

Aquatic Vet News



Vol. 2, No. 3

Summer 2008

Newsletter of the World Aquatic Veterinary Medical Association

One Profession; One Discipline; One Voice – Cohesive & Inclusive!

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, AND TO SUPPORT THE VETERINARY PROFESSION, AQUATIC ANIMAL OWNERS, ALLIED INDUSTRIES, AND OTHER ASSOCIATED STAKEHOLDERS.

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GROUP PHOTO DURING
THE WAVMA RECEPTION
AT THE 2ND
ANNUAL GENERAL MEETING
VANCOUVER, CANADA
JULY 2008



EDITOR'S NOTE

The 2nd Annual General Meeting of the World Aquatic Veterinary Medical Association (WAVMA), held in conjunction with the World Veterinary Congress in Vancouver, Canada was a great success! Four full days of meetings (July 28-31, 2008) provided something for everyone in the way of aquatic education. A job well done by those WAVMA members who organized this program; your efforts were appreciated by all those in attendance.

The programs presented at the WAVMA sessions brought speakers from all parts of the world together to share ideas about their aquatic animal health programs, disease concerns, and aquaculture issues. For those who missed the lectures, we will see about posting the transcripts from the Congress on the WAVMA Website.

In this issue of AVN, I have included notes from one presentation given by Dr. **Eva-Maria Bernoth**, from the Australian Government Department of Agriculture, Fisheries and Forestry. This presentation explains approaches to emerging aquatic animal diseases. As aquaculture continues to grow world wide in importance, issues such as this will require veterinary involvement. Let's get together and be prepared to advance the veterinary profession's involvement in this expanding industry.

NICK SAINT-ERNE, DVM
Newsletter Editor



Paul Hardy-Smith from Australia (left) and **Chris Walster** from England (right) in deep thought at the WAVMA 2008 Annual General Meeting.



Dusan Palic (left), WAVMA Treasurer, and **Nick Saint-Erne** (right) at the 2nd Annual General Meeting of WAVMA in Vancouver

EXECUTIVE REPORTS

PLEASE FEEL FREE TO CONTACT ANY OF THE WAVMA 2008 EXECUTIVE BOARD MEMBERS OR COMMITTEE CHAIRS ON ISSUES INVOLVING THE ASSOCIATION.

PLEASE REFER TO THE "CONTACT CORNER" AT THE END OF THE NEWSLETTER FOR BOARD AND COMMITTEE MEMBER'S CONTACT INFORMATION.

PRESIDENT'S REPORT

This report should have covered my attendance at the AGM and presentation of the President's annual report. Unfortunately the scheduling of the US and Canadian airline systems coupled with the inordinate delays inherent in anyone trying to cross the contentious border between those two highly developed nations without inciting the ire of the US Border Security confounded me and I arrived too late. Why is it that Passport Control Officers always seem to take comfort breaks at the very time that major flights arrive? It was very frustrating after going to the expense of the transatlantic flight in order to be there to miss any of the meetings. I am very grateful to David Scarfe for filling in for me.

The AGM this year was held at the 29th WVC triennial conference in Vancouver, where there was a very strong international fish health series of sessions which WAVMA had made a significant contribution to organising. Emphasis was on international epidemiology and the key OIE specified notifiable diseases. I was personally very impressed by the calibre of the research and development work going on in this area in US and Canada, as well as the European work, with which I was more familiar. Much

of this work was driven by the combined concerns for both ISA and VHS diseases. Veterinary input is now clearly very strong in the management of both of these problems.

It was clear however, that this work can only be done in collaboration with the other stakeholders in the area. These include industry, and also Government Fisheries and Wildlife Departments at both State and Federal levels. It was heartening to see that there is a growing recognition that nowadays Veterinarians have very specific roles to play in the overall efforts at management of such diseases.

My own Institute in Stirling, Scotland, which I directed for 25 years, was specifically established by the Nuffield Foundation in 1971 in order to establish a veterinary capacity for the new industry of salmon farming that was emerging in UK at the time. We always recognised the roles of the aetiologists, (parasitologists and micro-biologists), as well as the basic scientists, but they took some time to recognise veterinarians. It was only by demonstrating our specific clinical, histopathological and epidemiological skills, in the context of farmer friendly clinical medicine and therapeutic responsibility, that we were able to assume the clear position we now hold in most of Europe, and it is pleasing to note the way this is starting to develop in the US also.

Although WAVMA is headquartered in the US, it is truly an international body. Currently, the President is Scottish, the vice-presidents US and Canadian, the secretary English, the treasurer Serbian. The most obvious expression of this diversity is in the difficulty we have setting up telephone Board meetings when the time difference can be nine hours between the extremes. We did have one New Zealand Board member last year but that made phone co-ordination virtually impossible!

Our diversity is good, but unfortunately it barely represents the real depth of the profession's involvement in fish health. In Norway and Chile, for example, there are very significant numbers of veterinarians involved in clinical, regulatory, research and teaching roles. These as yet are not well represented in this association, nor are they represented at all at Board level. It is important that we seek to remedy this as we believe that it is only as a united force we can help both the improvement of aquatic animal health and also the status of the veterinarian in assuring it.

One area where we are trying to have a positive influence is in the clarification of the very confusing range of definitions currently used by OIE and by EU and North American agencies in regard to aquatic diseases. It may seem bizarre but there are differences even in such prosaic definitions as that of

the word "disease" itself. These differences are not just between OIE and the rest of the world, i.e., between OIE Aquatic Commission and the traditional definitions by which veterinary pathology lives, but even between the definitions used in the Terrestrial and Aquatic sectors of OIE. If we are to have harmonised legislation and veterinary certification that is acceptable for international trade, it is essential that the sender and recipient of a veterinary certificate use the same scientific language and standard medical terminology. Anything else is a route to chaos and the law courts. Hopefully our discussions with Eva-Maria Bernoth, the President of the OIE Aquatic Commission, and herself an eminent aquatic veterinarian, will rapidly lead to such harmonisation.

The aquatic specialization within Veterinary Medicine is a small one. It was, however, a lot smaller when I started in 1966. Then there were only five of us -- Nikola Fijan in Yugoslavia, Tore Hastein in Norway, Ghittino in Italy and an irascible but very gifted teacher, Bill Klontz, in Idaho. We were nothing like the first fish veterinarians however. That honour goes to the outstanding German lady veterinarian, Marianne Plehn who discovered Furunculosis in Germany in the 1880's. The progress we have all made in demonstrating the veterinarian's fulcrum role in fish health since then is something I think we ancient pioneers should be very proud of. It's the next generation that is now picking up the torch, and there is great hope I believe for the future. There will have to be, for this year farmed fish comprised more than 50% of the value of all fish consumed, for the first, but certainly not the last time. The challenge is great, but very satisfying.

With best wishes,
Prof. Ron Roberts
WAVMA President



President Ron Roberts with Dr. Helen Roberts of New York at the WAVMA Reception in Vancouver.

Photo by Dusan Palic

SECRETARY'S REPORT

Well, WAVMA is now one year old and perhaps it is time for some reflection on how things are developing. Whatever opinion you hold tends to be a personal one and although I believe that what has been achieved in the past year is exceptional, there will be others who feel that little if anything has occurred. The problem perhaps is that some things are tangible such as the newsletter which by all accounts is widely appreciated. Others are the intangibles such as the time spent by Executive Board members forging links with those sympathetic to WAVMA's Mission or building relationships with organizations and individuals at receptions and major meetings.

The problem is in measuring the results of these activities as it may take years for them to become apparent but who knows what would have been the result without the input? What has been the benefit to members? No one seems to doubt that there is a need for a global organisation and WAVMA fulfils that role. There is also no doubt that there is a lot of work required for WAVMA to succeed.

Two thoughts occur: knowledge is power; and, it isn't what you know but who you know. Within WAVMA through the membership there is an awful lot of knowledge and all of us have numerous contacts. The objectives of WAVMA can be more easily achieved if we all contribute together. That can be in assisting the development of the website, contributing to the newsletter, promoting WAVMA at meetings, using the listserv to disseminate information or simply passing the newsletter on to a colleague who may be interested.

We therefore appeal to each and every member to use your personal skills and expertise to participate in committees or other activities and help formulate member programs that will expand WAVMA and pave the way for the future of aquatic veterinary medicine.

Chris I. Walster BVMS, MPH, RCVS
WAVMA Secretary

WAVMA 2009 ELECTIONS

Nominations for the 2009 Officers and Directors-at-Large provided a slate of excellent candidates willing to help guide WAVMA through 2009. Written ballots from members at the AGM and the subsequently received absentee ballots were

passed to the WAVMA Parliamentarian for tallying. The result of votes by members in good standing was a clear support for **Dr. Otis Miller** as the President-Elect for 2009 (taking office as President in 2010), and the re-election of Drs. **Dusan Palic** and **Chris Walster** to serve respectively as Treasurer and Secretary through December 2009. Dr. Miller will serve as an ad hoc advisor to the Executive Board for the remainder of 2008 and will officially take office as the President-Elect on January 1, 2009.

Three excellent candidates (Drs. **Julius Tepper**, **Paul Hardy-Smith** and **Bill van Bonn**) were nominated as Directors-at-Large for two anticipated positions. However, a tie-vote occurred between two of the Director-at-Large nominees. Per the WAVMA Bylaws, until WAVMA had two Allied Veterinary Organization members to form the Advisory Council, the two Directors-at-Large would serve the interests of members as Executive Board members.

During the WAVMA reception at the WVC it was formally announced that the Eastern Aquaculture Veterinary Association (US and Canada) has decided to become a WAVMA AVO member. Consequently, along with a delegate from the Fish Veterinary Society (UK), the EAVA delegate would now necessitate the formation of the Advisory Council, and the roles of the two Directors-at-Large is unclear.

Therefore, until the Executive Board deliberates these issues and resolves whether WAVMA should consider continuing to have Directors-at-Large, a run-off election will be postponed.

Dave Scarfe PhD., DVM, MRSSA
WAVMA Parliamentarian

WAVMA CONFERENCE REPORT

The last month or so has been particularly hectic with the final preparations and running WAVMA functions at both the AVMA Convention in New Orleans and the World Veterinary Congress (WVC) in Vancouver. We are indebted and deeply grateful for all the assistance and tireless work of numerous WAVMA members; in particular, Wes Baumbartner, Dusan Palic, Nick Saint-Erne, Tim Miller-Morgan and David Scarfe, and several spouses. Without them the huge impact of aquatic veterinary medicine on the veterinary profession would not have been felt. We are also indebted to Intervet/Schering-Plough Animal Health and Wiley-Blackwell Publishers for their sponsorship for

WAVMA's very successful receptions in New Orleans and Vancouver.

Based on the attendance at the continuing education/professional development (CEPD) scientific sessions, the WAVMA booth and receptions, there is no doubt that the discipline of aquatic veterinary medicine is being recognized globally. If the interest shown during these functions were fully translated in to membership then WAVMA would have quadrupled membership overnight.

Equally important were the professional contacts made by WAVMA Board members with leaders and vet colleagues in international and national organizations, including the World Veterinary Association, OIE, FAO and many countries in the Caribbean, South America, Africa, Asia and the Middle East. Resounding support and possible future interaction with WAVMA and its future programs was expressed by several national veterinary organisations. Whilst the Board still needs to discuss and evaluate these activities, from a personal perspective, I was extremely encouraged by the interest and support shown. As this is the first time I've been involved in promoting aquatic veterinary medicine through an exhibit/booth and social activities at meetings; I learned a lot.

While there are a lot of things to consider and plan to ensure everything runs smoothly and has the maximal impact, I believe WAVMA can put a system in place which would allow promotion of WAVMA by members at any meeting they attend. Let us know your ideas at what meetings WAVMA may help organize CEPD sessions or have a booth – perhaps we can help.

The WAVMA-specific meetings on the Sunday before the Vancouver WVC and the WAVMA organized aquatic veterinary CEPD sessions launched one of the most successful meetings for aquatic veterinary medicine I've attended in 20 plus years. For several hours Sunday morning, members and non-member veterinarians engaged in discussion and brain-storming about the needs of aquatic veterinarians and possible future directions for WAVMA.

Several key needs emerged. The most important being: expanding WAVMA membership programs and services to attract veterinarians from around the world; ensuring these programs and services satisfy the needs of private practitioners wanting to offer aquatic veterinary services; surveying veterinary schools throughout the world to determine what aquatic-focused courses are part of veterinary degree curriculums (where necessary, help advise or develop expanding veterinary student education and CEPD opportunities, particularly

through web-based education); and, (perhaps most importantly) for WAVMA to develop a system, and the core education, training and experience (skill sets) necessary for credentialing and recognizing "aquatic veterinary general practitioners."

Sunday afternoon was time for the 2nd Annual General Meeting and WAVMA business. Attendees were treated to three informative presentations during the afternoon covering WAVMA and international issues. As Ron Robert's flights were delayed, David Scarfe kindly stepped in for the Presidential presentation and described the history leading up to the formation of WAVMA, how veterinary organizations are structured to serve its members, and some of the initial programs WAVMA is developing. This was followed by Jim Edwards (President of the Federation of Asian Veterinary Associations – FAVA – and a W V A Past-President) who discussed the importance of aquatic veterinary medicine in SE Asia and opportunities for WAVMA. Discussion revolved around how to engage with FAVA organizations and in WAVMA becoming a member of the WVA.

Introduction of the nominees for 2009 Officers and Directors-at-Large followed, with members present casting written ballots. No write-in nominations were received from the floor and absentee ballots will be sent to all members unable to be present (see earlier in this newsletter for results of the elections).

