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EDITORIAL

This is the 28th edition of the *International Ichthyoparasitology Newsletter*, an annual report on the activities of fish parasitologists founded in 1996 by Dr Kazuya Nagasawa.

Challenging was the most common word used to describe 2020. In Australia the year started with catastrophic bushfires and then floods. We could not have imagined that these were only a prelude to the devastating effects COVID-19 would have globally. Lives were turned upside-down and homes became the new workplaces. But even under the tightest of restrictions, there were surprisingly positive outcomes. As evidenced by this newsletter, many scientists embraced the forced pauses to focus on research and probably more than a few of us shared our dining tables with a microscope. Networking flourished as conferences zoomed onto our computer screens - a big bonus for those with no travel funds.

It is time for another change. I have enjoyed being the editor of this Newsletter for the past 22 years but have decided it is time to pass the reins onto another. Please contact me if you would like to become the next editor of this annual newsletter. Thank you to those who contributed this year. I am grateful David Vaughan for his editorial assistance. I should also like to express my deepest appreciation to David Gibson for his editorial assistance over the many years that we have been working together and for posting the Newsletter on the web.

2021 will continue to be very challenging and will test our vigilance. But I hope we will soon be free to pursue our passions, whatever they might be.

I send my best wishes to you and your families – stay safe.

Leslie (on right in the picture)

ANNOUNCEMENTS

10th International Symposium of Fish Parasitology
Cairns, July 5–9, 2021

Dear Friends and Colleagues,

We are pleased to announce that the 10th International Symposium for Fish Parasitology and Australian Society for Parasitology Annual Conference will now be held in Cairns, Australia from Monday 5th to Thursday 8th July, 2021.

You will enjoy Cairns as a venue. Temperatures range from 17-26 °C in July and there is little rain. Cairns also allows for ready access to the Great Barrier Reef and the north Queensland rainforest! An explanation about our logo created by Storm Martin: the creatures inspecting the text are cleaner wrasses (a little stylised). If you snorkel on the Great Barrier Reef while you are in Cairns, we guarantee that you will see these little fish (up to about 10 cm long) in action "cleaning" parasites from other fishes.

This is a family-friendly conference. There will be a parents/carers and children room during the conference separate from the lecture theatre, so that parents/carers will be able to watch and listen to the conference presentations live. A prayer room will be available for delegates to use. The conference venue is fully accessible for delegates who require lift access. We are working towards running a carbon-neutral conference and will be reporting on this progress. We hope our delegates will join us in reducing waste and their impact on the environment.

Please put the meeting in your diaries and mention it to colleagues and students who are not yet on our mailing list, and stand-by for further announcements as the details are organised. Should you be interested in running (or helping to run) a special symposium during the meeting then please let us know about your ideas.

We look forward to seeing you in Cairns in 2021.

The Organising Committee

Please contact the Conference Coordinator, Lisa Jones by email (lisa.jones1@jcu.edu.au) or telephone +61 (0)7 4232 1311 with any queries.

9th International Symposium on Monogenea
Lucknow, August 2–7, 2022

We are pleased to announce that the 9th International Symposium on Monogenea (ISM 9) will take place at the University of Lucknow, India in 2022 after being postponed due to COVID-19. The tentative date is August 2–7, 2022 but this is still to be finalised. Lucknow, the capital city of Uttar Pradesh, is a multicultural city known for courtly manners, beautiful gardens, poetry, music and fine cuisine. The University of Lucknow, currently celebrating its centenary year to mark 100 years of its rich history and excellence, is the perfect venue to host ISM 9. The university is situated in the middle of the city and a wide range of hotels and restaurants for symposium participants are in close proximity. The details of important dates, arrangements and costs for the symposium will be announced shortly.

For updates, please stay in touch with Amit Tripathi (tripathi_amit@lkouniv.ac.in) and Nirupama Agarwal (dr_neeru_1954@yahoo.in), Department of Zoology, University of Lucknow; ism9.lucknow@gmail.com

CURRENT RESEARCH ACTIVITY IN VARIOUS COUNTRIES

AUSTRALIA

James Cook University & Central Queensland University

provided by Kate Hutson, kate.hutson@cawthron.org.nz and
David Vaughan, d.b.vaughan@cqu.edu.au

