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THE PHYCOLOGIST

The Newsletter of the British Phycological Society

Editor: **Bruce Osborne**

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Editorial

Who was it who sang 'Now is the time to say goodbye. Now is the time to yield a sigh', as part of the finale to their television programme? Was it the Goodies? Was it Monty Python? It certainly could have been something from either Spike Milligan or the Goons* Well, now it is my time to say goodbye. After, I think, 5 years in the post, I have finally decided to give up the editorship of 'The Phycologist'. With a sigh? Well, yes, with a sigh. Although sometimes onerous it was never going to be an all-demanding task, it is the accumulation of a multitude of different tasks, one of which is producing this newsletter, that have resulted in a major demand on my time and effort. Besides, it's almost always constructive to bring in new individuals to posts within the Society with fresh ideas and approaches and now is as good a time as any for change. Whoever takes over the job, I wish them well!

Clearly the Society faces increasing challenges for the future. If we are honest most of us recognise that support for phycology is dwindling and we have already entered an era where a strict phycological distinction may soon be no more, or certainly much diluted. We may not like this, but we need to be prepared to adjust to changed circumstances if we are to maintain the Society as the vibrant and active organisation it is and to embrace all those who have even a peripheral interest in phycology.

Personally I believe that more resources should be invested in publicising the Society, whatever form that takes, and for providing a voice on relevant scientific issues. There has been a debate in the past, for instance, about on-line publication of the Newsletter, an issue that council and the membership may have to re-think. Whatever form the newsletter takes it can and should be, an important vehicle for publicising the Societies activities and, importantly, its opinions/views. The

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importance of these dual roles should not be under-estimated, as I have become acutely aware during my tenure as editor. Whilst we have come some way to covering the former we have only scratched the surface in regard to the more important issue of the Societies role, views and opinions on contemporary issues. There is a continuing debate out there about the direction of modern science and the role of scientists in society. Involvement in this debate will be uncomfortable for many of us who are interested primarily in research and education, viewing the present situation, where the influence of politicians and goal-orientated research appears to be paramount, as a tragedy. In truth these elements have always and will, probably always, be part of the way that science (and phycology) works, as anyone who has an interest in the history of science will be aware. What we must ensure is that we are involved in the debate. We must influence the decision makers. We must make sure our activities are recognised. We must provide consensus views and opinions. We must inform. We must encourage participation at all levels, particularly at the postgraduate level. These are changed times-not to be involved is to miss out. Surely to miss out would be the greater tragedy?

Finally, don't forget the winter meeting in Galway. This is a unique opportunity to attend a BPS gathering outside of the UK-a first! You will be rewarded with excellent hospitality and facilities and what promises to be a particularly interesting programme. An added incentive to attend is the opportunity to visit the spectacular scenery of the Burren on the Sunday, one of the most botanically important areas in the world. And....., there's also the black stuff!

* Peter Cooke and Dudley Moore show

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ANNUAL WINTER MEETING

PROVISIONAL PROGRAMME

National University of Ireland, Galway

2-5 January 2003

Thursday 2 January

Council Meeting Boardroom (Room 205) Martin Ryan Institute 15:00 hrs

Registration: Foyer of the Martin Ryan Marine Institute 16:00-20:00 hrs

Opening by Professor J. Browne (Registrar and Deputy President, NUI, Galway) and Welcome Reception Sponsored by the Martin Ryan Institute in the Foyer of the Martin Ryan Institute at 20.00 hrs

Friday 3 January

Session 1 9-10:30

Room 1

Underwood, G.J.C.
How important are species in the functioning of marine algal biofilms?

Crawford, R.M.
Misleading perceptions – two illustrations of impediments to our understanding of behavioural diversity among planktonic diatoms.

Davey, M., M. Mills, C. Ridame, P. Croot, J. LaRoche, and R.J. Geider
Assessment of nutrient limitation on phytoplankton communities across the tropical Atlantic

Forster, R.M., E.P. Morris, J.C. Kromkamp, and V. Martin
Resistance of photosynthesis to high irradiance stress in benthic diatoms.

