



**No green economy without blue economy,  
says UN Food and Agricultural Organization**  
(See related article on page 29)

# The Aquatic Veterinarian

Formerly *Aquatic Vet News*

Volume 7, Number 4  
Fourth Quarter, 2013



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

Formerly *Aquatic Vet News*

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WORLD AQUATIC VETERINARY MEDICAL ASSOCIATION

## WHO ARE WE

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

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

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

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



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## Editorial Staff

Nick Saint-Erne [Saint-Erne@Q.com](mailto:Saint-Erne@Q.com)  
*Executive Editor*

David Scarfe [dscarfe@ameritech.net](mailto:dscarfe@ameritech.net)  
*Communications Committee Chair*

### Contributing Editors

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Richmond Loh (Australia)

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*President Elect*

Dušan Palić (Germany)  
[d.palic@lmu.de](mailto:d.palic@lmu.de)  
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[chris.walster@onlinevets.co.uk](mailto:chris.walster@onlinevets.co.uk)  
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*Treasurer*

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Lydia Brown (UK) [drlydiabrown@gmail.com](mailto:drlydiabrown@gmail.com)  
*Director-at-Large*

David Scarfe (USA) [dscarfe@ameritech.net](mailto:dscarfe@ameritech.net)  
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# THE AQUATIC VETERINARIAN

Volume 7, Number 4

CONTENTS

Fourth Quarter 2013

## WAVMA News:

Editorials .....	4
Executive Board Reports.....	5
Committee Reports.....	8
Colleague's Connection.....	12
Becoming an Aquatic Veterinarian: an Interview with Myron Kebus.....	12
Meet Dr. Laura-Daniela Urdes .....	14
Colleagues' Connection Index.....	15

<b>Instructions to Authors</b> .....	11
--------------------------------------	----

## Clinical Reports:

Yellow Perch Mortality Diagnosis - By Dr. Myron Kebus .....	16
Cyanobacteria Treatment in an Aquarium - By Dr Richmond Loh .....	17
Oranda Goldfish with a Buoyancy Disorder - By Dr. Jena Questen .....	18

## Grand Round Cases :

Collation of discussions from the WAVMA Listserv .....	20
Farting goldfish.....	20
Bullhead shark ( <i>Heterodontus</i> sp.) with <i>Uronema marinum</i> protozoa on gills .....	21

## Literature Reviews:

Abstracts.....	22
----------------	----

## News and Views:

Sea Turtles Eating Plastic At Record Rates Amid Surge In Pollution .....	26
Taiwan seizes rare turtles bound for China .....	26
World's Largest Freshwater Turtle Nearly Extinct .....	27

## Legislative & Regulatory Issues:

CITES—New Turtles on Appendix I and II .....	28
Philippines finds hoard of endangered species .....	28
No green economy without blue economy .....	29
FDA Takes Significant Steps to Address Antimicrobial Resistance .....	30
OIE Tool for the Evaluation of Performance of Aquatic Veterinary Services .....	31

## Aquatic Veterinary CE&PD:

World Aquaculture Society 2014 .....	32
Internships, Externships and Residencies .....	36

<b>Job Opportunities</b> .....	37
--------------------------------	----

## Special Supplement:

Compiled Table of Contents for <i>The Aquatic Veterinarian</i> 2013 - Volume 7(1-4) .....	38
---	----

<b>Sponsors</b> .....	42
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## Please send articles, clinical reports, or news items to the editor by the following submission dates:

- Issue 1 – February 15 (published in March) All submissions should be in 10-point Arial font, single spaced.  
Issue 2 – May 15 (published in June) Submissions may be edited to fit the space available.  
Issue 3 – August 15 (published in September)  
Issue 4 – November 15 (published in December) [See page 11 for further instructions to authors.](#)



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

EDITORIALS

Fourth Quarter 2013

## Editor's Note

Wow, this has been a great year for WAVMA! I am not going to elaborate on all the details of our accomplishments in 2013, because they are explained in the Executive Reports section by the President, Secretary, and Treasurer. Be sure to read those reports as we have made some momentous advances in the field of aquatic veterinary medicine this year. And read the Meetings Committee report to see all the exciting things planned for 2014! That should be a great year as well.

For me, the best things about 2013 were meeting so many new aquatic veterinarians at the WAVMA lectures and dinner held at the AVMA meeting in Chicago, and the completion of the Certified Aquatic Veterinarian Program. This is something we have been discussing and then developing at WAVMA since its inception, and I think it turned out great! For those of you who have been involved in Aquatic Veterinary Medicine for years, this is a way to show your clients your expertise in the field. You should consider becoming certified as a goal for 2014.

One last thing to mention (last but not least!) is *The Aquatic Veterinarian*. What started out as a newsletter in 2007 has graduated into something bigger and better. We are on our way to becoming a Journal! We still want to keep veterinarians up to date with news and events occurring around the world, as well as legislation and regulatory issues. But we really need to increase the amount of case reports and research articles. Please consider writing up some of your clinical cases and submitting them for publication, as well as research you have been conducting. Sharing information is the best way to keep our profession growing and relevant. A special thanks to all the Editors and Contributors over the past year!

Happy Holidays to all...

**Nick Saint-Erne**, DVM CertAqV  
*Executive Editor*

GLOFISH® Tetras  
(Genetically modified  
*Gymnocorymbus*  
*ternetzi*) appear in  
Christmas colors due to  
their Fluorescent gene.

Photo by Nick Saint-Erne



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



## Cover Photo:



**No green economy without blue economy, says UN Food and Agricultural Organization**  
Apia, Samoa/Rome

Efforts to end hunger and fight the effects of climate change in the Pacific Islands will hinge on the success of sustainable development, including wise use of oceans and fisheries, FAO Director-General José Graziano da Silva told ministers from the region.

"There can be no truly 'green economy' without a 'blue economy', one that makes the sustainable development of oceans and fishery resources a priority," Graziano da Silva said. "The importance of capture fisheries and aquaculture cannot be neglected..."

See page 29 for full article.

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

EXECUTIVE REPORTS

Fourth Quarter 2013

## President's Report

December 2013

It has been a year since you have honored me to be the 2013 WAVMA President. I took this mission very seriously and committed time and resources for such a great cause to advance our beloved discipline, despite the heavy work schedule and a health emergency in my family.

Many accomplishments have been achieved. As I reflect on the past year, I feel a great sense of pride; a global organization developed for its members a comprehensive list of services that are seldom available in other professional organizations. The WAVMA credentialing program is one of a kind, allowing members' knowledge, skills, and experience to be recognized, as successful applicants enjoy the title of "Certified Aquatic Veterinarians." A WAVMA Council was formed of distinguished fellows whose primary mission is to brainstorm creative ways for WAVMA to better serve the profession and its members. An outstanding periodical, "*The Aquatic Veterinarian*," binds us together and bring us updates on major relevant research findings, advances in clinical aquatic animal medicine, future meetings and continuing education opportunities. WAVMA-organized workshops provided a large number of aquatic veterinarians with opportunities to earn continuing education credits taught by world-renowned veterinarians. Additionally, the WAVMA "*Clinical Corner*" has been launched on our WAVMA.org website to provide unique clinical aquatic experiences for members, available at their fingertips. All of these WAVMA services and activities are definitely a new landmark to our profession worldwide, one that has formed a solid background for a fast growing profession.

You should also be proud of the 2013 Executive Board Members and advisors, who have done monumental work to make 2013 an outstanding success. Their commitments were far above expectations as they brought high intellect and decades of experience to discussions, decisions, and overcoming challenges. I am humbled by their knowledge, enthusiasm, demeanor and cooperative spirit. These EB Members are all volunteers who take time out from their busy professional lives to do the work that keeps WAVMA functioning.

The members who attended our two social gatherings in Chicago (July) and Prague (September) provided us with valuable feedback and construc-



tive suggestions that we have implemented right away. Last, but not least, I would have never been able to manage my 2013 duties (including WAVMA business) if it were not for the help and follow up that my Laboratory Manager Ms. Michelle Gunn, senior postdoctoral fellow Dr. Thomas Loch, and Graphic Artist Mr. Daniel Bjorklund provided me. To all of those I would like to express my thanks and gratitude.

This year's Holidays Season is shadowed by the departure of an iconic figure in the history of mankind, President Nelson Mandela, a symbol of resilience, grace, and forgiveness. May his principles guide us, as individuals and as organizations, this year and for millennia to come.

Happy Holidays,

*Mohamed Faisal*

**Mohamed Faisal**, DVM, PhD. Doc. Honoris Causa  
WAVMA Certified Aquatic Veterinarian (CertAqV)  
2013 WAVMA President  
SF Snieszko Endowed Scholar and Professor of  
Aquatic Animal Medicine  
College of Veterinary Medicine  
Michigan State University  
East Lansing, MI

[faisal@cvm.msu.edu](mailto:faisal@cvm.msu.edu)

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

EXECUTIVE REPORTS

Fourth Quarter 2013

## Secretary's Report

How quickly this year has gone by and indeed the final quarter seems to have flown by. I cannot believe it is time to write another Secretary's report!

Firstly it is that time of year when WAVMA asks you to renew your membership. Currently we are making some changes to the payment side of the website so I am unsure as to when an invoice will appear in your membership profile or when the first membership renewal emails will be sent out. Presuming everything has been completed all you should need to do is to log into your membership profile ([www.wavma.org/wavma-members/member-profile](http://www.wavma.org/wavma-members/member-profile)), using your primary email (the email you received notification of the latest *Aquatic Veterinarian*) and password. You will be requested to pay the amount outstanding, and just need to follow the onscreen instructions. Sometimes, members have fingers that are quicker than the payment system, which can leave the impression that payment has not gone through and if you have any queries then please contact the WAVMA Treasurer: ([treasurer@wavma.org](mailto:treasurer@wavma.org)).

There are lots of benefits to being a WAVMA member, ranging from supporting WAVMA's Mission Statement ([www.wavma.org/About-wavma](http://www.wavma.org/About-wavma)), access through members-I to aquatic veterinarians from around the world, the latest editions of the *Aquatic Veterinarian*, discounted CE/CPD including meetings, textbooks, webinars and our latest addition to the website – Clinical Corner. Through the shop pages (yet to be made public) on the website you can attend webinars, order member benefits such as Livedrive and WAVMA merchandise such as T-shirts.

What new benefits does WAVMA have to offer its members in the next membership year? Two that you may already have noticed – the CertAqV ([www.wavma.org/CertAqV-pgm](http://www.wavma.org/CertAqV-pgm)) and Clinical Corner ([www.wavma.org/clinical-corner-archive](http://www.wavma.org/clinical-corner-archive)). Both are member only benefits with the CertAqV designed to be useful and easy for the busy practitioner to complete and be recognised for their expertise, and if you have not already done so, please look at the information available on the website, you will be glad you did.

Clinical Corner is exactly what it says: A series of reports and information regarding clinical cases investigated by members. The concept is that you can add your own tuppence worth to any discussion and any member can contribute a case. They

do not need to be complex, or for that matter do you need to be completely correct in your diagnosis. They are there to learn from and I would encourage all WAVMA members to contribute.

Years ago I was contacted by a fish vet with far more qualifications than me and a lot more experience. He had a koi with an ulcer he had been treating in a hospital tank for over six months with no success. Being in the part of the world that he worked in, koi were not very common and usually he treated salmon. My first impression was why on earth would he want to speak to me? He knew far more than I did! So, I listened to the history and it soon became apparent why the ulcer was not healing. The fish was being kept at a temperature of 8°C which is excellent to treat salmon in but absolutely no use for koi, where I have found an ideal temperature to be 25°C. The moral is that even the best of us get it wrong and you should never feel embarrassed to ask.

A third benefit for members is Livedrive. This is a cloud back-up solution and storage that members can use. The cost of the back-up solution for WAVMA members is a nominal \$10 and is very useful for all of you who have lost computer data at some point. You never can have too much backup! The storage solution is available at a very competitive price for members. Once we have the changes to the website finished you will be able to find more information and buy it online. Currently you will need to contact me ([secretary@wavma.org](mailto:secretary@wavma.org)) if you are interested and I can send you the information. I believe that the Back-up solution would be invaluable to all members and in monetary terms is worth the annual membership in itself. The storage solution is not for everyone, but if you have large files you wish to share with people, a large video or music collection you wish to stream to various devices or simply files you do not have the space to store on your laptop then the storage solution would be useful.

WAVMA now has several social media outlets. For the past couple of years WAVMA has had a Facebook page (<http://tinyurl.com/oj5tkkv>) which currently has 579 "likes" which means nothing to me and we also have a page on Linked-In (<http://tinyurl.com/obqmghm>) both of which you might like to follow. Additionally we have started a Twitter feed (<https://twitter.com/wavma>) and also a blog (<http://wavmaatwork.org>) which you might like to follow or contribute to. Not only can you now keep up with the latest WAVMA news but also contribute



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

EXECUTIVE REPORTS

Fourth Quarter 2013

to it, ask colleagues through members-L those difficult questions, participate in knowledge transfer through the blog or simply publicise your practice to the world through these pages.

Continuing on an education theme, WAVMA will be attending several conferences next year starting with Aquaculture America in Seattle (February 9-12) right through to the Federation of Asian Veterinary Association's Conference in Singapore (November 28-30). Additional meetings include AVMA Convention and the International Symposium on Aquatic Animal Health. For those of you who really like to book ahead, WAVMA will provide an aquatics stream during the WSAVA Conference 2015, in Bangkok, Thailand. It would be great to see members at any of these meetings and whilst WAVMA has worked hard to get aquatic veterinary medicine accepted by the mainstream of the veterinary profession we will only continue to be offered space at these conferences if the presentations are well attended.

The presentations are always of a high standard and whilst the programs WAVMA put together need to appeal to experienced practitioners (i.e., WAVMA Members) they also need to attract those new to the discipline so more veterinarians can see the benefits of offering aquatic veterinary services. So please consider attending one of these meetings and support WAVMA's Mission Statement: ([www.wavma.org/About-wavma](http://www.wavma.org/About-wavma)).

This year has been very busy for the various committees and a lot has been accomplished. I would like to thank all those members who have contribute to WAVMA's success and a special thanks to this year's President Mohamed Faisal who has steered WAVMA through some difficult challenges with great leadership. A lot less would have been achieved without his leadership.

This is the last report I will write as Secretary, as I move up to the dizzy heights of President-Elect in 2014. The next report will be written by Devon Dublin who will take over as Secretary. I wish him all the best and all it remains for me to do is wish all WAVMA members a Merry Christmas and a Happy New Year.

