

# TACADAR



Ancona 10 – 12 September 2004

# Agenda

**Friday 10 September**

**Meeting location: Hotel Jolly**

**1000: Welcome. Short presentation of the participants**

**1015: Erlend Moksness: TACADAR: where are we going and how**

**1035: Audrey Geffen: Is it an art ?**

**1100: Coffee break**

**1130: W. J. McCurdy: Quality issues in the use of otoliths for fish age estimation**

**1200: Peter Wright: The nature of secondary growth structures in temperate marine fishes**

**1230: Ronan Fablet: outline of the new version of our software TNPC dedicated to CS imaging+ statistical learning applied to age and growth analysis from otolith images**

**1330: Lunch**

**1430: Henrik Mosegaard: The effects of age, growth, species, population, and environment on fish otolith shape**

**1500: Hélène de Pontual: Continuation of the "hake story". The analysis of recaptures shows that we may largely underestimate growth and overestimate age.**

**1515: Arild Folkvord: TBA**

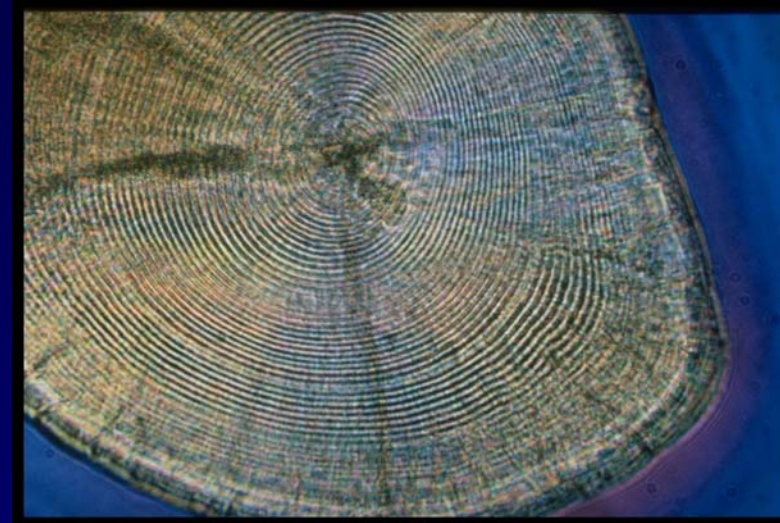
**1530: Working Groups**

**WG1: Discuss the levels of precision and accuracy to be used as qualifiers in statistical terms.**

**WG2: Discuss the evaluation of individual methods of age determination in cases where several methods are used to provide data input for the same stock assessment or environmental management model.**

**WG3: Develop guidelines for the creation and application of quality assurance and quality control mechanisms to protocols for the determination of the ages of fish from hard tissues.**

**WG4: Define the framework for the application of quality assurance and quality control mechanisms, to protocols for the determination of fish ages from hard tissues.**





## **Saturday 11 September**

0900: Summing up WGs

1100: Coffee break

1230: WG (TBA)

1330: Lunch

1500: Coffee break

2000: TACADAR dinner – everyone is signed on

A restaurant in Portonovo (6-7 Km from down town Ancona) located by the sea. The dinner include seafood entrées, pasta with shellfish, and grilled fish, wine is included and the price is 35 € per person.

## **Sunday 11 September**

0900: Summing up

1200: Until next meeting

# **TACADAR Steering Committee**

**Erlend Moksness, Chairman (Institute of Marine Research, Norway)**

**Cornelius Hammer (Federal Research Centre for Fisheries, Germany)**

**Nuno Formigo (Universidade do Porto, Portugal)**

**Henrik Mosegaard (Danish Institute for Fisheries Research, Denmark)**

**Beatriz Morales-Nin (CSIC-UIB, Spain)**

**Audrey Geffen (University of Bergen, Norway)**

**William James Mc Curdy (Aquatic Systems Group, Northern Ireland, UK)**

**Magnus Appelberg (Institute of Coastal Research, Sweden)**

**Quality of Life and Management of Living Resources**

# **Technical Annex**

**TOWARDS ACCREDITATION AND CERTIFICATION  
OF AGE DETERMINATION OF AQUATIC RESOURCES**

## **TACADAR**

**QLRT-2001-01891**

### Table 3. List of milestones

- Month 12: Annual progress report
- Year 2: 4 x TACADAR Newsletter
- Month 18: Plenary meeting in Italy
- Month 24: Annual progress report
- Year 3: 4 x TACADAR Newsletter
- Month 28: Completion of the initial draft of the quality assurance manual
- Month 30: Plenary meeting in Ireland
- Month 36: Annual progress report
- Year 4: 4 x TACADAR Newsletter
- Month 38: Completion of the final draft of the quality assurance manual
- Month 42: Plenary meeting in Spain
- Month 46: Review of quality assurance manual
- Month 48: Annual progress report
- Month 49: Submission of quality assurance manual including legal aspects to the EU
- Month 50: Final report

