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Editorial

Fried, grilled or sushi, baked or in paella or chowder, fish are a popular and often essential component of the diets of peoples around the globe. Wild fisheries have traditionally been the major source of fish in most countries, but declining stocks and the need for more predictable and efficient food production has seen huge expansions of aquaculture around the world. There are many social and environmental problems that need to be addressed to ensure that this expansion is acceptable and sustainable, but there is no question that aquaculture will be an important part of our future food production.

There are also many biological issues involved with aquaculture. One that is often overlooked is the impact of fish parasites. Parasites affect most aquaculture species. There is a real need to develop management strategies, including treatments and vaccines, to reduce the impact of parasitic diseases on aquaculture. This requires a thorough understanding of the biology of the parasites and their life cycles.

We also need to increase our knowledge of wild fish parasites. This is essential if we are to understand and predict the impacts of parasites on wild fish populations and, just as importantly, appreciate their contribution to biodiversity.

This special issue of the International Journal for Parasitology on fish parasites was supposed to coincide with the 10th International Symposium on Fish Parasites (ISFP), organised by the ISFP International Committee, chaired by Tom Cribb, with the Australian Society for Parasitology. Unfortunately, COVID-19 intervened and the symposium had to be postponed until 5th–8th July 2021, although the meeting venue in Cairns remains the same.

As this will be the 10th symposium of the ISFP, it is pertinent to look back at the history of these important events. The 1st Symposium of the ISFP was organised by Jiří Lom and Frank Moravec at České Budějovice, Czechoslovakia in 1983. Jiří Lom and Frank Moravec showed a lot of foresight and perseverance in organising this conference and bringing together researchers from both sides of the Iron Curtain. At that time, fish parasitology was more developed in Eastern Europe and this conference allowed the exchange of information through translation of the presentations into English or Russian. This meeting was such a success that it was decided to organise this symposium every 4 years. The second meeting took place in 1987 at Tihany in the beautiful surroundings of Lake Balaton in Hungary, and was organised by Kalman Molnár. The third meeting was in the Soviet Union and was organised by Eugeny Ieshko and colleagues at Petrozavodsk in Karelia. It was at ISFP3 that Kazuya Nagasawa (Japan) proposed the preparation and circulation of the International Ichthyoparasitological Newsletter, which he edited for several years. This newsletter is

currently at Issue 27 and is edited by Leslie Chisholm in Australia (see <https://sypa75.wixsite.com/diplectanum/international-parasitological-news>). At this meeting Oleg Bauer decided that the series of meetings needed an international committee to discuss various aspects such as future venues. David Gibson was the Chair of the Committee until 1995 and was followed by Kazuo Ogawa (Japan) (1995–2003), Jo Van As (South Africa) (2003–2007), Simonetta Mattiucci (Italy) (2007–2011), Marcelo Oliva (Chile) (2011–2015), Toni Raga (Spain) (2015–2017) and Tom Cribb (Australia) (2017–present).

The fourth meeting in 1995 was organised by Rudolf Hoffman in Munich. This was a huge and very successful meeting, perhaps the first that could really be termed truly international, with 250 people from 26 countries. The fifth meeting, in 1999, was back at České Budějovice and organised by Frank Moravec, Iva Dyková and Tomáš Scholz. This was another well-attended and productive meeting. The first meeting outside Europe was ISFP6 in 2003. This meeting, organised by Jo Van As and Linda Basson in Bloemfontein, South Africa, was the smallest of recent meetings, but nevertheless very successful and enjoyable. Many delegates enjoyed the spectacular scenery and wildlife for which South Africa is famous.

I am very glad that I was able to attend the last three symposia. The 7th ISFP in 2007 was organised by Simonetta Mattiucci in the beautiful Domus La Quercia, built in 1468 as a monastery near Viterbo in Italy. This was another large and successful meeting, and involved 320 people from 46 countries. The symposium's opening ceremony was held in the 'Pope's Palace', where the Bishop of Viterbo, in his welcome, famously referred to 'fish paradise' rather than 'fish parasites'. The 8th International Symposium was the second outside Europe and the first in South America. It was organised by a consortium of South American parasitologists from Brazil, Argentina and Chile, with Marcelo E Oliva (Universidad de Antofagasta, Chile) as the President of the Committee. Distance turned out not to be a problem as the conference was attended by more than 200 participants representing 30 countries. The meeting took place in the beautiful Viña del Mar. The 9th ISFP was organised in 2015 in Valencia (Spain) by Toni Raga with the University of Valencia and the Spanish Research Council. In this event, 300 scientists and students participated from 54 countries worldwide. This was the most "international" ISFP and had the greatest participation so far. The scientific program included a large number of disciplines and research fields associated with fish parasitology and focussed particularly on "New Challenges in Fish Parasitology".

