The Phycologist

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Student Reports | Antibiotic Resistome | Book reviews

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2018
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Secretary[1]

Estuary Cottages
Bentlass, Hundleton
Pembroke
Pembrokeshire
Wales, SA71 5RN

secretary@brphycsoc.org
Tel: +44 (0)1947605501

Treasurer[2]

Dr Maeve Edwards
Carna Research Station
Ryan Institute
National University of Ireland, Galway
Muigh Inis
Co. Galway, Ireland

treasurer@brphycsoc.org
Tel: +353 (0)9532201

Membership Secretary[3]

Dr Hilary Redden
University of Durham
Department of Chemistry/
Earth Sciences
South Road, Durham
DH1 3LE

membership@brphycsoc.org

Editor of The Phycologist[4]

Dr Jan Krokowski
Scottish Environment Protection Agency
(SEPA),
Angus Smith Building
Ecology
6 Parklands Avenue, Eurocentral
Holytown, North Lanarkshire
ML1 4WQ

jan.krokowski@sepa.org.uk
Tel: +44 (0)1698839000

Webmaster[5]

Dr Andrew Davies
School of Ocean Sciences
Bangor University
Menai Bridge
Anglesey LL59 5AB
UK

webmaster@brphycsoc.org
Tel: +44 (0)1248382842

Student Representative[6]

Amie Parris
University of Essex
Wivehoe Park
Colchester
CO4 3SQ

student.rep@brphycsoc.org
Tel: +44 (0)7914 029545

Editorial

Please note that the 67th annual meeting of the British Phycological Society will be held at the Scottish Association for Marine Sciences, Oban, Scotland from Jan 7th to Jan 10th, 2019.

The call for abstracts and registration will have been opened by now (open mid-September), with a deadline for abstract submission on November 16th 2018. The meeting will feature its traditional "general phycology" session, and plenary student session with prizes for best talk and best poster, named after Irene Manton. We will also host three exciting symposia on 1) interactions with microbiomes and grazers, 2) algal physiology in the lime light, and 3) blue carbon.

We have been working hard to make the conference affordable, with an unbeatable registration fee of £115 for BPS members, covering all social events and conference dinner. Accommodation deals and travel advice will also be announced when the registration opens.

All necessary information can be accessed from: https://bps2019.brphycsoc.org/. Enquiries can be sent to: bps2019@sams.ac.u k

We are looking forward to welcoming you in Scotland.

Remember - do keep sending in your contributions. Write to us with your phycological views, news, work events, or any matter you wish to share with readers of The Phycologist. *YOUR input is required; all relevant material will be considered (job adverts, science reports, book reviews, news items of topical interest, meeting announcements, research news, and suggestions for future articles are always welcome). Without YOU the newsletter would not exist.*

As a reminder, previous issues of *The Phycologist* can be downloaded at https://brphycsoc.org/phycologist.lasso.

Opportunities for membership of BPS Council

The British Phycological Society Council has vacant positions for two ordinary Council members from January 2019 for a period of 3 years. This is a good opportunity to get involved in the life of our society, and gain experience in how a "learned society" works. The duties are not onerous, as Ordinary Members you would be asked to be involved in one of the societies sub-committees, attend the two full Council meetings a year (one in the summer, one at the Annual meeting), and partake in discussions and decision-making by electronic means. Reasonable travel and other expenses are met by the Society.

We would welcome applications from any of our members. Council is particularly keen to encourage early career researchers or people working in algal-related industries to consider this opportunity.

If you are interested in serving and would wish to know more, please feel free to contact the President, Prof. Graham Underwood, gjcu@essex.ac.uk, who will be happy to have a conversation.

The formal process is to put yourself forward with your nomination, and contact the BPS Secretary (secretary@brphycsoc.org) with your name and the name of a seconder (who needs to be a BPS member too). You will need to send in your nomination to be received by midnight on November 7th 2018 (two months before the next Annual General Meeting). If we receive more than two valid nominations, there will be a ballot of members, and the Secretary will circulate details to all members of the BPS one month before the AGM. All completed ballot papers shall be returned to the Secretary before the AGM, and the results declared during the meeting, which will be held in Oban, Scotland during on Tuesday January 8th, 2019.

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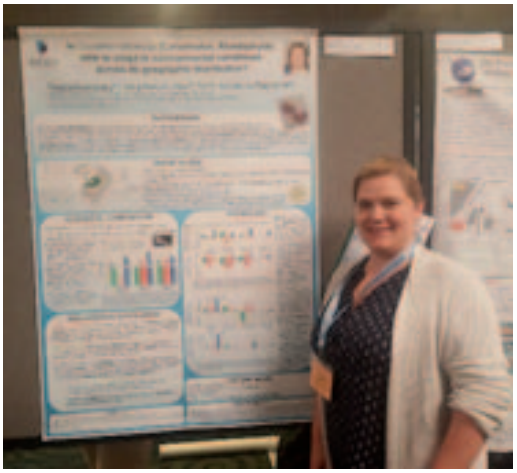


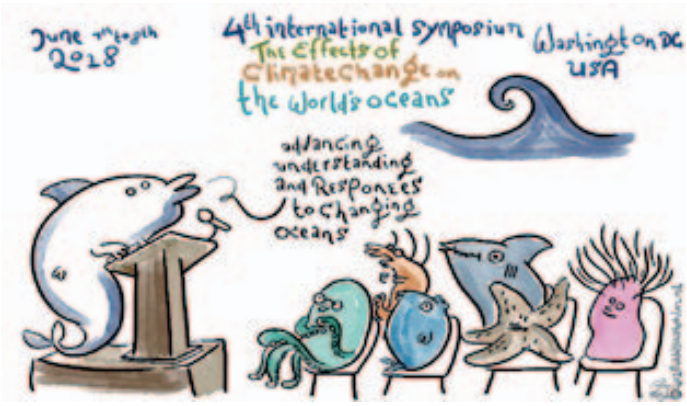
Regina Kolzenburg, University of Portsmouth, School of Biological Sciences, Institute of Marine Sciences, Portsmouth, UK,

regina.kolzenburg@port.ac.uk

Washington D.C. was the chosen location for the 4th International Symposium on the Effects of Climate Change on World's Oceans from the 4th – 8th June 2018, organised by a lovely and helpful committee of, just to name the primary sponsors, ICES (International Council for the Exploration of the Sea), PICES (North Pacific Marine Science Organization), IOC (Intergovernmental Oceanographic Commission of UNESCO) and the FAO (Food and Agriculture Organization of the United Nations). Over the course of a week, 677 delegates shared, highlighted and discussed the latest research and information in 18 sessions and 11 pre-conference workshops.

