

# International Ichthyoparasitology

## Newsletter No. 23

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## EDITORIAL

As always, I thank everyone who has contributed to this issue of the Newsletter. I also thank David Gibson for his editorial assistance and for posting the Newsletter on his website.

It has been a busy year in fish parasitology, most notably with many ichthyoparasitologists attending the 9<sup>th</sup> International Symposium on Fish Parasitology (ISFP9) in Valencia, Spain. We look forward to the 10<sup>th</sup> ISFP to be held in Brisbane, Australia in 2019.

If you wish to contribute to the next issue of the Newsletter (Number 24), the deadline date for submission is **November 15, 2016**. My contact details are at the end of this Newsletter. This, and future issues, will be available on David Gibson's Web Pages at: <http://www.diplectanum.talktalk.net/newsletter/>

## ANNOUNCEMENT



**3RD INTERNATIONAL WORKSHOP  
ON SYMBIOTIC COPEPODA**  
HERON ISLAND AUSTRALIA  
10-16 JULY 2016



This 7-day taxonomic workshop (July 10–16, 2016), led by experts in the field, will include: lectures, discussions, research presentations, dissection and identification techniques, lab tutorials, illustration techniques, field collections from the Great Barrier Reef and one day dedicated to symbiotic isopods. The course tutors are: **Professor Geoff Boxshall**, Natural History Museum, U.K., **Professor Rony Huys**, Natural History Museum, U.K., **Professor Nico Smit**, North-West University, South Africa, **Professor Niel Bruce**, Museum of Tropical Queensland, Australia

Organising Committee: **Dr Kate Hutson**, James Cook University, Australia, **Dr Julianne Kalman Passarelli**, Cabrillo Marine Aquarium, U.S.A., **Dr Danny Tang**, Orange County Sanitation District, U.S.A.

**For more information, please visit <https://sites.google.com/site/iwosc2016/> or contact Dr Kate Hutson (Email: [kate.hutson@jcu.edu.au](mailto:kate.hutson@jcu.edu.au); Tel. +61 7 478 16216)**

# MEETING REPORT

The 9<sup>th</sup> International Symposium on Fish Parasites (ISFP9) was held at the University of Valencia (Spain) between August 31 and September 4, 2015. This Symposium was organised by the University of Valencia and the Spanish Research Council (CSIC).



The scientific programme included a large number of disciplines and research fields in fish parasitology, with special reference to the “New Challenges in Fish Parasitology”. ISFP9 included eight plenary lectures by **Jerri Bartholomew** (USA), **Tim Littlewood** (UK), **Barbara Nowak** (Australia), **Frank Nilsen** (Norway), **Tomáš Scholz** (Czech Republic), **Bernd Sures** (Germany), **David Thieltges** (The Netherlands) and **Juan Timi** (Argentina). Over 150 oral and 200 poster presentations, divided between 33 sessions, were presented. Additionally, two international collaborative forums (“New projects & courses” and “European Centre of Ichthyoparasitology, Czech Republic: promotion of a research and training centre”) and four workshops (“The Biodiversity of Trematodes of Fishes”, “Epidemiology, prophylaxis and control of parasites in aquaculture”, “Myxozoa” and “Biobanking: a new approach for improving research on fish parasite biorepositories”) were held.



More than 300 scientists from 54 countries attended. Forty (partial or total) registration fee grants for young scientists and six best student presentations were awarded (Best oral presentations: **Jordan Poley**, **Russell Qi Yung Yong**, **Sneha Patra**; Best poster presentations: **Jonathan Ben-David**, **J. Schwelm**, **Alma Gabriela Islas Ortega**).

