

**AFBI adheres to ISO 9001:2008; an internationally accepted quality of standard. All activities are regularly monitored by an independent Quality Assurance Unit.**

**This document is an uncontrolled copy of an AFBI standard operation procedure (SOP) and should be treated as a draft. AFBI has a dedicated laboratory manager whose responsibility it is to update SOPs on an internal Quality Management System (QMS) which may not be reflected in this document.**

**This document is for reference purposes only.**

**Agri-Food and Biosciences Institute  
Standard Operating Procedure**

<b>SOP Code:</b>	FAEB (Branch)	MARFISH (Unit/Group)	021 (SOP No.)	V5 (Version)
<b>Location</b> (e.g. Newforge Lane):	Newforge Lane			
<b>Author:</b>				
<b>Title:</b>	Age determination of Scallops ( <i>Pecten maximus</i> L)			
<b>Purpose:</b> (please specify: analyse / measure / test / operate a method / equipment etc)	This procedure details the operations to be carried out in order to ensure that the following is conducted in a consistent manner: Age determination of Scallops ( <i>Pecten maximus</i> L)			
<b>Date of creation /amendment:</b>	30/06/2014			

It is the project leader’s responsibility to ensure that the appropriate SOP is specified for scientific work and that the SOP and training are provided to staff conducting the work. It is the responsibility of the operator to follow the method, to record which SOP is used and any deviation from the written SOP.

**Procedure**

*Guidance:*

- 12 *Standard operating procedures may be in numbered point format, with or without subheadings, or in a different format as appropriate to the work.*
- 13 *Any other documents referred to must be clearly cross-referenced.*
- 14 *If it is necessary to amend the SOP, a new version must be created and copied to all who use it. Old versions must be withdrawn and archived and dates of amendments recorded.*

<b>Signed:</b>	(author)	(date)
	(laboratory manager)	(date)
	(unit manager or project leader)	(date)

## CONTENTS

<b>SECTION</b>	<b>TOPIC</b>
<b>1 &amp; 2</b>	<b>Scope and Field of application</b>
<b>3</b>	<b>References</b>
<b>4</b>	<b>Principle</b>
<b>5</b>	<b>Reagents</b>
<b>6</b>	<b>Apparatus</b>
<b>7</b>	<b>Sampling</b>
<b>8</b>	<b>Operational procedure</b>
<b>9</b>	<b>Expression of results</b>
<b>10</b>	<b>Quality assurance</b>
<b>11</b>	<b>Reporting of results</b>
<b>12</b>	<b>Safety</b>

1. **Scope**

The procedure covers age determination of the bivalve *Pecten maximus* L., using the pattern of growth zones found on the upper (flat) shell, for samples from the Irish Sea (ICES area VIIa), and the north coast of Ireland ICES area VIa).

2. **Field of application**

Sampling scallops at sea aboard R.V. *Corystes*, produces the prepared flat shells of *Pecten maximus* L., required by this procedure.

This procedure, uses these flat shells to determine scallop (*Pecten maximus* L.) ages.

These scallop ages are required for scallop age and growth studies.

3. **References**

MARFISH020 Sampling at sea aboard R.V. *Corystes*: Scallop and queen scallops

MARFISHRA02: Shell processing for age reading

MARFISHRA05: Otolith and shell age reading

MARFISHRA08: Using a microscope at a work bench

4. **Principle**

Scallop catches are sampled at sea on board the R.V. *Corystes*, in accordance with Standard Operating Procedure MARFISH020.

Individual shells from scallop samples are uniquely numbered and biological data for individual scallops are recorded.

The external surface of the flat shell is cleaned of all extraneous material and firmly scrubbed to expose the ridges at the base of each individual growth layer.

The ligament is cleaned from the hinge plate to reveal the pattern of winter and summer growth zones on the hinge plate.

The age of each individual scallop is determined by comparing the growth patterns.

These scallop age determinations, must be supported at intervals by validation assessments using material of known age from tagged or marked individuals.