Room 2 (Manton Prize)

Clegg, M.R., S.C. Maberly and R.I. Jones
Behavioural response of freshwater flagellates: a new perspective on ecological distribution

Hemmi, A., V. Jormalainen and T. Honkanen
Inducible resistance to herbivory in *Fucus vesiculosus* – duration, spreading and variation with nutrient availability.

Rose, D.T.
Gomphonma parvulum (Bacillariophyta): aspects of valve morphology and taxonomy.

Waring, J., G. Underwood and N. Baker
The impact of elevated ultraviolet-B radiation on the intertidal microphyto-benthos.

Refreshments

Session 2 – 11:00 – 1:00

Room 1

Ní Chatháin, B., T.J. Harrington and J. Breen
Ecology of epilithic diatoms in the River Deel, Co. Limerick, Ireland.

Wang, R.Y., L.D. Carswell, and P.J. Keay
A charge-coupled device based portable detector for at-site monitoring of algal blooms in freshwaters

Maberly, S., J. Parker and A. Elliott
Earlier growth of *Asterionella formosa* in four Cumbrian lakes: response to climate or catchment?

Codd, G.A., J.S. Metcalf, L.F. Morrison, I. Krienitz, A. Ballot, E. Krause, K. Kotut, S. Putz, C. Wiegand, and S. Pflugmacher
Cyanobacterial toxins in the mass mortalities of flamingos at Kenyan lakes.

Anderson, N.J and J. Saros
Resolving the paradox – where, when and why do diatom water chemistry models work?

Room 2

Werner, A., M. McConville, G. Savidge and M.J. Dring
Fucus serratus: a brown alga for tertiary treatment in an urban sewage treatment works.

Morrison, L. and D.B. Stengel
Heavy metal content of seaweed along the Arklow (Irish Sea) coastline as influenced by acid mine drainage from the Avoca mines

Baumann, H.A. and D.B. Stengel
Chlorophyll fluorescence and O_2–evolution as indicators of metal toxicity in marine macroalgae.

Wiedemann, T. and M.J. Dring
Cultivation of *Corallina officinalis* for medical applications: physiological methods for measuring growth rate.

Browne, L. and M.J. Dring
Tank cultivation of several economically important red algae.

Vize, S.J. and C. Maggs
A seasonal comparison of epiflora species on maërl and cobbles.

Lunch

Session 3. 14.30-16.00

Room 1

McIvor, L.M., C.A. Maggs, M.D. Guiry, and M.H. Hommersand
A molecular phylogeny of the *Laurencia* Lamouroux complex

Evans, K., L. Medlin, and P. Hayes
Genetic structure of diatom and dinoflagellate populations.

Wilce, R.T. and P.M. Pedersen
Professor Rosenvinge's curious *Punctaria.*

Townsend, R.A. and J.M. Huisman
Epulo gen. nov., a new red algal parasite

John, U., R.A. Fensome and L.K. Medlin
A new ribotype in the *Alexandrium tamarense* 'species complex' (Dinophyceae) and the application of a molecular clock to explain the biogeographic distribution of the genus.

Room 2

Jamieson, J.
The water framework directive – an overview.

Kelly, M.G.
Monitoring phytobenthos for the water framework directive.

Jones, L.
Marine algae and conservation

Lindsay, J., J.H. Best, F.B. Eddy, J.S. Metcalf and G.A. Codd
Lipopolysaccharide endotoxins in cyano-bacterial blooms: occurrence and significance in water quality and toxicity assessment.

Giantzoudis, D., R. Baxter and B.A. Whitton
Ecology of *Chara hispida* in hell kettles.

Refreshments

Poster Session and Wine Reception 1600-17.30

Authors have 3 minutes to explain poster and 2 minutes questions to chaired groups. Two groups will be announced at the meeting. Wine Reception sponsored by Taylor & Francis, the new publishers of the *European Journal of Phycology* (to be confirmed).

17:30 Buffet and Entertainment at Brennan's Yard Hotel.

