

DETERMINATION OF AGE AND GROWTH IN THE TOOTHED PONYFISH, *GAZZA MINUTA* (BLOCH) FROM PORTO NOVO

N. JAYABALAN* AND K. RAMAMOORTHY

Centre of Advanced Study in Marine Biology, Parangipettai, 608 502.

ABSTRACT

Age and growth of the toothed ponyfish *Gazza minuta*, (Bloch) of Porto Novo region were estimated. Length-frequency distribution of fish in commercial catches showed that *G. minuta* attains a length of 98 mm at the end of 1st year and 138 mm at the end of 2nd year of its life. Von Bertalanffy growth equation fitted for length at age data for *G. minuta* is,
 $L_t = 160 (1 - e^{-0.8649 (t + 0.2316)})$.

Key-words: Ponyfish, age and growth, *Gazza minuta*, Porto Novo waters.

Determination of age and growth in fishes is very essential to understand their life history and population dynamics. Owing to the paucity of information on the age and growth of the toothed ponyfish, *Gazza minuta* from Indian waters, the present study was undertaken to estimate the age and growth of this species.

Random samples of *G. minuta* from the commercial catches at fish landing centre, Porto Novo (Lat. 11° 29' N and Long. 79° 46' E) were measured biweekly for their total length (T.L.) between May 1976 and October 1977. A total of 5574 specimens were examined and the length-frequency data analysed (Petersen method). Since, the external examination did not reveal the sex of the fish, both the sexes were treated together. The pooled data were classified into various size groups with a class interval of 5 mm. As, the number of fish measured in each month was not constant, the length-frequency distribution was made comparable by converting into percentages. The monthly size ranges and modal values were plotted in frequency polygons and the growth was estimated by tracing the modes through various months.

Empirical growth curve fitting of Von Bertalanffy growth equation was also employed to estimate the growth parameters and the maximum theoretical growth (L_{∞}) was calculated by the graphical method of Walford (1946).

Length frequency distribution

The rate of growth in *G. minuta* was estimated by progression of modes in succeeding months (Fig. 1) as follows.

*Present address : Department of Fishery Biology, College of Fisheries, Mangalore-575 002.