5. **Reagents**

Liquid neutral detergent

6. **Equipment**

Oyster knife

Scrubbing brush

Scalpel

Heavy duty gloves

Low power optical microscope

Indelible marker pen

Fine artists paintbrush

7. **Sampling**

The flat scallop shells used in this procedure are taken from samples produced by the sampling regimes set out in MARFISH020.

Only flat shells with undamaged hinges and intact edges in the central area of the shell are used for age determination and growth study.

8. **Operational procedure**

8.1 The flat shell is removed from each scallop, cleaned of all soft tissue on both sides by firm use of a scrubbing brush and warm soapy freshwater. The ligament tissue is also carefully removed from the umbo without damaging the hinge plate, using a combination of thumb pressure and gentle strokes of the scrubbing brush.

8.2 Each shell is then dried with paper towelling, and labelled with a unique identification number using an indelible marker pen in accordance with MARFISH020.

8.3 Each shell is placed internal face upwards, on the viewing platform (stage), of a low power optical microscope which has been properly set up for the vision of the user.

- The magnification is set between X 6 and X 12, depending on the size of the shell, and the clarity of the individual growth zones.
- 8.4 The number of winter growth zones visible on the hinge plate are counted. In order to facilitate this, excess ligament may be carefully trimmed away from the hinge with a scalpel, and the hinge brushed with freshwater to make the growth zones more legible.
- 8.5 The shell is then turned over and the number of winter growth zones visible on the external face of the flat shell are counted.
- 8.6 If the hinge and shell readings disagree this is because;  
The origin of the hinge plate has been broken off due to the application of excessive force when cleaning the shell, causing the hinge age to be under estimated by one or two years.  
The scallop is old (>8 years), and some of the rings near the edge of the shell have not been counted, causing the shell age to be underestimated.  
False growth checks on the external face of the shell have been counted as winter growth zones, causing the shell age to be overestimated.  
False checks on the hinge have been counted as winter growth zones, causing the hinge age to be over estimated (This is an uncommon error as false checks on the hinge are much fainter in comparison with the winter zones on the hinge).
- 8.7 Repeat 8.7 and 8.9 until agreement is reached. Where agreement cannot be reached, the shell should be rejected as un-ageable by optical microscopy alone.
- 8.8 The position of each winter zone is the marked along the central axis of the external shell surface using a fine pointed "HB" pencil. The width of each summer growth zone is then measured to the nearest millimetre using a pair of dividers and a plastic 30 cm. ruler.

## 9. Expression of results.

- The results are expressed as the number of annual growth zones per shell, and this age is written on each shell together with the shell identification number using the indelible marker pen. The width of each summer zone is measured to the nearest millimetre below.
- The unique identification number comprises the cruise or sample details, the tow number, and the scallop number in that tow or sample.

## 10. Quality assurance

- Remove ligament and carry out the age determination immediately after opening the scallop. If the ligament is allowed to dry out, (as early as 30 minutes after opening depending on the ambient temperature and humidity), the origin of the hinge plate will be damaged during any attempt to remove the ligament.
- Process only one sample at a time
- Use three personnel to process each sample, one to record the data, one to remove and clean the shells, and one to age the shells while they are still fresh.

## 11. Reporting of results

All results must be entered on to the marine fisheries database at the time of processing by the person recording the data, either directly using an computer terminal, or indirectly using a data logger or scallop recording sheets.

## 12. Safety

- Eye protection must be worn by all personnel at all times when processing Scallop samples.
- Heavy duty gloves must be worn by the person opening and cleaning the scallop shells.
- The low powered optical microscope must be set up correctly in accordance with the manufacturers instructions for the operator, each time there is a change of operator.
- Scalpels and knives are potentially dangerous. The utmost care must be exercised when using these and inexperienced personnel must wear a steel mesh safety glove.
- Avoid long uninterrupted periods of microscope work by rotating tasks and taking frequent rest breaks. Every 15 minutes, close your eyes or focus on something distant. Care should be taken to ensure that light intensity is not excessive when observing specimens.

Use a designated microscope chair which provides correct ergonomic support. An adjustable footrest should be used to support feet. A break away from the microscope should be taken every 30-60 mins: get up to stretch and move.

Spread the work out doing a few hours daily over a number of days than trying to condense it all into a short period.