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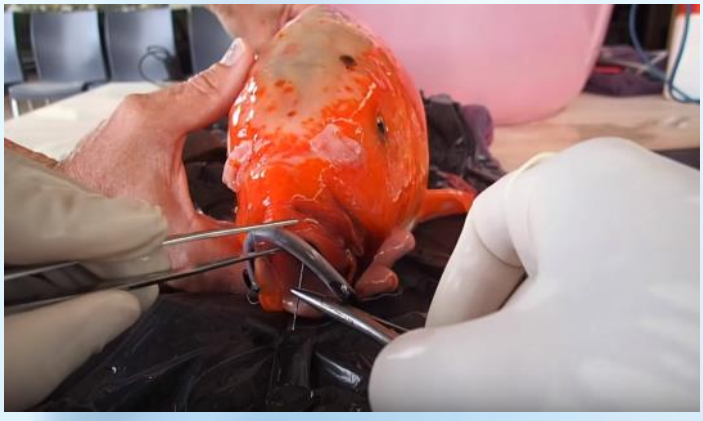
The Aquatic Veterinarian



Repairing a fractured maxilla in a koi.
See case report on page 27.
Photo credit: Richmond Loh.

Volume 12, Number 1
First Quarter, 2018

World Aquatic Veterinary Medical Association

WHO ARE WE

MISSION

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.

OBJECTIVES

A. To serve aquatic veterinary medicine practitioners by developing programs to support and promote our members, and the aquatic species and industries that they serve;

B. To be an advocate for, develop guidance on, and promote the advancement of aquatic animal medicine within the veterinary profession and with associated industries, governments, non-governmental entities and members of the public;

C. To develop and implement aquatic veterinary education programs, certifications and publications, including a credentialing process to recognize day-one competency in aquatic animal medicine;

D. To foster and strengthen greater interactions among: aquatic veterinarians, related disciplines, veterinary allied and supportive groups and industries, governments and animal owners.

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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Editor's Note

Being an Aquatic Veterinarian can be exciting work. I have enjoyed all my years of practice, both in clinical medicine and now in corporate medicine, working with fish and many other animal species. I have traveled extensively around the US visiting fish farms, and in Europe and Asia giving lectures at veterinary conferences about aquatic veterinary medicine. But all of our work as veterinarians involved in fish medicine stems back to early pioneers who were diagnosing fish diseases and developing treatment options many years ago. The first vet working with fish that I met was Dr. Mark Dulin, who wrote the book *Fish Diseases,* published by TFH in 1979. I met him while in veterinary school and discussed my interest in fish medicine, and he suggested fish medicine could be a *"lucrative career!"*

Many of those are early fish veterinarians are members of WAVMA. In our Colleague's Connection article this issue, we have a tribute to Dr. Ron Roberts (p. 14-15), a founding member of WAVMA, our second President, a WAVMA Distinguished Fellow, and the author of a monumental work on in the field of fish disease research: *Fish Pathology*. His contributions to aquatic veterinary medicine are many, including editing the *Journal of Fish Diseases*. For another article about Dr. Roberts, see the *Aquatic Vet News,* Volume 5, Number 4, 2011. Use the QR code to the right, or the link to the past years' editions to get to the WAVMA.org website area with all our archived issues.

For great information by another fish veterinarian, see the article on page 27 by Dr. Richmond Loh, who is a full time aquatic veterinarian in Australia, and has many interesting clinical cases.

Nick Saint-Erne, DVM, CertAqV
Executive Editor
TAVeditor@wavma.org

Nick Saint-Erne at the River Safari—Singapore, January 2018.

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

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

The latest editions are available for download at https://www.wavma.org/TAV-Current-Issues.

Past years' editions are available for download at https://www.wavma.org/TAV-Archives.

Cover Photo:

Repairing a fractured maxilla in a koi. See case report on page 27. Photo credit: Richmond Loh.

President's Report

Meeting our challenges in 2018 and beyond

2018 promises to be a big year for WAVMA and its members. Since our humble beginnings more than 13 years ago, WAVMA has grown to become the global leader in aquatic veterinary medicine, with members and linkage to others in more than 74 countries. In 2017 more than 280 individuals became members for the first time – these are truly impressive statistics and clearly demonstrates the value of membership and WAVMA programs. All of this is due to dedicated and enthusiastic volunteers who have devoted their time, energy, and many times their own funds, to help grow programs that help advance members, and help others interested or involved in this unique veterinary discipline.

But there is still a lot to accomplish, and I always ask, "What do we need to improve and where do we find the expertise, time and funds?" For 2018, building on what the Executive Board and our committees have previously developed, it is now time to develop a new strategic plan for the next 5 years. For 2018 my hopes as the President are for the Board and Committees to focus on important, high-level strategies that strengthen existing programs, and develop new initiatives that help advance aquatic veterinary medicine even further. As in previous years we will call on members to provide input on what they feel ***they*** need. So, anticipate providing your input through surveys we will develop throughout the year.

Strategic planning to ensure WAVMA functions efficiently and effectively is no simple challenge. Since WAVMA began, we have relied on the generosity of very busy volunteers to lend their skills, expertise and knowledge to develop and run our programs. While WAVMA has numerous committees to help manage a number of programs, and to make membership more meaningful for members and to get their innovative ideas on how to improve WAVMA programs we will start a campaign to encourage members to join committees. While financial resources are always a limitation, the Board will be examining options for rewarding volunteers for the work they perform, and may consider hiring an administrative assistant to help with routine operations, such as website management, run educational webinars, bookkeeping, etc.

To help ensure funds are available for hiring staff, and to help support existing and new member programs we will beginning to examine the best approaches for generating non-dues income, such as attracting sponsors and increasing advertising on the website and in *The Aquatic Veterinarian*.

Few realize that there are currently 13 or 14 organizations around the world that cater to aquatic veterinary medicine. Not surprisingly, all have similar objectives – promoting and supporting aquatic veterinary medicine. Many of them have small publications, programs and conferences to support their members, and the Board will be looking into the best options to develop collaborative programs for organizations to share resources and boost membership in all organizations.

Students tend to be the future of any professional organizations. Not surprising, WAVMA has a large number of student members. To help them, WAVMA will be putting a lot of effort into supporting current student chapters and developing new chapters at veterinary schools around the world. Of particular importance to their future in aquatic veterinary medicine, we will be encouraging a number of veterinary schools to adequately cover aquatic veterinary issues in their curricula. In particular, the CertAqV Program and our web-based educational programs have been very useful in identifying the knowledge, skills and experience (KSEs) needed to practice aquatic veterinary medicine and are, to some degree, serving as a great example for what needs to be in a veterinary curriculum.

Equally important, the CertAqV Program has helped guide a large number of practicing veterinarians in attaining the KSEs that are needed to serve clients – and be recognized for their competence. With this program becoming a WAVMA center-point, WAVMA will be putting a strong effort to refine the program in 2018.

So, to all our current members, and to any others considering getting involved in aquatic veterinary medicine, welcome to WAVMA. If there is anything you would like your Board to consider, please contact any of us.

Most sincerely,

David Scarfe *PhD, DVM, MRSSAf, CertAqV*
President 2018
President@wavma.org

Secretary's Report

2018 is off to a great start for WAVMA. Under the leadership of President David Scarfe, Immediate Past President Laura Urdes, and President-Elect Devon Dublin the Executive Board has had great discussion on strategic planning and focused on improving WAVMA's presence in the global veterinary profession, bringing increased value to our members, and maintaining our strong financial position. Our organization continues to remain large, with close to 350 members to date. The number of Certified Aquatic Veterinarians (CertAqV) continues to grow, and this year represents the first CertAqV renewals. In addition, WAVMA recently welcomed it newest Student Chapter at the University of Illinois College of Veterinary Medicine.

WAVMA helped organize sessions at the 2018 Aquaculture America conference in Las Vegas, will be presenting at the 2018 World Veterinary Association Conference in Barcelona, the 2018 American Veterinary Medical Association Convention in Denver, the International Veterinary Students' Association Conference in Poland, the 2018 International Symposium on Aquatic Animal Health in Prince Edward Island, and the 2018 World Small Animal Veterinary Association Congress in Singapore. In addition, WAVMA will be hosting it's 3rd Conference and Biosecurity Workshop along with Ross University School of Veterinary Medicine and the International Aquatic Veterinary Biosecurity Consortium in St. Kitts in November. The 2018 WAVMA Annual General Meeting will be held at this event, we hope to see many of our great members there!

We continue to work tirelessly to keep the WAVMA website updated with all the news and updates to WAVMA programs. If you haven't already, take a minute to check out our Facebook page (www.facebook.com/WAVMA). Be sure to "Like" the page to see all the great updates, news stories, and aquatic job postings from around the world. You may even be the 6,000th person to the Like the page! You may also want to check out our Facebook Group (www.facebook.com/groups/WAVMA), this is a great place to ask your aquatic questions, share stories or pictures, and talk to others involved in aquatic animal health; or do so through our Members-L listserv! I also encourage you to submit articles for the Colleague's Connection, Clinical Cases, and Book Reviews to The Aquatic Veterinarian or short news stories for the WAVMA e-News!

Stephen Reichley, DVM, PhD, CertAqV
WAVMA Secretary
Secretary@wavma.org

WAVMA LEADERSHIP FOR 2018

The Executive Board has the responsibility for charting the general course and direction of WAVMA. For 2018, the WAVMA board members are:

President	Past-President	President-Elect	Secretary	Treasurer
Dr. David Scarfe	Dr. Laura Urdes	Dr. Devon Dubin	Dr. Stephen Reichley	Dr. Nick Saint-Erne
(USA)	(Romania)	(Guyana/Japan)	(USA)	(USA)

Directors-at-Large: Dr. Trista Becker (USA), Dr. Jena Questen (USA), Dr. Howard Wong (Hong Kong)

To learn more about the **mandate** and **leadership structure** of WAVMA please visit our website.

WAVMA Elections

It's not too soon to think about standing for election for a 2019 officer or director on the WAVMA Executive Board. The positions of President-Elect, Secretary, Treasurer, and three directors are up for election each year. We rely on our veterinarian members to run for positions on the Executive Board to help keep the organization moving forward. The Executive Board meets monthly via Skype and we have had board members from all around the world. It doesn't matter where you live—only that you are willing to help out!

All of the great programs and features you get from WAVMA membership are provided by volunteers. We are always looking for more helpers, whether veterinary students or graduate veterinarians, to join us on the committees as well. If you are not interested in running for office, but would like to provide your input and guide the future of WAVMA, join one of our committees (no previous experience necessary!). See a list of our committees on page 8. Contact our Secretary or the committee chair for more information about the committee and the dates of the next meeting (also done via Skype). All are Welcome!

Join a WAVMA Committee today!

Discover core knowledge, skills & experience needed to become a WAVMA Certified Aquatic Veterinarian *(CertAqV)*

Did you know that WAVMA's ***CertAqV Program*** offers members the opportunity to become recognized and certified as having competency in 9 core areas deemed necessary to practice aquatic veterinary medicine? Find out more information online at: http://www.wavma.org/CertAqV-Pgm.

Treasurer's Report

First, I would like to thank Dr. Sharon Tiberio for managing the WAVMA Treasury for the last three years. We are in better financial position than ever before. Our main source of revenue is from membership renewals, so I also have to thank you, the WAVMA members, for continuing your support by renewing your dues. Secondly, please be sure to go on our website to https://www.wavma.org/membership-renewal to pay your 2018 dues if you have not done so already. WAVMA membership is by calendar year. We really do appreciate all our veterinarian, student, vet nurse, and other members.

Our biggest expenditures are our website development and maintenance, and the meetings we sponsor through donations or supporting lectures presented at the conventions (see the Meetings Committee Report, p. 12, for a list of meetings supported by WAVMA).

The WAVMA Executive Board believes that one of the main functions of this organization is the education of veterinarians who are interested in learning about Aquatic Veterinary Medicine. Having exposure in as many veterinary conferences as possible each year allows us to present WAVMA to a wide group of veterinarians and paraprofessionals.

The expense of maintain the WAVMA.org website is well worth it for the valuable resources we have there. The video webinars is a great way to learn about aquatic veterinary medicine, as are the past issues of The *Aquatic Veterinarian*, and its precursor, *Aquatic Vet News*.

Please use the links in the box below to look at all the content on our website, and make good use of the programs and services provided to our members.