The symposium was opened by presentations of the symposium convenors as well as a really interesting and inspiring talk by Jacques Cousteau's grandson, Philippe Cousteau about the importance of the ocean, outreach and how "to connect people to people". This was followed by a beautiful musical performance of the Anacostia String Quartet mirroring the oceans confluence. The day went on with concurrent sessions about the impacts of climate change on the deep ocean, high latitude systems and models to explore the future of marine coupled human-natural systems. The multiple daily coffee breaks were a perfect opportunity to network and socialise with not only peers but also colleagues from all over the world. Additional networking was possible at the 3 evening receptions. The following days the participants were able to join a high variety of sessions about ocean extremes, carbon uptake and ocean acidification, multiple stressors at multiple scales: ecosystem based management, deoxygenation in relation to climate change, management and conservation of species on the move, fisheries and aquaculture, seasonal and decadal forecasts, upwelling systems, benthic and pelagic responses or ocean ecosystem health. As an external highlight for all North American participants, the Stanley cup final took place on Wednesday evening in which the "Caps" of Washington won so you could see people wearing red jerseys in the halls of the venue for the rest of the symposium.

Each day, workshops and sessions were accompanied by Bas Köhler, an artist from the Netherlands. He drew informative and funny cartoons during sessions according to the topic of the presentations (more here: https://www.flickr.com/photos/pices/sets/72157669719136128).



On the 4th day of the conference in the evening, the poster session was held combined with a reception. More than 160 posters were presented and lively and constructive conversations and discussion arose from this. I presented my poster in session 11: Benthic and pelagic system responses in a changing ocean: From genes to ecosystem level functioning and really enjoyed the conversations and new ideas that came up with colleagues from all over the world. All presenters got the chance to inform and explain their research further, the combination of topics was very diverse and there was a high quality of posters and presentations.

The last day of the symposium attendees could choose between 4 sessions again and could exchange final thoughts during a last joined lunch and coffee before making their way home. A lunch "Town Hall event" was also held in which all participants were able to listen and contribute to first discussions for and about the sixth Assessment cycle of the Intergovernmental Panel on Climate Change (IPCC) and their report.

The overall atmosphere of the symposium was welcoming, familial and convivial with plenty of opportunities to network and casual conversations. I would like to thank the BPS for their financial support that made it possible for me to go to the symposium where I was able to discuss my research with international experts, made new contacts and was even able to form new collaborations for future experiments. Overall, it has been a great symposium and experience.

The Society for Experimental Biology (SEB) annual meeting, Florence-Italy, 3-6 July 2018

Fatemeh Ghaderiardakani, School of Biosciences, University of Birmingham

Email: fxg433@student.bham.ac.uk

I am currently a fourth-year PhD student in the University of Birmingham under the supervision of Dr. Juliet Coates. With great support of the BPS, I was fortunate enough to attend the annual meeting of Society for Experimental Biology (SEB) at the Firenze Fiera Congress and Exhibition Centre in Florence, Italy. The event started on Tuesday 3th July with nine parallel scientific sessions covering a large variety of research projects about animal, plant and cell biology.

The session that I have been interested in was "Morphogenesis in non-flowering plants". It was organised by Dr. John Bothwell and my supervisor Dr. Juliet Coates. Great speakers from different areas such as non-flowering plants, algae, bryophytes (moss), ferns, marchantia, gymnosperms, lifecycles, morphogenesis, evolution, development had been invited to this session to present their research. One of the most insightful talks was the first presentation in this session on 4th July by Dr. Dianne Edwards (Cardiff University, UK) on "Morphogenesis in early land plants: the beginnings". However, the most relevant talk to my research in this session, which I had this privilege to be in chair of it, has been presented by Dr. Thomas Wichard (Friedrich Schiller University Jena, Germany) entitled "Bacteria-induced morphogenesis in macroalgae: The sea lettuce *Ulva* only gets into shape with the right bacteria".

The poster that I submitted in conference was entitled "The cross-kingdom interaction: Bacteria-induced morphogenesis in the marine green macroalgae". Giving this presentation allowed me to have discussions with a number of researchers in this field and to get valuable feedback and comments from other attendees. In addition, I established a number of new contacts potentially leading to collaboration in the future.

Attending this great meeting gave me this opportunity to share my research, be inspired by fellow scientists and forge new collaborations and friendships. Therefore I sincerely thank the British Phycological Society for their financial support and would like to thank everyone involved for making this meeting such a unique experience.

Young Algaeneers Symposium 2018: a conference organised by students for students

Victor Sanchez Tarre

victor.sancheztarre.11@ucl.ac.uk

The 4th edition of the Young Algaeneers Symposium (YAS) was hosted from May 16th to 18th at the Scottish Association for Marine Sciences (SAMS). Masters and Doctoral students as well as early career post- doctoral researchers from all across Europe made the trip to the little university town of Oban. I travelled to present a flash talk on my findings regarding the effects of monochromatic light on *C. reinhardtii* and would not have been able to do so without BPS' help and the student bursary they awarded me with. Upon arrival, we were all welcomed by slightly unexpected clear skies and a radiant sun shining across the bay of Oban. A quick three mile drive took us to SAMS and the great YAS 2018.

YAS lauds itself as a meeting organised by students for students in an effort to encourage free and open discussions. In my opinion, the lack of established principal investigators did not affect the quality of scientific discussion, which was of a very high level across the three days of duration. After registration, we were all led to the William Speirs Bruce Conference Room where all the proceedings would take place. Five excellent talks ranging from *Nannochloropsis* microbiome engineering to developing *Haematococcus* strains resistant to common parasitic infections

kick started the proceedings. They were followed by the icebreaker session. Unsurprisingly the levels of noise in the room were raised by all our introductory spiels. I met so many interesting people that the length of this report would increase exponentially if I tried to give a brief description of them all. Suffice to say the success of the icebreaker was palpable during the improvised dinner back in Oban where many conference attendees spontaneously got together to continue their phycological discussions.

