



## Workshop on standardisation of age reading based on otolith samples in the MedSudMed Project area

13-17 December 2004, Mazara del Vallo, Italy

- Terms of reference<sup>1</sup> -

### 1. Background

The MedSudMed Project is currently implementing a series of activities in the framework of the Project component on “spatial distribution of demersal resources and the influence of environmental factors and fishery characteristics”, following a work plan that was discussed and agreed upon by the Project’s Coordination committee. The Expert Consultation organised on this issue (Malta, December 2002), highlighted the need of standardizing the data collection and processing methods, in order to produce comparable and valid results at regional level.

The workshop on Standardization of trawl surveys protocol in the MedSudMed project area (Mazara del Vallo, May 2003) was organized in this perspective and was already taken into consideration during recent joint trawl surveys. The agreed indicative work-plan adopted during the Expert Consultation also includes the comparison of the procedures used by the participating countries to read the otoliths of priority species identified by the participating experts (see appendix 1). The foreseen target species for the present workshop are *Merluccius merluccius* and *Mullus barbatus*. Similar activities were implemented within FAO Regional Projects and advantage could be taken from these experiences.

### 2. Objectives of the Workshop

The workshop is focused on the preparation and reading of otoliths to get age-length-keys and transform length structures in age structures, according to a common protocol to be used in the framework of the MedSudMed activities. The main objectives of the workshop are therefore to standardise the age-reading methodology and to establish homogeneous age-reading criteria at regional level. The workshop will provide an overview of the methodologies applied to the target stocks (presenting existing national and international protocols, giving technical characteristics regarding material, methods, sampling design and data processing). More specifically, the workshop aims at:

- presenting and discussing the otolith processing methods and the age estimation criteria used by the different research institutes;
- on the basis of the previous, producing a common sampling and processing protocol related to otoliths;
- consequently, planning local training course on the basis of the common protocol;
- producing a glossary of terms to be used (a draft should be prepared before the workshop);
- discussing the prospective at regional level.

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<sup>1</sup> Notes provided by Othman Jarbouli (Institut des Sciences et Technologies de la Mer, Sfax, Tunisia) and Sergio Ragonese (Istituto di ricerche sulle Risorse Marine e l’Ambiente, Mazara del Vallo, Italy).

### **3. Expected outputs**

The main expected outputs are:

- A common protocol to be used for age-reading at regional level, and in particular for any activity conducted in the framework of the MedSudMed Project.
- An age reading method which will have been validated and to be used by all four institutes to estimate the age for the species targeted by the MedSudMed Project activities.
- A glossary of terms giving definitions.

### **4. Participation**

The seminar is open to technicians and researchers belonging to Institutes and/or organizations from countries involved in the MedSudMed Project.

An extra-regional expert on age-reading will be invited to chair and supervise the workshop. He should provide a synthetic presentation on the issue in order to update the participants on the latest existing techniques and standards. He should take care of orienting the discussions so that the common protocol produced sticks to international standards.

Invitation will also be made to national program coordinators, and to other regional Projects who might be interested in the issue.

### **5. Organization**

The organization is detailed in the provisional agenda at the end of this document. Each participating institute will present the status and aim of its activities in the specific field of otoliths treatment, addressing the points detailed below in a brief document (2-3 pages following the Project's Guide for Authors). Moreover, the extra-regional expert will be invited to prepare an introductory paper giving a general overview of the issue.

These introductory papers will be presented in plenary session; thereafter, a working plan will be agreed upon and, if necessary, different groups will meet in separate sessions to discuss and agree on specific and detailed methodologies for each issue and for each species. A practical session will allow the participants jointly follow the whole process of otolith preparation and reading according to the protocol agreed upon. Eventually, the working groups will present their document to further discussion in plenary session and the meeting will approve the resulting common protocols.

During the workshop, available glossaries will also be compared and a synthetic annotated glossary will be prepared by the participants.

The items to be discussed are detailed below.

#### **5.0. Choice of the hard structure (otoliths, scales, vertebrae, spine, etc.)**

A brief description of the different structures used or potentially usable in the MedSudMed Project area will be done; however, the seminar will mainly be oriented on otoliths.

