Relationship Between Body Size and Otolith Morphology of Three Species of Family Sciaenidae from The Coast of Pakistan

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ABSTRACT

Introduction: The fishes of family Sciaenidae have significant role in human diet throughout the indo-pacific region due to their valuable and nutritional flesh. These are teleost fishes belong to order Perciforms also known as Croakers and Drums because of producing sound (Ramcharitar, et al., 2006). There are about 80 Genera and 300 species of this family have been reported worldwide (Chien et al., 2011). These are mostly coastal marine fishes but some species are also found in fresh water while the majority live inshore water but some species are also found in deep water (Soura, 2006). These fishes also found in reef area and surf zone (Chien et al., 2011) and use estuaries as nursery ground (Hettler and Barker 1993).

Otoliths are small calcified structure found inside the inner ear cavity of fishes, which are three in pair, the largest one is known as Sagitta and serving significant role in fishes such a balancing organ and hearing (Assis, 2005). Otoliths are used for the determination of age, growth rate, taxonomy, and stock identification of fishes, beside them it is also use for the identification of fish species into the diet of predator by recovering the otoliths from the digestive tract and faeces of piscivorous animals (Cottrell *et al.,* 1996; Cardinale *et al.,* 2004). Otoliths of Sciaenids is larger as compared to the other family of fishes and used in defining fish species (Kumar *et al.,* 2015).

Objective: The objective of the study is to provide information about the relationship between otolith morphology and size with the body size of three species of family Sciaenidae "*Johnius carruta, Johnius amblycephalus, Nibea maculata"*.

Materials And Methods: Fish was collected from Karachi fish harbor and identified through concerned literature and identification keys of FAO, 1985. The sagittal otolith of desire fishes was removed by cutting the cranium, cleaned, photographed and measured. The otolith weight (in milligram) of each individual was determined using a standard electronic balance. The relationship between the otolith size (length, width, weight) and body size (standard length, total weight and total length) of fishes were determined by using least square regression between various measurements.

Results: In the present study, it was observed that the shape of otoliths in these species are oblong and the marginal sculpture were irregular and dentate. The size and weight of otolith is increase with respect to size and development of fishes. There were no difference detected between left and right otolith of these fishes. Generalized linear regression models were applied for analyzing of relationship between otoliths size, mass and body size of fishes and find out that otolith mass and otolith length is good indicator of fish total length, standard length and fish weight in all three species.

Conclusion: In this investigation it's concluded that the length, width, and weight of otolith exhibited a positive correlation with the body size in the three selected species of family Scianidae.

Keywords: Sciaenidae, Piscivoreous, Otoliths, Morphology, Length and weight relationship, Pakistan

ACKNOWLEDGMENT

Present work is supported by HEC research grant 20-4530/NRPU/HEC is highly acknowledged.

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