The Marine Parasitology Laboratory, James Cook University (JCU), continues to progress research on parasites of coral reef fishes**. Associate Professor Kate Hutson** (now based at the Cawthron Institute, New Zealand) remains an adjunct academic at JCU and enjoys Zoom meetings with her remaining students. PhD student **Pauline Narvaez** is continuing her research on cleaner fishes and for the first time has documented the parasites hosted by specialised cleaner fishes themselves. Pauline found that *Labroides dimidiatus* was infected by eight parasite groups including ectoparasites (copepods, isopods, trichodinids, monogeneans and turbellarians) and endoparasites (myxozoans, trematodes and cestodes) representing at least 12 species. Her findings add to mounting evidence that some parasite species exhibit atypical life-cycles that exploit cleaning symbiosis. PhD student **Katie Motson** continues her research on the relationship between coral reef health and parasitic infection in herbivorous coral reef fishes. She documented the abundance, taxonomic richness and composition of parasite communities among three co-occurring herbivorous coral reef fishes, *Siganus doliatus*, *Pomacentrus wardi* and *P. adelus* on the Great Barrier Reef. For *Siganus doliatus,* Katie then explored how those three factors differed with benthic composition, representing a gradient of coral reef health (i.e., live coral, macroalgal

and rubble-dominated). The overall abundance of ectoparasites was highest on fish caged at rubble- relative to coral-dominated habitats, while benthic composition had no observable effect on ectoparasite species richness or community composition. **Jonathan Barton** successfully completed his PhD on parasitic flatworms infecting corals. His recently published works are of broad interest to the ichthyoparasitological community, and notably, he used fish as a biocontrol for the management of this parasitic flatworm in coral aquaculture.

At Central Queensland University, **Dr David Vaughan** continues his work with various international collaborators on *Gyrodactylus* species of marine fishes. He is also studying the taxonomy of bathydemersal monogeneans from off southern Africa and has recently discovered of two new deep-sea species representing the Hexabothriidae and Microbothriidae. In addition, David is also working with Kate on a new blood fluke species from Australia, and with **Emeritus Professor Klaus Rohde** on his chapter on parasitism for the Encyclopedia of Biodiversity.

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 will be returning to academic life in 2021 after completing a 2-year Senior Research Fellowship looking at the parasites of freshwater fish (and other hosts) in the Murray Darling Basin, NSW.

2020 has been a challenging year on many fronts, but the Parasitology Laboratory has managed to complete a number of projects (one of the advantages of isolation with your computer). Research papers have been published on various parasites of sharks and fishes from northern Australia, including our hammerhead shark connectivity project (now complete) where parasites were used to assist in stock discrimination. In addition, a number of introduced parasites (a *Dermocystidium*-like organism and *Lernaea cyprinicaea*) have been reported from various freshwater fish (native and feral) in local waterways through a combination of morphological and molecular assessments.

Shelley Williams is set to complete her PhD on "Biosecurity and seafood safety: Assessing the risk and knowledge gaps for zoonotic parasites in imported seafood products" by the end of 2020. **Shafat Hossen** is working on the occurrence of selected parasites on some marine fishes in Australia waters. **Scott Day** completed his Veterinary Science Honours project on *Clinostomum* species infecting various freshwater fishes, with two publications in preparation. **Megan Porter** has commenced a PhD project looking at the parasites of a sciaenid, *Protonibea diacanthus*, from the Northern Territory. Her project will be focusing on the effects of different environments and seasons on the parasite fauna.

Shokoofeh and Di ran a workshop on drawing of fish parasites during National Science week. You can access an interview by the amazing Sally Bryant at ABC National Radio: Capturing the science and the beauty: https://www.abc.net.au/radio/riverina/programs/breakfast/nematodes-as-art/12588680?fbclid=IwAR1qLf7LjsqF_l9fw7sWCo1LZYRGRjPtz8kMBxvbKtV5ENaAg4wTRzCu2WI

South Australian Museum

provided by Leslie Chisholm, leslie.chisholm@samuseum.sa.gov.au

With the temporary shutdown of the Australian Helminthological Collection due to COVID-19, **Dr Leslie Chisholm** was excited to devote time to research on her neglected monocotylid monogeneans. In collaboration with **Professor Delane Kritsky** (Idaho University), she described three new monocotylid species from rays collected in Moreton Bay, Queensland. Leslie also participated in a study with PhD student **Houda Kheddam** and her supervisor **Fadila Tazerouti** (Université des Sciences et de la Technologie Houari Boumediene) to describe a new genus and species, *Septitrema lichae* (Monocotylidae) from the nasal tissues of the deep-sea kite-fin shark *Dalatias licha* off Algeria.