Nick Saint-Erne, DVM CertAqV
WAVMA Treasurer
Treasurer@WAVMA.org

QUICK LINKS TO WAVMA PROGRAMS & SERVICES:
(Press control then click on item using computer mouse)
Online Member Directory
Certified Aquatic Veterinarian Program (CertAqV)
WebCEPD
The Aquatic Veterinarian
Aquatic Veterinary Jobs Listing
WAVMA Student Chapters
Veterinary Student Externship Listing
John L. Pitts Aquatic Veterinary Education Awards Program

New Members—1st Quarter 2018

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

Veterinarian Members
Prakan Chiarahkhongman
Jolene Rettig
Nicole Syngajewski
Lisa Trout
New Graduate veterinarian Members
Kristian Danorwayan
Charis Lorenz
Vet Graduate Student, Intern or Resident
Márton Hoitsy
Cody Minor
Massimo Orioles
Taylor Yaw
Vet Student Members
Jasmine Alam
Shelby Baden
Stephanie Bellinghausen
Thomas Burdette
Corrina Burnside
Alyssa Capuano
Allison Chute
Chelsea Ciambrone
Nicole Clark
Lesley Cohen
Holly Earyes
Erika First
Luis Garcia
Amanda Hoskins
Samantha Hughes
Haena Lee
Casie Lew
Adrian Lopez Porras
Amber Lum
Michelle Martinek
Patricia Miller
Diane Moon
Jacqueline Morgan
Robert Mraz
Nadia Qassem
Eva Marie Quijano Cardé
Kaitlynn Samborsky
Kevin Shade
Lauren Smith
Kerry Thomson
Silja Väyrynen
Dominik von La Roche
Amanda Watters
Katherine Weber
Jaclyn Wilson

PRIVILEGES & BENEFITS OF WAVMA MEMBERSHIP

Enjoy on-line *e-Learning* programs & courses to advance your knowledge & skills

Get continuing education credit through *WebCEPD*, *PubCEPD* & *Clinical Corner*

Discover core knowledge, skills & experience needed to become a WAVMA Certified Aquatic Veterinarian *(CertAqV)*

Receive *discounted* subscriptions to publications & meetings

Utilize *WAVMA's picture & video libraries* for your own presentations

Join *listservs* to discuss clinical cases & other issues

Mentor & be mentored to expand your and other's aquatic veterinary skills

Publish your articles in WAVMA's quarterly journal: *The Aquatic Veterinarian*

Find world-wide externships, internships, residencies & jobs in all aquatic vet areas

Access *Member Directories* & have your Clinic/ Hospital listed on-line

Benefit from *Educational grants* for vet students & new veterinary graduates

Form & participate in *veterinary school chapters* throughout the world

Participate in veterinarian and client surveys

Help build additional member programs by serving as an Officer, Director or Committee Member

WAVMA Committees

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

Budget and Finance Committee

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

This Committee shall consist of the Treasurer (Chair); the President-Elect; and one other member of the Executive Board who will volunteer to serve a one-year renewable term.
Chair: Nick Saint-Erne, Treasurer@wavma.org

Communications Committee

This Committee manages the communications among members and others involved with aquatic veterinary medicine. It oversees the listservs, membership lists, publication of WAVMA's quarterly journal *The Aquatic Veterinarian*, e-News, Facebook, Twitter, LinkedIn and other social media accounts.
Chair: Stephen Reichley, Secretary@wavma.org

Credentialing Committee

This Committee oversees and administers the CertAqV Program for credentialing aquatic veterinary practitioners, and evaluates aquatic veterinary educational programs useful to members.
Chair: Tim Miller-Morgan tim.miller-morgan@oregonstate.edu

Meetings Committee

This Committee oversees and coordinates logistics for WAVMA-organized or sponsored aquatic veterinary educational meetings, including the Annual General Meeting.
Chair: Julius Tepper, cypcarpio@aol.com

Membership Committee

This Committee oversees membership issues to optimally serve individual members and the organization. Chris Walster, chris.walster@onlinevets.co.uk

Student Committee

This Committee facilitates networking between student members and helps development of student programs and services.
Chair: Emily Munday

Credentialing Committee

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

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

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

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

The WAVMA Certified Aquatic Veterinarian (CertAqV) program has now certified 69 aquatic veterinarians from 20 countries. Congratulations on our newest Certified Aquatic Veterinarians:

Dr Pierre-Marie Boitard
Dr Colin McDermott
Dr GalitSharon
Dr TaylorYaw

There are an additional 52 other WAVMA members currently in the process of being certified. For more information, see the WAVMA website: http://www.wavma.org/CertAqV-Pgm.

Tim Miller-Morgan, DVM, CertAqV
2017 Credentialing Committee Chair

Certified Aquatic Veterinarians

Giana Bastos-Gomes	Australia
Heather Bjornebo	USA
James Bogan	USA
Todd Cecil	USA
Michael Corcoran	USA
Emily Cornwell	USA
Darren Docherty	UK
Simon Doherty	UK
Devon Dublin	Japan
Ashley Emanuele	USA
Mohamed Faisal	USA
Ari Fustukjian	USA
Christopher Good	USA
Krystan Grant	USA
Stephanie Grimmett	UK
Orachun Hayakijkosol	Australia
Kerryn Illes	New Zealand
Jimmy Johnson	USA
Colin Johnston	New Zealand
Kasper Jorgensen	Denmark
Brian Joseph	Canada
Parinda Kamchum	Thailand
Elizabeth Kaufman	Israel
Amy Kizer	USA
Jack Kottwitz	USA
Eric Littman	USA
Richard Lloyd	UK
Richmond Loh	Australia
Adolf Maas	USA
David Marancik	Grenada
Matthijs Metselaar	UK
Tim Miller-Morgan	USA
Haitham Mohammed	Egypt
Alissa Mones	USA
Danny Morick	Israel
Ross Neethling	UK
Dušan Palić	Germany
Brian Palmeiro	USA
Christine Parker-Graham	USA
David Pasnik	USA
Ayanna Phillips	Trinidad & Tobago
Jena Questen	USA
Aimee Reed	USA
Stephen Reichley	USA
Komsin Sahatrakul	Singapore
Nick Saint-Erne	USA
Jessie Sanders	USA
David Scarfe	USA
Khalid Shahin	UK
John Shelley	USA
Melissa Singletary	USA
Esteban Soto	USA
Win Surachetpong	Thailand
Gillian Taylor	South Africa
Julius Tepper	USA
Sharon Tiberio	USA
Laura Urdes	Romania
Greta Van de Sompel	Belgium
Sarah Wahlstrom	USA
Chris Walster	UK
Scott Weber	USA
Trista Welsh	USA
Peter Werkman	Holland
Howard Wong	Hong Kong
Irene Yen	St. Kitts & Nevis

COMMITTEE REPORTS

Fellows Advisory Council

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

Our WAVMA Distinguished Fellows are:

Dr Peter L. Merrill
Dr Ronald J. Roberts
Dr A. David Scarfe
Dr Julius M. Tepper
Dr Christopher I. Walster
Dr Dusan Palic
Dr Grace Karreman
Dr Marian McLoughlin
Dr Mohamed Faisal
Dr Nick Saint-Erne

See: http://www.wavma.org/wavma-fellows.

Executive Board Responsibilities

The Executive Board has the responsibility for charting the course of WAVMA, fiduciary oversight of all issues, and, with input of committees, provides the oversight and approval for all WAVMA programs and services that fulfill the Mission and Objectives of the organization. The Board generally meets once a month through teleconferences, to discuss and approve WAVMA programs, services, and policies that drive the organization and issues that affect aquatic veterinary medicine. Members may submit items for discussion at the next Executive Board by contacting the *WAVMA Secretary*.

WAVMA VETERINARY SCHOOL CHAPTERS

https://www.wavma.org/WAVMA-Student-Chapters

Auburn University, *College of Veterinary Medicine* **(established 2013)** ***2016 Officers*** - Kate Butzen (President), Patricia Debow (Vice President), Erika Gibson (Treasurer), Lindsay Lawreck (Secretary); ***Faculty Advisors*** - Drs. Ray Wilhite & Jack Kottwitz; ***Chapter Contact*** - *click here*.

Mississippi State University, *College of Veterinary Medicine* **(estd 2014)** ***2016 Officers*** - Elizabeth Works (President), Taylor James (Vice-President), David Mills (Treasurer), Madeleine Hendrix (Secretary); ***Faculty Advisor*** - Dr. Wes Baumgartner; ***Chapter Contact*** - *click here.*

Murdoch University, *School of Veterinary & Life Sciences* **(estd 2014)** ***2016 Officers*** - Ming Jun Lim (President), Cheryl Tan (Vice President), Chermaine Lim (Treasurer), Jia Wen Lim (Secretary); ***Faculty Advisors*** - Drs. Lian Yeap & Richmond Loh; ***Chapter Contact*** – *click here*.

Ross University, *School of Veterinary Medicine* **(established 2015)** ***2016-2017 Officers*** - Larissa Menke (President), Erika Brigante (Vice President), Jean Fournier (Secretary), Robin Sayres (Treasurer), Michelle Sparks (Wetlab Coordinator), Mandy Murti (Fundraising Chair); ***Faculty Advisors*** - Drs. Don Bergfelt & Mark Freeman; ***Chapter Contact*** - *click here.*

Oregon State University, *College of Veterinary Medicine*, **USA (estd 2017)** ***2017 Officers*** – Katharine Onofryton (President), Holly Arnold (Vice-President), Linda Yang (Secretary), Katie Royer (Treasurer), Courtney Pace (lab coordinator); ***Faculty Advisor*** – Dr. Tim Miller-Morgan; ***Chapter Contact*** – *click here*.

Tuskegee University, *School of Veterinary Medicine* **(established 2012)** ***2016 Officers*** - Jacqueline Elliott (President), Jennifer Algarin (Vice Prs), Jennifer Algarin (Secrty), Aaron Judson (Treas.), Ayxa Rosado (Historian), TBD (Fundraising Chair); ***Faculty Advisor*** - Dr. Kenneth Newkirk; ***Chapter Contact*** - *click here*. View the Chapter's *Facebook* page.

University of Florida, *College of Veterinary Medicine* **(established 2013)** ***2016 Officers*** - Haley Violetta (President), Riley Shugg (Vice President), Kaylee Brown (Treasurer), Megan Joyce (Secretary); ***Faculty Advisor*** - Dr. Tom Waltzek; ***Chapter Contact*** - *click here.*

University of Georgia, *College of Veterinary Medicine* **(established 2015)** ***2016 Officers*** - Kristina Pascutti / Laura Burns (Co-Presidents), Sara Collins (Vice-President), Jaclyn Levin (Treasurer); ***Faculty Advisor***, Dr. Alvin Camus; ***Chapter Contact*** - *click here*.

University of Minnesota, *College of Veterinary Medicine* **(established 2016)** ***2016 Officers*** - Sarah Knowles (Chair), Angela Jackson (Secretary); ***Faculty Advisor*** - Dr. Amy Kizer; ***Chapter Contact*** - *click here*.

University of Pretoria, Onderstepoort Faculty of Veterinary Science**, South Africa (established 2017).** ***2017 Officers*** - Varushka Naidoo (Chair), Aaminah Vahed (Dpty Ch), Joanet Van Zyl (Secretary), Jodi Botha (Treas), George Woodley (Social Media), Robynne Britz & Vianca Naidu (Funding); ***Faculty Advisor*** – Dr. Jan Myburg; ***Chapter Contact*** – *click here*.

University of Sydney, *Faculty of Veterinary Science* **(established 2014)** ***2016 Officers*** - Ellen Rasidi (President), Arthur Chau (Secretary), Dr. Paul Hick (Treasurer); ***Faculty Advisor*** - Dr. Paul Hick; ***Chapter Contact*** - *click here*.

University of Tennessee, *College of Veterinary Medicine* **(estd 2012)** ***2012/13 Officers*** - Wesley Siniard & Grace Normann (Co-Presidents), Krista Lipe (Vice President), Carrie Dobey (Secretary), Samantha Schraith (Treasurer), Bree Dell (Wetlab Coordinator); ***Faculty Advisors*** - Dr. Michael Jones & Dr. Debra Miller; ***Chapter Contact*** - *click here.* View the Chapter's *Facebook* page or *website.*

University of Wisconsin-Madison, *School of Veterinary Medicine* **(established 2014)** ***2016 Officers*** - Katherine Hausmann (President), Nikki Wuestenhagen (Vice President), Geoffrey Gieni (Secertary), Jenna Newman (Treasurer), Jenna Epstein (Activities Coordinator); ***Faculty Advisor*** - Dr. Mike Collins; ***Chapter Contact*** - *click here.*

Western University of Health Sciences, *College of Veterinary Medicine* **(established 2014).** ***2016 Officers*** - Andrew Switaj (President), Alexis Wohl (Vice President), David Abolnik (Secretary), Hali Jungers (Treasurer); ***Faculty Advisor*** -Dr. Suzana Tkalcic; ***Chapter Contact*** - *click here.* View the Chapter's *Facebook* page.

