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The



quatic

eterinarian



Journal of the World Aquatic Veterinary Medical Association

WHO ARE WE**MISSION**

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

OBJECTIVES

- A. To serve aquatic veterinary medicine practitioners by developing programs to support and promote our members, and the aquatic species and industries that they serve;
- B. To be an advocate for, develop guidance on, and promote the advancement of aquatic animal medicine within the veterinary profession and with associated industries, governments, non-governmental entities and members of the public;
- C. To develop and implement aquatic veterinary education programs, certifications and publications, including a credentialing process to recognize day-one competency in aquatic animal medicine;
- D. To foster and strengthen greater interactions among: aquatic veterinarians, related disciplines, veterinary allied and supportive groups and industries, governments and animal owners.

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

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

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Cover Photo by Nick Saint-Erne:

*Marine aquarium at LiveAquaria facility.
 See pages 18-21 for more information.*



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>

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>.

Editor’s Note

Another year has come to an end...and hopefully a new 2022 will be a blessed year for us all! The past two years have brought challenges not experienced for the last century, since the Influenza of 1919. We have been restricted in travel, employment, gatherings with families, and have encountered considerable illness and losses among our families and friends. Never the less, we make our best way through it and strive to be successful in our endeavors. It is a time to remember that we are all connected and to try always to help each other out as best as we can.

WAVMA in 2021 has started a new program, through the Education and Student Committee to revise the support for WAVMA Student Chapters at Colleges of Veterinary Medicine. WAVMA may provide funding up to US\$500 for Student Chapter activities. See the Education and Student Chapter report on pages 12-15 for more information. If you are a veterinary student - join your school WAVMA Student Chapter - and if there isn't one at your school, then help create one!

Corals seem to be a theme for this issue, as there is a report by student member Alex Hall on Treating Acropora Corals for Red Bugs on pages 16-17. There is also a report about the LiveAquaria coral production facility in Rhinelander, Wisconsin on pages 20-21. Some photos of their corals are used throughout this issue. They also have freshwater and marine fish for sale, and I couldn't resist including photos of their beautiful aquarium full of altum angelfish for the centerfold photograph.

Wishing all WAVMA Members a safe and healthy and prosperous 2022!

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

*Photo of Altum Angelfish (Pterophyllum altum)
At LiveAquaria, Rhinelander, Wisconsin.
Photo by Nick Saint-Erne*



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



You will need your WAVMA User ID and Password to access the most recent 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**

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WAVMA Members

Free 1/8 page (business card size) advertisement
Contact TAVeditor@wavma.org for information on advertising and payment options.

President's Report

WAVMA Vision for 2022

Being passed the baton of President for such an organization as WAVMA is an amazing privilege. Reflecting on the goals and aspirations of the founding members and the growth and metamorphosis of this association, as a "pikkie" (small seemingly insignificant) aquatic vet located far south at the bottom of Africa, it feels a tall order for me to measure up to. We speak down here in South Africa of "Ubuntu" (I am because we are: Zulu), of "vasbyt" (hanging in there: Afrikaans), an "Indaba" (a conference or consultation: Xhosa), "lekker" (good: Afrikaans), and "Gees" (soul: Afrikaans). All these come to mind as I think ahead to my term.

I will endeavour in 2022 to serve WAVMA to my best capacity. We have a strong foundation already laid, but each year brings new challenges and highlights new areas needing attention. It is my intention to swing the spotlight on Africa during my term. We live in an immense continent filled with many wonderful people, and very much a land rich in water, and resources. However, food security is a massive issue and many people go hungry every day.

Covid has certainly not helped the situation. Africa's aquaculture potential is large but mismatched in terms of aquatic health veterinary and diagnostic capacity and support. The need for affordable diagnostics is high, the need for basic training is high - from farmers to veterinary level, and I believe WAVMA can play a pivotal role in bringing positive change in this part of the world.

I believe reaching out can only further strengthen our association, open new doors and forge new links and relationships. Pharmaceutical stewardship and education and support of para-veterinarians within the aquatic sector are two other key areas that I feel warrant attention in the near future. And then, of course, ongoing feedback and input from our members. It is our members that bring to our attention challenges out in the field, gaps that need addressing, emerging issues and the ongoing communication and support of one another is the lifeline of our organization.

As we wind up our 2021, may you all have a wonderful festive season, some feet-up time, and time with family and friends. As WAVMA EB 2022, may our "indabas" be filled with the spirit of "ubuntu", the ability to "vasbyt" through the difficult challenges and problems, be a "lekker" year for our team and association, and, most importantly, be filled with "gees".

Dr Gillian Taylor
 WAVMA President-Elect 2021
 WAVMA President 2022
President@wavma.org

Annual General Meeting

Wednesday 22nd December 2021,
 13:00 to 14:00 UTC

Due to COVID travel restrictions, our Annual General Meeting to be held at the Aquaculture Europe Conference in Madeira, Portugal in October was canceled. Instead, WAVMA will hold a Virtual AGM.

WAVMA 2021 Executive Board Reports

- Stephen Reichley, WAVMA President - Summary of WAVMA 2020 activities
- Jena Questen, WAVMA Past President - Progress to Date and Future Directions
- Gillian Taylor, WAVMA President-Elect - Vision for 2021
- Wes Baumgartner, WAVMA Treasurer - Financial Update

WAVMA 2021 Directors Reports: Perspectives from their regions

- Nelly Isyagi, WAVMA Director for Africa and Middle East
- Claudia Venegas, WAVMA Director for Americas
- Stephen Pyecroft, WAVMA Director for Asia/Pacific
- Matt Metselaar, WAVMA Director for Europe

2021 WAVMA Fellow Announcement, by Laura Urdes, Chair of WAVMA Fellows Committee

2022 WAVMA Executive Board Elections – reminder to vote, by Stephen Reichley

Virtual Group Photo (All attendees turn cameras on for a screenshot)

Virtual Town Hall - Questions and Answers led by Jena Questen

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Secretary's Report

The elections for WAVMA Officers and Directors had one nominee for each position this year, so our 2022 Executive Board members are as follows:

President-Elect: Bartolomeo Gorgoglione

Education:

- Specialist Degree in Veterinary Medicine; University of Bari, Italy
- Master in Aquatic Veterinary Studies; University of Stirling, Scotland
- PhD in Fish Immunology; University of Aberdeen, Scotland



Treasurer: Wes Baumgartner

Education:

- Doctor of Philosophy in Veterinary Sciences; Louisiana State University, USA
- Pathology Residency in Anatomic and Surgical Pathology; Louisiana State University School of Veterinary Medicine, USA
- Diplomate, American College of Veterinary Pathologists (anatomic)
- Doctor of Veterinary Medicine, High Honors; University of Illinois, USA



Director-at-Large for Africa/Middle East: Nelly Isyagi

Education:

- Bachelor of Veterinary Medicine; Makerere University, Uganda
- MSc. Aquaculture; Wageningen University, The Netherlands
- PhD. Aquaculture; Stirling University, United Kingdom



Director-at-Large for Americas: Claudia Venegas

Education:

- Veterinarian (Médico veterinario) / Facultad de Ciencias Veterinarias y Pecuarias; Universidad de Chile, Chile
- Philosophy Doctor - Faculty of Applied Biological Sciences; Hiroshima University, Japan



Director-at-Large for Asia/Pacific: Stephen Pyecroft

Education:

- Doctorate of Philosophy; The University of Queensland, Australia
- Bachelor of Veterinary Science Post-Graduate Honours (by research); The University of Queensland, Australia
- Bachelor of Veterinary Science; The University of Queensland, Australia



Director-at-Large for Europe: Matt Metselaar

Education:

- Doctor of Veterinary Medicine at School of Veterinary Medicine; University of Utrecht, Netherlands
- Doctor of Philosophy; Institute of Aquaculture, University of Stirling, Scotland



Executive Secretary: Chris Walster

Education

- BVMS, Veterinary Medicine, Glasgow Veterinary School
- MVPH Veterinary Public Health, Glasgow Veterinary School

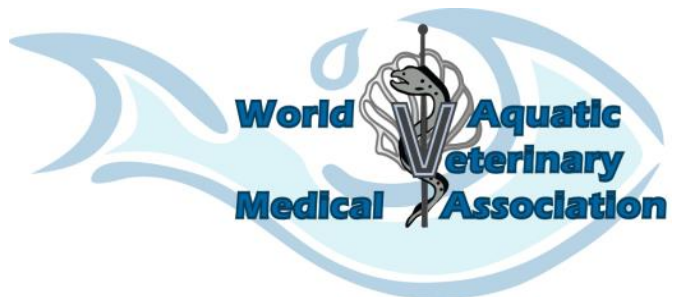


Congratulations to these members who in 2022 will join the WAVMA President Gillian Taylor and Past-President Stephen Reichley on the WAVMA Executive Board. Looking forward to an amazing year!

