

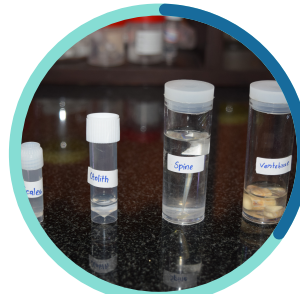
Steps in Fish Aging



1. Sampling



2. Extraction



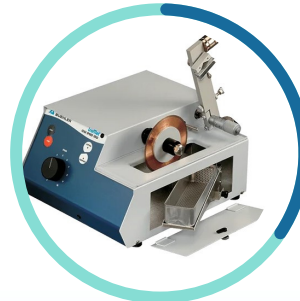
3. Storage



4. Moulding



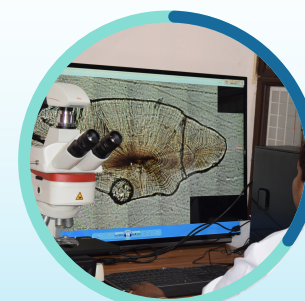
Moulded blocks of otolith,
vertebrae and fins



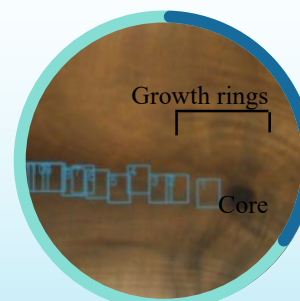
5. Cutting



6. Polishing



7. Image analysis



8. Otolith section



Fish Age Estimation Using Hard Structures

Published by:

Dr. Grinson George
Director
ICAR-CMFRI, Kochi-18

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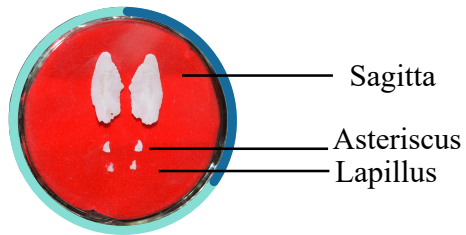
**Remya L., Ashly G., Jesli D., Retheesh T.B.,
Ragesh N., Pakkri Muthu, Kaushik T.R.,
and Shoba Joe Kizhakudan**
Finfish Fisheries Division, ICAR-CMFRI



ICAR- Central Marine Fisheries Research Institute
Indian Council of Agricultural Research
Post Box No. 1603, Kochi-18

What is Otolith?

Otoliths (ear stone) are calcified structures located within the inner ear of fish. Fish possess three pairs of Otoliths: the Sagitta, Asteriscus, and Lapillus.



What are the functions of Otolith?

- Maintaining balance, buoyancy
- Detecting sound vibrations
- Sensing gravitational force

What is mean by hard part ageing in fish?

It is the process of estimating a fish's age by examining its natural growth rings in hard parts. These structures develop annual or seasonal rings, similar to growth rings observed in trees.

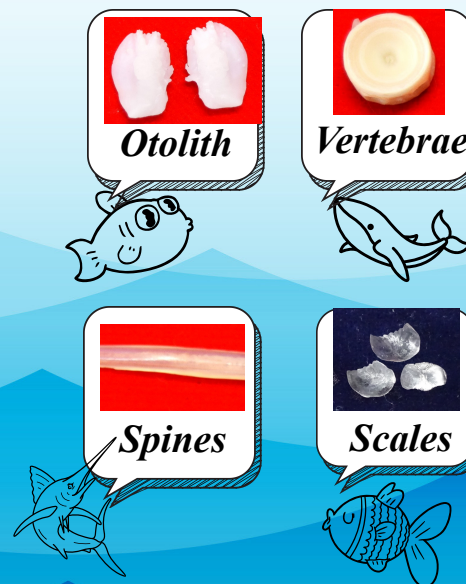
Why Otolith preferred over other hard parts for ageing?

Otolith develops from embryonic stage and are metabolically inert, do not undergo resorption or remodeling. Unlike scales or bones, they are not lost or regenerated and grow continuously by depositing daily or annual rings.

Why vertebrae and spines are used for ageing elasmobranchs?

Unlike teleost fishes, hearing in elasmobranchs is aided with hair cells in the inner ear. Therefore, vertebrae and spines are used for ageing purpose.

Which are the different hard parts used for ageing?



How is fish ageing possible using hard parts?

Fish age is determined by analysing natural growth rings in hard parts, which are deposited continuously as the fish ages, similar to tree rings in wood.

Otolith ageing studies conducted at ICAR- CMFRI

- The maximum lifespan of Indian oil sardine, estimated using otoliths, is about 1.5 years, reaching 20.1 cm in the first year.
- Microstructure increments are frequent in scales and otoliths, but rare or absent in vertebrae of Indian oil sardine.
- Scale increments are common during early growth but lack a consistent time pattern and eventually cease.
- Sagittal otoliths show regular daily formation of one light and one dark band throughout growth, regardless of size, sex, or age.
- Growth bands were detected in the endocuticle layer of longitudinal sections of eyestalks and the mesocardiac ossicle of the gastric mill of decapod crustaceans.