AN ASSESSMENT OF MARINE PRAWN FISHERY RESOURCES OF KANYAKUMARI DISTRICT - SOUTH WEST COAST OF INDIA*

by

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ABSTRACT

The prawn fishery of Kanyakumari District which accounts for about 500 tonnes of prawns a year is exclusively constituted by large-sized first and second year classes of a single species of penaeid prawn - *Penaeus indicus*. The fishing season extends throughout the monsoon period when prawn fishery in other areas of west coast of India is inactive. The growth studies indicated a monthly growth rate of 3 mm in males and 5 mm in females. The recruitment to this fishery is apparently taking place from the fishing grounds off the Kerala coast.

INTRODUCTION

The recent developments in the exploitation of fishery resources in India have shown that the South west coast of India supports a very rich prawn fishery. The southern limit of this fishing area was generally considered to be Trivandrum, the areas further south being of different ecological situation. The coast line and sea bottom of this southern region are generally rocky and sandy with occasional patches of corals in the deeper regions. Practically no information was available regarding the indigenous prawn fishery of this region, but with the development of frozen prawn export trade in Kerala sizable quantities of large prawns started coming from here. The Central Marine Fisheries Research Institute therefore started a project to assess the prawn resources of this region in 1959. The results of this project are reported here.

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Kanyakumari District (Lat. between 8°5' and 8°20'N) is situated on the southern extremity of the Indian peninsula and has about 35 miles of coast line, extending from Kollencode to Cape Comorin, on the west coast. Altogether there are 27 fishing villages where prawn fishery exists at some time or other during the season (Fig. 1). No significant rivers join the sea in this part of the coast line. The Manakkudy lake situated about 8 miles north of Cape Comorin is small (about 1000 acres) and shallow and remains land-locked during major part of the year. The inshore sea where the fishing is carried out is relatively shallow with rocky and sandy patches; the 10 fathom contour being broader here than in the northern areas.

The project was designed to obtain correct estimates of the seasonal magnitude of prawn landings, methods of fishing, species composition of prawns and other biological aspects of the fishery. These data were collected from selected fishing villages employing random sampling techniques. Samples of prawns were drawn from the commercial catches and analysed from these centres on all days of observation. Length measurements of prawns were taken to the nearest millimetre from the tip of the rostrum to the tip of the telson.

FISHING METHODS AND SEASON

Fishing is essentially carried out in 2 to 7 fathoms areas with the help of indigenous gears and craft; catamarans of various sizes being the only craft employed. The principal gear in use is the "Thattu madi" a type of boat seine made of cotton twine and operated with the help of two catamarans. Besides this "Veechu valai" (cast net) and "Vala valai" (gill net) are also used occasionally in certain villages.

The fishing season generally commences with the onset of the South west monsoon in May-June and extends up to the end of the North east monsoon in September-October; the commencement and closure of the season being apparently associated with those of the monsoons. Within the region itself the fishing season begins and also ends earlier in the northern villages. The significance of this fishery is that it is carried out during monsoon when fishing activities all along the west coast are either stopped or very slack.

SPECIES EXPLOITED

The most noteworthy feature of the prawn fishery of this region is that it is exclusively constituted by a single species, namely, *Penaeus indicus* H. Milne Edwards, locally called "naaran". This is one of the largest sized species of Indian penaeids, particularly in demand from the freezing industry. Other species like *Penaeus monondon, Penaeus semisulcatus, Metapenaeus monoceros, Metapenaeus dobsoni* and *Parapenaeopsis stylifera* are found very rarely in the catches, although some of these form regular fishery in adjacent areas.

PRODUCTION AND TREND OF FISHERY

The overall yearly landings of the species amount to about 500 tonnes on an average. The estimated total landings of *P. indicus* during the 4 seasons in 1959 to 1962 are given in table I. While production in 1959 and 1961 was quite high that of 1962 was exceptionally poor. The 1962 season was also very brief lasting only for 3 months from June to August. In the adjacent Kerala coast also the fishery was poor during this season (George et al. in press).

TABLE I

SHOWING THE MONTHLY ESTIMATED LANDINGS OF *P. INDICUS* IN THE FISHERY OF KANYAKUMARI DISTRICT

Year	Month	Landings in Kg.
1959	May	338
	June	342,234
	July	189,455
	August	510
	September)	
	October)	
	November) no data	
	December)	163,308
		695,845
1960	May	27,992
	June	108,256
	July	95,355
	August	76,545
	September	64,121
	October	430
		372,699
1961	July	8,505
	August	363,474
	September	237,050
	October	42,383
	November	18,507
		669,919
1962	June	75,060
	July	102,263
	August	16,893
		194,216

In 1959 the fishery commenced by end of May and the catches were very high in June and July, but declined considerably in August. There was no data for September, October and November, but in December there was quite a good fishery which is quite unusual. Although the magnitude of the fishery was relatively poor, the 1960 season showed the same trend; the season lasting up to October. The fishing started about 2 months late in 1961, but the landings were quite high in August and September.

