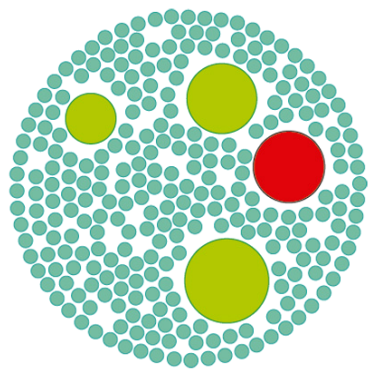




THE PHYCLOGIST

The Newsletter of the British Phycollogical Society

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In this Issue:

- Citizen science at Deptford
- Steam explosion meets Ulva
- Highlights from Hull BPS Meeting

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Front Cover Image: Selection of diatoms from UK freshwaters published at <https://naturalhistory.museumwales.ac.uk/diatoms/>

Hello Readers,

Apologies for the delay in this issue, I was at sea in the Southern Ocean onboard the RRV Sir David Attenborough for the whole of February and March. We were sampling for the BIOPOLE program led by the British Antarctic Survey and I collected numerous phytoplankton samples throughout Antarctica. I look forward to sharing about my research and findings at a future BPS meeting. Meanwhile, we have a big issue this time around with lots of activities from our membership to read about.

Very best,

Amanda Burson



Dr. Amanda Burson, Ice Berg,, 2025

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 the 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
<http://www.brphycsoc.org/the-phycologist-back-issues/>

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73rd ANNUAL GENERAL MEETING MINUTES

Editor's note: Due to extenuating circumstances, not all the necessary reports were available for the in-person AGM during the science meeting hosted in Hull. Thus, a later online AGM was necessary to allow time for these reports to be collected, reviewed and ultimately approved by the membership. Below are the minutes from this later meeting only. All of the council and sub-committee reports are available in full on the BPS website at <https://brphycsoc.org/annual-general-meeting/>.

Meeting Minutes

Meeting chaired by the President, Saul Purton. Meeting was quorate with 30 in attendance.

1. Apologies for Absence

Chris Howe - member

Dan Franklin (Chair O&E committee)

Nicky Slee (Treasurer)

2. Announcements

Key aspects of the AGM are the formal approval of the BPS accounts and last year's AGM minutes. For various reasons neither of these documents were available on 8th January at the conference in Hull, so we decided to go ahead with the presentation of reports from Council Officers and sub-committees at the Conference but hold a separate online AGM. This would ensure approval of the accounts prior to their submission to the Charity Commission (deadline for which is 31st Jan). The minutes, the accounts, and the reports presented are all on the BPS website.

3. Approval of the Minutes of the 72nd AGM, 10th January 2024 Reading University

CM proposed, FB seconded. Minutes were approved

4. Matters Arising

Confirmation that the membership fees will increase on 01 April 2025 in line with the new financial year.

5. Treasurer's Report (Jane Lewis)

There is no formal report available from the Treasurer, but the Auditors have sent a draft report for the year ending 31st March 2024. Jane gave a summary of the figures

presented in the Auditor's report. It was noted that there is some additional income generated in this year from the Annual Meeting but will not arrive in the accounts until the following year (2024/25). In addition, the big Awards round agreed in 2023/24 will appear as an expense in 2024/25 accounts. JL gave thanks to all who contributed to the Journal that brings us income. CM noted that there was a discrepancy in the dates of the financial year as stated in the report – this will be updated to the correct dates by the Auditor. In addition, some wording for CM's report needs to be corrected. These corrections will be sent back to the auditor before the accounts are signed off. 1

6. Approval of the Accounts for the year to 31st March 2024

Proposal to accept the Accounts (with corrections) proposed CM, seconded JA

Final accounts to be submitted to the Charity Commission by 31st January 2025.

7. Appointment of Auditors

Paul Murray of LM Griffiths & Co Ltd appointed on 16th February 2021 and has been efficient and effective as our Independent Examiner. Members invited to approve Paul Murray as our auditor for a further 12 months.

Proposal to keep the same Auditor for next year – proposed SP, seconded PH

A query was raised regarding the allowed length of tenure of Independent Examiners and it was requested that JP check the Charity Commission website and BPS Constitution to clarify.

8. Elections and Council Vacancies

Two elected officers (Andy Davies as Webmaster and Kirstin Covington as Secretary) stepped down from Council this year. Council sought suitably qualified replacements through emails to members, and an excellent candidate for each position was identified.

The following candidates are proposed:

- Webmaster: Leonardo Cherin
- Secretary: Jane Purton

Leonardo Cherin as Webmaster – Proposed – PH, Seconded – JL. Appointment approved Jane Purton as Secretary – Proposed – AB, Seconded – FB. Appointment approved.

There are two vacancies on Council for Ordinary Members, which were advertised in the autumn issue of the Phycologist, but no nominations were received. Council therefore sought candidates, and two nominations have now been received.

Mánus Cunningham, Queen's University Belfast. Proposed CM, Seconded FB – appointment approved.

Francis Bunker (retired) Proposed CM, Seconded AB – appointment approved.

9. Appointment of Honorary Life Member

Owing to the sad passing of Prof. John Raven FRS, there is a vacancy for an Honorary Member. Council wishes to recommend Prof. Paul Hayes as the new Honorary Member. Proposed JA, Seconded CM – appointment approved.

10. *Forthcoming events: Hilda Canter-Lund Prize and Royal Society Summer Exhibition Annual HCL competition: Macro and micro categories.*

See the BPS website for past winners and inspiration.

Timings will be:

Announcement - early Spring;

Deadline for submissions - late Spring/Early Summer;

Winners announced - late Summer.

With much thanks to Dan Franklin for the efforts in the application phase, we have been selected to exhibit at the **Royal Society Summer Science Exhibition 01-06 July 2025: 'Harnessing the power of algae for new natural products and a cleaner and more sustainable world.'**

Micro and macro algal themed hands-on activities and passive displays are planned. Please contact/talk to Dan

Franklin if you'd like to discuss potential involvement in this event.

Jane Lewis also highlighted the Training and Awards funds and the upcoming deadlines of 1st February and 1st May.

11. Subcommittee and Federation reports

All other reports were presented at the Winter Meeting in Hull and are available online at: <https://brphycsoc.org/annual-general-meeting/>

12. Future Annual meetings and AGM dates

The next Annual Meeting will be in early January 2026 in Aberystwyth (provisionally 8th Jan 2026). Jessica Adams is leading the organisation.

The meeting in January 2027 will be at Queen's University Belfast – this will be the 75th AGM.

13. AOB

A new social media email will be announced to members soon – please use this to send in potential posts.

The webmaster will update the website with the newly elected Council Members.

(Key to names: Amanda Burson (AB) Christine Maggs (CM) Francis Bunker (FB) Jessica Adams (JA) Jane Lewis (JL) Jane Purton (JP) Leo Cherin (LC) Paul Hayes (PH) Saul Purton (SP))



PROJECT REPORTS

Slimewatch 2 (this time, it's Deptford): Community Science in Central London

'Slimewatch' (SW1) was an art/science collaboration with Jane Lewis, 2019, based on fieldwork in the tidal Thames near Tower Bridge. Documentation of microphytobenthos culminated in a public-facing, multi-media exhibition shown in London galleries in the West End and South Bank, as well as a 'science space' at the January 2020 BPS Winter Meeting at Plymouth University.¹

Colour and movement drew visitors into a scientific and aesthetic appreciation of algae. Timelapse filming had initiated SW1, and one of the resulting movies was also used for outreach by Martyn Kelly at 2021's 'Green Man' music festival in rural Wales, alongside live microscopy.² BPS project funding has now enabled outreach that involves the public in actual fieldwork.

Inner-city tidal mudflats are rare, and in countries such as the UK they are often difficult to access because of the physical dangers. SW1 was also constrained by property ownership.

The location near Tower Bridge, St Saviour's Dock (aka Jacob's Island, where Bill Sikes meets his death in Dickens' 'Oliver Twist'), was still a working dock in the 1980s. Since then it has been characterised by warehouse apartments and upmarket business premises (aka Shad Thames, home to the Conran lifestyle and design group). A working jetty on the west bank had been one of the initial attractions for at least some incomers (pers.comm). But successive management companies have allowed it to dilapidate, limiting access for even professional researchers, and making direct public outreach impossible.

'Slimewatch 2' (SW2) is located just a few kilometres downstream (Fig. 1). Creekside Discovery Centre was established by conservation campaigners during the massive redevelopment of their surroundings in late 1990s/early 2000s. A decaying wharf and disused carpark has been gradually replaced by a compact cluster of new habitats, both terrestrial and aquatic, and a footbridge/cyclepath now spans the creek itself.³ Fencing protects the ecosystems and public alike. But safe, guided access to the creek at low tide, in the care of trained volunteers and professional staff, is central to their remit ("for people and wildlife").⁴

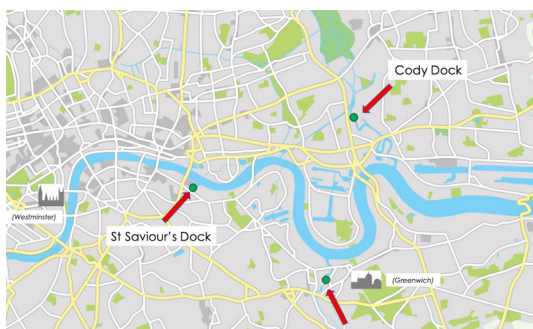


Figure 1. Slimewatch locations (basemap courtesy of PrimaryLeap.co.uk)

Colour and movement is the stuff of film-making.⁵ Changing colourfields on intertidal mudbanks in central London was the starting point for SW1; how and why were patches of greens, browns and intermediate colours emerging and disappearing from grey mud, as the tide fell and rose again? (Fig. 2 and video link 1 'Slimewatch 1; mud, moon and microbes'). SW1 directly related colours seen by the human eye and/or digital cameras, to the relative abundance of different taxa of microphytobenthos.



Figure 2. St Saviour's Dock - image from 4-way timelapse montage. These were overwhelmingly either green euglenids, or yellow/brown/orange diatoms (Fig. 3).

Both groups can be seen to migrate up from the mud onto the surface at low tide; in both cases, at least a proportion migrate back down as it rises again.⁶

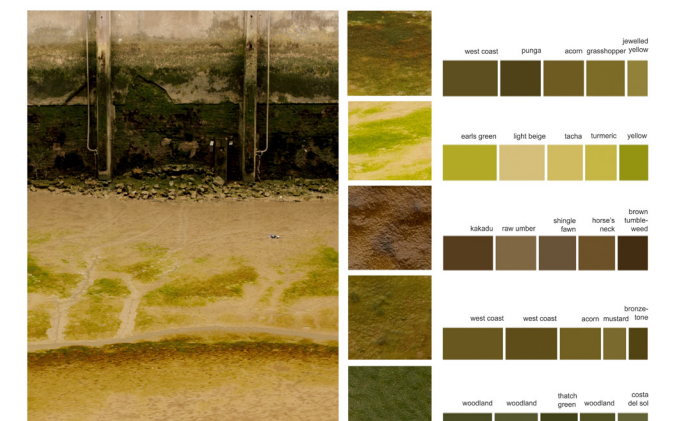


Fig 3: exhibition poster 7 ('Colourways'), Slimewatch SW1

Similar but more accessible tidal mudflats exist in Deptford Creek, and SW2 emerged from casual observations made during the COVID19 pandemic. Similar colour fields were easily visible from the cycle path/footbridge. Timelapse filming, and initial contact with CDC via social media, were productive. Once the pandemic began to ease, a portable iolight digital microscope made it easy to share

enthusiasm with Creekside staff. Together we confirmed similar populations of microalgae to St Saviour's Dock (Fig 4 and video link 2 'Days in the life, Deptford Creekside'). In September 2022, Slimewatch was included in CDC's first public Open Day for over two years.

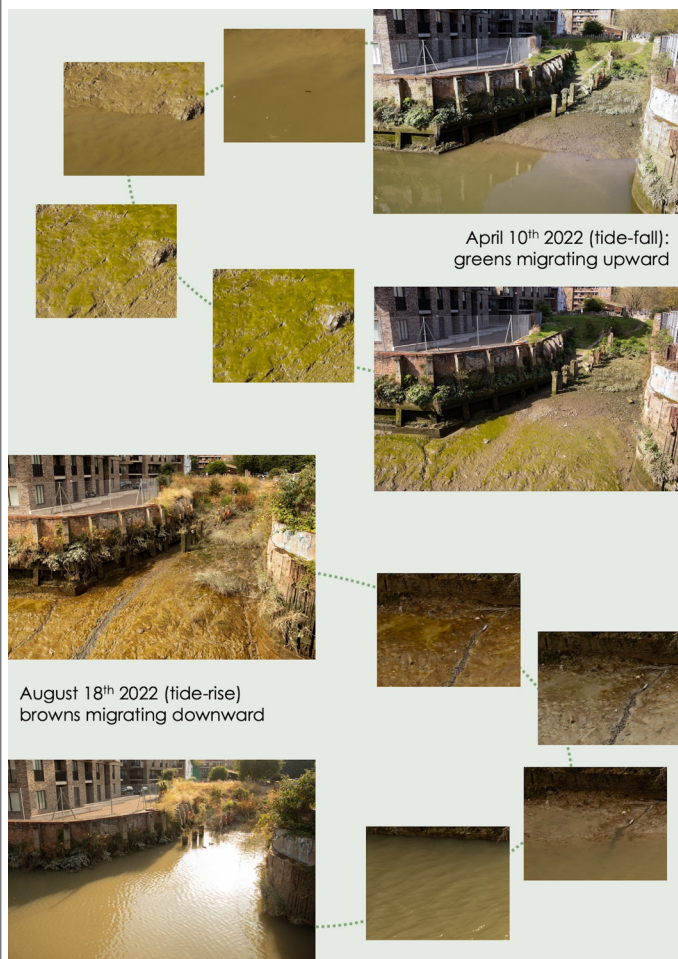


Figure 4. Images from video link 2 'Days in the life, Deptford Creekside'

Wildlife surveying/conservation and public outreach already weave together at Creekside.

