S4

4h of December 2013 | 14h50-16h50 | Room C6.2.52

Understanding and conserving biodiversity

Organized by Elena Casetta (CFCUL, Portugal / LabOnt, Italy)

Introduction

Since the coinage of the term 'biodiversity' in 1986, the biodiversity crisis has become a top priority of the societal agenda, and it is becoming one of the main concerns for governments, decision makers, and the general public. Conservation of biodiversity has rapidly become the center of numerous international political treaties and studies, amongst which there are: the 1992 Convention on Biological Diversity (as well as the related Cartagena Protocol on Biosafety); the titanic effort of the Millennium Ecosystem Assessment, released in 2005; and finally, the UN declared the period from 2011 to 2020 the UN-Decade on Biodiversity. In spite of all the attention devoted to the subject, the tools to manage the biodiversity crisis are far from obvious and clairvoyant. Better policies are required, as witnessed by the failure of the 2010 Biodiversity Target "to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level" to which the Parties of the Convention on Biological Diversity committed themselves in 2002. In order to achieve more effective conservation policies, we argue that what is required is a deeper understanding of what biodiversity is, why it is valuable, how it is produced, and which types of evolutionary mechanisms and natural laws are in play. The proposed symposium unites scientists and philosophers, and aims at providing guidelines in that direction. In particular, the symposium will address three main topics. First, we look into the nature of extinction and the evolutionary and natural processes that cause loss in biodiversity, giving a special emphasis to climate change and the influence it can have on a species' ecological niche, and phylogenetic and ontogenetic mechanisms that sometimes prohibit species to remain adaptive to their environment. Secondly, we address the patterns of biodiversity: does species diversity (meaning the number of species and their relative abundance) change in predictable ways when we increase the size of the area sampled and, if so, how can we use this knowledge to address species conservation and, in particular, reduce species extinction risk? Finally, we will tackle the relation between ethical theories on species on the one hand, and the target of conservation policies on the other, focusing, in particular on the difference between species-centered and habitat-centered approaches to biodiversity conservation.

Program

Introduction by Jorge Marques da Silva

Natural and Evolutionary Causes for Species Extinction
Nathalie Gontier (Director AppEEL-The Applied Evolutionary Epistemology Lab, Center for Philosophy of Science, University of Lisbon; Post-Doctoral Researcher FCT)

Abstract. The majority of multicellular life forms as we know them evolved in the Cambrian, in a period designated as the Cambrian Explosion. It is during this period in time that the major eukaryotic phyla or "body plans" evolved. Soon after the Cambrian explosion, there was a rapid extinction phase (a real decimation) in the amount of phyla that had evolved, but at the same time, the number of genera and species within the surviving phyla diversified and increased, causing the biodiversity as we know it today. Nonetheless, during certain time periods, entire species and genera go extinct. In this talk we look at the natural and evolutionary causes that explain species extinction, and special emphasis will be given to (1) climate change and the influence it can have on a species' ecological niche; and (2) phylogenetic and ontogenetic mechanisms that sometimes prohibit species to remain adaptive to their environment.

Patterns of Biodiversity from Local to Global Scales
Luís Borda-de-Água (Post-Doctoral Researcher, CBA-Center for Environmental Biology, University of Lisbon)

Abstract. Species richness is not equally distributed on Earth, equatorial regions are the richest and richness decreases when one moves towards the poles. This is a pattern at global scales. However, there are also patterns at smaller spatial scales. The most renown one is the species-area relationship: the number of species increases when the area sampled increases. Probably even more remarkably, the number of species increases with area as a power law with exponent smaller than one, meaning that the rate of increase in the number of species slows when are increases; a pattern that has been often used (and misused) in conservation studies. Diversity, however, is not only species richness, the relative abundance of species is another component.. Are there similar patterns to the species abundance distribution similar to those observed to the species richness? The answer is "yes". Small samples exhibit a monotonically species abundance distribution, well described by a logseries, and larger samples exhibit a distribution with bump for intermediate abundance classes, and is usually described by a lognormal like distribution. Although, the species abundance distributions have different shapes depending on the scale of analysis, we have recently uncover a pattern related to the spatial scaling of the moments. Here we will discuss the importance of this new pattern, as well as, the importance of patterns in general to theoretical and applied work in ecology.

From Ethics to Policies: US Endangered Species Acts and EU Natura 2000

Elena Casetta (Post-Doctoral Researcher FCT, CFCUL - Center for Philosophy of Science, University of Lisbon) & **Jorge Marques da Silva** (Assistant Professor, Department of Plant Biology - Center for Biodiversity, Functional and Integrative Genomics, University of Lisbon)

Abstract. Two macroevolutionary phenomena—radiation and extinction—have governed the increasing and decreasing of biodiversity in evolutionary timescale. This talk focuses on extinction, and in particular on the relation between the ethical theories on species value and the policies on species conservation aimed at facing the new mass extinction we could be entering, the first involving our own species as primary cause. Comparing the US Endangered Species Acts and the EU Habitats Directive, we would like to explore the hypothesis that two different views on biodiversity value underlie the two policies, resulting in two different conservation approaches.