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Saturday 4th January

Session 1. 9:00 – 11:00

Strong, J., C. Maggs and M. Dring
Modelling the distribution and dispersal of *Sargassum muticum* in and outside Strangford Lough.

John, D.M., P.A. Sims and J.A. Bryant
The freshwater algae of Clare Island, Ireland: Changes over the last 80 years.

Rindi, F. and M.D. Guiry
The marine benthic flora of Clare Island, Co.Mayo, Western Ireland.

Blomster, J., S. Bäck, D.P. Fewer, M. Kiirikki, A. Lehvo, C.A. Maggs and M.J. Stanhope
Green tides cause radical changes in algal morphology.

Russell, G. J., McGill & A. Fielding
Size matters: two geographically isolated populations of *Ascophyllum nodosum.*

Parry, J., J. Smith, J. Day, J. Drinkall and K. Harper
Ecolophysiological differences between isolates of freshwater *Synechococcus.*

Refreshments

Session 2. 11:30 – 13:30

Patterson, D.J.
New strategies for using the Internet for taxonomic infrastructure.

Raven, J.A.
Functional interactions between carboxysomes and peptidoglycan walls in cyanelles?

Flynn, K.J.
Mechanistic models of photo-acclimation: are they worth it?

Osborne, B. A.
Ecology of the *Nostoc-Gunnera* symbiosis

Tuohy, M.
Molecular and biochemical investigation of the interaction of laminaran polysaccharides with cultured mammalian cells

Cowan, R.A. and A.S. George
Bibliographies, algae and the antipodes

Lunch

Session 3. 14:30-15:30

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Note that speakers in multi-authored texts are underlined

Presidential Address

Eileen J. Cox

From Tubes to Tubulin—Peripatetic Studies on the Systematics of Naviculoid Diatoms, with a few Diversionary Excursions

16:00 hrs Annual General Meeting

19:30 hrs Banquet Radisson Hotel Galway

Sunday 6 January 2003

09:30 hrs Excursion to the Burren: **Depart from Brennan's Yard Hotel**

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BPS SUMMER BURSARIES

Project 1. Isolation of Cyanophage Active Against Freshwater *Synechococcus*

I was employed at Lancaster University from July to September 2001, on a summer bursary provided by the British Phycological Society. The aim of my work was to isolate as many phages active against freshwater *Synechococcus* as possible, as they only appear in great numbers during the summer period. No such phages currently exist in culture so this added to the excitement of the work.

Stage 1

Water was collected from Esthwaite Water in July, August and September, by staff at CEH Windermere. This water was divided into 16 aliquots and each was enriched with cells of a different *Synechococcus* strain (16 strains previously isolated from Esthwaite by Katie Harper during her PhD). The enriched waters were incubated at 23°C until they became clear (due to the lysing of the cyanobacterial cells by the phage). The waters were then filtered through a 0.2 um filter so that the resulting suspension contained only phage particles.

Stage 2

The next stage was to purify these phage suspensions, as each suspension might contain more than one phage strain. This was done by performing ten-fold dilutions of the phage suspension, mixing an aliquot of each dilution with some host cells and plating the mixtures onto the surfaces of BG11 plates. After incubation at 23°C, individual plaques were recorded and each was assumed to have arisen from a single phage strain.

Stage 3

These plaques were cut out of the agar and placed in BG11 medium overnight at 4°C, so that the phage particles could leach out of the agar. This yielded a suspension of a single phage population, which were subsequently used for future experiments.

Because of the slow growth of the *Synechoccocus* on agar plates, I managed to complete stage 3 for the July water sample only. The August and September samples reached Stage 2. Even so, more than 30 phage strains are already present in the collection. A third year undergraduate student is now continuing the work as his dissertation project and will (i) test the host ranges of the phage and (ii) examine their morphology with transmission electron microscopy..

