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The Australian Society for Parasitology Inc.

NEWSLETTER

Volume 31 Issue No.3 June 2020

IMAGE: Domenico Otranto's image of a captive tiger used for the study of parasitic infection. See the IJP:PAW interview.

PARASITRAVAGANZA!

Join us for an online parasite fest

The Australian Society for Parasitology Inc.

FRIDAY 31ST JULY 2020 ONLINE

Hear from our dynamic students and early career researchers (ECRs) as they discuss the latest research and state-of-the-art technologies in parasitology.

Prizes for the best presentations by students and ECRs

Fun online events post-conference for everyone!

Registration and abstract submission is now open
parasite.org.au/parafest

Everyone needs to register for the conference for the zoom link and password. Abstract submission closes Friday 26th June 2020

Student and ECR career development events on Thursday 30th July 2020 online - just add this event onto your registration.

We look forward to seeing you online in July!

#2020PARASITRAVAGANZA #PARAFEST

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The Australian Society for Parasitology Inc.

NEWSLETTER

Volume 31 Issue No.3 June 2020

IN THIS ISSUE

From the President's Desk

Dear Members,

The photo on this cover most likely summarises how many of us felt during the lock down and some may still feel like this. COVID 19 continues to challenge our research, with access to laboratories and field work limited by the social distancing and lockdown. I would like to acknowledge ASP members who are involved in COVID-19 response – on the frontline or doing research or developing or doing testing or being involved in advisory groups and other support roles.

The cover picture was provided by Domenico Otranto from University of Bari, Italy, who was interviewed for this issue. Domenico talks about his passion for parasitology research, specifically about parasites of tigers. Most of us will be able to relate to his enjoyment of research which is "a game which could lead to a success, making it as an unforgettable adventure you live with other colleagues and junior researchers, who very often turn to be new friends". This is true for a lot of researchers. As a cat lover I was very interested to hear that cats are more challenging to work with than tigers. Another interview in this newsletter features Damian Lettoof from Curtin University who gave an interview about his recent IJPPAW publication on parasites and tiger snakes. I am fascinated by how urban wetland snakes are unhealthy and the effects of environmental contaminants on snake parasites. Great to hear Damian's project has not been impacted by the pandemic. We wish both Damian and Domenico good luck with their research and thank them for sharing their stories.

While the lock down rules are being relaxed now and research institutions are slowly allowing more access, other countries are in the midst of pandemic. Dr Colin Sutherland, Vice-President of the British Society for Parasitology contacted us in March with a message of support seeing that our conference has been postponed to 2021. At that time we encouraged him to write a contribution for the newsletter. Colin has been a member of ASP since 2007 and is hoping to join our next year conference. His contribution included BSP plans for future F2F meetings taking into account the pandemic. On a personal note, Colin's and my PhD overlapped at Sydney University (he graduated in 1992 and I did in 1991), so lots of memories there.

Sadly, Alan Donald, who was the third IJP Editor-in-Chief (1993-97) and ASP Fellow (1984), passed away last April. A great friend and mentor to many ASP members, Alan made a significant contribution to the Society and you can read tributes to him in the newsletter. We will be publishing an obituary for Alan in a future newsletter.

Australian Society for Parasitology (ASP) stands with #BlackLivesMatter and #AboriginalLivesMatter movements to end racism, injustice and inequality. This is consistent with ASP operating on the basis of inclusivity principles, which means that

From the President's Desk continued

we recognise the we operate in a diverse local, national and global community. Domenico Otranto says in his interview that "all humans being are equal when planning research. Any form of discrimination should not undermine doing research, since we all deserve the same opportunities in our pursuit of scientific knowledge.", which is true for all our life activities.

This year we will have virtual AGM (29 July) and then (31 July) a virtual ASP meeting where we will hear about parasitology research from our PhD students and ECRs, it looks really exciting. TThank you to the conference committee Coralie Boulet, Siobhan Egan, Thorey Jonsdottir, Lily Tran, Mae White, Michelle Power, Stuart Ralph and all others who showed a lot of initiative and passion. I'm looking forward to this meeting. If you haven't done so yet, please register for both. The 2020 Australian Society for Parasitology Annual General Meeting which will take place online through Zoom on Wednesday 29th July, 2 – 5pm AEST.

The ASP has been very fortunate in winning a National Science Week Queensland grant to run "Parasites Online" virtual outreach events through our ASP Facebook page from 15-23 August 2020. Congratulations to Lisa Jones who wrote the application. Watch out for events which will be listed on the National Science Week events website, posted on the ASP website and through ASP social media and please join in on the fun and bring your friends and family too!

This newsletter contains a lot of other interesting stories, including the news from ASP student representative (first one in the history of ASP), Coralie Boulet, Women in Science Parkville Precinct (WiSPP) report and survey link and information about Outreach events, for example virtual Outreach conducted by Vignesh Rathinasamy through the Darwin Science Club that is accessed by lots of school children in rural India as well as their teachers. I am most grateful for all the enthusiastic support from the ASP Executive and ASP Council, in particular Lisa Jones, who I would also like to thank for putting this wonderful newsletter together.

Congratulations to Terry Miller on his move to Queensland Museum to take up a position of the Head of the Biodiversity and Geosciences Program. It is great to see the Queensland Museum appointing a Parasitologist to this position. The Queensland Museum collection continues to be the largest and most significant parasite collection in the Southern Hemisphere. This appointment will allow the museum to maintain its focus on research, postgraduate training and public education in parasitology that has been a strength within its Biodiversity and Geosciences Program.

And while many of us still can't go back to our offices and sometimes labs, we can start enjoying recreational activities – the dive I did after 2 months without diving was fantastic. Hope everybody can enjoy some of the freedom of movement that we gained in the last few weeks.

Please remember to register for our virtual events - ASP AGM and the online parasite fest Parasitravaganza. Hope to see all of you there!

Best regards,

Barbara Nowak

President of the ASP

www.parasite.org.au
www.facebook.com/ASParasitology
www.twitter.com/AS_Para

Image of Barbara on previous page courtesy of Jon Bryan.This page: Terry Miller (on the left) assisting Holly Heiniger with fish collecting as part of the Queensland Museum's involvement in the CReefs – Census of Marine Life program investigating the biodiversity and ecology of parasites of Australia's coral reef ecosystems.

Tributes to Alan Donald (1933-2020)

Sadly, Alan Donald passed away on Thursday, 23rd April 2020. We will be publishing an obituary for Alan in a future newsletter. Here we present a brief introduction to Alan's career and some tributes.

Alan was Head of CSIRO Animal Health and also Livestock Industries and also developed Animal Health Australia.

Alan was a foundation member of the ASP and was made a Fellow of the ASP in 1984. Alan was Secretary of the ASP 1968-70 at the time that the International Journal for Parasitology (IJP) was conceived (the first issue of IJP was published in 1971) and was ASP President in 1980-81 when the Bancroft-Mackerras Medal was designed and dies were struck for the first presentation in 1982.

Maria Meuleman of the International Journal for Parasitology writes:

"Alan was the third IJP Editor-in-Chief (1993-97) and the first with whom I worked (for a few months), when it was based a the new CSIRO McMaster Laboratory at Prospect in NSW. Alan was a busy man, a pleasure to work with, very flexible (my role was a part-time job back then) and he always brought the wine when a few of us went out to lunch.

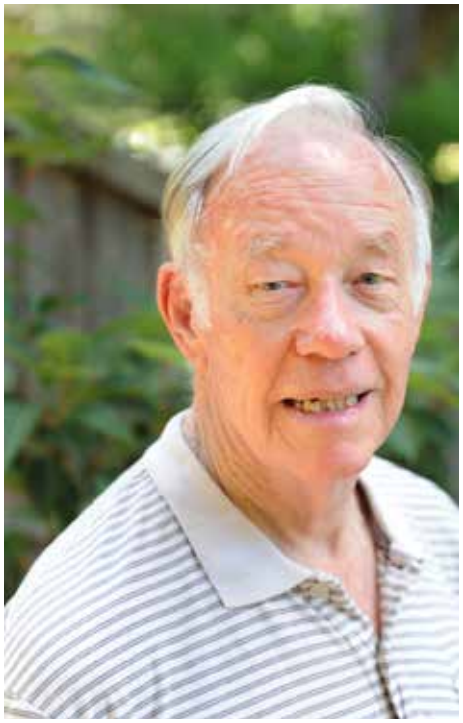
More recently, I saw Alan and his wife Nancy at the ASP 50th Anniversary Conference in Canberra in 2014. Alan was in great spirits and continuing to enjoy retirement, and proudly told me he had learned to touch type.

Alan will be missed."

Noel Campbell writes:

"I knew Alan during my PhD at University of Sydney in 1975-1978 and casually there after. I was supervised by Dr John Kelly from the University of Sydney and worked closely with Dr John Dineen from the McMaster Lab. A number of my sheep graced various dinner tables due to the butchering expertise of McMaster and University of Sydney animal health staff. Alan was very genuine and we had useful discussions internal parasites of sheep, especially the development and impact of anthelmintic resistance.

Condolences to Alan's family."



An obituary of Alan, written by Helen Wolff, is availaible on the CSIRO website:

https://csiropedia.csiro.au/alan-donald/

Black Lives Matter

The Australian Society for Parasitology (ASP) stands with #BlackLivesMatter and #AboriginalLivesMatter movements to end racism, injustice and inequality.

The ASP operates on the basis of Inclusivity Principles (PRINCIPLES, BY-LAWS AND GUIDELINES FOR AWARDS, GRANTS, JOURNALS, COMMITTEES AND ARCHIVES OF THE AUSTRALIAN SOCIETY FOR PARASITOLOGY INC.), which means ASP recognises that we operate in a diverse local, national and global community. The Society is committed to sustaining a diverse, culturally inclusive membership and strives to achieve equality in all aspects of its governance, administration, awards and conference participation. Our goal is a socially inclusive membership and we support multiculturalism and anti-discrimination including non-discrimination on the basis of race.

The Society recognises the importance of participation by Aboriginal and Torres Strait Islanders in parasitology and welcomes all Aboriginal and Torres Strait Islander colleagues and indigenous researchers from all countries. ASP stands in support of equality, respect and justice.

2020 Australian Society for Parasitology Annual General Meeting

Please join the 2020 Australian Society for Parasitology Annual General Meeting which will be an online Zoom meeting on Wednesday 29th July, 2 – 5pm AEST. Please register in advance for this meeting:

https://us02web.zoom.us/meeting/register/tZEkcuquqDgrGdam1LIeMcx71CTsX7OXxPso

After registering, you will receive a confirmation email containing information about joining the meeting.

Business to be conducted

The following business will be conducted at the 2020 Annual General Meeting of the Society:

- receiving the Society's financial statement, and audit report, for the last reportable financial year;
- presenting the financial statement and audit report to the meeting for adoption;
- electing members of the Council (see details below);
- appointing an auditor or an accountant for the present financial year;
- announcement of ASP Awards and Prizes;
- receipt of reports from Editors, Convenors, Archivists, Secretariat and subcommittees; and
- review and debate other actions or decisions by the Council.