The second day of the meeting started with a talk I had awaited with much anticipation. As an avid user of the Algem photobioreactor system for cultivating microalgae, I was curious to hear about its utility for growing *Osmundea pinnatifida*, a species of red macroalgae. The talk demonstrated the capability of the system to establish cultivation methods for this species. It was the first of many very interesting macroalgae talks given throughout the meeting. Topics included seasonal and geographical variation of biomass constitution and furthering our understanding of macroalgal microbiomes. It is encouraging to see the great work so many young researchers are carrying out in the growing field of macroalgal phycology. The afternoon included the Algal gaps session where three separate groups each had a roundtable discussion on one of three topics: Microbial communities associated to algae cultivation, Algae processing: from cells to products and Algae applications. The main conclusions of each discussion were presented the following day during the closing session. The second day ended with the organised dinner at the Argyllshire Gathering Halls in Oban. The highlight of which was of course the Ceilidh! I had not danced so much since, well, forever.

Just as Nelly Furtado, the following morning I woke up wondering why all good things come to an end? The symposium was personally very encouraging. I feel extremely lucky to be able to call the attendees my peers. The high level of professionalism maintained throughout the meeting was very impressive and the fact that we all seemed to have great fun made it all the better. I would like to end my report by thanking the organising committee for such an inspiring event, BPS for the funding that made my attendance possible and Dr. Brenda Parker for the little nudge that got me to submit my abstract.

Young Algaeneers Symposium 2018, 16-18th of May 2018 in Oban

Veronika Sommer, Universität Rostock

veronika.sommer@uni-rostock.de

A number of young Algaeneers met in spring in the Scottish Association for Marine Science (SAMS). As the institute is situated in a scenery worth its field of study, already the way to the conference could end up in an excursion. You pass a bay that offers all its beauty on low tide: No, it's not grass, its algae! Same story with the sandy beach close by. Nevertheless, everyone made their way to the conference halls without getting too muddy.

Already the first event in the afternoon was an innovative algal speed dating. Every three minutes we had a new partner and should introduce ourselves. Most of the time the participants did not talk about their favorite dish but explained their aims, challenges and future goals in their research or jobs. As a PhD student in a more fundamental research topic, for me it was very interesting to meet people who study or work in the field of algae production or development of algae products.

However, the conference schedule also included classical sessions like key note talks, flash talks and a poster session. I learned about the usage of algae in wastewater treatment, pathogens of seaweeds, innovative bioreactors, ideas to improve human health with algal products and much more. I was involved with a key note talk and was really happy about a lot of questions from the audience and further discussions in the coffee break. In addition, representatives of the sponsors of two YAS awards, European Algal Biomass Association (EABA) and BPS, gave a presentation about their organizations. This gave us an insight to their work and an opportunity to ask questions.

Another interactive idea of the YAS organizers was to hand out tokens to vote for the best presentation in each category. During the coffee breaks this was a good opportunity to talk to your most favorites speakers and make people happy with giving them your vote in person.

Furthermore, a group discussion was organized. Participants should choose one topic and talk about algal gaps. The three groups were Algal Microbiome, Algal Production and Algal Application and should present their ideas afterwards and discuss with all Algaeneers.

After the official agenda topics of the day we met in restaurants or pubs in Oban, the small city close to SAMS where everyone stayed. The harbor was perfect just to enjoy the sunset with some fish and chips or to book a boat trip to the seal colony nearby. Oban distillery turned out to be the place to go. Tickets for guided tours were hard to get but also the bar was well worth a visit with their broad palette of local whiskeys. Just a recommendation: Go in a group of your favorite Algaeneers and share the drinks! You can try more flavors without not finding back to your hotel afterwards.

For the conference dinner, the YAS organizers arranged a very special event: a Scottish ceilidh. We met in a big dining hall starting with a typical Scottish menu. The national dish haggis, sheep's stomach filled with chopped offal, onions and oat meal, was of cause not missing. My favorite part was the sticky chocolate pudding with caramel sauce. Nevertheless, the dessert was not the end of the evening. When suddenly a band begun to play traditional music it was time to move the tables and start to dance! The violinist explained the steps, we tried to follow. Couple dance, group dance, changing partners, clockwise, counterclockwise, in a line… Enough elements to totally

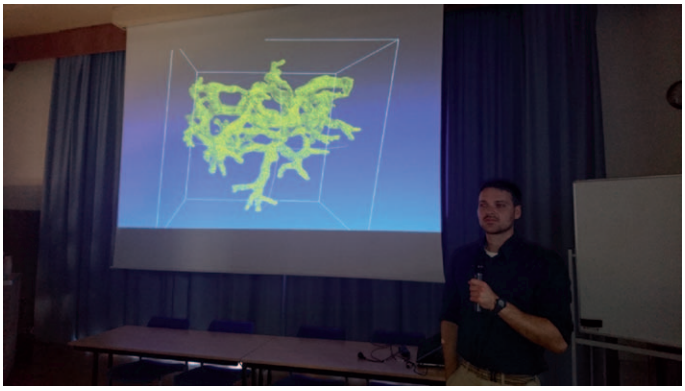
get confused. Luckily, the amount of fun was independent from the amount of correctly performed moves. However, from time to time a break was needed to have a beer or a local whiskey. After this evening, I guess everyone was sleeping as well as I did. In the closing session the two participants awarded with the prizes of BPS and EABA had the opportunity to introduce their affiliated institutions and finally the winners for the best presentations where revealed.

All in all, it was great to be part of this innovative symposium. The fact that most of the participants where early career researchers or just started to work in companies lead to a very relaxed atmosphere without restrain in asking questions or discussions. For me, it was a perfect opportunity to get an insight in different fields of algae application and production, to visit the SAMS in its beautiful surrounding and to meet a lot of people that love algae as much as I do. Thank you BPS for making this possible!

VI International Rhodolith Workshop 2018

Beauregard Marsh, Marine Benthic Ecology, Biogeochemistry and In-situ Technology Research Group, The Lyell Centre for Earth and Marine Science and Technology, Heriot-Watt University, Edinburgh EH14 4AS, UK

bcm2@hw.ac.uk



In June of 2018, I had the pleasure of attending the VI International Rhodolith Workshop 2018 thanks to the generous support of BPS. This workshop was hosted by Sophie Martin and Jacque Grall at the Station Biologique de Roscoff in the picturesque seaside town of Roscoff, France. Every three years since the first meeting in 2000, researchers from around the globe have gathered to discuss the ubiquitous and fascinating group of red coralline algae which form rhodoliths (also known as maerl). Rhodoliths are rigid nodules of calcium carbonate deposited by coralline algae. Much like a coral reef, their complex, 3-dimensional shape allow coralline algae to form large beds which support biodiverse ecosystems throughout the world's seas.

