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EDITORIAL

This is the 27th edition of the *International Ichthyoparasitology Newsletter*, an annual report on the activities of fish parasitologists founded in 1996 by Dr Kazuya Nagasawa.

I should like to express my gratitude to David Gibson for kindly taking over my editorial tasks last year to bring you an excellent 26th edition of the newsletter. At that time, I was literally up to my eyeballs in parasites for the 'Parasites Undercover' exhibition showing at the South Australian Museum. Kate Hutson left Australia to take a new position as Senior Aquaculture Scientist at the Cawthron Institute in Nelson, New Zealand. I thank Kate for her Associate Editor and Australian Representative services these past few years and am happy to announce that Dr David Vaughan of Central Queensland University has kindly volunteered to fill both these roles. In addition, I am pleased to introduce another two new regional representatives who have offered their assistance. Welcome the representative for Germany, Prof Dr Bernd Sures of Aquatische Ökologie, Universität Duisburg-Essen, who has replaced Rudolf Hoffmann who sadly died in 2016. Dr Bronwen Presswell, of the Ecological Parasitology group, Department of Zoology at the University of Otago, is the new representative for New Zealand. I am saddened to announce the recent passing of Professor Emeritus Bjørn Berland. A contribution about his remarkable life is included in this issue of the Newsletter. Conferences that feature fish parasitology continue to be well attended worldwide, as shown by our many meeting reports. I look forward to seeing many of you at the next International Symposium for Fish Parasitology in Cairns, Australia during July 2020.

ANNOUNCEMENTS

The 10th International Symposium on Fish Parasites (ISFPX) will be held in conjunction with the 2020 Annual Conference of the Australian Society for Parasitology, 6th – 9th July, 2020, at the Shangri-La Hotel, Cairns, Queensland, Australia. Preparations are now well advanced, and details of invited speakers, accommodation and registration (now open) can be found at https://www.isfpx.org/.

Cairns in July has balmy temperatures of 18–26°C (64–79°F) and is a magnificent spot for exploration of the Great Barrier Reef and nearby tropical rainforests. As the 10th iteration of this wonderful meeting, we will do our best to give delegates a scientifically stimulating and a socially delightful (Aussie style) experience. We look forward to seeing you "down under" in 2020.

We would like to acknowledge the generous support of our sponsors - thanks to Elsevier Parasitology and the International Journal for Parasitology (IJP), IJP DDR and IJP PAW, Virbac and New England Biolabs.

MEETING REPORTS

ENBRAPOA 30 YEARS (Brazilian Meeting of Pathologists of Aquatic Organisms)

provided by Maria de los Angeles Perez Lizama (maria.lizama@unicesumar.edu.br) and Ricardo Massato Takemoto (takemotorm@nupelia.uem.br)

"ABRAPOA 30 YEARS" was held during October 3 – 4, 2019, at the Água Branca Park in the city of São Paulo in commemoration of the 30th anniversary of the *Brazilian Association of Pathologists of Aquatic Organisms*. The founding partners of ABRAPOA were honoured for their dedication to the Association over the years. Pictured right is the current board of directors with the first associates.

Several topics of great relevance to the pathology and health of fish were discussed, including fish infestation by parasites, use of vaccines in salmonids and tilapia, and the study of nanogene technologies. This event included participants from Brazil, Chile, France and Thailand, industrial technicians, commercial companies and government representatives. **Dr Delphine Garzón** (below left), Université de Montpellier (France), spoke about pathogen-host relationships and **Dr Ruben Avedeño** Herrera (below right), Andrés Bello University (Chile), lectured on autogenous vaccines in fish farming.


This meeting also hosted the book launch of "Biotecnologia e Sanidade de Organismos Aquáticos" organised by **Dr Maria José Tavares Ranzani Paiva** (Instituto de Pesca, São Paulo State), **Dr Ricardo Massato Takemoto** (Universidade Estadual de Maringá, Paraná State), **Dr Maria de los Angeles Perez Lizama** (UNICESUMAR, Paraná State), **Dr Luciane Maria Perazzolo** and **Dr Rafael Diego Rosa** (Universidade Federal de Santa Catarina, Santa Catarina State) (photo below).

19th EAFP International Conference on Diseases of Fish and Shellfish

provided by Dr Bartolomeo Gorgoglione (BartGorg@msu.edu)

Every two years aquatic animal health researchers and professionals worldwide gather for the International Conference of the European Association of Fish Pathologists (EAFP). The 19th meeting was held September 8 – 13, 2019 in Porto, Portugal. It was hosted in the heart of this UNESCO heritage historic town at the Alfândega Congress Centre, a 150 year-

old former customs building. The extremely rich scientific programme included 42 oral sessions, with a total of 252 talks, 336 posters and several official workshops and forums. Participants had many opportunities for sharing knowledge on the most recent advances on fish health. Social events provided the best interaction for networking, with a traditional civic reception held at the rectory of Porto University and a gala dinner held at Port Wine Cellars Ferreira in Gaia preceded by a fascinating sunset cruise on the River Douro.

