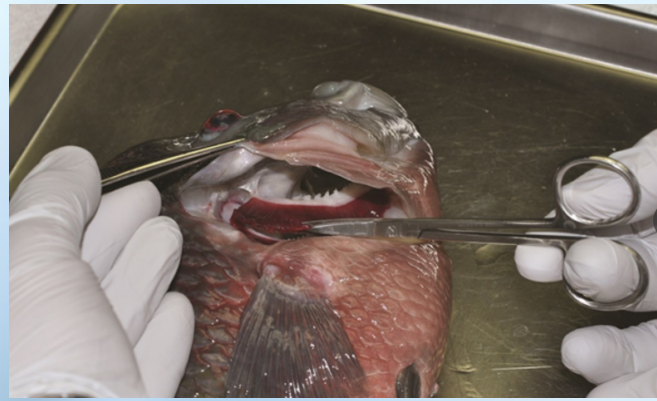


# The



# quatic

# eterinarian



***Performing a Gill Biopsy***  
See article by **Dr Christoph Mans** about  
The Basics of Pet Fish Medicine  
on pages 36-37.

Volume 9, Number 3  
Third Quarter, 2015



## WHO ARE WE

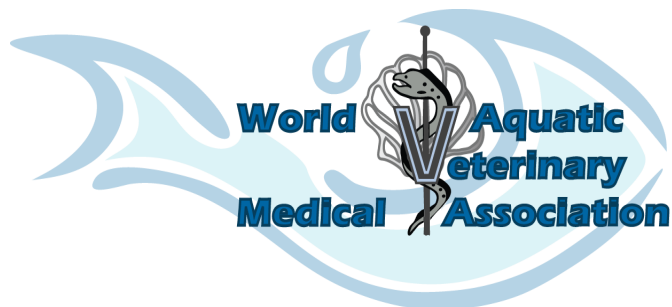
**The mission** of the World Aquatic Veterinary Medical Association is to serve the discipline of aquatic veterinary medicine in enhancing aquatic animal health and welfare, public health, and seafood safety, in support of the veterinary profession, aquatic animal owners and industries, and other stakeholders.

**The purpose** of the World Aquatic Veterinary Medical Association is:

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

*The ideas presented in this publication express the views and opinions of the authors, may not reflect the view of WAVMA, and should not be implied as WAVMA recommendations or endorsements unless explicitly stated.*

*Information related to the practice of veterinary medicine should only be used within an established valid Veterinarian-Patient-Client Relationship.*



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Devon Dublin (Japan)

Richmond Loh (Australia)

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Dr Dusan Palic (USA/Germany)	2012
Dr Mohamed Faisal (USA)	2013
Dr Richmond Loh (Australia)	2014

## Past Secretaries and Treasurers

Chris Walster, Secretary	2007-2013
Dusan Palic, Treasurer	2007-2010
Nick Saint-Erne, Treasurer	2011-2014

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EDITORIALS

Editor's Note

Welcome to the Third Quarter 2015 issue of the World Aquatic Veterinary Medical Association's house publication, The Aquatic Veterinarian. This quarterly journal/news magazine keeps WAVMA members up to date on the latest worldwide activities relating to Aquatic Veterinary Medicine. It is available to members on the WAVMA website at: http://www.wavma.org/Aquatic-vet-newsletter-for-members. Back issues are also available here: http://www.wavma.org/News-ViewsAVN-Archive, and these older issues can be viewed by non-members as well. Please download the pdf files and peruse each issue at your leisure on your computer or mobile device.

You may wonder, as a WAVMA member, why I placed an explanatory paragraph at the beginning of this Editor's Note. It is because it is the beginning of a new school year for veterinary students and we have a plethora of new student members join WAVMA at this time of the year. They will find the articles in the older issues of The Aquatic Veterinarian, and its precursor, Aquatic Vet News, helpful in learning more about Aquatic Veterinary Medicine and the activities of member veterinarians. Welcome, Students!

We also have the World Veterinary Congress in Istanbul, Turkey coming up, and I will be printing some copies of this issue to bring to the Congress and give away at the Aquatic Veterinary presentations. So, if you are reading this copy that you received at WVC, welcome to the exciting world of Aquatic Veterinary Medicine and I hope that reading the fascinating articles in this issue will pique your interest in our wild and wet field of medicine.

Nick Saint-Erne, DVM, CertAqV  
Executive Editor  
AVNeditor@WAVMA.org



Dr. Nick Saint-Erne with his daughters Alexandra, Victoria and Rachel at the Monterey Bay Aquarium, June 2015.

Photo by Judy Saint-Erne.

See article on The Monterey Bay Aquarium Page 28-30.

Download a QR reader onto your Smart Phone and scan the Quick Response Code to the right. It will take you to the WAVMA.org website page for accessing all of the past WAVMA Newsletters.



You will need your WAVMA User ID and Password to access the most recent issues of The Aquatic Veterinarian.

Cover Photo:

Dr Christoph Mans gives us a brief introduction to what a Veterinary Technician needs to know when assisting a client or an aquatic veterinarian with a fish patient.



Performing a Gill Biopsy  
See article by Dr Christoph Mans about The Basics of Pet Fish Medicine on pages 36-37.

WAVMA is on Facebook!



Assisted by the WAVMA Student Committee, aquatic veterinary medicine is being actively promoted on Facebook.

Become a WAVMA "friend" and feel free to post information useful for other veterinarians and veterinary students, and inform the public about what aquatic veterinarians do.

Search for WAVMA at [www.facebook.com](http://www.facebook.com).



## President's Report

The summer in the UK is nearly over and has not been much to write home about, with a couple of short warm and sunny spells and with a lot of cloud and rain otherwise. It's the second time in 25 years that I've failed to make decent hay. Elsewhere in Europe there have been record heatwaves and droughts. Variation in the daily UK weather is why us Brits are so fascinated by the weather, it can change abruptly and dramatically even in the summer and there are times when I wish we had a more settled continental weather pattern.

I read a couple of interesting reports regarding the weather recently or more specifically temperature. One reported the finding of *Mikrocytos mimicus* (<http://tinyurl.com/pspqchc>) in UK oysters during the spring of 2013 after a particularly cold spell. This parasite had not been previously reported in the UK and the presumption seemed to be that infection was caused by the prior unusually cold spell as there have been no further reports since. The other looked at high and low ambient temperatures and the mortality risk in people (<http://tinyurl.com/oo5thom>). Interestingly it concluded that mortality was greatest not during extreme events but when temperatures were just above or below "normal". This made me wonder whether the same might apply to aquatic species.

I experienced my own extremes of temperature in Romania during July (with temperatures hovering around 40-45°C) whilst attending the International Veterinary Students Association Congress 2015. Along with WAVMA members Laura Urdes and Ross Neethling, WAVMA provided talks and a workshop to around 132 students with 23 students attending the workshop that had been designed for 15! Not only was the workshop oversubscribed, but many more students had to be turned away. The interest shown by the students in aquatic veterinary medicine was overwhelming and demonstrated the need for all veterinary schools to include this within their curriculum and for those of us already involved to keep reminding anyone who will listen of the importance of aquatic veterinary medicine. All three of us felt the day was a great success and I would like to thank Laura and Ross for their help, which included a rather frantic trip to purchase live fish (including several very hilarious moments) for the workshop and keeping rainbow trout alive in temperatures I would consider well above their optimum. Ross was particularly successful at achieving this showing that ingenuity can often overcome adverse situations. At the end of the workshop students were provided with WAVMA USB sticks with the presentations and other information on them to circulate amongst those who could not attend. Next year WAVMA has been asked to provide two lectures at the IVSA Welfare



symposium and I suspect provision of appropriate temperature and dissolved oxygen may play a significant part in that.

Whilst the summer months are generally quiet months for the Executive Board and committees, several projects have been moving forward. There have been several improvements to the website with more to follow, notable amongst is the Externship page, a place where you can promote or find upcoming intern/externships ([www.wavma.org/Externships](http://www.wavma.org/Externships)). The page is meant to be updated by all, so if you have some information please go to the website and follow the instructions. It is very easy to do and a great resource to use. Progress has been made for next year's scholarship program and I suspect further information shall come from the Scholarship committee later in September. This program has helped many WAVMA students to gain experience in our great discipline and I hope between the Externship page and member contributions to the scholarship fund we can all do our bit to expand the field of aquatic veterinary medicine. The Meetings committee is already formulating plans for which meetings WAVMA will attend and where and when next year's AGM will be.

What could develop in to one of the most useful projects is the one managed by Julius Tepper – the Certified Aquatic Veterinarian Manual of Aquatic Animal Health (CAV Manual). The aim is to provide peer reviewed material available to members and at a cost to non-members. This could become the ultimate reference manual if we are all prepared to contribute and ties in with several other WAVMA initiatives in the pipeline. All of which add greater value to your membership subscription.

## EXECUTIVE REPORTS

As ever, some projects have fallen a bit behind of which the e-newsletter is probably the one I would most liked to have been completed. Unfortunately other priorities have taken precedence and much of it is my fault due to lack of time. However, I expect it to arrive in your email soon. Another project which will be slightly delayed is the Virtual Conference due to my practice changing computer systems during the time I was thinking of holding it. I for one would not want to miss it due to a lack of working computer and it may also make it hard to manage. Having said that I am still very keen to get people to contribute. This could prove to be a very successful way of transferring knowledge and skills, demonstrating that aquatic veterinary medicine is mainstream and be a feather in the cap for WAVMA. Publicise yourself, your facility, your colleagues on the world stage whilst helping WAVMA.

At the time of writing, I've just spent most of the afternoon looking through the "Green Book" for the WVA General Assembly in Istanbul. There are several areas where the World Veterinary Association wishes to develop policy that are of interest to WAVMA and its members. These range from availability of pharmaceuticals, animal welfare, day one competencies, education and antimicrobial resistance to more mundane topics such as how WVA should interact with its constituents. There is a lot that WAVMA could influence given time and resources. Likely as not, at the time of you reading this, the General Assembly will be over but I would ask all of you if any of the above interests you to contact me at [President@wavma.org](mailto:President@wavma.org) and let me

know your thoughts.

When working in your daily lives it can be difficult to appreciate how these matters affect how you carry out the work of your practice. Those of us who have been around a few decades recognise there have been many changes, some for the good and some for the worse, with today's communications tools there is no excuse to not become involved or complain that you did not know it happened. The information is there if you know where to look.

This is one of the advantages of TAV, e-news and Members-L. It might mean you get a few extra emails in your inbox, easy enough to just hit delete if you're not interested, but at least you had the chance to see the information. Equally, WAVMA can only send you that information if it is aware of it. I would therefore encourage all members to make use of the communications available, suggest improvements and respond to request for information. WAVMA is an altruistic organisation where the circulation of knowledge is one of the main reasons for its existence. Even if you think what you know will not be as good as others, unless you tell them no one may know, and even small blocks of information may provide the key to unlocking a huge problem. The more we discuss the more we all learn!

**Chris Walster, BVMS MIPH**  
 CertAqV MRCVS,  
 2015 WAVMA President  
[President@WAVMA.org](mailto:President@WAVMA.org)



*The Past, Present and Future of WAVMA Presidents: [From the left] Nick Saint-Erne (2016), Chris Walster (2015), Richmond Loh (2014); At WSAVA meeting, Bangkok, Thailand, May 2015.*



### Secretary's Report

Dear WAVMA members,

As we approach the end of the year I wish to use this space to reflect a little on the year gone by. But first allow me to express gratitude to those of the members that participated in the recently held elections as office bearers for the year 2016. As secretary, I am indeed pleased with the work that the board has rendered during this calendar year.

In my effort to review the year, I wish to look at the member benefits that are offered by WAVMA and reflect on what may have transpired throughout the year. As we continue to advance with the WAVMA Certified Aquatic Veterinarian program, 30 persons have successfully been accredited, 7 for this year so far. In addition, there is a team of CertAqVs that remain available to function as mentors and also that meet to review the program on an annual basis.

WAVMA has continued to faithfully execute and facilitate on-line *e-Learning* programs and courses to advance the knowledge and skills of its members. For the purpose of continuing education, credits have been obtained by members through *WebCEPD*, *PubCEPD* and the *Clinical Corner*. Here I would like to specifically mention Dr. Richmond Loh for his commitment to the webinar hosting process, sometimes almost singlehandedly getting the job done.

WAVMA continues to actively pursue and explore other avenues for its members to receive discounted subscriptions to publications, meetings, and other benefits. I wish to appeal to the membership that they should take advantage of these when they are presented. The benefits offered by WSAVA for example are not being fully utilized to date.

We should endeavor to expand and utilize WAVMA's picture and video libraries which can serve as a valuable resource for use in presentations and such like. I must say that I am particularly pleased with the active use of the Join listservs, which could very well be our most utilized resource. I thank you for providing answers and solutions to questions and cases that are posted through this medium.

The Student's Committee is seeking to be as active as possible and one of the projects that they seek to see materialize is the Mentor – Mentee program. Based on the successful use of the Listserv, I have no doubt in my mind that we have members with lots of experience and expertise in various aspects of aquatic medicine. This therefore can easily be translated into the mentorship program and would encourage our senior members to consider assisting a younger/student member in this regard.

Keeping in the area of students, WAVMA contin-

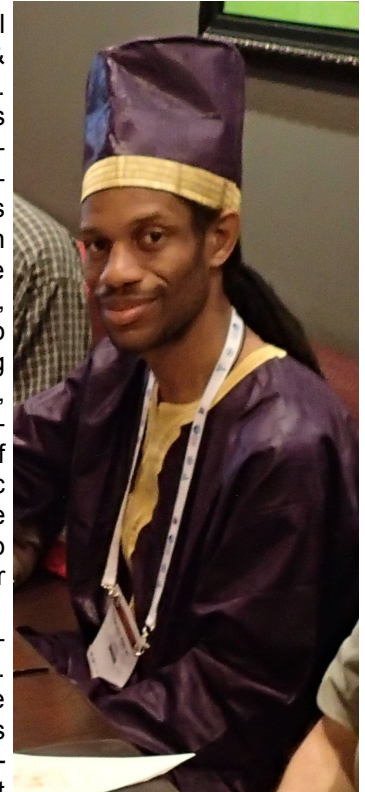
ues to offer Educational grants for vet students & new veterinary graduates. WAVMA also promotes the formation and subsequent participation in veterinary school chapters throughout the world. In addition, through the website and newsletter, information is provided to facilitate students finding world-wide externships, internships and residencies in aquatics. Of course, jobs in all aquatic vet areas are made known for persons who may be eligible and/or interested.

Finally, I have two appeals for the next year. The first is to encourage you publish your articles in *The Aquatic Veterinarian*. As time progresses, it is increasingly being known as a credible publication in the field of aquatic medicine and we should therefore continue to nurture and support it.

My second appeal is to ask you our members to consider serving as an Officer, Director or Committee Member on the executive board or one of the committees (Certification, Communications, Meetings, Membership, Students). I am certain that there is a pool of talent in our membership that could be tapped into, and whenever new persons take up leadership roles they bring the much needed fresh ideas and perspectives that is crucial for the future development of WAVMA and its member programs.

Finally I reiterate my call to all of you to inform us of ways in which we can serve you better. As we approach the close of 2015, I do hope that your reflections on what has been accomplished so far in your individual lives would be considered as favourable and that you and your family will indeed have a wonderful season at the end of the year.

**Devon Dublin, PhD, DMVZ, MSc. CertAqV**  
WAVMA Secretary  
Global Environment Facility - Satoyama Project  
6-7-22-451 Conservation International-Japan,  
Shinjuku, Tokyo,  
160-0022, Japan  
[Secretary@wavma.org](mailto:Secretary@wavma.org)





EXECUTIVE REPORTS

Treasurer's Report

WAVMA's membership continues to grow! We have exceeded our 2015 membership projections, the membership income this year totals \$16,150, so far. Membership dues fund WAVMA benefits (see page 17) such as the WebCEPD webinars (see pages 24-25), publication of *The Aquatic Veterinarian*, subsidizing WAVMA Student Chapter educational expenses, and the Certified Aquatic Veterinarian Manual (see page 16) currently being developed on Wikispaces. Thank you to all members, including those new members who have joined this year.

The Scholarship Committee also awarded veterinary students \$6000 for attending externships and courses through the John Pitts Aquatic Veterinary Education Grants Program. See how the veterinary students used this funding in their Reports (pages 18-23). Your contributions are needed to continue funding this great program (see page 9)!

We also had a great Aquatic Veterinary Meeting at the WSAVA convention in Bangkok, Thailand earlier this year in May (see last issue of *The Aquatic Veterinarian* for details), and the Annual General Meeting will be held in September at the World Veterinary Congress in Istanbul, Turkey. WAVMA was also a sponsor for the IAAAM Annual Meeting in Chicago in April.

These are just a few of the things that are used by WAVMA to promote Aquatic Veterinary Medicine. Your membership is important to WAVMA, let the Executive Board members know what you would like WAVMA to do, or better still, volunteer for one of our Committees (see page 9) to help us move forward!

**Sharon Tiberio, DVM, CertAqV**  
 2015 WAVMA Treasurer  
[Treasurer@WAVMA.org](mailto:Treasurer@WAVMA.org)



**SUMMARY**

	ACTUAL	BUDGETED
Total income	23,329.25	22,750.00
Total expenses	22,199.47	25,195.00
<b>Income less expenses:</b>	<b>1,129.78</b>	<b>-2,445.00</b>

**INCOME DETAILS**

	ACTUAL	BUDGETED
Veterinarian Memberships	10,300.00	10,000.00
Vet Student Memberships	4,400.00	4,500.00
New Graduate Memberships	450.00	200.00
Vet Tech/Affiliate Memberships	150.00	150.00
AVO Memberships	850.00	1,000.00
Webinar/Meeting Income	413.25	1,800.00
CertAqVet application fees	3,750.00	4,000.00
Income - WAVMA merch	16.00	100.00
Donations / Sponsorship	3,000.00	1,000.00
<b>Total income:</b>	<b>23,329.25</b>	<b>22,750.00</b>

**EXPENSE DETAILS**

**MEETINGS**

	ACTUAL	BUDGETED
Annual General Meeting		3,000.00
AVMA Meeting		500.00
IAAAM	1,500.00	1,500.00
IVSA	671.23	1,500.00
WSAVA	2,108.25	2,000.00
AVMA/AqVM Committee	772.80	1,000.00
SAVMA		100.00
Aquaculture America	349.93	1,385.00
<b>Total Meetings expenses:</b>	<b>5,402.21</b>	<b>10,985.00</b>

**ADMINISTRATIVE**

Illinois Secretary of State	10.00	10.00
Credit Card TXN Fee	760.37	1,000.00
PayPal Fees	280.93	500.00
Bank Transfer Fees	160.00	50.00
Fellowship Plaques		100.00
WAVMA Store Merch		50.00
Office supplies	49.25	100.00
Postage/Shipping	37.66	50.00
Promotions for Booths	420.35	100.00
Contributions	300.00	500.00
Organization Dues	824.47	1,000.00
Donation/Student Scholarship	6,000.00	3,000.00
<b>Total admin. expenses:</b>	<b>8,843.03</b>	<b>6,460.00</b>

**SERVICE & EQUIPMENT**

Accounting		100.00
Legal - DKM&O	125.00	200.00
Professional Management		100.00
Survey Monkey, Survey Gizmo	570.00	200.00
WikiSpaces	200.00	500.00
Vimeo	59.95	0.00
Citrix Webinar Expense	1,641.84	950.00
Net Business Website Hosting	401.92	800.00
Imagination Website Dev't	4,955.52	5,000.00
<b>Total S&amp;E expenses:</b>	<b>7,954.23</b>	<b>7,750.00</b>

## WAVMA Committees

As a member-driven organization, WAVMA relies on volunteers to help implement programs useful for all members. Any WAVMA member can volunteer on a Committee to help shape the direction of the Association, meet new colleagues, forge valuable and lasting relationships, and help address key issues affecting aquatic veterinary medicine today. To find out more about serving on a Committee, please contact the Committee Chair or the WAVMA Parliamentarian.

### Budget and Finance Committee

This Committee develops and regularly revises the Association's annual budget and assists the Treasurer, as necessary, in developing the Association's annual financial reports and tax materials.

This Committee shall consist of the Treasurer (Chair); the President-Elect; and one other member of the Executive Board who will volunteer to serve a one-year renewable term.

Chair: Sharon Tiberio, [Treasurer@WAVMA.org](mailto:Treasurer@WAVMA.org)

### Communications Committee

This Committee manages the communications among members and others involved with aquatic veterinary medicine. It oversees the listservs, membership lists, publication of WAVMA's quarterly journal *The Aquatic Veterinarian*, Facebook, Twitter, LinkedIn and other social media accounts.

