

# International Ichthyoparasitology Newsletter No. 25 January 2018

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## CONTENTS

[Editorial](#)

[Meeting Reports](#)

[Current Research Activity in Various Countries \(Australia, Brazil, Iraq, Portugal, Spain, Wales\)](#)

[Editorial Policy](#)

## EDITORIAL

It is hard to believe that this is the 25<sup>th</sup> edition of the International Ichthyoparasitology Newsletter. In 1996 the founding editor, Dr Kazuya Nagasawa, wrote *“Electric mail via the Internet is now available to many recipients of the Newsletter. The Editor (K. Nagasawa) and Associate Editors (D. I. Gibson or J. R. Arthur) are able to send you the Newsletter through Internet directly and quickly. This enables us reduce the time and cost involved in distribution. If you wish to receive the newsletter in this form, please contact one of us. We shall also try to make the newsletter available on David Gibson's Web pages”*. The method by which we disseminate your news may have changed, but the essence of the news is a constant – it continues to convey interesting and innovative research information. It is heartening to hear about grants won, collaborations forged and about what students, the future of ichthyoparasitology, are up to in labs worldwide. I am extremely grateful to David Gibson who is still an Associate Editor after all this time and who still makes the newsletter available on his webpage. Many thanks also to the contributors of this edition. I wish everyone all the best for 2018.

## MEETING REPORTS

### MYXOZOAN WORKSHOP

The **Myxozoan Workshop** was held in Belfast (North Ireland, UK) during September 2017, within the EAFP Conference. This working group first convened at the 2003 EAFP meeting in Malta, with the purpose of connecting researchers who study the intriguing Myxozoa – a widespread group of parasitic Cnidaria. Over its history, the Myxozoan Group has held ten, day-long sessions in conjunction with the EAFP Conference, the International Symposium of



Aquatic Animal Health (ISAHH) and the International Symposium on Fish Parasitology (ISFP). This year we had two dedicated sessions, chaired by **Oswaldo Palenzuela**, **Stephen Atkinson**, **Jerri Bartholomew** and **Ariadna Sitjà-Bobadilla**, with 12 oral presentations and

many posters. We also had time to discuss future activities of the Myxozoan Network, and to enjoy Irish beers! The next Myxozoan session will be held in conjunction with the 2018 ISAAH, to be held in Charlottetown, Prince Edward Island (Canada), on September 2-6.

## WoRMS

The main aim of the [World Register of Marine Species](#) (WoRMS) is to provide an authoritative and comprehensive list of names of marine organisms, and, as such, it is beginning to be highly cited in the scientific literature. Also gradually being included is a large amount of ancillary information, such as data on the relevant literature, type-material, biogeography, hosts, editorial notes, etc.

During April, 2017, 20 editors of the various parasite groups included in WoRMS met at the Flanders Marine Institute in Belgium – the home of WoRMS. These editors, both taxonomic and thematic, came from a wide range of countries, including Australia, China, The Czech Republic, Mexico, South Africa, the UK and the USA (photo below includes nemertine specialists). In addition to the presentation of reports on the status of each parasite group and an analysis of gaps, there was hands-on training and discussions on current problems and future developments. Most important was the decision to extend the database to include the freshwater parasite fauna and to develop a Parasite Portal for WoRMS.



## CURRENT RESEARCH ACTIVITY IN VARIOUS COUNTRIES

### AUSTRALIA

**James Cook University**

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

The Marine Parasitology Laboratory at James Cook University in Townsville, Queensland is led by **Kate Hutson**. **Dr Alexandra Grutter** (University of Queensland) and **Dr Paul Sikkell** (Arkansas State University), who have shared interests in the role of cleaner organisms in the management of parasites infecting fishes, visited the laboratory to share their knowledge. The group also hosted leaders in fish aquaculture, CEO **Chris O'Donoghue** from Asparapearl, Singapore, and Group Technical Manager **David Whyte** from Huon

Aquaculture, and we look forward to developing productive research relationships with these partners.