Click here to get **WAVMA Student Chapter Guidelines** .

John L. Pitts Education Awards Program

This Program offers financial support to veterinary students or recent graduates of recognized veterinary schools, allowing recipients to explore a career in aquatic veterinary medicine through a variety of aquatic veterinary educational activities. Awards are intended to assist veterinary students and veterinarians, who have graduated in the past 24 months, to become involved in aquatic veterinary medicine.

Awards (generally $250-$1,000) may be used towards offsetting personal costs associated with aquatic veterinary conferences, symposia, continuing education and professional development, aquatic veterinary externships, or equipment and supplies needed for aquatic veterinary research projects not funded by other sources.

Awards will be announced by May 2018. After completion of their activity, all awardees must provide a written report for publication in The *Aquatic Veterinarian,* a quarterly publication of the World Aquatic Veterinary Medical Association (WAVMA).

Stephen Reichley, DVM, PhD, CertAqV
Chair, John L. Pitts Aquatic Veterinary Education Awards Program
stephen.reichley@gmail.com

TO SUPPORT FUTURE STUDENT SCHOLARSHIPS, PLEASE MAKE A DONATION TODAY TO THE SCHOLARSHIP FUND! WWW.WAVMA.ORG/SCHOLARSHIPS.

WAVMA is on Facebook!

Find us on Facebook

"Like" WAVMA's Facebook Page and join the WAVMA Facebook group to keep up-to-date with WAVMA activities and aquatic veterinary medicine topics from around the world.

Search for WAVMA at www.facebook.com.

www.facebook.com/WAVMA

The Aquatic Veterinarian is meant to be read as a 2-page spread (like a paper magazine!). To view it this way on your computer, open the pdf document using Adobe Acrobat or Adobe Reader, then go to the menu bar at the top of the computer screen and click on View, then Page Display, then Two Page View. That will allow you to scroll thorough the issue seeing the cover page by itself first, followed by two pages side by side for the rest of the issue. Doing this, you will be able to see the Centerfold picture in all its ginormous glory!

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 TAVeditor@wavma.org.

Did you know?

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

The videos can be accessed at:
http://www.wavma.org/WAVMAs-Aquatic-Vet-Video-Library

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

COMMITTEE REPORTS

Communications Committee Report

The Communications Committee is the group that manages all of the communications, website and publications for WAVMA. The committee meets monthly via conference call. The Communications Committee was established in January 2008 to foster communications within WAVMA membership and with others involved with aquatic veterinary medicine. The Committee is charged to assist in the development and maintenance of:

1. The Association's website;
2. *The Aquatic Veterinarian* journal;
3. Listservs and other electronic communications mechanisms for members;
4. Any other forms of communication, including social media (Facebook, Twitter), that would benefit members and the Association;
5. Contact with other WAVMA committees to ensure information flow of interest to all members.

The current members of the committee are Andrei Bordeianu, Devon Dublin, John Griffioen, Miguel Grilo, Nick Saint-Erne, Stephen Reichley (Chair), David Scarfe, Chris Walster, and Irene Yen. Any WAVMA members who are interested can join the committee, and we need help especially with updating website information, finding and editing articles and information for the monthly e-News email and the quarterly journal.

Any WAVMA member interested in joining can contact Stephen Reichley to be informed of the next committee meeting.

Stephen Reichley
Communications Committee Chair
WAVMA Secretary
Secretary@wavma.org

Meetings Committee

The Meetings Committee 2018 budget was submitted to the Treasurer for USD $21,500. Budget allocation has been increased slightly taking into consideration attending one of the IVSA annual events. Additional funds may be requested for St. Kitts if needed and will be discussed at the Meetings Committee before approaching the Board.

Meetings planned for 2018 includes:

The following are veterinary meetings that WAVMA is attending or sponsoring for 2018:

- 2018 Aquaculture America Conference – Las Vegas, NV (February 19-22)
- 2018 WVA Conference – Barcelona, Spain (May 5-8)
- 2018 AVMA Convention – Denver, CO (July 13-17)
- 2018 IVSA Conference – Krakow, Poland (July 16-28)
- 2018 ISAAH – Prince Edward Island, Canada (Sept 2-6)
- 2018 WSAVA – Singapore (25-28 September, 2018)
- 2018 WAVMA/RUSVM/IAVBC Conference – St. Kitts (November 2018)

We will have a booth at some of the meetings above and can always use people to help man our WAVMA booth for short periods.

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

AUTHOR'S INSTRUCTIONS

Instructions for Authors and Contributors

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

Colleague's Connection

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

Peer-Reviewed Articles

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

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

Clinical Cases

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

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.

Advertising

See advertising rates on page 4.

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.

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 TAVeditor@wavma.org.

Meet WAVMA Distinguished Fellow:
Professor Ronald John Roberts
CCT, FRCVS, FRCPath, FRS(Edin)

Few people have had the opportunity to transform their profession. While he would assert that it was a matter of being in the right place at the right time, Ron Roberts revolutionized the attitude of the veterinary profession to the significance of fish and shellfish. By his research, his teaching, his writing and the force of his personality he built an Institute of world calibre and a cadre of well trained veterinary scientists who have extended his ideas and his vision throughout the world.

Ronald John Roberts was born in Liverpool, England in 1941 at the height of the 'blitz', in an underground shelter below the rubble of a maternity hospital destroyed by a land mine. He graduated from the University of Glasgow Veterinary School, in 1964. In the same year he married Helen Macgregor, a local school teacher, and this year they celebrated 54 years of marriage.

After a short time in veterinary practice, he secured a post in the Department of Veterinary Pathology at the Glasgow School and also graduated with a PhD. His time as a junior pathologist coincided with a severe outbreak of a dermatopathology in wild salmon which had variously been called 'fungus disease,' columnaris and ulcerative dermal necrosis (UDN).

As a result of this work he became inundated with post-mortem material from the embryonic trout, salmon and turbot farming industries which were developing at that time in Scotland, but was greatly handicapped by the lack of even the most basic information on the pathophysiology of the processes of infection, inflammation and healing in fishes. He therefore began the studies of inflammation, wound healing, cellular immunity and melano-macrophage function, which have become a cornerstone of modern fish pathology.

In 1971 his work and the rapidly growing aquaculture scene led the Nuffield Foundation to agree to fund a Research Unit at the University of Stirling, but retaining close links with the University of Glasgow Veterinary School -- the Aquatic Pathobiology Unit. Now that he was adequately funded, Roberts established a Masters training course for Veterinary Graduates, and PhD courses for both veterinarians and for microbiologists and parasitologists, whom he believed must be part of the holistic approach to fish medicine. His early students who have made significant marks on their subjects included Tony Ellis, Tore Hastein, Christina Somerville, Hugh Ferguson, and Hamish Rodger.

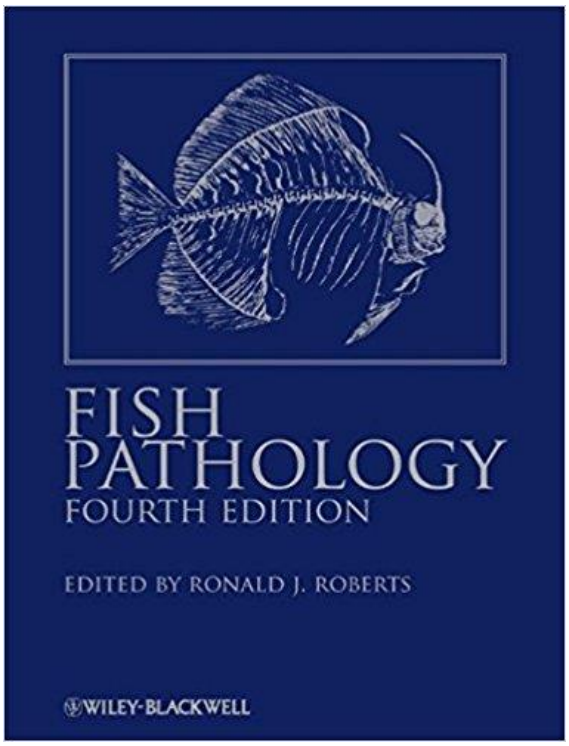
In 1978 Nuffield funding ended and the Research Unit was converted to a self standing University Institute—The Institute of Aquaculture. It had grown dramatically since its inception and the year was also significant in that it marked the publication of the first edition of *Fish Pathology*. This scientific text, now in its fourth edition, has been translated into ten languages. It also marked his launch of 'Journal of Fish Diseases,' the first scientific journal in English devoted entirely to disease in fish and shellfish. Unfortunately, it also marked the beginning of the long term decline in Ron's health and he underwent open heart surgery to correct a major congenital cardiac defect. He was also elected a Fellow of the Royal Society of Edinburgh, at the early age of 37.

Much of the work of the Institute at this time was funded by the UK Overseas Development Administration and Roberts' persuasive ideas for funding what were often difficult projects were usually well received. The Institute also attracted funding from FAO, and The World Bank and it was on one such project that he was dragooned into leading a very large UN Mission, extending over five years, to investigate a serious condition of rice field fishes in Asia, which was alleged to be caused by use of the fertilizers and pesticides that were essential to the 'Green Revolution'.

The matter was of great concern to both national governments and also major chemical companies, and the requirement was for a definitive answer to the cause and advice as to how it might be managed without losing the benefits of enhanced rice production.

Roberts established an international team working out of Bangkok, which collected disease material in the field from an area stretching from Australia and Papua New Guinea to Pakistan. The final conclusions, published in Bangkok as a large report in 1985, showed that there was no connection to toxic pesticides or fertilizers, and that while a great many pathogens ranging from viruses to protozoan parasites could be involved in specific outbreaks, the single necessary primary pathogen was a recent mutant clonal *Aphanomyces* fungus, highly invasive and of great pathogenicity, which was named *Aphanomyces invadans* ,Willoughby, after the late Guy Willoughby, the mycologist on the team, who isolated it.

The success of this project, for which Roberts was appointed Commander of the Most Noble Order of the Crown by His Majesty King Bhumibol of Thailand, coupled with other overseas contracts, led to other honours for the Institute. Most notable of these was the Queen's Award for Exports from Her Majesty Queen Elizabeth II and a formal visitation of the Institute by HRH Diana Princess of Wales.



In his last five years at Stirling, Roberts was very active in establishing the Regional Institute for Fish Diseases (AAHRI) in Thailand, which still flourishes as a regional training and diagnostic centre. He also embarked on his last Institutional building effort, designing, generating funding for and building a facility for the testing of commercial drugs, genetic fish variants and vaccines to allow assessment for efficacy and environmental legislative requirements. It was built at Machrihanish, on an isolated coastal area near the family home that he had retained in Kintyre. It is owned by the University of Stirling, but is run entirely on a self-funded basis, and such has been its success that it has been extensively expanded and still operates profitably, over twenty years later.

By 1996, Ron Roberts was beginning to run out of steam, his heart problems recurred and fighting major changes in the administration of the University, which seemed determined, in the hands of new, younger senior management, to rein in the independence of the Institute, despite the fact that this was widely seen by its Advisory Board to be one of its main strengths. Eventually, after a series of disputes he decided to take ill-health retirement and leave the Institute that had been his life's work.

Ron Roberts was never again able to take on full time employment, despite many offers. Instead he enjoyed a variety of involvements in a range of work. His two major commitments however, were to the University of Idaho, where he was invited to take up a Distinguished Visiting Professorship and as a Director of the commercial salmon farming company Landcatch, with which he had had a relationship for many years.

In Idaho, he was involved in both research and teaching and re-located the editorship of the 'Journal of Fish Diseases' there. He also made use of its excellent library and secretarial support facilities to complete both the third and later the fourth edition of *Fish Pathology*.

At Landcatch, his role was to seek a way to adapt their large scale salmon breeding facility to the opportunities offered by the molecular genetic advances that had already influenced poultry breeding so significantly. Once more he used his combined skills of persuading both proprietors and funding agencies of the wisdom of a particular opportunity, and then leading it to ensure it delivered as promised. By the time he retired from Landcatch, when it was sold to Hendrix Genetics, the major international poultry breeding company, it had become the first company to successfully develop and market a molecularly selected strain of fish genetically resistant to both a virus (IPN) and a parasite (*Lepeophtheirus*).

Ron Roberts has contributed widely to his profession. He has also served as an example to younger scientists by his vision, his enthusiasm and his leadership. His contributions to basic fish science have provided a baseline for the future, his students have extended his influence throughout the world, and though in deprecating his career his favourite aphorism has been that he was lucky and that "in the land of the blind the one eyed man is king", his efforts have been a major factor in why fin-fish pathology is no longer the "land of the blind".

