The Aquatic Veterinarian

Journal of the World Aquatic Veterinary Medical Association



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WHO ARE WE

MISSION

The Mission of the 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.

To fulfill this Mission, the World Aquatic Veterinary Medical Association has established the following:

Objectives

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

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

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

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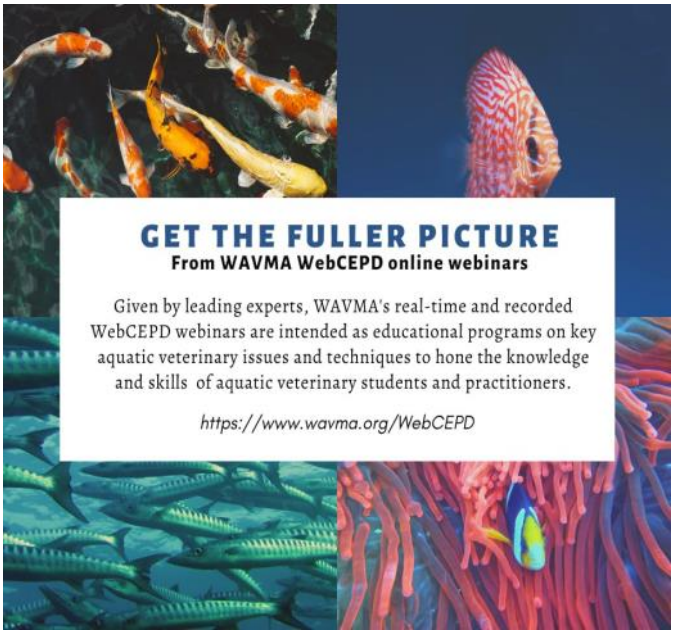
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Dr. Robert Martinez performing endoscopy on an anesthetized koi.

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World Aquatic Veterinary Medical Association

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.

EDITORIAL

Editor's Note

Hoping everyone is off to a fantastic year of 2024. Business has been very good so far this year, and many fish vets are working in the Aquatic Industries: at zoos and aquariums, fish farms, tropical fish wholesale facilities, in research and universities, and private practice. The importance of veterinarians in fish health has expanded tremendously since WAVMA was formed in 2007.

Preparing this issue for the 18th year of WAVMA, I looked back on our first publication, the Aquatic Veterinary Association's *AqVA Members Newsletter* of June 2007, published by our first Secretary, Chris Walster. This newsletter reported that the AqVA sought and kindly received assistance from the American Veterinary Medical Association to hold the inaugural Annual General Meeting in conjunction with the 144th AVMA Annual Convention in Washington, DC, USA on July 18th, 2007. At this meeting, our first President, Peter Merrill, presided over topics including the "History, Needs and Concepts Behind the AqVA Formation" and "Issues, Concerns and Needs Facing Aquatic Veterinary Medicine."

The next newsletter, published in September, 2007, was titled *Aquatic Vet News*, and announced the results of events from that meeting, including revising the organizations name to the *World* Aquatic Veterinary *Medical* Association, to better reflect the international makeup and scope of our organization. An overwhelming majority of Members considered this to be of utmost importance. Secondly, the Bylaws were ratified by a unanimous vote. And lastly, also by unanimous vote, a new slate of Officers and Directors for 2008 was elected: Prof. Ronald Roberts (President) and Hugh Mitchell (President-Elect). Two other Officers, Julius Tepper and Tim Miller-Morgan, were re-elected to fill 2008 positions as Directors-at-Large and together with the current President (Peter Merrill), the Secretary (Chris Walster) and Treasurer (Dušan Palić) were on the Executive Board.

This little reminiscence from the first issues published by WAVMA reminds us that any of us and all of us can become an active participant of this association. I took over the quarterly *Aquatic Vet News* on Volume 2, Number 2 (2008), and have edited every edition since then. The name was changed to *The Aquatic Veterinarian* for Volume 7, Issue 1 in 2013. Looking back to my editorial in Volume 2:2, I found this comment: "Whether treating food fish, tropical aquarium fish, ornamental pond fish, marine mammals, sea birds, aquatic turtles, or aquatic invertebrates, we all need each other to support this growing field of medicine." This is as true today as it was 16 years ago.

Nick Saint-Erne, DVM, CertAqV
Executive Editor
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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

Advertising Rates (per issue)

	Commercial	Non-Profit
Full page (~7" x 9")	$100	$50
1/2 page (~7" x 4.5") **or 1 column** (3.5" x 9")	$60	$30
1/4 page (~3.5 x 4.5")	$30	$15

WAVMA Members can place a free 1/8 page (business card size) advertisement in the TAV. Contact TAVeditor@wavma.org for information on advertising and payment options.

EXECUTIVE REPORTS

President's Report

Dear members,

As you all may know, I am not only the President for WAVMA, this year, but I also chair the Credential Committee which looks after the CertAqV. As I write this I am on my way home from a personal development workshop in London, UK. The best investment you can do is in yourself. Aquatic medicine, or at least in my case, requires a lot of self-study. More and more resources are now available and the future is looking bright. Aquatic Medicine is also very broad and has many opportunities in which to specialise. WAVMA's CertAqV is the only program in the world that is both broad enough to capture all these niche interests in aquatic animals, yet specific enough to guarantee a high standard of day-one competence in this field. Designed to uphold rigorous standards and ensure proficiency in this specialized domain, the CertAqV certification offers numerous advantages to veterinary professionals seeking to advance their careers in aquatic veterinary medicine.

One of the primary advantages of the CertAqV program is its comprehensive curriculum, which covers a wide array of topics essential to aquatic veterinary medicine. From anatomy and physiology, to aquatic pathology, pharmacology, and diagnostics, the program equips participants with the knowledge and skills necessary to diagnose, treat, and prevent diseases in aquatic animals effectively.

Furthermore, obtaining CertAqV certification demonstrates a commitment to excellence and a dedication to staying abreast of the latest advancements in the field. As aquatic veterinary medicine continues to evolve, certification serves as a testament to an individual's expertise and competence, instilling confidence in clients and employers alike.

The CertAqV program also fosters a sense of community among aquatic veterinary professionals. By connecting participants with like-minded individuals from around the globe, the program facilitates knowledge sharing, collaboration, and networking opportunities. This sense of camaraderie not only enhances the learning experience but also provides ongoing support and mentorship throughout one's career.

Additionally, holding CertAqV certification can open doors to new career opportunities and professional advancement. Whether working in private practice, academia, research, or industry, certified aquatic veterinarians are highly sought after for their specialized expertise and skills. From consulting on aquaculture operations to working in aquariums and zoos, the possibilities for certified aquatic veterinarians are vast and diverse.

In summary, the WAVMA CertAqV program offers numerous advantages to veterinary professionals interested in specializing in aquatic veterinary medicine. From its comprehensive curriculum and commitment to excellence to its sense of community and professional opportunities, certification through the WAVMA CertAqV program is a valuable investment in one's career and a testament to one's dedication to the health and well-being of aquatic animals.



Last year we added the CertAqVNT. Veterinary nurses form a vital role in current veterinary medicine. We rely heavily on their knowledge and expertise to look after the care for the patients. We see our community growing by the day which is a great sign. It gives the team not only a way to acknowledge their skills it will also add value to the offering of a veterinary practice. Last year also saw the implementation of an automated system. I am the first one to admit that it hasn't all been smooth sailing but it has transformed the way we vet our vets and nurses. The system is more robust and easier to work with. It stores all applications for posterity.

Together with the Credential Committee, we continue to improve the certification process so we can guarantee that the certificate stands for excellence. We work hard to expand the recognition of the certification internationally with organisations such as WVEPAH, ECAAH and the ABVS recognising this programs as an entry level to their programs.

If you are already certified as a CertAqV or VNT, we congratulate you on your achievement. We also like to thank you for your continued support. The program is very much a peer program so we ask you to keep working with the program both as a mentor and an adjudicator. You can find this option on your member's profile on the WAVMA.org website. It doesn't take long, and those who dis this before you made it possible for you to become certified. Many minds make light work

I hope you all had a very good Easter break, announcing to the fish health specialist in the northern hemisphere that the water is getting warmer and we have to sharpen our blades and oil our microscopes for the coming season. Those in the southern hemisphere… if won't be long now until it all calms down a bit.

All the best,

Matthijs Metselaar DVM PhD Dipl ECAAH
CertAqV, MIFM, MRCVS
WAVMA President for 2024
www.aquaticvets.com
President@wavma.org

EXECUTIVE REPORTS

Secretary's Report

Dear WAVMA Members,

We have started this year 2024 under the leadership of President Dr. Matthijs Metselaar (UK), Immediate Past President Dr. Bartolomeo Gorgoglione (USA) and President-Elect Dr. Nelly Isyagi (Uganda). This year we have a renewed Executive Board (EB) fostering regional representation in order to get a close view of needs in specific regions aiming to increase local and international networks and support our members in each region with relevant and opportune information. A warm Welcome to Director for North America Dr. Stephen Reichley (USA), Director for Oceania Dr. Stephen Pyecroft (Australia), Director for Asia Dr. Win Surachetpong (Thailand), Director for Europe Simon Doherty (UK), Director for Middle East Dr. Farah Gonul Aydin (Turkey), Director for Africa Dr. Kunda Ndashe (Zambia) and Director for Latin America and Caribbean Dr. Paola Barato (Colombia).

Members of the EB, from the President to Regional Directors, are actively contributing to represent WAVMA at a series of Congresses, Exhibitions and Meetings occurring this year. Briefly, Dr. Paola Barato, Director for Latin America and Caribbean, has been part of the organizing committee of a series of workshops on aquatic veterinary medicine, pathology, and biosecurity of fishes in Latin America, to be held in Costa Rica, Colombia and Mexico. For more information, please contact Dr. Paola Barato.

A rich and continuous interaction with other veterinary professional associations is of special relevance and interest to our organization; in this context WAVMA and the World Veterinary Association (WVA) have collaborated and prepared a position statement regarding the Role of Veterinarians in Aquatic Animal Health. WAVMA is also contributing to a WVA position statement on the Vaccination Preparedness (in advance of outbreaks). In another equally important scenario, and in support of the World Organization for Animal Health (WOAH) efforts on the AMR issue, WAVMA has elaborated a position statement on this relevant topic as well. These position statements will be available soon in our WAVMA.org webpage.

In another arena - one of our successful programs has been for years the Aquatic Veterinarian Certification; last year and these days the Credentialing Committee - lead by Dr. Matthijs Metselaar - continues receiving more applications to the CertAqV Program. The process now is 100% online, which is allowing us to shorten the adjudication period. Applications are welcome via https://www.wavma.org/CertAqV-Pgm. In the same context, the Certification for Aquatic Nurses and Technicians (CertAqVNT) is receiving many more applications as well, more information and applications at: https://www.wavma.org/CertAqVNT-Pgm.