The ISFP9 was made possible thanks to the effort of many people, including 25 graduate students and post-doctoral volunteers (pictured below), external referees for the abstracts,

members of the organising and scientific committees, and technical support from ADEIT. Despite current economic shortcomings, we received support from several institutions and companies: the University of Valencia (especially the Cavanilles Institute of Biodiversity and Evolutionary Biology, the Faculty of Biological Sciences and the MCI-Aquacluster), the CSIC (in particular, the “Torre de la Sal” Aquaculture Institute), the Generalitat Valenciana and MINECO, the Autonomous University of Barcelona, CAB International, VWR and the Andromeda Group. Special support was obtained from the City of Arts and Sciences through public and technical visits to the Oceanographic Aquarium.



Additionally, our social programme gave conference participants the chance to experience, in depth, both Valencia and its natural surroundings, and included a walking, guided tour to the Historic Centre of Valencia, a visit to the Oceanographic Aquarium and a visit to the wetland “La Albufera” Natural Park.

The 10<sup>th</sup> ISFP will be held at Brisbane (Australia) to be organised by Tom Cribb and his team at the University of Queensland in 2019.

Toni Raga, Chairman of ISFP9

# CURRENT RESEARCH ACTIVITIES IN VARIOUS COUNTRIES

## AUSTRALIA

provided by Kate Hutson, [kate.hutson@jcu.edu.au](mailto:kate.hutson@jcu.edu.au)

The *Marine Parasitology Laboratory* at James Cook University in Queensland is led by **Kate Hutson** and includes the PhD students **Alexander Brazenor**, **Giana Gomes**, **Alejandro Trujillo-González** and **David Vaughan**, and Masters students **Soranot Chotnipat** and **Joshua Allas**. Our research largely involves capsalid monogenean culture methods, reproductive biology, systematics and treatment. We are also examining the parasites of imported ornamental fishes and potential biocontrols.

**Kate**, **Alex** and **Alejandro** (pictured right with **Ana Gabriela Trasviña Moreno**) attended ISFP9.

Immediately prior to this, they participated in a workshop on parasites of aquaculture fishes, coordinated by **Barbara Nowak** and **Francisco Montero**, where **Kate** gave an invited overview presentation on the key parasitic diseases of aquaculture fishes in tropical Australia.

**Kate** spent time working at the Natural History Museum, London with **Geoff Boxshall** on a revision of the poorly known Australasian argulid fauna (parasitic Branchiura). She has identified 30 lots of previously unidentified argulids from Australian museums. **Giana** had a successful Researcher Exchange at the Microbial Diversity Laboratory at UMass-Amherst (Program in Organism and Evolutionary Biology) led by **Laura A. Katz**. She is learning new techniques for cultivating ciliate parasites of fishes and now has a healthy culture established in the laboratory. **Alejandro** is continuing on in the laboratory (following the award of his MSc) for his PhD on the parasites of ornamental fishes. He spent time during 2015, working in Spain with **Ariadna Sitjà-Bobadilla** at the Instituto de Acuicultura de Torre de la Sal, on protozoan parasites of ornamental fishes. Masters of Applied Science student **Joshua Allas** was also involved in the ornamental fish project, with a focus on parasites of imported cardinal fishes.



**David Vaughan** recently moved from South Africa to start a PhD on the ecology of cleaner shrimp using a monogenean experimental model. **Soranot Chotnipat** returned to the laboratory (following a Masters of Applied Science in 2014) to conduct his MSc project on pharmaceutical treatments for monogenean infections on farmed fishes. The laboratory said goodbye to Research Fellow **Terry Miller**, who moved to Perth for a new position as a Senior Research Scientist at the Fish Health Laboratory, Dept. of Fisheries Western Australia. We also said goodbye to **Alex**, who has secured a position as Policy Officer in the Technical Assurance team in the Animal Biosecurity Branch, Department of Agriculture and Water Resources, Canberra.

At the South Australian Museum, **Prof Lesley Warner** completed a large checklist of Acanthocephala from Australian fish, and **Leslie Chisholm** has started to work again on monogeneans from sharks and rays, after spending the past year involved with higher level Collection Management duties.