If you have any trouble registering for or accessing the AGM by Zoom on the 29th July 2020, or if you want to test out Zoom before the AGM to make sure it works for you please email secretary@parasite.org.au or phone 07 42321311.

The 2020 ASP AGM will be recorded. Other participants will be able to see and hear you if your microphone is on and your video is on. When you first join this meeting your microphone will be muted and your video will be off. We will use polls to vote for AGM matters. If you can't access the poll then you need to let me know straight away so I can give you another option to vote. There is also a chat option so that you can send a message to all. The Executive will address all questions. This chat will also be recorded and saved for viewing afterwards. Please be respectful of everyone when participating in this meeting.

Shape the future, join the ASP Council

Every year the Australian Society for Parasitology (ASP) seeks nominations for positions on the ASP Council. Nominations for the ASP Council for terms beginning 29 July 2020 have opened. To nominate someone you must be a member of the ASP. To be a member of the ASP Council you must be an eligible (under section 61A of the Act) adult and a member of the ASP. Check whether you are a financial member on the ASP membership site (https://asp.wildapricot.org/).

Please see www.parasite.org.au/joincouncil to read about the positions on Council that we will be voting on at the 2020 ASP AGM. We invite you to seek and encourage appropriate candidates. Nominations should be emailed to secretary@parasite.org.au and will close on 29 June 2020. The candidates will be announced by 22 July 2020 on the ASP website and by email and ASP members will vote for ASP Council positions online at the 2020 ASP AGM. We already have some candidates for Council positions, you can check these on the ASP website.

The ASP is an inclusive organisation. We encourage nominations from Indigenous Australians, people with disability, people from diverse cultural and linguistic backgrounds, parasitologists of all ages and career stages and LGBQTI people. The Society is also committed to achieving gender equality across all its Committees including, but not limited to, the ASP Council. The Society recognises and values the wealth of talent, creativity and discoveries achieved by women in parasitology. We acknowledge that women continue to be under-represented in the field, particularly at senior levels. The Society is, therefore, committed to gender equality in our discipline and in the Society and hence we encourage nominations from women for ASP Council positions. (Read about Gender Equality within the ASP Principles, By-Laws and Guidelines https://www.parasite.org.au/the-society/constitution/).

Please don't hesitate to get in touch if you have any questions. We look forward to electing strong and enthusiastic representatives to the ASP Council.

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From the ASP Student Rep

Coralie Boulet is the interim Student Representative on the ASP Council. Here she talks about some exciting news for the students and ECR members of the Society.

Student representative role in the ASP Council

The ASP Council decided that having a student representative would bring immense benefits to the composition of the Council and to the Society and so this role was included in the 2019 ASP Constitution. The Student Representative will officially be voted in during the AGM, on the 29th of July. To be a candidate, two ASP members need to nominate you: an email to Lisa Jones is enough.

In the meantime, I am the interim Student Representative. My name is Coralie Boulet, I am a PhD candidate in Dr Teresa Carvalho's laboratory, in La Trobe University. I investigate the relationship between the malaria parasite *Plasmodium falciparum* and its host red blood cell. Besides research, I am an eager climate activist, as well as an enthusiastic latin dancer.

Online conference: Parasitravaganza, join the Parasite Fest

You probably are aware that the ASP conference is going online this year. Due to the pandemic, many conferences would have been cancelled or postponed, so the opportunities to present your work and talk to your peers might have significantly shrunk.

Therefore, the ASP has decided to put together "Parasitravaganza", a two-day online conference.

The first day, Thursday 30th, will consist of career development workshops: from discussing the impact of COVID-19 with A/Prof Inger Mewburn, AKA the Thesis Whisperer, to getting your paper published, tips on communicating your research and an exciting panel about life outside of academia, it is not to be missed! An evening trivia is also part of the agenda.

Then, on Friday 31st, the talented students and ECRs will present their work. We will also enjoy a session on improving diversity and inclusion within research, as well as the winner of the Sprent prize presenting their project. For those who do not know, the ASP awards a prize every three years to a researcher for their outstanding thesis (more information here).

Submit your abstract (max. 200 words) by the Friday 26th of June!

Facebook group for ASP Students and ECRs

One of the feedback from student members regarding ways to improve the ASP experience was to enhance communication among peers outside of the annual conference. We have created a Facebook group for this: join us to discuss ideas, share grant resources, tips to working from home, conferences and social events.

Monthly Shut Up And Write sessions

As part of improving communication among ASP students and ECRs, I have put together a monthly event of online "Shut Up And Write". SUAW are Zoom sessions where we follow the Pomodoro method: 25min of intense work (writing, data analysis...) and breaks of 5 to 10min. The breaks are great ways to get to know each other, share tips, as well as a way to keep ourselves accountable.

The next session is on Monday 20th July, 1:30-5pm AEST, 1-4:30pm ACST, 11:30am-3pm AWST.

The Zoom link is here. Join the Facebook group or contact me (C.Boulet@latrobe.edu.au) for the password.

Other ideas? Get in touch!

If you have other ideas, please contact me at C.Boulet@latrobe.edu.au. I would love to hear from you!

Read about parasitravaganza at: parasite.org.au/parafest

STA Members Update

Science & Technology Australia (STA) is an association of member societies like the ASP. Representing more than 75,000 Australian scientists and technologists working across all scientific disciplines, the STA is a respected and influential contributor to debate on public policy. In this updates, the STA discuss, among other things, the impacts of COVID-19 and the role of science and technology in the recovery.

The gender impact of COVID-19

The COVID-19 pandemic has been hard on everyone. But now the early evidence of its impact on the STEM sector reveals women in STEM have been disproportionately hard hit.

Australia's scientific and technical services industry recorded job losses of 5.6% from mid-March to mid-April 2020, with jobs down 6.3% for women compared with 4.8% for men.

Science & Technology Australia and the Australian Academy of Technology and Engineering partnered to gather evidence for the report for Industry and Science Minister Karen Andrews.

It was prepared by the Rapid Response Information Forum chaired by the Chief Scientist, Dr Alan Finkel. The report's lead author is Professor Emma Johnston.

It shows us the impact of the pandemic has been particularly acute for women in STEM with children under 12, given their greater share of caring responsibilities and domestic work. The combination of juggling working from home while supervising distance learning for children has made women's double burden even greater again.

Further, there are early signs that women's submission rates for publishing research may have declined. With publication records being a factor in career promotion and grant funding, a reduction in research publications is likely to harm women's job and funding prospects.

STA has worked hard to help advance greater representation of women in STEM. Now we fear the pandemic will reverse some of the hard-won gains of recent years.

The impact of this uneven burden could be felt for years to come – with potential long-term consequences for Australia's social and economic future.

So our plea to all STEM employers is to keep a very close eye on and mitigate the gender impact of the pandemic on jobs and careers – or the hard work over many years to recruit and retain more women in STEM could be undone.

We cannot afford to go backwards.

Until next time, Misha

Opinion | Supporting postgraduate students through COVID-19

Science & Technology Australia President Associate Professor Jeremy Brownlie had

STA members update continued

an opinion piece for the Canberra Times on Friday, outlining why we must support our postgraduate research students through COVID-19. We've called for a one-off boost in the October budget to fund an extension of postgraduate scholarships, which could support up to 66,455 of our next generation of research stars.

Science and technology key to economic recovery

In an interview for the Reconstruction series by InnovationAus, STA CEO Misha Schubert outlined the secret to Australia's success on our COVID-19 response to date: a strong embrace of scientific expertise. "It's been the makings of our success. If there is a lesson to be learned about how the public has responded to Governments embracing that expertise, it is that we should carry that model forward into recovery and reconstruction."

STA Bushfire submission

As part of our ongoing policy work on the 2019-20 bushfires, STA has made a submission to the Senate inquiry: Lessons to be learned in relation to the Australian bushfire season 2019-20. The submission draws on insights from STA members about the impact of the 2019-20 bushfire season. We made a series of recommendations on how Australia can better prevent, mitigate and aid recovery from bushfires. We can share the submission once it has been published.

Further information: Peter Derbyshire, STA Policy Manager – Peter.Derbyshire@sta.org.au

STA webinar: How to 'Marie Kondo' Your Writing

Everyone can benefit from this writing masterclass. Glean expert tips on how to declutter your writing – and become a stronger and more persuasive author. You'll come away with a clear set of insights to apply straight away in your member communications, opinion pieces, research and public speaking. CEOs, media teams, policy writers, and science communicators - this practical primer is relevant to anyone who writes as part of their job. This webinar will be run by Science & Technology Australia CEO and longtime journalist and speechwriter Misha Schubert.

Duration: 45-60 mins via Zoom
Date: Tuesday 23 June - 11.00AM (AEST)
Cost: STA Members $50.00 (+ GST)

Register now

Sydney Science Trail

The Royal Botanic Garden Sydney

The Australian Museum and the Royal Botanic Garden Sydney have partnered for Sydney Science Trail as part of National Science Week. This will be a digital platform to present the amazing work of Sydney's science community.

More details and to submit an EOI

The Dream Collective – supporting women through COVID-19

In an effort to support highly skilled professional women who have recently lost their jobs due to COVID-19, The Dream Collective has a free 4-part online capability-building workshop to re-skill and up-skill individuals to help prepare them for career transitions and new job opportunities.

Register now

Useful information for STA Members

- The Australian Academy of Science announced 24 new fellows
- The search for Australia's next Chief Scientist has begun.
- Australia's Technology Investment Roadmap was launched and is look for feedback (due 21st June)
- CSIRO launched the Quantum Technology Roadmap
- The Australian Centre for International Agricultural Research released a rapid assessment on food systems security
- The ABS released new figures on higher education resources dedicated to Research and Development
- The NCSEHE is looking for survey participants on supporting students with disabilities to succeed in and after higher education

Further information: Peter Derbyshire, STA Policy Manager – Peter.Derbyshire@sta.org.au

Keep it Moving through COVID19

During the pandemic, more people have become sedentary as they work from home. Gyms, recreational centres and pools have been closed. This is particularly alarming as evidence from the Dallas Bedrest studies of the 1960s demonstrated that just three weeks of inactivity had the equivalent effect of 30 years of ageing on the cardiovascular system.

To get ahead of this risk, one of Science & Technology Australia's member organisations – the Baker Heart and Diabetes Institute – is leading crucial work to help people stay active during COVID-19.

Learn more

Parasitology Societies and the COVID-19 pandemic

Dr Colin Sutherland of the British Society for Parasitology considers ways in which physical meetings can be resumed while helping still to minimise the risk of transmission during a pandemic.

How strange for we purveyors of protists, helminths and arthropods stuck to the gills of fish to be caught up in the struggles of a world rendered unrecognisable by a wee thing without a nucleus – the novel coronavirus SARS-CoV-2. I mean, really! That isn't even a proper name for a pathogen, is it? Particularly one that has brought human endeavours world-wide to a near-standstill.