# Terminology

- Accreditation and Certification
- **Quality Manual (QM)**
- Quality assurance (QA)
  - laboratory-wide measures
- Quality control (QC)
  - sample specific
  - measures of precision (repeated age estimates)
  - accuracy (comparisons against reference sets)

# Accreditation and Certification

**ISO 9001:2000** is a generic standard for quality management systems applicable to all organizations irrespective of type, size or product or service provided. Therefore, it is also applicable to laboratories, even though its language is generic. Its purpose is to specify a quality management system that will allow an organization to demonstrate its ability to provide product that meets customer and applicable regulatory requirements. It also aims to enhance customer satisfaction, including processes for continual improvements and assurance of conformity.

ISO/CASCO is currently reviewing ISO/IEC 17025 *management requirements* for possible alignment with ISO 9001:2000.

# Accreditation and Certification

In applying ISO 9001:2000 to a laboratory's operations, the emphasis for certification bodies is to establish compliance with *quality management systems* requirements. Unlike ISO/IEC 17025, it does not contain technical requirements for laboratory personnel and operations and, as such, certification against ISO 9001:2000 should not be interpreted to mean that it demonstrates the technical competence of a laboratory to produce valid data and results.

# What are the differences between the processes used for laboratory accreditation and certification?

Apart from the different emphasis of the two standards, there are some fundamental differences in the processes used by accreditation bodies and certification bodies to establish compliance with ISO/IEC 17025:1999 and ISO 9001:2000, respectively.

Because laboratory accreditation aims to recognize *specific technical competence*, the assessments of laboratories are conducted by teams comprising relevant technical experts and assessors able to evaluate compliance with the management systems requirements of ISO/IEC 17025. While the management system requirements are an important component of a laboratory's assessment for accreditation, the major *emphasis* is on determining the *specific technical competence* of personnel and the availability of all the technical resources needed to produce reliable data and results for specific test methods. Often the accreditation process will also use objective data from proficiency testing programmes to assist accreditation decisions. (Proficiency testing programmes are described in detail in ISO/IEC Guide 43: Parts 1 and 2:1997).

For certification of a laboratory against ISO 9001:2000, the assessment team will consist of auditors with detailed experience in assessment of quality management systems. They may have the technical expertise (or be supported by technical experts) to enable them to apply the generic requirements of the Standard to the operations of laboratory services, but the *emphasis* is on determining compliance with the *quality management system requirements*.

**QA:**

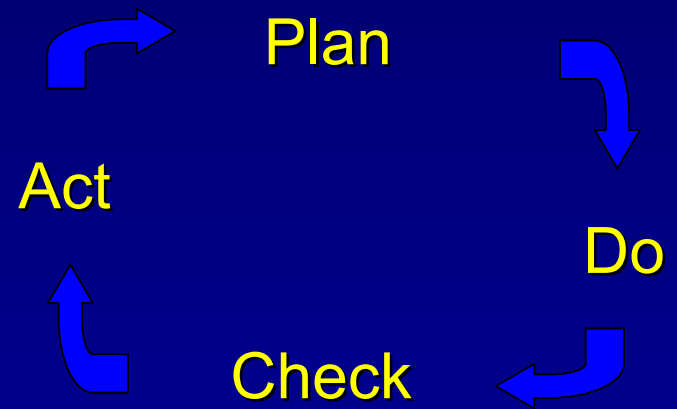
**Training Procedures**

**Technical Protocols**

**Ageing Procedures**

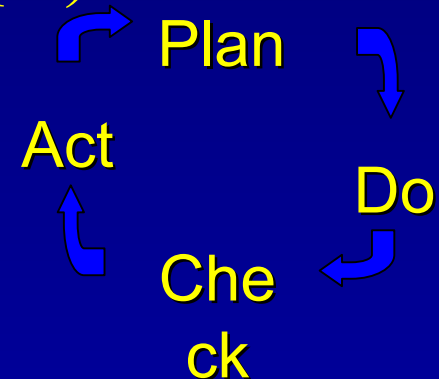
**QC:**

**Calibration reading**



# There are three components to the application of QA/QC:

1. Prevention – correct training, age estimation protocols, and feedback mechanisms (mainly QA), calibration reading (QC)
2. Detection – inspection and analysis of QC outputs, quality audits (QA)
3. Correction – adjustments to results (QC) and procedures (QA) as necessary



Those seeking to establish a QA/QC protocol should note the approach recommended by Campana (2001):

1. the early development of a reference collection, preferably consisting of known-age or consensus-aged structures;
2. the periodic ageing of a randomly-drawn, blind-labelled subsample of the reference collection, intermixed with a subsample of structures recently aged as part of routine ageing;
3. the use of age bias graphs and CV as tools to evaluate the results of the monitoring.