## IRAQ

provided by Prof Dr Z. I. F. Rahemo, [zohair\\_rahemo@yahoo.com](mailto:zohair_rahemo@yahoo.com)

### University of Salahaddin

At the University of Salahaddin (Kurdistan Region), **Prof Dr Shamall M. Abdulla** is very active supervising the MSc thesis of **Younis Sabir Abdulla** from the Department of Pathological Analysis, Sulaimani Polytechnique University, entitled “*Dactylogyrus scrjabinensis* (Monogenea: Dactylogyridae): first occurrence on the gills of *Capoeta trutta* from Iraq”. He is also working with **Ashna Muhamad-Ali Abubakr**, studying nematodes of two cyprinid fishes from the Greater Zab River near Aski-Kalak, Kurdistan Region, with special reference to the effect of sex, length and season on infection rates.

**Dr Samir J. Billal**, from the College of Education at Salahaddin University, is conducting a number of studies including: a revision of the species of the cestode genus *Khawia* from Iraqi freshwater fishes; examining the effects of sex and age of *Luciobarbus kersin* (Cyprinidae) on the parasitic nematode *Rhabdochona kurdistanensis* from the Great Zab River; and a comparative study of the intestinal helminths parasitising some fishes from the Greater and Lesser Zab Rivers at, Erbil, Kurdistan Region, Iraq.

### University of Basrah

In different research centres and laboratories at the University of Basrah, a number

researchers, including **Drs Khalidah S. Al-Niaeem** (pictured right with her students), **Atheer H. Ali**, **N.R. Khamees**, **F. Mhaisen**, **Hayder A.H. Al-Hasson**, **Suzan A. Al-Azizz**, **Fatimah H. Al-Ataby**, **Azhar A. Al-Saboonchi**, **Omar M. Amin** and **Atif M. El Naggat** carried out various studies on the parasites of Iraq fishes. These studies included investigations on *Gyrodactylus* (Gyrodactylidae) and *Ligophorus* spp. (Dactylogyridae) from the gills of mullets collected from the inland waters of



southern Iraq, a description of a new species of *Ligophorus*, checklists of crustaceans and nematodes of freshwater and marine fishes of Basrah Province, and a study on the monthly variation of parasites on carangid fishes in the northwest Arabian Gulf.

In addition, *Anuretes similis* (Copepoda: Caligidae) was recorded for the first time on the sordid rubberlip, *Plectorhynchus sordidus* (Haemulidae), and the plerocercoid *Floriceps minacanthus* (Cestoda: Trypanorhyncha) was recorded for the first time in two carangid fishes, *Carangoides armatus* and *C. malabaricus*, from the northwest Arabian Gulf. A paper documenting new features, using the SEM, and the histopathology of *Neoechinorhynchus*

(*Neoechinorhynchus*) *dimorphospinus* (Acanthocephala: Neoechinorhynchidae) from recent collections in the Arabian Gulf was also recently published.

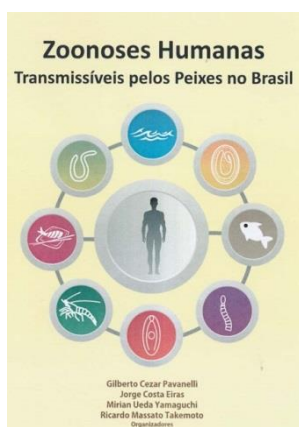
**Mr Rashad Abdul Zahra Ahmed** completed his MSc thesis entitled: “Evaluation of organic pollution levels and its effect on the diversity of filamentous benthic algae and fishes infected with copepods from three stations in Basrah Province, Iraq”.