Chair: Laura Urdes, [laurau\\_2005@yahoo.com](mailto:laurau_2005@yahoo.com)

### Credentialing Committee

This Committee oversees and administers the Cert-AqV Program for credentialing aquatic veterinary practitioners, and evaluates aquatic veterinary educational programs useful to members.

Chair: Nick Saint-Erne, [nsainterne@gmail.com](mailto:nsainterne@gmail.com)

### Meetings Committee

This Committee oversees and coordinates logistics for WAVMA-organized or sponsored aquatic veterinary educational meetings, including the Annual General Meeting.

Chair: Julius Tepper, [cypcarpio@aol.com](mailto:cypcarpio@aol.com)

### Membership Committee

This Committee oversees membership issues to optimally serve individual members and the organization. Chair: Lydia Brown, [drydiabrown@gmail.com](mailto:drydiabrown@gmail.com)

### Student Committee

This Committee facilitates networking between student members and helps development of student programs and services.

Chair: Justin Krol, [justkrol21@gmail.com](mailto:justkrol21@gmail.com)

## Scholarship Committee

For more than 10 years WAVMA has developed many programs to expand and advance the discipline of aquatic veterinary medicine, for the betterment of the veterinary profession, all aquatic animals, society at large, and the world we live in. ***We seek your help and support to ensure a very successful program, the John L. Pitts Aquatic Veterinary Education Support Program, is sustainable and can expand.*** This Program is complimented by the on-line WAVMA Aquatic Veterinary Student Externship Listings that identifies educational opportunities for the next generation of veterinarians.

The Education Support Program's goal is to assist veterinary students and new graduates in becoming more involved with aquatic veterinary medicine by providing financial support for activities they select to broaden their understanding of career opportunities within aquatic veterinary medicine.

Since its inception in 2010, the Program has awarded over \$38,000 to 58 veterinary students and recent graduates from 37 colleges and universities, across four continents (Americas, Asia, Australia & Europe). ***Donations from people like you have helped recipients participate in educational activities at public, private, and academic institutions, or attend conferences, workshops, and short courses all over the world.***

From the number of applicants supported each year, and the remarkable quality of the applicants, it is clear that the Program is filling an important need, and making a difference in the lives of people who will shape the future of aquatic veterinary medicine. ***We have accomplished a lot. But we need your help in ensuring the program is sustainable, and can grow.***

The Program was started to honor the late John L. Pitts, DVM, who was passionate about student involvement in the profession and to aquatic veterinary medicine. His service to the profession began as a veterinary student in 1969 when he helped create the Student American Veterinary Medical Association. John also helped form the National Association of State Aquaculture Coordinators, the Aquaculture and Seafood Advisory Committee of the AVMA, and he worked tirelessly to get the U.S. Congress to pass the Minor Use and Minor Species Act of 2004.

*We now need your help to ensure this program will be sustainable for 2016 and beyond. To make a donation and to learn more about this exciting program, please visit [www.wavma.org/scholarships](http://www.wavma.org/scholarships) or contact the WAVMA Treasurer ([treasurer@wavma.org](mailto:treasurer@wavma.org)).*

## COMMITTEE REPORTS

## Fellowship Advisory Council

WAVMA has established a fellowship program to recognize those world-renowned veterinarians who have advanced aquatic veterinary medicine as a discipline and devoted their time and efforts to serve WAVMA's mission. The Fellowship Advisory Council allows Fellows to advise the Executive Board with guidance on their initiatives, and mentor applicants for Aquatic Veterinarian Certification (CertAqV).

Our WAVMA Distinguished Fellows are:

Dr. Peter L. Merrill  
 Dr. Ronald J. Roberts  
 Dr. A. David Scarfe  
 Dr. Julius M. Tepper  
 Dr. Christopher I. Walster  
 Dr. Dusan Palic  
 Dr. Grace Karreman  
 Dr. Marian McLoughlin

See: <http://www.wavma.org/wavma-fellows.cfm>

Certified Aquatic Vets	Email Address
Bastos-Gomes, Giana	<a href="mailto:giana.gomes@jcu.edu.au">giana.gomes@jcu.edu.au</a>
Bogan, James	<a href="mailto:thecrifferfixer@gmail.com">thecrifferfixer@gmail.com</a>
Cecil, Todd	<a href="mailto:waavs@aol.com">waavs@aol.com</a>
Corcoran, Daniel Michael	<a href="mailto:mikecdvm@yahoo.com">mikecdvm@yahoo.com</a>
Cornwell, Emily	-
Dublin, Devon	<a href="mailto:devdub@yahoo.com">devdub@yahoo.com</a>
Faisal, Mohamed	<a href="mailto:faisal@cvm.msu.edu">faisal@cvm.msu.edu</a>
Good, Christopher	<a href="mailto:c.good@freshwaterinstitute.org">c.good@freshwaterinstitute.org</a>
Johnston, Colin	<a href="mailto:brightwaterconsultingnz@gmail.com">brightwaterconsultingnz@gmail.com</a>
Loh, Richmond	<a href="mailto:thefishvet@gmail.com">thefishvet@gmail.com</a>
Maas, Adolf	<a href="mailto:DrMaas@ZooVet.us">DrMaas@ZooVet.us</a>
Miller-Morgan, Tim	<a href="mailto:tim.miller-morgan@oregonstate.edu">tim.miller-morgan@oregonstate.edu</a>
Palić, Dušan	<a href="mailto:d.palic@lmu.de">d.palic@lmu.de</a>
Palmeiro, Brian	<a href="mailto:petfishdoctor@gmail.com">petfishdoctor@gmail.com</a>
Pasnik, David	<a href="mailto:chesapeakeaquatic@yahoo.com">chesapeakeaquatic@yahoo.com</a>
Questen, Jena	<a href="mailto:drquesten@gmail.com">drquesten@gmail.com</a>
Reed, Aimee	<a href="mailto:reeda@onid.orst.edu">reeda@onid.orst.edu</a>
Reichley, Stephen	<a href="mailto:stephen.reichley@gmail.com">stephen.reichley@gmail.com</a>
Sahatrakul, Komsin	<a href="mailto:komsin.s@rwsentosa.com">komsin.s@rwsentosa.com</a>
Saint-Erne, Nick	<a href="mailto:nsainterne@gmail.com">nsainterne@gmail.com</a>
Sanders, Jessie	<a href="mailto:ncfishvet@gmail.com">ncfishvet@gmail.com</a>
Scarfe, David	<a href="mailto:dscarfe@ameritech.net">dscarfe@ameritech.net</a>
Shelley, John	<a href="mailto:thejohnnyshelley@yahoo.com">thejohnnyshelley@yahoo.com</a>
Soto, Esteban	<a href="mailto:balasotom@gmail.com">balasotom@gmail.com</a>
Tepper, Julius	<a href="mailto:cypcarpio@aol.com">cypcarpio@aol.com</a>
Tiberio, Sharon	<a href="mailto:srtiberio@att.net">srtiberio@att.net</a>
Urdes, Laura	<a href="mailto:laurau_2005@yahoo.com">laurau_2005@yahoo.com</a>
Van de Sompel, Greta	<a href="mailto:lohan.van.der.cruyssen@telenet.be">lohan.van.der.cruyssen@telenet.be</a>
Walster, Chris	<a href="mailto:chris.walster@onlinevets.co.uk">chris.walster@onlinevets.co.uk</a>
Weber, Scott	<a href="mailto:sharkdoc01@gmail.com">sharkdoc01@gmail.com</a>

## Credentialing Committee

The WAVMA CertAqV Program is administered by the WAVMA Credentialing Committee, along with the assistance of other Certified WAVMA members who serve as mentors and adjudicators.

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

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

- Register for the Program (application at [www.wavma.org](http://www.wavma.org) or contact the [WAVMA Administrators](#)).
- Identify a mentor to assist the registrant through the Program. The potential mentors would be available WAVMA Certified Aquatic Veterinarians.
- Provide the mentor with written evidence of satisfactory completion of each of the core Knowledge, Skills and Experience (KSE) subject areas.
- Be adjudicated by the Credentialing Committee for recognition of completion of all KSE requirements after the mentor has approved the documentation.
- Have the CertAqV certification approved by the WAVMA Executive Board

The WAVMA Certified Aquatic Veterinarian (CertAqV) program has now certified thirty aquatic veterinarians. Please welcome our latest Certified Aquatic Veterinarians:

**Dr. Komsin Sahatrakul**  
**Dr. Esteban Soto**  
**Dr. Emily Cornwell**

There are an additional eighteen other WAVMA members currently in the process of being certified. For more information, see the WAVMA website:

<http://www.wavma.org/CertAqV-Pgm>.

**Nick Saint-Erne, DVM, CertAqV**  
 2015 Credentialing Committee Chair  
[nsainterne@gmail.com](mailto:nsainterne@gmail.com)



### Communications Committee

**The WAVMA e-News:** The Committee is making final arrangements needed for the e-News to reach targeted audiences and better rankings on Google Analytics. The first issue is to be published by mid September. A public announcement was made through the members listserv, informing the members about this new exciting communications tool that soon will become available for them.

**Reminding members about WAVMA member benefits:** In an effort to make our members aware of the various WAVMA programmes and resources available, and in order to help refresh the picture and video galleries for public/member's use, the Committee is working on developing the first advert for the members' resources to be sent via WAVMA's readily available communications means, primarily, through members-L, e-News and TAV.

**The IVSA 2015 congress, Cluj-Napoca:** WAVMA - through its delegates, Laura, Chris and Ross - was represented to this event from 27 July to 1 August. The WAVMA programme consisted of a 60 minute course, 'INTRODUCTION TO AQUATIC VETERINARY MEDICINE', and a 90 minute workshop, "Basic Aquatic Veterinary Procedures in Use". On July 29<sup>th</sup> and 31<sup>st</sup>, WAVMA was also promoted to the participants through a WAVMA Booth placed in the main hall.

During the whole programme, which proved to be longer than initially scheduled, there was used promotional material under the form of brochures, banners, student video testimonials, memory sticks with WAVMA logo, and various aquatic medicine related promo videos.

The feedback received from the local organizers and the WAVMA programme attendees show this was a successful representation of WAVMA during the congress, which we hope to have put the basis of a fruitful and sound collaboration with IVSA into the future.

If you are interested in helping on this committee, please contact me!

**Laura-Daniela Urdes** DVM PgDip PhD CertAqV  
 Communications Committee Chair  
[laurau\\_2005@yahoo.com](mailto:laurau_2005@yahoo.com)



### Did you know?

**WAVMA maintains an aquatic vet video library.**

Currently the videos cover a wide range of topics, including surgical procedures, diagnostic methods and guidance on how to be an aquatic veterinarian.

The videos can be accessed at:

<http://www.wavma.org/WAVMAs-Aquatic-Vet-Video-Library>

In addition, if you have a video that you would like to make available to other WAVMA members, kindly contact [WebAdmin@wavma.org](mailto:WebAdmin@wavma.org).



## COMMITTEE REPORTS

## WAVMA TRAINING VET STUDENTS ON AQUATIC VETERINARY MEDICINE AT THE IVSA SUMMER CONGRESS 2015

By Laura Urdes

Recently, WAVMA has hosted its first ever aquatic veterinary medicine international training programme destined for veterinary students, which was held in Cluj-Napoca, Romania. The WAVMA programme took place under the auspices of the International Veterinary Student's Association (IVSA) Summer Congress, 2015, <http://www.ivsa.org/events/ivsa-64th-congress-romania/>.



IVSA is an international organization, run by volunteer veterinary students and focused on improvement of

veterinary education internationally, "through the exchange of ideas, knowledge and culture". Engaging veterinarians and veterinary students in aquatic veterinary education and (lifelong) learning is one of the themes of a paramount importance to WAVMA. With this in mind, WAVMA took advantage of the opportunity for sharing basic concepts of aquatic veterinary medicine to the student participants of IVSA Summer Congress 2015, which proved to be an exciting experience, equally for the attendees and the WAVMA delegates.

The Congress' **"Human-animal interaction: Amazing Transylvania!"** theme comprised lectures and workshops revolving around hot topics of veterinary medicine, as well as general assemblies, tourist trips and entertaining programmes. The IVSA Summer Congress lasted for 13 days, from 27/07 to 08/08/2015. In total, 120 students from 32 countries attended the event. Additionally, over 20 international guest speakers took part to the event.

The whole programme, "AQUATIC VETERINARY MEDICINE: DETERMINING YOUR VETERINARY EDUCATIONAL PATH", provided by the WAVMA delegates during the IVSA Summer Congress 2015, had as main objective introducing veterinary students to Aquatic Veterinary Medicine and to current opportunities in making a career into this field. The session comprised two streams - an introductory course and a wet lab.

The course "INTRODUCTION TO AQUATIC VETERINARY MEDICINE", structured in three short presentations – *i.e.* "What Aquatic Vets Do" (speaker: Chris Walster, U.K., WAVMA President), "How to become an Aquatic Veterinarian" (speaker: Laura D. Urdes, Romania, WAVMA Director at Large) and "A Student's Perspective of Studying Aquatic Veterinary Medi-

cine" (speaker: Ross Neethling, U.K., WAVMA student and a fresh graduate of the University of Bristol) – preceded the WAVMA wet lab and was received with enthusiasm and interest by the student public. The course featured the world of aquatic animals inhabiting various systems, *e.g.* pets, public aquariums, zoos, farms etc., focusing primarily on the event theme and emphasizing various aspects of human-aquatic animals interactions, including conservation efforts and welfare issues. This course also encouraged the participating students to study aquatic veterinary medicine, by bringing into their attention the currently available opportunities and resources of education for both vet undergraduates and postgraduates, as well as by sharing with the public a student's perspective and experience of studying aquatic veterinary medicine.



Fig 1 – "What Aquatic Vets Do" (IVSA Congress 2015, speaker: Chris Walster, U.K.)



Fig 2 - "How to become an Aquatic Veterinarian" (IVSA, speaker: Laura D. Urdes, Romania)



Fig 3 - "A Student's Perspective of Studying Aquatic Vet Medicine" (IVSA 2015, speaker: Ross Neethling, U.K.)



The wet lab “BASIC AQUATIC VETERINARY PROCEDURES IN USE” ran along with four other competing veterinary medicine workshops. The wet lab was a hands-on training session on some basic procedures applicable into practice. The session included fish handling and clinical examination, sedation and anesthesia, i.m. injection, skin scrapes, gill and blood sampling, preparation and examination of wet samples (L.M.) and necropsy techniques. Although a maximum of 15 participants were expected to attend the session, eventually 23 attendees showed up in the lab, apparently having struggled to ensure a seat therein, as many more students had wanted to sign up for the WAVMA workshop.



*Fig 4 (above) – Dr Walster performing fish handling & Fig 5 (below) – Dr Urdes introducing the IVSA students clinical examination (wet lab) to sampling and preparation of wet samples (wet lab).*



Apart from the information and training provided through the WAVMA programme during the event, additional information was distributed to all workshop attendees, as well as to other participants who could not attend the workshop. The additional information included a WAVMA Student Testimonial Video promoting aquatic veterinary medicine and a video presentation by Nick Saint-Erme, “An Introduction to Aquatic Veterinary Medicine”.



*Fig 6 – Showing organ topography in fin fish (performing: Dr Walster)*



*Fig 7 - Examination of wet samples (L.M.)*

Overall, WAVMA's participation at the IVSA Summer Congress 2015 was perceived as a success, demonstrating that there is a huge interest and demand amongst veterinary students to be taught aquatic veterinary medicine. In order to further meet the demand, WAVMA is currently looking with great interest into developing an outstanding programme on Fish Welfare Concepts & Practices designed for students, which will be provided during the IVSA Summer Congress 2016, in Utrecht, Netherlands, <http://www.ivsa.org/events/ivsa-animal-welfare-conference-2016/>. Looking forward to that!





## COMMITTEE REPORTS

**Membership Committee**

This short note will give you a flavor of what WAVMA's membership committee has done in the past year. We have continued to work on how to encourage vets from least-developed countries to become members of WAVMA and also trying to find links to other national fish vet organisations.

This year we held the first International Aquatic Veterinary Council (IAVC) teleconference meeting by Skype. This is a novel approach to getting our fellow fish vet professionals around the world to talk with each other. We had representatives from five national fish vet organisations speaking to each other about how their organisations work, how they link in with other veterinary organisations and also they highlighted their particular areas of concern.

We are shortly to have a second teleconference meeting later this month and at this meeting we shall welcome the Nigerian fish vets to the table. This is very much an informal talking shop where information is shared and passed back to each of our organisations. It is a loose connection of fish vet organisations but is probably the first time our organisations have come together to talk just about aquatic veterinary medicine. Our role is to host and facilitate the discussion and to provide a record of each meeting for members of IAVC to share with their organisations.

Finally we are writing a document which tries to encapsulate what are the benefits of being a WAVMA member. We think we know, but would love to hear from you. Please email me and tell me what you really like about WAVMA, what is useful to you (and why) and what you would like to see more of.....

Would you like to be involved in this work?  
Do you have national fish vet association contacts we could invite to the IAVC?  
Please email me:

**Lydia Brown** MBE FRCVS  
Membership Committee Chair  
[drlydiabrown@gmail.com](mailto:drlydiabrown@gmail.com)

**New Members (July-September, 2015):**

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

**Full Members**

Christine Huynh  
Dominique Keller  
Ever Alvarado  
John Walakira  
Orachun Hayakijkosol  
Robert Berridge  
Stephen Chan Chi Ho

**Vet-Tech/Nurse**

Vladimir Semenov

**Vet Student Members**

Adam Wagner  
Alexis Wohl  
Alicia Sweeney  
Allison Salinger  
Andrew Switaj  
Caitlin Hepps Keeney  
Caitlyn McAlpin  
Cally Hammond-Tooke  
Cora Hollomon  
Drew Gossett  
Elizabeth Hodges  
Elizabeth Works  
Emily Hsieh  
Erdem Danyer  
Hadley Watson  
Jaime Nelson  
Jennifer Ringenberg  
Jessenia Vargas  
Josephine Iwo  
Julie Forstadt  
Kate Butzen  
Kellie Toma  
Kelly Toomey  
Khrystyna Leasor  
Kristina Pascutti  
Kristine Hill  
Lauren Rodriguez  
Lee Hae Jin  
Manuel Antonio de la Riva Fraga  
Michelle King  
Rafael Payan Aviles  
Rebecca Souter  
Rhett Bridger  
Rodrigo Roca  
Sophia Johnson  
Vincent Borkowski

## ANTIBIOTICS IN AQUACULTURE

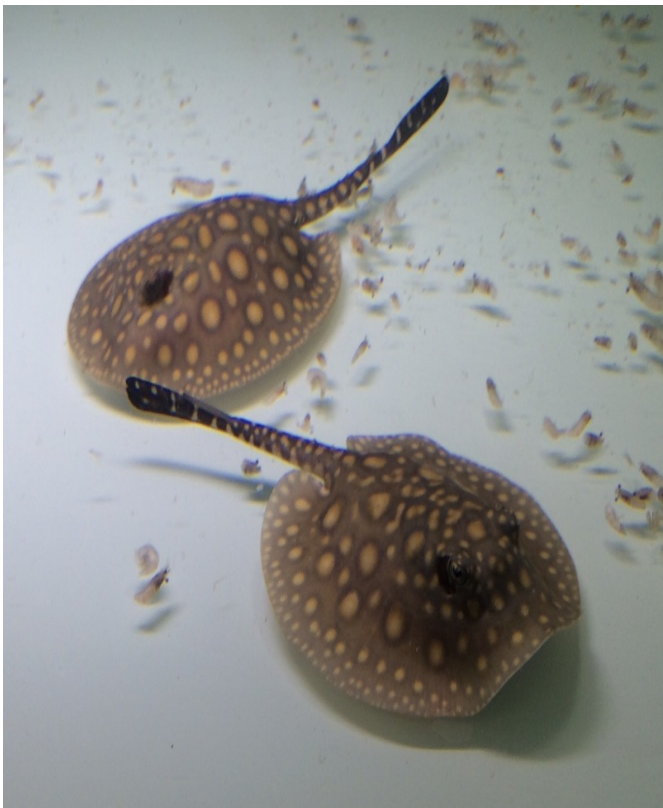
Last year, WAVMA established a process whereby we collated the use of antibiotics in aquaculture around the world. We use reliable, quantifiable data from reputable sources to input into our database. This database will be regularly uploaded to *The Aquatic Veterinarian* and is then published. The first report was published in *The Aquatic Veterinarian* (2014) 8 (3): pp 24-28 by Sam Nute. Please take a look and see if you would like to be involved in this project.