**Chris Walster**, BVMS, MVPH, CertAqV  
WAVMA Secretary  
[Secretary@wavma.org](mailto:Secretary@wavma.org)

## Treasurer's Report

This year has been a good year for WAVMA, fiscally as well in the advancement of our profession. Overall, we are in rather good shape for next year, with a net cash asset of \$8204.44. The number of Veterinarian (Full) members is exactly where we expected it to be for the year, but the new graduate and student memberships exceeded expectations! We also have an Allied Veterinary Organization member with the Australia and New Zealand College of Veterinary Science.

We did not have any other sources of income this year (such as contributions from meetings or donations), so our total income was about \$3000 less than we had budgeted. The good news is that our expenses were less than budgeted by over \$2000, so we almost evened out, with a net loss of about \$890.

INCOME DETAILS	ACTUAL	BUDGETED
<i>Veterinarian Memberships</i>	8,500.00	8,500.00
<i>Student Memberships</i>	2,175.00	1,000.00
<i>New Graduate Memberships</i>	550.00	200.00
<i>Other Memberships- AVO</i>	850.00	850.00
<i>Meeting Income</i>		1,000.00
<i>Income - WAVMA merch</i>		500.00
<i>Donations / Sponsorship</i>		3,000.00
<b>Total income:</b>	12,075.00	15,050.00

The new project development on the website (Clinical Corner and WAVMA Store) accounted for \$2926.96 in expenses, about \$1000 over budget, but the new website functions should be worth it. Getting the WAVMA store up and running is important and should generate income going forward. The Clinical Corner should keep members coming back to the Website regularly.

There may be a few more expenses yet, but also more members will be paying dues for next year in the last weeks of December, so a finalized version will be made on 12/31/2013. Remember, dues are by calendar year, so the 2014 membership is due on January 1, 2014. Please let me know if you have any questions about the expenses for 2013.

**Nick Saint-Erne**, DVM CertAqV  
WAVMA Treasurer  
[Treasurer@WAVMA.org](mailto:Treasurer@WAVMA.org)

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

COMMITTEE REPORTS

Fourth Quarter 2013

## Meetings Committee Report

By Julius M. Tepper, Chair

The Meetings Committee has been working hard the past few months to help our incoming President, Richmond Loh, achieve his vision of promoting aquatic veterinary medicine to as large a portion of the profession and related aquatic industry as possible. As such, we have started arranging one of the most extensive series of meetings ever organized by WAVMA. The year kicks off with Aquaculture America 2014 in Seattle, Washington from February 9 - 12, 2014. In addition to our information booth, we have organized a day long program of talks.

The 41<sup>st</sup> SAVMA Symposium will be held from March 20-22, 2014 at Colorado State University, Loveland, Colorado. As in the past, WAVMA will have our information booth at this event. This is the best opportunity for WAVMA to promote aquatic veterinary medicine to US vet students.

The AVMA Annual Convention will take place in Denver, CO from July 26-29, 2014. In addition to our information booth, in conjunction with the AVMA Aquatic Veterinary Committee, we will have several WAVMA members, including incoming President Richmond Loh and Treasurer Nick Saint-Erne lecturing during the aquatic sessions. If you plan to attend, join them for the talks as well as informal discussions during the conference.

The International Symposium on Aquatic Animal Health will be held in Portland, Oregon, Aug 31 – Sept 4, 2014. With the large number of WAVMA members planning to attend, as well as the potential for attracting new members, we have decided to hold our Annual General Meeting here during the conference. If you will be there, plan to attend and enjoy a hearty meal and lively discussion. The exact date, time and location will be announced soon.

The World Small Animal Veterinary Association, of which WAVMA is a member organization, will take place in Cape Town, South Africa from Sept.16-19, 2014. Our representative, Devon Dublin, will be in attendance.

The Asian Fisheries Society will host the Diseases of Aquatic Animals 9, aimed at improving aquaculture in the region, in Ho Chi Minh City, Vietnam from Nov. 24-28, 2014. Immediately after, the Singapore Veterinary Association will host the Federation of Asian Veterinary Associations

(FAVA) conference, to take place in Singapore from Nov. 28- 30, 2014. Incoming President Richmond Loh will be attending and speaking at this conference and has expressed his interest in having WAVMA present an organized program here. Though still in the early stages of development, we are working on realizing this event.

More info to come ....

**Julius Tepper, DVM, CertAqV**

Meetings Committee Chair

[cypcarpio@aol.com](mailto:cypcarpio@aol.com)

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# THE AQUATIC VETERINARIAN

Volume 7, Number 4

COMMITTEE REPORTS

Fourth Quarter 2013

## University of Tennessee College of Veterinary Medicine Student Chapter By Wesley Siniard

(Class of 2016, UTCVM Chapter co-President)

In March of 2013, while attending the Student AVMA Symposium in Baton Rouge, I noticed a booth on the vendor floor that appeared to be dedicated to aquatic medicine. Being from Tennessee, where aquatic medicine is not a very common field of interest, I was immediately drawn to learn more about this organization. After speaking with Dr. David Scarfe at the combined AVMA/WAVMA booth, I knew that this organization was definitely something that I wanted to get involved with, and expose my fellow classmates to as well. Dr. Scarfe gave me the tools and information that I needed to set up a Student Chapter of WAVMA at Tennessee, and I began the necessary steps to do so.

One of my fellow classmates, Grace Normann (co-president of our Chapter) had expressed her interest in aquatic medicine to me before I had received the idea to start up a student chapter, and I thought that she would be a great person to work with in order to do so. She is more driven towards the aquaculture side of aquatic medicine, whereas I am more driven toward the aquarium and conservation medicine aspect. In order to receive support and funding from our school for our chapter, we made a proposal to become a SCAVMA (Student Chapter of the American Veterinary Medical Association) sponsored club, and our proposal was approved. This allowed for us to receive a small amount of funding for meeting snacks, lunches, fundraisers, etc. Our WAVMA student chapter is also recognized as the Aquaculture and Aquatic Medicine Club in order to make it easy for people to be aware of exactly what our interests are.

Since establishing the student chapter, we have had multiple successful meetings. Dr. Chris Keller from the Tennessee Aquarium has come to speak to us about his career. We have also had our own Dr. Michael Jones and Dr. Debra Miller speak with us about their experiences in the field of aquatic medicine. Also, we have participated in a fish necropsy lab where we collected fish from a local hatchery. Dr. Michael Jones lead the necropsy and taught us all about basic fish anatomy and physiology as well as proper necropsy and sampling procedures. All of our activities that we have completed so far have been extremely successful and we are looking forward to the future of the student chapter.

We have many things planned for the upcoming semester, including trips to local aquaculture and conservation facilities such as Eagle Bend Hatchery and Conservation Fisheries. We are also planning a trip to the Tennessee Aquarium and possibly Ripley's Aquarium as well. We are looking into planning trips to the first annual meeting of the American Association of Fish Veterinarians in April/May and the AVMA Conference in July, amongst others. We are in the process of inviting speakers for our lunch meetings that will cover a broad range of topics included in this field of medicine. Also, we are very excited about the Clinical Case of the Week posts that are going to begin to be posted on the WAVMA website and have enjoyed viewing the first one already. We plan to get together and discuss these cases as a group in order to further our learning and discuss current journal articles as well. We also plan on holding another fish necropsy lab during this semester.

Overall, we are all very excited about our newly formed student chapter. We are proud to be associated with such a well-respected organization in the field as WAVMA is and we look forward to what the future holds for us.

*Participants in a fish necropsy lab that was led by Dr. Michael Jones on October 30, 2013.*

*From left to right:*

*Jennifer Green, Bree Dell, Grace Normann, Wesley Siniard, Steven McIntyre, Krista Lipe.*



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

COMMITTEE REPORTS

Fourth Quarter 2013

## 2013 WAVMA/AVMA/AVMF Aquatic Veterinary Scholarship Awardee Report

By Maya Sawyers (University of Georgia, College of Veterinary Medicine – Class of 2015)

I participated in the MARVET workshop held in Playa del Carmen, Mexico, in June 2013. The Marine Veterinary Medicine (MARVET) workshop provided an introductory course in marine mammal medicine to veterinary students, veterinarians, marine biologists and other individuals interested in learning about marine animal health and conservation. The workshop combined classroom lectures and hands-on field experience.

Lectures were held during the first session, where I was introduced to marine mammal conservation, taxonomy, anatomy, physiology and pathology. For example, the three mammalian orders containing “marine mammals” are Carnivora (polar bears, otters and pinnipeds), Sirenia (manatees and dugongs) and Cetacea (whales, dolphins and porpoises). The order Cetacea is further divided into Mysticeti (baleen whales) and Odontoceti (toothed whales). The teeth from the Odontocetes can be used to determine age and to differentiate dolphins from porpoises.

I also learned that form follows function as indicated by the laryngeal modification. The epiglottic and arytenoid cartilages of the whale larynx are elongated to provide better separation between the gastrointestinal and the respiratory tracts. In addition, this modification accommodates the location of the external nares on the dorsal aspect of the head. The dolphin stomach is composed of three-chambers; the first of which is non-glandular and functions in mechanical digestion. The second chamber is lined with mucous, parietal and chief cells and functions in chemical digestion. The final chamber is a connecting chamber between the stomach and small intestine. Dolphins have two layers of fat. The superficial layer of fat is cutaneous and plays a significant role in thermoregulation. The deep layer of fat is subcutaneous and provides nutritional storage. This layer is the first layer to be mobilized in times of nutritional hardships. The width of this layer can be used to determine the general fitness of an animal.

To supplement the classroom lectures, I participated in hands-on experience working alongside aquatic veterinarians at several marine parks. Dolphin Discovery was the first scheduled marine park visit. The attending veterinarians lectured about the

fish house and diet management, and their relevance to preventative medicine. I inspected and sorted the day's fish for the park animals, and was instructed on the importance of the daily physical exams (DPE). The DPE is one of the first steps to maintaining health and welfare of the animals. After the lecture, I was given the opportunity to practice a physical exam on the resident dolphins and manatees.

On the last day at the park, I observed the veterinarians and trainers while they performed endoscopy on an adult bottle-nosed dolphin. The endoscopy was performed to demonstrate the healthy esophagus of an adult dolphin. In addition, procedure demonstrated the amount of coordination and effort required to prepare animals for examination.

The second marine park I visited was Xcaret. There, I practiced anesthetizing male gray Tilapia using clove oil. While the fish was under the anesthesia, a physical exam was performed; fin, gill and scale samples were collected and blood draws from the lateral line were attempted before the fish recovered. In addition, I was allowed to help capture, clean and draw blood on the resident male green sea turtle. The blood is normally collected once a week for routine blood profile to monitor the health of the animals on exhibit.

During the shark and stingray encounter, the trainers demonstrated the behaviors used to aid in the completion of a thorough physical. With their hands, the trainers slapped the water's surface to get the sharks' attention. Then the sharks allowed themselves to be captured. The trainers rolled the sharks onto their backs, so I could assess their ventral aspects. I was also given the opportunity to help with the necropsy of stingray, as well as an adult and a baby sea turtle to determine the cause of death. The necropsies did not provide a definitive cause of death of each animal, but they provided a great hands-on opportunity to learn stingray and sea turtle anatomy.

As a third year veterinary student, I found the MARVET workshop invaluable training. I plan to build on my veterinary experience in Mexico, by externing with the Georgia Aquarium for four weeks in September 2014. The WAVMA scholarship to attend MARVET has provided me with skills and experience in the field of marine mammal medicine that are not provided by conventional veterinary school curriculum. After I graduate, I hope to use my experiences to pursue a career working at a marine park or aquarium.

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

AUTHOR'S INSTRUCTIONS

Fourth Quarter 2013

## Instructions for Authors and Contributors

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

### Colleague's Connection

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

### Peer-Reviewed Articles

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

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

### Clinical Cases

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

### Book Reviews

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

### Publication Abstracts

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

### News

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

## Legislative & Regulatory Issues

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

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

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

## Jobs, Internships, Externships or Residencies

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

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

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

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

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

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



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

COLLEAGUE'S CONNECTION

Fourth Quarter 2013

## **Becoming an Aquatic Veterinarian: an Interview with Myron Kebus MS, DVM by Peter Werkman**

[Editor's note: Dr. Kebus is the State Fish Health Veterinarian with the Wisconsin Department of Agriculture, Trade & Consumer Protection, Division of Animal Health, an Adjunct Assistant Professor in veterinary medicine at the University of Wisconsin, and owns Wisconsin Aquatic Veterinary Services]

### **When and how did you get involved in aquatic veterinary medicine?**

I began in aquaculture twenty five years ago by working as a research assistant with the University of Wisconsin-Madison Aquaculture Program. That was before veterinary school and before my Master's degree, where I did research in fish stress. At this first job I learned many practical aspects of fish rearing from experience, and especially from experienced aquaculturists.

### **How did you obtain the knowledge, skills and education to feel comfortable to work in aquatic veterinary medicine?**

I received a Master's of Science degree for my work on stress in fish. I also attended AQUAVET I in 1989 and AQUAVET II in 1990. Before graduating from veterinary school in 1992 I did externships in salmon aquaculture in Maine with Dr. Hugh Mitchell, another in salmon aquaculture with Dr. Michael Kent and Dr. Jim Brackett in British Columbia, and catfish aquaculture with Dr. Mike Johnson in Mississippi. Since graduation I have continued to obtain aquaculture knowledge by working with fish farms, and training veterinarians on aquaculture medicine.

### **What kind of aquatic veterinary medicine have you been involved in and can you make a living out of it?**

For the past twenty years I have worked full-time with fish veterinary medicine. I have and continue to work with farmed fish (commercial aquaculture), pet fish, and fish in public aquariums. I have been able to make a living by being employed as the director of a veterinary fish health program with a State Government Agency. I began by doing full-time private practice in fish only and remain active in private fish practice by providing services to select clients. I see that the viability of private fish practice remains very challenging and is limited by a number of factors.

The ability for veterinarians to practice aquatic veterinary medicine full-time has progressed far less over the years than I expected when I first began. This is a topic that I have begun to speak on in my presentations at aquaculture and veterinary meetings – the Economics of Fish Practice.



### **How are you currently involved in aquatic veterinary medicine?**

Throughout my career I've been involved in fish medicine, with a mixture of private practice, teaching and training, working with aquaculture industries, dealing with fish health regulations, and volunteering with veterinary organizations. In collaboration with colleagues I have developed, a program to train veterinarians on aquaculture medicine:

([http://ce.vetmed.wisc.edu/Fish\\_Health\\_for\\_Veterinarians](http://ce.vetmed.wisc.edu/Fish_Health_for_Veterinarians))

and a program for fish farmers:

([http://ce.vetmed.wisc.edu/Fish\\_Producer\\_Courses](http://ce.vetmed.wisc.edu/Fish_Producer_Courses))

so they will know how to work with their aquaculture veterinarian.