I was pleased to see what an impressive scope of research is being done on this particular group of algae by such an international community of scientists. I suppose it is not surprising given the expanse of rhodolith beds, from the tropics to the poles and down to the deepest mesophotic regions. Topics ranged from taxonomy to ecophysiology to paleoecology and more. This made for really dynamic discussions since participation included people from nearly every field of the earth sciences. For example, I learned about the different techniques being developed in order to use fossil rhodolith beds as biomarkers for past climate reconstructions. Also, there is a lot being done to measure how future ocean acidification projections may affect coralline algae. Due to the high Mg calcite which forms the skeleton of coralline algae, multiple researchers presented how growth rates of the algae can greatly decrease, whilst dissolution will increase. This is of great concern to scientists given their major role in the global carbon cycle. It certainly highlighted the global significance of coralline algae as both primary producers and marine calcifiers.

As a first year PhD student, I was excited to be giving my first oral presentation and be able to contribute to the conference. My research focuses on the photosynthetic mechanisms employed by red coralline algae. Something else interesting about this algae is that is currently the deepest found photosynthesizer in the world; it has recently been found deeper than 330m! I presented the first results of my PhD which utilized 3D scanning technology to analyse how the physical structure of coralline algae, formed by its rigid calcite skeleton, may enhance light availability to its photosynthetic pigments. My presentation was well received, and I was lucky enough to be awarded a presentation award for which I was extremely grateful!

I would like to thank BPS for supporting my participation at this meeting. It provided me valuable insights into potential new directions for my research, and I made new connections with researchers of similar interests. Thanks to BPS and the International Rhodolith Workshop, I now have exciting, international collaborations which will provide a great addition to my PhD. Overall, it was an invaluable experience, and I cannot wait to attend the next meeting in Newfoundland!

20th International Conference of Biopesticides and Human Health

Emma O' Keeffe, Waterford Institute of Technology, Cork Road, Waterford, Ireland
emma.okeeffe@postgrad.wit.ie

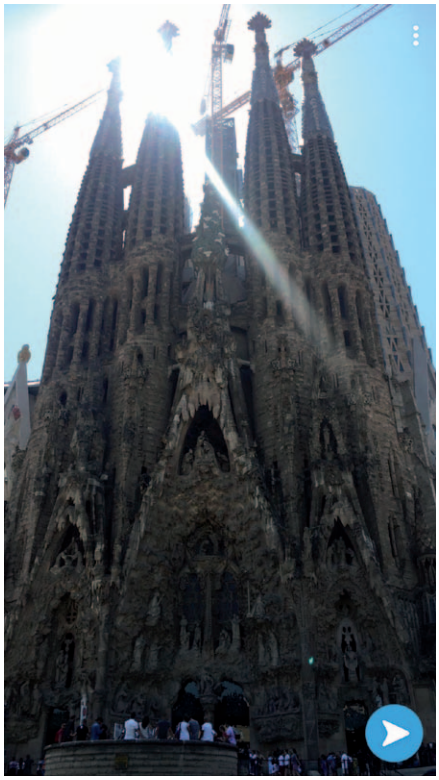
I'm currently a PhD student in Waterford Institute of Technology, Ireland and I was luckily enough to attend the 20th International Conference of Biopesticides and Human Health which took place in the beautiful city of Barcelona, Spain between 20th-21st August 2018. I arrived a day or so before the conference, which gave me the opportunity to get my bearings of this fabulous city and explore the sights it had to offer including the famous Sagrada Familia and the aerial tramway which displays spectacular views of the city skyline.

The conference started early on Monday morning with registration at 8:00 am where I got the opportunity to meet with other attendees who were eager to discuss their views on their current research topics. The conference was officially opened at 8:15 am by the conference organiser who went through the conference schedule. I had been selected as the first speaker of the conference with my talk on: "Investigating the use of seaweed extracts as biopesticides". The skills gained from this experience included communication, organization and time-management skills. After the completion of my presentation, I was asked a number of questions which is an invaluable learning curve for me when presenting my work at other national and international conferences.

However, since this conference was an international research conference it incorporated a wide range of talks and e-poster presentations including such talks on the "effects of ophiocordyceps dipterigena BCC 2073 β-glucan as prebiotic on the in vitro growth of probiotic and pathogenic bacteria". Whilst other talks more applicable to my area included aquatic based bioeconomy for microalgae which is the use of algae as source of food, as well as value added products to both the pharmaceutical and power industries. Both the oral and e-poster presentations were evaluated by the chair person for each session on the basis of presentation of scientific content, ability to explain the project and respond to questions.

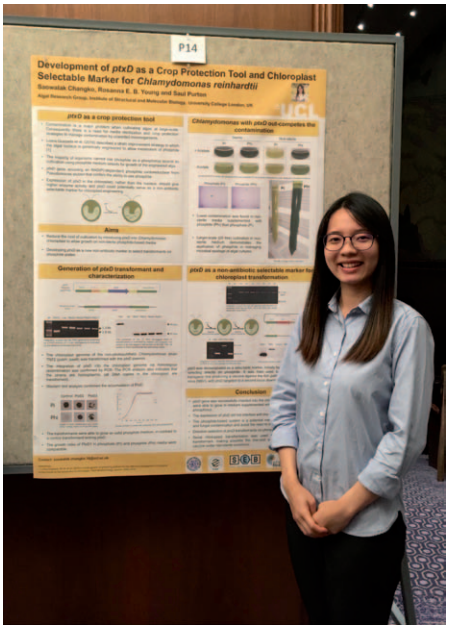
The coffee breaks in between sessions allowed me network with other researchers in my area and pass on some of my knowledge to other researchers in order to aid them in overcoming some challenges they were experiencing in their current project. This also gave me the chance to see all the different types of research currently being carried out such as the influence of infrared radiation on the growth rate of microalgae.

The closing ceremony on Tuesday afternoon consisted of thanking everyone who helped in the organization of such a successful conference followed by more photographs.



However, I could not have participated in the 20th International Conference of Biopesticides and Human Health without this student bursary. It was a great opportunity for me to complete my first oral presentation and to establish new contacts potentially leading to collaborations in the future. Therefore I sincerely thank the BPS for their financial support and truly look forward to my next conference whether it is national or international.