Unlike Australia and New Zealand, here in the UK our Government chose to ignore warnings in February and early March and waited too long to take the precautions that have served you well in the southern hemisphere. In fact, these same precautions served many northern hemisphere countries well too. But not here. With the current official UK mortality from COVID-19 test-positive cases nearing 40,000 people and still over 1,000 new confirmed cases each day, we in the BSP are not confident of a welcome at any international parasitology conferences for the foreseeable future. Just as ASP colleagues were forced to cancel the Cairns meeting in July, our flagship Spring Meeting that would have been held in Edinburgh in April was cancelled, as has been our Autumn Symposium in Keele, now likely to be in 2022. We were able to proceed with a successful Tryps/Leish seminar in Granada, Spain in early March but soon after both Spain and the UK became gripped by the COVID-19 pandemic, meaning that for delegates attending it was the last opportunity for in-person scientific exchange for a long time.

How can Parasitology Societies adapt to this difficult environment, where the joy of collegiate, intellectual exchanges at physical meetings is one of the elements that drives the Societal identities we share?

Where we are bound together by the rare but precious moments when a room filled with fellow scientists sees new data for the first time and sighs in recognition of an incremental advance in our knowledge of Schistosoma / Sarcoptes / Plasmodium / Yourfavouriteparasita? For all their utility, Zoom rooms are not good for subtle collective sighs. And yet, to doggedly pursue physical meetings as usual, without adapting to the presence of a new virus, seemingly destined to become endemic, is to disenfranchise many colleagues for whom exposure is too great a risk.

On the BSP Council we have been having some frank discussions on this topic, trying to seek a way to keep our vibrant sense of collegiality and communality sustained without meetings as normal. We do not have any killer answers I'm afraid. However something we have all learnt from the

Above: Colin Sutherland

Parasitology societies and the COVID-19 pandemic continued

current crisis is that a combination of caring consideration for each other and continuing intellectual engagement goes a long way towards softening the hardship of lockdown, and so in our Learned Societies we should look for formal and informal ways to communicate, converse, argue, counter-argue and look out for each other's welfare.

I would like to tentatively share with you some of the draft suggestions we have under consideration in Council for the eventual resumption of physical BSP meetings in the future. Down Under, with much lower SARS-CoV-2 infection rates, these may be considered for implementation quite soon.

1. Some conditions that need to be met before proceeding with a physical meeting:

a. An adequate SARS-CoV-2 test and trace system is operating in the host country, and in the country of origin of all delegates attending

b. In host and home countries, reliable official figures from serological testing indicating overall levels of SARS-CoV-2 exposure are published

c. A venue is available in which adequate physical distancing and hand & respiratory hygiene can be maintained

d. Safe travel routes, minimising exposure to possible virus transmission, have been identified

2. Precautions to be incorporated in meeting plans, and presented in a collegiate fashion rather than "decrees", as a means of taking considerate care of fellow delegates:

a. A pre-meeting risk assessment should be developed by meeting organiser(s) following the initial site visit. This needs to be venue specific, and include scenarios "modelling" different numbers of attendees

b. From the risk assessment, full Council should agree the maximum number of delegates than can be accommodated without compromising the measures below (and any other measures agreed)

c. Provision of plenty of hand sanitiser, excess hand-washing access with disposable paper towels in good quantities, a low ratio of individuals per available toilets

d. At the commencement of the meeting an interactive (rather than headmasterly) information session is held at which the agreed precautions are presented and delegates given opportunity to question, comment and suggest.

e. A strategy to minimise virus transmission through "Physical (not social) distancing" while maximising interaction among delegates is to group people into "pods". Each pod is in some ways similar to a family unit in lockdown scenarios –the 2m distancing rule is not applied among pod members but STRICTLY maintained with members of other pods. Within the pod there should be no physical contact (handshakes etc are out), no sharing of eating and drinking utensils and agreed behaviours around coughing and sneezing (elbows? disposable paper napkins?).

f. Staggered tea-coffee provision / continuous tea-coffee provision with max 2 delegates at the station at any time and use of multiple beverage stations to eliminate crowding.

g. Erection of "conversation stations" where Perspex screens partially separate people from different "pods" in conversation but permit easy conversation without shouting. This simple structural alteration to communal space may become very commonplace.

ASP Council and members will likely develop your own strategies, and of course are in a better place to utilise outdoor spaces less conducive to virus transmission. We would like to hear what you come up with!

Finally, may I extend warm greetings from BSP Council on behalf of all our members. Perhaps some of you may be able to join us in Norwich for the 2021 Spring meeting (see website), and I hope to see you all in Cairns next July.

Dr Colin Sutherland

BSc (Hons) U Syd; PhD U Syd; MPH
Menzies SHR
Dept Infection Biology, LSHTM, London
Council Member, British Society for Parasitology

www.bsp.net.uk

Parasitologists who bake

One of the few positives to come out of the COVID-19 crisis has been a renaissance in home baking. On these pages, we showcase some of the yummy creations to have emerged from the kitchens of Lisa Jones, Brian Cooke, Sarah Preston and Kiaran Kirk.

On this page

The top 3 pictures show the preparation of Brian Cooke's challah.Below these are Lisa Jones's sourdough and croissants.

On the next page

The 3 pictures at the top left show the preparation of babka by Lisa Jones. Below these is a picture of a sourdough loaf by Sarah Preston. On the right are two loaves by Lisa Jones, a sourdough and a pumpernickel.

On the page after that

"Self-confessed bread tragic", Kiaran Kirk, phographed by James Walsh (ANU) baking sourdough loaves at home.

Parasitologists who bake continued






Parasitologists who bake continued

Initiatives for women in science

Women in Science Parkville Precinct (WiSPP) works with five of Australia's largest medical research institutes to advance research and translation by providing an environment that allows more women in science to lead and excel.

Women in Science Parkville Precinct (WiSPP) was formed in 2014 as a grass-roots driven, and institutionally championed action with the purpose of addressing gender inequity within medical research.

The goal of this initiative is to develop and demonstrate an effective model of tackling the problem, drawing on the collective knowledge, resources, and commitment of our five eminent MRIs. We believe social change comes from strong partnerships and cross-sector coordination rather than from individual organisations working in isolation.

Read WiSPP's position paper "Mitigation of the gendered impacts of the COVID -19 pandemic on the medical research workforce". Their intention is to is to encourage our industry to be as inclusive as possible during their response to COVID-19 and this paper identifies major risks and opportunities presented by the pandemic, and a suggested framework of key mitigation strategies. Data will also be essential to understanding the inequitable impact of COVID-19; please complete this online survey (developed in Qualtrics)

https://melbourneuni.au1.qualtrics.com/jfe/form/SV_cNKiraDaO4oyaON

Find out more
www.wispp.org.au/covid19

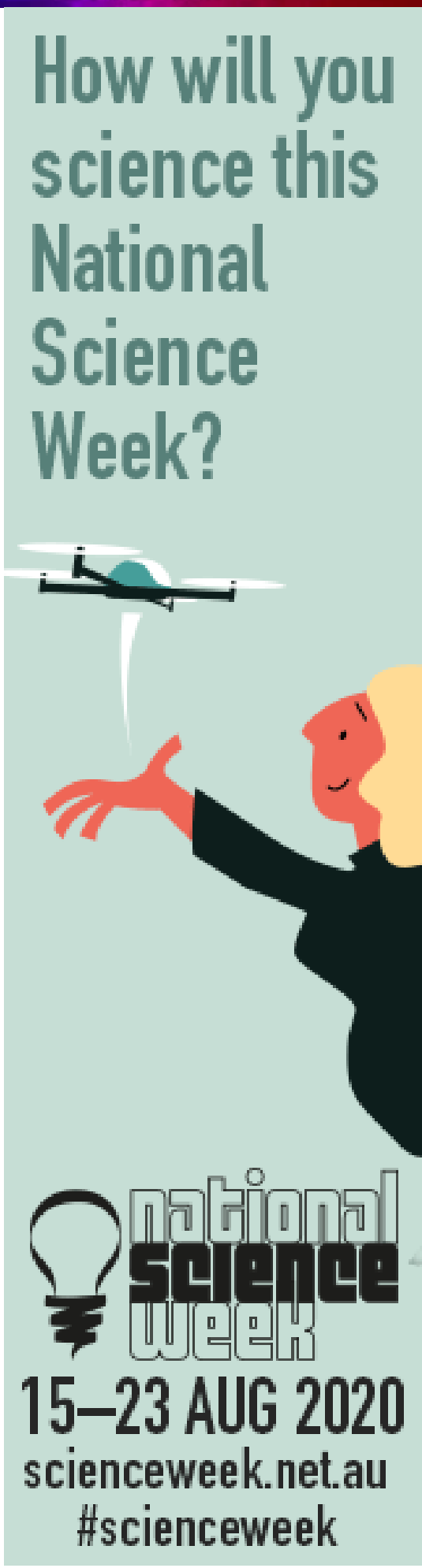
Women & Leadership Australia (WLA) has launched a brand new networking and learning hub called WLA Connect.

The platform is designed for women to gather, network, share and learn about being a female leader in today's working environment. Members are able to access events, learning materials and forums where they can collaborate with women from the science sector and beyond.

This is an important developmental initiative for women across the country. Features of WLA Connect include:

- A curated learning laboratory filled with leadership development content
- Expert masterclasses on leadership theory and practice
- Face-to-face and online networking events
- Member led contributions and recommendations
- Peer coaching, executive coaching and mentoring opportunities.

Find out more at:
https://www.wlaconnect.com.au



Parasite detectives in the ACT

In February, ANU hosted eager Human Biology students from the University of Canberra Senior Secondary College for a "Parasite Detectives" prac.

In this prac, led by **Giel van Dooren**, students had to diagnose and treat **Sadaf Ilyas**'s *Plasmodium falciparum* infection, **Cibelly Goulart**'s Toxoplasma infection, **Soraya Zwahlen**'s Chagas disease and **Jenni Hayward**'s *Plasmodium knowlesi* infection before these ANU parasitologists succumbed to their illnesses. Students undertook diagnostic PCRs, microscopy analysis, and literature searches in a race against time, and managed to save their demonstrators with minutes to spare. We thank the wonderfully engaged students and their teachers (Sarah Belling and Roger Amey) for coming along for the morning, Danny Wilson's group (University of Adelaide) for providing Plasmodium knowlesi-infected blood smears, and the ANU Research School of Biology Teaching staff for providing facilities and reagents.

Pictured: eager University of Canberra Senior Secondary College students actively diagnosing parasitic diseases with the help of Giel van Dooren (green lab coat, top) and Jenny Hayward (purple lab coat, right).

Darwin Science Club

Dr Vignesh Rathinasamy of the Monash Biomedicine Discovery Institute recently gave a virtual address to the Darwin Science Club.

The Darwin Science Club is an Indian initiative that is accessed by lots of school childern in rural India as well as their teachers.

Not only did Dr Rathinasamy discuss the important parasitology is, but, more excitingly, did so in Tamil.

