion for success, the



Other WAVMA members are cordially invited to join the Communications Committee. We need assistance in soliciting contributions for the Newsletter and with designs and maintenance of the website.
Please contact Nick Saint-Erne if interested.

wealth of experience and opportunities for networking, being clinically focused and aware of the economic and business aspects of aquatic veterinary medicine. Additional strengths were seen as our newness, diversity and uniqueness. However our weaknesses are the ability to communicate around the world, newness and lack of awareness of WAVMA by others. There are communications challenges which are compounded by the fact that WAVMA depends on volunteers and has no staff.

To date, WAVMA has accomplished setting up a suitable structure to do business, such as the bylaws, being a 501(C)6 organisation, some committees have been formed, and a financial system has been set up. WAVMA has a website, listserv, logo, promotional material, a trade show booth, and of course this newsletter. We have held two AGMs at significant veterinary meetings (AVMA 2007 & WVC 2008) and have made an impression on several national veterinary organisations, as well as WAVMA being recognised by WVA, FAO and OIE. A survey has been conducted on WAVMA members wishes.

Those attending the meeting listed 24 aspects of the value of being a WAVMA member, which ranged through setting ethical standards, networking, CE opportunities, advocacy for the profession, the newsletter, position statements (policy . must do, position . should do, opinion), job announcements, global perspective and providing a mechanism for action.

What it was felt is still needed are more tangible membership deliverables including: clinical aquatic CE; representation at national/international meetings; policy statements and guidance for member use; more members to serve on committees, or on the Executive Board; and, easily accessible annual meetings. These are things that all members can contribute their talents to help us achieve.

Because strategic planning is a process, not an end-point, the group that met in Chicago re expected to continue discussion to examine how to implement the WAVMA priorities.

Chris I. Walster BVMS, MVPH, RCVS
WAVMA Secretary

STUDENT ISSUES

We invite student members to contribute issues or information to this column.

Important news for students wanting to join the WAVMA . all students currently enrolled in

recognized veterinary academic programs (including post-graduate programs, internships and residencies) can join the WAVMA for 50% off the normal dues. This could be the best \$50 you ever spent. Further information is available on the WAVMA.org website and on the 2008 Membership Application at the end of this Newsletter.

MEMBER'S LETTERS

We invite members and other readers to send letters to the editor.



To stimulate members comments the photograph below is of albino sailfin mollies at a wholesale pet fish supplier's facility that have been permanently tattooed! What are the opinions of other WAVMA veterinarians regarding this kind of alteration of animals?

Should we as aquatic animal health care providers oppose this type of treatment as being potentially cruel to the fish?

Send your responses to:
Nick Saint Erne, DVM
AVN Newsletter Editor
nsainterne@gmail.com

A well planted display aquarium built into a wall Photo by Nick Saint-Erne



PUZZLED BY THE PUZZLE?

Here is the answer to the **Fishy Crossword** puzzle from last issue of AVN.

If you haven't completed the crossword yet, before you read all the answers, go to AVN Vol. 2, No. 3 on the WAVMA website and give it a try..

Go to <http://www.wavma.org/index.cfm/id/5/did/3126> to download AVN 2(3).

	A	R	I		C	O	R	T	I	S	O	L			
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It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change. . Charles Darwin



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Organizers

- American Veterinary Medical Association
- Atlantic Veterinary College, University of Prince Edward Island
- Center for Food Security and Public Health, Iowa State University
- Institute for International Cooperation in Animal Biologics, Iowa State University
- Norwegian National Veterinary Institute
- Norwegian Veterinary Medical Association
- World Aquatic Veterinary Medical Association

Audiences/Participants

International, national, state/provincial and local:

- Aquatic veterinarians and veterinary organizations
- Aquaculture producers and industry organizations
- Government agencies and standards-setting bodies
- Academic education, research and extension personnel
- Commercial aquaculture-supportive companies

BOOK REVIEWS

FISH FARMING FOR THE FUTURE

Brian Halweil, Worldwatch Institute, Washington, DC. 2008. 48 pages

This booklet provides an overview of world aquaculture. It is not a "how-to" book, but rather a "why" book. The author discusses the world-wide trend in increasing seafood consumption, due to fish and other seafood being an affordable form of protein and because it is considered a healthy food. This increasing demand for seafood has made fish farming the future of seafood supplies, as wild seafood harvesting cannot keep up, and the catch is already diminishing.

Farmed seafood, or aquaculture, now provides 42% of the world's seafood supply and is on target to exceed half in the next decade, states the opening summary in the book. One concern of the author is the production of predatory species that require being fed perfectly edible wild food sources. This means that smaller fish species are being wild caught and then processed into fish meal based pelleted foods to feed the aquacultured carnivorous species. This process still makes a net drain on wild resources even though the human food fish is farm raised.

Chapter 1: A Different Sort of Salmon describes the salmon culture methods used in the Bay of Fundy, Canada. There they raise 3 species (salmon, blue mussels and kelp) that complement each other to reduce nutrient enrichment and contamination of the surrounding waters. The author states, "Properly guided, the explosive growth in fish farming may in fact be the most hopeful trend in the world food system."

Chapter 2: From Ornamental Ponds to Industrial Aquaculture is a historical perspective of human's culturing fish, from the raising of tilapia in Egypt some 4000 years ago to the incorporation of fish culture in Asian rice paddies for thousands of years. These historical aquaculture methods usually produced herbivorous species of fish, with minimal impact on the environment. Now predatory fish are being produced in increasing numbers. China is leading the world in farmed seafood, producing 70% of global farmed seafood, including predatory species such as black carp, river eels, and marine shrimp.

Chapter 3: Reducing Fish to Produce Fish compares the traditional small-scale integrated fish farms raising fish for sustenance with large

corporate farms raising predatory fish species for profit. The concern here is that fish farms that raise species high on the food chain consume considerably more fish in the form of feed than they produce in aquaculture. However, recent advances have improved the feed conversion of some fish species, and better pelleted foods have dramatically reduced the amount of excess nitrogen in the water. It is also suggested to use food animal slaughterhouse wastes in producing fish food, instead of other fish species. [The concern about mad cow disease is mentioned]. This would help reduce the amount of the world fish catch that is being converted into fishmeal for other animal consumption, which is currently done with about 1/3 of the fish catch.

Chapter 4: Fish Farming for Restoration discusses making fish farming function more like a healthy aquatic ecosystem. Integrated fish farming uses wastes from one process as a resource, such as using fish waste as crop fertilizer. This is more easily done with intensive fish farming, using indoor vats and water filtration. This type of farming can be done away from coastal waters, even in cities. And the integrated fish farming has potential to even be able to clean wastewater, particularly valuable in urban settings.

Chapter 5: A Shift in Mindset recommends increasing farming of species that are low on the food chain, such as seaweeds, shellfish, and herbivorous fish. The author recommends that aquaculturists learn from the mistakes made by land-based agriculture, and integrate into aquaculture conservation goals, reducing dependence on chemical and external inputs, and embrace diversity.

Chapter 6: Toward Sustainable Aquaculture Standards recommends standardizing the best practices of fish farming that limit pollution, improve nearby habitats, and minimize food safety risks.

This is not a fish farming handbook, but rather an overview of the philosophy and guiding factors one must consider in developing aquaculture practices. As the author states, "The explosive growth in aquaculture may in fact be the most hopeful trend in the world food system." Overall this booklet makes one think about the current fish farming methods and stimulates thought for what would be the best method of farming fish for the future.

Review by Nick Saint-Erne, DVM

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## **OIE LAUNCHES NEW ONLINE BOOKSHOP FOR SCIENTIFIC PUBLICATIONS**

In a move to improve the global ordering system for its scientific publications, the OIE website now offers a new online bookshop. More customer-oriented and interactive, the shop answers the needs expressed by web users and customers looking for scientific documentation. The OIE bookshop is a user-friendly application that offers a variety of new purchase options: memberships, single articles, set price packages and new items. It also proposes worldwide users wanting to access OIE scientific publications the possibility to place joint orders, reserve upcoming publications, and follow-up on their orders. Also, an integrated search tool allows researchers to screen through reviews and books by topic, year and type of publication. The system is equipped with an up-to-date secured payment function and details of OIE publications distributors worldwide can be found in a dedicated space. The OIE online bookshop can be found on the OIE website home page:

<http://www.oie.int/boutique/index.php?page=cat&lang=en>

## **COLLEAGUE'S CONNECTION**

### **AVMA SEEKS NOMINATIONS FOR EUTHANASIA PANEL WORKING GROUPS**

Nominations and expressions of interest are sought for membership in working groups that will contribute to the next edition of the AVMA Guidelines on Euthanasia. The current guidelines are posted at:

[www.avma.org/issues/animal\\_welfare/euthanasia.pdf](http://www.avma.org/issues/animal_welfare/euthanasia.pdf).

Members selected for working groups will have demonstrable expertise in particular euthanasia techniques or the application of those techniques to various animal types, species, or uses.

Working groups for which nominations are sought are inhalant agents, non-inhalant agents, physical agents, equine, food animals (large animals, poultry), zoo/wildlife (including reptiles and amphibians), birds, **aquatics** (fish, marine mammals), companion animals (dogs, cats, birds, small mammals, reptiles, amphibians), laboratory animals (rodent, nonrodent, primate), and depopulation.

Expressions of interest and nominations are also sought for an ethicist, who will engage with the working groups to provide that perspective.

Letters of interest or nomination, together with the individual's curriculum vitae - including a current list of publications - should be e-mailed to [euthanasiapanel@avma.org](mailto:euthanasiapanel@avma.org); faxed to (847) 925-1329; or surface mailed to Kathy Sikora, Animal Welfare Division, AVMA, 1931 North Meacham Rd, Suite 100, Schaumburg, IL 60173.

Closing date for submissions is Dec. 31, 2008. Questions regarding the panel or this process may be directed to the AVMA Animal Welfare Division at (847) 925-8070, Ext. 6635

### **WORLD 'FISH DOCTORS' FORGE GROUP**

Terry Dillman, News-Times. Sep 05, 2008

Schooling - swimming together in large groups - is a behavior prevalent in almost 80 percent of the known species of ocean fish. Schooling fish respond quickly to changes in the direction and speed of their neighbors. They change direction swiftly while retaining a closely-knit swimming pattern, move from one configuration to another, and regroup almost as one.

Recognizing the need for veterinarians involved in aquatic animal medicine to develop a similar ability, fish doctors from around the world forged the foundation of a new veterinary organization in 2007.

Dr. Tim Miller-Morgan, Oregon Sea Grant's ornamental aquaculture specialist and leader of the Ornamental Aquatic Animal Health Program (OAAHP) at Oregon State University's Hatfield Marine Science Center (HMSC), was one of the six interim directors of what began as the Aquatic Veterinary Association. Miller-Morgan helped organize the association's first meeting in July 2007, where founding members approved by-laws and structure for the fledgling organization now officially known as the World Aquatic Veterinary Medical Association (WAVMA).

Its stated mission is to enhance and advance the science and art of aquatic veterinary medicine, aquatic animal health and welfare, public health, and seafood safety, while supporting the veterinary profession in general, and the estimated 7,500-plus veterinarians worldwide already involved with different aspects of aquatic veterinary medicine.

Many of the world's fishing industries rely on schooling patterns to boost their catch. WAVMA

organizers want those fishing for knowledge about aquatic animal health to hone in on the schooling pattern established by the association, boosting their catch of useful information.

For the complete newsarticle, please go to:  
<http://www.newportnewstimes.com/articles/2008/09/05/news/news03.txt>

## NEW FISH HEALTH BLOG SITE

Dr. Tim Miller-Morgan (Extension Veterinarian/ Assistant Professor - Aquatic Pets, Ornamental Fish Health Program, College of Veterinary Medicine, Oregon State University, Newport, Oregon) has initiated a web-log (blog) for the Ornamental Fish Health Program at Oregon State University.



This will replace the highly irregular newsletter, and will let everyone know about upcoming opportunities in a more timely fashion, post short articles and news items, and perhaps initiate some lively discussion. It seemed time for me to move, kicking and screaming a bit, into the 21st Century+ he reports. The web link is:

<http://seagrant.oregonstate.edu/blogs/wetvet/>.