**Kate** and PhD students **David Vaughan** and **Giana Bastos Gomes** (pictured left) went to the 4<sup>th</sup> FRDC Australasian Aquatic Animal Health and Biosecurity Scientific Conference in Cairns. **Kate** presented her research on establishing and maintaining fish parasite cultures, **David** discussed his PhD work on cleaner shrimp as biocontrols and **Giana** presented her PhD work on ciliate parasites (*Chilodonella*) infecting freshwater aquaculture fishes. **Alejandro Trujillo Gonazalez** went to the 8<sup>th</sup> International Symposium on Monogenea held in Brno, Czech Republic and presented part of his PhD research on alien monogenean parasite species that infect

imported ornamental fish species. **Alexander Brazenor** completed his PhD on various biological aspects of *Neobenedenia girellae*. This work included maintaining an *in vivo* culture of *N. girellae* for four years. For her PhD **Katie Motson** is exploring the relationship between coral reef health and parasitic infection in herbivorous coral reef fishes. Master's student **Julian Wilson** is investigating parasite assemblages of invasive tilapia *Oreochromis mossambicus* in north Queensland river systems. **Jonathan Chew** (Graduate Diploma of Research Methods) is working on metazoan ectoparasites infecting cultured grouper in Singapore. For more information about us go to [www.marineparasites.com](http://www.marineparasites.com).

#### **Charles Sturt University**

provided by Shokoofeh Shamsi, [sshamsi@csu.edu.au](mailto:sshamsi@csu.edu.au)

In **Shokoofeh Shamsi's** group, **Anita Poupa** completed her work on nematodes in fish from New Caledonia, **Eleanor Steller** finished her studies on nematodes in fish from Moreton Bay, Australia and **Annie Stoddart** completed her honours project on parasites of freshwater fish in the Murray Darling basin. **Monica Dickson**, Master of Animal Science, is currently investigating seafood safety training (including information on *Anisakis*) among Australian chefs. **Md Shafaet Hossen** from Bangladesh has started a PhD on the taxonomy of nematodes and monogeneans from selected commercial fish in Australian waters.

**Di Barton** has moved from NT Fisheries to Wagga and joined **Shokoofeh's** lab to work on the many fish parasites she has collected over the past 4 years. The focus of her projects was stock discrimination across northern Australia and **Di** is now able to put the time into describing the many species of parasites collected, or sending them to someone who can!

**Shokoofeh**, was successful in leading a joint grant application (other investigators including **Geoff Boxshall**, **Tom Cribb**, **Rob Adlard** and **Scott Cutmore**) receiving funds from LifeWatch to organise a 2-day workshop bringing all WoRMS parasite taxonomists together with the aim of improving parasite data management through WoRMS database. For more information see: <http://www.marinespecies.org/news.php?p=show&id=4967>



### South Australian Museum

provided by Leslie Chisholm, [leslie.chisholm@samuseum.sa.gov.au](mailto:leslie.chisholm@samuseum.sa.gov.au)

At the South Australian Museum **Lesley Warner** recently completed a large review of the Acanthocephala parasitising freshwater fishes.

**Leslie Chisholm** won a grant from the Australian Society for Parasitology to fund a large data-cleaning project for the Australian Helminthological Collection (AHC) Database. Approximately 20% of the 44,000 items in the AHC are parasites from fish. When complete the database will be uploaded onto the Atlas of Living Australia. One of the more unusual visits to the AHC this year was by the Australian Dance



Theatre group (right). They came to look at fish parasites in the collection and get inspiration for an upcoming theatre production. To give the group an idea of how parasites move **Leslie** put together a short video starring some of the live fish parasites she has filmed over the years. Click here to watch these parasites knocking out some seriously funky dance moves. [https://www.youtube.com/watch?v=XKrUyYsB\\_DY](https://www.youtube.com/watch?v=XKrUyYsB_DY)

### BRAZIL

provided by Simone Cohen, [cohen.simone@gmail.com](mailto:cohen.simone@gmail.com)

In southern Brazil, the **Aquatic Organisms Health Laboratory - AQUOS**, led by **Professor Maurício Laterça Martins, PhD**, has been promoting an extensive study in partnership with the Brazilian Agricultural Research Corporation (EMBRAPA Western Amazon), National Council of Scientific and Technological Development (CNPq), entitled "Sanitary advances in fish at national fish farms: identification, distribution, transmission and risk factors of diseases in fish populations". This work encompasses several PhD and Masters projects. Protozoa, digenean metacercariae, monogeneans, cestodes, nematodes and branchiurans have been observed on ornamental fish collected from fish farms. Host tissue alterations, including changes in gill and intestinal structure, have also been examined. The research aims to strengthen epidemiological studies of national ornamental fish culture facilities using specific analyses. A questionnaire, which we developed to monitor the fish farms, made it possible for us to identify the factors that influenced the proliferation of parasitic diseases.