It is seen that the peak landings are always recorded in the second month after the commencement of the season and in that month alone approximately half the yearly landings are obtained in all the years. The production figures remained high in the third month also and thereafter the magnitude declined.

BIOLOGY

Growth and age composition

The prawns caught from this area had a size range of 130 mm to 195 mm. Length frequency polygons of males and females separately for the seasons 1959 and 1960 are shown in Fig. 2 and 3. In Fig. 2 it can be seen that in the case of male the dominant mode shifted from the length group 146-150 mm in June to 161-165 mm in December, showing a growth of 15 mm during a period of 6 months. In 1960 the data for male (Fig. 3) showed that the mode shifted from 146-150 mm size group in June to 161-165 mm group in October, indicating a growth of 15 mm during a period of 4 months. From these the average growth rate per month worked out to 3 mm.

In the case of females in 1959 (Fig. 2) the prominent mode shifted from 146-150 mm group in June to 161-165 mm size group in August so that the growth during 2 months was 15 mm. A secondary mode at 151-155 mm in August can be traced to the mode in December at 161-165 mm, showing a growth of 10 mm during 4 months. In the next years data also 2 modes could be traced (Fig. 3). The first mode at size group 146-150 mm in June was noticed to shift to 156-160 mm length group by next month, i.e. a growth of 10 mm during 1 month. Another mode in July at 161-165 mm group shifted to 176-180 mm group by October, thereby indicating a growth of 15 mm in 3 months duration. The average growth from these worked out to 5 mm per month. Thus a differential growth rate is exhibited in males and females, the latter showing a higher growth rate than the former, as is common with penaeid prawns.

George et al. (in press) records 3 year classes for the species in the fishery at Cochin. Taking their age groups into consideration, it is mostly the late 1st year classes passing on to the 2nd year classes which sustain the fishery of this area. It is this fact which should make the fishery more attractive to the shrimp freezers.

Sex ratio and maturity

In all the months of observation, with the exception of September 1960, the percentage of males remained higher than that of females. On the contrary in the inshore fishery of the Kerala coast Menon (1957) reports the dominance of females of the species in sizes above 150 mm.

Maturity conditions of the gonads of females were recorded. Immature individuals were practically absent while the developing stages like 'early maturing' and 'late maturing' predominated in the catches and were found throughout the period of observation. Fully 'mature' stages were more common during the peak of the season and 'spent' individuals were poorly represented in the catches. The occurrence of maturing and mature stages in large numbers indicate the possibility of the species breeding in these waters or in the vicinity, particularly in July-August.

DISCUSSION

The prawn fishery of this area is fully supported by large sized *P. indicus* in advanced stages of maturity. The total absence of juveniles in the fishery and the minimum size of prawns observed (130 mm) clearly establishes the fact that all these prawns are getting recruited into this fishery from elsewhere. From where exactly are these adult prawns entering these grounds is a question to be considered in detail. The available information about the species shows that they spend their juvenile stages in estuaries and move out into the sea when they attain a size of 120 to 130 mm (Panikkar & Menon 1955; Menon 1957; Menon & Raman 1961; George 1961, 1962 a and b; and George et al. in press). There are no such vast estuaries in this region sufficiently large to form a nursery ground for the juveniles of the species. The small size of the Manakkudy lake referred to earlier and the fact that it remains land-locked during major part of the year excludes the possibility of this lake forming an exclusive nursery ground to support a fishery of this magnitude, although juveniles of the species are obtained from this lake in small numbers. Hence the main nursery ground could only be elsewhere. In the Kerala coast where estuaries forming the nursery grounds for the species are close by, young adults of about 100 mm to 120 mm lengths are often obtained from marine catches as well. The absence of these sizes in the fishery here not only strengthens the contention that these large prawns contributing to this fishery are immigrants to the area but also indicates that they are not directly drawn from the nursery grounds. Thus the major recruitment of the species to this fishery could be taking place only from the adjacent areas having the advantage of extensive nursery grounds in the vicinity. The only possible source from where such a movement can take place is from the northern region, viz. the Kerala coast where the species exists as a fishery. This is further strengthened by the fact that the fluctuations in the landings observed in the Kerala coast (George et al., in press) are reflected here also. The source of recruitment, therefore, seems to be from the grounds off Kerala coast where the stock gets replenished from the extensive estuaries.

