



Volume 15, Number 3
Third Quarter, 2021

The Aquatic Veterinarian



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

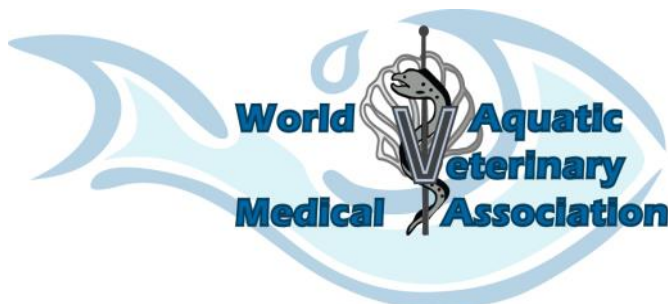
- A. To serve aquatic veterinary medicine practitioners by developing programs to support and promote our members, and the aquatic species and industries that they serve;
- B. To be an advocate for, develop guidance on, and promote the advancement of aquatic animal medicine within the veterinary profession 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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Cover Photo by Nick Saint-Erne:
 Seafood is an important part of the daily diet
 of the inhabitants of the Iberian Peninsula.
 Here is the fresh catch at a local fish market.
 See page 17 for information about the European
 Aquaculture Conference in Madeira, Portugal.



**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 med-
 icine? Find out more information online at:
<http://www.wavma.org/CertAqV-Pgm>.



Get The Fuller Picture From WAVMA WebCEPD Online Webinars

WAVMA’s WebCEPD Program - Webinars for Global Aquatic Veterinary Education

Given by leading experts, WAVMA’s real-time and recorded WebCEPD webinars are
 intended as educational programs on key aquatic veterinary issues and techniques to
 hone the knowledge and skills of aquatic veterinary students and practitioners.

<https://www.wavma.org/WebCEPD>

Editor’s Note

This issue of *The Aquatic Veterinarian* was intentionally delayed in order to report on the European Aquaculture Society 2021 conference held in Madeira, Portugal in October. The WAVMA Annual General Meeting was originally scheduled to be held at this conference, the first WAVMA in-person meeting since 2019, but unfortunately the risks of traveling during the COVID pandemic were still too great for persons from many countries. So, the WAVMA AGM is now planned as a virtual online event in December 2021. None the less, Dr. Julius Tepper and myself did still attend the Aquaculture Europe meeting (see page 17) and it was a very informative conference.

There is also a report by our Regional Director for Africa and the Middle East, Dr. Nelly Isyagi, about another online Aquaculture conference (see page 13) the First Eastern Africa Regional Aquaculture Conference. This conference was co-sponsored by WAVMA, along with the World Aquaculture Society.

Another important event that will be happening soon is the WAVMA Elections for new Officers and Regional Directors (see page 6). We encourage all members to become actively involved in WAVMA Committees, and for Veterinarians, you can also serve on the Executive Board. This is a great way to meet your colleagues from around the world, share your knowledge, and support Aquatic Veterinary Medicine.

And speaking of colleagues from around the world, I had the pleasure of meeting WAVMA member Nuno Ribeiro at the European Aquaculture Society meeting. He is a full-time Aquatic Veterinarian in Portugal, serving the aquaculture and pet fish industry. Learn more about him in the Colleague’s Connection article (see pages 22-23).

Fall is here and things are cooling off in the Sonoran Desert of Arizona, and I am looking forward to the beautiful weather ahead and the upcoming Holidays. Best wishes to you all, and stay healthy.

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

*Judy and I are above the clouds
on top of Madeira Island - October 2021.*



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>.



The Aquatic Veterinarian

**The Quarterly Magazine of the
World Aquatic Veterinary Medical Association**

**Consider promoting your products, services
or programs to aquatic veterinarians,
veterinary students, nurses &
paraveterinary professionals
throughout the world**

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WAVMA Members

Free 1/8 page (business card size) advertisement
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WAVMA Student Chapter Mini-Grant

A limited number of WAVMA Student Chapter Mini-Grants of up to **500 USD** are available to assist official WAVMA Student Chapters with conducting activities intended to engage students in opportunities related to aquatic veterinary medicine.

*Applications due
15 December 2021*

Find out more at
www.wavma.org/WAVMA-Student-Chapters

Questions? Email ESC@wavma.org



Secretary's Report

WAVMA Elections

The positions of President-Elect, Secretary, Treasurer, and the four Regional 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 web conferencing 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!

Nominations are now open for the 2022 WAVMA Executive Board! **Self-nominations are encouraged.** All Executive Board members receive complimentary WAVMA membership beginning during their year of service on the Executive Board.

- **President-Elect**
- **Secretary**
- **Treasurer**
- **Director-at-Large for Africa/Middle East**
- **Director-at-Large for Americas**
- **Director-at-Large for Asia-Pacific**
- **Director-at-Large for Europe**

Executive Board members elected will serve as *ad hoc* advisors to the 2021 Executive Board, until they take office as voting members of the Executive Board on January 1, 2022.

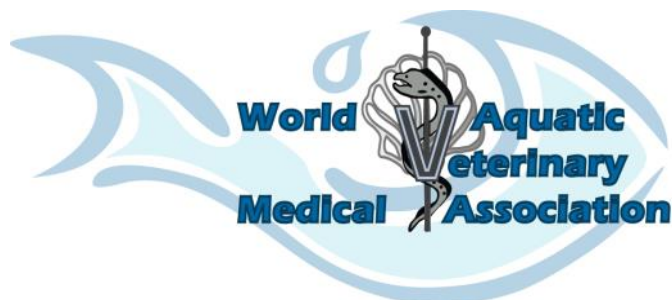
Candidates need to email a completed Nomination Form as well as a head and shoulders photograph to the WAVMA Administrators **by the end of business November 30th, 2021**. The Nomination Form and the WAVMA Executive Board Responsibilities document are available at www.wavma.org/elections.

For questions about the 2022 elections, please contact the WAVMA Administrators at: administrators@wavma.org.

We look forward to receiving your nomination materials!

Morag Clinton

WAVMA Secretary
Secretary@wavma.org



Executive Board Responsibilities

The WAVMA Executive Board consists of the President, Immediate-Past President, President-Elect, Secretary, Treasurer and Directors. The President-Elect, Secretary, Treasurer and Directors are elected annually by a vote of the WAVMA Full Members (Veterinarian and New Veterinarian Members) to serve on the Executive Board beginning their term the following year on January 1st. The previous President and President-Elect become the Immediate Past-President and President, respectively, on January 1st.

The Executive Board will provide oversight and approve all fiscal and administrative activities of WAVMA and its committees, programs and services in accord with the Bylaws, and facilitates the development and implementation of WAVMA programs. Individual Executive Board member's responsibilities include:

The President will: Schedule, draft agendas and preside over the Executive Board meetings; Monitor and facilitate implementation of all active WAVMA and Committee programs, services and other initiatives; serve on the Budget Committee; Provide an update of WAVMA activities for the association's quarterly publication; Liaise with other veterinary and paraveterinary organizations; Work with the Meetings Committee to finalize and implement the WAVMA Annual Conference and Annual General Meeting; Preside over the WAVMA Annual General Meeting.

The President-Elect will: Assume the President's responsibilities in the absence of the President; Serve as a member of the Budget Committee; Identify at least one new WAVMA program or initiative to implement during his/her 3-year tenure; Assist in facilitating and implementing active WAVMA programs and initiatives during his/her 3-year tenure; Work with the Meetings Committee to facilitate the development of the following year's WAVMA Annual Conference and AGM.

The Immediate Past-President will: Assume the President's responsibilities in the absence of the President and President-Elect; Assist the President-Elect and other Board members in developing or implementing new or existing WAVMA initiatives and programs; Assist the President in implementing administrative procedures.

The Secretary will: Serve as the primary WAVMA point of contact for the public; Inform members of WAVMA programs & initiatives on a regular basis; Assist the developments and distribution of WAVMA official correspondence; Serve as Chair of the Communications Committee; Maintain a calendar of WAVMA events including Board and Committee meetings.

The Treasurer will: Maintain all WAVMA bank accounts and bookkeeping, receive all payments, and pay all expenses approved by the Board; Chair the Budget Committee and facilitate the development of an annual budget for the following membership year.

Directors will: Represent individual WAVMA member's general interests; Assist WAVMA in identifying and acting on issues important to specific geographical regions.

Treasurer’s Report

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

New Members—Third Quarter 2021

Veterinarians

Ali Anwar Ahmad	Singapore
Azad Saheb	Kuwait
Bess Pierce	United States
Christina Du	United States
Debra Moore	United States
Eileen Harrington	Ireland
Elizabeth Mackey	United States
Fernando Mesias Valle	Peru
Kimberly Foca	United States
Krista Ann Lee	United States
Mandy Mills	United States
Miceala Shocklee	United States
Naphat Panthukumphol	Thailand
Nick Hopman	New Zealand
Ruth Zadoks	Australia

Veterinarian—New Graduate

Steven Williamson	United States
Katrina MacNeill	Canada

Vet Student Members (enrolled in Vet Curriculum)

Ailie Yeh	Australia
Akandwanaho Adison	Uganda
Bryanna Malbouf	United States
Cahyani Fortunitawanli	Indonesia
Caitlin Houlihan	United States
Carrick Anderson	United Kingdom
Chloe Fan	Canada
Connie Stallworthy	United Kingdom
Deanna Center	United States
Devyn Birchall	United Kingdom
Emma Fralin	United States
Enrique Riera-Ferrer	Spain
Garrett Wachoski-Dark	Canada
Hannah Dado	United States
Hery Ríos-Guzmán	United States
Jonathan Chee	Australia
Jonathon Eisenstein	Saint Kitts and Nevis
Kayla Bonadie	United States
Kenneth Kawooya	Uganda
Kiersten Ellis	United States
Mariacamila Garcia Estrella	United States
Marisa Gazzola	United States
Masia Nanc Mercy	Uganda
Mathew Kawuki	Uganda
Maya Yaffe	Australia
Megan Allen	United States
Nalwera Noeline	Uganda
Namata Alice	Uganda

Natalie McGregor	United States
Nikita Vannessa Hamer	Australia
Rebecca Fulton	United Kingdom
Ronald Nahabwe	Uganda
Saarah Yob	Saint Kitts and Nevis
Sabrina Graham	United States
Selina Nackley	Grenada
Solen BAS	Turkey
Ssebagala Ahmed	Uganda
Timothy George Orenge	Uganda
Vanessa Katabazi	Uganda
Zarah Deutsch	United States

Affiliate Members (Non-veterinarian)

Veterinary Technician/Nurse

Britney Price	United States
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Welcome to WAVMA!