In addition, Nile tilapia were sampled from 12 different localities - high infestations of *Ichthyophthirius multifiliis*, *Cichlidogyrus sclerosus* and *C. halli* were found on the gills and *Trichodina magna* and *T. compacta* on the body surface of fish. The group has also been working with Nilton Lins University to investigate acanthocephalosis in tambaqui *Colossoma macropomum* in the north of Brazil.

AQUOS Laboratory has been investigating the use of essential oils as an antiparasitic agent as well as an immunostimulant against bacteriosis associated with fish farming in Brazil. The laboratory also promotes academic training courses, including "Management and use of

cephalopods, fish and amphibians in research" (pictured right), held annually at the Federal University of Santa Catarina. AQUOS maintains scientific collaboration with the Department of Microbiology at Oregon State University, Corvallis, OR, USA.



The **Laboratory of Helminth Parasites of Fishes** of the Instituto Oswaldo Cruz includes **Drs Simone C. Cohen** ([scohen@ioc.fiocruz.br](mailto:scohen@ioc.fiocruz.br)), **Marcia C.N. Justo** ([marciajusto@ioc.fiocruz.br](mailto:marciajusto@ioc.fiocruz.br)), **Melissa Q. Cárdenas** ([melissaq@ioc.fiocruz.br](mailto:melissaq@ioc.fiocruz.br)) and **Ana Claudia Ribeiro Fiuza** ([ana.fuiza@ioc.fiocruz.br](mailto:ana.fuiza@ioc.fiocruz.br)). **Berenice M. M. Fernandes** (pictured below) retired in 2017, after forty years of contributions to the taxonomy and systematic of the Trematoda.



Pictured (left to right) Daniele Vidal, Juliana Barbosa, Tais Santos da Silva (graduate students), Berenice M.M. Fernandes, Williane M. O. Martins, José Paulo Roberto de Almeida, Simone C. Cohen, Ana Claudia R. Fiuza, Melissa Q. Cardenas and Ana Maria M. Silva

Several projects are being carried out by the group. **Dr Mariana dos Santos Lopes Leão**, who finished her PhD thesis in February, studied fish parasites of the reservoir of the Hydroelectric Power Station at Itaipu, Paraná State, including the examination of monogeneans from fishes cultivated in cages. Studies of tuna parasites by **Marcia C.N. Justo**, **Simone C. Cohen** and masters student **Ana Maria Moreira da Silva** continue. They are using morphological and molecular data to investigate the taxonomy of the trematode family Didymozoidae in *Thunnus obseus*. Other graduate student projects are being developed involving helminths of freshwater fishes from river basins in the northern region of Brazil, including the descriptions and redescriptions of species of Monogenea, Digenea and Nematoda, some of them being new to science. In particular, PhD student **Williane M. O. Martins** investigated the helminths harboured by *Leporinus macrocephalus*.

The group has a long tradition of publishing checklists and catalogues of helminth parasites from South America. In 2017, a "Checklist of Brazilian Cestoda" with a list of species, hosts and geographical distribution was published by **Marcia C. N. Justo**, **Berenice M.M. Fernandes**, **Melissa Q. Cárdenas** and **Simone C. Cohen**, together with **Marcelo Knoff** of the Laboratory of Helminth Parasites of Vertebrates of the Instituto Oswaldo Cruz. It contains a complete list of 432 species of Cestoda that have been described and/or reported from

Brazil. Cestodes are distributed across 15 orders and 36 families; 50 species are unidentified and 9 are considered to be *species inquirenda*.

## IRAQ

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

At the Fish Resource and Aquatic Animal Department, Agricultural College, **University of Salahaddin**, Erbil, Kurdistan, **Prof. Dr Shamall MA Abdulla** has been carrying out a number of projects and supervising students. In collaboration with **Dr Furhan T. Mhaisen**, he produced checklists of investigations on of parasites of fishes in the Kurdistan Region. Masters student **Sarhang Ismael** completed a thesis on disease agents of *Cyprinus carpio* collected from a fish farm in Erbil City.



At the **University of Basrah**, **Dr M. Banaii** and **Dr E.T. Mohammad** recently completed work on the morphological variability, ultrastructure and molecular characterization of the nematode *Hysterothylacium reliquens* from the oriental sole *Brachirus orientalis*. **Dr Furhan T. Mhaisen**, **Dr Atheer H. Ali** and **Dr Najim R. Khamees** completed checklists of fish parasites of the Basrah Marshlands, Iraq and of protozoans and myxozoans from freshwater and marine fishes of Basrah Province, Iraq.