Are there any vet students out there interested in helping with this desk-based project? It could make a great piece of minor research; you would be recognised with your name on a publication in TAV and you would be mentored by Dr Lydia Brown. It will require a maximum of three days work from your home base provided you have access to the internet and it will be a great benefit to everyone in the global aquaculture industry. If you are interested please contact [drlydiabrown@gmail.com](mailto:drlydiabrown@gmail.com)

Best wishes,

**Lydia Brown, MBE FRCVS**

### *Freshwater stingrays (Photo by Nick Saint-Erne)*



## Meetings Committee

As of this writing, I am travelling to the World Veterinary Congress and the location of our 2015 Annual General Meeting and dinner, which will be held from 7-11 PM on Sept. 15, 2015 at the Pasazade Restaurant, Hoca Paşa Mah. İbni Kemal Cad., Hotel Erboy No: 5/ A, 34200 Istanbul, Turkey. This will be the last WAVMA meeting scheduled for 2015.

However, in looking forward to 2016, several exciting venues are being explored for possible collaboration. Here is the short list: The 2016 AVMA Conference is being held in San Antonio, TX from the 5th through the 9th of August, 2016. President-Elect Nick Saint-Erne is planning to be there and our Annual General Meeting will likely be held in conjunction with this meeting. The 3rd Annual AAFV Conference is being held at the North Carolina Aquarium at Pine Knoll Shores, NC on April 10, 2016. This meeting will precede but not be affiliated with the Eastern Fish Health Workshop. We are currently in discussion with the AAFV meeting's organizers about co-sponsorship. The first edition of the IVSA Animal Welfare Conference will be held in Utrecht, the Netherlands from the 22nd to 24th of April 2016. During these 3 days there will be lectures, workshops, discussion panels and excursions related to animal welfare in different fields of veterinary medicine. These lectures and workshops will be given by international veterinary organisations. As we have just successfully participated in the 64th Annual Summer Conference of the IVSA in Clij- Napoca, Romania this year, this next conference would seem to be a good fit for WAVMA participation. If any of our members are planning to attend any of these events or would otherwise like to offer their input, the Meetings Committee would certainly welcome it. Please email me at: [cypcarpio@aol.com](mailto:cypcarpio@aol.com).

**Julius M. Tepper, DVM, CertAqV**  
Fellow, World Aquatic Veterinary Medical Assn.  
Meetings Committee Chair



**Introduction to the CertAqVet Manual**

The questions and responses sent to the WAVMA member’s listserv have often been cited as one of our most appreciated member benefits. I have realized for some time however, that once the discussion of a particular thread has been exhausted, we no longer have any easily searchable access to a particular topic. In looking for a system to improve the archiving of this data, I have started the development of the WAVMA **Certified Aquatic Veterinarian Manual of Aquatic Veterinary Medicine**. This project aims to: a) provide a simple method to access clinically important data with real-time updating by recognized expertise, b) offer an opportunity to enhance the status of the CertAqVs and support WAVMA’s effort to promote the CertAqV program, c) create a substantial program that will allow WAVMA to attract industry sponsorship and d) lead to the eventual online access and mobile apps accessible to the general public, as well as WAVMA members.



The Manual is a wiki, currently available via password, that can be viewed at <https://cavmanual.wikispaces.com/>. It is free to all WAVMA members with read only access. The content can be modified only by the CertAqV managers. The site has been developed using templates for each species and topic. After review by the Credentialing Committee, the topic would be certified. (see below). The manager would be listed as the default “expert” and contact person for that topic. The manager would act as the gatekeeper for the topic, monitoring the new data polls to move to the body of the topic when appropriate and adding new poll questions when new data appears (see example on **Koi** page). New data may arise from any credible source, i.e., the member listserv, articles in journals (and TAV) and even from dedicated hobbyists and industry experts. A new data poll item, as well as newly written managed topics and species will undergo the



built-in verification process. This is presented by grey text not having been reviewed and black text as reviewed and considered accurate and complete. Red text is used for data that is currently in the topic poll and should be answered by all the CAVs who have firsthand experience on this topic.

If all goes as planned, we would be creating the “last” book of aquatic animal medicine ever written, with a planned launch date to the general public in 2018. For the immediate future, I would like to seek your help in populating the relevant data for the major species and topics. Contributing members should contact the topic manager listed to add new data to the manual. Members would be recognized for their contributions and this work may be used as part of the requirement fulfillment for certification (CertAqV). This would then give us something to show when we approached a major sponsor to partner with, whose name would appear on the cover (see **cover page**) and at the top of every page. Once a partnership agreement was signed, funding to pay content managers, partnership general management and profit to WAVMA’s general fund could begin. Additional industry and private sponsors may be invited to support the project with recognition on the sidebar of each of their designated topic pages. Access to the manual could eventually be sold to the general fish-keeping public for a small fee.

Please feel free to contact me if you are as excited about this project as I am.

**J. M. Tepper, DVM, CertAqV,**  
General Manager  
[cypcarpio@aol.com](mailto:cypcarpio@aol.com)



**Current WAVMA Student Chapters:**

**Murdoch University, School of Veterinary & Life Sciences** (established 2014)

**Faculty Advisors** - Drs. Lian Yeap & Richmond Loh. **Chapter contact** – [click here](#)

**Auburn University, College of Veterinary Medicine** (established 2013)

**Faculty Advisor** - Dr. Ray Wilhite  
**Chapter Contact** - [click here](#)

**St. George's University, School of Veterinary Medicine** (in development)

**Tuskegee University, School of Veterinary Medicine** (established 2012)

**Faculty Advisor** - Dr. Kenneth Newkirk  
**Chapter Contact** - TBA

**University of Florida, College of Veterinary Medicine** (established 2013)

**Faculty Advisor** - Dr. Tom Waltzek  
**Chapter Contact** - TBA

**University of Illinois, College of Veterinary Medicine** (in development)

**University of Prince Edward Island, Atlantic Veterinary College** (in development)

**University of Tennessee, College of Veterinary Medicine** (established 2012)

**Faculty Advisors** - Dr. Michael Jones & Dr. Debra Miller  
**Chapter Contact** - [click here](#)  
View the Chapter's [Facebook](#) page

**University of Wisconsin, College of Veterinary Medicine** (in development)

**Western University of Health Sciences, College of Veterinary Medicine** (established 2014)

**Faculty Advisor** - Dr. Suzana Tkalcic  
**Chapter Contact** - [click here](#)

**University of Nottingham, School of Veterinary Medicine & Science** (in development)

**University of Sydney, Australia** (NEW)  
**Ross University** (NEW)

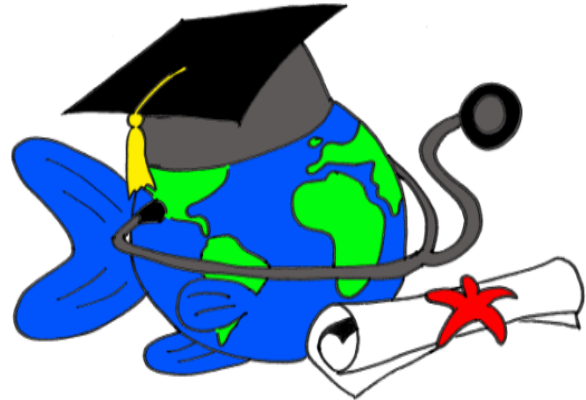
For information or assistance, please contact the [WAVMA Chapter Coordinator](#)

To initiate a new Student Chapter see the "**Guidance for Forming a New Student Chapter**" ([click here](#) to download PDF).

## PRIVILEGES & BENEFITS OF WAVMA MEMBERSHIP

### Aquatic Veterinary e-Learning

Supporting WAVMA's WebCEPD, PubCEPD  
CertAqV & Clinical Cases Programs.



- Enjoy on-line *e-Learning* programs & courses to advance your knowledge & skills
- Get continuing education credit through *Web-CEPD, PubCEPD & Clinical Corner*
- Discover core knowledge, skills & experience needed to become a WAVMA Certified Aquatic Veterinarian (*CertAqV*)
- Receive *discounted* subscriptions to publications & meetings
- Utilize *WAVMA's picture & video libraries* for your own presentations
- Join *listservs* to discuss clinical cases & other issues
- Mentor & be mentored to expand your and other's aquatic veterinary skills
- Publish your articles in WAVMA's quarterly journal: *The Aquatic Veterinarian*
- Find world-wide externships, internships, residencies & jobs in all aquatic vet areas
- Access *Member Directories* & have your Clinic/ Hospital listed on-line
- Benefit from *Educational grants* for vet students & new veterinary graduates
- Form & participate in *veterinary school chapters* throughout the world
- Participate in veterinarian and client surveys
- Help build additional member programs by serving as an Officer, Director or Committee Member

**SCHOLARSHIP COMMITTEE:  
2015 WAVMA Aquatic Veterinary  
Education Grant Recipient Reports**

**Ashley Kirby**

North Carolina State University  
Class of 2018

The AQUAVET® program has been instrumental in educating veterinary students and veterinarians about aquatic animal health for thirty-nine years. This summer I enjoyed taking the AQUAVET® I course in Bristol, Rhode Island from May 24<sup>th</sup> through June 20<sup>th</sup>. The program is now administered by Cornell University and classes took place at Roger Williams University.

In addition to lectures on aquatic species from snails to whales, I also participated in laboratories, discussions, and field trips. Completing this program increased my awareness of aquatic veterinary medicine by increasing my knowledge of diverse animal species and broadening my awareness of career opportunities in aquatic veterinary medicine. One of the best things about AQUAVET® is the opportunity to network with other students with aquatic interests, as well as meet aquatic veterinarians and other experts in aquatic fields. I am very thankful that WAVMA supported my efforts to learn more about aquatic veterinary medicine through a John Pitts Aquatic Veterinary Education Support Program grant.

The faculty who lectured at AQUAVET® were enthusiastic about their topics and were very engaging. Field trips and labs helped to reinforce information learned in lectures. I did not know much about aquaculture before attending AQUAVET®, so I was thrilled to tour the Sandwich Fish Hatchery as well as facilities at Roger Williams University. Other field trips included Mystic Aquarium, Long Island Aquarium, New England Aquarium, and Marine Biological Laboratory. While watching a beluga whale training session at Mystic, I was reminded of how important teamwork between trainers, veterinarians, and animal care specialists is for the health of each animal. Wet labs included testing water quality, collecting invertebrates along the shore of the bay, invertebrate anatomy, coral fragging, fish anatomy, microbiology, fish histology, fish histopathology, fish anesthesia and surgery, aquatic bird anatomy, reptile anatomy, sea turtle necropsy, marine mammal necropsy, diagnostic techniques, and physical examinations on a variety of aquatic species.

Other opportunities included optional field trips to New England Aquarium's Rehabilitation Facility and a whale watch. It was my first whale watch, so I was thrilled to see humpback whales and fin whales. I also enjoyed participation in class discussions on topics such as animal welfare of aquatic species in human care. Watching and participating in fish surgery was

*Ashley Kirby with  
Pamela Penguin  
at Long Island  
Aquarium  
(photo taken by  
Sierra Imanse).*



not only a great way to help me prepare for surgery class this semester, but also increased my passion to pursue a career in aquatic veterinary medicine.

Students and veterinarians travelled to AQUAVET® from all over the world. My classmates taught me a lot over the four weeks and I enjoyed spending time with them. Everyone completed a twenty-five to thirty minute seminar on an aquatic animal topic. Topics ranged from anemones to zebra fish. I chose to talk about the biology and significance of horseshoe crabs. During free time, I enjoyed making s'mores, eating lobster mac and cheese, and walking the beautiful Cliff Walk in Newport with my classmates. I also enjoyed talking with the AQUAVET® faculty in less rushed settings. It was inspiring to meet so many aquatic veterinarians who have so much passion for their careers. Since I have only lived in North Carolina, I enjoyed learning more about New England culture. This summer, I ate my first lobster roll, lobster ice cream, mussel, and clam. This also coincided with lectures on seafood safety.

After completing the AQUAVET® course, I feel significantly more prepared to pursue a career in aquatic veterinary medicine. This year, I plan to utilize information I learned this summer in my activities at North Carolina State University College of Veterinary Medicine. For example, I can apply what I learned in labs and lectures on reptile medicine to treating turtles with NCSU's Turtle Rescue Team. I have been reinforcing information I learned about bivalves through volunteering in a lab that propagates freshwater mussels. As marine mammal representative in NCSU's Wildlife, Avian, Aquatics, and Zoological Medicine club, I feel more prepared to coordinate educational activities for fellow students to learn about marine mammals. I feel very lucky that NCSU offers quite a few aquatic courses such as zoological medicine electives, and plan to enroll in week-long electives in fish medicine, invertebrate medicine, and aquaculture as soon as possible. In the future, I plan to design a research project that relates to aquatic veterinary medicine.



*AquaVet I class members with beluga whales at Mystic Aquarium (photo taken by Christina McKenzie).*

I joined WAVMA after talking with my advisor, Dr. Gregory Lewbart, who also encouraged me to participate in the AQUAVET® program. In the future I plan to continue to be a member of WAVMA and attend more aquatic veterinary conferences. As my second year of veterinary school begins, I will encourage other students at my school to join WAVMA and participate in aquatic activities like AQUAVET®.



*New  
WAVMA  
goodies.*

*This style  
and many  
more  
available  
now.*

### WAVMA is on Facebook!



Assisted by the WAVMA Student Committee, aquatic veterinary medicine is being actively promoted on Facebook.

Become a WAVMA "friend" and feel free to post information useful for other veterinarians and veterinary students, and inform the public about what aquatic veterinarians do.

Search for WAVMA at [www.facebook.com](http://www.facebook.com).



**SCHOLARSHIP COMMITTEE:  
 2015 WAVMA Aquatic Veterinary  
 Education Grant Recipient Reports**

**Kurt Arden BVMedSci (Hons)**  
 (University of Nottingham, UK, 2016 candidate)

**MARVET, Grand Cayman 2015.**

Thanks to the John Pitt's 2015 Aquatic Veterinary Education Support Program Award, I was able to attend MARVET's Grand Cayman workshop in July of 2015. The programme allowed the attendees a taste of careers based in marine conservation medicine. During the course we were granted hands on experience with marine mammals.



At Dolphin Discovery, I was able to take a rectal temperature on a pregnant bottlenose dolphin a procedure which is done daily to look for a drop in temperature which indicates impending parturition. Other practical sessions

included taking morphometrics and phlebotomising Green Sea turtles at the Cayman Turtle farm for cytological purposes as well as accompanying the Department of Environment to conduct physical exams on Southern Stingrays on Grand Cayman's Stingray Sandbar also known as 'Sting Ray City', this practical session also allowed us to experience one of the Cayman island's famous tourist experiences, hand feeding wild stingrays. We were also fortunate enough to examine a Loggerhead Sea Turtle's nest with the Department of Environment.

The course content emphasised the importance of One Health, rehabilitation, global warming, emerging diseases, ecotoxicology as well as



anatomy and physiology of marine species including corals. Anatomy and Physiology lectures were reinforced with wet labs where necropsy of aquatic birds, teleost fish, elasmobranchs and sea turtles occurred.



Coral lectures highlighted the difficulties these marine environments face as well as restoration projects such as the Cayman Magic Reef Restoration Project which attempt to correct the damage humanity has caused to these marine ecosystems. Diving trips reinforced the ecology and conservation of coral, where identification and mapping of specific coral species was undertaken in addition to fish identification. The importance of mangrove ecology was delivered with lectures on the mangrove ecosystems and kayaking within the coastal forests of Grand Cayman. In addition to marine conservation, MARVET also provided an opportunity to visit The Blue Iguana Recovery programme where we were able to see first-hand the conservation efforts put into a species that was reduced to a population of just seventeen individuals.

Undertaking MARVET Grand Cayman 2015 was truly a once in a lifetime experience and further developed my passion and interest in aquatic medicine. It presented an opportunity to enhance my medical knowledge of dolphins, turtles, sea birds,



and fish. As well as providing a greater understanding of both coral reef and mangrove ecosystems and emphasising their importance to our planet. The course also provided an essential understanding of wildlife law, aquaculture and how the marine environment relates to veterinary public health, areas which are not taught in depth at Veterinary School.

This experience has reinforced my desire to pursue a career in aquatic veterinary medicine and to truly make a difference to welfare of marine life. In the future I hope to assist in research developments which provide value to aquatic medicine and promote both marine conservation and sustainability. I am very grateful to the John Pitt's 2015 Aquatic Veterinary Education Support Program Award for allowing me to undertake the MARVET programme.



**Aquatic Medicine Programme – Norway 2015**  
**Ross Neethling BVSc. MRCVS**

Earlier this year before graduating from the University of Bristol veterinary school in England I was selected, out of vet student applicants from across Europe, to attend the Aquatic Medicine Programme in Norway. A truly fantastic opportunity, this 2 week intensive programme is jointly organised by European Veterinarians in Education, Research, and Industry (EVERI) and the Norwegian Veterinary Institute and was established to help prepare final year vet students for a career in aquatic medicine by providing hands on clinical experience and training. The programme took place in Norway's Sør Trøndelag region, mainly on the Islands of Frøya and Hitra, the birthplace and epicentre of Norwegian Aquaculture.



Week one involved working with vets at the largest fish health practice in Norway as I accompanied them on various visits to both hatcheries and sea sites across the region. The visits allowed valuable experience of all the important aspects of modern aquaculture, from routine husbandry to the more clinical and scientific side of things and the important role of vets in this industry. Practices such as vaccinations, size grading, feeding systems and routine health monitoring; as well as medical treatments (for example, large scale sea lice treatment), diagnostics and sample taking, and well boat inspections were all things that I became well acquainted with throughout the programme.

Week 2 was spent with students from the Norwegian Veterinary School re-emphasising and re-visiting the topics learned the previous week, but with added formal lectures and instruction as well.



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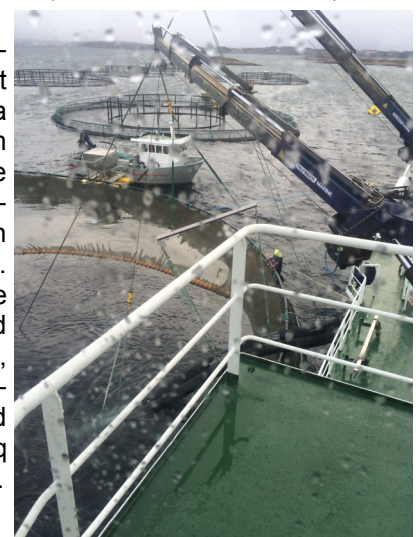
Week 2 was spent with students from the Norwegian Veterinary School re-emphasising and re-visiting the topics learned the previous week, but with added formal lectures and instruction as well.



In addition to this was a visit to two of the largest fish slaughter houses in Norway. The enormous scale of production and processing, and the efficiency with which it is carried out was mind-blowing indeed! These visits highlighted to me both the advances in fish welfare, particularly at slaughter, that have been made in recent times, but also the need for further research and development in this field.

This unique programme enabled my further development of relevant aquatic clinical skills and knowledge in the realistic setting of modern industry and it's current pertinent issues. Furthermore it has enabled a greater understanding and appreciation of both the opportunities and challenges faced by modern aquaculture with respect to the universal issues of efficiency of production and economics; welfare & ethics; diagnostics; disease surveillance, and

biosecurity. Overall the programme has without doubt put me in a position where I am now as a graduate able to begin to pursue a career as an aquatic veterinarian. Sincere thanks are due to the vets and staff I worked with, the institutions mentioned herein, and MSD and Pharmag for providing funding.





**SCHOLARSHIP COMMITTEE:  
2015 WAVMA Aquatic Veterinary  
Education Grant Recipient Reports**

**Kaylee Perry**

(DVM Candidate 2015, Auburn University)

Thanks to the generous support from WAVMA, I was thrilled to be able to expand my horizons into the world of marine mammal medicine during my clinical externship at Sea Life Park, HI.



I received the opportunity to assist with numerous cases extending from management of lacerations in bottlenose dolphins to surgery on penguins, to management of a neurologic case in a shark. I was able to appreciate the routine daily physical examinations of every animal in the park and the promotion of the essential human-animal bond between trainers and the animals.

Weekly monitoring of some of the more sensitive mammals was also essential in early detection of serious conditions, and I was able to receive ample experience evaluating blowhole cytology, CBCs, and blood smears. Recognizing normal social animal behavior was also a key aspect that was emphasized during my experience. I found that understanding the social dynamic between individuals was essential in managing clinical cases as well as in management of animals in the park in general. The cases I was able to follow were varied, but consisted of common complications seen in marine and domestic animals alike.

I learned of the incredible ability that sea turtles have in surviving ingestion of foreign bodies and subsequently, the high risk of foreign bodies and the importance of environmental health to turtles and other marine animals in the wild. I gained first-hand experience in management of ophthalmology cases in sea lions and was able to relate them to canine ophthalmology. I gained the confidence to diagnose and treat a cutaneous abscess in a shark pup, which is similar to treatment across species.

I am extremely grateful for this opportunity, which has given me insight into the marine mammal world. I was able to walk away from the experience with an increased confidence in working with exotic animal species and a preparedness for future endeavors in exotic and aquatic veterinary medicine.