For decades staff, volunteers, visitors and the general public have documented birds, plants and invertebrates. They've played host to bat-watch groups and the local arts festival 'Deptford X'. Their own events often include creative 'making', from bookmarks to sculptures, finger-painting to music and modern dance.

The term 'citizen science' tends to imply mass collection of systematic data by the public on behalf of professional scientists. A better term for SW2 might be 'community science'; in this case field-work, investigation, knowledge-sharing and engagement in a public-facing and non-academic space.⁷

The key staff member has been Andy Lyon, a biologist with extensive experience in conservation and outreach. With input from Martyn Kelly, Andy developed this survey protocol for trained volunteers:

1. From the footbridge, assess likely sampling locations and photograph an 'overview'
2. Record air temperature and a general comment on the weather
3. On the foreshore, on each coloured patch of wet mud:
 - lay down a 2x2cm square of lens-cleaning tissue (noting time)
 - place calibration colour palette nearby and photograph a 'medium closeup'
 - label a specimen bottle and add 3ml creekwater
 - after 40 min, retrieve tissue with tweezers and place into specimen bottle
 - with cap on, shake well to loosen and suspend any 'commuter microphytobenthos (MPBs)'
4. In the Centre, as immediately as possible, for each specimen:
 - re-suspend MPBs by shaking the vial vigorously
 - place a single drop of the suspension onto a plain glass slide and cover with a slip
 - under the iolight 1mm digital microscope, identify using six agreed categories: Euglena; Nitzschia, Navicula, Sigmoid or Centric diatoms; and 'other' count and total individuals in 9 'fields of view' using the iolight stage graticule

5. On the 'Epicollect' database account 'Creekside Algal Survey', enter recorded data including temperature and weather and the related photography

From December 2023 to November 2024, on 'volunteer Wednesdays', Creeksiders completed a calendar year of monthly samples, at daytime low-tides when weather permitted. This same protocol, minus data storage, has been shared with visitors on low-tide walks, public-facing open days and project-specific events.

The iolight uses up little space, sending images to a smartphones or ipad. But it doesn't link easily to larger displays or screens, and slides/specimens can only be re-positioned by hand. So whenever possible, public outreach also involves a compound light microscope with a controllable stage, optical eyepieces and a range of lenses. This greatly improves the experience even for individual visitors and small groups, and linking to a sizeable flatscreen allows live microscopy of vivacious samples to attract mass attention even at general open days - when microalgae are in competition with crab-racing, wild-flower identification and more.

Jan 2025

SLIMEWATCH 2

mudflat micro-algae of Deptford

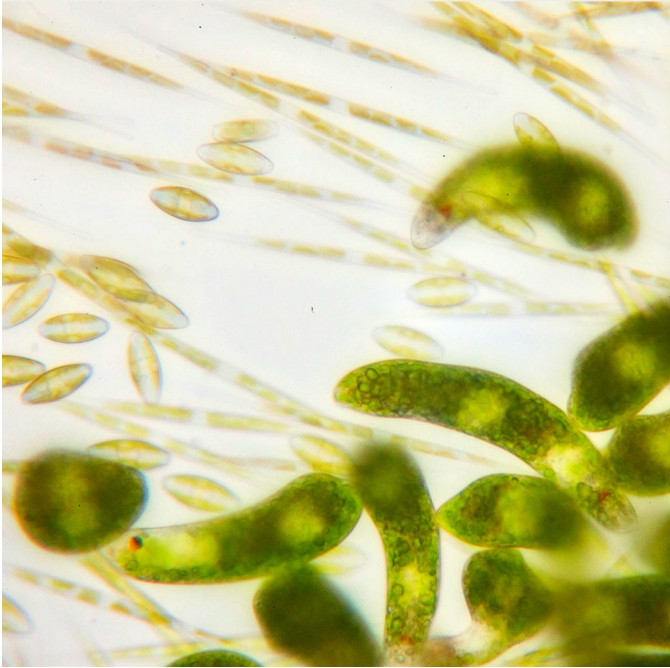


Figure 5. Front cover, SW2 microalgae 'zine

A temporary website has become semi-permanent⁸, and an illustrated micro-algae 'fanzine' includes space for visitor's own drawings (Fig. 5 and *ibid.*) Other resources from Slimewatch¹ have also often been on hand. (For more on exhibition assets, outreach and public engagement with science, see forthcoming report in 'Applied Phycology'.)

The first year's survey work on relative abundance produced a coherent but limited dataset (Fig. 6). The very low and irregular temporal resolution limits the usefulness. However, discussing this was an intervention in itself; Creeksiders noted that changes in MPBs are more frequent, that temperature records seem chaotic as seasons destabilise, and that the 'tide-time' of sampling is likely

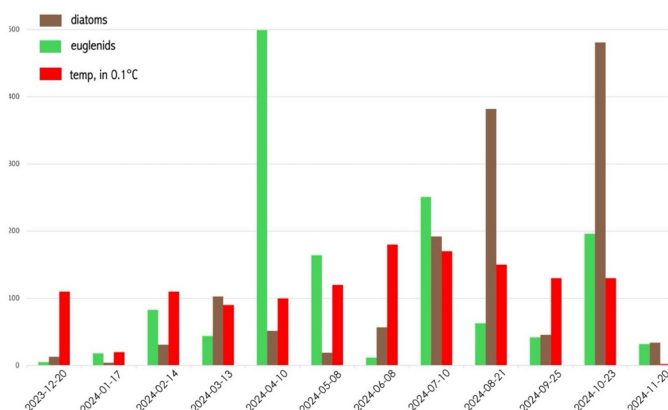


Figure 6. Combined monthly sample totals, Dec 2023–Nov 2024

Slimewatch is now routinely included in school trips that include a low tide walk. And CDC volunteers bring their own activities to Slimewatch events at the Centre, such as finger-painting (sometimes with mud itself), clay work and badge-making. (Making plasticine diatom models continues to be popular, though space and time constraints rule out hanging these in a perspex 'tank' as per SW1.) At another extreme, one of the public 'low-tide walks' including SW2 protocols led to a participant instigating a bespoke low tide walk for their cohort of postgraduate, mid-career artists. City & Guilds School of Art had their own Slimewatch-specific morning beginning with an 'artist in residence' presentation before a low tide walk with microphytobenthos (MPB) sampling, followed by live microscopy.

Timelapse filming from a nearby terrace belonging to the Laban Conservatoire of Music and Dance was another opportunity for outreach, which in turn led to creek visits by staff and students. Many were already keen birders, but now took an interest in commuter MPBs and their foundational role in the whole creek ecosystem. (Mudflats below Laban are inaccessible except by boat. But they are but deep and rich, and more easily filmed from above/in closeup: see video link 3).

Extracts from the visitor 'Comments Book':

Incredibly inspiring for us artists feeling more connected to the life we overlook!

(City & Guilds SW-specific event)

It's crazy how people learn about space before [sic] they no know [sic] fully about Earth (a prematurely wise Year-6 visitor)

Really exciting to get an insight to a project where there is still so much that is unknown. The creek is so beautiful and peaceful, and I love all the bright greens of the slime! I think it could inspire some exciting costume & choreography collaborations at Laban! (Public event involving SW in addition to normal low tide 'walkabout')

Me and my sister put it in different places [sic] and they were the same colour [sic] but different shades of the colour [sic]. Harry V (child-friendly after-school 'SW-specific' event)

Martyn Kelly has beautifully described 'What Constable Never Saw'⁹. In a similar vein, Slimewatch has taken a wide range of people on a journey through time and space, colour and movement.

This consolidates and informs the public outreach: 'Slimewatch' is now a constituent part of many low-tide-walks in Deptford Creek, and SW-specific events are now pro-actively timetabled. Funded staff time for monthly sampling has long since been used up, but volunteer enthusiasm makes it likely to continue into 2025, perhaps beyond.

Volunteers have already asked two investigatory questions; 1) does the 'time of the tide' sampled at, make a difference to absolute and relative abundances? And 2) if mud is

isolated, do micro-algae still commute? Supporting them in experimental design may fall to BPS members, or they may continue to develop independently. Relating counts to noteworthy events in the Creek at large (e.g. recent flooding and/or drought, seasonal and climate changes, Thames Tideway dredging and construction activities, a sewage release or building works upstream) may only be hypothetical. But this would acknowledge frequent queries from visitors concerning species and water quality, environmental health and/or water company activity, etc. and make it more likely that the band of capable volunteers will grow.



Further into 2025, the sampling and identifying protocols will inform work at another location even further downstream, at Cody Dock on Bow Creek/River Lea¹⁰ (Fig 1).

An initial outreach visit in January 2025 involved local 6th-formers as well as adults, with a presentation about Slimewatch 1 and 2 followed by sampling and live microscopy.

This mainly involved 'toothbrush sampling' of river wall biofilms, as access to tidal mudbanks here is only possible via canoe! But that's how they conduct monthly sampling of invertebrates in mudbanks facing their main site. 'Piggy-backing' biofilm sampling onto these activities was suggested by staff members, and scheduled in for April 2025.

Cody Dock works with just as diverse a range of volunteers and visitors as Creekside. What we don't yet know is the diversity of their microphytobenthic communities.

Acknowledgements

This work was supported with a Project Grant from the British Phycological Society (BPS reference no.2023_BPS_02333). We are grateful to Dr Martyn Kelly for practical, theoretical and artistic input.

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1. Son, D (2020) *The Phycologist* 198, p21 (see also p16)
2. Kelly, M (2021) <https://microscopesandmonsters.wordpress.com/2021/08/26/jammin-in-the-key-of-algae/>
3. Deptford Creek: Surviving Regeneration (1999) ISBN 1 898536 76 7
4. Creekside Discovery Centre and the Creekside Education Trust, <https://www.creeksidecentre.org.uk/>
5. More on time-lapse filming in Applied Phycology (Arnott or Arnott-and-Lewis, forthcoming)
6. Mireille Consalvey, David M. Paterson & Graham J. C. Underwood (2004) The Ups and Downs of life in a benthic biofilm: migration of benthic diatoms. *Diatom Research*, 19:2, 181-202
7. More on public engagement and demographics (Arnott or Arnott-and-Lewis, *ibid*)
8. Slimewatch 2 'Sway', at <https://bit.ly/SW2Deptford>
9. <https://microscopesandmonsters.wordpress.com/2016/02/12/what-constable-never-saw/>
10. Cody Dock, <https://codydock.org.uk/>

Video Links:

1. 'Slimewatch 1; mud, moon and microbes' <https://vimeo.com/368883532?share=copy>
2. 'Days in the life, Deptford Creekside' <https://vimeo.com/870055829#t=0>
3. 'Laban Closeup Topshot' <https://vimeo.com/872166436#t=0>

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***“Slimewatch has taken a
wide range of people on
a journey through time
and space, colour and
movement.”***



Using Seaweed To Mitigate the Impact Of Harmful Algal Blooms

Introduction

Harmful algal blooms (HABs) are a global issue that have been increasing in both frequency and scale for the past 2-3 decades. These blooms are harmful to aquatic life, public health, tourism, food security and aquaculture. Scotland has a large shellfish industry which is negatively impacted by these blooms causing closures of shellfish farms resulting in economic losses in many rural areas. Increasingly, research has focused on finding environmentally friendly strategies for mitigating and managing HABs. Seaweeds have the potential to play a role in reducing the adverse impacts of HABs due to the production of allelopathic compounds. Whilst it is putatively suggested that the synthesis of phytochemicals by macroalgae play a factor in HAB reduction, it remains unclear which seaweeds, commonly found in Scotland have the potential to produce allelopathic compounds against microalgae as well as which mechanisms underpin this or how these may be utilized in practice.

The aim of this project was to understand which common macroalgae found along the coastline in Scotland have allelopathic factors against HABs and how this might affect different representative microalgal species. This involved both field work and a lab-based studies. BPS funding made it possible to obtain the microalgae used in this research and conduct co-cultivation experiments. Additionally, the funding made it possible to undertake monthly samplings for an entire year at Dunstaffnage of several seaweeds including *Laminaria digitata*, *Saccharina latissima*, *Alaria esculenta*, the invasive *Sargassum* sp. (Phaeophyceae), *Ulva lactuca* (Chlorophyceae) and *Palmaria palmata* (Rhodophyceae). This will provide a valuable resource of samples which will be not only be used in this current research project but also in future projects relating to HAB-seaweed interactions, seaweed microbiome and seaweed biochemistry.

Materials & Methods

Though various seaweeds and extracts have been tested during this research project, here in this report the focus is only on *Laminaria digitata* a large brown kelp which is abundant on the Argyll coast. *L. digitata* was collected from Dunstaffnage pebble back beach (56°27'15.8"N 5°26'37.0"W) during low tide and processed by freeze drying and grinding, before storing at -200C. The harmful algal species selected are native to Scotland and are a common nuisance to the aquaculture industry. All microalgae species were purchased from CCAP and included three harmful strains of *Prorocentrum lima* (CCAP1136/11), *Scropsiella trochoidea* (CCAP1134/9), *Prorocentrum cordatum* (CCAP1112/2) as

well as 2 non-harmful microalgae species *Dunaliella salina* (CCAP19/12) and *Phaeodactylum tricornutum* (CCAP1055/1) (Fig. 1). Microalgae were cultivated to commonly occurring bloom densities before being exposed to freeze dried seaweed powder in concentrations ranging from 0-10 g/l. These co-cultivation tests lasted up to 56h. The effects of the seaweed on microalgae were evaluated using photosynthetic performance indices using the AquaPen-C (PSI). Though the photosynthetic performance differs by species a rough key can be used in which species

showing a QY 0.6-0.8 are healthy, QY, 0.4-0.6 are stressed, OY 0.2-0.4 high stress likely leading to mortality, QY, >0.2 mortality occurs.

