

Tuesday September 4th – Tilly / Tupper
World Aquatic Veterinary Medical Association
Moderator – A. David Scarfe (University of Pretoria)

9:30 AM	WAVMA	<u>Dhar</u> - The University of Arizona, Aquaculture Pathology Laboratory: A Worldwide Resource for Diagnostic Services and Collaborative Research to Shrimp Aquaculture Industry
10:00 AM		<u>Llano</u> - Parasitic Survey on Captive, Wild and Reintroduced Sirenians (<i>Trichechus inunguis</i> and <i>Trichechus manatus</i>) in Brazil
10:30 AM		Refreshments
10:45 AM	WAVMA	<u>Scarfe</u> - Ensuring a Well-trained Aquatic Veterinary Workforce: Past, Present and Future Initiatives
11:15 AM		<u>Miller-Morgan</u> - Defining the Practice of Aquatic Veterinary Medicine – A Unique Approach for Establishing Day-1 Competencies
11:45 AM		<u>Panel / Audience Discussion</u> - Optimal Approaches for Ensuring a Well-Educated Aquatic Veterinary Workforce – Meeting the Needs of the Profession & Clients Served
12:15 PM		Lunch



8th International Symposium on Aquatic Animal Health

September 2-6, 2018 - Charlottetown, Prince Edward Island, Canada



The University of Arizona, Aquaculture Pathology Laboratory: A Worldwide Resource for Diagnostic Services and Collaborative Research to the Shrimp Aquaculture Industry

Arun K. Dhar*, Brenda L. Noble, Fernando Aranguren Caro, Michelle Garfias, Jasmine D. Millabas, Kevin M. Gee, L. Siddhartha Kanrar, Hung N. Mai, Roberto C. Flores, Paul J. Schofield, and Tanner J. Padilla.

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Aquaculture Pathology Laboratory (APL) in The University of Arizona, Tucson, Arizona is an OIE-Reference Laboratory of Crustacean Diseases. The laboratory is also an USDA Reference Laboratory of Crustacean Diseases and an ISO 17025 accredited laboratory. The APL has two laboratories under its operation. The disease diagnostic laboratory is located in the main campus of The University of Arizona and the wet lab is located in the West Campus Agricultural Center (APL-WCAC) of the university. APL's missions are: (a) provide disease diagnostic services to shrimp industry, (b) provide educational and training services to researchers and professionals from public and private institutions, non-governmental organizations, (c) conduct inter-laboratory calibration test, also called proficiency test or ring test, (d) carry out shrimp disease challenge studies, testing therapeutics, feed & feed additives, and (e) carry our basic research in shrimp virology, microbiology & genomics. Several major diseases that have impacted and continue to impact shrimp farming worldwide were discovered in APL, and method developed for experimental challenge and their detection by histopathology and molecular tools. In 2017 alone, APL has provided disease diagnostic services to clients from industry and academia from 36 countries around the world. As of 2018, APL has conducted 28 trainings in shrimp disease diagnostics through a summer course called "Shrimp Pathology Short Course" that has trained almost 1500 researchers and professionals engaged in shrimp diseases around the world. The "Shrimp Pathology Short Course" provides a unique platform for researchers from around the world to interact and foster collaborations. In addition, APL has conducted numerous trainings in shrimp disease diagnostics in countries in Latin America and Asia. The APL-WCAC research facility is conveniently located over 200 miles from the nearest ocean which has proven to be the ideal place to study shrimp and other crustacean pathogens as well as other shellfish and fish pathogens without the risk of introduction into their natural habitat. Since its inception 28 years ago, the APL-WCAC lab has helped to develop pathogen resistant stocks, develop experimental challenge methods for multiple shrimp pathogens which aid in the selection of genetically superior and disease resistant stocks, tested numerous products against viral and bacterial pathogens, run primary quarantine to aid in the diversity of the gene pool in shrimp captive breeding programs, and studied new and emerging pathogens in live animals. The presentation will provide an overview of accomplishments and a role this iconic laboratory has played over the past four decades in making shrimp industry sustainable worldwide.

Conference Session Designation: (World Aquatic Veterinary Medical Association)
Presentation Format: (Oral)



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Parasitic Survey on Captive, Wild and Reintroduced Sirenians of the Species *Trichechus inunguis* and *Trichechus manatus* in Brazil: Preliminary Results

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Sirenians, as *Trichechus inunguis* and *Trichechus manatus*, are aquatic mammals vulnerable to extinction for which better knowledge regarding the health condition of their population is urgent for conservation purposes. Both species figure on National Action Plans for conservation that relies, among other measures, on the rehabilitation and reintroduction of specimens into the wild. Prior to the release of rehabilitated manatees into the wild, the health assessment is necessary and is based only on serological tests for *Brucella*, *Toxoplasma* and *Leptospira* infection, as well as on coproparasitological analysis, but proper characterization of the parasites usually is not conducted. In view of the gap on parasitic information regarding these species, the goal of this study is to survey parasites from fecal samples of Brazilian manatees in order to perform future molecular characterization of the findings to apply the information on these species management. Fresh fecal samples were collected in 2016 and 2017 from 29 captive *Trichechus inunguis* from Aquatic Mammals Preservation and Research Center, Eletrobras Amazonas Energia, Amazonas State, Brazil and from three *Trichechus manatus manatus* (two natives, and one reintroduced) from the area of environmental protection of Costa dos Corais, Alagoas State, Brazil by *Instituto Chico Mendes para Conservação da Biodiversidade*. The samples were stored at 4° C in 2.5% potassium dichromate solution (1:2). The centrifugal flotation method using Sheather's sugar solution and the formalin-ether sedimentation technique were conducted on the 32 stool samples followed by direct examination. Eggs of helminths were observed in 6 samples (19%) and protozoa cysts/oocysts in 29 samples (91%). Ten samples (31%) had protozoa cysts/oocysts and helminths concomitantly. Among the protozoa positive samples, 26 had *Eimeria* sp. oocysts (80%) and six had *Giardia* sp cysts (19%).