As a mature student coming from a background with little biological know-how, I felt privileged when my application to take part in summer work was accepted. The work and techniques used were new to me, and I was able to practice many standard laboratory methods daily. This gave me a much-needed opportunity to get to grips with the 'behind the scenes' aspects of practical laboratory work, something that undergraduates normally miss out on. The examination of the samples was truly fascinating as well as fun. I found the project very rewarding and informative. Jacky, who was in charge of the project, and indeed the post grads and technicians in the lab, were all very helpful when I had any questions (and I had many!). Whatever field of Biology my future leads me to, I will definitely have benefited from this experience.

Tony McKeown

Department of Biological Sciences
University of Lancaster

(Supervised by Jackie Parry)

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Project 2: Dissolved organic nitrogen excretion by marine macroalgae

In the summer of 2002 I received a BPS summer studentship to work with Kay Sommerville on dissolved organic nitrogen excretion by marine macroalgae, at Queen's University of Belfast. The research project was based at the Queen's University Marine Laboratory, which is situated on the shores of Strangford Lough. The Lough is dominated by rocky and boulder shores, supporting large stands of brown algae, mainly fucoids and laminarians, making this an ideal study area.

Research already carried out at the Marine Lab has highlighted the role of macroalgae in coastal N-cycling. Fucoid species have been shown to naturally assimilate substantial quantities of NO_3 and PO_4 from seawater. This suggests that macroalgae may act as natural sinks for anthropogenic nutrient input into coastal environments. High natural rates of uptake of dissolved inorganic nitrogen (DIN) in the form of NH_4 and NO_3 by *Fucus serratus* justified its use in earlier bioremediation tests to remove excess nutrients from wastewater. After assimilation of nitrogen by algae, the consequent rate and quantity of excretion of nitrogenous nutrients is unknown. For an understanding of coastal N-cycling it is important to consider the rate at which algae excrete fixed nitrogen since this may directly affect the uptake rate of inorganic N. Put simply, bioremediation and nitrogen uptake may be viewed as one end of current Marine Lab research, with excretion and nitrogen output the other. Given the absence of detailed information on N excretion, my study aimed to assess the types and levels of dissolved organic nitrogen (DON); i.e. proteins, peptides and amino acids excreted by major representatives of the brown algae.

This work was to be integrated into an ongoing study by Kay Sommerville on the importance of macroalgae in terms of DON cycling. For my work I carried out two sets of batch culture experiments, one in July and one in August. I collected samples of three of the most abundant macroalgae in Strangford Lough; *Ascophyllum nodosum*, *Fucus serratus* and *Laminaria hyperborea*; to represent three distinct tidal heights; middle and low intertidal and subtidal respectively. Each species was incubated in a separate, aerated seawater tank. A tank was also set up with seawater alone to act as a control. Samples of the incubation medium were taken at the start of the experiment and then on a daily basis to monitor the changes in concentrations of both inorganic and organic nutrients. NO_3 was added to each tank daily to prevent the plants becoming N-limited. Samples of plant tissues were also taken to determine internal NO_3 pools.

During the study I learned to perform the methods required to determine inorganic nitrogen concentrations, such as NO_3, NO_2, and NH_4. I also gained experience of using a persulfate wet oxidation technique to determine total N concentrations in the culture medium. In this method all compounds containing N are converted to NO_3, which is easily determined. The amount of total DON can then be obtained by subtracting the inorganic N concentrations from the final result. Additionally I helped carry out fluorimetric determination of total amino acid concentrations. Due to time constraints during the project I was unable to carry out protein analyses, however, samples for this were collected and frozen. Kay Sommerville will analyse these at a later date.

The experiments I carried out showed that there was a similar pattern of DON excretion by the algae during both experiments, although higher levels of DON and amino acids were excreted in the August experiment. *L. hyperborea* excreted more amino acids than the other two algae, towards the end of both experiments. It is hoped that these experiments will contribute to a yearly picture of macroalgal DON production. Seasonal fluctuations in DON excretion in batch culture experiments will be related to those in Strangford Lough itself. Research will also include a study of DON components with analysis of amino acids, peptides and proteins.