With many thanks, we wish the best to Dr. Ron Roberts, our WAVMA President in 2008, and a member of the first group of WAVMA veterinarians elected as Distinguished Fellows, in 2012.

STUDENT REPORTS

John L. Pitts Veterinary Education Awards

Nicole Nietlisbach
DVM Candidate, Class of 2019
University of Wisconsin-Madison
Wisconsin Aquatic Animal Medicine, Vice President

At the end of my first year of vet school, I took a weeklong fish medicine course at UW-Madison. The course, put on every year by Dr. Myron Kebus and Dr. Michael Collins, opened my eyes to the world of fish veterinary medicine. Since then, I've continued to explore the field, and each experience, including my summer project, has bolstered my desire to pursue a career as an aquaculture vet.

This past summer and fall, thanks to the support of the John Pitts Aquatic Veterinary Education Scholarship, I was able to research the Wisconsin aquaponics industry. Aquaponics is a system of growing fish or other aquatic species and using their nitrogenous waste products to farm plants. As a recent Aquaculture Magazine article eloquently outlines, aquaponics is seen by some as having the potential to revolutionize the American aquaculture industry. Its attributes include up to 90% less water usage than traditional aquaculture methods, fresh produce grown all year, highly efficient space utilization compared to traditional agriculture, and much less pollutant-rich effluent than that produced by traditional aquaculture systems.

Wisconsin has a relatively strong history of aquaponics, compared to other areas of the country. We have UW-Stevens Point's Aquaponics Innovation Center, Nelson and Pade which is one of the oldest and most influential aquaponics system companies, and Will Allen's Growing Power farm in Milwaukee (sadly, recently closed due to financial issues), which was an urban farm that utilized aquaponics as well as other agriculture methods to address the issue of food deserts in Milwaukee. A large commercial aquaponics farm that is raising Atlantic salmon recently opened in northern Wisconsin, and is the first land based, indoor Atlantic salmon producer in the United States. With the promise of fresh, local greens and sustainably grown fish year-round, it is easy to understand the ever-growing interest in aquaponics, especially in a cold-weather state with an extremely strong "Farm-to-Table" culture like Wisconsin.

My goal was to learn more about the aquaponics industry: Was it as promising as it seemed? Is fish health a common problem? What kind of health problems exist on Wisconsin aquaponics farms? And how are these farms equipped to handle disease?

I chose to narrow my focus to Nile tilapia (*Oreochromis niloticus*) aquaponics farms as it is the most common fish species grown in aquaponics systems in Wisconsin. As each of the farmers I talked to reiterated, it is a hardy, productive fish that can survive many of the mistakes of amateur fish farmers. It is also often mistakenly billed as a "disease-resistant fish." All the farms I visited were small scale commercial farms, that mostly sell produce and fish to local grocery stores and restaurants. I ended up building a relationship with some of the farms, returning with Dr. Kebus on numerous occasions to investigate different health issues that arose.

With Dr. Kebus and Dr. Collins coaching me along the way, I contacted farms to set up meetings, toured facilities, wrote and conducted a survey with farmers, reviewed farm records, reviewed fish health certification papers, tested water parameters, performed non-lethal physical exams and external parasite checks, performed necropsies and sample collection, and conducted some diagnostic testing, such as gram stains and bacteriology cultures. I also got the opportunity to collaborate with professionals like Dr. Esteban Soto, a tilapia disease expert and veterinarian who talked with me about *Francisella noatunensis,* and Dr. Chris Hartleb, an aquaponics expert and professor who talked with me about the intricacies of aquaponic systems. The clinical pathology laboratory at the UW-

Madison School of Veterinary Medicine advised me on bacteriology and ran more advanced diagnostic tests for me, like Maldi-Tof. One of the anatomic pathologists at the veterinary school also agreed to help me analyze histology samples I collected from one of the cases.

Some of my most valuable takeaways involved basic skills, such as how to properly net fish, which was harder than I had expected. I also got the chance to use various water testing kits. At each farm, I tested dissolved oxygen, ammonia, nitrite, and pH with kits and hand-held meters from various companies including Hach, LaMotte, API, and YSI. This gave me an idea of how each of the tests work, their pros and cons, and the importance of keeping handheld meters properly calibrated. One particularly educational experience came from helping a farm figure out why they had high carbon dioxide levels. Dr. Hartleb helped us figure out that the colorimetric titration test they had been using was not suitable for water with high levels of organic matter. Instead, Dr. Hartleb brought a handheld meter to the farm, which revealed that their CO_2 levels were in fact normal. Making sure that meters are calibrated and that tests are being used appropriately is integral when evaluating water quality.

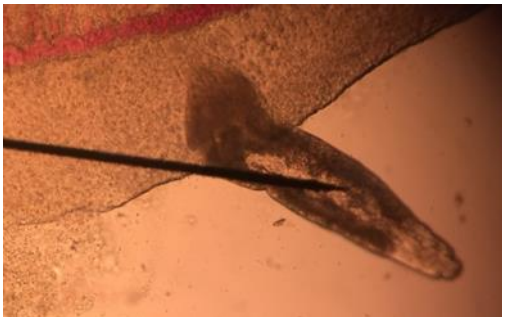
I found that aquaponics farms do indeed struggle with fish health problem. We found *Trichodina sp.* and monogenean trematodes (*Gyrodactylus sp.* and *Dactylogyrus sp.)* on every farm we visited, though parasitic load varied between farms and between tanks. This discovery on each of the farms was not terribly surprising, as all the fish came from the same tilapia hatchery. Despite some farms having particularly high numbers of external parasites, few fish exhibited clinical signs of infestation. But, these parasites could easily become a health problem if the fish experience a stressful and immunosuppressive event.

Some farms also experienced bacterial infection outbreaks. One farm in particular had a history of *Francisella noatunensis* which had a recurrence this summer. We were able to necropsy affected fish and confirm the continued presence of *F. noatunensis* in this farm. We also investigated a severe, acute mortality event in which fish put into a purge system before harvest suddenly developed dramatic scale loss, skin lesions, and died within 2-4 days of onset. We found gram negative rods on gram stain of impression smears of major organs and cultured *Aeromonas veronii,* serovar *sobria (*Confirmed by Maldi-Tof and genotyping) from tissues collected during necropsy of affected fish. We never quite figured out what inciting cause lead to such intense *Aeromonas* infections, as water parameters were normal and consistent with the rest of the system and nothing unusual was noted in transfer. It may have been a particularly virulent strain and has not caused problems since.

Tilapia infected with Francisella noatunensis. Multifocal granulomatous lesions visible in the spleen, liver, kidney, and thymus.

Farmers that I talked with were very interested in working with veterinarians. But, there are obstacles to veterinary involvement that may be unique to aquaponics. Even though fish are integral to the system, plants make around 90% of the profits, especially for farms that sell a relatively cheap fish like tilapia. With the small farms that seem to be most common around Wisconsin, it is hard or at least takes a while for a business to turn a significant profit. This makes it difficult for them to afford veterinary care or consultation, especially if they are paying for a veterinarian to drive a few hours to see them.

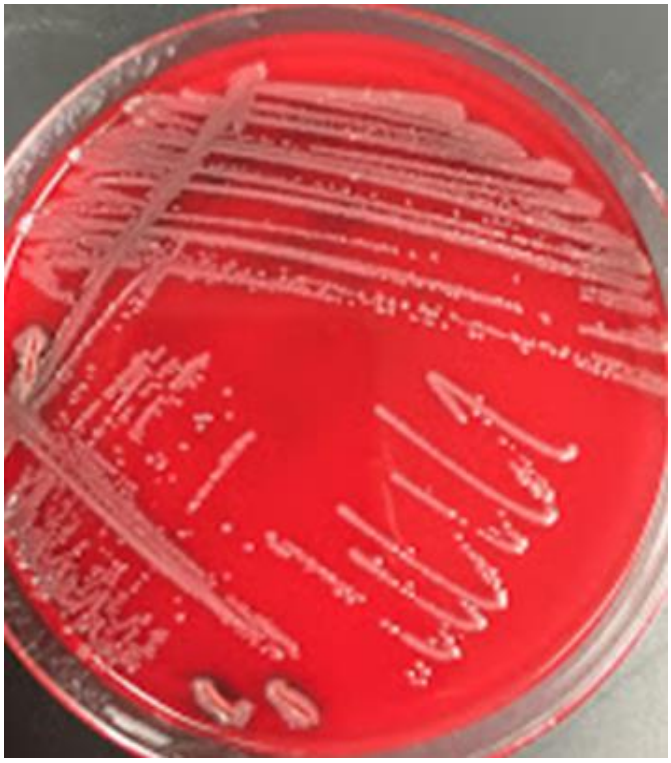
While some of the farmers I worked with were already aware of fish veterinarians because of past interactions with Dr. Kebus and Dr. Collins, especially newer aquaponics farmers are not necessarily aware of fish veterinarians. For there to be a demand for veterinarians in aquaponics, farmers need to be aware of how veterinarians can help them increase their profit through improved fish health and lower mortality rates. Outreach by fish veterinarians to aquaponics farmers and associations will be an important factor in whether aquaponics farmers choose to seek veterinary services in the future.



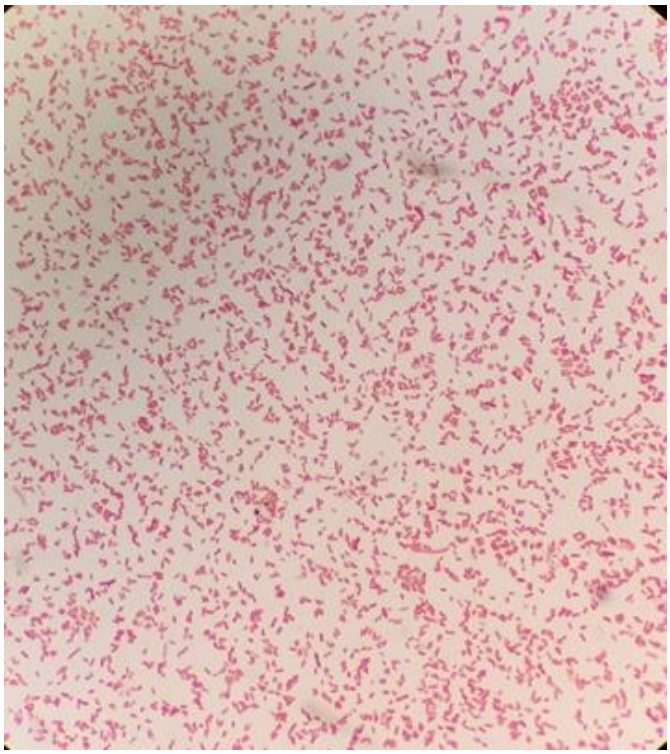
Dactylogyrid found on a gill clip.

I believe the aquaponics industry could most benefit from veterinary involvement with systems planning. The systems we saw did not seem to be built with quarantine in mind. There was no way to disconnect a tank from the system, or much of any tank space to move sick fish to. If treatments were needed, there was no way to disconnect fish from the plants in the systems we saw. Most of these farms are organic and would not use antibiotics in any case, making biosecurity and preventative medicine even more important. It is also extremely difficult to rid the system of some pathogens, like *Francisella noatunensis*. Once they are introduced, eradication may require nothing short of completely dismantling, cleaning, and restarting the system.

Tilapia with severe scale loss, hemorrhagic skin lesions, and eroded fins from an unusual Aeromonas veronii biovar sobria infection.



Aeromonas veronii biovar sobria colonies on a blood agar plate (above) and a gram stained sample of one of the colonies (below).



The attitude of farmers about the future of aquaponics ranged from very optimistic to skeptical. Particularly with some of the older farms we visited, there was frustration over fish health and/or plant health. It isn't as simple or harmonious of a system as is sometimes advertised. It will be especially interesting to see how larger aquaponics operations that are run by people with aquaculture backgrounds and that grow more lucrative fish will do financially. Like in any other area of agriculture I believe veterinarians could help optimize the health and production of fish in aquaponics systems, through both direct involvement in farm management or planning and in future research on the health of animals in aquaponics systems.

When I originally talked with Dr. Kebus and Dr. Collins about this project, I had envisioned a more traditional, scientific research project. It turned into a more empirical study than I first planned, but I believe I learned much more about what it would be like to be an aquaculture veterinarian than I would have if I had conducted a traditional, scientific research project. Although limited in scope, this experience was a fantastic way for me to start to build my general

knowledge of aquaculture and fish husbandry. As I continue my career, I hope to learn more about aquaponics. I am hoping to get a chance to see a new, larger commercial aquaponics operation in the near future. I am also planning to present on my project and the health cases I encountered at a couple of conferences during my last year of veterinary school.