**Christine Richey**

(DVM 2015; University of California)



First, I would like to extend an enormous thank you to WAVMA for providing the funding for this incredible award, and also for choosing me as a recipient. So many of us would not be able to take part in such amazing opportunities were it not for this funding!

I was fortunate to participate in AQUAVET I during the four weeks following my graduation from veterinary school at UC Davis. AQUAVET is a three-course program, designed to bring together individuals with an interest in learning more about the field of aquatic veterinary medicine. AQUAVET I, an introduction to aquatic animal medicine, was comprised of lectures, wetlabs, microscope labs, and fieldtrips.

Lectures covered phylogeny, anatomy, physiology, husbandry, disease processes, medicine, and surgical techniques of various aquatic species, from invertebrates to marine mammals and aquatic birds.



Wetlabs provided an opportunity to put that

knowledge to work through intertidal invertebrate collection and identification; invertebrate, fish, reptile, and aquatic bird dissections; sea turtle necropsies; and fish physical examination, diagnostics, and surgery. Water quality, an essential component of aquatic animal health, was also discussed in detail in lecture and put to practice in a testing lab.

Field trips provided the opportunity for behind-the-scenes tours of local aquaculture facilities and several aquaria, as well as additional hands-on experience (e.g., marine mammal physical exams and blood collection, penguin physical exams, marine mammal necropsies). The opportunity to learn about and work with such a diverse group of aquatic animals in one course setting is unrivaled.

Finally, in addition to the general course content, each student was required to prepare and present a 25-minute seminar, which afforded an opportunity to delve even deeper into a specific topic of our choosing.





AQUAVET I was truly one of the most educational experiences I have had. The course opened my eyes to the breadth and diversity of the field of aquatic medicine, gave me a new perspective on career trajectories and opportunities, and highlighted areas of ongoing or growing research.

AQUAVET was also of tremendous value in terms of networking opportunities and the formation of what I am certain will be lifelong friendships. It is important to recognize how small and close-knit the aquatic veterinarian and scientist community is – any opportunity to meet professionals in this field should be sought out and embraced. I would encourage anyone with an interest in aquatic animal medicine to apply for AQUAVET!

**Sarah Knowles**

(DVM Candidate 2017, University of Minnesota)

AQUAVET® II Program, March 23-June 6, 2015. For the first two weeks of my final summer vacation, I chose to spend it in a classroom with 14 other veterinary students and professionals from around the world learning from experts in aquatic veterinary medicine. Some may not share my enthusiasm for sitting in a classroom, but considering the topic of the AQUAVET® II program, I couldn't think of a better way to spend my time.

Within those two weeks I was immersed in comparative pathology and diseases of aquatic animals, specifically fishes and invertebrates. From bivalves to corals and catfish to dogfish, a huge variety of topics and species were covered, including but not limited to endocrine disorders of fishes and amphibians, toxicological pathology, and hematology.

My time at AQUAVET® II was also spent learning gross, histological and cytological presentations of numerous pathologies across the species. My favorite part of the program, by far, was the wet labs, wherein I was able to practice collecting blood and tissue samples as well as conduct full necropsies of fishes and invertebrates.

As a veterinary student highly interested in aquatic animal medicine and enhancing the presence of aquatic animal health professionals in the state of Minnesota, the AQUAVET® program has helped to supplement and advance my experience, especially since my school, the University of Minnesota, does not have its own aquatic medicine program. In completing the AQUAVET® I course last summer and now the AQUAVET® II course, I have gained much more than just aquatic medical knowledge and experience: I have learned to better balance animal health management between individuals and the herd; I have greatly expanded my professional contacts and friends in the field which has helped to open many doors to other aquatic medicine opportunities; and finally, I have gained more confidence in my personal veterinary skills and abilities, propelling me to take on projects and challenges I never would have expected.

I am so honored and grateful to be chosen as a 2015 John Pitts Awardee. This award not only helps with the financial burden that goes along with being a veterinary medical student, but it instills confidence within me to strive to be the best I can be and continue in my aquatic veterinary medicine endeavors.



**Sarah Knowles**  
collecting hemolymph  
from a surf clam  
(*Spisula solidissima*)

Collecting  
hemolymph  
from a lobster



My lab partner and I are observing and investigating the surf clam's (*Spisula solidissima*) anatomy during a necropsy.

**WAVMA CEPD Webinars****18<sup>th</sup> September 2015 6.00pm GMT**

**B-1015 Vets in Fish Conservation. Aquatic Veterinarians and Fishery Conservation**  
**Speaker: Prof. Mohamed Faisal**

Description

In their hostile aquatic habitat, fish are subjected to a multitude of stressors. As a result, many fish species have extirpated or at the brink of extinction. Over the last three decades, bacterial and viral pathogens have decimated fish populations throughout the world and the sight of miles-wide mats of dead fish became very common in marine and freshwater environments alike.



This presentation gives an overview of conservation medicine as an emerging discipline with an emphasis on the role played by aquatic veterinarians in rehabilitating wild fish stocks and managing fish health issues.

Learning Objectives

- Understand the discipline of Conservation Medicine
- Understand the role played by pathogens in causing serious fish kills.
- Understand the role played by aquatic veterinarians in saving fish species from extinction

Speaker Biography

Professor Faisal started his aquatic veterinary professional career in 1977, when his doctoral thesis at the Veterinary School of the University of Munich, Germany, focused on the Spring Viraemia of Carp Virus. Since then he practiced aquatic veterinary medicine in academia where he combined field observation, clinical examination, and laboratory studies harmoniously. His clinical experience included teleosts, mollusks, and amphipods. His research focused on understanding the host-pathogen intricacies. Currently, he directs the Aquatic Animal Medicine Program at Medicine, Michigan State University. He oversees all fish health issues for Michigan including fishery rehabilitation programs. He is proud to have served as WAVMA President in 2013.

**5<sup>th</sup> October 2015**

**B-1016 Marine Ornamental Invertebrate Medicine**  
**Speaker: Prof. Greg Lewbart**

Description

Invertebrate animals comprise >95% of the animal kingdom's species, yet non-parasitic invertebrates are vastly underrepresented in the typical veterinary school curriculum. This lecture provides an introduction to some of the more prominent marine invertebrate groups (coelenterates, mollusks, crustaceans, echinoderms, and the horseshoe crab) and reviews the state of the science with regards to clinical techniques. Areas of emphasis include taxonomy, anatomy, physiology, anesthesia, diagnostic techniques, and clinical management.

Learning Objectives

- Describe the differences between the major marine invertebrate taxonomic groups.
- Describe how to work up a marine invertebrate case.
- Discuss the treatment and management options for the most common and important diseases and syndromes of captive marine invertebrates.

Speaker Biography

Greg received a B.A. in biology from Gettysburg College in 1981, an M.S. in biology with a concentration in marine biology from Northeastern University in 1985, and a V.M.D. from the University of Pennsylvania, School of Veterinary Medicine in 1988. He worked for a large wholesaler of ornamental fishes before joining the faculty at the North Carolina State University College of Veterinary Medicine in 1993, where he is Professor of Aquatic Animal Medicine. He's a diplomate of the American College of Zoological Medicine and was named 2007 Exotic DVM of the Year by ExoticDVM Magazine. In 2012 he received the William Medway Award for Excellence in Teaching from the International Association for Aquatic Animal Medicine.

Greg is an author on numerous popular and scientific articles about invertebrates, fishes, amphibians and reptiles and speaks locally, nationally and internationally on these subjects. He's also authored or co-authored over 20 book chapters related to veterinary medicine of the above-mentioned taxonomic groups and edited or co-edited three veterinary textbooks: Self-Assessment Colour Review of Ornamental Fish (Manson Publishing and ISU Press, 1998), Rapid Review of Exotic Animal Medicine and Husbandry (Manson Publishing, 2008), and the multiple award winning Invertebrate Medicine (Wiley-Blackwell Publishing, 2006; 2012).



**19<sup>th</sup> November 2015**  
**B-1017 Elasmobranch**  
**(Shark) Medicine**  
**Speaker: Dr. Rob Jones**



Description

Elasmobranchs are the cartilaginous fish – the sharks and rays. They are commonly kept in public aquariums and the public have a fascination with them. They have significant differences from an anatomical viewpoint as well as physiologically - these basic differences will be covered.

I will also discuss some of the artificial reproduction research I have been involved with for the past 10 years. Finally, I will discuss some common problems seen in elasmobranchs in captivity as well as some of the wild shark rescues I have been involved with.

Learning Objectives

Understand elasmobranch anatomy and how it differs from teleosts

Understand elasmobranch physiology and reproduction and how it differs from teleosts

Examine some shark medicine cases and treatments

Speaker Biography

Since 1999, I have been working within the aquarium world. I now travel and consult to all the public aquariums in Australia and New Zealand and more recently internationally.

Commencing in 2003, I organized a research team working on artificial reproduction in sharks, which culminated in the first Artificial Insemination shark born in March 2014.

I also have developed the world's first online course for aquarists and others working in the aquarium and zoo industry (the e-aquarist course) was launched in May 2011 and now has students on five continents.

*Model of Great White Shark  
in Balboa Park Museum,  
San Diego, California.  
Photographed by  
Nick Saint-Erne*



**December 2015**  
**B-1018 Fish Leukocytes**  
**Speaker: Prof. Dušan Palić**



Description

Leukogram is one of most common tools used during clinical evaluation of a patient. This would be true for the fishes as well, however, available information is scattered through scientific journals and some clinical textbooks, and focuses on just a few out of more than 35,000 fish species. Further, many instruments that are routinely used in blood cell analysis do not work well, or at all, with fish blood for multiple reasons such as presence of nucleated red blood cells. Because of this, it is important for a clinician who wants to practice on (especially ornamental or pet) fishes, to learn how to distinguish the leukocytes in fish blood smears. This presentation on fish leukocytes will provide a practicing aquatic veterinarian with information how to take advantage of blood smears to collect more information about health status of fish.

Learning Objectives

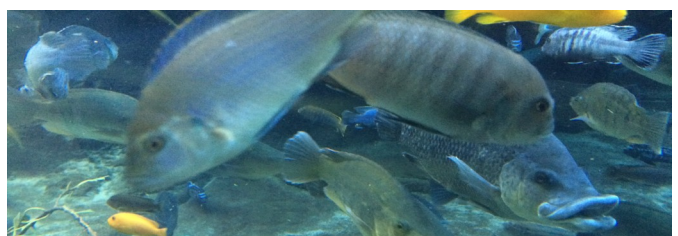
Veterinarian will understand the value and limitations of the fish blood smear.

Veterinarian will become familiar with major leukocyte types in fish.

Veterinarian will be able to prepare tools for collection and use rapid staining techniques to produce a readable fish blood smear.

Speaker Biography

Prof. Palić is a third generation veterinary professor, who fell in an aquarium when he was two years old. He has his life focused on aquatic animal veterinary medicine since. Dušan has been involved in teaching, research and extension/practice in fish for over 20 years, and has participated in number of initiatives to enhance veterinary workforce in the area of aquatics. He is a founding WAVMA member, fellow and past president, and also a Cert AqV. Dušan also is a founding diplomate of European College of Aquatic Animal Health (ECAAH). He participated in development of USDA NVAP (veterinary accreditation program) aquatic modules. He served on multiple committees, including World Veterinary Association Communication work group, and has organized many events.





**How did you become interested & involved in Aquatic Veterinary Medicine?**

**Dr Peter J. Werkman –  
Dierenarts voor Visziekten,  
Leusden, The Netherlands**

My practical work as a fish vet started in 1978, but since 2009 I have only treated fish in my practice. After graduating as a veterinarian in 1972 from the State University Utrecht faculty of veterinary medicine, I worked in a mixed practice in Amersfoort, Netherlands. I worked with farm animals for seven years, and the next 36 years as a small animal practitioner.

In 1978 I also began to include fish in my practice when a gentleman came into the practice and asked for one kilogram of oxytetracyclin, one kilo of chloramphenicol and one kilo of neomycin pure substance. I asked him what he planned to do with these drugs, he told me that he imported pet fish from Southeast Asia and South America and that he used the medication by experience.

At that time a colleague was working with fishes at the University in Utrecht and I suggested that I would take some of his sick fish to Utrecht to get a diagnosis, so that he could properly treat the fish. This lasted for about a year and a half and then he stopped his business. After that I met a fishfarmer who was involved in starting a new group of foodfish farmers and they wanted to make use of a veterinarian with some knowledge of fish diseases.

In the meantime I attended several short fish disease courses in the UK organised by the BSAVA and I went to an EAFP Congress in Budapest (Hungary) and Brest (France). In 1984 I went to the University of Stirling for a 14 day European Aquaculture Course for veterinarians.

A problem in the Netherlands is that many fishfarmers have graduated from Wageningen University with a degree in aquaculture and they learned much more about fish diseases than we veterinarians did at the Veterinary Faculty. Dutch fishfarmers could also get free advice from a government appointed fish-consultant, from fishfood producing companies, and from Wageningen



University. Why should a fishfarmer then ask for help from a veterinarian (with little knowledge of fish diseases) who would even ask him to get paid?

I started a Veterinary Aquaculture Workinggroup in 1984, and we organized lectures and visits to fishfarmers and at some time we had 30 veterinarians interested in joining us. But most of them stopped attending because even if they had a fishfarm in their practice area, they never got a call.



In the meantime I was asked by a friend who transported live eels (*Anguilla anguilla*) from Egypt to the Netherlands in two containers with a capacity of 10 -tons each to join him. Just outside of Alexandria, Egypt, close to a garbage belt, the eels were already caught and kept in containers in the water. The eels were fat silver eels ready to swim to the Sargasso Sea to spawn and die there. They were the best for smoking. The water in the containers was cooled to 5° C. Extra oxygen was added to the water and zeolite was used to absorb the produced ammonia. During a 14-day trip many of the eels got small abrasions from catching and moving around in the tanks. After a week in the Netherlands they got red fins and had some small wounds. I was asked to assist and look for the cause of the problems?

We went by ferry from Alexandria to Pireaus in Greece, and from there to Venice in Italy. I took bacteria samples every day from the kidneys and liver of two eels, but no growth was found. In Venice two trucks picked up the containers and they were driven to the Netherlands. After arrival the eels were weighed and put in basins, with a water temperature of 12°C. This jump from five to twelve degrees was sufficient to cause septicaemia in the eels. The suggested solution was to raise the water temperature two degrees per day maximum to twelve degrees, and to add some salt to reduce the fluid loss from the wounds. After this transported fish had no more problems.

Several fish disease courses or meetings I participated in gave me the information I needed, including: 1983 and 1986 BSAVA courses in Pershore and Worcester, UK; 1984 Aquaculture Europe 14 day course in Stirling, Scotland; 1991 EAFP Congress in Budapest, Hungary; 1993 EAFP Congress in Brest, France; 2004, 2011 and 2012 Fish Veterinary Society meetings in Edinburgh or Southampton, UK; 2006 Eastern Fish Health Workshop in Charleston SC, USA; 2008 WAVMA aquatic vet sessions at the WVC in Vancouver, Canada; 2010 WAVMA Conference in Athens, Greece; and the 2012 WAVMA meeting at ISAAH in San Diego, USA.

In 2008 I joined WAVMA and was asked to become Director-at-Large in 2009. I also became a member of the WAVMA Communications Committee in 2010.

But my involvement in aquatic veterinary medicine has involved a lot of other things. Starting in 1985 I have been giving lectures and practical work on fish diseases to veterinary students and in 1990 expanded this to include veterinarians, fishfarmers and people working with laboratory fish at universities and research institutes. In 2000 I became a member of PUM (Programma Uitzending Managers) a government institute that sends senior experts to developing countries to help poor farmers' problems – more than 3,500 senior experts are available in various subjects, like tourism, wood work, machine repair; and for me, fish diseases. In 2000 I spent three weeks on a trip to Malawi to help with a petfish farm, and in 2007 on a 3-day trip to Lagos, Nigeria I helped with African Catfish problems. Other assistance included two weeks in 2010 helping solve problems with Tilapia, Pangasius and Indian carp in Kalna, India. In 2011, I also spent two weeks in Kobeleti, Georgia (Black Sea) on problems with trout, and another two weeks in Mugla, Turkey for problems with seabass. In 2012 I also spent two weeks in Dong Thap, Vietnam solving problems with Pangasius.



*Dr. Werkman Consulting & Lecturing in Vietnam*



*Goldfish Tumor:*

*Before Surgery*

*After Surgery*



I have also published several articles in Veterinary Magazines (although all in the Dutch language) including “The next patient is a fish. Now what?” (2003) and in 2007 a series of 6 articles, including: “The owner has a sick fish. And then?”; “Buying and keeping new fishes”; “The fishbowl and water quality”; “Viruses, bacteria and fungi”; “One-celled and more-celled parasites”; “Crustacea and internal parasites.” Other published articles included (2008) “A story with a tail” in Quest Magazine, (2009) “The necessity of quarantine for fishes” and “Surgery: How to ballast a fish”, (2013) “Fish diseases in Vietnam” and “Fish surgery by a first line veterinarian” in 2014.

I have participated in writing chapters in books including “Fish diseases, prevention, recognition and curing. A manifest for aquaculture: (1998), “Veterinary Memorandum: Aquaculture in The Netherlands and Belgium” (2010) and “Diseases of fishes, crustacea and shellfish in the Netherlands and Belgium (2011).

I still visit aquarium or pond owners with fish disease problems. I also have been asked to help solve problems in zoo aquariums and I do, if necessary fish surgery (mostly tumour removal) on mainly goldfishes.

[Editor's note: At age 74, Dr. Werkman is still in private practice, and continues to contribute a great deal advancing WAVMA and aquatic veterinary medicine in Holland, Europe and elsewhere.]

**Photo Credits**—Dr. Peter Werkman.



**Meet Dr. Michael Murray**  
 Monterey Bay Aquarium  
[Mmurray@mbayaq.org](mailto:Mmurray@mbayaq.org)

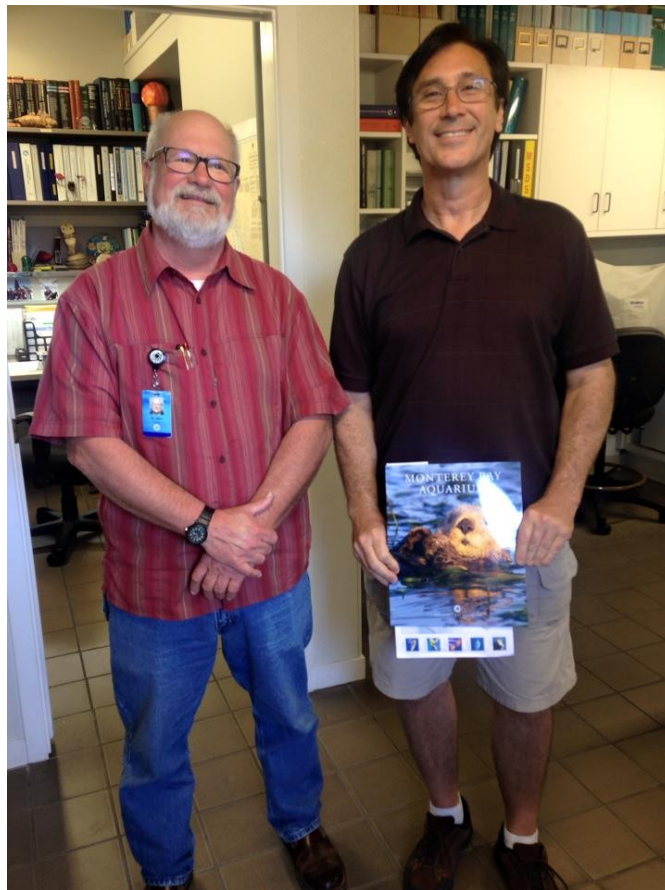
Dr. Mike Murray, the Director of Veterinary Services at Monterey Bay Aquarium, is a key figure in sea otter recovery efforts from California to the Russian Far East. He is also deeply engaged in the aquarium's Project White Shark exhibit and field research, cares for the aquarium's living collection, and has worked to support recovery of endangered bald eagles and California condors.

As staff veterinarian, he provides routine health care for exhibit sea otters and other animals in the aquarium's living collection, from shorebirds to giant Pacific octopus. He is the veterinarian for the aquarium's pioneering Sea Otter Research and Conservation program, which rescues and rehabilitates stranded sea otters for return to the wild, and is a partner in the recovery program for the southern sea otter. Dr. Mike also supports medical and surgical activities for a variety of researchers working with marine mammals.

Dr. Mike lectures and publishes widely on avian and exotic veterinary subjects, as well as wildlife and conservation medicine. He teaches veterinary endoscopy procedures worldwide, and has helped develop statewide veterinary standards through the California Veterinary Medical Association.