BRAZIL

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

Members of **The Laboratory of Helminth Parasites of Vertebrates** of the **Instituto Oswaldo Cruz** (LHPV/IOC) led by **Delir Corrêa Gomes Maués da Serra Freire** PhD and **Marcelo Knoff** PhD have been studying digeneans, monogeneans, cestodes, nematodes and acanthocephalans of Brazilian marine and freshwater fishes of commercial importance. This work has been in partnership with other laboratories of IOC, including the Federal Fluminense University (UFF), the Coordination of Improvement of Higher Level Personnel (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES) and the National Council of Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq). **Jessica Botti Diniz** completed her MSc studies on trypanorhynch cestodes and nematodes found in marine fishes that are of

potential importance to human health. **João Victor Ferreira de Oliveira** finished his BSc on trypanorhynch cestodes parasitising *Mugil liza* collected in the State of Rio de Janeiro. **Michelle Cristie Gonçalves da Fonseca** continued her postdoc studies on parasites of the flounders *Paralichthys patagonicus, P. isosceles* and *Xystreurys rasile* from the State of Rio

de Janeiro. **Dr Gabrielle Fontenelle**, **Priscila Queiroz Faria de Menezes** and **Mayla Monique dos Santos Leite** have been working on anisakid and raphidascaridid nematodes and trypanorhynch cestodes from teleost fishes purchased in the State of Rio de Janeiro.

The staff of the **Laboratory of the Helminth Parasites of Fishes** at the **Institute of Oswaldo Cruz** (LHPP) include **Dr Simone C. Cohen** (scohen@ioc.fiocruz.br), Head of the Laboratory, **Dr Marcia C. N. Justo** (marciajusto@ioc.fiocruz.br), **Dr Melissa Q. Cárdenas** (melissaq@ioc.fiocruz.br) and **Dr Ana Claudia Ribeiro Fiuza** (ana.fuiza@ioc.fiocruz.br).

Many projects related to the parasite fauna of fishes are being carried out by the team, including descriptions of new species of Monogenea from *Auchenipterus nuchalis* by Simone and **Marcia Jin,** in collaboration with **Dr Walter Boeger**, and the acquisition of new data on species of the Didymozoidae parasitising scombrids from the Brazilian part of the southwestern Atlantic Ocean by Márcia, Simone and Melissa.

The group is also studying Nematoda, Monogenea and Digenea from two different river basins: the Araguaia-Tocantins basin, in collaboration with **Dr Diego Carvalho Viana**, and the Amazon basin, in collaboration with **Dr Williane Martins**, with descriptions of new species and new morphological data for these groups of helminths. MSc student **Álvaro Freitas** is studying *Urocleidoides* spp. of Characiformes fishes from Tocantins River, and MSc student **Dennisiane Saraiva** is studying the helminth fauna of various fishes of the same region. Other graduate student projects, based on morphological and molecular data, are also being developed involving helminths of freshwater fishes from these river basins.

Associate Professor Ana Carolina Figueiredo Lacerda (acflacerda@dse.ufpb.br) leads the **Laboratório de Hidrologia, Microbiologia e Parasitologia** (LAHMP), at the **Universidade Federal da Paraíba** (UFPB), in João Pessoa, Paraíba State, northeastern Brazil. The group was formed in 2017 and currently includes Professors **ACF Lacerda** and **Gilson Moura**, researchers **Gilson Melo**, **Marcylenne Oliveira** and **Creuza Soares**, PhD student **Júlia Martini Falkenberg**, MSc students **Manuella Feitosa Leal**, **Paulo Henrique Izidro** and **Vitória Lima** and undergraduate students **Brenda Luany do Nascimento** and **Nathália Martins**.

The group is developing projects in three main areas of ichthyoparasitology: (1) the description of the parasite fauna of fishes from regions in northeastern Brazil that have never been studied for parasites, such as estuarine systems, high altitude marshes and semi-arid intermittent rivers; (2) fish parasites as indicators of environmental conditions; and (3) fish parasites in a river basin before and after receiving the water from the São Francisco River diversion. The group is only a few years old, but several new records and hypotheses are emerging from these three main areas, and we have a special interest in ecological questions on parasites as bioindicators, parasites of invasive species, microhabitat selection, the role of parasites in conservation and restoration, and networks involving parasites, hosts and their prey.