I am extremely grateful to all the generous donors to the John L. Pitts Aquatic Veterinary Education Awards Program and to the scholarship committee for choosing to help me fund my project. It was invaluable to be able to learn from Dr. Kebus and Dr. Collins in real-life scenarios and to learn about the concerns of fish farmers in person. The knowledge and experience I gained during this project will continue to help me as I pursue a career as an aquaculture vet.

Getting Experience in Aquatic Veterinary Medicine

Sarah Wright
2nd year Veterinary Student
University of Illinois

After midterms last month, I had the opportunity to travel to Dallas, Texas, to attend the American Association of Zoo Veterinarians (AAZV) conference. The conference was held at the Embassy Suites Hotel and Convention Center in Frisco, Texas. The conference was also held concurrently with the American Association of Fish Veterinarians (AAFV), the Association of Exotic Mammal Veterinarians (AEMV), the Association of Reptile and Amphibian Veterinarians (ARAV), and the Association of Zoos and Aquariums Nutrition Scientific Advisory Group (NAG) conferences.

I arrived at the conference during the weekend to assist with the pre-conference wet labs for AAFV with Nicole Nietlisbach, a veterinary student from the University of Wisconsin School of Veterinary Medicine. The first night Nicole and I went out to dinner with AAFV members from all over the world. It was great speaking with them about the differences and similarities in veterinary medicine around the globe and it opened up our eyes to the diversity that exists in our field.

The next day, the wet labs began. The first lab that Nicole and I assisted with on Sunday was the morning lab titled “Fish Handling, Clinical Procedures, and Sedation.” Nicole and I checked in the participants and ensured that the wet lab flowed smoothly. Towards the end of the lab, we also were able to go through the necropsy of a koi and practice clinical techniques such as sedation, venipuncture, performing gill, fin, and skin scrapes, and performing a fecal collection. We then helped transition the wet lab room to set up for the next wet lab by changing out the supplies.

The afternoon wet lab was titled “Introduction to Sharks.” This lab began with a lecture on shark medicine, surgery, anatomy, and physiology. Then, the lab transitioned to the hands-on portion. The participants were given various shark species cadavers for necropsy. Nicole and I were given a dogfish shark cadaver and we performed a necropsy of the brain to show the lab participants what a shark brain looks like. It was actually really interesting to draw parallels between the brain of the shark to the brains of the dogs that we dissected as first-year students at our colleges.

After assisting with the clean-up of the lab, we then freshened up and traveled to the Dallas World Aquarium in downtown Dallas for the evening icebreaker session. The night was filled with animals, networking, and laughter. One of my favorite parts of the icebreaker was re-connecting with University of Illinois Vet Med grads that I had met as an undergraduate volunteer at the Wildlife Medical Clinic at Illinois. My peers and I also had a great time exploring the Dallas World Aquarium and seeing all of the animals on exhibit.

The next day was the New Member breakfast. I attended the breakfast with Allison Dianis, a fellow Illinois second-year student who was also attending the conference, and we learned more about what AAZV was and how to become further involved. After the breakfast, the scientific sessions began. I spent the day attending the AAFV scientific sessions, learning about novel techniques and research in the field of fish medicine.

After the scientific sessions, the other Illinois students and I attended the AAZV Student Reception. At this event, various institutions were set up at tables and students were able to go and speak with them about their various externship, internship, and residency opportunities. This night was one of my favorite nights of the conference because I was able to reconnect with professionals and students from other Colleges of Veterinary Medicine that I had met through participating in experiential learning activities in the past, and I was able to meet new professionals and students as well. I left the Student Reception feeling excited about the various opportunities in the field of zoo medicine. After the reception, Illinois students and alumni attending the conference went out to dinner. It was really fun to talk with the previous students about their career paths and how Illinois is similar and different compared to when they were students.

The last day that I attended the conference was Tuesday. I attended the scientific sessions in the morning and early afternoon, which covered primate medicine and aquatic animal medicine. Unfortunately, I had to head to the airport to go back to class in the late afternoon. However, we did take a group Illinois picture before I left. It was truly amazing how many current and past Illini were attending the conference.

Getting Experience in Aquatic Veterinary Medicine—*Continued*
Sarah Wright

Ultimately, I left my four days at the conference with a renewed passion and interest in the field of zoo medicine. Although attending my first AAZV and AAFV conferences was intimidating initially, I gained more knowledge, clinical skills, and connections from attending than I ever could have imagined. One of the biggest takeaways that I gained from this experience is that if you take the first step and put yourself out there, doors will open for you and lead to opportunity after opportunity. I look forward to attending more AAZV and AAFV conferences in the future, and I encourage my peers who have an interest in zoo or aquatic animal medicine to do the same.

A Visit to River Safari—Singapore
By Nick Saint-Erne

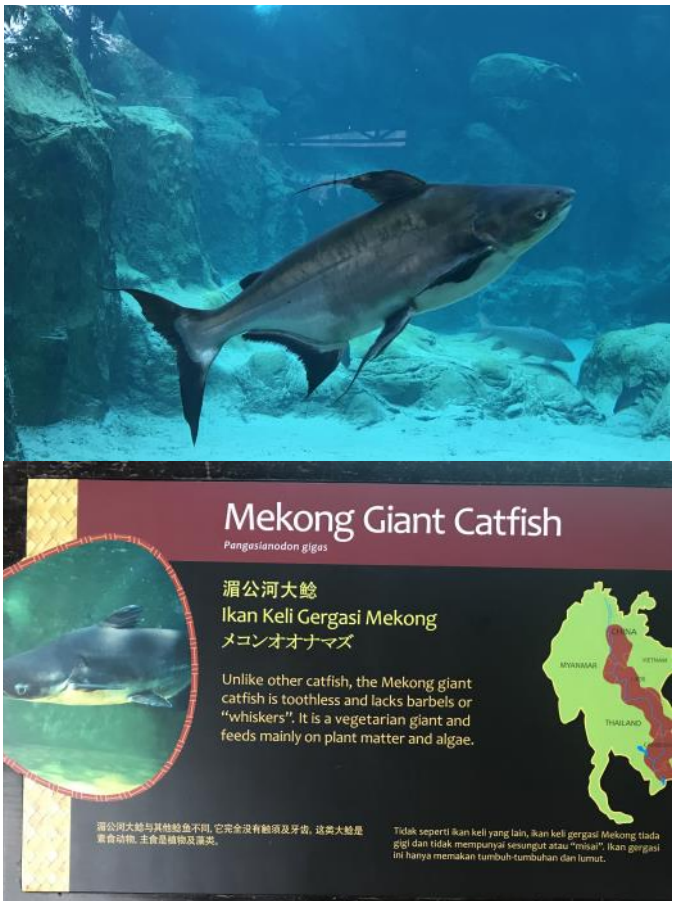
In January, while visiting tropical fish farms in Asia, I had the opportunity to visit a wonderful nature park, River Safari in Singapore, Asia's only river-themed wildlife park. It has exhibits that cover some of the major rivers in the world: the Amazon, Mississippi, Congo, Nile, Ganges, Mekong and Yangtze rivers, occupying 12 hectares and housing one of the world's largest collections of freshwater fishes, featuring over 6000 animals across 200 species – of which 40 are threatened. In addition to aquatic animals, they have Red Pandas and Giant Pandas in an intricately designed climate-controlled exhibit along the Yangtze River zone.

A herd of capybaras taking a swim in the Amazon River exhibit.

We were given a personal park tour by the staff curator, Wah Yap Hon, a very personable and knowledgeable fellow. The park is in a beautiful setting, with some indoor exhibits and some outside. It also includes a ride through the Amazon River exhibit that allows one to rest while still seeing many great displays of birds, mammals, and of course fishes!

For more information, see the website:
https://www.wrs.com.sg/en/river-safari.html

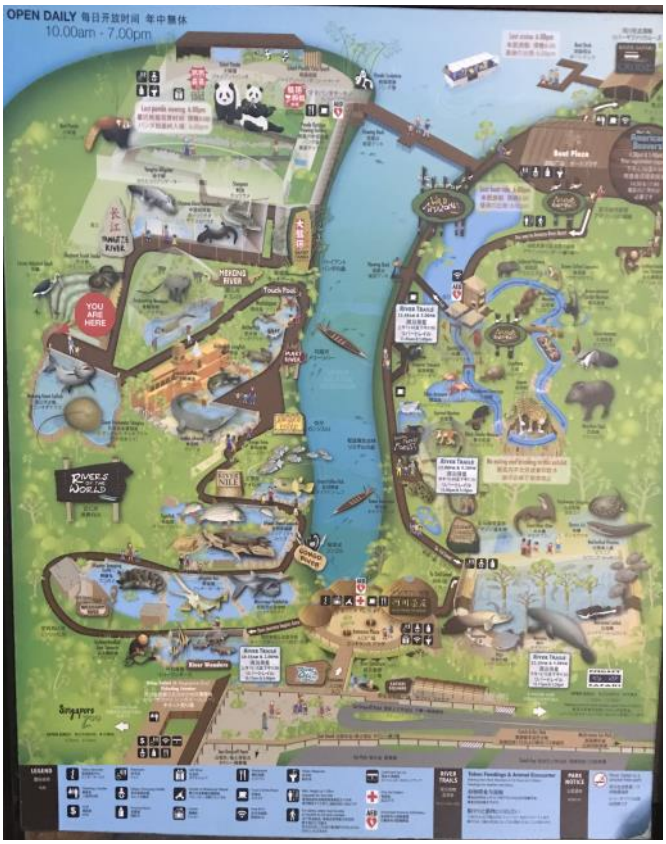
Wah Yao Hon and Nick Saint-Erne at River Safari, 80 Mandai Lake Road, Singapore 729826.



Top Left: Giant Catfish

Top Right: cleaning gravel in exhibit using ingenious gravel vacuum unit.

Left: A real river runs through River Safari!



Left: Map of River Safari

Above: Let sleeping giant pandas lie!

Right: Scan QR code to see map of park and interactive videos (in Chinese!).

CENTERFOLD


Alligator Gar
Ikan Buaya Gar
アリゲーターガー
This is the largest of all gars, growing up to 3 m and over 100 kg. The wide alligator-like snout is lined with razor-sharp teeth. Its flesh is edible but the eggs are toxic to humans.

CENTERFOLD

AQUATIC VETERINARY ABSTRACTS: Phytotherapy

Recovery of *Cyprinus carpio* (Ornamental Koi Carp) Experimentally Infected with *Aeromonas hydrophila* Through Phytotherapy

Journal of Aquatic Research and Marine Sciences.
ID: ARMS - 101014

Antimicrobial resistance in bacterial pathogens is a global public health problem. The aim of this research was to reveal the benefit of phytotherapy instead of chemotherapeutic agents for treatment of the bacterial pathogen *Aeromonas hydrophila* in intramuscularly infected Koi carp.

Lesions were manifested as a hemorrhagic spot within 19.00 ± 2.00 hours, which progressively increased in size and became an open wound measuring 1.73 ± 0.50 cm in diameter on the 3rd day. The infected fish were given a short-duration bath treatment in plant extracts of *Indigofera aspalathoides* or *Acorus calamus*, and healing commenced with the shrinking of the lesions and improved appearance of epidermis, in 15 ± 2 days with *A. calamus* and 17 ± 3 days with *I. aspalathoides*. The scale formation was complete in the next 5 ± 2 days with *A. calamus* and 20 ± 3.5 days with *I. aspalathoides,* confirming the effectiveness of the short bath treatment with herbal residue, and the increased potency of *A. calamus* over *I. aspalathoides* in combating the *A. hydrophila* infection in koi carp.
https://norcaloa.com/ARMS

Influence of Tetra SmokeTree (*Cotinus coggygria*) Extract against *Vibrio anguillarum* Infection in Koi Carp, *Cyprinus carpio*

By Soner Bilen, Sevdan Yılmaz, Aslı Müge Bilen
Turkish Journal of Fisheries and Aquatic Sciences
13: 517-522 (2013)

In this study, the effect of the methanolic extract of tetra (*Cotinus coggygria*) against *Vibrio anguillarum* in cultured koi carp (*Cyprinus carpio*) was investigated. Three different concentrations of tetra extract (0, 0.5, 1, 1.5 g kg-1 of feed) were individually mixed with the basal diet and fed to koi (average body weight of 4,14±0,08 g) for a 4-week period to assess the immunomodulatory characteristics of tetra. At the end of the study, koi were challenged with a strain of *Vibrio anguillarum* (108 CFU/ml). Growth performance was not affected by dietary tetra extract intake.

