



Porcupine Marine Natural History Society Annual Conference 2011

A CELEBRATION OF MARINE LIFE

at the National Oceanography Centre, Southampton

11th - 13th March 2011

PROGRAMME & BOOK OF ABSTRACTS

Organizers:

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Porcupine Marine Natural History Society

Annual Conference 2011

A CELEBRATION OF MARINE LIFE

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National Oceanography Centre, Southampton

Programme

Friday 11th March 2011

- 09.00 Registration
- 09.45 Welcome and housekeeping
- 10.00 **Paul Tyler** – Census of Marine Life: what have we learned from this 10-year programme?
- 10.45 **Bob Kennedy** & G. Savidge – Benthic monitoring at Strangford Lough Narrows in relation to the installation of the SeaGen wave turbine.
- 11.05 Tea/coffee break
- 11.30 **Teresa Darbyshire** – The polychaetes of the Isles of Scilly: a new annotated checklist.
- 11.50 **Garnet Hooper-Bué** – BioScribe – a new decision support tool for biotope matching.
- 12.10 **Amy Dale** – Seagrass in the Solent
- 12.30 Lunch
- 13.30 **David Barnes**, Piotr Kuklinski, Jennifer Jackson, Geoff Keel, Simon Morley & Judith Winston – Scott's collections help reveal rapid recent marine life growth in Antarctica.
- 13.55 **Yasmin Guler** – The effects of antidepressants on amphipod crustaceans.
- 14.15 **Paula Lightfoot** – From dive slate to database: sharing marine records through the National Biodiversity Network.
- 14.45 **Geoff Boxshall** – The magnitude of marine biodiversity: towards a quarter of a million species but not enough copepods!
- 15.15 Tea/coffee break
- 15.45 **Simon Cragg** – Prospecting for enzymes with biotechnological potential among marine wood-boring invertebrates.
- 16.15 **Lin Baldock** & Paul Kay – Diversity in the appearance of British and Irish gobies.
- 16.45 **Judith Oakley** – Beneath Mumbles Pier.
- 17.15 Depart
- 19.00 Conference Dinner at the Royal Southampton Yacht Club

Saturday 12th March 2011

- 09.30 **Jolyon Chesworth** – Tracking the Solent’s seals.
- 10.00 **Josie Pegg**, Roger Herbert, Kathryn Dawson & Ken Collins – Surf’s up dudes! - The colonization of Europe's first artificial surf reef at Boscombe, Dorset.
- 10.20 **Robert Mansergh**, Simon Cragg & Alex Ford – Parasite biomarkers of amphipod health.
- 10.40 **Patricia Esquete** – Postmarsupial development of the tanaidacean *Apseudopsis latreilli*.
- 11.00 [Tea/coffee break](#)
- 11.30 **Jason Hall-Spencer** – Celebrating seamounts.
- 11.50 **Pat Collins**, Bob Kennedy & Cindy Van Dover – A biological survey method applied to Seafloor Massive Sulphides (SMS) with contagiously-distributed hydrothermal-vent fauna
- 12.10 [movement of chairs](#)
- 12.15 **34th Annual General Meeting** of Porcupine MNHS
- 12.30/12.45 [Lunch](#)
- 13.30 **Keith Hiscock** – Lundy - marine life highlights and science achievements 1971-2011
- 14.00 **Reuben Shipway**, Simon Cragg, Luisa Borges, Huseyin Sivrikaya and Johann Müller – An invasive species of teredinid, *Teredothyra dominicensis* (Teredinidae, Bivalvia), in the eastern Mediterranean Sea.
- 14.20 **Frances Dipper** – A Scilly fishy tale: fish rambling with Porcupine in the Isles of Scilly.
- 14.45 **Claudia Alt** & Daniel Jones – The effects of mid-ocean ridges on benthic megafauna.
- 15.15 [Tea/coffee break](#)
- 15.45 **Louise Firth**, Martin Skov & Stephen Hawkins – Coastal defences: enhancing biodiversity using sensitive design.
- 16.05 **Grant Duffy** – The effect of submarine canyons on the biodiversity and composition of deep-sea scavenging amphipod.
- 16.25 **Roger Herbert**, Bill Farnham & Rachel Luxton – Status of the BAP Priority marine alga *Padina pavonica* in the British Isles - an update.
- 16.45 **Doug Herdson** – Big fish and little fish, a celebration of the ichthyofauna of the Isles of Scilly.
- 17.15 [Depart](#)

Sunday 13th March 2011 [Field trip \(boat departs at 10.00\) and sample examination at NOC](#)



ABSTRACTS OF ORAL PRESENTATIONS

In order of presentation

The Census of Marine Life: what have we learned from this 10-year programme?

Paul Tyler

School of Ocean and Earth Science, University of Southampton, NOCS, Southampton SO 14 3ZH

The Census of Marine Life was completed in its final meeting at the Royal Society in September 2010. The aim of the 10 year Census had been to try and determine just how many individual species were living in the sea. Over 80 countries were involved. The Census comprised a series of field programmes examining different types of ecosystems in the ocean and determining their diversity. Regional programmes examined how different geographic regions of the ocean varied and how this contributed to an understanding of the biogeography of the oceans. Finally additional programmes examined processes within the ocean such a migration, and the history and future of the oceans. In this presentation I will talk about generalities of the Census than concentrate on what has been discovered in the largest of all the ocean realms- the deep sea. The past concept that the deep-sea was a sediment-filled monotonous basin has been completely dispelled with the discovery of a high degree of heterogeneity extending from sedimentary abyssal plains, though ecosystems independent of sunlight to massive coral reefs and extensive deep sea canyons and seamounts.

Benthic monitoring at Strangford Lough Narrows in relation to the installation of the SeaGen wave turbine

Robert Kennedy^a & G. Savidge^b

^aZoology Department, Ryan Institute, School of Natural Sciences, National University of Ireland, Galway, University Road, Galway, Ireland

^bQueen's University Marine Laboratory, 12-13 The Strand, Portaferry, Newtownards, County Down BT22 1PF, Northern Ireland

A SeaGen wave turbine was installed in Strangford Narrows in 2008. As part of the associated ecological assessment, epifaunal suspension feeding communities present on tide swept reefs in the Narrows were surveyed. Four stations were sampled by video quadrat: a reference station 50m east of the turbine and stations 20m, 150m and 300m south southeast of the turbine along the axis of the Narrows. One pre-installation and four post installation surveys have been carried out. The epifaunal communities of Strangford Narrows conform to EUNIS biotopes encompassed by CR.HCR.FaT Very tide-swept faunal communities. The stations sampled in the baseline survey were strongly differentiated and only overlapped occasionally in terms of community composition with their nearest neighbours. This pattern was generally maintained throughout the sampling program, though there was a seasonal shift in the communities in the summer months that confounded this somewhat. The relative distribution of the stations in March 2008, March 2009 and April 2010 was very similar. In July 2008 and July 2009, the summer growth of epizoids was substantial. The settlement of opportunists caused a change in the spatial pattern of the macrofaunal communities. There appears to be no significant deleterious effect of the turbine installation. There is significant change in the epifaunal communities at the stations both spatially and with time, but the temporal change observed appeared to lie within the natural variability of the area. The two year period of monitoring up to this point while the current turbine is operating at a very low level of activity will provide a good baseline against which to assess future changes when the turbine becomes fully operational.