Given the rising awareness on the impact and pathogenetic dynamics of heterogenous co-infections affecting fish, an EAFP-promoted workshop focused on co-infections and multiple stressors. Crowded with ~200 attendees, the workshop opened with a keynote talk by **Prof. Mark Fast** demonstrating pathological synergies during co-infections patterns involving sea lice in Atlantic salmon. Twelve further oral presentations illustrated novel cross-disciplinary studies on complex host-pathogen interactions, eliciting different pathological and immunological outcomes; several of them considered parasitic infections, such as PKD in trout, nematodes in eels or AGD in farmed salmon. The Myxozoan Group was highly represented, with 21 oral presentations given during four sessions fully dedicated to parasitic cnidarian diseases. Many other talks and posters focused on parasitological diseases, host-parasite interactions and immunity to parasitic infections in fish. Workshops illustrated advances by EU-funded consortia, such as ParaFishControl, highlighting management strategies for fighting parasites damaging Mediterranean farmed fish species, and MedAID, PerformFish and AdriAquaNet, dealing with an array of key health issues for the aquaculture sector in the Mediterranean and Adriatic Seas. The next EAFP conference will be held in 2021 at Aberdeen, Scotland.

VII All-Russian Conference, "School for Theoretical and Marine Parasitology"

provided by Evgenija V. Dmitrieva (genijadmitrieva@gmail.com)

From 9 – 14 September, 2019, parasitologists at the A. O. Kovalevsky Institute of Biology of the Southern Seas (Sevastopol, Crimea) hosted the VII All-Russian Conference entitled "School for Theoretical and Marine Parasitology" (https://cprs.marine-research.org/events/parasites2019), which is run by the Society of Parasitologists of the Russian Academy of Sciences every three years.

The programme included oral and poster presentations on a variety of topics, including: modern environmental and evolutionary problems in theoretical and marine parasitology; the biodiversity, life cycles and population biology of marine parasites; molecular markers in parasite taxonomy, phylogeny and ecology; and the use of parasites to assess aquatic ecosystems and as biological labels in the study of host ecology.

Ten reports of the plenary session covered a wide range of fundamental problems by speakers, such as **Prof. Dr K. Galaktionov** (ZIN, St Petersburg, Russia), **Dr V. Aleoshin** (Lomonosov Moscow State University, Russia), **Dr V. Nikishin** (Institute of Biological Problems of the North, Magadan, Russia), **Drs S. Semyenova** and **G. Chrisanfova** (Institute of Gene Biology, Moscow, Russia), **Dr D. Atopkin** (Federal Scientific Centre of Terrestrial Biodiversity of East Asia, Vladivostok, Russia) and **Drs N. Yurlova** and **N. Ponomareva** (Institute of Systematic and Ecology of Animals, Novosibirsk, Russia).

The conference was attended by about 70 participants (below), including colleagues from Belarus, Poland, Turkey, Vietnam and Azerbaijan. All conference abstracts (in Russian with a short summary in English) are available at https://cprs.marine-research.org/events/parasites2019/parasitology-conf-proc-2019.pdf

The Eighth, School of Theoretical and Marine Parasitology, will be held in 2021, also in the Crimea, at the T.I. Vyazemsky Karadag Scientific Station – Nature Reserve, famous for its scientific history and beautiful landscapes of an ancient volcano. All will be welcome.

CURRENT RESEARCH ACTIVITY IN VARIOUS COUNTRIES

AUSTRALIA

Central Queensland University & James Cook University
provided by David Vaughan, d.b.vaughan@cqu.edu.au

Ass. Prof. Kate Hutson of the Marine Parasitology Laboratory, James Cook University (JCU), took up a new permanent role as Senior Aquaculture Scientist – Aquatic Health at the Cawthron Institute in Nelson, New Zealand (https://www.cawthron.org.nz) in February 2019. Kate remains associated with James Cook University as an adjunct academic.

Of Kate's (centre) Marine Parasitology Laboratory students, **Dr Alejandro Trujillo-González** (left) and **Dr David Vaughan** (right) successfully completed their PhDs in the Centre for Sustainable Fisheries and Aquaculture, JCU, and **Dylan Skilton** successfully completed his MSc. Both PhD students **Pauline Narvaez** and **Katie Motson** continue their research on cleaner fish (*Labroides dimidiatus*) as a potential vector of fish ectoparasites, and the relationship between coral reef health and parasitic infection in herbivorous coral reef fishes, respectively.

David has taken up a permanent academic position at the Central Queensland University in Rockhampton, where he will focus on teaching commitments and will continue his research interest on monogeneans and other marine fish parasites. Recently, **Kate** and **David**, together with co-author **Dr David Blair**, published the first record of what appeared to be a new species of *Cardicola* (fish blood fluke) from a dugong. **David Vaughan's** current collaborative work includes several book chapters with **Kate** on *in vitro* culture methods for various fish parasites, the development rate of a cold-water isolate of *Amyloodinium ocellatum* and new monogenean species from the South East Atlantic Ocean.

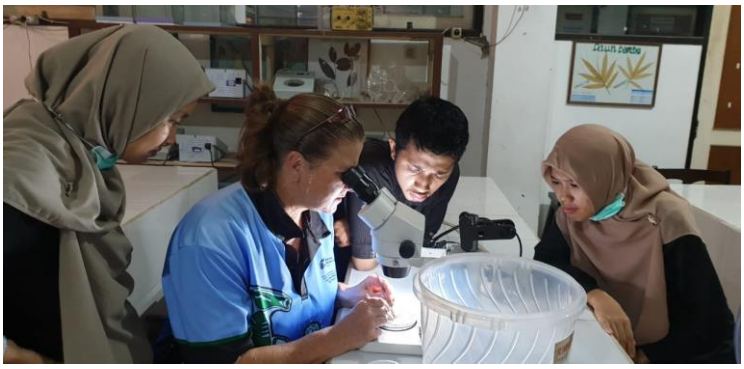
Dylan Skilton's research on the use of parasite bait traps for parasite management in aquaculture will soon be published in *Aquaculture*. His work examined four potential attractants (urea, host mucus, parasite conspecifics and light) and the response of two problematic marine parasite species (*Neobenedenia girellae* and *Cryptocaryon irritans*) to identify the most suitable bait for trap development in finfish aquaculture. The use of

attractants and traps presents a potentially promising research direction towards mitigating parasitic disease issues currently faced by the aquaculture industry.

