2020/2

ASPAB NEWS

The official newsletter of the Australasian Society for Phycology and Aquatic Botany

HIGHLIGHTS

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Contact us for questions or if you want to contribute content:

MAREIKE BABUDER
mareike.babuder@pg.canterbury.ac.nz

THIRUCHENDURAN SOMASUNDARAM
tsomasundaram@deakin.edu.au

ELLYN ERLANIA
eerlania@deakin.edu.au

WELCOME BACK

Letter from the Editors

by Thiru

DEAR ASPAB MEMBERS,

Last month we were able to complete our first ever pre-newsletter survey. We thank all the participants for taking their time to complete the survey. Your intuitive responses and contributions have made our job easy in editing the second ASPAB newsletter for the year 2020. The pre-newsletter survey results assured us that we all have had a challenging year so far, due to the spread of the SARS-Cov-2 virus and associated preventative measures and restrictions to control the pandemic. However, for some of us, these challenges were in fact blessings in disguise and spared us extra time to write our thesis, articles and/or research grants and complete pending tasks.

This year we had to change our routine habits and behaviour both in our personal and professional space confirming to the newly imposed "pandemic rules". Among many changes, masks, social distancing, frequent use of hand sanitisers, home-cooked food and zoom meetings have become the aspects of “new normal”. Adopting one of the new-normals in the academic and research space, ASPAB conference this year is going virtual (see conference section) and our conference organising committee is already on the move. We encourage our readers to give their full support to the 34th annual ASPAB conference through early registration and kindly spreading the word across their networks.

ASPAB members have proved again that nothing can stop them from achieving their goals and continuous contribution to science. We proudly announce several awards and grants received by our members (see awards section). Several amazing papers published by our members are listed under publications. In addition, we extend our thanks and congratulations to researchers those who kindly sent their articles to this issue of newsletter.

As editors and early career researchers, editing ASPAB newsletter has given us an opportunity to learn and grow. We are grateful for your feedback and we are committed to bringing a better newsletter every time.

Editors

PRESIDENT'S LETTER

Dr. Alecia Bellgrove

Senior Lecturer in Marine Biology and Ecology in the School of Life and Environmental Sciences and Centre for Integrative Ecology at Deakin University Warrnambool Campus

2020 - wow what a year so far! I think it's safe to say that when we met last year at the ASPAB conference in Wellington none of us imagined that the year ahead could have possibly looked this way. The COVID-19 pandemic has certainly created massive challenges for many of us, and forced us to think carefully about how we work, live and play and, indeed, what is the most important to us.

For those of us with academic teaching responsibilities, it is been a massive challenge, but also a unique opportunity, to think about how we can deliver and create resources to teach phycology online in an engaging and interactive way.

In research, the lockdowns have provided opportunities for some to focus on publishing results, but for others, it has meant a pause to fieldwork and lab experiments and consequent delays in meeting project milestones. We have had to get creative in making sure our research teams stay connected and as productive as possible under the circumstances. And all of us have had to learn new ways to maintain our physical and mental health in isolation. All this has led to many innovations in the online space, including the rise of virtual conferences. And this year we have a fantastic team of students and ECRs that are organising a very first virtual ASPAB conference (more information in this issue - registrations close 31st of October!).

Our newsletter editors have brought together a fantastic issue that brings us some stories from lockdown, a list of some of those publications that have been coming out this year, research stories, job and scholarship opportunities and a list of virtual conferences.

I look forward to catching up with as many of you as possible at our virtual conference in November. With super-cheap registration (that will be funnelled back into student funding) and no travel costs we are hoping to get as many members participating as possible. It's also a fantastic opportunity for people working in phycology and aquatic botany that may not be members and attend regular ASPAB meetings to participate, so spread the word. Until then stay safe and enjoy this fantastic newsletter.

Spotlight

Dr Maren Preuss

MARSDEN FAST START
ROYAL SOCIETY OF NZ

"UNRAVELLING PARASITE EVOLUTION BY TRACKING GENE LOSS IN PLASTID GENOMES OF PARASITIC RED ALGAE"

Prof. Catriona Hurd, John Beardall et al.

AUSTRALIAN RESEARCH COUNCIL (ARC) DISCOVERY PROJECTS FUNDING

"SEAWEED FORESTS OF THE FUTURE: RESPONSES TO OCEAN ACIDIFICATION AND WARMING"

Prof. Leanne Armand

King et al. The Australian Centre for Excellence in Antarctic Science
Australian Research Council Special Research Initiatives in Excellence in Antarctic Science (SRIEAS) 2020 round 1

Post et al. Antarctic Bottom Water production in the past: Records from marine sediments, Cape Darnley, East Antarctica
Marine National Facility Full Proposal Ship Time

congrats!