You can sign up for email or RSS feeds at the site as well. He will also begin improving and updating the OFHP web site at <http://oregonstate.edu/extension/fishhealth/index.html>.

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AQUATIC VETERINARY MEDICINE PODCAST

Source: AVMA Media Library

The AVMA has initiated an important resources for practitioners and the public . podcasts.



In the AVMA's latest podcast, Dr. Helen Roberts talks about veterinarians who specialize in finned, not furry, animals. Fish have always been a popular

choice of pet. They're relatively easy to care for, soothing to watch in their tanks, and they never leave a surprise for you at the foot of your bed.

More veterinarians than ever before are treating not just valuable koi, but also the goldfish won at county fairs. Dr. Helen Roberts, a practicing veterinarian in Orchard Park, N.Y., talks about aquatic veterinary Listen to the MP3 at:

http://www.avmamedia.org/manage/mediainmg/s104-podcast_drroberts_fishaspets_v3.mp3

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## WISCONSIN AQUATIC MEDICINE TRAINING PROGRAM

In 2002, a fish health educational program began as a collaborative project between Myron J. Kebus, DVM, M.S. (Wisconsin Department of Agriculture, Trade & Consumer Protection, Division of Animal Health) and Michael Collins, DVM, PhD, (University of Wisconsin-Madison, School of Veterinary Medicine). This led to the development of a new short course, Aquaculture Veterinary Medicine for Practitioners, an intensive program designed to provide practical training in field techniques for sample collection and field diagnostics for veterinarians. All veterinarians in Wisconsin who wish to be certified to issue Wisconsin's fish health certificates are required to complete the Aquaculture Veterinary Medicine for Practitioners course.

Completed in April 2006 a new program, Fish Health Medicine Certificate Program+ <http://vetmedce.vetmed.wisc.edu/fhm>, has been adapted for online delivery through the continuing education (CE) portal of the University of Wisconsin, School of Veterinary Medicine. It is constructed as a series of CE modules for veterinarians leading to certification. The first five modules can be taken anytime and anywhere using narrated PowerPoint presentations and supplemental reading materials delivered using new educational technology software.

The modules cover:

- Introduction to aquaculture and fish medicine
- Risk management and biosecurity
- Water quality
- Fish health inspections
- Veterinary health assessments

Each module has a post-test automatically generated and computer scored. Successful completion of each module will result in the award

of CE credit that can be used to satisfy state veterinary licensure requirements. The final module will require hands-on practice of the principles and techniques learned in the first five modules, with final proficiency judged by the course instructor. The hands-on training is conducted at the Wisconsin Veterinary Diagnostic Laboratory, and at a major Wisconsin fish farm. Passing the final module will result in awarding of the Certificate. To-date, 122 veterinarians have completed the online modules.

Supported with funding from the USDA Risk Management Program, administered through Mississippi State University, funded this project of developing an online training program for veterinarians, other fish health inspectors, and state and federal regulatory authorities the project has the following expected outcomes:

- Online training program in fish health assessments available via the Internet.
- Veterinarians trained in performing fish health assessments and properly completing certificates.
- Access by farmers to professionals and to techniques that can reduce the risk of introducing diseased fish into farms and public waters.
- A regulatory tool for states to reduce the risk of importing diseased fish.

It is hoped that the overall impact will be a reduced risk of disease introduction on fish farms.

To date, Wisconsin has trained more than 150 private veterinary practitioners through the new Fish Health Medicine Certificate Program and the previous Aquaculture Veterinary Medicine for Practitioners course. These veterinarians are from over 30 states and include mainly private practice veterinarians, but also state and federal veterinarians. The University of Wisconsin maintains a list of the veterinarians who have completed the online modules and WDATCP maintains a list of aquaculture veterinarians who are certified by WDATCP to perform regulatory services on Wisconsin fish farms.

By training and certifying private practice veterinarians, WDATCP privatized many of the on farm fish health services that in other states are performed by government employees. This has allowed WDATCP staff to work on progressive efforts, as opposed to working solely on sample collection and submission for disease testing.

In addition to veterinary training and certification the WDATCP fish health program includes registration of fish farms, rules for health standards for fish introduced into public waters, and issuance of fish import permits. A key component of the Wisconsin fish health program's success has been the close working relationship between WDATCP and fish farmers, and veterinarians.

Since 1997 WDATCP has reviewed and approved over 2,700 fish health certificates for fish originating from 26 states and Canada. In 2007, WDATCP approve 374 fish health certificates, most of which were issued by veterinarians trained in Wisconsin.

For more information contact Dr. Myron Kebus, State Fish Health Veterinarian, at [myron.kebus@datcp.datcp.state.wi.us](mailto:myron.kebus@datcp.datcp.state.wi.us) or 608-224-4876.

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THE IMPORTANCE OF AQUATIC VETERINARY MEDICINE – A PANEL DISCUSSION

The following is a report of a panel discussion on The Evolving Importance of Veterinary Medicine in Aquatic Animal Health Management. The panel served as part of an opening Session at the 2008 American Fisheries Society, Fish Health Section Annual Meeting at the Atlantic Veterinary College, University of Prince Edward Island, Canada (July 9-12, 2008) and included:

- Dr. Brian Evans (DVM) - Chief Veterinary Officer for Canada, CFIA.
- Mr. Kevin Amos - National Aquatic Animal Health Coordinator, National Oceanographic and Atmospheric Administration.
- Dr. Leighanne Hawkins (DVM) - Fish Health Manager, Cooke Aquaculture and active member of Eastern Aquatic Veterinary Association (EAVA).
- Dr. Larry Hammell (DVM), UPEI-Atlantic Veterinary College, Aquatic Epidemiology Professor; and Director of the AVC Centre for Aquatic Health Sciences (CAHS).
- Dr. Ron Thune (PhD), Head of the Department of Pathological Sciences, Louisiana State University.
- Dr. David Scarfe (DVM), Assistant Director, Scientific Activities, American Veterinary Medical Association (AVMA).

Introducing the topic Dr. Brian Evans, Chief Veterinary Officer for Canada and Executive Vice-President, Canadian Food Inspection Agency

initiated thinking in a Plenary Presentation titled "Aquatic Animal Health - Veterinary Medicine's Contribution for Market Opportunities."

He outlined the following (abstract): The role of veterinary medicine in support of terrestrial animal production and health management is very well established and recognized; however, it has only been relatively recently that roles have started to be applied to the seafood sector. The timing for this mirrors growth and diversification of aquaculture production as well as globalisation of seafood trade - most notably over the last 20-30 years - which, concomitantly, was associated with the emergence and spread of a number of serious infectious diseases.

The World Organisation for Animal Health (OIE), which is the International Science based standard setting organisation responsible for establishing disease control standards, reporting and certification for international movement of animals, animal products and genetic material recognised this problem and, in 1960, established a "Fish Health Commission" (FHC). As industry and trade pressures continued to grow, the OIE expanded the responsibility of the FHC to include molluscan and crustacean diseases and, in 2003, changed its name to the Aquatic Animal Health Standards Commission.

This forms the international backdrop for veterinary medicine contributions to growing aquatic animal market opportunities. Veterinary medical expertise supports husbandry management to optimise growth and disease resistance of aquaculture stocks; epidemiological research to assess disease risks and develop effective disease control measures; and development of government policies and regulatory controls that are effective in preventing disease introduction and spread. All these activities benefit from veterinary input, and contribute to secure access to market opportunities (import, export and domestic transfers) for both live aquatic animals and products.

As the seafood and aquaculture industries continue to grow, we need to ensure that the relevant expertise is identified, developed and prepared to contribute to this dynamic and evolving market environment. Canada has taken initial steps by moving aquatic animal health management under the auspices of the CFIA whose mandate is food safety and the protection of Canada's animal and plant resource base.

A brief introduction for the panel was provided by the moderator, Sharon McGladdery, who

underlined the need for increased veterinary involvement in aquatic animal health as part of the "community of competencies" discussed in Dr. Evans' plenary presentation. It was also noted that the setting for the AFS-FHS meeting at the Atlantic Veterinary College was particularly appropriate for this panel discussion, as AVC has a strong aquatic curriculum and post-graduate programs that have provided Canada with a significant number of its recruits to aquatic animal health activities. The background also explained why this discussion is so timely; set against the increasing international alignment of aquatic animal health management standards with those applied to terrestrial animals.

With this backdrop, **David Scarfe** led off the discussions by emphasizing that, as highly trained, credentialed and licensed service providers, private-practice aquatic veterinarians are the critical link between the large amount of aquatic animal health and disease research, regulatory, and other information that is generated by veterinarians and non-veterinarians. Aquatic veterinarians deliver this information through veterinary services to clients (primarily aquatic animal owners and industries).

Currently large numbers of aquatic veterinarians are now employed in academics, government, industry and other institutional situations. In these positions they are not well positioned to deliver the needed veterinary services to the aquatic animal owners and the aquaculture industry. However, without an adequate private veterinarian workforce to translate and deliver this institutional knowledge and programs involving prevention, control and eradication of diseases, and optimizing the health and welfare of animals, public health and seafood safety, all end-users and stakeholders (aquatic animal owners, producers, health-supportive industries, government programs) will not be well served.

Key to the success of expanding the aquatic veterinary workforce is making all stakeholders (including the veterinary profession at large) aware of opportunities, and the value and importance of veterinary medicine and veterinary approaches, and aquatic veterinarians. Equally important is the full recognition, integration and collaboration of all veterinarian, non-veterinarian, governmental and industry sectors, as all sectors rely on the others. Without this effort neither aquatic private veterinarians nor any of these stakeholders will be able to optimally serve the primary "end-user" - the aquatic animal industries and owners.

Dr. Scarfe explained that the AVMA accreditation system for all 33 veterinary schools in

North America (and 9 in Europe, Australia and New Zealand) is specifically designed to ensure that all graduates have a "well toolbox" of skills to ensure they are able to practice veterinary medicine on any species-group or veterinary discipline that the individual graduate desires (veterinary education is medically oriented, not species specific). Beyond graduating with a veterinary degree, National Board and Clinical Competency examinations, and state/provincial licensing ensure competency.

As with other veterinary disciplines, the choice for practicing aquatic veterinary medicine inevitably comes from several non-veterinary education forces, including: an individual's interest, mentoring and exposure to the discipline and opportunities in aquatic veterinary medicine; an introduction to aquatic-specific industries and production methods, exposure to unique areas of aquatic animal anatomy/physiology (not gleaned in pre-veterinary education), some disease pathophysiology, life support ("water quality") systems, etc; and, exposure to practice and job opportunities before, during and after formal university veterinary education.

Over the past 10-15 years, 10 or more of the 33 N. American veterinary schools have incorporated introductory, senior student rotations, internships and residencies and other programs focused on aquatic veterinary medicine. Other graduate/post-veterinary degrees (MS/PhD) in veterinary and non-veterinary schools may provide additional education; however, most of these graduates inevitably pursue careers in academics, veterinary supportive industries, and government and generally do not contribute the veterinary service-provider (private practitioner) workforce. Furthermore, while many suggest aquatic veterinarians require board certification (similar to Board Certified veterinary surgeons, pathology, epidemiology and 34 other recognized veterinary specialties) Dr. Scarfe built a case for developing a system (primarily for others outside of the veterinary profession) for recognizing the skills and experience of veterinarians as "aquatic veterinary general practitioners". He believes that board certification at this point would be an "over-kill" and difficult to justify; aquatic veterinary medicine is too broad for specialization; fees required by board specialized veterinarians in private practice is unlikely to be supported by clients; and, presently it would be difficult to justify fulfilling complex and arduous requirements for establishing an entity and system acceptable to the American Board of Veterinary Specialties.

Perhaps the greatest stimulus for encouraging private practice aquatic veterinarians (old and new graduates) to be comfortable with, and offer aquatic veterinary services to clients, are the availability of continuing education and professional development opportunities (CEPD) which are often required for annual veterinary licensure renewal. Fortunately, there are numerous aquatic veterinary CEPD programs available. These, coupled with other resources initiated by AVMA and other veterinary entities, possibly account for rallying the rapidly growing N. American aquatic veterinary workforce that is currently estimated at 2,500-3,500.