The closing AGM presentation was given by Eva-Maria Bernoth (President, OIE Aquatic Animal Health Standards Commission). She explained the way the OIE operates, such as it takes a two year cycle to get approval to any changes to the Aquatic Code or Manual from the 172 member countries. The Aquatic Code and Manual form the backbone of veterinary procedures and processes necessary for countries to prevent, control and possibly eradicate high priority finfish, crustacean and mollusc diseases. Importantly, the Commission is beginning to address reptile and amphibian diseases, and aquatic animal welfare standards. She pointed out that while the OIE aquatic standards have rapidly advanced since the Commission was initiated in 1960, only a few countries offer substantive comments and suggestions to proposed new or revised Code and Manual chapters. These comments and suggestions are provided by the Chief Veterinary Officer (CVO) of each country and, unfortunately many lesser developed countries don't contribute (possibly because of poor veterinary infrastructures).

In discussion, what was surprising is that in many highly developed countries (e.g., UK) it appears that the CVOs do not seek input from

aquatic veterinarians. Other interesting discussion followed about how WAVMA and its members may become more engaged and involved, including the possibility of WAVMA soliciting input from members and collating and making them publically available for members to share these with their respective CVOs. Another possibility may be to channel WAVMA comments through the World Veterinary Association, who now has a formal relationship with OIE. Building a WAVMA relationship with OIE and future WAVMA-OIE interaction and collaboration was seen to be very important.

On the final day of the WVC, WAVMA hosted a special session on various issues in aquaculture dealing with education, training, and credentialing of aquatic veterinarians, non-veterinarians practicing veterinary medicine, welfare issues, and the “politics” of aquaculture production. The debate at the end was wide ranging but four issues topped the list – educational opportunities; the costs of veterinary services; the need for recognizing aquatic veterinarian’s competency; and, the need for communicating sound veterinary information to clients and publics.

On the education front, aquatic curricula in veterinary schools are helpful, but current curricula are already overflowing. While aquatic post-graduate veterinary degrees and Board Certification are great, few PhD or Board Certified veterinarians will end up as private practitioners and, if they do, the high cost of education may result in high fees that may exceed typical aquatic client’s financial abilities. Areas that it was felt that WAVMA should get involved with included: determining existing aquatic programs in veterinary schools; developing clinically pertinent CEPD programs to help private practitioners expand practice opportunities; exploring the economics of veterinary services; developing a system for recognizing clinically competent aquatic veterinarians; determining the impact of emerging welfare legislation and regulations on global markets, aquatic animal industries, and aquatic veterinarians; setting guidelines for what constitutes good welfare or humane treatment of poikilothermic vertebrates and invertebrates.

Indeed, WAVMA participation in national and international conferences is contributing substantially to WAVMA’s recognition, and producing excellent programs for its members.

Chris I. Walster BVMS, MPH, RCVS
WAVMA Secretary

To renew you Membership, please complete and return the Membership Renewal Application form available at the end of this Newsletter, or on WAVMA’s website (www.WAVMA.org) – full instructions are on the form.

ASSOCIATION’S ENDEAVORS

COMMUNICATIONS COMMITTEE REPORT



Contact Nick Saint-Erne (Chair)
nsainterne@gmail.com

Facilitated by teleconference meetings approximately monthly members including Nick Saint-Erne (Chair), Chris Walster (Vice-chair), David Scarfe, and David Pasnik have attempted to set several communications priorities into action, with each person taking an oversight role. These include attempting to layout a communications plan of prioritized communications tools for members and others, including revamping the WAVMA website, developing member and committee list-servers, developing possible membership and other databases and, of course ensuring a good quarterly newsletter.

While we’ve made good progress, there is still a lot to do. We particularly encourage other members that have an interest or expertise in developing these further to consider becoming member of this committee – we need your help and ideas.

Several more specific actions to develop this communications plan are being considered by the committee. One of our highest priorities has been e-communication within WAVMA. We now have several list-servers up and running for the Executive Board, and all current committees that are active. We have also developed a Members-L list-server for all members to share information or discuss emerging issues. Instructions on how to subscribe and use WAVMA Members-L has been distributed to all members. As this list-server is intended for WAVMA members only and until we develop a member's only page, please contact the Secretary (Dr. Walster) if you need a copy of the Members-L instructions.

For expanding WAVMA communications to outside audiences we are considering the best processes for developing and distributing Aquatic Veterinary News, press releases, and other aquatic veterinary news stories to outside entities to use. Some of the worldwide audiences being considered include potential members, veterinary schools (faculty/staff and students), veterinary organizations and their members, non-veterinary University teaching and research programs, public aquaria and zoos, aquatic food animal and ornamental/pet organizations and their members, current and potential corporate sponsors, government agencies, legislators, wildlife/natural resource agencies and the public and press.

On the WAVMA newsletter (Aquatic Vet News) we intend a quarterly Winter (February), Spring (May), Summer (August – after the AGM) and Autumn/Fall (November) distribution. While specific individuals are asked to contribute, we rely on all members to provide us with the most important and up to date information.

While our website has been a little improved and numerous documents and information is available, we believe it needs improvement. We therefore

anticipate developing a new website map and layout, and adding a members-only (possibly password protected) access to Board and committee minutes. To assist us the Board has approved a substantial budget for 2008 for which we will be able to maintain the registered URL (www.WAVMA.org) and pay our ISP (Net Business) for improvements. However, as all of us are really challenged and somewhat limited with understanding web designs and technology, and available time to implement everything, we desperately need a WAVMA member to assist us with website revisions. The committee is also considering whether to request the Board support and perhaps become involved with the online aquatic veterinarian and disease diagnostic databases project (www.AquaVetMed.info) that was developed by the American Veterinary Medical Association and others as this is a decided asset for WAVMA members.

Again we call for member to join this committee and help develop the many things that will expand our ability to communicate with WAVMA members and outside entities and individuals. Feel free to contact me at any time.

Nick Saint-Erne, DVM
Communications Committee Chair

**ONLINE AQUATIC VETERINARIAN & DISEASE
DIAGNOSTIC LABORATORIES DIRECTORIES**

A free resource for all aquatic veterinarians and an opportunity for clients to find you.

Simply go to

AquaVetMed.info

MEMBER'S LETTERS

(We invite members and other readers to send letters to the editor)

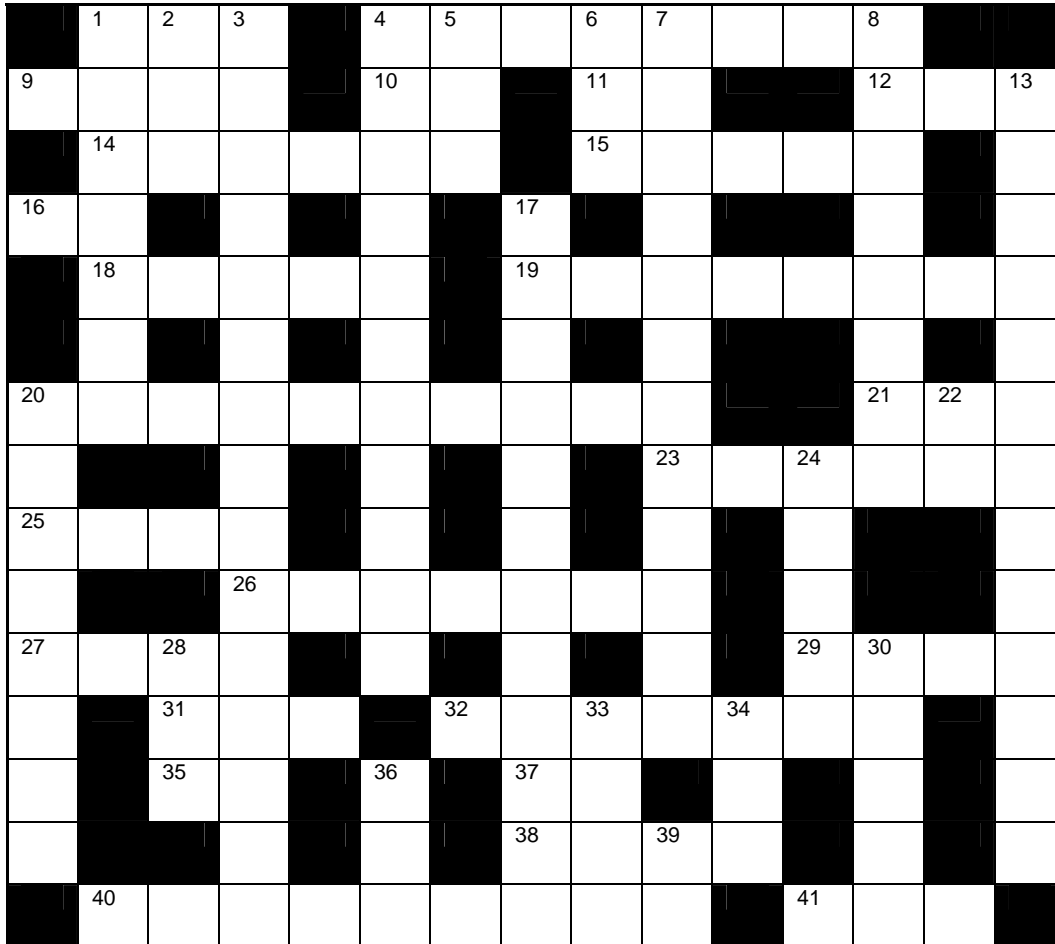
THIS AMAZING PHOTO OF KOI PROVIDED BY DR. TIM MILLER-MORGAN.
See the article about his trip to an Israeli koi farm in this issue



TIME TO PROVOKE YOUR AQUATIC VETERINARY KNOWLEDGE

In order to stimulate some letters and contributions from members, here is a **Fishy Crossword** puzzle by Dr. Nick Saint-Erne. **Completed crosswords will be entered into a drawing for prizes!**

Fax a completed copy to Nick Saint-Erne +623-580-6184(US). Be sure to include your name and contact information.



CLUES:

ACROSS

- | | |
|---|--|
| <p>1. Short name for a family of marine catfishes in which the males incubate the eggs in their mouths</p> <p>4. Stress induced adrenal output</p> <p>9. Combining form from the Greek word meaning "wind"</p> <p>10. The two initial letters for the name of a white powder chemical compound, NH₄NO₃, that is commonly used in agriculture as a high-nitrogen fertilizer, and the field runoff of this chemical is a source of water pollution</p> <p>11. One-tenth of a meter (abbr.)</p> <p>12. This disease of Salmonids, caused by an RNA virus of the family Orthomyxoviridae, causes lethargy, anorexia, anemia and high mortality</p> <p>14. This is released from an Ich tomont after successive binary fissions</p> <p>15. Fish of several genera in the family Osmeridae</p> <p>16. Prefix meaning "two"</p> <p>18. In fish, this organ produces either milt or roe</p> <p>19. Cosmopolitan in eating habits, such as carp</p> <p>20. Designation for fish, such as Pacific salmon species, that return from the sea to fresh water rivers to spawn</p> | <p>21. The Salmonid fish <i>Plecoglossus altivelis</i></p> <p>23. The productivities of a population removed per unit of time</p> <p>25. Plural of the Genus name of two species of endangered Indian Cypinid fish that both go by the common name of Mahseer</p> <p>26. A doctor who treats diseases of the eyes</p> <p>27. Something smells fishy</p> <p>29. This generally follows the taking of the patient's medical history (shortened form)</p> <p>31. One of the common names for <i>Leuciscus idus</i></p> <p>32. A cartilaginous marine fish in the subclass Holocephali (American spelling)</p> <p>35. English initials for the Latin ophthalmic abbreviation O.S.</p> <p>37. A suffix that indicates a group of organisms associated in an aquatic habitat</p> <p>38. A genus of South American cichlids</p> <p>40. Furunculosis sequelae</p> <p>41. Common acronym designation for Cyprinid Herpesvirus</p> |
|---|--|

DOWN

1. This elicits an immune response
2. This group of icosahedral RNA viruses includes species that infect golden shiners (*Notemigonus crysoleucas*), chum salmon (*Oncorhynchus keta*) and channel catfish (*Ictalurus punctatus*), and one from American oysters (*Crassostrea virginica*)
3. E.g., allergies, AIDS, and lupus (two words)
4. Fish that prefer salt with their sex
5. The first word in the title of a classic fish book by Dr. Seuss
6. All inorganic and organic substances contained in a liquid (abbr.)
7. The body's defense mechanism against infectious organisms and diseases
8. The coastal zone (not figuratively)
13. Part of the eye; or a British WAVMA joke (two words)

17. Arrangement of the cilia in protozoa such as *Ichthyophthirius*
20. Class of Coelenterates that includes sea anemones
22. Abbreviation for 3 feet in length
24. A young Anguilliformes
28. Liquid obtained from the blubber of various species of whales
30. Combining form meaning "yellow"
33. A suffix that indicates a subfamily group in animal taxonomy
34. Habitation for poissons, en français
36. The fully ripe egg mass of a fish
39. The common initials used for the Royal Society of London for the Improvement of Natural Knowledge, which is a learned society for science that was founded in 1660 and is the oldest such society still in existence.

