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Length-Frequency Studies on Catfish Macrones Vittatus (Bloch, 1794) At Bhategaon Dam, Hingoli District, Maharashtra.

KEYWORDS: Length-Frequency, Macrones vittatus, Bhategaon Dam.

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ABSTRACT *Length-Frequency study made on Macrones vittatus (Bloch, 1794) at Bhategaon Dam during the year January to December 2011 is presented in the paper. The determination of age and growth of the catfish Macrones vittatus (Bloch, 1794) has been attempted employing Length-Frequency Method. The frequency polygon for the entire period shows two distinct modes at 106-115 mm and 116-125 mm size group. The smallest fishes were found from January, October and November during the study period. It has been stated that the fish spawned in July and August.*

INTRODUCTION

Size structure data particularly that of length frequency distribution is very important fisheries management tool. Such data are essential for a wide number of studies, for example estimating growth rates, age structure and other aspects of fish population dynamics. Study of the size structure (length frequency) in riverine fish reveals many ecological and life-history traits such as the river health, stock conditions and breeding period of the fish. The size structure of a fish population at any point in time can be considered a 'snapshot' that reflects the interactions of the dynamic rates of recruitment, growth and mortality (Neumann 2001).

Growth is perhaps the most studied of all parameters used to describe the life history of exploited fish. Growth is usually expressed as a mathematical equation describing the mean growth of a population and relating size to age Katsanevakis and Maravelias (2008). The methods used to estimate growth in fish vary significantly with the type of data being used. The most commonly used data for estimating fish growth is length-at-age data, although length frequency data and mark recapture data are also used Francis, (1988); Labelle, *et al.*,(1993). There are 3 techniques for providing information on the age and growth of fishes: Length frequency analysis, Tag-recapture studies and direct aging from the hard anatomical structures Jones, (1976); Ricker, (1979).

Valuable information about the growth of fish can often be extracted from length data that have been collected regularly over an extended time period. Such data often exist for commercially harvested species where routine length sampling of the catch occurs Geoff, *et al.*, (2004).

In the present investigation length frequency method has been used to understand the rate of growth of *Macrones vittatus* (Bloch, 1794) from Bhategaon Dam, Hingoli.

MATERIAL AND METHODS

The studies on growth of *Macrones vittatus* (Bloch, 1794) were based on random samples obtained usually once a week from Bhategaon Dam, Hingoli. Total numbers of 419 specimens were collected during the study period of one year from January 2011 to December 2011. During the study minimum length recorded was 88mm and maximum was recorded 167mm. The size range 86mm to 175mm was divided into 9 groups with 10mm class interval.

RESULTS AND DISCUSSION

The length frequency analysis of the collected data is given in Table-2 and by graph in Graph-1. The frequency polygon for the entire period shows two distinct modes at 106-115 mm and 116-125 mm size group. Pearson (1928) while study on the natural history of red fish, quotes, "The individuals of large collection are grouped according to their length and each prominent mode or hump in the plotter distribution is assumed to represent an age class".

From the above quotation, it may be inferred that the life span of *Macrones vittatus* (Bloch, 1794) is about two years. However, the smallest fishes were found from October, November and January. In the next quarter an increase in size becomes apparent. There have been notable contributions by Longhurst (1964), Gulland (1969) and Pauly (1980) in this area of fisheries research.

The month wise distribution of specimens as shown in Graph-1 indicates two modes, showing the frequency distribution is mostly bimodal. It has been stated that the fish spawned in July and August.

In January 2011, modes obtained were at 86-95 mm and 106-115 mm where the probable broods found were in Feb. 2010 and Apr. 2010. In February 2011, the modes obtained were at 96-105 mm and 116-125 mm and the probable broods of Apr. 2010 and Feb. 2010. In March 2011, there was modes found at 106-115 mm and 116-125 mm and the broods were of Apr.2010 and May 2010. In Apr. 2011, modes were seen at size group of 116-125 mm and 126-135 mm, which shows the broods of Apr. 2010 and Mar. 2010. In May 2011, modes were obtained in 116-125 mm and 136-145 mm size group in which brood found were of May 2010 and March 2010.

In June 2011, the modes seen at three size groups and that are 126-135 mm , 136-145 mm and 146-155 mm and the probable broods were of May 2010, Apr.2010 and Mar.2010. In July 2011, again two modes were obtained of 146-155 mm and 166-175 mm size group which were having broods of Apr.2010 and Feb. 2010. In Aug. 2011, 146-155 mm and 156-165 mm size group modes were obtained of which the broods were of May 2010 and Apr.2010. In September 2011, mode obtained was at 126-135 mm with broods having about Aug.2010. In October 2011, modes obtained were in size group 86-95 mm and 96-105 mm having broods of Dec.2010. In November 2011, modes found were at 96-105 mm and 106-115 mm with having broods of Jan.2011 and Dec.2011. In December 2011, mode seen was at 106-115 mm size group and having broods of Jan.2011.