Charles Sturt University

provided by Di Barton, dbarton@csu.edu.au

The Parasitology Laboratory at Charles Sturt University, Wagga Wagga, is led by **Dr Shokoofeh Shamsi**, with **Drs Di Barton** and **Xiacheng Zhu** rounding out the senior research team.



Shokoofeh continues her work on seafood safety, nematodes from fish, incorporating morphological and molecular characterisation of species, and parasites as indicators of ecosystem health. **Di Barton** continues her project work with Northern Territory Fisheries, working on parasites of various marine fish. In May, 2019, she travelled to Indonesia to collaborate (pictured right) with Sonja Kleinertz (Bogor University) and Benaya Simeon (WCS Indonesia). They examined the parasites of Scalloped Hammerheads to compare with Australian stocks. At the beginning of 2020, she will travel back to Darwin to help **Amy Kirke** (CDU) process her PhD samples of small school sharks for parasites and describe new species. **Di**, **Dr Leslie Chisholm** and **Prof. Lesley Warner** (The South Australian Museum, Adelaide) recently published results of a survey of 284 sharks collected between 2015 and 2018 from 10 localities in Australian waters. Eleven were infected with acanthocephalan cystacanths and a new species of *Gorgorhynchus* was described from the Cobbler Wobbegong *Sutorectus tentaculatus*.

Xiacheng Zhu is working in the lab. as a postdoctoral fellow, looking at the genetics of various parasites and determining the usefulness of eDNA in the Murray Darling Basin for the detection of parasites. **Shelley Williams** is midway through her PhD on "Biosecurity and seafood safety: Assessing the risk and knowledge gaps for zoonotic parasites in imported seafood products". Accomplishments so far include the development of a new scoring system to identify high risk provenances and fish species, both farmed and wild, to justify the examination of imported seafood products for parasites.

Md. Shafaet Hossen is nearing completion of his PhD on the taxonomy of nematodes and monogeneans from various species of commercially important marine fish in southern Australian waters. He has described one new parasite larval type along with some other zoonotic and non-zoonotic nematode larvae from popular edible Australian fish.
Scott Day is completing a Veterinary Science Honours programme looking at infections of *Clinsotomum* in local fish and water bird populations. This work has involved morphological and genetic characterisation of the metacercarial and adult stages, hoping to confirm the species identity of the parasite and its potential impact on local aquaculture. Other projects have involved looking at the potential effects of parasites on the behaviour of fish,

especially in relation to fish being released into the local environment as part of a restocking programme. This work is in conjunction with **Dr Raf Freire**, also from CSU.
Dr Javad Daghigh successfully completed his PhD on the genetic characterisation of freshwater fish Monogenea in northern Iran, with **Shokoofeh** as one of his supervisory panel.

University of Queensland
provided by Tom Cribb, t.cribb@uq.edu.au

The Marine Parasitology Laboratory at the University of Queensland has been busy with a large turnover of students. In the last 12 months four PhD candidates have graduated - **Russell Yong** with a thesis on aporocotylid blood flukes of tetraodontiform fishes, **Dan Huston** with a thesis on trematodes of herbivorous coral reef fishes, **Storm Martin** with a thesis on opecoelid trematodes of fishes, and **Pablo Diaz** with a thesis on faustulid trematodes and the parasitological exploitation of corallivorous fishes. Between them, they have published 34 papers. They and their productivity will all be missed, although some of them are not completely gone!

In their place we now have **Nick Wee** sorting out monorchiid trematodes, **Clarisse Louvard** elucidating life cycles of trematodes of pelagic fishes and **Berilin Yong** straightening out the trematodes of damsel fishes (Pomacentridae) of the Great Barrier Reef and beyond. Lashing the laboratory into action is now (senior) postdoc **Scott Cutmore** (pictured left enduring another horrible day in paradise at Lizard Island with Dylan Corner, Clarisse and Nick), who is leading a major study of blood flukes (both Aporocotylidae and Spirorchiidae) with a view to describing species, elucidating life cycles and inferring evolution. **Scott** is interested in samples from either of these groups, especially if preserved for molecular analysis. This work is supported by Australian Biological Resources Study funding to **Scott**, **Tim Littlewood** of the Natural History Museum (London) and **Tom Cribb**.

BRAZIL

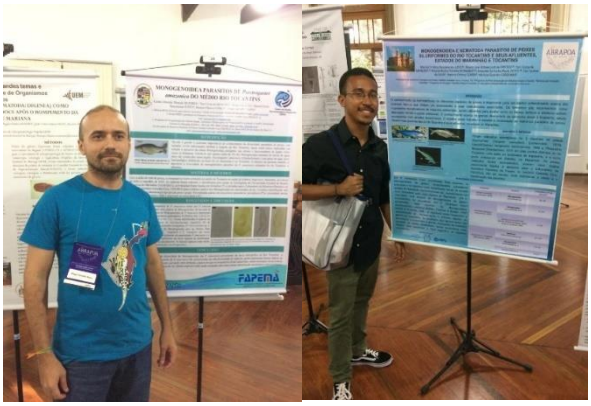
provided by Simone Cohen, cohen.simone@gmail.com

The Laboratory of Helminth Parasites of Fishes of the **Instituto Oswaldo Cruz** (IOC) is headed by **Simone C. Cohen** (scohen@ioc.fiocruz.br) and includes the researchers **Marcia C. N. Justo** (marciajusto@ioc.fiocruz.br), **Melissa Q. Cárdenas** (melissaq@ioc.fiocruz.br) and **Ana Claudia Ribeiro Fiuza** (ana.fuiza@ioc.fiocruz.br).