The Polychaetes of the Isles of Scilly: A new annotated checklist

Teresa Darbyshire

Department of Biodiversity & Systematic Biology Amgueddfa Cymru - National Museum Wales Cathays Park Cardiff CF10 3NP Wales, UK.

As part of the long-running 'Marine Flora and Fauna of the Isles of Scilly' series, the Polychaeta were first compiled by Harris in 1972. Nearly 40 years on, this list has been updated and expanded, incorporating later benthic surveys of the area as well as new collections undertaken by the National Museum Wales from both intertidal and subtidal locations. Almost 400 species are listed compared to the 184 originally published in 1972. The effectiveness of sampling from as many different shores and depths as possible is discussed with a comparison of species only found using certain methods.

BioScribe – a new decision-support tool for biotope matching

Garnet Hooper-Bué

Emu Ltd., Victory House, Trafalgar Wharf (Unit 16), Hamilton Road, Porchester, Portsmouth PO6 4PX

Through funding from the Marine Aggregate Levy Sustainability Fund (Marine ALSF), Emu Ltd. have developed a new biotope-matching decision-support tool. “BioScribe” has been developed as part of a larger research project, which investigated “*Redefining biotopes at a regional scale and development of a Biotope matching decision support tool*” (MEPF project number 09/P93; <http://www.alsf-mepf.org.uk/>). The tool was developed to improve efficiency and reduce subjectivity in biotope matching. This freeware package, developed in an MSAccess framework, which was created by the GeoData Institute in Southampton, searches over 645,000 samples defined as characterising 446 intertidal and subtidal biotopes from the JNCC database. BioScribe is not intended to provide a single-biotope output. Rather, it has been designed to present the user with a range of options and links to support information to make the biotoping process easier. Various statistics are presented to provide the user with confidence indicators. This facilitates the user in choosing from a range of biotopes in the output list for subsequent review in a comparative table. Although user expertise is therefore still required, this tool will be of interest to a broad range of end users, including marine scientists, governmental organisations, NGOs, consultancies, survey companies and industry.

BioScribe will be freely available via the JNCC from 16th February, 2011.

Seagrass in the Solent

Amy Dale

Hampshire & Isle of Wight Wildlife Trust

The importance and vulnerability of seagrass habitats are now widely accepted. Yet despite their inclusion in a number of national and international directives and conservation policies designed to protect them, fundamental information such as distribution and bed extent is often lacking. The Solent Seagrass Project was initiated in 2006 to improve the knowledge of distribution and extent of seagrass beds within the Solent, and to raise awareness of seagrasses to stakeholders and the public. This presentation will provide an introduction to seagrass in the Solent, and an overview of the project to date. Current protection of seagrasses and their involvement in the designation of Marine Conservation Zones will also be discussed.

Scott's collections help reveal rapid recent marine life growth in Antarctica

David K.A. Barnes, Piotr Kuklinski, Jennifer A. Jackson, Geoff W. Keel, Simon A. Morley and Judith E. Winston

British Antarctic Survey

Marine life provides a dazzling array of 'ecosystem services' and two key ones in the polar regions are signals and feedbacks on global change. A strong signal and feedback have recently become apparent thanks to the considerable marine faunal collections made by the Census of Antarctic Marine Life and more than a century earlier by Captain Scott's expeditions. Scott remains famous for coming second to Amundsen in the race for the South Pole and the fatalities on the journey back to base, but scientific effort on his expedition was never sacrificed and set many invaluable physical and biological baselines. Amongst these were collections of benthos, such as the bryozoan *Cellarinella nutti*, which records environmental information in tree-ringlike growth check lines. We measured the growth of *C. nutti* in the Ross Sea from museum and new collections and find no trend from 1890–1970 but a rapid increase from the 1990s to present. Causality is probably complex but reflects coincident increases in regional phytoplankton production which is driven by increased wind in turn due to regional ozone losses. Thus it is the first evidence that greater surface productivity is being sequestered to the seabed and thus of increasing polar carbon sinks.

The effects of antidepressants on amphipod crustaceans.

Yasmin Guler¹, S. Short¹, P. Kille², A.T. Ford¹

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²Cardiff School of Biosciences, Biological Sciences Building, Museum Avenue, Cardiff, United Kingdom, CF10 3AT.

Within the invertebrates serotonin can control reproduction, maturation, metabolism, moulting, as well as behaviour. The effects of serotonin, serotonin altering parasites and several selective serotonin reuptake inhibitors (SSRIs) on the behaviour of the marine amphipod, *Echinogammarus marinus*, were investigated. Trematode parasites are known to alter the swimming behaviour in their intermediate hosts through changes in serotonergic activity and result in increased predation. Behavioural assays were adapted to record changes in phototaxis and geotaxis behaviour in male *E. marinus* following 7, 14 and 21 days exposure to serotonin and the SSRIs at four concentrations compared to a control (between 10 ng/L & 10 µg/L). *E. marinus* infected with trematode parasites had both significantly higher phototaxis and geotaxis scores than those of uninfected specimens. Phototaxis and geotaxis behaviour increased significantly in a concentration-dependent manner with exposure to serotonin. Fluoxetine significantly altered phototaxis and geotaxis activity in what appeared to be a non-monotonic concentration response curve with the greatest behavioural changes observed at 100 ng/L. From this study phototaxis and geotaxis behaviour have been observed to be affected by exposure to serotonin modulators. Parasite studies have shown strong links between changes in behaviour and increased predation risk correlating with changes in serotonergic activity. This study has highlighted the potential for highly prescribed anti-depressant drugs to change the behaviour of an ecologically relevant marine species in ways that could conceivably lead to population level effects. The effects of further SSRIs are being investigated. In addition to behavioural assays, the recently sequenced *E. marinus* transcriptome enables the use of quantitative RT-PCR to measure the expression level of selected genes involved in the serotonin pathway.

From dive slate to database: sharing marine records through the National Biodiversity Network

Paula Lightfoot

National Biodiversity Network Trust, The Lace Market, Nottingham NG1 1HF

Records of marine species and habitats are made under a wide variety of circumstances, from family rockpool rambles to offshore environmental impact assessments. Data may be collected for academic research, to monitor protected species and sites, to mitigate the impact of development or simply for the pleasure of discovering and recording marine life.

Collating these disparate datasets and making them available for re-use has obvious benefits as we enter the new era of Marine Spatial Planning ushered in by the Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010. A robust evidence base is needed to underpin planning decisions and to inform the creation of an ecologically coherent network of Marine Protected Areas. Reliable marine data can provide an insight into issues such as the spread of invasive species or the response of marine ecosystems to climate change. Access to marine biological data can also enhance our appreciation and enjoyment of the marine environment, directing us to the best dive sites, most fascinating strandlines and diverse rockpools – the better to celebrate marine life!