Working at Queen's University Marine laboratory has given me a valuable insight into chemical methods of seawater analysis and batch culture techniques. It has also provided a useful introduction to protein and amino acid analysis techniques, as well as experience using laboratory equipment. Safe working practice, lab techniques, a familiarity with the general routine of phycological research, and a responsibility for sample processing and data analysis are just some of the skills I have acquired. The studentship provided experience of field sampling, macroalgal identification and gave me an appreciation of species diversity, ecology and taxonomy in Strangford Lough. Working at the Marine Lab has been an enjoyable and worthwhile experience, and has provided a greater awareness of the mechanisms involved in marine nutrient cycling and the complexity of this area and its study. I have also enjoyed meeting and working with postgraduate students and postdoctoral fellows and gaining an appreciation of the variety of research work carried out within Queen's University.

Robert Wills
Marine Laboratory
Queen's University of Belfast
Portaferry
Co. Down
Northern Ireland

(Supervised by Kay Sommerville, John Berges and Graham Savidge)

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Project 3: Environmental stress and maerl

This project was based on how environmental stresses can affect maerl and was studied in Strangford Lough, Northern Ireland. Previous investigations had shown maerl to be an ecologically fragile species based on measurements of growth rates made under various conditions. As maerl is very slow growing (0.5 mm/y), the previous experiments were long-term investigations, and there has been little work done on short-term effects of environmental stress.

In this study PAM (Pulse Amplitude Modulated) fluorometry was used to assess the state of the

photosynthetic apparatus. Maerl species were subjected to varying temperature, salinity and light conditions, and experiments were also done on responses to burial or fragmentation. Additional experiments were carried out using heavy metals as potential sources of contaminants. Using PAM fluorometry the 'health' of each species under different conditions was examined and the results statistically analysed to quantitatively assess how maerl responded to environmental stress.

The main results were that maerl was, in general, not as susceptible to environmental stress as previously assumed. However burial or exposure to bright light caused significant damage to the thalli. The results will shortly be submitted in full for publication and a poster on this work will be presented at the BPS winter meeting in Galway. I would like to thank the British Phycological Society for giving me the opportunity to carry out this research after my degree. See you in Galway!

Sian Wilson
Marine Systems Reserach Group
School of Biology and Biochemistry
Queen's University of Belfast
Belfast
Norther Ireland

(Supervisor Charmaine Blake)

KINDROGAN FRESHWATER ALGAE FIELD COURSE

The 2002 Freshwater Algae Identification course at Kindrogan Field Centre was a thoroughly enjoyable, interesting and useful experience. I found it an excellent opportunity to learn and practice identifying freshwater algae, with expert help and enthusiasm on tap.

Although a 'specialist' course, it has a very wide scope. It is not limited to identification, but is also a good opportunity to learn and revise algal biology and ecology. The people attending the course came from a wide variety of backgrounds, both from industry and academia. This in itself gave a good appreciation of the wide applicability and importance of the study of phycology.

A variety of different habitats were sampled and studied, including the benthic and planktonic populations of rivers, lochs, and Kindrogan Pond itself. By looking at so many different habitats, and learning about the different species and communities and their various adaptations, a broad range of experience was gained that would be applicable in any number of research projects.

The area around Kindrogan lends itself particularly well to the course, given the massive diversity of algal species inhabiting the local environment. In fact, over 200 taxa were identified during the week (and many more were probably seen, but not identified!).

I came away from the course feeling enthusiastic, motivated, and eager to start processing my own samples. The plus points of the course – beautiful countryside, excellent tuition, variety of skills and knowledge gained – definitely outweighed the sore head and mild insanity contracted by the end of the week.

Joanne Moodie

Department of Biological Sciences
Lancaster University

2001
British Phycological Society
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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 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, on disc (ms word for windows) and the editor reserves the right to edit the material before final publication.

Submission of Copy and Deadlines

Copy should be submitted to: Dr Bruce Osborne, The Phycologist, Botany Department, University College Dublin, Belfield, Dublin 4, Ireland, Tel. +35317062249, Fax. +35317061153, E-mail: Bruce.Osborne@ucd.ie.

Deadlines are January 31 for the April issue, May 31 for the August issue and September 30 for the November issue

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