This year we are completing 5 years in a row delivering a continuous WebCEPD Program!! These WAVMA webinars have become a rockstar within WAVMA!! We now have more than 100 excellent lectures dealing with different topics within aquatic veterinary medicine. We continue to organize interesting lectures with lead experts in their fields. Keep tuned, every month here for more information: https://www.wavma.org/WebCEPD.

Attention!! The Education and Students Committee – Education Resources subcommittee has launched a new period of application for the John L. Pitts Aquatic Veterinary Education Awards Program; the window for applications started on March 1 and will be open until April 7. For more information, please visit https://www.wavma.org/scholarships.

Keep an eye on this Students Committee and WAVMA Student Chapters!! The Education and Students Committee – Students Support Subcommittee lead by Maribel Escobedo is delivering a Newsletter full of interesting information. Stay tuned with this resource!!!

We continue to work to keep the WAVMA website updated, thanks to our Administrator Dr. Chris Walster - with all the news and updates to WAVMA programs. We are also present in different social networks, so please have a look on our Facebook page, Instagram and LinkedIn. These are great places to ask your aquatic questions, share stories or pictures, jobs, and talk to other colleagues involved in aquatic animal health. Don't hesitate to use our Members or Students -L listserv! I also encourage you to submit articles dealing with Clinical Cases, and Book Reviews to *The Aquatic Veterinarian* editor, or short news stories for the WAVMA e-News!

WAVMA needs your contribution to keep going with our motto: *One Profession, One Discipline, One Voice – Cohesive and Inclusive!*

Claudia Venegas, MV, PhD, CertAqV, MVetClinTr
WAVMA Secretary
Puerto Varas, Chile
Secretary@wavma.org

EXECUTIVE REPORTS

Director for Latin America/Caribbean Report

WAVMA is co-sponsoring four workshops in 2024 on Freshwater Fish Medicine and Pathology in Latin America (Mexico, Costa Rica, Colombia, and Brazil) in cooperation with Esteban Soto from UC-Davis (please see the flyers on page 40):

- Costa Rica, March 22 and 23, 2024
- Brazil, August 27 and 28, 2024
- Colombia, Sept 30 through Oct 2, 2024
- Mexico, November 21 and 22, 2024

I will attend these conferences during 2024 as a speaker as the Director of CORPAVET and the Regional Director for Latin America for WAS and WAVMA:

Other meetings in Latin America this year include:

- AQUAEXPERT 2024, Neiva, Huila, Colombia, March 6 to 8, 2024. Conference: "Charting the Horizon of Fish Health and Biosafety: Knowledge, Decisions and Future of the Industry"
- SIMPOSIO DE ACUICULTURA GUATEMA, 2024, Guatemala, May 22 to 24, 2024. Conference: ""Situation of the Main Emerging Diseases in Latin America and How to Face Them",
- GLOBAL TILAPIA LEADERS, El Salvador, June 26 to 28, 2024.
- ACUICULTURA - REP DOMINICA, Republic of Dominica, Agosto 2, 2024
- LACQUA 2024, Medellín, Colombia, Sept 24 to 27, 2024

PAOLA BARATO
WAVMA Director for Latin America/Caribbean



Executive Board Responsibilities

The WAVMA Executive Board consists of the President, Immediate-Past President, President-Elect, Secretary, Treasurer and Directors. 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.

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; Work with the Meetings Committee to finalize and implement the WAVMA 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;

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.

The Secretary will: Serve as the primary WAVMA point of contact for the public; Inform members of WAVMA programs & initiatives; Assist the developments and distribution of WAVMA official correspondence; Serve as Chair of the Communications Committee;

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

Directors will: Represent individual WAVMA member's general interests in their geographical regions.



EXECUTIVE REPORTS




Matthijs Metselaar, UK
President 2024


Bart Gorgoglione, USA
Past President


Nelly Isyagi, Uganda
President Elect


Wes Baumgartner, USA
Treasurer


Claudia Venegas, Chile
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Stephen Pyecroft, Australia
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Simon Doherty, Ireland
Director-at-large
Europe


Farah Gonul Aydin, Turkey
Director-at-large
Middle East


Kunda Ndashe, Zambia
Director-at-large
Africa


Paola Barato, Colombia
Director-at-large
Latinamerica and Caribbean

www.wavma.org

EXECUTIVE REPORTS

WebCEPD Program

Since 2013, WAVMA has produced over 172 Webinars that are available to watch on our website: https://www.wavma.org/WebCEPD, including conference recordings on the Video page: https://www.wavma.org/video-library). You may be able to use these for continuing education credit for veterinary licensing, and you will also sure learn a lot!

Lectures are given by leading experts, and WAVMA's WebCEPD webinars are intended as educational programs on a variety of aquatic health issues and veterinary techniques to hone the knowledge and skills of aquatic veterinarians and veterinary students. To earn Continuing Education and Professional Development (CEPD) credit, you will need to complete a short Knowledge and Skills Assessment (KSA) to ensure you have met the learning objectives. On successful completion, you will receive a CEPD Certificate, which may be useful for licensure/registration to practice veterinary medicine and to earn credit towards becoming a WAVMA Certified Aquatic Veterinarian.

New WebCEPD videos available:

- B-1078 Fish Bone Health.

- B-1079 Antimicrobial resistance and alternative to antimicrobial in aquaculture

- B-1080: Captive Husbandry and Common Illnesses of Amphibians

Date: March 1, 2024

Presenter: Nicholas Jew, DVM

Credits: 1.0 hour



WAVMA's Member Programs and Services

Find a Fish Vet Directory - a directory for the public to find aquatic veterinarians

Member Directory - a members-only tool to locate other members and for vet students to locate mentors

The Aquatic Veterinarian - a quarterly publication with news, peer-reviewed contributions, clinical cases, jobs, meetings and more

Certified Aquatic Veterinarian (CertAqV) Program - a program identifying and certifying veterinarians with competency in core subject matter necessary for practicing aquatic veterinary medicine

WebCEPD Program - live and recorded webinars, courses, and presentations;; many are available for CEPD credit

John L. Pitts Aquatic Veterinary Education Awards Program - an international program that provides financial support for veterinary students and new graduates to increase their experience in aquatic veterinary medicine

Employment Opportunities - a list of available aquatic veterinary jobs, available to members only

Image Library - a collection of images useful for presentations, diagnostic interpretations, and more

Video Library - a collection of videos to help members and others understand aquatic veterinary techniques and issues

WAVMA Student Chapters - WAVMA chapters formed by veterinary students and faculty mentors at veterinary schools and colleges around the world

Members-L - (WAVMA_Members-L@.wavma.org). A members-only listserv for discussions on any topic of interest. To post to it, you must be a current member and ticked the appropriate box in your Member Profile Preferences tab.

Students-L - (WAVMA_Student-L@wavma.org). A discussion listserv for WAVMA student members. you must be a current member and ticked the approrpiate box in your Member Profile Preferences tab.

Leadership Roles - All members (including students) have the opportunity, and are encouraged, to serve on any WAVMA Committee. All full members may also be nominated for a position on the Executive Board. If you are interested in more information, please contact the WAVMA President.

COMMITTEE REPORTS

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 nine core subject matter areas:

- Aquatic Environment and Life Support Systems
- Taxonomy, Anatomy and Physiology
- Husbandry and Industries
- Pathobiology and Epidemiology of Aquatic Animal Diseases
- Diagnostics and Treatment of Aquatic Animal Diseases
- Clinical Veterinary Experience and Client Communications
- Public Health, Zoonosis and Seafood Safety
- Legislation, Regulations, and Policies
- Principles of Aquatic Animal Welfare

The Process

It is recommended that you initially speak with a mentor prior to applying, this is to ensure that you can complete the CertAqV process within the 12 months allowed. You can identify a mentor by going to the WAVMA Member Directory and click on the green CertAqV box at the bottom of the page. This will bring up a list of all potential mentors. Alternatively, you can email: administrators@wavma.org who will talk you through the process prior to you applying.

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 one year to complete these, once registered.

When your mentor is satisfied you have sufficient KSE credits, he/she will then 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

Samah Abdelrazek	United States
Ali Anwar Ahmad	Singapore
Jessica Allen	United States
Sara Alves	United States
Chelsea Anderson	United States
June Ang	Singapore
Farah Gonul Aydin	Turkey
Romualdo Balagapo	Philippines
Benjamin Balducchi	Canada
Sarah Balik	United States
Marcello Balzaretti	Italy
Madison Barnes	United States
Christa Barrett	United States
Heather Barron	United States
Julia Bauer	Germany
Trista Becker	United States
Jenice Bell	United States
Heather Bjornebo	United States
James Bogan	United States
Pierre-Marie Boitard	France
Rachel Brown	United Kingdom
Faith Burgos	United States
Shraddha Cantara	United States
Christian Capobianco	United States
Todd Cecil	United States
Ri Chang	United States
Bryony Chetwynd-Glover	United Kingdom
Prakan Chiarahkhongman	Thailand
Annie Clift	United States
Mike Corcoran	United States
Emily Cornwell	United States
David Craton	United States
Rebecca Crawford	United States
Hannah Dadah	United States
Manuel De la Riva Fraga	Spain
Zarah Deutsch	United States
Darren Docherty	United Kingdom
Simon Doherty	United Kingdom
Christina Dover	United States
Devon Dublin	Japan
Freeland Dunker	United States
Michael Dutton	United States
Ashley Emanuele	United States
Maribel Escobedo	Mexico
Antonella Fabrissin	Italy
Mohamed Faisal	United States
Erika First	United States
Julie Fithian	United States
Ari Fustukjian	United States
Danielle Godard	United States
Giana Gomes	Singapore
Emmanuel Gonzalez Rueda	Mexico
Bartolomeo Gorgoglione	United States
Krystan Grant	United States
Michelle Greenfield	United States
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Katharina Hagen-Frei	Switzerland
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Eileen Henderson	United States
Jenny Herbert	United States
Chelsea Hester	United States
Kelsey Hoag	United States
Adrien Izquierdo	United States

COMMITTEE REPORTS

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Sharmie Johnson	United States
Jimmy Johnson	United States
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Elizabeth Kaufman	Israel
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Denyse Khor	Singapore
Amy Kizer	United States
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Sonya Miles	United Kingdom
Timothy Miller-Morgan	United States
David Minich	United States
Haitham Mohammed	United States
Katrina Murray	United States
Kunda Ndashe	Zambia
Lucie Nedved	Australia
Jenifer Nix	United States
Ladislav Novotny	Czech Republic
Massimo Orioles	Italy
Alec Ortiz Colosi	USA
Courtney Pace	United States
Dušan Palić	Germany
Veronica Pardini	USA
Christine Parker-Graham	USA
Lily Parkinson	USA
Chris Payne	USA
Melanie Peel	USA
Sarah Pellett	United Kingdom
Ayanna Phillips Savage	United States
Maximilian Polyak	United States
Jena Questen	USA
Eva Quijano Cardé	USA
Janis Raines	USA
Atisara Rangsichol	Thailand
Zachary Ready	USA
Aimee Reed	USA