Results & Discussion

There was a clear and immediate response in photosynthetic performance dependent upon *L. digitata* dose. A reduction in photosynthetic performance in microalgae can be observed with increasing additions of *L. digitata* powder. An example using *P. lima* can be seen in figure 2. Looking more closely at this response in *P. tricornutum* (Fig. 3), *P. cordatum* and *S. trochoidea* an initial stress response can be seen in the first hour after *L. digitata* is added. This is followed by a recovery before a secondary reduction occurs at the higher dosing concentrations.

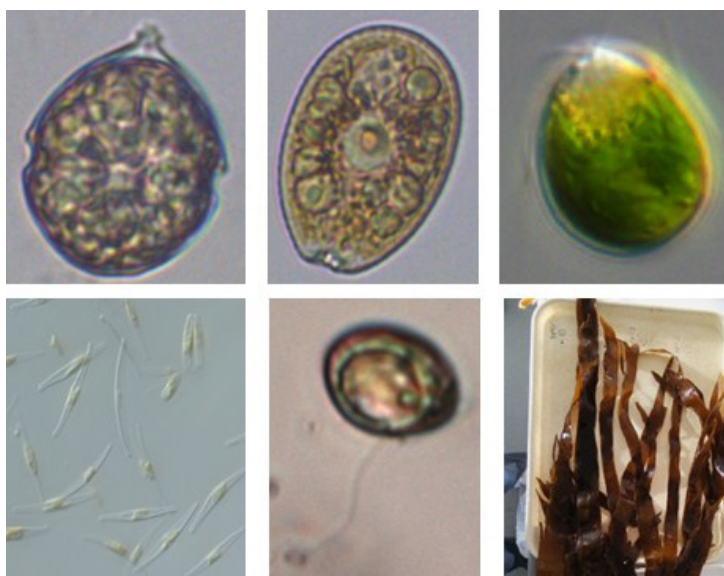


Figure 1. Microalgal species used to assess the inhibiting effect of macroalgae. From left to right top row *Scropsiella trochoidea* (CCAP 1134/9), *Prorocentrum lima* (CCAP 1136/11) and *Dunaliella salina* (CCAP 19/12). From left to right bottom row *Phaeodactylum tricornutum* (CCAP 1055/1), *Prorocentrum cordatum* (CCAP 1112/2) and *Laminaria digitata*. Microalgal images obtained from CCAP.

Figure 2. Dose response changes in photosynthetic performance in *Prorocentrum lima* after the addition of *Laminaria digitata* at different concentrations.

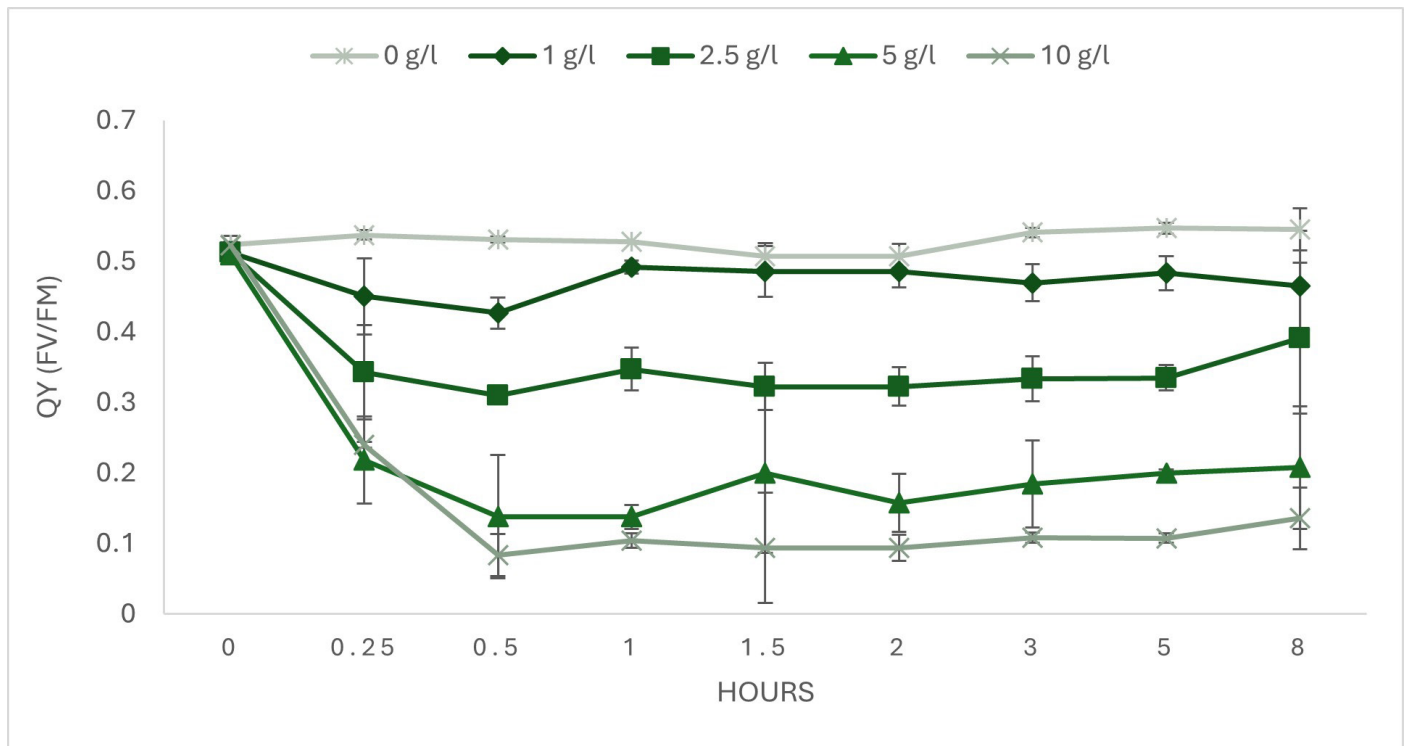
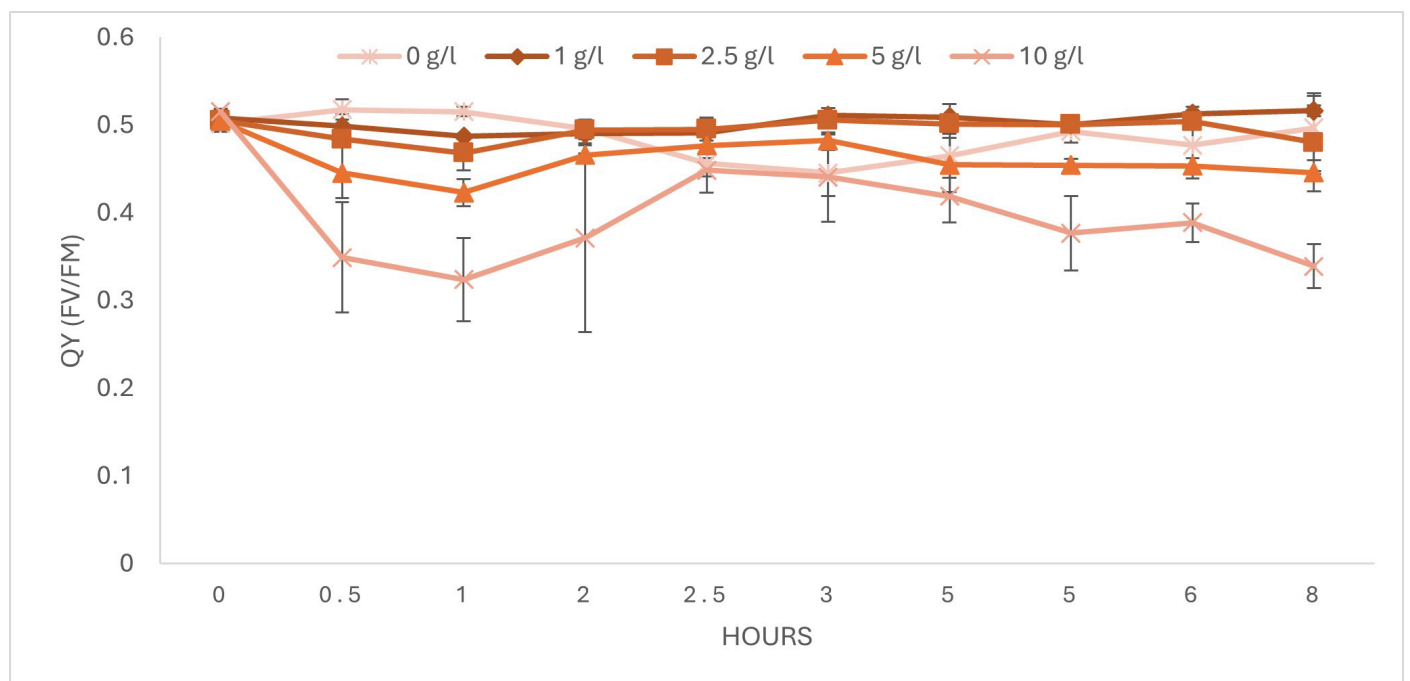


Figure 3. Change in photosynthetic performance of *Phaeodactylum tricornutum* over 8h at various *L. digitata* dosages.



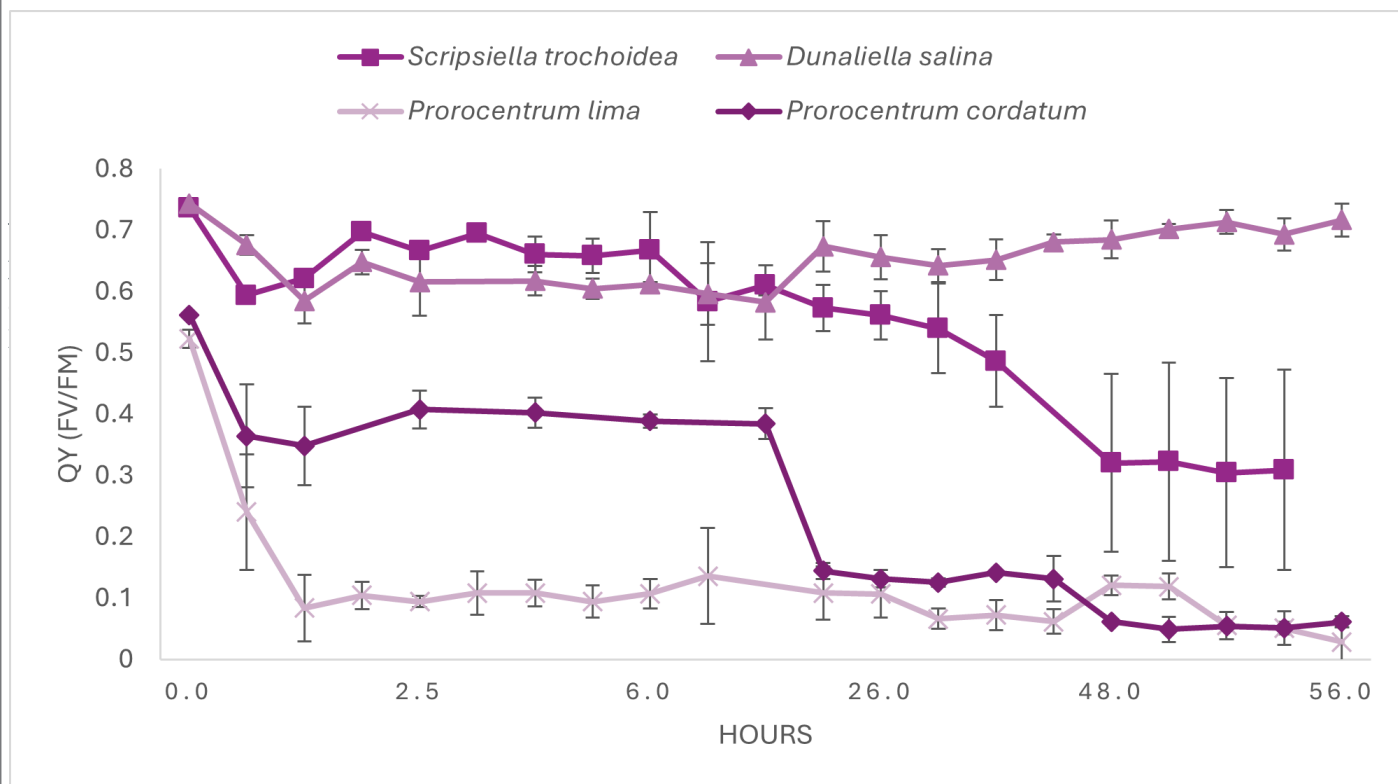


Figure 4. Microalgae variation in photosynthetic performance after the addition of 5 g/l of *Laminaria digitata*.

Acknowledgements

Thank you to all of the people who were kind enough to donate their time to help me with the seaweed collecting and processing, as well as CCAP for their advice on culturing the dinoflagellates used in this research.

We would like to thank BPS for funding this project with award 2023_BPS_O240. This was an explorative project looking into identifying if native seaweeds have the potential to mitigate HABs and reduce their overall impact on aquacultures. The generous support from the BPS has enabled my own career and research development as an ECR. Importantly, this has provided preliminary data which will provide a foundation for future grant application and more detailed research. This funding has also enabled me to develop an internship and dissertation project for 2 undergraduate students.

