

## MarBEF Theme 2: Marine Biodiversity and Ecosystem Functioning

# RMPs: progress report

By Rebecca Aspden, David Paterson and Carlos Duarte

Theme 2 consists of seven Responsive Mode Projects (RMPs) (Table 1), previously discussed in the Autumn 2005 and Spring 2006 newsletters. The overall aims of these RMPs are to determine rates of ecosystem functionality in both benthic and pelagic systems, by generating theories, models and experimental tests of the relationship between marine biodiversity and ecosystem function.

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BIOFUSE rocky-shore experiment in progress.

Details of the meetings and any downloads regarding the RMPs can be obtained from the individual RMP websites (Table 1), and minutes of the kick-off workshops are placed as deliverables in the download section of the MarBEF webpage ([www.marbef.org](http://www.marbef.org)).

Twelve months down the line and Theme 2 RMPs are now well and truly under way. Theme 2 was well-represented at the MarBEF General Assembly, held in Lecce, Italy, on 9-11th May 2006. The keynote address by Jeff Huisman was entitled *The Paradox of the Plankton*. Harold Asmus presented a short introduction to ecological network analysis: *First steps to modelling the relationship between biodiversity and ecosystem function*.

Oral presentations were given by each RMP leader to explain in detail what progress the RMPs have made to date. Prof David Paterson gave an oral presentation on *Experimental unravelling of ecosystem function*. This was followed by a Theme-2 summary and report from Carlos Duarte, including a very insightful bibliometric study by Iris Hendriks. This study

highlighted the imbalance in terrestrial and marine publications, and how key areas in the new JPA should include chemical diversity and metabolism, whilst functional groups and species approaches provide a solid base from which to work. MarBEF provides the ideal opportunity for collaboration between these fields and to increase the number of publications based on ecosystem function and biodiversity within the marine environment.

### RMP progress

**GBIRM** has taken steps to create a ranked list (by importance) of candidate species to be part of a co-phylogeographic analysis. The candidate species were separated into three groups – macrophytes, fish and invertebrates – to produce a draft list. A proposal to initiate a tissue library for future large-scale genetic monitoring programmes (beyond MarBEF for 7th PCRD) was well-received by members of the RMP.

A **MarENGIN** metadata base was set up to provide detailed information on available data relevant to the RMP: the ecosystem

engineering species, study area(s), sampling and experimental designs, types of observations/measurements on the ecosystem engineering species, on the biological (biodiversity) components and on abiotic (physical, chemical) attributes. A kick-off meeting took place in Yerseke on 24-26th January. Smaller collaborations are being created and encouraged, either focusing on comparing species-specific data across sites or on joined experiments using unique facilities present at one of the participating laboratories. MarENGIN research was also presented at the MarBEF General Assembly in Lecce, and future work will include the creation of a dedicated website.



A **MarPACE** Workshop (protocol finalisation) took place in Banuyls, France, on 8-9th June 2006. This involved collaboration with the ANEMOON SETL project on invasive species, inter-calibration of panels and water-sample processing, adjustment in sampling site requirements and sampling frequency, and definition of the species of interest for DNA identification. Fieldwork has already begun with the deployment of recruitment frames.

The progress of the meta-analysis on existing databases in **BIOFUSE** is well under way, with three of the seven proposed hypotheses already tested. The overall aim of this project is to quantify the functional relationship between biodiversity and the functioning and stability of ecosystems with variable regimes of diversity. 50% (22 of 44) of the databases were received. The remaining data will be received by the end of the year. Results showed that:

- 1 Temporal variability is generally not related to biodiversity at the scale of small patches of habitat (quadrats) (Obj. 1).
- 2 Temporal variability is generally not related to biodiversity at the scale of shores/sites (100s of m<sup>2</sup>) (Obj. 1).
- 3 Relationships between temporal variability and biodiversity at either scale vary among locations within Europe (Objs. 1 & 5).

