A PRELIMINARY STUDY OF GROWTH IN *CERITHIDEA (CERITHIDEOPSILLA) FLUVIATILIS* (POTIEZ AND MICHAUD), (PROSOBRANCHIA—GASTROPODA)

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ABSTRACT

Observations on the growth of *Cerithidea (Cerithideopsilla) fluviatilis* in the Vellar estuary have been in progress for over six months. Weekly samples were collected and linear measurements were recorded for a total number of 13,300 specimens. The samples showed unimodal frequency. The heavy aggregation of young ones during July and August and the unimodal frequency distribution would indicate that there is only one breeding season in the year. In the interior parts of inlets and creeks during flood time and at other times also over-sized specimens above 23 mm. were observed whereas only large number of dead ones infested with crabs were noticed during flood time in the sampling area. This is apparently due to differential survival, the over-sized specimens taking shelter in creeks.

INTRODUCTION

THE study of growth in any of its different aspects is a problem of great importance and a comparative study in any group of organisms is a promising field of investigation. The gastropod molluscs are particularly interesting for studies of growth and are also very suitable material. In recent years some important contributions have been made on the growth of a few prosobranchs, in particular *Gibbula*, *Opisthostoma*, and *Littorina*. The latter has been studied by more than one investigator. Hayes (1927, 1929) studied the effect of environmental factors on the development, growth, and behaviour in *Littorina*. Moore (1937) investigated growth of the shell in *Littorina littorea* and Smith and Newell (1955) studied the dynamics of zonation. Williams (1964 *a*) investigated growth and distribution of *Littorina littorea* (L.) on a rocky shore with a view to determining which section of the population was responsible for the maintenance of the population as a whole. Green and Green (1932) compared growth rates in *Littorina littorea* using weight and height as size indicators. Of the Indian forms, *Trochus* and *Cerithidea* have been studied so far. Rao (1939) investigated rate of growth in *Trochus niloticus* found in the Andamans. Sadasivan (1948) studied the rate of growth in *Cerithidea cingulatus* from the backwaters of Madras. The present paper records the results of a preliminary study of growth in *Cerithidea (C.) fluviatilis* based on length-frequency data for a period of seven months.

MATERIAL AND SAMPLING METHOD

Cerithidea (C.) fluviatilis occurs in abundance along the banks of estuaries and is able to live under the varying conditions prevailing in these regions. The species is particularly abundant in backwater creeks and in mud-flats where it is densely distributed from high-water level to low-water. The abundance of populations of *Cerithidea fluviatilis* throughout the year is a striking feature of estuarine areas.

The genus *Cerithidea* Swainson, according to Thiele (1931), contains two subgenera *Cerithidea* s.s. and *Cerithideopsis*. *Cerithideopsis* s.s. contains two sections *Cerithideopsis* s.s. and *Cerithideopsilla*. *Cerithidea (Cerithidea) decollata* (Linne) and *C. (Cerithideopsilla) fluviatilis* (Potiez and Michaud) are distributed in the Indo-Pacific regions. *Cerithidea (C.) fluviatilis* (Potiez and Michaud) is synonymous with *Cerithidea cingulatus* Gmelin, and *Potamidea cingulatus* Hornell.