THE CONVERSATION

Alex Maier (left) of the Australian National University recently co-authored a piece on parasites for the Conversation website entitled **"Love the parasite you're with - the entertaining life of unwelcome guests from flea circuses to Aliens."**

https://theconversation.com/love-the-parasite-youre-with-the-entertaining-life-of-unwelcome-guests-from-flea-circuses-to-aliens-137602

national science week 2020

National Science Week 2020

Stay updated at parasite.org.au/nsw2020

The ASP has been very fortunate in winning a National Science Week and Inspiring Australia grant to run "Parasites Online" virtual outreach events as part of National Science Week, 15-23 August 2020

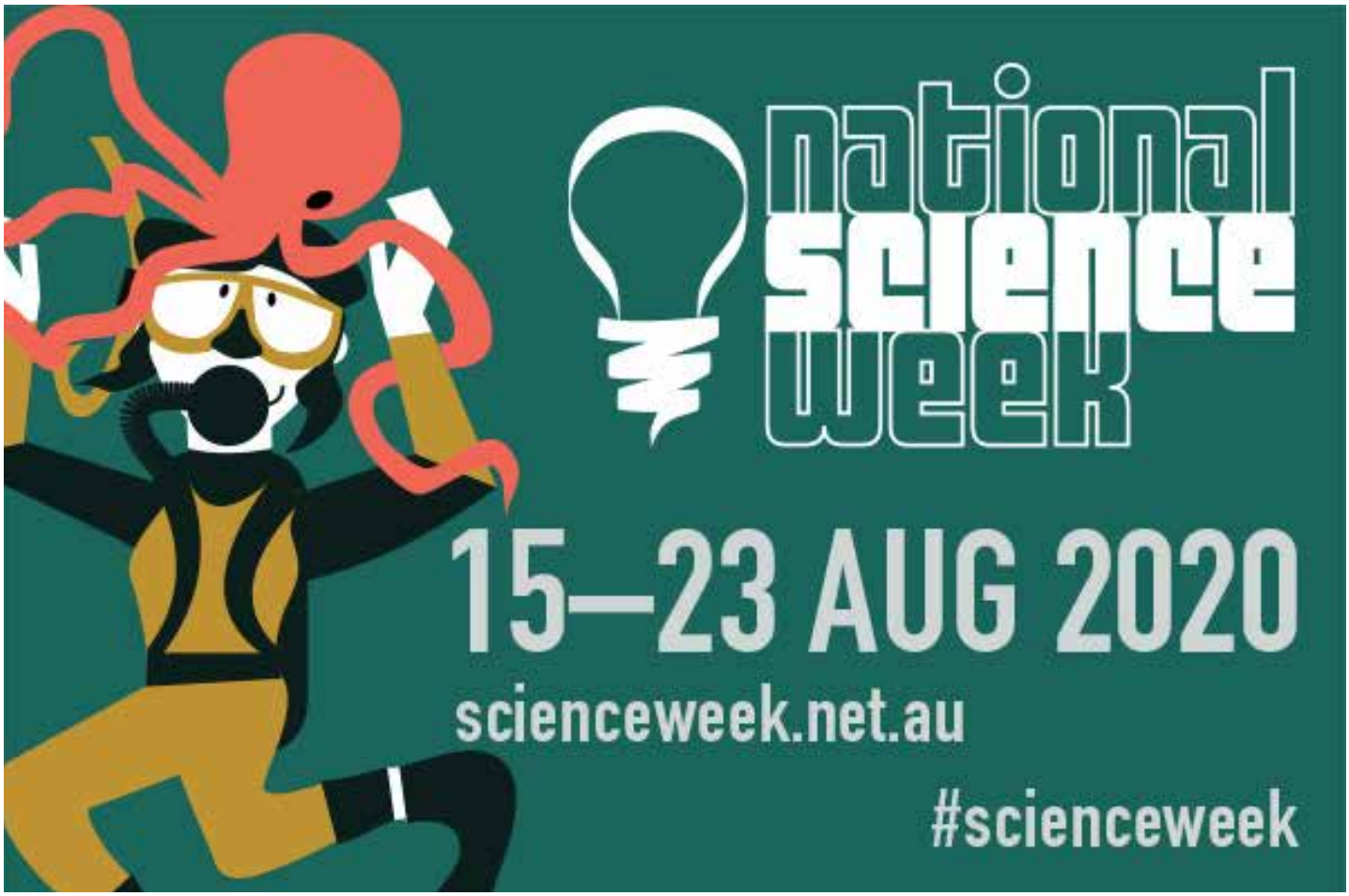
Please join in on the virtual fun and bring your friends and family too! Our free "Parasites Online" Science Week events will be listed on the National Science Week events website https://www.scienceweek.net.au/ and posted on the ASP website www.parasite.org.au/outreach and through ASP social media channels.

ASP researchers will share their stories through online science shows and short research presentations, "Live from the Lab" laboratory tours and "Fresh From the Field" field work tours, or "Scientist@Home" if we are unable to go into workspaces, and science book readings to increase community awareness and understanding of parasites and engage and inspire the next generation of scientists.

Through this program of online presentations we will collaborate with Australian parasitologists to present the following featuring parasites from the poo of veterinary animals and wildlife, scabies, malaria, worms and more:

- Dr Rina Fu will introduce young minds to the fascinating world of lab science during her interactive story-time and after-school "Little Scientist" workshops and run a family art-science workshop.
- Science book reading That's RAD! and Live Lab Tours with Kathy Andrews (Griffith University).
- Researcher presentations, Live Lab Tours & Fresh From The Field with Sarah Preston (Federation), Katja Fischer (QIMR Berghofer), Lisa Jones (JCU), Michelle Power (Macquarie), Tina Skinner-Adams (Griffith University), Coralie Boulet (La Trobe) and Christina Spry "Parasites and You (from ANU)" with videos, blogs and games.
- Art-science online workshops with Danny Wilson (Adelaide Uni) and Shokoofeh Shamsi (CSU)"
- We will also show the stunning animated artwork of Cairns-based indigenous artist Bernard Lee Singleton www.parasite.org.au/outreach/gula-guri-mayin and invite students to create their own art-science work with an online workshop.

@ASParasitology (Facebook)
@AS_Para (Twitter)
@ASPParasiteNetwork (Youtube)



IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY

In this newsletter we focus on three editor's choice papers from the IJP.

While co-infection with multiple parasite species is common, our understanding of how parasites interact with each other is in its infancy. Many host animals exhibit a hump-shaped relationship in their parasite burden for a particular parasite species during their lifetime, often relating to continued exposure and an acquired immune response. The peak burden and the host age at which this occurs may provide important clues about how different parasite species interact within a host. Park and Ezenwa develop a theoretical result that relates 'peak shifts' to co-infection mechanisms and test this with an ungulate parasite dataset, revealing parasite interactions causing both increased susceptibility and reduced clearance.

Characterising interactions between co-infecting parasites using age-intensity profiles

Andrew W. Park, Vanessa O.Ezenwa

International Journal for Parasitology, Volume 50, Issue 1, 2020, Pages 23-26, ISSN 0020-7519, https://doi.org/10.1016/j.ijpara.2019.11.001. (http://www.sciencedirect.com/science/article/pii/S0020751919302991)

Abstract: Interactions between co-infecting parasite species can impact transmission. Whether co-infection is beneficial or detrimental to a target parasite, and whether the mechanism involves changes in host susceptibility or parasite clearance, can be difficult to assess. We demonstrate the potential for host age-parasite intensity curves to allow assessment of these factors. A model is developed to generate predictions and test these predictions using helminth parasites of white-tailed deer (Odocoileus virginianus). We identify three beneficial interactions involving five helminth species, including susceptibility and clearance-based mechanisms. Our results suggest that analysis of age-intensity data represents a new tool for assessing the nature and strength of co-infecting parasite interactions.

The 2011 Great East Japan Earthquake generated tsunami waves that struck the Pacific coast of northeastern Japan. Our ecological monitoring demonstrated that the diversity of trematodes in the intertidal snail host was significantly reduced by the tsunami and has not fully recovered 8 years after the tsunami. Since the diversity of trematodes in snail hosts is generally positively correlated with the diversity of their second intermediate and final hosts (macrobenthos and birds), the long-term decline in trematode diversity indicates considerable damage to the coastal ecosystem of northeastern Japan.

Prevalence and species richness of trematode parasites only partially recovers after the 2011 Tohoku, Japan, earthquake tsunami

Osamu Miura, Gen Kanaya, Shizuko Nakai, Hajime Itoh, Satoshi Chiba

International Journal for Parasitology, Volume 49, Issues 13–14, 2019, Pages 1023-1028, ISSN 0020-7519, https://doi.org/10.1016/j.ijpara.2019.07.006. (*http://www.sciencedirect.com/science/article/pii/S0020751919302577*)

Abstract: Trematode parasites have complex life cycles and use a variety of host species across different trophic levels. Thus, they can be used as indicators of disturbance and recovery of coastal ecosystems. Estuaries on the Pacific coast of northeastern Japan were heavily affected by the 2011 Tohoku earthquake tsunami. To evaluate the effect of the tsunami on the trematode community, we examined trematodes in the mud snail, Batillaria attramentaria, at five study sites (three sites severely exposed to the tsunami and

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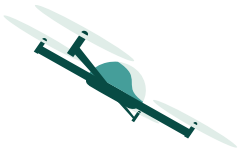
International Journal for Parasitology continued

two sites sheltered from the tsunami) in Sendai Bay for 2 years prior to and 8 years after the tsunami. While the trematode prevalence decreased at all study sites, the species richness decreased only at the sites exposed to the tsunami. Although parasitism increased over the study period post-tsunami, the community had not fully recovered 8 years after the event. Trematode community structure has changed every year since the tsunami and has not stabilised. This could be explained by the alteration of first and second intermediate host communities. Our study suggests that it will take more time for the recovery of the trematode community and the associated coastal ecosystem in the Tohoku region.



Differential expression analysis between parasitic nematode strains is commonly used to implicate candidate genes in anthelmintic resistance or other biological functions. In this paper we show that high genetic diversity in the parasitic nematode Haemonchus contortus can confound such analyses. High rates of sequence polymorphism in RNAseq reads are associated with lower read mapping efficiency that can lead to biased assessments of differential expression between strains. As a practical example, we show that over half of the ABC transporters and the ligand-gated ion channels (LGICs) identified as differentially expressed between ivermectin-resistant and a susceptible H. contortus strains, using default TopHat2 parameters, were an artifact of sequence polymorphism differences. For all but the most polymorphic genes, these polymorphism-based biases can be largely corrected by empirical optimization of read mapping allowances. We also show that a high level of inter-strain real transcriptional diversity can occur between strains: a pairwise comparison between three genetically divergent H. contortus strains revealed ≥ 824 genuinely differentially expressed genes. This work illustrates the need to account for sequence polymorphism in inter-strain differential expression analysis and the need for caution when interpreting the relevance of individual differentially expressed candidate genes to specific phenotypic differences between strains.

