



Scottish Government
Riaghaltas na h-Alba
gov.scot

Marine Scotland Science

Fish Age Determination Procedures: Megrin

G Henderson



marinescotland
science

FISH AGE DETERMINATION PROCEDURES
3: MEGRIM

Gordon Henderson*

Marine Scotland Science, Marine Laboratory, 375 Victoria Road, Torry, Aberdeen, AB11 9DB

Gordon.Henderson@gov.scot
0131 244 2965



This manual is intended to be used in conjunction with training at the microscope

In order to undertake stock assessments for use in fisheries management, a knowledge of fish age/stage is required. Although there is a general relationship in most species between age and size, It is difficult to determine the age of a species by simple measurements of body length or weight. Fisheries scientists, therefore, are required to determine fish age using alternate measures. The most common method is observing the growth rings in hard, bony structures of the fish the ear bones (otolith), scales, spines etc .

This manual describes the procedures employed by Marine Scotland Science for the aging of Megrim (*Lepidorhombus whiffiagonis*)

Collecting megrim otoliths

The principal is similar to gadoids (Henderson 2017a) except that the fish is laid on the board upside down in a similar manner to Angler fish and similar to Angler fish (Henderson 2018b)The gill cover is lifted, the gills scraped back to reveal the underlying bone, and an incision is made in to the auditory capsule. The otoliths are extracted by inserting the point of a knife blade and twisting it to remove the otolith. If the otolith has been missed, it can be extracted from the skull by using forceps. Great care should be taken to prevent external damage when carrying out this procedure, as Megrim is also a high value species.

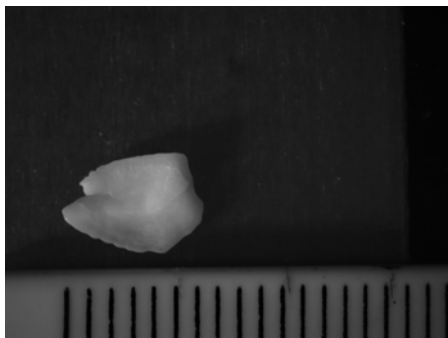


Figure 1. Megrim otolith in January; scale in millimetres

Preparing megrim otoliths

Otoliths (Fig 1) are prepared for reading by removing them from their individual packets and placing them in separate wells in a clear plastic tray as shown below (Fig 2).



Figure 2. Tray used to rehydrate megrim otoliths prior to reading.

The wells are filled with tap water, the lid is replaced and the otoliths are allowed to soak for a period of 24 hours. Longer soak times should be avoided as the otoliths become too transparent and annual rings difficult to distinguish. The bundle of envelopes is attached to the lid of the tray with an elastic band, to identify the sample and prevent spillage of the contents. In most cases a single tray will suffice for each sample although larger samples may require two trays.

Reading procedure

Following the soak period described above, the otoliths are ready for reading. Fill a black plastic tray with sufficient water to completely immerse the otoliths.

Position the tray on the microscope stage and adjust the bench lamp to direct its beam on to the surface of the well in the tray. The use of a blue filter in the path of the beam will remove the yellow cast from a tungsten lamp and aid interpretation of the otolith. Transfer a group of three otoliths from the clear tray, and position them with their distal surface uppermost and the ventral end in the 12 o'clock position. Under a total magnification of $\times 10$, a series of opaque and translucent consecutive rings should be apparent. Higher magnifications should be avoided as they may reveal the presence of secondary features and lead to confusion. The age estimate is achieved by counting the translucent rings, as viewed under the microscope (Fig 3). Nucleus to rostrum is the preferred axis, but almost any axis can be the one to give a clear age. Older fish can have closely packed annual rings on the otolith edge and these can be difficult to discern, especially since the otoliths tend to thicken with age.

