



Length Frequency Studies in *Gobius biocellatus*

KEYWORDS

Length frequency, *Gobius biocellatus*

Jaiswal N.R.

Department of Zoology, Yeshwant Mahavidyalaya Nanded-431602, Maharashtra

ABSTRACT

The age and rate of growth of a fish is extremely useful knowledge for the development and scientific management of a fishery. It is essential to know amongst other things the size or age composition of the fish stock from season to season and from the year to year. In the present investigation length frequency method has been used to understand the rate of growth of *G. biocellatus* from river Kayadhu near Hingoli. Total 615 specimens were collected for the study. The fish attains average length of about 120 to 129 mm and 180 to 189 mm in total length at the age of first and second year respectively. The growth in the first year is fast i.e., 10.41 mm per month and slows in the second year i.e., 5 mm per month.

Introduction:

The age and rate of growth of a fish is extremely useful knowledge for the development and scientific management of a fishery. It is essential to know amongst other things the size or age composition of the fish stock from season to season and from the year to year. There are three methods generally used in the age and growth study viz., 1) Length frequency method, 2) Otolith and bone method and 3) Scale method. Jhingran (1963), Kagwade (1971), Kothari and Bal (1975) studied the hard parts like scales, bones otoliths and spines of fishes to determine the growth rate. In tropical regions where the seasons are not distinctly marked and the temperature of water does not show wide range of fluctuations, the growth rings on scales and otoliths are not clear and in such circumstances length frequency methods gives good results.

In the present investigation length frequency method has been used to understand the rate of growth of *G. biocellatus* from river Kayadhu near Hingoli.

Materials and Methods:

The studies on growth of *G. biocellatus* were based on random samples obtained, usually once a week, from river Kayadhu near Hingoli. Total number of 615 specimens was collected during the period of one year from January 2003 to December 2003. The maximum length recorded was 200 mm and the size range, 80 mm to 200 mm was divided into 13 groups with 10 mm class interval.

Result And Discussion:

The length frequency analysis of the collected data is given in Table No.1 and by graph in Figure No. 1. The frequency polygons for the entire period show two distinct modes at 130-139 mm and 150-159 mm size groups. 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 *G. biocellatus* is about three years, with an average size 120-129 mm at the end of first year and 180-189 mm at the end of second year. The average growth rate of the fish in the first year 10.41 mm per month and 5 mm per month in the second year. This is in accordance with the findings by Baranov (1916) and Ford (1933) who marked that fishes in general have an accelerated growth during the subsequent year.

The month wise distribution of specimens as shown in Figure

No.1 indicates two or more than two modes in each month owing to the breeding throughout the year of this fish it become difficult to trace the progress of each mode in successive months. It is evident from Figure No.1 that the size frequency distribution present a poly modal pattern, Rounsefell and Everhart (1953) attributed a poly modal distribution to a prolonged breeding season in fish. Gadgil (1967), while studying the length frequency distribution in *Coilia dussumieri* state, "that the length frequency distribution remaining without much progress from month to month may be due to the prolonged spawning period of fish". Parulekar and Bal (1970) in *Bregmaceros McClellandi* and Mehta (1974) in *Ophiocephalus gachua* are also on similar lines. In the present study monthwise length frequency curves show a poly modal nature, which may be due to the breeding throughout the year. It may also be added that as *G. biocellatus* is a fractional spawner, during the breeding season, number of batches of hatchlings are added which according to Pearson's (1928) statement culminate into number of modes and thus, represent a poly modal nature of curves.

From Table No.1 and Figure No.1 it can be seen that specimen belonging to 80 to 89 mm size groups occur during February to March and July. Their negligible percentage in July indicates that recruitment takes place during February and March. The modes indicates in length frequency graphs for different months give an idea of the growth of the fish during these months.

Figure No.1 shows that there is no marked regular progress of each mode in successive months. It can be interpreted from Figure No.1 that in the month of October 2003 the mode at 110 to 119 mm size group repeated again in the month of November and December 2003 without any successive progress and the mode at 180-189 mm size group in the month of June 2003 to August 2003 appeared in the same size group. The age of the fish can be determined on the basis of scientific evidence and the average rate of growth of the fish, although the growth rate for certain period differs due to varied condition of the environment and other factors. Variation in growth rates under different reasons have been marked by many workers. Sekharan (1959), while analyzing the data on age and growth rate of *Sardinella albella* and *Sardinella gibbosa* indicate that the growth rate of these species varied from season to season and remarked that "this in all probability is mainly due to changes in environmental conditions and density of population".

From this study it can be inferred that the fish matures for the first time at the age of eight to nine months or before it complete the first year of its age, as stated vide supra, the

fish attains maturity for the first time in its life at 110 to 119 mm size group. Hence it can be confirmed from the present study that the percentage of mature fishes is always high in the catch and they were not getting an opportunity to spawn. If the present trend of fishing mature fishes is confined, it may adversely affect the fish stock of this species.