At the **University of Hamdanyia**: **Prof. Dr Zohair Rahemo**, along with colleagues **Dr Samir J. Bilal** and **Dr Shamall M. A. Abdullah**, made histological and ultrastructural observations on a new species of cestode, *Senga mastacembeli*, and revised the genus.

## 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 the other senior researcher 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: the postdocs **Francisca Cavaleiro**, **Margarida Hermida** and **Luis Rangel** (Volunteer), PhD student **Sónia Rocha**, Masters students **Ricardo Severino**, **Sara Nogueira**, **Fernando Rodrigues**, **Duarte Frade** (Volunteer) and **José Pedro Silva** (Volunteer), and BSc students **Jessica Ribeiro**, **João Torres**, **Bárbara Costa** and **Liliana Ribeiro**.

The Laboratory of Pathology investigates the pathology of freshwater and marine fish not only from Portugal but also of important tropical fish species from South America (Brazil),

Tunisia and Saudi Arabia. We have a strong collaborative research programme which was established more than two decades ago. Current projects include a survey of pathogenic agents of important farmed fishes, and Apicomplexa and Myxozoa from seabass (*Dicentrarchus labrax*) and seabream (*Sparus aurata*).

The Project 400945/2014-2 (**Jorge Eiras**; collaborator), supported by CNPq, Brazil, concerning human infections by zoonotic fish nematodes in Brazil and other South American countries, was developed in 2016/2017.

More detailed information about our previous work and publications can be seen at <https://www2.ciimar.up.pt/research.php?team=22>. A new website on aquatic parasitology is being developed by **Maria João Santos** (in Portuguese) Parasitologia\_Aquática.PT: <http://mjsantos.wixsite.com/parasitologiaaqua-pt>

**Graça Costa** ([gcosta@uma.pt](mailto:gcosta@uma.pt)), of Madeira University, is carrying out fish parasitology research off Madeira, the Selvagens (Savage) Islands and the Portuguese mainland.

## SPAIN

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

2017 was an intense year for the **Fish Pathology Group** of the Institute of Aquaculture of Torre de la Sal (IATS) (Castellón, Spain), which is part of the largest Spanish public research institution (CSIC). We have reached the mid-way point of a 5-year European project **ParaFishControl** ([www.parafishcontrol.eu](http://www.parafishcontrol.eu)).

The main goal of this 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 that affect the main farmed fish in Europe (Atlantic salmon, rainbow trout, common carp, turbot, European sea bass and gilthead sea bream). We organised the first **Industry Forum**, within the EAFP Conference in Belfast (Northern Ireland, UK) during September, to explore how the European aquaculture sector could benefit from the latest research results in the area. Target outputs of the ParaFishControl project that have potential industry relevance were presented and the facilitation of their effective transfer to industry was discussed.



Members of the Fish Pathology Group have been involved in different activities. **Amparo Picard**, PhD student, spent two months at the Scottish Fish Immunology Centre (Aberdeen, UK) under the supervision of **Prof Chris Secombes** to work on a pipeline for filtering the transcriptome of myxozoans of the genus *Enteromyxum*. **Dr Carla Piazzon** taught at the **18<sup>th</sup> Fish Vaccination Workshop**, held during April-May at Wageningen University & Research (The Netherlands). **Nahla Hossam**, finished a 2-year PhD stage at our lab. and will soon present her thesis in Egypt on microsporidian parasites. **Dr Itziar Estensoro** has been



working as a postdoctoral fellow at CISA-INIA (Madrid, Spain), under the supervision of **Dr Carolina Tafalla** and in collaboration with **Dr Jesús Lamas** (USC, Spain). Her research focuses on the immunoglobulin and inflammatory response of turbot vaccinated against the ciliate *Philasterides dicentrarchi* and the cellular immune response in rainbow trout kidney to the myxosporean *Tetracapsuloides bryosalmonae*.

**Drs Ariadna Sitjà-Bobadilla** and **Carla Piazzon** presented their results on the immune response against the enteric myxozoan parasite *Enteromyxum leei* during the **EAFP conference**, and enjoyed the fishy monuments of the city. Some of the research results have already been published ([doi:10.3389/fimmu.2016.00637](https://doi.org/10.3389/fimmu.2016.00637)). **Drs Oswaldo Palenzuela** and **Ariadna Sitjà-Bobadilla** presented the results of different feeding additives used to mitigate the disease outcome of *E. leei* during the **Aquaculture Europe Conference** held in Dubrovnik (Croatia) during October.