### **What experience has impacted your decision to practice aquatic veterinary medicine?**

All my experiences combined have afforded me a wonderful opportunity to see aquaculture from many angles, perspectives, viewpoints, and over a significant period of time. Now I am going beyond aquaculture in an effort to find answers to challenges that other animal sector, like poultry, also have faced. In some cases I've found excellent solutions. Remaining solely immersed in aquaculture runs the risk of becoming myopic. Currently being involved with the poultry industry is making me a better aquaculture veterinarian as this is teaching me lessons that benefit my aquaculture work.



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

COLLEAGUE'S CONNECTION

Fourth Quarter 2013

## What basic knowledge, skills and education do you think every veterinarian should have, to be able to practice aquatic veterinary medicine?

I suppose all veterinarians can benefit from knowing more about all areas of veterinary involvement, like aquaculture, but I understand that the vast majority of veterinary practitioners do not derive their livelihood from aquaculture, so I hesitate to say every practitioner should have some basic knowledge about aquaculture. However, all veterinarians should know that while they may not have the ability to provide veterinary service to aquaculture, there are colleagues that do, and all veterinarians should encourage clients seeking assistance to be directed to aquaculture/fish veterinarians in their area.

## What suggestions do you have for veterinarian veterinary students to become involved in aquatic veterinary medicine?

My advice is to listen to your heart first, and secondly listen to colleagues who have experience in aquaculture veterinary medicine. If you have a passion that drives you to aquaculture and you have the fortitude to persevere eventually an opportunity will arise. It just might take longer than you wish.



Photos:

Dr. Kebus at work instructing veterinarians on how to provide services to clients (below left), working in the field (above), and exciting future veterinarians about what aquatic veterinarians do (below).



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

COLLEAGUE'S CONNECTION

Fourth Quarter 2013

## Meet Dr. Laura-Daniela Urdes, DVM, PhD

The Faculty of Animal Science  
Univ of Agricultural Sciences & Veterinary Medicine  
Bucharest, Hungary

My activity within the field of aquaculture and fishery started about seven years ago when the Faculty of Animal Sciences established a new specialization for undergraduates, named "Acvacultura si Piscicultura" (i.e. Aquaculture and Fisheries). At that time, I was teaching the students Animal Pathology and Sanitary-Veterinary Techniques, so the faculty management team naturally thought that I should be the one to also teach the Fish Pathology course and seminars for the students of the newly-established specialty.

When I was assigned to do this course, I remember being both excited and concerned, as this field was totally new to me. I was aware I had to first build the basic knowledge for myself, in order for me to understand - and further explain to my students - how lesions and symptoms develop and how they should be interpreted. Building that knowledge for myself was hard, as this was the first foray ever into aquatic animals study; and this was really self study!

So, I started studying good books of Ichthyology, and practicing dissections on a few ornamental golden carps to understand normal topography, gross structure and function of the skeletal muscles, skeleton, the main organs and large vessels. With this knowledge "on board", fish pathology started to make some sense to me, and became naturally easy to teach. To me, my new activity was exciting enough to then make me want to embark, along with a few interested fellows, on scientific research on finfish and their parasitic fauna within the Danubian Delta area, a place which is not far from the city of Bucharest; this is a very resourceful spot for those wishing to explore preserved natural aquatic habitats.

As for my educational activity, I have always considered the work with my students a great opportunity for me to take the pulse of the national aquaculture industry, as many of my students generally own, intend to establish, or work on a fishery farm. From the discussions that I have had with my students, I soon started to become aware of the need for veterinarians knowledgeable about fish health, capable of really helping these farmers who told me about their discouraging economic losses, mainly due to the inability of the vet assigned to

care for their farm to establish a cause of that situation or to take any sort of measures to prevent further outbreaks occurring therein. This is not surprising, considering the way the veterinary curricula has been structured in Romania, and looking back at the way I myself - as a successful graduate of the main veterinary school in Romania, with a PhD in vet medicine

- had to study in order to understand fish biology and pathology. I strongly believe this situation must be improved in order for this industry to be encouraged to evolve here and elsewhere, including through veterinarians prepared to assist the fishery farmer in managing their livestock health and production.

Having this in mind, I have always felt like I should really do something in this respect, but did not know exactly how I might help initiate this change. Not long ago, I learned that I can write projects, so I decided that I should write a project that could make the change I was looking for. This is how the EuroNet project concept was born about two years ago. I had the call, my vision and a number of people from different national and international organizations that trusted me, all ready to follow. The project was unsuccessful at that time, but is still a "must do" to me.

Although I have been working in this field as an educator and researcher for seven years now, and even though I have attended lately a number of meetings and webinars on different topics related to aquatic veterinary medicine, I still consider myself a novice in this field. I feel like I need a structured study and a more hands-on practice to deepen and master the knowledge in this hidden magic area. Like in the case of the project I mentioned earlier, it is also in my power to make this change happen. I know the time for me to make a shift in the professional life is near and, for those that have not experienced it, I can tell you, nothing is more exciting than this!

I believe every veterinary practitioner should have some basic knowledge about aquaculture, as well as fishery and aquaculture farmers should have basic knowledge about aquatic veterinary medicine. To me, it is the same as in zootechny





# THE AQUATIC VETERINARIAN

Volume 7, Number 4

COLLEAGUE'S CONNECTION

Fourth Quarter 2013

and veterinary medicine. I remember as a student I had in my curricula courses that were merely connected to veterinary medicine, like genetics, nutrition, housing designs, animal production etc. I have always considered veterinary medicine, on one hand, and the related industries - zootechny, aquaculture & fisheries, pets and exotics, on the other hand, as interlinking fields, which depend on, and should support each other. Thus, they must be interested in sharing common knowledge/practices among themselves for the common good. My students, although not veterinary students, learn at my discipline what is a disease, what are the main groups of factors and pathogenic agents of aquatic animal populations, and some basic lesions and symptoms (signs) that fish develop during certain diseases – mostly diseases common to our geographic region.

This will not make veterinarians out of them, but will ensure the necessary knowledge to help them distinguish between really serious situations, when the veterinarian involvement is direly necessary, from one that can be dealt with without a vet in the field, as well as how to prevent diseases from entering their farms. This usually makes the difference when it comes to considerable losses in animal farms. Likewise, I think a graduate veterinarian must have the same type of knowledge and skills about the main aquatic animals that they usually acquire when studying the medicine of terrestrial animals. They must know, for instance, that also environmental factors can initiate or co-act as causes of diseases in fish, so they should learn about fish welfare, production systems and nutrition, apart from the veterinary disciplines *per se*.

My perception is that, along with the rapid development of the aquaculture and fishery industries around the world, a new paradigm in veterinary medicine is silently being born. This should enable us to follow new paths that our predecessors did not have the chance to discover and pursue. Enthusiastic veterinary students and graduates willing to study, to conduct research and/or perform medical assistance, as well as those practitioners bored with their work on “classical” pets and livestock animals and, nonetheless, veterinarians looking for a job into a field that really needs them, should focus their attention and interest on this young, but very promising new branch of the veterinary medicine, which is aquatic veterinary medicine. Not only that this field needs us to help it evolve, but we, as veterinarians, might as well agree we need it, too.

## Colleagues' Connection Index

Below is a list of WAVMA members profiled in the Colleagues Connection in past issues of the *Aquatic Vet News* (AVN) and *The Aquatic Veterinarian* (TAV) with volume and issue number followed by page number. Profiles from the Student Committee Reports are followed by SC.

The names are listed in alphabetical order by last names:

Barry Baker – AVN 6(1): 6 SC  
Brandon Boren – AVN 5(2): 6 SC  
Lori Corriveau – AVN 3(1): 7  
Brett De Poister – AVN 6(3): 6 SC  
Emily Denstedt – AVN 6(2): 6 SC  
Kyle Donnelly – TAV 7(3): 12 SC  
Devon Dublin – AVN 4(2): 9; AVN 4(3): 11  
Ian Gardner – AVN 5(3): 13  
Rob Hildreth – AVN 2(3): 29  
John Howe – AVN 6(2): 10  
Colin Johnston – AVN 3(3): 11  
Timothy Jones – AVN 5(1): 9 SC  
Kirstin Kamps – AVN 4(4): 6, SC; AVN 5(1): 7 SC;  
Myron Kebus – AVN 2(4): 14-15; TAV 7(4): 14-15  
David Kestenman – AVN 5(1): 18-19  
Veronique LePage – AVN 5(1): 8 SC  
Richmond Loh – TAV 7(3): 14-17  
Peter Merrill – AVN 5(2): 12-15  
Tim Miller-Morgan – AVN 2(3): 29; AVN 2(4): 13-14; AVN 4(4): 11  
Brian Palmeiro – AVN 3(2): 8  
Samara Parker – AVN 5(3): 5 SC  
John Pitts – AVN 3(4): 1; AVN 4(1): 7  
Caryn Poll – TAV 7(3): 9  
Jena Questen – AVN 3(1): 1  
Stephen Reichley – AVN 6(3): 10  
Helen Roberts – AVN 2(4): 14; AVN 6(1): 10-11  
Ronald Roberts – AVN 5(4): 12-13  
Nick Saint-Erne – TAV 7(1): 12-13  
Maya Sawyers – TAV 7(4): 11 SC  
Julius Tepper – AVN 5(3): 12-13  
Laura-Daniela Urdes – TAV 7(4): 16-17  
Jonas Vaitkus – AVN 5(1): 10-11 SC  
Chris Walster – TAV 7(2): 10-12  
Scott Weber – AVN 3(4): 9; AVN 6(4): 10-13;  
Sophie Whoriskey – AVN 5(4): 5 SC



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

CLINICAL REPORTS

Fourth Quarter 2013

## Yellow Perch Mortality Diagnosis

By Dr. Myron Kebus

A yellow-perch farmer in Wisconsin was starting a new 10,000 gallon recirculating tank. He ordered 12,000, 3-5 inch pond-reared fingerlings from a producer in Nebraska. The fish arrived in September looking okay, other than 15 mortalities during shipment.

Fourteen days after arrival into the tank, the mortality rate began to rise up to 10% per day. The farmer called the Nebraska producer and said that the problem was due to her fish being diseased. She responded that the problem must be with his tank system, not her fish. So the farmer decided to call me to analyze the fish and water, and to sort things out.



Recirculating tank for the Yellow Perch rearing.

The veterinary health assessments indicated that the fish were showing signs of hemorrhage mainly at the bases of the fins, mostly on the pectoral fins and tail. There were also signs of hemorrhage at the rostrum or nose and occasionally the side of the fish, and the blood was dark and brown. No infectious organisms were found in the health assessment. Next I conducted water quality analysis, testing the primary water quality parameters.

In this case, the nitrite levels were 0.85 parts per million, or milligrams per liter. As you know, this follows the chain of events for the 'new tank syndrome' where nitrite levels increase to lethal levels around weeks two or three. The introduction of the large number of fish resulted in a new tank syndrome and led to a 30% cumulative mortality rate.

I recommended the addition of 1 Lb. of salt per 100 gallons of water (creating approximately 0.12% salinity). Salt will prevent the nitrite from being absorbed by the fish's gills, thus reducing the toxic

effects of nitrite in the water: brown-blood disease (methemoglobinemia).

The mortality rate was almost eliminated and



the perch began to feed again. However, some mortalities continued to persist until the third month when they dropped to near zero. By this time the tank had established a sufficient bacterial population to support the density of the fish and metabolize their waste products.

Mortality patterns and lesions similar to these can be seen with Ulcerative Dermal Necrosis (UDN) syndrome in yellow perch. In fact, this case could be argued to have secondary UDN and this contributed to the delay or failure to recover of many of the fish once the nitrite toxicity was treated.

It has been my experience that elevated nitrite levels are the most common cause of mortality of yellow perch (and some other species) in recirculating tank systems, occurring in every farm when producers introduce more fish than the filtration system can biologically accommodate. This has contributed to over a dozen Wisconsin yellow perch recirculating farms to fail in the past twenty years at a cumulative cost to the farm investors of over \$16 million. There are currently no successful commercial yellow perch recirculation farms in Wisconsin.

**Myron Kebus, MS, DVM**  
State Fish Health Veterinarian  
WDATCP, Division of Animal Health  
2811 Agriculture Dr.  
Madison, WI 53708-8911  
608-224-4876  
608-224-4871 fax  
[Myron.Kebus@wisconsin.gov](mailto:Myron.Kebus@wisconsin.gov)



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

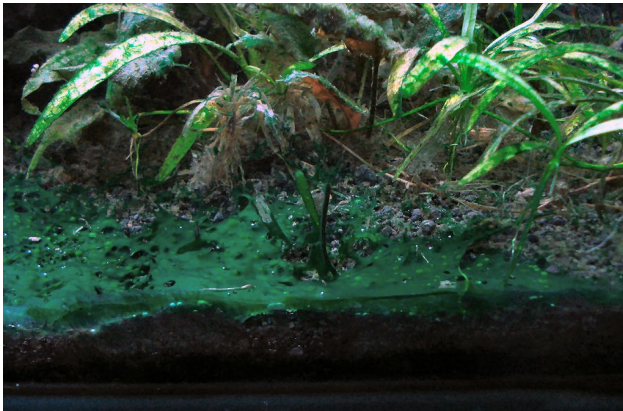
CLINICAL REPORTS

Fourth Quarter 2013

## Cyanobacteria Treatment in an Aquarium

**Dr Richmond Loh** *DipProjMgt, BSc, BVMS, MPhil*  
(Vet Path), *MANZCVS* (Aquatic Animal Health & Pathobiology), *CMAVA* –  
[The Fish Vet](#), Perth, Australia.

A client had an overgrowth of Cyanobacteria in his home aquarium. Ammonia and nitrite were 0 parts per million, nitrate was 5 ppm and phosphate 0.25 ppm. I started treatment of the tank with erythromycin around 5 pm on Friday.

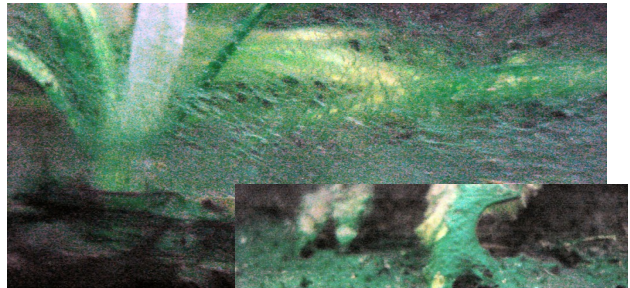


Above and below are some photos of the aquarium before treatment.



Naturally, the tank went a little cloudy when the medication was put into the system, but then cleared shortly after. In addition to the treatment, I also placed a pad of zeolite into the tanks trickle filter to absorb any ammonia. No adverse reaction was observed in the fish. In fact, some fish ate what little pieces of erythromycin that had not been fully dissolved!