CANADA

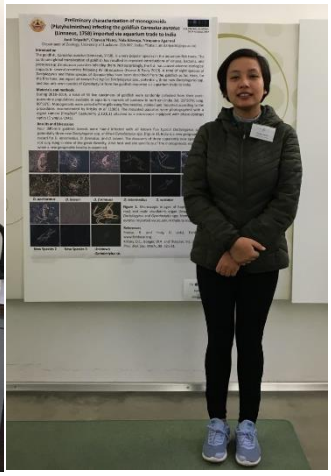
provided by David Marcogliese, david.marcogliese@canada.ca

The band is back together! After a long hiatus, **David Cone**, now retired and formerly of St. Mary`s University in Halifax, Nova Scotia, and **David Marcogliese**, also retired, and formerly of Environment and Climate Change Canada (ECCC), in Montreal, Quebec, and now Scientist Emeritus with the ECCC, are collaborating once again on a number of projects. The two scientists worked together extensively between 1989 and 2010 on the ecology, pathology and taxonomy of parasites in cyprinids, salmonids, eels and other fishes, publishing 17 papers. Their current projects include: 1) studies on myxozoan communities in cyprinids from eutrophic rivers in Quebec; 2) recruitment of parasites by young-of-the-year brook trout (*Salvelinus fontinalis*) in small streams in Nova Scotia; and 3) parasite communities in brook trout from lakes in Nova Scotia. Future collaborations are also in the works.

INDIA

provided by Amit Tripathi, amit.tripathi@rgu.ac.in

The **Laboratory of Helminthology**, currently run jointly by **Dr Amit Tripathi** and **Dr Nirupama Agarwal**, was established in 1967 by the late **Professor K. C. Pandey** under the aegis of the Department of Zoology, University of Lucknow. We do basic and applied research on helminth parasites. In particular, we aim to integrate detailed morphological studies on parasitic monogenoids with molecular genetics. Our ongoing projects fall into three categories, where we investigate: 1) the diversity of monogenoids of exotic Indian ornamental fishes; 2) the diversity of *Gyrodactylus* spp. from India; and 3) the diversity of fish helminths in general. Nirupama**,** a recipient of the prestigious Asutosh Mookerjee Fellowship, is currently writing a monograph on the cercarial fauna of India.



Chawan Matey (above right), a Junior Research Fellow in the laboratory, recently visited the University of Graz, Austria on an International fellowship and also attended the Network of Biological Systematics meeting (November 2019) in Salzburg, Austria with Amit, her mentor.

The laboratory is looking forward to holding the 9th meeting of the International Symposium on Monogenea (ISM 9) in India during 2022. Our group of two faculty members and four research scholars is currently funded by the Science and Engineering Research Board (SERB) and Department of Science and Technology (DST), Government of India. The laboratory is open to collaborate with foreign researchers on projects involving helminth parasites.

IRAQ

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

At the **University of Salahaldin**, Erbil, Kurdistan, **Professor Dr Shamall M. A. Abdulla** has supervised 2 PhD studies. The first, by **Muqdad Kamal,** involved morphological and molecular studies of species of *Neoechinorhynchus* from two freshwater fish species in Sulaimani Province. The second, by **Qaraman Mamakhidr Koyee,** examined the host specificity, diversity and molecular phylogeny of *Dactylogyrus* spp. from the gills of cyprinids collected from the Lesser Zab River in the Kurdistan region of Iraq.

In the Department of Fisheries and Marine Resources, College of Agriculture at the **University of Basrah**, **Professor Dr Atheer H. Ali** (pictured right) supervised two higher degree students. **Ali A. Radeef** (PhD) is carrying out morphological and genetic studies on some monogeneans from marine fishes of Iraq; and **Jawad A. Mizher** (MSc) is examining endoparasitic helminths of marine fishes of Iraq. **Tamir K.Adday** and **Nagim R. Khamees** had a prolific year, publishing two papers on fish parasites. One presented the first record of two species of *Eudactylina* (Copepoda:

Siphonostomatoida) from elasmobranch fishes in the Arabian Gulf, and the other discussed the occurrence of *Catoessa gruneri* (Crustacea: Isopoda), a parasite of *Photopectoralis bindus* from the Arabian Gulf, including the first description of its male.

ITALY

provided by Professor **Simonetta Mattiucci**, simonetta.mattiucci@uniroma1.it

Parasitology Unit, Department of Public Health and Infectious Diseases of Sapienza-University of Rome

Simonetta Mattiucci 's research group continue their studies on the parasites of fishes. Their main focus is anisakid nematodes, aetiological agents of human anisakidosis. Their work has been carried out in collaboration with **Giuseppe Nascetti** (Tuscia University, Department of Biological and Ecological Sciences, Viterbo, Italy) and **Mario Santoro** (Senior Researcher at the Stazione Zoologica "Anthon Dohrn" in Naples, where a marine parasitology unit has recently been established) and associated researchers, postdocs and PhD students **Maria Letizia Palomba**, **Michela Paoletti**, **Eleonora Bello**, **Armando Macali** and **Renato Aco Alburqueque**.