Morag Clinton

WAVMA Secretary

Secretary@wavma.org



Treasurer’s Report

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

New Members—Fourth Quarter 2021

Danielle Boyle	United Kingdom
Tammy Mak	United Kingdom
Matteo Zamaria	United Kingdom
Emma Mills	United Kingdom
Natalie Leong	United Kingdom
Alexandra Payne	United Kingdom
Amy Bowman	United Kingdom
David Aita	United States
Rebecca Byrd	United Kingdom
Deyi Yang	United Kingdom
Jiaying Yu	United Kingdom
Samantha Keller	United Kingdom
Thomas Juhasz	Ireland
Kaitlin May	United States
Brianna Mellen	United States
Avery Fry	United States
Cat Olson	United States
Francesc Padros	Spain
Kara Shacklette	United States
Greer Cauthen	United States
Jessica Meier	United States
Jessica Knaffl	United States
Carter Rushing	United States
Hannah Szarenski	United States
Jennifer Lewis	Saint Kitts and Nevis
Kelsey Yates	United States
Kailash Bohara	United States
Ana Griefen	United States
Sarah Strack	United States
Kristen Larson	United States
Ausrine Davies	Australia
Hunter Wojtas	United States
Nitika Sansgiry	United Kingdom
Isabella Cebberos	United States
Bethan Wainfur	United Kingdom
Cassie Seebart	United States
Maddie Barrett	United States
Maria Sanjuan	United States
Caitlyn Dedet	United Kingdom
Robyn Hawley	United States
Kim Le	United States
Lucy Fleming	United Kingdom
Francisca Samsing	Australia
Fabrizio Vitale	United Kingdom
Lacey Brown	United States
Kristen Nielsen	Australia
Ya-ying Shih	Australia
Baris CISDIK	Turkey
Alfonso Lopez	Singapore
Allison Daugherty	United States
Kristina Kaleel	United States

Kayla Amstutz United States
Stacy Kiewiet United States

Welcome to WAVMA!

Wes Baumgartner
WAVMA Treasurer
Treasurer@WAVMA.org



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. 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; 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; 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 approved expenses; 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.

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!



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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

First of all, I would like to congratulate and welcome Dr Gregory Lewbart as the Fellow for the year 2021. A well-deserved honorific title for his important contributions to advancing aquatic veterinary medicine, that are in line with WAVMA’s mission and goals.

As our 2021 project, a sub-Committee group carried out a partial revision of the by-laws early this year. A special focus was put on the description of the provisions referring to Allied Veterinary Organization, in Article II., Section 1.F., and the Advisory Council, Article V., with the aim to create the terms and definitions required to better describe the Fellows’ profile, and to consolidate the Fellows’ role, for the benefit of WAVMA and the field of aquatic veterinary medicine. Other sections of the by laws were also reviewed by the sub-Committee group, and are to be discussed at our next Fellows meeting.

As in previous years, the Fellows Program invites nominations all year round. Applications under the Call 2021-2022 will be accepted up to the end of April 2022. All WAVMA members are welcome to nominate themselves or other distinguished colleagues. The nomination package consists of a filled nomination form, the candidate’s curriculum vitae and at least two letters of support. Self-nominations will also be accepted. Nomination forms must be submitted to FellowsChair@wavma.org. To read more about this and how to apply please click [here](#):
[https://www.wavma.org/WAVMA -Fellows](https://www.wavma.org/WAVMA-Fellows)

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

WAVMA Fellows

- 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)



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>

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

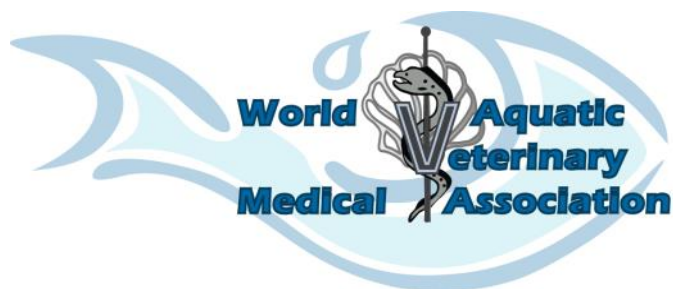
For CertAqV Program Description [Click here](#) to download, or go to WAVMA.org/CertAqV-Pgm.

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 Bjernebo	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
Michael Dutton	
Jacqueline Elliott	USA
Ashley Emanuele	USA
Azureen Erdman	USA
Antonella Fabrissin	Italy
Mohamed Faisal	USA
Erika First	USA
Lindsay Francis	
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
Alex Hall	
Katharine Haussman	USA
Orachun Hayakijkosol	Australia

Certified Aquatic Veterinarians

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Chelsea Hester	USA
Nora Hickey	USA
Karlee Hirakis	Australia
Kelsey Hoag	USA
John Howe	USA
Dr Huynh	
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
Amy Kizer	USA
Jessica Koppien-Fox	USA
Jack Kottwitz	USA
Lana Krol	USA
Diya Lake	
Elizabeth Leuchte	UK
Sarah Lietzke	USA
Jan Linkenhoker	USA
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Christine Parker-Graham	USA

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Atisara Rangsichol	Thailand
Zachary Ready	USA
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
Sonja Saksida	
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
Alissa Tepedino	
Julius Tepper	USA
Sharon Tiberio	USA
Miranda Torkelson	USA
Norrapat Towanabut	Thailand
Alexandra Troiano	
Laura Urdes	Romania
Greta Van de Sompel	Belgium
Claudia Venegas	Chile
Jelena Vukcevic	
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

Education and Students Committee

The WAVMA Education and Students Committee (ESC) has had many great accomplishments completed during this last quarter of 2021. Leading the ESC WebCEPD subcommittee, Dr. Claudia Venegas, Chile, managed to successfully hold one WebCEPD webinar each month in 2021. Leading the ESC Student Chapter Support subcommittee, Vivian Lee, USA, managed to define rules and start the Student Grant Mini Grant. Ashley Powell, USA, recently took the lead of the ESC Students and Resources subcommittee, managing to organize the student panel "A Sea of Student Opportunities 2". As a committee we updated the "WAVMA Education & Students Committee" leaflet to include more about what the committee does and information on the membership reward program.

The Student Chapter Support subcommittee has been very productive in retrieving and updating information about each WAVMA Student Chapter. New WAVMA Student Chapters are expected to be established in several universities around the world. Students from Ankara University, Turkey have completed their application to establish the first WAVMA Student Chapter in Asia. Work is in progress at other Veterinary Medicine Universities, such as at Purdue University, Indiana-USA; Makerere University, Uganda; and Prince Edward Island, Canada. We hope to inspire more schools to start new student chapters around the world and support current student chapters by having the "Guidelines for WAVMA Student Chapters" available in both English and Spanish and by preparing a new leaflet "Keeping active WAVMA Student Chapters".

In 2021 we have facilitated the establishment of new WAVMA Student Chapters at the College of Veterinary Medicine, Michigan State University, Michigan-USA, and at the Royal Veterinary College, University of London, England. Thanks to the new established Student Chapter Mini Grant, official WAVMA Student Chapters can now apply for small grants, requesting up to US\$500 to support aquatic activities at their universities; full application information is available on the WAVMA website. At the first call we received four applications, and the awardees will be communicated soon.

The ESC Students and Resources subcommittee organized the second edition of the student panel, held on 18th December with the aim to foster networking and prospecting externships and other learning opportunities for WAVMA students. Panelists included Dr. Eileen Henderson, from the San Bernardino branch of the California Animal Health and Food Safety Laboratory; Dr. Ashley Powell, an anatomic and aquatic pathology resident and PhD candidate at the University of Georgia; and Hanna Smith, a third year DVM student at Purdue University. To provide veterinary students with additional aquatic resources, the subcommittee is planning a series of wet labs for WAVMA Student

Chapters that might need help in organizing activities or do not have an aquatic veterinarian on staff. There are many great externships opportunities listed on the website, but further suggestions for worldwide educational opportunities, including externships, internships, residencies, training visits, etc., and/or student resources, are always welcomed, so please contact us.