Stephen Reichley	USA
Nuno Ribeiro	Portugal
Julianne Richard	USA
Camille Richie	USA
Michelle Rivard	USA
Rifky Rizkiantino	Indonesia
Lucy Robson	United Kingdom
Patinan Rookkachard	United Arab Emirates
Justin Rosenberg	United States
Benjamin Rosenbloom	Saint Kitts and Nevis
Daniel Ruvolo	United States
Komsin Sahatrakul	United Arab Emirates
Nick Saint-Erne	USA
Sonja Saksida	Canada
Maria Eugenia Sancho Santos	United States
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 Martinez	USA
Brandon Spolander	South Africa
Heather Srch-Thaden	United States
Elizabeth St. Germaine	USA
Brittany Stevens	USA
Chairat Sumgorthong	Thailand
Win Surachetpong	Thailand
Spencer Ee Joon Tan	Australia
Tanatporn Tantiveerakul	Thailand
Gillian Taylor	South Africa
Alissa Tepedino	USA
Julius Tepper	USA
Sharon Tiberio	USA
Miranda Torkelson	USA
Norrapat Towanabut	Thailand
Aubrey Traina	United States
Alexandra Troiano	USA
Kaitlyn Upton	United States
Laura Urdes	Romania
Julian Vaillard Cerdio	Mexico
Greta Van de Sompel	Belgium
Claudia Venegas Morales	Chile
Pedro Viadanna	United States
Jelena Vukcevic	Australia
Zachary Waddington	New Zealand
Sarah Wahltinez	USA
Bridget Walker	United States
Chris Walster	UK
Lindsey Waxman	United States
Scott Weber	USA
Marcus Webster	USA
Trista Welsh	USA
Michael Wenninger	USA
Laura Whalen	USA
David Wilbur	USA
Sarah Wilson	USA
Howard Wong	Hong Kong
Sarah Wright	USA
Taylor Yaw	USA
Irene Yen	USA

COMMITTEE REPORTS

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.

Communications Committee

This Committee manages the communications among members and others involved with aquatic veterinary medicine. It oversees the e-News, Facebook, Twitter, LinkedIn and other social media accounts.
Chair: Claudia Venegas, 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

Education & Students Committee

This Committee facilitates networking between student members and helps development of educational programs and services. It is composed of three subcommittees: WebCEPD, Education Resources, and Student Support.
Chair: Bartolomeo Gorgoglione, BartGorg@msu.edu

Meetings Committee

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

Membership Committee

This Committee oversees membership issues to optimally serve members and the organization. It oversees the listservs and membership lists.
Chair: Chris Walster, Administrators@WAVMA.org

Publications Committee

This committee oversees the publication of WAVMA's quarterly journal, *The Aquatic Veterinarian*, and other occasional publications.
Chair: Nick Saint-Erne, TAVeditor@WAVMA.org

Communications Committee

Members: Chris Walster, Nick Saint-Erne, Kunda Ndashe, Claudia Venegas.
Invited Committee Chairs/Observers: Laura Urdes, Devon Dublin, David Scarfe, Stephen Reichley, Richmond Loh.

The Communications Committee held an online meeting on January 9, 2024 with the intention to reactivate the Communication Committee. It has not been active since 2019, and activities have been carried out by other committees and members. We are actively requesting volunteers from the membership to join the committee,

Devon Dublin will support the ComCom from the Fellows Advisory Council, which is now drafting WAVMA strategy, so incorporating communications strategy as well.

The Aquatic Veterinarian - TAV

Nick Saint-Erne continues to gather content for TAV each quarter. NS proposes to make a compendium from previous TAV issues to include in future issues, bringing articles on similar topics from the past issues together in future issues.

Nick suggested that the Publications Committee to become a Communications Committee subcommittee, to reach more coordination, and to assist in soliciting members to contribute to TAV.

Claudia Venegas suggested to include transcripts of the Aquadocs Blogs in the TAV. Claudia will review the MoU with Michelle Greenfield to see if this is possible, or we can have a meeting with her regarding this to include her broadcast information in TAV.

Social media

Claudia will contact Stephen Reichley, as he was looking after our Facebook page previously, and will explore whether he will be part of the Communications Committee as well.

All attendees to this meeting agreed that we need to communicate what we do and be opportune in doing this.

Claudia Venegas
WAVMA Secretary
Communications Committee Chair

COMMITTEE REPORTS

Meetings Committee

The Meetings Cmte. has begun a new initiative for 2024. In an effort to better publicize the programs and benefits of WAVMA membership, the Executive Board has approved funds for travel expenses to be used by members who are willing to provide short presentations at meetings they are already planning to attend. If you are interested in participating in this program, please contact me as soon as possible.

As of this writing, we have begun coordinating members with targeted meetings. I hope to have a more detailed itinerary of meetings in the next few months.

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

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



Fellows Advisory Council

A WAVMA Fellow is someone who has conferred on them the honorific: *WAVMA Distinguished Fellow*. The Fellows Advisory Council is composed of WAVMA Distinguished Fellows who are current WAVMA members and who wish to contribute to the development of WAVMA. The Chair of the Fellows Committee will be the Fellows Representative to the Executive Board.

WAVMA Distinguished Fellows are:

Peter Merrill (2012)
Ronald Roberts (2012)
David Scarfe (2012)
Julius Tepper (2012)
Christopher Walster (2012)
Grace Karreman (2013)
Marian McLoughlin (2013)
Dusan Palic (2013)
Mohamed Faisal (2016)
Nicholas Saint-Erne (2017)
Richmond Loh (2018)
Laura Urdes (2019)
Devon Dublin (2020)
Gregory Lewbart (2021)
Matt Metselaar (2022)
Stephen Reichley (2023)

WAVMA receives multiple requests for discounted/free membership. Currently the only mechanism to receive free membership is either as a committee chair or webinar presenter. Recently, the Fellows Advisory Council has elaborated a plan for discounted WAVMA Membership Dues to individuals who contribute to the organization. The WAVMA Regional Director will review applications from their region and provide feedback on the suitability. Their recommendation will be forwarded to the Executive Board for final approval. To maintain discounted membership on an annual basis, the applicant must agree to contribute actively through one or more of the WAVMA needs:

- Provide an article for TAV; TAVeditor@wavma.org.
- Be active on a committee (see www.wavma.org/WAVMA-Leadership)
- Provide at least two articles for the blog page or e-news. Submit via e-newseditor@wavma.org.
- Contribute other activities to WAVMA.

This program is still being refined and will be rolled out once approved by the Executive Board.

Laura Urdes, PhD DVM CertAqV
Fellows Advisory Council Chair

STUDENT COMMITTEE

WAVMA Student Chapter Guidelines

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.*

Examples of available Student Chapters programs:

- Assistance in organizing and promoting Chapter programs and activities.
- MiniGrants 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. Download the Flyer here and the application form here.
- 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. Get more information here and a Spanish version here.
- Reduced rate (50% off) WAVMA Full Membership the year after graduation.
- John L. Pitts Aquatic Veterinary Education Awards Program
- Access to the latest editions of WAVMA's quarterly journal, *The Aquatic Veterinarian*.
- Access to WAVMA member-only webpages.
- Aquatic veterinary externship and job listings.
- Participation in the WAVMA Certified Aquatic Veterinarian (CertAqV) 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.



WAVMA Student Chapters

University of Pretoria, Onderstepoort Faculty of Veterinary Science, South Africa (established 2017)

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

University of Sydney, School of Veterinary Science, Australia (established 2014)

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

Colorado State University, College of Veterinary Medicine & Biomedical Sciences, USA (est. 2019)

Cornell University, College of Veterinary Medicine, USA (established 2019)

Michigan State University, College of veterinary Medicine, USA (established 2021)

Mississippi State University, College of Veterinary Medicine, USA (established 2014)

The Ohio State University, College of Veterinary Medicine, USA (established 2018)

Oregon State University, College of Veterinary Medicine, USA (established 2017)

Ross University, School of Veterinary Medicine, St. Kitts & Nevis, West Indies (established 2015)

St. George's University, School of Veterinary Medicine, Granada, West Indies (established 2018)

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

University of California, Davis School of Veterinary Medicine, (Established 2020)

University of Georgia, College of Veterinary Medicine, USA (established 2015)

University of Illinois, College of Veterinary Medicine, USA (established 2018)

University of Pennsylvania, School of Veterinary Medicine, USA (established 2020)

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

University of Edinburgh, Royal (Dick) School of Veterinary Studies, Scotland UK (established 2020)

University of London, Royal Veterinary College, England UK (established 2021)

Ankara University, Faculty of Veterinary Medicine, Turkey (established 2022)

Makerere University College of Veterinary Medicine Animal Resources and Biosecurity (established 2022)

St. Matthew's University School of Veterinary Medicine West Bay, Cayman Islands (established 2022)

University of Bristol, Bristol Veterinary School, England (established 2023)

University of Calgary, Canada (established 2023)

STUDENT COMMITTEE

Education and Students Committee

BG illustrated WAVMA opportunities on 8 and 9 February to vet students at Kasetsart University, Bangkok, Thailand and on 12 February with a dedicated 1h talk "Get to know the WAVMA Student Chapter" to the vet students at IPB University, Bogor, Indonesia.

WebCEPD Subcommittee (Claudia Venegas)
Recent WebCEPD webinars
B-1079: "Antimicrobial resistance and alternatives to antimicrobials in aquaculture" by Dr. Farah Gonul Aydin on 25 January 2024 at 14:00 h UTC. 227 registered, 92 attended live. Moderated by Claudia Venegas and Robert Martinez.
B-1080: "Captive Husbandry and Common Illnesses of Amphibians" by Dr. Nicholas Jew on 1 March 2024 at 14:00 h UTC. 108 registered.
Confirmed 2024 subcommittee members: Claudia Venegas, Bartolomeo Gorgoglione, Chris Walster, David Scarfe, Farah Gonul Aydin, Nelly Isyagi, Ryan Nel, Heather Cameron.

Education Subcommittee (Robert Martinez)
Priority task 1: Promote and manage 1 cycle of John L. Pitts Aquatic Veterinary Education Awards Program (including seeking additional donors, selecting reviewers, and selecting people to be awarded in each category)
Priority task 2: Promote and manage 2 cycles of WAVMA Student Chapter Mini Grant (including reviewing applications and select WSC to be awarded)
Priority task 3: Disseminate the fundraising email to potential donors. The email template and list of those already contacted are available in DropBox.
Confirmed 2024 subcommittee members: Robert Martinez, David Scarfe, Victoria Kobbevik, Nurhan Ayikol, Madelyn Pitts.