Recognizing the importance of aquatic veterinary medicine, the AVMA has been actively involved for more than 15 years with expanding interest in, and importance of this discipline, within the profession and with aquatic industries, governments and the public. Some of the activities include: the production of a DVD about the diversity of veterinary medicine (available from Dr. Scarfe on request); developing policies, positions and guidance on many aquatic veterinary issues; making veterinarians and industries aware of veterinary programs, services and information through a tradeshow booth; developing online directories of aquatic veterinarians and disease diagnostic laboratories (accessible at www.AquaVetMed.info); distributing aquatic veterinary information through AquaVetMed e-News; assisting USDA-APHIS revamp the National Veterinary Accreditation Program (utilizes private veterinary practitioners to implement government regulatory programs); and making state veterinary medical associations, state boards of veterinary medical examiners, and veterinary schools aware of aquatic veterinary needs.

Larry Hammell underscored the current lack of private practice opportunities in aquatic animal medicine compared to other fields of veterinary medicine, which means that experience in the real world remains limited . especially for graduation directly into aquatic animal health practice. New graduates of veterinary medicine rely heavily on mentoring from practicing veterinarians and other expertise which in aquatic animal medicine is limited. He underscored the need for governments to support on-farm service experience noting that internships are rarely seen as an aquatic career opportunity at the undergraduate level.

Kevin Amos followed that thought by noting opportunities with State/ Government hatcheries, as well as the private sector. He also underlined the importance of the team approach, which has contributed to the depth of information and

guidance provided in the AFS-FHS *Blue Book*, which is used as a standard procedure manual for disease management by all stakeholders (government, academia and industry).

He noted that aquatic health requires more exposure as aquatic animal production and trade grows to meet increasing protein requirements. The need for well-trained aquatic animal health expertise, including veterinarians, in the near future is a certainty and has to be given serious consideration in revising and updating teaching curricula and for internships with industry and government.

Recognizing that veterinarians are educated in the principles of veterinary medicine, so as to provide medical services for all animals, the focus of their training continues to be on terrestrial and avian species. It is the rare veterinary graduate that is competent to practice aquatic medicine, due to their lack of in-depth knowledge in the anatomy, physiology, and infectious /non-infectious diseases of finfish and shellfish, as well as a thorough understanding of the aquatic environment. Coursework in limnology, aquatic ecology, and oceanography are not normally part of the undergraduate veterinary curriculum.

He suggested the way forward is clear in that veterinarians trained in aquatics are needed and will play an ever increasing role in providing services for aquatic animals. USDA/APHIS has taken an important step in developing a program to train federally-accredit veterinarians in aquatics. Another important step would be for veterinary schools to add aquatics coursework to their curricula. A reasonable ten year goal for veterinary schools would be that new graduates are knowledgeable in aquatics and capable of passing a state and federal competency exam, as they do now for terrestrial animals. Achieving such a goal will be critical for the growth of the aquaculture industries of North America.

Ron Thune also reinforced the message that academic and research needs require teamwork and multidisciplinary expertise. Fishery and fish biology expertise are a critical component, since the wild-cultured interface is very important for effective fish health management. He also noted that, in addition to fish farming, the *AquaMed* program . run by the Gulf States Consortium of Colleges of Veterinary Medicine. includes marine mammals and pet fish as additional opportunities for aquatic animal medicine. This equates directly to farm/wild/companion animal medicine in the terrestrial context.

Brian Evans noted that the new Division created within the CFIA to address aquatic animal health has left a significant void in aquatic veterinary expertise outside the federal government. The CFIA recognises that it is responsible for ensuring that the skills transferred from the private and provincial government sectors are replaced through a number of different mechanisms. In addition to the veterinary student internship program, aimed at encouraging students to explore government programs and services, Dr. Evans noted that skills sought for aquatic animal health management are transferable from skills developed in other animal sectors. He also noted that, across all animal sectors, the upcoming veterinary practitioners will have a different perspective from previous generations as it moves towards a more holistic approach to health management.

Environment and ecosystem based approaches will need multidisciplinary expertise for both wild and cultured production systems. In addition to traditional economic analyses, there is also growing awareness of the social value of effective health management. We all have to work to enhance public appreciation of the public benefit from the addition of veterinary expertise to overall animal health management, including growing interest in aquatic as well as terrestrial welfare management.

Leighanne Hawkins reinforced the comments made by the other panelists and added the importance for recognising that aquaculture health management, by definition, is a rural career choice with significant lifestyle implications. Selection processes that favour applicants with small animal practice experience and interests tend to select candidates with urban career aspirations; and maybe the rural experience could be given more weight.

Discussion from the floor followed with several comments about switching to aquatic animal health practice following graduation and a period of experience in small animal practice. Many people felt that accessible training courses to help people switch into aquatic animal health practice would be worthwhile . noting that in Canada the Atlantic Veterinary College has led the way in this, but there is room for more widespread opportunities.

In summary the session provided an excellent overview of the complexity of the aquatic animal sector in relation to need for veterinary expertise on the multi-disciplinary teams needed for effective health management. The AFS-FHS history with the

development of the Blue Book and subsequent certification of Fish Health Professionals also provides an appropriate spring-board for looking towards the future evolution of DVM opportunities in a wide diversity of areas, spanning farm management practice and the steering of government policy, to regulation development. The need for greater Veterinary College involvement in curricular opportunities was underlined along with the need for training opportunities for post-graduate veterinarians who often, mid-career, look for new challenges and opportunities for diversification. The evolution of needs is now better aligned with international standards, as the OIE also evolves its aquatic program to have greater consistency with the terrestrial sector.

Panel members offered the following recommendations:

- In Canada, the CFIA should continue to promote aquatic animal health management as a career option through mentoring and scientific exchange with related sector expertise. This includes the Veterinary Student Internship Program.
- Veterinary Colleges and Deans need to be kept informed of evolving needs for veterinary expertise as medicine as a whole evolves to adapt to zoonotic, welfare and environmental health management practices. This evolution is reflected in the Strategic Vision exercises undertaken by the OIE which is aimed at helping Veterinary Authorities, as well as the private sector, prepare for future veterinary needs. Aquatic animal health is one of the largest sector expansions to develop over the last 10 years and clearly merits this planning for the near future.
- The industry needs to be informed of the value-added of veterinary support especially for preventative measures. Although the salmon farming sector is familiar with the benefits of veterinary services for early disease intervention, facility health management in support of site management and market access, the rest of the aquatic industry (farmed and wild sectors) is less informed. This needs to be addressed at the same time as Veterinary Colleges and re-training programs are pursued.
- That a US/Canadian Task Force be established in the very near future, with representatives of relevant state and federal agencies, national veterinary, non-veterinary and diagnostic organizations, research and education academic institutions, and extension systems to

examine and optimize the roles, responsibilities and integration of all aquatic veterinary and animal health services provided to the aquaculture industries.

As noted in the introduction and by various panelists, aquatic animal production internationally is growing exponentially to meet protein production requirements.

Strategy without tactics is the slowest route to victory; tactics without strategy is the noise before defeat. - Sun Tzu . "The Art of War"

EMERGING ISSUES

IS THE AQUACULTURE BOOM STARTING TO FADE? New questions on the future of fish farming

6 October 2008, Puerto Varas, Chile / Rome . The aquaculture industry has reached an important crossroads, with new challenges emerging regarding the sector's ability to meet future world demand for fish. Small-scale farmers in developing



countries are facing difficulties in exporting their produce, and need help to become competitive

and access global markets, according to FAO.

In 2006, the world consumed 110.4 million tonnes of fish, with 51.7 million tonnes of that originating from aquaculture.

Production by traditional capture fisheries has reached a plateau, so to meet the projected demand for fish of an expanded world population, in 2030 aquaculture will need to produce an additional 28.8 million tonnes . 80.5 million tonnes overall . each year just to maintain per capita fish consumption at current levels.

However, a report of the FAO Committee on Fisheries (COFI), Subcommittee on Aquaculture that met in Puerto Varas, Chile, 6-10 October 2008 (<ftp://ftp.fao.org/docrep/fao/meeting/014/k3060e.pdf>) cautions countries that attended the meeting that a

series of emerging challenges need to be addressed if aquaculture is to live up to its potential.

Additional information is available from:

<http://www.fao.org/newsroom/en/news/2008/1000930/index.html>

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## **US\$50 BILLION LOST BY MARINE FISHING EACH YEAR New World Bank - FAO report reveals "the sunken billions"**

9 October 2008, Rome/Washington – Economic losses in marine fisheries resulting from poor management, inefficiencies, and overfishing add up to a staggering US\$50 billion per year, according to a new World Bank-FAO report released today. Taken over the last three decades, these losses total over US \$2 trillion, a figure roughly equivalent to the GDP of Italy.

But *The Sunken Billions: The Economic Justification for Fisheries Reform* report (accessible at <http://tinyurl.com/6e6zzl>), a joint study by the two agencies, also argues that well-managed marine fisheries could turn most of these losses into sustainable economic benefits for millions of fishers and coastal communities.

"Sustainable fisheries require political will to replace incentives for overfishing with incentives for responsible stewardship," said Kieran Kelleher, Fisheries Team Leader for the World Bank. "It is not just about boats and fish. This report provides decision makers with the economic arguments for the reforms needed."

Strengthened fishing rights can provide fishers and fishing communities with incentives to fish in an economically efficient and socially responsible manner. Phasing out subsidies that enhance redundant fishing capacity and harvesting effort will improve efficiency. Greater transparency in allocation of fish resources and greater public accountability for fisheries management and health of fish stocks will help ecolabelling initiatives to certify sustainable fisheries.

For more information, see:

<http://www.fao.org/newsroom/en/news/2008/1000931/index.html>

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OIE CERTIFIED SHRIMP WSSV PCR TEST KIT

The first shrimp viral PCR detection kit for diagnosing White Spot Syndrome Virus in shrimp is

certified by OIE. White Spot Syndrome Virus (WSSV) is a major shrimp disease, which has caused high mortality rate and economic losses to the major shrimp farming countries in South East Asia, Central America and Southern USA. It is a pathogen found in different penaeid shrimp species including *Penaeus monodon*, *P. japonicus* and *L. vannamei* as well as other crustaceans, such as crab and crayfish.

After nearly three-years of hard work, the first shrimp viral PCR detection kit is certified by OIE. This system fits the following purposes:

1. To certify freedom from infection (<10 virions/sample) in individual animals or products for trade/movement purposes;
2. To confirm diagnosis of suspect or clinical cases (confirmation of a diagnosis by histopathology or clinical signs);
3. To estimate prevalence of infection to facilitate risk analysis (surveys/herd health schemes/disease control).

The **IQ2000™ WSSV Kit** is labeled by OIE logo with the certificate number. Users can find the new instruction manual at OIE VCDA website.

The kit is available through: Farming IntelliGene Tech. Corp. <http://www.iq2000kit.com/news22.htm>
Email: sales@iq2000kit.com

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## **NEW COALITION FOCUSES ON LOBSTER HEALTH**

John Richardson, Portland Press Herald Staff Reporter August 18, 2008

The University of Maine's Lobster Institute is helping to create a coalition of scientists and agencies to protect the health of the region's lobster fishery. The National Oceanic and Atmospheric Administration is providing \$178,421 for the Lobster Health Coalition, according to the Orono-based Lobster Institute. The effort also is being led by the Lobster Institute and the Maine Aquatic Animal Health Laboratory at UMaine.

It will include scientists and industry representatives from the Northeastern United States and Atlantic Canada and will collect baseline lobster health data and encourage coordinated research.

"We must be proactive in sustaining both the lobster resource and the lobster industry, which employs thousands of citizens, many in economically depressed areas," Robert Bayer, executive director of the Lobster Institute, said in a written statement.

The commercial lobster fishery has an estimated annual national economic impact of \$700 million- \$1.2 billion. It supports thousands of Maine families, including those of the 5,800 men and women who hold commercial lobster licenses. Maine's 2007 lobster landings totaled approximately 56 million pounds, valued at approximately \$248,000,000

## FIRST BELUGA IN CANADA BORN TO AN AQUARIUM-BORN MOTHER.

By Chantal Eustace, Vancouver Sun, Wednesday, October 01, 2008

Veterinarian Martin Haulena has been carefully monitoring her health along the way. Caring for a baby beluga is a very hands-off job, says Vancouver Aquarium staff veterinarian Martin Haulena.