For the first time since WAVMA was founded, the hard work of the WebCEPD ESC subcommittee allowed to provide one WebCEPD webinar on each month of 2021. High quality contributions were kindly provided by international speakers. We are grateful to all speakers for their contribution, managing to engage a considerable number of attendees during each event and generating a precious archive of lectures on the WAVMA website. During the last quarter or 2021, we hosted Prof. Ruth Zadoks, Australia on 15th September, for a webinar on "Group B Streptococcus: a killer of fish and men", moderated by Dr. Bartolomeo Gorgoglione and Vivian Lee and attended live by 53 people, with 121 registered. On 29 October, Prof Mark Fast, Canada illustrated co-infections in salmon and how they can shape fish disease management, during moderated by Dr. B. Gorgoglione and Dr. C. Venegas, attended live by 83 people live, with 253 registered. On 24th November, Prof. Francesca Carella, Italy provided a unique lecture on features and common diseases and disorders of mussels from the Mediterranean Sea. Her shellfish webinar, moderated by Dr. B. Gorgoglione and Dr. C. Venegas, was attended live by 72 people, with 158 registered. The 2021 webinar series was closed on 15th December by Prof. Mark Powell (in photograph on the right above), Norway, greatly explaining gill functions and current gill disease challenges in salmonid aquaculture. Even this webinar was moderated by Dr. B. Gorgoglione and Dr. C. Venegas, and attended live by 99 people, with 190 registered.

We continue to work on the organization of upcoming webinars, with Dr Gustavo Ramirez-Paredes, UK scheduled in January 2022 with a webinar on "The use of autogenous vaccines in aquaculture". All previous webinars are available on our website, free for all WAVMA members only, both for re-watching and to obtain CE credits after completing the knowledge and skills assessment. We invite all WAVMA members to participate in WebCEPD events, thus, to contact ESC (esc@wavma.org) if wishing to contribute by delivering a webinar reaching colleagues from all around the world.

Finally, we would like to invite more WAVMA members to actively join our vibrant committee. ESC will continue to work intensively to increase educational opportunities offered or facilitated through WAVMA to the aquatic veterinarians, students, and pathologists around the world. Our next virtual meeting will be held on 29th January 2022, so you are welcome to join us to be allocated in one of the ESC subcommittees. Your contribution will be much appreciated as we do need the support of new contributors to improve our organi-





**Marineholmen
RASLab**
Innovating the future of aquaculture



Gill disease challenges in salmonid aquaculture – more than just AGD

Dr Mark Powell
Marineholmen RASLab AS

zation capacities. If you are interested in joining ESC please contact us!

We hope to see you at our next ESC meeting and activities!

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

Dr. Darbi Jones,
Vice Chair of ESC
drjones01@vt.edu

*Photograph to right:
Dr. Darbi Jones, currently a 3rd year veterinary student at Virginia-Maryland College of Veterinary Medicine, receiving the 2020 Best Paper Award for the Journal of Aquatic Animal Health during the last American Fisheries Society meeting.*



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.

**TO SUPPORT FUTURE STUDENT
 SCHOLARSHIPS, PLEASE MAKE
 A DONATION TODAY
 TO THE SCHOLARSHIP FUND!
[WWW.WAVMA.ORG/
 SCHOLARSHIPS.](http://WWW.WAVMA.ORG/SCHOLARSHIPS)**

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)



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



**Treating *Acropora* Corals for Red Bugs
(*Tegastes acroporanus*, Humes, 1981)**

By **Alex J. Hall**
ahall7@rvc.ac.uk
4th Year Student
Royal Veterinary College, University of London

The Coral Red Bugs (*Tegastes acroporanus*) are one of the most common parasites encountered infesting *Acropora* corals in the home aquarium. This parasitic copepod can be spread on fragments of infested coral that are passed from one aquarist to another with coral fragment swaps.

Copepods of the family Tegastidae (Crustacea, Copepoda, Harpacticoida) are characterized by a laterally compressed amphipod-like body, a modified male genital area, and the nauplii possess a claw-like mandible. About 60 species belonging to 6 genera have been described, although those listed as parasitic to corals are few.

Host: *Acropora* sp. of corals

Diagnostics: Visual Inspection, Low Magnification

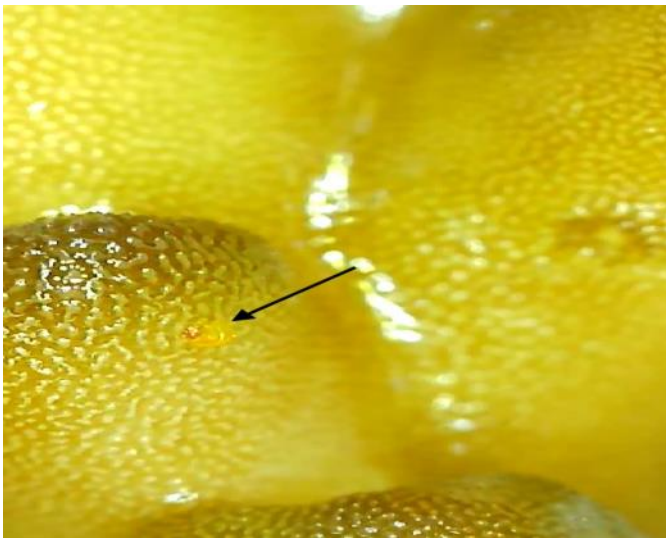


Photo above shows a red Bug (arrow) on a coral.

Left photo is a Red Bug on low magnification on a Microscope.

Treatment 1 (Old method):

Use Interceptor tablets (Milbemycin Oxime, also contains praziquantel)

Dosage:

Use 1 Large tablet (White, 23.0 mg)/ 400 gallons water

Procedure:

- 1) Grind the pill into a fine powder and mix with 40 ml of RO or DI water. Dose the solution volume to 1 tablet (23 mg) / 400 gallons of water in the aquarium. This would be 10 ml of the prepared solution per 100 gallons of water, or 1 ml per 10 gallons of water.
- 2) Pour the contents into a high flow area in the tank.
- 3) Repeat this process 1 week after the first treatment.
- 4) Repeat again 2 weeks after the second treatment.

Treatment 2 (New Method):

MilbeMite 0.1% (Milbemycin Oxime Otic Solution)

Dosage: 0.167 µg Milbemycin Oxime / Liter of water
MilbeMite comes in a 0.25 ml tube that can be applied at a rate of 1 tube/1,500 L (400 Gallons) to achieve a concentration of 0.167 µg Milbemycin Oxime/Liter (0.760 µg Milbemycin Oxime/Gallon).

Duration: Treat twice weekly for 3 weeks.

This new method has shown more promising elimination of *T. acroporanus*!

During both treatments carbon and other filtration modalities should be turned off for at least 6 hours.

HAZARDS:

Milbemycin Oxime is TOXIC to some invertebrates. Certain species of crabs, shrimp and copepods are extremely susceptible to this medication and will die during its administration. It is not recommended to treat the entire aquarium if these invertebrate species are desired, and doing so should only be done in emergencies. It is recommended, if the infestation is caught early enough, to remove the infected colonies from the main aquarium and treat via dip in a quarantine tank. If the infestation is too advanced for more conservative measures, then treating the entire tank may be necessary. Remove as many crustaceans as possible and hold them in a quarantine tank during treatment of the main fish system if treating that aquarium becomes necessary.

CAUTION:

Interceptor contains Praziquantel (an anthelmintic), this medication has the potential to kill many species of beneficial/ desirable worms, such as spaghetti worms and feather dusters.



Conclusion:

Treating a reef tank systematically will always come with risks and collateral damage. However, sometimes it is necessary to treat the entire tank for a *T. acroporanus* infestation. Please be careful when treating these unstable systems. There is always a possibility for adverse reactions and more death.