ASPAB RESEARCH FOCUS

PRE-NEWSLETTER SURVEY RESULTS

n=16

phytoplankton taxonomy

carbon sequestration

aquaculture

cultivation & bioremediation

seaweed phycology

science education

ocean acidification

seaweed ecology

ASPAB

seagrass

dairy feed development

Invasive species

connectivity of coastal systems

management of coastal ecosystems

metagenomics of red algae

seaweed biology

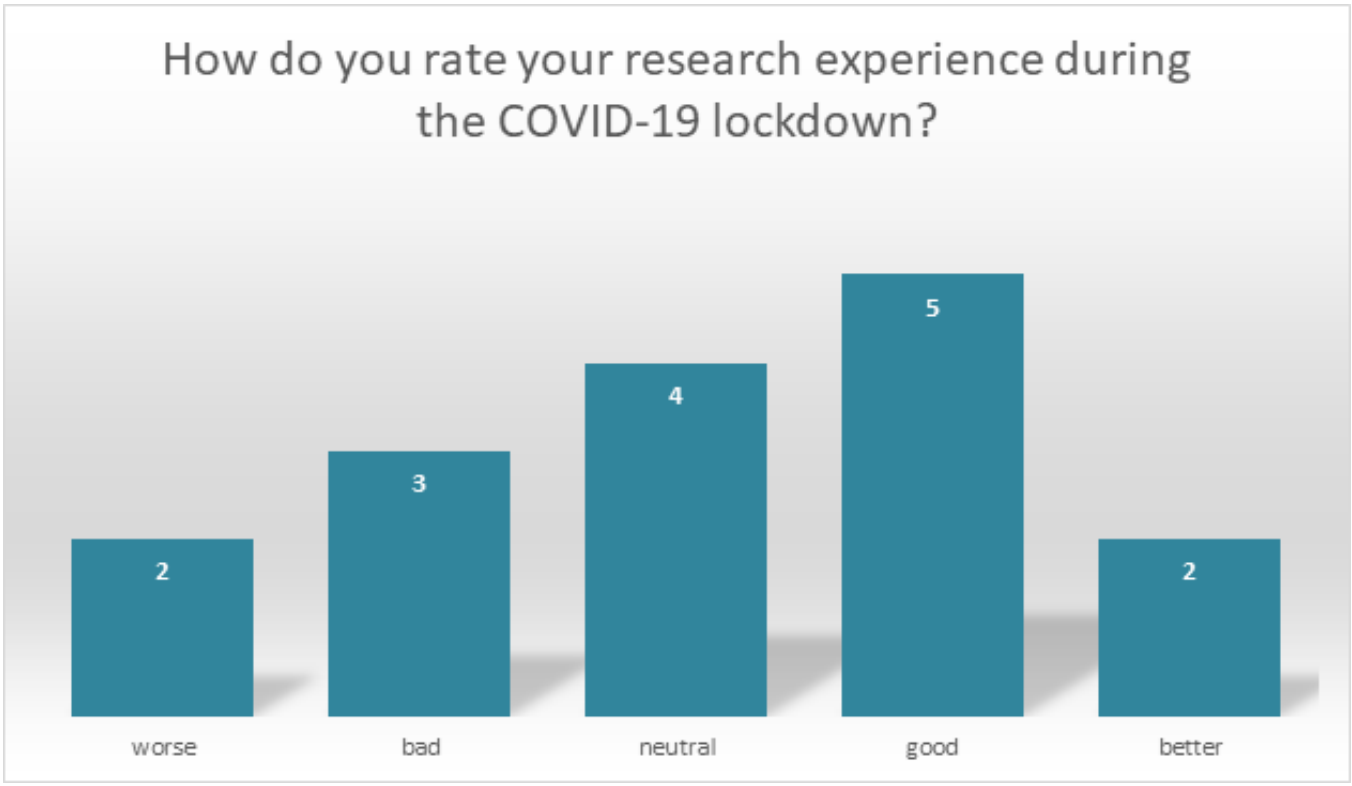
southern ocean and antartica

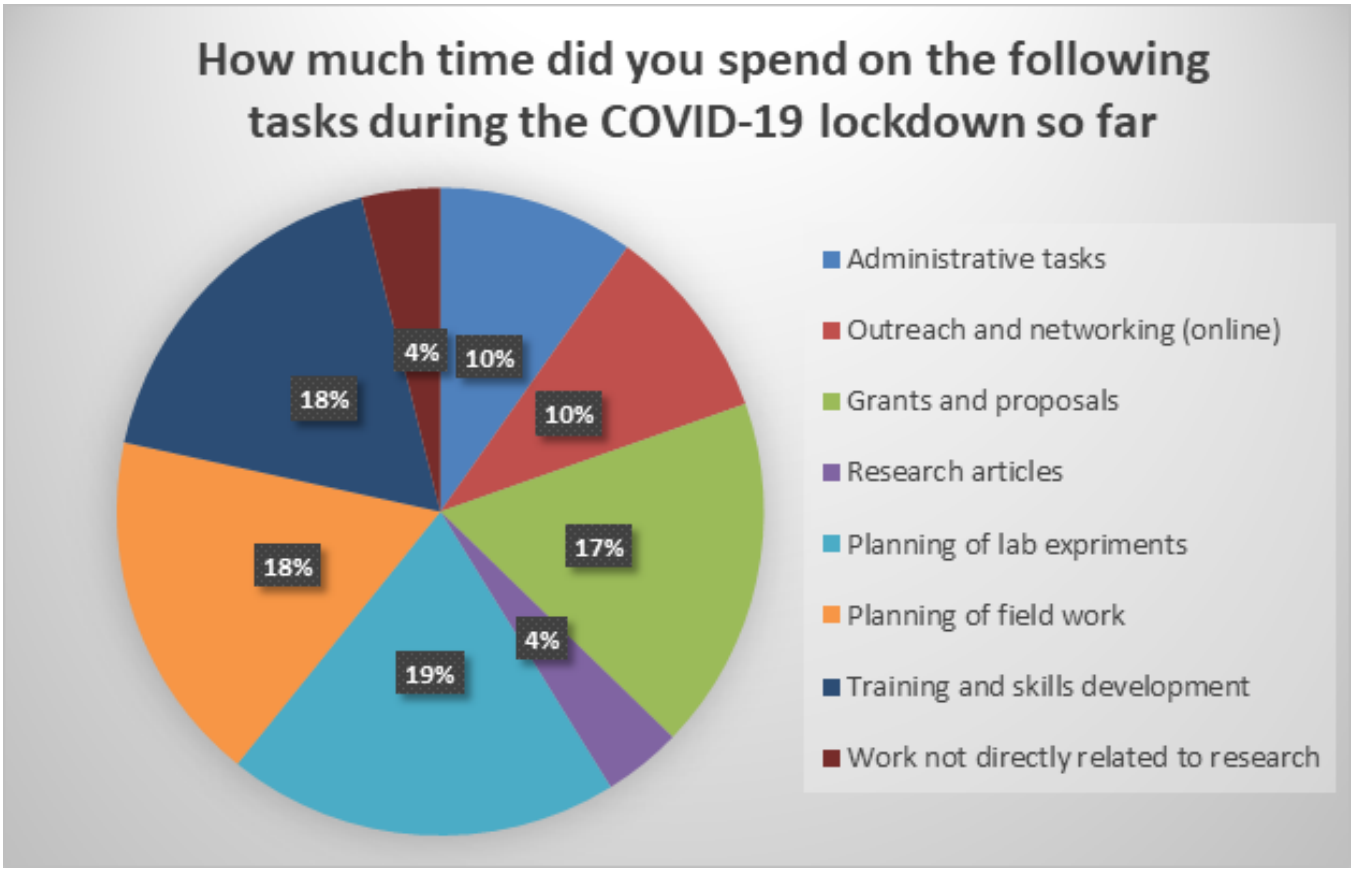
Biofouling / biofouling management

What happend in lockdown, stays in lockdown!?

PRE-NEWSLETTER SURVEY RESULTS

n=16

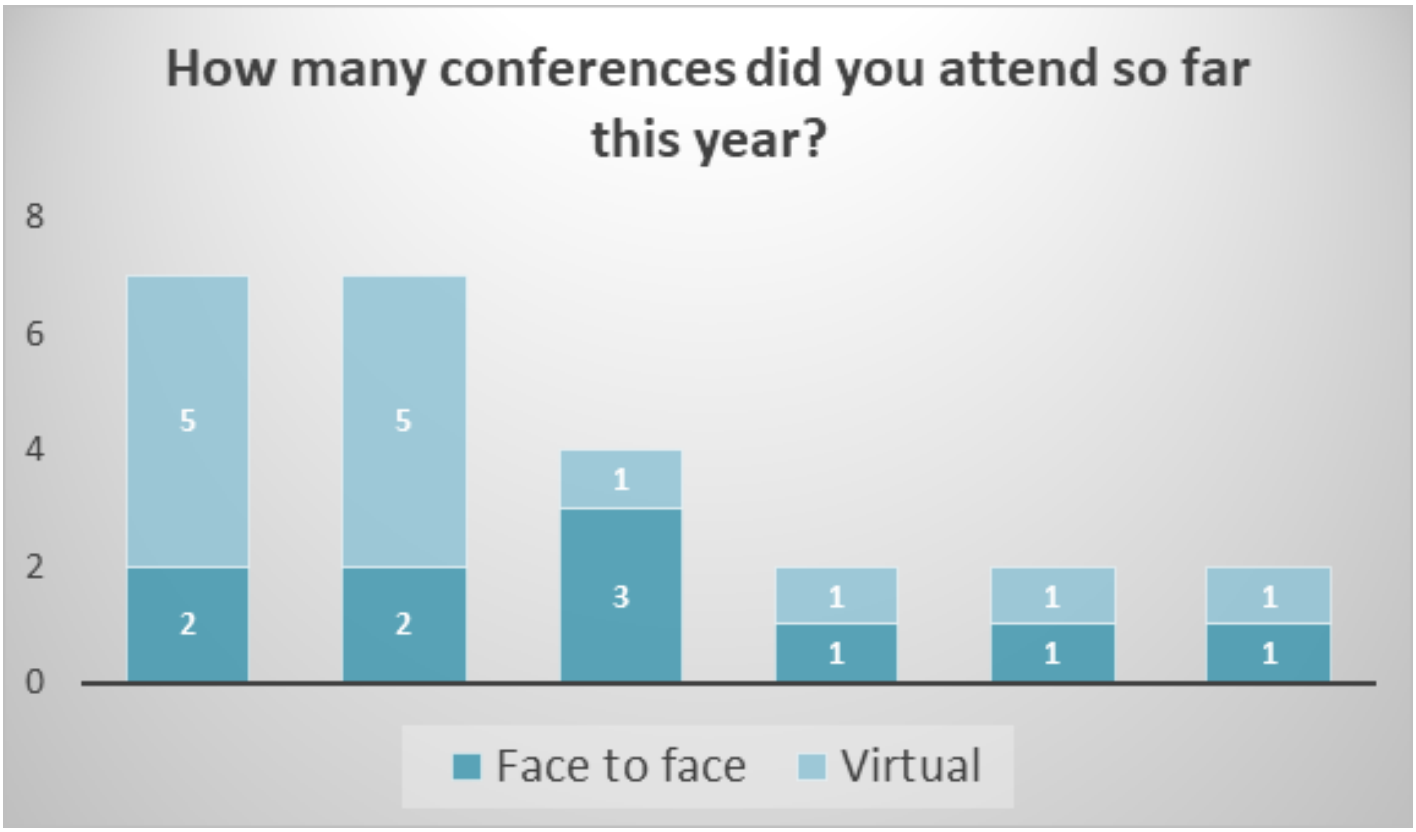




What happend in lockdown, stays in lockdown!?

PRE-NEWSLETTER SURVEY RESULTS

n=16



"There are no clear updates as yet on the re-opening of the universities or other educational institutions, as the rise of cases is still reported in parts of the country, while some states have battled to control the spread."

"Better work routine= more focused and productive working hours; more physical activity and outdoor time= better mental health"

"Thus in short, the pandemic has made me explore many opportunities, analyze my failures in various experiments and reconstruct these experiments after a long thoughtful process, and, consideration of the new-normal state that is to be expected."

"However this year, restrictions imposed to control the spread of the pandemic stalled my planned pre-monsoon field trip as the state borders were closed."

"In spite of the stressful life presented to us by this pandemic, a lot of new opportunities which we would have never thought of venturing into or have long planned and pushed it to the back of the mind have taken shape."