Submitted by Dr. Francisca Vermeulen,
Prof. Michele Stanley
Scottish Association for Marine Science

Steam Explosion Processing Of *Ulva* and *Undaria*

Introduction

Steam explosion is a biomass pretreatment method which super-heats biomass material under pressure to 120-230°C. After a designated length of time, a valve is opened and the material is rapidly depressurised, causing the liquid water within the biomass to expand into a gas, breaking the cellular structures of the biomass as it does so. This method is used extensively at scale, especially with lignocellulosic material e.g. woody biomass, but there have been few trials with it using seaweed.

IBERS, Aberystwyth University has the only pilot-scale steam explosion rig in the UK, capable of processing 1 kg samples at a time and allowing ranges of optimisation studies to be conducted (Fig. 1). The BPS project fund was split, with the majority of run-days funded by BPS to process the green seaweed *Ulva lactuca*, and a single day funded to conduct initial trial runs on the invasive brown seaweed *Undaria pinnatifida*.

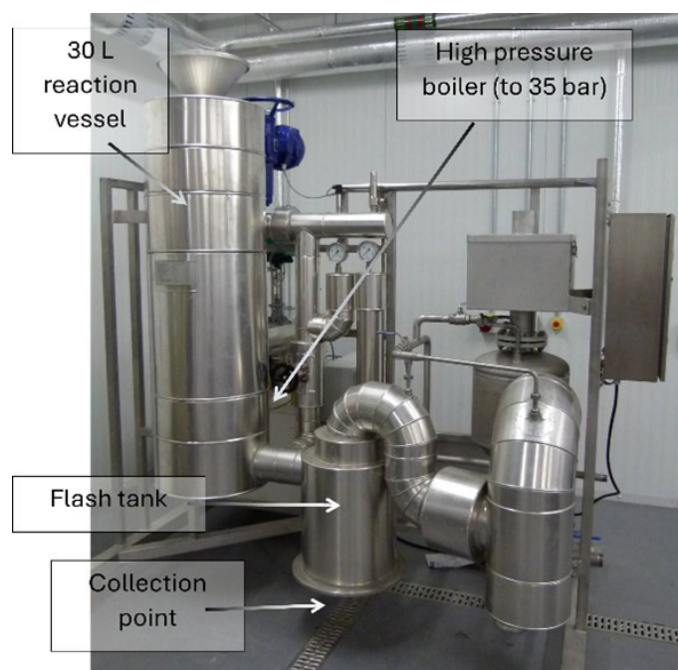


Figure 1. The pilot-scale steam explosion unit at IBERS, Aberystwyth

Ulva Lactuca

Using this rig, multiple batches of the green macroalgae *U. lacinulata* were run through it, using material cultivated and frozen in Portugal and subsequently shipped to the UK. Cultivated *Ulva* differs considerably from wild-harvested *Ulva*, both in identification (one defined cultivated species versus potentially several species which have similar morphology) and in quality, with no silt residues or infauna, typically mud snails (*Peringia ulvae*) trapped within or around the seaweed as can be found with wild-harvested *Ulva*.

Ulva contains approximately 44% ulvan, a complex sulphated polymer predominantly composed of disaccharide structures formed of rhamnose sugars joined to xylose, galactose or other sugars. Consequently, ulvan contains a relatively high proportion of rhamnose, an unusual sugar with high market value and used in a range of industries, from foods to cosmetics. Due to the complexities of the ulvan structure, several enzymes are required to hydrolyse different bonds to reduce it to monomers; however, using the cruder steam explosion method, rhamnose could theoretically also be released in monomeric form.

Using the cultivated *U. lactuca* we were able to conduct multiple runs of 1 kg batches with and without dilute acid pre-incubation (a standard pre-treatment for steam exploded biomass), and at a range of different pressures/temperatures and retention times. We then performed chromatography analysis on the liquids generated, which varied from thin soup to gloopy porridge due to the different treatments (See Fig. 2). The results were also aligned with a complementary autoclaving study, which used a wider range of acids for two autoclaving run times (121°C for 15 or 60 minutes); the autoclave also uses pressure, though at a lower level.

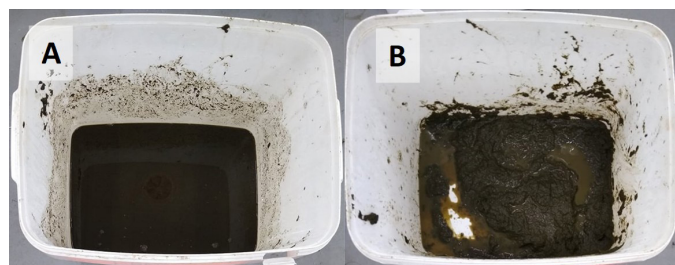


Figure 2. Steam explosion liquors, showing variation in product generated due to changes in the temperature and retention times. A: homogenous liquid, B: with particulates remaining

Previous experimental results showed that using the autoclave, the more severe the treatment (longer time at temperature, using more concentrated acids), the higher the sugar release was. Continuing up the severity index, the steam explosion process, with higher temperatures gave higher rhamnose yields again whilst using weaker acids, maximising the amount of rhamnose that could be released whilst reducing the quantity and therefore cost of acid.

The mean sugar release from the samples has been analysed, with 0.5% phosphoric acid as a pre-treatment step generally giving higher yields. Up to 25% of the *Ulva* biomass has been released as rhamnose under certain conditions, approaching maximum release.

Findings from this work are currently being written up

and are intended to be submitted for publication in the near future.

Undaria Pinnatifida

U. pinnatifida is an invasive brown seaweed which is used extensively in Japanese cooking, where it is called wakame; in the UK we meet it most commonly as the green wakame salad which sometimes accompanies sushi, and as the pieces of seaweed in miso soup. It was first detected in UK waters 50 years ago but though spreading, especially along the south coast of England, is mainly found in ports and marinas elsewhere in the UK. Following two unsuccessful collection attempts at known locations in Milford Haven in summer to autumn 2023; we were supplied with 7 kg collected *U. pinnatifida* from Cornwall, via the fantastic Cat Wilding based at the MBA in Plymouth, in Feb 2024 (Fig. 3).



Figure 3. Cornish *Undaria* prior to steam explosion

Material was processed by steam explosion in single reps to cover the breadth of parameters available using the rig, with the resource available. These were then analysed by chromatography to quantify the single sugar release, as for the *U. lactuca* samples, showing distinct changes depending on severity of treatment. Samples of the *U. pinnatifida* material were freeze dried and we then took the resulting powder to the Ferrier Research Institute, part of the Victoria University of Wellington in New Zealand in May 2024, through internal University impact funds. New Zealand has a problematic level of *U. pinnatifida* colonisation around its coast and the group at the Ferrier Research Institute are looking at ways to potentially convert and utilise this material in the future. Whilst in New Zealand we conducted some

initial trials on the material using NMR and size exclusion chromatography which have shown that the molecular weight decreases as the severity increases. More analysis will be done by the chemists at this institute over the next few months and again we are looking to publish this work in the future, anticipated summer 2025.

The BPS project award number 2023_BPS_0232 enabled us to conduct novel trials on two different seaweeds, and we are looking to publish on both using sets of data accrued through this project (with the BPS acknowledged). Once published, we are looking to use these as springboards, both for future UK funding, and for building on our relationship with New Zealand in the future.

Submitted by Dr Jessica Adams, Aberystwyth University, jaa@aber.ac.uk



Diatom Flora Of Britain and Ireland - Studies On The Diatom Collection Of The Reverend William Smith (1808–1857).

The Diatom Flora of Britain and Ireland consists of a web-based illustrated diatom flora and of peer-reviewed publications on diatoms from aquatic and subaerial habitats. Currently > 350 species have been published on the website <https://naturalhistory.museumwales.ac.uk/diatoms/>. Despite recent taxonomic revisions, there is still disagreement about the application of many species' names. A considerable number of poorly understood taxa described from the British Isles, including many rare and potentially endangered species from insufficiently studied areas, require re-examination.

The current funding from the British Phycological Society for Phase 2 of the Diatom Flora project focusses on the species described by the Reverend William Smith (1808–1857) and other taxa from across the British Isles held in the collections of Amgueddfa Cymru – Museum Wales (National Museum Cardiff), the Natural History Museum, London, and Meise Botanic Garden, Belgium (Fig 1).

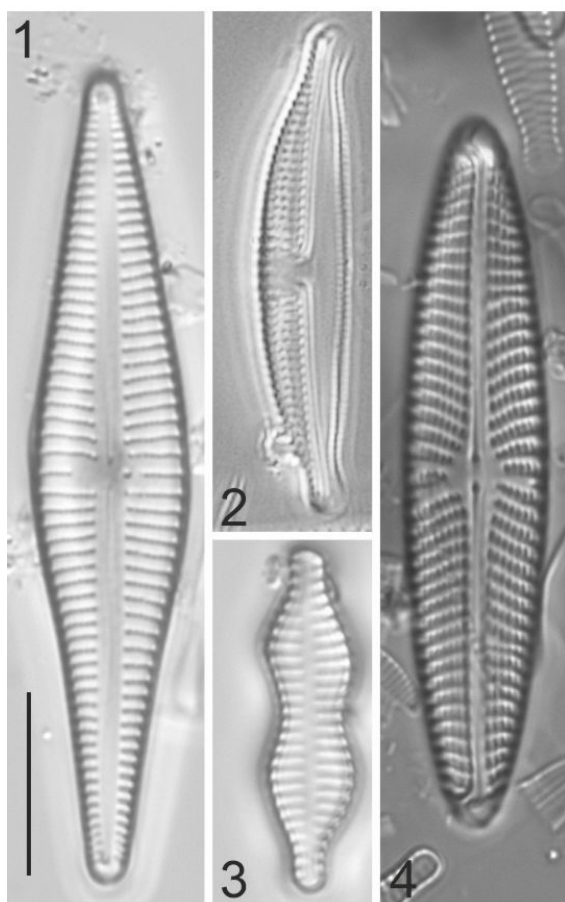


Figure 1. Diatom species from UK freshwaters published on <https://naturalhistory.museumwales.ac.uk/diatoms/>. Image 1. *Gomphonema naviculoides* W.Sm., Edinburgh, Scotland; Image 2. *Halamphora normanii* (Rabenhorst) Levkov, Taff's Well, Wales; Image 3. *Staurosira binodis* (Ehrenberg) Lange-Bert., Ormesby, Norfolk, England; Image 4. *Navicula eidrigiana* Carter, Gallan Head, Isle of Lewis, Scotland

William Smith was one of the most prominent diatomist pioneers in the 19th century and published the first comprehensive flora of British diatoms¹ as well as several papers in the *Annals and Magazine of Natural History*^{e.g.2-4}. Smith was born near Ballymoney, Co. Antrim, Northern Ireland, educated at the Royal Belfast Academical Institute, and then became a Unitarian Minister at Dundee, and subsequently at Molton and Stockport. Because of ill health, he moved to southern England, first to Torquay, then Jersey, Cheltenham, Wareham and finally to Lewes, East Sussex. Many of the species documented in his *Synopsis of the British Diatomaceae* were collected from areas in southern England (e.g. Fig. 2). Smith was elected a fellow of the Linnean Society in 1847, and in 1854 became the chair of Natural History at Queen's College, Cork, a position he held until his death at only 49 in 1857. We were unable to find a picture of William Smith and would be happy to receive a copy if one can be found.

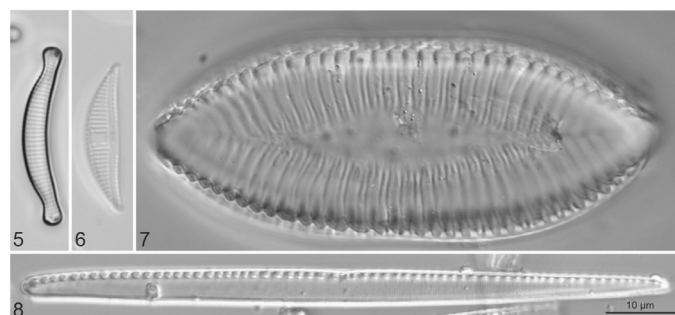


Figure 2. LM. Image 5. *Himanthidium arcus* Smith 1856, Rackham, Sussex, 30.8.1853, likely conspecific with *Eunotia arculus* Lange-Bert. & Nörpel-Schempp in Lange-Bertalot 1993. Image 6. *Amphora minutissima*, type, BM 23137, Lewes, Sussex, Dec. 1850. Image 7. *Surirella constricta*, type, BM 23219, Lewes, Sussex. Image 8. *Homoeocladia* (*Nitzschia*) *filiformis*, type, BM 24416, Bexhill, Sussex, Sep. 1850.

Smith's work was helped by collaborations with his contemporaries including R.K. Greville, L.A. de Brébisson, G. Dickie, J. Ralfs, G.H.K. Thwaites, F.C.S. Roper and C. Johnson. His collections comprise more than 1200 samples from all over Britain. The *Synopsis*, documenting and illustrating, with the help of Tuffen West, around 400 taxa on 69 plates, was for a long time the only comprehensive work on British diatoms^{5,6}. In the *Synopsis*, duplicates of slides with species described by Smith were offered for sale by the publishers and thus, Smith's collection was dispersed to several institutions and countries. A substantial number of his slides and original type materials mounted on micas are now housed at the Natural History Museum (BM), London, and at Meise Botanic Garden (BR), Belgium and were used as part of the current project. A letter from 1862 by Wm.

In the *Synopsis*, Smith described numerous species



Figure 3. Bart Van de Vijver and Ingrid Jüttner (Image 9) working on the William Smith collection at Meise Botanic Garden, Belgium (Image 10-11).