References:

A new species of Tegastes (Copepoda: Harpacticoida) associated with a scleractinian coral at Enewetak Atoll. <http://www.marinespecies.org/aphia.php?p=taxdetails&id=356041>

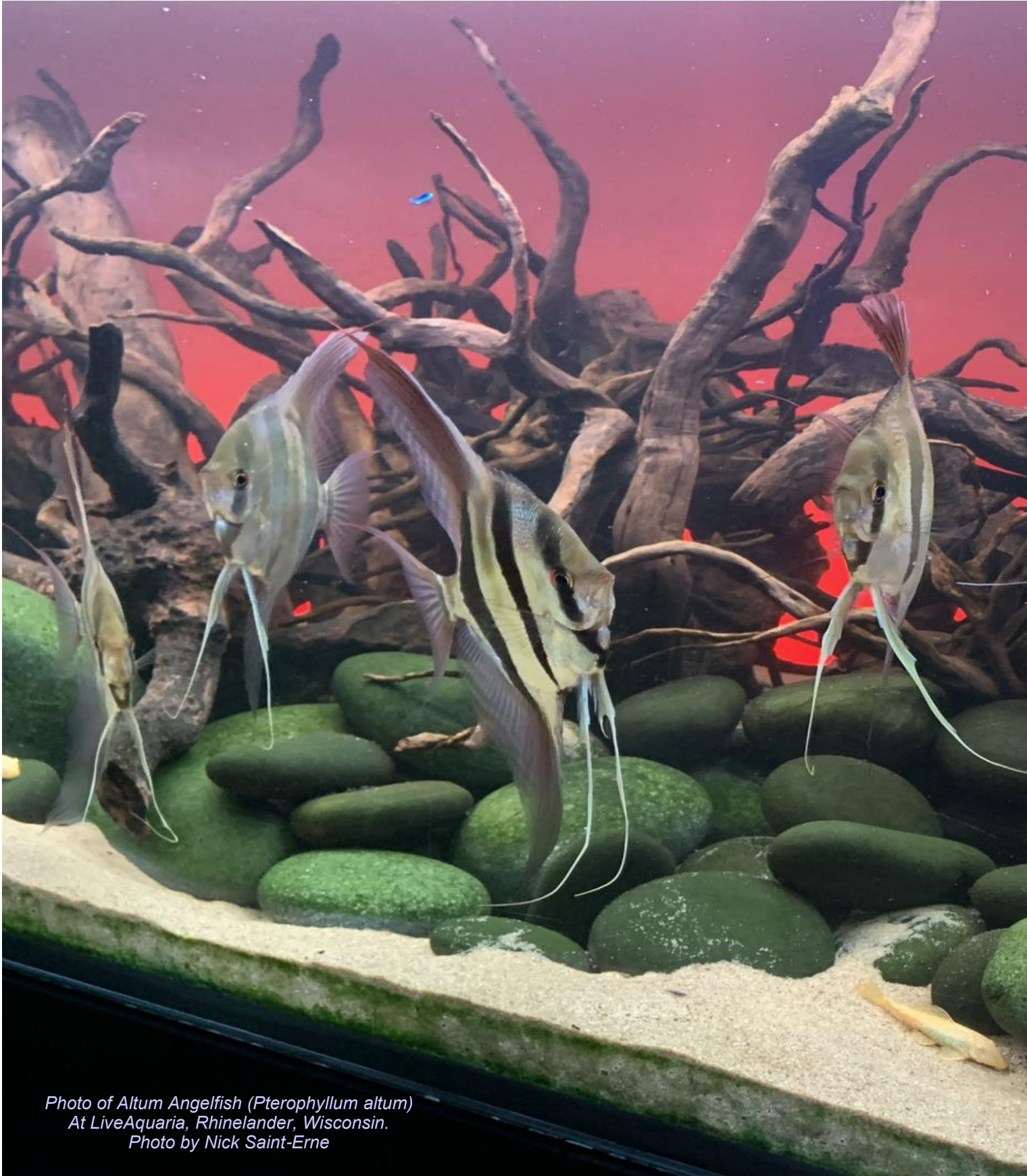
Aquarium Corals: Stony Coral Parasites: Red and Black Bugs: Identification Guide, Preventive Measures, and a Review of Treatment Protocols. <https://reefs.com/magazine/aquarium-corals-stony-coral-parasites-red-and-black-bugs-identification-guide-preventive-measures-and-a-review-of-treatment-protocols/>

Christie, B. L., & Raines, J. A. (2016). Effect of an otic milbemycin oxime formulation on *Tegastes acroporanus* infesting corals. *Journal of Aquatic Animal Health*, 28(4), 235–239. <https://doi.org/10.1080/08997659.2016.1206636>

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 in all its ginormous glory!



*Photo of Altum Angelfish (Pterophyllum altum)
At LiveAquaria, Rhinelander, Wisconsin.
Photo by Nick Saint-Erne*



Aquarium Report: *LiveAquaria*

By Nick Saint-Erne, DVM, CertAqV

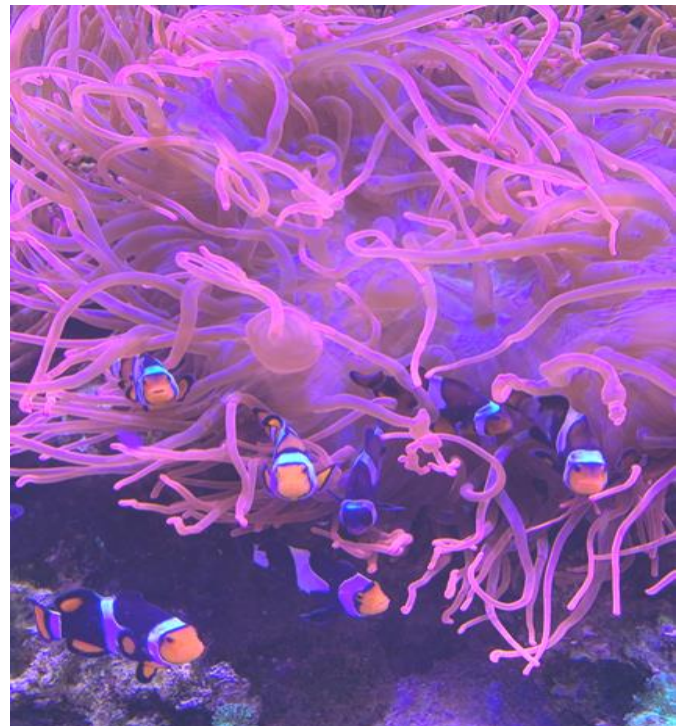
Most of the past Aquarium Reports in *The Aquatic Veterinarian* were about public aquariums and aquatic exhibits in zoos, but notable aquarium businesses that have outstanding facilities and reputations deserve recognition. Earlier this month, I had the opportunity to visit the LiveAquaria operation in Rhinelander, Wisconsin USA, where they sell directly to aquarists the marine corals propagated onsite, as well as marine and freshwater fish. This cutting-edge facility employs the most sophisticated technology in lighting, filtration, water movement, and quarantine systems to ensure the corals and fish purchased online make a safe and successful transition to the home aquariums.

Opening in July of 2005, the LiveAquaria Coral Farm & Aquatic Life Facility has become one of the nation's premier coral propagation operations. Early successes led to expansion of the facility in 2007 that more than doubled the space. Additional expansions in 2016 and 2017 added an improved marine fish quarantine system and additional freshwater fish holding systems, for a total water volume of over 30,000 gallons. The entire facility is hooked to a 130KW external Natural Gas power backup generator to ensure smooth operations year around, regardless of the wild winter weather that can happen in the chilly northern USA. The well insulated and sealed building is fed by two air handling systems that maintain humidity levels below 60%, and keep a stable temperature of 76 degrees Fahrenheit. This is perfect for the fish, and the workers.



Part of the LiveAquaria.com website features the Diver's Den® WYSIWYG Store, where individual corals pieces and fish are listed and "What You See Is What You Get" – when you purchase the item off the website you are getting the actual item that is in the photograph. What makes aquatic life available in the Diver's Den® WYSIWYG Store truly one-of-a-kind is the 5-point acclimation, stress reduction, disease prevention, quarantine, and conditioning protocols that are employed under the strict supervision of the dedicated LiveAquaria professionals. To see the tropical fish, corals, clams and other invertebrates offered for sale online at the Diver's Den® WYSIWYG Store (liveaquaria.com) go to:

<https://www.liveaquaria.com/divers-den>.



Live Aquaria Facility Overview

Water Storage Tanks

RO Unit: 3,500 gallons per day unit with industrial deionization resin cartridges producing 0 TDS pure water
 Heater: 9,000 watts
 (1) 2,000-gallon water storage tank for holding pure RO/DI water
 (2) 2,000-gallon water storage tanks for holding freshly mixed LiveAquaria® Professional Reef Salt saltwater

Separate aquatic systems, with independent filtration:

(3) Marine systems (treatment, quarantine, and main)
 (3) Main coral holding rows
 (1) Large Polyp Stony (LPS) corals / Soft Coral / Invertebrate quarantine system
 (1) Small Polyp Stony corals quarantine system
 (1) Clownfish holding system
 Freshwater fish holding racks - 225 gallons each
 Freshwater fish holding racks - 330 gallons each

Controller: RK2/Aquadyne automated system monitors pH, ORP, and Temperature; doses Kalkwasser; sends alerts if needed via mobile/email. Corrections can be made remotely via software.