"Workload for teaching increased so could not allocate time to research"

"I learned how to be more productive working from home."

LOCKDOWN STORIES

by Thiru

AINSE THE AUSTRALIAN INSTITUTE OF NUCLEAR SCIENCE AND ENGINEERING

24TH WINTER SCHOOL (ONLINE)

As a Ph.D. student I have reduced my sphere of influence facilitating research aims to occupy most of my resources. At the beginning of isolation and closure of non-essential working spaces including universities, I feared that I am going to lose my leftover networking opportunities. As an early career researcher sometimes, our networks bring us good influence and a sense of security in the long run. Despite my fears, I was amazed by the speed that global scientific community has adapted their events very quickly to the online mode. Within a short period event invitations started to pile up in my inbox. I was fortunate to to attend some of the Australian and international networking events from the comfort of my bedroom. This mode of delivery has in fact increased my ability to extend my network across countries. One of the highlight events that I participated was the AINSE 24th winter school, organised by the Australian Institute of Nuclear Science and Engineering. This was conducted as an intensive three days event allowing students to witness AINSE's research capabilities and on going projects. Streaming online tour in their magnificent accelerator and analytical facilities somewhat made me resent the online mode of the winter school. Apart from this odd feeling as the oldest student in the group, everything else was an enjoyable learning experience. For me the highlight of the event was that I was able to make good connections with Australian scientists who may become future collaborators in my current project "Future proofing Australian Agriculture with Seaweed Supplementation"

Acknowledgment -
I acknowledge Deakin University and its staff for helping me throughout the selection process to attend this event.

LOCKDOWN STORIES

by Swetha Balakrishnan

COVID-19 pandemic has exposed human vulnerabilities as well as opened new windows of opportunities. It has set the benchmark for the future interactions; communications and need for better understanding of the micro, macro and global environment. Hands-on science involving regular interphase with the research study at the field, not any moreaccessible and are forced to make do within the limitation exposed by the situation. My experience with the research has come as a godsend opportunity to reinvent my work culture, dabble with the data more thoroughly, look to global knowledge and focus on the new analysis, information and knowledge. Working on the variation in morphological and molecular aspects of Charophytes from India, extensive collection from different regions with a minimum of two field trips each year (pre and post – monsoon) at every collection spot visited was necessary. However this year, restrictions imposed to control the spread of the pandemic stalled my planned pre-monsoon field trip as the state borders were closed. Cultures maintained in the lab, ongoing experimental procedures were brought to a halt. The efforts taken to collect, maintain, study these samples and loss incurred during the pandemic create a nightmare; also the questions – "Will I be able to find samples? When the shutters are expected to rise? Will this time be compensated?" The institution hosting my lab is at present used as institutional quarantine center. There are no clear updates as yet on the re-opening of the universities or other educational institutions, as the rise of cases is still reported in parts of the country, while some states have battled to control the spread. Rising to the situation and realizing the opportunities lying within it is necessary at every phase of life. In spite of the stressful life presented to us by this pandemic, a lot of new opportunities which we would have never thought of venturing into or have long panned and pushed it to the back of the mind have taken shape. One such plan of mine was to explore the basics of bioinformatics. The study on Chrophytes included molecular work involving partial sequencing of chloroplast genes was performed for rbcL and matK regions, where matK did not reveal difference between populations. Confused on how to interpret the various dimensions of my study, COVID-19 gave an opportunity to sit back and analyze things. Being very new to the molecular world, it was very difficult in understanding the various terms and techniques (both in lab and analysis). Attending various courses and webinars to understand concepts and share our views, get our queries answered was a great experience. These new courses also helped me get in contact with some people from different university across the globe, who helped me with my queries. Sequencing, generating aligned sequences and constructing phylogenetic tree may be considered basic by many, still there many who struggle with these. And, dedicating a considerable time to understand and apply these to one's own study needs a lot of time and patience. This lockdown gave enough time for these making me more knowledgeable. Thus in short, the pandemic has made me explore many opportunities, analyze my failures in various experiments and reconstruct these experiments after a long thoughtful process, and, consideration of the new-normal state that is to be expected. Though direct discussion with the principal investigator (which my PI prefers) was impossible during these tough times, the digital world compensated very much for this. The period definitely was made constructive by preparing papers, analyzing the available data and inferring new outputs, learning new courses, redesigning experiments, extending networks, etc.

Photo credits: Canva.com

LOCKDOWN STORIES

by Joe Zuccarello

Nationwide COVID-19 restrictions came down fast and hard in New Zealand (for the first time) in March. This meant campus was closed, we had to stay home, except to buy food or to see a doctor, and we could only walk around the neighborhood, unless you were an essential worker, which teachers are not. It was actually very nice. Luckily for me (I am very lucky) I had no university teaching, so while my colleagues scrambled to get some semblance of a course online, I could focus on my research. For me, that means writing or collaborating in writing research papers. I felt that I finally had time, and an excuse, to just sit and think a bit about both my research and things I wanted to say. It is odd that a worldwide pandemic, with all its horrible consequences, is needed to just think a bit more carefully about what you what to do with your life, and with your research! Well ,I did not do that fully (thank god), but it did give me the time, uninterrupted time, to write papers, that I think express a bit more my ideas on aspects of phycology and think of the point of it all.

Joes favourite algae collecting spot in Wellington: Moa Point.
Photo Credits: Joe Zuccarello

Two things. One is "***What is the point of taxonomy?***" As a taxonomist, I should not have to ask this question. But it's not just the point of taxonomy that is a question (there are lots of reasons to understand taxonomy, especially if you are interested in the patterns and processes of evolution), but I am more concerned with what non-taxonomist think taxonomy is – given names and ranks to organisms. A rank is "*we have 5 species that are all in the same genus*" or "*....in 5 genera*", or 3? Rank is the problem/issue, and at what point does it not help to keep adding genera, families, classes...