Student Support Subcommittee (Maribel Escobedo Mondragón)
Priority task 1: Retrieve 2024 updates from each WAVMA Student Chapter,
Priority task 2: Organize the next Student Panel initiative (at least once in 2024)
Priority task 3: Suggest new learning opportunities for WAVMA Students and Student Chapters.
Confirmed 2024 subcommittee members: Maribel Escobedo Mondragón, Rachael Feeney, Heather Cameron, David Scarfe

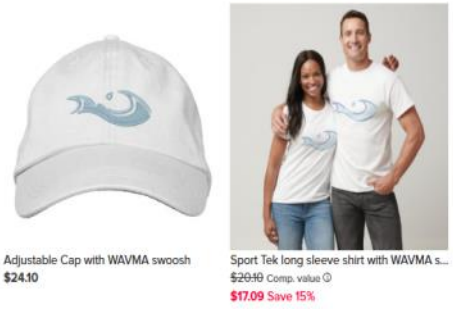
Bartolomeo Gorgoglione, DVM, MSc, PhD, CertAqV
Chair of WAVMA Education and Students Committee

Robert Martinez, DVM CertAqV
Education Resources Subcommittee leader
drrobmartinez@aquaticvetconsulting.com

A variety of items (mugs, t-shirts, hoodies, bags, etc.) are available for purchase through WAVMA's Store.

Items in the Zazzle store can be purchased in a variety of sizes, colors, and can even be customized to include your name, clinic name, or to include WAVMA Student Chapter information. For help with customization, please contact the WAVMA Administrators.





https://www.zazzle.com/store/wavma788

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

STUDENT REPORTS

John L. Pitts Aquatic Education Award Report

Prevalence and antibiotic sensitivity of *Pseudomonas aeruginosa* in fish from ponds of Chitwan, Nepal

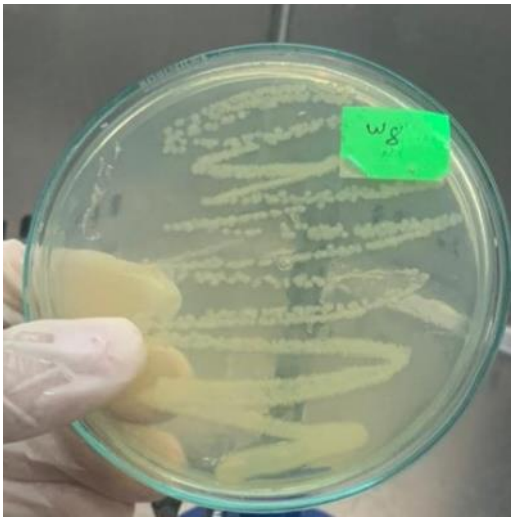
By Yashoda Khadka
B.V.Sc. and A.H. - 7th semester student
Agriculture and Forestry University (AFU),
Chitwan, Nepal

Introduction

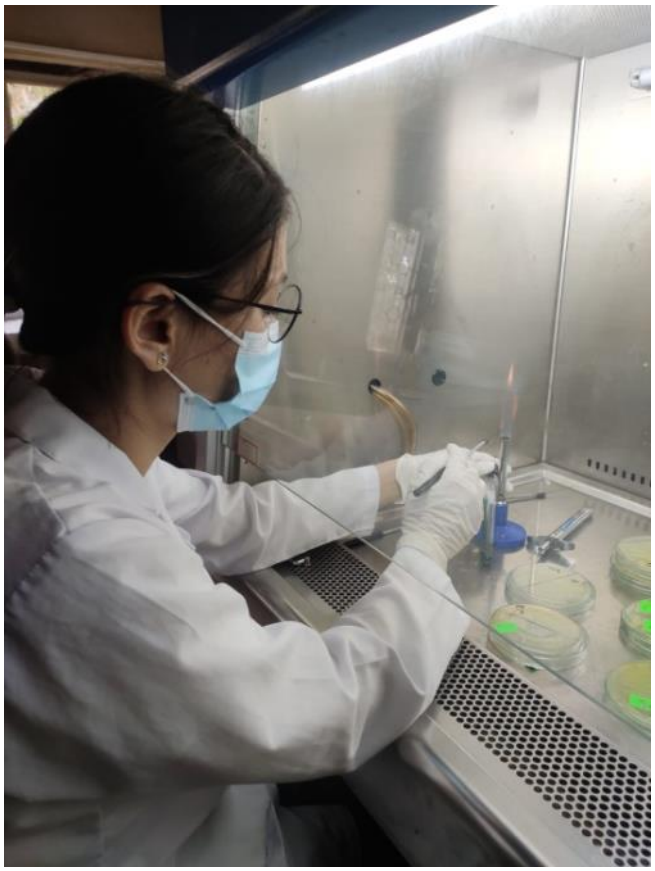
A research project was carried out from June, 2023 to November, 2023 to find out the prevalence and antibiotic sensitivity of *Pseudomonas aeruginosa* bacteria in fish from a fish farm of Chitwan district of Nepal. The research involved both the field based (collection of samples) and laboratory based work (bacterial culture, biochemical tests and antibiotic sensitivity test).

Methods and Methodology

Out of 46 registered fish farms of Chitwan, a total of 50 samples were collected (2 samples from each farm that was tested), including 25 sample that were taken from fish skin by swabbing method, and 25 water samples. The fish farms were selected randomly from different regions of Chitwan district so the samples would be representative of Chitwan district. The samples were collected inside a sample vial, kept inside an icebox, and transported to the Veterinary Microbiology Laboratory of Agriculture and Forestry University. The samples were then processed according to ISO 657:2002 protocol. It includes Non-selective Pre-enrichment (Buffered peptone water), Selective enrichment (MacConkey agar), Isolation (Cetrimide agar), Biochemical Confirmation (OF glucose test, Arginine dihydrolase test, oxidase test, Catalase test), Gram staining test, and growth at 42°C. The antibiotic sensitivity test was done by disc diffusion method following CLSL guidelines.



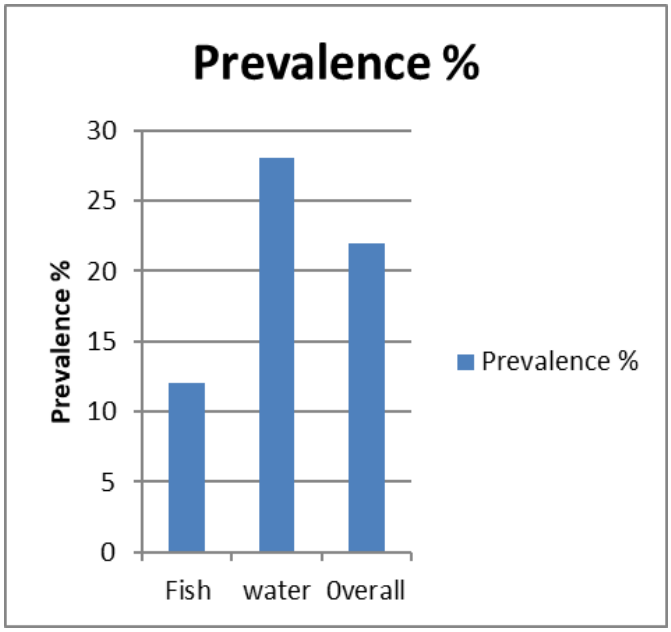
Pseudomonas aeruginosa growth in Cetrimide agar



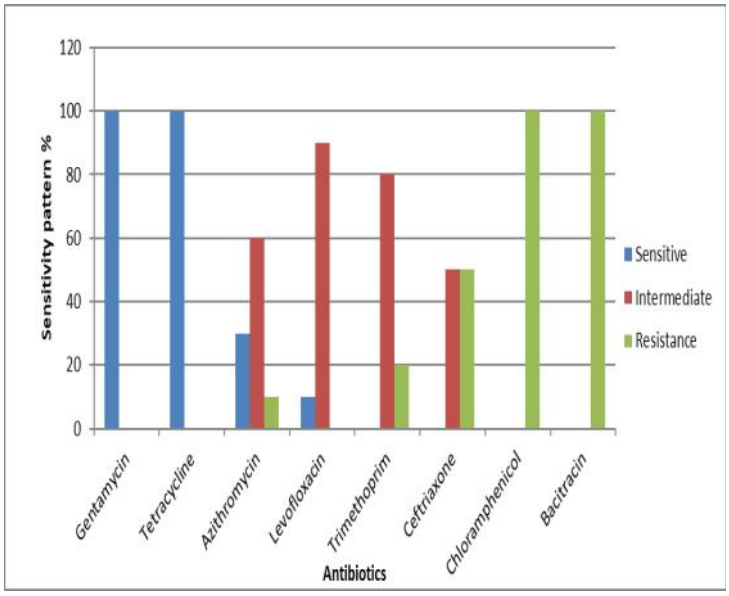
Performing biochemical tests in Biosafety Cabinet

Results

The total prevalence of *Pseudomonas aeruginosa* bacteria in the tested fish farms of Chitwan was 22%. The prevalence of *Pseudomonas aeruginosa* from the fish samples and water from the pond was 12% and 28% respectively.



There were 8 antibiotics used in the antibiotic sensitivity test; results were that the bacteria were 100% sensitive to gentamycin and tetracycline and were 100% resistant to the antibiotics bacitracin and chloramphenicol.



Funding

This research was funded by World Aquatic Veterinary Medical Association (WAVMA) through the John L. Pitts Aquatic Veterinary Education Award Grant 2023. I would like to thank the organization for providing this research fund opportunity.

Acknowledgement

I am highly grateful to Prof. Dilip Kumar Jha, Prof. Hom Bahadur Basnet, Associate Prof. Rebanta kumar Bhattarai, Dr. Shiva Bhusal, and Dr. Swechha Khanal for providing their unwavering support and guidance to complete this research successfully. I would like to thank Mr. Prabin Pokharel, Ms. Sonia Thapa, Ms. Susma Thapa, Ms. Aarati Sigdel, Ms. Sunima Roka Magar, and Mr. Madhav Kafle for their kind help and co-operation during the research period.



CSU WAVMA STUDENT CHAPTER TOUR IN BELLVUE-WATSON HATCHERY THIS PAST SPRING



By Rachel Fost
CSU WAVMA Student Chapter President

This past fall our WAVMA student chapter had the pleasure of touring the Bellvue-Watson lake fish hatchery. During our tour, students were able to learn more about common aquaculture diseases and the process of raising trout for stocking Colorado's lakes.

The tour was led by Dr. Colby Wells, a veterinarian for Colorado Parks and Wildlife, who was able to share her experience as a wildlife veterinarian and her job overseeing fish health at the hatchery. Students were able to observe each stage in the aquaculture process and learn more about the requirements of each stage (eggs, juveniles, yearlings, and adult fish).

Staff at the hatchery shared past and current research projects employed for breeding strategies, including breeding whirling-disease resistant trout. At the conclusion of the tour, students were led by CPW veterinarians in a fish necropsy wet lab. During this lab, students learned the appropriate way to euthanize fish for necropsy and were able to practice skin scrapes and gill clips.

After samples were taken, CPW veterinarians walked students through histologic and cytologic evaluation of samples under the microscope. Overall, the hatchery tour was a fantastic opportunity and well-rounded experience for our club chapter to gain hands-on skills and practical knowledge through our local hatchery and aquaculture facilities.