#### **5.1. Extracting, cleaning, storing and preparing otoliths**

This issue deals with the processing and preparation methods. The following topics summarize the type of information that will be examined:

- a. Left, right or both;
- b. Storing and labelling;
- c. Preparation methodologies (whole surface, whole grounding, break and burnt, thin sections etc.);
- d. General procedures (mounting, gluing, resins, bases, cutting, polishing, clearing, etching and viewing,)

### **5.2. Examining, reading and ageing otoliths**

This topic deals with the most critical methodological procedures regarding otoliths. It regards more detailed processing, such as relative and absolute age attribution, and related basic statistics (such as precision of the counts). The issues listed below include also a practical session based on representative otolith samples prepared for one or all target species of the workshop:

- a. Morphometric otolith features (*i.e.*, the primordium and nucleus) and related measurements;
- b. Scaling (morphometric relationships, for example length-weight curve, otolith to somatic growth etc.);
- c. Reading and ageing otoliths (classic approach and Image Analysis application);
- d. Checks identification (in particular, those linked to sexual maturation and spawning);
- e. Counting axes (*i.e.*, figure out the fast and the slow growth areas);
- f. Relative and absolute counts (first growth increment, interpretation of the marginal growth);
- g. Relative and absolute age (birthday);
- h. Qualitative (*i.e.*, graphical such percent agreement and age bias plots) and quantitative (*i.e.*, statistical) comparison between readers (Precision, Average Percent Error, Coefficient of Variation, Single Best Increment Count, ageing-error matrices etc.);
- i. Accuracy and validation (Marking, chemical tagging or markers, length analysis, etc.);
- j. Preparation of reference collections.

### **5.3. Individual and length based growth reconstruction**

Age information represents the basis for the estimation of growth, but it is interesting to attempt to clarify the individual trajectories and enlarge the age samples (necessarily small) by using also the length structures routinely collected in the area. The complexity of the issue will allow only a preliminary treatment during the workshop.

- a. Back calculation;
- b. Age-Length-Keys (ALK).

### **5.4. Methods and software to model size (length) at age**

The most adaptive procedures and software available to transform size and age data in growth modelling will be analysed. The item, however, is so complex by itself that only a preliminary treatment will be done within the workshop. Therefore, the issues that will be addressed are:

- a. storage of defined information about age and related data;
- b. management of input data;
- c. exploratory analysis to identify the most suitable model;
- d. growth comparison.

## **6. Date and venue**

According to the planned activities, the seminar should have a total duration of 5 days and is scheduled in December 2004. It will be hosted by IRMA-CNR in Mazara del Vallo, Italy.

## **Provisional program**

### **1<sup>st</sup> day**

Morning: Presentation of background information on MedSudMed activities  
Aims of the seminar and presentation of the participants  
Adoption of the agenda and practical organization of the seminar

Afternoon: For each topic, one presentation per research institution (30 min maximum) and by the invited expert is foreseen. An introduction will be made on the glossary, presenting the available information and the expected output.

### **2<sup>nd</sup> day**

All day: working groups will be created according to what will have been presented the previous day and according to the number of participants. The issues to be addressed to produce a protocol draft for each topic will be discussed and agreed upon.

### **3<sup>rd</sup> day**

Morning: working groups (continued)

Afternoon: practical session for each species following the whole process from preparation to age determination, under the supervision of the expert. Participants are invited to bring all relevant material (otolith samples, photographs ...) that could be useful for the practical session and the drafting of the common protocol.

### **4<sup>th</sup> day**

All day: practical session (continued)

### **5<sup>th</sup> day**

Morning: discussion of the draft report and definition of the future training activities

## Appendix 1: List of identified priority species within the MedSudMed Project

### 1. Demersal species:

- Bony Fish

*Merluccius merluccius*  
*Mullus barbatus*  
*Pagellus erythrinus*  
*Mullus surmuletus*  
*Trachurus trachurus*  
*Helicolenus dactylopterus*

- Cephalopoda

*Sepia officinalis*  
*Octopus vulgaris*  
*Eledone cirrhosa*

- Crustaceans

*Parapenaeus longirostris*  
*Aristaeomorpha foliacea*  
*Nephrops norvegicus*

- Cartilaginous Fish

*Raja clavata*

### 2. Pelagic species:

*Engraulis encrasicolus*  
*Sardina pilchardus*  
*Sardinella aurita*  
*Scomber japonicus*  
*Scomber scombrus*  
*Trachurus trachurus*  
*Boops boops*  
*Trachurus mediterraneus*