The National Biodiversity Network (NBN) is a partnership dedicated to making biological records freely and easily available to everyone, encouraging and facilitating the use of biodiversity data for conservation, research, planning, land management and education. The NBN Gateway provides public access to over 61.4 million records shared by over 140 data providers, including local records centres, national recording schemes, central Government, public agencies and institutions, commercial enterprises, natural history societies, conservation organisations and scientific associations. Porcupine Marine Natural History Society recently became a data provider and member of the NBN, sharing over two decades of records made during field meetings at locations from Orkney to Cornwall.

Over the last ten years, the NBN has worked closely with the Marine Biological Association to overcome barriers to the mobilisation and re-use of marine data, leading to the development of access controls to protect sensitive records and commercial interests, online commenting facilities to improve data quality through peer review, and metadata standards to help data users make informed decisions about re-using datasets.

This presentation will explain how marine records are shared through the National Biodiversity Network, demonstrate how to use some of the Gateway's new features to explore data, and give a preview of the outputs of a current NBN/MBA contract to improve marine data quality and data flow. It will also consider the wider picture and how the NBN integrates with other national and international data networks and data-sharing strategies.

The magnitude of marine biodiversity: towards a quarter of a million species but not enough copepods!

Geoff Boxshall

Dept of Zoology, The Natural History Museum, Cromwell Rd, London SW7 5BD

Nearly a quarter of a million species have been described from the oceans of the world. The largest groups are the molluscs, crustaceans and fishes, followed by various kinds of worms. Worldwide, between 1800 and 2000 new species are described each year from the oceans, including many from well-studied European waters. Our knowledge of the extent of marine diversity is growing and the Census of Marine Life estimated about 1 million species currently exist in the oceans. Where are all the missing species...and to which groups do they belong. In this lecture I will look at the diversity of the major groups of marine metazoans and, using the hyper-abundant copepods as an example, I will explore the missing diversity.

Prospecting for enzymes with biotechnological potential among marine wood-boring invertebrates

Simon Cragg

School of Biological Sciences, University of Portsmouth, Institute of Marine Sciences,
Ferry Road, Portsmouth PO4 9LY, UK

Wood is a recalcitrant but energy-rich form of detritus that is only exploited by a limited range of specialist detritivores - marine wood borers. Controlling the negative effects of these borers on man-made structures has until recently been the main aim of research into these interesting creatures. Now, their ability to degrade lignocellulose has attracted attention. Two groups of wood borers have attracted particular attention: bivalves of the Family Teredinidae (shipworms) and isopods of the Family Limnoriidae (gribbles). With the teredinids, the focus has been on symbiotic microorganisms that live within cells of the teredinid on the gill filaments. Nitrogen fixation, proteolytic and cellulolytic capabilities have been identified in these bacteria. Limnoriids do not have microbial endosymbionts, though they have a diverse epibiota.

Sequencing of the messenger RNA from the hepatopancreas has revealed a transcriptome rich in glycosyl hydrolase enzymes whose potential for use in generating biofuels from feedstocks that do not compete with food crops is now being explored. These marine organisms offer enzymes that may be utilised in terrestrial biotechnology.

Diversity in the appearance of British and Irish gobies

Lin Baldock & Paul Kay

(lin.baldock@virgin.net)

It is generally accepted that gobies as a group are difficult to identify accurately; however, of the 19 species of goby listed for Britain and Ireland we can be reliably identify 16 in the field or from good photographic images taken in the field. It is also possible to distinguish the juveniles. Two species which we are not yet able to separate either in the field or photographically are two of the sand gobies: *Pomatoschistus minutus* and *Pomatoschistus lozanoi*. The two species are closely related and have been reported to hybridize. We have not studied the giant goby (*Gobius cobitis*) in its natural habitat and have no *in situ* photographs of this species.

Detailed observations of gobies in the field have shown a wide range of colour variation in several species which depends on age, mood, sex, habitat or time of day/night. This variety of colouration is generally not included in the standard descriptions of the species. Examples are the rapid change from the black colouration of displaying parental male black gobies (*Gobius niger*) to the more drab colours of resting adult males, or the dramatic change in the male common goby (*Pomatoschistus microps*) from a series of black vertical bars on a dark grey background to the more typical pepper-and-salt colours within a few seconds. Observations made on night dives in Lough Hyne showed remarkable changes in colour in several species, including painted, black and Couch's gobies.

Our presentation illustrates some of this diversity in the appearance of selected goby species and we provide a summary of the differences which we have found useful in distinguishing Couch's and black gobies in a variety of situations in the field.

Observations of intertidal life beneath Mumbles Pier, South Wales

Judith Oakley

Oakley Intertidal Marine Education and Outreach

Mumbles pier is located three miles from Swansea. It has stood for around 110 years and was built in 1898 as a jetty for visiting steamers. There are currently extensive plans for redevelopment, with a new £39 million scheme to extend the pier and build a 150 bed hotel and spa, a conference and exhibition centre, all weather attractions, amusement arcade and restaurants. The metal supports were last rebuilt in the 1950s. The pier extends 250m seawards, west of Mumbles Head, in a north-easterly direction across Swansea Bay.

It is one of the few piers where intertidal life can be investigated, due to the high tidal range of the Bristol Channel. The tidal range at Swansea is 10.4m with a spring range of 8.5m. A low tide of 0.5m or below is essential to allow access to the pier piles and stanchions.

My observations since 2004 have revealed an incredible assortment of animal life living below the pier, ranging from the rosy featherstar (*Antedon bifida*) and flat oyster (*Ostrea edulis*) to dragonet (*Callionymus lyra*) and the non native leathery sea squirt (*Styela clava*). A diverse assemblage of fauna is present on the pilings, including encrusting sponges, bryozoans, cnidarians and ascidians. The marine fauna comprises mainly filter feeders typical of tide-swept environments. The lower shore in the immediate vicinity of the pier consists of mixed sediments with boulders and cobbles, overlaying fine muddy sand. It is moderately exposed to wave action.

This presentation will reveal the rich array of intertidal life living beneath Mumbles pier.

Tracking the Solent's seals

Jolyon Chesworth

Hampshire & Isle of Wight Wildlife Trust

A small but regionally unique population of harbour seals live in the Solent. The population is poorly understood and precise population details, haul-out, foraging and breeding sites are all unknown. As a result they are rarely considered in relevant management and conservation plans.

To aid understanding of the seal population, in 2009 the South East Wildlife Trusts and partners initiated a project using a variety of techniques, including visual census, public reporting, photo-ID and GPS GSM tags developed by the Sea Mammal Research Unit. The tags, which collect not just location data but also dive depth and duration, have highlighted primary foraging grounds and behaviour. This information has been used to direct a towed video seabed survey of the foraging grounds to identify any feeding habitat preference.

This presentation will introduce the local population, detail the monitoring work carried out and discuss the results and the impacts on the populations conservation.

