

## EXPLOITATION OF MUD CRAB *SCYLLA SERRATA* (FORSKAL) FROM KORAPUZHA ESTUARY, KERALA

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### ABSTRACT

The hooks and line fishery for mud crab (*Scylla serrata*) in the Korapuzha estuary is described. The fishing season extends throughout the year with a peak during December-June. The average annual catch for 1987-89 was 14.0 tonnes with a CPUE of 11.3 kg. The size ranged from 51-215 mm in females and 46-195 mm in males with majority between 86-120 mm. The length-width and the width-weight relationship,  $L_{\infty}$  and K values, sex ratio, maturity and marketing aspects were studied.

### INTRODUCTION

AMONG the commercially important crabs, the genus *Scylla* De Haan 1833, ranks first because of their largest size, high meat quality, the capacity to live out of water for a longer period and its compatibility with other species. Its wide tolerance of environmental parameters make them highly esteemed ones for culture practices also. Its lucrative fishery along the coast of India is described by Rao *et. al.*, (1973). The fishery and some aspects of biology has been reported from Bombay (Rai, 1933; Chapgar, 1961), Chilka Lake (Jones and Sujaṅsingani, 1952), Utterbag in Bengal (Hora, 1935; Chopra, 1939; Datta, 1973), Pulicat Lake (Thomas, 1971; Srinivasagam and Raman, 1985), Tuticorin (Shanmugham and Bensam, 1981) and also from Cochin Backwater (Devasia and Balakrishnan, 1985).

The present paper deals with the fishery and some morphometric characters of mud crab *Scylla serrata* from Korapuzha estuary, based on the data collected during 1987-89.

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### MATERIAL AND METHODS

The catch and effort data were collected twice a week, from Korapuzha estuary and raised to monthly estimates. Along with this, length (distance between the frontal teeth and

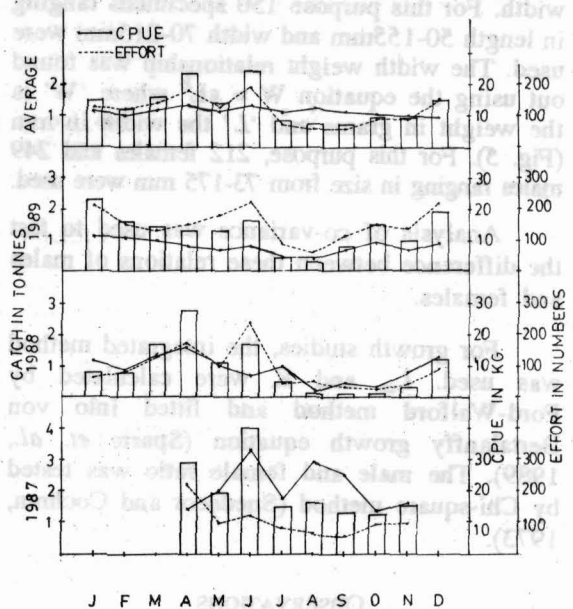


FIG. 1. Estimated catch, effort and CPUE.

the centre of the posterior margin of carapace), width (distance between the ninth antero-lateral teeth) in mm and weight in 5g accuracy were taken individually for females and males.

The length-width relationship was derived using the equation  $Y = a + bX$  where  $X$  is the carapace length and  $Y$  is the carapace

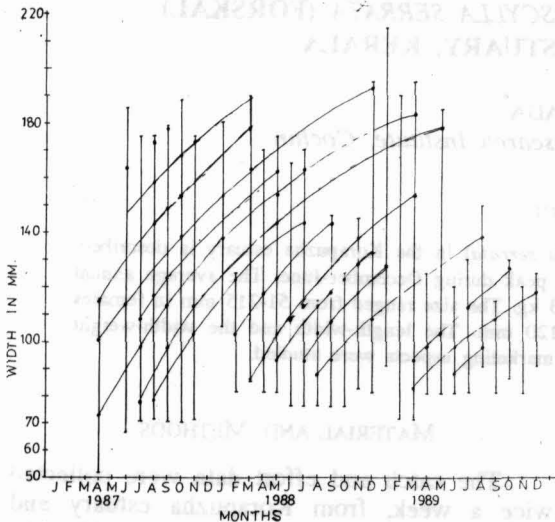


FIG. 2 Size distribution.

width. For this purpose 150 specimens ranging in length 50-155mm and width 70-215mm were used. The width weight relationship was found out using the equation  $W = aL^b$  where 'W' is the weight in grams and 'L' the width in mm (Fig. 5). For this purpose, 212 females and 249 males ranging in size from 73-175 mm were used.

Analysis of co-variance was used to test the difference between these relations of males and females.