The confounding effects of high genetic diversity on the determination and interpretation of differential gene expression analysis in the parasitic nematode *Haemonchus contortus*

Andrew M. Rezansoff, Roz Laing, Axel Martinelli, Susan Stasiuk, Elizabeth Redman, Dave Bartley, Nancy Holroyd, Eileen Devaney, Neil D. Sargison, Stephen Doyle, James A. Cotton, John S. Gilleard,

International Journal for Parasitology, Volume 49, Issue 11, 2019, Pages 847-858, ISSN 0020-7519, https://doi.org/10.1016/j.ijpara.2019.05.012. (http://www.sciencedirect.com/science/article/pii/S002075191930205X)

Abstract: Differential expression analysis between parasitic nematode strains is commonly used to implicate candidate genes in anthelmintic resistance or other biological functions. We have tested the hypothesis that the high genetic diversity of an organism such as *Haemonchus contortus* could complicate such analyses. First, we investigated the extent to which sequence polymorphism affects the reliability of differential expression analysis between the genetically divergent H. contortus strains MHco3(ISE), MHco4(WRS) and MHco10(CAVR). Using triplicates of 20 adult female worms from each population isolated under parallel experimental conditions, we found that high rates of sequence polymorphism in RNAseq reads were associated with lower efficiency read mapping to gene models under default TopHat2 parameters, leading to biased estimates of inter-strain differential expression. We then showed it is possible to largely compensate for this bias by optimising the read mapping single nucleotide polymorphism (SNP) allowance and filtering out genes with particularly high single nucleotide polymorphism rates. Once the sequence polymorphism biases were removed, we then assessed the genuine transcriptional diversity between the strains, finding ≥824 differentially expressed genes across all three pairwise strain comparisons. This high level of inter-strain transcriptional diversity not only suggests substantive inter-strain phenotypic variation but also highlights the difficulty in reliably associating differential expression of specific genes with phenotypic differences. To provide a practical example, we analysed two gene families of potential relevance to ivermectin drug resistance; the ABC transporters and the ligand-gated ion channels (LGICs). Over half of genes identified as differentially expressed using default TopHat2 parameters were shown to be an artifact of sequence polymorphism differences. This work illustrates the need to account for sequence polymorphism in differential expression analysis. It also demonstrates that a large number of genuine transcriptional differences can occur between *H. contortus* strains and these must be considered before associating the differential expression of specific genes with phenotypic differences between strains.

EDITORS CHOICE

IJP: Drugs and Drug Resistance

Article selection curated by Editors-in chief, Professor Kevin Saliba & Professor Andrew Kotze

https://www.journals.elsevier.com/international-journal-for-parasitology-drugs-and-drug-resistance/editors-choice

IJP INTERNATIONAL JOURNAL FOR PARASITOLOGY
Drugs and Drug Resistance

www.journals.elsevier.com/international-journal-for-parasitology-drugs-and-drug-resistance/

Editors In Chief: Andrew Kotze & Kevin Saliba

Facebook: www.facebook.com/IJPDDR/

In this newsletter we focus on three editor's choice papers from IJP:DDR.

In the first paper, the authors report on a series of albendazole drug efficacy trials conducted on schoolchildren infected with Ascaris lumbricoides in Rwanda. The mean efficacy across the study was 75.4 %. While the authors acknowledge that there are a number of confounding factors that could influence such drug efficacy trials in this field environment, the lower-than-expected efficacy raises the suspicion of benzimidazole drug resistance in the study population.

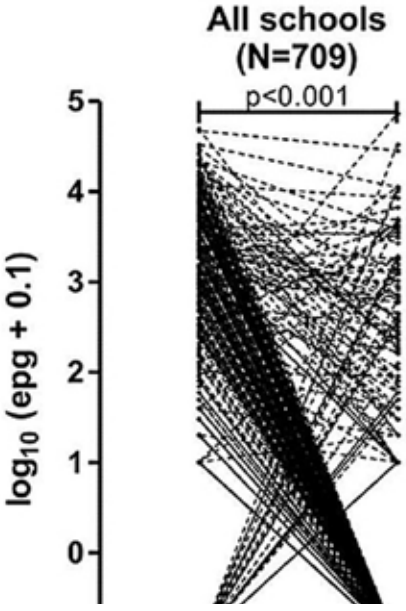
Reduced efficacy of albendazole against *Ascaris lumbricoides* in Rwandan schoolchildren

Jürgen Krücken, Kira Fraundorfer, Jean Claude Mugisha, Sabrina Ramünke, Kevin C. Sifft, Dominik Geus, Felix Habarugira, Jules Ndoli, Augustin Sendegeya, Caritas Mukampunga, Claude Bayingana, Toni Aebischer, Janina Demeler, Jean Bosco Gahutu, Frank P. Mockenhaupt, Georg von Samson-Himmelstjerna

International Journal for Parasitology: Drugs and Drug Resistance, Volume 7, Issue 3, 2017, Pages 262-271, ISSN 2211-3207,
https://doi.org/10.1016/j.ijpddr.2017.06.001.

Abstract

Control of human soil-transmitted helminths (STHs) relies on preventive chemotherapy of schoolchildren applying the benzimidazoles (BZ) albendazole or mebendazole. Anthelmintic resistance (AR) is a common problem in nematodes of veterinary importance but for human STHs, information on drug efficacy is limited and routine monitoring is rarely implemented. Herein, the efficacy of single dose albendazole (400 mg) was evaluated in 12 schools in the Huye district of Rwanda where Ascaris is the predominant STH. Ascaris eggs were detected by wet mount microscopy and the Mini-FLOTAC method to assess cure rate (CR) and faecal egg count reduction (FECR). Blood and faecal samples were analysed for co-infections with Plasmodium sp. and Giardia duodenalis, respectively. *Ascaris* positive samples collected before and after treatment were analysed for putatively BZ-resistance associated β-tubulin gene single nucleotide polymorphisms. The overall CR was 69.9% by Mini-FLOTAC and 88.6% by wet mount microscopy. The FECR was 75.4% and the 95% calculated confidence intervals were 50.4–87.8% using sample variance, 55.4–88.8% by bootstrapping, and 75.0–75.7% applying a Markov Chain Monte Carlo Bayesian approach. FECR varied widely between 0 and 96.8% for individual schools. No putative BZ-resistance associated polymorphisms were found in the four *Ascaris* β-tubulin isotype genes examined. Since FECRs <95% indicate reduced efficacy, these findings raise the suspicion of BZ resistance. In the absence of respective molecular evidence, heritable AR in the local *Ascaris* populations cannot



IJP:DDR continued

be formally proven. However, since FECRs <95% indicate reduced efficacy, BZ resistance may be suspected which would be alarming and calls for further analyses and routine monitoring in preventive chemotherapy programs.

Read the paper here https://www.sciencedirect.com/science/article/pii/S2211320717300337

In our second chosen paper, the authors make the point that the 'rule of 5' was never originally meant to be used as a Go/No Go decision making step for anti-parasitic drug discovery. They urge the pharmaceutical industry, as well as those involved in academia-based drug discovery, to avoid the application of such stringent criteria that may hinder the development of new parasiticides.

The rule of five should not impede anti-parasitic drug development

James H. McKerrow, Christopher A. Lipinski

International Journal for Parasitology: Drugs and Drug Resistance, Volume 7, Issue 2, 2017, Pages 248-249, ISSN 2211-3207,

https://doi.org/10.1016/j.ijpddr.2017.05.003.

Highlights

- "rule of 5" is a mainstay of decision-making in drug screening efforts.
- Acts as an absorption-permeability alert procedure to guide medicinal chemists.
- Never intended to apply to parasitic infectious diseases.
- Should not impede anti-parasitic drug development.

Abstract:

The "rule of 5" has become a mainstay of decision-making in the pharmaceutical industry as well as in nonindustrial (academic and institutional) drug development. However the authors of the original paper never intended for "double cutoffs" to preclude development of new drug leads for parasitic diseases.

Read the paper here: http://www.sciencedirect.com/science/article/pii/S2211320717300520

In our third chosen paper, the authors review the transient receptor potential (TRP) channels in schistosomes. These ion channels are critical for transducing sensory signals, and respond to a wide variety of external stimuli. The authors describe the TRP channel gene families in Schistosoma mansoni, and then report on the known effects of TRP channel inhibitors on schistosome motility and viability. The paper highlights the potential of TRP channels as therapeutic targets for control of schistosomes and other parasitic helminths.

TRP channels in schistosomes

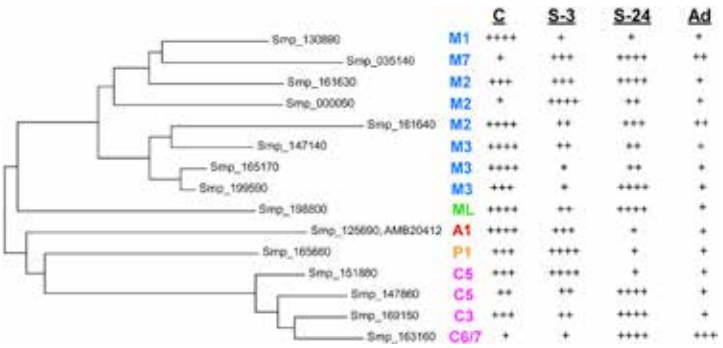
Swarna Bais, Robert M. Greenberg,

International Journal for Parasitology: Drugs and Drug Resistance, Volume 6, Issue 3, 2016, Pages 335-342, ISSN 2211-3207,

https://doi.org/10.1016/j.ijpddr.2016.07.002.

Abstract:

Praziquantel (PZQ) is effectively the only drug currently available for treatment and control of schistosomiasis, a disease affecting hundreds of millions of people worldwide. Many anthelmintics, likely including PZQ, target ion channels, membrane protein complexes essential for normal functioning of the neuromusculature and other tissues. Despite this fact, only a few classes of parasitic helminth ion channels have been assessed for their pharmacological properties or for their roles in parasite physiology. One such overlooked group of ion channels is the transient receptor potential (TRP) channel superfamily. TRP channels share a common core structure, but are widely diverse in their activation mechanisms and ion selectivity. They are critical to transducing sensory signals, responding to a wide range of external stimuli. They are also involved in other functions, such as regulating intracellular calcium and organellar ion homeostasis and trafficking. Here, we review current literature on parasitic helminth TRP channels, focusing on those in schistosomes. We discuss the likely roles of these channels in sensory and locomotor activity, including the possible significance of a class of TRP channels (TRPV) that is absent in schistosomes. We also focus on evidence indicating that at least one schistosome TRP channel (SmTRPA) has atypical, TRPV1-like pharmacological sensitivities that could potentially be exploited for future therapeutic targeting.



