

Age estimation of *Tenualosa toli* from fish harbor Karachi, Pakistan

*¹Narejo NT, ¹Jalbani S, ²Iqbal R, ³Manzoor H, ¹Khan P and ³Rasul S

¹Department of Freshwater Biology and Fisheries, University of Sindh, Jamshoro, Sindh, Pakistan

²Institute of Pure and Applied Biology, Bahauddin Zakariya University, Multan, Punjab, Pakistan

³Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, Multan, Punjab, Pakistan

*Corresponding Author E-mail: dr_ntnarejo46@yahoo.com

Accepted 30 January 2015

Abstract

Age estimation of *Tenualosa toli* from landing center at fish harbor Karachi Pakistan was carried out from 200 fish specimen. It was determined that the length-frequency and scale method of fish at length 10-20.0 cm possess two annuli denoted as (I year class) and 5 annuli was observed in the scales of fish having 20.1-30.0 cm length termed as (II year class) respectively. The age determination from length-frequency and scale method matched very well.

Keywords: Age estimation, *Tenualosa toli*, fish harbor, Length- frequency, Scale method

INTRODUCTION

The shads are most common group of clupeid fishes, mainly found in coastal and estuarine waters. It is the most commercially and culturally important estuarine fish species. Recent studies of their life cycle (Hua, 1999), have shown that the species is anadromous, spawning in the middle reaches of only large, well-mixed estuaries by defining fish reserves in spawning estuaries where spawning occurs. Some of them are migratory and they ascend upstream for spawning while others complete their life cycle within the coastal water, estuaries and freshwater. *Tenualosa toli* belongs to clupeidae family it is known as toli shad locally known as Dother. It is available in Western Indian Ocean and the Bay of Bengal (Mirza, 1988). It inhabits of fast- flowing turbid estuarine and adjacent coastal waters. No work has so far been done in Pakistan on any aspect of this commercially important clupeid fish. So that present investigations were started with the intention to supply baseline information on the biology of this commercially important fish for subsequent studies.

MATERIALS AND METHODS

Length-frequency method for Age estimation

The simple method of age estimation is the analysis of size frequency distributions known as Peterson method this method used the individual length of a large number of a population.

For age estimation key scales were used (scales which are taken from the same row and at the same point on each fish known as key scales), taken from this study were picked up from the regions directly below the dorsal fin and above the lateral line. These were first washed in tap- water for about an hour and then scrubbed between the thumb and fingers in water, taking care not to damage the delicate margins. They were dried in on the neat blotting paper. The scales at this stage became quite clean and translucent were immediately mounted in between two glass slides with both the remote ends of the slides clipped with a sticking tape. Current study is based on the examination of 150 scales

taken from 50 fishes belonging to 3 length groups.

Binocular microscope with optical micrometer used for the measurement of scale. Length of scale was measured from anterior to posterior margin, along a vertical imaginary line passing through the center.

RESULTS

Scale along the lateral line was used for the purpose of age estimation of *Tenualosa toli*. Apparently these scales are sub quadrate in shape. The posterior field is sharply distinguished from the interior or basal one. Number of annuli is present in apical region (Figures 1 and 2). The scale of fish of length 10-20.0 cm possess two annuli denoted as (I year class) and 5 annuli was observed in the scales of fish having 20.1-30.0 cm length termed as (II year class).

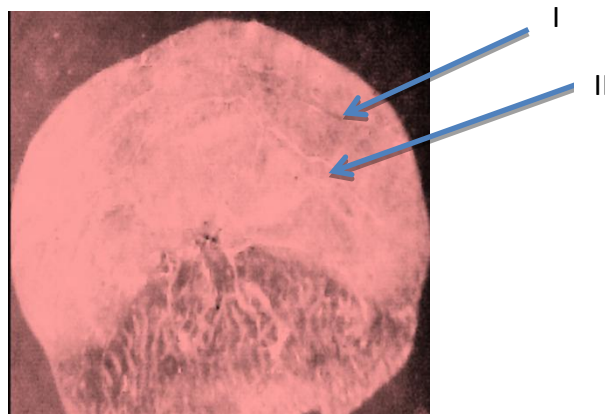


Figure 1. Showing scale of *Tenualosa toli* of length 10-20 cm possesses two annuli (I year class) from landing center at fish harbor Karachi Pakistan

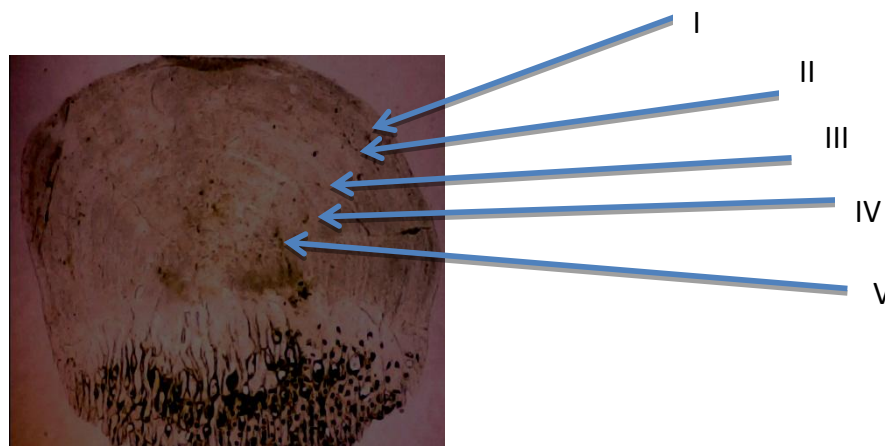


Figure 2. Showing scale of *Tenualosa toli* of length 10-20 cm possesses two annuli (I year class) from landing center at fish harbor Karachi Pakistan