**Proposed index for the  
Elaboration of**

**the Otolith age  
determination Quality  
Manual (QM)**

**WG3-TACADAR**

# Otolith age determination Quality Manual (QM)

Index

Introduction

1. Field of application
2. Quality policy and references
3. Definitions
4. Acronyms and Abbreviations

Chapter 1 – Structure and QM management

Chapter 2 - Requirements of the quality management system

Chapter 3 – Technical requirements of the laboratory

Chapter 4 – Ageing structure extraction and analysis

Chapter 5 – Obligations related to Accreditation

# A reviewed manual for the quality assurance of age determination protocols for fish species from hard tissues

Submission of a quality assurance manual including an evaluation of  
legal aspects and implications to the EU (WG 4)

levels of precision and accuracy to be used as qualifiers in statistical terms (WG 1)

evaluation of individual methods of age determination in cases where several methods are used to  
provide data input for the same stock assessment or environmental management model (WG 2)

guidelines for the creation and application of quality assurance and quality control mechanisms to  
protocols for the determination of the ages of fish from hard tissues (WG 3)

**QA & QC Procedures**

**Training Procedures**

**Otolith age determination**

**Ageing Procedures**

**Quality Manual (QM)**

**Technical Protocols**

**WG1:** Discuss the levels of precision and accuracy to be used as qualifiers in statistical terms.

**WG2:** Discuss the evaluation of individual methods of age determination in cases where several methods are used to provide data input for the same stock assessment or environmental management model.

**WG3:** Develop guidelines for the creation and application of quality assurance and quality control mechanisms to protocols for the determination of the ages of fish from hard tissues.

**WG4:** Define the framework for the application of quality assurance and quality control mechanisms, to protocols for the determination of fish ages from hard tissues.

WG1	WG2	WG3	WG4
Nuno Formigo (Chair)	Pedro Re' (Chair)	Lotte A. Worsøe Clausen	Audrey Geffen (Chair)
Francis Neat	John D M Gordon	Michael Easey (Chair)	Magnus Appelberg
Helene DE PONTUAL	Rajlie Sjöberg	Helen McCormick	Cornelius Hammer
Henrik Mosegaard	Birgitta Krischansson	Ana Moreno	Erlend Moksness
	Michael Easey	Jenny Palmkvist	
	Jacques Panfili	Groa Petursdottir	
	Barbara Bland	Carmen Piñeiro Alvarez	
	Olga Bukovskaya	Ann-Sofie Ågren	
	Carin Ångström	Paulino Lucio	
	Carina Jernberg	Ronan FABLET	
	Willie McCurdy		
	Katerina Anastasopoulou		
	José Eduardo Rebelo		
	Enrico Arneri		
	Iñaki Quincoces		
	Beatriz Morales (Chair)		

# *WG 1*

## *proposed the following lines of work:*

- use of a simulation approach to assess the importance of error propagation through models use in fisheries assessment and its impact on the estimation of numbers per age class in the population
- definition of standard procedures for estimating precision levels within and between institutions
- definition of minimal precision levels to be achieved when training new readers
- definition of guidelines to identify and try to solve problems with accuracy

# **WG2:**

**began the process of defining suitable quality questions. As there was insufficient time to do this a limited number of examples were produced and it was agreed to continue this work by email.**

**Examples of quality questions for each aspect of EFAN Report 5-2000 should be available for the next TACADAR meeting and if agreed at plenary session, these could form part of the input for the Quality manual that will be final output of TACADAR. Progress achieved at the 1st TACADAR Meeting is summarised in a table.**



# **EFAN Report 5 - 2000**

## **Guidelines for the Quality Assurance of Fish Age Determinations**

**by**

W. J. Mc Curdy, Appelberg M., Ayers R., Belcari P.,  
Bolle L., Cendrero O., Easey M.W., Fossum P.,  
Hammer C., Hansen F. I., Jacobsen T. and Raitaniemi J.

# WG3: Production of the Guidelines

- The manual/guidelines that we produce should be general and not specific, however highlighting some species as examples.
- The guidelines will have flow charts and images of the processes.
- Have quality control measures during each step of the procedure.
- Include excel files for the stats with a simple explanation on the stats.
- A chart of the structure to be used for ageing will be included, this already exists in EFAN for several species.
- Fix a protocol for image acquisition, including hardware, software, annotations etc.
- What is the minimum amount of biological information that you should collect when collecting the otolith. Establish levels of information that you need.

# WG 3 - Terms of Reference:

- TOR 1 Define the species
- TOR 2 Produce and Index
- TOR 3 List of flow charts outlining procedures
- TOR 4 Basic excel spreadsheets for levels of data collection
- TOR 5 Basic excel spreadsheets for statistical analysis
- TOR 6 Guidelines for Image acquisition and annotation
- TOR 7 Guidelines on minimum hardware requirements for image acquisition and processing

## WG 3 – Recommendations:

- Meet at the next plenary meeting for at least one morning.
- Review the draft TORS.
- Produce a final version that should be evaluated by other TACADAR members and externally.

