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Morphological changes of otoliths during the growth of icefish Pseudochaenichthys georgianus, Chaenocephalus aceratus and Champsocephalus gunnari.

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Abstract

Vibration of otoliths in each species studied gives the same information about the change of position and acceleration of the body. With the increase in the speed of swimming the body and the statoliths lose radial symmetry, they are become elongated and flattened and obtain bilateral symmetry. Extension of bilateral symmetry is so important that the opposite development, in the direction of radial symmetry (Starfish) causes a loss of statoliths. Changes in the shape of otoliths in three species of icefish indicate changes in body shape, in the strategy of swimming, in lifestyle and in the occurrence. Post-larvae Pseudochaenichthys georgianus feed post-larvae the other two species. During the development, Champsocephalus gunnari gets more elongated body, which gives more speed to escape, has the smallest and most flattened otoliths. Another species Chaenocephalus aceratus has faster growth, which gives protection against lesser predator, and has otolith largest and occurs at greater depths. Changes in the shape of otoliths take place in dependence on the life strategy. One type clearly indicates appropriate unique strategy. Daily increments, which their pattern determines the shape of otolith, were discovered and choose as the smallest periodicity (larvae-postlarvae: $1.5\text{-}2.8\times10^{3}$ mm) during checking all periodicity on density profiles by closer proximity. The numbers of daily increment were estimated by fitting periodic functions to them. Age was recognized in age groups of otolith shape (by closer proximity), and of body length (by Bhattacharya method extended with minimize of squared differences between sums of the modified age groups and the length frequency).

Key words: SGI, ANI, otolith shape, age of icefish, Antarctic fish.

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