COLLEAGUE'S CONNECTION

Meet Dr. Paul Manesis, BSc MVB CertAqV
Fish & Bee Mobile Veterinary Services



Hello everyone, my name is Paul Manesis, and I was recently asked to write a small piece about myself and how I got to where I am today. I grew up on the shores of New Jersey, USA and like most of you, I have kept fish since a small child and always enjoyed them. My fishkeeping hobbies included predator freshwater fish, breeding seahorses, and propagating corals. I completed an undergraduate degree from LaSalle University with an Integrated Science, Business, Technology (ISBT) major and biology minor, then a veterinary degree from University College Dublin. During veterinary school, we were never given courses on honey bees and only given a weekend's worth of fish medicine, which mainly discussed aquaculture, so I did not think much of an aquatic veterinarian or even honey bees.

After graduation, I entered the world of small animal emergency medicine and rotating internships. I loved that side of things and still kept my fishkeeping hobbies going strong. My adventures took me to practice in Canada, where eventually the government removed antibiotics from the shelves for fish and honey bees. My boss at the time, who had me managing her reef tank and seahorse tank, informed me of the news and thought I would be a good candidate to add a twist to the practice.

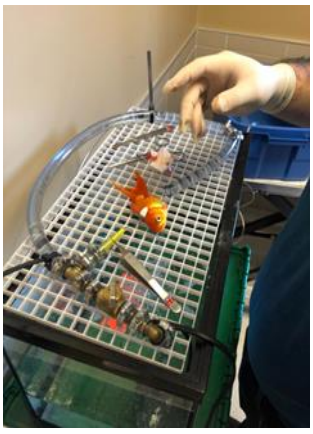


I added beekeeping to my list of hobbies and dived into as much research as I could in regard to husbandry and disease. At the same time, I took a few courses offered by Véronique Lepage in Toronto, then found WAVMA online. I eventually got in contact with Julius Tepper and Nick Saint-Erne, which led me to meeting other WAVMA members in person at WSAVA in Toronto, in 2019. This interaction gave me a glimpse of what an aquatic veterinarian's role would look like, both inside and outside of aquaculture. Aquatics was something that I had a passion for and now it looked like I could actually earn a living from something that I really enjoyed and at times can be very challenging, which is always fun. I bought and read multiple text books, numerous scientific articles and started seeing cases. After a few years, I developed a good reputation, expanding through most of Ontario, with beginner to advanced fish keepers.

Currently with regards to aquatics, I work on the pet industry side with large suppliers and wholesalers, but still help out small private fish keepers when they are in need. For honey bees, I started with small hobbyists and worked my way to become the trusted veterinarian for large scale beekeeping operations. In most recent news, being on a list of veterinarians that supply the first insect vaccine to beekeepers to prevent the devastating American Foulbrood (AFB).

My overall goal is to help the average person understand that the world of aquatic medicine and honey bee medicine is more detailed than they might think. These industries are not just about keeping a goldfish alive or only honey production. If what I learned on my own was taught to me back in veterinary school or even undergraduate school, I might not have gone in the direction that I first did. Courses similar to Dr. Sanders' *Careers in Aquatic Medicine* should be shown to students at an early stage to expose them to different career paths that they may be unaware of.

Recently, I opened up my own veterinary mobile clinic, Fish & Bee Mobile Veterinary Services, to focus more on these underserved fields in Ontario. I would like to find the time to pursue the new Board Certification but will have to set this goal further down my timeline. My advice to veterinary students and new veterinarians is to get involved and do not be afraid to ask questions. The fields of aquatic medicine and honey bees are nowhere near as researched as small animal medicine and no one has all the answers!





COLLEAGUE'S CONNECTION

Meet Dr. Robert Martinez
Aquatic Veterinary Consulting, PLLC



Dr. Robert Martinez is the owner and chief veterinarian of Aquatic Veterinary Consulting, PLLC, a mobile aquatic veterinary service primarily for fish. He is also a Certified Aquatic Veterinarian, practicing in the greater Salt Lake City, Utah area and a graduate of the College of Veterinary Medicine at Kansas State University.

INSPIRATION:
When did you first become interested in Aquatic Veterinary Medicine (AVM)?
Who were your inspirations or instructors in AVM?

I became interested in aquatic medicine during an externship that I attended at the Wildlife Safari Workshop with Dr. Benji Alcantar. During the workshop, we took a trip to Newport, Oregon to visit the Hatfield Marine Science Center. We were exposed to fish medicine by Dr. Tim Miller-Morgan. This experience was eye opening and from there I wanted and needed to learn more. My journey into the deep began and I learned to become an aquatic veterinarian attending AQUAVET I and AQUAVET III. Veterinary medicine can be stressful, and I find inspiration from other colleagues who have helped me along the way. When I graduated from veterinary school and moved to Iowa, I had no idea how I could work with fish. I was fortunate to find Dr. David Starling, and he pushed me to start my mobile aquatic business, Aquatic Veterinary Consulting, PLLC. I am also inspired by my fellow aquatic colleagues, and they how continue to further aquatic medicine. I hope that I can be an inspiration to other aquatic veterinarian and to inspire other veterinary students and veterinarians to see and work with aquatic species.

EDUCATION:
Where did you receive your Veterinary Degree?
Did your initial Veterinary training include Aquatic Veterinary Medicine classes?
What were your early resources (books, educational programs)?

I graduated from Kansas State University College of Veterinary Medicine in 2014. At K. State we received a good education on exotic animals, but unfortunately, we weren't exposed to aquatic medicine. I learned aquatic medicine from AQUAVET I and III. The education and connections made at AQUAVET are invaluable, and I highly recommend it to any veterinary student or veterinarian interested in aquatics. After AQUAVET, my main resource was the book *Fish Disease Diagnosis and Treatment* by Edward Noga, also known as the Noga book. My copy is worn, taped together, highlighted, written in, with post it note bookmarks, and of course some water damage. Now there are many new books available, but that Noga book definitely holds a special place in my heart.

EXPERIENCE:
What steps led you to your present work in AVM?
What kind of AVM are you involved in now (food fish, pet fish, research, teaching, government, aquaculture industry, public display aquarium, others)?
What were some of the interesting cases you have worked on?

I have been fortunate to have people pop up along my journey that have helped me start my mobile business. Aquatic medicine I have found doesn't have a direct route, which can be daunting, though I find other aquatic veterinarians are willing to help you out and give you guidance. Currently, I work with pet fish, the majority of my practice is with freshwater fish, be-



COLLEAGUE'S CONNECTION

ing primarily koi, goldfish, and cichlids. I have been fortunate to also consult with smaller aquariums and aquarium science/marine biology classes there I work with other marine species. Additionally, I am also venturing into aquaculture with the Utah Department of Wildlife Resources. My most interesting case was working with an electric eel. I was lucky enough to be interviewed by (now) Dr. Michelle Greenfield in her podcast Aquadocs. It was a fun case that I love to talk about and present in lectures.

OPPORTUNITIES:
What changes have you seen in the field of AQM during your career?
What advice do you have for new vets or vet students interested in AVM?
What do you predict for the future of AVM?

The change I have witnessed is the public's recent awareness of aquatic/fish veterinarians. Most owners find me or my business after doing Google searches. People have a special bond with their fish, just like owners have with our furry companion animals. They deserve the same care and treatment from their veterinarian. One of my passions is teaching students. I even seek out pre-veterinary clubs to expose students to aquatic/fish medicine, so they know this is an avenue of veterinary medicine that is out there, and I hope to inspire a future aquatic veterinarian. Now that fish medicine has a board certification (ABVP - fish practice) I feel that the field will continue to elevate to the point of other specialties, which will bring more people into the field of aquatics.

Should every veterinary practitioner have some basic knowledge about aquaculture?
What knowledge should that be? (first aid, how to euthanize a fish, other)?

I feel that veterinarians should have a good, rounded knowledge of all species. Even though we have our primary species that we work with day in and day out, it is a nice change of pace to see something new or different. I have primarily worked with fish as pet fish or publicly owned fish (aquarium, town ponds, etc.). I am starting to dip my toes into aquaculture/conservation, and I have found it to be fascinating. Lots of research has been done in aquaculture and I feel that it has made me a better fish veterinarian to my pet fish. I feel the beneficial knowledge that other aquatic veterinarians should know or be familiar with is husbandry and water quality. Most pet fish issues can be corrected by improving husbandry and understanding optimum water quality.

Robert Martinez, DVM, CertAqV
Aquatic Veterinary Consulting, PLLC
AAFV President-Elect 2024
drrobmartinez@aquaticvetconsulting.com



Monogenean trematode *Neobenedenia* found on a blue tang (*Paracanthurus hepatus*). Photo by Robert Martinez



CASE REPORT

Parasitic Larval Nematode Meningoencephalitis in a Blue Shark (*Prionace glauca*) Causing Abnormal Behavior

McCaide Wooten,[1,4] Brett DePoister,[2] John Humphrey,[3] and Robert Jones[2,5]
[1]Department of Clinical Sciences, College of Veterinary Medicine, North Carolina State University, 1060 William Moore Dr., Raleigh, NC 27607, USA;
[2]The Aquarium Vet, PO Box 2327, Moorabbin, Victoria, Australia 3189;
[3]Panaquatic, 3/814 Glenferrie Rd., Hawthorn, Victoria, Australia 3122;
[4]Current affiliation: Faculty of Veterinary Medicine, University of Calgary, 3280 Hospital Dr. NW, Calgary, AB T2N 4Z6, Canada;
[5]Corresponding author (phone: 61-416-256-605, email: rob@theaquariumvet.com)

ABSTRACT: Parasitic meningoencephalitis was diagnosed in a free-living blue shark (*Prionace glauca*) that was presented for evaluation on February 25th, 2017 after being caught in Port Phillip Bay, Victoria, Australia and transported to an aquarium, where it was euthanized. Large numbers of metazoan parasites with morphologic characteristics consistent with nematode larvae were seen on histopathological sections of the deep dermal stroma and the meninges with associated infiltration of inflammatory cells. Taxonomic identification of the parasite could not be determined, but we presume this infestation either to be an abnormal presentation, or the blue shark to be an aberrant host given the lack of similar reports. The route of infestation and the parasite life cycle were not determined.

Key Words: Blue Shark, Elasmobranch, Meningoencephalitis, Parasite, Nematode

On February 25th, 2017, a 36.7 kg, 221 cm (total body length), free-ranging, subadult to adult female blue shark (*Prionace glauca*) was caught by the Victorian Fisheries Authority in Port Phillip Bay, Victoria, Australia and transported to the SEA LIFE Melbourne Aquarium for veterinary evaluation. Presumptively, this individual animal had been seen by the public (both boaters and swimmers) abnormally swimming at the surface of the water in the Bay on many occasions for approximately two weeks prior to presentation. It was often seen in shallow water less than one meter in depth. The blue shark, although known to be a highly migratory species, is typically regarded as a pelagic shark with only vagrant movements into shallower waters (Nakano and Stevens 2008). The sighting of a blue shark within the confines of Port Phillip Bay, and especially in shallow water, is considered atypical behavior.