The research being done on anisakids includes: molecular systematics, population genetics, morphology, phylogeny, host-parasite co-phylogeny, ecology, studies on hybridization/introgression events between closely related species, pathological aspects, and epidemiological surveys in both natural and accidental (human) hosts. Recent studies on anisakid worms infecting fishes, have explored other co-evolutionary aspects of these parasites. Specifically, a transcriptomic (RNAseq and qRT-RNA) approach has been applied to investigate the gene expression profiles of target proteins involved in the fish host-anisakid parasite interactions and co-adaptation.

The Team is also investigating the use of anisakids of elasmobranchs from the Mediterranean Sea as ecological markers for stock identification. Population genetic studies, inferred by both mitochondrial genes and nuclear markers, performed on target species of *Anisakis*, parasitic in distinct fish populations of the same species, have been suggested as an additional tool to be included in multidisciplinary studies on fish stock structure. Furthermore, the same Team continues their work on molecular systematics of parasites of fishes from the Antarctic and Arctic Sea regions.

In terms of the zoonotic aspects of fish parasites, the Team is also investigating the molecular and immunological mechanisms involved in human anisakiasis using a multi-methodological approach. Specific objectives are: 1) to assess the presence and role of microvesicles (MVs) released by *Anisakis* spp.; 2) to improve our knowledge of gene expression levels of molecules involved in the differential invasiveness of *Anisakis* species in host tissues.

The Team continues their collaborative work on anisakids with **Dr Arne Levsen** of the Marine Research Institute (MRI) in Bergen, Norway and his team (**Paolo Cipriani**, **Lucilla Giulietti**, **Miguel Bao**), as well as with **Professor Juan T. Timi** (Universidad Nacional de Mar del Plata, Argentina) and his Team, and with **Dr Steve C. Webb** (Cawthron Institute, Nelson, New Zealand).

provided by **Bahram Sayyaf Dezfuli**, dzb@unife.it

Bahram Sayyaf Dezfuli is a fish parasitologist at the **University of Ferrara,** Northern Italy. His work focuses on host-parasite interactions, morphology of helminths and life cycles of helminth parasites of freshwater and marine fishes. Other interests include the histopathology, with a particular focus on fish innate immune response against helminths. During the past 25 years, 37 students have completed their undergraduate, master's or doctoral work under his supervision.

Since 1997, **Paolo Merella** has worked in the field of ichthyoparasitology at the Department of Veterinary Medicine at the **University of Sassari**. Paolo's areas of interest include the biology, ecology and systematics of marine fish parasites, the monitoring and control of parasites of farmed fishes, the use of fish parasites as biological tags, the study of parasites of invasive species and the study of fish parasites of zoonotic interest.

NEW ZEALAND

provided by Bronwen Presswell, bpresswell@hotmail.com

With **Professor Robert Poulin** at the helm, **The Evolutionary and Ecological Parasitology** group at the **University of Otago** continues to work on the ecology, behaviour and taxonomy of New Zealand parasites.

For years, metacercariae of *Tylodelphys darbyi* have been known from the eyes of the common bully *Gobiomorphus cotidianus* from lakes in the South Island of New Zealand. PhD student **Brandon Ruehle** has discovered two new morphologically and molecularly distinct species of *Diplostomum* in the eyes of *G. cotidianus* - one in the humour and one in the lens. The search continues for the definitive and first intermediate hosts. Brandon has also published two papers this year on the influence of *T. darbyi* on bully behaviour.

Robert, **Dr. Bronwen Presswell** and **Dr. Fatima Jorge** published a review paper on the state of fish parasite discovery. They found that more new helminth parasite species are being found and described now than ever before, the network of collaborating researchers involved in finding and characterising species is growing and the overall quality of species descriptions is rising constantly. However, they also found a number of areas where we are falling short and suggested ways to improve efficiency and progress in fish parasite taxonomy.

Robert also published an analysis looking at seasonality of infection levels of fishes. His findings suggest that seasonal dynamics of infections are far from universal among parasites of fishes, and that no single factor drives seasonality of infections. The only consistent patterns emerge within certain parasite taxa, indicating that the particular biology of some parasites makes them sensitive to abiotic conditions, linking their population dynamics to seasonal variation in external conditions.

Another study by Robert and Fatima looked at the geography of parasite discovery across taxa and over time. They found that helminth species discoveries are both spatially incongruent among higher helminth taxa and inconsistent over time. They concluded that global parasite discovery effort is less than efficient, spatially biased and subject to idiosyncrasies.

Jerusha Bennett (pictured right) is now well into her PhD studying parasites in the Otago marine ecosystem. She has collected numerous unknown parasites from a huge variety of fish and elasmobranchs, as well as invertebrates, linking life cycle stages and demonstrating trophic links. New MSc student **Xuhong Chai** begins her exploration of the parasites of rattail fish (Macrouridae) from the depths off the New Zealand coast.

