

BOOK REVIEW

Fréon, P. and J. Mendoza. – 2003. *The sardine (Sardinella aurita), its environment and exploitation in Eastern Venezuela*. IRD Éditions. Institut de Recherche pour le Développement. Collection Colloques et séminaires. Paris, 549 pp.

Research into fisheries has changed enormously in recent years. The traditional approaches based on the monitoring of an exploited population and the study of its population dynamics have been demonstrated to be insufficient and in some cases erroneous. Fishing activity, targeted towards the exploitation of one or a few dominant species, has generated changes far beyond those caused to the species in question. The decrease in the stocks of some exploited species favours the proliferation of others that can easily lack commercial interest. The reduction of one element of the ecosystem has repercussions both on the trophic chains and on the production processes. At the same time, the inclusion of information from other disciplines in the exploitation models, such as the physical characteristics of the environment and the biology of the target and by-catch species, is of great interest.

The widespread trend is orientated towards the confirmation of a fishery oceanography that undergoes increasingly multidisciplinary exploration and experimental study. The factors that must be borne in mind for rational and sustainable exploitation of the fishery resources are increasingly varied and lead to research groups working in coordination with experts of different specialities. Solutions to the fishing crisis on a global scale can only be approached from this point of view. This crisis has affected society and, partly as a result of the pressure and the demands of the solutions, has helped to change the study of fisheries radically.

The book edited by Fréon and Mendoza is a clear example of the approach to follow in fisheries studies. The authors have compiled a collection of studies from different disciplines in one volume that provides an overall view of what the fisheries of the sardine, *Sardinella aurita*, represent in the north-east region of Venezuela. The book covers such different fields of research as the physical and hydrodynamic characteristics of the environment (e.g. the role of the continental run-off, the processes associated with upwelling), the biology of the exploited species and the trophic relationships between co-existing organisms, as well as

population dynamics and socio-economic aspects. The interaction between these disciplines requires the ability to deal with data from meteorological and hydrological records, as well as that derived from plankton sampling, trophic relationships, acoustic surveys, stock assessment, population dynamics and fisheries models and also a consideration of information from socio-economic studies. The use of the ECOPATH II programme allows interesting conclusions to be drawn and extrapolated concerning not only the future of the resource but also of the dynamics of the whole ecosystem.

The book centres on the *Sardinella aurita* fisheries in the continental shelf region of north-east Venezuela, where the species represents the most important fin-fish biomass. The environmental framework considered, especially in the extensive summary published by the authors, both in English and in Spanish, highlights the important role of the upwellings during the periods of drought and the contributions of the Orinoco river in the interannual variations of the stocks of this species. The study area is one of the most important for fisheries exploitation in the Caribbean Sea and the conclusions drawn by the authors can be extrapolated, with the customary caution that must always be exercised in these cases, to other regions of tropical and temperate waters. The global approximation that the authors offer can be considered as a very useful reference framework for fisheries scientists, especially from tropical zones.

The book includes a fairly exhaustive initial synthesis and 12 more specific chapters. These are written in Spanish and represent more detailed contributions for the environmental, biological, and exploitation topics mentioned above. The effort of the editors is especially outstanding since they have drawn up a long list of recommendations at the end of the synthesis, including suggestions such as how to approach research projects concerning the species and the management of the resource. This is especially interesting if the recommendations, which are clear and evident, reach the decision-making organisations that help with preventive measures, better stock management and conservation of the ecosystem that shelters this important natural resource, *Sardinella aurita*.

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