Body scale length relationship

Ascertainment of age by using body-scale length relationship may be defined; and exhibit in (Table 1). Therefore, it may be concluded that length of fish v/s length of scale (L/S) ratio is directly proportional to total length of fish. The graph of scale length V/S fish length dubbed into ideal affiliation. Enumerated link termed into linear relationship and displayed. The regression coefficient (r.) of both the variables like empirical and log- log relationship resulted in equation. $\text{Log } L = 1.0 + 1.33 \text{Log } S$

Where L=total length of fish in cm, and S= length of scale cm.

The relationship between scale length v/s radius length (S/R) were also calculated and values of both variables are $\text{Log S} = -3.5 + 97 \text{Log R}$

It is noticed that the scale length against the total length association appeared as ideal relationship. It was concluded that the age estimation of *Tenualosa toli* from scale method and length-frequency indicated two year class I and II. Computation of age during the period *Tenualosa toli* fish harbor Karachi, Pakistan, length-frequency analysis was performed (Table 2). From the length- frequency polygons two year class were discerned one at length 10.1 to 20.0 and other on 20.1to 30.0cm. It resulted as age group I and II correspondingly. Polygons of frequency histogram after two years were not found to be distinctive. Enumeration of age through scale method and length-frequency compared very well.

Table 1. Data on body length (BL) and scale length (SL) radius length (RL) and annuli on scale of *Tenualosa toli* from landing center at fish harbor Karachi, Pakistan

Length group (cm)	Mean length (cm)	Mean scale length (cm)	Mean radius length(cm)	No. of annuli	Age group Assigned
15.1-20.0	19.7 ±1.3	5.3 ± 0.7	2.4 ± .06	2	I Year
20.1-25.0	22.3 ±1.7	5.25 ± 0.75	2.6 ± 0.4	2-3	I Year
25.1-30.0	26.7 ± 1.3	9.5 ± 0.5	6.0 ± 0.5	4-5	II Year

Table 2. Data on length frequency of *Tenualosa toli* from landing center at fish harbor Karachi, Pakistan

Length group (cm)	No. of female	No. of male	Percentage Frequency
10.1- 20.0	-	100	25%
20.1- 30.0	80	150	57.5%
30.1- 40.0	50	20	17.5%
Total	130	270	100%

DISCUSSIONS

For age estimation of *Tenualosa toli* length-frequency designs was done. Two years classes were perceived one at 10.1-20 cm fish length I age group and the subsequent model lengths 20.1-30.0 cm designated as II year group. Alike statement was also conveyed by Jayaram (1977) estimated age in case of *Tenualosa toli* and commented that the fish of length 10.1 to 20.0cm and 20.1.0 to 30.0 cm labeled as I and II year of age. The above remarks are in agreement with the current results. Hora and Nair (1940) studies the age and growth of *Hilsa ilisha* in its earlier phase of life. They found that the rate of growth in the first three months of rapid and then it declined. It reached in size of 30 cm during 10 months' time it might be due to the different environmental conditions, rate of growth and availability of food where two populations live. Narejo *et al.* (1999) used length- frequency analysis in *T. illisha* and observed that the fish attains a model length of 27.5, 32.5 and 37.5 cm at the end of 1st, 2nd, 3rd years of the life, respectively. They further inferred that the relationship between fish length and scale- length was found to be linear. The above observation accords with the present findings small change could be due to the different species.

References

- Hora SL, Nair KK(1940). Observation on the bionomics and fisheries of the Indian shad *Hilsa ilisha* in Bengal water .*Res. Ind. Mus.* **42** (1): 35-40.
- Hua AY(1990). Culture trials of young *Tenualosa toli* in net cages under trying conditions at batang Lupar Estuary, Sarawak. *Fisheries Res. Institutes.* Pp. 435-446.
- Jayaram KC(1977). *The freshwater fishes of India Pakistan, Bangladesh, Bhurma and Srilanka.* A handbook. Zoological survey of India, Calcutta, India. 22: 13.
- Mirza MR(1982). *A contribution to the fishes of Lahore.* Polymer Publications Urdu Bazaar, Lahore. Pp. 48.
- Narejo NT, Ali SS, Jafri SIH, Hussain SM(1999). Study on the age and growth of Palla, *Tenualosa ilisha* from the river Indus. *Pakistan J. Zool.* **31**(1): 25-29.