This study shows that the koi treated with 0, 0.5, 1 and 1.5 g/kg tetra extract prior the challenge with live *V. anguillarum* had 37.50%, 31.94 %, 18.06 % and 12.50 % mortality. According to study results, tetra is an effective non-specific immunostimulant for koi.

Traditional Indian herbal extracts used *in vitro* against growth of the pathogenic bacteria – *Aeromonas hydrophila*

By Bhuvaneswari, R., & Balasundaram, C.
The Israeli Journal of Aquaculture - Bamidgeh, 58(2), 89-96. (2006)

Crude ethanol extracts of *Acalypha indica, Acorus calamus, Coleus aromaticus, Heliotropium indicum,* and *Indigofera aspalathoides* were screened for antibacterial activity *in vitro* against the growth of the fish pathogenic bacteria, *Aeromonas hydrophila*. Terramycin, widely used to control *A. hydrophila* in aquaculture, was used as a positive control.

The herbs *A. calamus* and I. *aspalathoides* warded off the growth of the pathogen completely at minimum inhibitory concentrations of 1.29 and 2.16 mg/l, respectively. A minimum bacterial concentration of 1.00 cfu occurred at concentrations of 0.77 mg/ml for *A. calamus* and 1.29 mg/ml for *I. aspalathoides*. The order of potency of the herbs in warding off growth of *A. hydrophila in vitro* was ranked: *A. calamus, I. aspalathoides, C. aromaticus, A. indica*, and *H. indicum.* The inhibitory potency of *A. calamus* and *I. aspalathoides* was significantly higher ($p<0.05$) than that of the positive control, indicating the potential of these herbs to replace antibiotics in controlling *A. hydrophila* infection.
https://evols.library.manoa.hawaii.edu/handle/10524/19165

Effects of Dietary Incorporation of Tetra Smoke Tree (*Cotinus coggygria*) Extract on Immune Response and Resistance to *Aeromonas hydrophila* in Koi Carp (*Cyprinus carpio*)

By Soner Bilen, Sevdan Yılmaz, Aslı Müge Bilen, Gouranga Biswas.
The Israeli Journal of Aquaculture - Bamidgeh, IJA_66.2014.1051.

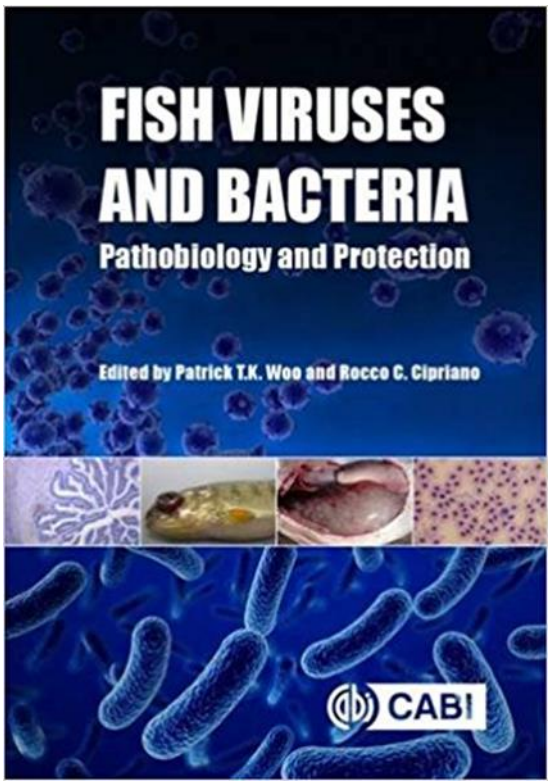
In this study, immunostimulant effects of dietary supplementation of tetra tree extract on the non-specific immune response, and protection against *Aeromonas hydrophila* infection in Koi carp were investigated. Koi were fed with tetra extract incorporated diets containing 0 (Control), 0.5 (Te1), 1.0 (Te2) and 1.5 g/kg (Te3), for 30 days. At the end of the study there were no differences in the values of hematological parameters between treatments.

In the challenge study with *A. hydrophila* (108 CFU/ml) administered after 30 days of feeding where the Koi received Te3, Te2, Te1, and control diets, they had 13.3, 20.0, 26.7, and 40.0% mortality, respectively. Tetra extract supplemented diets enhanced the immunological responses and triggered the immune system of Koi carp against *A. hydrophila* infection.

Book Review

Fish Viruses and Bacteria: Pathobiology and Protection
Patrick T. K. Woo & Rocco C. Cipriano
CAB International, ISBN 978-1-78064-778-4,
384 pages. 2017. Price $157.50.

Fish Viruses and Bacteria: Pathobiology and Protection is a thorough look at the most important diseases of fish today. The book focuses on major viruses and bacteria that have high economic consequences and potential global impacts. This book will be of value to veterinarians working in any aspect of aquatic animal medicine, particularly those who work with aquaculture providers.



The pathogens discussed in this book include 13 viruses and 12 bacterial species that primarily affect economically relevant freshwater aquaculture species. This book builds upon the diseases previously discussed in Fish Diseases and Disorders, Volume 3: Viral, Bacterial and Fungal Infections, which was published in 2011.

Descriptions of sampling techniques for and photographs and photomicrographs of gross and histologic lesions caused by the pathogens discussed will be useful for aquatic animal clinicians. Each disease is thoroughly discussed along with helpful preventative and control strategies. Each chapter is broken down into specific sections including structure, distribution, economic impacts, diagnosis and clinical signs, transmission, pathology, protective and control strategies, available treatments, and possible further research directions.

For some of the pathogens described, knowledge gaps regarding pathobiology still exist and require further research. However, rather than ignoring those shortcomings, the authors provide suggestions for future research studies when appropriate. This book will be a great reference for all aquatic veterinarians, from those working with common pet koi to high-volume commercial aquaculture. It contains a wealth of relevant information that is easy to access for most common and important viral and bacterial diseases of fish.

The book contains 25 illustrated chapters that describe the epidemiology, prevalence, distribution, transmission, physiopathology, clinical signs, diagnosis, prevention, control strategies, legislative aspects and economic impact of bacterial and viral diseases of fishes, including: Infectious pancreatic necrosis virus; Infectious haematopoietic necrosis virus; Viral haemorrhagic septicaemia virus; Epizootic haematopoietic necrosis and European catfish virus; *Oncorhynchus masou* virus and Cyprinid herpesvirus; Infectious salmon anaemia virus; Spring viraemia of carp virus; Channel catfish viral Disease; Largemouth bass viral disease; Koi herpesvirus disease; viral encephalopathy and retinopathy; red sea bream iridovirus and white sturgeon iridovirus; alphaviruses; *Aeromonas salmonicida*and *A. hydrophila; Edwardsiella* spp.; *Flavobacterium* spp.; *Francisella noatunensis; Mycobacterium* spp.; *Photobacterium damselae; Piscirickettsia salmonis; Renibacterium salmoninarum; Streptococcus iniae* and *S. agalactiae; Vibrio anguillarum, V. ordalii* and *Aliivibrio salmonicida; Weissella ceti* and *Yersinia ruckeri*.

While the book is intended for research scientists in the aquaculture industry and universities, managers and supervisors of fish health laboratories and veterinarians in public aquaria, it is also appropriate for senior undergraduate/ graduate veterinary students who are conducting research on diseases of fish, as well as being a useful reference book for university courses on infectious diseases, general microbiology and the impacts of diseases on the aquaculture industry.

Book review by Jessie Sanders, DVM, CertAqV
Aquatic Veterinary Services of Northern California,
Soquel, CA

The Aquatic Veterinarian is meant to be read as a 2-page spread (like a paper magazine!). To view it this way on your computer, open the pdf document using Adobe Acrobat or Adobe Reader, then go to the menu bar at the top of the computer screen and click on View, then Page Display, then Two Page View. That will allow you to scroll thorough the issue seeing the cover page by itself first, followed by two pages side by side for the rest of the issue. Doing this, you will be able to see the Centerfold picture in all its ginormous glory!

Questions & Answers from the WAVMA Listserv
(WAVMA_Members-L@wavma.org)
Carbon Associated Head and Lateral Line Erosion

Hi All,

I have a new client on my schedule who has a marine tank containing a cleaner Wrasse, a Foxface Rabbitfish, a Blue Throat Trigger and an Emperor Angelfish, with the 3 year old Emperor Angelfish being the fish she has concerns about. She recently moved them from a 55 gallon tank to a brand new 135 gallon tank (which I think may still be too small). She thinks it is developing HLLE.

A separate concern is that this fish intermittently develops "brownish/greyish blotches" in the submandibular area (anterior to the pectoral fin) which then disappear in a few hours. I don't have a lot of experience with *Pomacanthus* spp but it seems to me that it could be a reaction to stress since it comes and goes in such a short time frame. Has anyone observed this phenomenon or have any experience or opinion they can share?

Thanks,

Sharon R. Tiberio, DVM, CertAqV
Certified Aquatic Veterinarian
954.552.4001
myfishvet.com
email: DrSharon@myfishvet.com

Hi Sharon,

Triggers tend to be very aggressive fish so may not be a good combination. Agree about stress issues and rapid colour changes.

HLLE – make sure no carbon is in the system as it has been shown to be a definite cause in marine fish in two studies.

All the best.

Dr Rob Jones
The Aquarium Vet: www.theaquariumvet.com

Sharon,

I agree with Rob Jones' comments about carbon being associated with Head and Lateral Line Erosion. We used to use powdered carbon in a bag in the filter systems at our stores and we had a few cases of the fish in the system losing their fins! They would try to swim and eat, and seemed normal other than their fins eroding away. It was hundreds of fish at a time.

On necropsy, I was surprised to find not parasites or fungus or bacteria, but black specks in the damaged tissues. I attributed this to carbon dust in the water being absorbed by the fish into their system and occluding blood vessels in the fins (like gas bubble disease but with carbon dust rather than air).

We removed carbon from the recirculating filter systems and the problems stopped. Now, we still use a carbon cartridge for dechlorinating the incoming tap water flowing into the fish systems, but NO CARBON on the recirculating filtration.

Jack Wattley, the famous discus breeder, has stated to not use carbon with discus as it can cause skin lesions. He did not know the specific etiology, but had also seen a correlation between carbon use and fish lesions.

Anyone else seen that?

Nick Saint-Erne, DVM CertAqV
Certified Aquatic Veterinarian
PetSmart, Inc.
19601 N. 27th Avenue, Phoenix, AZ 85027
email: nsainterne@petsmart.com

Sharon,

These articles may be of interest:

Effects of Full-Stream Carbon Filtration on the Development of Head and Lateral Line Erosion Syndrome (HLLES) in Ocean Surgeon
M. Andrew Stamper, Michele M. Kittell, Erin E. Patel & Allison L. Corwin (2011)
Journal of Aquatic Animal Health, 23:3, 111-116,
DOI: 10.1080/08997659.2011.608608
To link to this article:
http://dx.doi.org/10.1080/08997659.2011.608608

And:

The Role of Activated Lignite Carbon in the Development of Head and Lateral Line Erosion in the Ocean Surgeon (Acanthurus bahianus)
Jay Hemdal & R. Andrew Odum (16 Nov 2011)
North American Journal of Aquaculture, 73 (4)
Toledo Zoological Society, 2700 Broadway,
Toledo, Ohio, 43609, USA
http://www.tandfonline.com/loi/unaj20 or
https://www.tandfonline.com/doi/full/10.1080/15222055.2011.635781

B. Denise Petty, DVM
North Florida Aquatic Veterinary Services
http://nflaquavetsrvc.com/home.html

Mouth brace to stabilise premaxillary bone fracture in a koi fish (*Cyprinus carpio*)

By Cheryl Tan, Murdoch University veterinary student & Dr. Richmond Loh, the Fish Vet

Go here to watch full video:
https://www.youtube.com/watch?v=ELdh_kfd5nc

Clinical Case

Koi presented with an injured mouth that collapses on inspiration. This was confirmed as a premaxillary bone fracture. The mouth of a fish serves to feed and breathe, and is highly mobile, thus surgical intervention was necessary to prevent deformities when healing that may compromise function.

Procedure

To stabilise the fracture, a 'mouth splint or brace' was fashioned out of metal wire threaded through silicone airline tubing. The silicone tubing allowed cushioning from the hard metal, and allowed purchase for sutures.

Figure 1: Positioning of the mouth splint.

The patient was transferred into an anesthetic bath to prepare for surgery. Anti-inflammatory (flunixin 0.5mg/kg/body weight) was given for post-operative pain relief.