Read the paper here: https://www.sciencedirect.com/science/article/pii/S2211320716300380

IJP INTERNATIONAL JOURNAL FOR PARASITOLOGY
Parasites and Wildlife

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Editors: R.C. Andrew Thompson, Susan Kutz

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Recent publications by ASP members in IJPPAW and interviews with two authors; Damian Lettoof who is completing his PhD at Curtain University in Western Australia studying tiger snakes and parasites and Domenico Otranto who is Professor of Parasitic Diseases and Head of Department of Veterinary Medicine, University of Bari in Italy, President of the World Association for the Advancement of Veterinary Parasitology and Visiting Professor of Parasitology and Parasitic Diseases at the Faculty of Veterinary Sciences, Bu-Ali Sina University, Hamedan, Iran.

Cryptic species diversity in ticks that transmit disease in Australia

Kirsty M. McCann, Warwick N. Grant, David M. Spratt, Shannon M. Hedtke,

International Journal for Parasitology: Parasites and Wildlife, Volume 10, 2019, Pages 125-131, ISSN 2213-2244, https://doi.org/10.1016/j.ijppaw.2019.08.002. (http://www.sciencedirect.com/science/article/pii/S2213224419301014)

Abstract: Ticks are important vectors of a broad range of pathogens in Australia. Many tick species are morphologically similar and are therefore difficult to identify using morphology alone, particularly when collected in the larval and nymphal life stages. We report here the application of molecular methods to examine the species diversity of ixodid ticks at two sites in southern New South Wales, Australia. Our taxon sampling included six morphologically characterised adult stage voucher specimens of *Ixodes trichosuri, Ixodes tasmani, Ixodes fecialis* and *Ixodes holocyclus* (the paralysis tick) and ~250 field collected specimens that were in the larva or nymph stage and thus not morphologically identifiable. One nuclear and two mitochondrial amplicons were sequenced using a combination of Sanger and Illumina MiSeq sequencing. Phylogenetic relationships were estimated using both maximum likelihood and Bayesian methods. Two clades with strong bootstrap and Bayesian support were observed across trees estimated from each of three markers and from an analysis of the concatenated sequences. One voucher specimen of *I. trichosuri* was located in one of these clades, while the other *I. trichosuri* voucher specimen was in a second clade with the remaining three identified species, suggesting these morphologically similar ticks may represent different cryptic species. Unidentified specimens were found across both clades, and molecular divergence of many of these is equal to or greater than that observed between identified species, suggesting additional unidentified species may exist. Further studies are required to understand the taxonomic status of ticks in Australia, and how this species diversity impacts disease risk for livestock, domestic animals, wildlife and humans.

Investigating the role of urbanisation, wetlands and climatic conditions in nematode parasitism in a large Australian elapid snake

Damian Lettoof, Brenton von Takach, P.W. Bateman, Marthe Monique Gagnon, Fabien Aubret

International Journal for Parasitology: Parasites and Wildlife, Volume 11, 2020, Pages 32-39, ISSN 2213-2244, https://doi.org/10.1016/j.ijppaw.2019.11.006. (http://www.sciencedirect.com/science/article/pii/S2213224419302408)

Abstract: Tiger snakes (*Notechis scutatus*) in wetlands of South-West Western Australia (SW WA) are commonly parasitised by the nematode *Ophidascaris pyrrhus*.

IJP:PAW continued

Above: A Bibra Lake Tiger Snake photographed by Damien Lettoof

Host-parasite interactions are complex and can potentially be impacted by factors such as urbanisation or climate. We assessed whether urbanisation, distance to wetland sites, and climatic factors have influenced parasitism in tiger snakes from specimens collected over the last century. We dissected 91 museum specimens of tiger snakes across SW WA and counted gastrointestinal nematodes. Binomial generalised linear modelling, with presence/absence of nematodes as a response variable, was used to determine which factors were driving infection. Model selection using AICc values showed that proximity to wetlands, rainfall and topographic wetness were most strongly associated with the probability of infection of snakes by nematodes. We also found a slight positive correlation between nematode abundance and annual mean maximum temperature. We found no significant influence of distance to urban centre on nematode burdens; however, our results suggest that water-related variables are a key driver of nematode parasitism in tiger snakes in SW WA. We also suggest that urbanisation is still of interest as its role in wetland and climate modification may increase parasitism in wetland snakes.

IJP-PAW has a Facebook page, please check it out and like us and some of our articles so we can promote the journal and all of the wonderful research published through IJP-PAW

Characterisation of the tongue worm, *Linguatula serrata* (Pentastomida: Linguatulidae), in Australia

Shokoofeh Shamsi, Diane P. Barton, Xiaocheng Zhu, David J. Jenkins,

IJP:PAW continued

International Journal for Parasitology: Parasites and Wildlife, Volume 11, 2020, Pages 149-157, ISSN 2213-2244, https://doi.org/10.1016/j.ijppaw.2020.01.010. (http://www.sciencedirect.com/science/article/pii/S2213224420300109)

Abstract: We describe adult males and females and a nymph belonging to *Linguatula serrata* in Australia, based on light and scanning electron microscopies. In addition, 18S and Cox1 sequence data have also been provided and were compared with similar sequences in GenBank. Our specimens had identical 18S sequences and limited genetic distance in Cox1 region which fell within the intra-specific range observed for *Linguatula spp.* suggesting that they all belong to one species. Phylogenetic analyses showed that Australian specimens were grouped with *L. serrata* in Europe where the species was first found and described. A number of *L. serrata* from Iran and Bangladesh formed a distinct group. The genetic distance between these Linguatula and Australian/European *L. serrata* ranged from 0.46% to 2.21% which is larger than the genetic distance observed between *L. arctica* and Australian/European *L. serrata* (0.12%) suggesting that they belong to a different species. As pointed out previously by several other authors, *L. serrata* comprises more than one species and those from the Palearctic region (including Iran and Bangladesh) should not be automatically named *L. serrata* unless there is enough evidence for the identification. To accurately address the complex taxonomy of *Linguatula spp*. a detailed morphological and genetic characterisation of numerous developmental stages of the parasite is necessary, to ensure morphological differences are not due to development. This however may not be achievable in the near future due to significant reduction in expertise as well as research funding awarded in this area of research to understand the basics of our planet.

Zoonotic and vector-borne pathogens in tigers from a wildlife safari park, Italy

Roberta Iatta, Alda Natale, Silvia Ravagnan, Jairo Mendoza-Roldan, Andrea Zatelli, Maria Alfonsa Cavalera, Yaarit Nachum-Biala, Gad Baneth, Domenico Otranto,

International Journal for Parasitology: Parasites and Wildlife, Volume 12, 2020, Pages 1-7, ISSN 2213-2244, https://doi.org/10.1016/j.ijppaw.2020.03.006. (http://www.sciencedirect.com/science/article/pii/S2213224420300298)

Abstract: Infectious diseases by pathogens, including those of zoonotic concern, may act as a primary or contributory cause of threat to wildlife conservation and may represent a risk for human health, mainly for people working at, or visiting the zoological parks. Given the paucity of data on pathogens infecting wild tigers, we investigated the occurrence of infectious agents in this animal species, with a special focus on those of zoonotic concern. Blood and serum samples from tigers (n = 20) living in a wildlife safari park of southern Italy were screened by serological and molecular tests. All animals scored positive for antibodies against *Toxoplasma gondii* (100%), whereas they displayed different prevalence of seropositivity for *Rickettsia conorii* (30%), *Bartonella henselae* (15%) and *Leptospira interrogans* sv Icterohaemorrhagiae and/or *Leptospira kirschneri* sv Grippotyphosa (15%). No antibodies against *Coxiella burnetii* were detected. In addition, 8 tigers (40%) tested molecularly positive to "*Candidatus* Mycoplasma haemominutum", and 3 (15%) to *Hepatozoon canis*. No DNA of R. conorii, Bartonella spp., *Ehrlichia/Anaplasma* spp. and piroplasmids was amplified. The occurrence of tiger infections by bacteria and parasites may represent a risk for morbidity and, in some circumstances, mortality in this endangered species and a source of infection for other animals, including humans. These findings indicate that the circulation of zoonotic pathogens such as *T. gondii, R. conorii, L. interrogans* sv Icterohaemorrhagiae, "*Candidatus* Mycoplasma haemominutum" and B. henselae in given environments may represent a relevant health issue considering the close association among animals and humans visiting, or working at, the wildlife safari park. Preventative measures are advocated in order to control ectoparasites and other sources of infection (e.g., small rodents), thus for minimizing the risk of infection for animals as well as for humans.

IJP:PAW interview with Damian Lettoof

We interviewed PhD student Damian Lettoof who is based in the Behavioural Ecology Laboratory at Curtin University, Western Australia about his parasitology research in Tiger snakes (*Notechis scutatus*).

Damian, please tell us a bit about yourself and your research. What do you enjoy the most about your research?

I am a herpetologist with a lifelong interest in snakes, and I've spent the last decade researching and consulting around Australia on various ecosystems and on a range of species. I have always loved the Australian bush and spend a lot of time exploring new places, trying to learn as much as I can about how to find and identify the local wildlife.

My academic research began with studying cane toad (*Rhinella marina*) and native frog parasites, and toad ecology. Once I finished this I went on to be involved with research on wild reptile trade in South-East Asia, and then I moved to Perth (from Sydney) to start my PhD on tiger snakes. The scope of my thesis is to identify some of the impacts urbanisation is having on the local tiger snake populations, and if we can use tiger snakes as bioindicators of wetland health.

How did you get interested in Tiger snakes (*Notechis scutatus*) and parasites and why do you think it is important to study them?

I always wanted to do my PhD on snakes, but they're a very difficult taxa to work on in Australia. I already had an interest in parasitology from my Masters research on frog and toad parasites.

In Perth, we have a great system to study tiger snakes due to several high abundance populations occurring in wetlands that vary in their degree of urban degradation. We see that snakes from the most urban wetlands are noticeably unhealthy. Physical signs of their poor health include low body condition, more external wounds and damage, high degree of tail loss, and generally more sluggish behaviour.

We wanted to know, **what makes an urban wetland snake unhealthy**? The first hypothesis was gastric nematodes that are found in high intensity in Perth tiger snakes but not tiger snakes on an off-shore island. I dissected 92 tiger snake specimens from the Western Australian Museum collected across all of the South-West of WA and over 100 years, and counted their stomach worms. We found that most tiger snakes have these worms and there was no clear influence on time, distance from urban centres or climate on the number of worms. However, we did find a nice pattern that suggested snakes found much closer to wetlands, and in areas of less rainfall, have a higher chance of being infected. We speculate that this is because frogs (tiger snakes favourite food) are probably the intermediate host for the nematode, and as there are no frogs on the offshore island the snakes are parasite-free!

The best field detection method we have to detect worms is by rubbing their belly and feeling the squishy lump at the base of the stomach. This can tell us if snakes have an infection of about 12 or more worms, and guess what? About 80% of snakes are infected. Now this complicates trying to find out if worms are having an impact on the health of tiger snakes. Other research has found snakes commonly infected with gastric nematodes show complete tolerance to the infection, they're part of the snake's ecology.