Wes Baumgartner

WAVMA Treasurer
Treasurer@WAVMA.org



Join A WAVMA Committee

All of the great programs and features you get from WAVMA membership are provided by volunteers. We are always looking for more helpers, whether veterinarians, veterinary students or veterinary nurses, to join us on the committees. 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 12. Contact our Secretary or the committee chair for more information about the committee and the dates of the next meeting (also done via web conference). All are Welcome!

Join a WAVMA Committee today!

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 meeting by contacting the [WAVMA Secretary](#).

**TO SUPPORT FUTURE STUDENT
SCHOLARSHIPS, PLEASE MAKE
A DONATION TODAY
TO THE SCHOLARSHIP FUND!**

[WWW.WAVMA.ORG/
SCHOLARSHIPS.](http://WWW.WAVMA.ORG/SCHOLARSHIPS)

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 through 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!

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 Secretary.

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: Wes Baumgartner, 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: Morag Clinton, Secretary@wavma.org

Credentialing Committee

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

Chair: Matthijs Metselaar CertAqV-Admin@wavma.org

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 members and the organization.

Chair: Chris Walster, Administrators@WAVMA.org

Education & Student Committee

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

Chair: Bartolomeo Gorgoglione, BartGorg@msu.edu

Fellows Advisory Council

A Fellows meeting took place on August 18, 2021, with six Fellows attending this meeting. During the meeting, the following items were discussed:

Finalizing the Description of the Fellows Advisory Council and its role within WAVMA; and selection of the new Fellow for 2021.

We are also pleased to announce our new WAVMA Distinguished Fellow for 2021 is:

Dr. Greg Lewbart

One only has to scan his CV to see his contributions to aquatic veterinary medicine since 1987 and the accolades and awards he has received for his tireless contributions to advancing aquatic veterinary medicine, and the leadership he has provided for almost four decades. What is equally impressive are his large number of books and peer-reviewed publications on aquatic veterinary medical topics; the number of aquatic veterinary academic courses he has developed; the number veterinary and graduate students he has mentored through their veterinary, MS or PhD degrees; the number of veterinary and non-veterinary presentations he has given; and, the popular articles he has written – all to promote aquatic veterinary medicine, both inside and outside the profession. As a veterinary faculty member at the University of Pennsylvania and North Carolina State University, his efforts for developing programs at both institutions have led to them being recognized as among the best aquatic veterinary educational programs in America.

Laura Urdes, DVM PgDip PhD CertAqV
Fellows Advisory Council Chair
FellowsChair@wavma.org

WAVMA Shop

A number of WAVMA branded items
(including shirts, mugs, caps) are available
at the WAVMA Store. Get yours today!



Go to: <http://www.wavma.org/Shop>

Meetings Committee

Since our last Meetings Committee report in June, an update of the rest of 2021 is in order. Dr. Jessie Sanders was present at Aquaculture America 2021 held on August 11-14 in San Antonio, TX. She reported that attendance was recorded at about ¼ the usual numbers we have seen in the past. The next Aquaculture America conference will be in 6 months and is the larger, triannual conference in association with other aquatic organizations, so we anticipate a much better turnout. We plan to prepare a lecture series and have a booth at that event, scheduled for February 28-March 4, 2022 in San Diego, CA.

Aquaculture Europe sponsored by the European Aquaculture Society, took place October 4-7, 2021 in Funchal, Madeira, Portugal. WAVMA was represented by Dr. Nick Saint-Erne and myself. Look for the separate article in this issue about that event.

The WSAVA Congress <https://wsava2021.com> will be held virtually this year and WAVMA will again have a lecture stream with 7 hours of CE presented by Drs. Nick Saint-Erne, Jena Questen and myself on Nov. 13 and 14. Registration is now open at: <https://wsava2021.com/register>.

Looking forward to more in-person meetings in 2022!

Julius M. Tepper, DVM, CertAqV
Meetings Committee Chair
dvm2468@gmail.com



Credentialing Committee

The WAVMA Aquatic Veterinarian Certification Program identifies the core competency or subject matter areas needed to practice aquatic veterinary medicine, and recognizes those veterinarians who have acquired the necessary knowledge, skills and experience (KSE) from a variety of sources, in the following 9 core subject matter areas:

1. Aquatic Environment and Life Support Systems
2. Taxonomy, Anatomy and Physiology
3. Husbandry and Industries
4. Pathobiology and Epidemiology of Aquatic Animal Diseases
5. Diagnostics and Treatment of Aquatic Animal Diseases
6. Clinical Veterinary Experience and Client Communications
7. Public Health, Zoonotics and Seafood Safety
8. Legislation, Regulations, and Policies
9. Principles of Aquatic Animal Welfare

For CertAqV Program Description [Click here](#) to download, or go to WAVMA.org/CertAqV-Pgm.

Individuals who desire to participate in the WAVMA CertAqV Credentialing Program will first need to register and pay the US\$250 administrative fee. When registering you will select a mentor to assist and guide you through the requirements. After you have registered, you will receive an e-mail on how to download a document to record where you have obtained sufficient KSEs (knowledge, skills and experience/education) in each of the 9 modules or subject areas. You have up to 2 years to complete these.

When your mentor is satisfied you have sufficient KSE credits, he/she will request the WAVMA Credentialing Committee to evaluate these. Once the Committee and the WAVMA Executive Board have evaluated these and are satisfied you meet all requirements, you will be notified and mailed a certificate suitable for framing and display.

If you have questions about the Certification process, please send me an email.

Dr. Matthijs Metselaar DVM PhD CertAqV MRCVS
Credentialing Committee Chair
CertAqV-Admin@wavma.org



Certified Aquatic Veterinarians

Jessica Allen	USA
June Ang	Singapore
Nimrod Arad	USA
Brenda Arras	USA
Farah Gonul Aydin	Turkey
Sarah Balik	USA
Madison Barnes	St. Kitts & Nevis
Michelle Barnett	USA
Christa Barrett	USA
Heather Barron	USA
Giana Bastos-Gomes	Hong Kong
Mariah Beck	USA
Trista Becker	USA
Jenice Bell	USA
Heather Bjornebo	USA
James Bogan	USA
Pierre-Marie Boitard	France
Serena Brenner	USA
Tessa Brown	USA
Erika Brigante	St. Kitts & Nevis
Todd Cecil	USA
Bryony Chetwynd-Glover	UK
Prakan Chiarahkhongman	Thailand
Dondrae Coble	USA
Michael Corcoran	USA
Emily Cornwell	USA
Galaxia Cortes-Hinojosa	Chile
Rebecca Crawford	St. Kitts & Nevis
Rubén López Crespo	Mexico
Charles Cummings	USA
Nadav Davidovich	Israel
Manuel De la Riva Fraga	Spain
Darren Docherty	UK
Simon Doherty	UK
Devon Dublin	Japan
Jacqueline Elliott	USA
Ashley Emanuele	USA
Azureen Erdman	USA
Antonella Fabrissin	Italy
Mohamed Faisal	USA
Erika First	USA
Ari Fustukjian	USA
Erika Gibson	USA
Danielle Godard	USA
Giana Gomes	Hong Kong
Christopher Good	USA
Bartolomeo Gorgoglione	USA
Krystan Grant	USA
John Griffioen	USA
Miguel Grilo	Portugal
Stephanie Grimmett	UK
Katharina Hagen-Frei	Switzerland
Katharine Haussman	USA
Orachun Hayakijosol	Australia
Eileen Henderson	USA
Chelsea Hester	USA
Nora Hickey	USA

Certified Aquatic Veterinarians

Karlee Hirkakis	Australia
Kelsey Hoag	USA
John Howe	USA
Kerryn Illes	New Zealand
Leslie Jarrell	USA
Jimmy Johnson	USA
Kelsey Johnson	USA
Sharmie Johnson	USA
Kasper Jorgensen	Denmark
Brian Joseph	Canada
Hali Jungers	USA
Parinda Kamchum	Thailand
Fritz Karbe	Germany
Sherri Kasper	USA
Elizabeth Kaufman	Israel
Denyse Khor	Singapore
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Lana Krol	USA
Elizabeth Leuchte	UK
Sarah Lietzke	USA
Jan Linkenhoker	USA
Eric Littman	USA
Richard Lloyd	UK
Richmond Loh	Australia
Ruben Arturo Lopez Crespo	Mexico
Jordi Lopez Ramon	Spain
Amber Lum	USA
Adolf Maas	USA
Raphael Malbrue	USA
Paul Manensis	Canada
David Marancik	Grenada
Victoria Maroun	St. Kitts & Nevis
Laura Martinelli	USA
Robert Martinez	USA
Alexandra Mason	USA
Colin McDermott	USA
Alicia McLaughlin	USA
Matthijs Metselaar	UK
Sonja Miles	UK
Tim Miller-Morgan	USA
Haitham Mohammed	Egypt
Alissa Mones	USA
Danny Morick	Israel
Lucie Nedved	Australia
Ross Neethling	UK
Jenifer Nix	USA
Sally Nofs	USA
Ladislav Novotny	Czech
Massimo Orioles	Italy
Dušan Palić	Germany
Brian Palmeiro	USA
Christine Parker-Graham	USA
Lily Parkinson	USA
Chris Payne	USA
Melanie Peel	USA

Ayanna Phillips	Trinidad & Tobago
Ashley Powell	USA
Jena Questen	USA
Eva Quijano Cardé	USA
Janis Raines	USA
Atisara Rangsichol	Thailand
Zachary Ready	Thailand
Aimee Reed	USA
Stephen Reichley	USA
Nuno Ribeiro	Portugal
Camille Richie	USA
Julianne Richard	USA
Patinan Rookkachard	Thailand
Komsin Sahatrakul	Singapore
Nick Saint-Erne	USA
Jessie Sanders	USA
Sasha Saugh	South Africa
David Scarfe	USA
Neha Shah	India
Khalid Shahin	UK
Galit Sharon	Israel
John Shelley	USA
Chris Shirkey	USA
Constance Silbernagel	USA
Melissa Singletary	USA
Esteban Soto	USA
Brandon Spolander	South Africa
Elizabeth St. Germaine	USA
Brittany Stevens	USA
Chairat Sumgorthong	Thailand
Win Surachetpong	Thailand
Tanatporn Tantiveerakul	Thailand
Gillian Taylor	South Africa
Julius Tepper	USA
Sharon Tiberio	USA
Miranda Torkelson	USA
Norrapat Towanabut	Thailand
Laura Urdes	Romania
Greta Van de Sompel	Belgium
Claudia Venegas	Chile
Zachary Waddington	Canada
Sarah Wahlstrom	USA
Chris Walster	UK
Scott Weber	USA
Marcus Webster	USA
Trista Welsh	USA
Michael Wenninger	USA
Peter Werkman*	Holland
David Wilbur	USA
Sarah Wilson	USA
Howard Wong	Hong Kong
Sarah Wright	USA
Taylor Yaw	USA
Irene Yen	USA

To initiate a new Student Chapter, download the [WAVMA Student Chapter Guidelines](#)

A Spanish version of the Student Chapter Guidelines can be [downloaded from the WAVMA website](#).