BOOK REVIEWS

Aquaculture Biosecurity: Prevention, Control and Eradication of Aquatic Animal Disease

A. David Scarfe, Chen-Sheng Lee & Patricia J. O' Bryen.

Blackwell Publishing, Ames, IA, USA. 2006, 182 pg
ISBN: 978-0-8138-0539-

Disease in aquaculture is responsible for widespread and often economically debilitating losses and has implications for stock welfare, international trade and consumer perception and purchasing patterns. As a consequence, aquaculturists, veterinarians, policy-makers, scientists and a range of other stakeholders have become increasingly aware of the need to develop a coherent and integrated approach to aquatic animal disease prevention and management. It is against such a backdrop that the theory and practice of biosecurity has gained increasing prominence in recent years.

In March 2004, during the World Aquaculture Society annual conference in Hawaii, the Oceanic Institute and the American Veterinary Medical Association brought together a diverse group of stakeholders for a three-day session entitled 'Aquaculture Biosecurity 2004'. The aim of this session was to present and assess the range of approaches being taken globally, and then to identify the key steps necessary to effectively implement biosecurity programmes in the production environment. 'Aquaculture Biosecurity: Prevention, Control and Eradication of Aquatic Animal Disease' is a compilation of twelve of the thirty presentations given at the stakeholder session.

Chapters one and two of the book provide an overview of the biosecurity approaches undertaken at

the international level by focusing on the OIE (World Organisation for Animal Health), the World Trade Organisation (WTO) and The Codex Alimentarius Commission (Codex) and their respective standards aimed at eliminating trans-boundary disease transmission. Chapter three presents an interesting and informative example of a regional approach to aquatic animal health management; in this chapter the scope and utility of programs designed by the Network of Aquaculture Centres in Asia-Pacific (NACA) is presented as an example of effective regional co-operation. This is followed by a comprehensive and well written account of the development and functioning of Canada's national Aquatic Animal Health Program, using relevant case studies to highlight the need for an overarching and all encompassing approach to biosecurity. Then national dimension is continued in chapter five where the U.S. Fish and Wildlife Service's "Aquatic Animal Health Policy" is discussed, with particular emphasis on the innovative approaches to disease management contained therein. A detailed account is presented of the plan's risk assessment procedures which were developed in order to both standardize and optimise the decision-making process pertaining to aquatic animal relocation.

The situation in the USA makes for an interesting discussion point and is explored in detail in this book. That many states have no regulations, whilst others address only salmonids provides an entry point to showcase Wisconsin's veterinary approach to fish health, the topic of chapter six. Wisconsin's approach is an interesting one given that it includes non-salmonids and deals with fish farm registration, certification of veterinarians, health standards for fish introduced into public waters and the issuing of fish import permits. Moreover, the programme evolved as a result of an effective working relationship between the state government,

aquaculturists and veterinarians and is therefore an important example of multi-stakeholder co-operation.

Chapter seven makes a coherent and succinctly presented case for a harmonised system of accreditation to ensure diagnostic data and test result validity in aquatic animal health diagnostic systems. That valid data and test results are a critical pre-requisite for effective biosecurity planning and implementation is forcefully brought home in this chapter.

Chapter eight provides an excellent in-depth review of the types of disinfectants applicable to aquaculture, as well as stressing the need for disinfection as an integral component of effective biosecurity at all levels. Information on the efficacy and characteristic of commonly used disinfectants, fish pathogen classification and transmission/susceptibility characteristics of important fish pathogens is presented clearly and helpfully in tabular format and makes an excellent point of reference for the interested reader. Moreover, the 'example disinfection protocols' are another informative reference point and a welcome addition to a well-rounded chapter.

The ninth chapter highlights the importance of aquatic animal health surveillance in effective policy making, not only for disease control, but also for quarantine and health certification.

Chapter ten deals with the key issue of biosecurity at farm level and how to create the optimum environment and 'state of mind' amongst farm workers and managers to significantly minimise risk in aquaculture facilities. That effective farm-level procedures are critical in the process is a point worth emphasising and this chapter succeeds in doing that. However, it would have been helpful to see some of the ideas presented in this chapter developed further. For example, how can the latest advances in business communication theory be utilised and developed to inculcate a sense of biosecurity awareness? What are the motivational models that can best be applied to the aquaculture environment to enable staff at all levels in the enterprise to promote and foster 'good practice'? It seems to me that a more detailed and nuanced approach can be formulated, using human resource management practice, to address this issue and to develop guidelines for farm managers.

The book closes with two case-studies of diseases affecting the salmon industry: Infectious Haematopoietic Necrosis (IHN) and Infectious Salmon Anaemia (ISA). Such case studies are certainly helpful in comparing and contrasting approaches and make the case effectively for pathogen-specific strategies where necessary.

Overall, 'Aquaculture Biosecurity: Prevention, Control and Eradication of Aquatic Animal Disease' is an indispensable source of detailed information for biologists, veterinarians, policy makers and aquaculturists. The editors are to be congratulated for bringing together so effectively and succinctly a diverse range of topics presented by such a distinguished list of contributors. The result is a well-balanced mix of legislative, scientific and management information that both complements and augments the existing literature on this most important of topics

Review by Dr. Scott Peddie
Aquaculture Health International
Used with permission.

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**Manual of Exotic Pet Practice**

Mark A. Mitchell, DVM, MS, PhD. and Thomas N. Tully, Jr., DVM, MS, Dip. ABVP (Avian), ECAMS.  
Saunders 2008, pp. 546. ISBN 978-1-4160-0119-5.

After many weeks of anxiously awaiting the new **Manual of Exotic Pet Practice**, I eagerly opened the section on Ornamental Fish. After reading the chapter, however, I was disappointed to find it broke no new ground.

The book covered the following specific topics relating to ornamental aquarium fish: Common Species Kept in Captivity, Freshwater Fish, Saltwater Fish, Unique Anatomy and Physiology, Nutrition, Preventative Medicine, Restraint, History and Physical Examination, Diagnostic Testing, Common Disease Presentations, Therapeutics, Surgery, and Zoonoses. In addition to the chapter on fish, the book has chapters on invertebrates, amphibians, reptiles, birds, many types of exotic pet mammals, and wildlife.

A list of the chapters in this book:

- Chapter 1 – History of Exotic Pets
- Chapter 2 – Preparing your Hospital
- Chapter 3 – Invertebrates
- Chapter 4 – Ornamental Fish
- Chapter 5 – Amphibians
- Chapter 6 – Crocodylians
- Chapter 7 – Snakes
- Chapter 8 – Lizards
- Chapter 9 – Chelonians
- Chapter 10 – Birds
- Chapter 11 – Marsupials
- Chapter 12 – Mice and Rats
- Chapter 13 – Ferrets
- Chapter 14 – Rabbits
- Chapter 15 – Hamsters and Gerbils
- Chapter 16 – Hedgehogs

- Chapter 17 – Guinea Pigs
- Chapter 18 – Chinchillas
- Chapter 19 – Wildlife

All-in-all, I found the book to be a good basic text for the small animal – exotic practice to have as an up-to-date resource for all those minor species one might be asked to see. For the practitioner who wanted to “dabble” in Ornamental Fish, it can be considered a reliable resource, but other books currently available might be a better choice for the practitioner who wanted greater depth to their fish practice. I was also stunned to read the last section of this chapter on Zoonoses, (pg. 71) where the practitioner is advised to “follow standard safety protocols and wear gloves” and then to see the photos of barehanded fish restraint on pg. 67. These photos need to be replaced in the next edition.

**Review by Julius M. Tepper, DVM**

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## STUDENT'S ISSUES

(We invite student members to contribute issues or information to this column)

Important news for students wanting to join the WAVMA – all students currently enrolled in recognized veterinary academic programs (including post-graduate programs, internships and residencies) can join the WAVMA for 50% off the normal dues. This could be the best \$50 you ever spent. Further information is available on the WAVMA.org website and on the 2008 Membership Application at the end of this Newsletter.

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## CLINICAL REPORTS

### FDA Approves Antimicrobial (Terramycin) for Two New Aquaculture Indications

FDA-CVM Update  
July 10, 2008

The U.S. Food and Drug Administration (FDA) has approved **Terramycin® 200 for Fish** (oxytetracycline dihydrate) for the control of mortality in freshwater-reared salmonids due to coldwater disease caused by *Flavobacterium psychrophilum* and for the control of mortality in freshwater-reared *Oncorhynchus mykiss* due to columnaris disease associated with *Flavobacterium columnare* (New Animal Drug Application 038-439). In addition to these two new indications, the approval allows for

removal of the temperature limitation on previously approved salmonid indications, which restricted its use to water temperatures above 48.2 degrees F (9 degrees C).

Terramycin® 200 for Fish is the second drug approved for use during outbreaks of coldwater disease. Untreated, this disease can cause significant losses among salmonids at state and federal hatcheries, including native species in restoration programs.

Terramycin® 200 for Fish is the first drug approved for the control of mortality due to systemic columnaris disease associated with *Flavobacterium columnare* in freshwater-reared *Oncorhynchus mykiss* (including rainbow, steelhead, and redband trout, as well as other related subspecies). Columnaris can be a problem for trout and other fish when water temperatures are above 57.2 degrees F (14 degrees C).

FDA reviewed extensive data to ensure the product met all necessary effectiveness, target animal safety, human food safety, and environmental safety standards. As part of the human food safety requirements, Terramycin® 200 for Fish was reviewed under the Center for Veterinary Medicine's Guidance for Industry #152 "Evaluating the Safety of Antimicrobial New Animal Drugs with Regard to Their Microbiological Effects on Bacteria of Human Health Concern." GFI #152 provides a regulatory pathway sponsors can use to show how any antimicrobial resistance risks associated with the use of an antimicrobial drug in food-producing animals can be managed without endangering public health. FDA has concluded that fish fed oxytetracycline are safe for human consumption when the drug is administered according to the approved label directions.

Terramycin® 200 for Fish is a product of Phibro Animal Health, Ridgefield Park, New Jersey. It is designated under the Minor Use and Minor Species Animal Health Act of 2004, which entitles Phibro Animal Health to seven years of exclusive marketing rights beginning on the date of approval.

This supplemental approval is the result of cooperation between the pharmaceutical company, Phibro Animal Health, and public sector researchers, the U.S. Fish and Wildlife Service's Aquaculture Animal Drug Approval Partnership Program and the U.S. Geological Survey's Upper Midwest Environmental Science Center.

Additional information on this approval may be obtained by contacting Dr. Donald A. Prater, Division of Therapeutic Drugs for Food Animals, FDA, Center for Veterinary Medicine, Office of New Animal Drug Evaluation, 7500 Standish Place, HFV-

131, Rockville, MD, 20855. Phone: 240-276-8343,  
Email: [Donald.Prater@fda.hhs.gov](mailto:Donald.Prater@fda.hhs.gov).

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Anchovy links cats to marine mammals

Friday, 20 June 2008

Brooke Borel, Cosmos Magazine

NEW YORK:

The mystery of why marine mammals worldwide have been dying from a parasite spread in cat faeces may have been solved. Anchovies may be playing host to the parasite responsible for marine mammal deaths around the globe.

Toxoplasmosis, the sometimes fatal disease caused by the protozoan parasite *Toxoplasma gondii*, is found only in cats in its infectious form, and only the fertilised eggs of the parasite - called oocysts - cause an infection. But over the past decade the disease has also killed a vast number of marine mammals, leaving scientists puzzled over how the parasite found its way from felines to the sea.

See the source (<http://tinyurl.com/4zddq2>) for the full story.

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**FAU Harbor Branch Mammal Research and Conservation Staff Save Entangled Dolphin in the Indian River Lagoon**

BOCA RATON, FL (June 20, 2008) - Mammal Research and Conservation (MMRC) scientists, veterinarians and research staff at Harbor Branch Oceanographic Institute at Florida Atlantic University intervened and rescued an entangled, young dolphin calf in the Indian River Lagoon (IRL), near Melbourne, Florida on Thursday, June 19, 2008.

With approval from the U.S. National Marine Fisheries Service, the mother/calf pair – well-known to the MMRC staff that has been studying the IRL dolphin population since 1996 – was captured to remove an entangled automotive belt around the calf's neck. It was first observed by FAU Harbor Branch researchers on June 6 in the IRL, and was monitored while efforts to coordinate logistics were within a fair-weather window.

"This was a team effort and demonstrates the strength and skill of our marine mammal staff and fellow collaborators," said Steve McCulloch, program manager and rescue supervisor for FAU Harbor Branch MMRC. "This is a remarkable effort considering that we first had to locate one specific dolphin in the IRL region that covers approximately 40 percent of Florida's east coast. The 'take home' message or lesson here is that what we as humans

do does have a direct impact on the environment that we all share."



**Image 1:** Indian River Lagoon mother/calf pair was first observed on June 6 by FAU Harbor Branch researchers with an automotive belt wrapped around the calf's neck.

The 3-year-old dolphin calf was sighted south of the 192 Causeway in Melbourne with its mother, who has been in the MMRC photo-id catalog since 2001. The rescue effort involved six boats and 30 people, and was led by FAU Harbor Branch MMRC staff with assistance from National Marine Fisheries Service, Florida Fish and Wildlife Commission, Save the Manatee Club, Hubbs Sea-World Research and other specialists trained by FAU Harbor Branch



MMRC staff during past dolphin health assessments.

**Image 2:** From left to right, FAU Harbor Branch rescuer Colby Lawrence, Blair Mase of U.S. National Marine Fisheries Service, Dr. Greg O'Corry Crowe of FAU Harbor Branch, and FAU Harbor Branch Program Manager Steve McCulloch. With the dolphin calf safely secured, and the mother dolphin waiting patiently in the distance, rescue staff first evaluate and then prepare to cut away the entanglement with a special net knife.