So I started to look at the next obvious stressor the urban tigers should be exposed to: contaminants. And we found the urban snakes are accumulating a suite of heavy metals from contaminated wetlands, which can also impact parasitism. The impacts are converse, but ecosystem contamination can results in higher parasitism by suppressing the immune system of the host, or it can lower parasitism by killing off the parasites (ie pesticides). It's important to study and monitor parasites as an increase or decrease in their abundance can impact the health of their host species, and indicate subtle changes in the ecosystem.

After the results of your study, do you think that parasites can be used as an indicator of the impact of urbanisation on ecosystems in all species?

I think they can, but it's much easier to monitor ectoparasite communities as they live on the outside of the study organism. For ethical reasons we use animals that are already deceased, so we often get much smaller sample-sizes when investigating endoparasites and it becomes harder to detect changes in their abundance. When field monitoring I use the method where I feel for the presence or absence of worms. However, obvious increases of parasites in urban areas will reflect

IJP:PAW interview continued

a change in the landscape, whether that be an introduced environmental variable that favours the parasite's lifecycle, or an additional stressor on the host species that makes them more vulnerable to parasitic infection.

Can you expand more on the possible outcomes a changing environment could have on temperature influenced parasitism and whether you see climate change having this influence in the longer term?

As invertebrate parasites are generally poikilotherms, their developmental rate at each life stage is dictated by temperature. So subtle increases in environment temperatures can result in increased individual growth, breeding events and fecundity, and even a shift in emergence dates. This does raise concerns of a saturation of parasites in a changing environment. Although it's not that simple. Like all organisms a lot of parasites operate in a strict thermal gradient and too much time at either end of that gradient can kill them. Multi-host parasites are even more sensitive to changes, if an increase in temperature reduces abundance of one of their hosts they can't complete their lifecycle. I think extreme heat events and significant increases in temperature would likely results in a decline in parasites; but subtle shifts in temperature from urbanisation and climate could easily result in short-term increases in parasitism and sensitive host species may suffer from this additional stressor.

How are you continuing your research at the present time, when the world is self-isolating due to the COVID-19 outbreak and what advice do you have for fellow field researchers?

Fortunately tiger snake activity in Perth is pretty low during the pandemic, so I've been working on publications and my project hasn't been impacted. I have a lot of friends and colleagues who have been severally impacted by the shutdown, losing field seasons and completely stopping their research. I can't offer much advice but everyone should stay safe and try to stay positive until they can access their sites again...

And, finally Damian, we all want to know, are snakes challenging to work with?

They certainly can be, for two reasons! Obviously tiger snakes, like a lot of our large common snakes, are dangerously venomous. This can make the capturing and handling the biggest safety risk of the research. I've minimised this risk by using soft pining tools and Hexarmor needle-proof gloves to capture and restrain the snakes. Thankfully tiger snakes aren't very long in Perth (< 1m) so we don't have a lot of snake we need to control, and once a snakes head is restrained they're just a big flexible tube and are very easy to manipulate. I also only allow experienced handlers to work with these snakes, and we've been very successful safely handling over 320 individuals.

The second risk is more from a scientific perspective. Snakes can be difficult fauna to work with because they're extremely cryptic and they have much lower activity patterns compared to birds and mammals. This means finding and collecting snakes to get a good sample size for research can be very tricky, and more so if you want to re-catch individuals as part of a monitoring project. Most times you catch a snake and mark it you may never find it again! Thankfully my research species loves dense vegetation beside water bodies in wetlands, so we have a specific area to focus our efforts on and survey for several hours each morning before the sun gets too hot. We catch them when they're warming up in the grass.

Thank you Damian we look forward to hearing more about your research in the future and good luck with finishing your PhD!

Images
Previous page: Damian Lettoof in the field
Above left: specimen worms
Below left: Gastric Nematodes

IJP:PAW interview with Domenico Otranto

We interviewed researcher Professor Domenico Otranto from the Department of Veterinary Medicine, University of Bari, Italy about his research of pathogens in captive tigers from Italy.

Domenico, please tell us a bit about yourself and your research. What do you enjoy the most about your research?

The essence of my being a researcher is enclosed in the quote of Leonardo da Vinci that accompanies the electronic signature of my email: 'I have been impressed with the urgency of doing. Knowing is not enough; we must apply. Being willing is not enough; we must do.'

Doing research is one of the few opportunities we have to live our condition of human beings, driven by the curiosity. This may happen through the formulation of any research hypotheses (for a research a new challenge!), and thus by testing them through the field and laboratory methodologies available. This is like a game which could lead to a success, making it as an unforgettable adventure you live with other colleagues and junior researchers, who very often turn to be new friends. This is the essence of our lives, and we do it enjoying ourselves.

Finally, another important aspect I enjoy a lot in doing research is that research makes us free. Just, think about the fact that all human beings are equal when planning their research. Any form of discrimination should not undermine doing research, since we all deserve the same opportunities in our pursuit of scientific knowledge.

How did you get interested in tigers and parasites and why do you think it is important to study them?

Honestly speaking, by chance. In February 2019, the clinical case of a tiger presenting a non-healing laceration was referred to our Parasitology and Micology Unit, Department of Veterinary Medicine (Bari, Italy). Upon PCR testing, *L. infantum* DNA was detected in a skin punch biopsy sampled from the tiger, confirming the diagnosis suspicion and, thus representing the first autochthonous case of leishmaniosis in a tiger in Europe. Indeed, 'Zara', this is the name of the female 7 years-old tiger positive to *L. infantum*, was born and raised in a zoologic park in southern Italy. Since then, the curiosity and enthusiasm of my research group (in particular of Roberta Iatta, associate professor working with me) led to firstly investigate the prevalence of *L. infantum* infection in the local tiger and sand fly population and, then, with this study, to carry out a serological and molecular survey of pathogens infecting these tigers, with a special focus on those of zoonotic concern.

Studying the occurrence of infectious agents in this animal species is highly important because infections by bacteria, viruses and parasites may pose significant risks to wildlife populations, in particular to endangered species as tigers, leading in some cases to mortality. Furthermore, considering the close association among zoo animals and humans, zoonotic diseases by bacteria and parasites, including those transmitted by arthropods, represent a relevant health issue that is scantly investigated in animals kept in heavily frequented environment as zoological parks. It was an incredible adventure and..... I was very excited to be able to take samples from tigers (when they were well sedated!).

Tell us how do studies in captive tigers help us understand parasitic infections in free ranging tigers?

Zoos provide a framework for scientific investigation. Tacking the 'difficult patients' into account, studies of parasitic infections in captive tigers allow us to collect information otherwise challenging, even impossible, to be obtained in the wild. Understanding the presence and the impact of infectious diseases including parasitic infections on the health of captive animals is one of the conservation objectives to preserve endangered species such as tigers in nature.

After the results of your study, do you think that there are any zoonotic pathogens that are particularly important for tigers and what is the best way to minimise the risk of infection to humans and animals?

In our study, tigers sampled in the wildlife safari park were exposed to multiple pathogens of zoonotic concern such as *Toxoplasma gondii* (100%), *Rickettsia conorii* (30%), *Bartonella henselae* (15%), *Leptospira interrogans* sv Icterohaemorrhagiae and/or Leptospira kirschneri sv Grippotyphosa (15%). Among them, the seropositivity to *T. gondii* in all the zoo tigers analysed is most likely related to the dietary habits or environment factors since these animals were generally fed with raw meat and may hunt birds and rodents that may act as intermediate hosts. The seroprevalence to *R. conorii* and *B. henselae* has been firstly detected in tigers in our study, raising questions about the transmission route and the pathogenic role of these pathogens in wild felids as well as their potential role as reservoir. Differently, the

IJP:PAW interview continued

exposure of tigers to *Leptospira serovars* of zoonotic concern was not something new because it has been already observed in other wild felids. However, in our study, out of 3 tigers seropositive to *Leptospira sv*, one presented high antibodies titres against two serogroups (i.e., *L. interrogans* sv Icterohaemorrhagiae and *L. kirschneri* sv Grippotyphosa) suggesting a recent field contact with those pathogens. Specifically, considering that *L. interrogans* sv Icterhaemorrhagiae is the most pathogenic serovar to humans, our results indicate the potential risk of infection for other animal species, including humans. From the clinical point of view, even though limited data on the pathological significance of these pathogens for tigers is available, it is possible to hypothesize that infections caused by these bacteria and parasites in some circumstances such as in animals under stress, with impaired immune system responses and concurrent infections, might predispose to clinical disease thus increasing the risk of morbidity and mortality due to these pathogens. In view of this, diagnostic and screening test as serology should be part of routinely surveillance programs to be performed on tigers in zoological gardens located in endemic areas for the zoonotic pathogens detected. In addition, preventative measures for controlling ectoparasites and small mammalians, thus for minimizing the risk of infection for animals as well as for humans working in the zoo should be highly advised.

Can you expand more on the first report of *Hepatozoon canis* in tigers and why this is important?

Considering that *Hepatozoon felis* is the most frequent Hepatozoon species reported in wild and domestic felids worldwide, the detection of *H. canis* in tigers was quite unexpected. However, this interesting result can be explained by the low host specificity of this protozoan, which has been reported in several wild canine species and other carnivores (e.g., red fox, crab-eating fox, black-backed jackal, golden jackal, African wild dog and hyena). Furthermore, the role of some tick species feeding on both canids and felids, such as *Rhipicephalus sanguineus* group, as well as the predation on prey infected by *Hepatozoon* cysts may explain the circulation of this pathogen in tigers. The occurrence of *H. canis* in these endangered animals could have several clinical implications. Indeed, even though this protozoan usually causes subclinical infections in wildlife as well in dogs, it has occasionally been associated with clinical disease in young wild canids, mortality in hyenas and recently in domestic cats in Austria and Switzerland. In dogs with a high parasitaemia *H. canis* is able to cause a severe and life-threatening illness with extreme lethargy, cachexia and anaemia. In addition, an increased risk of severe

disease has been described in patients with immune suppression induced by concomitant infections, an immature immune system (i.e. young animals) or immunodeficient conditions. In this scenario, the detection of a parasite in a new host species can be considered only the first step in understanding of the real existing host-parasite relationship or the pathological significance that will deserve further attention.

How are you continuing your research at the present time, when the world is self-isolating due to the COVID-19 outbreak and what advice do you have for fellow field researchers?

My life is usually hectic. I'm always fully committed on several fronts as researcher, Head of Department, Professor, mentor of students coming from anywhere in the globe (Brazil, Colombia, India, Vietnam... Italy) and so on. Self-isolation has given me the chance to regain my time for writing and planning new researches. During the lockdown in Italy I've never stopped trying to maximize my 'smart working' *routine*. I had the opportunity to finalize most of my pending stuff (a miracle!) and to think about what new could be done in the future! However, I can't deny how much I missed fieldwork that I immediately started again as soon as the Italian restrictions were lifted! After all, as parasitologists, it is necessary to learn from 'parasites' to be adaptable and resilient in any condition, even the worst (...that caused by a virus)!

And, finally Domenico, we all want to know, are tigers challenging to work with?