Coral System Parameters:

Alkalinity: 9.0-10.0 dKH
 Calcium: 425-440
 Magnesium: 1400-1450
 Phosphate: 0.02-0.04
 Nitrate: 0.0-0.10
 Specific gravity 1.025
 Temperature: 76-78 degrees Fahrenheit

Marine Fish System:

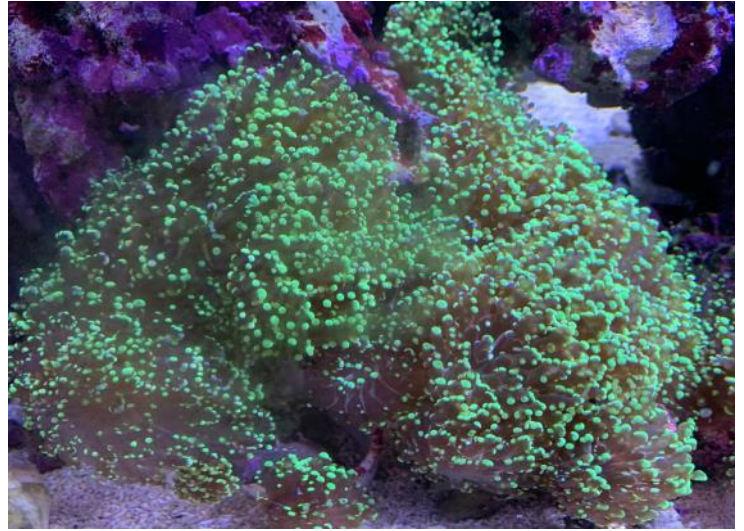
pH 8.1-8.3
 Ammonia 0.0
 Nitrite 0.0
 Nitrate 0.10
 Specific gravity 1.025
 Temperature: 77-78 degrees Fahrenheit

Freshwater Fish System:

pH 6.5-8.7 (targeted to species requirements)
 Ammonia 0.0
 Nitrite 0.0
 Nitrate 0.10
 Temperature: 77-85 degrees Fahrenheit

LiveAquaria®.

2389 Air Park Road,
 Rhinelander, Wisconsin 54501



Photos by Nick Saint-Erne on pages 20-21 are of the fish and corals for sale at LiveAquaria; photo to the right is of part of the coral production systems.

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

Betta Fin Nipping

Hi all!

Has anyone had any success managing fin-nipping in a betta? Husbandry is a work in progress (had owner improve diet variety, feeding frequency, and stop use of a laser pointer), water quality is excellent, housing is excellent. No sharp edges or opportunity for tearing. The Betta is the only inhabitant in the tank.

Cytology on fin at initial presentation was unremarkable, no other lesions. This truly appears to be behavioral and cyclical with no obvious trigger. Has anyone tried live feeding or any other tricks to manage this? Why don't they make Feliway for fish? Thanks in advance!

Ashley Emanuele, DVM, CertAqV
 Oak City Aquatics Mobile Veterinary Service

Are you thinking he is nipping his own caudal fin? Are you sure that is not the normal look for this fish's fins? The ragged edges of the fin can be trimmed while the fish is anesthetized. This will make it look better and the edges will grow back out.

Live food will make him more active and possibly distract him. Daphnia and cyclops are good choices.

Nick Saint-Erne, DVM,
 CertAqV
 Certified Aquatic
 Veterinarian

Thanks Nick!

Yes, we're sure the fish is self-mutilating. The owner has seen it, and his fins are usually much longer with nipped-off pieces being found on the bottom of the tank after he has a bad "episode." I forgot to mention that we also previously did a minor trim on some tattered areas and that only bought us a little reprieve from this behavior.

Thanks for the thoughts on live foods, I'll recommend that to her!

Ashley Emanuele, DVM, CertAqV

Hi Ashley,

Here is some interesting information I found on Betta tail nipping: *Tail Biting is due to Boredom; Encourage flaring, add more plants or decor, and consider betta fish toys.*

<https://bettafish.org/diseases/>

Perhaps using a mirror for a few minutes a couple times a week will stimulate him to flare and prevent him from attacking his own tail.

[Or it may make him more aggressive and make it worse! ???]

Nick Saint-Erne, DVM CertAqV

Ashley,

I bred and raised Betta's for many years. I never saw a case of self-mutilation. However, if more than one male is kept in a tank, aggression resulted in ragged fins. This sometimes happens in all-female tanks, and when a male and female are placed in their own breeding tank (presumably the male is over-aggressive, or the female is not ready to breed, and nips at the male).



Warmest regards,

Dave

A. David Scarfe PhD, DVM, MRSSAf, CertAqV
 Aquatic Veterinary Associates International, LLC
 365 Monarch Birch Ct., Bartlett, IL 60103, USA

**A Betta Solution -
 Exploring Siamese Fighting Fish Medicine**

An excerpt from the lecture for the WSAVA Congress:
 Sunday, 11/14/2021, 01:30 PM - 03:15 PM
 By **Dr. Nick Saint-Erne**, DVM, CertAqV

The Siamese Fighting Fish (*Betta splendens*), or more appropriately called today the Betta, is one of the most commonly kept tropical fishes. It is a beautiful fish available in many color varieties, and the males can have long flowing fins as a result of selective breeding.

In its native swampy waters of Thailand and other countries in southeast Asia, the fish are tan to greenish with the males having blue and red on the fins. The females are less colorful than the males, and typically have several brownish bars running along the sides of their bodies.

Bettas belong to a group of fish known as Anabantoids, which have an accessory air breathing organ called the Labyrinth, due to its maze-like shape. It is in the pharynx above the gills (suprabranchial) and the fish can take in a bubble of air through the mouth from the surface and hold it in the labyrinth and absorb oxygen from it. Bettas can live in stagnant water with zero dissolved oxygen. It may have difficulty breathing if unable to get to the surface of the water.

The name Siamese Fighting Fish comes from the aggressive nature of the males, which will fight with each other if kept together. For this reason, the males are housed in separate containers, although one male can be maintained with other community aquarium fishes if they do not resemble another Betta. The males build a nest of air bubbles held together with mucus to hold eggs when breeding.

Common Betta Habitat Concerns

- Too Small of Container – need a minimum of 1 L, preferably 4-8 L with filter; 20 L is ideal
- No aeration/filtration = poor water quality – need to perform 50% water change weekly
- No lid/cover on bowl or aquarium = fish can jump out; air temperature is too cool
- No water heater – Bettas prefer temperature of 77-80 degrees F / 25-27 C
- Sharp or stiff décor items in aquarium that the betta will snag and tear its fins on
- Poor nutrition = small container of food can still last 6 months or more and lose nutritional value
- One male or several females can be kept in aquarium with other non-aggressive fish species – but may get their fins nipped if other fish are aggressive
- Too strong water flow in aquariums with filtration – Bettas need slow water movement



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.

Find episodes on Spotify and Apple/Google Podcasts and at www.aquadocspodcast.com
 Follow us on Instagram and Facebook @aquadocspodcast

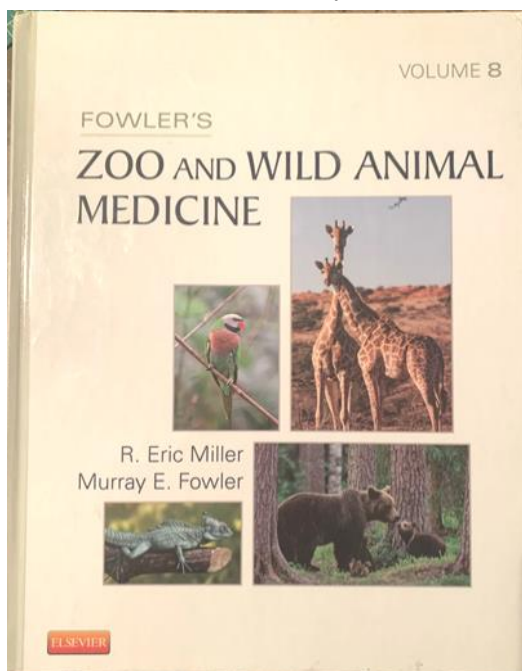


Book Review: Part 4**Fowler's Zoo and Wild Animal Medicine; 9 Volumes Reviewed by Nick Saint-Erne, DVM, CertAqV***Volumes 8 and 9:*

As an aquatic veterinarian, I consult with zoos, public aquariums, pet stores, and fish farmers, as well as clients who are koi pond owners and fish keepers. It is important to keep up with information in the exotic and aquatic animal field, and *Zoo and Wild Animal Medicine* has been a useful reference for over 40 years. I bought the first volume of *Zoo and Wild Animal Medicine* (published in 1978) while still in veterinary school. While not part of any of the school curriculum, I knew that it would be a valuable reference to my future practice since I planned on working with exotic and aquatic animals, as well as with the more commonly kept pets. A few years after I graduated from veterinary school the second edition was published and I bought that one as well. My collection continued to grow over the years, with a new book being published every 4-8 years. This series now has 9 volumes, with the latest tome printed in 2019.