After a short while, it could be seen the Cyanobacteria was reacting to the erythromycin. It showed up in areas on the glass and on the large thick clumps of Cyanobacteria. It began to 'pull-apart'. It was no longer a smooth appearing surface. This can be seen in the photos below.

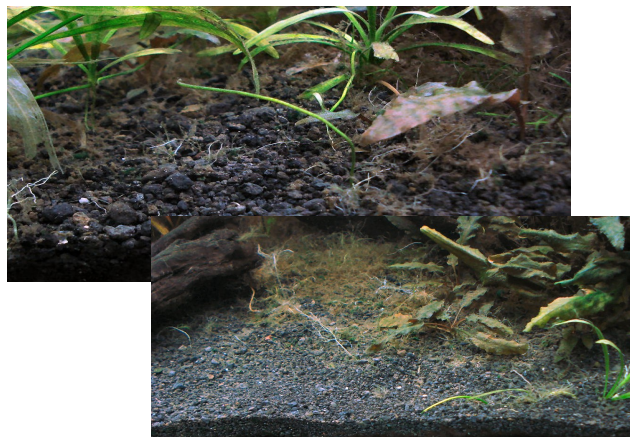


Twenty-four hours later, the client did a water change. As part of this change, the gravel had a



good cleaning and removed some plants. The gravel cleaning was successful in removing most of the dead or dying Cyanobacteria. What was not removed by this, was removed by hand.

After this water change, a test of the water quality was performed. Ammonia and nitrate measured 0 ppm. Nitrate at less than 5 ppm and phosphate was measured to be 0.50 ppm. Then 5 ppm of  $KNO_3$  was added to increase the nitrate to between 5 and 10 ppm for the aquarium plants. Below are pictures of the same areas taken after the treatment and cleaning.



All fish are doing great and never showed any signs of stress or discomfort apart from the large water change, but they are all happy again.

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

CLINICAL REPORTS

Fourth Quarter 2013

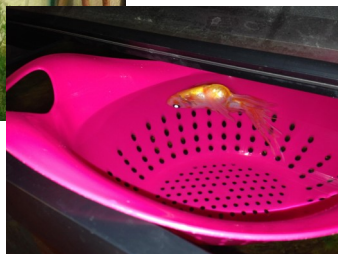
## Oranda Goldfish with a Buoyancy Disorder By Dr. Jena Questen

The client purchased the goldfish, Party Girl, approximately 2 years ago from a pet store. She now knows it is a male fish for she has seen him develop breeding tubercles on the operculum covers during the breeding season. The fish is kept in a 35 gallon aquarium with 3 other goldfish. Ever since first obtained, this particular fish has had occasional problems with bloating, turning upside down, and then not being to right himself. When this occurs the client hand feeds peas, and after a few days the condition resolves and the fish returns to a normal upright position. However, I was contacted when the fish was not responding to the pea treatment for nearly a month, and was getting progressively lethargic and now the other fish were beginning to pick at his fins.

Water quality parameters were all within normal limits; meaning the ammonia, nitrites, and nitrates were all nearly zero, and no fluctuation in pH changes, and the salt level was 0.04%. There is no heater in the aquarium. There is a nice gravel bed for biological filtration, as well as an over the side mechanical carbon filter. Aeration currents throughout the tank appear adequate and not too brisk. The fish have appropriate places to hide, and the other remaining fish in the tank appear physically normal, in good body condition, and are behaving normally. The client had placed the fish in a plastic pasta strainer suspended in the top of the tank to protect him from the other fish but still allow him to be in the same tank. She was hand feeding him 1 bloodworm, 2-3 goldfish pellets, and 2 peas daily. The fish was eating well and accustomed to being handled.



Party Girl in the floating strainer in the aquarium.



On physical examination the fish has a fork length of 2.5 inches, and a Body Condition Score of 4/9. There was a dense firm ceolomic mass with greater protrusion on the right than the left; gills are normal shape but slightly pale; the oral cavity is normal although also slightly pale; the fins are frayed and diffusely mild to moderately erythemic.

Careful percutaneous aspiration of the "mass" removed nothing but air, and the mass greatly reduced in size with the removal of 2.5 cc of gas. Cytology of the skin and the aspirate removed from the mass revealed no parasites, but a very few cocci bacteria. After aspiration the fish became less lethargic and was able to move with greater ease through the water column, although he still could not right himself.

Differential diagnosis includes swim bladder disease, neoplasia, and constipation due to the conformation body type of the fish and past history. My treatment plan includes:

- 1) Place an aquarium heater in the tank and raise and keep the temperature of the tank closer to 78-80 degrees Fahrenheit. While fish are sick fish, I usually recommend a slightly higher water temperature, if possible, as this helps maximize the function of the immune system. Once the fish is recovered, then the ideal temperature for the goldfish is 68-72 degrees F. Having a heater in there permanently that is adjusted to this temperature range would be more ideal for these fish. However, fish do not tolerate quick water temperature changes, so the water temperature should be raised slowly if possible over several hours. In fact, fish can die from an instant temperature change of 20 degrees, and should not have an instant temperature change of greater than 5-10 degrees at any one time.



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

CLINICAL REPORTS

Fourth Quarter 2013

2) Add 1 teaspoon aquarium salt /1 gallon of water to the tank to help improve osmoregulation of the fish and conserve energy, which should bring the salt concentration close to 0.1%. I usually give this general rule of thumb to aquarium fish caretakers who tend to not have a salt meter so that they do not accidentally add too much salt, or neglect to do regular water changes for water quality, and might accumulate too much salt. For pond folks with salt meters, I usually recommend keeping sick fish between 0.2-0.3% salt.

3) Continue hand feeding as she has been and offer fresh fruits as well, such as oranges and pineapple, being careful not to foul the water.

4) Continue to daily monitor and maintain ideal water quality, and keep the fish in isolation.

5) Do Epsom salt bath soaks with the fish, 1Tablespoon in 1 quart of water every 48 hours for a total of 3 treatments. This helps draw fluid and potentially feces out of the fish, which can sometimes improve this condition.

Follow up: 1 week later the client called to say the fish was much more energetic and eating well, but still unable to right himself. At this point we were discussing making the arrangements for transporting the fish into my fish hospital for radiographs and possibly a barium study for further diagnosis. Then miraculously two days later the client called and ecstatically explained to me that suddenly the fish was upright and swimming perfectly normally with no further signs of bloating or swimming abnormalities!



Party Girl swimming with her tank mates.

Although Epsom salt soaks have been known to improve this condition, it is also thought to often reoccur due to the complicated anatomical structure of this type of fancy goldfish.

Many thanks to Dr. Myron Kebus for his assistance with this case, and may Party Girl the male gold fish swim upright from now on!

[See the Grand Round Cases in this issue for more thoughts on goldfish buoyancy disorders—Editor]



Party Girl back in the tank swimming normally!

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

Send your article (<1,000 words) with pictures to  
[Saint-Erne@Q.com](mailto:Saint-Erne@Q.com)

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

GRAND ROUNDS CASES

Fourth Quarter 2013

## WAVMA Members-L: Farting goldfish

I've a client with two goldfish and one of them has frequent relapses of buoyancy disorder. Also noticed that when its buoyancy disorder is at its worst, this fish will produce faeces that contains trapped air bubbles; and so much of its poop floats to the water surface (a bit like tinsel that hangs from your living room ceiling at Christmas).

Do you have any ideas on whether this could be a contributory issue and how to remedy it? I've asked the owner to change its diet to a different brand, incorporate peas into their diet and maybe try some probiotics.

Yours sincerely,

### Dr Richmond Loh

BSc BVMS MPhil MANZCVS (Aq & Pathol)  
The Fish Vet, Perth, Western Australia.  
Veterinary Medicine for fish.

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

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

P: +61 (0)421 822 383

Hi Richmond,

I have seen this several times in goldfish. Gas production in the intestinal tract dis-equilibrates the neutral buoyancy status. Although I have no proof of infection (enteritis) as a cause, most have responded well to antibiotics (usually enrofloxacin injection IP q3d). Paradoxically, feeding peas may introduce high levels of free carbohydrates into the water column, possibly fueling a bacterial explosion. Just a thought ....

### Julius M. Tepper, DVM

My theory is this type of stool is a result of inflammatory bowel disease with numerous etiologies ....similar to other species...???

The swim bladder is embryologically derived from gut tissue, so it makes sense enteritis could have swim bladder involvement. [Especially since in goldfish and koi the gas bladder is connected to the pharynx by the pneumatic duct - editor] In addition to visible gas in the gastrointestinal tract on radiographs, the swim bladder lobes are also frequently affected.

Many options for symptomatic treatment: fiber from shelled peas, metronidazole, antibiotics, em-

piric anti-endoparasite treatment, species-specific probiotics, etc....

I've seen this type of stool with enteric parasites, acute diet change, adverse/stressful environmental conditions, etc. I think of it as goldfish diarrhea.

### Helen Roberts DVM

Great discussion and comments. I have seen several goldfish with GI gas accumulation and similar feces that ended up having intestinal flagellates and some with what I would consider 'intestinal bacterial overgrowth'. Worth checking a fecal wet mount and gram stained fecal smear. I find the ones with GI gas to be easier to treat than the standard distended swim bladder cases. As Helen mentions - dietary changes to increase fiber, metronidazole, other antibiotics, and probiotics are a great idea, but what product have you guys used in fish?

### Brian Palmeiro, VMD, Diplomate ACVD

Lehigh Valley Veterinary Dermatology & Fish Hospital

[www.lehighvetderm.com](http://www.lehighvetderm.com) [www.petfishdoctor.com](http://www.petfishdoctor.com)

I don't see any parasites or their ova on wet preps. Have sampled faeces for bacterial culture and possible antibiotic sensitivity. If nothing significant is found and condition persists, I'll go with empiric enrofloxacin, metronidazole and meloxicam treatment.

Probiotic-wise, there's none available commercially for fish, but have anecdotal reports that the ones used in humans may be useful.

### Dr Richmond Loh

## An example of floatation device used to help an oranda goldfish swim upright after an air bladder disorder.



See full story:

<http://swns.com/news/goldfish-crippled-bladder-diseases-stay-afloat-again-personal-life-jacket-34498/>



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

GRAND ROUNDS CASES

Fourth Quarter 2013

## **Bullhead shark (*Heterodontus* sp.) with *Uronema marinum* protozoa on gills**

Dear WAVMA Members-L:

I was contacted by a zoo veterinarian experiencing problems with *Uronema marinum* on the gills of *Heterodontus* species sharks. There are 3 sharks in a 17.5 m<sup>3</sup> tank. 1 died (was diagnosed with *Uronema* only on and in the gills, not in other organs); 1 shark is still fine and 1 is apathetic, breathes at 70/min, doesn't eat.

They are very interested in a dosage for toltrazuril because they use it in other animals as well. He was also asking about metronidazole injection. I don't have much experience in sharks, can anybody help? Would freshwater dips be a possibility or even hyper salinity?

Thanks a lot,

**Ralph Knüsel**, Dr. med. vet.

fishdoc GmbH            fon: +41 79 820 42 43  
Schaubhus                fax: +41 41 458 12 00  
CH-6026 Rain            email: [info@fishdoc.ch](mailto:info@fishdoc.ch)  
Switzerland              web: [www.fishdoc.ch](http://www.fishdoc.ch)

Dear Ralph,

I have never seen *Uronema* in sharks, whereas I have seen it many times in teleosts, unfortunately.

**Rob Jones**

"The Aquarium Vet"  
PO Box 2327 Moorabbin,  
Victoria, Australia, 3189  
[www.theaquariumvet.com.au](http://www.theaquariumvet.com.au)

Baths won't be effective because *Uronema* are highly invasive (in teleosts, I've found them in the muscle, coelomic cavity, organs and even brain!) and so they will be 'shielded' from superficial drugs, including osmotic challenge.

Metronidazole might work. Other drugs you could consider include toltrazuril (20 mg/kg BW po sid x 7d) and amprolium.

**Dr Richmond Loh** DipProjMgt, BSc, BVMS, MPhil  
(Pathology) Murdoch, MANZCVS  
(Aquatics & Pathobiology), Cert AqV.  
The Fish Vet, Perth, Western Australia.

W: <http://www.thefishvet.com.au>  
E: [thefishvet@gmail.com](mailto:thefishvet@gmail.com)  
P: +61 (0)421 822 383

We've recently recognised severe disease due to systemic scuticociliatosis caused by the *Uronema*-like protozoan *Philasterides dicentrarchi* in sharks. Typically a triad of necrotizing hepatitis, necrotizing meningoencephalitis, and thrombosing branchitis with intralesional ciliates affecting the liver, brain and gills, but other organs such as pancreas and skin may also be affected.

The first cases we recognised were in zebra, Port Jackson and Japanese horn sharks, all of which seem to be particularly predisposed, but we have now recognised it in other species, both since the initial cases were identified, and in retrospective review of earlier undiagnosed cases in our histology archive. "*Uronema*-like" ciliates on sharks should therefore be taken seriously, particularly in a *Heterodontus* species. Progression can be rapid in some of these cases.

See: **Systemic Scuticociliatosis (*Philasterides dicentrarchi*) in Sharks.**

Stidworthy MF, Garner MM, Bradway DS, Westfall BD, Joseph B, Repetto S, Guglielmi E, Schmidt-Posthaus H, Thornton SM. Vet Pathol. 2013 Jun 17.

**Mark Stidworthy**, MA VetMB PhD FRCPath MRCVS

RCVS Recognised Specialist in Veterinary Pathology (Zoo and Wildlife)

International Zoo Veterinary Group

Pathology laboratory direct line:

+ 44 (0)113 391 9710

Mobile: + 44 (0)7771 567506

**Laboratory address (for all sample submissions):**

IZVG Pathology

c/o Nationwide Laboratory Services, Leeds

2 Gateway Drive

Yeadon, Leeds UK LS19 7XY



# THE AQUATIC VETERINARIAN

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LITERATURE REVIEW

Fourth Quarter 2013

## AQUATIC VET EDUCATION ABSTRACTS

Compiled by David Scarfe

### Veterinary Work in the Field with Fish and Other Aquatic Species

Scott, PW (2013).

*J. Exotic Pet Med.*, 22 (1): 46–50.

#### Abstract

Veterinarians who work with fish and other aquatic species often must perform examinations, diagnostic investigations, and treatments away from the clinic or laboratory. Careful planning is important, and attention to biosecurity is essential. Various items of equipment form part of the field kit for such work and range from measuring scales to surgical instruments and anesthetic agents. Excellent recordkeeping at the site is essential.

### Expanding Veterinary Medical Education to Meet the Needs of Aquatic Animal Industries in Eastern Europe

Urdes LD, AD Scarfe, C Diaconescu & S Diaconescu (2012). *J. Intern'l. Sci. Pub.: Educational Alternatives*, 10 (1):158-165.