PROGRAMS AVAILABLE TO STUDENT CHAPTERS:

- Assistance in organizing and promoting Chapter programs and activities.
- Access to recorded webinars and live web-based presentations from experts around the world.
- Low annual WAVMA Student Membership (\$25) - 50% Chapter member's dues may be available to support Chapter-organized activities.
- Reduced rate (50% off) WAVMA Full Membership the year after graduation.
- John L. Pitts Aquatic Veterinary Education Awards Program
- Access to WAVMA member-only programs.
- Aquatic veterinary externship and job listings.
- WAVMA promotional flyers, brochures and other materials for distribution to other students.
- Free or discounted registration for WAVMA meetings, conferences or educational webinars.
- Participation in the WAVMA Certified Aquatic Veterinarian (CertAqV) Credentialing Program.
- Access to WAVMA e-mail listservs, including Members-L, and Student-L.

A list of all current WAVMA Student Chapters is available on the website:

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

Consider joining the [WAVMA Chapter Facebook Group](#) to find out what's happening in other Chapters.

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Education and Students Committee

The ESC is currently coordinating the establishment of new Student Chapters at: Ankara University (Turkey), Makerere University (Uganda), Purdue University (USA), Prince Edward Island (Canada).

The ESC WebCEPD Subcommittees (Leader: Claudia Venegas) is pursuing the goal to organize one webinar per month, including setting up collaboration with affiliate associations. The WebCEPD webinar: B-1046 "Enhancing aquatic disease surveillance towards One Health" was held on 15th July (worth 1 CE), given by Dr. Fernando Mardones (Chile). It was Attended live by 136 people, with 239 registered. The following WebCEPD webinar: B-1047 "Applying radiology and sonography in the aquatic practice" was given on 24th August (worth 1 CE) by Dr. Verena Jung-Shroers (Germany); The WebCEPD webinar: B-1048 "Group B Streptococcus: a killer of fish and men" was given on 15th September (worth 1 CE) by Dr. Ruth Zadoks (Australia); and B-1049 "Understanding co-infections in salmon and how it can shape our management of disease" was given on 19th October (worth 1 CE) by Dr. Mark Fast (Canada).

The Student Chapters Support subcommittee (Leader: Vivian Lee) has completed the leaflets "Guidelines for WAVMA Student Chapters" in English and Spanish.

If you are interested in joining the committee, please email Dr. Gorgoglione (BartGorg@mus.edu) or Dr. Jones (drjones01@vt.edu).

We hope to see you at our next ESC meeting!

Dr. Bartolomeo Gorgoglione, Chair of ESC
BartGorg@msu.edu



Report of the First Eastern Africa Regional Aquaculture Conference

Date: 27th to 29th August, 2021

Venue: Online

e-Host:: World Aquaculture Society African Chapter – Eastern Africa Region

By Dr. Nelly Isyagi

World Aquatic Veterinary Medical Association – Regional Director - Africa and the Middle East

The World Aquaculture Society (WAS) was founded in 1969 as the World Mariculture Society. Its membership has since expanded to over 3,000 across more than a 100 countries. In order to meet the expanding needs of this international diversity, the WAS has created the following Chapters that represent each continent: United States, Japan, Korea, Latin American and Caribbean region, Asian-Pacific region and the African Chapter (WAS-AC) that was formed in 2017. The WAS is associated with other aquaculture associations from across the globe such as the Aquaculture Association of South Africa and Egyptian Aquaculture Society.

The WAS Eastern Africa Regional Chapter (WAS-EA) was operationalized in 2019 when its Regional Director was duly elected by the WAS membership. There are 11 countries within the region, namely: Burundi, Djibouti, Ethiopia, Eritrea, Kenya, Rwanda, Somalia, South Sudan, Sudan, Uganda and the United Republic of Tanzania. The status of commercial aquaculture development in Eastern Africa can best be described as being in its take-off phase, having dramatically transformed from a largely semi-subsistence farm activity into a fully-fledged agricultural enterprise over the last 15 years. Therefore there is limited practical knowledge and experience for managing a commercial aquaculture sectors within the region.

Aquaculture was first introduced to Eastern Africa in the 1950s. From a subsistence activity, it has since transformed into a regional sub-sector that produces about 256,000 tons of fish worth \$390 million USD (FAO, 2018). The region's conducive environment for commercial aquaculture development has arisen from the growing inability of the fisheries to sustainably meet the fish consumption needs for the region's rapidly growing population, demographic changes, expanding fish markets, environmental degradation, climate change, and policy changes.

Several lessons have been learnt by stakeholders during this transformation. To consolidate the lessons learnt into a knowledge resource, the African Chapter of the World Aquaculture Society – Eastern Africa Region (WAS-EA), East African Aquaculture Associations, World Aquatic Veterinary Medical Association (WAVMA), Lake Victoria Fisheries Organisation (LVFO), and Lake Tanganyika Authority (LTA) collaborated to organise the *First Eastern Africa Regional Aquaculture e-Conference – 2021*.

The three-day event was hosted by LVFO and offi-

cially opened by the Acting Director of the African Union – Interafrican Bureau of Animal Resources (AU-IBAR), Dr. Nick Nkwapa. The following key issues were discussed during ten parallel technical sessions: policy and governance, nutrition and feeds, new approaches for industry, business, finance and economics, biodiversity conservation, genetics and selective breeding, sustainable management of trans-boundary aquatic resources for commercial aquaculture, and aquatic animal health, welfare and biosecurity. A close-out workshop hosted by LTA was conducted thereafter to deliberate the outcomes, draw the way forward and disseminate the conferences recommendations.

The organization of the conference was a milestone for regional collaboration among the region's aquaculture agencies and Non-State Actor (NSA) associations. According to the African Union Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa (PFRS), regional aquaculture networks are recognised as being instrumental for mobilising the private-sector support and promote the adoption of best practices and service delivery for sustainable commercial aquaculture development. The e-conference exemplified this and as such, there was consensus that regional online aquaculture conferences be conducted annually henceforth; the next conference being in 2022.

For sustainability, it was proposed that a strategy be developed for encompassing resource mobilisation, strengthening aquaculture associations and creating awareness on the value of the conferences to promote the contribution and participation of the sectors stakeholders, including of students and youth.

A tremendous amount of local knowledge was shared at the conference that participants of all categories found beneficial. It was therefore recommended that a communication and knowledge management system be developed to ensure the information shared remained accessible and was disseminated widely to the region's multiple aquaculture stakeholders. The establishment of a regional aquaculture farmer's magazine, website, webinars and student mentorship program were strongly supported.

Regional collaborative research in the fields of aquatic animal genetic resource management, environmental management, aquatic animal health, mariculture, development of aquaculture production systems based on agro-ecological zones and small machinery for SME aqua-feed manufacturing were advocated. Participants recommended the need for regional policy guidelines to assure the quality of feed ingredients for feed manufacturing, aquaculture and aquatic animal health education.

The close-out workshop marked the official end of the conference, and was closed by the Executive Director of LTA, Mr. Tusanga.

Citation: WAS, WAVMA, LTA and LVFO, 2021. Report of the First Eastern Africa Regional Aquaculture Conference - 2021

New WAVMA Student Chapter starting strong at Michigan State University!

The ZEWA (Zoo, Exotics, Wildlife, and Aquatics) Student Club was established several years ago at the College of Veterinary Medicine of Michigan State University to provide alternative learning opportunities for vet students. Considering that little emphasis is currently placed in our CVM curriculum on zoo or exotic animals, every academic year ZEWA attracts a growing number of students.

On May 26, 2021, a new WAVMA Student Chapter was established at the MSU-CVM, as part of ZEWA, aiming to raise the CVM student interest for aquatic animal medicine. In line with most universities and veterinary schools in the US, any student club event at MSU had to be held virtually from March 2020 to August 2021. During this time, we worked on the WAVMA Student Chapter establishment application and held several online events. These included a series of lectures kindly given by Dr. Gregory Lewbart, virtual watch parties/discussions on WAVMA WebCEPD webinars, and the Netflix documentary “Seaspiracy.”

On October 12, a delegation of the MSU WAVMA Student Chapter finally got the chance to get some hands-on experience with fish. Coordinated by our Academic Advisor, Dr. Bartolomeo Gorgoglione, we took a trip to Platte River State Fish Hatchery and Lowe Platte River Weir, located close to Beulah, MI. These facilities are managed by the Michigan Department of Natural Resources (MI-DNR) to support migratory salmonid populations, including Coho and Chinook salmon that were introduced in the Great Lakes in the 1960s.

Working at the hatchery facility, we sampled adult Coho Salmon, taking advantage of the abundance of large fish. These animals were trapped at the fish weir in October during their annual migration from Lake Michigan to spawn in the Platte River. This process limits the number of fish going upstream where they would naturally die post-spawning. Dr. Gorgoglione instructed us on each procedure, including on how to draw blood from the tail vein (using both the ventral and lateral approach), and from the heart.



Photo 2. Drawing blood from the heart of a Coho Salmon.



The blood collected was used to practice blood smear preparations. Practicing this technique was particularly useful, considering that virtual classes the previous year did not provide the chance to collect and use real animal blood. Thereafter, each Coho was weighed and total length measured.

Pathologic signs and lesions, if present, were observed and documented. Mucus from the body and from the gills was used to prepare fresh slide preparations. These samples were then analyzed using light microscopy and screened for the presence of ectoparasites using a portable microscope (IoLight).

We learned how to perform fish necropsy, and to properly identify the internal organs. This was a great opportunity to learn about the male and female salmon anatomy, both external and internal features. The MI-DNR natural Resource Manager, Paul Strowe, also taught us on how to stage the ovary maturation, in preparation for their seasonal egg collection.