## **WG 4:**

agreed that a Guide would be the most appropriate output from the TACADAR project, rather than a rigid Manual.

### **This Guide would contain:**

Protocols  
Definitions  
and Steps to accreditation

### **The QA & QC could be divided into four protocols:**

Training  
Technical  
Ageing  
QA & QC

# **Procedure for quality assurance of age determination of fish**

## **Purpose**

Assure that the age determination of fish at an Institute is as similar as possible irrespective of age reader. This is achieved by a comparison of results for a certain part of the age material among the readers normally participating in the age determination of the species under consideration.

# Overview of Technical Protocols

Title	Responsible	Institute/Country	Version	Last updated
Sectioning otoliths using the accutom 5 cutting machine	M W Easey	CEFAS, UK	1.1	16.11.2001
Sectioning otoliths using the “V4” superior cutting machine	M W Easey	CEFAS, UK	1.1	19.12.2001
Mounting cut sections of otoliths onto glass slides	M W Easey	CEFAS, UK	1.1	19.12.2001
Mounting otoliths in black polyester resin for sectioning	M W Easey	CEFAS, UK	1.1	15.11.2001
Mounting pelagic otoliths in resin for age determination	M W Easey	CEFAS, UK	1.1	19.12.2001
Staining cut sections of otoliths	M W Easey	CEFAS, UK	1.1	19.12.2001
The otolin system of preparing demersal otolith sections	W.Mc. Curdy	DARD, UK		
Larval otolith microstructure	P. Re	Guia Mar. Lab., Portugal		Web-based <a href="http://astrosurf.com/re/otolith1_bio.html">http://astrosurf.com/re/otolith1_bio.html</a>
Otolith preparation: <i>Coryphaena hippurus</i>	J. Moanta & B. Morales-Nin	IMEDEA, Spain		
Age determination: Standard methodologies	P. Belcari, A. Ligas & C. Viva	Univ. of Pisa, Italy		
Larval otolith microstructure	J. Panfili	IFREMER, France		
Age determination methods for juvenile plaice <i>Pleuronectes platessa</i>	A.J. Geffen	Univ. Of Liverpool, UK		
Procedures for age determination of anchovy and sardine through the reading of the annual rings at ISMAR	G. Giannetti, F. Donato & E. Arneri	ISMAR, Italy		
Anglerfish ageing guide	Duearte et. al.	Spain, France, Portugal, Ireland		
Procedure for dissecting and preparing of age material on pelagic fish	H. Gjørseter	IMR, Norway	1.0	Sep. 1999



# Overview of Ageing Procedures

Title	Responsible	Institute/Country	Version	Last updated
Procedure for ages estimation of herring ( <i>Clupea harengus</i> L.)	H. Gjørøster	IMR, Norway	1.0	Des. 1999
Procedure for ages estimation of polar cod ( <i>Boreogadus saida</i> Lepechin.)	H. Gjørøster	IMR, Norway	1.0	Des. 1999
Procedure for ages estimation of capelin ( <i>Mallotus villosus</i> Muller.)	H. Gjørøster	IMR, Norway	1.0	Sep. 1999

# Overview of Quality Control Procedures

<b>Title</b>	<b>Responsible</b>	<b>Institute/Country</b>	<b>Version</b>	<b>Last updated</b>
Quality control of age determination	M W Easey	CEFAS, UK	1.1	01.04.2003
Procedure for quality assurance of age determination of fish	H. Gjøsæter & K. Nedreaas	IMR, Norway	1.0	June 1999

# Overview of Training Procedures

<b>Title</b>	<b>Responsible</b>	<b>Institute/Country</b>	<b>Version</b>	<b>Last updated</b>
Training in age determination	M W Easey	CEFAS, UK	1.1	01.05.2003

## Overview of Guidelines

<b>Title</b>	<b>Code</b>	<b>Institute/Country</b>	<b>Version</b>	<b>Last updated</b>
<b>Quality management systems Fundamentals and vocabulary</b>	<b>ISO 9000/2000</b>			
<b>Laboratory Quality Manual</b>				
<b>Guidelines for QC in the Analytic Laboratory</b>	<b>NATA</b>	<b>Australia</b>		<b>Oct. 1995</b>

## Overview of Manuscripts

<b>Title</b>	<b>Responsible</b>	<b>Institute/Country</b>	<b>Version</b>	<b>Last updated</b>
<b>Quality issues in the use of otoliths for fish age estimation</b>	<b>A. K. Morison, J. Burnett, W. J. McCurdy, and E. Moksness</b>			<b>July 2004</b>