Current progress of the **FOODWEBIO** project includes collection of data on stable isotopes in different components of ecosystem and data collection necessary for *Network Analysis* (such



Participants of the MarBEF training course on Bioassay Methods in Tjärno, Sweden, in September.

as standing stocks of auto- and heterotrophic species, rates of their basic physiological processes and their diets) from different European coastal systems. Data are being gathered through a questionnaire that lists single parameters and variables required for each methodological approach.

**MarMICRO** has begun work on the project and held a workshop on the methodology for analysing microbial diversity. A presentation was given at the General Assembly in Lecce.

Future work includes the creation of a website. A conceptual paper, summarising the current understanding, differences between the research communities and gaps of knowledge, will be produced by the participants.

As a result of the **ROSEMEB** kick-off meeting in 2005, a paper has been published in *Estuaries and Coasts* where some of the new trends and emerging topics in marine chemical ecology are reviewed. This paper is available on the MarBEF Open Archive and as an open-access publication on the *Estuaries and Coasts* website.

A MarBEF training course on Bioassay Methods in Marine Chemical Ecology was held at Tjärno Marine Biological Laboratory, Strömstad, Sweden, during 9-14th September – this was also part of the Core Strategic Programme (CSP) workshop scheme. The course was attended by 20 students and 14 lecturers. The course programme is available on the ROSEMEB webpage.

### Progress on Core Strategic Programme (CSP)

The workshop 'Measuring Biodiversity and Ecosystem Function in Estuarine Systems' was held for a second year at St Andrews University (5-9th June 2006) as part of the MarBEF Core Strategic Programme. Feedback was sought and all of the participants reported enjoying the workshop (see report, next page).

The first of two 'Integration across RMPs' workshops occurred during the 2006 General Assembly in Lecce, Italy. Questionnaires were completed by RMP members during RMP presentations, in order to determine where, and between which RMPs, integration could occur. From this activity it was determined that

there is the opportunity and willingness to increase integration between RMPs within Theme 2, and between Themes 1, 2 and 3.

Cross-theme integration occurred between Themes 1, 2 and 3 in the form of two workshops during the First European Congress of Conservation Biology. These workshops provided an ideal opportunity for delegates with current expert knowledge of the key issues of conserving European marine biodiversity to produce a statement on 'European marine biodiversity threats and conservation needs.' This has been released and presented to appropriate policy-makers and national and EU ministers. It will also be available on the MarBEF website shortly.

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**Table 1: THEME 2 RMPs (RESPONSIVE MODE PROJECTS)**

WP-RMP code and title	Principal Investigator(s)
4-1 RMP on Genetic Biodiversity (GBIRM) ( <a href="http://www.marbef.org/projects/gbirm/index.php">www.marbef.org/projects/gbirm/index.php</a> )	J.-P. Ferral
4-2 The role of native and/or invasive ecosystem engineers in explaining biodiversity	T. Bouma, P. Herman, T. Ysebaert
4-3 Marine Propagation Along the Coasts of Europe (MarPace) ( <a href="http://www.marbef.org/projects/settlement/index.php">www.marbef.org/projects/settlement/index.php</a> )	K. Philippart
4-4 Effects of biodiversity on the functioning and stability of marine ecosystems – European scale comparisons (BIOFUSE) ( <a href="http://www.marbef.org/projects/biofuse/index.php">www.marbef.org/projects/biofuse/index.php</a> )	T. Crowe, L. Benedetti-Cecchi
4-5 Functioning of FOOD Webs across ecosystems of different BIOdiversity level (FOODWEBIO) ( <a href="http://www.marbef.org/projects/foodwebio/index.php">www.marbef.org/projects/foodwebio/index.php</a> )	A. Sokolowski
4-6 Microbial diversity and ecosystem functions: concepts, open questions and recommendations for integration of microbes into general ecological frameworks	K. Jürgens, J.M. Gasol
4-7 Role of Secondary Metabolites in Ecosystem Biodiversity (ROSEMEB) ( <a href="http://www.marbef.org/projects/rosemeb/index.php">www.marbef.org/projects/rosemeb/index.php</a> )	A. Ianora