Projects being carried out by the group include studies of tuna parasites by **Marcia**, **Simone** and **Ana Maria Moreira da Silva**, who published new host and geographical records on the taxonomy of didymozoid trematodes from *Thunnus obesus* based on morphology. A new nematode species, *Ichthyouris nunani,* was described from *Laemolyta taeniata* and *Curimata acutirostris*, both of which were caught in the River Tocantins, State of Maranhão, Brazil. In the same river, post-doctoral intern **Diego Carvalho Viana,** from the Estadual University of Maranhão, and master's student **Dennysiane Saraiva** are studying the helminths from *Triportheus* spp., and **Alvaro José Bittencourt de Freitas** is undertaking an MSc on *Urocleidoides* spp. (Monogenea) of characiform hosts.

Members of the lab participated in the XXVI CBO (Brazilian Congress of Parasitology), which was held in July, 2019 at São Paulo. Students presented their work on: new geographical records of monogeneans from *Cichla* spp.; nematode and digenean parasites of Characiformes from the River Tocantins and its tributaries; and monogeneans and acanthocephalans from culture systems in the Tocantins-Araguaia river basin.

Yuri C. Meneses and **Diego** (right) attended the Brazilian Meeting of Pathologists of Aquatic Organisms (ENBRAPOA 30 Years). **Marcia** and **Simone** completed a chapter on 'Monogenoidea: implications on aquaculture and review of main treatment alternatives' in the book "**Biotecnologia e sanidade de organismos aquáticos**" (Biotechnology and health of aquatic organisms).



The Laboratory of Helminth Parasites of Vertebrates of **the Instituto Oswaldo Cruz** (LHPV/IOC) is led by **Dr Delir Corrêa Gomes Maués da Serra Freire** and **Dr Marcelo Knoff**. The group is studying all groups of parasitic helminths in Brazilian marine and freshwater fishes of commercial importance. **Bianca Porto Kuraiem** recently finished her PhD on the immunological response to antigens of *Eustrongylides* sp. collected in freshwater teleostean fishes, and **Sandra Helena Gomes Miguel** completed her MSc on trypanorhynch cestodes and nematodes of potential importance to human health parasitising the marine fish *Fistularia petimba*. The MSc, PhD and Postdoctoral work of **Michelle Cristie**

Gonçalves da Fonseca has focused on helminth parasites of the flounders *Paralichthys patagonicus, P. isosceles* and *Xystreurys rasile* from the State of Rio de Janeiro. **João Victor Ferreira de Oliveira**, a graduate in Veterinary Medicine, is finishing his BSc on trypanorhynch cestodes parasitising *Mugil liza* collected in the State of Rio de Janeiro. Other postdoctoral, PhD and MSc and students, working on anisakid and raphidascaridid nematodes and trypanorhynch cestodes from teleost fish purchased in the State of Rio de Janeiro, include: **Dr Gabrielle Fontenelle**, **Priscila Queiroz Faria de Menezes**, **Mayla Monique dos Santos Leite** and **Jessica Botti Diniz**.

The Laboratory of Systematic and Coevolution (LASCO**,** www.lasco.ufpa.br) of the **Federal University of Pará** in Bragança (Pará State) is headed by **Dr Marcus Vinícius Domingues**. This laboratory began its activities in 2011 and the main focus of the research is the diversity of monogenoids from the Amazon region. So far, more than 50 taxa, including new genera, species and new combinations, have been proposed.

About 30 students have completed their undergraduate, master's or doctoral work under the supervision of **Marcus**. **João Santos-Neto** is doing his PhD on the integrative taxonomy, phylogeny and coevolution of species of *Urocleidoides* Mizelle & Price, 1964. For his PhD **Matheus Watanabe** is investigating the question: "Historical parasite-host associations: what do the coastal drainages of northeastern Pará and monogenoid parasites and their poeciliid hosts (Cyprinidontiformes, Poecillidae) have in common?". **Geusivam Soares** is doing his PhD at the University of Campinas, São Paulo on the "Integrative taxonomy, phylogeny and coevolution of monogenoid parasites of Ariidae (Osteichthyes: Siluriformes) off the Brazilian coast". For his MSc, **Ailson Sales** is investigating " Polystomatids from *Physalaemus ephippifer*: integrative taxonomy and biology". Finally, MSc student **Fabio Nascimento** is working on the diversity of monogenoids on siluriform fishes from the Eastern Amazon.

Researchers from other countries have visited the laboratory since its founding. Among them, we highlight the visit of our late friend **Dr Ian Whittington** (2011). LASCO's next actions will be aimed at creating a database of monogenoid diversity in the Amazon region. We also intend to expand our network of collaboration with researchers from Brazil and other countries. For this, we invite you to visit us at LASCO. All are welcome!