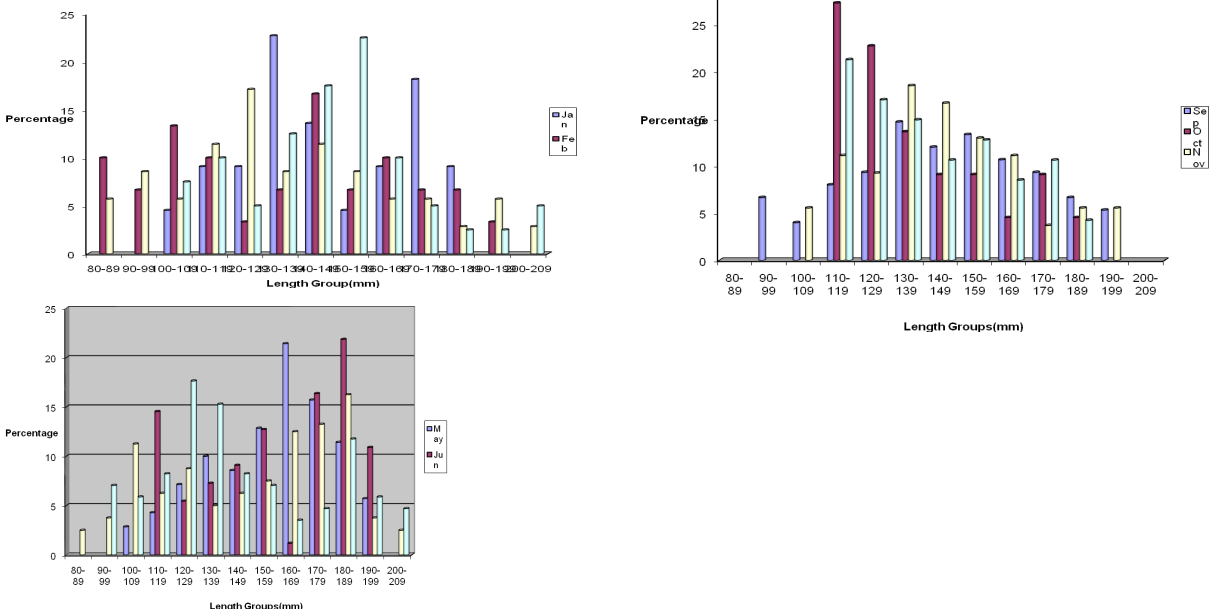
Two general conclusions on the growth rate of *G. biocellatus* can be made as :-

- a) The fish attains average length of about 120 to 129 mm and 180 to 189 mm in total length at the age of first and second year respectively.
- b) The growth in the first year is fast i.e., 10.41 mm per month and slows in the second year i.e., 5 mm per month.

Table No.1
Length Frequency Distribution in *Gobius biocellatus*

Length group in mm	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
80-89	.....	3 (10.00)	2 (5.71)	.....	.....	.....	2 (2.5)	.....	.....	.....	.....	.....	7 (1.13)
90-99	.....	2 (6.66)	3 (8.57)	.....	.....	.....	3 (3.75)	6 (7.05)	5 (6.66)	.....	.....	.....	19 (3.08)
100-109	1 (4.54)	4 (13.33)	2 (5.71)	3 (7.5)	2 (2.85)	.....	9 (11.25)	5 (5.88)	3 (4.00)	.....	3 (5.55)	.....	32 (5.20)
110-119	2 (9.09)	3 (10.00)	4 (11.42)	4 (10.00)	3 (4.28)	8 (14.54)	5 (6.25)	7 (8.23)	6 (8.00)	6 (27.27)	6 (11.11)	10 (21.27)	63 (10.24)
120-129	2 (9.09)	1 (3.33)	6 (17.14)	2 (5.00)	5 (7.14)	3 (5.45)	7 (8.75)	15 (17.64)	7 (9.33)	5 (22.72)	5 (9.25)	8 (17.02)	66 (10.73)
130-139	5 (22.72)	2 (6.66)	3 (8.57)	5 (12.5)	7 (10.00)	4 (7.27)	4 (5.00)	13 (15.29)	11 (14.66)	3 (13.63)	10 (18.51)	7 (14.89)	74 (12.03)
140-149	3 (13.6)	5 (16.66)	4 (11.42)	7 (17.5)	6 (8.57)	5 (9.09)	5 (6.25)	7 (8.23)	9 (12.00)	2 (9.09)	9 (16.66)	5 (10.63)	67 (10.89)
150-159	1 (4.54)	2 (6.66)	3 (8.57)	9 (22.5)	9 (12.85)	7 (12.72)	6 (7.5)	6 (7.05)	10 (13.33)	2 (9.09)	7 (12.96)	6 (12.76)	68 (11.05)
160-169	2 (9.09)	3 (10.00)	2 (5.71)	4 (10.00)	15 (21.42)	1 (1.18)	10 (12.5)	3 (3.52)	8 (10.66)	1 (4.54)	6 (11.11)	4 (8.51)	59 (9.59)
170-179	4 (18.18)	2 (6.66)	2 (5.71)	2 (5.00)	11 (15.71)	9 (16.36)	11 (13.25)	4 (4.70)	7 (9.33)	2 (9.09)	2 (3.70)	5 (10.63)	61 (9.91)
180-189	2 (9.09)	2 (6.66)	1 (2.85)	1 (2.5)	8 (11.42)	12 (21.86)	13 (16.25)	10 (11.76)	5 (6.66)	1 (4.54)	3 (5.55)	2 (4.25)	60 (9.75)
190-199	.....	1 (3.33)	2 (5.71)	1 (2.5)	4 (5.71)	6 (10.90)	3 (3.75)	5 (5.88)	4 (5.33)	.....	3 (5.55)	.....	29 (4.71)
200-209	.....	.....	1 (2.85)	2 (5.00)	.....	.....	2 (2.5)	4 (4.70)	.....	.....	.....	.....	9 (1.46)
Total	22	30	35	40	70	55	80	85	75	22	54	47	615

Figure No. 1: Month wise length frequencies distribution in *Gobius biocellatus*



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