For growth studies, the integrated method was used.  $L_{\infty}$  and  $K$  were calculated by Ford-Walford method and fitted into von Bertalanffy growth equation (Sparre *et. al.*, 1989). The male and female ratio was tested by Chi-square method (Snedecor and Cochran, 1973).

#### OBSERVATIONS

##### Fishing and fishing season

Fishing was carried out by hooks and lines. The Fishermen used small dugout canoes of 4-6m in length to reach the fishing ground. The canoes were manned by two, one propelled

the boat with wooden oars while the other operated the gear. Each boat had 125-150 hooks (No. 8) which were hung at 15-20 cm length intervals in the main line. The total length of the main line was about 200 m and weighed on either sides with stones. At one end, a float was attached to locate the position. Fresh eel meat was used as bait, which was usually obtained from the stakenet catch or by angling. Eels were preferred as baits because of its easy availability and rigidity of its flesh. The skin of eels was stripped of by making an incision on the lower side of the head and the flesh was cut into pieces. This was done just before going for fishing as the crabs are easily attracted by the smell of blood.

Generally the fishing started in the morning and ended by afternoon, lasting for 6 hours. After setting the lines on the bottom, they were lifted slowly from one end at an interval of every 10-15 m. At this time the crabs hanging on to the baits with their chelipeds were scooped out by using a scoop net and put them into large bamboo baskets. *Scylla* was also caught in stake nets but their number was meagre. Fishing season extended throughout the year with peaks during December-June.

##### Catch and effort

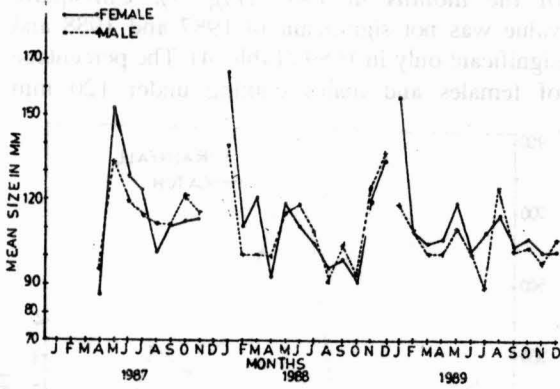
The total catch for the period 1987-89 was estimated at 42.14 tonnes with a CPUE of 11.4 kg and the average annual catch and CPUE was 14 tonnes and 11.3 kg respectively. The highest catch was recorded in 1987, amounting to 15.9 tonnes with a CPUE of 19.9kg. The lowest catch was recorded in 1988 (11.1 tonnes) with a CPUE of 10.3 kg. Though the CPUE in 1989 was the lowest, the catch was higher than that of 1988 and almost nearing to 1987 catch (Table-1). The catches were relatively high during December-June and low during the rest of the period (Fig. 1).