For more information on what we are up to visit our webpage: https://www.otago.ac.nz/parasitegroup/home.html

provided by Kate Hutson, kate.hutson@cawthron.org.nz

Dr Kate Hutson (Senior Scientist, Programme Leader for Aquatic Health; pictured centre) at the **Cawthron Institute** in Nelson, New Zealand, is working on aquatic diseases of ornamental and aquaculture fish with her Cawthron-based colleagues (including **Dr Javier Atalah** pictured left and **Dr Iain Davidson** pictured right) and international collaborators, with a focus on fish parasites. Kate, Javier, **Dr Max Scheel** and **Natalie Bird** from the Cawthron are currently working on the development of a web-based interactive tool to help fish farmers make informed decisions about parasite management. Understanding the best treatment intervals means less fish handling, fewer disease outbreaks and better productivity. The decision support tool will provide the emerging New Zealand kingfish industry with clear directions on treatment intervals for single or multi-species infections for three problematic parasites. Photos, videos and info graphics will aid the detection and diagnosis of parasites, which can be cryptic in nature. The tool will also show fish farmers the most appropriate times to clean aquaculture structures that may be contaminated with parasite eggs (e.g., net changes and tank cleaning). The developed tool will be a valuable blueprint for decision-based management in aquatic environments – watch this space!

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), **Jorge Eiras** (jceiras@fc.up.pt) and **Luis Rangel** (luisfiliperangel@sapo.pt), plus an associated member, **Graça Casal** (gcasal@icbas.up.pt).

Several students and collaborators are currently working on their theses or other projects in fish parasitology, including: **Andreia Caldeira** (from Brazil); PhD students **André Carrido**, **Renata Duarte** and **Diego Vieira** (from Brazil); MSc and BSc students **Ana Carolina Rodrigues**, **Ana Catarina Araújo**, **Ana Isabel Azevedo**, **Ana Sofia Fernandes**, **António Labela**, **Beatriz Nogueira** and **Sílvia Rodrigues**. Also present is an Aquaculture collaborator, **Ricardo Severino**.

We investigate the pathology of freshwater and marine fishes, not only from Portugal but also from other countries, including 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 fishes; and anisakids of commercial marine fishes. More detailed information on our previous work and publications is available at:
https://www2.ciimar.up.pt/research.php?team=22

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

SPAIN

provided by Ariadna Sitjà-Bobadilla, ariadna.sitja@csic.es

The **Fish Pathology Group** of the **Institute of Aquaculture Torre de la Sal** (Consejo Superior de Investigaciones Científicas, CSIC) (Spain) is led by **Ariadna Sitjà-Bobadilla** and includes senior researcher **Oswaldo Palenzuela**, two postdoctoral researchers, **Itziar Estensoro** and **Carla Piazzon**, laboratory technician, **Raquel del Pozo** and PhD student **Enrique Riera**. Our research aims to improve of the health of aquacultured marine fishes, with particular focus on developing control and prophylactic methods against important Mediterranean parasites. The group is one of the Fish Health Laboratories and Advisory Services in the European Union listed by the European Association of Fish Pathologists.

In 2020, due to the Covid-19 restrictions, we did not attend many conferences, meetings or perform student exchanges. However, it was still an important year for our research group and we remained very active.

In March, the European H2020 project ParaFishControl finished. ParaFishControl was a five-year collaborative project of 28 European partners from 13 countries, all coordinated by Ariadna. The project, aimed to improve our understanding of fish-parasite interactions and develop solutions and tools to diagnose, prevent, control and mitigate the most important parasites affecting the main farmed fish in Europe. Several brochures and videos summarising the research and main findings of the project and four guides to combat parasitic infections in salmonids, turbot, common carp, European sea bass and gilthead sea bream aquaculture can be found here: https://www.parafishcontrol.eu/parafishcontrol-media-5/media-centre. Our main role in ParaFishControl was to study *Enteromyxum leei*, *Sparicotyle chrysophrii* and *Enterospora nucleophila* infecting gilthead sea bream.

Amparo Picard-Sánchez, a PhD student appointed in the ParaFishControl project, completed her experimental work in March and is currently finishing her thesis. This includes research on gilthead sea bream-*Enteromyxum leei* interactions with a special focus on adaptive immunity. Her results will set the basis for developing vaccines and diagnostic tools for this myxozoan parasite. The thesis also includes the first comprehensive description of *Enterospora nucleophila* (an emerging microsporidian parasite) pathology and experimental transmission. Since August, Amparo (pictured right) has been working in **Astrid Holzer**'s (pictured left) lab., at the Czech Academy of Sciences, on another myxozoan parasite infecting carp (*Sphaerospora molnari*).