## PORTUGAL

provided by Maria João Santos, [mjsantos@fc.up.pt](mailto:mjsantos@fc.up.pt)

The **Animal Pathology Group of CIIMAR** – CIMAR Associated Laboratory, University of Porto, headed by **Maria João Santos**, includes other senior team members: **Aurélia Saraiva** ([amsaraiv@fc.up.pt](mailto:amsaraiv@fc.up.pt)), **Carlos Azevedo** ([azevedoc@icbas.up.pt](mailto:azevedoc@icbas.up.pt)), **Cristina Cruz** ([cfcruz@fc.up.pt](mailto:cfcruz@fc.up.pt)), **Graça Casal** ([gcasal@icbas.up.pt](mailto:gcasal@icbas.up.pt)) and **Jorge Eiras** ([iceiras@fc.up.pt](mailto:iceiras@fc.up.pt)).

Several students and collaborators are currently working on their theses or other projects in fish parasitology, including: **Susana Pina** (Post-Doc), **Joana Costa** (Post-Doc), **Francisca Cavaleiro** (PhD, Volunteer), **Luis Rangel** (PhD student), **Sónia Rocha** (PhD student), **Caner Sirin** (PhD student), **Ricardo Castro** (MSc, Volunteer), **Duarte Frade** (BSc, Volunteer), **Daniela Cruz** (BSc student) and **Marco Amaral** (BSc student). The Laboratory of Pathology investigates the pathology of freshwater and marine fish species. Some studies focus on Portuguese fish species, whereas others include work on important tropical fish species, mainly from South America (Brazil) and Saudi Arabia. Thus, we have a strong collaborative research programme which was established more than two decades ago. Projects currently running include: A survey of pathogenic agents of important aquaculture fish; Parasites of marine fish from off Alagoas, Brazil; Apicomplexa and Myxozoa from seabass (*Dicentrarchus labrax*), seabream (*Sparus aurata*) and estuarine polychaetes; Trematode life cycles, using morphology and molecular tools



A book (see left) on “Human zoonosis transmitted by fishes in Brazil” will be published very soon, in a collaborative work with Brazilian colleagues.

The **Project IDASSMyx** - Infection Dynamic of Aquaculture Seabass and Seabream by Myxozoa (FCOMP-01-0124-FEDER-020726 (Refª. FCT - PTDC/MAR/116838/ 2010)) (April 2012 – September 2015), headed by **Maria João Santos** with the collaborators **Carlos Azevedo**, **Csaba Székely**, **Cech Gábor**, **Graça Casal**, **Luis Rangel**, **Ricardo Severino**, **Francisca Cavaleiro**, **Sónia Rocha** and **Ricardo Castro**, has produced important results in relation to estuarine Myxozoa (see

more on: <http://mjsantos.wix.com/idassmyx>).

The **Project AQUAIMPROV** – Sustainable Aquaculture and Animal Welfare (NORTE-07-0124-FEDER-000038) (January 2013 – June 2015), headed by **Aires Oliva Teles** with the collaborators **Jorge Eiras**, **Aurélia Saraiva**, **Cristina Cruz** and **Maria João Santos**, produced important results in relation to seabass welfare and octopus parasitology.



A workshop on “**Pathology of Aquatic Organisms**” was held in July at Porto (<http://misantos.wix.com/idassmyx#!page3/cee5>), with the invited speaker **Ariadna Sitjà-Bobadilla**. This workshop will form the basis for future events and collaborations between members of the small group of attendees (pictured left).

**Graça Costa** ([gcosta@uma.pt](mailto:gcosta@uma.pt)), from Madeira University, has also been carrying out research on fish parasites from off Madeira and the Ilhas Selvagens (Savage Islands ).

More detailed information on our previous work and publications can be seen at: <http://www.ciimar.up.pt/researchgroup.php?id=PATHOLOGY>

## SPAIN

provided by Dr Ariadna Sitjà-Bobadilla, [ariadna.sitja@csic.es](mailto:ariadna.sitja@csic.es)