Monofilament nylon suture material was used in a simple interrupted pattern technique, to secure the brace to the premaxillary bone and the silicon air tubing of the wire.

Betadine solution was sprayed onto the wound to prevent bacterial infection. The patient was recovered from anaesthesia in his pond, under the waterfall.

Figure 2: Stitching the mouth splint around the lips.

Results

5 days post-surgery

The patient's relationship with other fish, swimming behaviour, and feeding habits were observed and recorded as good. The brace was examined to be in proper position, and no infection was found around the lips.

16 days post-surgery, removal of mouth brace

Light sedation was used. Suture-removing scissors were used to remove all sutures. Finally, betadine spray was applied topically to prevent infection. The patient's mouth healed and had good apposition; he could use his mouth to create suction for the prehension of food, and breathing.

Figure 4: Cutting the sutures with scissors.

Figure 5: Patient fully recovered from surgery.

Antimicrobial Resistance Website

FAO has just made a very informative Antimicrobial Resistance (AMR) website public. FAO's intent is to increase global awareness to antimicrobial resistance, and the global threat of increasing concern to human and animal health, and implications for both food safety, food security, farming, people, and the economic wellbeing of millions.

While the information currently being added to the website is rapidly evolving, the website provides easy access to a number of important data, facts, documents and approaches to address problems. Important for WAVMA members, it has a page devoted to aquaculture and fisheries, with easy access to a number of important publications, including:

- Antimicrobials and aquaculture, and FAO Initiatives on Antimicrobial Resistance (FAO Newsletter)
- Improving biosecurity through prudent and responsible use of veterinary medicines in aquatic food production (FAO Fisheries and Aquaculture Technical Paper)
- One Health – Integrating Aquatic Biosecurity into the Way Forward - A Natural Progression (FAO Aquaculture Newsletter)
- Improving Biosecurity through Prudent and Responsible Use of Veterinary Medicines in Aquatic Food Production (FAO Aquaculture Newsletter)
- Disease control in aquaculture and the responsible use of veterinary drugs and vaccines: the issues, prospects and challenges (Options Méditerranéennes. Série A, Séminaires Méditerranéens)
- Use of chemicals in aquaculture in Asia: Proceedings of the Meeting on the Use of Chemicals in Aquaculture in Asia, 20-22 May 1996, Tigbauan, Iloilo, Philippines (SEAFDEC/AQD, Philippines)

Go to this website:
http://www.fao.org/antimicrobial-resistance/en/

Canada Suspends Import of Salamanders

The Government of Canada has implemented a one-year import restriction on salamanders. The restriction, which is implemented through an amendment to the *Wild Animal and Plant Trade Regulations* (WAPTR), was approved by the Governor in Council on May 12, 2017 and was published in the *Canada Gazette*, Part II, on May 31, 2017. The purpose of the amendment is to prevent the introduction of *Batrachochytrium salamandrivorans (Bsal)* into Canadian ecosystems by temporarily prohibiting the import of all species of the order Caudata (such as salamanders, newts and mudpuppies) unless authorized by a permit issued by Environment and Climate Change Canada, for a period of one-year, until May 11, 2018.

During this time, the Government of Canada will explore longer-term measures to protect Canadian salamanders. Prohibiting the import of all salamander species is consistent with the precautionary principle, and takes into consideration the limited and evolving understanding of the disease, as well as the enforcement challenges associated with identifying different salamander species at Canada's numerous ports of entry.

Additional details on the import restriction on salamanders and the associated permitting policy are available at: http://ec.gc.ca/cites/default.asp?lang=En&n=0FC40F59-1. The regulatory text and Regulatory Impact Analysis Statement are available on the *Canada Gazette* website at: http://gazette.gc.ca/rp-pr/p2/2017/2017-05-31/html/sordors86-eng.php

If you have any questions or concerns about the import restriction on salamanders, please contact us at ec.enviroinfo.ec@canada.ca.

Thank you for your invaluable support and engagement, as well as for your continued interest in the protection of Canadian salamanders.

Sincerely,
Caroline Ladanowski, M.Eng., P.Eng.
Wildlife Management and Regulatory Affairs,
Canadian Wildlife Service
Environment and Climate Change Canada
Government of Canada K1A OH3
Caroline.Ladanowski@canada.ca

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:
TAVeditor@wavma.org.

Read the *FrogLog*

FrogLog is an informative non-peer-reviewed resource for the amphibian conservation community that is readily accessible to both professionals in the community and those who have a strong personal interest in a wide variety of amphibian conservation topics.

It illuminates and shares the fantastic work of Amphibian Specialist Group (ASG) Members and Amphibian Survival Alliance (ASA) Partners, in addition to publicising a wide variety of amphibian stories from around the world. It disseminates news of threats and declines, but also promotes stories about new species, fascinating behaviours, conservation successes and the wonderful people who champion amphibians globally. *FrogLog* celebrates amphibians, and educates diverse audiences about the challenges they face, while also reporting on the implementation of the Amphibian Conservation Action Plan (ACAP).

http://www.amphibians.org/froglog/

Scientists survey medicinal potential of endangered frog family

By Brooks Hays | Jan. 27, 2017

The compounds secreted by the cane toad, Rhinella marinus, are used in traditional medicine. Photo by Brian Gratwicke/STRI

New research details the medicinal potential of *Bufonidae*, a large tropical frog family. Secretions from *Bufonidae* species have been used in traditional folk medicine for centuries. Researchers suggest the family may be harboring dozens of undiscovered chemical compounds with medicinal value. But as the new study warns, the family includes several endangered species, like Panama's golden frog -- species which could disappear before scientists have a chance to study them.

Despite the medical value offered by the *Bufonidae* family, the most of the family's 580 species have yet to be studied by chemists. Compounds yielded from *Bufonidae* species are used all over the globe to treat both humans and animals. The majority of chemicals produced by amphibians are toxins deployed as a defensive mechanism.

"Remarkably, toxins from a single frog skin can kill 130 to 1000 mice," said Candelario Rodriguez, researcher at the Center for Biodiversity and Drug Discovery in Panama. The mechanism of action is to reduce cardiac rhythm, making these interesting candidates as therapeutic compounds.

In the new paper, published in the Journal of Ethnopharmacology, researchers argue more should be done to protect and study amphibians.

For full article, go to:
http://www.upi.com/Science_News/2017/01/27/Scientists-survey-medicinal-potential-of-endangered-frog-family/7891485550646/

Cold waters killing more Florida manatees
By Hannah Morse
hemorse@bradenton.com
February 02, 2018

Consistently cold waters were responsible for the largest portion of Florida manatee deaths in January 2018. Thirty-five manatees across Florida died as a result of cold stress syndrome from Jan. 1 to 26, according to a preliminary report from the Florida Fish and Wildlife Conservation Commission. This was five times as many deaths compared to the same time in 2017, but it doesn't come close to the 151 that died during a cold snap in January 2010.

Cold stress syndrome can occur when the aquatic mammal encounters water below 68 degrees Fahrenheit for a prolonged period of time. Manatees experience hypothermia, their organs start to shut down and their skin begins to slough off. Two of the manatees that died in January were found in Manatee County waters.

National Oceanic and Atmospheric Administration data show that water temperatures at Port Manatee never went above 67.1 degrees Fahrenheit in January. The average water temperature recorded was 57.6 degrees.

In all, 87 manatees were found dead statewide, with 10 of the deaths associated with boat strikes. The FWC measures deaths in eight categories, including natural and undetermined.

An aerial survey conducted over a three-day period in early January counted 6,131 individuals, falling behind the highest count last year by 489. A record number were found on the east coast of Florida, but the west coast of Florida had 732 fewer individuals compared to 2017.

The Manatee Viewing Center near Tampa Electric's Big Bend Power Station in Apollo Beach, Fla., is perfect spot to see manatees that gather there in the winter to enjoy the warm waters put out by the plant.

Read more here: http://www.bradenton.com/news/state/florida/article198111244.html#storylink=cpy

http://www.bradenton.com/news/state/florida/article198111244.html

Incident Report - North Atlantic Right Whale Mortality Event In the Gulf of St. Lawrence, 2017
By Daoust, P.-Y., Couture, E.L., Wimmer, T., and Bourque, L.
Canadian Wildlife Health Cooperative,
Marine Animal Response Society,
and Fisheries and Oceans Canada.

The North Atlantic right whale (*Eubalaena glacialis*) is an endangered species that is protected under the *Species at Risk Act*. Sightings and identification of individual North Atlantic right whales (NARW) in the Gulf of St. Lawrence has increased over the last few years. Large numbers of NARWs were observed in the Gulf of St. Lawrence in 2017, due in part to extensive survey and surveillance efforts.

In 2017, an unprecedented NARW mortality event occurred in the Gulf of St. Lawrence. The publication '*Incident Report - North Atlantic Right Whale Mortality Event In the Gulf of St. Lawrence, 2017*' describes the key findings of the first six NARW necropsies as well as provides contextual information on the conditions and human activities occurring in the Gulf of St. Lawrence. Accordingly, the report is meant to provide information that will help to better understand the causes of death of these NARWs

Carcass of Catalog #3603 on 21 June 2017. Photo provided by Fisheries and Oceans Canada/Conservation & Protection

While we conclude that vessel traffic and fishing contributed to the deaths of most of the animals examined, we can only speculate as to exactly why they may have occurred. There are likely a combination of factors which contributed to the increased NARW mortality: NARW abundance increased in the Gulf of St. Lawrence, NARW exposure to human-activities increased in the Gulf of St. Lawrence, Carcasses were more apt to be discovered as surveillance and survey efforts increased. Given the severity and complexity of this mortality event, we expect that many more detailed analyses will be required to further explore the threats to NARW.

Download full report at:
http://www.cwhc-rcsf.ca/right_whales.php

Development of an opioid self-administration assay to study drug seeking in zebrafish
By Gabriel D.Bossé & Randall T.Peterson

Abstract

The zebrafish (*Danio rerio*) has become an excellent tool to study mental health disorders, due to its physiological and genetic similarity to humans, ease of genetic manipulation, and feasibility of small molecule screening. Zebrafish have been shown to exhibit characteristics of addiction to drugs of abuse in non-contingent assays, including conditioned place preference, but contingent assays have been limited to a single assay for alcohol consumption.

Using inexpensive electronic, mechanical, and optical components, we developed an automated opioid self-administration assay for zebrafish, enabling us to measure drug seeking and gain insight into the underlying biological pathways. Zebrafish trained in the assay for five days exhibited robust self-administration, which was dependent on the function of the μ-opioid receptor.

To train them, 1.5 milligrams of hydrocodone per liter of water was released every time they swam over a shallow platform. The drug quickly filtered out of the tank, so they had to keep going back if they wanted more hydrocodone. After just 5 days, the trained fish were visiting the opioid-delivering platform almost 2000 times every 50 minutes. When no drug was present, they visited the platform only about 200 times.

Fish normally avoid shallow water, where they're more likely to be spotted by predators. But over and over again, the zebrafish left the safety of deep water for the shallow platform. When the team rigged the tank so it took several visits to get a hit, the fish ramped up their efforts, returning as many as 20 times for one dose.

In addition, a progressive ratio protocol was used to test conditioned animals for motivation. Furthermore, conditioned fish continued to seek the drug despite an adverse consequence and showed signs of stress and anxiety upon withdrawal of the drug. Finally, we validated our assay by confirming that self-administration in zebrafish is dependent on several of the same molecular pathways as other animal models.

Given the ease and throughput of this assay, it will enable identification of important biological pathways regulating drug seeking and could lead to the development of new therapeutic molecules to treat addiction. Because zebrafish and humans share the same opioid receptor in their brains, the team hopes to use them to screen for new treatments for opioid addiction.

http://www.sciencedirect.com/science/article/pii/S016643281730801X?via%3Dihub

Antibiotic treatment of zebrafish mycobacteriosis: tolerance and efficacy of treatments with tigecycline and clarithromycin
By C T Chang, K M Doerr, C M Whipps
Journal of Fish Diseases, Volume 40, Issue 10
October 2017; Pages 1473–1485
First published: 19 April 2017
DOI: 10.1111/jfd.12619

Abstract

Zebrafish (*Danio rerio*) are a popular model organism used in a growing number of research fields. Maintaining healthy, disease-free laboratory fish is important for the integrity of many of these studies. Mycobacteriosis is a chronic bacterial infection caused by several Mycobacterium spp. and is the second most common disease found in laboratory zebrafish.

Current mycobacteriosis control measures recommend the removal of infected fish and in severe outbreaks, depopulation. These measures can be effective, but less disruptive measures should be assessed for controlling mycobacteriosis, particularly when valuable and rare lines of fish are affected.