The 8th edition of *Fowler's Zoo and Wild Animal Medicine* was published by Elsevier in 2015. It was edited by R. Eric Miller and Murray E. Fowler, and the chapters were written by 108 authors from 15 countries. The editors wrote in the Preface that "the first two editions [of this book] covered the world's animal groups in a comprehensive fashion, as did the 5th edition published in 2003. The 3rd, 4th, 6th, and 7th editions reflected a Current Veterinary Therapy format focusing on specific topics of current interest. This edition returns to the overall taxa format..." although the fish taxa is not included in this volume, except for a mention in Chapter 76, Use of Ultrasonography in Wildlife Species.

The book is divided into 5 parts with a total of 82 chapters. Including the index, it contains 773 pages. Part I Amphibian Groups contains three chapters: 1. Anurans, 2. Caudata, and 3. Caecilians. These chapters, along with the others in the book, list information under the headings of Biology, Anatomy and Physiology, Housing, Feeding, Restraint, Anesthesia, Analgesia, Surgery, Clinical Techniques, Diseases, Therapeutics and Reproduction, with a list of References at the end of each chapter. The three chapters on Amphibia cover 26 pages. This section has charts that include drug dosages, diseases presented by clinical signs, and blood parameters for select species. There are color photographs in each section.



Part II Reptile Groups include: Chapter 4. Chelonians (Turtles, Tortoises), 5. Crocodylians (Crocodiles, Alligators, Caiman, Gharial), 6. Sphenodontia (Tuatara), 7. Lacertilia (Lizards, Skinks, Geckos) and Amphisbaenids (Worm Lizards), 8. Ophidia (Snakes). The Reptile Groups covers 47 pages. Each of these chapters has a format and charts like those in the Amphibian Group and provides a thorough although brief review of the biology, care, diseases and treatments of the taxa.

Part III Avian Groups contains 23 chapters on birds. Those of interest to aquatic veterinarians include Chapter 10. Sphenisciformes (Penguins), 11. Gaviiformes, Podicipediformes and Procellariiformes (Loons, Grebes, Petrels, Albatrosses), 12. Pelecaniformes (Pelicans, Tropicbirds, Cormorants, Frigatebirds, Anhingas, Gannets), 13. Ciconiiformes (Hérons, Ibises, Spoonbills, Storks), 14. Phoenicopteriformes (Flamingos), 15. Charadriiformes (Auks, Oystercatchers, Plovers, Sandpipers, Snipes, and other shorebirds), 16. Anseriformes (Ducks, Geese, Swans, Screamers), and 19. Gruiformes (Cranes, Limpkins, Rails, Gallinules, Coots, Bustards). The Avian Groups covers 171 pages and contains information and charts categorized as in the other parts.

Part IV Mammal Groups is the largest part of the book, over half of the volume, containing 403 pages and 33 chapters. The chapters applicable to aquatic animals include: 43. Cetacea (Whales, Dolphins, Porpoises), 44. Pinnipedia (Walrus, Sea Lion, Seal), and 45. Sirenia (Manatee). These three chapters cover 36 pages. Chapter 48. Mustelidae includes information on river and sea otters.

The final section of the book, Part V General Zoo and Wild Animal Topics is 93 pages long and contains these articles of interest for aquatic veterinarians: Chapter 65. Avian Deflighting Techniques, which is helpful information for anyone working with waterfowl or other birds in a zoo environment, and Chapter 76. Use of Ultrasonography in Wildlife Species, which includes useful information on sonography of fish and invertebrates, as well as the animal groups covered in the volume.

The last 31 pages are the index. This volume is an updated version of the Fifth Edition, but sadly dropped the chapter on Fish. For fish medicine, I recommend volumes 5 and 7. The 8th Edition does have full-color photos throughout each chapter, whereas volume 5 has very few photographs and these are only in black and white. Much has improved in the ease of publishing in those intervening twelve years.

The final volume released to date is titled *Fowler's Zoo and Wild Animal Medicine – Current Therapy*. It was published in 2019 by Elsevier and sadly opens with a Tribute to Murray E. Fowler, who passed away in May 2014. Dr. Fowler was involved in not only these books, but also in many veterinary organizations and educational programs. This volume was the first of the nine that he did not edit. Dr. R. Eric Miller from the Saint Louis Zoo continued as editor, along with new editors Nadine Lamberski from the San Diego Zoo and Paul P. Calle from the Bronx Zoo. In the Preface, the editors write "This 9th edition contains 100 chapters and returns to the current veterinary therapy format featuring focused, specialized topics, which will also be the focus of the 10th edition. The last (8th) edition featured the taxa-based approach, which will also be the focus of the 11th edition." We hope that the 11th edition will once again include a chapter on fish medicine.

Volume 9 has chapters written by 115 authors from 21 countries. It is divided into 19 sections and is 734 pages long. The first section has 11 chapters on general information for zoo veterinarians, such as Chapter 1. The Role of Veterinary Advisors in Animal Management Plans. Section 1 is 63 pages long.

Section 2: Animal Welfare has four chapters and is 30 pages long. Section 3: Conservation Medicine has five chapters, including 17. Disease Risks to Native Wildlife From Zoos and Aquariums, and is 30 pages long.

Section 4: Reproduction contains three chapters and is 14 pages long. Section 5: Therapeutics has two chapters: 24. Stem Cell Therapy in Zoo Animals, and 25. Compounding Pharmacies, and is 13 pages long.

Section 6: Anesthesia and Analgesia contains four chapters and is 43 pages long. Section 7: Diagnostics is 33 pages long and has three chapters, including Chapter 30. Wildlife Necropsy Primer, which is a good refresher course on necropsy techniques and provides information beyond how to cut up the corpse. There is no specific information about aquatic animals in any of these sections. Each of the chapters includes a list of References.

Section 8: Emerging and Changing Infectious Diseases contains 11 chapters that includes Chapter 36. The Effects of Climate Change on Disease Spread in Wildlife, which includes diseases among marine organisms such as bleaching of coral reefs and sea star wasting disease. Chapter 39. Emerging Reptile Viruses mentions Crocodylian Herpesviruses.

Section 9: Infectious Diseases has three chapters and is 23 pages long, but does not include aquatic animal diseases.

Section 10: Aquatics has four chapters and is 33 pages long. The chapters are: 47. Techniques for Addressing Parasites in Saltwater Aquariums by Claire Erlacher-Reid, which includes a chart of drugs and dosages used to treat aquatic parasites; 48. Touch-Pools: The Other Side of the Hand by Catherine Hadfield and Kathryn A. Tuxbury; 49. Sharks and Medicine by Leigh Clayton and Kathryn E. Seeley, that includes chemical restraint methods and blood values; and 50. Decompression Medicine in Aquatic Species by Daniel Garcia-Parraga and Jose Luis Crespo-Picazo, which discusses the care of sea turtles and fish.

Section 11: Amphibians and Reptiles has 11 chapters and is 84 pages long. The chapters cover topics such as 51. Euthanasia of Ectotherms (which includes fish) by Gregory A. Lewbart; 52.

Ranaviral Diseases; 53. Anuran Reproduction; 54. Minimally Invasive Surgery of Amphibians; 57. Fibropapillomatosis in Marine Turtles; 59. Medical Evaluations of Crocodylians; 60. Reptile and Amphibian Analgesia, which includes a chart of drugs and dosages (pages 424-426).

Section 12: Avian includes seven chapters and is 49 pages long. Chapter 66. The Use of Prosthetic and Orthotic Limbs in Avian Medicine has specific information on their use in aquatic birds.

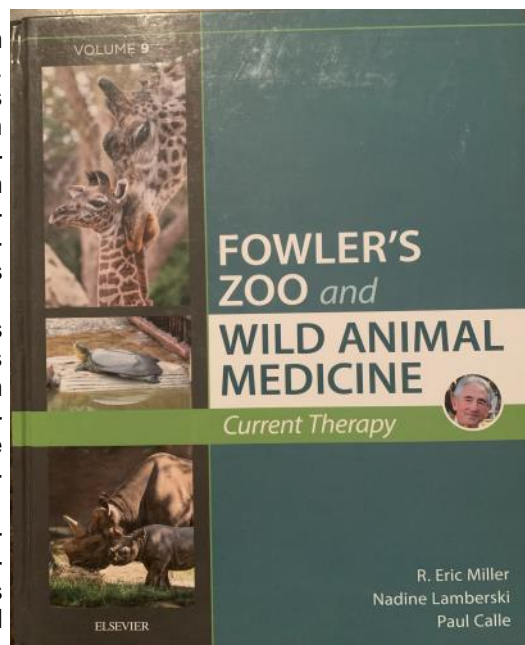
Section 13: Marsupials has three chapters. Section 14: Small Mammals has four chapters. Section 15: Carnivores has four chapters. Section 16: Great Apes has 4 chapters.

