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A STUDY OF GROWTH RINGS IN OTOLITHS OF FISH BY MICRORADIOGRAPHY

OTOLITHS of fishes are used for the determination of their age by many conventional methods (Trout, 1958). Ehrenberg and White (1957), described microradiography and its uses in industrial radiography. An attempt is made here to study the growth rings in otoliths of fishes by microradiographic technique. This technique avoids the cumbersome procedures of grinding and polishing the otoliths for good resolution of rings. Otoliths of *Pomadasys hasta* (Bleeker), which forms a good trawl fishery along the Bombay coast, were taken for investigation.

Otoliths were washed in water and dried. The mounting of the sample was done in the dark room. They were placed at the centre of the lead frame over a black paper. A double-coated film "F" type, folded in a black paper was kept over it. Another black paper was placed on it so that the film remained in position over the specimen. This arrangement was made tight by keeping a lead sheet measuring $4" \times 4" \times \frac{1}{8}"$ over it with an adjustable screw. The mounted specimen was placed on a stand 13 cm. away from the X-ray tube. The specimen was exposed to X-rays of 18 kV with 10 mA. current for 10 minutes. (35 kV X-rays with 60 mA. for 6 seconds gave result with less contrast and kV higher than 35 did not give satisfactory results). After the exposure, the film was removed to the dark room and developed. The negative was enlarged to the desired size.

The differential concentrations of the materials in the otoliths make a pattern of image on the radiographic plate according to the concentration in a particular area. When exposed to X-rays, there will be more absorption of X-rays in the opaque areas resulting in less incident radiation on the film and less darkening of the radiographic plate. In the hyaline areas (less dense) as there will be less absorption of the incident X-rays, more X-rays fall on the film making it more dark. As the plate is the positive of the radiograph, the hyaline areas are seen white and the opaque areas dark (Fig. 1, A). A photograph (Fig. 1B) of the

same otolith is given for comparison to show the finer resolution of growth rings obtained by microradiography. The study of this pattern along with other methods like length frequency distribution will help to arrive at the correct determination of age in fishes which is an important aspect of fishery research.



FIG. 1. A. Microradiograph of otolith showing the growth rings, $\times 10$. B. Photograph of otolith showing the growth rings, $\times 10$.

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