Figure 4. David Williams with Bart Van de Vijver (Image 12), and Ingrid Jüttner (Image 14), working on the William Smith collection at the Natural History Museum, London (Image 13).

indicating that any taxon name (binomial) followed by 'n.sp.' is 'believed to be now for the first time described' (Smith 1853, p. 4, i.e., it is a new species). What today would be considered new combinations or new names, when proposed by Smith, are appended with 'W.Sm.': 'that the species has been previously described, or the generic or specific name been altered, by the present writer' (Smith 1853, p. 4). Since Smith's work, several species reinvestigated by us have been transferred to other genera, such as for example *Synedra biceps* W.Sm., it is now *Eunotia flexuosa* (Bréb. ex Kütz.) Kütz. (Jüttner et al. in press, Fig. 5). Others include *Colletonema vulgare* Thwaites [*Frustulia vulgaris* (Thwaites) De Toni], *Colletonema eximium* (Thwaites) Kützing [*Gyrosigma eximium* (Thwaites) Boyer], and species placed in *Navicula* Bory by Smith but later transferred to other genera, e.g. *N. minutula* W.Sm. [*Fallacia pygmaea* (Kütz.) Stickle & D.G.Mann], *N. scutelloides* W.Sm. ex. W.Greg. [*Cavinula scutelloides* (W.Sm. ex. W.Greg.) Lange-Bert.], *N. angustata* W.Sm. [*Cymboplectra angustata* (W.Sm.) Krammer], *N. tumens* W.Sm. [*Anomoeoneis sculpta* (Ehrenb.) Cleve], and *N. tumida* W.Sm. [*Placoneis elginensis* (W.Greg.) E.J.Cox].

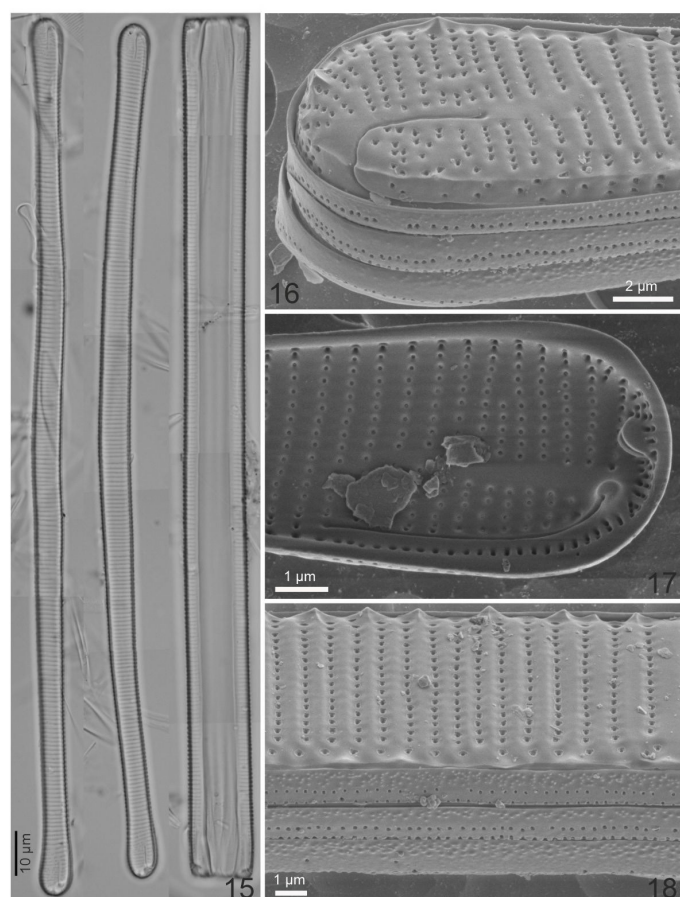


Figure 5. *Synedra biceps* W.Sm. = *Eunotia flexuosa* (Bréb. ex Kütz.) Kütz., type, Wareham, Dorset, 5.12.1849. Image 15. LM. Specimens in valve and girdle view. Images 16 & 18. SEM of outside view of valves. Image 17. SEM of inside view of valve.

Of 26 *Nitzschia* species listed in the Synopsis, Smith described eight as new species in the first volume, mostly from brackish or marine habitats in southern

England, including *N. obtusa*, *N. vivax*, and *N. reversa* from fresh or brackish waters. Of the species occurring in freshwater, he made new combinations of *N. linearis*, *N. tenuis*, *N. minutissima*, and *N. acicularis* (Figs 19–25). *Nitzschia plana* was described as a new species, but now belongs to *Tryblionella* (Van de Vijver et al. 2021). Seven new *Tryblionella* species were described, three from marine/brackish and four from fresh- or brackish waters, including *T. acuminata*, *T. angustata*, *T. gracilis*, *T. levidensis* (Figs 26–30), and *T. marginata*.

For *Mastogloia* Thwaites in W.Sm. 1856, Smith documented five species, *M. danseii*, *M. lanceolata*, *M. smithii* described by Thwaites, and two new species, *M. grevillei* and *M. apiculata*. The material from Lancing, Sussex, with *M. lanceolata* contained two further *Mastogloia* species which are currently studied in detail to determine whether they are new to science. Smith listed 31 species in *Pinnularia* Ehrenb., although some now belong to other genera. We investigated eight species including *P. acrosphaeria* W.Sm., *P. stauroneiformis* W.Sm., *P. acuminata* W.Sm., *P. lata* (Bréb.) W.Sm., *P. divergens* W.Sm., *P. alpina* W.Sm., *P. interrupta* W.Sm. and *P. nodosa* (Ehrenb.) W.Sm.. Other taxa studied include *Cymatopleura apiculata* W.Sm. and *C. solea* (Bréb.) W.Sm. (Van de Vijver et al. 2024), *Asterionella ralfsii* W.Sm., *Campylodiscus costatus* W.Sm., several species in *Epithemia* including *E. hyndmanii* W.Sm., *E. proboscidea* Kütz. and *E. smithii* Carruth. (Jüttner et al. submitted), *Epithemia rupestris* W.Sm. [*Rhopalodia rupestris* (W.Sm.) Krammer], and *Himanthidium soleirolii* Kütz. Several manuscripts about these taxa are currently being prepared for publication in peer-reviewed journals and will be documented subsequently on <https://naturalhistory.museumwales.ac.uk/diatoms/>.

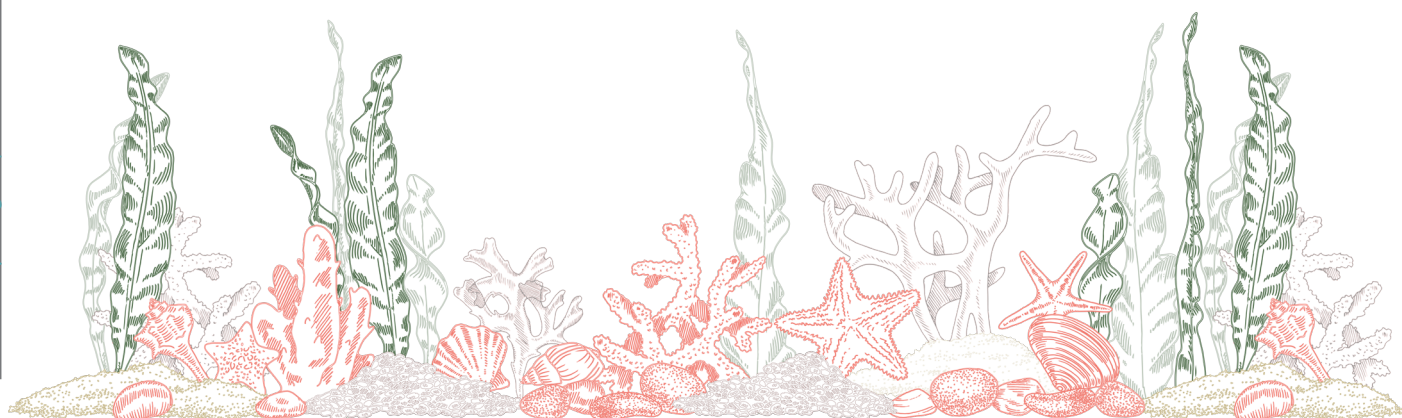
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Submitted by: Ingrid Jüttner¹, David M. Williams²,
Bert Van de Vijve^{3,4}, Edgley A. Cesar²

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STUDENT BURSARY REPORTS

Coffee, Conversation and Celebration: The British Phycological Society's annual meeting, Hull, 6-8th January 2025.

The British Phycological Society's annual meeting kickstarted this January with a reflection of meetings past and for me the last BPS meeting I attended was one of my favourite conferences from during my PhD. I could have perhaps felt on the peripheral, given I'm not sure I truly consider myself a phycologist having more of a background in seagrass, but the fact that I have returned for more phycological fun stands as testament to the aura of BPS. It is a space for those fully submerged in phycology and those working on more peripheral phycological studies to come together for great coffee conversations. This year's meeting did not disappoint, it had the same friendly conversational atmosphere I have come to know and

*"It is a space for those fully submerged
in phycology & those working on
more peripheral phycological studies
to come together for great
coffee conversations."*



love. It brought a complimentary mix of talks ranging from reflections of lifetime achievements beautifully delivered regarding Prof J.A. Raven and Prof A.E. Walsby, to upcoming research paving the way for future endeavours. Further to this, there were key celebrations to be had given foundational milestones were achieved for BPS through the recent publication of Robert Fletcher's book on the 'Brown seaweeds of Britain and Ireland, rounding out the production of identification guides for red, green and brown seaweed across the British Isles', a fundamental milestone for phycology in the UK and for BPS as an organisation.

As always, I have to greatly thank BPS for its continuing support which enabled me to attend the meeting this year through their ECR Travel grant (2024_BPS_096). This gave me the opportunity to act as a session chair for the first time and present one of the final chapters of my PhD on stable isotope ecology and the provenance of carbon within seagrass sediment. I have a keen interest in how algal communities (macroalgal and epiphytic) may

contribute and influence the carbon storage capacity of seagrass habitat from an allochthonous perspective. My talk focused on what proportion of the organic carbon in seagrass sediment is seagrass, algal, suspended particulate matter, saltmarsh or terrestrial in origin. That I was given the opportunity to present this work at a BPS meeting felt most befitting as the BPS were fundamental supporters of this work. BPS provided training funds (2022_BPS_0184) in order for me to attend the 'Survivors guide to stable isotope ecology' during my PhD, which directly benefitted this research. In fact, attending now as a postdoc, these BPS coffee conversations have been key to creating future collaborations. This meeting culminated in a delightful dinner set in the heart of Hull at The Deep in keeping with the marine theme of BPS. Ultimately this 2025 BPS annual meeting and the BPS as an organisation have had a lasting impact on me, and I thoroughly recommend attending future BPS meetings to other ECR's.

Submitted by: Emma A Ward, University of
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British Phycological Society Winter Meeting in Hull

I had the opportunity to attend the annual winter meeting in Hull with the support of a BPS Early Career Researcher travel bursary (Award #2024BPS095). After attending my first BPS meeting in Reading in 2024, I knew that I wanted to come back for more in the following years! The 2025 BPS winter meeting again presented me with firsts such as my first time visiting Hull and the first time sharing my current postdoctoral research on single-nucleus transcriptomic sequencing of the algal partner (photobiont) found in lichens. While the photobiont is a frequently overlooked yet essential part of the lichen, I knew that a room of phycologists would greatly appreciate my ongoing efforts to characterize the functional diversity in these algal symbionts. The results I presented this year were from a pilot scale project used to demonstrate the successful application of single-cell transcriptomics to capture algal symbionts and it was great to engage in discussions with other attendees about future directions to take this project including the exploration of the impacts of climate change and desiccation to further capture functional capabilities in the photobionts.

I presented my work in one of the general phycology sessions which included talks from the other diverse research areas in phycology including chloroplast genome engineering and seaweed ecology. Other talks at this year's meeting took us from snowy landscapes in the mountains of the Scottish Highlands to submersibles exploring the mesophotic zone in Bermuda. The same level of diversity in research could be seen in the methodologies applied including talks and posters covering topics ranging from stable isotopes to flow cytometry to machine learning approaches to automatically identify and classify microalgae images.



Presenting my research on lichen photobionts (Photo credit: Kirsten Müller)

The meeting provided opportunities for me to reconnect with old colleagues, including my PhD supervisor (Kirsten Müller from Canada), form new relationships with potential collaborators for the future, and to engage in discussions with others about our own research experiences.

The meeting concluded with an evening dinner at The Deep, a thematic aquarium venue to host an evening for phycologists. Mingling with jelly fish in a welcome reception and dining next to a tank full of fishy friends provided a social conclusion to two days of exciting scientific content.