Dr. Mike graduated from Purdue University as a Doctor of Veterinary Medicine and is licensed to practice veterinary medicine, dentistry and surgery in California and Indiana, as well as being a USDA Accredited Veterinarian. He is a Research Associate at the University of California, Santa Cruz, and serves on the Accreditation Commission of the Association of Zoos and Aquariums, which honored him as Accreditation Inspector of the Year. Prior to entering private practice and subsequently joining the aquarium staff, he worked in the U.S. Army Veterinary Corps, and at a private zoo and exotic animal practice.

His honors include recognition by the Monterey County Society for the Prevention of Animals as its two-time Humanitarian of the Year, and by his peers in 2002 as Exotic Doctor of Veterinary Medicine of the Year.



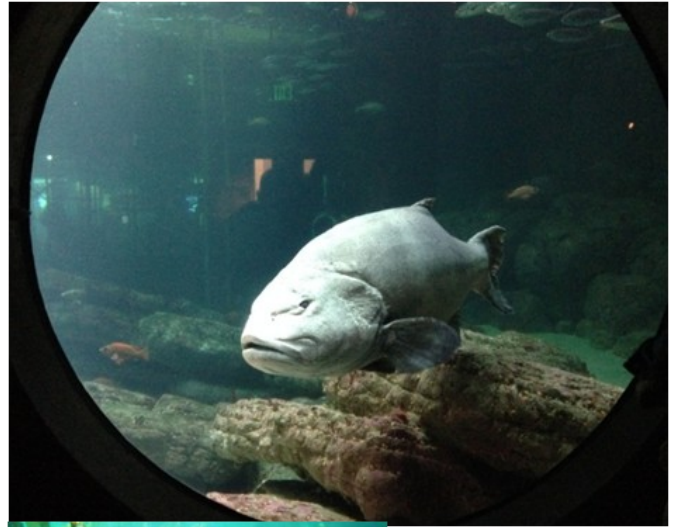
The Monterey Bay Aquarium was a vision that turned into a reality. One day in 1977, four marine biologists at Stanford University's Hopkins Marine Station were once again contemplating a dilapidated building on the shore just a few hundred feet away. Someone said "aquarium," and the rest is history. The aquarium building stands on the site of historic Cannery Row's largest fish-packing plant, the Hovden Cannery. Built in 1916, the Hovden Cannery operated until 1972, and was the last of the canneries to close. Demolition of the abandoned building began in 1980, and construction of the Aquarium began shortly after, in the spring of 1981. The Monterey Bay Aquarium opened to the public on October 20, 1984—and brought the fish back to Cannery Row. From the beginning, the founders' intent was to give visitors an intimate tour of Monterey Bay's beautiful natural communities and other fascinating marine environments, and ultimately inspire them to care for and protect the world's oceans.

Monterey Bay Aquarium  
 886 Cannery Row  
 Monterey, CA 93940  
 (831) 648-4800  
[MontereyBayAquarium.org](http://MontereyBayAquarium.org)





*The "Kelp Forest" exhibit holds 335,000 gallons of sea water.*



*A big fish looks back at the Monterey Bay Aquarium visitors.*



*All photos by Victoria and Nick Saint-Erne*

*Sardines swimming in the Giant Kelp Forest.*



*Spotted Mastigias sea jellies in "The Jellies Experience" exhibit.*



*The "Great Tide Pool" is right below the Aquarium at the rebuilt Hovden Sardine Cannery. There are SCUBA diving programs offered to guests in the tide pool.*





*Sardines are thriving in Cannery Row in the "Open Sea" Exhibit!*

For 30 years, the non-profit Monterey Bay Aquarium has been the standard by which all other aquariums are judged. It's hailed by peers and public alike for its innovative exhibits and unsurpassed visitor experience. Located on the shores of Monterey Bay—the heart of the largest national marine sanctuary in the continental United States—the Aquarium is home to nearly 35,000 animals and plants, in 34 major galleries and nearly 200 exhibits. It's a showcase for sea life from one of the world's richest marine regions: from sea otters and jellyfish to great white sharks; from kelp forests and wave-swept rocky shores, to the vast open ocean. Changing special exhibitions, hands-on activities and lively daily programs make the Aquarium a must-see attraction for all ages. There are special opportunities for groups to explore everything the Aquarium has to offer.

Go to the Aquarium website to watch the Live Shark camera:

<http://www.montereybayaquarium.org/animals-and-experiences/live-web-cams/shark-cam>

*Dr. Mike shows us the culturing tanks and veterinary treatment room.*





## AUTHOR'S INSTRUCTIONS

**Instructions for Authors and Contributors**

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

**Colleague's Connection**

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

**Peer-Reviewed Articles**

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

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

**Clinical Cases**

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

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**Hide and seek: Tracking transparent skin flukes on the body surface of teleost fish**

By **Alejandro Trujillo González, MSc**  
James Cook University

Capsalid monogeneans are harmful ectoparasites of ornamental and farmed fishes in tropical and subtropical marine environments (Thoney & Hargis, 1991; Deveney et al., 2001; Hirazawa et al., 2011; Hutson et al., 2012; Whittington, 2012). These parasites normally attach to external surfaces of their host using two attachment organs located anteriorly, and one larger posterior attachment organ called the haptor. The anterior attachment organs are located directly above the pharynx, which is used to graze on epidermal and mucous cells of the fish (Whittington 2012). The posterior organ has chitinous structures that provide mechanical attachment, including paired anterior hamuli, accessory sclerites, posterior hamuli and peripheral hooklets (Whittington & Horton 1996). A marginal valve on the haptor allows the organ to create suction on the host. The strong adhesion of the haptor, mechanical attachment of the hamuli and sclerites, as well as the adhesion of the anterior attachment organs when grazing, can cause epidermal lesions, haemorrhage, bulging of the eyes; and it also increases the likelihood of secondary infections (Thoney & Hargis 1991; Leong & Colorni 2002; Trujillo-Gonzalez et al., 2014).

Within Capsalid monogeneans, the genus *Neobenedenia* is comprised of particularly virulent species that exhibit low host specificity, a direct life cycle, high fecundity and environmentally resilient eggs (Dinh Hoai & Hutson, 2014). *Neobenedenia* sp. have been observed attached to all external surfaces of the host including the nostrils, eyes, mouth cavity and fins (Whittington, 1996; Ogawa et al., 2006; Hirazawa et al., 2011; Trujillo-González et al., 2014). Nonetheless, juvenile *Neobenedenia* sp. are small in

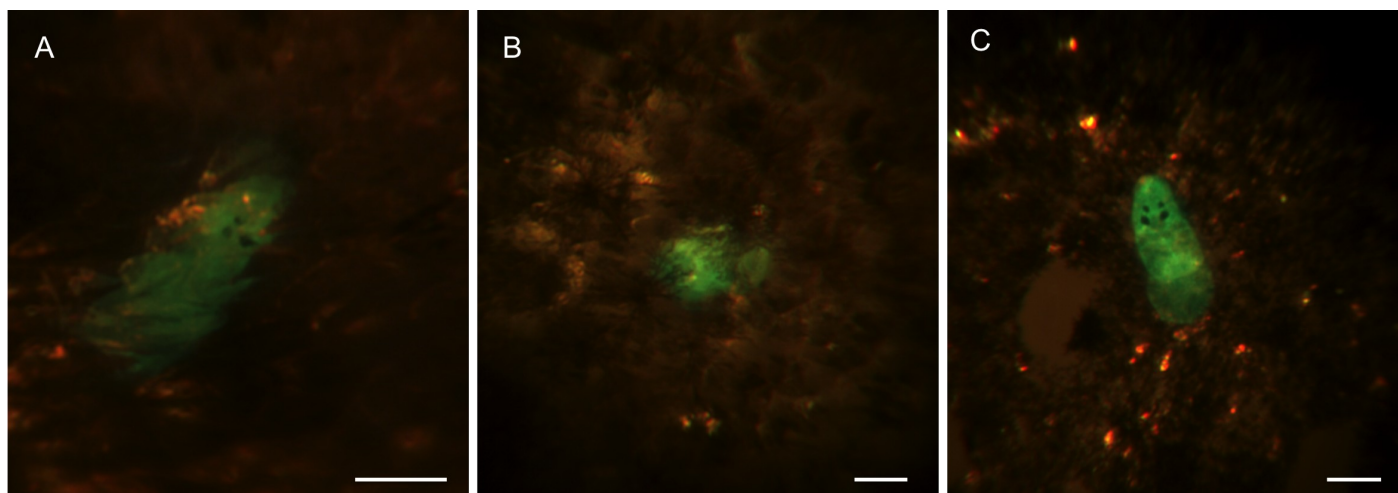
size, and may be transparent or have pigments that serve as camouflage when attached to the host, making these parasites cryptic in nature and extremely difficult to observe (Whittington & Ernst, 2002).

Fluorescent labelling is a useful tool to examine the infection biology of parasites and has been previously used to describe the invasion route and site selection of monogeneans (i.e. *Branchotentes octohamatus*) on elasmobranchs (Glennon et al., 2007), *Heterobothrium okamotoi* on tiger puffer fish, *Takifugu rubripes* (Chigazaki et al., 2000), and actinospores in salmonid and cyprinid species (Yokoyama and Urawa, 1997). By labelling *Neobenedenia* sp. larvae with a fluorescent marker, we were able to track this elusive parasite over the body surface of its host, *Lates calcarifer*, over time.

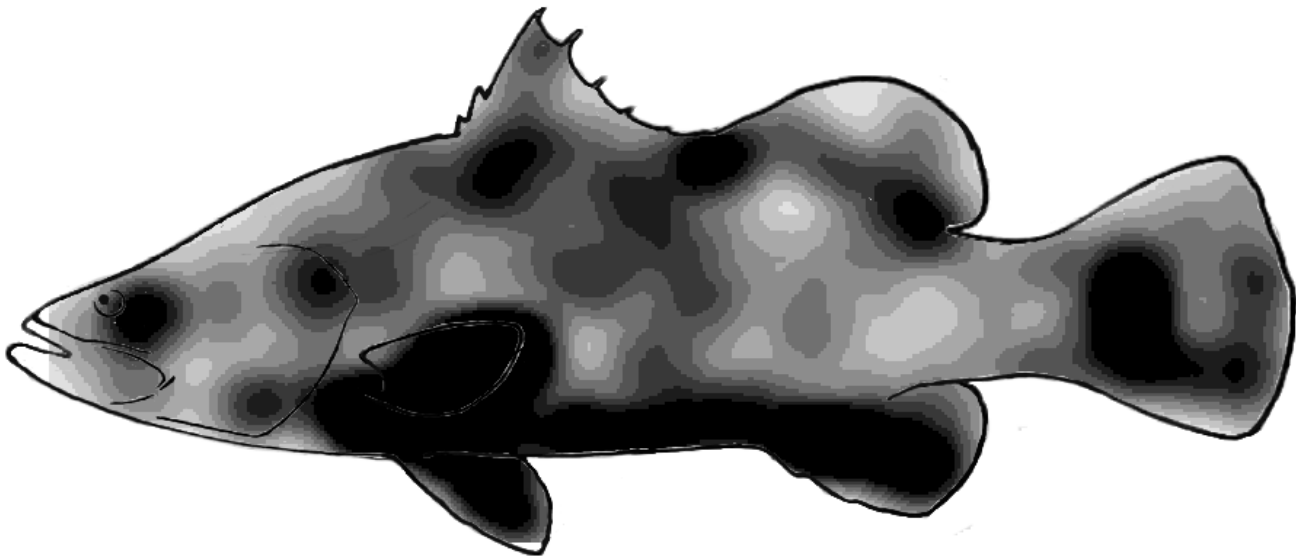
Previous research has reported that skin flukes from *Neobenedenia* frequently attach on the eyes, pectoral fins and body surface of the fish. Our research shows that the site of attachment changes as the parasite develops. *Neobenedenia* sp. larvae exhibited an initial random distribution on the body surface of the host, which indicates that larvae may not be especially selective of their microhabitat during recruitment, but could be influenced by the need to find a host and ensure transmission. Following attachment, there was considerable aggregation of parasites between 48 h and 8 days on the pectoral fins, upper and ventral body surfaces, caudal peduncle and caudal fin, indicating that the majority of parasites migrated to specific microhabitats on the host following initial attachment.

**Below:**

*Live fluorescent Neobenedenia sp. juveniles attached beneath the scales of Lates calcarifer (A, B) and attached to the surface of the fish scales (C). Parasites are 1 hour old (A, B) and 2 hours old (C). Scale bar = 100 µm.*





**Above:**

Neobenedenia sp. distribution on the body surface of *Lates calcarifer* over a period of 16 days. A kernel spatial point analysis was used to estimate the number of parasites/unit of measure. Dark areas show microhabitats with higher number of parasites over time.

The fluorescent marker revealed that *Neobenedenia* sp. attached underneath fish scales. This is a well-known microhabitat for transversotrematid trematodes (Cribb et al., 2002) but is a relatively rare occurrence, or is poorly documented, for monogeneans. Monogenean post-larvae of *Urocleidus adspetus* and juveniles and adults of *Entobdella soleae* (Capsalidae) have been observed attached beneath the scales of their hosts (Cone and Burt, 1981; Kearn, 2004). In both studies, parasites attached to the underside of the scales with the haptor, with the anterior region, including the eye spots, uncovered (Cone and Burt, 1981; Kearn, 2004).

The ability of *Neobenedenia* sp. to attach beneath the scales may have evolved in response to predation by cleaner organisms. Furthermore, this microhabitat may enable the parasite to be almost entirely secluded from the environment and could reduce the efficiency of current parasite management methods (e.g. chemical and freshwater bathing) used in aquaculture. Research is currently ongoing to test the efficiency of such treatments on parasites hidden beneath scales of the host.

This research brings new information about the ecology and interaction of *Neobenedenia* sp. with its host fish. Firstly, this study showed that parasite attachment and microhabitat selection changes over time as the parasite develops. Secondly, parasites were highly selective for the fins, upper and ventral body surfaces of the host, which differs from previous

reports suggesting that *Neobenedenia* sp. attached predominantly on the fins of host fish species (i.e. *Paralichthys olivaceus* and *Seriola dumerili*) and then migrated to the main body surface as they grew (Bondad-Reantaso et al., 1995; Hirayama et al., 2009). Attachment on the fins, upper and ventral body surfaces may occur as a response to predation by cleaner organisms in the wild, or preventing detachment from the host by avoiding areas with greater water resistance. Lastly, this study showed that *Neobenedenia* sp. attached beneath the scales of the host, such behaviour should be considered when doing freshwater or chemical bathing on the fish to control infections, as some parasites could remain unaffected by the treatment.

[Editor's Note: It seems a good idea to select the areas around the eyes, the pectoral fins and the ventral body for performing skin scrapes when sampling mucus to examine microscopically for Monogenean parasites on fish biopsies.]

For more information on this elusive parasite visit [www.marineparasites.com](http://www.marineparasites.com), and see our recent publication.

**Publication reference:**

**Trujillo-González A.**, Constantinoiu C.C., Rowe R. & Hutson K.S. (2015). Tracking transparent monogenean parasites on fish from infection to sexual maturity. *International Journal of Parasitology: Parasites and Wildlife* 4, 316-322.

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## REVIEW PAPERS

## Recent Koi Articles in Scientific Literature

1. Diagnostic techniques and treatments for internal disorders of Koi (*Cyprinus carpio*).

**Saint-Erne N.**

*Vet Clin North Am Exot Anim Pract*; 2010 Sep;13 (3):333-47.

2. [Pilot study on the use of diode laser therapy for treatment of dermatitis in koi carp (*Cyprinus carpio*)].

**Pees M, Schmidt V, Pees K.**

*Tierarztl Prax Ausg K Kleintiere Heimtiere*; 2011;39 (2):89-96.

3. [Ovarian tumor in a koi carp (*Cyprinus carpio*): Diagnosis, surgery, postoperative care and tumour classification].

**Lewis E, Reifinger M, Schmidt P, El-Matbouli M.**

*Tierarztl Prax Ausg K Kleintiere Heimtiere*; 2014;42 (4):257-62.

4. Risk factors for development of internal neoplasms in koi carp *Cyprinus carpio koi*.

**Ott KnÄsel F, Doherr MG, KnÄsel R, Wahli T, Schmidt-Posthaus H.**

*Dis Aquat Organ*; 2015 Jun 3;114(3):199-207.

5. The efficacy of alfaxalone for immersion anesthesia in koi carp (*Cyprinus carpio*).

**Minter LJ, Bailey KM, Harms CA, Lewbart GA, Posner LP.**

*Vet Anaesth Analg*; 2014 Jul;41(4):398-405.

6. Koi herpesvirus epizootic in cultured carp and koi, *Cyprinus carpio* L., in Taiwan.

**Cheng L, Chen CY, Tsai MA, Wang PC, Hsu JP, Chern RS, Chen SC.**

*J Fish Dis*; 2011 Jul;34(7):547-54.

7. Evaluation of the effects of tricaine methanesulfonate on retinal structure and function in koi carp (*Cyprinus carpio*).

**Bailey KM, Hempstead JE, Tobias JR, Borst LB, Clode AB, Posner LP.**

*J Am Vet Med Assoc*; 2013 Jun 1;242(11):1578-82.

8. The complete mitochondrial genome of the Japanese ornamental koi carp (*Cyprinus carpio*) and its implication for the history of koi.

**Mabuchi K, Song H.**

*Mitochondrial DNA*; 2014 Feb;25(1):35-6.

9. Characterization of a novel cell line from the caudal fin of koi carp *Cyprinus carpio*.

**Lin SL, Cheng YH, Wen CM, Chen SN.**

*J Fish Biol*; 2013 Jun;82(6):1888-903.

10. 'Fish' associated with '*Cyprinus carpio* Organism': Top Publications.

**Cooper IF, Siadaty MS.**

*BioMedLib Review; Fish; Cyprinus carpio Organism*: 706734071. ISSN: 2331-5717. 2014/4/30.

11. Comparative analgesic efficacy of morphine sulfate and butorphanol tartrate in koi (*Cyprinus carpio*) undergoing unilateral gonadectomy.

**Baker TR, Baker BB, Johnson SM, Sladky KK.**

*J Am Vet Med Assoc*; 2013 Sep 15;243(6):882-90.

12. Physiologic and biochemical assessments of koi (*Cyprinus carpio*) following immersion in propofol.

**Oda A, Bailey KM, Lewbart GA, Griffith EH, Posner L.**

*J Am Vet Med Assoc*; 2014 Dec 1;245(11):1286-91.

13. Alfaxalone as an intramuscular injectable anesthetic in koi carp (*Cyprinus carpio*).

**Bailey KM, Minter LJ, Lewbart GA, Harms CA, Griffith EH, Posner LP.**

*J Zoo Wildl Med*; 2014 Dec;45(4):852-8.

14. Seminoma in a koi carp *Cyprinus carpio*: histopathological and immunohistochemical findings.

**Sirri R, Mandrioli L, Grieco V, Bacci B, Brunetti B, Sarli G, Schmidt-Posthaus H.**

*Dis Aquat Organ*; 2010 Oct 26;92(1):83-8.

15. Sensitivity of seven PCRs for early detection of koi herpesvirus in experimentally infected carp, *Cyprinus carpio* L., by lethal and non-lethal sampling methods.

**Monaghan SJ, Thompson KD, Adams A, Bergmann SM.**

*J Fish Dis*; 2015 Mar;38(3):303-19.

16. Examination of the early infection stages of koi herpesvirus (KHV) in experimentally infected carp, *Cyprinus carpio* L. using in situ hybridization.

**Monaghan SJ, Thompson KD, Adams A, Kempter J, Bergmann SM.**

*J Fish Dis*; 2015 May;38(5):477-89.

17. Draft Genome Sequence of *Aeromonas hydrophila* Strain Ae34, Isolated from a Septicemic and Moribund Koi Carp (*Cyprinus carpio koi*), a Freshwater Aquarium Fish.

**Jagoda SS, Tan E, Arulkanthan A, Kinoshita S, Watabe S, Asakawa S.**

*Genome Announc*; 2014;2(3).

18. Effect of ploidy on scale-cover pattern in linear ornamental (koi) common carp *Cyprinus carpio*.

**Gomelsky B, Schneider KJ, Glennon RP, Plouffe DA.**

*J Fish Biol*; 2012 Sep;81(4):1201-9.

19. *Thelohanellus toyamai* (syn. *Myxobolus toyamai*) infecting the gills of koi *Cyprinus carpio* in the eastern United States.

**Griffin MJ, Goodwin AE.**

*J Parasitol*; 2011 Jun;97(3):493-502.

20. Efficacy and safety of a modified-live cyprinid herpesvirus 3 vaccine in koi (*Cyprinus carpio koi*) for prevention of koi herpesvirus disease.

**Weber EP 3rd, Malm KV, Yun SC, Campbell LA, Kass PH, Marty GD, Salonius K, Dishon A.**

*Am J Vet Res*; 2014 Oct;75(10):899-904.