In the far south of Brazil, the **Laboratório de Parasitologia de Organismos Aquáticos – LABIPOA** (https://labipoa.furg.br/) is led by **Prof. Dr Rogério Tubino Vianna**. One area of research the lab. is pursuing seeks to describe the diversity of Monogenoidea from freshwater fish in order to understand phylogenetic, co-evolutionary and biogeographical relationships and the ecological conditions that influence the parasites. **Aline A. Fonseca** is studying the diversity of gyrodactylid parasites of Cyprinodontiformes from Lagoa dos Patos and their phylogenetic relationships. For her MSc, **Sabrina D. Brachi** investigated the diversity of gyrodactylids of Siluriformes from the Coastal Hydrographic Region of Southern Brazil, as well as their phylogenetic relationships. MSc student **Tainã Guimarães** studied the diversity of monogenoid parasites of Characiformes from Lagoa dos Patos, in order to understand the phylogenetic relationship between parasitic and host species, as well as the environmental parameters that influence these parasites.

In addition, the LABIPOA has an extension project being developed by undergraduate student **Madalena D. Linder** to curate the LABIPOA helminthological collection, disseminate its data on platforms such as the SiBBr (Brazilian Biodiversity Information System) and GBIF (Global Biodiversity Information Facility), and develop a didactic catalogue. The catalogue will be available on the LABIPOA website and on the Secretariat of Education's online platform, so that students and teachers of higher education and elementary and high schools can access the material.

GERMANY

provided by Bernd Sures, bernd.sures@uni-due.de

We are pleased report on the activities in fish parasitology from Germany after a few years of absence. Firstly, our condolences go to the families of **Rudolf Hoffmann** and **Martin Kalbe** who passed away in recent years. **Rudolf Hoffmann** was the representative for the group of German fish parasitologists for a long time. He was head of the Institute of Zoology, Fish Biology and Fish Diseases at the Ludwig-Maximilians-University in Munich and died at the age of 74 in July, 2016. Sadly, **Martin Kalbe,** from the Max Planck Institute for Evolutionary Biology, Plön, passed away in May, 2018, at only 53 years of age. His main focus of research was on evolutionary aspects of sticklebacks and the tapeworm *Schistocephalus solidus*. Two really enthusiastic and fantastic parasitologists have gone and the world is poorer without them.

Currently, fish parasitology is still a vital field in Germany and ongoing research focuses on many different aspects, including those of **Jasminca Behrmann-Godel** (Konstanz, https://www.limnologie.uni-konstanz.de/behrmann-godel), **Sven Klimpel** (Frankfurt, https://www.bio.uni-frankfurt.de/43925886/Abt__Klimpel), **Klaus Knopf** (Berlin, https://www.igb-berlin.de/knopf), **Joachim Kurtz** and **Jörn Scharsack** (Münster, https://www.uni-muenster.de/Evolution/animalevolecol), **Harry Palm** (Rostock, https://www.auf.uni-rostock.de/en/professorships/a-g/aquaculture-and-sea-ranching/team), and **Bernd Sures** (Essen, https://www.uni-due.de/aquatic_ecology). The research topics of these groups comprise a huge field of applied and basic research on freshwater and marine animals and their parasites.

For more than 35 years, our annual "Ichthyoparasitological Symposium" has brought all interested German-speaking aquatic parasitologists together. In 2019, 20 talks were given on aquatic parasites, with several attendees present from non-German-speaking countries. Therefore, the meeting was held in English to facilitate exchange between parasitologists from Germany, Austria, the Czech Republic, Italy, the Netherlands, Iran, Puerto Rico and Qatar. The next meeting, organised by the group of **Bernd Sures**, will be from June 26th to 28th, 2020. Please e-mail bernd.sures@uni-due.de if you wish to attend.

IRAQ

provided by Prof. Dr Z. I. F. Rahemo, zohair.f.rahemo@gmail.com

During this past year at the **University of Basrah**, **Prof. Dr Khalidah S. Al-Niaeem** (pictured below with her research team) and her colleagues carried out a number of ichthyoparasitological studies. In collaboration with **Suzan Al-Azizz,** parasitic copepods of the order Siphonostomatoida were investigated in the northwest Arabian Gulf on the carangid *Megalaspis cordyla* (L., 1785). Checklists of fungi and fungal-like organisms infecting fishes from Basrah Province were produced with **Prof. Furhan T. Mhaisen**. Two other projects, with **Hayder A. H. Al-Hasson** and **Suzan A. Al-Azizz,** were also undertaken. The first project documented the occurrence of six larval nematode species from Iraqi

marine fishes, and, in the second study, the capsalid monogenean *Sprostoniella multitestis* was recorded for the first time from *Platax teira* and *P. orbicularis* collected in Iraqi waters**.**

At the **University of Salahaldin**, Erbil, Kurdistan, **Prof. Dr Shamall M. A. Abdulla** has completed a number of studies with his colleagues. With **Dr Qaraman M.K. Koyee**, he examined host specificity, community components and diversity dynamics of *Dactylogyrus* spp. parasitising the gills of cyprinids. In another study, with **Younis S. Abdullah**, **Samir J. Bilal** and **Shwan K. Rahman,** the helminths in *Glyptothorax kurdistanicus* (Actinopterygii: Sisoridae) in the Greater Zab and Lesser Zab Rivers, Kurdistan Region, were investigated. In another collaboration with **Younis S. Abdullah,** the ichthyofauna of Lake Darbandikhan in the Kurdistan Region was also examined.