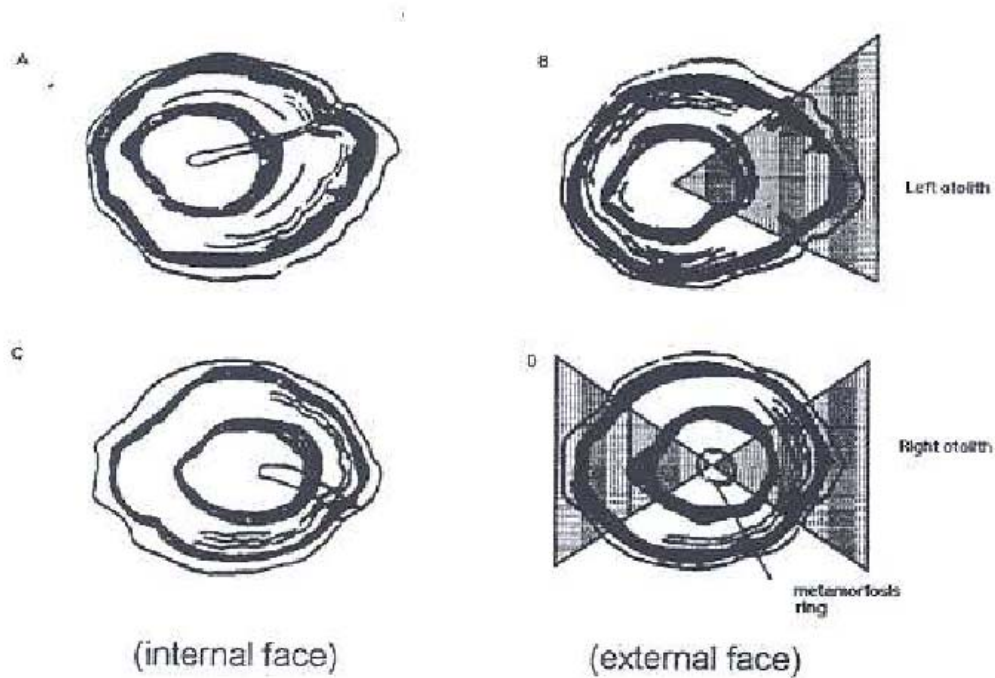


Figure 3. Brief megrim otolith protocol (from the Workshop on Megrim Otolith and Fin Rays Age Reading held in Vigo, May 1997)

Table 1: The general criteria adopted for ageing megrim otoliths is based on the number of annual hyaline rings, using the following rules:

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
N rings Hyaline Edge	Age = N	Age = N	Age = N-1 Early winter	Age = N-1 Early winter
N rings Opaque edge	Age = N+ 1 late winter	Age = N	Age = N	Age = N

An example demonstrating the spacing of these rings is provided in the photograph below (Figure 4):

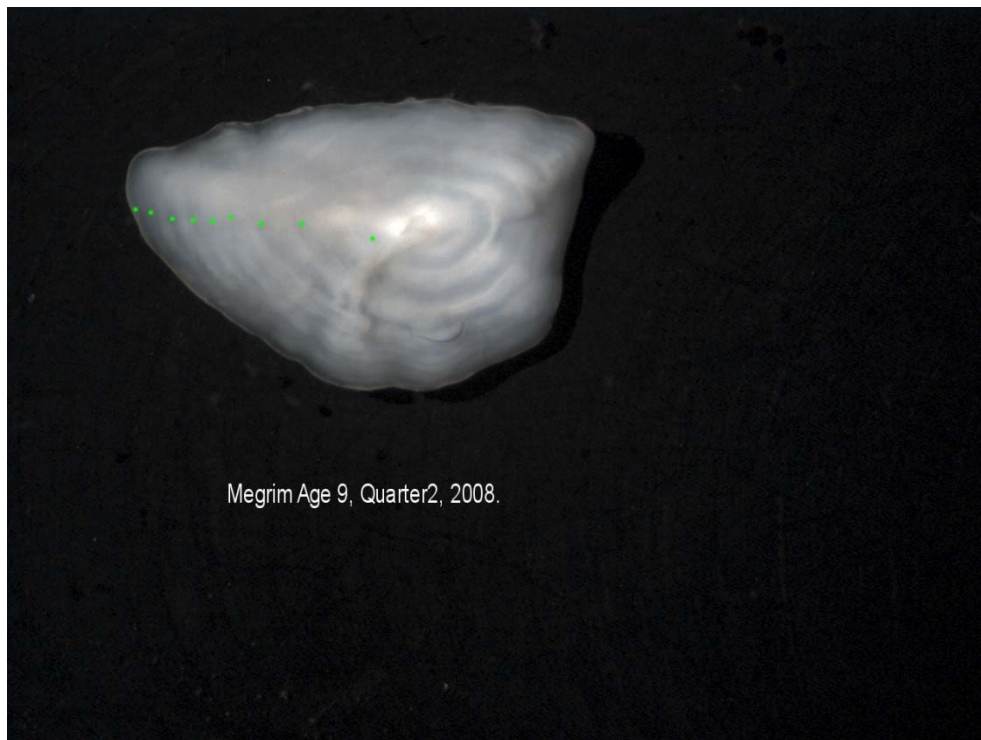


Figure 4. Photograph of a megrim otolith, showing the counted translucent zones by marking them with a green dot. Caught in quarter 2, 2008, aged 9.

Although the interpretation of younger megrim otoliths is relatively straightforward, in some older fish the rings on the edge are very faint. Considerable manipulation of the otolith in these cases will be required in order to distinguish the rings, and several counts may need to be made before an age estimate is derived. Otoliths from the Outer Hebrides (demersal) sampling area can present particular difficulty as they appear to be much older at a given length, than those from other areas (Henderson, personal observation). Agreement between readers is poor for older fish. Attempts to stain otolith sections proved disappointing, as did breaking and burning the broken edge. Both techniques are used successfully on other flatfish species.

Ages derived from the otoliths should be written on the bottom right of the original packets, ready for entry in FMD. Ages for this species are entered by the reader.

The processed otoliths should then be returned to their original packets, assembled in to a bundle, secured with an elastic band and placed in storage.

References

Henderson, G. (2018a) FISH AGE DETERMINATION PROCEDURES

1: Gadoids. Marine Scotland Science, Aberdeen

Henderson, G. (2018b) FISH AGE DETERMINATION PROCEDURES

2: Angler Fish. Marine Scotland Science, Aberdeen



© Crown copyright 2019

You may re-use this information (excluding logos and images) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit <http://www.nationalarchives.gov.uk/doc/open-government-licence/> or e-mail: psi@nationalarchives.gov.uk.

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

Published by the Scottish Government, August 2019