And really what is the point of choosing between, or arguing forcefully, for any of these options! It's been said that GENERA, should be recognizable. Even I can identify Caulerpa, Ulva, Bryopsis, Padina... Is it useful to divide Caulerpa into 5 genera? Or Gracilaria? It's happening, and it annoys me. I tried to incorporate my frustration into a paper I wrote and submitted! BAD IDEA. Got nothing but grief. Scientific papers need to be factual and pretty dry to pass without a problem. I will continue with my small debate.My second thing is that COVID restrictions made me think too much. "*An unexamined life is not worth living*" someone famous said that (supposedly Socrates). I think the worldwide pandemic should allow us all to examine what we are doing and why. I'm looking forward to a change of attitude in myself, and hopefully in the world around me. While I wait for that (either optimistic or not an any particular day), I will try and do research that is more relevant, at least to me and hopefully to the world (a bit).

Once we went from level 4 restrictions to level 3, I decided to travel (2km) to my favorite collecting spot in Wellington, by the airport, and look at algae again.

I hope restrictions, with all their negative consequences, has also had a positive side to them for you, at least a chance to catch up with your research (writing does take time! Don't be too controversial for quick publication!) and maybe think about how you can contribute to the people around you, including our friendly phycological society.

Joe Z (in partial restrictions now).

Bostrychia arbuscula
Photo Credits: Joe Zuccarello

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2020/1

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D'Archino, R., Ngauma, B., Norman, J. H., & **Zuccarello, G. C.** (2020). A new species of Polycoelia (Kallymeniaceae, Rhodophyta), P. kurariirapa, from the Three Kings

de los Santos , B., Olivé, I., Moreira, M., Silva, A., Freitas, C., Araújo-Luna, R., ... & Cunha, M. E. (2020). Seagrass meadows improve inflowing water quality in aquaculture ponds. Aquaculture, 735502.

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2020/2

Diaz Martinez, S., Boedeker, C., & **Zuccarello, G. C.** (2020). Microsatellite design for species delimitation and insights into ploidy for the Lake Baikal Cladophoraceae

Garbary, D. J., D'Archino, R., Flack, B., **Hepburn, C. D., Nelson, W. A., Pritchard, D., & Sutherland, J. E.** (2020). First record of Bonnemaisonia hamifera

Hallegraeff, G., **Eriksen, R.**, Davies, C., Slotwinski, A., McEnnulty, F., Coman, F., ... & Richardson, A. (2020). The marine planktonic dinoflagellate Tripos: 60 years of

Kinoshita-Terauchi, N., **Bellgrove, A.**, Shiba, K. and Inaba, K. 2020. Flagellar motility during sperm chemotaxis and phototaxis in fucalean algae. Eur. J. Phycol.: 1-9.

Miller, A. D., Coleman, M. A., Clark, J. Cook R., Naga Z., Doblin M.A., Hoffmann A.A., Sherman C.D.H., **Bellgrove A**. 2020. Local thermal adaptation and limited gene

Nguyen, H. T., **Pritchard, D. W.**, & **Hepburn, C. D.** (2020). Nitrogen and phosphorus ecophysiology of coralline algae. Journal of Applied Phycology, 1-15.

Paine, E., Schmid, M., Revill, A. & **Hurd, C.** (2020). Light regulates inorganic nitrogen uptake and storage, but not nitrate assimilation, by the red macroalga

Preuss, M., & **Zuccarello, G. C.** (2020). A comment on Salomaki and Lane 2019 "Molecular phylogenetics supports a clade of red algal parasites retaining native

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2020/3

Preuss, M., Muangmai, N., **Nelson, W. A**., Guillemin, M. L., West, J. A., & **Zuccarello, G. C.** (2020). Agarophyton transtasmanicum sp. nov. from Australia and New

Preuss, M., Verbruggen, H., & **Zuccarello, G. C.** (2020). The organelle genomes in the photosynthetic red algal parasite Pterocladiophila hemisphaerica

Rhodes, L. L., Smith, K. F., Murray, J. S., Nishimura, T., & Finch, S. C. (2020). Ciguatera fish poisoning: the risk from an Aotearoa/New Zealand perspective. Toxins,

Rigual Hernández, A. S., Trull, T. W., Nodder, S. D., Flores Villarejo, J. A., Bostock, H., Abrantes, F., ... & Fuertes Prieto, M. Á. (2020). Coccolithophore biodiversity

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Schmid, M., Fernández, P. A., Gaitán-Espitia, J. D., Virtue, P., Leal, P. P., Revill, A. T., ... & **Hurd, C. L.** (2020). Stress due to low nitrate availability reduces the

Sordo, L., Santos, R. O. P., Barrote, I., Freitas, C., & Silva, J. (2020). Seasonal photosynthesis, respiration and calcification of a temperate maërl bed in Southern

Twigg, I. M., Baltar, F., Hall, J. R., & **Hepburn, C. D**. (2020). Revealing hydrogen peroxide as an external stressor in macrophyte-dominated coastal ecosystems.

Adriana Vergés

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I still remember vividly the day I chose seaweeds as a focus for my Honours project. I was lucky enough to join Professor Michael Guiry's lab at the Ryan Institute, in the National University of Ireland Galway. Mike Guiry is best known for being a true master in seaweed taxonomy, and he is also the founder of AlgaeBase and a great promoter of the sustainable use of seaweeds. In the days when I joined his lab, his team was starting to use genetics approaches, and I got to work with his then PhD student Stefan Kraan to identify fast growing strains of the edible kelp Alaria esculenta.

Mike Guiry had a vibrant lab and was obviously immensely successful in brain-washing me, as I've been a little bit obsessed with seaweeds, and marine 'plants' more generally, ever since those days!