The mother/calf pair was isolated from other dolphins in the area and a net set was made in shallow water so that they could be safely managed, treated and released after examination by FAU Harbor Branch MMRC veterinarian Dr. Juli Goldstein. Currently, FAU Harbor Branch photo-id research staff

is conducting a full-day follow-up to ensure that both mother and calf continue to do well.



**Image 3:** From left to right, FAU Harbor Branch rescuer Colby Lawrence, Dr. Greg O'Corry Crowe of FAU Harbor Branch, and FAU Harbor Branch Program Manager Steve McCulloch. While carefully restrained, the reluctant dolphin calf is freed from an automotive belt that would have eventually killed her.

FAU Harbor Branch researchers took part in a similar rescue mission in May 2007, when a young dolphin calf was sighted entangled in fishing gear that was wrapped around its neck. The calf also was rescued, treated and released back to its mother as has been the case in several other rescue interventions that FAU Harbor Branch's Marine Mammal staff has carried out in the past.



**Image 4:** FAU Harbor Branch Marine Mammal Veterinarian Dr. Juli Goldstein (light blue shirt) carefully examines the young dolphin before approving her release, while MMRC Program Manager and Rescue Supervisor Steve McCulloch displays the hard rubber automotive belt that was entangled around the dolphin's neck.

For more information, contact Stephen McCulloch, program manager for the Marine Mammal Research and Conservation Center at FAU Harbor Branch, at 772-465-2400, ext. 604 or [smccull5@hboi.fau.edu](mailto:smccull5@hboi.fau.edu).

## EMERGING ISSUES

### Approaches to Emerging Diseases of Aquatic Animals

**Eva-Maria Bernoth**, *Dr med vet*  
Office of the Chief Veterinary Officer  
Australian Government Department of Agriculture,  
Fisheries and Forestry  
GPO Box 858, Canberra ACT 2601, AUSTRALIA  
E-mail: [eva-maria.bernoth@daff.gov.au](mailto:eva-maria.bernoth@daff.gov.au)



DR. EVA-MARIA  
BERNOTH

PHOTO BY NICK  
SAINT-ERNE

**Presented at the  
WAVMA Aquatic  
Veterinary  
Sessions, World  
Veterinary  
Congress.  
July 2008**

### Abstract

The World Organisation for Animal Health (OIE) *Aquatic Animal Health Code* defines an 'emerging disease' as a newly recognised serious disease, the cause of which may or may not yet be established, that has the potential to be spread within and between populations, for example by way of trade in aquatic animals and/or aquatic animal products. Definitions published elsewhere include the re-emergence of a known disease in new geographic areas or populations. This paper explains some of the factors underlying infectious disease emergence in aquatic animals, drawing on several examples. Approaches to emerging infectious diseases (EIDs) in aquatic animals are discussed, looking at detection and diagnosis, and prevention and response options. Components of a broader framework for dealing with the threat of EIDs are described, including risk analysis, effective global disease surveillance and early warning systems, novel diagnostics, scientific modelling, and cooperation between veterinary and other competent authorities.

### 1. What is an 'emerging infectious disease'?

The journal *Emerging Infectious Diseases* of the Centers for Disease Control and Prevention (United States Department of Health and Human Services) offers the following definition which – while

focused on humans – is broadly applicable to animals:

Infectious diseases whose incidence in humans has increased in the past two decades or threatens to increase in the near future have been defined as "emerging."

These diseases, which respect no national boundaries, include:

- a. new infections resulting from changes or evolution of existing organisms
- b. known infections spreading to new geographic areas or populations
- c. previously unrecognized infections appearing in areas undergoing ecologic transformation
- d. old infections re-emerging as a result of antimicrobial resistance in known agents or breakdowns in public health measures.

The definition in the World Organisation for Animal Health (OIE) *Terrestrial Animal Health Code* (*Terrestrial Code*, OIE 2007a) is very similar: A new infection resulting from the evolution or change of an existing pathogenic agent, a known infection spreading to a new geographic area or population, or a previously unrecognized pathogenic agent or disease diagnosed for the first time and which has a significant impact on animal or public health.

The definition in the OIE *Aquatic Animal Health Code* (*Aquatic Code*, OIE 2007b) is somewhat shorter:

A newly recognised serious disease, the cause of which may or may not yet be established, that has the potential to be spread within and between populations, for example by way of trade in aquatic animals and/or aquatic animal products. The first two definitions include the spread and impact of a known agent to new geographic areas or populations; this is sometimes also referred to as a re-emerging disease. Common to all three definitions is the notion of spread and disease impact of a novel or changed agent. The scope of this paper is emerging and re-emerging infectious diseases of aquatic animals.

## 2. Factors of infectious disease emergence

In 2003, the United States Institute of Medicine published a report entitled *Microbial Threats to Health: Emergence, Detection, and Response* (Smolinski *et al.* 2003). The authors suggested that a group of factors (thirteen discrete ones were identified) could converge to create high-risk environments where infectious diseases may readily emerge or re-emerge. Such "microbial perfect storms" could occur; however, unlike meteorological perfect storms, the events would not be in the order of once-in-a-century, but frequent. The report addressed microbial threats to humans; as such, most of the factors of disease emergence identified in

the report were of a social, political or economical nature.

The topic of emerging zoonoses and pathogens of public health concern has been extensively reviewed over the last years; a compilation of expert papers was published in 2004 as a volume in the OIE's *Scientific and Technical Review* series (King 2004). The papers in that publication focused on zoonotic diseases, because 75% of all emerging infectious diseases (EIDs) in humans over the last two decades occurred as a result of an animal pathogen moving into the human host (Brown 2004). While the factors identified were therefore focused on disease emergence in humans, some of them are equally applicable to disease emergence in animals. Based on several papers (Brown 2004; Glaser 2004; Morse 2004; Thiermann 2004) in that volume, such factors would include:

1. Host factors
  - large, susceptible and non-immune animal populations
  - presence of competent vectors
  - rapid increase in the movement of animals and products as a result of globalisation
2. Agent factors
  - microbial adaptation and change (e.g. antigenic drift)
  - 'new' agents being identified ('inventory expanding')
  - environmental changes ('pathogen pollution')
3. Environmental factors (mostly through human intervention)
  - changes in animal husbandry and production technologies (multi-national agribusinesses)
  - destruction of animal habitats
  - ill-prepared animal health infrastructure

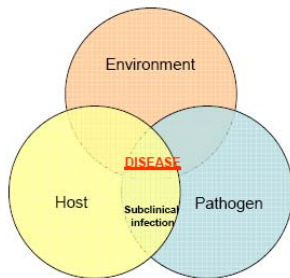
There are other ways to group factors of infectious disease emergence into categories; however, the three categories chosen above are consistent with an older model of infectious disease emergence, specifically prepared for aquatic animals. This is explained below.

## 3. Emerging infectious diseases in aquatic animals

Aquatic animals are prone to experience EID events, for several reasons. Most fundamentally, the aquatic medium (water) readily supplies not only oxygen and feed to the animals, but also pathogens. The influence of the environment on turning a benign cohabitation between an aquatic animal and a potential pathogen into a disease outbreak was illustrated many decades ago by the Polish microbiologist Stanislaw Sniezsko in the famous

diagram of the three overlapping circles (Snieszko 1974).

Influence of host, pathogen and environment on infectious disease outbreaks in aquatic animals



Source: Snieszko 1974

Any overlap of two circles, or spheres, presents a danger zone, but disease emergence is more likely where all three spheres overlap. The mere co-existence of a pathogen and a susceptible host does not necessarily lead to disease, but the pathogen can cause disease if environmental conditions are conducive. The diagram helps explaining the scenarios below. The list of examples could be much longer – the ones chosen merely reflect this author's familiarity with them.

### Scenario 1

The expansion and diversification of the aquaculture sector, along with globalisation and trade liberalisation, has led to an increase in transboundary movements of live animals (as well as products) and subsequent serious disease outbreaks. Aquatic animal species grown successfully in one location are introduced into another as new, promising candidates for aquaculture, but clinically healthy specimens can carry along 'stow-away' pathogens. For example, to overcome rearing problems with the native black tiger shrimp *Penaeus monodon*, a national policy in Thailand in 2002 allowed the partial replacement of this species with the exotic Pacific white shrimp *Penaeus vannamei*. Because the viral shrimp disease Taura syndrome (TS) was exotic to Thailand, introduced *P. vannamei* needed to be certified free of TS. In 2003, there was evidence of a TS outbreak in imported *P. vannamei* broodstock. The disease subsequently emerged as a problem in *P. vannamei* culture in Thailand (Nielsen *et al.* 2005) and continues to be an important problem in that country (NACA 2008). In the diagram, this can be illustrated as follows: prior to shipment, there is overlap between the host (*P. vannamei*) and the agent (TS virus) spheres only, and they co-exist without disease. This situation is then overlaid by the stress of shipment (the environment sphere), leading to the re-emergence of a known disease in a new location.

Such re-emergence of a known disease in a new location can go hand-in-hand with the emergence of

a new genotype of the pathogen, which can assist in tracing back the origin of the pathogen. For example, in the TS example above, Phalitakul *et al.* (2006) quoted that there were at least four geographically different isolates of TS virus at the time, and that the Thai virus was phylogenetically related to the Taiwanese strains (98.3 % identity of a particular gene) rather than Western hemisphere ones. In 2006, infectious myonecrosis (IMN) of *P. vannamei* was detected, for the first time outside of Brazil, in Indonesia. There is 99.6% similarity between the Indonesian strain and the Brazilian strain, suggesting that the emergence of this disease in Indonesia has been associated with the movement of crustaceans from Brazil to the Asia-Pacific region (NACA 2008).

Viral haemorrhagic septicaemia (VHS) was for many decades thought to be limited to Europe and regarded as an endemic disease of freshwater fish, particularly problematic for farmed rainbow trout (*Oncorhynchus mykiss*). Since the late 1980s the virus has been found in many species of marine and anadromous fish in the Pacific and Atlantic Oceans, causing mortality in wild and farmed fish. Four genotypes could be identified that generally correlate with geographic location, with the North America isolates assigned to Genotype IV. Since 2005, a highly virulent strain of VHS virus has spread in over 25 species of freshwater fish in the Great Lakes region in the United States and Canada. The virus appears to be a sub-type of Genotype IV. This means that the Great Lakes strain is more likely to have come from a source closer to North America than to Europe, where Genotypes I, II and III are present. Further testing revealed that the Great Lakes isolates could be assigned to a separate sub-lineage, termed Genotype IVb, with the isolates from the West Coast of North America forming Genotype IVa (Winton *et al.* 2008).

### Scenario 2

The translocated pathogen can also affect other species in the new destination, causing the re-emergence of a known disease in a new species. Phalitakul *et al.* (2006) showed that following TS outbreaks in *P. vannamei* in Thailand in 2003, the native shrimp *P. monodon* also became infected with TS virus; however, *P. monodon* is not considered a principal host species, and disease signs do not develop (OIE 2006). In the diagram, this can be shown through the overlapping spheres environment (Thailand) and host (*P. monodon*) overlapping only slightly with the third sphere of the pathogen (TS virus).

### Scenario 3

Another scenario for the re-emergence of a known disease in a new species is resident populations of aquatic animals carrying pathogens

that cause disease in newly introduced species. For example, Atlantic salmon (*Salmo salar*) derived from disinfected, certified eggs from Norway and brought into quarantine into British Columbia in Canada proved to be susceptible to the enzootic disease infectious haematopoietic necrosis (IHN), which until then had never been reported in Atlantic salmon, or anywhere in Europe (Mulcahy & Wood 1986).

Phalitakul *et al.* (2006) reported that *P. vannamei* translocated to Thailand became infected with white spot syndrome virus (WSSV). This is somewhat ironic: the native *P. monodon* was heavily affected by this disease, and *P. vannamei* were considered to be relatively resistant, so *P. vannamei* were imported to make up for the decline in *P. monodon* production. In the diagram, these two examples can be shown by the overlapping spheres environment and pathogen (British Columbia and IHN virus/ Thailand and WSSV) becoming overlaid with the third sphere, the new host (Atlantic salmon/ *P. vannamei*); known diseases (IHN/ white spot syndrome) emerge in new species.

#### Scenario 4

A modification of the 'translocation scenarios' is that the translocated agent is not a pathogen of the translocated species, but resident populations in the new location prove to be susceptible. Possibly the first documented case was that of crayfish plague (CP), caused by the fungus *Aphanomyces astaci*. This fungus is ubiquitous in North America where native crayfish are resistant to the disease. In Europe, the disease was first described in the third quarter of the 19<sup>th</sup> century in native European stocks of crayfish, following the introduction of North American crayfish into local river systems. CP subsequently decimated native European stocks of crayfish in many countries (OIE 2006). In the diagram, this can be shown by the overlap of the spheres host (noble crayfish) and environment (Europe) with the third sphere – the pathogenic fungus – and subsequent emergence of the disease CP.

Under the four scenarios above, all examples are cases of EIDs occurring because of translocation of aquatic animal species for aquaculture purposes. However, other activities can have similar effects. For example, taking live koi carp to competitions was implicated in the spread of koi herpesvirus disease in Thailand in 2005 (see quarterly aquatic animal disease reports available at:

<http://www.enaca.org/modules/wfdownloads/viewcat.php?cid=45>).