Photo 3. Performing necropsies on Coho Salmon.



Photo 1 (Left): The MSU-CVM WAVMA Student Chapter delegation at the visitor center of the Platte River State Fish Hatchery. Left to right: Hailey Penticoff (3rd year-DVM), the WAVMA Student Chapter Vice-President; Robyn Hawley (2nd year-DVM); Hunter Wojtas (2nd year-DVM); Luke VanBlois (2nd year-DVM), the WAVMA Student Chapter Secretary-Treasurer; Tessa Peerbolte (2nd year-DVM), the Student Chapter President. Photos: Dr. Bartolomeo Gorgoglione.

We sampled 25 Coho Salmon, saving kidney samples in ethanol for molecular biology analysis. A panel of organs, including gill, spleen, liver, and kidney, were saved in individual cassettes in NBF for histological analysis. We also prepared organ impression smears, using spleen and kidney, which were fixed and later stained for cytology at Dr. Bart's lab. All samples collected will be used for research and archived for future student activities.



Photo 4. The MSU-CVM WAVMA Student Chapter delegation learned how to draw blood from the tail vein with a lateral and ventral approach.

During the afternoon, we visited the hatchery building, where salmon eggs are incubated to produce fry that would be used to restock Michigan's river systems. During the visit we learnt how eggs are disinfected, and methods used to determine the eggs' viability to prevent molding of the unfertilized eggs that would kill the fertilized eggs. We also visited the Lower Platte



Photo 5. The hatchery facility, with Paul Stowe showing an egg tray with viable (orange) and dead (white) Coho Salmon eggs.

River Weir, located in the wonderful Sleeping Bear Dunes National Lakeshore. Every year MI-DNR only allows 20,000 adult fish to swim upstream, aiming at preventing eutrophication of the river after these fish will spawn and die, considering the lack of natural predators.



Photo 6. The lower weir on the Platte River. Here, the MI-DNR allow 20,000 adult Coho Salmon to swim upstream annually.

For our 2nd year CVM students, this was their first time dissecting an animal since they entered vet school! We wish to repeat this activity next year and we are currently planning several other in-person and virtual activities, aiming at attracting more students to join our Chapter and to learn about fish and other aquatic species.

Article by Hailey Penticoff, with help from Tessa Peerbolte, Luke VanBlois, Hunter Wojtas, Robyn Hawley, and Bartolomeo Gorgoglione

Photo 7. The MSU-CVM WAVMA Student Chapter delegation at the MI-DNR Platte River State Fish Hatchery.



First Event Held at RVC WAVMA Chapter

The Royal Veterinary College, University of London WAVMA Student Chapter has officially rolled out! We were excited to present at this year's "Freshers Fair" to new and returning students. The number of students that signed up for further information surpassed our expectations. The excitement of our launch was evident in the attendance of our first event the following week.

In October, our first event featuring Dr. Julius Tepper's lecture "Feed, Feeding, Behavior and Body Condition in Koi" gave RVC students their first taste of aquatic medicine. Fortunately, Dr. Tepper was able to stay for a Q & A session and he answered questions about how students can further their career in aquatic veterinary medicine.

We are excited to grow as a chapter and to bring aquatic medicine to our university.

Respectfully,

Alex Hall

President of RVC WAVMA Student Chapter
4th Year Student, RVC



Dr. Julius Tepper at the Royal Veterinary College WAVMA Student Chapter, stopping by for a lecture after the Aquaculture Europe Conference in Funchal, Madeira, Portugal. Image of Madeira Island (below):



*Left:
Members of
RVC
WAVMA
Student
Chapter.*

*Right:
Traditional
Portuguese
sardine
fillets at the
AE2021
Dinner.*





Aquaculture Europe 2021 was attended by more than 1400 participants from 57 countries. Of these, 248 students were registered and had a dedicated workshop and special events during the week. 943 abstracts were submitted for conference presentations and 560 of these were presented orally in the 39 conference sessions. A further 383 Eposters were presented online and on several viewing stations in the conference area.

The trade show allowed 80 companies to present their products and services to the sector and included a special pavilion of Portuguese companies presented by the Ministry of the Sea.

The opening session was delivered by Shakuntala Thilsted, WorldFish, Malaysia. Her wide ranging overview of the “Diversification of aquatic food systems” perfectly framed the importance of aquaculture for nutrition, health and livelihoods throughout the world,

During the plenary session on the last day, AE2021 was fortunate to have the presence of the Portugal's Minister of the Sea, Ricardo Serrão Santos (above), who gave a passionate speech about the importance of aquaculture as an alternative to traditional forms of fish supply, with its large market and long tradition of production of molluscs and fish in fresh and salt water.

In his closing comments, EAS President Herve Migaud expressed his thanks to all those that had helped to make this such an enjoyable, high quality and safe event. It was especially important to be able to see each other again in person and Herve thanked the Hospital de la Luz, Funchal for having administered the COVID antigen testing for all participants.

Below:

One of many lectures presented at the conference.

Below: Conference was held at the Pestana Park Hotel





FISH TRANQUILIZATION

Abstract ID# 208 - A

Nick Sain

World Aquatic Vet

ABSTRACT

Tranquilization aids in shipping live fish and in handling fish during physical examination, for biopsy sampling or for breeding purposes such as egg and milt stripping during artificial spawning.

Anesthesia and analgesia are required for surgical or invasive procedures. Surgery can be performed on anesthetized fish to implant transponders or for research purposes, and to repair wounds, remove skin and fin tumors, or to remove abdominal masses.

Euthanasia is sometimes needed prior to performing diagnostic testing and necropsies, to end the suffering of a sick or injured fish, or for research or other purposes.

Each of these techniques can be accomplished with fish by adding anesthetic medications to the water, or by injection or oral administration of anesthetics. Food fish have specific limitations to medications that can be used with them, and withdrawal times for approved medications must be observed.

BACKGROUND

Many chemicals have been used to induce tranquilization (sedation) or anesthesia (unconsciousness) in fish (see chart below). All have some element of risk, but when used carefully they have successfully induced sedation or anesthesia. Anesthetic agents used in lower doses produce tranquilization, and at higher doses they are used for anesthesia purposes.

Care must be taken not to overdose the fish or leave them anesthetized too deeply for too long of time. It is recommended to start with a lower dose and add more as needed if using a new drug or working with an unfamiliar species of fish. Monitor the heart rate, blood oxygen concentration, and operculum (gill cover) motion during anesthesia to ensure fish is not too deeply anesthetized.

Anesthetic Drugs for Fishes

- Alfaxalone - dose at 1-2 milligrams/liter (mg/L) for sedation, 1.5-4.0 mg/L will achieve anesthesia. Induction time is 5 minutes with recovery in 3-10 minutes.
- Eugenol / isoeugenol (clove oil) – 1 drop = 0.029 ml = 28.6 mg. For sedation during transport, use 3-5 mg/L (1-2 drops per 10 liters) in shipping water. For anesthesia, use 30-60 mg/L (1-2 drops / liter of water). Mix vigorously with water. Induction occurs in 2-3 minutes. Excellent for short duration physical examinations. Not recommended for use in invasive surgeries due to low analgesic effect. A dose of 4 drops per liter (114 mg/L) induces euthanasia.
- Metomidate – sedation concentration: 0.1–1.0 mg/L of water. Dosages for tranquilization used in transporting fish vary from 2.5 to 5 mg/L. Anesthesia: 1.0–10.0 mg/L of water. The dosage should be individualized, depending upon the fish species and the degree of anesthesia required. Euthanasia in 100 mg/L in 60 minutes for most warmwater fish.
- Tricaine methane sulfonate, MS-222 – dose at 10-40 mg/l for sedation (handling/ shipping). Dose at 50-400 mg/L for anesthesia induction, 50-100 mg/L for maintenance. Induction in 1-5 minutes, recovery in 3-15 minutes in clean water.

ANESTHESIA INDUCTION

Most fish anesthetics are added to clean, well-oxygenated water in a suitable glass or plastic container. The water is thoroughly mixed to ensure all the chemical is dissolved and dispersed evenly. The anesthetic solution should be the same temperature and pH as the water from which the fish was taken. Use a thermometer to monitor the water temperature during anesthesia, and if an oxygen meter is available, also monitor the dissolved oxygen concentration of the anesthetic solution. An aquarium air pump with an air stone should be placed into the water to circulate it to maintain adequate oxygen level, especially with a large fish. The water should be tested to ensure all the water quality parameters are in the correct range for the fish species.



When placed into the container with the anesthetic in the water, the fish will gradually begin to lie on its side and the respiratory rate will slow as the chemical induces anesthesia. In some cases, there may be an excitatory stage, so the anesthetic chamber may need to be covered to prevent fish from jumping out. After the fish is anesthetized in the anesthetic bath, it can be removed from the water for short-term examination or diagnostic procedures.

If the fish is removed for longer procedures, anesthetic solution can be dripped across the gills through an IV bag and drip line, by hand with a syringe, or with a recirculating water pump or aquarium filter powerhead. Have oxygenated fresh water on hand to syringe across the gills if the plane of anesthesia becomes too deep.

Keep the body moist if out of the water for examination or surgery. Use ophthalmic ointment on the eyes to keep them from drying. Monitor the respiration rate (operculum movements) to assess the depth of anesthesia.



ANESTHESIA AND EUTHANASIA IN AQUACULTURE

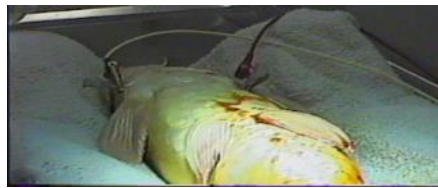
QUACULTURE EUROPE 2021, Madeira, Portugal.

Saint-Erne, DVM, Certified Aquatic Veterinarian

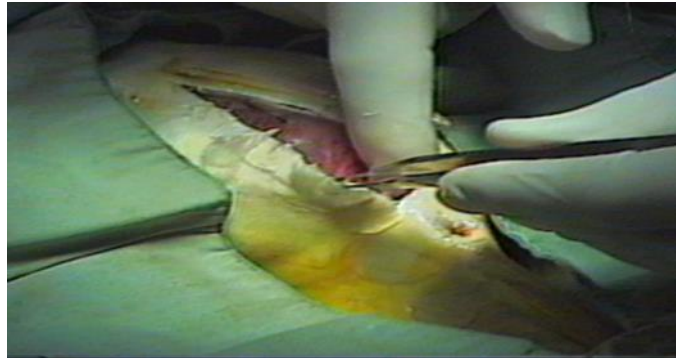
American Veterinary Medical Association | Phoenix, Arizona USA | Email: nsainterne@gmail.com

MONITORING ANESTHESIA

A pulse oximeter can be clipped onto the caudal fin of large fish, near the tail base, to monitor the pulse and blood oxygen concentration.