##### Rainfall and the fishery

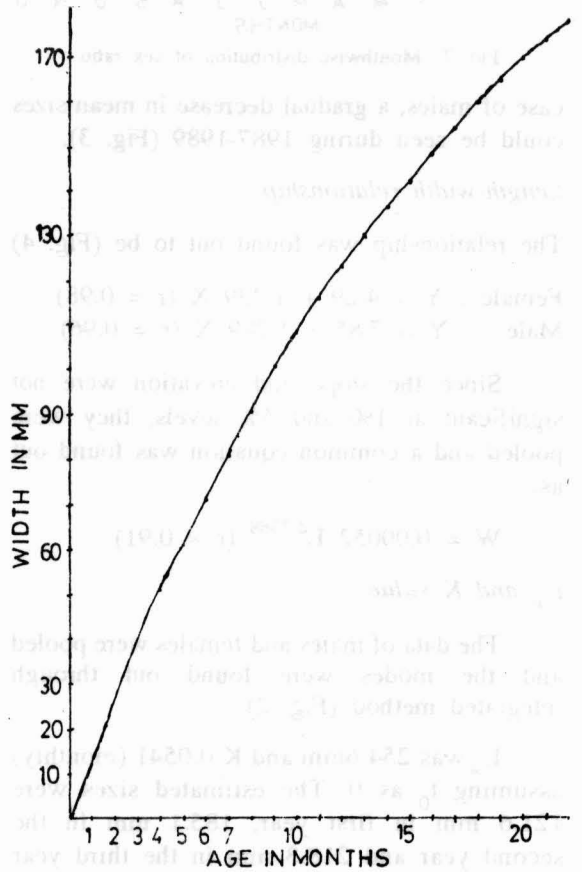
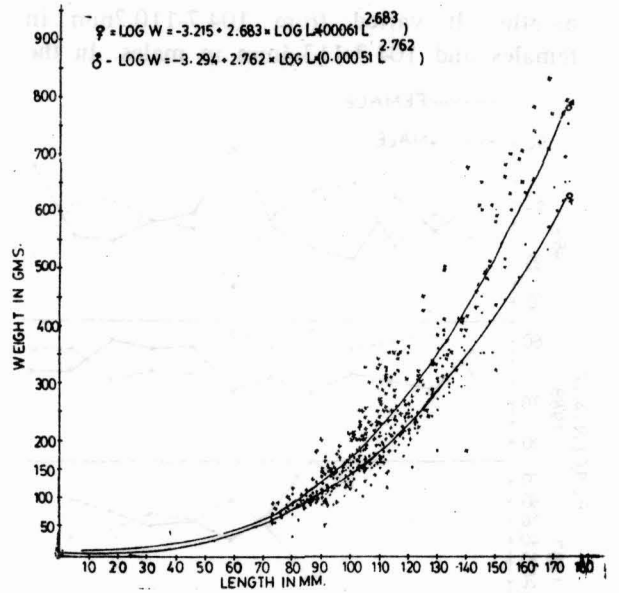
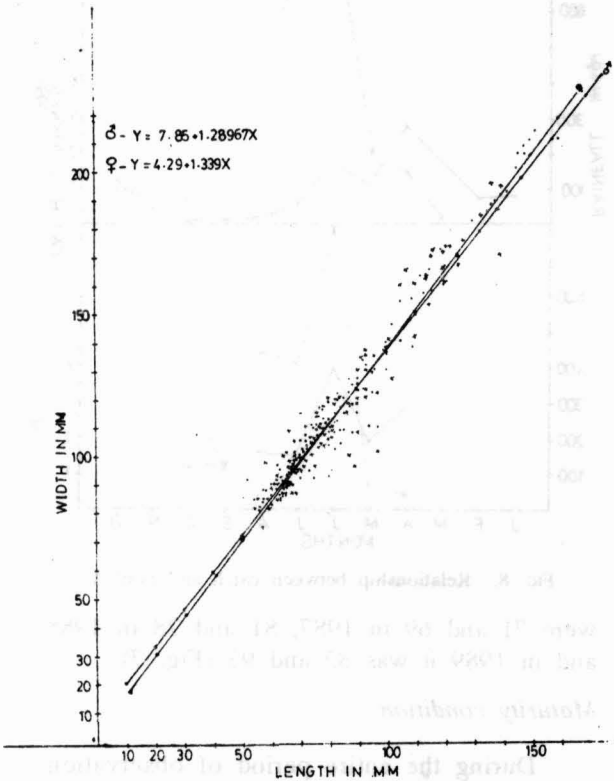
The catch was compared with the rainfall of the respective months but could not find any direct relationship between them (Fig. 8).

*Size distribution*

The size of females ranged from 51-215mm and males from 46-195mm. Majority



of the catches were distributed between 86 and 120 mm. There was not much variation between the mean sizes of females and males in different



months. It varied from 104.7-110.7mm in females and 104.3-113.4mm in males. In the

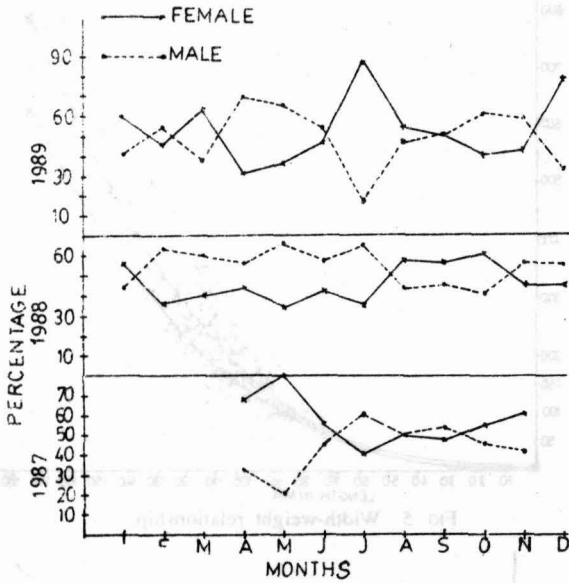


FIG. 7 Monthwise distribution of sex ratio

case of males, a gradual decrease in mean sizes could be seen during 1987-1989 (Fig. 3).

**Length-width relationship**

The relationship was found out to be (Fig. 4)

Female :  $Y = 4.29 + 1.339 X$  ( $r = 0.98$ )

Male :  $Y = 7.85 + 1.289 X$  ( $r = 0.96$ )

Since the slope and elevation were not significant at 1% and 5% levels, they were pooled and a common equation was found out as:

$W = 0.00052 L^{2.7388}$  ( $r = 0.91$ )

**$L_{\infty}$  and K value**

The data of males and females were pooled and the modes were found out through integrated method (Fig. 2).