**Dr Mar Marcos-López**, from the Galway-Mayo Institute of Technology and FishVet Group (Ireland), visited us in March as part of a Transnational Access (TNA) stage within the European project AQUAEXCEL<sup>2020</sup> ([www.aquaexcel2020.eu](http://www.aquaexcel2020.eu)). This is a joint project with the Nutrigenomics and Endocrinology of Growth Group of IATS to study the gene expression of mucins in Atlantic salmon affected by amoebic gill disease.



## WALES

provided by [Jo Cable](mailto:cablej@cardiff.ac.uk) ([cablej@cardiff.ac.uk](mailto:cablej@cardiff.ac.uk))

Workwise, this year has been full of change as we welcomed two new SêrCymru II - Marie Skłodowska-Curie Actions COFUND research fellows, **Dr Anna Paziewska-Harris** and **Dr Rachel Paterson**, to the lab. **Anna** isn't working on fish (yet) but will be developing new *in vitro* culture methods for *Cryptosporidium*. **Rachel** is investigating the effects of multiple stressors associated climate change and anthropogenic stress on parasite assemblages in European Arctic charr. **Rachel** is joined by **Alice Jones**, a new KESS II funded PhD student, and together they have been assessing multiple stressor effects on digenean populations between Wales and northern Norway.

Back to our established fish and parasite stocks, **Dr Amy Ellison** ([AquaWales](#)) has delved into



the importance of social stress on disease resistance in Nile tilapia. She found that sub-optimal stocking densities substantially alter immune gene expression responses to *Saprolegnia* infection. PhD student **Emily Matthews** has been working alongside **Amy** to discover more about this freshwater oomycete which is devastating stocks of wild and farmed salmonids. With the help of the Environment Agency and public engagement via the website [fluffyfish.org](#), **Emily** has collected and isolated over 60 samples of *Saprolegnia* from rivers around the UK. She aims to conduct a landscape genomics study to assess how environmental pressures have led to genetic variation among different isolates of *Saprolegnia*, allowing her to explore the virulence, diversity, distribution and host-specificity of this pathogen.

Our links to the Environment Agency continue with **Rhi Hunt**, a new NERC GW4+ funded PhD student. **Rhi** is investigating novel treatment methods for *Argulus*, a freshwater fish louse of increasing concern in the UK, combining laboratory tests with field trials. New investigations are also being conducted by PhD student **Numair Masud** into the welfare of ornamental fish species. Fellow PhD student **Elisavet Arapi** has also stepped into the world of guppies, working on combination control of fish pathogens in collaboration with Nutriad, an animal nutrition company which aims to explore whether certain food additives could aid in the elimination of fish ectoparasites. Back in the guppy's native home of Trinidad and Tobago, but in the marine environment, **Katie Dunkley** is continuing her cleaner-client fish studies on the coral reef, and has been joined by new PhD student **Kath Whittey**, who will be studying cleaner microfauna.

Last but not least, **Rhidian Thomas** has almost finished writing his PhD on invasive species, although has been happily distracted by crayfish plague in the last 6 months. **Willow Smallbone** and **Mike Reynolds** (right) completed their PhDs on the same day (of course), and although we were really sad to see them leave – they both immediately stepped into great jobs with Welsh Water and Public Health England, respectively. We wish them all the best for their future careers, but are hopeful they might still collaborate with their old lab. mates sometime!



We hope to see some of our fellow ichthyoparasitology friends in the New Year at the [British Society for Parasitology](#) (joint with British Ecological Society this year, 8-11<sup>th</sup> April) in

Aberystwyth. For more information about our research see our lab webpage, designed and managed by our post-graduates ([www.cripescardiff.ac.uk](http://www.cripescardiff.ac.uk)), and/or follow us on twitter @CRIPESCardiff

## 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, 2018.

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).

National representatives are asked to download a copy of each issue of the Newsletter and make this available (photocopies, e-mail, URL, etc) to his or her domestic members, where necessary. When it is impossible to download a copy, please advise the editor. In addition, the information in the Newsletter can be made available via E-mail.

Thank you

**Leslie Chisholm**

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