The 18th International Conference on the Cell and Molecular Biology of Chlamydomonas



Saowalak Changko, University College London
saowalak.changko.16@ucl.ac.uk

The 18th International Conference on the Cell and Molecular Biology of *Chlamydomonas* was organized at the historic Carnegie Institution for Science in Washington, DC, USA. The meeting brought several well-known and leaders in *Chlamydomonas* field, for example, Martin Jonikas who has an expertise in photosynthetic eukaryotes by developing and applying cutting-edge technologies. This five-day conference was mainly focused on progress in many areas of molecular biology with the full schedule of talks ranging from Flagella, plastid, cell cycle and developed technology. Most of the talks were very informative and great quality. All the keynotes by experts in the field were inspiring and broaden my view of molecular tools for *Chlamydomonas*, especially the MoClo Toolbox for synthetic biology aspect. This meeting was not only to fulfill my knowledge but also to build up a connection with research teams in the USA.

As a second-year PhD student, it was a great opportunity to present my work to other experts in the field. Even it was a poster presentation, I had a useful discussion with other delegates and gained a number of suggestions to improve my future experiments. Presenting a poster is not the only way I obtain new knowledge, but also allow me to build collaborations and make my lab known to other delegates. The connection skill would be the most useful to me as a PhD student and future career path as an academic group leader.

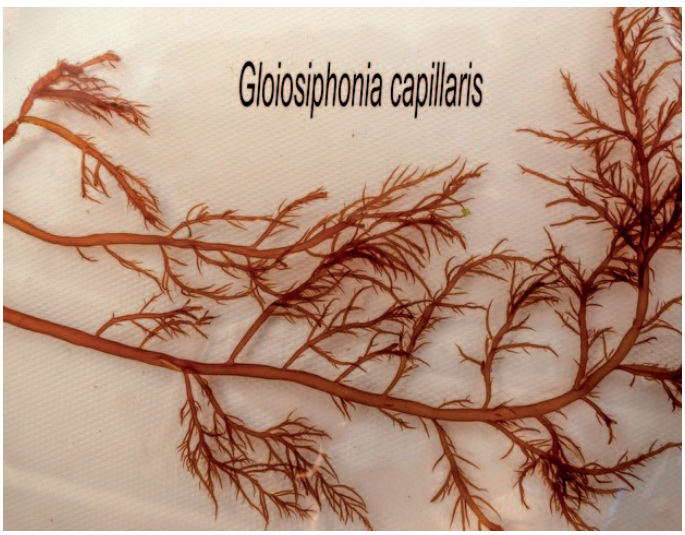
In this conference, the team organized social events as an ice-breaking cocktail where I made new international friends at all stage of their careers. Most of the people have a background in *Chlamydomonas* molecular biology and work in the states. This is a fantastic opportunity to make connections with USA researchers who could answer some of my research questions. Interestingly, I also experienced a lot of collaborations among universities working as a team to achieve excellent studies. During a coffee break, I had a chance to speak to Dr. Severin Sasso who gave a talk on a biotic relationship of microalgae with other microbes. I learned some of bacteria-killing mechanism against *Chlamydomonas* species. In addition to the discussion with speaker, I had a chance to share my work with a PhD from Australia who specialized in *Chlamydomonas* chloroplast the same as me. We, therefore, exchange a lot of experience and idea for our works.

I would like to thank the conference team for organizing this excellent meeting and all the feedback I gained during the poster presentation. I am truly grateful to the British Phycological Society for funding me to attend and present the poster at the fantastic meeting.

Plymouth Collecting and Identifying Seaweeds course, May 1st- 3rd 2018

John Archer-Thomson, co-author Rocky Shores, British Wildlife Collection, Volume 7

Let's say you wished to attend a seaweed identification course, what requirements might you have? The tutors would have to be pretty good at their seaweed identification, so how about the authors of the Seasearch guide to the *Seaweeds of Britain and Ireland*? Between them they also have other rather impressive credentials, but I won't embarrass them further. Check. There would need to be a suitable venue with lab space, microscopes, seawater supply and nearby shores replete with diverse seaweed communities. How about the Marine Biological Association, Plymouth? Check. Really good food, and I mean really good food. Check. How about field trips to identify and collect seaweeds for microscopic inspection and photography? Access to a world class herbarium? Lectures on seaweed classification and other useful topics? etc, etc, I think you get the point.



At the *Collecting and Identifying seaweeds* course I attended in May of this year all these ingredients were present and more. There was plenty to do but at the same time the course was relaxed and allowed for plenty of time to identify specimens collected on our field trips. ID sessions were broken up with informative talks about a variety of seaweed related topics, including the ever-useful DNA-based identification techniques; attention was also given to non-native species and their relation to climate change. We sampled a few of these incomers from the nearby marina on the morning of the final day. I think the quality and efficacy of the course is demonstrated by the number of people, myself included, who return more than once to attend the event. Groupies is probably putting it too strongly, but we are not far off. One of the major benefits of a course like this is that you can have a stab at identifying your specimens with all the provided keys, customised cheat-sheets, pictures and so on but in the event of your identification skills falling short (a common occurrence in my experience) then you know that at least one of the course tutors will be able to put you right. They are not winging it, keeping one page ahead in the ID guide (which they wrote), they really know what they are talking about and this is the key ingredient above all others that makes this course such a success.

I enjoyed my three days down in Plymouth tremendously and can recommend this course unreservedly for professionals who need to enhance their ID skills, volunteer surveyors with conservation groups and interested amateurs wishing to enhance their knowledge of this fascinating group of photosynthetic organisms.

BPS Algal Course

Lizzie Watt, Queens University of Belfast

The British Phycological Society hosts an annual field course on macroalgal identification at the Marine Biological Association in Plymouth, and this year, from the 1st-3rd May, I was fortunate enough to participate.

The informal setting of this course allowed for the busy itinerary to be delivered in a fun and informative manner, and with it being led by Francis Bunker and Prof. Christine Maggs, a high level of expertise in phycology was certainly present. The great variety of backgrounds amongst the attendees, from full time phycologists to geneticists to students (like myself) and even foragers, enabled the perfect environment to learn from each other's input and experience.

A good balance of lectures and practical work onshore was maintained to give an encompassing introduction to the world of seaweed. The lecture material covered a variety of areas such as the evolution of the algal groups, their life histories and reproduction, and chiefly, the mechanics of identification. The content was detailed, yet with the interactive style of presentation, was easily accessible to beginners in the field. Several highlights included Prof. Juliet Brodie's talk on a recent phycological expedition to the Falklands and Anne Bunker's lecture on understanding keys in the identification of Chlorophyta.