A good few years later I did my PhD with seagrass experts Teresa Alcoverro and Javier Romero, at the University of Barcelona. My thesis focused on the strategies of defence used by marine macrophytes (seagrasses and seaweeds), and during those student days I was fortunate to do my first research visit to Australia. I worked with Nick Paul and Peter Steinberg at UNSW on one of my thesis chapters, investigating the chemical defences of *Asparagopsis armata*. I also did a short study visit to Edith Cowan University, to work with Mat Vanderklift and Paul Lavery on the west coast of Australia, which is a bit of a Mecca for seagrass ecologists. That coastline, with its spectacular sunsets, remains one of my favourite parts of the world, especially for diving.

Fast forward a few decades (through a not-very-linear career path) and I'm now an academic myself, based at UNSW and the Sydney Institute of Marine Science. I lead a research group with truly fantastic researchers including a post-doc, two research assistants, eight PhD students and two Honours students. It's a large group, but all my students are jointly supervised by brilliant hands-on colleagues, so the workload is (just about) manageable. Our collective work focuses on two broad themes: understanding the impacts of climate change on marine ecosystems and developing conservation solutions to protect seaweed forests and seagrass meadows, especially through restoration. On the climate change side of things, our work has shown that the range expansion of tropical herbivorous fishes can lead to overgrazing of *Ecklonia radiata* kelp forests. We are currently investigating the consequences of this so-called 'tropicalisation' on the ecosystem functions and benefits provided by shallow reefs. It's exciting but alarming research, as changes are happening incredibly fast. Some of this work was recently featured in an ABC three part documentary series called Australia's Ocean Odyssey: a journey down the East Australian current (still available on iView).

The kelp *Ecklonia radiata* disappeared from many midshelf reefs in the Solitary Islands, with losses being partly linked to increases in fish herbivory, but kelp still coexists with corals in inshore sites. Photo credit: *Adriana Vergés*

Some of the Operation Crayweed team launching a new restoration site in Manly. Left to right: Damon Bolton, Peter Steinberg, Adriana Vergés, Ziggy Marzinelli, Derrick Cruz, Madelaine Langley. Photo Credit: *Leah Woods*

On the restoration side of things, I am one of the co-founders of **Operation Crayweed**, a project focused on restoring lost populations of Phyllospora comosa, a.k.a. 'crayweed'. This project is a collaboration with some brilliant phycologists and ecologists including Ziggy Marzinelli, Alexandra Campbell, Melinda Coleman and Peter Steinberg. Because this is a rare 'good-news' project, where we are focusing on developing solutions and effectively reversing the loss of an important seaweed species, we find that it provides a great conduit to raise awareness about seaweed forests more generally. We have a long-standing collaboration with award-winning artists Jennifer Turpin and Michaelie Crawford, who are helping is us spread the word about the importance and beauty of seaweeds and provide a more emotive platform to make our underwater work visible and accessible to all via their participatory artworks. Jenny and Michaelie recently worked with students from North Balgowlah Public School to make an amazing short animated film that tells the story of the crayweed project. We are now planning a Seaweed Festival at the Manly Art Gallery, scheduled for April 2021. There will be an opportunity for seaweed craft/ art to be sold on site, so if anyone has any contacts/ suggestions for seaweed-related items to sell please let me know!

Finally, I also run **Operation Posidonia**, a project to restore Posidonia australis, a seagrass that is endangered in six estuaries along the New South Wales coastline in eastern Australia. This is a collaboration with top seagrass ecologists including Tim Glasby and his team at NSW Department of Primary Industries, and with Liz Sinclair and others at the University of Western Australia. We have developed a method to obtain seagrass donor material for restoration without damaging existing meadows by asking citizen scientists to 'rescue' shoots that become naturally detached after storms.Beach walkers collect these shoots when they are still green and we have set up collection stations where they can be kept underwater and kept in tanks until we have enough to get underwater and restore a plot. So far we are getting great input from the community, with over 1500 shoots collected, and the survival of the transplants is looking very encouraging.

I feel immensely lucky to be able to do all this research with such a collaborative community of marine scientists. Although our seaweeds and seagrasses continue to be threatened by multiple human impacts, we are also developing effective science-based solutions to reverse this damage and to protect intact populations. I am a bit biased, but I think there's never been a more important time to be a phycologist or aquatic botanist!

Recently graduated Dr Georgina Wood happily posing next to a restored crayweed forest in Freshwater.
Photo Credit: *John Turnbull*

Zali Steggal launching the art-meets-science collaboration led by Jennifer Turpin and Michaelie Crawford with the kids from North Balgowlah Public School, who created an animated film about the story of Operation Crayweed. Photo Credit: *Ariana Vergés*

Adriana Vergés planting *Posidonia australis* in boat mooring scars in Port Stephens.
Photo Credit: *Harriet Spark*

Seaweeds, can't get enough!! First harvest for Seaweed Solutions CRC-P in Tassie

Written by
Dr. Cecilia Biancacci
Seaweed Solutions CRC-P
postdoc fellow
Deakin University
Warrnambool Campus

Photo credit: Cecilia Biancacci

Lines of M. pyrifera farmed in Okehempton
Image credits: CRC-P Seaweed solutions

Cooperative Research Centres (CRC) Grants provide funding for medium to long-term, industry-led research collaborations. CRC projects are specifically targeted to help improve the competitiveness, productivity and sustainability of Australian industries. This project (Seaweed Solutions for Sustainable Aquaculture CRC-P,) is a collaboration between industry partners the Tassal Group Ltd, Spring Bay Seafoods and researchers from the Institute for Marine and Antarctic Studies (University of Tasmania) and the Seaweed team at Deakin University to develop a sustainable Integrated Multi-Trophic Aquaculture (IMTA) model and support commercial seaweed production in Australia.