(An open access publication accessible at:

<http://www.scientific-publications.net/download/educational-alternatives-2012-1.pdf>)

#### Abstract

With rapid expansion of farmed fisheries (i.e. aquaculture) throughout the world, and the increasing number of pathogens and diseases that affect this industry, there is a desperate need to address education programmes that focus on aquatic animal health and welfare, public health and seafood safety. A well trained aquatic veterinary workforce is needed to support the growing needs of animal owners, industries and growing legislative and regulatory initiatives.

Unfortunately, relatively little attention has been given to formalized education within veterinary academic programs that provide new veterinarian graduates with “day-one” aquatic veterinary skills and competency essential to provide services to aquaculture clients. However, some examples in higher education curricula, (both in veterinary and non-veterinary undergraduate and postgraduate programmes), and options for extracurricular aquatic veterinary continuing education and professional development exist for veterinarians already in practice, and may serve as examples or models for similar programmes in Eastern Europe.

### Professional education and aquatic animal health – A focus on aquatic veterinarians and veterinary para-professionals

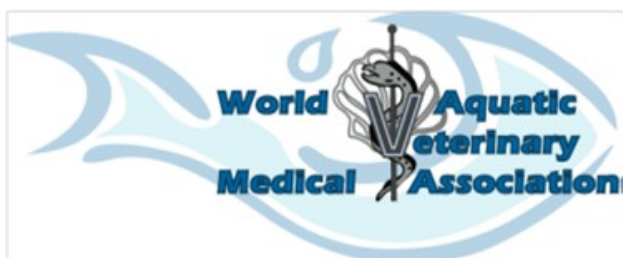
DeHaven WR & AD Scarfe (2012). *Proc. OIE Global Conference on Aquatic Animal Health Programmes. Panama, 28–30 June 2011*. World Organisation for Animal Health (OIE), Paris. pp: 139-154. (An open access publication accessible at <http://www.oie.int/doc/ged/D12238.PDF>)

#### Abstract

The rapid growth of global aquaculture has resulted in challenges typically seen in any new developing agricultural industry, including an increase in disease outbreaks among aquatic animal species. Ensuring an adequate number of well-trained and skilled aquatic veterinarians and veterinary para-professionals, together with the national, regional and global infrastructure to prevent, control and possibly eradicate aquatic animal diseases is, therefore, an imperative.

The current challenge in the burgeoning aquaculture field is to determine the diverse veterinary and paraveterinary skills and services needed in an aquatic veterinary workforce, the education necessary to ensure these skills, what educational and training programmes currently exist and what education refinements are needed to expand the workforce and produce deliverable veterinary services.

Several programmes to evaluate and address these needs have either recently been established or are in development in multiple countries around the globe. These include: the World Organisation for Animal Health (OIE) Performance of Veterinary Services (PVS) processes, including Gap Analysis, to evaluate a country's veterinary infrastructure; the efforts of the OIE Ad hoc Group on Veterinary Education (AHG) to examine minimum veterinary educational needs; and the development of academic and extra-academic educational opportunities and credentialing programmes for aquatic veterinarians and veterinary para-professionals.



## AQUATIC ANIMAL WELFARE ABSTRACTS

Compiled by David Scarfe

### Fish welfare and genomics

Prunet P, Ø Øverli, J Douxfils & G Bernardini (2012). *Fish Physiol.Biochem.*, 38 (1):43-60.

#### Abstract

There is a considerable public and scientific debate concerning welfare of fish in aquaculture. In this review, we will consider fish welfare as an integration of physiological, behavioral, and cognitive/emotional responses, all of which are essentially adaptative responses to stressful situations. An overview of fish welfare in this context suggests that understanding will rely on knowledge of all components of allostatic responses to stress and environmental perturbations.

The development of genomic technologies provides new approaches to this task, exemplified by how genome-wide analysis of genetic structures and corresponding expression patterns can lead to the discovery of new aspects of adaptative responses. We will illustrate how the genomic approach may give rise to new biomarkers for fish welfare and also increase our understanding of the interaction between physiological, behavioral, and emotional responses.

In the first part, we present data on expression of candidate genes selected a priori. This is a common avenue to develop molecular biomarkers capable of diagnosing a stress condition at its earliest onset, in order to allow quick corrective intervention in an aquaculture setting. However, most of these studies address isolated physiological functions and stress responses that may not be truly indicative of animal welfare, and there is only rudimentary understanding of genes related to possible cognitive and emotional responses in fish.

We also present an overview on transcriptomic analysis related to the effect of aquaculture stressors, environmental changes (temperature, salinity, hypoxia), or concerning specific behavioral patterns. These studies illustrate the potential of genomic approaches to characterize the complexity of the molecular mechanisms which underlies not only physiological but also behavioral responses in relation to fish welfare. Thirdly, we address proteomic studies on biological responses to stressors such as salinity change and hypoxia. We will also consider proteomic studies developed in mammals

in relation to anxiety and depressive status which may lead to new potential candidates in fish.

Finally, in the conclusion, we will suggest new developments to facilitate an integrated view of fish welfare. This includes use of laser microdissection in the transcriptomic/proteomic studies, development of meta-analysis methods for extracting information from genomic data sets, and implementation of technological advances for high-throughput proteomic studies. Development of these new approaches should be as productive for our understanding of the biological processes underlying fish welfare as it has been for the progress of pathophysiological research.

### Injuries and deformities in fish: their potential impacts upon aquacultural production and welfare

Noble C, HAC Jones & B Damsgård (2012). *Fish Physiol.Biochem.*, 38 (1):61-83.

#### Abstract

Fish can be the recipients of numerous injuries that are potentially deleterious to aquacultural production performance and welfare. This review will employ a systematic approach that classifies injuries in relation to specific anatomical areas of the fish and will evaluate the effects of injury upon production and welfare.

The selected areas include the (1) mouth, (2) eye, (3) epidermis and (4) fins. These areas cover a large number of external anatomical features that can be injured during aquacultural procedures and husbandry practices. In particular, these injuries can be diagnosed on live fish, in a farm environment.

For each anatomical feature, this review addresses (a) its structure and function and (b) defines key injuries that can affect the fish from a production and a welfare perspective. Particular attention is then given to (c) defining known and potential aquacultural risk factors before (d) identifying and outlining potential short- and long-term farming practices and mitigation strategies to reduce the incidence and prevalence of these injuries.

The review then concludes with an analysis of potential synergies between risk factors the type of injury, in addition to identifying potential synergies in mitigation strategies. The paper covers both aquaculture and capture-based aquaculture.

## **Considerations on Psychophysical Welfare of Fish Employed in Scientific Procedures and on Recommendation for 2007/526/EC.**

Manciocco A, P Coluccio & A Passantino (2010). *Ann. 1st Super Sanità*, 46(2): 198-203  
(An open access publication available at: [www.scielosp.org/pdf/aiss/v46n2/v46n2a14.pdf](http://www.scielosp.org/pdf/aiss/v46n2/v46n2a14.pdf)).

### **Abstract**

The use of fish for experimental purposes has seen a significant increase over the past years, consequently scientific findings on factors influencing welfare of these vertebrates are now available, as well as debates on their capacity of experiencing suffering are increasingly found in animal welfare discussions.

Nowadays, in Europe, the use of these animals as experimental models is regulated by the Recommendation 2007/526/EC, where in the Section on the species-specific guidelines for fish, aspects such as the environmental characteristics of housing, the monitoring of animal health, the general care of subjects (*i.e.* feeding, handling, transport), and the killing procedures, are considered.

In this manuscript, some aspects regarding the use of fish for human benefits will be discussed, and the suggestions provided by the European legislation are pointed out in order to identify limits and advantages.

## **Are fish the victims of 'speciesism'? A discussion about fear, pain and animal consciousness.**

Cottee SY (2012).

*Fish Physiol. Biochem.*, 38 (1):5-15.

### **Abstract**

Fish welfare is currently a hotly debated topic; this is mainly due to the issue of whether or not fish have the capacity for conscious awareness, or subjective states. Because of the contentious nature of animal consciousness, the subject is often avoided in many welfare arguments, but it is argued that since welfare should be about how animals feel, this issue is unavoidable. There is also good reason to believe that the issue of assessing subjective states is not as insurmountable as some believe.

## **Shock avoidance by discrimination learning in the shore crab (*Carcinus maenas*) is consistent with a key criterion for pain.**

Magee B & RW Elwood (2013).  
*J. Exp. Biol.*, 216: 353-358.

### **Abstract**

Nociception allows for immediate reflex withdrawal whereas pain allows for longer-term protection *via* rapid learning. We examine here whether shore crabs placed within a brightly lit chamber learn to avoid one of two dark shelters when that shelter consistently results in shock.

Crabs were randomly selected to receive shock or not prior to making their first choice and were tested again over 10 trials. Those that received shock in trial 2, irrespective of shock in trial 1, were more likely to switch shelter choice in the next trial and thus showed rapid discrimination. During trial 1, many crabs emerged from the shock shelter and an increasing proportion emerged in later trials, thus avoiding shock by entering a normally avoided light area. In a final test we switched distinctive visual stimuli positioned above each shelter and/or changed the orientation of the crab when placed in the chamber for the test. The visual stimuli had no effect on choice, but crabs with altered orientation now selected the shock shelter, indicating that they had discriminated between the two shelters on the basis of movement direction.

These data, and those of other recent experiments, are consistent with key criteria for pain experience and are broadly similar to those from vertebrate studies.

## **Welfare of farmed fish in present and future production systems (editorial notes).**

Kiessling A, H van de Vis, G Flik (2012).

*Fish Physiol. Biochem.*, 38 (1): 1-3.

### **Abstract**

The effort manifested in this special issue, dedicated to the welfare of farmed fish, is the joint result of members of the Cost action 867 "Welfare of Fish in European Aquaculture." This publication is supported by COST. COST is a framework for European Cooperation in the field of Scientific and Technical Research, which facilitates the coordination of nationally funded research on a European level. For the coordination and harmonization of national and EU level research project efforts, a network was established. The network comprised



26 countries, including Canada, New Zealand and Australia, and more than 100 researchers. The action began in 2006 and continued for 5 years, ended with a final meeting in Madrid, Spain, in March 2011.

The main aim of the action was to provide a meeting platform supporting (a) discussion and information between active researchers, (b) harmonization throughout Europe of the Welfare concept and (c) formulation of tomorrow's production systems introducing welfare as a management tool.

### **Behavioural indicators of welfare in farmed fish**

Martins CIM, L Galhardo & C Noble (2012).  
*Fish Physiol. Biochem.*, 38 (1):17-41.

#### **Abstract**

Behaviour represents a reaction to the environment as fish perceive it and is therefore a key element of fish welfare. This review summarises the main findings on how behavioural changes have been used to assess welfare in farmed fish, using both functional and feeling-based approaches.

Changes in foraging behaviour, ventilatory activity, aggression, individual and group swimming behaviour, stereotypic and abnormal behaviour have been linked with acute and chronic stressors in aquaculture and can therefore be regarded as likely indicators of poor welfare. On the contrary, measurements of exploratory behaviour, feed anticipatory activity and reward related operant behaviour are beginning to be considered as indicators of positive emotions and welfare in fish. Despite the lack of scientific agreement about the existence of sentience in fish, the possibility that they are capable of both positive and negative emotions may contribute to the development of new strategies (e.g. environmental enrichment) to promote good welfare.

Numerous studies that use behavioural indicators of welfare show that behavioural changes can be interpreted as either good or poor welfare depending on the fish species. It is therefore essential to understand the species-specific biology before drawing any conclusions in relation to welfare. In addition, different individuals within the same species may exhibit divergent coping strategies towards stressors, and what is tolerated by some individuals may be detrimental to others. Therefore, the assessment of welfare in a few individuals may not represent the average welfare of a group and vice versa.

This underlines the need to develop on-farm, operational behavioural welfare indicators that can be easily used to assess not only the individual welfare but also the welfare of the whole group (e.g. spatial distribution). With the ongoing development of video technology and image processing, the on-farm surveillance of behaviour may in the near future represent a low-cost, noninvasive tool to assess the welfare of farmed fish.

### **Health of farmed fish: its relation to fish welfare and its utility as welfare indicator**

Segner H, H Sundh & K Buchmann (2012).  
*Fish Physiol. Biochem.*, 38 (1):85-105.

#### **Abstract**

This brief review focuses on health and biological function as cornerstones of fish welfare. From the function-based point of view, good welfare is reflected in the ability of the animal to cope with infectious and non-infectious stressors, thereby maintaining homeostasis and good health, whereas stressful husbandry conditions and protracted suffering will lead to the loss of the coping ability and, thus, to impaired health.

If fish are subjected to unfavourable husbandry conditions, the resulting disruption of internal homeostasis necessitates energy-demanding physiological adjustments (allostasis/acclimation). The ensuing energy drain leads to trade-offs with other energy-demanding processes such as the functioning of the primary epithelial barriers (gut, skin, gills) and the immune system. Understanding of the relation between husbandry conditions, allostatic responses and fish health provides the basis for the second theme developed in this review, the potential use of biological function and health parameters as operational welfare indicators (OWIs). Advantages of function- and health-related parameters are that they are relatively straightforward to recognize and to measure and are routinely monitored in most aquaculture units.

As the efforts to improve fish welfare and environmental sustainability lead to increasingly diverse solutions, in particular integrated production, it is imperative that we have objective OWIs to compare with other production forms, such as high-density aquaculture. However, to receive the necessary acceptance for legislation, more robust scientific backing of the health- and function-related OWIs is urgently needed.

## Sea Turtles Eating Plastic At Record Rates Amid Surge In Pollution

Mother Nature Network, Russell McLendon

Sea turtles around the world are eating plastic at an unprecedented pace, a new study reveals, with some species eating twice as much as they did 25 years ago. This indigestible, potentially fatal diet is especially popular among young turtles in the open ocean, deepening concerns about the ancient animals' long-term outlook.

Plastic bags can bear a striking resemblance to jellyfish underwater, and scientists have long known they have a tendency to confuse hungry sea turtles. But the problem has exploded lately amid a [historic surge in plastic pollution](#), which is forming giant oceanic "garbage patches" that are expected to continue growing for centuries. The new study is the first global analysis of the issue since 1985, covering more than a quarter century of research on green and leatherback sea turtles, both of which are endangered.

While younger turtles eat more gut-clogging plastic than their elders - a troubling trend for animals with such slow reproduction rates - the researchers say the phenomenon is more complex than it appears. Turtles stranded in cluttered coastal areas, for example, don't seem to eat as much plastic as turtles living farther away from people.

"Our research revealed that young, ocean-going turtles were more likely to eat plastic than their older, coastal-dwelling relatives," lead author Qamar Schuyler says in a [press release](#) about the research, which was published this month in the journal *Conservation Biology*. "Amazingly, turtles found adjacent to the heavily populated New York City area showed little or no evidence of debris ingestion, while all of the turtles found near an undeveloped area of southern Brazil had eaten debris."