We recently started a four-year Spanish project, named SpariControl. The aim is to find solutions for mitigating the devastating impact of the monogenean *Sparicotyle chrysophrii* (left) in Mediterranean gilthead sea bream cultures by increasing our knowledge of the parasite and host-parasite interactions. For this project, the PhD student Enrique joined us in October, 2020

thanks to a four-year grant from the Spanish Ministry of Science and Innovation. Enrique is a veterinarian with a Master's degree in Aquaculture, with both research and field experience. Enrique completed his Master thesis at the Università di Bologna (Italy) within the Horizon 2020 PerformFish project. We are sure he will deliver first-class results in the new project.

In January, Raquel was awarded a three-year grant (PTA) for technicians from the Spanish Government to continue her work on parasite molecular diagnosis. In February, in the framework of the Sparicontrol project, Itziar came back to the group, after spending one year working in the Fish Immunology and Pathology group of the CISA-INIA (Madrid) with **Carolina Tafalla**. In April, Carla was awarded a Ramón y Cajal five-year contract from the Spanish Government for post-doctoral fellows; this will allow her to continue her studies on the immune response of fish against parasites.

IN MEMORIAM

Dr Véronica A. Ivanov (1967-2020)

On January 14, 2020, Verónica A. Ivanov passed away in the city of Buenos Aires at the age of only 52 after a long, hard fight against a serious illness. Her passing at such a young age represents, without a doubt, a great loss to Argentine science.

Verónica was a member of a group of young researchers who gave a new impetus to the study of parasites of aquatic organisms in Argentina. She graduated with a Bachelor's degree in Biology from the National University of La Plata (UNLP) in 1991. Following her graduation in 1992, she entered the Helminth Laboratory at the Centre for Parasitological and Vector Studies (CEPAVE) in the city of La Plata as a CONICET fellow. There, she undertook her Doctoral Thesis on the ecology of helminth parasites of elasmobranch fishes. In 1996, after obtaining her Doctorate, Verónica moved to the laboratory of Dr Ronald Campbell in the United States in order to acquire more experience in the study of fish cestodes. She returned to Argentina in 1998 and, a year later, became a CONICET Scientific and Technological Researcher in the Helminth Laboratory of the Department of Biology, University of Buenos Aires. From that moment on, Verónica blossomed as an expert in the field of cestodology. Her research resulted in fundamental contributions to our knowledge of the diversity and ecology of fish tapeworms, especially tetraphyllideans and trypanorhynchs. Verónica was passionate about her work. Her scientific integrity and her daily involvement in research and teaching always served as example for colleagues and students. The acquisition of scientific knowledge and the pleasure of new discoveries were among the Verónica's major motivations.

Throughout her career, Verónica directed and supervised interns, scholarship holders, both undergraduate and doctoral theses, and CONICET researchers. In recent years,

she served as a founding member and co-director of the IBBEA (Institute of Biodiversity and Experimental and Applied Biology, CONICET, UBA). With regard to her teaching activities, Verónica worked as a Diploma Assistant (UNLP), as Head of Practical Works (UBA) and, later, as Professor of Invertebrate Zoology (DBBE-FCEyN-UBA).

Until her last days, thanks to her integrity and tenacity, Verónica continued directing the Systematics and Biology of Parasites of Aquatic Organisms group (IBBEA-UBA-CONICET), and even developed a postgraduate course on the morphology and systematics of cestodes to be taught at the UBA during December, 2019. Unfortunately, the course had to be suspended due to her deteriorating health. Nevertheless, Verónica's teachings and legacy will endure in the form of her students and scientific works, which will pass from one generation of parasitologists to another.

We and other friends will miss 'Vero' very much. We will keep in our hearts the dinners and long talks in cosy places that she carefully chose for our meetings, and her witty humour will resound forever in our memories.

Veróncia is survived by her husband Guido and by her beloved son Juan.

Graciela T. Navone, Jorge A. Etchegoin, Adriana Menoret

Emeritus Professor John Mackiewicz (1930-2020)

John S. Mackiewicz passed away on October 25th, 2020 at the age of 90. He will be best remembered internationally as the foremost expert on cestodes of the order Caryophyllidea, but was a dedicated zoologist with a wide range of expertise and interest over a period of more than 60 years.

John was born on July 12th, 1930 and spent most of his life in Albany, New York State. As a young child, he was seriously affected by a life-threatening bone infection which destroyed much of his hips at a time when antibiotics were unavailable to help. After extensive hospitalisation and four major operations in Connecticut, he was able to walk again, but his hip movement was restricted for the rest of his life.