Vancouver Aquarium veterinarian Martin Haulena is happy to report the three-month-old beluga whale is doing very well. She has doubled in weight and her wrinkly grey body has filled out. Photograph by Jenelle Schneider, Vancouver Sun

"Mostly it's all about monitoring behaviour, activity levels, body condition, weight gain, nursing," says Haulena. So far he says, the aquarium's three-month-old female beluga calf is doing very well.

The unnamed whale has doubled in size, weighing in at about 100 kilograms. Its once wrinkly grey body is filled out; its skin marbled due to shedding, a normal part of growing up. And the baby beluga holds her own in the tank, swimming beside her 595-kg mother, Qila, and visiting with her 750-kg grandmother, Aurora.

See the full story at:

<http://www.canada.com/vancouver/news/westcoastnews/story.html?id=f7b4e393-75d5-4cef-9791-306efca85864>

## HI-TECH WINDOWS INTO A WHALE'S WORLD

By Richard Black, Environment correspondent, BBC News website, Canary Islands, Wednesday, 1 October 2008

Just as the humble torch broke humankind's inability to see through night, new technology based on acoustics and video imaging is giving scientists unprecedented glimpses of a whale's life. Even elusive, reclusive creatures such as beaked whales are giving up data in previously unthinkable detail.

El Hierro, the southernmost point of the Canary Islands, is one of the best places ever found for studying the animals. But even so, they come to the surface apparently randomly and for only brief periods of time. It is a far cry from the acrobatics of the humpback whale or the ebullient eruptions of dolphins.

But these brief appearances have been enough to allow scientists to fix tags to beaked whales and register what they do beneath the waves.

See more of this article at:

<http://news.bbc.co.uk/2/hi/science/nature/7647325.stm>

## CLINICAL REPORTS

### EVALUATION OF FIVE CLINICAL CHEMISTRY ANALYZERS FOR USE IN HEALTH ASSESSMENT IN SEA TURTLES.

KN Wolf, CA Harms, JF Beasley (2008).

*J. Amer. Vet. Med. Assoc.*, 233 (3): 470-475

#### Abstract

**Objective.** To compare blood biochemical values obtained from a handheld analyzer, 2 tabletop analyzers, and 2 diagnostic laboratories by use of replicate samples of sea turtle blood

**Design.** Validation study.

**Animals.** 22 captive juvenile sea turtles.

**Procedures.** Sea turtles (18 loggerhead turtles [*Caretta caretta*], 3 green turtles [*Chelonia mydas*], and 1 Kemp's ridley turtle [*Lepidochelys kempii*])

were manually restrained, and a single blood sample was obtained from each turtle and divided for analysis by use of the 5 analyzers. Hematocrit and concentrations or activities of aspartate aminotransferase, creatine kinase, glucose, total protein, albumin, BUN, uric acid, P, Ca, K, Na, Cl, lactate dehydrogenase, and alkaline phosphatase were determined. Median values for each analyte were compared among the analyzers.

*Results.* Significant differences were found among the analyzers for most values; however, data obtained from the 2 diagnostic laboratories were similar for all analytes. The magnitude of difference between the diagnostic laboratories and in-house units was  $\pm$  10% for 10 of the 15 analytes.

*Conclusions and Clinical Relevance.* Variance in the results could be attributed in part to differences in analyzer methodology. It is important to identify the specific methodology used when reporting and interpreting biochemical data. Depending on the variable and specific case, this magnitude of difference could conceivably influence patient management.

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COMPARISON BETWEEN COELIOSCOPY AND COELIOTOMY FOR LIVER BIOPSY IN CHANNEL CATFISH

SS Boone, SJ Hernandez-Divers, MG Radlinsky, KS Latimer, JL Shelton (2008). *J. Amer. Vet. Med. Assoc.*, 233 (6): 960-967.

Abstract

Objective. To evaluate endoscopic liver biopsy and compare that technique with a standard coeliotomy biopsy technique in fish.

Design. Randomized controlled clinical trial.

Animals. 30 channel catfish (*Ictalurus punctatus*).

Procedures. 10 fish were randomly assigned into control, coeliotomy, and coelioscopy groups. Anesthesia was performed with a recirculating anesthesia machine. Body weight, PCV, and total protein (TP) concentration in blood as well as plasma activities of aspartate aminotransferase, creatinine phosphokinase, lactate dehydrogenase, and sorbitol dehydrogenase were measured before and after surgery. Standard ventral coeliotomy or coelioscopy was performed, and the biopsy specimens were scored histologically.

Results. Coeliotomy and coelioscopy procedures were well tolerated without acute deaths. Blood TP concentration and PCV decreased after surgery in the coelioscopy group

because of intracoelomic fluid administration to aid visualization. Minor changes in activities for hepatic and muscular enzyme activities were apparent, but were not significantly different between the coelioscopy and coeliotomy groups. Coelioscopy and coeliotomy yielded biopsy specimens of similar diagnostic quality. However, coelioscopy permitted a more extensive evaluation of the viscera, and all 10 surgical wounds healed completely, compared with severe wound dehiscence in 3 of 10 fish that underwent coeliotomy.

Conclusions and Clinical Relevance. Both coelioscopy and coeliotomy were capable of yielding antemortem liver biopsy specimens of diagnostic quality in catfish. Coelioscopy permitted a more detailed examination of the coelomic viscera through a smaller surgical incision, was less traumatic, and resulted in decreased wound dehiscence.

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## SPECIAL REPORT

### KOI HERPESVIRUS: THE INTERNATIONAL PERSPECTIVE

Chris I. Walster, BVMS, MVPH, RCVS

*Presented at the WAVMA Conference held in conjunction with the 29th World Veterinary Congress, Vancouver, Canada, July 2008*

This presentation is split into two parts with the first being background information on KHV, which is used to draw the conclusions in the second part. The second section is somewhat speculative as the distribution and prevalence of KHV within countries is poorly known and the resources available to control or eradicate the disease vary considerably between countries. The actual presentation will concentrate more on the international impact of the disease than on the background.

Koi Herpes Virus (KHV) is the commonly recognised term used for a disease that emerged in 1998 and threatens the production of common carp (*Cyprinus carpio*) and varieties such as koi and ghost carp worldwide. Sometimes in the literature common carp are referred to as *Cyprinus carpio carpio* and koi are referred to as *Cyprinus carpio koi*. The virus has yet to be named by the International Committee on Taxonomy of Viruses (ICTV) and is also referred to in the literature as Cyprinid Herpesvirus-3 (CyHV-3) or carp interstitial nephritis and gill necrosis virus (CNGV).

Although the first outbreak of KHV disease (KHVD) was noted in Israel in 1998 there are now confirmed earlier outbreaks, in Germany in 1997 (Bretzinger, A *et al.* 1999) and in the UK in 1996. The 1996 UK events were confirmed by *in-situ* hybridisation on archived material held at the Centre for Aquaculture and Environmental Studies (CEFAS) from common carp mortalities (Aoki, T. *et al.* 2007). Interestingly there are anecdotal reports of a similar syndrome seen in koi around 1995-96 in Belgium which was called Koi Immuno-Suppressive Syndrome (KISS).

Common carp are widely cultivated for human food with around three million metric tonnes produced annually (FAO 2006), principally in China, other Asian countries, Eastern Europe and the Middle East. Koi are a high value ornamental fish cultivated worldwide particularly in Japan, China, Malaysia, Indonesia, Thailand and Israel. This intensive culture of common carp and large-scale international movements of live koi, often in the absence of health certifications, has undoubtedly contributed to the rapid distribution of KHV (Haenen, O.L.M. *et al.* 2004). Outbreaks of the disease have been reported from countries in Europe, North America, Africa and Asia.

The timescale is somewhat disputed but there is little doubt that the distribution of KHV was considered global by May 2003 when it was reported from Japan (Pokorova, D. *et al.* 2005), one of the last significant producers of *Cyprinus carpio* to officially report an outbreak. Epizootics have been recorded in much of Western Europe, the United States of America (USA), Israel and many Asian countries such as Indonesia, Thailand, Malaysia, China and Japan. These outbreaks have occurred in both cultured and wild *Cyprinus carpio* (Aoki, T. *et al.* 2007).

Prevalence for individual countries varies between Israel where around 90% of carp production has been affected (Perelberg, A. *et al.* 2003) and Australia which is considered free of the disease although there is no surveillance for it. The import of *Cyprinus carpio* into Australia has been illegal for a number of years and is probably why the disease has apparently not been introduced there. As there is little quantitative data on disease prevalence in cultured fish reported (Noga, E. J. 2000) it is difficult to ascertain the number of outbreaks per year of a disease and relate them to the extent of any aquaculture industry within a given country.

Recent listing of KHVD by the World Organisation for

Animal Health (OIE) and the European Union (EU) may aid in determining the actual prevalence. The disease was made notifiable in the UK since April 2007. During 2006 twenty-three outbreaks were confirmed by CEFAS in fisheries in England and Wales, causing concern for potential impact to wild stocks. There have been no reported outbreaks of the disease in Scotland. There is undoubtedly underreporting of KHV (OIE 2007), often due to failures in surveillance or the availability of fish health services within a country.

The KHV causative agent is a large double stranded DNA virus with virion morphology similar to other herpesviruses (Dishon, A. *et al.* 2005). Until the 1980s assignment as a herpesvirus was based on virion morphology that presented a characteristic appearance in electron microscopy (EM), with biological criteria then being used for assignment to one of the three subfamilies of *Herpesviridae* (McGeogh, D. J. *et al.* 2006). The name KHV was first ascribed to this virus due to its morphological appearance when first isolated from koi (Hedrick, R. P. *et al.* 2000).

One group (Gilad, O. *et al.* 2002) considered that the two originally isolated strains of the virus, one from Israel and a second from the USA, appeared to be identical from RFLP (Restriction Fragment Length Polymorphism) analysis. Analysis of these two strains and one later isolated in Japan showed that the Japanese isolate was a different strain but all three isolates arose from a common KHV ancestor (Aoki, T. *et al.* 2007). In 2007 a non-virulent KHV with 96% homology to the virulent form was isolated from fisheries in England.

The virus can survive in pond water for at least four hours at temperatures of around 22°C (Perelberg, A. *et al.* 2003) and probably survives for much longer in droppings and pond mud (Hutoran, M *et al.* 2005; Dishon, A *et al.* 2005). KHV deoxyribonucleic acid (DNA) has been detected in river water four months prior to any recorded outbreak in the fish (Haramoto, E. *et al.* 2007). The virus is leucotrophic and localises in white blood cells within the kidney (Pikarsky *et al.* 2004).

Infectivity is abolished after two days at 35°C (Perelberg, A. *et al.* 2003) and the virus is inactivated at pH values below 3 and above 11. It is also readily inactivated in chloroform, 25% ether or 0.1% TritonX-100 (Hutoran, M *et al.* 2005). The virus is inactivated by Ultra Violet radiation and temperatures above 50°C for 1 minute. The following disinfectants also inactivate the virus: iodophore at 200 mg per litre for 20 minutes, benzalkonium chloride at 60 mg per litre for 20

minutes, ethyl alcohol at 30% for 20 minutes and sodium hypochlorite at 200 mg per litre for 30 seconds, all at 15°C (OIE 2007). Viral reproduction is not inhibited in the presence of Acyclovir or Gancyclovir (Ilouze, M. et al 2006b; Bercovier, H. et al. 2005).

International spread of the disease is thought to be due to the movements of either infected fish incubating the disease or latently infected fish (Haenen, O.L.M. et al. 2004). Certainly the unrestricted trade in koi has been implicated. Spread between farms or even ponds on farms remains unclear as does how the virus survives between outbreaks and seasons (Ilouze, M. et al. 2006a). Transmission of KHV is horizontal, but vertical transmission cannot be ruled out. Horizontal transmission may be fish to fish or via the water, or animate vectors (e.g., parasitic invertebrates and piscivorous birds and mammals), and fomites may also be involved in transmission (OIE 2007).