That shouldn't be taken as *carte blanche* to litter coastlines, though. About 80 percent of all marine debris comes from land, so cleaning up Coney Island or Copacabana Beach could benefit sea turtles near and far. Instead, Schuyler says, the findings point to the need for a more holistic approach to protecting turtles and other sea life from plastic.

"This means conducting coastal cleanups is not the single answer to the problem of debris ingestion for local sea turtle populations, although it is an important step in preventing marine debris input," Schuyler says. "[The data] indicate oceanic leather-

back turtles and green turtles are at the greatest risk of being killed or harmed from ingested marine debris. To reduce this risk, manmade debris must be managed at a global level, from the manufacturers through to the consumers — before debris reaches the ocean."

Managing the planet's flood of plastic is a tall order, though. Some 240,000 plastic bags are used globally every 10 seconds, [according to the Sierra Club](#), and fewer than 5 percent are recycled. U.S. municipal waste is now [13 percent plastic](#), up from 1 percent 50 years ago, and the average American now uses 300 to 700 plastic bags per year. Broad statistics are scarce, but plastic bags make up roughly 14 percent of all shoreline litter in California, according to an [EPA report](#), and about a quarter of trash in Los Angeles storm drains.

Still, efforts to rein in plastic pollution have gained momentum in recent years. And since a [recent study](#) showed sea turtles actually use sanctuaries created for them, protecting more habitat might help offset pressure from other manmade dangers like [egg poaching](#) and [light pollution](#).

## Taiwan seizes rare turtles bound for China

Aug 25, 2013—Australian Broadcasting Network

Taiwan coastguards have seized more than 2,500 protected turtles bound for dinner plates in China, officials say, calling it the biggest smuggling case of its kind they have ever seen. Coastguards discovered the 2,626 rare turtles - 1,180 Asian yellow pond turtles and 1,446 yellow-lined box turtles - in a container on board a vessel in Kaohsiung, a port in the south of Taiwan.

The animals were to be eaten by rich Chinese or used as an ingredient there in traditional medicine, officials said, adding it was the biggest seizure in Taiwan of protected turtles.

"After consuming up their own turtles, now they are turning their eyes to south-east Asia and Taiwan," Lin Kuo-chang, an official in charge of conservation affairs at Taiwan's council of agriculture, said.

Because the number of wild turtles is in sharp decline in China, market prices have surged to about five times those of Taiwan, which is separated by a 200-kilometre strait from the Chinese mainland.

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

NEWS AND VIEWS

Fourth Quarter 2013

## **World's Largest Freshwater Turtle Nearly Extinct- The last known pair of Yangtze giant softshell turtles mated again in June.**

Kaitlin Solimine, [National Geographic](#), July 1, 2013

The fate of a species is resting on the shells of two turtles at China's [Suzhou Zoo](#). In June, researchers collected eggs from the last mating pair of the critically endangered Yangtze giant softshell turtle (*Rafetus swinhoei*) in the hopes that at least one will be fertile.

The 220-pound (100-kilogram) freshwater giant, which spends most of its life burrowing in mud, was once common in its namesake Yangtze River, China's Lake Taihu and Yunnan Province, and parts of Vietnam. By the late 1990s, however, human encroachment and poaching for use of the shells in Chinese traditional medicine rapidly depleted the population. Now, a total of four animals are known—two wild males in Vietnam and the mating pair at Suzhou Zoo.

It's the team's sixth year of breeding the turtles at the zoo, which is not far from Shanghai. So far, none of the eggs have hatched. Researchers can't pinpoint the reason for the infertility, but they suspect a combination of factors, including poor sperm quality due to the male's age—roughly a hundred—an improper mating posture, and stress on the female.

Because the turtles are the last in captivity and too much human interaction could kill them, sperm samples cannot be taken nor tests run. Still, scientists are hoping that this year will be the lucky one.

"The resurrection of this iconic species in the wild, the largest freshwater turtle in the world, would be a symbol of hope," said Gerald Kuchling, founder of the Australia-based group [Turtle Conservancy](#) and a turtle-reproduction expert.

As is the case with many near-extinct species, by the time scientists realized the extent of the turtle's decline, the species was almost gone. In 2006, the U.S. nonprofit [Turtle Survival Alliance](#) asked Kuchling to establish the sex of the last three captive giant softshell turtles in China, which at the time lived at the Shanghai Zoo, Suzhou Zoo, and Suzhou's West Garden Buddhist Temple.

When Kuchling landed in China in 2007, the Shanghai Zoo and Buddhist Temple individuals had already died. The Suzhou Zoo male was the last known Chinese survivor. Researchers sent an all-points bulletin to every zoo in the nation in the off chance a turtle had been misidentified.

Their call was answered: A photograph of a turtle at the Changsha Zoo looked promising. Kuchling, along with Lu Shunqing, China director for the [Wildlife Conservation Society](#), traveled to Changsha, where they confirmed it was a Yangtze giant softshell—and a female to boot.

Although moving the Changsha Zoo's female—the younger of the pair at then 80 years old—to the Suzhou Zoo was risky because of the stress it would cause the animal, zoo officials and researchers had no choice.

Surveys in the wild consistently had turned up no Yangtze giant softshells aside from the two males already known in Vietnam. These individuals haven't been captured because catching and transporting them could be fatal. Either the Suzhou Zoo pair would mate, or the species would go extinct.

In May 2008, after much red tape, the female finally arrived in Suzhou. Just over a week later, the turtles mated, despite the fact that the female had likely never met a male. A month later, the female laid her first clutch of 45 eggs on the zoo enclosure's beach, 32 of which were incubated.

To determine if an egg is fertile, the scientists candle them, or hold a candle behind the egg to look for a developing embryo. The initial batch yielded no hatchlings. Later that month, a second batch was equally infertile. The turtles mated each of the following years, but with the same result.

Di Min, a zoologist at the Suzhou Zoo, said when the program started there was talk about assisted reproductive techniques, a kind of "turtle IVF."

"But the best and safest is they breed naturally. There's only this pair—if we lose one, especially the female, we don't have any chance."

The team doesn't know how much longer the zoo turtles will live or continue to mate, but scientists suspect Yangtze giant softshells can live well over a hundred years.

Despite these setbacks, scientists are staying optimistic about saving the turtle.

"We have these two [Suzhou] animals, and hopefully in the very near future, as opposed to far distant, we'll have baby Rafetuses on our hands," added field assistant King.

"In one shape or another, the program will go on, because everyone is invested in having this species continue."

[Excerpt from original article]

# THE AQUATIC VETERINARIAN

Volume 7, Number 4 **LEGISLATIVE & REGULATORY ISSUES** Fourth Quarter 2013

## CITES—New Turtles on Appendix I and II

Forty-four species of Asian freshwater turtles and tortoises and three species of North American pond turtles received increased protections at CoP16. The following table outlines the changes to the [CITES Appendices](#). For Appendix-II species, you will need to obtain the proper CITES documentation to conduct international commercial trade. International trade for primarily commercial purposes is effectively prohibited for Appendix-I listed species.

These listings will have little effect on the average hobbyist or pet owner. If you do plan to travel internationally with your pet, please refer to the Service's website on "[personal pets](#)." However, as a pet owner and consumer you should make sure that you always purchase reptiles and amphibians from a reputable seller/breeder/dealer. Ask questions. Where did the animals come from? Were the animals legally acquired? If the juveniles are captive bred were the parents legally acquired? Be an informed consumer and help ensure that trade is legal and sustainable.

If you have any questions regarding the required CITES documentation for these species, please contact the Division of Management Authority at [managementauthority@fws.gov](mailto:managementauthority@fws.gov).

### APPENDIX I

Burmese star tortoise (*Geochelone platynota*)  
Big-headed turtle (*Platysternon megacephalum*)  
Asian Narrowheaded Softshell (*Chitra chitra*)  
Burmese Narrowheaded Softshell (*Chitra vandijki*)

### APPENDIX II

#### North American Turtle Species

Spotted turtle (*Clemmys guttata*)  
Blanding's turtle (*Emydoidea blandingii*)  
Diamondback terrapin (*Malaclemys terrapin*)

#### Asian Turtle/Tortoise Species

Malayan Softshelled turtle (*Dogania subplana*)  
Leith's Softshell turtle (*Nilssonina leithii*)  
Burmese Peacock Softshell turtle (*Nilssonina formosa*)  
Wattlenecked Softshell turtle (*Palea steindachneri*)  
Hunan Softshell turtle (*Pelodiscus axenaria*)  
Northern Chinese Softshell turtle (*Pelodiscus maackii*)  
Lesser Chinese Softshell turtle (*Pelodiscus parviformis*)  
Swinhoe's Giant Softshell turtle (*Rafetus swinhoi*)  
Japanese Pond turtle (*Mauremys japonica*)

Red-necked Pond turtle (*Mauremys nigricans*)  
Indian Black turtle (*Melanochelys trijuga*)  
Indian Eyed turtle (*Morenia petersi*)  
Beal's Eyed turtle (*Sacalia bealei*)  
Four-eyed turtle (*Sacalia quadriocellata*)  
Cochin Forest Cane turtle (*Vijayachelys silvatica*)  
Western Blackbridged Leaf turtle (*Cyclemys atripons*)  
Asian Leaf turtle (*Cyclemys dentate*)  
*Cyclemys shanensis*  
Southeast Asian Leaf turtle (*Cyclemys oldhamii*)  
Eastern Blackbridged Leaf turtle (*Cyclemys pulchriata*)  
Ryukyu Blackbreasted Leaf turtle (*Geoemyda japonica*)  
Black-breasted Hill turtle (*Geoemyda spengleri*)  
Crowned River turtle (*Hardella thurjii*)

## Philippines finds hoard of endangered species

July 05, 2013,  
[AFP](#); MANILA (AFP) –

Five dead crocodiles, 14 critically endangered turtles and a cache of other rare species have been found in the home of a suspected wildlife trader in one of the Philippines' biggest slums, the government said Friday.

The juvenile saltwater crocodiles, as well as 90 birds, were killed by the trader or his aides shortly before police and environment officials raided the place, Environment Secretary Ramon Paje said. He denounced the unnamed suspects' "cruelty".

"What's particularly alarming about this poaching incident is that there were reports that most of these endangered animals were intentionally killed to avoid detection by authorities," Paje said.

The authorities also found 14 live Philippine forest and pond turtles in the address in Manila's Tondo slum district, he added. The turtle species are considered "critically endangered" according to global "red list" compiled by the Swiss-based International Union for the Conservation of Nature.

All the animals, which also included 78 Palawan hill mynahs and 12 blue-naped parrots, are protected by Philippine law, which prohibits their trade or capture. Paje said an informant tipped off the government that a wildlife trafficker was shipping protected animals to Manila from the western Philippine island of Palawan, one of the country's last wildlife refuges. They were to have been sold in Manila markets known for peddling wild animals as pets, Paje said. Police and wildlife officers found



# THE AQUATIC VETERINARIAN

Volume 7, Number 4 **LEGISLATIVE & REGULATORY ISSUES** Fourth Quarter 2013

the dead animals outside the house, which reeked of a foul odour, he added.

"The...administration is dead serious about stopping not only the destruction of our environment but also wildlife crime," Paje said.

Last month, the Philippines crushed five tonnes of smuggled elephant tusks, making it the first country in Asia to destroy its ivory stockpiles in support of global efforts to stamp out the illegal wildlife trade.

## **No green economy without blue economy, says UN Food and Agricultural Organization** Apia, Samoa/Rome

Efforts to end hunger and fight the effects of climate change in the Pacific Islands will hinge on the success of sustainable development, including wise use of oceans and fisheries, FAO Director-General José Graziano da Silva told ministers from the region today. "There can be no truly 'green economy' without a 'blue economy', one that makes the sustainable development of oceans and fishery resources a priority," Graziano da Silva said. "The importance of capture fisheries and aquaculture cannot be neglected. They provide over 3 billion people with about 15 percent of their average per capita intake of animal protein. And these two activities contribute over 200 million jobs globally. At the same time, these vital services must not jeopardize the key role oceans play in regulating the earth's climate. The oceans absorb more than 25 percent of the carbon dioxide emitted into the atmosphere from human activities."

Speaking at the 10th Meeting of FAO South West Pacific Ministers for Agriculture in the Samoan capital, Graziano da Silva also said addressing climate change had become "a question of survival – just like hunger." The South West Pacific area accounts for roughly 15 percent of the globe, and includes about two thousand islands and atolls, which are particularly vulnerable to storms and flooding, water scarcity, and stresses on fishery and forestry systems. The Director-General said one of FAO's priorities was to work on the especially urgent climate change issues faced by Small Island Developing States (SIDS) and low-lying coastal areas in the Pacific and all regions.

FAO supports Pacific island countries in many ways, in part, by working to broaden and deepen implementation of internationally agreed norms, like the Code of Conduct for Responsible Fisheries



and related instruments. The organization works with governments and partners at the national, regional and international levels on issues like illegal, unreported and unregulated fishing; the management of tuna fishing; and the management of marine areas beyond national jurisdictions.

Graziano da Silva pointed out that the world had gained ground in the fight against hunger, but there was still much work to be done to improve both food security and the quality of nutrition, and to achieve the Millennium Development Goal to halve by 2015 the proportion of people who suffer from hunger, as measured against 1990 benchmarks. Graziano da Silva also noted that three-quarters of all adult deaths in the Pacific are linked to nutrition and lifestyle-related diseases. He highlighted the importance of addressing nutritional issues by implementing integrated nutrition strategies, diversifying diets and recovering the use of traditional, local crops produced by smallholders.

The main task before participants of the meeting was to review and adopt an overall plan for FAO's work in 14 countries in the region from 2013 to 2017. "The support FAO offers you must respond to your development needs and priorities, as laid out in your sustainable development plans," said the FAO Director-General, who also stressed the importance of aligning them with FAO's revised strategic framework.

During his three-day visit, Graziano da Silva was bestowed with an honorary chiefly title during the Samoan Ava ceremony. He was scheduled to meet with Samoan Prime Minister Tuilaepa Aiono Sailele Malielegaoi, ministers from other countries in the region, and local representatives of civil society and the private sector. The Director-General was on his first visit to the Pacific islands since taking the helm of the hunger-fighting agency.

# THE AQUATIC VETERINARIAN

Volume 7, Number 4 **LEGISLATIVE & REGULATORY ISSUES** Fourth Quarter 2013

## **FDA Takes Significant Steps to Address Antimicrobial Resistance**

FDA is implementing a plan to ensure judicious use of antibiotics in food animals. The proposed plan is open for comments until March 10, 2014.