Our objective is to define a viable seaweed culture model (identifying species, growing techniques, and products) and based on this develop an IMTA partnership model that brings together salmon, shellfish, and seaweed production to optimise regional economic, environmental, and societal benefits.

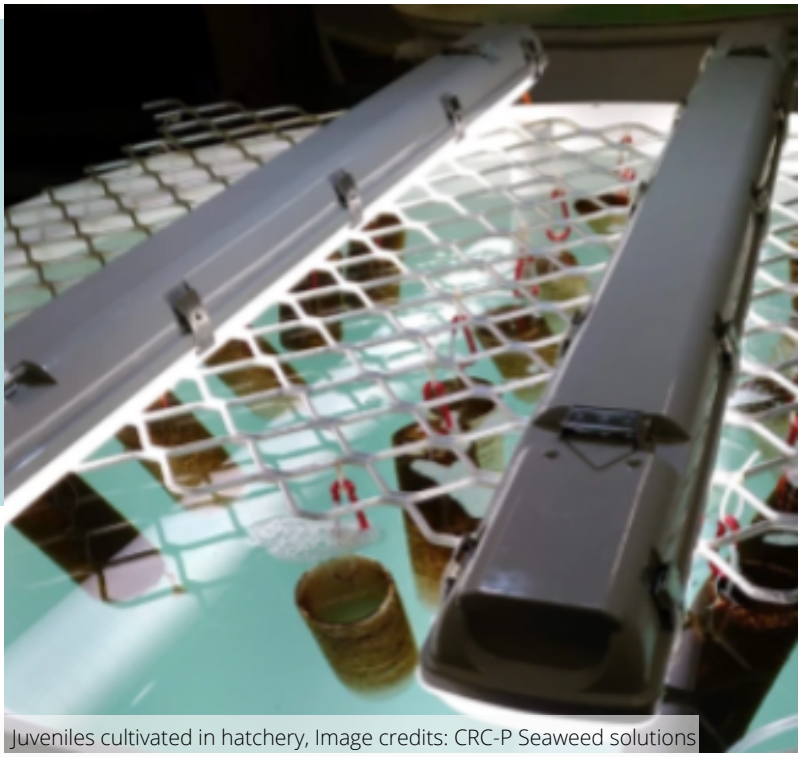
There are three industry-based problems associated with this key project aim, and these will be tackled in 3 collaborative work packages (WPs):

WP1: Unlocking Seaweed Potential: This work package will validate the seaweeds selected for IMTA (*Macrocystis pyrifera, Ecklonia radiata,* and *Lessonia corrugata*) and establish appropriate seasonal growth strategies, identify their capacity to remove nutrients and clarify their commercial utility).

WP2: Developing Farming Technology: it will determine practical techniques for growing these seaweeds in a scalable IMTA context.

WP3: IMTA Sustainable Partnership Model: it will define the management frameworks that support IMTA culture as a partnership between finfish, shellfish, and seaweed growers.

Together these three WPS will provide the understanding needed to ensure that IMTA is successful biologically (for the farmed species), economically (as a business venture), environmentally (increased sustainability) and societally (builds trust and social capital), and that governance/ management structures can be optimized for IMTA in different regions.



Juveniles cultivated in hatchery, Image credits: CRC-P Seaweed solutions

There have been lots of media recently highlighting the amazing potential for Seaweed aquaculture. Lloyd's register foundation has identified seaweeds as a major new source of protein and key to global food security (**more info**) while the Seaweed manifesto outlined how seaweed can contribute to delivering on the sustainable development goals (**more info**) and defines a vision for the industry globally.

In Australia the Seaweed Industry Blueprint released earlier this week shows the potential very clearly with an R&D Plan to grow a $100M plus industry by 2025, creating thousands of jobs in regional towns and providing an opportunity to reduce Australia's national greenhouse gas emissions significantly. The amazing potential of the Australian industry was one step closer the 8th of September, when the Seaweed Solutions CRC-P brought in its first harvest. Whilst relatively modest in scale, this harvest is both exciting and significant - it shows that we can take Australian seaweed aquaculture from a concept into a real commercial operation.

The whole team would like to thank everyone involved from Tassal Pty Ltd, Spring Bay Seafoods, University of Tasmania and Deakin University – a great team effort. Read more about our project on our website **www.seaweedsolutions-crc.com** and follow us on

Indigenous Uses of Seaweed in Australasia

Zoe Brittain
David J Jones, Liz Cameron, Ruth Thurstan, Prue Francis and Alecia Bellgrove
zebritta@deakin.edu.au

Seaweed production has grown exponentially over the past decade, as is an increasing acknowledgement of the role seaweed has played in the lives of Indigenous communities around the world. Such communities have rich, traditional knowledge around utilizing their local seaweed resources. This traditional knowledge is especially pertinent in Australia, where a commercial seaweed industry is still developing, and where additional collaboration has great potential to guide that development in a sustainable manner. We explore the current breadth of research in Australia regarding Traditional Knowledge and seaweeds, highlight what we have uncovered so far and present an outline of where and how this research looks to expand in the future.

Learning from Communities: Indigenous Uses of Seaweeds in Australasia

Last year, I was lucky enough to present the results of my 2018 Honours Research at the 2019 ASPAB conference in Wellington, joined by one of my collaborators and Aboriginal Elder Aunty Judy Dalton-Walsh. It was a truly irreplaceable experience for both myself the Wadawurrung women who joined us - who never thought seaweed would be the reason they book their first overseas flight! From my time spent with Aunty Judy, and for those of you fortunate enough to hear her talk, it became quite clear that despite all the work we had already completed, we had only just begun to scratch the surface of Aboriginal knowledges of seaweed. So, in April of this year, I was accepted to continue this research as a PhD student at Deakin University. Over the next three years I will be further exploring Aboriginal oral histories as they relate to traditional and contemporary use of Australian seaweed species.

