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## THE FRENCH MARINE DIVERSITY NETWORK

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Biodiversity is a rather new term whose significance is very broad because it rests on various concepts of Science, Society, Economy and even Politics. This explains the sometimes ill-defined ideas surrounding it. Species diversity was first considered as a consequence of the historical accumulation of species. Ecologists now consider spatial and temporal dimensions, recognizing the existence of connections between local habitats and global biogeography and between short time and geological time. It is now considered that present observable diversity patterns are the result of a number of ecological and evolutionary processes, historical accidents and geographical circumstances. It is thus necessary to develop new concepts and analytical approaches that match the respective scales of the processes responsible for diversity. The foreseeable changes, particularly those caused by human activities, explain the present concern about the preservation of biodiversity (*cf.* the Rio de Janeiro Conference and the wide range of national and international regulations). A scientific understanding of all aspects of biodiversity is a major objective towards effectively supporting conservation and management of marine systems and the living resources involved.

In contrast to the terrestrial context, the marine living resources come almost exclusively from natural populations whose stocks are far from being assessed. Their renewal depends on the population dynamics of exploited species but also on evolutionary and environmental constraints. This operational system is threatened by overfishing, pollution, fragmentation or loss of habitats and by the probable consequences of global climatic changes. It is thus necessary to gain better knowledge not only on the exploitable species themselves, but also on their environments both biotic and abiotic, whose properties are even more poorly known than in the terrestrial environments. An important characteristic of the marine environment is that it is dense and dispersive. The sea is a physical environment allowing a planktonic phase in about 70% of the species, associated with very high fecundities and important dispersal capacities. In spite of the geographical continuity of the world ocean, marine ecosystems present zona-

tions as complex as, and sometimes much sharper than, on land. Often these zonations exist along with marked gradients (*e.g.* temperature, salinity, light, trophic abundance) arising in general over vast expanses

Since its establishment in 1994, the RDM [Réseau *Diversité Marine* = Marine Diversity Network] has made an important contribution by giving an infrastructure to the community of French scientists in disciplines as different as molecular biology, population genetics, systematics, marine ecology, halieutics or oceanography. The network presently covers most of the issues of the international DIVERSITAS program. About sixty actions are in progress, involving approximately 250 researchers, supported by various funding sources such as the PNB (programme national Biodiversité – jointly funded by CNRS and IFREMER), ACC-SVs (Actions concertées et coordonnées – Sciences du Vivant), the national network of Biosystematics, the European Union. However, up to now, most of the funding is due to wider programs and to recurrent resources of laboratories. When scrutinizing the actions according to the core elements of DIVERSITAS, it appears that: “Systematics: inventorying and classification” corresponds to 40% of the activity, “Origin, maintenance and change of biodiversity” to 20%, “Functional aspects of biodiversity” and “Conservation, restoration and sustainable use” each to 18.5%, and only 3% are directly devoted to the “Monitoring of Biodiversity”. Assessment concerning Europe was published by Warwick R., R. Goñi & C. Heip [eds] 1997: *An inventory of marine biodiversity research projects in the EU/EEA member states*, CEC/MAST, EERO and MARS (European Marine Station network).

In 1995-1996, the RDM supported six projects and organised workshops giving rise to three more elaborated programmes: “Inventory of the flora and the fauna of the metropolitan marine stations”, “Genetics and marine diversity” and “Biodiversity of the renewable marine resources”. The aim of the congress *Biodiversité en milieu dispersif* (biodiversity in dispersive environments) held in the Muséum national d’Histoire naturelle (MNHN) at Paris in November 1996 was to survey these ac-

tivities and to evaluate the scientific potential of the French community. 37 oral presentations, coming under 7 topics, were accepted by the scientific committee :

- Inventorying and classification (6)
- Monitoring of biodiversity (4)
- Invasion of species (4)
- Molecular tools (4)
- Origin, maintenance and change of biodiversity (8)
- Sustainable use of biodiversity (6)
- Effects of biodiversity on ecosystem functioning (5)

The number of communications shows that the activity in the fields of marine biodiversity in France goes beyond the actions specifically supported. Thus there is a high potential in this field, related in particular to the Marine Stations, some laboratories of IFREMER and the MNHN.

The variety of aspects covered by the conference<sup>1</sup> reflects the stimulation of theoretical considerations in both the framework of data bases and of populational and ecosystemic approaches. It has confirmed that current key topics are :

- the activity of inventorying and construction of data bases, although the average age of the systematists permits to foresee a considerable decline in capacity of taxonomic expertise in the near future,
- research on the origin, the maintenance and the change of marine diversity, especially the intraspecific (genetic) aspect, for which a functional approach must be encouraged,
- the study of the exploitation and the modifications of diversity by fishing and aquaculture, and the study of the renewable nature of the resources

on an evolutionary time scale and their deterioration by anthropic impact,

- the study of the consequences of species invasions (*Crepidula*, *Caulerpa*,...),
- the use of powerful molecular tools allowing to assess diversity of very small organisms (e.g. picoplankton) or their monitoring, and of geographical information systems (GIS),
- research on functional aspects of biodiversity relating to the ecological successions, space complexity and their consequences on energy flows and their links to productivity.

The organisers are indebted to all who made the congress so successful and would like especially to acknowledge the hospitality of "La grande Galerie de l'Évolution" at the MNHN. In particular, we thank the conference speakers and participants for their input and for the enthusiasm with which they try to tackle the problems of size, time and space scales, of linking diversity and productivity, genetics and ecology or integrating species and ecosystem perspectives.

Dr Nicole Coineau, managing editor of *Vie et Milieu*, and her editorial assistants are gratefully acknowledged for their excellent collaboration. This volume comprises peer reviewed notes, short and full-length articles. We are very grateful to all the authors for producing their manuscripts on time. Special thanks are due to the national and international referees for their careful reviewing of the manuscripts. We also thank CNRS (département des Sciences de la Vie et Programme national: Dynamique de la Biodiversité et Environnement), IFREMER, MNHN, ELF-AQUITAINE (direction de l'environnement et de la sécurité) for their support.

<sup>1</sup> The congress programme is given at the end of the volume, along the list of participants.