The U.S. Food and Drug Administration is implementing a plan to help phase out the use of medically important antimicrobials in food animals for food production purposes, such as to enhance growth or improve feed efficiency. The plan would also phase in veterinary oversight of the remaining appropriate therapeutic uses of such drugs.

Certain antimicrobials have historically been used in the feed or drinking water of cattle, poultry, hogs, and other food animals for production purposes such as using less food to gain weight. Some of these antimicrobials are important drugs used to treat human infection, prompting concerns about the contribution of this practice to increasing the ability of bacteria and other microbes to resist the effects of a drug. Once antimicrobial resistance occurs, a drug may no longer be as effective in treating various illnesses or infections.

Because antimicrobial drug use in both humans and animals can contribute to the development of antimicrobial resistance, it is important to use these drugs only when medically necessary. The plan announced today focuses on those antimicrobial drugs that are considered medically important (i.e., are important for treating human infection) and which are approved for use in feed and water of food animals.

In a final guidance issued today, the FDA lays out a road map for animal pharmaceutical companies to voluntarily revise the FDA-approved use conditions on the labels of these products to remove production indications. The plan also calls for changing the current over-the-counter (OTC) status to bring the remaining appropriate therapeutic uses under veterinary oversight. Once a manufacturer voluntarily makes these changes, its medically important antimicrobial drugs can no longer be used for production purposes, and their use to treat, control, or prevent disease in animals will require veterinary oversight.

The FDA is asking animal pharmaceutical companies to notify the agency of their intent to sign on to the strategy within the next three months. These companies would then have a three-year transition process.

“Implementing this strategy is an important step forward in addressing antimicrobial resistance. The FDA is leveraging the cooperation of the pharmaceutical industry to voluntarily make these changes because we believe this approach is the fastest way to achieve our goal,” said FDA Deputy Commissioner for Foods and Veterinary Medicine Michael Taylor. “Based on our outreach, we have every reason to believe that animal pharmaceutical companies will support us in this effort.”

In order to help phase in veterinary oversight of those drugs covered by the guidance that are intended for medically appropriate uses in feed, the FDA also has issued a proposed rule to update the existing regulations relating to Veterinary Feed Directive (VFD) drugs. The use of VFD drugs requires specific authorization by a licensed veterinarian using a process outlined in the agency’s VFD regulations. The VFD proposed rule is intended to update the existing VFD process and facilitate expanded veterinary oversight by clarifying and increasing the flexibility of the administrative requirements for the distribution and use of VFD drugs. Such updates to the VFD process will assist in the transition of OTC products to their new VFD status.

“This action promotes the judicious use of important antimicrobials to protect public health while ensuring that sick and at-risk animals receive the therapy they need,” said Bernadette Dunham, DVM, Ph.D., director of the FDA’s Center for Veterinary Medicine. “We realize that these steps represent changes for veterinarians and animal producers, and we have been working -- and will continue to work -- to make this transition as seamless as possible.”

See <http://tinyurl.com/kcek648> for more information.

The guidance for animal pharmaceutical companies is now in final form, and the proposed VFD rule is open for public comment for 90 days starting on Dec. 12, 2013. To electronically submit comments on the proposed VFD rule, go to: [www.regulations.gov](http://www.regulations.gov) and insert docket FDA-2010-N-0155.

Send written comments to the Division of Dockets Management, Food and Drug Administration, Room 1061, 5630 Fishers Lane, Rockville, MD 20852. Consumer and Industry Inquiries should be addressed to [AskCVM@fda.hhs.gov](mailto:AskCVM@fda.hhs.gov).

# THE AQUATIC VETERINARIAN

Volume 7, Number 4 **LEGISLATIVE & REGULATORY ISSUES** Fourth Quarter 2013

## **OIE Tool for the Evaluation of Performance of Aquatic Veterinary Services**

Paris - In this era of globalisation, the development and growth of many countries, as well as the prevention and control of major biological disasters, depends on the performance of their agricultural and food policies and economies, and this, in turn, directly relates to the quality of their Veterinary Services (VS).

Strengthening of VS to help them comply with OIE international standards for quality and evaluation requires active participation and investment by both the public and the private sector. The World Organisation for Animal Health (OIE) has refined an Evaluation Tool which is designed to assist VS to establish their current level of performance, to identify gaps and weaknesses in their ability to comply with OIE international standards, to form a shared vision with stakeholders (including the private sector) and to establish priorities and carry out strategic initiatives.

The production of and trade in aquatic animals and their products is of increasing importance and the aquaculture sector is growing fast in response to the strong and growing global demand for high quality protein. In some countries the VS are the competent authority for aquatic animal health services (AAHS), but in some countries other agencies of government hold this responsibility.

Regardless of whether veterinarians are involved in the AAHS, it is clear that the general principles for quality would be similar to those that apply to VS. For example, appropriate legislation and good governance are required to support AAHS in complying with OIE requirements, including for disease detection, reporting and control.

The application of the PVS Tool to the evaluation of AAHS commenced in 2009 when the OIE undertook a pilot mission in Vietnam. Following this mission and several subsequent missions, it was clear that a stand-alone tool for the evaluation of an AAHS was necessary due to differences between the terrestrial and aquatic sectors. The OIE has developed the OIE Tool for the Evaluation of Performance of Veterinary Services and/or Aquatic Animal Health Services ("OIE PVS Tool: Aquatic") which is based on the sixth edition of the OIE PVS Tool and includes amendments to some critical competencies (CC) and Levels of Advancement so that the Tool is more appropriate for the evaluation of the performance of AAHS.

## **Applying the "OIE PVS Tool: Aquatic"**

To establish the current level of performance, form a shared vision, establish priorities and carry out strategic initiatives, six to thirteen critical competencies have been elaborated for each of the four fundamental components. For each critical competency, qualitative levels of advancement are described. A higher level of advancement assumes that the VS/AAHS are complying with the preceding (non 1) levels (i.e. level 3 assumes compliance with level 2 criteria; level 5 assumes compliance with level 4 and preceding criteria; etc.). Additional critical competencies might be added with the evolution of these tools.

The OIE has provided a Manual for Assessors, containing information and procedures relevant to the conduct of an OIE PVS Evaluation, including a list of suggested indicators used by PVS assessors. Chapter 3.1. of the Aquatic Animal Health Code (Aquatic Code) provides a legal base for the OIE quality requirements for AAHS where these are not covered by the Veterinary Services.

The benefits and outcomes of using the OIE PVS Tool and the OIE PVS Tool: Aquatic include: An indication of overall performance for each of the four components and a relative performance rating within each of the critical competencies; A basis for comparing the performance of the VS/AAHS with that of other relevant government services; Providing the basis for verifying compliance with the OIE standards and assessments of VS/AAHS by external or independent bodies under the OIE; Where gaps are identified in the course of a PVS Evaluation, through the conduct of an OIE Veterinary Legislation Identification Mission, obtaining an indication of the specific actions needed to modernise the veterinary legislation to the OIE standards.

Through the conduct of a specific follow up, i.e. the OIE PVS Gap Analysis, helping countries to identify priorities and present justifications when applying for financial support from national governments or international donors; Providing a basis for establishing a routine monitoring mechanism on the overall level of performance of the VS/AAHS over time; Helping to determine the benefits and costs of investing in VS/AAHS and identifying the actions and securing the investments that are needed to help improve compliance with the OIE standards for Good Governance.

For more information on the OIE PVS Process, and to download a copy of the "OIE PVS Tool: Aquatic," go to [www.oie.int/en/support-to-oie-members/pvs-pathway](http://www.oie.int/en/support-to-oie-members/pvs-pathway).



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

AQUATIC VETERINARY CE & PD

Fourth Quarter 2013



## 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.

### AQUACULTURE AMERICA 2014

Aquatic Veterinary Medicine Program

February 9 - 12, 2014

Seattle, Washington, USA

AVMA & WAVMA members receive discount registration rates. Presentations pertinent to practicing veterinarians and aquaculture producers are suitable for veterinary Continuing Education, veterinarians attending will receive a veterinary CE certificate of participation.

# WORLD AQUACULTURE Society

WAS  
Adelaide,  
South  
Australia  
June 7 -  
11, 2014

[World  
Aquacul-  
ture 2014](#)



## AQUACULTURE AMERICA



# 2014

### International Conference "Innovations in feeding technologies and commercial fish farming"

Feb 04, 2014

All-Russia Exhibition Centre, Moscow

International Conference "Innovations in feeding technologies and commercial fish farming" will be held in Moscow February the 4th, 2014, at the All-Russian Exhibition Centre in the frame work of the 19th International Trade Fair "Cereals-Mixed Feed - Veterinary-2014", which is the largest professional forum in Russia, bringing together the foremost domestic and overseas exhibitors.

Topics of the Conference include: Feeds for commercial fish farming, Modern market of fish feeds, Cost effective use of feed and balance between economy and quality of fish, Use of alternative feed and quality of final fish product, New feeding technologies, Modern technologies and equipment, New technological solutions for commercial fish farming, Technical facilities for commercial fish farming, Equipment for fish farming, Feeding equipment for fish farms, Fish processing equipment.



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

AQUATIC VETERINARY CE & PD

Fourth Quarter 2013



AQUATIC MEDICINE SEMINAR 2014

## Shark Reef Aquarium Aquatic Medicine Seminar 2014 Mandalay Bay Resort and Casino February 14th, 15th, and 16th

ACCREDITED BY THE  
**ASSOCIATION  
OF ZOOS &  
AQUARIUMS**

The Shark Reef Aquatic Medicine Seminar 2014 is set to go - with an even more focused and in-depth program than ever. Join us in Las Vegas for three days of information packed presentations centered on practical applications of aquatic medicine in day-to-day situations. The seminar includes a fully "hands-on" wet lab - allowing you to engage not only the animals and the process - but work side-by-side with some of the best aquatic veterinary specialists in the country. You will also be able to join us for our very special ice breaker hosted by the Mirage Dolphin Habitat in their beautiful facility.

The following speakers are scheduled to present:

**Lisa Hoopes** Georgia Aquarium  
-Elasmobranch Nutrition: Diet and Feeding  
-Elasmobranch Nutrition: Supplementation

**Tonva Claus** Georgia Aquarium  
-Diving Deeper into Sandtiger Management: Updates from the Field and Aquaria  
-Managing Wounds & Abrasions in Elasmobranchs

**Jayne Gardiner** Mote Marine Labs  
-The Sensory Basis of Shark Feeding Behavior I: Finding Food  
-The Sensory Basis of Shark Feeding Behavior II: Capturing Food

**Greg Lewbart** NC State University  
-Advances in Invertebrate Medicine

**Scott Weber** USDA Foreign Agricultural Service  
-Environmental and Nutritional Conundrums in Aquatic Animal Medicine: Case Perspectives  
-Gastroenterology for the Piscine Patient

**Tim Hovanec** Dr. Tim's Aquatics LLC  
-Comparing Aerobic and Anaerobic Use of Biodegradable Carbon to Control Nutrients in Saltwater Systems  
-Ammonia, Nitrite and Nitrate Toxicity in Marine Fish and Elasmobranchs

**Lysa Posner** NC State University  
-Can Fish Feel Pain (The Pain Pathway in Teleost Fish)?  
-Alternative Fish Anesthetics (Propofol and Alfaxalone)

**Doug Mader** The Turtle Hospital  
-Skin Diseases in Reptiles  
-Reptilian Burns and Abscesses - The Healing Process

### Wet Lab

Wet Lab (limited to 30 participants)  
Sea Turtle Conditioning Session  
Round Tables (Shark Reef Classroom)

Fees:  
Lectures \$350.00  
Wet Lab \$75.00  
\$100.00 Late Fee

RACE Approved  
Continuing Education  
Provider # 543

For additional information  
please contact:

Jack Jewell  
jjjewell@mandalaybay.com

Ashley Lucero  
alucero@mandalaybay.com

or call 702.632.4559

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

AQUATIC VETERINARY CE & PD

Fourth Quarter 2013

## 2014 AQUAVET® I & II & III

The University of Pennsylvania School of Veterinary Medicine and the College of Veterinary Medicine at Cornell University are pleased to announce the 2014 AQUAVET® I, II & III course offerings. They are aquatic veterinary medicine education programs that currently consist of two courses that will be presented at Roger Williams University in Bristol, RI in June 2014 and one on aquarium medicine which is at three venues.

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

**AQUAVET® II: Comparative Pathology of Aquatic Animals** is a 2-week course (27 May - 7 June 2014) that is oriented toward the pathology of diseases of aquatic invertebrates and fish that are used in biomedical research, encountered in display aquaria and are of importance in commercial aquaculture.

**AQUAVET® III: Clinical Aspects of Captive Aquatic Animal Medicine** is a 5 week course (following AQUAVET® I) and is limited to a small number of students. The venues include Georgia Aquarium, U of GA (Athens, GA) and Dolphinaris, Cancún, México.

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

More detailed information and applications for admission (due by January 15, 2014) are available on the web site [www.aquavet.info](http://www.aquavet.info).



PHOTO from  
AQUAVET III  
2013

## 16th International Symposium of Fish Nutrition and Feeding

**May 25, 2014 - May 30, 2014**

Cairns, Australia

The International Symposium on Fish Nutrition and Feeding is the premier international forum for researchers, academics and industry concerned with the nutrition and feeding of aquatic animals. The Symposium typically attracts 300–700 researchers, academics and industry representatives from throughout the world. The venue of the International Symposium on Fish Nutrition and Feeding (“ISFNF 2014”) will be the award winning facilities at the Cairns Convention Centre—Australia’s gateway to the Asia Pacific. This world acclaimed convention centre is everything you would expect from an international standard purpose-built venue located amidst the World Heritage Great Barrier Reef and ancient tropical rainforests.

For more information see: [www.ISFNF2014.org](http://www.ISFNF2014.org)

## International Congress on the Biology of Fish

**Aug 3, 2014 - Aug 7, 2014**

Heriot-Watt University,  
Edinburgh, United Kingdom

This is the biannual meeting of the Physiology Section of the American Fisheries Society. 300-500 delegates are expected from North America, UK, Europe and farther afield, covering everything from Physiology of fish Aquaculture, nutrition, parasites and disease to swimming and migratory physiology, ecological physiology, environmental stress and toxicology, in both fresh and seawater environments.

For more information see: [ICBF2014](http://ICBF2014)



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

AQUATIC VETERINARY CE & PD

Fourth Quarter 2013

## 2014 INTERNATIONAL SYMPOSIUM ON AQUATIC ANIMAL HEALTH

**Aug 31 – Sept 4, 2014**

Portland, Oregon

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

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



## Sealice 2014

**August 31-September 3, 2014**

Portland, Maine, USA

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

For more information visit:

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

## 39th World Small Animal Veterinary Association Congress

**16-19 September, 2014**

Cape Town, South Africa.