Electrocardiogram (ECG) monitors can also be used in large fish by attaching the monitor clips to hypodermic needles placed into the muscles on either side of the body by the pectoral fins. This will create a 2-lead ECG that will show the heart rate of the fish. It is important to get a baseline heart rate and monitor for slowing, rather than to see if the heart stops, as the heart in fish can continue to beat after the fish is dead!



Stages of Anesthesia in Fishes

Stage	Plane	Description	Signs
0	0	Normal	Swimming actively, equilibrium normal
I	1	Light sedation	Reduced motion, ventilation decreased
I	2	Deeper sedation	Motionless unless stimulated
II	1	Light anesthesia	Partial loss of equilibrium
II	2	Deep anesthesia	Total loss of equilibrium
III	1	Surgical anesthesia	Total loss of reactivity when stimulated
III	2	Deep surgical anesthesia	Decrease in respiratory and heart rates
IV	1	Medullary collapse	Cessation of respiratory movements
IV	2	Cardiac arrest	Death

RECUPERATION

Recuperation after anesthesia is accomplished by transferring the fish into a container of fresh, well-aerated water without any anesthetic. It is helpful to move the air pump and air stone from the anesthetic to the recovery container to continue to aerate the water.

Never leave a fish unattended while it is under anesthesia. Some large fish tend to jump during induction or recovery from anesthesia. Moving the fish gently in a forward direction will aid the flow of fresh water across the gills, hastening anesthesia release from the gills. Do not slosh the fish back and forth in the water.

Once there are steady operculum movements let the fish rest and gradually recover in a quiet, dim environment. The longer a fish is under anesthesia, the longer it will take to recover from the anesthetic. Monitor the fish until it has regained its equilibrium and is swimming normally and can be transferred back into the aquarium.

EUTHANASIA

Humane death can be induced in fish by immersing them in an anesthetic solution, usually ten times the normal anesthetic concentration is used, and leaving them in the solution until respiration and heart beats cease. It is recommended to wait at least an hour after respiration has stopped to confirm death.

Secondary methods of euthanasia, such as pithing, can be performed after the fish is anesthetized to ensure death.

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Ribeiro Frio Aquaculture Station Tour

As part of the Aquaculture Europe 2021 conference, a tour of the mountainside trout farm was offered. Leaving the hotel in Funchal, we rode in a large bus up the windy road to the top of the mountain, then down to the trout farm that is perched on the hillside in the northern slopes of Madeira Island. This part of the island still has much of the original vegetation. The island was once totally covered with 'Laurissilva' forest, a relic from prehistoric times. Ribeiro Frio's governmental trout farm is always worth a visit. You can view the hatchery and round off your visit at the local restaurant with a freshly cooked trout or a *chouriço* sausage grilled on your table!



Right: Information signs on the trout farm.

Below: Aerial photograph of the fish farm. It is very small but efficient.





Ribeiro Frio (Cold Stream) runs down the mountain along side the trout farm, and some of the water is diverted into the flow-through ponds. The holding ponds for adult brood stock (photos on the left) are not large but are deep.

The rearing raceways (above photos) have water that flows in one side and out the other.

The farm raises rainbow trout (below), which originally came from America and were introduced into Europe in 1880. They began farming them here in 1960.



**Meet Dr. Nuno Ribeiro:
 Portugal's Aquatic Veterinarian**

Passionate about fish medicine, with a special interest in animal welfare, I took a course in Veterinary Medicine at the University of Porto, in Portugal, during which I took an internship in salmonid medicine in Norway. Afterward, I received specialized training at the Institute of Aquaculture, at the University of Stirling, Scotland, internationally recognized as among the best educational institutions in the field of aquaculture, where I graduated with distinction and the prize for best student.

I entered the job market at Scottish Sea Farms, as a Veterinarian responsible for 25 salmon farms. Later came the opportunity to return home to Portugal and start working in the Mediterranean with Aqualife Services to provide vaccination and veterinary services in the Mediterranean basin. Finally, I started MVAQUA, a company specialized in veterinary services for aquaculture and the aquarium hobby, focused on the needs of aquaculturists in the Iberian market. In 2020, I was certified as an Aquatic Veterinarian by the World Aquatic Veterinary Medical Association.

MVAQUA was created to provide a specialized medical and veterinary service to a developing aquaculture industry. We provide a service tailored to the customer, so that our diagnosis and consultancy service can help improve the well-being of your fish and produce fish sustainably and profitably. We also provide services in the aquarium and ornamental fish farming sector.

We can provide specialized training tailored to the client's needs and specificities. Some examples of training provided:

- monitoring the health status of fish stocks;
- biosafety;
- fish anesthesia/sedation;
- fish vaccination/drug administration.

Contact:

Dr. Nuno Ribeiro

Veterinary Doctor and CEO of MVAQUA

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*Above:
 Dr. Ribeiro (left) at his booth
 at the Aquaculture Europe 2021
 conference in
 Funchal, Madeira, Portugal.*

*Below:
 Dr. Ribeiro performing a skin mucus biopsy
 on a large Orenji koi for a client.*



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Questions & Answers from the WAVMA Listserv
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Guppy Gastroenteritis

I have a client that has set up a few guppy tanks in the fish room. The guppies are coming from a local fish store and big name chain stores. We are having trouble getting the guppies through quarantine. His fish go through a four week quarantine process of praziquantel once a week for the first two weeks then levamisole once a week for the third and fourth week.

A lot of the guppies seem healthy going into the quarantine but don't make it out. It seems to be due to a high Camallanus worm burden. When I necropsy the fish I find the worms in the GI tract or free in the coelom. I am guessing the guppies are dying from impaction or inflammation resulting from the dead worms. Any suggestions on how to adjust the quarantine protocol to help these guppies?

Thank you,

Michael Charney

Murray Hill Veterinary Associates

Hi Michael,

For the intestinal worms, would it help to evacuate them by putting fish through Epsom salt baths initially, and then medicate them with anthelmintics a week later? This should reduce the number that die within the host, thereby reducing the degree of inflammation.

Yours sincerely,

Dr Richmond Loh, DipProjMgt, BSc, BVMS, MPhil (Pathology), MANZCVS (Aquatics & Pathobiology), CertAqV, Fellow WAVMA.
 Aquatic Veterinarian & Veterinary Pathologist.

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Richmond and Michael,

So is the assumption that addition of Epsom Salts (MgSO₄) is going to induce an osmotic intestinal hypermotility hence increasing the likelihood of worm loss? Or are you assuming that MgSO₄ will have a direct effect on the worms? I'm not convinced of the latter and struggling with the rationale for the first scenario.

With this we would have to assume that the fish would be drinking actively to intake adequate volumes of water laced with MgSO₄ so that within the lumen the MgSO₄ would draw bodily fluids into the lumen and

hence increase luminal volume hence stimulating increased evacuation of the lower intestine by hypermotility. Given that the adult worms are attached by mouth parts to the luminal wall in order to consume fish blood, would there need to be a flow to flush them out? Just looking for clarity.

Sounds like they have a significant worm burden and so deaths may also just be due to chronic anaemia, secondary infection, secondary effects of chronic stress?

Another thought is whether the Levamisole is causing an adaptive immune suppression and it's the secondaries that are killing them. I know Levamisole is thought to be immune-stimulatory but depends on the fish species.

I think there are some therapeutic aspects in the case, but sounds like many of these fish need to be handled with kid gloves for a while as they move through whatever quarantine protocol you have. Would pay to nurse them with dietary augmentation and stress less management as well.

Cheers,

Dr Stephen B Pyecroft BVSc (Hons) PhD MANZCVS (Aquatic & Pathobiology)

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 Current Director At Large, Asia/Pacific,
 World Aquatic Veterinary Medicine Association

Michael,

As the veterinarian in charge of fish health for a major Pet Store chain in the USA for over 20 years, I can confirm that guppies are one of the highest loss species of fish commonly kept by aquarists. Once you get them healthy and in a good aquatic system, they are prolific breeders and do quite well, but coming from the farms to the stores, in the first place, they are often burdened with many species of parasites, both external and internal.

The combined stores in this chain sell about 5 million guppies a year, but the loss percent is the highest among all the fish species, so reducing losses makes a significant impact in reducing costs. One study I performed on 287 guppies from multiple fish farms found many species of parasites on or in the guppies.

The guppies were inspected for external and internal parasites. Skin and tail fin biopsies were performed on live fish from each variety from each supplier. Necropsies were performed on deceased fish and the abdominal organs were examined.

Photographs of some of the parasites found during this test:



treated with medications such as Minn Finn (Hydrogen Peroxide/Peracetic Acid) or Quick Cure (Formalin/Malachite Green) added to the water. The internal protozoa (Spiroucleus) are treated with Metronidazole medicated fish food.

External skin flukes (Gyrodactylus) can be treated with Minn Finn, but are better treated with medication containing Praziquantel, which also can eliminate the Digenean Trematodes. The intestinal worms are best treated with medicated fish food containing Fenbendazole.

Bacterial infections such as Flavobacterium columnare can be treated with antibiotics in the water (although care is necessary to not inhibit the bacteria in the biological filter) or with antibiotic medicated fish food. Mycobacterium has a low level of treatment success and affected fish should be culled.

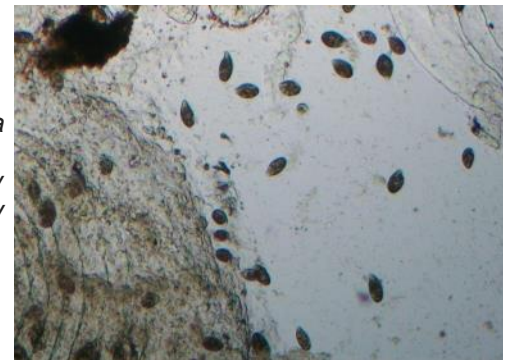
Nick Saint-Erne, DVM, CertAqV
Dr. Saint-Erne Consulting, PLLC.
Phoenix, Arizona
Nsainterne@gmail.com

These pathogens were found in the guppies:

- Protozoa - Chilodonella, Ichthyobodo (Costia), Spiroucleus, Tetrahymena
- Worms - Camallanus, Digenean Trematodes, Pentastomids, Skin Flukes (Gyrodactylus)
- Bacteria - Columnaris, Mycobacterium

The varieties of parasites found on the guppies require several different medications and modes of administration for their treatment. The external protozoa (Chilodonella, Ichthyobodo, Tetrahymena) can be

Tetrahymena Protozoa on a skin biopsy from a guppy



WAVMA is excited to partner with Aquadocs Podcast



Looking for new and on-the-go ways to learn about aquatic medicine? Check out Aquadocs podcast hosted by Michelle Greenfield where aquatic animal health experts share their research, clinical cases, stories, and more.