The importation into Australia of frozen pilchards as tuna feed has been suggested to have introduced a herpesvirus that was found associated with two large scale mortality events in pilchards (*Sardinops*

*sagax neopilchardus*) off Australian's southern coasts in 1995 and 1998; the virus is now considered enzootic in some Australian pilchard populations (Whittington *et al.* 2008). Murray & Peeler (2005) quote other examples where introductions of aquatic animal pathogens are thought to have been caused by movement of product for human consumption, fish food, equipment, and ballast water; however, none of these examples are definitively proven cases.

The four scenarios describe situations of re-emergence of known infectious diseases in new species and in new locations. However, genuinely new infectious diseases readily and frequently emerge in the aquatic environment, because of the large number of aquatic animal species under culture. Animals cultured include vertebrates (an increasing number of fish species, but also some amphibians and reptiles) and a wide range of invertebrate molluscs and crustaceans (the list of which goes well beyond traditional species groups such as oysters, mussels, abalone, prawns and crayfish). A total of 442 species are listed in the Food and Agriculture Organization's 'FISHSTAT Plus' database as being cultured or having been cultured at one time between 1950 and 2004, and this does not include the figures for the production of cultured ornamental fish; in 2004, the database lists 115 families and 336 individual species under culture (FAO 2006).

Knowledge about diseases is largely confined to those species that have been cultured for a very long time and yield a high-value product (such as salmon) that makes investment in health research and development economically justifiable. At the sixth Annual General Meeting of the Asia Regional Advisory Group on Aquatic Animal Health, in December 2007, the list of new EIDs in finfish in the Asia-Pacific region included 'big belly' associated with a new *Vibrio* sp. in sea bass fry, *Streptococcus dysgalactiae* in yellowtail, and *Francisella* sp. and *Streptococcus agalactiae* in tilapia (NACA 2008).

In aquatic animals, and especially so in invertebrates, new and emerging syndromes – rather than neatly defined, one-causative-agent diseases – are frequently found. The role of each infectious agent associated with the disease remains elusive – is it a causative factor? Is its presence sufficient to cause disease? Is the co-presence of two or more infectious agents required?

The Asia Regional Advisory Group on Aquatic Animal Health noted abdominal segment deformity disease (ASDD) as an EID in *P. vannamei*. Many viral-like particles are found in the muscle and ventral nerve cord of affected animals, and a new pathogen originating from natural Asian carrier species appears to have a causative role. Monodon slow growth



syndrome (MSGs) is a serious problem in farmed *P. monodon* in the region and possibly the biggest single disease problem in farmed prawns in Thailand. A novel virus called Laem Singh necrosis virus (LSNV) appears to be associated with MSGs, but a non-pathogenic yellowhead virus "type-4" and an unknown icosahedral viral-like particle associated with tegumental glands are investigated as potential partners for LSNV in causing MSGs.

In Vietnam, milky lobster disease, which has caused losses of USD \$10 million, appears to be caused by a new type of rickettsia. In finfish, loss of mucus and septicaemia syndrome in eel, and visceral toxicosis in catfish were reported as major problems in China, but as yet no agents have been identified with the disease. Also in China, acute viral necrosis was discussed as an emerging disease in scallops (NACA 2008).

Finally, there is also the possibility of the emergence of a more virulent strain of an agent that has existed benignly in a local reservoir without previously being detected. This has been suggested as a possible cause of the onset of infectious salmon anaemia in farmed Atlantic salmon in Norway in 1984 (Nylund *et al.* 2003).

#### 4. Prevention and response: what are our options?

Where a known disease re-emerges in a new geographic area or population, the response would most likely be identical with, or very similar to, the approach taken when that disease normally occurs. The difficulty may principally lie in recognising the disease in the first place, because awareness about this 'exotic' disease may be low among farmers as well as aquatic animal health specialists. In many cases, a confounding factor can be the lack of ready access to an experienced diagnostic laboratory. In cases of a genuinely novel EID, the response options may have to revert to first principles. This is explained below in more detail.

##### 4.1 Detection and diagnosis

An EID would be suspected when a negative impact cannot be explained by known infectious and non-infectious causes. It is likely that the diagnostic definition of an EID would initially consist of a broad syndromic case definition. This could entail trigger points for daily or cumulative mortality rates, or a combination of clinical and pathological signs, or the detection of one or more agents thought to be associated with, but not necessarily the cause of, the disease. It is important to agree and stick to such a definition as soon as possible and to use it consistently when collating data on the occurrence of the disease. The definition will change over time, as a result of gaining experience with cases, and it is

important to document when and how the definition is changed.

The impact of an EID can be acute, with high mortality events, it can take the form of reduced product quality and marketability, or it can materialise as long-term productivity loss because of slow growth or runting. For example, although not affecting survival, the emergence of ASDD in *P. vannamei* farms in Thailand and Indonesia is associated with deformities that lead to a reduction in market prices, therefore leading to significant financial losses. Likewise, MSGs is possibly the biggest single disease problem in farmed prawns in Thailand, because of yields of small, runted prawns (NACA 2008). However, these EIDs, while 'emerging', have not caused 'emergencies'. In cases where disease effects are not dramatic, or when the affected species are of low economic or ecological value, research funds to elucidate disease aetiology and develop diagnostic tools may be slow in coming.

##### 4.2 Response options

If the emerging disease does not present as an 'emergency', the response is most likely to follow proven responses for similarly-presenting diseases. Aspects to consider include the range of affected species, ages or stages of animals affected, ways of transmission, patterns of spread, mortality and morbidity data, etc. A non-emergency presentation of the disease allows time for research to deliver answers to questions about aetiology, epidemiology and through that, management and control.

In an acute outbreak of an unknown disease in aquaculture, a purist approach might be to assume all stock infected, put the farm under quarantine, order the compulsory destruction of all stock and generally follow a 'scorched earth' approach. Looking at a marine salmon farm as an example, there are valid questions that first need to be addressed. For example, in the absence of compensation schemes, farmers may wish to salvage any unaffected animals to reduce financial loss.

But what exactly is 'unaffected', if there is no reliable diagnostic test available? If salvage slaughter is considered, should it be immediate, or should stock be allowed to grow to market size? While immediate slaughter of all animals may not be possible due to staff shortages (for example, number of licensed divers to remove animals) or logistical problems (for example, machinery too heavy for site access), protracted slaughter raises questions about enforcement of movement restrictions. Also, can the disease affect other species in the aquatic environment? Are there human health implications, for the people harvesting the animals or for consumers of product? Does any salvaged product need to be treated in a manner that ensures

inactivation of any possible infectious agent? How are processing effluents to be treated? These are not easy questions to answer, especially in a crisis situation, and while there will always be situations where farmers as well as authorities will have to 'think on their feet', it is prudent – and maybe the only real response option – to plan ahead for such situations (see below). If a novel disease emerges in wild fish in open waters, response options are limited or nonexistent.

A confounding factor may be a lack of clarity about who is in charge at a government level, with potentially involved agencies including veterinary, public health, fisheries and environmental authorities. Clearly, the clarification of governance arrangements should, and easily can, take place in peace-time.

### 4.3 Preparedness rather than response

Many countries are now engaging in discrete disease contingency planning activities as part of broader strategies such as national aquatic animal health plans. Such approaches are no longer necessarily the sole realm of governments; rather, they are frequently initiated by industries. Incentives such as indemnification or compensation in eradication programmes are important. EIDs must not be left out of such planning; rather, emergency response procedures – whilst often initiated with a specific disease in mind – should also allow for enough flexibility to effectively deal with the 'unknown'.

The topic of national aquatic animal disease contingency plans has recently been reviewed by Håstein *et al.* (2008). The authors suggest that while the most immediate benefit of such planning is that an agreed position on 'what-to-do' can be developed in peace-time, there are other specific benefits that include:

- identification of the resources required to underpin effective disease management (whether the resources are equipment, personnel, medications, disinfectants, scientific and technical information, and so on)
- more effective allocation of funding and other resources to priority areas (for example, the identification of the scientific and technical information requirements for effective disease management can lead to the prioritisation of research and development, and so, a more effective allocation of research and development funding to these priority areas)
- improved awareness amongst the range of parties (government, academic, industry,

others?) of the principles of effective disease management

- more realistic expectations of disease responses (as a result of improved awareness of principles of, and resource requirements for, effective disease management)
- reduced conflict between involved parties in a disease response
- improved communication and working relationships among different parties involved in disease management
- opportunities to measure performance in disease simulation exercises against objective requirements outlined in disease strategy manuals.

Another generic tool is on-farm biosecurity. This can be utilised to develop and implement a management-based approach to disease control to avoid spread of the disease while allowing parts of the operation to continue. This concept – known under the perhaps awkward technical term of 'compartmentalisation' – can be used instead of, or more likely in conjunction with, the more traditional 'zoning' that relies on geographical parameters to delineate infected from noninfected areas. While not providing a solution for each disease and each production system, compartmentalisation with its foundation on a partnership approach between the regulatory agency and the private enterprise – and the resulting lesser need for public funds and increased ownership by industry – may well prove to be an excellent means to approach new and emerging diseases in a generic way (Zepeda *et al.* 2008).

Simulation exercises are an excellent tool to test preparedness arrangements for disease responses in general and perhaps even more so for EIDs. A recent paper by Deveney & Scott (2008) summarises the lessons learned from three aquatic animal disease response exercises conducted in Australia, under the headings of inter-jurisdictional coordination, whole-of-government approach, communication, legislative instruments, human resources, counseling and assistance packages, increasing and enhancing technical expertise, industry involvement, and training prior to exercises. The conduct of such exercises is strongly encouraged. Not only do they highlight shortcomings in existing response systems; they are also of immense benefits where true emergencies occur only infrequently and sporadically, and the danger of complacency and a slackening of commitment to follow established protocols is very real. Contingency plans can be road tested in such exercises.

While contingency plans and simulation exercises frequently target high-level government intervention, both preparedness tools can be modified to suit the farm level. In Australia, a recent project developed reference material for on-farm use, called *Emergency simulation exercise and standard operating procedure for a significant unexplained stock mortality or signs of disease at an aquaculture facility*. The material can be downloaded from the Australian Aquaculture Portal at:

<http://www.australian-aquacultureportal.com/links/aah.html>.

It outlines a standard set of logical steps – standard operating procedures (SOPs) – that should be followed in the event of an unexplained stock mortality. The idea is that these generic SOPs should be customised to suit each individual aquaculture operation. The best way to do this is for each facility to undertake an emergency simulation exercise using the guidelines provided.

## 5. Frameworks for dealing with the threat of EIDs

Because of their ‘unknown’ nature and their propensity for spread, EID events can easily present too big a problem for individuals to tackle on their own. Even traditional national frameworks for animal disease management may not be entirely appropriate. For a successful approach to zoonotic EIDs, the following needs have been identified (Morse 2004):

- knowledge of the factors underlying disease emergence
- effective global disease surveillance and early warning
- new technologies in communications, informatics and diagnostics
- research to learn about the natural ecology of infectious diseases
- better prognostic epidemiology to predict emergence and spread
- cooperation between veterinary and human health communities (e.g., OIE and the World Health Organization).

Following are examples and suggestions for components of a framework to deal with aquatic animal EIDs.

### 5.1 Knowledge of the factors underlying disease emergence

Murray & Peeler (2005) applied risk analysis to explore the potential for disease emergence in aquaculture. Risk analysis provided a framework to break down the disease emergence process in four stages:

- 1) emergence of a pathogen (release),
- 2) establishment in a farmed population,

- 3) establishment at the larger (regional) scale, and,
- 4) development of disease and its consequences (economic, ecological, welfare).

Risk analysis also allowed investigating the underlying processes, e.g., increase in production and number of species cultivated, high farm stocking densities, international trade in fish and fish products, climate change, and pathogen exchange between wild and farmed fish populations.

### 5.2 Effective global disease surveillance

The OIE assists its Members in protecting themselves from new and emerging diseases through a variety of provisions. Perhaps the most obvious one is to make such diseases internationally notifiable so that information on their occurrence is rapidly collated and disseminated. The aquatic “criteria for listing an emerging aquatic animal disease” (OIE 2007b) allow the listing of a disease if an infectious agent is strongly associated with the disease but the aetiology is not yet known. Over the last years, abalone viral mortality and white tail disease of the giant fresh water prawn (*Macrobrachium rosenbergii*) were made notifiable using these criteria.

For listed (=notifiable) diseases, the *Aquatic Code* states that “Countries shall make available to other countries, through the OIE, whatever information is necessary to minimise the spread of aquatic animal diseases and their aetiological agents and to assist in achieving better worldwide control of these diseases.” The overall purpose of these provisions is transparency about the animal health situation worldwide. As soon as the OIE Central Bureau receives an immediate notification, they forward it by e-mail as an “Alert Message” to all subscribers to the OIE’s distribution system. This service is free of charge, and anybody can subscribe to it; the information also appears on the OIE website: [http://www.oie.int/eng/en\\_index.htm](http://www.oie.int/eng/en_index.htm)

The *Aquatic Code* specifies the conditions under which its Members must notify the OIE of the occurrence of listed diseases. The following EID events require notification within 24 hours of confirmation:

- the first occurrence or re-occurrence of a disease in a country or zone or compartment of the country, if the country or zone or compartment of the country was previously considered to be free of that particular disease, or
- if the disease has occurred in a new host species, or

- if the disease has occurred with a new pathogen strain or in a new disease manifestation; or
- if the disease has a newly recognised zoonotic potential.

However, OIE Members are also obliged to notify the OIE of the occurrence of non-listed, emerging diseases or pathogenic agents should there be findings that are of epidemiological significance to other countries.