Photo Credit: Zoe Brittain

We will also be exploring the analysis of a range of physical artefacts to widen the picture on historical uses. To support this work, in June, I was awarded an 'Applied Park Management Research Scholarship' from Parks Victoria. As many of you know, Australia has a unique and diverse array of marine flora, but many species are often under-researched, especially in terms of their ecological role. Due to this, current marine park management strategies sometimes lack in-depth or specific data for the seaweeds under their care.

Photo Credit: Zoe Brittain

Whilst Western scientific investigation of Australia's seaweed flora is but only a few hundred years old, Aboriginal knowledge in Australia is born from the longest continuous cultural history in the world (dating back 65,000 years!).

By supporting the revitalisation and strengthening Aboriginal connections to Sea Country, we aim to create pathways for the inclusion of such valuable perspectives in marine and coastal park management. Recognising the ongoing cultural importance of seaweeds to Aboriginal Australians, and the knowledge they hold, has the potential to enhance our ability to protect and manage Australia's magnificent range of marine algae.

The scholarship funding allows us to engage with further Aboriginal collaborators, supporting the creation of localised knowledge bases and place-based ecological histories.

Photo Credit: Ellie Paine

The environmental regulation of dissolved organic carbon exudation by seaweeds under current and future ocean conditions

Ellie Paine

ellie.paine@utas.edu.au.

Prof. Catriona Hurd, Prof. Philip Boyd and Dr Matthias Schmid

Institute for Marine and Antarctic Studies

My interest in seaweed began in the 2nd year of my undergraduate degree at the Institute for Marine and Antarctic Studies (IMAS), Hobart, Tasmania, when Prof. Catriona Hurd was giving a lecture on shoreline zonation of seaweeds and their physiological adaptations. I already knew that I did not want to study zoology - the idea of having to work on dead marine life was too depressing! So, instead I decided that I wanted to conduct research on seaweeds and approached Catriona with my fingers crossed that she would have a project for me. Lucky for me, she did, and my first research project looked at the inorganic nitrogen uptake (nitrate and ammonium) by a species of red macroalga, *Hemineura frondosa*, known to not utilise a carbon concentrating mechanism (non-CCM).

After I completed this project in 2016, Catriona offered me an honours project and we morphed the undergraduate project into a full eco-physiological experiment looking at the influence of light on nitrogen uptake and utilisation by *Hemineura frondosa*. Nearly three years later this research was finally published in August 2020 entitled, '**Light regulates inorganic nitrogen uptake and storage, but not nitrate assimilation, by the red macroalga *Hemineura frondosa* (Rhodophyta)**'.

Hemineura frondosa (Rhodophyta). Photo Credit: Olivia Johnson

After competition of my honours year, I worked at IMAS developing a kelp gametophyte culturing protocol for an FRDC (Fisheries Research and Development Corporation) funded project in collaboration with Tasmanian finfish aquaculture company **Tassal**, trialling integrated multi-trophic aquaculture (IMTA) systems around their salmon farms. As part of this work, we conducted an experiment looking at optimal light and temperature conditions for *Lessonia corrugata*, an endemic Tasmanian kelp using a temperature gradient table. This research manuscript is currently in review with the Journal of Applied Phycology.

Following these research projects, I started my PhD in December 2018, researching the environmental regulation of dissolved organic carbon (DOC) exudation by seaweeds under current and future ocean conditions. We have numerous experiments underway, including one on ocean acidification in our unique automated, pH-controlled culture system. Although I can't share any juicy snippets here, I am looking forward to sharing my results at the upcoming ASPAB conference.
Looking forward to seeing you all (virtually, thanks COVID).
If you have any questions or comments, regarding my research I'd love to hear from you !

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PhDs in seaweed aquaculture
DeakinSeaweed
Research group,
Warnambool, AU
Applications close on the 31st of September 2020
please contact:
alecia.bellgrove@deakin.edu.au

2 PHD POSITIONS
Restorative Aquaculture
University of the Sunshine Coast, Australia
Work towards evaluating the potential of restorative aquaculture to reverse human impacts on coastal marine environments, through the co-culture of seaweed and shellfish within the Moreton Bay marine park.

Applications close 30th September 2020
More information **here**

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Further information can be found on

www.aspab.org

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13-18 FEBRUARY 2022
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www.iss2022.net

Planning for the Symposium is proceeding for February 2022 as scheduled. In light of the COVID-19 pandemic we anticipate the conference will be of a hybrid nature. We will plan to have some face-to-face sessions where possible, but we will be incorporating online attendance as well.

The organising committee feels the opportunity to have part of the Symposium hosted online presents an opportunity for us to reach a broader audience than the traditional Symposium and will also give us the opportunity to include different presentation formats. As such, we see 2022 as being a new and positive direction for the Symposium.

ISS2020 Organisation Team

algaeworkshops.org

SCIENCE MEETS PARLIAMENT 2021

Image credit: Mlenny - Getty images/istock photo

Science meets Parliament 2021 is tentatively scheduled for 15-17 March, to be confirmed upon the release of the 2021 Parliamentary Sitting Calendar in November.

ASPAB has the opportunity to nominate Australian based delegates to participate. If you're interested please send your expression of interest to Dr. Alecia Bellgrove.
email: alecia.bellgrove@deakin.edu.au

Meet the ASPAB Board

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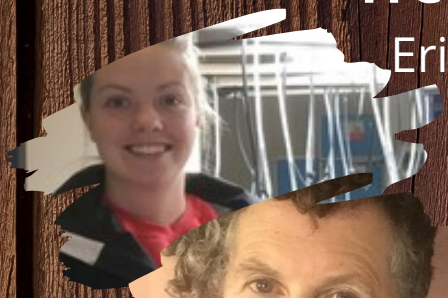

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