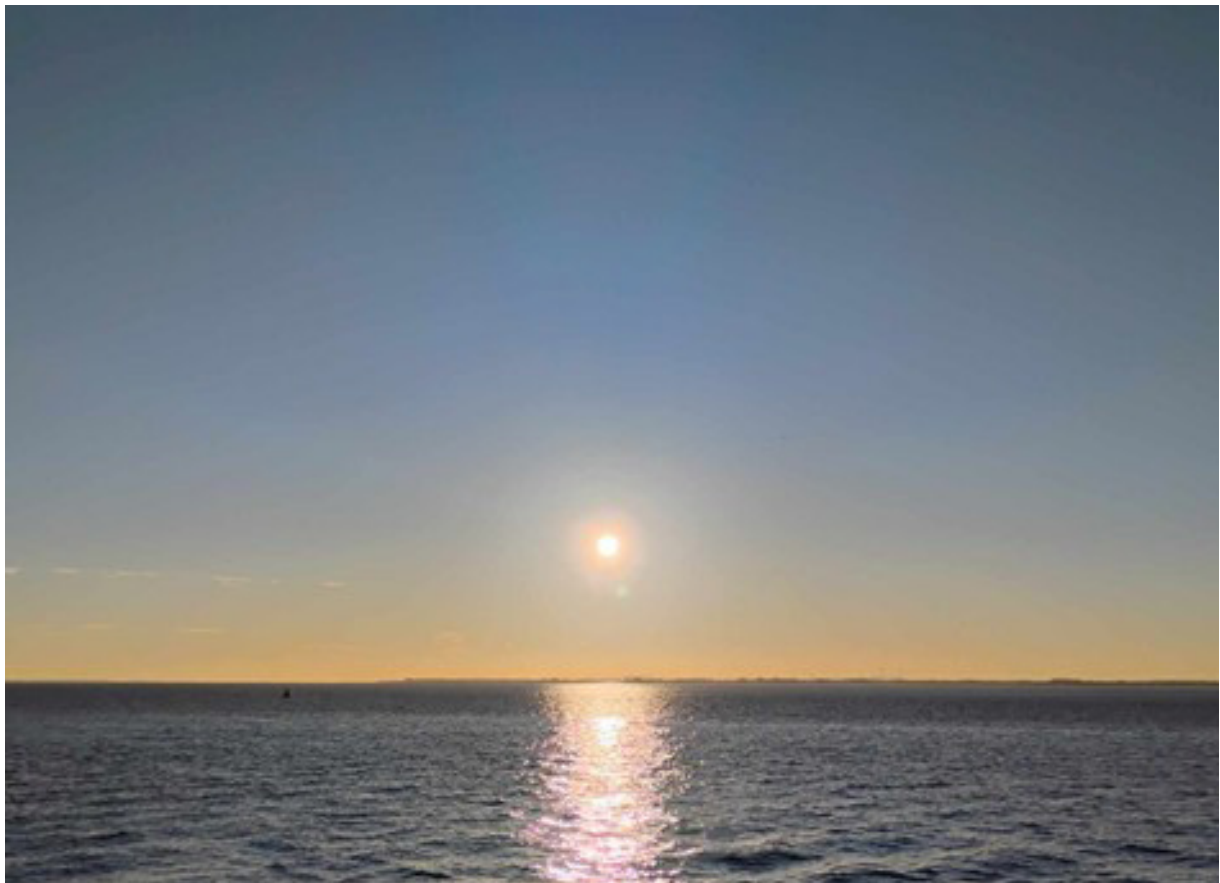
Conference dinner at the aquarium, The Deep, with jellyfish in attendance

With the short daylight hours and jam-packed days full of scientific content getting to see the city in daylight had been difficult. I spent my final morning before my journey back to Norwich enjoying some of the scenery on a brisk, but sunny winter walk. I would like to thank the BPS for providing me with this opportunity to attend this year's winter meeting and for being able to engage further with phycological community.





Winter morning walk in Hull following the conference



Submitted by: Ellen Cameron, Earlham Institute,
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Optimizing Cultivation and Nutrient Enrichment for Enhanced Biomass Production in *Asparagopsis taxiformis*

At the 73rd British Phycological Society (BPS) Winter Meeting, I had the opportunity to present my research on optimizing *Asparagopsis taxiformis* cultivation to enhance biomass production. *Asparagopsis taxiformis* is a red macroalga with significant potential as a methane-reducing feed additive for livestock. However, large-scale cultivation requires a comprehensive understanding of its strain-specific growth responses and nutrient requirements. My research aims to refine these parameters to support sustainable production for agricultural applications.

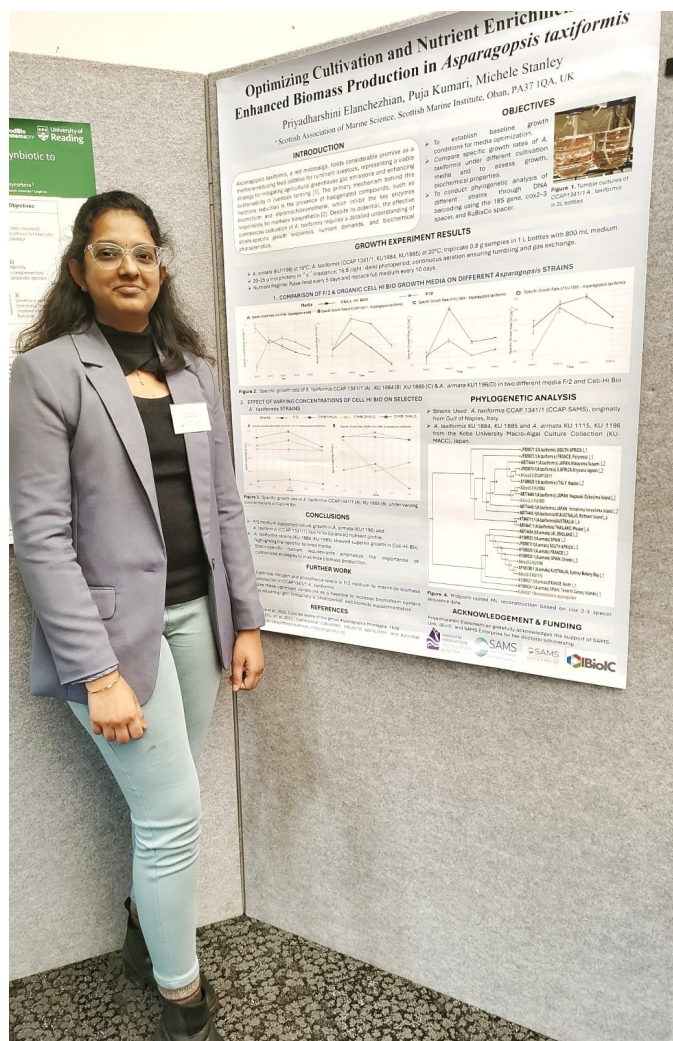
To achieve this, I utilized DNA barcoding (18S, *cox2-3* spacer, *RuBisCo* spacer) to identify multiple *Asparagopsis* strains and develop tailored cultivation strategies. Growth trials were conducted under controlled conditions (20°C, 16:8 light-dark cycle) comparing F/2 and Cell-Hi Bio media to assess their impact on biomass yield. Results demonstrated that Cell-Hi Bio (2 mL per 800 mL seawater) significantly enhanced the growth of strain KU1885, while a 2:1 nitrogen-phosphorus ratio in F/2 medium yielded the highest biomass for strain CCAP 1341/1. These findings provide critical insights into nutrient optimization, directly influencing the feasibility of *A. taxiformis* as a methane-reducing feed supplement.

The BPS meeting was a valuable experience that provided a platform to engage with experts in phycology and algal biotechnology. The event featured a range of informative talks covering advancements in macroalgal cultivation, biotechnological applications, and environmental sustainability. Presenting my research in the poster session facilitated meaningful discussions with fellow researchers and industry professionals. The audience showed great interest in the potential of *A. taxiformis* for methane reduction, particularly regarding the balance between maximizing biomass yield and maintaining high bromoform content—a key compound responsible

for methane inhibition in ruminants. Engaging in these conversations helped refine my perspective on the broader applications of my work, especially in the context of sustainable agriculture and climate change mitigation.

Attending this conference also allowed me to establish new connections. Coming from India to Scotland for my PhD was a significant journey, and traveling to Hull for this event marked another milestone in my academic career. The student bursary I received from BPS played a crucial role in making this trip possible. This financial support enabled me to share my findings, exchange ideas with leading scientists, and gain constructive feedback that will help shape the next phase of my research.

Beyond the academic sessions, the conference provided numerous networking opportunities, including informal discussions during social events. The conference dinner was particularly memorable, offering a relaxed setting to interact with researchers from diverse backgrounds. These interactions reinforced the importance of interdisciplinary collaboration in advancing algal biotechnology and addressing global sustainability challenges. I sincerely thank the British Phycological Society for their generous support (Award 2025BPS140).



Riddhi Salotra from Queen's University Belfast took a picture of me presenting my poster.

Submitted by: Priyadarshini Elanchezhian, Scottish Association for Marine Science, Priyadarshini.Elanchezhian@sams.ac.uk

BPS Travel Bursary Report Hull Meeting

At the beginning of 2025, I had the opportunity to present my PhD work at the British Phycological Society (BPS) Annual Winter Meeting held at the University of Hull. This was possible thanks to support from the BPS Travel Bursary grant (2024BPS094). As my second BPS meeting, I was excited to give my first oral presentation to an audience of experts in the field of phycology.

The conference began with the Manton Prize session, where I presented the first experiment of my PhD looking into 'Self-cleaning Slipways: Harnessing Species Interactions for Sustainable Management of Coastal Infrastructure'. I discussed the potential for using common limpets (*Patella vulgata*) as a sustainable, nature-based solution for the management of hazardous algal growth on boat slipways. This was a valuable opportunity as I was able to present my first set of results and receive feedback and new ideas from experienced academics.

was another fantastic experience and a chance to talk to other PhD students from a range of universities. Overall, the BPS Winter Meeting 2025 was a key opportunity to build my confidence and career connections and to share my work with the BPS community. I am already looking forward to the 2026 Winter Meeting in Aberystwyth!

Supervisory Team: Dr John Griffin¹, Dr Louise Firth², Dr Matthew Perkins³

Swansea University¹, University College Cork², University of Plymouth³

PhD Funding Bodies: Swansea University, Pembrokeshire County Council, Natural Resources Wales



S. Henderson presenting at the BPS meeting

BPS is a welcoming society, and this annual meeting enables those earlier in their careers to meet researchers and engage in topics across the broad area of phycology. It was particularly enjoyable to meet familiar faces again and to see how their projects and careers had developed over the past year.

The finale, the conference dinner at The Deep aquarium,

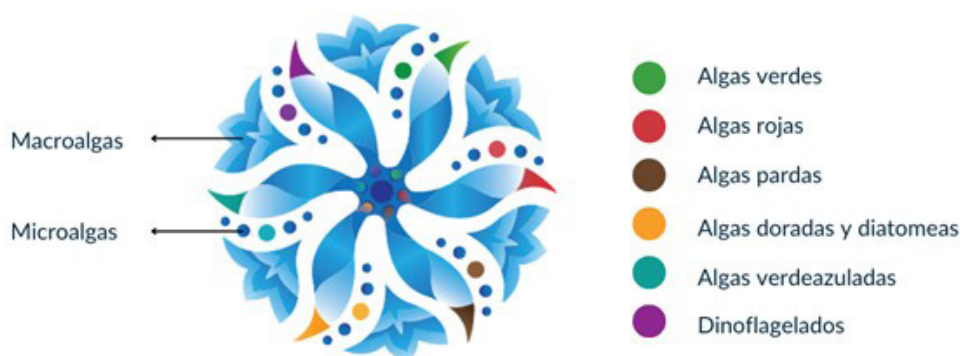
Submitted by: Sally Henderson, Swansea University, (2272796@swansea.ac.uk; sallyhenderson.bsky.social)



BPS Member's Travels

XII Congreso De Ficología De Latinoamérica y el Caribe & X Reunión Iberoamericana de Ficología Costa Rica Nov. 17-22, 2024

Escaping from the dull grey and cold November in the UK to the tropics of Costa Rica was a great winter treat. I attended the XII Congreso De Ficología De Latinoamérica y el Caribe and the 10th Iberoamerican Meeting of Phycology. The joyous and colourful nature of the country are exemplified by the conference logo.



The conference (the first since 2017) was hosted by The Phycological Society of Latin America and the Caribbean, the Spanish Society of Phycology, the University of Costa Rica and the National University of Costa Rica (UCR). The venue was the University of Costa Rica (UCR) in San José.

The main or rather only language at this conference was Spanish. I soon found out that I was the only delegate from the UK and the only person to give a talk in English. I arrived at the tail end of a tropical storm that had closed many roads and caused UCR to shut to students. Throughout the week the weather veered from pleasant sunshine to very heavy downpours, sometimes at hourly intervals!

We all know how bad the English are generally at speaking other languages and going to this conference emphasised to me how most of the English speaking world takes the universality of our language for granted. My 'learners' grasp of Spanish and the high quality of the PowerPoint presentations together with the niche subject material allowed me to understand most of the talks.

The conference lasted 5 days (Monday to Friday) with a 'free day' in the middle when one could go on tours and see a bit of the surrounding country or simply explore San José. The format of the conference was familiar, with a program of parallel sessions. On Monday the topics were biotechnology,

biodiversity and ecology. On Tuesday these topics continued with the addition of taxonomy. Wednesday was the free day and on Thursday topics were maerl, calcareous algae, toxicology, physiology and biodiversity. On the last day, Friday, the morning session was on Sargassum, and the afternoon was a variety of topics, largely biodiversity and aquaculture.

The inaugural lecture by Ligia Collado-Vides (from Florida International University) was 'Macroalgae in the Anthropocene era: Causes, challenges and opportunities'. Ligia talked eloquently about the problems associated with our era: climate change, nutrient

enrichment, pollution and loss of biodiversity. A lot of her talk centred on algal blooms and specifically the problem of pelagic Sargassum species in the Caribbean and its ecological and economic consequences. Ligia's approach wasn't just one of doom and gloom. She put forward some potential benefits to humans in terms of harnessing this resource and encouraged people to subscribe to SargNet.

On each day, to introduce sessions, there were 'Magistral' talks by eminent phycologists including Guiseppe Torzillo, Alejandro Buschmann, Félix López Figueroa, Maribel Vargas and Gabriel Acien.

Speakers were from countries ranging from the Antarctic south of Patagonia to Central America, Mexico and the Caribbean. Many speakers were PhD students but there were also inspirational talks from experienced experts in various fields of study.

My overall impression was one of being in a parallel phycological universe. Many of the talks were on subjects one would hear about at a BPS conference but here different species were being studied and everything was in Spanish.

Delegates were well catered for with delicious Costa Rican coffee being provided during breaks together with cakes, pastries and savouries. At lunch time we could

either wander off campus or go to the university canteen where food was tasty and inexpensive. I quickly found friendly delegates who invited me along to sit with them. I attempted some Spanish but things usually lapsed back in to English as my limited Spanish vocabulary didn't make for conversation that flowed easily.