Surf's up dudes! - The colonization of Europe's first artificial surf reef at Boscombe, Dorset

Josie Pegg, Roger Herbert, Kathryn Dawson & Ken Collins

Centre for Conservation Ecology, Bournemouth University, Poole, Dorset. BH12 5BB, UK

Completed in Autumn 2009, Boscombe Surf Reef is Europe's first and only artificial surf reef. The structure located 260m offshore is constructed of sand filled geo-textile bags and covers an area equivalent to a football pitch. Its purpose is to magnify waves, improving their quality for surfers. The Boscombe Surf Reef project aims to establish and evaluate the ecological impact of the reef on the inshore marine ecosystem; its biodiversity and local fisheries resources. Our research asks how this reef, unique in form and function differs in its biological impact from other natural and artificial reef structures.

The methodology employs a combination of SCUBA and remote underwater visual census, fisheries catch sampling and sediment sampling. The results of which will identify the species occupying the reef, discover any evidence to suggest the reef acts as a nursery area, and tease out seasonal, successional and long term changes in the local marine life. Examination of the initial survey data reveals an already high diversity of life on the reef. However the presence of non-native plants and animals raises the question of whether it is acting as an oasis for native species or an opportunity of a foothold for alien species.

The outputs of this research will be used not only to evaluate the impact of this reef on the locality but will contribute to the body of science used to advise environmental best practise in the growing number of near and offshore constructions.

Concurrent to the scientific research we will use this opportunity to engage with the public and increase awareness of the marine ecosystem around the reef and in Poole Bay.

Parasite biomarkers of amphipod health

Robert Mansergh, S. M. Cragg, & A. T. Ford

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Contact: robert.mansergh@port.ac.uk

Parasites can have significant impacts on the host population despite their low biomass. Consequently, any environmental impact on the parasite community is likely to have knock-on effects within the local ecosystem. How parasites respond to environmental pollutants is believed to be dependent on the parasite life-cycle and specificity of host-parasite relationships. Recent studies using the marine amphipod, *Echinogammarus marinus* have shown increases in feminising microsporidia resulting in intersexuality and coinciding with decreases in trematode parasites. In this study the effects of industrial contaminants on crustacean ectoparasitic ciliates is being explored. *E. marinus* specimens from industrially impacted and reference sites are having their ciliate fauna recorded using light and scanning electron microscopy. Results have shown that a varied array of Peritrich and Chonotrich ciliates attach to discrete micro-niches on the exoskeleton of the *E. marinus*. Preliminary data suggest a lower diversity of ciliate species at an industrially affected sites known for high levels of hydrocarbons, PCBs and heavy metals compared to a two reference sites. Interestingly, there was a significantly greater incidence of *Lagenophrys sp.* on the gills of *E. marinus* at an industrially polluted site compared to one reference site. In some circumstances *Lagenophrys* ciliates represented a substantial proportion of the gills surface area in these amphipods potentially having an impact on the host's fitness. Efforts are currently ongoing to replicate the numbers of both clean and polluted sites.

Postmarsupial development and intraspecific morphological variations in *Apseudopsis latreillii* (Milne- Edwards, 1828) (Crustacea, Tanaidacea)

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Intraspecific variations in morphology during development are common among crustaceans. Nevertheless, descriptions of such variations are scarce in the literature. The need of such descriptions arises when juvenile characters are required for the identification of a significant number of individuals within a sample. In this study, the postmarsupial development of a common, widely-distributed tanaidacean species of the north-east Atlantic – *Apseudopsis latreillii* – is investigated. Specimens from three different localities in the north-east Atlantic have been examined, and the size of 766 individuals has been measured. The results show that the manca II offspring is followed by two juvenile stages before reaching maturity. Males present two possible morphologies. After a preparatory stage, females pass through a sequence of copulatory instars followed by intermediate stages in which the female loses the ovisac after release of the mancae. The number of articles of the inner flagellum of the antennule increases through life, and can be used as an indicator of the developmental stage of the individual. Likewise, the differentiation of the copulatory structure on pereonite 7 is characteristic of the adults. A general increase in the number of setae and spines on the pereopods, as well as in the number of articles on the inner flagellum of the uropodal endopod occurs through the developmental history of *A. latreillii*. On the other hand, characters that remain stable throughout development, and as a result are useful for identification, include the features of the rostrum and, more importantly, the spination of the first pereopod.

Celebrating Seamounts

Jason Hall-Spencer¹, Malcolm R. Clark², Mireille Consalvey², Martin Attrill¹, Thomas Schlacher³

¹Marine Biology and Ecology Research Centre, Marine Institute, University of Plymouth,

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Seamounts are undersea mountains, typically volcanic in origin, and rising from 100 m to over 8000 m above the seafloor. There are an estimated 33,400 seamounts >1 km high; they can be amazing sites of species diversity and abundance, but are also targets of resource exploitation (e.g. for armourhead, alfonsino, cardinalfish, orange roughy, oreo dories and roundnose grenadier), and hence conservation concerns. They haven't been well studied, and so CenSeam became one of the Census of Marine Life field programmes in 2005 and posed two thematic questions: What are the factors driving community composition and diversity on seamounts? and What are the main impacts from human activities?

This talk will describe some of the seamount discoveries that were made, and consider whether community composition and diversity differ between seamounts and continental slopes, whether seamounts are centers of enhanced biological productivity, and whether they have unique trophic architecture. We also discuss seamount exploitation and habitat conservation in the face of ocean acidification.

There have been considerable advances in recent years but there remain many questions about seamount ecosystems (e.g. integrating molecular, oceanographic, and ecological research). The Census has made a huge difference to our understanding of seamount ecosystems, and the improved science is being used to feed into management of both fisheries and habitats as part of the EC Framework 7 project Knowledge-based Sustainable Management for Europe's Seas (KnowSeas-226675).

A biological survey method applied to seafloor massive sulphides (SMS) with contagiously distributed hydrothermal-vent fauna

P.C. Collins^a, R. Kennedy^a, C.L. Van Dover^b

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Strategies for mitigation of mining of seafloor massive sulphides (SMS) in the deep sea include establishment of suitable reserves that may serve as sources of larvae for the re-colonization of mined hydrothermal fields that continue to vent fluids and re-establish suitable habitat after mining is completed. In this study, we characterize deep-sea vent communities in Manus Basin (Bismarck Sea, Papua New Guinea) and use macrofaunal data sets from a proposed reserve site (South Su) and a proposed mine site (Solwara 1) to test the hypothesis that there was no difference in macrofaunal community structure between the sites. We used dispersion weighting to adjust species-abundance matrices to down-weight the importance of contagious distributions of numerically abundant taxa. Faunal assemblages of three habitat types defined by biogenic taxa (two provannid snails: *Ifremeria*, *Alviniconcha*, a sessile barnacle: *Eochionelasmus*) were distinct from one another and from the vent peripheral assemblage, but were not differentiable from mound-to-mound within a site or between sites. Mussel and tubeworm populations at South Su but not at Solwara 1 enhance the species and habitat diversity of the proposed reserve site.