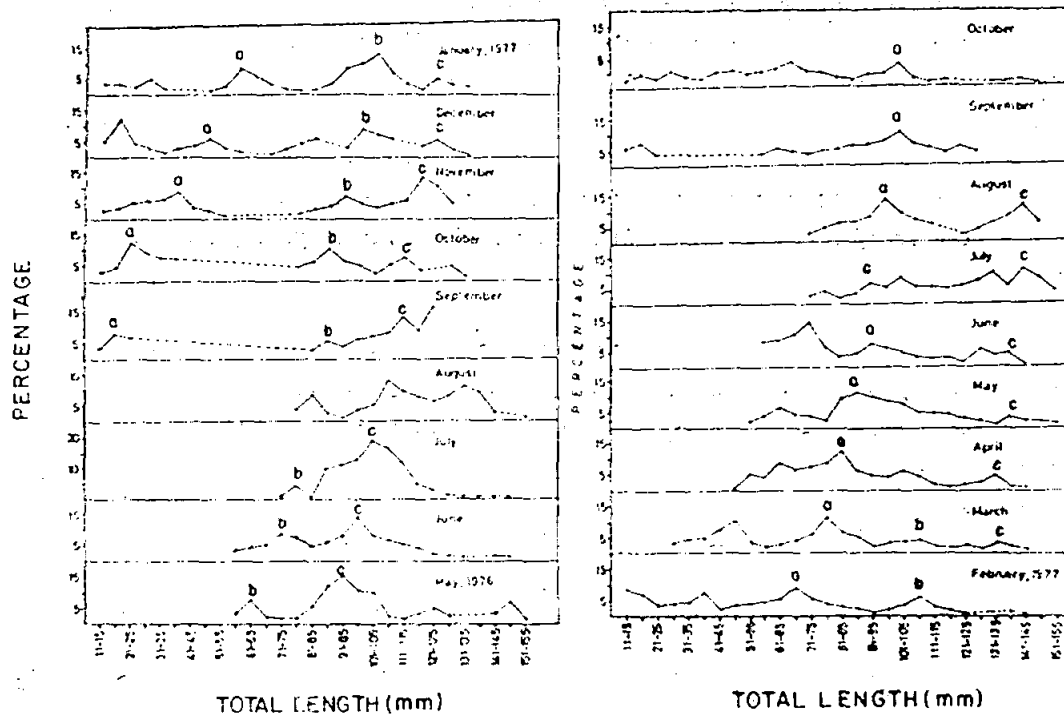


Fig. 1. Monthly length frequency distribution of *G. minuta*.

The mode 'c' at 93 mm in May 1976 shifted to 108 mm in September 1976 at a monthly increment of 5 mm. Thereafter, the growth rate slowed down and could further be traced up to 143 mm in August 1977. The mode 'b' at 63 mm in May 1976 grew to 73 mm in June of the same year and further tracing of this mode revealed that it attained 108 mm in March 1977 with an average monthly growth rate of 4.5 mm. Beyond that it was not possible to trace this mode further. The mode 'a' at 18 mm in September 1976 was formed by the new recruits and was traceable up to September 1977 at 103 mm. However, in October 1977, this mode was stationary. Though, there were several other modes, they were inconspicuous.

Assuming the new recruits of mode 'a' during September 1976 at 18 mm as one month old, it was found to grow to a length of 98 mm in one year with an average monthly growth rate of 8.2 mm. Based on the estimated growth rate of mode 'a', it is possible to consider that the individuals of mode 'b' at 98 mm during December 1978 as one year old. Further this mode grew to 108 mm in March 1977 showing the growth for 15 months. While considering the mode 'c' at 98 mm in June 1976 as one year old, the mode at 143 mm in August 1977 indicated 26 months growth. The growth estimated for 2 years was found to be 138 mm (mode at 138 mm of June 1977). During second year of its life, *G. minuta* was found to grow at an average rate of 3.3 mm per month.

Estimation of parameters of Von-Bertalanffy growth equations

The equation of Von-Bertalanffy for growth in length (Beverton and Holt, 1957) which is expressed as.

$L_t = L_{\infty} (1 - e^{-k(t-t_0)})$, where L_t = length at age 't' L_{∞} = maximum or asymptotic length that the fish can theoretically grow, e = base of the Naparian logarithm, k = a constant related to the coefficient, t_0 = the age at which 'Lt' is theoretically zero.

After fitting the equation to the growth in length of *G. minuta* the estimates of various parameters were arrived at as, $t_0 = -0.2316$; $k = 0.8649$ and $L_{\infty} = 160$. Hence, Von-Bertalanffy growth equation for *G. minuta* can be expressed as,