He obtained his BSc in 1953 from Cornell University, Ithaca, New York State, followed by his MSc (1954) and PhD (1960) from the same university, developing an intense interest in fish tapeworms. He became especially interested in the Caryophyllidea, a basal group of monozoic tapeworms which mainly occur in freshwater fishes. In his studies, he investigated the systematics, evolution, zoogeography, host-parasite relationships and general biology of this group. Like many of the great cestode specialists of the middle of the 20th Century, he undertook post-doctoral studies in the laboratory of Professor Jean Baer at Neuchâtel, Switzerland.

On his return in 1961, John joined the Department of Biological Sciences at the State University of New York at Albany, where he remained on staff for 56 years. He retired in 2002, but continued to teach the course *Parasitic Diseases and Human Welfare* until 2017

and was still listed as a faculty member on the university website at time of his death. In 1973 he was promoted to the rank of Distinguished Teaching Professor, the first faculty member to reach this level. In recent years the atrium of the biology building has been named after him.

During his academic career at Albany, John taught 15 different courses on various aspects of biology, supervised 12 postgraduate students and was sought after as a PhD examiner for students throughout the world. In terms of his research, he published 86 papers, many of which were monographs or extensive reviews. He published his major monographs entitled 'Caryophyllidea (Cestoidea): a Review.' and 'Caryophyllidea (Cestoidea): Evolution and Classification' in 1972 and 1981. This was followed by his international recognition as 'the' expert on the Caryophyllidea and resulted in him being asked to revise the entire group for the *CABI Keys to the Cestode Parasites of Vertebrates* in the early 1990s. He also carried out the first extensive review of the cytogenetics and chromosomes of cestodes. John described 21 new tapeworm species and other cestodologists have named seven species after him. During the course of his work, he visited numerous other research institutes, including the Natural History Museum in London and the Institute of Parasitology in České Budějovice, and was a Research Affiliate of the H.W. Manter Laboratory at the University of Nebraska State Museum for more than 25 years. Even though retired, he continued collaboration with colleagues in Czechia, Slovakia and Poland and actively participated in preparation of manuscripts or served as a reviewer until his last moments.

No comment on John would be complete without mention of his ability as a teacher and mentor. He will be remembered by many for the enthusiasm for parasitology which he engendered and for the unselfish help which he gave to colleagues, not only in terms of his expertise and material but also with the editing of manuscripts and theses.

One could not spend long in John's company without finding out that he had seven great-grandchildren and that he was a keen fisherman. In relation to the latter, he undertook many fly-fishing expeditions to rivers in Quebec, Montana and Maine and was a life member of 'Trout Unlimited'. Needless to say his published comments extended to fly-fishing magazines. He also published letters in 'Time' magazine others on topics as varied as 'God versus science' and 'Same sex marriage'.

During his career John was a member of numerous scientific associations and was honoured by some. These included Life Membership of the American Association for the Advancement of Science and the Helminthological Society of Washington. He has also been listed in 'Who's Who in America'.

John will be sorely missed as a researcher, teacher, mentor and friend.

David I. Gibson, Zdzisław Świderski

Professor K.C. Pandey (1943–2019)

Professor K. C. Pandey left us for a heavenly abode on December 1, 2019. He was a leading expert in India on helminth parasites, especially the larval helminths. He published, by himself or with co-authors, more than 170 scientific papers and three monographs (*An encyclopedia on Indian Monogenoidea*, *Metacercarial fauna of India*, and *Trematode fauna of freshwater fishes of India*) on helminth parasites. He also supervised 36 PhD students in helminthology. He initiated the *Indian Journal of Helminthology* (new series) and successfully ran it from 1984 to until his death.

Prof. Pandey made numerous scientific and educational trips to other countries, including Thailand, Czechoslovakia, Japan, China, Australia, Germany, France, Malta and South Africa. His long and illustrious academic and administrative experiences in the different capacities span three and a half decades, including Lecturer, Reader, Professor, Dean and a full-term Vice Chancellorship of CCS University, Meerut, India. His career culminated when he was elected to be the General President of the Indian Science Congress Association, the most prestigious professional scientific body of the Department of Science & Technology of the Government of India. His very positive, energetic and encouraging attitude will always stay alive in the memories of his family, friends and colleagues. His passing is a great loss to the helminth community.

Amit Tripathi and Nirupama Agrawal

EDITORIAL POLICY

Please note that the editor position is currently open. When the position is filled a notification will be sent to contributors with the new submission instructions.

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

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Thank you

Leslie Chisholm

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