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**The Basics of Pet Fish Medicine\***

**Christoph Mans**, Dr.med.vet., DACZM,  
 University of Wisconsin, Madison WI, USA.

Ornamental fish are the third most commonly kept pets in the United States (AVMA, 2012) and are increasingly presented to veterinarians for evaluation and treatment of diseases. Veterinary technicians play an important role in evaluating and treating these patients.

**TRANSPORTATION**

Ornamental fish owners should be instructed how to properly transport fish to the practice because minimizing stress during transport is important. Pet fish can be placed in plastic (polyethylene) bags filled one-third with water and two-thirds with room air or carried in plastic containers or buckets. They should also be protected from sudden temperature changes and remain in the dark. Also, in addition to the water in the transport container, clients should be instructed to bring extra water to be used for water testing, for transportation following the appointment, and/or for recovery after an anesthetic procedure.

**HISTORY COLLECTION**

Veterinary technicians should be knowledgeable about the basics of fish husbandry and standard equipment used (eg, aquarium filtration types, aeration, heaters) as well as the basics of water quality. They should also be familiar with commonly used equipment sold in pet stores and online to ask appropriate questions during history collection. See Table 1 for a basic history collection list for ornamental fish.

**WATER QUALITY ASSESSMENT**

Environmental assessment is an important part of the evaluation of fish patients and basic water quality testing should be performed whenever possible. Basic water quality test kits are readily available. Clients should be instructed to bring water for evaluation to the appointment in a separate container in which no fish are transported. Water quality parameters evaluated routinely should include:

- pH
- Ammonia
- Nitrate
- Nitrite
- Alkalinity
- Hardness

Additionally, dissolved oxygen, salinity, and chlorine/chloramines can be measured.

**VISUAL PATIENT ASSESSMENT**

An initial visual assessment should be performed. Evaluate the following:

- Fish's position in water column
- Behavior (e.g. gasping)
- Orientation
- Swimming behavior (e.g. circling, drifting)
- Reaction to external stimuli
- Opercular (gill cover) movements
- Body condition
- Distention of the abdomen (may be caused by ascites, bloat, organomegaly, generalized edema, coelomic mass, obesity, or polycystic kidneys)
- Eye condition (e.g. exophthalmos, enophthalmos, cataracts)

- Gill condition (e.g. anemic, hemorrhagic, necrotic, fungus, parasites); may also need a gill biopsy and cytology
- Skin lesions (e.g. ulcers, white spots, increased mucus, erythema)
- Tail and fin condition (frayed, erythema, parasites)
- Anal opening (fecal retention, inflammation, prolapse)

**Table 1.** Basic History Collection List for Ornamental Fish Housed in Tank

<b>Environment</b>	Fresh or saltwater tank Size and volume of tank Species, number, and size of fish in tank Age of established tank Live or artificial plants Most recent introduction of live plants or fish Location of tank Substrate (size, layer thickness) Filtration system (eg, filter type [internal/external], filter media) Temperature and temperature monitoring Lighting Water quality Source of water Dechlorination technique used Water testing performed Regular water changes and tank cleaning schedule Feeding (e.g. type, frequency, amount)
<b>Patient-specific History</b>	Age of fish (eg, duration of ownership) Duration of presenting complaint Previous medical history Appetite and activity



### DIRECT PHYSICAL EXAMINATION

A physical examination should be performed after the fish has been removed from the water. Do not restrain fish without wearing disposable gloves to minimize possible zoonotic disease transmission and to avoid damage to the fish's skin.

Manual restraint may be sufficient for brief physical examinations and diagnostic sample collection, but sedation is preferable, particularly for larger fish or if several diagnostic procedures are planned (eg, blood collection). For sedation, MS-222, TMS, tricaine methanesulfonate (Tricaine-S, Western Chemical, wchemical.com) is FDA-approved for immobilization of fish. Routinely a 10 g/L stock solution is prepared, which should be buffered (v/v) with sodium bicarbonate. Dose-dependent levels of sedation or anesthesia can be achieved with dosages ranging from 15–150 mg/L administered by bath. Reversal of the sedation/anesthesia is accomplished by placing the fish in water without the immobilization agent.

Common clinical diagnostic procedures routinely performed in fish include skin scrapings (Figure 1) and gill or fin biopsies (Figures 2 & 3) for cytologic examination as well as blood collection and diagnostic imaging.



**Figure 1. Skin scraping (mucous smear)**

Use a coverslip, microscope slide edge, or blunt edge of a scalpel blade to superficially scrape in a cranial-caudal direction. Avoid excessive pressure during the sample collection to avoid trauma to the underlying skin. Transfer the harvested mucous sample to a microscope slide, add a drop of tank water, and cover with a cover slip. Examine the wet-mount preparation immediately for ectoparasites, fungi, and bacteria.

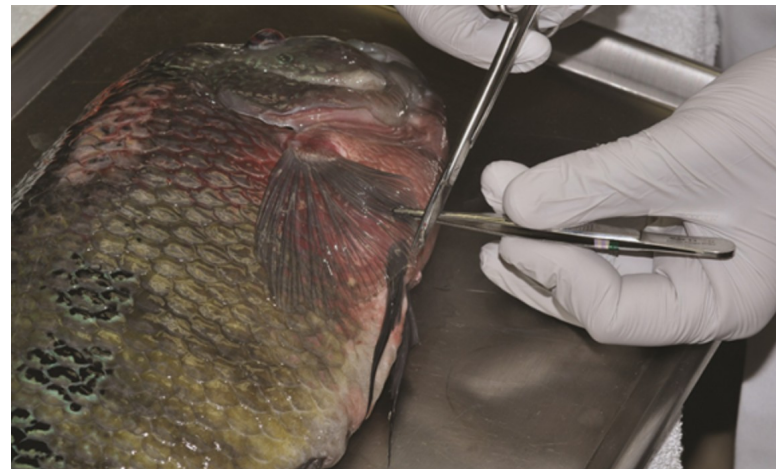
### CONCLUSION

Veterinary technicians may not see pet fish frequently, but knowing these basics will make them feel confident when they do.



**Figure 2. Gill biopsy (gill clip)**

Lift the operculum and use fine-tipped scissors to cut a small wedge of gill tissue. Some bleeding will occur during gill biopsy collection. Place the gill tissue on a microscope slide, add a drop of tank water, and cover with a coverslip. Perform a microscopic examination of the wet-mount preparation.



**Figure 3. Fin biopsy (fin clip)**

Spread the fin and use fine-tipped scissors to cut a small wedge of fin tissue. Place the tissue on a microscope slide, add a drop of tank water, and cover with a coverslip. Perform a microscopic examination of the wet-mount preparation.

### References

AVMA (2012). [U.S. Pet Ownership & Demographics Sourcebook](#). American Veterinary Medical Association, Schaumburg, IL, USA.

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**Case Report: Exfoliating Scorpionfish**  
by Richmond Loh and Parinda Awpituk

While at the WSAVA conference in May 2015, a curious observation was made regarding the Weedy Scorpionfish (*Rhinopias frondosa*) seen in an aquarium. There were multiple wafer-thin, transparent sections of material wafting through the water, sometimes attached to the scorpionfish (Figure 1), and often trapped on aquarium decor (Figure 2).

The aquarist explained that this is normal sloughed skin from the scorpionfish. In this tank there were 6 scorpion fish. Each fish will slough its skin every 3-4 week, but not all at the same time. These fish have been in the aquarium more than one year, with a 20-30% water change every week. Water quality in the tank had dissolved oxygen at 96-99% saturation, temperature 24-26° C, pH 7.9-8.1, salinity 3.0-3.2 ‰ (30-32 g/L), nitrate <30 mg/L. The fish are fed with ghost shrimp twice per day.

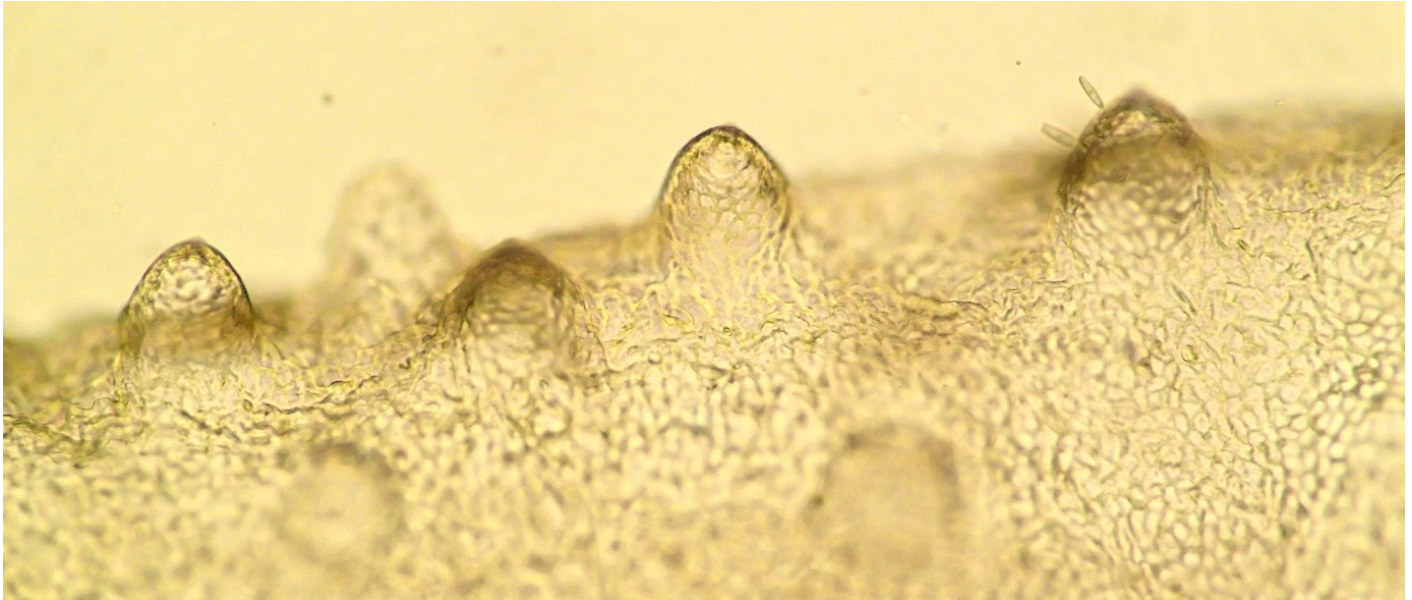
Figure 1: Weedy Scorpionfish



Figure 2

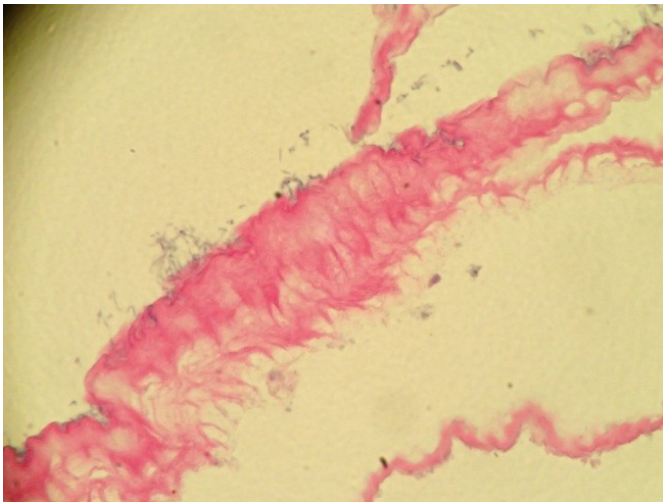
For confirmation, some of this material was collected from the water and placed into neutral buffered formalin. The material was initially examined on wet mount (Figure 3, next page) and they occur as thin sheets with fine-textured ridges, and evenly spaced studs.





*Figure 3: Wet mount of sloughed epithelium.*

The material was routinely processed for histology. The material was eosinophilic and had a tessellated structure in some planes, consistent with sloughed epithelium. Superficially, there were focal areas colonised by rod bacteria (Figure 4) and the occasional ciliated protozoa (Figure 5).

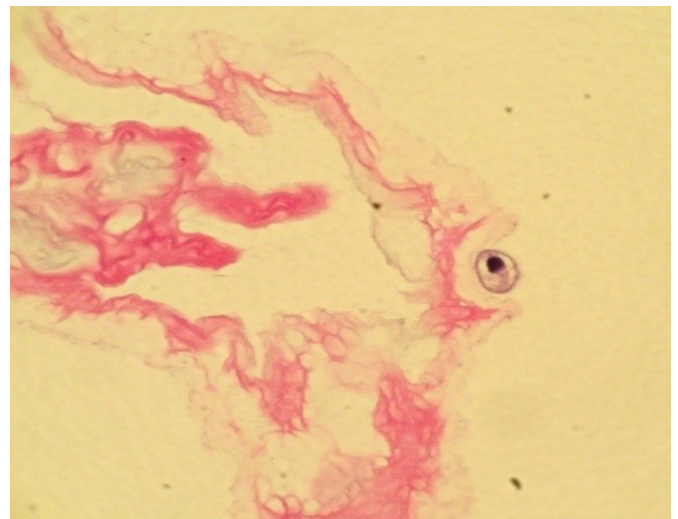


*Figure 4*

The findings may support skin shedding as a means of parasite removal, perhaps stimulated by skin irritation. Though, we suspect the colonisation by bacteria and protozoa occurred post-slough since there was no evidence of host reaction. It would be interesting to perform skin scrapes on the live fish and look for microorganisms. If found, treating the fish to eliminate the parasites may reduce incidence of shedding if it is stimulated by parasite irritation.

Weedy scorpionfish are sedentary and ambush their prey. Another hypothesis for the peeling skin is that the wafts of material may act as a visual attractant for prey. Once a prey species comes close to investigate, they become a meal for the scorpionfish.

The sloughing of skin is patchy, and has also been observed by keepers of lionfish (also within the Scorpaenidae family). Whatever the reason for skin sloughing, it is clear that the dead skin needs to be removed from the aquarium on a daily basis, to reduce substrate for opportunistic pathogens.



*Figure 5*

**So now to finish off with a joke:**

Question: Why did the weedy scorpionfish see the vet?  
 Answer: Because he wasn't peeling well.

## GRAND ROUNDS CASES

**Questions & Answers from the WAVMA Listserv**  
([WAVMA\\_Members-L@wavma.org](mailto:WAVMA_Members-L@wavma.org))**Snail Removal in Aquariums**

Dear WAVMA Members,

An associate of mine has a 30 gallon fresh water tank that they recently placed new plants into. The tank is now overpopulated with snails. I understand adding a loach is an option. Does anyone else have more options?

**Sherri Kasper; DVM, MS**

The Animal Hospital and Pet Resort at Southwood

My favorite option for a freshwater tank that is overpopulated with snails is to add a few assassin snails (*Clea helena*). They are carnivorous and readily prey on other snail species. They are slow-growing, reach a maximum size of 3 inches, and aren't prolific themselves, so they don't generally become pests. They're also relatively attractive, as far as snails go. I would add about 5-7 assassin snails for a 30-gallon tank.

Best of luck,

**Natalie Steckler, DVM, MS**

PhD Student, Aquatic Animal Health

Infectious Diseases and Pathology

University of Florida College of Veterinary Medicine

Is it necessary to worry about these assassin snails escaping into the environment with waste water, or are they already indigenous in your area?

I have just been doing a load of histopathology work on Polynesian tree snails (*Partula* species) prior to a reintroduction. These snails, which are a molluscan version of Darwin's finches with highly restricted distributions on Polynesian islands, have gone extinct in many of their native islands due to the introduction of the carnivorous snail *Euglandina rosea* in an ill-fated biological control project. 51 species of *Partula* are now listed as extinct and a further 12 are listed as extinct in the wild (IUCN 2013).

A salutary lesson.

Best wishes,

**Mark Stidworthy MA VetMB PhD FRCPATH MRCVS**  
RCVS Recognised Specialist in Veterinary Pathology (Zoo and Wildlife)

International Zoo Veterinary Group

That's a good question and certainly a consideration. Assassin snails are native only to southeast Asia. In a single 30-gallon home aquarium, I think it

would be manageable to treat discarded tank water after water changes to kill any caught snails. I would not want to use assassin snails in large numbers in a commercial operation, particularly in flow-through systems, for the reason you mentioned.

Best wishes,

**Natalie Steckler, DVM, MS**

Good point, Mark. In many states in the US, the possession or import of these snails is illegal, as they are considered invasive.

**Dr. Chris Wilson**

Utah Division of Wildlife Resources

Fisheries Experiment Station

Logan, UT 84321

Clown loaches are helpful to remove small snails, but they can then become quite aggressive when they get larger. If you're into chemicals, copper sulphate can be used, provided there aren't sensitive fishes.

Anecdotally, addition of salt at 2g/L may inhibit breeding. Another option is to place blanched lettuce, weighted with a peg. As snails congregate, the snail-laden leaves are removed each night. Works Better than the snail traps sold at fish shops. Yours sincerely,

**Dr Richmond Loh**

DipProjMgt, BSc, BVMS, MPhil (Pathology),

MANZCVS (Aquatics & Pathobiology), CertAqV,

NATA Signatory.

THE FISH VET,

Perth, Western Australia, AUSTRALIA.

The lettuce trick works very well. Use romaine or a thicker bodied lettuce. That's how I used to catch snails from my planted tanks to feed to my puffers.

**Jack Kottwitz DVM**



Assassin Snail  
(*Clea helena*)

Photo from Wikipedia:

[https://en.wikipedia.org/wiki/Clea\\_helena](https://en.wikipedia.org/wiki/Clea_helena)



Unwanted snails in an aquarium are unsightly, and can clog the filter tubing and cause issues with the filtration system. It is difficult to remove them safely and easily without affecting the fish. Most chemical treatments are potentially toxic to the fish. Manual method is the first step in getting the snail infestation under control.

There are three types of pesky snails commonly seen:



*Malayan Live-bearing Snail* — has a very hard, long cone-shaped shell and lives in the gravel bed



*Rams Horn Snail (Planorbium corneum)* — circular shaped shell



*Pond Snail (Lymnaea sp)* — small, spiral pointed shell.

Here are some suggestions on helping to reduce the snails in your aquarium:

Use a plastic container with a lid that has a 1" hole cut in the center of the lid.

- Place it on its side buried in the gravel so that the container is full of water and the hole is just above the gravel surface.
- Place an algae wafer (veggie round) or a fish vacation feeder inside the cup. Lettuce will also work.
- The snails will crawl into the cup to feed at night.
- In the morning, remove the cup and dispose of the snails that were collected.

Rinse out the cup.

Repeat nightly as needed.

Goldfish, some gouramis, clown loaches and cichlids will often eat young snails, helping to control the population.

As a last resort, treat with Cupramine. The Seachem Cupramine buffered active copper does effectively kill snails, and is safe for use with most fish species. It comes in a 500 ml bottle that will treat 2500 gallons of water for 2 doses.

Note: If the Alkalinity is below 100 mg/L increase the alkalinity before using this product. This process might take a couple of weeks to reach an alkalinity level of 100mg/L or higher. Do not use any other medication during the day of each treatment.

If there are Malayan snails (Red-rimmed melania) in your Aquarium, you may need to replace the gravel. The Malayan snail, *Melanoides tuberculata*, is a parthenogenetic freshwater snail. Malayan snails have a door plate (operculum). They retract back into their hard shell and close their door plate, making them resistant to the Cupramine medication. These Malaysian snails burrow in the gravel. Look closely at the gravel, if it appears to be moving you have a heavy infestation. Gravel replacement would be a recommendation.

Assassin snails will reproduce in freshwater, and I have had a tank that was overrun with pond snails get an abundance of assassin snails after they ate all the pond snails! However, probably due to lack of food (no more pond snails?) their numbers dwindled down to only a few left after a while. Those few are still alive years later in my tank.



*Nerite snails (Neritina natalensis)* are good additions to freshwater aquariums as they look nice, but reproduce in salt water so they won't overrun a freshwater tank.



*Mystery snails (Pomacea bridgesii)* lay their large, pink egg masses above the water line, so they can be scraped off when seen if you don't want more of these snails in the aquarium.

Snail photos from Wikipedia

**Nick Saint-Erne, DVM CertAqV**  
Certified Aquatic Veterinarian  
PetSmart, Inc.

## LITERATURE REVIEW

## AQUATIC VETERINARY ABSTRACTS

Topic: Anaesthesia

Compiled by Dr David Scarfe

**Anaesthesia of Atlantic halibut (*Hippoglossus hippoglossus*): Effect of pre-anaesthetic sedation, and importance of body weight and water temperature**Inger Hilde Zahl IH, A Kiessling, OB Samuelsen & [MK Hansen](#) (2011). *Aquacult. Res.* 42 (9): 1235–1245.**Abstract**

The efficacy of the anaesthetic agents benzocaine, metacaine (MS-222), metomidate, 2-phenoxyethanol, quinaldine and isoeugenol was studied in Atlantic halibut (*Hippoglossus hippoglossus*). Fish with an average body weight of 33 g were anaesthetized at 8°C and fish with an average body weight of 1243 g were anaesthetized at 8 and 15°C. Agents were tested individually and as combination anaesthesia comprising pre-anaesthetic sedation, followed by anaesthesia.