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Follow us on Instagram and Facebook @aquadocspodcast



Book Review: Part 3

Fowler's Zoo and Wild Animal Medicine; 9 Volumes
Reviewed by Nick Saint-Erne, DVM, CertAqV

Volumes 5, 6 and 7:

The Fifth Edition of *Zoo & Wild Animal Medicine* (2003) was edited by Murray E. Fowler and R. Eric Miller, and is not labeled Current Therapy, as were volumes 3 and 4, but is a new review of exotic animal veterinary medicine by phyla, and includes sections on Fish, Amphibians, Reptiles, Avian, Mammals, and a section on Diseases Common to Multiple Taxa. This volume was written by 75 contributing authors from 10 countries. It has 782 pages, including the index. There are no appendices in this volume.

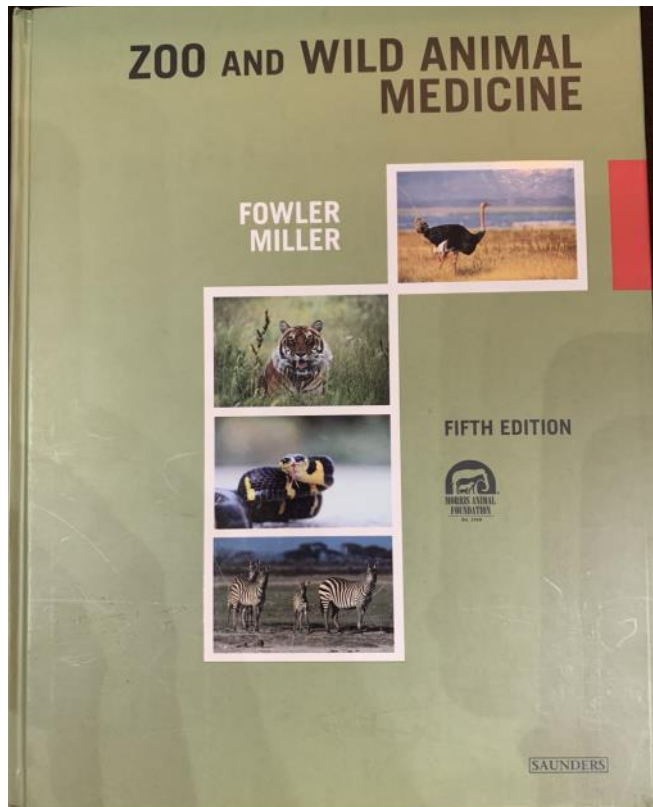
Part I is the section on Fish, written by Craig A. Harms, and contains 19 pages. The topics covered include Biology, Unique Anatomy and Physiology, Water Quality and Filtration, Feeding, Restraint and Handling, Anesthesia and Surgery, Diagnostics, Diseases, Reproduction, Preventive Medicine, Acknowledgements and References.

The topics discussed, although brief, are described with conciseness and clarity, so this is a good review of fish medicine. The disease section lists the common infections and parasites seen with fish, and provides the names of the drugs used for treatment of the specific diseases, but does not list dosages, so that information would need to be found in a separate reference source. The references list 7 books as sources of drug dosages, and 31 total references are included.

The Amphibian section (Part II) has three chapters. The first covers Anurans: Frogs and Toads, written by Graham Crawshaw. The next is on Urodela: Salamanders and Sirens, written by John E. Cooper. The third chapter is on Caecilians by Natalie D. Mylniczenko. These chapters contain topics similar to the Fish section, with charts of the common diseases.

Part III covers the Reptile Groups and includes Chapter 5 Chelonians (Turtles, Tortoises), by Bonnie L. Raphael, Chapter 6 Crocrodilia (Crocodiles, Alligators, Gavials and Caimans) by Mark L. Lloyd, Chapter 7 Sphenodontia (Tuatara) by Wayne Boardman, Chapter 8 Lacertilia (Lizards, Skinks, Geckos) and Amphisbaenids (Worm Lizards) by Juergen Schumacher, and Chapter 9 Ophidia (Snakes) by Mark Mitchell. As with the previous sections, the information concisely covers the main themes required for the species' care and maintenance, feeding and housing, and diseases and treatments. There are charts listing medications used and dosages, and reference ranges for hematologic parameters for common species.

Part IV covers the Avian Group and has Chapters 10 to 32 on the main bird families. The aquatic birds are found in Chapter 11 Spenisciformes (Penguins) by Michael R. Cranfield, Chapter 12 Gaviiformes (Loons) Podicipediformes (Grebes), and Procellariiformes (Albatrosses, Fulars, Petras, and Shearwaters) by Michael K. Stoskopf, Chapter 13 Pelecaniformes



(Pelicans, Tropicbirds, Cormorants, Frigatebirds, Anhingas, Gannets) by Martha Weber, Chapter 14 Ciconiiformes (Hérons, Ibises, Spoonbills, Storks) by Michael Waters, Chapter 15 Phoenicopteriformes (Flamingos) by Terry M. Norton, Chapter 16 Charadriiformes (Gulls, Shorebirds) by Ray L. Ball, Chapter 17 Anseriformes (Waterfowl, Screamers) by Karen S. Kearns, and Chapter 20 Gruiformes (Cranes, Limpkins, Rails, Gallinules, Coots, Bustards) by James W. Carpenter.

The 181 pages of the Avian Group provides a comprehensive introduction to avian medicine with the associated husbandry and diseases. Treatment dosages are not specified in many of the chapters, but there is a Formulary chart of commonly used avian drugs in Chapter 18 Falconiformes (Vultures, Hawks, Falcons, Secretary Bird) by Patrick T. Redig.

Part V Mammal Groups includes 32 chapters over 405 pages. Each chapter covers a class or order of mammals, with these chapters on marine mammals: Chapter 44 Cetacea (Whales, Dolphins, Porpoises) by Thomas H. Reidarson, over 17 pages that includes husbandry, hematology, diseases and a chart of Selected Pharmaceuticals and dosages. Chapter 45 Pinnipedia (Seals, Sea Lions, Walruses) by Lauri J. Gage, 17 pages that includes biological information, chemical immobilizing agents, blood values, diseases, and treatments. Chapter 46 Sirenia (Manatees, Dugong) by David Murphy, over 7 pages containing biology, housing, feeding, diagnostics, diseases, drugs and dosages. Chapter 49 Mustelidae includes the otters, by Jesus Fernandez-Moran.

The final section, Part VI Diseases Common to Multiple Taxa, contains 16 chapters on frequently encountered diseases such as Salmonella, Mycobacteria, Aeromonas and Pseudomonas.

Overall, this is a great reference book, and will suffice as a primary reference for zoo veterinarians who do not have access to any of the previous volumes in this series, as it includes all major taxa likely encountered in a zoo environment. It does not go into great detail, especially on drugs and dosages, but would guide a veterinarian to potential differential diagnoses and has sufficient references to find more information on any topic in another source.

Zoo & Wild Animal Medicine Volume 6 (published in 2008), once again, is listed as Current Therapy, and has the same two editors, with 50 contributing authors. It contains four sections: Section I General Topics and Conditions Affecting Multiple Species, and Conservation Medicine; Section II Poikilotherms, including, Fish Amphibians and Reptiles; Section III Avian Medicine; and Section IV Mammals. This book is 495 pages long and contains articles that are supplementary information to Volume 5, and highlights the latest knowledge on emerging diseases, including Avian Influenza, West Nile Virus, Ebola and Mycobacterium.

At the beginning of the book there are 23 pages of color photographs that are referenced throughout the chapters. Previous editions had only black and white photographs, except for the original Volume 1 that has one color plate of Reptile Hematology.

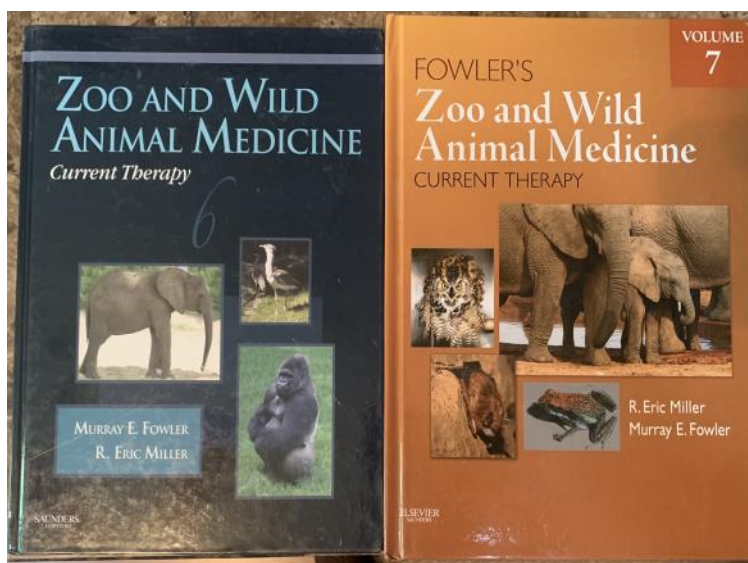
Fish are covered in Section II, Chapter 14 Selected Fish Diseases in Wild Populations, by Francis T Scullion, which discusses environmental, parasitic, bacterial, viral and fungal diseases that occur in the wild. The only other article about fish is Chapter 15 Spring Viremia of Carp Virus, by Gregory A. Lewbart and Raghunath Shivappa. This reportable viral disease was first diagnosed in the United States in 2002 and veterinarians should be aware of this disease and its signs (lethargy, ascites, exophthalmia, hemorrhages and edema) in order to promptly notify federal authorities if it is diagnosed.

The Amphibian Section has Chapter 16 Veterinary Participation in Puerto Rican Crested Toad Program, by Graham Crawshaw, and Chapter 17 Amphibian Chytridiomycosis, by Allan P Pessier. Chytridiomycosis has caused significant declines in wild populations of frogs and toads around the world.

