



# **SIZEMIC**

## **Body-size and ecosystem dynamics: Integrating pure and applied approaches from aquatic and terrestrial ecology to support an ecosystem approach**

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**1<sup>st</sup> Workshop of the ESF Research Networking Programme SIZEMIC**

### **Trophic dynamics in ecosystems: feeding interactions, species identity and body size**

**April 4-7<sup>th</sup>, 2008**

**University of Cambridge, Cambridge, United Kingdom**

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**Cefas**

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#### **OUTLINE**

- There are two main paradigms for thinking about trophic dynamics of large numbers of interacting species: (1) webs with nodes of known species of fixed body size joined by feeding links; (2) size spectra of organisms of unknown species that grow and die through eating one another.
- Experiments and size-based models of few interacting species show, however, that body size, individual growth and species identity **all** contribute to the complex webs that determine the structure and function of ecosystems.
- This first SIZEMIC workshop aims to generate dialogue about the merits and shortcomings of the research methods currently in use. The intention is to spark off new and exciting research directions that integrate and break down current research boundaries.
- The workshop will set the scene for subsequent SIZEMIC activities, which will be focused on collaborative research and meetings. We welcome scientists with research interests in traditional food webs, size-spectra, aquatic ecosystems, terrestrial ecosystems, and from both academic and applied realms. In particular, we encourage participation by researchers interested in developing research beyond the traditional approaches to trophic interactions in ecosystems.

## KEYNOTE SPEAKERS

The workshop will begin with a day of stimulating talks from internationally recognised ecologists including: Joel Cohen (Rockefeller and Columbia Universities, USA), Ulrich Brose (Darmstadt University of Technology, Germany), Simon Jennings (Cefas, UK), Lennart Persson (Umeå University, Sweden), Peter de Ruiter (Wageningen University, NL), Pablo Marquet (CASEB/IEB/ Universidad Católica de Chile, Chile) and Ken Andersen (DIFRES,UK).

## GROUP DISCUSSION

- A combination of plenary and break-away group discussions will take place over the following day and a half. The aim of the discussions will be to generate topics for research that could form the basis of working groups over the lifetime of the SIZEMIC (2007-2011). Groups will report back to the meeting at the end and submit proposals (1-page max) to be evaluated and ranked by the Steering Committee of SIZEMIC. Appropriate proposals will go forward as funded working groups of SIZEMIC up to the financial limits set for the programme as a whole. Funds will be available for visits and meetings of participants of the working groups.
- We ask participants to choose the topic area they are most interested in from the list below as a part of their application to attend the workshop.

## TOPICS

In an attempt to organise structure and integration within the principles of SIZEMIC, we have formulated some core topics around a set of provocative statements. They may sound fairly one-sided – the aim isn't to be conventional. But neither is the aim to be confrontational; we already know there is merit to different viewpoints! How convincing are the statements? Do you have evidence or arguments for or against them? Are there ways forward to rigorously evaluate them?

### **1. *From data to webs – does it really matter how we aggregate for understanding the big picture?***

There are a bewildering number of ways in which we can lump species or individuals into groups to describe food web interactions and macroecological patterns. Does using species or taxonomic averages result in the same emergent patterns as when variation due to individual body size or life history stage is accounted for?

### **2. *Interaction strengths at the individual or species level?***

Moving from observed patterns to model design. In describing model foodwebs, some might say that interaction strengths are meaningless. Trophic interactions change as organisms grow within a species. One cannot assume all individuals within a species are identical. Should the focus be at the individual level or at the species level? Does scaling from the individual to the population at this stage mask critical foodweb interactions?

### **3. *Where does species identity (or size) matter the most?***

In terrestrial systems species identity matters and body size is unimportant. In aquatic systems the reverse is true. Terrestrial and aquatic systems have entirely different kinds of trophic dynamics and need to be treated separately.

### **4. *Time for a paradigm shift in biodiversity?***

Species identity does not matter: a kilogram of tuna is the same as a kilogram of jellyfish! What matters for the functioning of an ecosystem is diversity of size structure. The traditional theory relating biodiversity and stability does not apply in size spectra. By promoting the diversity of size structure, species diversity will look after itself.

### **5. *Is there more to life than species and body size?***

What about life-histories? In many cases the ontogenetic changes on trophic interactions that occur are more discrete than continuous growth processes. What extent do life history processes

like growth play a role in the ecological dynamics of the food web? The ecological parameters of food webs and size spectra are evolutionary variables and the trophic structure of an ecosystem will not be understood without understanding the processes that takes place within it.

**Applied ecology:** Rather than including a separate topic on applications such as effects of environmental variability and/or climate change, the aim is for this to be a crosscutting area that may be relevant and interest for all of the topic areas above. This should be kept in mind when considering each topic.