The field aspect of the course took us to two very interesting shores, the sheltered, Warren Point (Wembury Bay) and the more exposed, Renny Rocks (Heybrook Bay). The differing intertidal environments allowed interesting identification sessions in the lab that aided us to apply the theory in a practical setting. Essential skills such as the collection, sectioning and slide preparation of seaweeds were demonstrated by the lecturers and with their guidance and useful tips, the group were able to produce full species lists for each shore. A session on seaweed pressing was also held, although I soon realised my own efforts left much to be desired after Dr. Gerald Boalch gave us a tour around the MBA's beautifully preserved herbarium!

As an undergraduate studying Biological Sciences, I would highly recommend this course for anyone with a keen interest in marine botany. I also would like to give a huge thank-you to the Marine Biological Association for their hospitality and for the excellent nourishment they provided, and as well to the course leaders for this fantastically interesting and most enjoyable event!

The Antibiotic Resistome:

Broadening the Recognition of Cyanobacterial Bloom Hazards

Geoffrey A. Codd, School of Life Sciences, University of Dundee UK, and School of Natural Sciences, University of Stirling, UK

In understanding the hazards which cyanobacteria can present to health, particularly via cyanotoxins, research with axenic, single strains of cyanobacteria in culture has been- , and continues to be- essential for the unambiguous assignation of cyanotoxin origins and the understanding of cyanotoxin biosynthesis. However in natural and man-made environments, cyanobacteria do not occur in isolation, but typically in close association with a range of other microbes. Non-photosynthetic (heterotrophic) bacteria have long been recognised to occur naturally with planktonic and benthic cyanobacteria (e.g. Fogg et al., 1973). This association can include the provision of a physical refuge and substrate for attachment of the non-photosynthetic bacteria on the cyanobacterial filaments and colonies, and the transfer of nutrients between partners. The association of several *Vibrio* species, including the human pathogen *Vibrio cholerae*, with cyanobacterial blooms, particularly of *Dolichospermum* (*Anabaena*) in brackish- and fresh-waters has also been recognised for several years with examples from tropical (e.g. Islam et al., 1999; Chaturvedi et al., 2015) to temperate latitudes (Jesser and Noble, 2018). These observations clearly support the widening concept of the range of health hazards associated with cyanobacterial mass populations.

A further indication of how cyanobacterial blooms may indirectly impact on health is provided by the recent findings of Guo et al. (2018). Study of 145 antibiotic bacterial resistance genes (ARGs: an antibiotic resistome), has shown complex changes in ARG diversity, abundance and partitioning during and after a *Microcystis* bloom in a freshwater lake. The development and spread of antibiotic resistance in pathogenic bacteria is rapidly emerging as a global health problem (Morehead and Scarborough, 2018). The extent to which cyanobacteria influence the development and distribution of the antibiotic resistome clearly merits further investigation.

Top: *Anabaena* at Loch Lochy (21-8-18)

Below: Bardowie 2012 bloom

References

Chaturvedi, P. et al. (2015). Microcystin-producing and non-producing cyanobacterial blooms collected from central India harbour potentially pathogenic *Vibrio cholerae*. *Ecotoxicology and Environmental Safety* 115, 67-74.

Fogg, G.E. et al. (1973). *The Blue-Green Algae*. Academic Press, London, United Kingdom.

Guo, Y. et al. (2018). The antibiotic resistome of free-living and particle-attached bacteria under a reservoir cyanobacterial bloom *Environment International* 117, 107-115.

Islam, M.S. et al. (1999). Association of *Vibrio cholera* O1 with the cyanobacterium *Anabaena* sp. elucidated by polymerase chain reaction and transmission electron microscopy. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 93, 36-40.

Jesser, K.J. and Noble, R.T. (2018). *Vibrio* ecology in the Neuse River Estuary, North Carolina, characterised by next-generation amplicon sequencing of the gene encoding heat chock protein 60 (*hsp60*). *Applied and Environmental Microbiology* 84, e00333-18.

Morehead, M.S and Scarborough, C. (2018). Emergence of global antibiotic resistance. *Primary Care* 45, 467-484.

Provasoli Award

Pilar Díaz-Tapia, Christine Maggs, John West and Heroen Verbruggen received the Provasoli award for the best paper in *Journal of Phycology* in 2017.

The American Phycological Society has selected Pilar Díaz-Tapia, Christine Maggs, John West and Heroen Verbruggen for the Provasoli award which is given annually to the most outstanding paper published in the *Journal of Phycology*. The award was presented at the banquet of the 72nd Annual Meeting of the PSA held at the University of British Columbia, Vancouver.

Their paper (Díaz-Tapia et al. 2017) presents the first comprehensive molecular phylogeny for the Rhodomelaceae, the most diverse family of the red algae. It is one of the first studies of seaweeds that use phylogenomics to resolve challenging phylogenies. Moreover, this work presents a phylogenetic analysis of a supermatrix including sequence data for more than 400 species. Based on these phylogenies and morphological evidence, the tribal classification of the family was reassessed, recognizing 13 previous tribes and proposing five new tribes.

This work is part of Pilar´s postdoctoral project and it was mainly carried out during her stay at the University of Melbourne where she was working with Heroen Verbruggen and collaborating with John West. Her postdoc also included stays in Christine Maggs´ lab at Queen´s University Belfast and at Bournemouth University (UK). She is at present continuing her research at the University of A Coruña (Spain).

Above is the official PSA award photo taken by Stacy Krueger-Hadfield showing (L-R)

Michael H. Graham, *Journal of Phycology* Managing Editor; Pilar Diaz (University of A Coruña, Spain); Alison Sherwood (President, PSA); Morgan Vis (Chair, PSA Board of Trustees); Heroen Verbruggen (University of Melbourne); Christine Maggs (Queen's University Belfast, Bournemouth University and JNCC).

Díaz-Tapia, P., Maggs, C.A., West, J.A. & Verbruggen, H. (2017). Analysis of chloroplast genomes and a supermatrix inform reclassification of the Rhodomelaceae (Rhodophyta). *Journal of Phycology*, 53: 920–937.