Section 17: Marine Mammals has three chapters and is 22 pages

long. The Chapters include 84. Marine Mammal Viruses; 85. *Mycobacterium pinnipedii*; and 86. Lens Diseases and Ophthalmologic Procedures in Pinnipeds.

Section 18: Ruminants has six chapters. Section 19: Elephants and Rhinoceroses has eight chapters. The Index fills the last 19 pages of this 734-page book.

Any of the volumes of *Fowler's Zoo and Wild Animal Medicine* would be a great resource for veterinarians who work on species other than dogs, cats and farm animals. So many of our clients are keeping 'exotic' pets such as birds and reptiles today that these tomes would come in handy even in a small animal clinic. But if you are veterinarian working with wildlife or zoo animals, they are indispensable. While not all volumes cover fish medicine, this four-part review should help you decide which volumes to get if you are interested in fish and aquatic species. Or, just get them all!



Abstracts from Scientific Literature: Corals

Introduction to the husbandry of corals in aquariums: A review

By Eric Borneman
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Abstract

Corals have been maintained in aquariums for hundreds of years, although long-term husbandry is a comparatively recent occurrence. The 1970s and 1980s witnessed the beginning of "reef" aquariums, where living substrates and biological processes were combined with increasing technological advances in maintaining water quality and providing essential environmental parameters in order to maintain corals in closed systems.

Corals, comprising members of the classes Anthozoa and Hydrozoa, are highly diverse and numerous species, with varying requirements for successful husbandry. The presence of intracellular symbionts, the phylogenetically diverse zooxanthellae, allows corals to be divided into two functional groups in terms of their husbandry: zooxanthellate and azooxanthellate.

The former group, as a whole, can be maintained with a high degree of success since much of their metabolic energy can be provided by light. Advances in lighting technology have made such widespread success possible. The azooxanthellate corals, however, remain difficult to maintain, principally because of the difficulty in providing adequate nutrition.

Advances in aquarium filtration, water movement, nutrition, habitat provisions, collection and transport, and communication between aquarists have allowed for rapid advances in coral husbandry. Today, almost all zooxanthellate corals can be propagated by asexual means, and virtually all have been kept in captivity. Sexual reproduction is becoming more common in aquariums, although synchronized mass spawning of broadcasting species is still uncommon and largely unpredictable. Other new issues have arisen in coral husbandry, however, including the occurrence, spread, and transfer of pathogens, parasites and predators. The major hurdles yet to be overcome are primarily in nutrition and in closing life cycles to allow for captive breeding programs. These issues and hurdles are the primary topics for this section on the husbandry of corals.

Borneman, Eric. "Introduction to the husbandry of corals in aquariums: A review." *Public Aquar. Husb.* Ser 2 (2008): 3-14.

Coral diseases in aquaria and in nature

By Michael Sweet, Rachel Jones and John Bythell

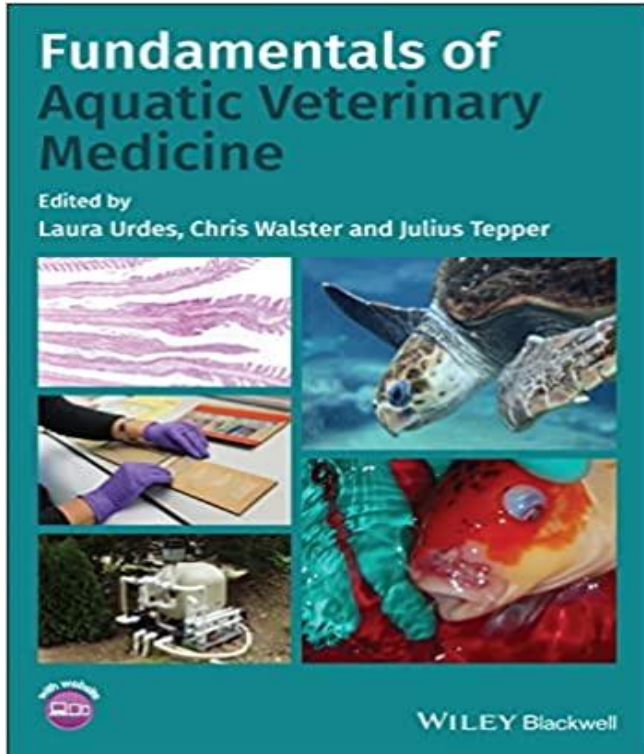
Journal of the Marine Biological Association of the United Kingdom,
Volume 92, Issue 4:
Coral Reefs, the Aquarium Trade and the Maritime Industry,
June 2012,
pp. 791 - 801
DOI:
<https://doi.org/10.1017/S0025315411001688>



Abstract

Many reef coral diseases have been described affecting corals in the wild, several of which have been associated with causal agents based on experimental inoculation and testing of Koch's postulates. In the aquarium industry, many coral diseases and pathologies are known from the grey literature but as yet these have not been systematically described and the relationship to known diseases in the wild is difficult to determine. There is therefore scope to aid the maintenance and husbandry of corals in aquaria by informing the field of the scientifically described wild diseases, if these can be reliably related. Conversely, since the main driver to identifying coral diseases in aquaria is to select an effective treatment, the lessons learnt by aquarists on which treatments work with particular syndromes provides invaluable evidence for determining the causal agents. Such treatments are not commonly sought by scientists working in the natural environment due the cost and potential environmental impacts of the treatments.

Here we review both wild and aquarium diseases and attempt to relate the two. Many important aquarium diseases could not be reconciled to those in the wild. In one case, however, namely that of the ciliate *Helicostoma* sp. as a causal agent of brown jelly syndrome in aquarium corals, there may be similarities with pathogenic agents of the wild coral diseases, such as white syndrome and brown band syndrome. We propose that *Helicostoma* is actually a misnomer, but improved understanding of this pathogen and others could benefit both fields. Improved practices in aquarium maintenance and husbandry would also benefit natural environments by reducing the scale of wild harvest and improving the potential for coral culture, both for the aquarium industry and for rehabilitation programmes.

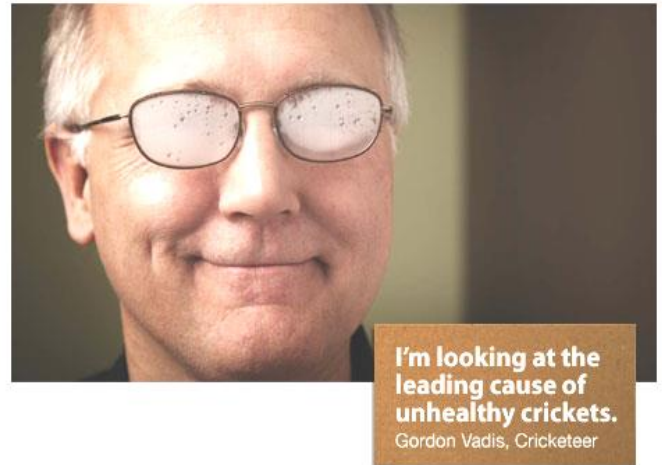


Fundamentals of Aquatic Veterinary Medicine covers the competencies necessary to assure the highest quality of aquatic veterinary services. This book provides systematic, practical guidance on the treatment of aquatic mammals, amphibians, fish, and invertebrates in veterinary practice.

Covering the nine core areas of the WAVMA Certified Aquatic Veterinarian (CertAqV) Program, this comprehensive clinical reference covers taxonomy, anatomy and physiology of aquatic species, water quality and life support systems, diagnostics, treatment, and prevention of aquatic diseases, and more. Designed to help readers acquire and demonstrate the necessary knowledge, skills, and experience to be competent in aquatic veterinary medicine, this authoritative guide:

- Focuses on “Day One” competencies outlined by the World Organization for Animal Health (OIE)
- Covers pathobiology and epidemiology of aquatic diseases, public health, zoonotic diseases, and seafood safety
- Provides up-to-date information on relevant legislation, regulations, and policies.

Fundamentals of Aquatic Veterinary Medicine is a must-have reference and review guide for veterinary students and practitioners interested in practicing aquatic veterinary medicine, as well as for aquatic veterinarians looking to become WAVMA certified or wanting to acquire OIE “Day One” competency.