The ability of this virus to invade through the gills, multiply there, and then be released back into the water is analogous to the respiratory viruses in mammals that infect the respiratory epithelium, replicate there, and are then spread through air droplets and aerosols (Ilouze, M. et al. 2006a; Pikarsky et al. 2004). The ability of the virus to survive for four hours in water is likely to be the key to its rapid dissemination between fish.

Clinical disease is only seen in common carp, koi and their hybrids, although there is some indication that other cyprinid species may be susceptible (Davidovich, M. et al. 2007) such as fathead minnow (*Pimephales promelas*), grass carp (*Ctenopharyngodon idella*), goldfish (*Carassius auratus*) and others, although this is considered speculative by some.

It is only seen at water temperatures between 16°C and 28°C (the permissive temperatures) although the virus is known to replicate at 13°C in common carp (Gilad, O. et al. 2004) and as low as 4°C in cell culture, in which no growth is seen at 30°C or 37°C (Gilad, O. et al 2003). That the virus can grow at 4°C suggests that the virus can over winter in infected fish. There is evidence of differences in susceptibility to the disease between different strains and hybrids of common carp (Shapira, Y. et al. 2005; Hedrick, R. P. et al. 2006) and it is noticeable in koi types that those closest to wild types exhibit increased resistance.

In the UK the disease is seen mainly between June and September whilst in countries such as Israel it is seen in the spring and autumn. In heated

systems used by ornamental fish keepers the disease can be seen all year. By raising water temperatures to 30°C, a management technique often used to decrease mortalities during a disease outbreak and also part of the process previously used in Israel to produce naturally immune fish+ (Ronen, A. et al. 2003), further progression of the disease can be halted.

Whether the virus under goes latent infection is of great epidemiological and economical importance. There is evidence that supports the virus becomes latent at temperatures below the permissive temperature (St.-Hilaire, S. et al. 2005; Gilad, O et al. 2003; Gilad, O. et al. 2004) but this has only been indicated in cell culture at temperatures greater than the permissive temperature (Dishon, A. et al. 2007). Other authors conclude that there is no solid evidence of latency in either survivors of natural infections or fish that have been immunised with a live attenuated vaccine (Ilouze, M. et al. 2006a).

Expert opinion also believes that for an outbreak to occur fish must suffer an additional insult such as stress from overstocking, heat stress (usually rapid increases in water temperature), low dissolved oxygen, management procedures such as grading, and other forms of poor management.

Typically there are no symptoms for five days post exposure with mortalities starting on days six to eight reaching a plateau at 10-12 days (Perelberg, A. et al. 2003) and finishing around day 24. The gill is the primary site of infection with both areas of hyperplasia and necrosis evident from as early as three days (Ilouze, M. et al 2006a).

From the gills, the virus is transported via the bloodstream to the kidneys and other organs such as the spleen, liver and intestine. Gill inflammation and interstitial nephritis are seen histologically from as early as two days post infection (Pikarsky et al. 2004). The virus causes cell lysis thus killing the infected cell. The result is that a lytic type of disease is seen and there is no evidence of oncogenic disease.

Clinical signs are not pathognomonic, and diagnosis can only be confirmed by laboratory investigation. Classically the disease causes severe gill necrosis, excess or decreased mucous production on the skin and gills, reddening or erosion of the skin, enophthalmia, +/- nervous system symptoms, with +/- increased external parasites, and with morbidity and mortality up to 100% in *Cyprinus carpio* (Bretzinger, A. et al. 1999; Walster, C. 1999). In the United Kingdom (UK)



there have been recent reports of investigations into chronic losses of *Cyprinus carpio* at fisheries with cumulative mortalities of around five percent that have confirmed KHV presence by polymerase chain reaction (PCR), with no other pathogens isolated.

In addition, fish may show lethargy, lack of appetite and gathering at water inlets or the edges of the pond, typical signs of respiratory distress. Some fish may show disorientation or episodes of hyperactivity indicative of neurological imbalance. Gross pathology is also non-specific with erosion and fusion of the gill lamellae occurring, along with possible erosion of the skin. Internally organs can appear darker or paler than normal, sometimes with accumulation of fluid or adhesions in the abdomen.

In viral disease, virus isolation is usually considered to be the gold standard in confirming a diagnosis but isolation of KHV can be problematic and PCR is currently considered the best method of confirmation (OIE 2007). The recommended cell lines for virus isolation can be difficult to maintain and it is difficult to recover the virus from frozen or autolysed samples. There is debate over which cell lines the virus can be grown in, with some authors reporting growth in FHM (Fathead Minnow) (Oh, M. J. et al. 2001; Grimmett, S. G. et al. 2006) whilst others state it is resistant (Davidovich, M. et al. 2007). The recommended cell lines for virus isolation are KF-1 (koi fin cells), CCB (carp brain cells) and CaF-2 (carp fin) (OIE 2007).

Samples for virus isolation should be taken from moribund fish either from the gills, avoiding areas of necrosis, or the kidney. There are various PCR methods published (Bercovier, H. et al. 2005; Soliman, H. and El-Matbouli, M. 2005; Gilad, O. et al. 2002; Gray, W. L. et al. 2002; Gunimaladevi, I. et al. 2004; Ishioka, T. et al. 2005) In a ring test comparing the available PCRs carried out in 21 laboratories in 19 countries the PCR of Bercovier produced the best overall result (K. Way, unpublished data) and has an analytical sensitivity of 10 femtograms equivalent to 30 virions (Bercovier, H. et al. 2005).

It has been shown that *Cyprinus carpio* produce antibodies to KHV (Ronen, A. et al. 2003; Adkison, M. A. et al. 2005) and that these antibodies can still be detected one to two years post infection or longer (Adkison, M. A. et al. 2005; K. Way, unpublished data). Experimental data has indicated that not all fish develop detectable antibodies for long periods but that at least 25% of the population will (K. Way, unpublished data).

An antibody ELISA (Enzyme Linked Immuno-Sorbent Assay) can be used to assess previous exposure to KHV for a population but is unlikely to be useful in testing an individual except where that individual is positive for KHV antibody. The antibody ELISA can be used to demonstrate exposure to KHV and indicate potential risk of movement of virus with antibody positive fish (Adkison, M. et al. 2005) suggesting that this is an indirect method of detecting possible latency. There are several antibody ELISAs available around the world and they offer a non-lethal means of testing previous exposure to KHV. A disadvantage is that it can be several weeks post exposure before antibodies become detectable (K. Way, unpublished data) and were vaccines to become more widespread (currently there is a live attenuated vaccine licensed in Israel which has been used in Poland on an emergency basis) then the usefulness of this method would be limited.

There is only currently one antigen ELISA available, although another one is being validated. The current antigen ELISA detects antigen in fish faeces and can be used to confirm a disease outbreak. It is described as being specific for KHV antigen in the literature but only one sample from a sick fish eight days post infection and one sample from a mock infected fish are described (Dishon, A. et al. 2005). Again this method offers a non-lethal means of testing fish during an outbreak, but currently is only available in Israel.

Various other aids to diagnosis are also available, such as histopathology, electron microscopy (EM) and indirect fluorescent antibody tests (IFAT), but in conclusion, the available diagnostic tests provide a good ability to confirm active infection but provide limited ability to detect potential carriers or latently infected fish.

Herpesviruses represent a group of highly successful viruses that have evolved with their hosts, and entry by the virus into host cells is dependent on the presence of cell receptors (Roizman and Pellet 2001). There are over 120 known herpesviruses (Davison, A. J. 2002) and eight are known to infect humans (Dolan, A. et al. 2004). Co-evolution and close association with their hosts is evident in the genome of herpesviruses, where capture, duplication, and modification of host genes are evident. As a result of this coevolution, also termed co-speciation, herpesviruses show a restricted host range and tend not to induce serious diseases in immuno-competent individuals. Through latency they establish a long-term residence with their hosts (Davison, A. J. 2002).

There are two hypotheses as to how KHV arose. The first is that due to evolutionary pressure placed on the virus in intensive culture of *Cyprinus carpio* an increase in virulence of a hitherto unnoticed virus occurred. Increases in virulence have been noted for another herpesvirus, Marek's Disease Virus (MDV) which is pathogenic for poultry, influenced by the intensive nature of poultry farming (Nair, V. 2005). Possible evidence for this might be the isolation in 2007 of a non-pathogenic form of the virus. A similar mechanism was put forward for the appearance of Infectious Salmon Anaemia (ISA), an *Orthomyxoviridae*, in Norway (Norwegian Scientific Committee for Food Safety 2006). A second mechanism is that an ancestral virus to KHV lost gene functions encoding membrane glycoproteins associated with host specificity and virulence (Aoki, T. et al. 2007) although the authors consider this speculative.

From an international perspective there are four major questions:

1. Where is the virus?
2. What is the economic impact?
3. Can the presence/absence be accurately detected or confirmed?
4. What methods are available for control or eradication?

The first two questions can be answered easily as the virus is undoubtedly found worldwide, except possibly Australia, wherever carp are found and, with mortality rates of up to 100%, the effects can be economically devastating. Where carp are the major source of protein, such as in some Asian countries, then the impact on humans potentially could be great. The second two questions are not so clear cut.

Of the various published PCR tests, most only make reference to the analytical sensitivity and specificity, meaning the limit of detection and potential cross reaction, respectively, and not to the diagnostic sensitivity and specificity, meaning the probability of the test returning a positive result given that the true status of the animal tested is positive for the disease and the probability of the test returning a negative result given that the true status of the animal tested is negative for the disease. Both measures are essential in validating any new test, but when no other known gold standard test exists then such diagnostic sensitivity and specificity are more difficult to calculate.

There are still problems when trying to detect potential latent infections due to a variety of factors, including population size, the number of fish sampled from the population, the number of carriers

present, the number of virus particles or DNA copies in the carrier fish, the distribution or location of virus/DNA in the fish, the amount of tissue sampled from the fish and the minimum detection level of the diagnostic test used. Thus although the current diagnostic tests may have a very low minimum detection limit these other factors may prevent proper classification of infected fish.

As with the PCR, there is only reporting of analytical sensitivity and specificity for the majority of the ELISA tests available. There is cross reaction at low serum dilutions to CyHV-1 antibodies and it is suggested that to ensure populations are not misclassified as false positives the cut-off titre be at least as high as 1:1600 or 1:2500 (K. Way, unpublished data; Adkison, M. et al. 2005). Current ELISAs can only be considered suitable for detecting populations of fish previously exposed to KHV and possibly as an indirect method of detecting latency.

Despite the fact that KHV is listed by the OIE, there is no single diagnostic test that can be considered confirmatory of presence/absence. Virus isolation can be problematic even when samples are taken during a disease outbreak. PCR only works during an epizootic and ELISA only indicates previous exposure. Presence of the virus can only be confirmed by clinical signs along with a positive PCR result or virus isolation. Absence within a population of fish can only be confirmed by a negative antibody ELISA test and absence of clinical disease. Potential problems with proper classification of fish have been discussed above and it is therefore suggested that to accurately confirm absence it is likely that the fish would need to be tested over a period of years.

Given that confirmation of presence/absence can prove difficult, then control and, in particular, eradication could also be difficult. At present there are no treatments available for KHV and only one vaccine is currently in production. The vaccine is a live attenuated virus and is considered by some to be a GMO (genetically modified organism), which under EU (European Union) legislation would mean a protracted period of validating its safety. It is only licensed in Israel, and certainly within Europe the authorities appear unwilling to license live virus vaccines for use in aquaculture, although it is noted that to date no company has applied for such a license.

Control therefore depends on identifying infected fish and putting in place good biosecurity. However since there is little doubt that the virus was spread by trade in fish either incubating the disease

or latently infected, then even restricting the source of supply may not prevent entry and a period of quarantine (two to four weeks) is necessary. It should also be noted that anecdotal evidence suggests that the disease can lie dormant within a population for several years until conditions arise that cause an outbreak.