This year the 10th ISFP was going to be held in July in Cairns, Australia, but due to the COVID-19 outbreak it has been postponed until July 2021. Some of the contributions to this issue are co-

authored by invited speakers, who have confirmed their availability for the conference in 2021. We are really looking forward to seeing everybody at this conference; please see <https://www.isfpx.org/> for more information.

This issue of International Journal for Parasitology contains invited papers on a wide range of topics on fish parasitology including reviews on current issues and new research results; many by the invited speakers to the 10th ISFP. Some of the highlights from those papers include a review of research on fish parasite biodiversity recommending maximising the knowledge gained per fish sacrificed, and per funding and time invested into research on fish parasite biodiversity written by Poulin et al. In this issue, Timi and Poulin show that ignoring fish parasites by fish ecologists resulting in bias and erroneous conclusions. The effects of low sampling effort in North America and multiple ecological records with questionable parasite identification in Europe on differences in parasite diversity of host specificity are emphasised by Kuchta and colleagues. Effects of environmental factors, for example those associated with climate change such as temperature and pH, were evaluated for some commercially important parasites including *Ichthyophthirius multifiliis* by Tange et al. and *Neobenedenia girellae* by Brazenor et al. Climate change was also suggested as an explanation of more northerly clinical manifestations of Proliferative Kidney Disease in North America by Gorgoglione and colleagues. Infection of Atlantic cod by the anisakid nematode *Contracaecum osculatum* is characterised by Mohamed et al. Understanding the biology of parasites might require in vitro culture techniques which in this issue are described for blood flukes by Shirakashi et al. and gnathiid isopods by Grutter and colleagues. Information about fish parasites can be used to develop critical evaluation and management strategies for parasitic diseases, with Barrett and colleagues demonstrating the relatively short-term effect of cleaner fish, Coates et al. the impacts of depth manipulation and Braden et al. opening opportunities for drugs targeting chitin synthesis through identifying putative genes coding for enzymes involved in this process in *Lepeophthirius salmonis*. In this issue, Americus and colleagues review structure and function of nematocysts, char-

acteristic in Cnidaria and present in the only parasitic members of the phylum, myxozoans, and suggest synonymization of the terminology. Another group of parasites reviewed in this issue by Power et al. is the family Aporocotylidae (blood flukes). McElroy and colleagues focus on pathology of blood fluke infection of spotted trout, suggesting that granulomas carrying blood fluke eggs can clear fish heart by host-mediated transport through myocardium. Global distribution and hosts of parasitic isopod *Ceratothoa* spp., showing that this genus parasitises 104 fish species hosts in 76 genera and 42 families, is presented by Hadfield and Smit. Trypanosomes parasitic to African freshwater fish are characterised at morphological and molecular levels by Smit and colleagues. All publications in this issue contribute significantly to our understanding of fish parasitology and create the framework for our discussions at the 10th ISFP in 2021.

I would like to thank all the authors and reviewers contributing to this issue, and Maria Meuleman and Brian Cooke (IJP Editor-in-Chief) for putting it together so quickly and efficiently. A big thank you to David Gibson, Marcelo Oliva and Toni Raga for contributing their stories about the history of the ISFP. I am most grateful to Jon Bryan for his helpful comments and especially for donating the amazing cover image of the isopod *Creniola laticauda* on globe-fish *Diodon nichthemerus* (www.seanature.southcom.com.au) and Niel Bruce for the identification of the parasite.

I hope that this special issue of the IJP will be of interest to many of the regular readers of the IJP and attract others to this journal as well as encourage increased participation at the 10th ISFP in association with the Australian Society for Parasitology in Cairns in 2021.

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