$$L_t = 160 (1 - e^{-0.8649 + (t-0.2316)}).$$

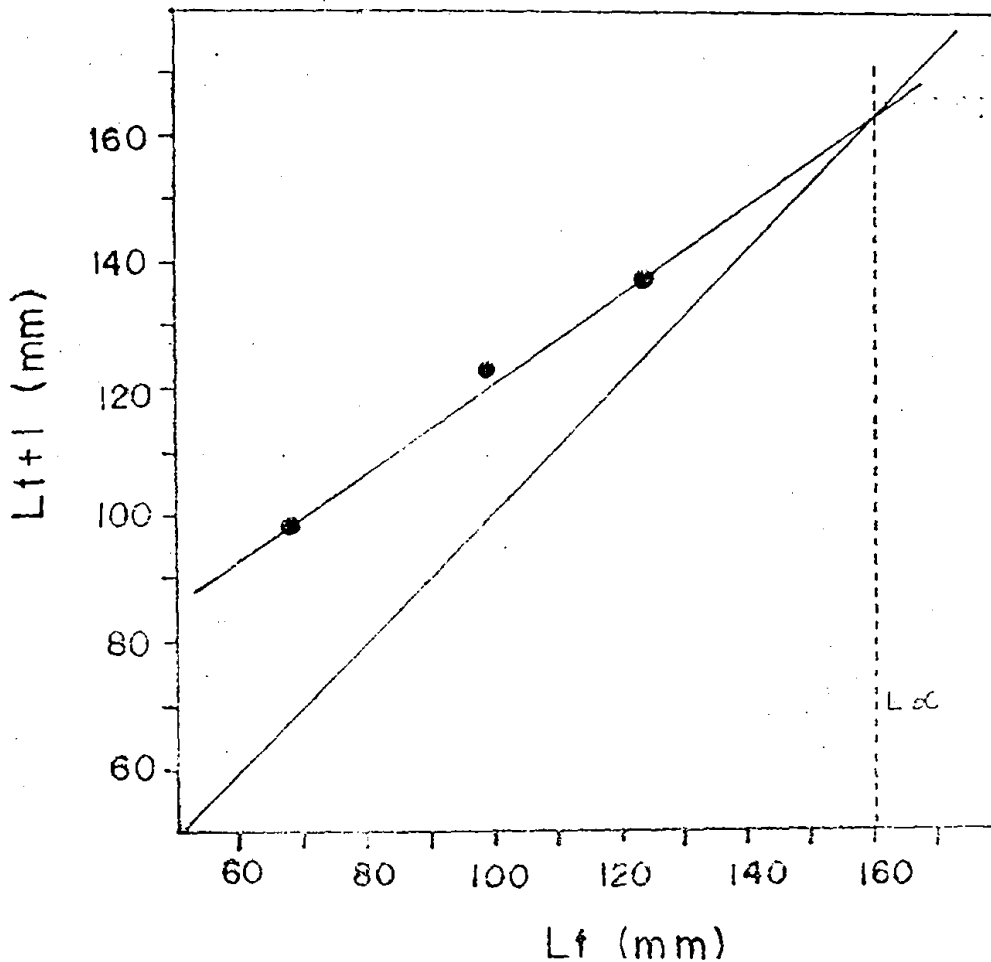


Fig. 2. Walford plot of *G. minuta*.

Adopting Walford's method (1946), the length at age 't' against length at age 't+1' for *G. minuta* on the basis of lengths attained at intervals of 6 months shown in Fig. 2. The points fell almost in a straight line relationship and the Asymptotic length (L_{∞}) was found to be 160 mm which is almost close to the maximum length (i.e. 155 mm) recorded in the present study.

The average length at first maturity for males and females of *G. minuta* along the Porto Novo coast was estimated at 99 and 101 mm respectively (Jayabalan, 1980). This clearly shows that *G. minuta* starts spawning when it is about 1 year o.d. As the smaller fish of about 18 mm length recruited during September 1976, increased in length to 143 mm when they were 26 months old, it may be inferred that the life span of *G. minuta* is between 2 and 3 years along the Porto Novo coast. This agrees with the view that the life span of most of the tropical fishes rarely exceeds 3 years (Qasim, 1973).

ACKNOWLEDGEMENTS

The authors thank Dr. R. Natarajan, Director, C.A.S. in Marine Biology for his keen interest and encouragement and to the U.G.C., New Delhi for financial support to one of them (N.J.). The facilities provided by Annamalai University is gratefully acknowledged.

REFERENCES

- Beverton, R. J. H. and S. J. Holt, 1957. On the dynamics of exploited fish populations. *Fishery Investigation (Ministry of Agriculture, Fisheries and Food, London), Series II, 19* : 533 pp.
- Jayabalan, N., 1980. Studies on silverbellies (Pisces: *Leiognathidae*) and their associated bioluminescent bacteria of Porto Novo waters. *Ph.D. Thesis, Annamalai University, India*, 243 pp.
- Qasim, S. Z., 1973. Some implications of the problem of age and growth in marine fishes from the Indian waters. *Indian Journal of Fisheries*, **20** (2) : 351-371.
- Walford, L. A., 1946. A new graphic method of describing the growth of animals. *Biological Bulletin*, **90** (2) : 141-147.