GASPAR

GENERAL APPROACH TO SPECIES-ABUNDANCE RELATIONSHIPS IN A CONTEXT OF GLOBAL CHANGE, REEF FISH SPECIES AS A MODEL

Principal Investigator: Michel Kulbicki, Laboratoire Arago, IRD, Baynuls/mer, France. contact: gaspar@cesab.org

9 participating institutions: IRD, La Réunion, France; IRD, Nouvelle Calédonie; James Cook University, Australia; Universidade Federal de Santa Catarina, Brazil; University of Hawaii, USA; University of Montpellier II- France; IUCN, United Kingdom; Dalhousie University, Canada; Universidad de Merida, Mexico

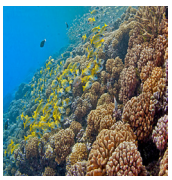
CESAB
CENTRE DE SYNTHÈSE ET D'ANALYSE SUR LA BIODIVERSITÉ

www.cesab.org
cesab@fondationbiodiversite.fr

2010 projects

Global changes more and more affect terrestrial and marine ecosystems. Although it might still be difficult to anticipate how they will evolve, a fundamental ecological question remains: how will these changes impact the structures and organization of communities? It is therefore fundamental to understand how communities—made up of a small number of common species along with a large number of less abundant or even rare species—might react to environmental factors. Such understanding would constitute a major step toward predicting the impact of global changes.

To answer this question, the GASPAR project will focus on coral reef fishes. They are the most diversified vertebrates in the world, and are sensitive to many global changes factors (temperature, increase in CO^2). Data on these organisms are available from many reef systems of the planet and are sufficiently well-known which make coral reef fishes a very relevant model for the questions addressed in this project. Beyond these advantages, they are part of the richest ecosystems of the planet and they are also one of the most threatened. For many populations of the world, coral reefs are an important food resource, while protecting the coast against erosion. They also have an invaluable cultural, esthetic, and touristic value.



CESAB'S ADVANCES

The large amount of data collected at the CESAB for this project will be available to analyze a range of questions in the field of ecology, test some predictions on climatic changes and the evolution of the coral reef ecosystem according to perturbations. The outcome of this research could largely impact the management of natural resources such as fishery and forestry.

STEPS

- Build a data base on:
  - the biology and ecology of the main coral reef species (over 6,000 species)
  - the geographical distribution of these species at the world-wide scale
  - their abundance in many sites of the coral reef systems of the planet.
- Analyze variations in the abundance of species as a function of their life history traits
- Regroup species according to their ecological functions thereby identifying functional groups* of species, and analyze their contribution to the resistance of communities to disturbances
- Test whether the diversity of a species assemblage impacts the relative abundance of these species, their biomass and their production and if any loss of diversity results in a loss of services.

Focus

*Functional groups

A particular species fulfills a group of functions within its ecosystem. These functions are defined according to life-history traits of the species (feeding habits, size, behaviour, mating, ...). An identical function can be fulfilled by several species. We then say that they all belong to the same functional group. The more species can fulfill the same function, the more this function might be maintained in case of disturbances; if one of these species disappears or becomes rare, it is probable that another species will be able to replace it, at least in part. On the other hand if a particular function is achieved by only one species, this last one becomes crucial to fulfill it. The disappearance of this function could have major consequences over the entire balance of the ecosystem.

FRB
FONDATION POUR LA RECHERCHE SUR LA BIODIVERSITÉ

The FRB was launched in 2008 at the initiative of the ministry of research and the ministry for the environment of France, and was founded by 8 public research institutions (BRGM, CIRAD, CNRS, IFREMER, INRA, IRD, IRSTEA, MNHN). The FRB is a science-society platform and it supports and promotes scientific projects and expertise on biodiversity.

The CESAB is a centre for the synthesis and analysis of biodiversity created and developed by the FRB to foster knowledge on biodiversity through data and theoretical synthesis activities. CESAB provides researchers with the means to conduct these activities in a dedicated place over sustained periods of time.