Reptiles are included in Chapter 18 Raising Giant Tortoises, by Jean-Michel Hatt, Chapter 19 Reptile Protozoa, by Mary C. Denver, and Chapter 20 Fluid Therapy in Reptiles, by Juergen Schumacher.

Section III Avian Medicine contains seven chapters, with only Chapter 26 Minerals and Stork Nutrition by Andrea L. Fidgett and Ellen S. Dierenfeld concerned with water birds.

Section IV Mammals contains 30 chapters divided into specific taxa. The Marine Mammals are covered in Chapter 37 Melioidosis in Marine Mammals by Reimi E. Kinoshita, Chapter 38 Inflammation in Marine Mammals by Thomas H. Reidarson, Chapter 39 Capture and Anesthesia of Otariids in the Wild by Alberto Paras, Chapter 40 Tissue Cyst-Forming Coccidia of Marine Mammals by Melissa A. Miller, and Chapter 41 Algal Bloom Toxicity in Marine Animals by Linda J. Lowenstine.



This particular volume has limited specific information on aquatic animals, but the articles included are well written and it would make a good reference for those specific diseases.

Fowler's *Zoo & Wild Animal Medicine* Volume 7 (published in 2012), has a slight change to the title: adding Fowler's name. The order of the editors has also been reversed, so Miller's name comes before Fowler. The previous editions were all published by Saunders, but this one is listed as Elsevier

with Saunders in smaller type below it, as Saunders is now an imprint of Elsevier Inc.

This volume has 102 authors from 12 countries. It has 83 chapters in 15 sections and is 669 pages long. It is the first volume to include information on White-Nose Disease in bats (Chapter 56), and has an update on Chytrid Fungus in amphibians.

In Section 1 General, there is Chapter 16 AAZV Guidelines for Zoo and Aquarium Veterinary Medical Programs and Veterinary Hospitals by Thomas P. Meehan. This article discusses the guidelines for veterinary care and has helpful information for any veterinarian working in this situation. The guidelines recommend active participation in the management team by the veterinarian.

Section 2 Aquatic has Chapter 22 Medical Management of Rays by Natalie D. Mylniczenko; Chapters 23 Basic Water Quality Evaluation for Zoo Veterinarians, 24 The Mechanics of Aquarium Water Conditioning, and 25 Advanced Water Quality Evaluation for Zoo Veterinarians by M. Andrew Stamper and Kent J.

Semmen; and Chapter 26 Quarantine of Fish and Aquatic Invertebrates in Public Display Aquaria by Catherine Hadfield.

These 5 chapters contain a wealth of information and the book is recommended for aquatic veterinarians for the water quality chapters alone. These three chapters cover water quality testing, treatments to return extreme values to normal and filtration system reviews. The chapter about rays is important due to the increase in touch pools in zoos and aquariums containing rays. The Quarantine chapter is complementary to Chapter 16 in this volume and is helpful for veterinarians working in public aquariums. It also includes diagnostic procedures and frequently used disease treatments.

Section 3 Reptile and Amphibian contains 8 chapters: 27 Behavior Training of Reptiles for Medical Procedures, by Gregory J. Fleming, 28 The Diagnosis and Control of Amphibian Chytridiomycosis by Allan P. Pessier, 29 Mycobacteriosis in Amphibians by Norin Chai, 30 Amphibian Viral Diseases by Graham Crawshaw, 31 Sea Turtle Rehabilitation by Terry M. Norton and Michael T. Walsh, 32 Reptile and Amphibian Analgesia by Ann Duncan, 33 Virology of Nonavian Reptiles: An Update by Jim Wellehan, and 34 Hellbender Medicine by Randall E. Junge.

These interesting chapters provide important current information, especially the chapters on Chytridiomycosis, Mycobacteriosis, and Virology. Chapter 33 provides a review of the evolution of the Tetrapods, based on nucleic acid sequence phylogeny analysis and has included the birds (Avian) as a branch of the Sauropsids (Reptiles) that have descended from the Dinosauria, hence actually being evolutionarily advanced reptiles.

Section 4 Avian contains 13 chapters that are not specific to aquatic birds but include chapters on Mycobacterial Diseases, Circovirus and Polyomavirus, Aspergillosis, Avian Influenza as well as Analgesia.

Section 5 Mammals contains one chapter about Rabies; then each of the Mammal orders is covered in its own section. Section 11 Marine Mammals contains two articles: Chapter 63 Longitudinal Monitoring of Immune System Parameters of Cetaceans and Application to Their Health Management by Jeffrey L. Scott and James F. McBain, and Chapter 64 Ocular Disease and Suspected Causes in Captive Pinnipeds by Laurie J. Gage.

This volume has many articles that supplement the material found in comprehensive Volume 5 and the fish section has in-depth water quality information to augment the detailed fish disease information in Volume 5. There are not as many photographs in this edition as in previous volumes, but most of the images are in color and those are in line with the text in the chapters.

Drs. Fowler and Miller are to be greatly commended for their comprehensive contributions to the veterinary literature on wild and zoo animals, and any volumes in this series are highly recommended.

Abstracts from Scientific Literature:

Small-scale rainbow trout farming

Woyanovich, A.; Hoitsy, G.; Moth-Poulsen, T.
FAO Fisheries and Aquaculture
Technical Paper No. 561.
Rome, FAO. 2011. 81 pp.

Unemployment-generated poverty in the mountainous regions of the countries of Central and Eastern Europe and of the Caucasus and Central Asia is a considerable problem. The problem exists in spite of the fact that natural resources could provide both income generation and employment in these regions. Among the available natural resources, water excellent for trout farming is abundant in the mountainous regions.

However, instead of being produced locally, the highly valued trout is often imported. Therefore, the utilization of available water resources for trout production is an obvious possibility for both increasing employment opportunities and generating income. Because of the reasons mentioned above, the present practical reference publication has been designed and elaborated along with three related trout farming publications. These are the guides to *Small-scale Propagation of Rainbow Trout*, *Small-scale Trout Processing Methods* and *Trout Farming-based Angling Tourism*.

There are 206 species in the family of Salmonidae. Salmonids (salmon, trout, char and whitefish) are found in practically all continents, partly because they are indigenous there and partly because they have been introduced. Among trout, brook trout, brown trout, lake trout, sea trout and rainbow trout are the most widely known species. The rainbow trout (*Oncorhynchus mykiss*) is a highly commercial fish

This technical paper is a basic guide to the starting and successful practice of small-scale trout farming. It summarizes all the technical information that it is important to know for small-scale trout production.

In mountainous regions, where water resources could support profitable trout farming, protection of the environment is also important. Therefore, this technical paper contains sections with information about the basics of efficient treatment of trout farm effluents. The concept of this technical paper is to guide the reader through the necessary technical information, related practical solutions and the steps of preparation of both investment in and day-to-day operation of a small-scale rainbow trout farm.

In order to satisfy interest for specific details, a glossary has been compiled and tables and annexes attached. Explanations are short but together with their illustrations they should be informative. Hence, it is hoped that this combination will facilitate easy understanding and learning of rainbow trout farming.

Download at:

<https://www.fao.org/3/i2125e/i2125e.pdf>



The Aquarium Vet is very pleased to announce the launch of Aquarium School (be one of the first to visit www.aquariumschool.com). The vision of The Aquarium Vet is "To Advance the Health and Welfare of Aquatic Animals in Aquariums and Zoos Globally." Aquarium School is aimed at improving animal welfare in home and hobbyist aquariums. There is massive potential to educate and advise people with a home aquarium and in doing so, improve the health and welfare of these fish and aquatic invertebrates within their homes.

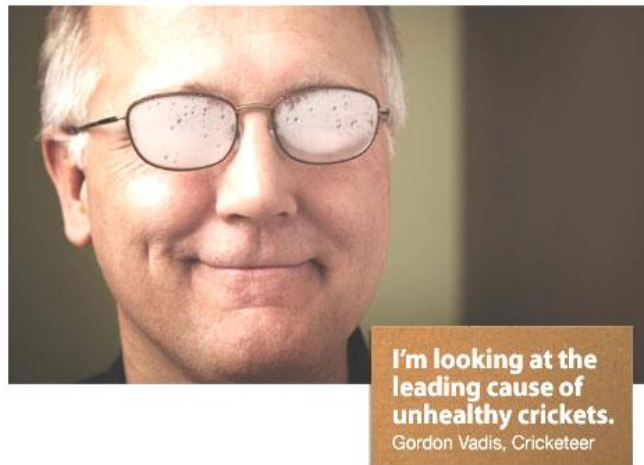
The series of free starter videos available at the Aquarium School website covers the Nitrogen Cycle in easy-to-understand detail. Even if you are an experienced aquarist, it is worth watching these to refresh your memory and you may even learn something new. Please feel free to share the link with any colleagues and friends you think may be interested. Whilst there is currently a single series of lectures, this will be constantly updated with new content in various formats presented in a very easy to follow and understandable manner.

We are also proud to announce that the E-aquarist course was first released over a decade ago, it is now internationally recognized in the public aquarium industry and veterinary field. For the second year, due to COVID, the Veterinary Department of the Utrecht University in the Netherlands has reached out to us to assist with the education of their veterinary student elective in aquatic medicine. We are delighted to be associated with such an esteemed University, which was established in 1636.

For the home aquariums and hobbyists, we now have an eConsult available: www.aquariumschool.com. For public aquariums and professional aquarists, please reach out to rob@theaquariumvet.com to discuss your requirements. Finally, we have been a proud AZA Recognized Learning Partner for the past six years and continue to see increases in our student numbers every year.

The Aquarium Vet Team

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USDA expanding efforts to protect farmed aquatic animals

By Greg Cima

[JAVMA News, August 11, 2021](#)

A plan published this summer would consolidate authority over aquaculture under the U.S. Department of Agriculture and expand measures to find and control disease outbreaks. The changes would create national guidance on aquaculture-related disease reporting, disease surveillance, outbreak response, biosecurity, employee training, diagnostic laboratory standards, pathogen testing, and certifications that aquatic animals are healthy and safe, according to information from the USDA Animal and Plant Health Inspection Service. All of those are elements of a robust aquatic animal health system, the plan document states.

APHIS officials outline the changes through the [National Aquaculture Health Plan and Standards, 2021-2023](#) (PDF), and the document notes that an executive order from President Biden mandates that the plan be updated every two years by the USDA and its partners.