### 5.3 Disease diagnosis

For rapid disease confirmation or exclusion during an outbreak it is crucial that the tests applied are not only accurate but also that they rapidly deliver the result. Although conventional isolation and characterisation techniques for the diagnosis of many diseases may still remain the methods of choice for some time to come, there is the potential to make significant progress in the development of rapid methods that will enhance the diagnosis of disease in aquatic animals. For example, rapid kits based on immuno-chromatography, Luminex xMAP technology, adaptations of the polymerase chain reaction, polygenic sequencing and micro-array technology are all methods that merit validation. Multiplex technologies such as xMAP and micro-arrays both have huge potential for the future because simultaneous analysis of many analytes in one small sample can be achieved (Adams & Thompson 2008).

While novel diagnostic methods for EIDs are needed, easy and rapid access to laboratories to confirm or exclude re-emerging known diseases is just as important. There are currently 27 OIE Reference Laboratories for listed aquatic animal diseases and one Collaborating Centre for Information on Aquatic Animal Diseases. These laboratories play an important role in assisting with the diagnosis of an emerging disease. For example, the OIE Reference Laboratory for epizootic ulcerative syndrome (EUS, a fungal disease of freshwater fish) in Thailand – the Aquatic Animal Health Research Institute in Bangkok – confirmed the tentative diagnosis of EUS as the cause of a serious EID event in the Chobe-Zambezi river system in Africa; the outbreaks had initially been reported as “haemorrhagic septicaemia” (OIE 2007c).

### 5.4 Early detection systems

The OIE *Aquatic Code* describes the requirements for self-declaration of country, zone or compartment freedom from specified diseases. In general, four different pathways exist, i.e., absence of susceptible species, historical freedom, targeted surveillance with negative results (to be underpinned with scientifically based, disease-specific surveys),

and regaining freedom after an outbreak. As part of each pathway, a set of defined “basic biosecurity conditions” must have been met continuously for a specified time period before such a declaration is made. These basic biosecurity conditions are defined in the *Aquatic Code*. They require, *inter alia*, that an early detection system is in place.

Such an early detection system must not only ensure the rapid recognition of signs suspicious of a known disease; it must enable rapid recognition of an EID situation, or unexplained mortality, in aquatic animals in an aquaculture establishment or in the wild, and the rapid communication of the event to the competent authority, with the aim of activating diagnostic investigation with minimal delay.

The *Aquatic Code* further defines that such a system will include the following characteristics:

- a. broad awareness, e.g., among the personnel employed at aquaculture establishments or involved in processing, of the characteristic signs of the listed diseases and emerging diseases
- b. veterinarians or aquatic animal health specialists trained in recognising and reporting suspicious disease occurrence
- c. ability of the competent authority to undertake rapid and effective disease investigation
- d. access by the competent authority to laboratories with the facilities for diagnosing and differentiating listed and emerging diseases.

The benefits to governments of investing in systems that are sufficiently flexible to deal with the ‘knowns’ as well as the ‘unknowns’, and that are aimed at reporting significant events and not only focus on notifiable diseases, are obvious.

### 5.5 Better prognostic epidemiology to predict emergence and spread

Murray (2008) describes how the control or prevention of aquatic animal disease emergence can be assisted through models of factors behind disease outbreaks, models for the design of efficient surveillance, models of disease spread, and models to evaluate consequences of disease outbreaks. Modelling provides an approach to make best use of limited information, a situation quite typical for EIDs. Scientific modeling consists of a range of methods to make understanding of a system formal and transparent. The process of model development helps to improve understanding of the system’s behaviour and identifies specific areas of lack-of – knowledge or of disagreement. Resultant models are a useful means of predicting how a system is likely to

respond to impacts, such as invasion of a disease and mitigating management actions.

## 5.6 Cooperation between veterinary and other competent authorities

In May 2004, the OIE International Committee endorsed a set of recommendations aimed at *inter alia* improving cooperation between veterinary and other competent authorities on aquatic animal health matters (OIE 2004). These recommendations were based on an assessment of the aquatic animal health situation in Asia-Pacific (Bernoth 2004), but the OIE noted that many of the findings had global relevance. For example, the recommendations took into account that in many countries the fisheries authorities had either the sole responsibility for aquatic animal health or shared it with the veterinary services; in those countries, fisheries authorities would take the lead in mounting an emergency response to an aquatic animal disease outbreak, and while the veterinary services were usually well experienced in managing terrestrial animal emergency disease outbreaks, there was infrequent contact between the two authorities. For OIE Member Countries and Territories, the recommendations included to:

1. Direct efforts at improving the coverage of the aquatic sectors with health services and strengthen veterinary and other tertiary education in aquatic animal health.
2. Clarify the roles and responsibilities for aquatic animal health assigned to veterinary and other authorities in their country.
3. Request their veterinary services to improve the communication and cooperation with fishery authorities, especially regarding disease reporting and disease emergency responses.

“Defining roles and responsibilities” was the subtitle of the first OIE Global Conference on Aquatic Animal Health that took place in Bergen, Norway, in October 2006. An increasing awareness of the constraints in handling aquatic animal diseases due both to knowledge gaps and fragmented responsibilities in many countries led the OIE to hold this conference. It focused on co-operation among stakeholders in aquatic animal disease management, infrastructure for disease surveillance and emergency response, communication and networking, education and training needs, and it had a separate session on aquatic animal welfare (Dodet 2007).

In reviewing some of the outcomes of this conference, Bar-Yaacov (2008) suggests that with aquaculture production now one of the major sources of animal protein globally, and with this explosion in production, there is also an increased need to manage and control aquatic animal diseases. Veterinary services have traditionally not played a

major role in aquaculture production and must now assert their competence in aquatic animal health management and control, in cooperation with those government authorities that deal with other aquaculture related issues.

A call for closer cooperation of veterinary authorities with their human health counterparts was made by several authors of the OIE’s publication on *Emerging zoonoses and pathogens of public health concern* (King 2004). Fortunately, emerging diseases in the aquatic environment are rarely zoonotic. However, where the responsibility for aquatic animal EID control rests with veterinary services, there should be an obligation on those services to attempt integration of aquatic animal disease preventive and control strategies between animal health, human health, fisheries and environmental authorities.

## 6. Conclusions and outlook

Trade in aquatic animals and their products will continue and most likely expand. Known diseases will therefore continue to appear in new locations and in new populations. In addition, new aquatic animal species continue to be introduced into culture systems; new infectious diseases will therefore emerge. Given the inherent aspects of ‘novelty’ and ‘spread’ in an EID event, it is not wise to leave discussions about how best to respond to an outbreak situation. Rather, preparedness and response arrangements should be put in place that – while based on proven arrangements for the approach to known diseases – are sufficiently flexible to deal with ‘unknowns’ and can usefully be integrated into broader frameworks for aquatic animal health management.

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**Full instructions are on the form.**

## LEGISLATIVE & REGULATORY ISSUES

From The Times  
April 26, 2008

NEW SWISS LAW PROTECTS RIGHTS OF 'SOCIAL' ANIMALS  
by Bojan Pancevski

It is a world in which the goldfish are never lonely, the dogs are always obedient and the guinea-pigs are never tormented by children. Under a new Swiss law enshrining rights for animals, dog owners will require a qualification, anglers will take lessons in compassion and horses will go only in twos.

From guinea-pigs to budgerigars, any animal classified as a "social species" will be a victim of abuse if it does not cohabit, or at least have contact, with others of its own kind.



The new regulation stipulates that aquariums for pet fish should not be transparent on all sides and that owners must make sure that the natural cycle of day and night is maintained in terms of light. Goldfish are considered social animals, or Gruppentiere in German.

The creator of this animal Utopia is the Swiss federal parliament, the Bundesrat, which adopted a law this week extending to four legs the kind of rights usually reserved for two. The law, which comes into force from September 1, is particularly strict over dogs: prospective owners will have to pay for and complete a two-part course — a theory section on the needs and wishes of the animal, and a practice section, where students will be instructed in how to walk their dog and react to various situations that might arise during the process. The details of the courses are yet to be fixed, but they are likely to comprise about five theory lessons and at least five sessions "in the field".

The law extends to unlikely regions of the animal kingdom. Anglers will also be required to complete a course on catching fish humanely, with the Government citing studies indicating that fish can suffer too.

The regulations will affect farmers, who will no longer be allowed to tether horses, sheep and

goats, nor keep pigs and cows in areas with hard floors.

The legislation even mentions the appropriate keeping of rhinoceroses, although it was not clear immediately how many, if any, were being kept as pets in Switzerland.

Animal protection groups have greeted the news enthusiastically, but critics say that it means an extra financial burden on taxpayers and animal owners, and that it will be impossible to monitor the implementation of the rules. Farmers' associations have protested, arguing that the law will have a negative effect on the economy and decrease their competitiveness on the international market.

One tabloid newspaper has accused the Government of pandering to the needs of guinea-pigs while ignoring more important animal issues, such as its failure to enforce a ban on dangerous dogs.

But Hans Wyss, head of the Swiss Federal Veterinary Office, said: "The aim is not only to ensure treatment of animals appropriate to each species, but also to decrease the risk of attacks by dangerous dogs. Inappropriate treatment could lead to behavioural disorders."

Doris Leuthard, the Economics Minister, assured pet owners that the authorities would not be visiting people's homes to enforce the law — although in extreme cases officials would have the power to intervene — but would count on the results of the training and a positive response from an "informed population".

"We do not want to create a surveillance state," Mrs Leuthard said. She added that, in an age of consumer concern for animal welfare, farmers would benefit from the new law.

Should pet owners require advance guidance as to what will be expected of them, a government website provides it. One entry reads: "Guinea-pigs are very sensitive social animals. They are interesting to look at, but not at all appropriate to be cuddled or carried around by children."

And a word of warning for those planning a mercy killing for their goldfish: special chemicals will be required "to put them to death". Flushing them down the loo is no longer an option.

Sources: [www.thaiaga.org](http://www.thaiaga.org);  
<http://www.timesonline.co.uk/tol/news/world/europe/article3818457.ece>

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Registration with USDA APHIS required to ship live fish/fish eggs to the European Union

Effective immediately, aquaculture facilities must become registered with USDA Animal and Plant Health Inspection Service (APHIS) in order for APHIS Veterinary Services to endorse export health certificates issued for live fish or fish eggs exported to the 27 Member States of the European Union. For a complete list of EU countries visit: http://europa.eu/abc/european_countries/index_en.htm.

Facility registration is voluntary; however, it is required in order for APHIS to endorse health certificates being presented for fish being exported to the European Union. In order for a facility to be registered the facility must have a valid veterinary-client-patient relationship with an APHIS accredited veterinarian and the facility must keep updated records on animal inventory, movement, suppliers and health that are available for review by APHIS if needed.

For more information about the registration process please contact Dr. Kathleen Hartman at 813-671-5230 x 119 or via email at Kathleen.h.hartman@aphis.usda.gov.

Source: Florida Aquaculture, 65 (2008) - http://www.floridaaquaculture.com/publications/Issue_65.pdf.

American Veterinary Medical Association brochure on Animal Welfare is now available online

The AVMA, as a medical authority for the health and welfare of animals, offers the following eight integrated principles for developing and evaluating animal welfare policies, resolutions, and actions:

- The responsible use of animals for human purposes, such as companionship, food, fiber, recreation, work, education, exhibition, and research conducted for the benefit of both humans and animals, is consistent with the Veterinarian's Oath.
- Decisions regarding animal care, use, and welfare shall be made by balancing scientific knowledge and professional judgment with consideration of ethical and societal values.
- Animals must be provided water, food, proper handling, health care, and an environment appropriate to their care and use, with thoughtful consideration for their species typical biology and behavior.

- Animals should be cared for in ways that minimize fear, pain, stress, and suffering.
- Procedures related to animal housing, management, care, and use should be continuously evaluated, and when indicated, refined or replaced.
- Conservation and management of animal populations should be humane, socially responsible, and scientifically prudent.
- Animals shall be treated with respect and dignity throughout their lives and, when necessary, provided a humane death.
- The veterinary profession shall continually strive to improve animal health and welfare through scientific research, education, collaboration, advocacy, and the development of legislation and regulations.

To see the complete brochure, go to: http://www.avma.org/issues/animal_welfare/animal_welfare_brochure.pdf

CONTINUING EDUCATION & PROFESSIONAL DEVELOPMENT

August 25-29, 2008. Health and Colony Management of Laboratory Fish. Mount Desert Island Biological Laboratory, Salisbury Cove, Maine. A short course for technical staff, graduate students, postdoctoral fellows, junior faculty and investigators who utilize or plan to utilize aquatic models in laboratory research. For complete information, visit <http://www.mdibl.org/courses/fishhealth08.shtml>.

August 27-29, 2008. International Workshop on Aquatic Toxicology and Biomonitoring. University of South Bohemia, Vodnany, Czech Republic. For full information: www.vurh.jcu.cz, go to the "Workshops, Conferences and Seminars" link.

September 1-12, 2008. E-Conference on Fish Welfare in Fisheries
Hosted by: Fisheries Society of the British Isles.
The issue: The welfare of fishes, what this means, whether human activities compromise it and, if so, what if anything should be done about it are complex, important and controversial topics. They have already been the subject of considerable debate in the context of aquaculture and recreational fisheries. In both cases, there are still many conflicting interests and many areas of uncertainty and disagreement. However, there is also sufficient consensus to

underpin constructive discussion of strategies and guidelines for the responsible, welfare-friendly use of fish in aquaculture and angling.