It is likely that over the previous decade or more KHV has spread to all carp producing areas, with only those areas where water temperatures do not reach the permissive temperature not experiencing an epizootic. Potentially KHV is present in wild populations, thus decreasing the possibility of eradication, although the author considers that eradication is possible given sufficient resources. These resources need to be coordinated internationally and to date this has been achieved by workshops such as that held by DEFRA (UK) in 2004, and the workshop in Israel in February of this year, amongst others. Initiation of these international efforts did not occur until it became apparent that KHV was not just a disease which occurred in ornamental fish but also impacted on carp for food and recreation.

Can KHV be eradicated? When the disease first appeared in Israel this was considered at length and they decided to go down the route of control. Firstly by exposing groups of fish to the wild virus thus producing naturally immune fish and then by using a live attenuated virus. Although the virus is widely disseminated in Israel carp, production using the vaccine and other methods such as indoor rearing and strict biosecurity has seen production of carp recover and exceed that prior to 1998. Where the disease is endemic, without expending huge resources, it is unlikely that it can be eradicated. In cases where the presence of the virus can be determined to be in only isolated geographical regions of a country then eradication may be possible using traditional methods of stamping out.

If a vaccine became widely available, then using methods such as ring vaccination would improve the chances of success. However, certainly within European countries it is unlikely that governments would provide all of the necessary resources and it would need to be coordinated by producers of carp or those that use them in a recreational capacity.

Although some authors state that goldfish (*Carassius auratus*) were implicated in the spread of Furunculosis bacteria in the past, KHV shows that the trade in ornamental fish is capable of transmitting disease around the world. KHV is

clearly a Transboundary Animal Disease (TAD). Our understanding of the disease is still far from complete, with latency being indicated but not proven and questions over transmission and what triggers an outbreak still needing to be resolved. Although the currently available diagnostic tests are not ideal, if they are used correctly they do provide a basis to control the disease and possibly eradicate it. As with any TAD, any attempt to control a disease needs to address the specific issues of each country and be coordinated internationally.

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LEGISLATIVE & REGULATORY ISSUES

INTERSTATE MOVEMENT AND IMPORT RESTRICTIONS ON CERTAIN LIVE FISH

(Federal Register, Vol. 73, No. 175, September 9, 2008, Rules and Regulations)

Agency: Animal and Plant Health Inspection Service, USDA.

Action: Interim rule and request for comments.

Summary: We are establishing regulations to restrict the interstate movement and importation into the United States of live fish that are susceptible to viral hemorrhagic septicemia, a highly contagious disease of certain fresh and saltwater fish. In 2005 and 2006, viral hemorrhagic septicemia was detected in freshwater fish in several of the Great Lakes and related tributaries. The disease has been responsible for several large-

scale dieoffs of wild fish in the Great Lakes region. This action is necessary to prevent further introductions into, and dissemination within, the United States of viral hemorrhagic septicemia.

Effective date: This interim rule is effective November 10, 2008. Comments on the interim rule were due on or before November 10, 2008 and comments on the environmental assessment are due on or before October 9, 2008.

*****Note*****.

On October 28, 2008 APHIS announced that, based on our review of the comments received to date, we consider it advisable to delay the effective date of the interim rule from November 10, 2008, until January 9, 2009, while retaining November 10, 2008, as the close of the comment period for the interim rule and October 9, 2008, as the close of the comment period for the environmental assessment. This additional time will allow APHIS to consider all comments and make some adjustments to the interim rule that may be necessary in order to successfully implement it.

It is anticipated that APHIS will invite further comments after they publish the adjustments to the interim rule.

The full Federal Register notices, and all comments submitted, are available at www.regulations.gov; search for APHIS-2007-0038, and click on **Docket ID: APHIS-2007-0038** in any record.

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**NOTE: WAVMA IS INCREASINGLY AWARE THAT OWNERS (POTENTIAL CLIENTS) AND GOVERNMENT AGENCIES THROUGHOUT THE WORLD ARE UTILIZING THESE ONLINE RESOURCES TO LOCATE AQUATIC VETERINARIANS & DIAGNOSTIC LABS !!!.**

**ONLINE AQUATIC VETERINARIAN & DISEASE DIAGNOSTIC LABORATORIES DIRECTORIES**

A free resource for all aquatic veterinarians and an opportunity for clients to find you.

Simply go to

**AquaVetMed.info**

Active or interested in any areas of aquatic veterinary medicine ? to register in the free online directory.

Register AT NO COST TODAY at [www.AquaVetMed.info](http://www.AquaVetMed.info)

## AQUATIC SPECIES SUSCEPTIBLE TO DISEASES LISTED IN DIRECTIVE 2006/88/EC

(European Food Safety Authority Journal 2008, 808, 1-144)

*Summary:* Following a request from the European Commission, the Panel on Animal Health and Welfare was asked to deliver a scientific opinion on aquatic animal species susceptible to the diseases listed in the Council Directive 2006/88/EC. More specifically, the question was to establish which species other than those listed in Part II of Annex IV to Directive 2006/88/EC that could be considered as susceptible; and which of the species currently listed as susceptible in Part II of Annex IV to Directive 2006/88/EC that cannot be considered as susceptible.

This was achieved through comprehensive literature review with considerations for: i) reflection of natural pathways provided by the experimental design of reported studies, ii) compliance with four objective criteria pertaining to susceptibility to infection, and iii) thorough identification of the causative agent.

The four criteria used to assess susceptibility of host species were: evidence of replication or growth of the organism (A), presence of a viable organism (B), presence of specific clinico-pathological changes (C), and specific location of the pathogen (D). This led to identification of two main groups: Group I, host species for which the quality of the data provided clear support for susceptibility, and Group II, host species for which incomplete or unclear data prevented a clear conclusion or the only available data was obtained from invasive experiments.

Group I (susceptible species) contains i) traded and non-traded species, ii) species belonging to several genera, and iii) many were susceptible to several of the specified pathogens, so may represent different levels of risk. Within Group I, species were identified that currently are not listed in Directive 2006/88/EC and those species are recommended to be considered for possible inclusion. Partial evidence suggesting susceptibility was obtained for a large number of host species (Group II). Several host species, including some currently listed in Directive 2006/88/EC, were identified as potentially non-susceptible but it was not possible to confirm this status firmly due to the quality of the data.

Further scientific studies are required to resolve the uncertainty concerning the susceptibility of the host species identified in this group. Such studies should apply clear criteria, such as those used in this opinion, to assess susceptibility of host species and clear identification of the pathogen and affected host(s). In addition, the opinion noted that the lack of clear case definition for some of the specified pathogens compromised assessment of the susceptibility of some host species.

Finally, the application of the taxonomic relatedness of host species and the broad taxonomic spread of affected hosts as guiding principles to susceptibility of host species needs to be assessed to determine their robustness and to clarify how they can be applied. This approach could be useful for the numerous species for which data is lacking and also avoid unnecessary experimental studies in the target hosts.

This Scientific Opinion should be updated and reviewed regularly. The publication is available at: [http://www.efsa.europa.eu/EFSA/Scientific\\_Opinion/ahaw\\_op\\_ej808\\_susceptspecies\\_opinion\\_en.pdf?](http://www.efsa.europa.eu/EFSA/Scientific_Opinion/ahaw_op_ej808_susceptspecies_opinion_en.pdf?)

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AQUATIC MEETINGS OF INTEREST

1ST INTERNATIONAL CONGRESS ON AQUATIC ANIMAL HEALTH MANAGEMENT AND DISEASES. JANUARY 27-28, 2009.

Tehran, Iran- The 1st International Congress & Exhibition on Aquatic Animals Health Management and Diseases" will be held by Veterinary Council I. R. Iran as Organizer, with active collaboration of Contemporary Conference Organizers as co-organizer, and with full support of Iran Fisheries Organization, Iranian Fisheries Research Organization, Iran Veterinary Organization, Faculty of the Veterinary University of Tehran, and Iran Department of Environment on January 27-28, 2009, in Tehran, Iran.

The main aim of this Congress & Exhibition is creating a dynamic scientific environment for presenting, transferring and exchanging the know-how and latest advanced research findings and scientific achievements in all health and nutrition management aspects of aquatic animals and in particular on diseases, prevention and treatment, nutrition health management, water quality management, and health management in aquaculture farms through active participation of Iranian and foreigner veterinarians, researchers, scientists and experts.

You and your distinguished colleagues are kindly invited to send abstracts of papers by October 21, 2008 to secretariat, to be submitted to the congress scientific committee. The abstract should include: title, authors, affiliations, corresponding author e-mail, abstract (not more than 350 words) and 5-7 keywords.

Also in conjunction with this Congress, an Exhibition will be held which creates a valuable opportunity for foreign and Iranian companies active in all above mentioned fields and also in all disciplines of fisheries, aquaculture and seafood production and processing to introduce their capabilities, products and services, and also to seek for new markets and business partners and opportunities in Iran's huge and vast market.

The interested scientists, researchers, experts and companies could take part actively as sponsor, exhibitor or participant.

For more information please contact:

Dr. Issa Sharifpour
Congress & Exhibition Secretariat
Tel: +98- 21- 66976060
Fax: +98- 21- 66970742
Mobile: +98- 912- 3544582
info@icahmd.com

Address: Unit 2, No. 208, Shohadaye Jandarmery St., 12th Farvardin St., Enghelab Ave., Tehran-Iran, P. O. Box: 13145-198
Email: Info@ichmda.ir
Web site: www.ichmda.ir

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### **3RD ANNUAL "GREATER NEVADA AQUATIC ECOLOGY & KOI HEALTH ACADEMY," FEBRUARY 28TH - MARCH 1ST, 2009.**

Reno, NV- This event will be held at the University of Nevada, College of Agriculture building, located in beautiful downtown Reno, Nevada. Two tracks are available: Pond Professional and Veterinarian.

Some of the featured speakers include: Dr. Tim Miller-Morgan, DVM - Oregon State University, College of Veterinary Medicine, Oregon Sea Grant Extension; Dr. Scott Weber, VMD, MS - University of California, College of Veterinary Medicine; Dr. Richard Strange, PhD - University of Tennessee, Department of Fisheries and Wildlife; Dr. Allen Riggs, DVM - Hawaii Department of Agriculture, Aquaculture Development Program and Dr. David

S. Thain, DVM - University of Nevada, State Extension Veterinarian.

Rail City Garden Center is looking forward to seeing you at the 2009 event. Please call (775) 355-1551, visit our website at [www.railcitygarden.net](http://www.railcitygarden.net), or email us directly at [justin@railcitygarden.net](mailto:justin@railcitygarden.net).

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34TH ANNUAL EASTERN FISH HEALTH WORKSHOP, 27 APRIL - 1 MAY 2009.

High Peaks Resort, Lake Placid, New York

For more information:

Rocco Cipriano: rcipriano@usgs.gov

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**40TH ANNUAL IAAAM MEETING AND CONFERENCE. MAY 2-6, 2009.**

Radisson Hill Country Resort and Spa, San Antonio, Texas, USA.

For more information [www.iaaam.org](http://www.iaaam.org)

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AQUAVET® I, MAY 17 - JUNE 13, 2009

Marine Biological Laboratory in Woods Hole, Massachusetts.

We are please to announce that AQUAVET® I - An Introduction to Aquatic Veterinary Medicine will be offered by AQUAVET® in 2009. The course is designed for veterinary students and veterinarians who have an interest in applying their veterinary training to aquatic animals.

The course will be presented at the Marine Biological Laboratory in Woods Hole, Massachusetts. The course dates are May 17 to June 13, 2009. The combined tuition, room, and board fee for the 4 week course has been set at \$1825 for full time veterinary students, and at \$3200 for veterinarians. Through the generosity of a program benefactor, a \$200 scholarship will be applied to partially offset the fee for all full time veterinary students resulting in a net tuition of \$1625 for such accepted full time veterinary students this year.

In addition, we anticipate a limited number of summer research opportunities during an 8-week period following the course. Students selected as AQUAVET® Summer Research Fellows are not required to pay tuition or room and board fees for the 8 weeks of the research program itself. In addition, research students will receive a stipend of \$1500 for the research period.

Detailed information about the course is available on our website. Applications for admission are due by January 15, 2009 and may be obtained by accessing the program website from which the application form may be downloaded for completion and submission by mail or e-mail.