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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.

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.



WSAVA
GLOBAL COMMUNITY CONGRESS
13-15 NOVEMBER 2021

47th WSAVA World Congress - 2022

Dates: 29-31 October 2022

Lima, Peru

See: [WSAVA](http://www.wsaVA.org)

48th WSAVA World Congress - 2023

Lisbon, Portugal

49th WSAVA World Congress - 2024

Shanghai, China

**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!

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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AQUACULTURE 2022

San Diego, California, USA
 February 28 - March 04, 2022

Every three years, the Triennial is held somewhere in the United States. In 2022, the Triennial returns to sunny San Diego – one of America's favourite cities. The Triennial is the largest aquaculture conference and tradeshow held in the world with nearly 4,000 attendees from over 90 countries and even more countries are expected to have attendees at AQUACULTURE 2022. The Triennial combines the annual meetings of the Fish Culture Section of the American Fisheries Society, World Aquaculture Society, National Shellfisheries Association, and the National Aquaculture Association. In addition to the annual meetings of the main sponsors, look what else is happening at AQUACULTURE 2022!

Annual Meeting of USAS, the U.S. Chapter of World Aquaculture Society and the Aquaculture Suppliers Association.

Annual Meeting of the U.S. Trout Farmers Association. Special sessions organized by Aquacultural Engineering Society and International Association of Aquaculture Economics and Management

Program with technical sessions and producers seminars covering virtually all species grown in aquaculture

The last Triennial was held in 2019 in New Orleans where it was pronounced a huge success by over 3,000 people who attended. Don't miss this Triennial!

Visit event's website:

<https://www.was.org/meeting/code/AQ2022>

Aquaculture UK 2022

Aviemore, Scotland
 May 03 - May 05, 2022

Aquaculture UK is a free to attend event taking place on 3-5 May 2022 in Aviemore, Scotland. Find the newest innovations from global suppliers, hear the latest commercial and technical advice for fish farmers, farm managers and aquaculture business professionals, and network with your peers to share ideas and experiences.

Visit event's website:

<https://aquacultureuk.com/>



International Symposium of Fish Parasitology

Copenhagen, Denmark
 August 21-26, 2022.
<https://icopa2022.org/>

This will be a hybrid meeting so people can join online or can be present physically. There will be at least three full days with fish parasitology (and even more if they get enough abstracts). Thus, fish veterinarians/parasitologists/pathologists are urged to submit abstracts before the end of January 2022.

Go to:

[15th International Congress of Parasitology - ICOPA 2022](https://icopa2022.org/)

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

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

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**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.

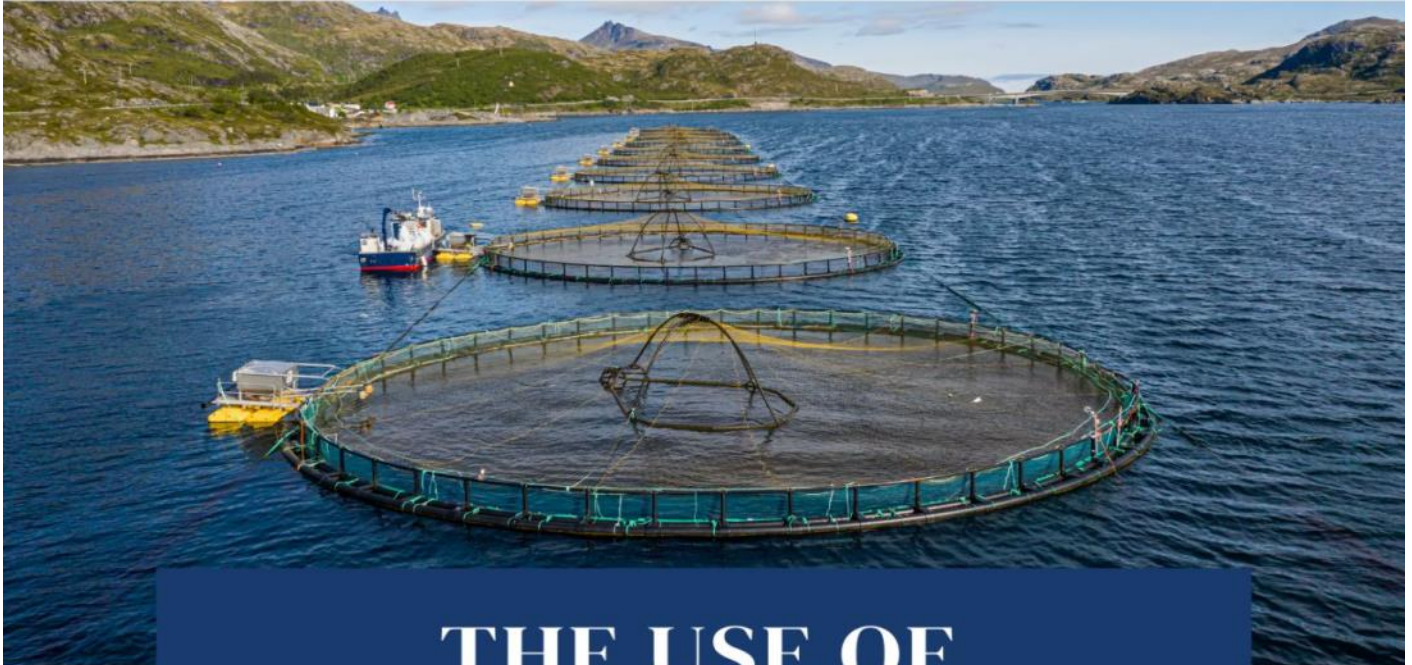
Nevertheless, scientific literature provides clear evidence that, according to current trends and within 10 years, our coastal and marine environment will change for sea acidification and warming, sea-level rise and coastal erosion and all water bodies will be affected by flooding, eutrophication and 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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WebCEPD program - Webinars for Global Veterinary Education



THE USE OF AUTOGENOUS VACCINES IN AQUACULTURE

JANUARY 27, 2022
02:00 PM UTC

Dr Gustavo Ramirez-Paredes

FOR MORE INFORMATION:

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



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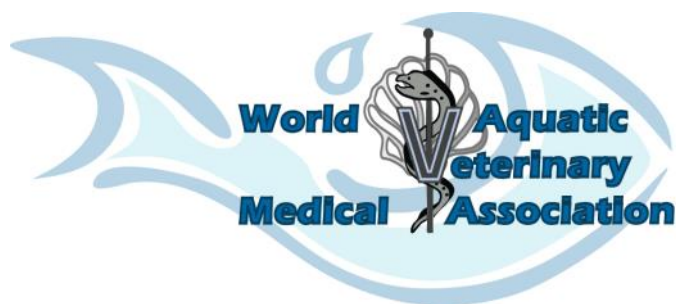
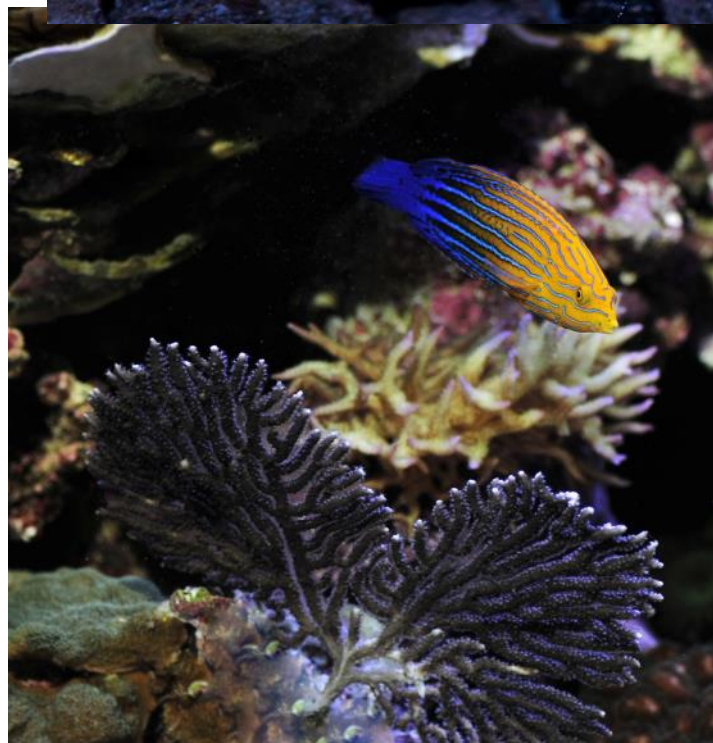
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