Lundy - marine life highlights and science achievements 1971-2011

Keith Hiscock

Marine Biological Association, Plymouth.

In February 1971, a consultation for the establishment of a marine nature reserve around Lundy was launched. That proposal set going a host of activities aimed at documenting especially the subtidal marine fauna around the island, but also providing opportunities for training in survey methods as well as the preparation of interpretive materials to help visitors enjoy the marine wildlife.

The late 1960s and the 1970s were early days for using diving as a tool in marine biological survey. We were busy undertaking straightforward sampling of the marine fauna for the lists being published by the Lundy Field Society, but also trying out methods of sampling – underwater suction samplers, towed diver sledges, burrow casting, through-water communications, underwater tape-recorders, quantitative photography etc. were all being used. We mapped habitats by sending divers up-and-down to the seabed along transects all around the island (and survived).

There were many features of Lundy's marine wildlife that were remarkable. The number of algae recorded around the island (initially by David Irvine and colleagues before I turned-up on the scene) stands at over 310 species, more than any other similar-sized location around the British Isles. The marine fauna list stands at 753 taxa. Lundy hosts all five species of shallow water coral known from Britain and there are many rare or scarce species present around the island. Work around Lundy particularly gave us early insights into the ecology of sublittoral rocky areas. We also undertook quantitative sampling of subtidal rock fauna which provided an idea of abundance and character of those communities but, unfortunately, has never been published. Monitoring sites were established in the 1980s but there is a 'patchy' history of monitoring to identify change. In 2008, a team re-visited the shores censused by Leslie Harvey 60 years previously. 2011 saw work to assess 'condition' of the Marine Conservation Zone that the waters around Lundy now are, as well as continued informal observations of change.

An invasive species of teredinid, *Teredothyra dominicensis* (Teredinidae, Bivalvia), in the eastern Mediterranean Sea.

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This report describes the recent discovery of an invasive species of teredinid, *Teredothyra dominicensis*, in the Eastern Mediterranean Sea. Sampling was carried out over a period of one week, from the 7th – 14th of August 2010, off the coast of Kaş, Turkey. Two species of shipworm were found, *Nototeredo norvegica* and the previously unreported *Teredothyra dominicensis*. The specimens of *T. dominicensis* collected in Turkey represent a considerable outlier from the reported distribution of this species, originally thought exclusively confined the Gulf of Mexico & Caribbean Sea. Variations in both teredinid pallet size and body length indicate the shipworm have spawned and recruited in the area, suggesting this species may have established itself in Mediterranean waters.

A Scilly fishy tale: fish rambling with Porcupine in the Isles of Scilly

Frances Dipper

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The algal-rich rocky shores found throughout the Isles of Scilly make excellent hunting grounds for intertidal fishes. This proved to be the case during the PMNHS field trip to the Isles of Scilly in September 2010. Whilst other hardy rubber-clad Porcupines braved the cold clear waters offshore, the ‘fish group’ potted happily in the sunshine, turning boulders and poking their noses and nets into rockpools. During the week 12 shore sites were searched thoroughly for shore fish at all levels. Simple bottle traps were also set by Ben Cowburn (Isles of Scilly Wildlife Trust volunteer) at some sites. A total of 26 species was recorded. Of particular interest was a possible giant goby *Gobius cobitis* (it may or may not be!). The difficulties of field identification of rare fish such as this will be discussed.

The effects of mid-ocean ridges on benthic megafauna

Claudia Alt & Daniel Jones

DEEPSEAS, Benthic Biology Group, National Oceanography Centre, Southampton Waterfront Campus, European Way, Southampton, SO14 3ZH United Kingdom

As part of the global Census of Marine Life, the multidisciplinary UK consortium ECOMAR investigated the effect of the Mid-Atlantic Ridge (MAR) on the biological communities living on and near this vast transoceanic mountain range. Study was concentrated on four study sites, northwest, northeast, southwest and southeast of the Charlie-Gibbs Fracture Zone (50-56°N). The 2500m deep sites were sampled over four years (2007-2010) using the ROV ISIS and trawls, both deployed from RRS *James Cook*. The seabed animals seen in ROV video (benthic megafauna) were assessed from over 48,000m² of ridge habitat, from steep rocky walls to flat sediment plains. The trawls collected 21,974 organisms from around 178 species, at least 10 of which are new to science.

Our results show that the Mid Atlantic ridge creates a large and varied habitat that supports a high biodiversity of megafauna. All four sites had unique characteristics, supporting different faunal assemblages. We suggest that the MAR may act as barrier on the dispersal of some benthic megafauna.

Coastal defences: enhancing biodiversity using sensitive design

Louise B. Firth, Martin W. Skov and Stephen J. Hawkins

Bangor University

Global climate change is one of the greatest threats facing society, the predicted effects of which include rising global temperatures, rising sea levels and changes in weather patterns. The predicted effects of climate change will be increased flooding and erosion prompting the need for building and upgrading of coastal defences to protect property and infrastructures. These structures provide hard-substrate habitat in areas that typically comprise soft sediments, acting as stepping stones, facilitating the range extension of rocky shore species. Coastal defences can also alter local hydrodynamic processes which can in turn affect benthic infaunal communities. By building coastal defences using ecologically sensitive design principles, it is possible to increase habitat-availability and enhance biodiversity.

Bangor University is involved in two consortium projects (THESEUS & URBANE) relating to the ecology and design of coastal defences. Here, we introduce the two projects, giving information on the background and objectives of both. The projects have 3 main objectives: (i) assess the biodiversity of both natural rocky shore and coastal defences; (ii) test the effects of defences on community structure of benthic assemblages and; (iii) examine the effect of different structure designs on colonizing biodiversity. We present some preliminary findings from surveys of natural rocky shore and coastal defences and outline future plans for objectives relating to the sensitive design of coastal defences.

The effect of submarine canyons on the biodiversity and composition of deep-sea scavenging amphipod assemblages

Grant A. Duffy

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The high level of environmental heterogeneity found both between and within submarine canyons makes them of particular interest to researchers examining biodiversity in the deep sea. Their role as sediment traps, intercepting suspended material being laterally transported across the continental shelf, makes them hotspots of secondary production with the potential to house distinct faunal assemblages and idiosyncratic ecosystems. Sampling deep-sea canyons using trawls is both difficult and destructive, however via the exploitation of their natural foraging behaviour it is relatively easy and cost-effective to collect large samples of scavenging amphipods from canyon sites using baited traps. Assemblages of scavenging fauna in the deep sea play a vital role in reintroducing organic matter from detrital sources into the wider deep-sea food chain. Freefall baited traps were set at different depths within three submarine canyons on the Iberian Margin. The collected amphipods were identified to the lowest possible taxonomic level, counted, and measured. Analysis of these data allowed for a comparison of composition and comparative abundance of scavenging amphipod assemblages at different depths within each canyon and between different canyon systems. This research furthers our understanding of the effect of deep-sea canyon systems upon deep-sea scavenging fauna.