Please visit our website at: www.aquavet.info

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**AQUAVET® II, MAY 17 - 30, 2009**

Marine Biological Laboratory in Woods Hole, Massachusetts.

We are please to announce that an advanced course in Comparative Pathology of Aquatic Animals will be offered by AQUAVET® in 2009. The course will be oriented toward the pathology of vertebrates and invertebrates commonly used as laboratory animals; encountered in display aquaria; and of importance to aquaculture enterprises. Representative species for each category will serve to demonstrate features of commonly observed diseases. The course is designed for veterinary students and veterinarians who have participated in AQUAVET® I or have had comparable experiences in aquatic animal medicine and pathology.

The course will be presented at the Marine Biological Laboratory in Woods Hole, Massachusetts. The course dates are May 17 to May 30, 2008. The combined tuition, room, and board fee for the 2 week course has been set at \$1,025 for full time veterinary students, and at \$1,700 for veterinarians. In addition, we anticipate a limited number of summer research opportunities during an 8-week period following the course. Students selected as AQUAVET® Summer Research Fellows are not required to pay tuition or room and board fees for the 8 weeks of the research program itself. In addition, research students will receive a stipend of \$1500 for the research period. At least one Fellowship will be restricted to aquaculture related projects.

Detailed information about the course is available on our website. Applications for admission are due by January 15, 2009 and may be obtained by accessing the program website from which the application form may be downloaded for completion and submission by mail or e-mail. You will receive an e-mail acknowledging receipt of your completed application.

Please visit our website at: [www.aquavet.info](http://www.aquavet.info)

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2009 ANNUAL AFS FHS MEETING, JUNE 8-10, 2009

Park City, Utah. The 2009 joint meeting of the American Fisheries Society Fish Health Section (AFS FHS) and the Western Fish Disease Conference has been scheduled for June 8-10, 2009 at Park City, Utah. More details to follow soon.

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Anemone- photo by Nick Saint-Erne, DVM

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ASSOCIATION OF AMPHIBIAN AND REPTILIAN VETERINARIANS ANNUAL MEETING, AUGUST 8-15, 2009.

Milwaukee, Wisconsin. The 16th annual meeting of the Association of Amphibian and Reptilian Veterinarians will be held in Milwaukee, WI from August 8-15, 2009. If you would like to submit a manuscript, please direct your attention to the ARAV website at <http://arav.allenmm.com>.

Directly on the homepage, you will see £2009 Call For Papers! Please choose this link and it will then take you to a pdf from Dr. Chris Griffin, President Elect and Program Chair. Please note that the deadline to submit your manuscripts will be no later than December 1, 2008.

If you should have any questions, please contact our Association Manager Shelley Black at sblack@allenpress.com (785)843-1234 ext 261 or (800)627-0326 ext 261

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## INTERNATIONAL AQUACULTURE BIOSECURITY CONFERENCE: PRACTICAL APPROACHES FOR THE PREVENTION, CONTROL AND ERADICATION OF DISEASE, AUGUST 13-18, 2009.

Trondheim, Norway

A WAVMA Function  
see page 11 for further information, and sign up  
at [www.IABConference.org](http://www.IABConference.org)  
for more information

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AQUATIC VETERINARY EMPLOYMENT OPPORTUNITIES

PANAQUATIC HEALTH SOLUTIONS PTY LTD.,
MELBOURNE, AUSTRALIA

Panaquatic provides high quality veterinary aquatic animal health and management advice to both the private and public sector. Clients range from commercial aquaculture companies farming species including abalone, barramundi and tuna to governments developing policies for these industries.

Panaquatic is seeking a full time veterinarian who ideally is experienced in aquatic animal health. Applications from veterinarians wishing to work in this exciting field but who have limited experience will be considered. A training program may need to be negotiated if such an applicant was chosen. A strong understanding in epidemiology and the ability to prepare and present high quality, thoroughly researched reports would be highly regarded.

The position is based in Melbourne, Australia and the successful applicant will be required on occasion to travel interstate and possibly overseas. Salary will be negotiable and will be dependent on the experience of the successful applicant.

Interested applicants can forward a detailed application to Ms Stephanie Alexander by fax (03 98181200) or email: steph@panaquatic.com

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## ATLANTIS, PARADISE ISLAND, NASSAU, BAHAMAS

Seeking a Staff Veterinarian to oversee the health and well being of our resort's marine



mammals and a variety of sharks, fishes, rays, and turtles. Applicants can e-mail their resume to Teri Corbett, Vice President or Marine Mammal Operations at: [teri.corbett@kerzner.com](mailto:teri.corbett@kerzner.com).

### *Job Summary*

Plans, directs and participates in the health care of Atlantis' marine animals. Establishes and conducts effective quarantine and testing procedures for all incoming animals to ensure the health of the collection, prevent the spread of disease and comply with all government regulations. Conducts regularly scheduled preventative care programs to maintain the health of the animals and guard against communicable diseases. Participates with other personnel in planning and executing nutrition, quarantine, and reproductive programs. Participates in employee training in the proper handling and care of the animals. Conducts postmortem studies and analyses. Cooperates with other zoo and aquarium personnel to exchange information concerning the care of animals.

### *Skills and Abilities*

1. Must possess the ability to successfully implement and manage a complete veterinary medical program.
2. Perform clinical procedures, diagnostic and therapeutic procedures, and surgery as required.
3. Demonstrate a strong knowledge of the biology, husbandry and medicine of exotic (non-domestic) animals in captivity.
4. Ability to conduct applied clinical research and to present research findings at conferences and in peer-reviewed journals.
5. Ability to teach and explain complex medical procedures to the staff.
6. Strong leadership, communication, and interpersonal skills.

### *Main Duties*

- \*Collect or direct the collection of various body tissues, blood, urine, bacteria, or feces for examination and analysis.
- Advises on the problems in the general care and maintenance of animals in the collections.
- Responsible for the maintenance of the animal records program of all related medical information and supervise appropriate procedures to check the accuracy of the data entered.
- Establish and conduct quarantine and testing procedures that prevent the spread of disease to other animals or to humans, and insure

compliance with all applicable governmental regulations.

- Examine animals to detect and determine the nature of diseases or injuries.
- Operate diagnostic equipment such as radiographic and ultrasound equipment and interpret the resulting images.
- Conduct postmortem studies and analysis to determine the cause of an animal's death.
- Perform various administrative duties such as budget development, scheduling appointments, record keeping, and staff appraisals.
- Plans and executes, along with the animal management team, all animal nutrition and reproductive programs.
- Assist in the proper training of animal care techniques and various medical procedures as appropriate.
- Participate in the exchange of information with other zoos and aquariums.
- Ability to conduct applied clinical research.
- Responsible for summarizing the data collected from staff and independent clinical studies into a scientific format for presentation and/or publication in appropriate peer-reviewed scientific journals.
- Maintains up-to-date familiarity with veterinary medical information and new drug developments.
- Responsible for pursuing and maintaining all appropriate licenses to practice veterinary medicine within the country and for obtaining and maintaining appropriate credentials for the storage and use of controlled substances.
- Presents a professional approach to his/her career and function as a team member, showing consideration, tolerance, cooperation, reliability and the ability to accept criticism.
- Maintains the department standard of excellent physical condition as needed to perform all aspects of the job safely.
- Extended travel and acceptance of irregular hours is a requirement.
- Serves as a spokesperson to guests and various media as required.

### *Required Education/Training*

- Doctorate of Veterinary Medicine from an accredited institution
- Must hold and maintain a valid veterinary license in the Bahamas
- Must be (or become) registered under the provisions of section 5 of the Veterinary Surgeons Act
- Minimum of two years training in exotic veterinary medicine, with marine mammal

experience, particularly with cetaceans, preferred

- Scuba Certification preferred
- Cardiopulmonary Resuscitation (CPR)

Applicants can e-mail their resume to Teri Corbett, Vice President or Marine Mammal Operations at the following address: [teri.corbett@kerzner.com](mailto:teri.corbett@kerzner.com).

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ROGER WILLIAMS UNIVERSITY. AQUATIC ANIMAL HEALTH SPECIALIST (DVM)

Location: Bristol, Rhode Island, USA

<http://departments.rwu.edu/biology>

Closing Date: Thursday, January 15, 2009

Qualifications:

A DVM/VMD degree from an accredited veterinary college is required with competency in aquatic animal medicine. Candidates must be qualified to become board certified in Rhode Island. The successful candidate also should have demonstrated research competence with an ability to compete for extramural funding. Preference will be given to candidates with either a MS or Ph.D. in aquatic animal disease research. Evidence of successful teaching experience is preferred. The candidate must possess strong interpersonal skills and have the ability to work with a variety of individuals including faculty, staff, students, producers, regulators, and the general public. Review of applications will begin January 15, 2009 and will continue until the position is filled.

Description and Responsibilities:

The Department of Marine Biology invites applications for the position of Aquatic Animal Health Specialist. This position is as a full-time Visiting Assistant Professor and entails developing a Center for Aquatic Animal Health at Roger Williams University.

The Aquatic Animal Health Center will join an existing shellfish hatchery in a new addition to the Marine and Natural Sciences Building on the Bristol (RI) campus, (expected completion in autumn 2009). The Aquatic Animal Health Center, consisting of this position and a research technician, will provide support services to the university's aquatic animal research groups; will establish an externally funded program of research in the Specialist's area of interest and will provide animal health services to the aquatic animal industry within the region. In addition, the Aquatic Animal Health Specialist will be expected to develop courses at the undergraduate level in

support of the biology and aquarium sciences programs. It is expected that the Center will provide opportunities for undergraduate research in the field of aquatic animal health. Other responsibilities will include management of the operations of the Center and supervision of the Research Technician.

To Apply:

Qualified applicants should submit: 1) a letter of intent including statements of teaching philosophy and research interests; 2) a current vita; 3) names and contact information of at least three references.

All applications should be submitted electronically via email to the chair of the search committee, Dr. Dale Leavitt, at dleavitt@rwu.edu with the following text in the subject line: "Aquatic Animal Health Position # FAC09-017; Applicant's Last Name, First Name".

Roger Williams University offers an outstanding benefits package and salary commensurate with qualifications, as well as a superb quality of life in a scenic setting. Please visit <http://www.rwu.edu> for more information.

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## **UNIVERSITY OF TASMANIA, AUSTRALIA FISH HEALTH (MOLECULAR IMMUNOLOGY) POSTDOCTORAL POSITION – AUSTRALIAN MARITIME COLLEGE**

*Reference No:* LA 290/08; *Position:* Research Scientist (Fish Health); *Type:* Academic; *Location:* Launceston School/Section: National Centre for Marine Conservation & Resource Sustainability; *Faculty/Division:* Australian Maritime College; *Appointment:* Fixed-Term. *Availability:* Internal & External

*Closing Date:* Monday, 3 November 2008. Applications are invited for appointment to this position, which will be offered on a full-time fixed-term basis until December 2011, commencing in December 2008.

The position contributes to the research on improvement of yersiniosis vaccine through understanding of gene expression in Atlantic salmon. The appointee will primarily be involved in molecular research, including microarray experiments.

The successful applicant will have a sound knowledge of molecular biology and immunology. Demonstrated ability to undertake independent

research, in particular perform molecular techniques and interpret their results is essential.

Depending on individual qualifications and experience an appointment will be made at Academic Level A or B. An appointment at Academic Level A and will have a total remuneration package of up to \$76,963 per annum (comprising salary within the range \$49,238 - \$65,780 plus 17% superannuation). An appointment at Academic Level B and will have a total remuneration package of up to \$95,311 per annum (comprising salary within the range \$69,088 - \$81,462 plus 17% superannuation). There is also the option of an additional 3% salary loading in exchange for 14% instead of 17% superannuation.

For further information about the position please contact Associate Professor Barbara Nowak, on telephone (03) 6324 3814, fax (03) 6324 3804 or email [B.Nowak@utas.edu.au](mailto:B.Nowak@utas.edu.au).