On presentation, the shark was in poor body condition, with decreased dorsal musculature present and a prominent pectoral girdle. There were multifocal lacerations along the dorsum and on the dorsal fin consistent with being struck by boat propellers. The lacerations appeared to be several days old, up to 1 cm deep, and were mildly inflamed. The shark was immediately sedated by immersion in a eugenol-based aquatic animal anesthetic bath (AQUI-S®, New Zealand Ltd) at a concentration of 100 mg/L with infusion of 100% oxygen by air stone. Following a brief physical examination, euthanasia was elected because the shark was in poor body condition with multiple external injuries, and the prognosis was considered guarded. Euthanasia was performed using 50 mL of pentobarbital administered intravenously via the ventral tail vein. Euthanasia was confirmed via a lack of corneal reflex and no respiration for more than 20 minutes. A necropsy was then performed.

On external examination the animal was subjectively thin, but not emaciated. Wet preparations of the skin and gills were negative for parasites on microscopic examination. Multiple platyhelminth parasites resembling cestodes were noted on the external surface of the liver. These were an uncommon incidental finding and were not associated with any gross pathological changes to the hepatic serosa. The liver itself was decreased in size, weighing 1.9 kg (5.2% total bodyweight, with less than 10% considered below normal). The stomach, small intestine, and spiral colon were completely devoid of ingesta and mucous. Wet preparations of the stomach and spiral colon mucosae were negative for parasites on microscopic examination. The spleen was unusual in shape (Fig. 1) and unlike any other elasmobranch spleen that the authors had observed at previous necropsies. It was elongated (approximately 30 cm to 40 cm in length) and consisted of multiple (100+) round lobules joined by thin strands of tissue. All other internal organs were subjectively normal on gross examination. There was an area of coagulated blood in the caudo-dorsal coelomic cavity, presumed to be secondary to the traumatic external injuries.



Figure 1 – Spleen of blue shark (Prionace glauca) showing elongated and lobulated structure.

CASE REPORT

Sections of skeletal muscle, liver, gill, integument, brain, spleen, heart, kidney, small intestine, spiral colon, oviduct, stomach, and thyroid were preserved in 10% neutral-buffered formalin and submitted to Gribbles Veterinary Laboratory (Clayton, Victoria, Australia) for processing and Hematoxylin and Eosin (H&E) staining. Examination of one section of integument showed extensive invasion of the deep stromal layer by metazoan larvae morphologically consistent with nematode larvae with several coinciding regions of intense focal necrosis (Fig. 2). A section of brain revealed a moderate to severe inflammatory cell infiltration at the meningeal surface. Multiple regions of the meningeal surface were colonized with aggregates of metazoan parasites resembling those also seen in the section of integument (Figs. 3 and 4).

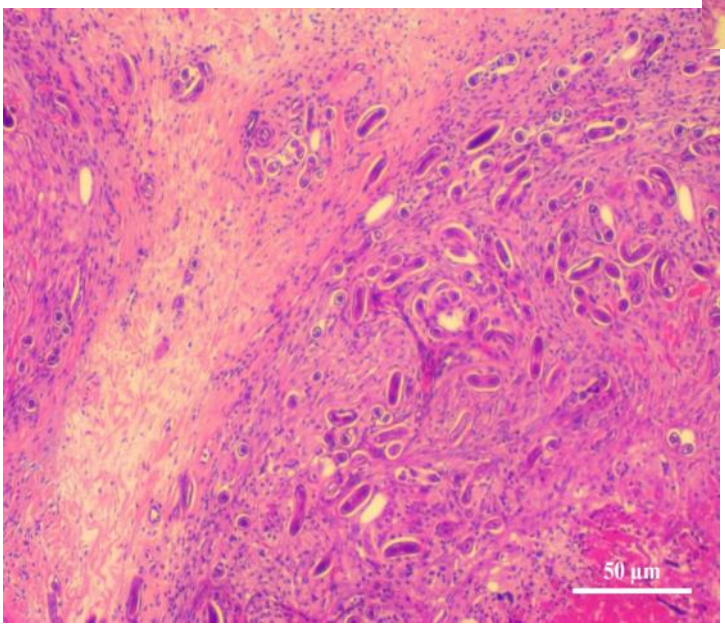


Figure 2 - Section of blue shark (Prionace glauca) integument with extensive invasion of the deep stromal layer by metazoan larvae morphologically consistent with nematode larvae with a region of intense focal necrosis in the lower right corner. Magnification x 40, H&E stain.

The brain tissue underlying these areas appeared normal, but an underlying gliosis could not be ruled out. Two sections of kidney showed sharply demarcated, poorly encapsulated, elongate to ovoid regions of variably necrotic tissue and large numbers of ovoid bodies resembling metazoan eggs (Fig. 5). Given the lack of metazoan larvae, we presumed this finding to be unrelated to larvae seen in the dermis and brain. The spleen was normal on histology, which indicates that the unique morphology is normal for this species. The liver had extensive areas of hepatocytes that were devoid of lipid, as well as numerous pigmented macrophages, suggesting prolonged inanition.

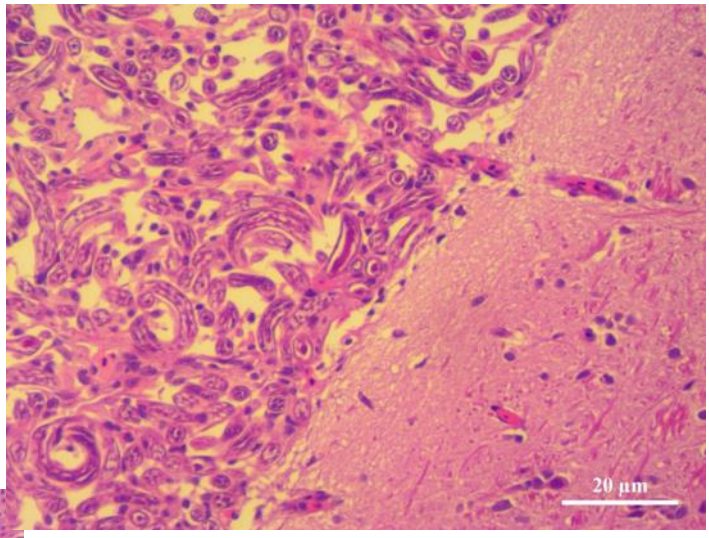


Figure 3 – Blue shark (Prionace glauca) meningeal surface colonized with aggregates of metazoan parasites morphologically consistent with nematode larvae. Brain tissue underlying these areas appeared normal. Magnification x 100, H&E stain.

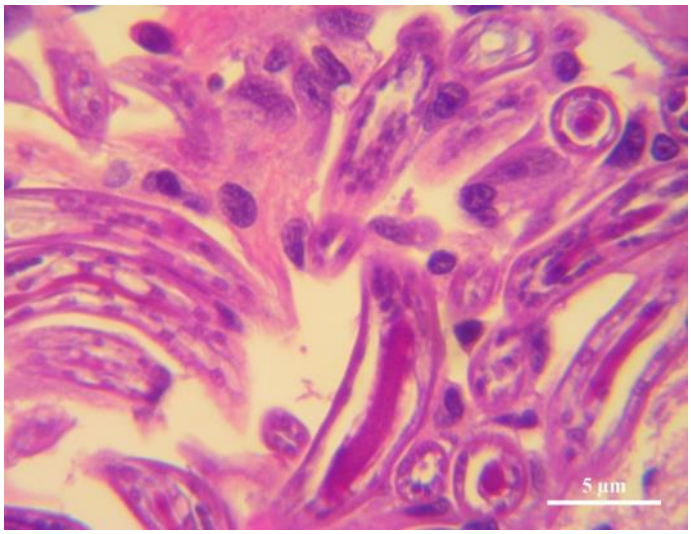


Figure 4 – Higher magnification of the metazoan parasites from Fig 3. Magnification x 400, H&E stain.

Parasitism in wild-caught elasmobranchs is a common finding (Cheung 1993) and is not uncommon in aquariums (Garner 2013). However, there are few reports of nematode-associated neurologic disease. One report identified a population of seven wild-caught nurse sharks (*Ginglymostoma cirratum*) that were uniformly parasitized by an unidentified nematode larvae (Credille *et al*. 1993). Similar to this case, the brain lesions were characterized by multifocal areas of larval aggregation and inflammatory cell infiltration within the meninges. Also paralleled was the presence of identical larval cysts in other areas of the body (endocardium, connective tissues).

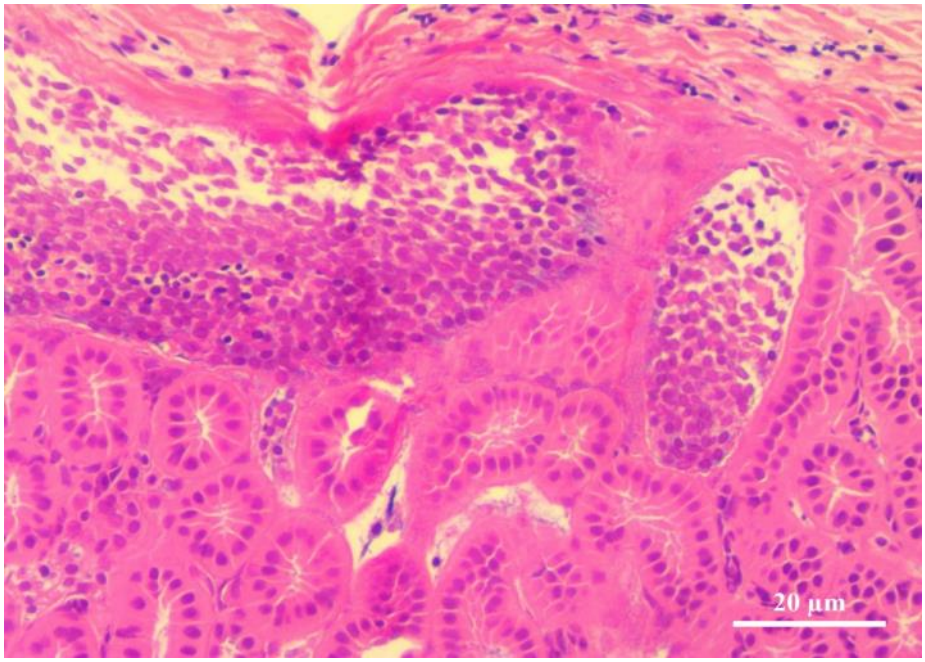


Figure 5 – Blue shark (Prionace glauca) kidney with sharply demarcated, poorly encapsulated, elongate to ovoid regions of variably necrotic tissue and large numbers of ovoid bodies resembling metazoan eggs. Magnification x 100, H&E stain.