The **Fish Pathology Group** of the Institute of Aquaculture “Torre de la Sal” (IATS-CSIC) has been investigating fish parasites since it was established in 1985 by Professor Pilar Álvarez-Pellitero. The primary aim of the group is to contribute to the improvement of the health of aquacultured marine fish by generating the necessary knowledge for the development of control and prophylactic measures. The most important pathogens and their impact on the main marine fish species cultured in Spanish waters (mullets, turbot, European sea bass, gilthead sea bream, sole and common dentex) have been studied. We are particularly focused on infections by members of the Myxozoa, Coccidia, Monogenea, Microsporidia, Amoebozoa and Scuticociliatida. The group is one of the Fish Health Laboratories and Advisory Services in the European Union listed by the European Association of Fish Pathologists. Currently, we have research projects focused on *Enteromyxum* spp., *Sparicotyle chrysophrii* and a new emerging microsporidium, *Enterosporea nucleophila*.



This has been an intense and successful year for the group. We are coordinating a collaborative project funded by the European Union (EU) in the first H2020 framework call, named **ParaFishControl** ([www.parafishcontrol.eu](http://www.parafishcontrol.eu)). The overarching goal of this 5-year project is to improve our understanding of fish-parasite interactions and to develop innovative solutions and tools to diagnose, prevent, control and mitigate the most important

parasites which affect the main farmed fish in Europe (Atlantic salmon, rainbow trout, common carp, turbot, European sea bass and gilthead sea bream). The consortium has a €7.8 million EU contribution and is composed of 29 partners from 13 countries.



We were involved in the organisation of the **ISFP9** and the **Myxozoa Workshop** held in Valencia (Spain) last summer. We also presented oral communications and chaired several sessions at the 17<sup>th</sup> International Conference on Diseases of Fish and Shellfish held in Las Palmas de Gran Canaria (Spain). We hosted the final meeting of the EU project AQUAEXCEL ([www.aquaexcel.eu](http://www.aquaexcel.eu)), which gave

European researchers the opportunity for open access to our facilities. In addition to scientific interchange, during the meetings people also enjoyed our fantastic Mediterranean beaches and tasteful “paellas”.

**Dr Ariadna Sitjà-Bobadilla** was invited by **Professor Maria João Santos** (Laboratory of Animal Pathology, CIIMAR, Porto University, Portugal) to participate in the workshop “Pathology of Aquatic Organisms”, in July.



We have contributed one chapter, devoted to **Fish Immune Responses to Myxozoa**, to the recently published book "Myxozan Evolution, Ecology and Development" edited by B. Okamura, A. Gruhl & J.L. Bartholomew (Springer). Three new members have been added to the group: **Dr Carla Piazzon de Haro**, a postdoctoral fellow, previously engaged as a Marie Curie fellow at the University of Wageningen (The Netherlands); **Nahla Hossam**, from Egypt, who has started her PhD under the supervision of **Dr O. Palenzuela**; and **Alberto Fernandez**, a new technician. **Dr Itizar Estonsoro** left us for a post-doc at the Czech Republic with **Dr Astrid Holzer**.



**Alejandro Trujillo-González**, from James Cook University (Australia), visited our lab for a month. During his stay, he learned how to analyse samples for his PhD project, in which he evaluates strategic approaches to identify pathogens of concern associated with the ornamental fish trade and importation into Australia.

More information on our group can be found at: <http://tinyurl.com/fishpathology>

## UNITED STATES

provided by Andrew Claxton, [andrew.claxton@eagles.usm.edu](mailto:andrew.claxton@eagles.usm.edu)  
and Sascha Hallett, [Halletts@science.oregonstate.edu](mailto:Halletts@science.oregonstate.edu)

**The Overstreet Lab.** At the Gulf Coast Research Laboratory, University of Southern Mississippi, the retirement and Professor Emeritus status of **Dr Robin Overstreet** has given him more free time for research. Projects on fish parasites in the Overstreet Lab in 2015 ranged from ecotoxicology, ecology and taxonomy to systematics. Two graduate students, **Michael Andres** and **Eric Pulis**, both completed their doctoral work and continue to publish descriptions of new trematode species. **Michael** now works in fisheries, examining Gulf Sturgeon ecology in Mississippi Sound, and **Eric** is employed at the Institute of Marine Mammal Studies, where he works on diseases.