NEW ZEALAND

provided by Bronwen Presswell, bpresswell@hotmail.com

Notwithstanding a lack of reports in recent years, ichthyoparasitology is alive and well in New Zealand. Under **Prof. Robert Poulin's** guidance, the **Evolutionary and Ecological Parasitology Group** at the **University of Otago** continues to work on the ecology, behaviour and taxonomy of New Zealand parasites, with considerable focus on fish parasites.
The Common Bully, *Gobiomorphus cotidianus*, our most common endemic freshwater fish, harbours at least 18 parasite species and, being relatively easy to maintain in the laboratory, has been the focus of many studies in the Poulin group. In the last couple of years an eye trematode, *Tylodelphys darbyi*, has been described from the bully and also from its definitive host by **Drs Bronwen Presswell** and **Isa Blasco-Costa** (now at the Geneva Museum of

Natural History), and PhD student **Brandon Ruehle** (pictured above right) has studied behavioural manipulation of the bully by this parasite. **Bronwen** and **Isa** also described a well-known, but previously undescribed metacercaria of genus *Apatemon* from the same fish species.

The invasive cestode *Ligula* sp. was reported by **Dr Clément Lagrue** from *G. cotidianus* and also from the salmon *Oncorhynchus tshawytscha*.

Drs Fátima Jorge and **Rachel Paterson** described a new capillariid nematode from the swim bladder of the enigmatic Brown Mudfish, *Neochanna apoda*, an endemic fish from swampy forests, and a new species of acanthocephalan was found in the same host species.

Marine species have also been of interest: cystacanths of a pinniped acanthocephalan, *Corynosoma hannae*, were reported by **Bronwen** and **Dr Jesus Hernandez-Orts** (of CMAS, Argentina) for the first time, infecting brill, *Colistium guntheri*, and sole, *Peltorhamphus novaezeelandiae*, from off the coast of Otago. Parasites of the sole were also studied by visiting student **Thibaut Anglade** and his supervisor **Dr Haseeb Randhawa**, in particular to gain insights into the ecological role of this fish off New Zealand. **Dr Gerardo Pérez-Ponce de León** joined forces with these two to describe *Steringotrema robertpoulini* from this host.

Elasmobranchs are well known around the New Zealand coasts and their parasites continue to attract attention. Supervised by **Haseeb Randhawa, Trent Rasmussen** completed his MSc on whether host diet governs the structure and diversity of cestode assemblages, using the model shark species *Cephaloscyllium isabellum*. **Jerusha Bennett** completed her MSc on helminth parasites of the Rough Skate, *Zearaja nasuta*, and used them to infer trophic links in the marine ecosystem. She is continuing with this theme for her PhD where she will study parasites in the larger Otago marine ecosystem, to include teleosts as well as elasmobranchs under the supervision of **Robert**, **Fátima** and **Bronwen**.

This past year **Bronwen** and **Jerusha** (pictured left) have donated a large collection of parasite material to the Otago Museum, probably the largest parasite collection in New Zealand, amongst which are specimens from both elasmobranchs and teleosts. Please contact Bronwen for more details about this collection.

PERU

provided by Jose Iannacone, neotrophelminthol@gmail.com

The **Laboratory of Ecology and Animal Biodiversity** (LEBA), Faculty of Natural Sciences and Mathematics, **Federico Villarreal National University**, Peru is led by **Dr José Iannacone Oliver**. The study of the parasitic fauna of marine fish of economic importance of the North central and southern Peru is among the many projects being carried out by the group. Currently, we are currently carrying out an ecological parasitic study of serranid (*Acanthistius pictus*, *Hyporthodus niphobles*, *Hemanthias peruanus*), carangid (*Selene peruviana*), malacanthid (*Caulolatilus princeps*), ophidiid (*Genypterus maculatus*) and other fishes. **Catherine Rey Clarke** is currently working on her thesis on the parasitofauna of the elephantfish, *Callorhinchus callorhynchus*, collected from off the pier of San Andrés, Pisco, Ica, Peru, and the thesis of **David Minaya Angoma** examines the community of parasitic eumetazoans associated with three species of marine fish off northern Peru.

LEBA organised the 'VIII International Congress of Neotropical Parasitology – COPANEO 2019', June 4th –7th, 2019, and both the 'VIIIth Latin American Symposium on Ichthyology' and a 'Symposium on Neotropical Ichthyoparasitology', October 21st – 24th, 2019, all at Ricardo Palma University, Lima, Peru. Pictured left: Participants and organizers of the VIII COPANEO 2019. From right to left: Rodrigo, Letícia, Cristiana, José, David, Edna and Karina.

The group held a number of workshops, including a 'Parasitic Ecology Workshop', taught by **José Iannacone**, at the Faculty of Natural and Mathematical Sciences of the Federico Villarreal National University, and one on 'Taxonomy and ecology of parasitic helminths in elasmobranchs', taught by **Oscar Méndez** (Mexico) at the Faculty of Biology of the Ricardo Palma University. Six of the 13 scientific articles published in the scientific journal *Neotropical Helminthology*, 2019 (1) (sponsored by the Peruvian Association of Helminthology and Related Invertebrates (APHIA)) covered ichthyoparasitological topics.