Here, the in vivo efficacy of two drug candidates, tigecycline (1 μg g−1) and clarithromycin (4 μg g−1), was tested in adult zebrafish experimentally infected with *Mycobacterium chelonae*. We assessed both short-term (14 day) and long-term (30 day) treatments and evaluated fecundity and pathological endpoints. Fecundity and histology results show that zebrafish tolerated antibiotics. Antibiotic treatments did not significantly impact the prevalence of acid-fast granulomas; however, the severity of infections (acid-fast granuloma intensity) was significantly decreased following treatments.

The Zebrafish (Danio rerio)

https://en.wikipedia.org/wiki/Zebrafish#/media/File:Zebrafisch.jpg

Project Piaba
Rio Negro, Amazonas, Brazil
January 19 to February 1, 2019.

We're working on the itinerary which you'll find here: http://projectpiaba.org/what-we-do-2/expeditions/

It is a fun trip and also a great way to learn about a segment of the aquarium fish industry, visit fishing villages and see an amazing amount of wildlife. I'll be on the trip again doing animal health assessments and training locals to serve as extension resources for the fishers and transhippers. We may have some veterinary students as well, since the trip is available as an externship.

Here's a video shot on the trip in 2014 that Oregon Sea Grant produced about the fishery on the Rio Negro and the travels of these fish to Oregon, https://www.youtube.com/watch?v=AqRmDFas_kg.

Here's some more information:
Costs: 2 weeks on the boat in Brazil approximately $2,750, all included except alcohol or carbonated/ bottled beverages and crew tip.
Brazilian tourist visa ($100)
airfare $1,200 - $1,300 from most US cities

Any questions, feel free to send an email or call me or Scott Dowd:
Scott Dowd - sdowd@projectpiaba.org or (617) 973-5243.

Let us know if you are interested in joining the Expedition in January; a 50% deposit will hold a spot for you.
Hope to see you in Brazil.

Timothy J. Miller-Morgan, DVM, CertAqV
Aquatic Animal Health Program, Oregon Sea Grant, College of Veterinary Medicine, Oregon State Univ.
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http://vetmed.oregonstate.edu/
http://www.oregoncoastcc.org/aquarium-science
Blog: http://blogs.oregonstate.edu/wetvet/
Facebook: https://www.facebook.com/aquaticanimalhealthprogram?ref=hl

UMass Boston's New Online Aquaculture Course – *Introduction to Sustainable Marine Aquaculture*

University of Massachusetts - Boston is helping to meet the aquaculture industry's growing need for trained fish farm technicians, scientists, engineers, managers, and government regulators with a new online course, *Introduction to Sustainable Marine Aquaculture*. The course will provide a basic foundation in the field of aquaculture, and is open to those already in the aquaculture field or looking to break in, including UMass Boston students.

For credit and non-credit options are available. Click here for additional information:

https://www.umb.edu/academics/environment/professional_development/aquaculture

This course is part of UMass Boston's new aquaculture initiative CoAST (Collaboration for Aquaculture Solutions through Technology).

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 TAVeditor@wavma.org.

UF IFAS UNIVERSITY of FLORIDA

Aquaculture Veterinary Medicine Training for Veterinarians Practicing in Rural America

Interested in adding aquaculture to your rural veterinary practice?

Aquaculture is an important component of global animal production and, like all animal agriculture operations, faces health management challenges. Veterinarians provide many services to aquaculture operations by addressing site-specific herd health needs, biosecurity recommendations, disease surveillance and testing, medications, and health certifications for trade.

In the U.S., commercial aquaculture needs more production animal veterinarians who are willing to work in rural communities where agriculture, including aquaculture, exists. Success of these private, rural veterinary practices often requires a business model that includes diversification of veterinary expertise in animals beyond traditional farm species (ruminants, poultry, swine, and equine).

To address the veterinary needs of underserved aquaculture producers in rural America, the University of Florida/IFAS in cooperation with USDA APHIS Veterinary Services is offering eight (8) veterinary fellowships for a two-year training program in aquatic animal health and aquaculture production medicine.

Training, comprised of online and field instruction, includes implementation of the NAA/USDA Commercial Aquaculture Health Program Standards (CAHPS) for clients.

Tuition and related educational expenses are provided, and a stipend of $5000 per participant will be paid upon successful completion of each year of training.

To apply for a fellowship:

Recent (≤5 years) veterinary graduates working in rural areas may apply by submitting an application packet consisting of all of the following:

1. A written statement of interest of working with aquaculture producers, including a statement of commitment to continued interest after the end of the fellowship
2. Three (3) professional references
3. Documented verification of state veterinary license and USDA accreditation as a category II practitioner.

Preference will be given to applicants submitting at least one letter of reference from an aquaculture facility.

Application submission or more information:

Dr. Ruth Francis-Floyd, Extension Veterinarian
University of Florida/IFAS
rffloyd@ufl.edu
386-643-8904

APPLICATION DEADLINE: June 1, 2018
Notification by: July 1, 2018
USDA NIFA Grant 2017-70024-27330

More Information: http://tal.ifas.ufl.edu/news-and-events-blog/aquaculture-veterinary-fellowships/

WATER & FISH

8th INTERNATIONAL CONFERENCE

Organized by

Faculty of Agriculture, University of Belgrade, Serbia
and
International Aquatic Veterinary Biosecurity Consortium, Ludwig-Maximilians-University Munich, Germany

International Aquatic Veterinary Biosecurity Consortium

With support of
European Aquaculture Society EAS and
Pan-Hellenic Society of Technologists Ichthyologists (PASTI)

eas european aquaculture society

First Announcement
Call for participation and
Call for papers

June, 13 – 15. 2018.
Faculty of Agriculture, Belgrade,
Serbia

www.cefah.agrif.bg.ac.rs
e-mail: ribarstvo@agrif.bg.ac.rs

MDI Biological Laboratory

Pioneering New Approaches in Regenerative Medicine

COURSE DIRECTOR

Michael L. Kent, Ph.D.
Oregon State University,
College of Veterinary Science

COURSE FACULTY

Rodman G. Getchell, Ph.D.
Cornell University, College of Veterinary Medicine

Christian Lawrence, M.S.
Boston Children's Hospital

Jan Spitsbergen, DVM, Ph.D., DACVP
Oregon State University,
Department of Microbiology

COURSE TOPICS

Fish Disease
Pathogenesis, diagnostics, necropsy methods, treatment and control

General Fish Biology
Anatomy, form and function

General training
Anatomy, histology, and necropsy techniques

Core Management
Zebrafish biology, breeding, nutrition, water quality, system design, and biosecurity

Health and Colony Management of Laboratory Fish

August 12-17, 2018

The MDI Biological Laboratory is pleased to present the short course Health and Colony Management of Laboratory Fish in our state-of-the-art training laboratory, the Maine Center for Biomedical Innovation.

This one-week short course is intended to help colony managers, researchers, and veterinarians monitor and maintain the health of a colony of aquatic organisms. The course consists of lectures, laboratory exercises with a high faculty to student ratio, and discussions. During the course, there are ample opportunities for students to discuss unusual and/or unsolved diagnostic case experiences from their home laboratories as problem-solving exercises.

This course is approved by the AAVSB RACE (American Association of Veterinary State Boards Registry of Approved Continuing Education) to offer a total of **35 CE** (Continuing Education) Credits to veterinarians and veterinary technicians.

More Information

Details on the course, as well as the online application, are available on the Health and Colony Management of Laboratory Fish course page. Principal investigators, technicians, core managers, students, postdocs, and veterinary professionals and trainees are encouraged to apply.

Inquiries

Education Office
MDI Biological Laboratory
education@mdibl.org

MDI Biological Laboratory | 159 Old Bar Harbor Road | Bar Harbor, ME | 04609 | mdibl.org

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.

3rd World Aquatic Veterinary Medical Association Conference, Annual General Meeting & Biosecurity Workshop
November 8-12, 2018
St. Kitts, USVI

The dates for the 2018 WAVMA Conference have been changed to November 8-12, 2018 to coincide with the West Indies Veterinary Conference.

Consider attending or presenting at the 2018 WAVMA St. Kitts Conference (2018-Conference.wavma.org**).**

Discover core knowledge, skills & experience needed to become a WAVMA Certified Aquatic Veterinarian *(CertAqV)*

Did you know that WAVMA's ***CertAqV Program*** offers members the opportunity to become recognized and certified as having competency in 9 core areas deemed necessary to practice aquatic veterinary medicine? Find out more information online at: http://www.wavma.org/CertAqV-Pgm.

THE 34th WVA CONGRESS
May 5-8, 2018
Barcelona, Spain

This is a unique opportunity for veterinarians in all branches to come together to explore the challenges that face animal health and welfare, to find solutions where possible, and to demonstrate the value of the profession for the public good in a changing world.

WebCEPD B-1034
20+ years of interactions with Little Penguins
April 10, 2018 at 13:30 UTC

Click http://bit.ly/2Dm9bCJ for more information and to register.

Program: Detail daily and annual cycle, and how the latter may affect interpretation of necropsies or treatment of injury/illness. How to sex penguins externally. Describe how penguins swim - importance of well-conditioned feathers, body parts used, foraging behavior. Penguin vision-visual predators, binocular vision, emmetropic in air. Give examples of injuries/illnesses/odd behaviours observed.

Learning Objectives

1. Daily and annual cycle of penguins;
2. Penguin biology;
3. Penguin behaviour; and,
4. Common health/disease issues in wild penguin populations.

About the speaker: Belinda Cannell has dedicated more than 20 years researching the ecology of Little Penguins in Western Australia, following completion of her PhD (at Monash University, Victoria) in which she studied the foraging behaviour of wild Little Penguins held in captivity. Over these decades she has radio tracked, micro-chipped, tagged, caught, counted, sampled and analysed hundreds of Little Penguins across some 10 separate projects in several WA locations.

XI International Congress Exotic, Zoo and Wild Animals Medicine and Surgery
March 21–23, 2018
Paris, France.
For more information:
http://yaboumba.org/congress-2018/

43rd Eastern Fish Health Workshop
April 3-7, 2018
Chattanooga, TN (USA)

Exotic Pet Medicine – Two-Day Conference
April 14–15, 2018
Warsaw, Poland.
For more information:
http://yaboumba.org/congress-2018/

AVMA Convention
July 13-17, 2018
Denver, CO (USA)

67th Annual International Conference of the Wildlife Disease Association
August 5–10, 2018
St. Augustine, FL, USA
For more information:
http://conference.ifas.ufl.edu/wda2018

8th International Symposium on Aquatic Animal Health
September 2-6, 2018
Charlottetown, Prince Edward Island (Canada)

ExoticsCon 2018 - Association of Avian Veterinarians, Association of Exotic Mammal Veterinarians, Association of Reptilian and Amphibian Veterinarians Joint Conference
September 22–27, 2018
Atlanta, GA, USA
For more information: http://www.exoticscon.org

3rd World Aquatic Veterinary Medical Association Conference,
November 8-12, 2018
St. Kitts, USVI

ICARE 2019
April 28 – May 2, 2019
London, Great Britain.
For more information: http://www.icare2019.eu

ExoticsCon 2019 - Association of Avian Veterinarians, Association of Exotic Mammal Veterinarians, Association of Reptilian and Amphibian Veterinarians Joint Conference concurrent with AAZV
September 27–October 5, 2019
St. Louis, MO, USA

43rd WSAVA Congress
September 25-28, 2018
Singapore

Plan ahead for World Congress 2018 in Singapore, the Tropical Garden City!

Our Congress will be held at our famous Marina Bay Sands, where you may lay down by the infinity pool after an eventful day of lectures. So, come on down and indulge yourself, because we all deserve it!
Marina Bay Sands Hotel
10 Bayfront Avenue
Singapore 018956
Website: http://www.marinabaysands.com/

Conference Registration: http://www.wsava2018.com/registration-hotels/registration#.WjrI87enEz0

Canadian Aquaculture Institute (UPEI), Aquatic Lab Animal Health, Husbandry and Medicine Workshops
Atlantic Veterinary College,
University of Prince Edward Island Charlottetown,
Prince Edward Island, Canada

The Introductory workshop (*Health and Husbandry of Aquatic Laboratory Animals*) will be held on Monday May 14-Tuesday May 15, and the Advanced workshop (*Advanced Aquatic Animal Care and Husbandry*) on Wednesday May 16-Thursday, May 17, 2018. Participants can register for one or both of the workshops, which will include both lectures and hands-on laboratories.

For further information and registration, please see: http://www.upei.ca/programsandcourses/canadian-aquaculture-institute.

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