For his PhD, **Andrew Claxton** is examining the parasite community structure and ecology of the Atlantic Croaker (*Micropogonias undulatus*) in the Northern Gulf of Mexico and in Mississippi Sound, adding a fifth decade of croaker parasite data from the area. Never too busy for additional side projects, **Andrew** is also examining the cercarial community in snails collected from seagrass beds in Florida and relating that to the adults present in resident fish species. In addition, he has been examining the parasite assemblage of the popular sport fish, Red Snapper (*Lutjanus campechanus*).

Last summer we had the good fortune to mentor an exceptionally motivated REU student, **Andrew Fuehring**. He was happy to spend a summer dissecting Vermilion Snapper (*Rhomboplites aurorubens*) and learning the techniques for the morphological and molecular identification of parasites under the tutelage of **Stephen Curran**, an Assistant Research Scientist at USM. **Stephen** continues to describe new species of trematodes and other parasites.



*Left:* Laboratory members, left to right: Andrew Claxton, Juan Carrillo, Robin Overstreet and Stephen Curran.

**The Bartholomew Lab.** There was some adjustment for us all at the beginning of 2015, as **Prof. Jerri Bartholomew** immersed herself in her new position as Head of the Department of Microbiology at Oregon State University. It was a high disease year for *Ceratonova shasta* in salmonids in the Klamath River, which kept Research Associates **Julie Alexander**, **Stephen**

**Atkinson** and **Sascha Hallett** busy with fish, water and polychaete sampling and associated genetic analyses.

We welcomed two new masters' students, **Sarah Vojnovich** and **Claire Howell**. **Sarah** is investigating myxozoan disease risks for salmonids in the Willamette and Deschutes Rivers, whereas **Claire** is focusing on *Ichthyophthirius multifiliis* in the Klamath River – identifying genetic strains and developing a monitoring program. First year undergraduate **Jessica Nava** joined us as part of OSU's STEM Leaders Program and is using PCR to describe the occurrence of malacosporean parasites in Oregonian vertebrates and invertebrates.

Summer is always a busy time with fieldwork and volunteers; we hosted **Deidre Spencer** (Murdoch Charitable Trust Partners in Science high school science teacher scholarship), who conducted experiments examining the infection dynamics of a myxozoan parasite in polychaete worms; and high school student **Jesse Marley** (Apprenticeships in Science and Engineering), who combined sampling of water and wild fish with sentinel fish exposures to investigate the occurrence of a salmonid parasite in his favorite river; he was thrilled to discover that line fishing was a valid research approach.

Visiting Spanish post-doc **Gema Alama-Bermejo** continues to juggle her time between our laboratory and the Czech Republic, studying myxozoan transcriptomes and motility. **Suellen Zatti** from Brazil (PhD supervisor Dr Edson Adriano) is with us for six months to describe Amazonian myxozoans using molecular and morphological data. Like many ichthyoparasitologists, several laboratory members had the pleasure of connecting with others at this year's ISFP in Spain, especially at the dedicated Myxozoan Workshop.

In October, our major research facility, the John L Fryer Salmon Disease Laboratory, celebrated its 25th anniversary and a name change to the JL Fryer Aquatic Animal Health Laboratory. The facility now boasts the availability of heated and chilled water between 5°C and 30°C to all indoor experimental tanks, allowing research on warm-water aquatic species, and ecological and climate change questions.

**Stephen** trekked across the country to South Carolina to collaborate with **Dr Isaure de Buron** (College of Charleston, pictured) in their ongoing search for the fish-infectious stage of *Kudoa inornata*, a common muscle parasite of seatrout. No *Kudoa* life cycle is known, despite this group being widespread fish parasites that can cause gastroenteritis in humans.



**Jerri** and **Stephen** are collaborating with **Tamar Lotan**, University of Haifa, Israel to investigate the structure and function of myxozoan parasite stinging cells, and develop methods to block infection. Senior personnel contributed to over half the 21 chapters in the green tome *Myxozoan Evolution, Ecology and Development* published this year.