Costa Rica is peppered with volcanoes, five of which are active. On our free Wednesday I went on an excursion to visit Irazú which is currently inactive but blew up with disastrous effects in 1963. The main crater is at 3,310 m and the slopes are cultivated for potatoes, onions and other crops. I even saw a herd of Jersey cows grazing. Not what I expected to see in a tropical country! We also visited the

Park off Panama. There is so much exciting work to be done on the maerl habitats of Central America. My talk on the long term monitoring of the Milford Haven maerl bed in Wales seemed well received and stimulated a few questions from the audience.

Thursday afternoon was a poster session. I thought the posters were generally of high quality and well presented. The poster sessions are always enjoyable and give delegates the opportunity to circulate and talk about research topics of interest to them.

Our last day was Friday with another session on Sargassum and problems that the blooms are causing in the Caribbean.



beautiful Jardín Botánico Lankester, a centre of orchid research and part of UCR.

Thursday morning's session on maerl (and other calcareous algae) was particularly interesting for me. There were young researchers from Columbia, Valentina Piñeros Pérez and Natalia Rincón Díaz, who are studying a newly discovered maerl bed in Tayrona National Park and doing interesting work on carbon sequestration. Another student, Noemi Leon Correoso, estimated that there were over 30 undescribed maerl species off an island in Coiba National

University of Costa Rica (UCR) in San José.

The final event was the conference dinner. A coach was organised to take us out of town to the big Crown Plaza hotel complex. A huge room laid out with tables was prepared for the event. There were speeches from the conference organisers and some sad but poignant obituaries read out to celebrate the lives of phycologists who had passed away since the last conference in 2017. The mood became more upbeat when it was announced that the next conference will be in Malaga at the end of 2025. Chief conference organiser Cindy Fernández-García was presented with

flowers. She had done a superb job. Dancing followed the food, led by a DJ with a great sound system. The Latinos sure know how to party! Everyone threw themselves into energetic salsas and various group dances where everyone knew the actions (apart from me of course!). It was a great night and fitting end to a very enjoyable week. I encourage you all to go to Malaga next November.

I want to send special thank yous to Cindy Fernández-Garcia and her team for making me feel welcome and especially to Natalia Rincón-Díaz for answering my numerous questions before the event!



Participants XII Congreso De Ficología De Latinoamérica y el Caribe & X Reunión Iberoamericana de Ficología

Submitted by: Francis Bunker, (fbunder@marineseen.com)

Visit to Edinburgh Botanical Gardens (E)

20th – 22nd November 2024

¹The Natural History Museum, London, SW7 5BD, UK,

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As part of the British Phycological Society Award to the ‘Diatom Group’, who are working on the Diatom Flora of Britain and Ireland project (<http://naturalhistory.museumwales.ac.uk/diatoms/>), David Williams visited the Edinburgh Botanical Gardens (E), Scotland from the 20th – 22nd November 2024. Although a short visit, several outcomes were possible.

‘Diatom Flora of Britain and Ireland’

The primary purpose of the visit was to enhance the data that appear, or will do so, on the ongoing ‘Diatom Flora of Britain and Ireland’ (<https://naturalhistory.museumwales.ac.uk/diatoms/>), in particular the types (or relevant, related and original material) from the early collections of William Smith (1808–1857), Friedrich Traugott Kützing (1807–1893) and Louis Alphonse de Brébisson (1798–1888). Particular interest was in the Kützing types as the Natural History Museum London (with other herbaria) has a comprehensive project on his specimens, their whereabouts, the duplicates and the types. Just for background, Kützing is considered one of the three founders of diatom taxonomy, discovering and naming a large part of the currently recognised, and still used, common freshwater diatoms – many occurring in European waters. Diatom-Base (<https://www.diatombase.org/>) – the comprehensive online database of diatom names – attributes over 1000 names to Kützing. Most of his specimens are housed in BM, Meise Botanic Garden, Belgium (BM) and to a lesser extent in Natural History Museum, Vienna, Austria, and the Natural History Museum in Leiden, The Netherlands and Edinburgh. In addition to the type specimens, there is a considerable amount of additional Kützing material.

The collections of the other two founders of diatom taxonomy, Christian Gottfried Ehrenberg’s (1795–1876) and Robert Kaye Greville’s (1794–1866) are housed respectively in Berlin and in London. Both Ehrenberg and Greville have usable, accessible printed and/or online catalogues, but no such item has ever been produced, or is generally available, for Kützing’s collection.

Uniquely, in BM, Kützing’s collection consists of samples dried on to mica stored in paper packets; the packets are

fixed to conventional herbarium sheets (the precise number of these packets is yet to be determined), along with a set of glass slides made from these samples (c. 1700 slides). Although the BM collection has many types – Kützing’s as well as his contemporaries – it is not simply a nomenclatural resource as the mica pieces stored in the packets provide almost perfect specimens for electron microscopy and have become part of a number of active and ongoing research projects. The purpose of this visit to Edinburgh was to ascertain what raw materials of Kützing’s were in Edinburgh.

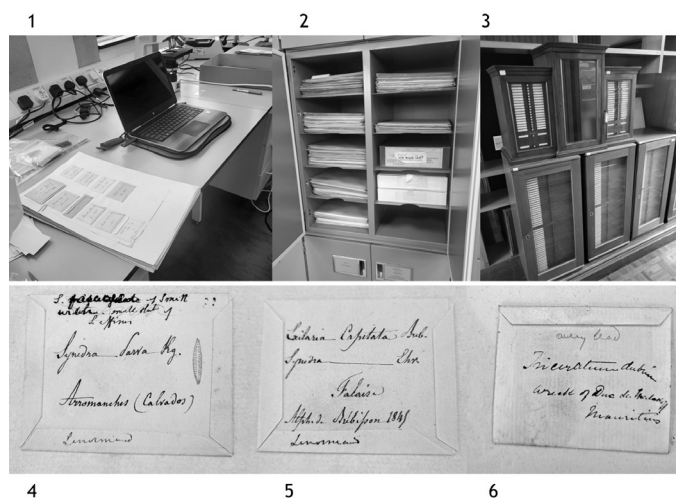
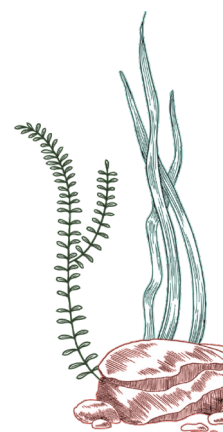
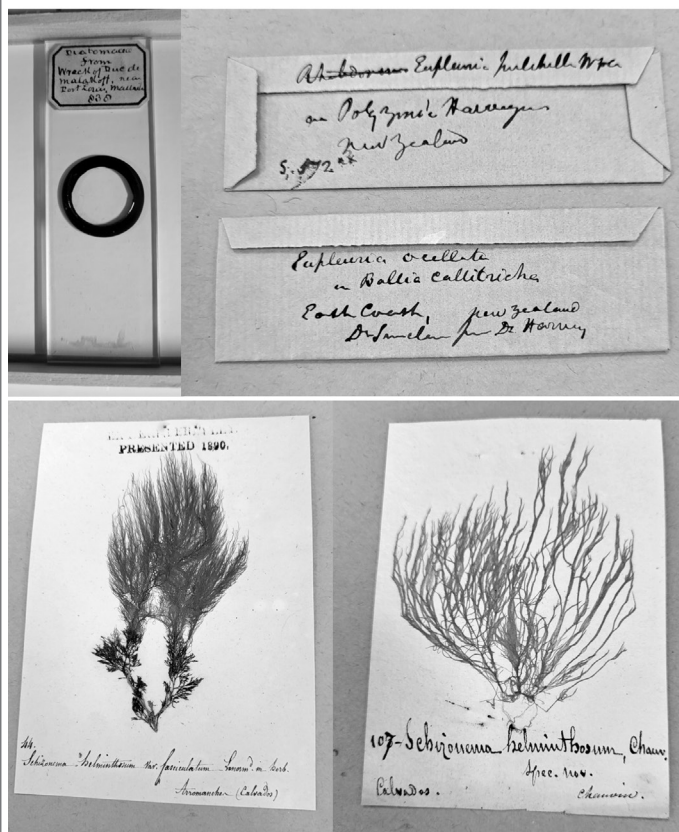


Figure 1. 1) The setup when in Edinburgh; 2) Herbarium cabinets; 3) slide cabinets; 4–6) packets of raw material that can be used for electron microscope work.

It was not possible to go through every herbarium sheet in the collection, but from those examined, information was extracted from some 50+ types – although it is not certain, at this moment, what types they are (syntypes, isotypes, etc.) without further study, or if some were actually de Brébisson’s species (specimens). Of the 50 that are of interest to our project, most are duplicates, but nevertheless they provide raw material that can be used for SEM (scanning electron microscope) work and, potentially at least, DNA work. The Edinburgh types have been added to the BM/BR spreadsheet.





9

10

Figure 2. 7) Slide from the collection; 8) two sampled packets; 9-10) two more packets of material, non Kützing.

One item worth pointing out is that the collection contained a large amount of raw material originally from Sébastien René Lenormand, or at least they came from him at some point. None of his diatoms are mentioned here: <https://bionomia.net/Q16065592> and we are not sure other herbaria recently visited have much of his diatom material. This needs further investigation.

Additional specimens found

Several other specimens were located that were required for other projects are:

Triceratium (?) *dubium* Brightwell (*Triceratium dubium*: E-1452805 (Mauritius): BM has a slide, which will be designated as lectotype, but Edinburgh has specimens that can be examined using the SEM. There is also an isolectotype slide in Edinburgh. This work will be part of the 'Notes on the diatom collection of the Natural History Museum, London (BM)' series ('Kützing's species of *Odontella*; Roper's species of *Biddulphia*'). This species is now *Pseudictyota dubia* (Brightwell) P.A.Sims & D.M.Williams.

'*Isthmia grandis*' Walker Arnott nom. herb. (*Isthmia grandis*: E01452808 (Australia)): Several slides in BM are labelled for '*Isthmia grandis* Walker Arnott', a name never validly published. A packet of raw material is kept in Edinburgh. Specimens of '*Isthmia*' *grandis* and *I. nervosa* were sampled

for SEM work, both from Australian material, neither are species of *Isthmia*.

Achnanthes costata: Samples of type specimens for *Eupleuria ocellata* and *E. pulchella* were taken to complete a study on *Achnanthes costata*:

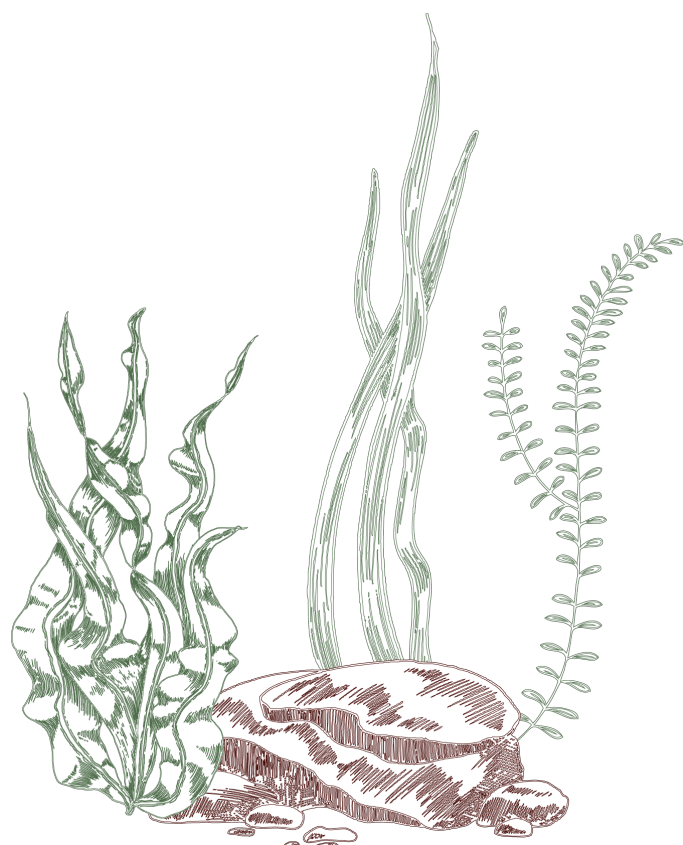
Eupleuria ocellata – 'New Zealand, on *Ballia callitricha*' [Harvey, Dublin] (*Eupleuria ocellata*: E01452792 (South Australia, Cape Northumberland, Dr Curdie))

Eupleuria pulchella – 'New Zealand, on *Polyzona Harveyana*' [Harvey, Dublin] (*Eupleuria pulchella*: E01452807 (New Zealand, [Harvey] 5.572))

'*Diademes obtusa*' (*Diademes obtusa*: E01452809 (UK)): Another unpublished name and part of a ms dealing with its complex nomenclature.

We are grateful to David Mann and Heleen Plaisier for their assistance during David's two-day stay at the Edinburgh Botanical Gardens.

Submitted by: David M. Williams¹, Ingrid Jüttner², Bart Van de Vijver



BOOK REVIEWS

Brown Seaweeds (Phaeophyceae) of Britain and Ireland

by Robert L. Fletcher

Pelagic Press

It's been a long time coming and now it's here, the ultimate guide to brown seaweeds (Phaeophyceae) of Britain and Ireland.

There are not many books like this published these days, an 806 page beautifully bound volume on the detailed taxonomy of one group of algae from a limited geographical area. Nearly 200 species of brown seaweed are described. This book isn't a page turner to keep by the bedside, rather an invaluable reference for any phycologist or marine biologist with an interest in seaweeds.