PORTUGAL

provided by Maria João Santos, 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, including **Aurélia Saraiva** (amsaraiv@fc.up.pt), **Carlos Azevedo** (azevedoc@icbas.up.pt), **Cristina Cruz** (cfcruz@fc.up.pt), **Graça Casal** (gcasal@icbas.up.pt), **Jorge Eiras** (jceiras@fc.up.pt) and **Luis Rangel** (luisfiliperangel@sapo.pt). Several students and collaborators are currently working on their theses or other projects in fish parasitology, including: the postdocs **Margarida Hermida** and **Andreia Caldeira**; PhD students **Sónia Rocha**, **Renata Duarte**, **Diego Vieira** (from Brazil), **Amira Elloumi** and **Kouloud Bouderbala** (both from Tunisia); Master's student **Duarte Frade** and BSc students **Rita Cortinhas**, **Adriana Melo, Ana Filipa Chibante, Beatriz Nogueira, Cristina Brito, Diogo Silva, Francisco Silva** and **Emanuel Baltarejo**. Also present is an Aquaculture collaborator, **Ricardo Severino**. In 2019, **Sónia Rocha** defended her PhD thesis on the Myxozoa.

The **Laboratory of Pathology** investigates the pathology of freshwater and marine fishes, not only from Portugal but also of important tropical fish species from South America (Brazil), Tunisia and Saudi Arabia. We have strong collaborative research programmes which were established more than two decades ago. Current projects include: a survey of pathogenic agents of important farmed fishes; Apicomplexa and Myxozoa from seabass (*Dicentrarchus labrax*), seabream (*Sparus aurata*) and other fish species. More detailed information on our previous work and publications is available at https://www2.ciimar.up.pt/research.php?team=22.

In April 2019**, José Estévez,** from Vigo University, visited our laboratory to work collaboratively on a myxozoan project. **Maria Santos** and **Andreia Caldeira** were invited in July to go to Ponte Vedra, Spain, to participate in the **XXI Conference of the Spanish Society of Parasitology**. **Graça Costa** (gcosta@uma.pt), of Madeira University, is carrying out research on fish parasitology off Madeira, the Selvagens (Savage) Islands and the Portuguese mainland.

19th International Conference on Diseases of Fish and Shellfish
Porto, Portugal
9th-12th September 2019

The **19th International Conference on Diseases of Fish and Shellfish** held in Porto was organised by **Aurélia Saraiva** and **Cristina Cruz,** with the help of other researchers from CIIMAR. In September we also participated in the Open Day at CIIMAR with an outreach activity called *'Anisakis* infection in our fishes in Portugal', where methods of prevention of *Anisakis* infection were discussed.

UNITED STATES

provided by Robin Overstreet, Robin.Overstreet@usm.edu

The **Overstreet Parasitology Group** at the Gulf Coast Research Laboratory, **University of Southern Mississippi**, has continued extensive research projects on fish parasites throughout the past year.

Doctoral student **Juan Carrillo** is now in Spain but still in the home stretch of his dissertation, investigating the effects of white spot disease *Haematodinium perezi* and various environmental parameters on the catch per unit effort of a host in the Mississippi Sound. Another doctoral student in the lab, **Andrew Claxton**, is tackling ecological aspects of parasitic infections in the Pinfish and Atlantic Croaker as both long-term and short-term studies. Master's student **Apryle Panyi** has begun writing up her data on the taxonomy and phylogenetics of members of the Monorchiidae (Trematoda) in the northwestern Atlantic Ocean (US East Coast, Gulf of Mexico and Caribbean, as well as the Mediterranean Sea). Master's student **Jaime Smith** is investigating a protist that causes mass mortalities of its hosts. **Robin Overstreet** has continued his work as an emeritus professor with students and on a variety of trematodes, microsporidians and other groups, as well as general parasitology. **Stephen Curran** (Co-Editor of *Comparative Parasitology*), **Richard Heard**, **Michael Andres** and **Eric Pulis**, all former students of Overstreet and still affiliated with our group, as well as colleagues **Earl Weidner** (LSU), **Yuliya Sokolova** (George Washington University; Institute of Cytology, Russian Academy of Sciences), **Vasyl Tkach** (Univ. North

Dakota) and **Serge Mironov** (Zoological Institute, Russian Academy of Sciences) all continue their collaborations with our group.

WALES

provided by Prof. Jo Cable, cablej@cardiff.ac.uk

In the **School of Biosciences** of **Cardiff University, Dr Rachel Paterson,** continues to investigate the effects of multiple stressors associated with climate change and anthropogenic stressors on host-parasite assemblages across the European distribution of Arctic Charr, and is soon to be based at the Norwegian Institute for Nature Research in Trondheim. Integrated Master's student **Meg Huggins** won the best ecological poster at the British Society of Parasitology Spring Meeting in April, 2019 for her research on the effect of parasites on stickleback vision. Together with researchers from the Cardiff School of Ophthalmology and Vision Sciences we have continued to explore this research theme, with summer students **Ferdie Amor** and **Vanda Adamkova** joining our lab for the summer (Rachel, Ferdie and Vanda doing fieldwork in the Welsh sun pictured right).

PhD student **Numair Masud** continues his investigations into how emerging and neglected stressors impact fish welfare, with an emphasis on disease resistance. This work includes an inter-disciplinary project with the Cardiff School of Engineering and recently graduated master's student **Laura Hayes** on how sound pollution impacts fish susceptibility to disease. Laura is now assisting PhD student **Elissavet Arapi** as a technician (funded by Adisseo) looking at the effectiveness of plant extracts and herbal remedies against *Gyrodactylus turnbulli* infections. This work is part of Elissavet's PhD research, which focuses on effective control strategies of aquatic infectious diseases. PhD student **Rhi Hunt** has been characterising the behaviour of *Argulus foliaceus* (a parasitic fish louse) and determining how these parasites can be manipulated to improve control strategies. Our collaborations with the Environment Agency also continue on our Saprolegnia projects. **Emily Matthews** is just completing the final stages of her PhD thesis, writing on the landscape genomics of *Saprolegnia parasitica*, research that will continue with BBSRC funding for **Scott MacAulay,** who has just joined us in Wales from Scotland.