BPS Summer Council Meeting

The British Phycological Society held their Summer Council meeting at the Linnean Society in London in June. Not everyone was able to attend, but in the photo you can see (from left to right):

Francis Bunker – Secretary, Amie Parris - Student Representative, Maeve Edwards – Treasurer, Christine Maggs - Joint Editor in Chief of the EJP, Martin Wilkinson - Representative of the Biodiversity & Conservation Committee, Andy Davies – Webmaster, Graham Underwood - President, Royal Society of Biology Representative, Gill Malin - Immediate Past President, Chair of Awards and Training Committee, Chair of Algal Applications Committee, Martyn Kelly - Ordinary Member, Juliet Brodie - Joint Editor in Chief of *EJP*, BPS Natural History Museum Representative, Hiroshi Kawai - Overseas Vice President, Jo Wilbraham - Ordinary Member, Christine Campbell - Co-opted Ordinary Member, Brenda Parker - Co-opted Ordinary Member, and Jason Hall-Spencer - President Elect

Obituary

Alain Sournia - 1940-2018

Alain Sournia, phycologist and philosopher passed away in June. He was best known among phycologists for his work on dinoflagellate taxonomy, circadian rhythms and coral reef ecosystems. He also authored the much used "Phytoplankton Manual" published in 1978 as well as three volumes of the "Manuel du Phytoplancton". In his later carreer he devoted himself to science adminstration and after his retirement authored a number of books on philosophy.

His papers can be found here : https://www.mendeley.com/community/alain-sournia/documents/

His philosophy books are accessible here : https://philosophiesauvage.com/

Book reviews

Marine Benthic Algae of North-western Australia, 2. Red Algae

John M. Huisman (with coauthors for several taxa). 2018. 672 pp. ABRS, Canberra and CSIRO Publishing, Melbourne, Australia. AUS$220. [ISBN 9781486309542]

Australian shores host one of the most diverse marine floras in the world. Documentation of the diversity commenced with the voyages of discovery expeditions that took place during the XVIII and XIX centuries. Huisman (2000) conferred on William Henry Harvey the title of "father of Australian phycology". Harvey made extensive collections, described a good proportion of the Australian macroalgal species and published *Phycologia Australica* (1858-1863), still today an important reference. More recently, the marine flora of southern Australia was described in a detailed account by Professor Brian Womersley. Likewise, Gerald Kraft (2007, 2009) documented the brown and green algal flora from the southern Great Barrier Reef. Seaweeds from other Australian regions have been comparatively much less studied. Furthermore, information on species characteristics, when available, has rarely been compiled. North-western Australia was among the most understudied regions, which led John Huisman to initiate a project describing its marine flora. In 2015 he published the first volume on the green and brown macroalgae and this second volume focuses on the red algae.

The red algal flora from North-western Australia is documented in this authoritative book based on the study of new collections and herbarium specimens. John Huisman is the principal author, while several authors have made contributions for some taxa (Ga Hun Boo, Sung Min Boo, Olivier de Clerck, Kyatt Dixon, Adela Harvey, Showe-Mei Lin, Yola Metti, Alan Millar, Gary Saunders, Roberta Townsend and William Woelkerling). The book includes information on 351 species classified according to current nomenclature in 158 genera, 55 families, 20 orders, 4 subclasses and three classes. Each one of these taxa is fully described.

The book starts with a brief introduction, that includes a description of the study area, its marine benthic coastal habitats, and the methodology, as well as specifying the references used to establish the taxonomic arrangement followed in the book. Diagnostic keys were included for every taxon, allowing identification from class to species.

For each species a detailed and accurate description of the morphological characters is provided. Moreover, information about the original description, the type locality and material, and a list of taxonomic synonyms is included. Also, previous published references are listed, differentiating the ones that include descriptions and/or illustrations. The distribution and habitat of the species are also described, along with information on the studied specimens. Finally, interesting taxonomic notes discuss particular aspects of many of the seaweeds, such as their specific and generic assignment, the morphological differences regarding similar species and the introduced or invasive status of some taxa.

Illustrations in this book deserve a special mention. Every species is illustrated with half-tone figures that in most cases show habit of the species and microscopic details. Moreover, a selection of 87 species is illustrated with coloured field pictures arranged in 16 plates. The quality of pictures is excellent and its selection illustrates very well the habit of the species and their key morphological features.

In this book, 88 species and seven genera are newly described, and 13 new combinations are proposed. Some of these taxa are supported by phylogenetic analyses, which are presented for the orders Gelidiales and Peyssonneliales, the families Galaxauraceae and Liagoraceae and the genus *Asteomenia*. Moreover, the family level classification of the order Corallinales is rearranged including the proposal of a new family (Lithophyllaceae), a new subfamily (Ozralioideae) and the elevation of three subfamilies to the family level (Hydrolithaceae, Mastophoraceae and Porolithaceae). The list of new taxa and combinations is provided at the end of the book.

In summary, this book is an invaluable floristic account

of the red algae from North-western Australia that represents an important advance in the knowledge of the Australian marine flora. Undoubtedly, it will greatly benefit phycologists and marine biologists from the studied area, as it provides for the first time useful tools that will facilitate identification of red algal species from the region. Beyond Australia, this book is an excellent taxonomic reference that makes an important contribution to a comprehensive understanding of red algal diversity and systematics.

References

Huisman, J. 2015. *Algae of Australia: Marine Benthic Algae of North-western Australia, 1. Green and Brown Algae.* ABRS, Canberra; CSIRO Publishing, Melbourne. 320 pp.

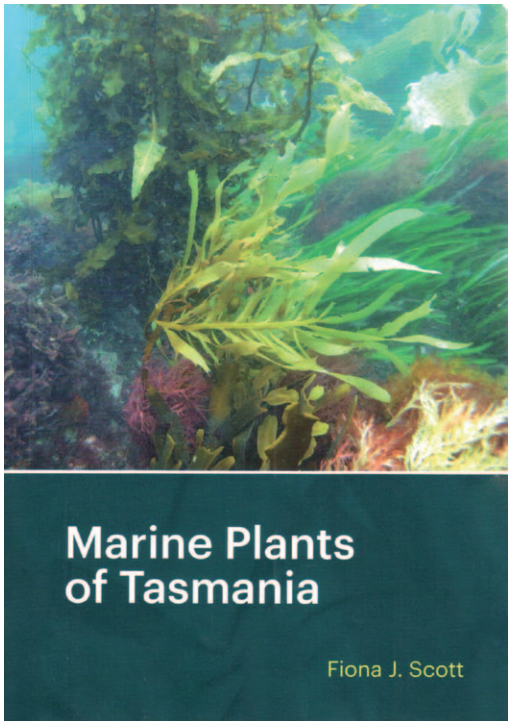
Huisman, J. 2000. *Marine plants of Australia.* University of Western Australia Press, Nedlands. 300 pp.