Bob Fletcher explains how the work started with the task to produce the book being initially taken on by Helen Blackler and Mary Parke in 1967 and then passed to George Russell in 1972. George Russell enlisted Bob Fletcher's help and eventually the whole task fell to Bob. I've used photocopies of George Russell's unpublished keys to the genera and species of brown seaweeds over the years and really, they are all we've had until now in the English language, especially for fine filamentous species such as *Ectocarpus*. Now we have the new book with updated taxonomy, line drawings, photographs and keys to all the major groups – all in one volume. (Bob did publish Part 1 of the Brown Seaweeds in 1987 but so many taxonomic changes have occurred since then, it was decided to update and include Part 1 in the current all-encompassing volume.

The introduction fills 60 pages and includes the topics of Cell Structure, The Brown Algal Thallus (including structure and development, longevity and environmental influences), Reproduction, Life Histories, Community Ecol-

ogy, Floristics and Systematics. There is also a Checklist of Phaeophyceae for Britain and Ireland.

There are two keys to genera, a 'quick generic key' which is a first port of call for someone with an unknown brown seaweed. Following this is a 'full generic key' best suited

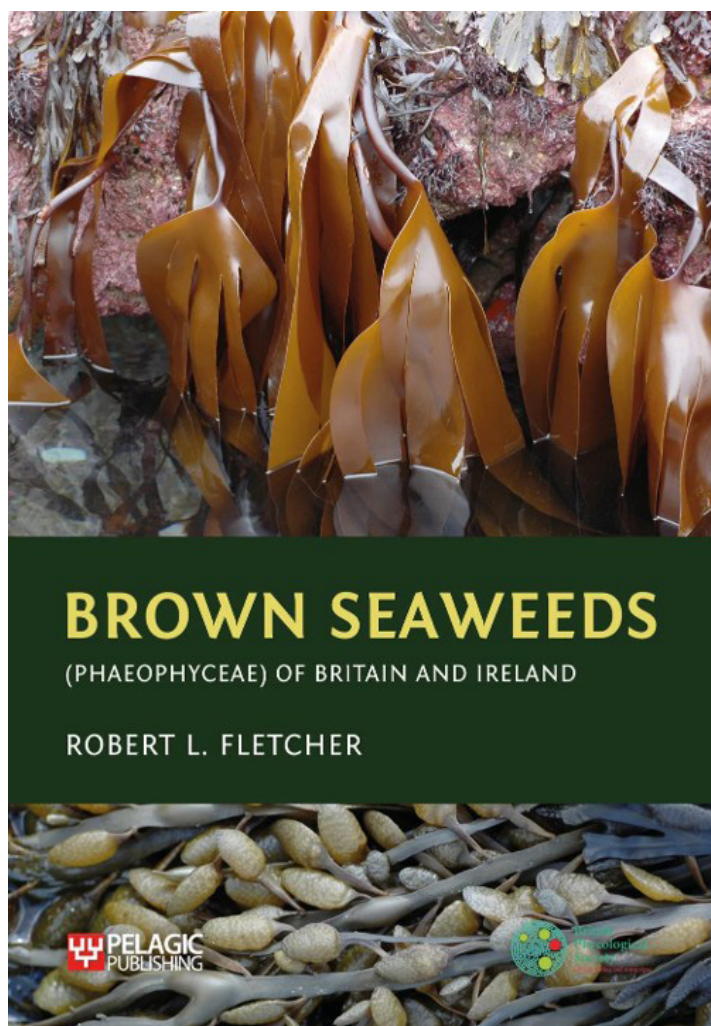
for field workers with more expertise. When arriving at a genus, one then turns to the section dealing with that genus. It would have been useful to be guided to page numbers within the keys but instead one has to look up the genera and species in the index. Never mind, my book will undoubtedly get a lot of use and I will pencil in the page numbers where appropriate.

Both the keys and the species descriptions rely heavily on terminology which may be unfamiliar, so there is a Glossary at the back of the volume where unfamiliar terms can be looked up.

Where there is more than one species in a genus, a further key to species is provided. In addition to the descriptions there are photographs and line drawings to aid with identification.

I decided to look at a couple of the genera that have caused me problems in the past. One example is the common and ubiquitous genus *Ectocarpus*. There are four species in the key: *E. siliculosus*, *E. crouaniorum*, *E. fasciculatus* and *E. penicillatus*. I looked with interest at the name *E. crouaniorum*, which I didn't recognise. Despite diagnostic features, the text explains how *E. siliculosus* and *E. crouaniorum* are very similar and hard to distinguish. However, there is then a useful summary of morphological differences which can distinguish the two species.

In the past I've struggled with identifying crustose brown



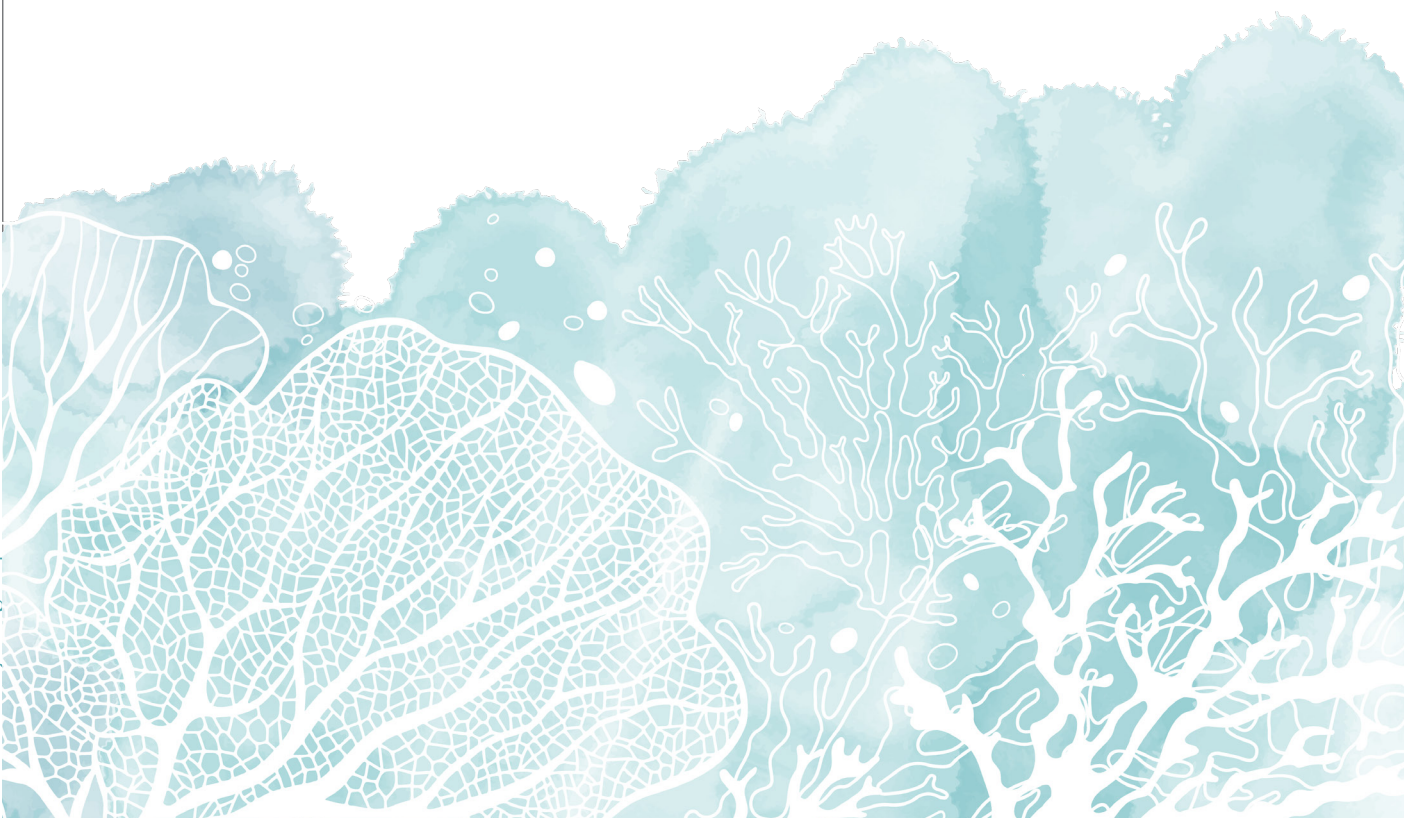
Brown Seaweeds (Phaeophyceae) of Britain and Ireland by Robert L. Fletcher

seaweeds and so I looked up the genera listed in Group E (thallus mainly epiphytic, either encrusting or procumbent, pseudoparenchymatous or parenchymatous). Seaweeds in this group are common on most rocky shores but readily available guidance on distinguishing them is lacking. Most of the field teams in which I work call all the brown crusts on limpets *Pseudoralfsia* (formerly *Ralfsia*) *verrucosa*. This is undoubtedly incorrect, and I now look forward to trying to being able to distinguish the different genera and species. Unfortunately, field photographs of some species are lacking (e.g. *Stragularia* sp.) but one can always use online resources such as AlgaeBase to supplement the guide.

For someone like me, a taxonomist and fieldworker, this book will be invaluable. There are very few records of some of the species covered by Bob's book and I predict that an important result of its publication is that we get a better understanding on the distribution of these species.

This is a lifetime's work and a great achievement for both Bob Fletcher and Juliet Brodie, whose editorial eye has ensured that we have a volume of outstanding quality. I would recommend this book to anyone involved with fieldwork and identification of brown seaweeds.

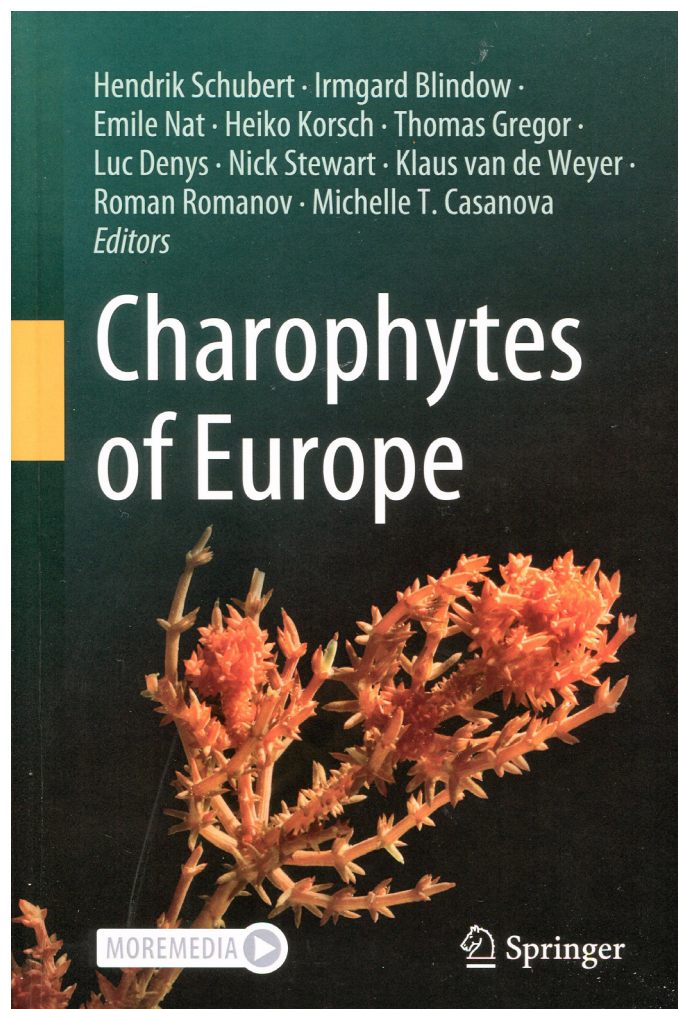
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Charophytes of Europe – A Major New Publication.

Charophytes of Europe

Edited by: Hendrik Schubert, Irmgard Blindow, Emile Nat, Heiko Korsch, Thomas Gregor, Luc Denys, Nick Stewart, Klaus van der Weyer, Roman Romanov & Michelle T. Casanova



Springer, Cham, Switzerland, 2024
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Pp. xiii + 1144, with numerous B&W and colour photos, drawings and maps;
hbk £199.99;
e-book £159.99

The Botanical Society of Britain and Ireland (BSBI) considers one group of algae, the charophytes, worthy of study by its members. This is probably because charophytes are often collected alongside other freshwater aquatics, thus making them honorary 'pondweeds'.

BSBI asked me to write a review of a major new work, *Charophytes of Europe*, published in December 2024. The full review can be found in BSBI News No. 159 (April 2025) on pages 76-77, but I wanted phycologists to be aware of this excellent book.

A determined team of European experts have come together over 10 years to pool their knowledge and data to produce this definitive work. It is now, as they hoped, "a useful tool" and "common standard", but it is so much more. Apart from some minor quibbles* it is almost perfect – a triumph of hard work, cooperation, a 'labour of love', and a good read, which is quite something considering it has 1144 pages and weighs 2 kg! An electronic version is available, of course.

As well as the 63 species descriptions, there are chapters covering taxonomic status, systematics, phylogeny, ecology, conservation status and evolution – and more. Well illustrated with photographs and line drawings, and packed with detail, I consider this book a marvel.

Rarely considered by phycologists in Britain and Ireland, charophytes were championed by (often) non professional devotees, whose expertise was borne out of their enthusiasm for the group. It is now time for BPS members to join with the BSBI community to further their study. 'AlgaeBase' has already updated the relevant entries and *Charophytes of Europe* is the 'jumping-off point' that will bring you further enlightenment.

*There is one major quibble. The 7 genera are introduced but not fully described.

Review submitted by: Jennifer Bryant,
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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 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.**

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Kelp on the sands of Bertha's Beach in East Falkland of the Falkland Islands.