Status of the BAP Priority marine alga *Padina pavonica* in the British Isles - an update

Roger Herbert, Bill Farnham and Rachel Luxton

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Owing to its characteristic morphology, the ‘Peacocks Tail’ alga *Padina pavonica* has possibly the most reliable historical record of any British species of marine alga. Listed as ‘scarce’, it is a UKBAP Priority Species owing to a restricted distribution and its potential vulnerability to coastal management interventions. This project, which is supported by Porcupine and SITA Trust, aims to establish whether the species has contracted further since previous survey in the 1960s and 1970s or has expanded its range, perhaps due to higher sea temperatures. This information is required to assess the risk of species extinction, population restoration potential and support for a UKBAP Action Plan for this species. Following fieldwork in 2009 and 2010, we present an update on the species distribution in the UK and our plans for further investigation.

Big fish and little fish, a celebration of the ichthyofauna of the Isles of Scilly

Doug Herdson

Marine Fish Information Services, 94 Dunstone View, Plymouth, PL9 8QW

Twenty eight miles west-southwest of Land’s End, the Isles of Scilly are the top of an extension of the granite batholith that stretches from Dartmoor to West Cornwall. It is claimed that the islands are named after a fish that was once important in the economy of the region.

The islands and their immediate sea area form the Isles of Scilly Complex Special Area of Conservation. This study also considers the wider area of British waters, south and west of the Seven Stones reef to the national fishing limits but excluding the shelf edge and beyond.

Around 130 species of fish have been recorded from the region and it is this diversity, along with the diversity of recording methods, that is a cause for celebration; but with a cautious look at the paucity of our knowledge and the potential for sustainability.

In some ways it is an impoverished south western British fauna, but with an oceanic input. Some of the largest British fish are found here alongside some of the smallest. While a number are relatively common in suitable habitats, others are remarkably scarce.

Some of these apparent scarcities are due to sampling methods and others to taxonomic difficulties. Unfortunately the loss of species such as the Angel Shark *Squatina squatina* and the Common Sturgeon *Acipenser sturio* are just the local manifestation of national and international trends. On the other hand a small number of species have appeared and even established themselves in the past fifty years.

The fish populations appear relatively stable at present; but this depends on the timeline of your perspective. Experienced local fishermen relate declines since World War II, and especially after the “Mackerel Bonanza” of 1978 to 1980. However comparison of recent angling catches with those of the last half of the nineteenth century indicate a long-term decline in both the numbers and size of commercial fish in the region.

This work was carried out as part of the Isles of Scilly Marine Biodiversity Project, which was funded by Natural England and the Crown Estate.

ABSTRACTS OF POSTERS

In alphabetical order of first author

Not all poster contributors submitted abstracts in advance

Peracarids of the Equatorial-West-African slope

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Exploration for hydrocarbon resources in the sea off Equatorial West Africa over the last 20 years has had a beneficial academic spin-off in that numerous samples of the benthos of the slope have been collected, allowing us to investigate the biodiversity of the peracarid crustaceans. Study of some 1400 samples from 40 surveys undertaken offshore of Angola, Equatorial Guinea, Gabon and Nigeria, at depths predominantly around 800 to 2600 m, are allowing us to understand the biodiversity, endemism, depth distributions, habitat-associations and zoogeographic associations of this peracarid slope assemblage.

Amphipods are dominant and more numerous in shallow-waters, principally represented by ampeliscid species and a few melitids. In the deeper waters, these are replaced by oedicerotids and phoxocephalids. Isopods are represented mainly by gnathiids, cirolanids and anthurideans in shallower waters, while the janiroids, particularly desmosomatids, are the dominant and most species-rich peracarid taxon in the deeper-waters. Tanaidaceans in shallower waters are dominated by apseudomorphs, particularly endemic hemikalliapseudids and pakistanapseudids, but in deeper slope waters tanaidomorphs, especially anarthrurids and pseidotanaids, predominate.

The taxa from Angola-Equatorial Guinea-Gabon are consistent, but changes occur off Nigeria; the assemblages on sandy substrata are distinct from those on muddier substrata; the assemblages in shallower waters above ca 300 m are distinct from those in deeper water down to 3000 m, coinciding with both the thermocline from the Angola Current, and the general change in sediment granulometry.

Diversity of the Tanaidacea of European mud volcanoes

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Study of the chemically-reduced habitats around submarine mud volcanoes has only recently extended to the smaller peracarid crustacean taxa. During the TTR12, TTR14, and TTR15 cruises onboard R/V *Prof. Logachev* between 2002 and 2005, samples from mud-volcano sites at depths between 355 and 3061 m in the Gulf of Cadiz collected over one thousand specimens of tanaidacean, representing over 80 putative taxa, demonstrating high diversity (and in some cases high density), and including a number of undescribed species.

We have investigated links between tanaidacean assemblages between such sites in the Gulf of Cadiz, the Gulf of Mexico, the Norwegian Sea (Håkon Mosby) and the Mediterranean, in an attempt to shed light on the evolutionary rates of zoogeographic spread or isolation, of endemism and allopatric speciation. Few of the apseudomorph taxa appear to be obligate associates of these seep sites. On the other hand, a number of tanaidomorph genera, such as *Coalecerotanais*, *Obesutanais* and *Cristatotanais*, appear to be endemic to such habitats. Trans-Atlantic phylogenetic links suggest that mud volcanoes offer refugia for vent-evolved taxa during tectonic drift.

Does marine conservation work? Evaluating the effectiveness of SACs and SPAs in the Solent and their future in response to climate change.

O. Chaffe & G. Watson

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The implementation of Marine Protected Areas (MPAs), through legislations including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), has led to the conservation of flora and fauna. SACs in particular, established under EC Habitats Directive will contribute to conserving those habitats and species most in need of conservation. Inter-tidal mudflats are one of the major habitats protected by the SACs and are also an important sub-feature for SPAs. The Solent inter-tidal area offers an excellent opportunity to assess SAC's effectiveness due to the vast macrofaunal historical data sets that exist.

This project aims to evaluate the effectiveness of these conservation strategies within the current predictions of climate change. Historical data sets from the Solent will be analysed using univariate (e.g. species diversity indices) and multivariate statistical methods (PRIMER) to compare similarities and changes in biodiversity of the macrofaunal community, biotopes and biomass between sites (inside and outside SACs) and over time. Evaluation of previous methods and historical data sets is vital in setting current monitoring standards.

A number of replicate macrofaunal core samples and an additional sediment core will be extracted from new and previously sampled sites in the Solent area to provide a comparison. Samples will be preserved, stained and then sieved before being analysed using the same statistical method as the historical data sets. Sediment particle size will be assessed through rapid partial wet sieving. Climate modelling will then be used to establish any differences in macrofaunal assemblages within existing predictions.

This project will be essential to the current and future decision making processes that aim to implement successful marine conservation through the establishment of a network of MPAs.