Kraft, G. 2007. *Algae of Australia: Marine Benthic Algae of Lord Howe Island and the Southern Great Barrier Reef, 1. Green Algae.* ABRS, Canberra; CSIRO Publishing, Melbourne. 347 pp.

Kraft, G. 2009. *Algae of Australia: Marine Benthic Algae of Lord Howe Island and the Southern Great Barrier Reef, 2. Brown Algae.* ABRS, Canberra; CSIRO Publishing, Melbourne. 370 pp.

Pilar Díaz Tapia, Coastal Biology Research Group, Faculty of Sciences and Centre for Advanced Scientific Research (CICA), University of A Coruña, Spain (pdiaz@udc.es).

Marine Plants of Tasmania by Fiona J. Scott



Fiona J. Scott is the Honorary Curator at the Tasmanian Herbarium. Marine Plants of Tasmania (Scott, 2017) is intended as an introduction to the benthic marine macroalgae and seagrasses of Tasmania (or more exactly the Maugean - south-eastern South Australia, Victoria and Tasmania - (marine biogeographic) province) and as such fills a hole in the market. It will be a great resource for amateurs, professionals and students alike who might otherwise be overwhelmed by great tomes that comprise the Marine Benthic Flora of Southern Australia by Womersley.

Womersley (1981) estimated that some 81% of the south Australian flora occurred in the cooler eastern region with 54% in Tasmania. Scott reports the total as 652 species, with more being found all the time due to molecular taxonomic investigations. Her book aims to be an introduction to the Marine Plants of Tasmania with 169 species being richly illustrated by colour photographs in a book 360 pages long.

A book dedicated to the seaweeds of Tasmania is justified not only due to the richness of the flora but also to its distinct nature. There are several species of seaweed endemic to Tasmania and the southern nature of the flora bears more relation to that of New Zealand and the Macquarie Island than the rest of Australia e.g. with the occurrence of the giant kelp, *Macrocystis pyrifera* (Scott, 2013).

A foreword by Professor Gerald T. Kraft outlines the long history of study of marine plants in Tasmania and the rich diversity of species. In an easy to understand introduction, the author explains the difference between the various groups covered by the book which includes red, green and brown algae as well as blue-green algae and seagrasses.

Sections illustrating species of the different groups then follow. The author has included one species to represent each genus, unless that genus is particularly diverse when several species are included (e.g. *Caulerpa*). The page margins are coded green, brown and red which allows easy access to the different sections.

Species are presented in alphabetical order by scientific name. The current name with authority is given and is followed by paragraphs entitled 'Classification', 'Features' (which provides notes on size, colour, texture and form), 'Notes' (giving seasonal information, habitat, the existence of other species of the genus or other species with which it could be confused and how to distinguish them), 'Distribution' and 'Publications' (which references the authoritative texts).

The Publications section is very useful and will assist the more academic user to confirm identifications. For anyone, the best way to learn how to identify seaweeds is to have a wide range of sources to which one can refer.

Arranging the species in each section in alphabetical

order is not the easiest way in which to find a species in one's hand. Those using this book to identify species will have to flip through the pictures in order to make a match.

The photographic illustrations are beautiful and the way they are presented on the page makes the book very attractive. Most of the photographs have been taken by the author in the field and are supplemented by ones taken in the laboratory to illustrate close up features. The author is an extremely successful underwater photographer. Anyone who has tried to photograph seaweeds, especially in situ, will understand the challenges of lighting, getting seaweeds to show up against suitable backgrounds and showing the key identification features. All these difficulties are amplified by water movement and the challenges presented by SCUBA diving.

Seaweeds have become popular subjects for artists over recent years. Several artists have attended the annual BPS field course I run with Christine Maggs in Plymouth. This book is more than an academic text or field guide. With such stunning photographs it also works as a coffee table delight and an inspiration for artists and botanical illustrators.

Publication was sponsored by the Tasmanian Government, an enlightened approach by the government that I wish we had here.

To a northern European, the similarities and differences of the temperate Tasmanian flora to our own native flora is interesting. Many genera are the same but just as many are completely different. Some species are the same but are they really? I'm sure the truth will be revealed in the future once the molecular taxonomists get to work.

I was lucky enough to dive in Tasmania and see the incredible seaweed diversity for myself. This book makes me yearn to go back.

Marine Plants of Tasmania is available through the TMAG (Tasmanian Museum and Art Gallery) shop https://www.tmag.tas.gov.au/visitor_information/museum_shop, or directly from the Tasmanian Herbarium (AUD 50.00 + postage). (Herbarium Enquiries to Kim.Hill@tmag.tas.gov.au)

Copies can also be obtained from NHBS https://www.nhbs.com for £79.99

References

Scott, F.J. 2013. Rare Marine Macroalgae of Southern Australia. University of Tasmania. Ph.D. Thesis. 270 pp.

Scott, F.J. 2017. *Marine Plants of Tasmania:* Tasmanian Herbarium, Tasmanian Museum and Art Gallery.

Womersley, H.B.S. 1981. Biogeography of marine macroalgae. In M. N. Clayton and R.J.King eds. *Marine Botany. An Australasian Perspective*. Longman-Cheshire Pty Ltd. pp. 468.

Francis Bunker.

Rhodomelacean

INSTRUCTIONS FOR CONTRIBUTORS

Copy which is submitted for publication in *The Phycologist* should be concise and informative. Articles should be scientifically sound, as jargon free as possible and written in a readable scientific magazine style. Unless absolutely essential references should not be included. All types of relevant material will be considered, these include job advertisements, scientific reports, book reviews, news items of topical interest, meeting announcements, grant awards, promotions, appointments, profiles of eminent phycologists and obituaries. If you are interested in submitting material that does not fall within any of these broad categories, or you are unsure of the appropriateness of a potential article, then contact the editor. Suggestions for future articles or a series of articles are welcomed.

Copy should be submitted, preferably as attachments to email or on disc (MS Word for Windows or Rich Text Format). **Illustrations and photos to accompany copy are welcomed and should be supplied as JPEG or TIFF file-format no less than 600 dpi resolution**. The editor reserves the right to edit the material before final publication.

Submission of Copy and Deadlines

Copy should be submitted to:

Dr Jan Krokowski,
Scottish Environment Protection Agency (SEPA),
Angus Smith Building
Ecology
6 Parklands Avenue, Eurocentral
Holytown, North Lanarkshire
ML1 4WQ

Tel. +44 (0)1698839000
E-mail: jan.krokowski@sepa.org.uk

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