

**STUDIES ON MICROSTRUCTURE AND MICROCHEMISTRY OF SAGITTAL
OTOLITH OF RASBORINE FISHES**

Abstract

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ABSTRACT

This study aims to examine the intra-specific and inter-generic relationship based on microstructure and microchemistry of sagittal otolith of Rasborine fishes *i.e* *Amblypharyngodon mola*, *Aspidoparia morar*, *Barilius bendelisis*, *Danio rerio*, *Devario devario*, *Esomus danricus* and *Rasbora daniconius*. In present study intra-specific and inter-generic relationship based on morphology of sagittal otolith and morphometrical relationship in fish length with otolith length, otolith width and fish weight with otolith weight and also microstructure and shape indices of otolith was analyzed using various imaging tools and microchemistry of otolith was done by using Inductively coupled plasma mass spectrometry (ICPMS) of Rasborine fishes. The data so obtained was photographed and statistically analyzed.

The fishes were obtained from Ganga River near Meerut region. Morphologically all the seven genus *Amblypharyngodon*, *Aspidoparia*, *Barilius*, *Danio*, *Devario*, *Esomus* and *Rasbora* were identified. Total fish length (FL ; in centimeter from the tip of snout to the longest fin ray of the caudal fin) was considered and measured to the nearest millimeter and body weight (FW in grams) including gut and gonad was recorded prior to the removal of otoliths. The otoliths (Sagitta) were removed as soon as the fish was sacrificed. Sagittal otoliths were removed as left and right discrimination for each fish sample. Then, the otoliths were cleaned with distilled water and all the otoliths were air-dried. Each dried otolith was stored in plastic vials, ready for use immediately. Sagittal otoliths were photographed on ventral and dorsal side. Otolith microstructure was read under a stereomicroscope with 40x magnification. Otolith length (OL), Otolith breadth (OB), Area of Otolith (A_0) and Perimeter of Otolith (P_0) was calculated using Image J software version 1.51K. The Otolith dimensions-fish length and fish weight relationships were examined. These measures allowed the calculation of three dimensional shape indices such as Coefficient of form, Roundness, Circularity, Rectangularity, Aspect Ratio.

Than the microstructure characteristics of Rasborine fishes were observed. In *Amblypharyngodon mola*, otoliths are oval in shape and its margins are smoother as compared to other Rasborine fishes. In *Aspidoparia morar*, otolith is somewhat oval in shape. Otolith margins are wavy. Otolith is equally wide in anterior and posterior part .The sulcus is not open to the edges of otolith. In *Barilius bendelisis*, all sagittal otolith characters are like *Amblypharyngodon mola*, except dorsal margin of otolith is wavy and ostium is small and there is no clear demarcation among ostium and cauda. In *Danio rerio*, Otolith is bean shaped. Otolith margins are rounded less wavy. In *Devario*

devario, otolith margins are wavy ventrally. Rostrum average may be hooked. In *Esomus danricus*, otolith is oval in shape. Otolith margins are rounded. In *Rasbora daniconius*, otoliths are elliptical in shape. Rostrum hooked and antirostrum pronounced.

The otoliths were processed for Otolith microchemistry and the elemental concentration of Calcium(Ca), Magnesium (Mg), Strontium (Sr), Barium(Ba), Lead (Pb), Mercury (Hg), and Cadmium (Cd) were determined using inductively coupled plasma mass spectrometry (ICPMS) from sagittal otolith of Rasborine fishes for showing differences among different groups and effect of water quality on the fish in which fish inhabit. Then the data was statistically analyzed.