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Table - 1: Different modes in each month can be described as follows:

Sr. No.	Year and Month 2011	Length at which mode obtained (mm)	Approximate age of fish representing the mode	Probable Brood
1.	January 2011	86-95 106-115	9 11	April; 2010 February; 2010
2.	February2011	96-105 116-125	10 12	April; 2010 February; 2010
3.	March2011	106-115 116-125	11 12	April; 2010 May; 2010
4.	April2011	116-125 126-135	12 13	April; 2010 March; 2010
5.	May2011	116-125 136-145	12 14	May; 2010 March; 2010
6.	June2011	126-135 136-145 146-155	13 14 15	May; 2010 April; 2010 March; 2010
7.	July2011	146-155 166-175	15 17	April; 2010 February; 2010
8.	August2011	146-155 156-165	15 16	May; 2010 April; 2010
9.	September2011	126-135	13	August; 2010
10.	October2011	96-105 86-95	10 9	December; 2010 January; 2010
11.	November2011	96-105 106-115	10 11	January; 2011 December; 2010
12.	December2011	106-115	11	January; 2011

Table-2: Length Frequency Distribution:

Length group in mm	Jan.2011	Feb. 2011	Mar. 2011	Apr. 2011	May2011	Jun. 2011	Jul. 2011	Aug. 2011	Sep. 2011	Oct. 2011	Nov. 2011	Dec. 2011	Total
86-95	4 (9.52)	.....	.....	.....	.....	.....	.....	.....	.....	2 (22.22)	1 (1.72)	.....	7 (1.67)
96-105	8 (19.04)	13 (20.63)	2 (7.69)	1 (2.27)	2 (14.28)	.....	.....	.....	.....	4 (44.44)	21 (36.20)	1 (16.66)	52 (12.41)
106-115	25 (59.52)	16 (25.39)	11 (42.30)	7 (15.90)	2 (14.28)	1 (1.58)	4 (7.84)	1 (3.84)	1 (5.88)	1 (11.11)	24 (41.37)	3 (50.00)	96 (22.91)
116-125	5 (11.09)	24 (38.09)	7 (26.92)	16 (36.36)	5 (35.71)	9 (14.28)	11 (21.56)	2 (7.69)	9 (52.94)	1 (11.11)	11 (18.96)	2 (33.33)	102 (24.34)
126-135	.....	9 (14.28)	4 (15.38)	19 (43.18)	3 (21.42)	12 (19.04)	4 (7.84)	1 (3.84)	5 (29.41)	1 (11.11)	1 (1.72)	.....	59 (14.08)
136-145	.....	1 (1.58)	2 (7.69)	1 (2.27)	2 (14.28)	19 (30.15)	13 (25.49)	6 (23.07)	2 (11.76)	.....	.....	.....	46 (10.97)
146-155	.....	.....	.....	.....	.....	20 (31.74)	15 (29.41)	8 (30.76)	.....	.....	.....	.....	43 (10.26)
156-165	.....	.....	.....	.....	.....	2 (3.17)	3 (5.88)	8 (30.76)	.....	.....	.....	.....	13 (3.10)
166-175	.....	.....	.....	.....	.....	.....	1 (1.96)	.....	.....	.....	.....	.....	1 (0.23)
Total	42	63	26	44	14	63	51	26	17	9	58	6	419

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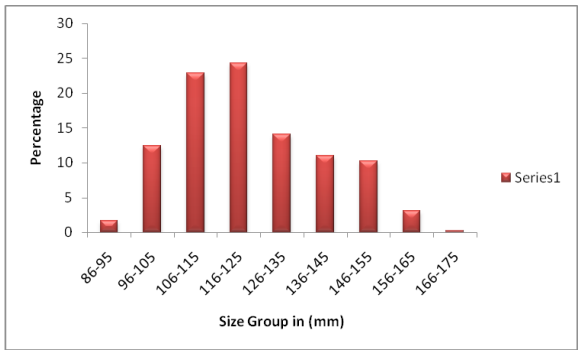

Graph-1: Showing Length frequency obtained modes in Macrones vittatus *(Bloch, 1794)*

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REFERENCE

Francis, R. I. C. C. (1988): Are growth parameters estimated from tagging and age-length data comparable? Can. J. Fish. Aquat. Sci. 45: pp 936–942. | Geoff M. Laslett, J. Paige Eveson and Tom Polacheck (2004): Fitting growth models to length frequency data. ICES Journal of Marine Science, 61: pp 218-230. | Gulland, J.A., (1969): Manual methods of fish stock assessment part 1. Fish population analysis. FAO manual in fisheries science No. Rome: pp 154. | Jones, R. (1976): Growth of fishes. In: Cushing, D.H., Walsh, J.J. (eds.). The ecology of the seas. Blackwell Scientific Publications, Oxford: pp 251-279. | Katsanevakis, S., and C. D. Maravelias (2008): Modelling fish growth: multi-model inference as a better alternative to a priori using von Bertalanffy equation. Fish Fish. 9: pp 178–187. | Labelle, M., J. Hampton, K. Bailey, T. Murray, D. A. Fournier, and J. R. Sibert. (1993): Determination of age and growth of South Pacif ic albacore (Thunnus alalunga) using three methodologies. Fish. Bull. 91: pp 649–663. | Longhurst, A.R., (1964): Bionomics of the Sclaenidae of Tropical west Africa. J. Cons. Perm. Int. Exploi. Mer., 29(1): pp 83-114. | Neumann, R. M. and Allen, M. S. (2001): Analysis and interpretation of freshwater fisheries data. Department of Natural Resources Management and Engineering, University of Connecticut. | Pauly, D., (1980): On the interrelationships between natural mortality, growth parameters and mean environmental temperature in 175 fish stock. J. Cons. 1. Int. Explor. Mer., 39 (2): 175-192. | Pearson, John C. (1928): Natural history and conservation of redfish and other commercial sciaenid's on -the Texas coast. U.S. Bur. Fish. Bull. 44: pp 129-214. | Ricker, W.E. (1979): Growth rates and models. In: Hoar, W.S., Randall, D.J., Brett, J.R. (eds.). Fish Physiology, vol. VIII. Academic Press, New York: pp 677-742.