Abstract Submission Opens: November 1, 2013

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

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

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

## 9<sup>th</sup> Symposium on Diseases in Asian Aquaculture (DAA9)

**November 24-28, 2014**

Ho Chi Minh City, Vietnam

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



# THE AQUATIC VETERINARIAN

Volume 7, Number 4 **INTERNSHIPS, EXTERNSHIPS & RESIDENCIES** Fourth Quarter 2013

## **SeaWorld (3-4 weeks)**

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

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

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

## **Mystic Aquarium**

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

## **Georgia Aquarium**

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

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

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

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

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

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

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

## **National Aquarium**

### **Baltimore, MD (6-8 weeks)**

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

## **New England Aquarium**

### **Boston, MA (6-8 weeks)**

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

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

JOB OPPORTUNITIES

Fourth Quarter 2013

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

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

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

## 2014 Fish Transportation Welfare Scholarships

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

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

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

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

## Applications & More Information

Closing date for applications is 28th February, 2014.

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



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

2013 CONTENTS

Fourth Quarter 2013

## Compiled Table of Contents for *The Aquatic Veterinarian* 2013 - Volume 7(1-4)

[Key=Volume(Issue):Page Number]

### WAVMA News:

Who We Are...7(1):2; 7(2):2; 7(3):2; 7(4):2;  
Editorial Staff...7(1):2; 7(2):2; 7(3):2; 7(4):2;  
Table of Contents...7(1):3; 7(2):3; 7(3):3; 7(4):3;  
Editorials ...7(1):4; 7(2):4; 7(3):4; 7(4):4;  
Executive Reports...7(1):5; 7(2):5; 7(3):5; 7(4):5;  
President's Report...7(1):5; 7(2):5; 7(3):5; 7(4):5;  
Secretary's Report...7(1):6; 7(2):6; 7(3):6; 7(4):6;  
Treasurer's Report...7(1):8; 7(2):7; 7(4):7;  
Committee Reports...7(1):10; 7(2):8; 7(3):8; 7(4):8;  
Student Committee: First WAVMA Student Chapter Formed at Tuskegee University SVM 7(1):10;  
2013 Scholarship Awardee Reports 7(3):12; 7(4):10  
Meetings Committee Report...7(2):8; AVMA Convention-Chicago 7(3):8; AGM-Prague 7(3):10; 7(4):8;

### Colleague's Connection...7(1):12; 7(2):10; 7(3):14; 7(4):12;

A Life Long Lover of Fish: Nicholas Saint-Erne...7(1):12  
Meet WAVMA Secretary and Fellow: Chris Walster...7(2):10  
A Trip to the Waikiki Aquarium – by Nick Saint-Erne...7(2):12  
Getting Involved in Aquatic Veterinary Medicine: Richmond Loh...7(3):14  
SeaVet Course at the University of Florida – by Richmond Loh...7(3):17  
Becoming an Aquatic Veterinarian: an Interview with Myron Kebus...7(4):12  
Meet Dr. Laura-Daniela Urdes ...7(4):14  
Colleagues' Connection Index...7(4):15

### Author's Instructions...7(1):11; 7(2):9; 7(3):13; 7(4):11;

### Peer-Reviewed Articles:

Research Papers...7(1):14; 7(2):13; 7(3):18  
Overview of the larval Eustrongylidosis In Freshwater Fish Captured From the Danubian Delta, Romania - Laura-Daniela Urdes...7(1):14  
A surgical approach to study differential gene expression of the fish pathogen *Flavobacterium spartansii* Loch and Faisal 2013 - Thomas Loch, Wei Xu, Jamie Morrison, & Mohamed Faisal...7(2):13  
Salmon Poisoning Disease in Dogs...7(3):18

### Clinical Reports...7(1):20; 7(2):19; 7(3):19; 7(4):16

Idiopathic Deaths in *Danio kayathit* - Ciesielski A., Oledzki J., Kistowski M., Malinowska A., Zarebski P., Dadley M. & Wadim J. Kapulkin...7(1):20  
The paradigm of using probiotics in finfish aquaculture practices - Laura-Daniela Urdeş, PhD, DVM...7(2):19  
An overview of the current state of knowledge on autochthonous GI microbionta in finfish - Laura-Daniela Urdeş, PhD, DVM...7(2):20  
Fish Disease In Turkey - Peter Werkman...7(2):22  
MinnFinn: The New Safe and Biodegradable Treatment for your Koi and Goldfish...7(2):23  
Non-chemical solution to water particulate problem causing gill disease – Myron Kebus...7(3):19  
Yellow Perch Mortality Diagnosis - Dr. Myron Kebus ...7(4):16  
Cyanobacteria Treatment in an Aquarium - Dr Richmond Loh ...7(4):17  
Oranda Goldfish with a Buoyancy Disorder - Dr. Jena Questen ...7(4):18



# THE AQUATIC VETERINARIAN

Volume 7, Number 4

2013 CONTENTS

Fourth Quarter 2013

## Grand Round Cases:

- Collation of discussions from the WAVMA Listserv ...7(1):22; 7(2):24; 7(3):20; 7(4):20
- Identifying an Unknown Sponge...7(1):22
- Cataracts in Cichlids...7(1):23
- Cataracts in Rainbowfish...7(1):23
- Mortality in Walleye Larvae...7(2):24
- Sutures for a Surgeon to Suture a Sturgeon...or other fish species...7(2):25
- Treating marine tanks without killing off Corals...7(3):20
- Seaweed extracts for treating Monogenean eggs...7(3):20
- Koi showing signs of edema...7(3):21
- Farting goldfish...7(4):20
- Bullhead shark (*Heterodontus* sp.) with *Uronema marinum* protozoa on gills...7(4):21

## Literature Review:

- Abstracts...7(1):24; 7(2):26; 7(3):22; 7(4):22
  - Identification of Anisakis species (Nematoda: Anisakidae) in marine fish hosts from Papua New Guinea...7(1):24
  - Population Structure of Three Species of Anisakis Nematodes Recovered From Pacific Sardines (*Sardinops sagax*) Distributed Throughout the California Current System...7(1):24
  - Injuries, envenomations and stings from exotic pets...7(1):24
  - Detection of Avian Influenza (H5N1) In Some Fish and Shellfish from Different Aquatic Habitats across Some Egyptian Provinces...7(1):25
  - High Prevalence of Multidrug-Tolerant Bacteria and Associated Antimicrobial Resistance Genes Isolated from Ornamental Fish and Their Carriage Water...7(1):25
  - Imported ornamental fish are colonized with antibiotic-resistant bacteria...7(1):27
  - More rapid and severe disease outbreaks for aquaculture at the tropics: implications for food security...7(1):27
  - Modelling salmon lice, *Lepeophtheirus salmonis*, reproduction on farmed Atlantic salmon, *Salmo salar* L....7(1):27
  - Reproductive Cycles of Marine Mammals...7(2):26
  - Disorders of the Respiratory System in Pet and Ornamental Fish...7(2):26
  - Molecular Pathology of Vertebral Deformities in Hyperthermic Atlantic salmon (*Salmo salar*)...7(2):26
  - Reproductive performance of alternative male phenotypes of growth hormone transgenic Atlantic salmon (*Salmo salar*)...7(2):27
  - The Chelonian Respiratory System...7(2):27
  - Metabolic and respiratory status of stranded juvenile loggerhead sea turtles (*Caretta caretta*): 66 cases (2008–2009)...7(2):27
  - Antibiotic-Resistant *Enterococci* in Seawater and Sediments from a Coastal Fish Farm...7(3):22
  - Antimicrobial Use and Resistance in Aquaculture...7(3):22
  - Evaluation of the aquatic toxicity of two veterinary sulfonamides using five test organisms...7(3):23
  - Efficacy of Florfenicol for Control of Mortality caused by *Flavobacterium columnare* infections in Channel Catfish...7(3):23
  - Determination of Florfenicol Dose Rate in Feed for control of Mortality in Nile Tilapia infected with *Streptococcus iniae*...7(3):24
  - Safety of Florfenicol in the Adult Lobster (*Homarus americanus*)...7(3):24
  - Francisella infections in farmed and wild aquatic organisms...7(3):25
  - Major bacterial diseases in aquaculture and their vaccine development...7(3):25
- Book Reviews...7(1):28
- New Directions in Conservation Medicine - Applied Cases of Ecological Health, Edited by A. Alonso Aguirre, Richard Ostfeld and Peter Daszak [Reviewed by A. David Scarfe]...7(1):28

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

2013 CONTENTS

Fourth Quarter 2013

## News and Views:

- Agency says GE salmon unlikely to harm U.S. environment...7(1):30  
Will the Zebrafish transform medicine?...7(1):30  
New study detects deadly fungus in Southeast Asia's amphibian trade ...7(1):31  
'Red Tide' Is Killing Florida's Manatees...7(1):31  
Anti-anxiety drug found in rivers makes fish more aggressive ...7(1):32  
Toxic turtles: Long-lasting chemicals could be harming sea turtles...7(1):32  
Fish found that gorges, starves itself to survive...7(1):33  
New York aquarium rebounds, rebuilds after Superstorm Sandy...7(1):33  
New nonlethal test developed to detect fish virus...7(2):28  
New Oyster Disease Test Could Give Aquaculture a Hand...7(2):29  
The Commercial Fisheries of the United States and Canada – Illustrated...7(2):29  
Caring for health and welfare of fish: A critical success factor for aquaculture...7(2):30  
The National Marine Fisheries Service and the U.S. Fish and Wildlife Service completed a review of the status of the hawksbill sea turtle...7(2):31  
30 dolphins dead in Indian River Lagoon...7(2):31  
Where Human Trash Accumulates in the Deep Sea...7(2):32  
American Association of Fish Veterinarians formed to advance fish medicine in North America...7(2):33  
Study reveals disease-causing parasites in dead otters...7(2):34  
Farmed Salmon Raises Blood Levels of Omega-3s...7(2):34  
New study looks at killer whale deaths to understand whales' lives...7(2):35  
Even Whales Get Bitten by Mosquitoes...7(2):35  
Fatal fungus found in third major amphibian group, caecilians...7(2):36  
Pregnancy Test Frog May Have Spread Fatal Fungus...7(2):37  
Ocean Genome Legacy Seeks Samples from Marine Mammal Genome Archive...7(3):26  
How Does Slaughter Affect Fish Welfare?...7(3):27  
AquaVet III – An Introduction to Clinical Aspects of Captive Aquatic Animal Medicine...7(3):28  
Sea Turtles Eating Plastic At Record Rates Amid Surge In Pollution ...7(4):26  
Taiwan seizes rare turtles bound for China ...7(4):26  
World's Largest Freshwater Turtle Nearly Extinct ...7(4):27

## Legislative & Regulatory Issues:

- Statutory and Regulatory Authority for Aquatic Veterinary Medicine ...7(1):34  
U.S. Leads Efforts to Protect Freshwater Turtles and Tortoises at CITES Meeting...7(1):35  
Six-legged livestock: Edible insect farming, collection and marketing in Thailand...7(1):36  
66 Coral Species To Be Listed Under The US Endangered Species Act...7(1):36  
Guyana seeks to expand aquaculture...7(1):37  
2013 AVMA Guidelines for Euthanasia...7(1):37  
AppliFish, marine knowledge of over 550 marine species at the touch of a button...7(1):38  
Irondequoit Bay Fish Kill Linked to VHS...7(2):38  
FDA Announces Grant Funding Available for Veterinary Testing Methods...7(2):39  
Special Permits for Oyster Farmers Hit by Virus...7(2):39  
EFSA guidance outlines approach for environmental risk assessment of Genetically Modified Animals...7(3):30  
Fukushima Fallout Not Affecting US Fish...7(3):31  
California game operator faces fines over baby turtle prizes...7(3):31  
CITES—New Turtles on Appendix I and II ...7(4):28  
Philippines finds hoard of endangered species ...7(4):28  
No green economy without blue economy ...7(4):29  
FDA Takes Significant Steps to Address Antimicrobial Resistance ...7(4):30  
OIE Tool for the Evaluation of Performance of Aquatic Veterinary Services ...7(4):31

# THE AQUATIC VETERINARIAN

Volume 7, Number 4

2013 CONTENTS

Fourth Quarter 2013

**Aquatic Veterinary CE&PD**...7(1):39; 7(2):40; 7(3):32; 7(4):32

Internships, Externships and Residencies...7(1):45; 7(3):39; 7(4):36

MARVET 2014...7(3):32

World Aquaculture Society 2014 ...7(4):32

**Job Opportunities**...7(1):46; 7(3):40; 7(4):37

**Certified Aquatic Veterinarian (CertAqV) Credentialing Program**...7(3):43

**Compiled Table of Contents for *The Aquatic Veterinarian* 2013 - Volume 7(1-4) ...7(4):38**



## **Harvesting goldfish from a dirt pond in Arkansas, USA.**

The pond is drained to a low level and the fish are collected in a seine. Then they are scooped into buckets with water and conveyed to the holding tanks on the transport truck. From there they are brought into the distribution center for sorting, medicating and then shipping out to customers.

Right: Sarasa comet goldfish (*Carassius auratus*)

Photos by Nick Saint-Erne





# THE AQUATIC VETERINARIAN

Volume 7, Number 4

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Fourth Quarter 2013

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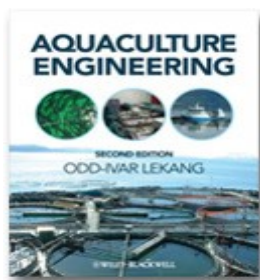


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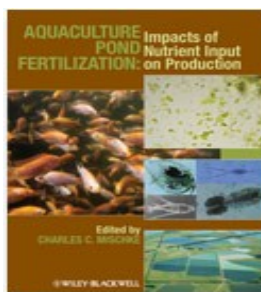


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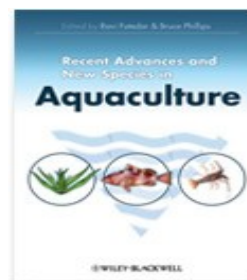
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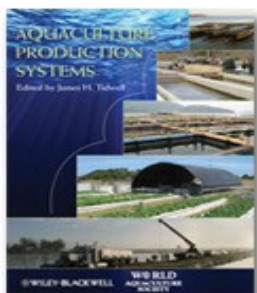
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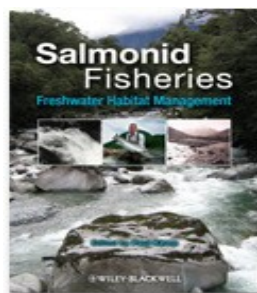
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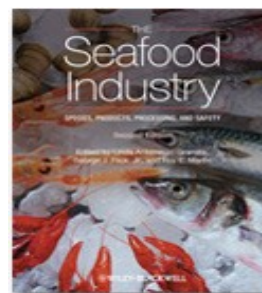
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