Dynamic Energy Budget (DEB) tele-course 2015

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My primary research interests are principally focused on the study of the physiology and ecology of intertidal molluscs. During my PhD and my post-doc I had the opportunity to collect a lot of data on respiration rates, heart rate, anaerobic end product and thermal tolerance of different species. Tring to explain species distribution and competition is a complicated task especially in the intertidal zone where environmental parameters such as temperature and food availability vary considerably due to the effect of the tide. The study of the effect of different combined stresses on the metabolism and growth can be difficult and time-consuming if performed in the laboratory. For those reasons, last year I decided to use the DEB models. Thanks to the collaboration with Prof. G. Sarà from the University of Palermo I started to parametrize one of my studied species, the intertidal mussel *Perna perna*, since no standard DEB model is available for this species yet.

Even if I was not new to this modelling technique, the four weeks of the tele-course gave me the opportunity to better understand the basic theory and principles. Thanks to my biologist background, it was easy for me to understand the theoretical metabolic notions but the mathematics and energetic concepts used by the DEB model was something new for me. The skype session with my working group has been really useful to clarify my doubt and help me to “digest” these complex equations. I found it particularly interesting and inspiring to have discussions with researchers working on completely different organism ranging from microalgae to turtles.

The ability of this model to merge the metabolisms of all living organisms really fascinates me; moreover, the increasing success and application of this technique during the last years confirmed its ability to be applied to many different species. Developing a solid DEB model for a species with limited information like *P. perna* can be challenging since not all the data required by the model are available and a lot of approximations and simplifications are necessary. I am convinced that the consideration of the important metabolic changes that this species has to face periodically during aerial exposure can make a big difference for the energetic budget and growth estimations. The big issue now is to be able to go over the basic model and try to include the metabolism changes measured during aerial exposure.

The book gave me many new ideas and helped me realise how much can be done thanks to this powerful model. Now I feel that developing the standard DEB theory for *P. perna* will represent only the first step for my research project and that many other modification and improvements will be necessary to explain the spatial distribution of this intertidal benthic species.