$L_{\infty}$  was 254.6mm and K 0.0541 (monthly) assuming  $t_0$  as 0. The estimated sizes were 121.6 mm in first year, 185.1 mm in the second year and 218.3 mm in the third year (Fig. 6).

**Sex ratio**

Though there was not a regular pattern of dominance of one sex over the other, preponderance of males could be seen in most of the months in 1988 (Fig. 7). Chi-square value was not significant in 1987 and 1988 and significant only in 1989 (Table. 4). The percentage of females and males coming under 120 mm

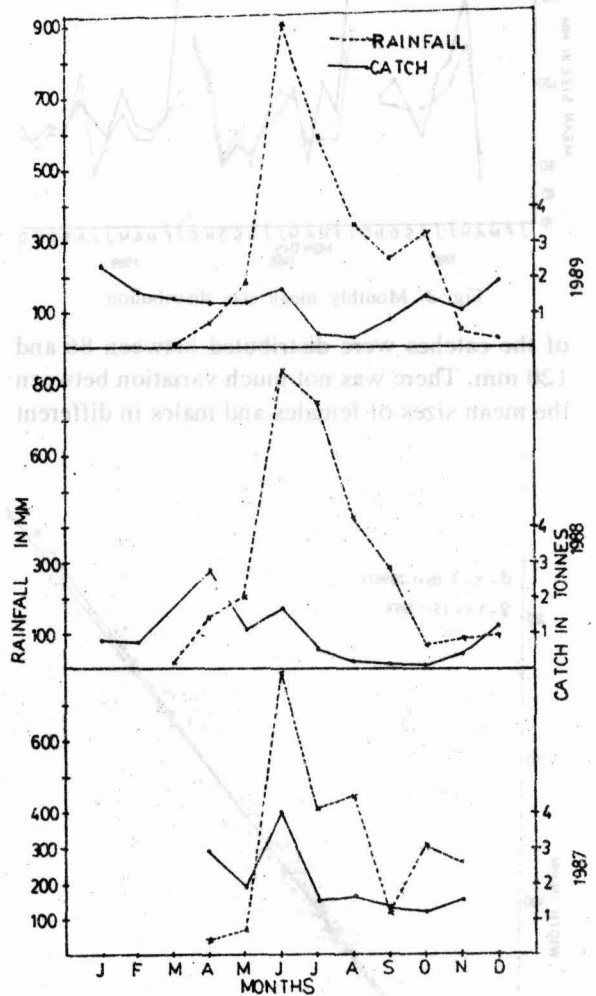


FIG. 8. Relationship between catch and rainfall

were 71 and 69 in 1987, 81 and 78 in 1988 and in 1989 it was 83 and 93 (Fig. 7).

**Maturity condition**

During the entire period of observation no berried crab was recorded from the estuary.

## MARKETING

*Scylla serrata* locally known as 'Puzhanjandu' has good demand in local market and as live crab in export market to Singapore. Crabs are also exported from the country in frozen and canned forms. With the increasing demand, the fishing activities are also intensified.

The chelipeds of each crab is tied together or tied against the body in order to avoid fighting among them. The live bigger ones are packed in bamboo baskets for export and sent to Madras by train and from there by flight to Singapore. While transporting them, no extra measures are taken to keep them alive as they are found to remain alive for more than five days out of water. The smaller ones and those with broken chelipeds are sold in the local markets at the rate of Rs. 13-15/-per kg.

## DISCUSSION

In the present study, the active fishing was observed during December-June and during the monsoon period the fishery was very poor due to the turbidity and heavy inflow of river water. Apart from this, the migratory breeding pattern may also play an important role in the

sparse availability. This is in contradiction to the observation by Devasia and Balakrishnan (1985) in Cochin backwater where the intensive fishing is during the monsoon (May-August).

In this study the catch was compared with rainfall of the respective months and could not point out a regular relationship between these two (Fig. 8) which is in conformity with the observations made by Srinivasagam and Raman (1985).

The size recorded in this study ranged from 46-215 mm and the largest crab had a width of 213 mm. This is the largest size recorded so far.  $L_{\infty}$  of this species is 254.6 mm which is comparatively larger than the maximum size observed in the fishery. It was found that the rate of growth is very high in the first year and from second year onwards it decreased. From the size and age arrived at, it could be seen that the fishery was composed of zero year class. No berried crabs were obtained from this estuary during the period of observation which indicate their possible migration to the nearby inshore waters for breeding purpose. The exploitation of under sized mud crabs from this estuarine system would affect the fishery, which needs fishery regulation to sustain the production level, as the resource available is limited.

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