Dr. Stephen Reichley, president of the World Aquatic Veterinary Medical Association, said implementing these science-based policies could help efforts to protect aquatic animal health, minimize disease, and facilitate trade.

"If the plan is successfully implemented and adopted by all stakeholders, then it could help support the aquaculture industry and provide the necessary infrastructure for advancement of animal health and sustainable growth of U.S. aquaculture," Dr. Reichley said.

Since a previous version of the aquaculture plan was published in 2008, representatives from APHIS, the National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service have shared leadership of a federal task force on protecting aquaculture animal health and aiding animal shipping and trade.

Accomplishments include coordinating export certification, developing animal health modules for the National Veterinary Accreditation Program, and incorporating aquatic animal pathogens into the National Ani-

mal Health Reporting System and National Animal Health Laboratory Network. The group led surveillance projects for diseases including infectious salmon anemia and viral hemorrhagic septicemia.

But the new plan notes that lack of resources hampered the group's progress, especially in light of the diversity of species, production methods, and uses for the aquatic animals affected by the plan, according to a summary in the new plan.

The document further states that oversight of animal health had been vague or dispersed among federal agencies and state-level departments, creating confusing and redundant regulations on aquatic animal health. Millions of healthy aquatic animals had been needlessly destroyed because of these conflicts, the document states.

The USDA is the primary federal entity overseeing livestock and other agricultural commodities, so it's fitting that the department would lead federal efforts on aquaculture and aquatic animal health. USDA officials will continue collaborating with officials from NOAA and USFWS.

Dr. Reichley said that continued collaboration with federal, state, and tribal entities is key to making the plan work. But he expressed disappointment that a technical working group described in the plan doesn't include dedicated

seats for the WAVMA or the American Association of Fish Veterinarians, which he said could be excellent resources for those federal and local agencies.

Dr. Reichley also said he commends USDA for recognizing that veterinarians must lead disease investigations, treatments, reporting, and other responses under the Comprehensive Aquaculture Health Program Standards.

"I think veterinarians are well positioned and qualified to ensure the health and welfare of aquatic animals," Dr. Reichley said. "We would like to see that role of veterinarians be applied to the plan in its entirety."

Center photo:

WAVMA President Stephen Reichley.





MEETINGS OF INTEREST TO AQUATIC VETERINARIANS

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

Many Veterinary Conferences being held in 2021 have been canceled or postponed. Please check websites to ensure conferences are still being held before making travel plans.



46th WSAVA World Congress

Dates: 13-16 November 2021

Hyderabad, India - Presented online virtually

Presentations include:

- A Betta Solution - Exploring Siamese Fighting Fish Medicine. Saint-Erne,
- Winter Woes - Cold Weather Koi Pond Problems. Questen,
- The ABCs of Koi Practice - Getting Started. Saint-Erne,
- Food and Feeding Behavior in Koi. Tepper,

[Visit the website here:](https://wsava2021.com/) <https://wsava2021.com/>

47th WSAVA World Congress - 2022

Dates: 29-31 October 2022

Lima, Peru

See: [WSAVA](https://www.wsava.org/)

48th WSAVA World Congress - 2023

Lisbon, Portugal

49th WSAVA World Congress - 2024

Shanghai, China



Call for Papers

A special Issue on *Viruses of Aquatic Animals*

Dr. James R. Winton of the United States Geological Service Western Fisheries Research Center has recently retired after a remarkable career in aquatic animals' health research and management that focused on fish viruses. We, his friends, colleagues, and collaborators are assembling a special issue on aquatic animal viruses and viral infections as a tribute to his outstanding career.

This special issue of the Aquatic Animals Section of *Animals* is expected to be completed by the end of 2021. *Animals* (ISSN 2076-2615) is an international peer-reviewed open access journal devoted entirely to animals, including zoology and veterinary sciences, published monthly online by MDPI.

The manuscripts are peer-reviewed, and a first decision provided to authors approximately 15 days after submission; with accepted paper posted online within a week with full-text archived in PubMed Central.

We would like to invite you to contribute to Winton's special issue by submitting a research paper, review article, or short communication that further our understanding of aquatic animals' viruses' pathogenicity, immunology, epidemiology, improved diagnostics, newly developed vaccines, taxonomy, and host susceptibility.

We are hoping that you will join our efforts in assembling an issue embodying emerging information in a field that Dr. Winton's led us through.

For further information please contact:

Professor Mohamed Faisal
Faisal@cvm.msu.edu



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The Aquarium Vet E-conferences



In 2020, The Aquarium Vet commenced holding E-conferences to fill the gap left by the cancellation of in-person aquarium and zoo conferences globally. Recordings of all our E-Conferences are available to purchase from our website:

<http://www.theaquariumvet.com/conference/>

The second E-lasmo Conference was held recently in March 2021. The E-lasmo Conference is the only conference in the world, that is solely dedicated to elasmobranchs in professional care in aquariums and zoos. We were delighted that more than 20 speakers presented over the four days with some amazing topics covered. Recordings of the entire E-lasmo Conference 2021 are now available for purchase.

This year we have decided to combine the E-Aquarium Conference and the E-Reef Conference into one massive fun filled week. Keep the week commencing October 18th 2021 available for what will be an amazing E-conference with world class speakers on a variety of topics. If you are interested in presenting at the E-Aquarium Conference later this year, we encourage you to submit an abstract to:

rob@theaquariumvet.com.

Aquaculture Europe 2021
 Madeira, Portugal

Monday, 4th October

Registration open 12.00-18.00
 EAS Board Meeting 09.00-14.00
 Opening Ceremony & EAS Awards 18.00-19.00

Tuesday, 5th October

Registration open 7.30-18.00 Daily
 Plenary Session 9.00-10.00
 Trade Show open 10.00-19.00
 Educational Sessions 10.30-12.50
 Industry Forum 10.30-17.30
 EAS General Assembly 13.00-14.00
 Educational Sessions 14.00-17.20
 Eposter Session/Happy Hour 17.20-19.00
 Student Reception 19.00-21.00

Wednesday, 6th October

Plenary Session 9.00-10.00
 Educational Sessions 10.30-12.50
 Innovation Forum 10.30-17.30
 Trade Show open 10.00-19.00
 Educational Sessions 14.00-17.20
 Eposter Session/Happy Hour 17.20-19.00
 President's Reception 19.00-22.00

Thursday, 7th October

Educational Sessions 9.00-11.00
 EATiP/EU Day 9.00-12.50
 Plenary Session & Poster Awards 11.30-12.50
 Trade Show open 10.00-16.30
 Sessions 14.00-17.20

Conference information: ae2021@aquaes.eu
 Registration: worldaqua@was.org

American Association of Fish Veterinarians
 2021 Virtual Conference

The AAFV Board and Conference Committee will once more be offering a two-day online conference. Sessions will be live on October 21 & 22, 2021. We are reaching out to both veterinarians and veterinary students to consider submitting abstracts for presentations.

In an effort to increase the diversity of talks that range the breadth of fish medicine, we are soliciting speakers from all clinically relevant topics to the fish veterinarian including, but not limited to: Clinical Pathology; Radiology; Surgery, Anesthesia & Analgesia; Diagnostics & Therapeutics; Economics; Ornamental/Pet Fish; Aquaculture; Public Aquaria; Unique Cases.

We welcome your submission for any of these focus areas, or any other topics you feel would be of great interest for fish veterinarians.

Please contact the Executive Secretary at: americanfishvets@gmail.com.

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 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. Make sure that the first page is viewed by itself. That will allow you to scroll through 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!

**AQUAVET® 2022
 COURSE
 ANNOUNCEMENTS**

We are pleased to announce the AQUAVET® 2022 courses and related information.

AQUAVET® I and II will be presented at Roger Williams University in Bristol, Rhode Island. Bristol is a picture perfect New England town about 20 minutes from Newport.

**AQUAVET® I -
 An Introduction to Aquatic Veterinary Medicine**

The course is designed for veterinary students and veterinarians who have an interest in applying their veterinary training to aquatic animals.

Duration: 4 weeks – May 29 to June 25, 2022

Fee: \$2,525 for full-time veterinary students, although a program benefactor will pay \$200 for each student, bringing the cost down to \$2,325. This includes tuition, room and most meals.

**AQUAVET® II –
 Comparative Pathology of Aquatic Animals**

The course is oriented toward the pathology of vertebrates and invertebrates commonly used as laboratory animals, encountered in display aquaria, and of importance to aquaculture enterprises.

Duration: 2 weeks – May 29 to June 11, 2022

Prerequisite: AQUAVET® I

Fee: \$1,515 for full-time veterinary students.

This includes tuition, room and most meals.

AQUAVET® Summer Research Fellow (one offered)

Fellows pay no tuition for the 8 weeks of the research program itself and will be reimbursed for room and board expenses. In addition, research student will receive a stipend of \$3,800 for the research period.

Duration: 8 weeks following AQUAVET® I

Prerequisite: AQUAVET® I

Venue: Laboratory at Cornell University

Detailed information about the courses is available on our website. The specific course programs for each course in 2019 are also listed there.

Applications for admission are due by January 15, 2022. The application is available on our website. You will receive an e-mail acknowledging receipt of your completed application and supporting materials.

Please visit our website at: www.aquavet.org



AQUACULTURE EUROPE 2022

Rimini, Italy

27-30 SEPTEMBER 2022

The issues of compatibility and mutual synergy between the users of marine, brackish and freshwater resources and their relationship with the quality of those ecosystems are central in promoting the sustainable development of aquaculture. Traditional and emerging Blue economy sectors, currently operating in the Adriatic, Mediterranean and water bodies throughout Europe, are expected to grow and expand over the next years and to sustainably contribute to food production, biofuel and clean energy.

Nevertheless, scientific literature provides clear evidence that, according to current trends and within 10 years, our coastal and marine environment will change for sea acidification and warming, sea-level rise and coastal erosion and all water bodies will be affected by flooding, eutrophication and pollution, with important effects on ecosystem services, fish and shellfish stocks and food security.

Climate change, depletion of natural resources, loss of biodiversity, food security and safety, environmental pollution and waste represent important sustainability challenges for further expansion of European aquaculture and the ambition of the European Green Deal and the Farm to Fork Strategy. It will be necessary for the sector to address these externalities, but also focus on the way in which we chose, use and re-use resources, as we move towards a circular Blue economy.

How aquaculture is facing these challenges, and the solutions put in place to develop a sustainable, responsible and productive and climate neutral European aquaculture sector for key marine and freshwater fish, shellfish and algal species are the main themes for AE2022 event in Rimini.

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