For a job application package please see [http://jobs.admin.utas.edu.au/positions/pd\\_package.aspx?PositionId=787](http://jobs.admin.utas.edu.au/positions/pd_package.aspx?PositionId=787)

## COLLEGE OF VETERINARY MEDICINE, MISSISSIPPI STATE UNIVERSITY

The College of Veterinary Medicine, Mississippi State University, is seeking applications for a tenure track Assistant/Associate Professor position in Aquatic Animal Health in the Department of Basic Sciences. The successful applicant will have research expertise in infectious diseases or immunology in vertebrate or invertebrate aquatic species. Experience in applied aspects of aquatic animal health and diagnostics is desirable. The department has an active group of researchers in aquatic infectious diseases that will provide excellent opportunities for collaborative studies.

The primary duty in this position is research, and the successful candidate should have an established record of or demonstrated potential for original research and will be expected to develop an active research program with extramural funding. The successful candidate will be expected to participate in an interdisciplinary teaching program for upper-level undergraduate and/or graduate students and to provide instruction in the DVM curriculum. Minimum qualifications include a Ph.D. in infectious diseases in aquatic species, or a related discipline. Candidates with a DVM (or equivalent) degree are encouraged to apply. Salary and rank will be commensurate with experience.

Evaluation of applications will begin December 7, 2008 and continue until the position is filled. Please send a CV, names and contact information for three persons who can provide letters of recommendation, and a brief (one page or less) statement of research plans and goals as well as teaching philosophy to: Dr. Stephen B. Pruett, Department of Basic Sciences, College of Veterinary Medicine, P.O. Box 6100, Mississippi State, MS 39762. MSU is an AA/EOE employer.

## SENIOR VETERINARIAN – SEAWORLD FAMILY OF PARKS, ORLANDO, FL

With 200 acres of world-class shows, thrilling rides and unforgettable animal encounters, SeaWorld Family of Parks provide the world's premiere marine adventure parks. Offering an exciting blend of marine-life entertainment, conservation, and education, we are seeking a Sr. Vet to join our animal care team. This professional is responsible for establishing and maintaining a complete anatomic diagnostic pathology service for the collection of fish, birds, terrestrial and marine mammals, and wildlife affiliated with SeaWorld Family of Parks.

In this position, you will be responsible for:

- Performing gross examinations with sample collections for histology and ancillary diagnostics
- Subgross sectioning of tissues for histologic processing
- Evaluating tissues slides
- Coordinating ancillary results for report generation
- Entering results into an electronic database or communicating them with appropriate staff in order to direct and improve animal care
- Conducting individual necropsy examinations
- Performing population health assessments
- Overseeing and directing investigations of health and disease concerns

To qualify, you must have:

- Doctorate in Veterinary Medicine
- ACVP diplomate status or qualifications for completion of the ACVP examination in veterinary anatomic pathology
- A minimum of one year of experience with exotic animal pathology
- Experience in management of personnel and veterinary facility
- Ability to write concise and accurate reports on pathological specimens and provide advice to

clients (general practitioners and some specialist practitioners) on prognosis and ancillary diagnostic tests

- Excellent communication and interpersonal skills
- Proven ability to organize and collaborate with others

To apply online or for more information, please visit us at: [www.buschjobs.com](http://www.buschjobs.com). Equal Opportunity Employer M/F/D/V.

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AQUATIC VETERINARY INTERNSHIP / RESEARCH OPPORTUNITIES - MYSTIC AQUARIUM & INSTITUTE FOR EXPLORATION

With the assistance of both external and in-house funding, the Department of Animal Care of Mystic Aquarium & Institute for Exploration, a division of Sea Research Foundation, is sponsoring a one-year internship/research opportunity in aquatic animal medicine. Applicants for the internship should be graduates of an AVMA accredited veterinary college or ECFVG certified. All applicants should have successfully passed the NAVLE. Preference will be given to applicants with graduate degrees and/or postgraduate clinical experience in a practice or internship setting. Entry level familiarity with ultrasound, radiology, and endoscopy systems is expected.

The stipend for the position is expected to be \$26,000 per annum plus benefits. The successful applicant will assist the veterinary, research, and husbandry staffs in the diagnosis and treatment of medical cases from the Aquarium's extensive collection of invertebrates, fresh and saltwater fishes, reptiles, amphibians, penguins, seals, sea lions, and beluga whales. In addition the intern will participate in our rescue, rehabilitation, and release program for stranded marine mammals and sea turtles.

Collateral opportunities at cooperating area academic, government, and private industry laboratories are possible and encouraged. The intern will have an opportunity to develop teaching skills by his/her involvement in the Aquarium's veterinary externship program and at informal seminars. The intern will be expected to pursue one or more clinical or research interests and to prepare the results for presentation to our staff and at an appropriate professional meeting as well as for publication in the peer reviewed literature. Past interns have gone on to acceptance into well-recognized graduate/residency programs or

employment in the field of aquatic, comparative, or zoological medicine.

Applicants should submit the following material to:

Dr. Allison D. Tuttle
Director of Animal Care/Staff Veterinarian
Mystic Aquarium
55 Coogan Blvd., Mystic, CT 06355

1. A current transcript from the veterinary school and any post-baccalaureate program which he/she has attended.
2. Three letters of recommendation from individuals familiar with the applicant's academic performance and his/her potential in the clinical and research arenas. At least two of the letters must be written by a veterinarian.
3. A statement reflecting the applicant's goals in the area of aquatic animal medicine and research.
4. A current curriculum vitae or resume.

Potential applicants who will be in the southern New England area are encouraged to contact us for a tour of our facilities and a chance to meet with our staff. All application materials must be received prior to 01 December 2008. The successful applicant will be chosen and notified by 10 Jan 2009 and must commit to the position within 72 hours. The internship period will extend from 01 June 2009 through 15 June, 2010. With prior agreement by both parties an additional year in the program may be possible.

Additional information may be obtained by calling Dr. Tuttle at 860-572-5955 X101, or by e-mail at Atuttle@MYSTICAQUARIUM.ORG. A general orientation to our facility and programs can be obtained by viewing our web page <http://www.mysticaquarium.org>. Mystic Aquarium & Institute for Exploration is an affirmative action/ equal opportunity employer.

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## **MISCELLANEOUS JOB POSTINGS FROM AQUAVETMED E-NEWS:**

Aquatic Animal Health Specialist (DVM):  
<http://aquanic.org/jobs/jobinfo.asp?Jobid=2937>

Postdoctoral position in fish genetics:  
<http://aquanic.org/jobs/jobinfo.asp?Jobid=2935>

Curator of Fish, Invertebrates and Water Quality:  
<http://www.aza.org/JobListings/index.cfm>

Senior Biologist (New England Aquarium):  
<http://www.aza.org/JobListings/ViewJob.cfm?JobID=1157>

Veterinary Fellowship (New England aquarium):  
<http://www.aza.org/JobListings/ViewJob.cfm?JobID=1152>

Marine Biology Assistant Professor:  
<http://aquanic.org/jobs/jobinfo.asp?Jobid=2944>

Assistant Professor fish physiology:  
<http://aquanic.org/jobs/jobinfo.asp?Jobid=2932>

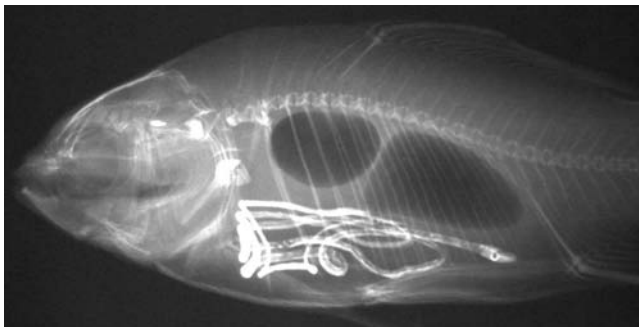
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Pufferfish laparoscopy- Willie Wildgoose



Goldfish radiology- Willie Wildgoose



GI Contrast Study- Willie Wildgoose

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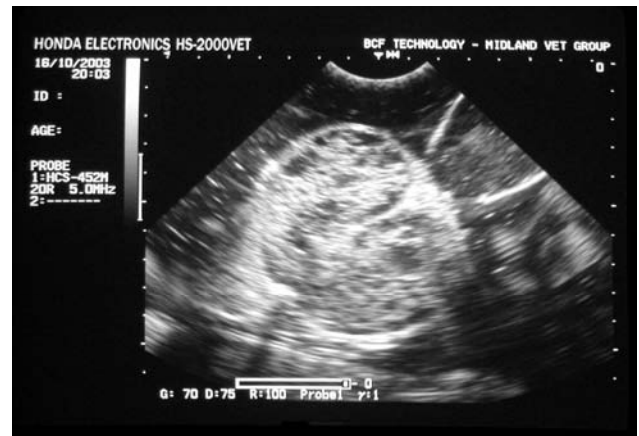
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Please e-mail any high resolution (>300 dpi) pictures that clearly illustrate what aquatic veterinarian's do, or the species or conditions we work with to: dscarfe@ameritech.net. All contributions will be fully credited if used. To prevent copyright violations please indicate the owner or source.

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Oscar radiology- Willie Wildgoose



Goldfish polycystic ultrasound · Willie Wildgoose

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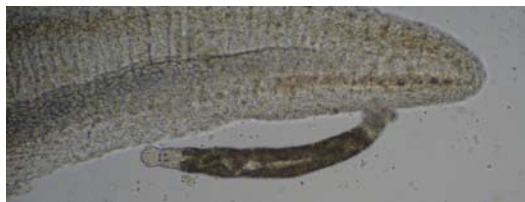
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Koi- Nick Saint-Erne



Gill fluke on an angelfish (*Pterophyllum scalare*) gill—Nick Saint-Erne



WAVMA COMMITTEES

Please contact the following if you are interested in serving on any of these Committees:

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To renew your Membership for 2009 please complete and return the Membership Renewal Form available at the end of this Newsletter, or on WAVMA's website (www.WAVMA.org) –

Full instructions are on the form.

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2009 MEMBERSHIP APPLICATION / RENEWAL

INITIAL APPLICATION **or RENEWAL** **(check one)**

For your convenience please complete and mail with the correct remittance (in US\$), or credit card information, to:

Dr. Dusan Palic
4211 Welbeck Dr.
Ames, IA 50010-4018 USA
Phone/Fax: (515) 294-2571
e-Mail: dulep@iastate.edu

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Check one membership category ¹	
<input type="checkbox"/> Full Member (US\$100)	<input type="checkbox"/> Student Member (US\$50)
Primary Veterinary Degree (as awarded e.g. DVM; VMD; BVMS; DEDV; Dr. vet. med.; MVZ, etc) _____	
Year _____; University _____; City _____; Country _____	
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Would you like any information to be excluded from your membership listing in an Annual Membership Directory? If so, please specify what information you want excluded _____

¹ **Membership Categories & Privileges**

Full Member—individual veterinarians that have graduated from veterinary Schools, Colleges or Universities recognized by any country as being a prerequisite for practicing veterinary medicine. Full Members are eligible to be nominated and serve as WAVMA Officers, and to serve on any WAVMA Committees.

Allied Veterinary Organization Member—legally formed organizations or entities (association/society) whose members are predominantly veterinarians. Allied Veterinary Organization Members are eligible to appoint a delegate and alternate delegate (must be WAVMA Full Members in good standing) to serve on the WAVMA Advisory Council.

Student Member—students enrolled fulltime in veterinary Schools, Colleges or Universities recognized by any country as being a prerequisite for practicing veterinary medicine. Student Members are entitled to all the right and privileges of Full Members, except to serve as an Officer of the Association, or to vote in any general election, referendum or ballot of the association's Full Members.

Veterinary Technician/Nurse Member—any non-veterinarian that is employed to assist in the legal practice of veterinary medicine, while under the direct supervision or direction of a veterinarian. Veterinary Technician/Nurse Members are entitled to all the rights and privileges of Student Members, except to serve in any voting capacity on any committees, councils, trusts, boards, liaisons or other entity that may be formed to do Association business.

Affiliate Member—any non-veterinarian that is a graduate of a nationally recognised university or institution of higher education, and who supports the Mission and Objectives of the Association. Affiliate Members are entitled to all the rights and privileges Student Members, except to serve in any voting capacity on any committees, councils, trusts, boards, liaisons or other entity that may be formed to do Association business.