Never as much as a cat! I had the precious chance to sample from cats more 'ferocious' than tigers! By the way, I don't want to seem unfairly brave as all tigers sampled have been properly anesthetized before any procedure! However, I won't hide that I was shivering when one of the tigers during sampling seemed to have woken up from the anaesthesia earlier...

Thank you Domenico for your wonderful research insights and wisdom, we look forward to hearing more about your zoonotic research in the future!

News from the ASP Network for Parasitology

ASP Annual Conference

As you know, due to the outbreak of COVID-19, the 10th International Symposium for Fish Parasitology and Australian Society for Parasitology Annual Conference, Shangri-la Hotel in Cairns, Australia has been postponed to 5-8 July 2021 http://www.isfpx.org/ We look forward to borders being opened and enjoying some face-to-face scientific exchanges in a beautiful part of the world next July.

This year we will be hosting online events and we encourage you to attend as many as you can.

- Parasitravaganza 2020, 31st July 1-5(ish) pm www.parasite.org.au/conferences/parasitravaganza/
- ASP student and Early Career Researcher career development events 30th July 2020 www.parasite.org.au/conferences/parasitravaganza/
- ASP AGM 2-5pm 30th July 2020 Click here to register
- National Science Week 2020 with Parasites Online - find out more and book into our ASP virtual events www.parasite.org.au/outreach

And that's not all...stay tuned for more fabulous online events for ASP members!

www.parasite.org.au
www.facebook.com/ASParasitology
www.twitter.com/AS_Para

Travel Awards

Regretfully, due to the COVID-19 outbreak we had to postpone the March 2020 round of the Researcher Exchange, Travel and Training and JD Smyth Postgraduate Student Travel Awards until 25 September 2020, if the situation allows. Check the ASP website (https://www.parasite.org.au/awards/jd-smyth-postgraduate-travel-awards/) to find out how to apply for a Researcher Exchange, Travel and Training Award including a JD Smyth Postgraduate Travel Award.

Grant news

Congratulations to the recent successful NHMRC Investigator Grant winners:

- **Julie Simpson** (The University of Melbourne) for Optimising treatment and prevention strategies to accelerate malaria elimination
- **Wilson Wong** (WEHI) for Structural biology of malaria parasite invasion and antibodies-mediated inhibition
- **Robert Commons** (Menzies School) for Advancing the radical cure of Plasmodium vivax malaria through optimal antimalarial regimens
- **Aaron Jex** (WEHI) for Systems-based study, intervention, diagnosis and control of gastrointestinal parasites
- **Don McManus** (QIMR) for A worm-free world: defeating parasitic helminths via global integrated control
- **Alan Cowman** (WEHI) for Malaria and development of new antimalarials
- **Brendan Crabb (**Burnet Institute) for Therapeutically Targeting Malaria Pathogenesis

With best wishes,

Nick and Lisa

Closing dates for ASP awards

ASP Fellowships
9 January 2021

ASP Researcher Exchange, Travel and Training Awards & JD Smyth
25 September 2020

John Frederick Adrian Sprent Prize
30 September 2022

Bancroft-Mackerras Medal for Excellence
30 September 2020

More information
www.parasite.org.au

10TH INTERNATIONAL SYMPOSIUM FOR FISH PARASITOLOGY

AUSTRALIAN SOCIETY FOR PARASITOLOGY ANNUAL CONFERENCE

ISFPX CAIRNS 2021

CAIRNS, AUSTRALIA
5-8 JULY 2021

The Australian Society for Parasitology Inc.

ISFPX

In light of COVID-19, the 2020 ASP & ISFPX Conference has been postponed. We are pleased to announce that the 10th International Symposium on Fish Parasites and the annual meeting of the Australian Society for Parasitology will now be held in Cairns, Australia from 5 - 8 July 2021.

Cairns boasts wonderful weather in July, with temperatures between 17-26 °C and very little rain, and is on the doorstep of both the Great Barrier Reef and the tropical north Queensland rainforest. We look forward to seeing you in Cairns in 2021!

Barbara Nowak & Thomas Cribb
Conference Co-chairs

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State News

ACT

Australian National University

Awards

Xiangning (Christine) Liu (Saliba lab) was awarded the prestigious Janet Elspeth Crawford Prize – a prize awarded to a female Honours student from the Joint ANU Colleges of Science who has demonstrated outstanding academic achievement. Congratulations Christine, very well deserved!

Christina Spry (Saliba lab) was one of four "Best Oral Presentation" prize winners at the Molecular Approaches to Malaria 2020 conference, held in Lorne in February.

Above: Christina Spry (second from right) with her fellow parasitologists and MAM2020 Best Oral Presentation prize winners (from left) Hugo Belda (Francis Crick Institute, UK), Claire Sayers (Umea University, Sweden) and Diana Munoz Sandoval (University of Edinburgh, UK).

Farewell

In February, we bade farewell to **Erick Tjhin**, who, after almost seven years as a student and research assistant in the Saliba lab and two years as a post-doc in the Smith and van Dooren labs, has moved to the USA to begin a post-doc with Michael Grigg at the National Institutes of Health. You will be missed Erick, but we wish you all the best for your new endeavours – and hope you enjoy getting to know a different protozoan parasite!

Left: past and present members of the van Dooren, Smith, Saliba, Broer and Kirk/ Lehane labs come together to farewell Erick Tjhin and wish him all the best for his new post-doc position.

$400

Undergraduate Prizes

The Australian Society for Parasitology is pleased to announce that it will be offering undergraduate student prizes of $400 each to Australian Universities identified as offering a suitable course in parasitology, for presentation to the best undergraduate student in parasitology (highest passing mark/grade).

The course(s) must be taught by a financial member of the ASP (of more than one year standing), and must comprise at least 30% parasitology. **Requests for 2020 prizes must be made by the eligible University to the ASP Treasurer by the 30th September 2020. Please complete the online application form:**

www.parasite.org.au/awards/asp-undergraduate-prizes/

State News continued

Victoria

Doherty Institute

A double farewell

In June, Stephen Rogerson's laboratory (Department of Medicine, Doherty Institute) will farewell **Pilar Martinez**, who is completing her Masters in Biomedical Sciences at Utrecht University, and **Putri Warta**, who has completed her Masters in Biomedical Science at the University of Melbourne. Pilar has been studying interaction between neutrophils and malaria parasites, while Putri has studied antibody responses to VAR2CSA in pregnant women from Papua New Guinea. We wish them both the best!

University of Melbourne

Funding news

Professor **Robin Gasser** (Lead Chief Investigator), Dr **Brad Sleebs** (Partner Investigator), Associate Professor **Abdul Jabbar** (CI) and Dr **Sergio Simonetta** (PI) ahev won a $751,260 grant from the Australian Research Council. Their project "New anti-parasitic drugs for a global veterinary market" will be conducted in collaboration with industry partner, Phylumtech.

Radio interview

Rebecca Traub at University of Melbourne recently gave an interview on ABC RN rear view program about "Animals, humans and disease - what is the relationship?". "Around two thirds of the infectious illnesses we humans suffer are caused by pathogens we've picked up from wild or domestic animals. They're called zoonotic diseases and these kinds of illnesses go back thousands of years." Check out the whole PODCAST here :

https://www.abc.net.au/radionational/programs/rearvision/rebecca-traub/12219722

Federation University

Welcome home

Richard Bradbury returned to Australia in January and is working at Federation University in Berwick (outer Melbourne). He spent three and a half years from 2016 as the Team Lead of the Diagnostic Parasitology Reference Laboratory of the CDC in Atlanta Georgia. Here he managed the CDC diagnostic parasitology reference service, including DPDx and performed research into Next Generation Sequencing based applications for parasitology diagnostics. Richard took a sabbatical in Slovakia, Central Europe, in the second half of 2016 where he was a visiting Professor of Public Health at the Slovak Topical Institute of St Elizabeth University, Bratislava, also assisting with research into the emergence of West Nile and Usutu viruses in that country.

Richard's research areas are focused on zoonotic disease, with particular reference to parasites. Richard's work is varied within these fields, including diagnostics, epidemiology and pathogen discovery. He works on all parasitic diseases affecting humans, with a particular interest in the detection and identification of novel and exotic parasitic diseases. Richard applies modern and traditional techniques such as microcopy, serology, PCR and next generation sequencing/bioinformatic techniques to develop new diagnostics and to answer important questions about the transmission, molecular epidemiology, prevalence and distribution of these diseases.

St. Vincent's Hospital

Publication

Dr Harsha Sheorey recently published a paper as invited author in the journal Tropical Medicine and Infectious Disease.

Sheorey H. (2020). E-Diagnosis in Medical Parasitology. Tropical medicine and infectious disease, 5(1), 8. https://doi.org/10.3390/tropicalmed5010008

Walter and Eliza Hall Institute

Recent publications

Jennison C, Lucantoni L, O'Neill MT, et al. Inhibition of Plasmepsin V **Activity Blocks Plasmodium falciparum Gametocytogenesis and Transmission to Mosquitoes**. Cell Rep. 2019;29(12):3796-3806.e4. doi:10.1016/j.celrep.2019.11.073 https://www.cell.com/cell-reports/pdf/S2211-1247(19)31564-5.pdf

Mellin R, Boddey JA. **Organoids for Liver Stage Malaria Research.** Trends Parasitol. 2020;36(2):158-169. doi:10.1016/j.pt.2019.12.003

Ebert G, Lopaticki S, O'Neill MT, et al. **Targeting the Extrinsic Pathway of Hepatocyte Apoptosis Promotes Clearance of Plasmodium Liver Infection**. Cell Rep. 2020;30(13):4343-4354.e4. doi:10.1016/j.celrep.2020.03.032 https://www.cell.com/cell-reports/pdf/S2211-1247(20)30346-6.pdf

Favuzza P, de Lera Ruiz M, Thompson JK, et al. Dual Plasmepsin-Targeting **Antimalarial Agents Disrupt Multiple Stages of the Malaria Parasite Life Cycle.** Cell Host Microbe. 2020;27(4):642-658.e12. doi:10.1016/j.chom.2020.02.005 https://www.cell.com/cell-host-microbe/pdfExtended/S1931-3128(20)30113-X

State News continued

The 2020 Molecular Approaches to Malaria conference was held in Lorne, Victoria, between 23rd and 24th February.

National Organising Commitee member Justin Boddey describes the conference as "a huge scientific, carbon-neutral success", which was attended by 454 investigators.

Summary at Tends in Parasitology: https://www.cell.com/trends/parasitology/fulltext/S1471-4922(20)30097-0

Conference website: https://www.mam2020conference.com.au/

Top: members of the McFadden lab on the beach at Lorne after a day of talks

Bottom: MAM2020 speakers

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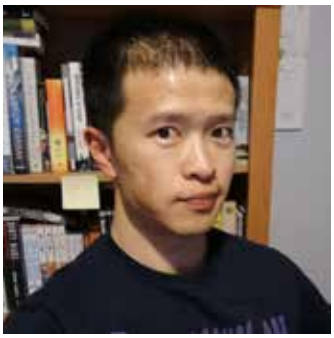

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