Interestingly, none of the sharks showed abnormal behavior as was seen in this case, but it was suggested the lesions could have predisposed the studied animals to capture. Infection by a Dracunculoid species, most likely *Lockenloia sanguinis*, was proposed (Credille *et al*. 1993) given similar morphologic characteristics and point of anatomical isolation (endocardium) of larvae as had previously been described in a nurse shark (Adamson and Caira 1991).

The life cycles of nematodes that infect elasmobranchs remain largely undescribed (Benz and Bullard 2004). Dracunculoid parasitism in fishes, in particular, is in need of further characterization in terms of taxonomic organization, pathogenic capability, and life cycle description (Moravec 2004). However, it is well-documented that the majority of nematode taxa, including the Dracunculoidea, found to parasitize fish utilize indirect life cycles, involving one or more intermediate and/or paratenic hosts (Molnár *et al*. 2006). Given the findings of larval presence in multiple tissues without gross or histological evidence for direct larval migration, we propose a hematogenous route of meningeal deposition originating from the dermal infection. It is unclear whether this mechanism of parasite migration is normal for this parasite in this host. With the significant histologic changes in the brain, we propose that this caused a consequential behavioral change in this blue shark.

The authors give their thanks for the assistance of Samuel Fawke, Damian Natale, and Lochie McKenzie in the examination, euthanasia, and necropsy of the animal, and the Victorian Fisheries Authority for animal capture and transport. We also thank the SEA LIFE Melbourne Aquarium for the use of their facility for the management of this case.

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AQUARIUM REPORT

SEA LIFE London Aquarium

On a recent trip to London, I had the opportunity to visit the SEA LIFE London Aquarium, which is one of the 45 SEA LIFE Aquariums around the globe (https://www.visitsealife.com/). The SEA LIFE London Aquarium is located on the south bank of the river Thames, within the County Hall building. It is situated right next to the London Eye, just over Westminster Bridge from Big Ben and The Houses of Parliament.

The trip through the aquarium take one through multiple floors on ramps winding around the central aquarium. The aquarium is divided into 14 sections, including the central shark tank that one walks around and inside through an acrylic tunnel. It has exhibits from the Atlantic and Pacific Oceans, coral reefs, rainforests, penguins from Antarctica, and sea jellies.





Atlantic Ocean Exhibit



Archerfish (*Toxotes jacalatrix*)



Panther Grouper (*Cromileptes antivelis*)



South American Freshwater system

AQUARIUM REPORT









Big Belly Seahorses (*Hippocampus abdominalis*)



Pacu (*Colossoma macropomum*) from the Amazon River basin in South America. Juveniles of these massive fish used to be commonly sold in aquarium stores for home aquariums!

Clownfish in a Pacific Coral Reef tank



Japanese Sea Nettle (*Chrysaora pacifica*)

SEA LIFE London
County Hall
Westminster Bridge Road
London, SE1 7PB
Open from 9:30 AM to 7:00 PM
https://www.visitsealife.com/london/

Photos by Nick Sait-Erne, DVM, CertAqV

LITERATURE REVIEW

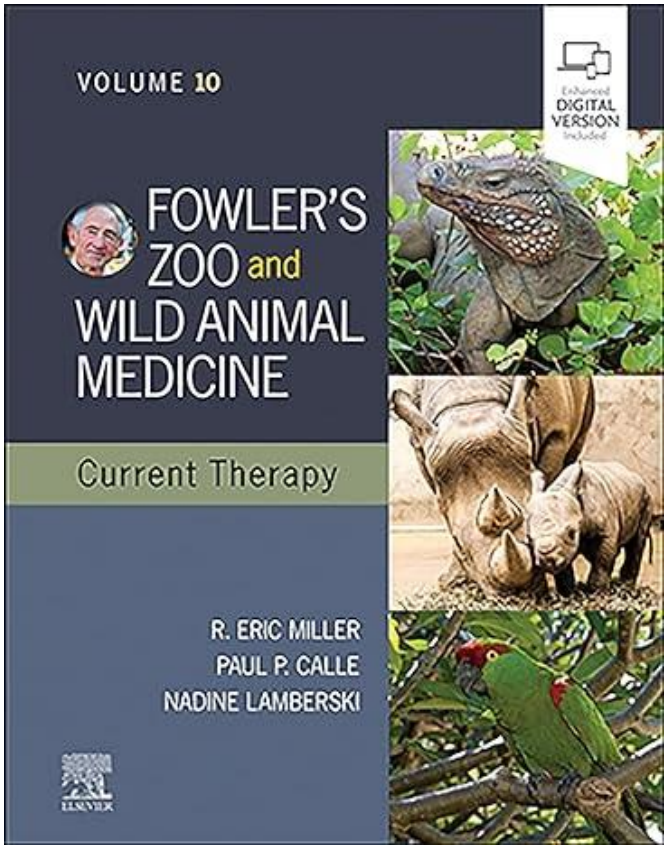
Book Review: Part 5
***Fowler's Zoo and Wild Animal Medicine*;**
10 Volumes
Reviewed by Nick Saint-Erne, DVM, CertAqV

Volume 10:

Continuing the book reviews [see the previous reviews in *The Aquatic Veterinarian* Volume 15 (1-4), 2021] regarding aquatic animal medicine information that is contained in the book series *Zoo and Wild Animal Medicine*, originally edited by Dr. Murray Fowler, here is a review of Volume 10. This volume is edited by veterinarians R. Eric Miller, Paul P. Calle, and Nadine Lamberski. It was published in 2023 and the hardback book also includes a digital eBook version, providing a fully searchable version of the entire text and access to all its figures and references. It is available from Elsevier for $201.99 USD, or Amazon for $131. There are 177 contributing authors to this edition, representing 26 countries. All proceeds from the book go to support the zoo, aquarium, and wildlife health and conservation work of the Morris Animal Foundation's Wildlife Health Fund and the American Association of Zoo Veterinarian's Wild Animal Health Fund.

This edition is in the Current Therapy format, as were Volumes 3, 4, 6, 7, and 9. It is divided into nineteen sections, including the first eight sections that contain general articles on Veterinary Professional Activities (Leadership; Diversity, Equity, and Inclusion; Training; and Standardized Data and Analytics), Conservation, One Health, Emerging Diseases, Zoo Health Management, Animal Welfare, Diagnostics and Therapeutics, and Anesthesia; and then eleven sections on specific animal groups: Invertebrates, Aquatics, Amphibians, Reptiles, Avian, Marine Mammals, Ungulates, Elephants, Primates, Small Mammals, and Carnivores. Each chapter ends with a list of cited references. There are 810 pages in the book, plus 21 pages in the front piece. There are no appendices, and the index is 12 pages long. The word *fish* in the index is referred only to page 327, where it describes cardiopulmonary resuscitation methods (Chapter 49) in fish. However, it should at least also include pages 389-393 where Roy Yanong has Chapter 58 Fish Medicine Updates.

The Section 9 Invertebrates contains three chapters: 55 Coral Diseases (6 pages long), 56 Honey Bees (5 pages), and 57 *Partula* Snail Medicine (5 pages). Chapter 55 Coral Diseases (pages 369-374) discusses causes of damage to corals (Phylum Cnidaria) in the oceans. Changes in water temperature, irradiance, salinity extremes, sedimentation, acidification, infectious diseases, and contact with oils, sunscreens, herbicides, heavy metals, or other pollutants are some of the causes of more than 40 diseases that have been reported in coral reefs. Increase in sea temperatures above 25°C has enhanced the growth of *Vibrio* bacteria that has induced bleaching of corals, or caused yellow blotching. Thermal induced fungal diseases have also caused mortalities in corals. Parasitic digenean trematodes, copepods, and ciliated protozoa can also cause coral erosion or disease. Molecular diagnosis using PCR tests are more reliable than cultures since not all pathogens are able to be grown in cultures. A table on pages 371-372 lists frequent types of lesions found in corals and their possible causes.



Chapter 55 *Partula* Snail Medicine (pages 381-385) describes care for the endangered Polynesian tree snails (Genera *Partula* and *Samoana*, Family Partulidae, Phylum Mollusca) that are being preyed upon by the introduced Rosy Wolf Snail (*Euglandina rosea*) in their native habitat of the French Polynesian Islands in the South Pacific. *Partula* snails are sensitive to environmental changes and must be kept in stable temperatures of 20-24°C and humidity of 60-80%. Captive husbandry has been successful and has reintroduced these snails back into their native habitats. *Partula* snails have been diagnosed with microsporidian parasites, flagellated and ciliated protozoa, nematodes, and bacterial infections.

Section 10 Aquatics (pages 387-408) contains three chapters: 58 Fish Medicine Updates, 59 Antibiotic Resistance in Public Aquariums, and 60 Harmful Algae Blooms. Chapter 58 (pages 389-393) summarizes emerging infectious diseases associated with Megalocytoviruses, Betanodaviruses, Tilapia Lake Virus, Clownfish Picornavirus, Tetra microsporidiosis (*Fusasporis stethaprioni*), and two species of *Erysipelothrix* bacteria that have been implicated in food and aquarium fish disease outbreaks.

LITERATURE REVIEW

One interesting note was to disinfect fish tanks between batches of fish using 0.3% hydrogen peroxide solution (1 ml of 3% hydrogen peroxide in 9 ml of water to make a 0.3% solution) to kill the biofilm, thus reducing the risk of reinfection when adding fish back into a tank.

Chapter 59 Antibiotic Resistance in Public Aquariums (pages 395-402) highlights the importance of implementing routine bacterial culture and antimicrobial sensitivity testing to support clinical work and to provide an antibiotic resistance assessment. Mutation in the bacteria's genomes, or acquisition of foreign DNA material containing Antimicrobial Resistance (AMR) genes through horizontal gene transfer are the two main ways bacteria gain AMR. Table 59.2 on page 397 lists antimicrobial drugs classed by human health risk if bacteria develop resistance to that drug due to over-use in animals. Drugs in Groups A and B should be avoided for use in animals due to their importance for use in human medicine. These drugs include Rifampicin, third generation Cephalosporins, Quinolones, Fluoroquinolones, and Polymyxin B. Drugs in Groups C and D should be used with caution and include Cephalexin, Chloramphenicol, Florfenicol, Aminoglycosides, Metronidazole, Nitrofurantoin, Sulfonamides and Tetracyclines.

Chapter 60 Harmful Algae Blooms (pages 403 -408) discusses toxins produced by certain algae and cyanobacteria that can adversely affect human and animal health. Clinical signs in animals that ingest or reside in contaminated water may include dermal or gastrointestinal irritation, neurologic disease, respiratory effects, hepatotoxicity, and death. Table 60.1 (page 404) lists 32 species of Cyanobacteria capable of producing toxins in freshwater.