## NEW BOOKS

### **Marine Fish Parasitology in Hawaii**

**Harry W Palm and Rodney A. Bray**

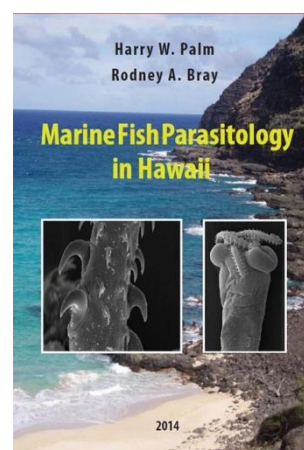
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The host-parasite and parasite host checklists from metazoan fish parasites of Hawaiian fish presented here summarise the literature information and are combined with new observations. A total of 652 different parasite taxa belonging to the Myxozoa (6 species), Monogenea (160), Cestoda (60, either recorded as adult or larval forms), Aspidogastrea (1), Digenea (326), Nematoda (20), Acanthocephala (9), Hirudinea (3) and Crustacea (67) have been reported so far. With parasites identified from 298 identified fish species, an average of 2.2 metazoan parasites occur in each host studied. As there is a total of 1473 fish species occurring in Hawaiian waters, about 20% of the Hawaiian fish community has been studied for parasites. This makes the region one of the best known marine habitats in terms of fish host parasite associations.



### **Myxozoan Evolution, Ecology and Development**

**Edited by: Beth Okamura, Alexander Gruhl and Jerri L. Bartholomew**

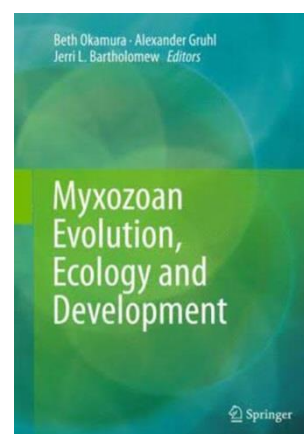
Published April 1, 2015; 441 pages

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DOI 10.1007/978-3-319-14753-6

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This book provides an up-to-date review of the biology of myxozoans, which represent a divergent clade of endoparasitic cnidarians. Myxozoans are of fundamental interest in understanding how early diverging metazoans have adopted parasitic lifestyles, and are also of considerable economic and ecological concern as endoparasites of fish. Synthesizing recent research, the chapters explore issues such as: myxozoan origins; evolutionary trends and diversification; development and life cycles; interactions with hosts; immunology; disease ecology; the impacts of climate change on disease; risk assessment; emerging diseases; and disease mitigation. This comprehensive work will appeal to a wide readership, from invertebrate zoologists, evolutionary biologists and developmental biologists to ecologists and parasitologists. It will also be of great practical interest to fisheries and conservation biologists. The identification of key areas for future research will appeal to scientists at all levels.



## EDITORIAL POLICY

Please note that material for the next issue should be sent to the Editor, Dr Leslie Chisholm [e-mail: [leslie.chisholm@samuseum.sa.gov.au](mailto:leslie.chisholm@samuseum.sa.gov.au)] Parasitology Section, The Science Centre, South Australian Museum, North Terrace, Adelaide 5000, South Australia, Australia; before November 15, 2016.

The Newsletter is issued once a year and the persons listed on the cover page act as regional representatives. Each representative may write or collect information from the members of their country or region. Naturally, direct contributions from any recipient to the Newsletter are also welcome. The Newsletter is intended for any news, notices, comments, etc. that you feel would be of interest to the world's ichthyoparasitologists. Please note that publication lists are not accepted. The editor would be grateful if submissions would follow the format similar to that of the present Newsletter. Images are welcome. Please send images as separate JPG files (do not incorporate them in your text file and do not send image files as PDFs).

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Thank you

**Leslie Chisholm**

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