Induction and recovery times varied in relation to the body weight and water temperature. Large fish had longer induction times and shorter recovery times, and displayed reduced responsiveness to handling compared with small fish. A higher temperature resulted in shorter induction times, longer recovery times and increased responsiveness to handling. Lower dosages were used for all agents in combination anaesthesia. In small fish, this had no effect on the induction times but resulted in shorter recovery times and reduced responsiveness to handling. In large fish, combination anaesthesia resulted in shorter induction times whereas no uniform trend in recovery times and no differences in responsiveness to handling were observed.

Neither individual agents nor combinations blocked all reflex reactions to external stimulation in all fish of any treatment group. MS-222 and benzocaine, used separately or in combination anaesthesia, were the most effective agents in reducing reflex reactions.



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**Comparative analgesic efficacy of morphine sulfate and butorphanol tartrate in koi (*Cyprinus carpio*) undergoing unilateral gonadectomy**Baker TR, BB Baker, SM Johnson & KK Sladky (2013). *J. Amer. Vet. Med. Assoc.*, 243(6): 882-890.**Abstract**

**Objective**—To identify pain-related behaviors and assess the effects of butorphanol tartrate and morphine sulfate in koi (*Cyprinus carpio*) undergoing unilateral gonadectomy.

**Design**—Prospective study.

**Animals**—90 adult male and female koi.

**Procedures**—Each fish received saline (0.9% NaCl) solution (which is physiologically compatible with fish) IM, butorphanol (10 mg/kg [4.5 mg/lb], IM), or morphine (5 mg/kg [2.3 mg/lb], IM) as an injection only (6 fish/treatment); an injection with anesthesia and surgery (12 fish/treatment); or an injection with anesthesia but without surgery (12 fish/treatment). Physiologic and behavioral data were recorded 12 hours before and at intervals after treatment.

**Results**—Compared with baseline values, the saline solution–surgery group had significantly decreased respiratory rates (at 12 to 24 hours), food consumption assessed as a percentage of floating pellets consumed (at 0 to 36 hours), and activity score (at 0 to 48 hours). Respiratory rate decreased in all butorphanol-treated fish; significant decreases were detected at fewer time points following morphine administration. In the butorphanol-surgery group, the value for food consumption initially decreased but returned to baseline values within 3 hours after treatment; food consumption did not change in the morphine-surgery group. Surgery resulted in decreased activity, regardless of treatment, with the most pronounced effect in the saline solution–surgery group. Changes in location in water column, interactive behavior, and hiding behavior were not significantly different among groups. Butorphanol and morphine administration was associated with temporary buoyancy problems and temporary bouts of excessive activity, respectively.

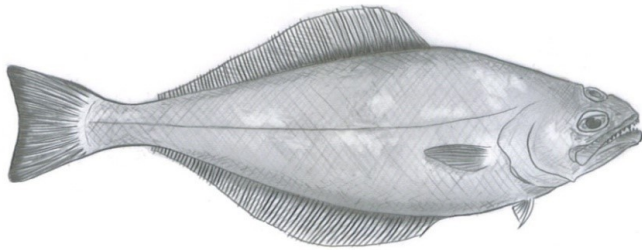
**Conclusions and Clinical Relevance**—Butorphanol and morphine appeared to have an analgesic effect in koi, but morphine administration caused fewer deleterious adverse effects. Food consumption appeared to be a reliable indicator of pain in koi.





## Know Your Fishes

### Arrowtooth Flounder, *Reinhardtius stomias*



**Arrowtooth flounder** (family Pleuronectidae) are one of the most abundant fishes in the Gulf of Alaska and are a significant food source for stellar sea lions. *FishBase* identifies the species by the common name, "arrow-tooth flounder" and Latin name of *Atheresthes stomias*, the latter considered a synonym in *ITIS*.

Arrowtooth flounder are distributed along the outer continental shelf of the Pacific coast from Northern California to the Bering Sea. In the US, 39,173 tonnes of arrowtooth flounder, valued at \$6.8 million, was landed in 2008. Note that the average catch for the 5-year period 2004-2008 was 24,000 tonnes, so 2008 catches were exceptionally high. In fact, arrowtooth accounted for almost 80% of US flounder landings in 2008 (i.e., excluding sole, plaice and larger flatfishes). Most of the 2008 catch (93%) was in Alaska. The rest was mostly caught in Oregon, Washington and California. The gear used was bottom trawls, flatfish nets and other unspecified gear. In Canada, 11 tonnes, valued at \$12,000 was landed in 2008, all in BC (see table).

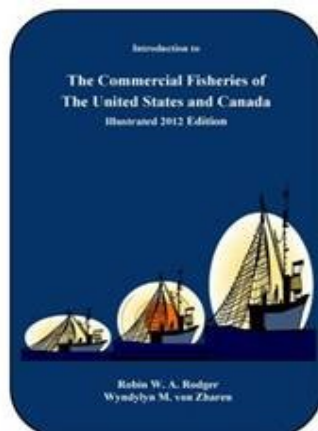
**Aquaculture Status:** Research stage (NOAA).

**Endangered Status:** Arrowtooth are not overfished.

Excerpted from **An Introduction to the Commercial Fisheries of the United States and Canada**, by R. Rodger and W. von Zharen. 2012. Used with permission.

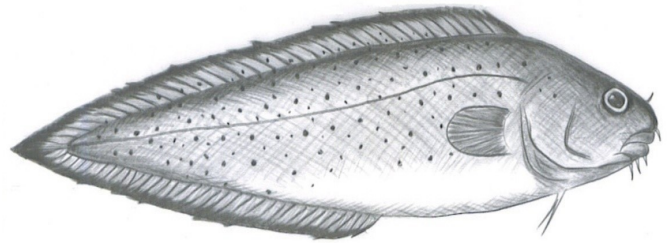
See our book *The Commercial Fisheries of the United States and Canada* for more information on life style and habits of this fish.

For additional information please see website: [http://www.CMPpublications.com/na\\_fisheries](http://www.CMPpublications.com/na_fisheries)



## Know Your Fishes

### Bearded Brotula, *Brotula barbata*



**Brotula** look similar to cuskeels and are in the same family, but different sub-family. Worldwide, there are 5 species in the brotula genus (family – Ophidiidae, subfamily – Brotulinae), but none are a major commercial fishery. However, minor commercial fisheries are reported for two of them. The **bearded brotula** is the main species landed in North America. It is reef associated fish often regarded as a bottom feeder, but also at home near the ocean's surface.

Brotula appear worldwide in both shallow and deep seas (15 meters to 120 meters). Adults are benthopelagic and can move through the open waters as well as along the bottom. They are most often found along the continental shelf over sandy or muddy bottoms. Juveniles are more common in reefs. In North America, bearded brotula range from northern Florida to the Gulf of Mexico, the Caribbean, and southward to northern South America.

In 2008, 5 tonnes of bearded brotula valued at \$12,000, were landed in the US. All of the catch in 2008 was caught on the Florida West Coast. The gear used was mostly long lines (reef fishing). It is not a commercial catch in Canada.

#### Commercial Uses

Bearded Brotula are often inadvertently caught by snapper fishermen and, unfortunately, discarded. Similarly, they are an unfamiliar species to many consumers; yet to commercial fish houses they are often one of the most highly prized catches, reported to command 6 to 10 times the original purchase price once reaching market. In living fish, the flesh has a very soft texture, but it becomes firm when cooked. It is an excellent eating fish with flaky white flesh and a mild taste. It is reportedly sometimes referred to as the "poor man's grouper."

#### Life Cycle

Very little is known of the biology of this fish. They are reported to be oviparous (open water/substratum egg scatterers). The eggs float in mats until fertilization and larvae development occurs.

**Pediatric researchers: Routine pet care of Betta fish can help children monitor diabetes**

By [Nurse.com](http://Nurse.com) on August 24, 2015

Pediatric diabetes researchers at [UT Southwestern Medical Center in Dallas](#) found incorporating routine pet care of a Betta fish into a child's diabetes self-care plan can significantly improve monitoring of the disease, resulting in lower blood glucose levels.

The study, which appeared in the April issue of the *The Diabetes Educator*, followed the diabetes management tasks of 28 adolescents, with Type 1 diabetes mellitus, ages 10 to 17, who were assigned to take care of a pet fish (*Betta splendens*).

"We learned that instructing families to associate regular pet fish care with the child's standard diabetes care significantly improved their hemoglobin A1C levels," the study's senior author Olga Gupta, MD, assistant professor of pediatrics and internal medicine at UT Southwestern, said in a news release.

Study participants selected for the intervention group were provided a fish (*Betta splendens*), a fish bowl, instructions for caring for the fish and recommendations to set up the fish bowl in their bedroom. They were instructed to feed their fish in the morning and in the evening, checking their own blood glucose level each time, according to the release. Then, they were asked to change one-fourth of the water in the fish bowl once a week and review their own blood glucose logs with a caregiver.

Findings from the study also suggest the importance of parental involvement in helping the adolescents establish a regular routine to monitor their blood glucose levels. Next steps include studying a group of adolescents for a longer period of time, as well as identifying the specific mechanisms leading to the glycemic improvement, such as type of pet, mood, conscientiousness, routine or level of parental involvement, according to the release.

Gupta's laboratory is part of the UT Southwestern Touchstone Center for Diabetes Research, a multidisciplinary research center focused on studying both basic and clinical aspects of Type 1 and Type 2 diabetes.

Read the full study.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4472382/>

Excerpted from:

<https://news.nurse.com/2015/08/24/pediatric-researchers-routine-pet-care-can-help-children-monitor-diabetes/>

**Researchers study dolphin health to gauge ecosystem health**

[PhysOrg.com](http://PhysOrg.com) (8/19)

Veterinarians are analyzing Atlantic bottlenose dolphin blood, blubber and skin, in addition to metabolic and physiological data, to determine the health of Florida's Indian River Lagoon and, by extension, the creatures and people who live in or near the lagoon.

Florida Institute of Technology assistant professor Spencer Fire worked with veterinarians to collect the data, and he intends to use the information to determine when algal blooms reach toxic levels. The initiative is part of the Health and Environmental Risk Assessment program, which looks at the intersection of human, animal and environmental health.

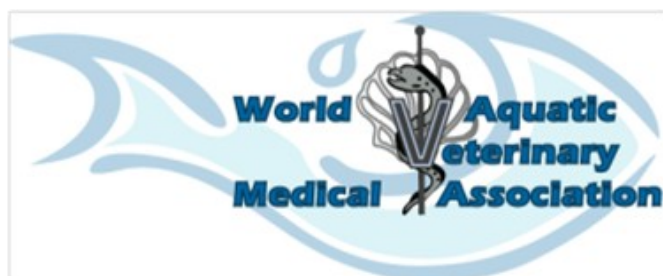
Dolphins are known to marine biologists as sentinel animals, if they are ailing, we humans may be next. The Indian River Lagoon, an ecologically diverse estuary that covers 40 percent of Florida's east coast, is ailing. The area is home to a large human population who live near its shores and plays a significant part in the area's economy. The lagoon's nitrogen-saturated waters—due to fertilizer run-off and other pollution—is likely promoting the algae blooms that are toxic to marine mammals and birds.

Under a federal permit, HERA program researchers have safely examined and released more than 350 [bottlenose dolphins](#), primarily from the Indian River Lagoon, since 2003. This year's assessments were in the northern IRL, where there've been three unusual mortality events, or unexpected strandings in which significant numbers of dolphins died.

"Dolphins are like the proverbial canaries in a coal mine," said Gregory Bossart, V.M.D., Ph.D., chief veterinary officer and senior vice president at Georgia Aquarium. "Understanding their health and determining what impacts them is important because they can serve as indicators of ocean health, giving insight into larger environmental issues that may also have implications for [human health](#)."

Read more at:

<http://phys.org/news/2015-08-dolphin-health-human-well-being.html>





### Dolphin genetic study provides revelations

A study published in the *Journal of Heredity* (Vol. 104, pp 765-778) focused on groups of dolphins that live in specific areas along the eastern seaboard of the United States, comparing them to other bottlenose dolphins that live offshore, in the northwest Atlantic Ocean, Gulf of Mexico and the Caribbean.

Specifically, the study looked at bottlenose dolphins that lived within the Indian River Lagoon (IRL) on Florida's east coast. Those animals were studied from a habitat and behavioral perspective as well as genetically, with some surprising results.

This first-of-its-kind study revealed that within the IRL, there are two different, distinct populations of bottlenose dolphins living in the waters. After the data were analyzed, researchers were able to determine that these two, genetically different groups were divided along a north-south geographic area of the IRL. Along with identifying genetic differences in the animals within the IRL, when compared to bottlenose dolphins that live in other areas, including the open oceanic waters, additional differences were found.

Read more at: <http://phys.org/news/2013-11-dolphin-genetic-revelations.html>

### Concerns mount over whale deaths in Alaska

By Ryan Schuessler  
KODIAK, Alaska –

Researchers are scrambling to determine what's behind the death of 30 whales in the Gulf of Alaska as unusually warm ocean temperatures continue to wreak havoc on the region.

Since May 2015, 14 fin whales, 11 humpback whales, one gray whale and four unidentified specimens have been found dead along shorelines in the Gulf of Alaska, nearly half of them in the Kodiak Archipelago. [Other dead whales have been reported off the coast of British Columbia](#), including four humpbacks and one sperm whale.

This year's total is roughly three times the annual average for the region, leading the National Oceanic and Atmospheric Administration to declare the deaths an "unusual mortality event." The investigation into the deaths will take months, or even years, [according to a statement released by the agency](#).

Predation, starvation, or disease could be behind the deaths, but researchers say there have been few signs of physical trauma to the whales. The more likely culprit is unusual water conditions.

For full story, see:

<http://www.washingtonpost.com/news/energy-environment/wp/2015/08/24/concerns-mount-over-whale-deaths-in-gulf-of-alaska/>

### Dissolving Sea Stars Reveal a Damaged Ocean

[Lynn Wilson](#),  
[Kaplan University](#) and [SeaTrust Institute](#)  
Excerpted from *Live Science's Expert Voices: Op-Ed & Insights*.

On a remote Pacific Northwest beach, the intertidal world reveals itself to the air breathers. Mussels and gooseneck barnacles fasten to exposed rocks that shelter the apex predators: ochre sea stars (*Pisaster ochraceus*). But something is wrong. White spots spread across the stars' disintegrating arms, and instead of regrowing the damaged appendages as sea stars often do, the entire animal rapidly dissolves into a mass of goo.

First noticed in Washington state in 2013, "sea star wasting disease" reached alarming proportions by July 2014, its cause unknown — even though the disease was first identified in 1979. Beginning in June 2014, local researchers from SeaTrust Institute investigated relationships between marine diseases and human health. They encountered significant numbers of the disintegrating echinoderms along coastlines and throughout the Salish Sea straddling the border of British Columbia and Washington state. The disease was of particular interest to the team because *Pisaster ochraceus* is considered a keystone species, with disproportionately large influence on maintaining local species diversity by keeping certain grazers in check and feeding on the mussel *Mytilus californianus*.

Cornell University epidemiologist Drew Harvell suspected a bacterium or a virus was causing the condition, and by November 2014, Cornell microbiologist Ian Hewson identified the source as the parvovirus Sea Star Associated Densovirus (SSaDV). This provided sufficient scientific evidence for the local researchers to weave the story of the sea stars and ocean health into the broader conversation about human health, climate change and sustainability. They did this at the December global climate change negotiations at the United Nations Framework Convention on Climate Change

If the fate of these sea stars is related to declining ocean health, that portends other disease outbreaks with ramifications for human health. Identifying and monitoring the multifaceted and interconnected aspects of potential events deserves strong attention at local and global levels.

Human health depends upon ocean health, and it may be that at least part of this complex story is written in the stars.

For full text, see: [Live Science](#).

<http://www.livescience.com/51113-dissolving-sea-stars-reveal-damaged-ocean.html>

### European newts and salamanders at risk from deadly skin-eating fungus

The skin-eating fungus, *Batrachochytrium salamandrivorans*, is believed to have originated in south-east Asia, where indigenous newts and salamanders are immune to its effects. But it is lethal to European and American species, which have evolved no resistance to the disease.

A craze for exotic pet newts has spread a deadly infection from Asia to Europe that could threaten to wipe out UK native amphibian species unless action is taken, scientists have warned. One of the creatures most at risk from the fungal disease is the great crested newt, already an endangered and protected species in the UK.

Last year, researchers learned the fungus was responsible for a mystery outbreak in the Netherlands that killed off 96% of the country's fire salamanders. Experts now fear an expanding epidemic spread by the pet trade and the authors of a new study assessing the threat suggest that animal movements may have to face controls to prevent the infection spreading.

Screening of more than 5,000 amphibians from four different continents suggested that the newt disease originated in Asian salamanders millions of years ago, but had only very recently spread to Europe. Tests for the fungus were carried out on 1,765 amphibian skin samples obtained from pet shops in Europe, London's Heathrow airport, and a Hong Kong exporter. In addition, 570 samples from other captive amphibians were tested. Test results are published in: [Science](#).

See full story:

<http://www.theguardian.com/environment/2014/oct/30/salamander-newt-fungus-infection-deadly-skin-eating>

### North American Team Formed to Address Emerging Diseases in Amphibians and Reptiles

Exotic viruses, fungi, bacteria and parasites are finding their way into herpetofaunal populations in some of the most imperiled animals on the globe. In some cases, the pathogens are already present and changes in environmental conditions are resulting in their emergence.

The recent outbreaks of pathogens, such as *Batrachochytrium dendrobatidis*, *Ranavirus* and *Ophidiomyces ophiodiicola*, are especially troubling, because they can lead to death of entire populations.

To combat the problem, the Partners in Amphibian and Reptile Conservation (PARC) formed a new [disease task team](#) made up of biologists, veterinarians and wildlife managers from the U.S., Canada and Mexico.

Details about the PARC Disease Task Team can be found at the [PARC website](#).

### Scientists call for ban on live salamander imports to US to stop skin-eating disease

By Zehrah Hasan

The import of hundreds of thousands of live salamanders to the US each year should be banned to save wild salamanders from a deadly disease, scientists say. They say the move is needed to stop the skin-eating fungal disease, *Batrachochytrium salamandrivorans* (Bsal), from spreading via the pet trade to wild populations, where there is currently no effective way to control it.

The pathogen was identified in the Netherlands where it has been blamed for the extinction of yellow and black fire salamanders, and causing rapid salamander declines across Europe by eroding their skin and often proving fatal. It is believed to have originated in Asia.

Dr John Wilkinson, science programme manager of the [Amphibian and Reptile Conservation Trust](#), welcomed the intervention but stopped short of calling for an outright ban on live imports, favouring stronger import controls instead.

But [previous efforts](#) to ban the import of live salamanders have failed, and there are concerns that authorities may not act quick enough to impose tighter controls or a ban on imports for the lucrative pet trade.

Peter Jenkins, president of the Center for Invasive Species Prevention said, "The potential for bureaucratic delays is very real and worrisome, as Bsal could arrive within the USA any day."

James Lewis, programme officer for the International Union for Conservation of Nature's amphibians specialist group, called for further research into [nascent but promising treatments for the disease](#), coupled with better trade controls.

For complete article, see:

<http://www.theguardian.com/environment/2015/jul/31/scientists-call-ban-live-salamander-imports-us-stop-skin-eating-disease>

### Chicago area zoo staff seek to understand rapid stingray die-off

All of the Brookfield Zoo's 54 stingrays in the Stingray Bay habitat died last week when the oxygen in their water dropped, although the precise cause of death has yet to be pinpointed. Veterinary teams worked unsuccessfully to address the oxygen deficiency and save the animals at the suburban Chicago facility. Zoo officials said Monday they may reopen the popular hands-on exhibit next year.

See: [Chicago Tribune \(tiered subscription model\)](#),

[CBS News/The Associated Press](#) (7/13).





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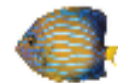
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### Understanding the Veterinary Feed Directive Rules

*Now Available On Demand!*

The US Food & Drug Administration published on June 3 a draft "[Guidance for Industry 120: Veterinary Feed Directive Regulation Questions and Answers](#)." The document provides general information about the new veterinary feed directive (VFD) rule and answers specific questions about the rule. FDA noted that the draft guidance is for comment purposes only and makes revisions to the final guidance #120 that was published in March 2009.

Any USA veterinarian that might utilize medicated feed, or work with his/her clients to treat a disease using medicated feed, should watch the **Understanding the Veterinary Feed Directive Rules** recorded webinar. To view the presentation (slides and audio), an archived version of this Webinar can be accessed at <http://tinyurl.com/ou4cmzj>. This archive will be available at this URL for one year.