Predicting population level effects of infertility in crustaceans

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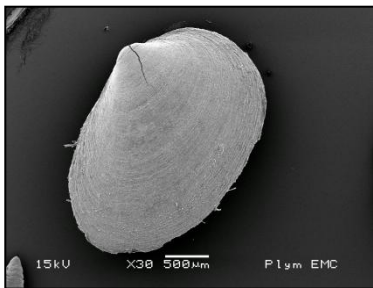
Many studies have linked chemical exposure with testicular abnormalities and reductions in sperm counts, however the ecological impact in wildlife of reduced male fertility has been difficult to predict. This study aimed to assess the impact of reduced sperm-counts in a crustacean population through population modelling. Data from previous studies detailing the impact of sperm count on female fecundity was re-examined for both crustacean and insect species to assess the correlation between sperm count and fecundity. This data was used to parameterize an amphipod population model to predict the long-term (10 year) survivorship of populations with impaired fertility. Comparison between species suggests that the relationship between male fertility (as measured by sperm count, weight or volume) and fecundity can vary considerably in slope and shape of the curve. Using current data for an amphipod (*Gammarus duebeni*), a 5% percent reduction in sperm count is predicted to have a 5-9% reduction in female brood size. The model predicts that whilst 5% reductions in brood sizes allow the population to be just still viable after ten years (albeit at critically low densities), brood size reductions of 10% or greater result in population collapse in less than 6-7 years. Results from this study suggest that relatively small reductions in sperm counts in invertebrates can have variable and possibly dramatic impacts at the population level.

Biological highlights from the Regional Environmental Characterisation (REC) Programme

Matt Green, Aimee Colcombe, Ross Griffin, Emma Delduca, Angela de-Burgh Thomas, Jack Pitts, Sara Marzialetti, Jacqueline Hill, Bryony Pearce

Marine Ecological Surveys Limited, 24a Monmouth Place, Bath BA1 2AY

Since 2003, the Department for Food and Rural Affairs (Defra) has funded six broad scale marine mapping projects covering the South Coast, Eastern English Channel, Outer Thames Estuary, East Coast and Outer Humber Regions. The aim of these surveys was to acquire data of the highest quality possible to enable broadscale characterisation of the seabed habitats, their biological communities and potential historical assets within the regions. These projects have resulted in huge scientific advances across a number of disciplines. Some of the biological highlights include the presence of extensive *Sabellaria spinulosa* reefs off the east Anglian coast, apparent northerly range extensions in both native and alien species and the discovery of extensive black bream nests off the South Coast. These advances demonstrate both the scientific worth of seabed mapping on this scale and their contribution towards marine planning and conservation.



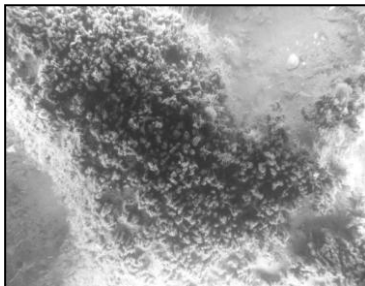
The second record of *Coracuta obliquata* in Britain



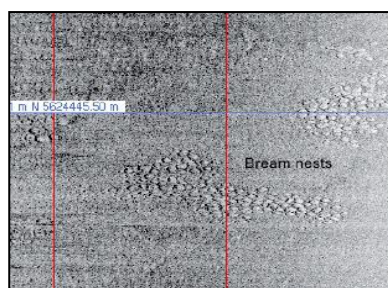
The most northerly record of *Crepidula fornicata* in Britain



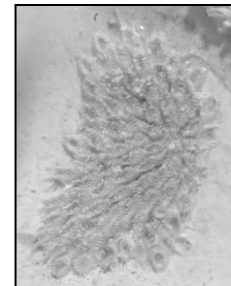
The most northerly record of *Rissoides desmaresti* in Britain



Newly discovered *Sabellaria spinulosa* reefs in the southern North Sea



Black bream nests mapped using side-scan sonar



Bryozoan found at new depths

Benthic communities of the Wave Hub development area, North Cornwall

Geraint Harris-Bryant

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In October 2005 Fugro Survey Ltd were contracted by Halcrow Ltd., on behalf of the South West Regional Development Association (SWRDA), to perform an Environmental Baseline and Habitat Mapping Survey of the seabed offshore and nearshore St Ives Bay. The survey was required in order to assess the physico-chemical and ecological seabed conditions in order to inform the HSEIA prior to installation of the prototype Wave Hub development. The survey comprised acquisition of high resolution underwater photographs and video footage, sediment samples and benthic trawls, targeted using side scan sonar and multibeam swathe bathymetry geophysical data acquired during an earlier survey.

The Wave Hub infrastructure, a wave energy testing facility located 16km off the North Cornish coast, was emplaced during the summer and autumn of 2010 and the facility is expected to become operational in 2011. The development consists of an electrical hub on the seabed, capable of supporting up to four wave generation arrays, which is connected to the UK energy grid via a 25 km cable.

This presentation will present the findings of the 2005 survey, with particular emphasis on the subtidal habitat mapping survey, which comprised characterization of epifaunal communities in conjunction with substrate type, to allow biotopes to be assigned within the framework of 'The Marine Habitat Classification for Britain and Ireland'. Field survey techniques and design strategy will also be discussed, demonstrating the use of geophysical data to optimise groundtruthing and subsequent habitat interpretation.

A wide range of benthic communities were identified within the Wave Hub development area, this diversity appearing driven by the variable topography, substrata and level of wave exposure across the site. Sand communities over the wave-exposed nearshore section of the cable route were typically species poor, supporting only low densities of polychaetes and amphipods, while deeper, more stable mixed-sediment communities were shown to be considerably richer. The communities of key interest within the site, and which will be the focus of this presentation, were those associated with hard substrata. High relief rock outcrops supported diverse sponge communities or dense beds of the jewel anemone *Corynactis viridis*, while flatter bedrock plateaus typically had mixed epifaunal communities comprising hydroids, bryozoans and erect sponges. Boulders and bedrock ridges within the shallower, more wave-exposed sections of the route were frequently colonized by the horn wrack *Pentapora fascialis* and, in certain areas, supported dense aggregations of brittlestars (*Ophiothrix fragilis* and *Ophiocomina nigra*). Biotopes associated with sediment substrata will also be discussed.

Additional surveys of the site have subsequently been conducted by the Peninsula Research Institute for Marine Renewable Energy (PRIMaRE), which also intends to monitor its benthic ecology following emplacement of the wave generation arrays. Whilst the results of these subsequent surveys are not publically available at present, it is recommended that the 2005 survey is used in conjunction with present and future surveys to build a holistic and ongoing picture of the effects of such developments on the communities, both from a physical, developmental, perspective and also from the less obvious potential effects of electromagnetic frequency (EMF) generated by the Wave Hub development on the faunal and floral communities in the area.

Fish utilization of intertidal habitats

Marc Hubble

APEM Ltd., Riverview, A17 Embankment Business Park, Heaton Mersey, Stockport SK4 3GN

The intertidal zone is a very important foraging and refuge area for fish and intertidal habitats provide potential nursery areas for numerous fish species including those of commercial and conservation importance. Few intertidal fish surveys have been conducted in Northern Europe. Those that have been conducted have generally focussed on one or two seasons during the year and the main results of some key studies completed over the past decade are summarised.