Jo also had the chance to visit northern Namibia this year to sample for waterborne parasites with new PhD student **Anya Tober** and long-term collaborators **Drs Isa-Rita Russo** and **Prof Mike Bruford,** and very much enjoyed catching up on fish microbiome research with Portuguese collaborators from **Dr Raquel Xavier's** lab. in Porto – hoping for more fieldwork (and less administration) next year!

After a wonderful sunny summer in Wales, the weather has turned a bit colder now, so a good excuse for the group to visit the Winter Wonderland, which is just minutes from the lab! For more information about our research see our lab webpage, designed and managed by our post-graduates (https://cripescardiff.co.uk), and/or follow us on Twitter @CRIPESCardiff.

IN MEMORIAM

Professor Emeritus Bjørn Berland (1929 – 2019)

Bjørn Berland passed away on 22 November, 2019 aged 90. Bjørn will be remembered as a dedicated zoologist with many interests and talents covering diverse fields, such as comparative vertebrate anatomy and fish parasitology as well as microscopy and photography, just to mention some. Nevertheless, his major field of interest and research in which he gained broad international recognition was the taxonomy, systematics and general biology of marine parasitic nematodes, especially the anisakids. In the past two to three decades, Bjørn was honourably recognised as the 'Grand Old Man' in fish parasitology among colleagues and friends in Norway and abroad.

Bjørn was born and grew up in Bergen, Norway, where he lived and worked most of his life. After completing his zoology studies in 1957 at the recently founded University in Bergen, he worked for five years at the Institute of Marine Research where he prepared the renowned and still widely cited paper on 'Nematodes from some Norwegian marine fishes', probably one of the most frequently cited articles in the history of *Sarsia* (now *Marine Biology Research*).

In the 1950s, while still in his twenties, Bjørn lived out his adventurous genes by embarking on sealing vessels eight times over three seasons to the hunting grounds in the Denmark Strait and along the east coast of Greenland. During these trips without regular contact with civilization (satellite communication didn't exist) and living under rather harsh conditions, Bjørn conducted both anatomical and parasitological studies on the Greenland Shark as well as the Hooded Seal. These efforts resulted in several publications including

one published in *Nature* (191; 829-830) on the eye-parasitic copepod *Ommatokoita elongata*, probably living in a mutualistic relationship with the Greenland Shark, as he suggested. In another paper, he described the anisakid nematode *Phocascaris cystophorae* from the Hooded Seal, also providing an emendation of the genus to include species of *Contracaecum* known from seals. Although Bjørn based his conclusion solely on morphology and field observations, the emendation of the genus, as proposed by him, seems to be supported by recent sequence analysis of various genetic markers of some of the actual species.

From 1962 to 1965, Bjørn worked as lecturer in zoology at the University of Kumasi, Ghana. According to his family, this stay was cherished, and during trips around the country, Bjørn eagerly photographed various daily life motifs as well as plants and wildlife. Many of his pictures are now archived in the collection of the University library in Bergen and can be retrieved at http://marcus.uib.no/instance/collection/ubb-bb-.

As a senior lecturer and from the early 1990s as full professor at the University of Bergen, Bjørn taught a wide range of courses including basic invertebrate zoology, comparative anatomy and embryology. But closest to his heart was teaching fish parasitology, where he always combined traditional classroom lecturing with exciting and all-embracing dissections of fish in the lab., especially cod ("you never know what you can expect to find"). To get the message through to the students as he said, he made extensive use of overhead projector sheets in which he often combined the most illustrative sketches with a sometimes simply indecipherable handwriting.

Bjørn cherished being a supervisor of MSc and PhD students. They all benefited from his enthusiasm and great knowledge in most aspects of fish parasitology and fish biology, and not to mention his ability to come up with plausible explanations to intriguing problems or puzzling observations – "you have to think biology" as he frequently put it. After his official retirement in 1999, Bjørn continued his work as Professor Emeritus, and he also had several stays abroad including Vietnam and Malaysia, resulting in a number of publications, book chapters and leaflets. He officially cleaned his desk at the "emeritus office" provided by the Inst. of Biological Sciences, UoB, as late as 2015.

His favourite word was "serendipity", not surprisingly perhaps since it was the principal agent in one of his most renowned contributions to practical fish parasitology – Berland's fluid (*Nature* 191: 1320-1321). The fixative was discovered by serendipity during fieldwork almost 60 years ago, when he accidentally collected nematodes into glacial acetic acid instead of ethanol with stunning results! To his surprise, the worms became beautifully straight and clear. Today, Berland's fluid is still the number one choice whenever nematodes need to be fixed and cleared for morphological examination and measurements. Bjørn lived a very rich and long life in the midst of his large and caring family and we will certainly miss him as a mentor, source of inspiration and friend.

Arne Levsen, Egil Karlsbakk, Danjal P. Højgaard, Simonetta Mattiucci

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], Parasitology Section, The Science Centre, South Australian Museum, North Terrace, Adelaide 5000, South Australia, Australia; before November 15, 2020.

The Newsletter is issued once a year and the persons listed on the cover page act as regional representatives for disseminating information on the latest and forthcoming issue. 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 e-mail, URL, etc) to his or her domestic members, where necessary. When it is impossible to download a copy, please advise the editor.

Thank you

Leslie Chisholm

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