What we are trying to achieve: To date, little attention has been paid to the welfare of fish in the context of commercial fisheries, although such attention will surely come and the industry should be prepared for it. The aim of this symposium is to open up debate, exchanging thoughts and hopefully identify a way forward, drawing on the experience gained in discussion of aquaculture and recreational fisheries.

Topics for discussion:

- What is welfare?
- Does the concept apply to fish?
- How can fish welfare best be measured?
- Are there different views of welfare relating to wild fish and to aquaculture?
- What are the common issues for aquaculture, angling and commercial fisheries?
- Are humans natural predators of fish?
- In what areas, if any, do commercial fisheries compromise fish welfare?
- Does this matter?
- What can be done about it?

Format: The e-conference will include introductory remarks by five keynote speakers above over a period of two weeks. The conference will be moderated by an independent e-conference administrator. Weekly summaries will be posted and the output of the e-conference will be used to set key questions for the keynote speakers to address at the symposium held during the 5th World Fisheries Congress in Yokohama.

The main topics for discussion are based on the themes of the one-day symposium to be held at the 5th World Fisheries Congress:

- Welfare and fisheries: Experience from aquaculture.(Felicity Huntingford, University of Glasgow)
- Welfare and recreational fisheries.(Robert Arlinghaus, Leibniz-Institute of Freshwater Ecology & Inland Fisheries, Berlin)
- Welfare in wild-capture marine fisheries. (Julian Metcalfe, CEFAS)
- How to balance the needs and wishes of humans against the concerns for fishes.(Peter Sandøe, Centre for Bioethics and Risk Assessment, University of Copenhagen)
- Living as Part of the Natural World.(J Claude Evans, Washington University, St Louis, USA)

Please register for the e-conference using the form found on the following website:

<http://www.fsbi.org.uk/e-conference-08.htm>

The e-conference can be found on the FSBI

Discussion Board <http://www.fsbi.org.uk/phpbb/>

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**September 6-9, 2008. International Conference on Fish Diseases and Fish Immunology.**

Reykjavik, Iceland. Further details at

[www.yourhost.is/content/view/211/141/lang.is](http://www.yourhost.is/content/view/211/141/lang.is)

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September 15-18, 2008. Aquaculture Europe 2008

including an aquaculture conference, an industry forum and an exhibition, organised by the European Aquaculture Society (EAS) and hosted by Polskie Towarzystwo Rybackie (the Polish Fisheries Association) will take place in Krakow, Poland. Register now at <https://www.was.org/easonline/Registration/Default.aspx>

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**September 17-20, 2008. The 6th Annual Symposium on Conservation and Biology of Tortoises and Freshwater Turtles.**

Tucson, Arizona. For more information contact Conference Program Chairman Don Boyer [DBoyer@sandiegozoo.org](mailto:DBoyer@sandiegozoo.org)

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October 11-12, 2008. Exotic Animal Medicine for the Clinical Practitioner, Los Angeles, California

Presented by the American Association of Zoo Veterinarians. Contact Dr. Sophie Dennison at dennison@svm.vetmed.wisc.edu or Dr. Ewan Wolff at ewolff@wisc.edu.

Register at <http://www.aazv.org>

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**October 20, 2008. CFIA Fish Inspection Program in the global context.**

As part of CFIA's continued commitment to openness and transparency, please be advised that the second Fish Industry - CFIA meeting will take place in tandem with the Fisheries Council of Canada's Annual Conference being held in Quebec. Fairmont Le Château Frontenac, 1 rue des Carrières, Québec City, QC  
Phone: 1-866-540-4460

<http://www.fairmont.com/frontenac/>

Please register your attendance by email to [DART-ERAD@inspection.gc.ca](mailto:DART-ERAD@inspection.gc.ca) or by fax to 613-221-1394 by September 30, 2008. Simultaneous translation will be provided. If you are unable to join us, please note that all documents presented at this meeting will be made available on the CFIA website following the meeting.

**October 12-15, 2008. 15th Association of Reptilian and Amphibian Veterinarians Conference A Joint Meeting with the American Association of Zoo Veterinarians.** Los Angeles, CA

Hilton Los Angeles Airport Hotel  
The Scientific Sessions Include:

Joint ARAV / AAZV Session on Reptile Medicine

- \* Amphibians
- \* Case Reports
- \* Chelonians
- \* Snakes
- \* Lizards

Wet Labs / Workshops Include:

- \* Reptile Diagnostic and Therapeutic Techniques
- \* Evidence-Based Medicine in Practice
- \* Chelonian Necropsy Techniques
- \* Chelonian Endoscopy
- \* MRI/CT Imaging

Master Classes Covering:

- \* Basic Procedures in Fish Medicine
- \* Reptilian Alimentary Canal
- \* Reptilian Toxicology

Keynote Speaker

Dr. Kevin Fitzgerald

For updated conference and registration information please view the ARAV website - <http://www.arav.org>  
For questions, please contact:  
Dr. Wilbur B. Amand (ARAV Executive Director)  
Phone: 610-892-4812; Fax 610-892-4813.

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November 4-5, 2008. SCOFDA workshop "Diagnosis and Control of Fish Diseases", Copenhagen (Denmark)

Main themes of the next SCOFDA workshop are "Control of Pathogens in Warm Water Aquaculture" and "Recirculated Model Trout Farms". The workshop is organised by the University of Copenhagen, Faculty of Life Sciences in Frederiksberg C (Denmark).

Deadline for registration and abstracts: October 1, 2008

Please mail Kurt Buchmann at kub@life.ku.dk

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**January 27-28, 2009. 1st International Congress on Aquatic Animal Health Management and Diseases.**, Tehran, Iran.

**Call for papers** – The 1st International Congress & Exhibition on Aquatic Animals Health Management and Diseases will be held by Veterinary Council I. R. Iran, as Organizer, with active collaboration of Contemporary Conference Organizers as co-organizer and with full support of Iran Fisheries Organization, Iranian Fisheries Research

Organization, Iran Veterinary Organization, Faculty of Veterinary-University of Tehran and Iran Department of Environment on **January 27-28, 2009**, in Tehran-Iran.

The main aim of this Congress & Exhibition is creating a dynamic scientific environment for presenting, transferring and exchanging the know-how and latest advanced research findings and scientific achievements in all health and nutrition management aspects of aquatic animals and in particular on diseases, prevention and treatment, nutrition health management, water quality management, and health management in aquaculture farms through active participation of Iranian and foreigner veterinarians, researchers, scientists and experts.

Topics of Congress consist of:

- Diseases, Prevention and Treatment
- Nutritional Health Management
- Water Quality Management
- Health Management in Farms

You and your distinguished colleagues are kindly invited to send abstracts of papers by October 21, 2008 to secretariat, to be submitted to the congress scientific committee. The abstract should include: title, authors, affiliations, corresponding author e-mail, abstract (not more than 350 words) and 5-7 keywords.

Also in conjunction with this Congress, an Exhibition will be held which creates a valuable opportunity for foreign and Iranian companies active in all above mentioned fields and also in all disciplines of fisheries, aquaculture and seafood production and processing to introduce their capabilities, products and services, and also to seek for new markets and business partners and opportunities in Iran's huge and vast market.

The interested scientists, researchers, experts and companies could take part actively as sponsor, exhibitor or participant.

For more information please contact:

Dr. Issa Sharifpour

Congress & Exhibition Secretariat

Address: Unit 2, No. 208, Shohadaye Jandarmery St., 12<sup>th</sup> Farvardin St., Enghelab Ave., Tehran-Iran, P. O. Box: 13145-198

Tel: +98- 21- 66976060

Fax: +98- 21- 66970742

Mobile: +98- 912- 3544582

[info@icahmd.com](mailto:info@icahmd.com)

Web site: [www.ichmda.ir](http://www.ichmda.ir)

**27 April - 1 May 2009. 34th Annual Eastern Fish Health Workshop**

High Peaks Resort, Lake Placid, New York

For more information:

Rocco Cipriano: [rcipriano@usgs.gov](mailto:rcipriano@usgs.gov)

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May 2-6, 2009. 40th annual IAAAM Meeting and Conference.

Radisson Hill Country Resort and Spa in San Antonio, Texas, USA.

For more information www.iaaam.org

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**16-27 November 2008. Training Course: Fish Health Management, WorldFish Regional Center at Abbassa (Egypt)**

The course is designed for fish hatchery/farm managers, technicians, veterinarians, paraveterinarian professionals, extension agents, food safety specialists and researchers. The focus of the course will be on warm water fish, including both freshwater and marine species.

For more information:

[http://www.onefish.org/servlet/BinaryDownloaderServlet?filename=1217932111888\\_FishHealthManagementCourse.pdf&refID=433969](http://www.onefish.org/servlet/BinaryDownloaderServlet?filename=1217932111888_FishHealthManagementCourse.pdf&refID=433969)

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November 7-22, 2008. Training courses: BIM Fish Welfare, November 2008, different locations/dates – Ireland

Stemming from initial discussions with the aquaculture industry, the level 6 Farmed Fish Welfare Training Course, which has received approval from the Further Education and Training Awards Council (FETAC), is aimed at those working with finfish, whether in commercial growing or research, and covers aspects of many different species including salmon, cod and trout, as well as some tropical and ornamental species. The course is designed and tailored both for those working day-to-day with the fish as well as those in management.

BIM, in conjunction with IFQC SMART Training Solutions and Vet Aqua International, will deliver the three-day training courses, which comprises two classroom days and a follow-up practical farm day, in three locations around the coast, namely;

- 7-8 November, Venue: Letterkenny Institute of Technology (Letterkenny)
 - 13-14 November, Venue: Marine Institute buildings (Galway)
 - 21-22 November, Venue: Environmental Research Institute (Cork)
- €200 per course per participant. Group discount for 10 people or more.

For more details and to book, please contact Dr. Susan Steele on 027-71232, by text 087-6825294 or by e-mail steele@bim.ie

HELP CREATE AND PROMOTE THE IMAGE OF WAVMA AND AQUATIC VETERINARY MEDICINE



Please e-mail any high resolution (>300 dpi) pictures that clearly illustrate what aquatic veterinarian's do, or the species or conditions we work with to: dscarfe@ameritech.net. All contributions will be fully credited if used. To prevent copyright violations please indicate the owner or source.

Images are only intended to be used for developing WAVMA brochures and other promotional materials to accompany a WAVMA booth. However, with the owner's permission, they may be used in a future "Image Library" accessible to WAVMA Members only.



INTERNATIONAL AQUACULTURE BIOSECURITY CONFERENCE

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Phone: (515) 294-7189
Fax: (515) 294-8259
e-Mail: iabcsec@iastate.edu
<http://www.iabconference.org>

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- Social Programs, Farm Visits and Tradeshow for stakeholders to promote their services

Audiences/Participants

International, national, regional, state/provincial and local:

- Aquatic veterinarians and veterinary organizations
- Aquaculture producers and industry organizations
- Government agencies and standards-setting bodies
- Academic education, research and extension personnel
- Commercial aquaculture-supportive entities

Conference/Workshop Coverage

- National/International Biosecurity Strategies
- Legislation/Regulations
- Risk-Analysis and Hazard Identification
- Epidemiology/Surveillance
- Prioritizing, Diagnosing & Confirming Diseases
- Certifying & Auditing Disease Status
- Contingency/Emergency Responses
- Building and Implementing Disease & Site-Specific Biosecurity Plans

Coordinating Entities

- American Veterinary Medical Association
- Atlantic Veterinary College, University of Prince Edward Island
- Center for Food Security and Public Health, Iowa State University

- College of Veterinary Medicine, Iowa State University
- Institute for International Cooperation in Animal Biologics, Iowa State University
- Norwegian National Veterinary Institute
- World Aquatic Veterinary Medical Association

For Sponsorship & Tradeshow Opportunities – Please contact the Secretariat

COLLEAGUE'S CONNECTION

READ ABOUT DR. ROBERT HILDRETH –
By TOM BERG
THE ORANGE COUNTY REGISTER

It's not sushi, but you won't believe what Dr. Bob does with a scalpel and a fish. The Irvine, California veterinarian once removed 3-pound tumor from 11-pound fish. His priciest patient was \$80,000 koi.

"You might want to step back," says the surgeon wearing shorts and sneakers. "There's going to be some splashing!" With that, he lifts a 25-inch fish named "George W" out of a tub of anesthetizing water and carries him into the X-ray room. Fish owner Don Chandler, a retired policeman, assists while his wife, Brenda, looks on in obvious emotional pain.

See this interesting article in a local newspaper about "Dr. Bob" Hildreth - one of about 20 fish surgeons in the nation...at <http://tinyurl.com/3lupfm>.

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### US VET VISITS ISRAEL FOR KHV CONFERENCE – Dr. Tim Miller-Morgan visits local koi farms



*Dr. Miller-Morgan in the middle of the group at Mag-Noy*

In February 2008 Dr. Tim Miller-Morgan from Oregon State University, College of Veterinary Medicine, Ornamental Fish Health Program traveled to Israel where he was invited to speak at the International Workshop on Cyprinid Herpes Virus-3 (Koi Herpes Virus). He presented a paper outlining the development of koi industry training programs intended to reduce the risks of KHV being introduced to retail facilities and subsequently to their customers' ponds.

These outreach programs focus in two areas, the first is basic education for koi dealers about koi herpes virus, the principles of health management, basic fish biology and an introduction to the principles

of biosecurity in a pet fish retail setting. The second portion of this outreach program is the development of a best health practices (BHP) certification program for koi dealers. This program is designed to mitigate some of the common risk factors associated with the introduction of disease, particularly koi herpes virus, into retail facilities and customers' ornamental ponds.