As part of a wider scale marine ecology survey to provide baseline data for the proposed Hinkley Point C Power Station development on the Bristol Channel, APEM was commissioned to conduct bimonthly intertidal fish surveys over the past year. The sampling strategy for intertidal fish followed a best practice WFD approach utilising a combination of static fyke nets and marginally deployed seine nets. All sampling was conducted over spring tides at three sites located within bays adjacent to Hinkley Point which were predominantly comprised of muddy substrates. Fyke nets were set to sample both the flood and ebb tide. A micromesh seine net was then deployed opportunistically during high slack water within the estuary margins, and at low tide within any areas of ponded water. Fish were identified to species and total length measured.

Key results of the intertidal survey at Hinkley Point are provided. Temporal variation in fish assemblage composition and numbers of individuals was greater than spatial variation across the three sites. Comparisons are made of catches utilising the different sampling methods and the implications are discussed.

Amphibase: an online database for amphipod genomes

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Despite their considerable species diversity, and extensive studies in the fields of ecology, evolutionary biology, developmental biology and ecotoxicology, the genomic information for amphipods and that of Crustacea in general has until recently been relatively limited. Without this detailed molecular knowledge, advancement in understanding the molecular basis of fundamental processes, such as the endocrine system, has been restricted, with consequential constraints for experimental design to provide insight into the biological impact of pollutants. Two substantive transcript surveys have been performed on the freshwater and marine gammarid species, *Gammarus pulex* and *Echinogammarus marinus* respectively. A lambda Zap library was generated from *G.pulex* cDNA representing mixed gender and moult stages. 9608 clones were selected and 5' sequence was determined using Sanger sequencing technology. Additionally, 4021 sequences were generated from a suppression subtractive hybridization library designed to enrich for male specific sequences. Of these 12,644 generated sequences passing appropriate quality-control criteria and these were assembled into 3917 gene clusters. A complementary study using the massively parallel sequencing technology (GS-Flx, Roche) utilized cDNA generated from aRNA representing gonadal and hepatopancreas tissue from normal and intersex males and female *E.marinus*. This yielded ~0.5 Million sequences representing ~100 Million base pairs. Initial analyses have generated 15,648 gene clusters which have been annotated with using Blast both to non-redundant GenBank and Flybase. AMPHIBASE (www.amphibase.org) will provide a one-stop portal enabling researchers to search the genetic information from the order Amphipoda enabling advancement in their fields where perhaps progress had been constrained by lack of genomic data.

Assessing the impacts of the chronic exposure of zinc and copper on the polychaete *Nereis virens* (Sars) 1835.

J. Pini & G. Watson

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Zinc and copper are common contaminants of sediment in coastal environments and are known to be toxic to marine invertebrates. The king ragworm (*Nereis virens*) is an ecologically and commercially important polychaete species of soft sediment inter-tidal communities found throughout Europe and the northern hemisphere. It is amenable to long-term studies to investigate chronic effects of these pollutants as it readily acclimatises to captive conditions and the endocrine control of growth, maturation and reproduction is well documented. Sediment cores and associated worms will be collected from a range of sites in the Solent, UK, with different pollution histories. Bioavailable concentrations will be assessed using BCR-sequential and aqua regia extraction followed by inductively coupled plasma-mass spectrometry (ICP-MS) analysis. The concentrations within the worms will also be measured using standard extraction techniques and ICP-MS. These will establish a suitable range for spiking the sediment that is environmentally relevant. To investigate the chronic effects of these metals, adults will be incubated for 9 months in control, copper-spiked, zinc-spiked and copper and zinc spiked sediment. Worms and sediment will be sampled at 3-monthly intervals and a range of end points including scope for growth, biochemical/genetic biomarkers (e.g. metallothioneins, antioxidant and oxidative damage, lysozyme, lipid peroxidation, and metabolomic changes), hormonal levels, maturation rates, feeding and regeneration rates will be assessed. In addition, SEM with EDX will be used to understand the sequestration and compartmentalisation of the metals in the tissues of the worms during the exposure. It is expected that this work will provide significant insights into the chronic toxicity of these metals in sediments (alone and in combination) on sediment-dwelling polychaetes.

New observations on the life-cycle of *Sabellaria spinulosa*

Bryony Pearce

Marine Ecological Surveys Limited, 24a Monmouth Place, Bath BA1 2AY & Marine Institute, University of Plymouth

The tubicolous polychaete *Sabellaria spinulosa* can be protected under Annex I of the EU Habitats Directive where it forms topographically distinct reef structures. There is therefore significant impetus on conservation agencies to identify and protect an ecologically coherent network of these structures as part of the Natura 2000 network. Despite the high level of interest in *S. spinulosa*, our understanding of its life-history remains rudimentary. Here we present the results of opportunistic sampling undertaken at a site in the North Sea as part of a time series sampling programme carried out between 2008 and 2010 which provides new observation on the life-cycle of this species. Eight surveys were carried out at the study site at intervals of approximately 3 months. Grab samples containing adult *S. spinulosa* were collected from the seabed and plankton hauls were used to sample larvae from the water column. These samples were then examined in detail in order to provide new information on the life-cycle of *S. spinulosa*.

A very high abundance of *Sabellaria spinulosa* larvae was recorded in the water column in February 2009 with smaller numbers in September and November 2009. These observations suggest that *S. spinulosa* has a main spawning event at the beginning of the year which corroborates the early observations of Douglas Wilson, although subsequent spawning events do also occur. Adult *S. spinulosa* were examined using histological techniques which confirmed that *S. spinulosa* spawn more than once a year and also illustrated that their reproductive cycle is not as coordinated as previously hypothesized in the literature. Finally, *S. spinulosa* gametes were liberated from live adults and were examined using a scanning electron microscope which has provided us with the first ever images and accurate measurements of these structures.

Deepsea amphipod diversity from the Ártabro Gulf (NW Iberian Peninsula).

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Study of deep-sea fauna has been increasing in recent decades; there are, however, some areas that have scarcely been sampled, such as most of the continental slope of the Galician Continental Margin (NW Iberian Peninsula). Between 2002 and 2004, three cruises were undertaken with the aim of studying the benthic communities of the continental shelf and bathyal depths of this area in general, and the amphipod diversity in particular. Sampling gears included an Epibenthic Sledge (EBS), which was deployed at different stations along a longitudinal transect covering a depth range from 100 to 1000 m. Samples were sieved through a 0.5 mm mesh and amphipods were identified to the family level at least, and to species level whenever it was possible. The family composition and abundance of gammaridean amphipods was determined for the three cruises, showing different patterns of distribution at each depth. The families Oedicerotidae and Lysianassidae were the most abundant on the continental shelf at depths from 100 to 400 m. In the deepest samples (continental slope), the abundance of amphipods was lower and the family composition different, with those families present represented by a few individuals only.

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