You can also find this webinar and other VFD information archived on **VFD Central** website – [click here](#) to access it. **VFD Central** is a go-to resource for Veterinary Feed Directive news, insights and updates, to help producers, veterinarians and feed manufacturers find the information most pertinent to them, in a one-stop online resource center.

To download a copy of this webinar's presentation, [click here](#).

### Mexico Deploys Drones to Protect Sea Turtle Nesting Grounds

Mexican officials say they have begun flying two drones over sea turtle nesting grounds on the Pacific coast to better monitor and protect the sensitive habitats. The drones are watching over La Escobilla and Morro Ayuta beaches in Oaxaca state. Officials aim for "full coverage" of the area to help them fight poaching.

August marks the start of peak nesting season, and officials are working to safeguard the endangered reptiles. They are protected under Mexican law.

La Escobilla experiences more sea turtle nesting than any other location on Earth, with some 1.1 million nests there last year. About 36 million sea turtles were born in all of [Mexico](#) in 2014.

### Turtle Status Review for CITES 2016

Please see the link below on U.S. species proposals for the 17th meeting of the CITES Conference of the Parties (South Africa; 2016). **Comments are due to us by 26 October 2015.**

There are a handful of turtle species on which the U.S. is undecided, so please take a look and share any pertinent information on the conservation or trade status of:

Chaco side-necked turtle (*Acanthochelys pallidipectoris*)

African and Middle Eastern softshell turtles in the family Trionychidae;

Aubry's flapshell turtle (*Cycloderma aubryi*)

Zambezi flapshell turtle (*C. frenatum*)

Nubian flapshell turtle (*Cyclanorbis elegans*)

Senegal flapshell turtle (*C. senegalensis*)

Euphrates softshell turtle (*Rafetus euphraticus*)

African or Nile softshell turtle (*Trionyx triunguis*)

Also, if you have significant new information on the conservation or trade status of *Graptemys*, *Macrochelys* or *Pelodiscus sinensis* please share that as well.

Thanks much,

**Bruce J. Weissgold**,  
Senior CITES Specialist  
U.S. Fish and Wildlife Service  
International Affairs,  
Division of Management Authority  
5275 Leesburg Pike  
Falls Church, VA 22041-3803  
Tel: (703) 358-1987 or (800) 358-2104 ext. 1987  
Mobile: (703) 346-8886  
Fax: (703) 358-2298

[bruce\\_weissgold@fws.gov](mailto:bruce_weissgold@fws.gov)

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### Western Pond Turtle Moves Toward Endangered Species Act Protection

Press Release - Center for Biological Diversity  
 Contact: Collette Adkins, (651) 955-3821  
 For Immediate Release, April 9, 2015

SACRAMENTO, California — In response to a 2012 [petition](#) by the Center for Biological Diversity and several renowned scientists and herpetologists, the U.S. Fish and Wildlife Service [announced](#) that Endangered Species Act protection may be warranted for the western pond turtle. The agency will now conduct a one-year status review on the turtle, which faces declines of up to 99 percent in some areas, including Oregon's Willamette Valley.

"The Endangered Species Act is the most powerful tool available to save western pond turtles, so I'm really happy that these amazing reptiles are a step closer to the protection they so desperately need," said Collette Adkins, a Center biologist and lawyer who works to protect reptiles and amphibians. "Western pond turtles are integral to the wild places where they live. Losing them would impoverish those places and our own connection with the natural world."

Western pond turtles are declining in abundance range wide, especially in the northernmost portion and the southern third of the range. The animals are listed as state endangered in Washington, sensitive/critical in Oregon, and a species of special concern in California. Although habitat destruction is one of the biggest threats to the turtle, none of these state laws provides effective habitat protection.

"Threats like habitat destruction from urbanization and agriculture are driving western pond turtles toward extinction," said Adkins. "Much-needed federal protection of these turtles would help ensure that rivers and wetlands across the West Coast are protected, both for the turtles and for people."

Today's finding responds to a 2012 petition that sought protection for the turtle and 52 other amphibians and reptiles found across the country — the largest ever petition focused on protection of amphibians and reptiles. The Fish and Wildlife Service must next issue a "12-month finding" on the turtle that will propose protection under the Endangered Species Act, reject protection under the Act or add the turtle to the candidate waiting list for protection.

Western pond turtles are found from western Washington south to northwestern Baja California. The name "pond" turtle is something of a misnomer because this species more frequently lives in rivers and spends a lot of time in terrestrial habitats. Western pond turtles are highly opportunistic eaters and will consume almost anything they can catch and overpower.

In June of 2014, the Center for Biological Diversity [notified](#) the U.S. Fish and Wildlife Service of new research revealing that the western pond turtle is actually at least two species, each of which is therefore more endangered than previously thought. According to that study, all populations north of the San Francisco Bay area and populations from the Central Valley north (including the apparently introduced Nevada population) are now known as *Emys marmorata*. Turtles in the southern portions of the range — the central coast range south of the San Francisco Bay and the Mojave River — are described as *Emys pallida*. Turtles from Baja California are tentatively also considered *Emys pallida*, but these animals may represent another distinct species pending results from additional analysis.

An upper respiratory disease epidemic in Washington in 1990 left a total population of fewer than 100 western pond turtles in the state. They are essentially extirpated in the lower Puget Sound, and only two populations remain in the Columbia River Gorge. In the Willamette Valley in Oregon, western pond turtles appear to have declined to a level that represents roughly 1 percent of historic levels.

In California's Central Valley, where most of the natural habitat has been eliminated, surveys detected turtles at only 15 of 55 sites, with sizable populations only at five sites. Pond turtles from Southern California are in precipitous decline, with few stable, reproducing populations known between Los Angeles and the Mexican border.



*Western Pond Turtle; Photo from Wikipedia.*



**MEETINGS OF INTEREST TO  
AQUATIC VETERINARIANS**

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

**CE on the Sea 2016**

**March 17-21, 2016**

**The Bright (and Sunny) Idea**

VetTechLife, with some help from VetMedTeam, is hosting a CE event that will "float your boat. Vet-TechLife and VetMedTeam, giants in veterinary continuing education, have joined together to provide a continuing education event that blows others out of the water. Mark March 17-21, 2016 on your calendar for this awesome event!

Join others in the veterinary profession for a CE event that caters to the entire veterinary team. And catering truly mean "catering". Welcome aboard Royal Caribbean's *Independence of the Seas* for tailored continuing education, small class sizes and one-on-one exposure to speakers that want you to get the most out of this event.

This event offers gourmet food, balcony state-rooms and many little extras that will make this a truly unforgettable experience.

For info on dates, room and registration rates, as well as ship amenities and CE info, visit Facebook: [VetTechLife Veterinary CE on the Sea 2016](#).



**World Veterinary Congress**

**September 13-17, 2015**

Istanbul, Turkey

Aquatic Veterinary Medicine Sessions:

See the full WVC scientific program online:

[http://www.wvcistanbul2015.com/?page=scientific\\_program&lang=en](http://www.wvcistanbul2015.com/?page=scientific_program&lang=en).

A. David Scarfe	Implementing Effective Veterinary Biosecurity Programs in Aquaculture that Meet International Standards & National Regulations
Christopher I. Walster	Making it Easy to Quantify and Display Disease Risks for Biosecurity Plan Clients in Data Poor Environments
Seyed Mohammad Ebrahim Jalil Zorriehzahra	Viral Nervous Necrosis (VNN) as a new Emerging Disease in the Aquatic ecosystem of the Caspian Sea
Seyed Mohammad Ebrahim Jalil Zorriehzahra	Isolation and Identification of <i>Yersinia ruckeri</i> in Rainbow trout ( <i>Oncorhynchus mykiss</i> ) and Study on relation of environmental factors and health management with occurrence of Enteric Redmouth Disease in West Azerbaijan province, Iran
A. David Scarfe	Aquatic Veterinary Educational Initiatives to Ensure a Well-Trained Workforce to Serve Client & Other Stakeholder Needs
Donald W Stremme	AQUAVET® has been teaching aquatic animal medicine since 1977
Nicholas Saint-Erne	Advanced Fish Diagnostic Techniques
Julius M Tepper	Koi Ulcer Disease – Lesion Assessment and Treatment Strategies
Nicholas Saint-Erne	Anesthesiology In Pet Fish
Julius M Tepper	The Use of a Waterfall Bypass to Mitigate Water Temperature Fluctuation in Outdoor Koi Ponds
Sadar Aslam	A Comparative study on growth performance of Chinese carps by using soybean meal and duckweed as dietary protein source
Mustafa Yipel	The Important Terms Of Marine Pollution
<b>Speaker Q&amp;A</b>	



**American Fisheries Society Meetings**  
2015-2016

<u>October</u>			
1	Early Registration ends for DFC meeting		<a href="http://www.desertfishes.org/?p=1858">http://www.desertfishes.org/?p=1858</a>
	Abstract deadline for DFC		
<u>November</u>			
18-22	Desert Fishes Council Annual Meeting	Death Valley National Pa	<a href="http://www.desertfishes.org/">http://www.desertfishes.org/</a>
<u>December</u>			
1	Western Division Small Project Grant Deadline		<a href="http://wdaafs.org/awards/small-project-grants/">http://wdaafs.org/awards/small-project-grants/</a>
<u>February</u>			
4-6	AZ/NM AFS/TWS Joint Annual Meeting	Flagstaff, AZ	<a href="http://arizona-newmexico.fisheries.org/jam/">http://arizona-newmexico.fisheries.org/jam/</a>
17-18	Using Hydroacoustics for Fisheries Assessment	Seattle, WA	<a href="http://www.HTIsonar.com/ha_short_course.htm">http://www.HTIsonar.com/ha_short_course.htm</a>
22-26	Aquaculture America Meeting	Las Vegas, NV	<a href="http://www.marevent.com">www.marevent.com</a>

**Aquaculture 2016**

**February 22-26, 2016**

Paris Hotel and Convention Center  
Las Vegas, Nevada USA

Every three years, the Triennial is held somewhere in the United States. In 2016, the Triennial returns to the exciting city of Las Vegas, Nevada! The Triennial is the largest aquaculture conference and tradeshow held in the world with nearly 4000 attendees from over 90 countries and even more countries are expected to have attendees at AQUACULTURE 2016. The Triennial combines the annual meetings of the World Aquaculture Society, National Shellfisheries Association, Fish Culture Section of the American Fisheries Society, and the National Aquaculture Association.

For more information, go to:

[http://marevent.com/2016\\_Aquaculture\\_LASVEGAS/AQ2016RegBro.pdf](http://marevent.com/2016_Aquaculture_LASVEGAS/AQ2016RegBro.pdf)



**AQUAVET® Alumni!**

**May 20-21, 2016**

Virginia Beach, VA

**40 YEARS !**

2016 is our 40th year of aquatic veterinary medicine education!



We are planning a celebration and seminar on May 20<sup>th</sup> and 21<sup>st</sup> in connection with the 2016 IAAAM conference in Virginia Beach, VA.

IAAAM is planned for Sunday, May 22nd to Friday, May 27th. The icebreaker would be Saturday night, May 21st. Based on this we plan to have our conference Saturday, May 21st and the anniversary dinner on Friday night, May 20th. IAAAM will likely also have the wet labs after the conference this year, so you can do both things (AQUAVET® and IAAAM web labs). You'll be able to rent a hotel room for just Friday night for AQUAVET or rent it as part of the block for IAAAM.

I hope to also have this information on our webpage, which is part of the Cornell site. [www.aquavet.info](http://www.aquavet.info)

For more information and to keep in touch, please send your email and other updated contact information to [aquavetmail@gmail.com](mailto:aquavetmail@gmail.com).

Thanks,

Donald W. Stremme, V.M.D.

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

P.S.—Spread the word to your classmates, since it's likely I don't have emails for many of them!

## World Congress of Aquaculture and Fisheries

November 6-8, 2015

Qingdao, China

The main theme of WCAF 2015 is the Green Aquaculture-Innovation & Sustainability. The WCAF 2015 will bring together scientific leaders from all over the world, as well as business executives and scientists to the field of Aquaculture and Fisheries.

Aquaculture and Fisheries is a multidisciplinary science, we expected to get together with tentative topics for plenary lectures, focus on the fields of Fish Biology; Aquatic Animal Health and Diseases; Genetics and Breeding; Nutrition & Feeding; Aquatic Animal Farming; Aquaculture Production; Biotechnology and Aquatic Environment Management etc.

These presentations will identify or offer solutions to problems, utilize case studies, identify knowledge gaps or collaboration opportunities, and discuss broader applications and implications of material presented.

Qingdao, the biggest city of Shandong Province, is located in the east part of China. Qingdao is also known for its beautiful coastal scenes and fascinating scenery. Lastly we hope that you could show your enthusiasm and make contributions to this event and enjoy your stay in Qingdao.

Sincerely Yours,

**Dr. Xiaodan Mei**, Ph.D.  
Executive Chair of WCAF-2015  
President  
BIT Congress Inc.

### Contact Us:

#### Ms. Emma Xiao

Organizing Commission of WCAF-2015  
East Area, F11, Building 1,  
Dalian Ascendas IT Park,  
1 Hui Xian Yuan,  
Dalian Hi-tech Industrial Zone,  
LN 116025, China  
Tel: 0086-411-84575669-859  
Fax: 0086-411-84799629  
Email: [emma@wcmfcon.com](mailto:emma@wcmfcon.com)  
<http://www.bitcongress.com/wcaf2015/default.asp>



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SAFEA](#)



[China Council for the Promotion of International Trade Dalian Sub-Council](#)



[China Fisheries Association](#)



[China Algae Industry Association](#)



[China Recreational Angling Association](#)



[China Shipowners' Association](#)



**AAFV 3rd Annual Conference**

**April 10, 2016**

North Carolina Aquarium at Pine Knoll Shores  
Pine Knoll Shores, NC

Meeting Precedes (but unaffiliated with) Eastern Fish Health Workshop.  
Clinically relevant fish-only continuing education.  
<http://www.fishvets.org/pages/category.asp?id=26>



**41st Annual Eastern Fish Health Workshop**

The meeting will consist of scientific presentations as well as a 1-day CE workshop.

For additional information, check out:  
<https://www.facebook.com/pages/Eastern-Fish-Health-Workshop/164449723610923>



**21st Biennial Conference on the Biology of Marine Mammals:**

**Bridging the Past Toward the Future,  
13-18 December 2015**

Hilton San Francisco Union Square I  
San Francisco, CA USA

<https://www.marinemammalscience.org/conference/>

**The 2016 North Florida Marine Science Symposium  
January, 2016**

UF Whitney Laboratory for Marine Bioscience  
Marineland, FL.

More information will be available closer to the date of the conference.

*Golden Head Arowana—photo by Nick Saint-Erne*



**SeaWorld (3-4 weeks)**

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

**The Marine Mammal Center (3-4 weeks)**

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

**Mystic Aquarium**

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

**Georgia Aquarium**

Atlanta, Georgia

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

**Navy Marine Mammal Program (4 weeks)**

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

**Vancouver Aquarium (2-4 weeks)**

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

**Georgia Sea Turtle Center (2-6 weeks)**

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

**National Aquarium (6-8 weeks)**

Baltimore, MD

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

**New England Aquarium (6-8 weeks)**

Boston, MA

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





### Graduate Student Support at the School of Fisheries - Auburn University

A position is open for a PhD student to work with fish pathogens in the daily operations of the Southeastern Cooperative Fish Disease Laboratory at Auburn University in Auburn, Alabama. An applicant must have previous experience on aquatic animal health, ideally some experience in pathology or tissue culture, and a MS degree.

Experience in molecular biology is not required, although the student's project will involve the use of DNA-based techniques including next generation sequencing.

Potential students should contact Cova Arias, PhD, (Assistant Director, Instruction, Extension & Outreach; Professor, Aquatic Microbiology), School of Fisheries, 385 CASIC, Auburn University, Alabama, AL 36849, USA; Phone: +1 (334) 844 9215, Fax: +1 (334) 844 9208, [ariascr@auburn.edu](mailto:ariascr@auburn.edu).

For more information on the Auburn University School of Fisheries, Aquaculture and Aquatic Sciences, go to <http://sfaas.auburn.edu>.

### Department of Health Management, Atlantic Veterinary College, University of PEI

Competition Number: 26A15

Closing Date: Friday, October 9, 2015

The position will be at the Assistant Professor level for a Tenure Track - Infectious Disease Epidemiologist. In addition to teaching epidemiology in the DVM and graduate programs, duties will include supervision of graduate students at the MSc and PhD levels. As part of a collaborative team, the successful applicant will be expected to develop and maintain an externally-funded research program in epidemiology with a priority focus on transmission of infectious diseases of aquatic food animals with some involvement in terrestrial animals as well.

Applicants must have a DVM or equivalent degree and a PhD in epidemiology. The applicant should have a track record in the development and application of quantitative methods in aquatic and terrestrial animals with a focus on transmission of infectious diseases. The salary is \$80,000 - \$100,000 annually, commensurate with credentials and experience.

Applicants should submit a letter of intent, curriculum vitae and the names of three references to:

Chair, Department of Health Management  
Atlantic Veterinary College, UPEI  
550 University Avenue  
Charlottetown, PE C1A 4P3  
Tel: (902) 566-0609  
Fax: (902) 566-0823  
e-mail: [toflaherty@upe.ca](mailto:toflaherty@upe.ca)

### Alltech recruiting recent graduates for corporate career development program

Alltech is currently accepting applications from recent graduates of bachelor's or master's degree programs, for its fourth Corporate Career Development Program, which begins in February 2016.

Exciting opportunities are available for 10 high-caliber university graduates hoping to work with experts in the fields of science, aquaculture, agriculture, marketing, sales, veterinary science, information technology, business and biotechnology. Alltech aims to develop future leaders in the agricultural industry and values long-term talent development through the Alltech Corporate Career Development Program, which started in 2012. The animal health and nutrition company has a presence in 128 countries globally and is set to grow into a \$4 billion business within the next several years.

"This is a life-changing opportunity for recent graduates to interact with colleagues from other countries, develop both their technical and interpersonal skills, and share their fresh ideas," said Dr. Aoife Lyons, director of educational initiatives for Alltech. "Previous Career Development Program members have worked in variety of areas, including internal auditing for Latin America, coordinating Alltech educational initiative efforts and developing the crop science market in Germany. We strive to match successful applicants' interests with Alltech's global needs."

The 12-month, salaried mentorship program will begin with an intensive training period at Alltech's global headquarters in Nicholasville, Kentucky, USA, where graduates will study topics including sustainable energy, communications, marketing and international business. Following this, they will continue training and development while simultaneously managing key company projects in one of the company's global offices, guided and mentored by senior management.

Applicants should be strong team players, with excellent communication skills and fluent in English, with another language as an added advantage.

Interested graduates are invited to apply before September 30, 2015 via the Alltech Career Development Program website (<http://tinyurl.com/o8obhch>).

For more information on Alltech's involvement with aquaculture, go to <http://www.alltech.com/animal-nutrition/aquaculture/health>.



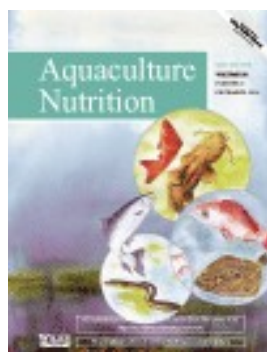
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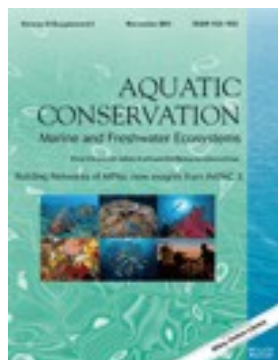
Online Only Journals



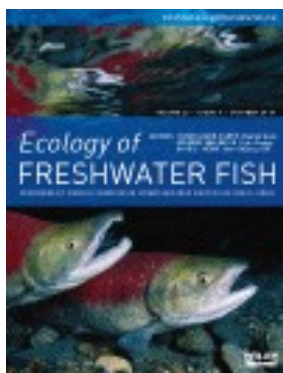
[Journal of Applied Ichthyology](#)



[Aquaculture Nutrition](#)



[Aquatic Conservation: Marine and Freshwater Ecosystems](#)



[Ecology of Freshwater Fish](#)



[Reviews in Aquaculture](#)



[Marine Mammal Science](#)

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This web resource allows users to search Directories of

**Aquatic Veterinarians and Disease Diagnostic Laboratories**

These directories assist veterinarians, veterinary-allied professionals, aquatic animal owners, aquaculture industries, governments, and the general public.

The objective is to support global aquatic animal health and welfare, public health and seafood safety.

There is no cost to veterinarians or disease diagnostic laboratories for registering in these Directories

A collaboration project of



and



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