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Within the *Giardia* sp. positive samples, all also had *Eimeria* sp. oocysts, and only one had helminths eggs concomitantly (3%). All *T. m. manatus* had coccidian oocysts; one reintroduced and one native specimens had *Eimeria* sp., and a native one was also positive to *Giardia* sp. Five *T. inunguis* had helminth eggs (16%), and five of them had Cyathostominae infective larvae (16%). This constitutes the first report of Strongylida in manatees. The preliminary results presented here reinforce the urgent need of long-term parasitic surveys on wild, captive and reintroduced manatees. This study will be further enriched by molecular characterization of parasites in order to assess the involvement of potential zoonotic agents and to better know the parasitic fauna that infect the studied hosts. Although the impact of our results on the conservation strategies and management in captivity of manatees is still unknown, this study will help to assess the risk of releasing the animals back to their natural habitat as well as to orient sirenians' management actions.

Conference Session Designation: (Aquatic Mammals / WAVMA)
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Student Presentation: (Yes)



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Ensuring a Well-trained Aquatic Veterinary Workforce: Past, Present and Future

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With increasing impacts of diseases on aquaculture production in all countries, the need for a well-trained aquatic veterinary workforce (including veterinarians and para-veterinarians) has become a global imperative. Numerous educational efforts are underway ensure that sufficient numbers are available to support aquaculture industries, producers, governmental agencies and a myriad of supporting industries that provide services or products to prevent, control or eradicate diseases. Without this infrastructure, sustainable and economically viable aquaculture will simply not thrive. A number of International and National veterinary organizations have, or are developing processes to determine, evaluate, harmonize and accredit veterinary education throughout the world, the educational needs within veterinary degree-earning curricular, and extracurricular continuing education and professional development (CEPD) programs, to ensure an adequate veterinary workforce to meet contemporary and societal needs. These include, but are not limited to, the World Veterinary Association (WVA), the Council on International Veterinary Medical Education, the World Organization for Animal Health (OIE), the North American Veterinary Medical Education Consortium (NAVMEC), the Federation of Veterinarians of Europe (FVE). Although organizations all address aquatic veterinary education to some degree, two are focusing on ensuring aquatic are addressed in veterinary curricular and CEPD programs – the World Aquatic Veterinary Medical Association (WAVMA), and the International Partnership on Aquatic Veterinary Education (i-PAVE). The WAVMA Aquatic Veterinary Certification (CertAqV) Program used to certify veterinarians who have Day-1 competency to practice aquatic veterinary medicine (equivalent to competencies required of individual receiving a veterinary degree), has identified 9 core subjects. To build on WAVMA and other veterinary organization's efforts, i-PAVE has embarked on a multi-year project to verify and validate that the aquatic veterinary knowledge, skills and experience (KSEs) identified by WAVMA, actually fulfill the needs of veterinarians actively practicing aquatic veterinary medicine in any country, using a DACUM (**D**eveloping **A** **C**urricul**U**M) process in workshops. These workshops in N. and S. America, Europe, Africa, and the Asia-Pacific are then followed by a survey of every veterinary school in each region, to determine which of the core aquatic veterinary subjects are actually covered in veterinary school curricula, or veterinary CEPD programs.

Conference Session requested: (WAVMA)

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Defining the Practice of Aquatic Veterinary Medicine – A Unique Approach for Establishing Day-1 Competencies

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A model curriculum has yet to be developed for the field of aquatic veterinary medicine we have utilized a unique approach to veterinary curricular development that seeks input from practicing full-time aquatic veterinarians identify the key Day-1 knowledge, skills and experiences that would be expected of new graduates entering the field of aquatic veterinary medicine. We have utilized a process called DACUM (Developing a Curriculum), a process that has proven time and again to be very effective, relatively quick, and a low-cost approach to accurately developing occupational standards for any job or occupational area. Because of its low cost and effectiveness, it has been and continues to be used by educators and trainers in over 40 countries (Adams, et al, 2015).

The DACUM process for job/occupational analysis involves a panel of 5-12 expert workers – the men and women with reputations for being “the best” at their jobs. Whether at the skilled, technical, supervisory, or professional level, these workers explain exactly what they do that allows them to be successful. We involved a committee of 6 aquatic veterinarians who are actively engaged in private aquatic veterinary medicine practice. They participated in a 3-day workshop during which they completed an occupational analysis that identified key General Areas of Competence (GAC), and the essential competencies (essential knowledge and skills) within each GAC, necessary to practice competent aquatic veterinary medicine (Adams, et al, 2015). The resulting occupational analysis identified 18 General Areas of Competence and 189 individual competencies essential for the Day-1 practitioner of aquatic veterinary medicine.

Finally, small groups of 3-5 aquatic veterinary practitioners from different global regions will be used to validate the findings in a series of online or face-to-face validation workshops, relative to the needs for aquatic veterinary education in the Americas, Europe, Africa and the Asia-Pacific. Their job will be to ensure that significant GAC’s have not been omitted and to weight each competency in relation to its GAC. The resulting occupational analysis will serve as the basis evaluating whether existing veterinary curricula adequately cover sufficient information to prepare a veterinarian to practice aquatic veterinary medicine.

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