Both the education program and the BHP program's protocols were developed by a group of practicing fish veterinarians and aquaculture specialists familiar with the koi industry in the United States. BHP program participants will be certified by veterinarians with fish experience who have completed an online training program that addresses the specific requirements and rationales for the program guidelines. Currently 12 beta sites and participating veterinarians are evaluating the effectiveness of the BHP program. Core funding for the development of these programs came from the Associated Koi Clubs of America.

Dr. Miller-Morgan spent a few extra days visiting Israeli koi and food carp aquaculture facilities. He was particularly focusing on their current approaches to biosecurity as it relates to KHV management. Israeli koi farms are currently utilizing two approaches: 1) strict biosecurity in which production of koi takes place indoors in a completely biosecure facility, and 2) an approach that combines less extensive biosecurity with vaccination. Israel is the only country currently marketing a vaccine for KHV. It is not yet approved in the US.



*Indoor facility for raising koi – Photo by Tim Miller-Morgan*

Dr. Miller-Morgan is also developing some internship and externship opportunities at Israeli koi farms for veterinary students at Oregon State University, as well as for students participating in a 2-year professional Aquarium Science program at the local community college in Newport, Oregon. There is a good chance he will have our first Aquarium Science interns placed on one of the Israeli koi farms

next Spring. He's currently developing opportunities with one farm which operates a completely biosecure recirculating system and another with a group consisting of a cooperative of five fish farms.

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AQUATIC VETERINARY EMPLOYMENT OPPORTUNITIES

Aquatic veterinarian wanted -

Panaquatic Health Solutions Pty Ltd ("Panaquatic") provides high quality veterinary aquatic animal health and management advice to both the private and public sector. Clients range from commercial aquaculture companies farming species including abalone, barramundi and tuna to governments developing policies for these industries.

Panaquatic is seeking a full time veterinarian who ideally is experienced in aquatic animal health. Applications from veterinarians wishing to work in this exciting field but who have limited experience will be considered. A training program may need to be negotiated if such an applicant was chosen. A strong understanding in epidemiology and the ability to prepare and present high quality, thoroughly researched reports would be highly regarded.

The position is based in Melbourne, Australia and the successful applicant will be required on occasion to travel interstate and possibly overseas.

Salary will be negotiable and will be dependent on the experience of the successful applicant.

Interested applicants can forward a detailed application to Ms Stephanie Alexander by fax (03 98181200) or email steph@panaquatic.com

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**Assistant Professor Fish Health -**

**Lake Superior State University** seeks a tenure-track faculty member in the Department of Biological Sciences beginning Fall semester 2008.

*Qualifications:*

Candidates must be trained in the discipline of fish health with a DVM or Ph.D. in Biology or related discipline. Preference will be given to candidates who demonstrate potential for exceptional teaching and expertise in analytical techniques such as QELISA, Q-PCR and histopathology.

*Responsibilities:*

This faculty member will be appointed half-time to oversee the Aquatic Research Laboratory Fish Health Lab and half-time to teach upper level undergraduate courses such as Virology, Ecology of Animal Disease, Animal Physiology and Histopathology. The successful candidate will also be expected to advise students, to assist with senior research projects, and to serve on departmental committees.

*The Department:*

LSSU's Department of Biological Sciences offers undergraduate degrees in Biology, Fisheries and Wildlife Management, Clinical Laboratory Science, and Biology Secondary Education. A new BS degree in Fish Health will begin Fall 2008. The department has a strong tradition of teaching excellence in organismal biology, pre-professional studies, and natural resources ecology. The department currently has 300 majors, and 12 full-time faculty covering the range of biological sciences. For more information about the department and the Aquatic Research Lab, visit [www.lssu.edu/biology](http://www.lssu.edu/biology) and [www.lssu.edu/arlab](http://www.lssu.edu/arlab).

*To Apply:*

Submit a signed cover letter, CV, statement of teaching philosophy, and names and contact information for three references to Fish Health Search Committee, Human Resources Office, Lake Superior State University, 650 W. Easterday, Sault Sainte Marie, MI 49783. For more information, contact Human Resources at 906.635.2213.

Priority Deadline August 1, 2008.

Search will continue until position is filled.

Equal Opportunity/Affirmative Action Employer.

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Chicago Zoological and Aquatic Animal Residency Program -

The University of Illinois, College of Veterinary Medicine in conjunction with Brookfield Zoo, Lincoln Park Zoo and John G. Shedd Aquarium are offering a three-year residency in Zoological and Aquatic Animal Medicine. The residency is approved by the American College of Zoological Medicine (ACZM) and is supervised by two Diplomates of this college. Interested candidates are encouraged to contact and/or visit participating institutions the summer prior to applying or well before the application deadline. Please contact Dr. Jennifer Langan, DVM, Dipl. ACZM via Barbara Matuch at Barbara.Matuch@CZS.org, Dr. Kathryn Gamble, DVM, MS, Dipl. ACZM (kgamble@lpzoo.org) or Dr. Bill Van Bonn (bvanbonn@sheddaquarium.org) for more information.

Applications should include a letter of intent, curriculum vitae, original transcripts, and three letters of reference. Applications should be sent to:

Sheila Voyles (svoyles@uiuc.edu)

Attn: CZAAR

University of Illinois, College of Veterinary Medicine
Department of Veterinary Clinical Medicine
282 SAC, 1008 West Hazelwood Drive
Urbana, IL 61802,
FAX: 217-244-1475.

Applications will be accepted October 1- 22, 2008.

Staff Veterinarian Position Available

Atlantis, Paradise Island Nassau is seeking a Staff Veterinarian to oversee the health and well being of our resorts marine mammals and a variety of sharks, fishes, rays, and turtles. Applicants can e-mail their resume to Teri Corbett, Vice President or Marine Mammal Operations at the following address: teri.corbett@kerzner.com.

Job Summary

Plans, directs and participates in the health care of Atlantis' marine animals. Establishes and conducts effective quarantine and testing procedures for all incoming animals to ensure the health of the collection, prevent the spread of disease and comply with all government regulations. Conducts regularly scheduled preventative care programs to maintain the health of the animals and guard against communicable diseases. Participates with other personnel in planning and executing nutrition, quarantine, and reproductive programs. Participates in employee training in the proper handling and care of the animals. Conducts postmortem studies and analyses. Cooperates with other zoo and aquarium personnel to exchange information concerning the care of animals.

Skills and Abilities

1. Must possess the ability to successfully implement and manage a complete veterinary medical program.
2. Perform clinical procedures, diagnostic and therapeutic procedures, and surgery as required.
3. Demonstrate a strong knowledge of the biology, husbandry and medicine of exotic (non-domestic) animals in captivity.
4. Ability to conduct applied clinical research and to present research findings at conferences and in peer-reviewed journals.
5. Ability to teach and explain complex medical procedures to the staff.
6. Strong leadership, communication, and interpersonal skills.

Main Duties

- * Collect or direct the collection of various body tissues, blood, urine, bacteria, or feces for examination and analysis.
- * Advises on the problems in the general care and maintenance of animals in the collections.
- * Responsible for the maintenance of the animal records program of all related medical information and supervise appropriate procedures to check the accuracy of the data entered.
- * Establish and conduct quarantine and testing procedures that prevent the spread of disease to other animals or to humans, and insure compliance with all applicable governmental regulations.
- * Examine animals to detect and determine the nature of diseases or injuries.

* Operate diagnostic equipment such as radiographic and ultrasound equipment and interpret the resulting images.

* Conduct postmortem studies and analysis to determine the cause of an animal's death.

* Perform various administrative duties such as budget development, scheduling appointments, record keeping, and staff appraisals.

* Plans and executes, along with the animal management team, all animal nutrition and reproductive programs.

* Assist in the proper training of animal care techniques and various medical procedures as appropriate.

* Participate in the exchange of information with other zoos and aquariums.

* Ability to conduct applied clinical research.

* Responsible for summarizing the data collected from staff and independent clinical studies into a scientific format for presentation and/or publication in appropriate peer-reviewed scientific journals.

* Maintains up-to-date familiarity with veterinary medical information and new drug developments.

* Responsible for pursuing and maintaining all appropriate licenses to practice veterinary medicine within the country and for obtaining and maintaining appropriate credentials for the storage and use of controlled substances.

* Presents a professional approach to his/her career and function as a team member, showing consideration, tolerance, cooperation, reliability and the ability to accept criticism.

* Maintains the department standard of excellent physical condition as needed to perform all aspects of the job safely.

* Extended travel and acceptance of irregular hours is a requirement.

* Serves as a spokesperson to guests and various media as required.

Required Education/Training

* Doctorate of Veterinary Medicine from an accredited institution

* Must hold and maintain a valid veterinary license in the Bahamas

* Must be (or become) registered under the provisions of section 5 of the Veterinary Surgeons Act

* Minimum of two years training in exotic veterinary medicine, with marine mammal experience, particularly with cetaceans, preferred

* Scuba Certification preferred

* Cardiopulmonary Resuscitation (CPR)

Applicants can e-mail their resume to Teri Corbett, Vice President or Marine Mammal Operations at the following address: teri.corbett@kerzner.com.

Aquatic Vet News



Vol. 2, No. 3 Summer 2008
Newsletter of the World Aquatic Veterinary Medical Association

One Profession; One Discipline; One Voice – Cohesive & Inclusive!

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dulep@iastate.edu

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Dr. Christopher I. Walster (UK)
+44 (178) 525-8411
chris.walster@onlinevets.co.uk

Aquatic Veterinary Education

Dr. Tim Miller-Morgan (USA)
+1 (541) 867-0265
tim.miller-morgan@oregonstate.edu

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Dr. Peter L. Merrill (USA)
+1(301) 210-0940
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Meetings

Dr. Julius Tepper (USA)
+1 (631) 281-8777
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World Aquatic Veterinary Medical Association

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2008 MEMBERSHIP APPLICATION

INITIAL APPLICATION or **RENEWAL** (check one)

For your convenience please complete and mail with the correct remittance (in US\$), or credit card information, to:

Dr. Dusan Palic
4211 Welbeck Dr.
Ames, IA 50010-4018 USA
Phone: (515) 441-1509
e-Mail: dulep@iastate.edu

Credit Card Payments <input type="checkbox"/> Visa; or <input type="checkbox"/> Master Card	
Name on Card _____	_____
Card Number _____	_____
Card Security Code _____	Signature _____
For e-Copies Typing your name will indicate your signature	

Please complete **all mandatory fields marked with an***. Please be as accurate and comprehensive as possible.

Contact Information

*Name (First, Middle, Last) _____
Business/Organization (if applicable) _____ Position/Title _____
*Mailing Address _____
*City _____, *State/ Province/ Canton/ County (UK) _____
*Zip/Postal Code _____, *Country _____
*Primary Phone _____ Is this a business ? /home ? or /cell/mobile ?
Secondary Phone _____ Is this a business ? / home ? or /cell/mobile ?
*Primary e-Mail _____; Secondary e-Mail _____
(Secondary e-Mail addresses will be used if the primary address becomes non-functional)

Check one membership category ¹

Full Member (US\$100) **Student Member** (US\$50)
Primary Veterinary Degree (as awarded e.g. DVM; VMD; BVMS; DEDV; Dr. vet. med.; MVZ, etc) _____
Year _____; University _____; City _____; Country _____
 Veterinary Technician/Nurse Member (US\$50)
Name of supervising veterinarian _____; Phone _____; e-mail _____
 Affiliate Member (US\$100)
*Degree _____; *Year _____; *University _____; *City _____, *Country _____
 Allied Veterinary Organization Member (US\$500)
*Total number of 2007 members _____; *Number (or %) of members that are *veterinarians* _____;
*Estimated number of members involved with *aquatic veterinary medicine* (any species/disciplines) _____

Would you like any information to be excluded from your membership listing in an Annual Membership Directory?

If so, please specify: _____

¹ 2008 Membership Categories & Privileges

Full Member—individual veterinarians that have graduated from veterinary Schools, Colleges or Universities recognized by any country as being a prerequisite for practicing veterinary medicine. Full Members are eligible to be nominated and serve as WAVMA Officers, and to serve on any WAVMA Committees.

Allied Veterinary Organization Member—legally formed organizations or entities (association/society) whose members are predominantly veterinarians. Allied Veterinary Organization Members are eligible to appoint a delegate and alternate delegate (must be WAVMA Full Members in good standing) to serve on the WAVMA Advisory Council.

Student Member—students enrolled fulltime in veterinary Schools, Colleges or Universities recognized by any country as being a prerequisite for practicing veterinary medicine. Student Members are entitled to all the rights and privileges of Full Members, except to serve as an Officer of the Association, or to vote in any general election, referendum or ballot of the Association's Full Members.

Veterinary Technician/Nurse Member—any non-veterinarian that is employed to assist in the legal practice of veterinary medicine, while under the direct supervision or direction of a veterinarian. Veterinary Technician/Nurse Members are entitled to all the rights and privileges of Student Members, except to serve in any voting capacity on any committees, councils, trusts, boards, liaisons or other entity that may be formed to do Association business.

Affiliate Member—any non-veterinarian that is a graduate of a nationally recognised university or institution of higher education, and who supports the Mission and Objectives of the Association. Affiliate Members are entitled to all the rights and privileges Student Members, except to serve in any voting capacity on any committees, councils, trusts, boards, liaisons or other entity that may be formed to do Association business.