



## **REPORT OF THE WORKING GROUP ON RECRUITMENT PROCESSES**

**This report is not to be quoted without prior consultation with the General Secretary. The document is a report of a Working Group under the auspices of the International Council for the Exploration of the Sea and does not necessarily represent the views of the Council.**

International Council for the Exploration of the Sea  
Conseil International pour l'Exploration de la Mer

At the 1994 ICES Annual Science Conference, resolution 2:51 was adopted as follows:

The Working Group on Recruitment Processes (Chairman: Dr P. Pepin, Canada) will work by correspondence in 1995, and report to the 1995 Annual Science Conference, to:

- a) develop a workshop to be held in June 1996 in Canada entitled "Towards an Otolith Growth Model" (Chairman: Dr S. Campana);
- b) plan a meeting in 1996 to:
  - i) review the outcome of the Workshop "Towards an Otolith Growth Model" and identify further steps to be taken,
  - ii) review progress with the Study Group on Spatial and Temporal Integration,
  - iii) review progress in the application of size based theory to recruitment problems and in particular.
    - develop explicitly relationships between mortality and body size in early life and carry out sensitivity analyses to determine which parameters are most sensitive to changes in size specific survival,
    - examine stage specific survival rates and their variability, and determine how variability changes with stage development,
    - determine whether there are critical stages or sizes where variability in rates change significantly;
  - iv) review progress in the application of otolith elemental analysis to recruitment problems.

Contact was maintained with members throughout the year and a general mailing was sent to the members of the Working Group in mid-June 1995 to canvas their opinion regarding the recommendations from the 1994 meeting held in Lysekil, Sweden.

Response to the general mailing was good and resulted in some additions to the original list of items put forth in the resolutions from the 1994 ICES Annual Science Conference.

Based on recommendations from S. Campana (Canada), it was decided that further discussion of the experiments and data required to address the relationship between body growth and otolith growth was required before sufficient new information would be available to warrant a separate workshop. As a result, some preliminary data will be presented during the next meeting of the working group to provide further

input on the issues pertaining to the workshop's development.

Progress in the work of the Study Group on Spatial and Temporal Integration is an essential element in the future development of research programs dealing with recruitment processes. Given the lack of support from the delegates of the recommendation concerning the funding and the constitution of the Study Group (see C.M.1994/L:12 recommendations 2 ii and 2 iv), work of the Study Group has continued by correspondence to draw up detailed specifications, budget requirements and evaluation criteria for the task originally assigned ("To provide advice on approaches to analysing data and optimising the temporal and spatial design of surveys for determining spatial patterns in stage-specific abundances and mortalities of fish eggs and larvae"). Review of this task and the development or availability of case study data will be presented for discussion and identification of further steps to be taken.

During the 1994 meeting, the Working Group was presented with an extensive review of the principles and applications of size based theory in the study of recruitment processes. The Working Group identified the need for further development of general relationships, and understanding of the sensitivity of size dependent processes that influence development and mortality throughout the early life history. Contributions detailing progress in the understanding of size dependent processes and some data set which can be used to address some of the issues identified during the previous meeting will be reviewed with the goal of outlining further applications of size based theory to the study of recruitment.

Rapid development of methodological applications of otolith elemental analysis to many issues dealing with the study of recruitment processes (e.g., mass chemical markings, radiochemical dating, pollution indices, stock identification, reconstruction of migration histories, reconstruction of temperature histories) represents an avenue of research that can be very important in the development of future initiatives. As a result, the Working Group has requested to be kept informed of developments in this field.

Finally, experimental protocols used to characterise growth, condition, and vulnerability to starvation or predation differ widely among studies. This has often lead to difficulties in providing a comparative evaluation of results for a given species from a suite of reports. Furthermore, there has been a great deal of progress in the study of larval fish which has accumulated in the aquaculture research community, but which has not been noted by many involved in recruitment related research. It has been suggested that there should be a minimum level of information necessary for the proper evaluation of the performance of the larval fish from different experiments. As a result, a review of experi-

mental protocols used in laboratory and enclosure studies appears necessary in order to provide criteria for the comparison of protocols and conclusions.

During 1995, the group was able to address the assigned terms of reference and as a result recommends that:

The Working Group on Recruitment Processes (Chair: Dr P. Pepin, Canada) will meet in Dartmouth, Canada from 17–20 June 1996 to:

- a) review progress with the planning of a Workshop to further study the Relationship Between Otolith Growth and Body Growth in Fish Larvae and identify further aspects to be considered;
- b) review progress with the Study Group on Spatial and Temporal Integration;
- c) review progress in the application of size based theory to recruitment problems and in particular
  - develop explicitly relationships between mortality and body size in early life and carry out sensitivity analyses to determine which parameters are most sensitive to changes in size specific survival,
  - examine stage specific survival rates and their variability, and determine how variability changes with stage development,
  - determine whether there are critical stages or sizes where variability in rates change significantly;
- d) review progress in the application of otolith elemental analysis to recruitment problems;
- e) review experimental protocols relating to experiments designed to characterise growth and condition, and vulnerability to predation.