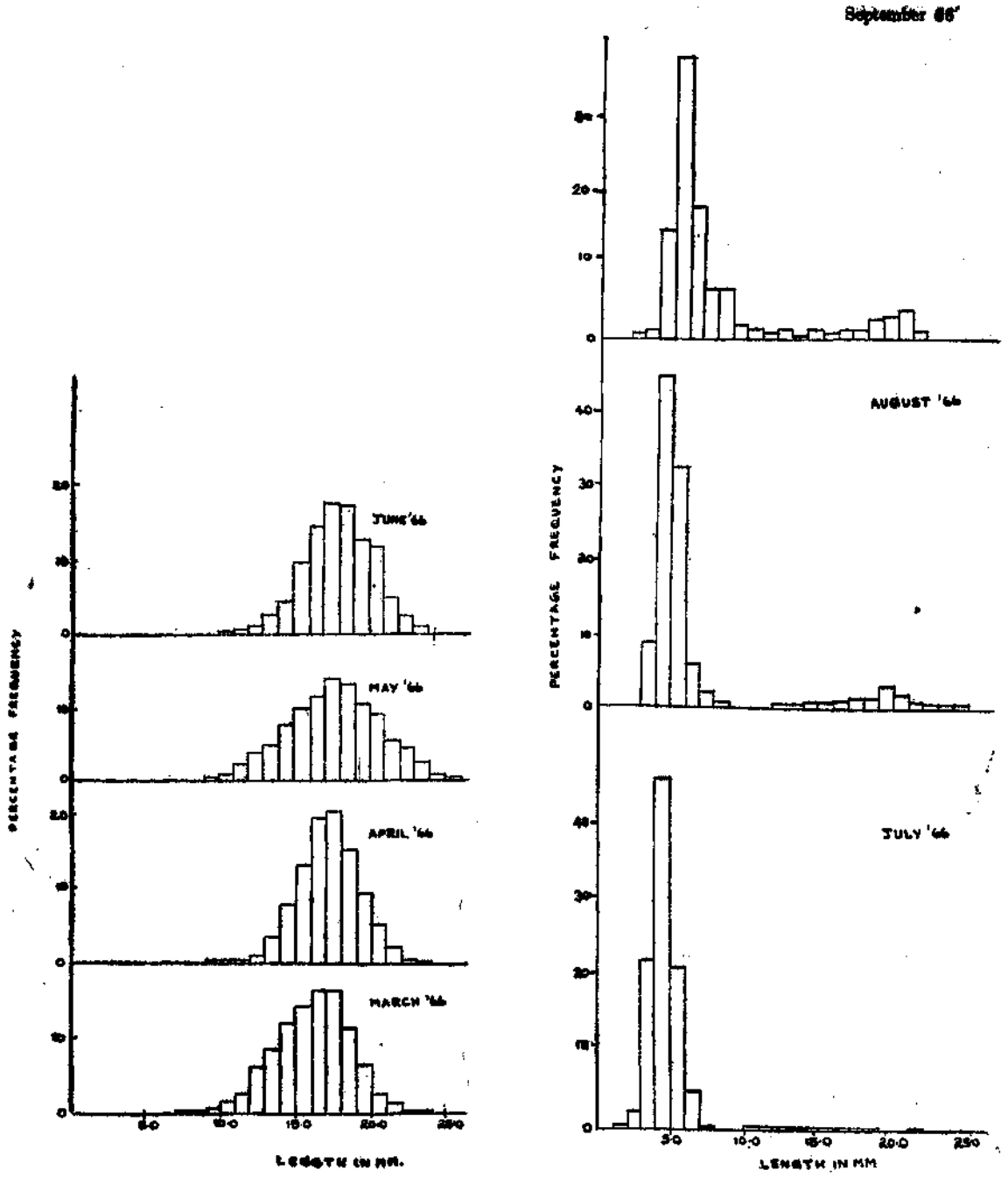

FIG. 1. Size frequency distribution of *Cerithidea fluviatilis* during March to September, 1966, at a station on the bank.

Samples of *Cerithidea (C.) fluviatilis* were collected once a week for a period of seven months, extending from March to September, 1966, at a defined station in the Vellar estuary. Specimens

were also collected from backwaters for about three months. On the whole, fifty samples with a total of 13,300 specimens, giving an average of 266 specimens per sample, were collected.

Cerithidea (*C.*) *fluviatilis* is relatively semi-sedentary, showing very restricted movement. Thus sampling could be effectively carried out by the "quadrat method". Wooden frames measuring 1 metre square, were used to obtain random samples. The specimens included in each quadrat were taken to the laboratory for measurement. The heights of the specimens were recorded to the nearest 0·1 mm. with vernier calipers. Shell height was considered as age/size indicator.

Observations and Discussion

It was found convenient to group the animals into two categories, those which are 7 mm. and less, and those which are above 7 mm. The former will be referred to in this paper as small-sized groups and the latter as the large-sized. Histograms (Fig. 1) showing the relative frequency of the size groups were drawn for each month and the frequency patterns of the different months compared.

The main features of the frequency distribution of the size groups are as follows:

(*a*) The range of variation in size is more or less similar from March to June. Specimens below 7 mm. are lacking, and there are only few below 10 mm. The predominant group is the 17-17·9 mm. group. The coefficient of variation for the population during these months is low.

(*b*) The predominant size groups during July and August is 4–4·9 mm. and during September 5–5·9 mm. During these months the large-size groups, *i.e.*, above 7 mm., show a low frequency. The frequency for these groups is mostly 0·1 per cent, and in August and September slightly higher. The large-size groups and small-size groups are discrete during July and August, but in September they show a continuous frequency. However, during August and September the large-size groups have distinct modes. The slight increase in the frequency of the large-size groups might have been due to a few immigrants from other areas, or due to sampling error or both. But this does not alter the overall picture, which is the great preponderance of small-size groups that were entirely lacking in the earlier months.

Field observations extending over a few years also indicated that the juvenile specimens occurred only during July to September and in very large numbers. Sadasivan (1948) reported on *Cerithidea cingulatus* from the backwaters of Madras that breeding season extended from January until June. The present study based on specimens from Porto Novo does not confirm this.

Sadasivan (1948) also reported that the maximum size observed by him was 22 mm. and the rate of growth in young shells was 1·17 mm. per month.

In the Vellar estuary specimens of *Cerithidea* (*C.*) *fluviatilis* were found to attain greater size. On the banks of the estuary 26 mm. size was occasionally met with and in the backwater and creeks specimens which were 31 mm. were collected.

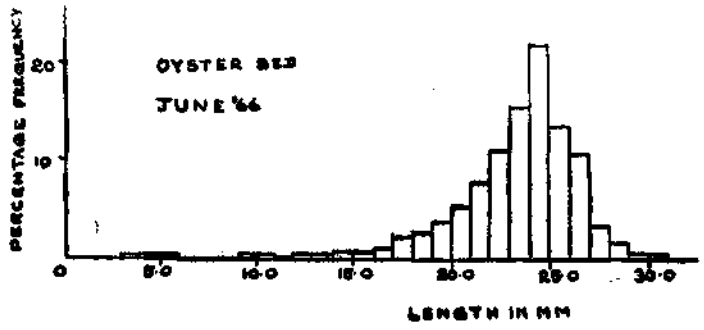

Fig. 2. Size frequency distribution of *Cerithidea fluviatilis* during the month of June at oyster bed region.

Sadasivan (1948) also reported that the average rate of growth in young shells was 1·17 mm. per month. In the present study the maximum size of juvenile specimens observed in July was 8 mm., in August 9 mm., and in September 10 mm. Thus it would appear that the average rate of growth was 1 mm. per month. However, this is only a provisional inference and will have to be corroborated by further observations which are in progress.

Another interesting feature which was observed was the high incidence of barnacles during March on the shells ranging in height from 12 to 18 mm. The percentage of incidence during this period was 54·71%. The incidence in other months was limited.

ACKNOWLEDGEMENTS

We are very thankful to Professor R. V. Seshaiya, Professor and Director, U.G.C. Centre of Advanced Study in Marine Biology, Porto Novo, for suggesting the problem. One of us (K. Alagaraja) is grateful to the University Grants Commission, New Delhi, for the award of a Junior Research Fellowship.

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