Section 11 Amphibians (pages 409-429) includes three chapters: 61 Updates on Amphibian Chytrid Fungus, 62 Medical Aspects of Mountain Yellow-Legged Frog Reintroductions, and 63 Noninvasive Imaging Techniques in Amphibian Medicine. Chapter 61 Updates on Amphibian Chytrid Fungus (pages 411-415) discusses the *Batrachochytrium dentrobatidis* (Bd) fungus that has been linked to the global decline of amphibian populations since it was first identified in 1998. In 2013, an additional fungus that infects amphibians, *B. salmandrivorans* (Bsal) was discovered. These fungi infect the epidermal cells of amphibian skin, leading to impaired vital skin functions, including electrolyte and fluid homeostasis, gas exchange, and pathogen barrier. *Batrachochytrium* fungus is diagnosed by PCR testing and histopathology. Options for treatment are listed on Table 61.1 (page 413).

Chapter 62 (pages 417-421) discusses the Mountain Yellow-Legged Frog that resides in the Sierra Mountains of California, USA and that has disappeared from most of their range due to predation by introduced fish and the infection of Bd fungus. Captive breeding and rearing at the San Francisco Zoo have been successful in releasing the two *Rana* species back into the wild. Husbandry and disease control are explained in this chapter, including treatment of cloacal prolapses. Chapter 63 (pages 423-429) reviews the use of radiology, sonography, computed tomography, and elastography for noninvasive imaging of amphibians.

Section 12 Reptiles (pages 431-457) includes Chapters 64 Snake Implant Techniques and Safety (pages 433-439); 65 Emerging Infectious Diseases of Reptiles (pages 441-446), which briefly mentions an invasive fungus named *Emydomyces testavorans* that has recently been described in aquatic chelonians associated with ulcerative dermatitis, necrotizing osteomyelitis, and dermal inclusion cysts; 66nNew methods of Reptile Health Assessment (pages 447-450); 67 Veterinary Management of European Pond Turtle Reintroductions (pages 451-457), which describes the European pond turtle's (*Emys orbiclaris*) reintroduction into Alsace in the northeast of France in 2013. This chapter details the husbandry methods, including egg harvesting, incubation, feeding, genetic surveys, and post-release individual monitoring. As of 2020, 362 European pond turtles have been released into the wild.

Section 13 Avian (pages 459-543) has twelve chapters. Aquatic birds are included in Chapter 69 Pelican Health (pages 467-474) and Chapter 77 Infectious Diseases of Antarctic Penguins (pages 523-528). This chapter includes Table 77.1 Extant Penguin Species (Class Aves, Order Sphenisciformes, Family Spheniscidae) that lists the 18 penguin species by scientific and common names, where they are found, and their IUCN endangered classification.

Section 14 Marine Mammals (pages 545-593) contains six chapters: 80 Dugong Medicine (pages 547-555) 81 Oral Health in Marine Mammals (pages 557-564) 82 Dolphin Nephrolithiasis (pages 565-571) 83 Marine Brucellosis (pages 573-579) 84 What Can Be Learned from Marine Mammal Strandings? (pages 581-585) 85 Large Whale Euthanasia and Necropsy (pages 587-593).

The last five sections cover terrestrial animals: Section 15 Ungulates (pages 595-647), 16 Elephants (pages 649-666), 17 Primates (pages 667-694), 18 Small Mammals (pages 695-743), and 19 Carnivores (pages 745-796). This last section includes Chapter 107 about polar bear (*Ursus maritimus*) conservation (pages 769-771).

As with the previous tomes in this tremendous compendium, it has much valuable information for veterinarians working in zoological parks or aquariums, and is helpful for clinical applications on the many species covered in each volume. Someday it might be possible to obtain volumes of ALL the chapters related to a specific type of animal in a single book. For example, all of the Fish chapters from the ten volumes as *The Fish Compendium*, or all of the elephant information compiled into *The Elephant Manual*. Then a reader can get just the information they need!

GRAND ROUNDS CASE

Questions & Answers from the WAVMA Listserv
(WAVMA_Members-L@wavma.org)

Tank Buster Trauma

Hi All,

Most of the fish I work with fall under monsters or “tank busters” in home aquariums. I often see large fish that flip out of the tank, or crash into the sides of their enclosure, e.g. arowana, African tigerfish, etc. These fish tend to end up floating upside down or at the bottom of the tank upside down. I have been largely unsuccessful in recovering these big guys.

Can anyone share strategies that have worked for them?
Thanks,

Michael Charney
Murray Hill Veterinary Associates

Hi Michael,

Do you have the ability to radiograph these big guys? I’ve had a few cases that sound similar to yours, and ended up being diagnosed with spinal fractures and euthanized.

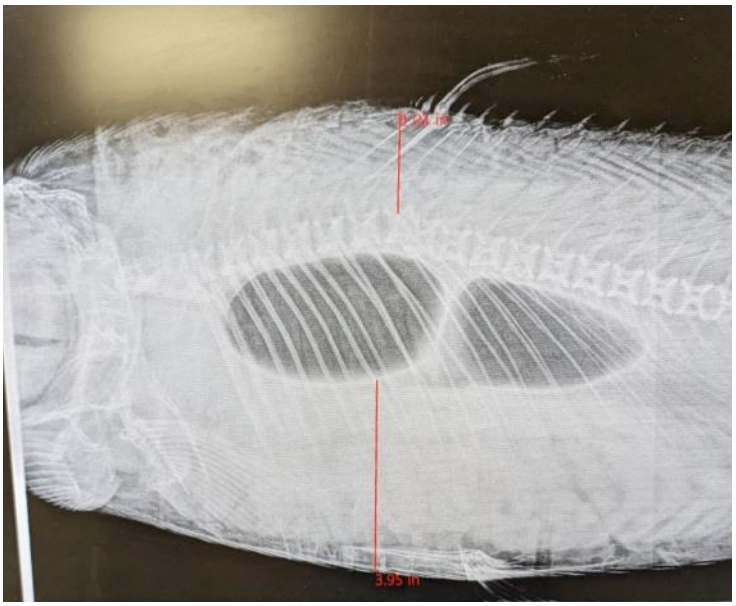
Ashley Emanuele, DVM CertAqV
Oak City Aquatics Mobile Veterinary Service
www.oakcityaquaticsvet.com

Traumatic injuries often cause spinal lesions in big fish. It is not uncommon to see koi with deviated spines. Koi can become aggressive jumpers when spawning. Spinal damage can also occur from Vitamin C deficiency in the diet, electric current in the water from faulty wiring or lightning strike, or overdose of organophosphates in the water. Many of these fish will survive long term, even with spinal deformities.

Nick Saint-Erne, DVM, CertAqV

Photograph of a koi with spinal deviation causing it to look like it has a swollen coelom. Photo by Nick Saint-Erne





Radiograph of a koi with a suspected swollen coelom. The radiograph shows a spinal separation at the end of the upper red line. The caudal portion of the spine overlaps laterally the cranial portion. This would cause the body to be deviated and can be mistaken as an abdominal swelling. Image by Dr. Stephanie Lamb, Arizona Exotic Animal Hospital.

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MEETINGS OF INTEREST TO AQUATIC VETERINARIANS

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

WAVMA Resources for CertAqV and CertAqVN/T
www.wavma.org/WebCEPD
Resource: one hour Webinars on various topics
Cost: Available for free to WAVMA Members.
KSE Credit: Stated for each webinar. To gain the CEPD certificate you need to complete a short quiz.
Evidence: Submission of Certificate with KSE record.

www.wavma.org/video-library
Resource: Video recordings deemed of good quality but not part of WebCEPD
Cost: Free to WAVMA members
KSE Credit: Variable,
Comments: One of WAVMA's primary aims is to promote aquatic veterinary medicine. There are other resources WAVMA provides such as The Aquatic veterinarian, member listservs, e-news and blog.

Aquadocs
www.aquadocspodcast.com
Resource: Various discussion topics
Cost: Free
KSE Credit: Dependent on time and topic
Evidence: None. Discuss with mentor
Comments: Lots of information on various topics.



Aquaculture Conferences & Exhibitions in 2024

ASIAN PACIFIC AQUACULTURE 2024 – **APA24**
Surabaya, Indonesia – July 2-5, 2024.
Aquaculture – Driving the Blue Economy is the theme of the conference. Asian Pacific Aquaculture 2024 will be the next chance for the international aquaculture community to visit Indonesia and see the rapidly expanding aquaculture industry in Indonesia – nearly 20% increase in the last 5 years in hectares in aquaculture production, and over 50% per year increase in tons produced every year for the last 10 years! More info at: www.was.org.

AQUA 2024, the combined European and World Aquaculture Societies' events, will take place from **August 26-30 in Copenhagen**. It will comprise a scientific conference, trade exhibition, industry forums, workshops, student events and receptions. The theme of AQUA 2024 is BLUE FOOD, GREEN SOLUTIONS. More information at www.WAS.org and www.aquaeas.org websites.

LATIN AMERICA & CARIBBEAN AQUACULTURE
Medellin, Colombia – Sept. 24-27, 2024.
Colombia has a wide hydroclimatic diversity and geographical, which has favored the development of the aquaculture, thus counting on production of species both warm waters and cold waters mainly In freshwater, mariculture is still an area for develop and strengthen. The largest species production are both red and Nilotic Tilapia, Cachama, rainbow trout and native species. Aquaculture in Colombia has been growing at a rate of close to 10% per year, this is how it has reached production of about 204,000 tons in the year 2022. The conference will be held in three languages for spoken and written materials. The conference will include all major aquatic species cultured in Colombia and the other LACC countries with a special focus on tilapia, trout, shrimp and marine species. More information on www.was.org.

AQUACULTURE AFRICA 2024 – **AFRAQ24**
Hammamet, Tunisia – November 19-22, 2024.
Tunisia is the second biggest aquaculture producer country in North Africa region, after Egypt, and is looking forward to expanding the sector owing to the competitive advantages on its blue economy domain.
Africa to European aquaculture actors.
Submit your abstract and block you booth at the AFRAQ24 Exhibition.

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AQUATIC VETERINARY CE & PD





The March 2024 issue of *Fish Farmer* magazine is available for free download at:

https://issuu.com/fishfarmermagazine/docs/fish_farmer_march_24_-_l?fr=xKAE9_zU1NQ



E-lasmo Conference 2024

The Aquarium Vet is delighted to be hosting the fifth E-lasmo Conference the week commencing Monday June 10th, 2024. This is the only conference in the world that is solely dedicated to elasmobranchs under human care in aquariums and zoos. The E-lasmo Conference 2024 will be held virtually with four hours of presentations each day.

To attend, an early bird registration is now available until the end of April 2024. To register for The Aquarium Vet E-lasmo Conference 2024, please go to https://www.theaquariumvet.com/store/

The entire E-lasmo Conference 2024 will be recorded and available afterwards to all attendees (in case you miss a session). Closer to the conference time the agenda will be posted.

All presenters receive free registration to the entire E-lasmo Conference 2024. If you are interested in presenting at the E-lasmo Conference 2024, please contact us at rob@theaquariumvet.com.

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