While recording the preponderance of males in the sex ratio of the species from Kerala coast Menon (1957) suspected sex segregated movement in larger forms. George & Rao (1965) established statistically significant segregation of sexes in the species and attributed the same to movements in the trawl fishery grounds off Kerala. The sex ratio observed here indicates preponderance of females. Could it be that these sex segregated movements are taking place between these two grounds? The mark recovery experiments being planned to be undertaken shortly may throw more light on this problem.

Prospects

The condition of the fishery as it exists now suggests possibilities of further development by increased exploitation. Any such development would be of immense benefit to the frozen prawn industry as increased catches from this source would provide them with large sized prawns during monsoon when raw materials are scarce for processing. Plans for development of this fishery will necessarily have to take stock of the existing conditions. The intermittent patches of rocky sea bottom make it difficult for the machanised trawlers to operate here. Therefore the development of this fishery can only be achieved through increase of efficiency and quantum of the existing fishing units.

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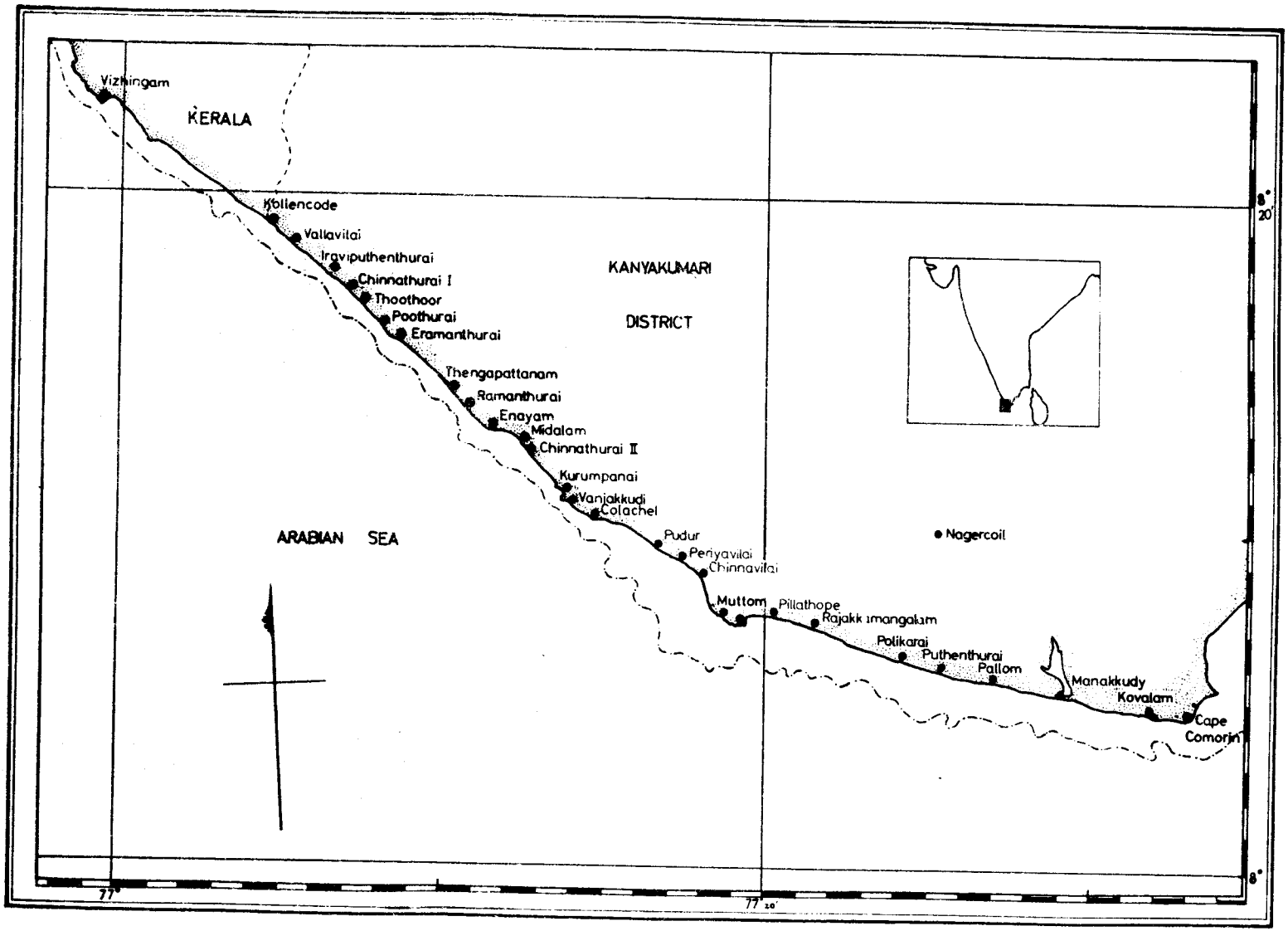

Fig. 1. Prawn fishing villages in Kanyakumari District.

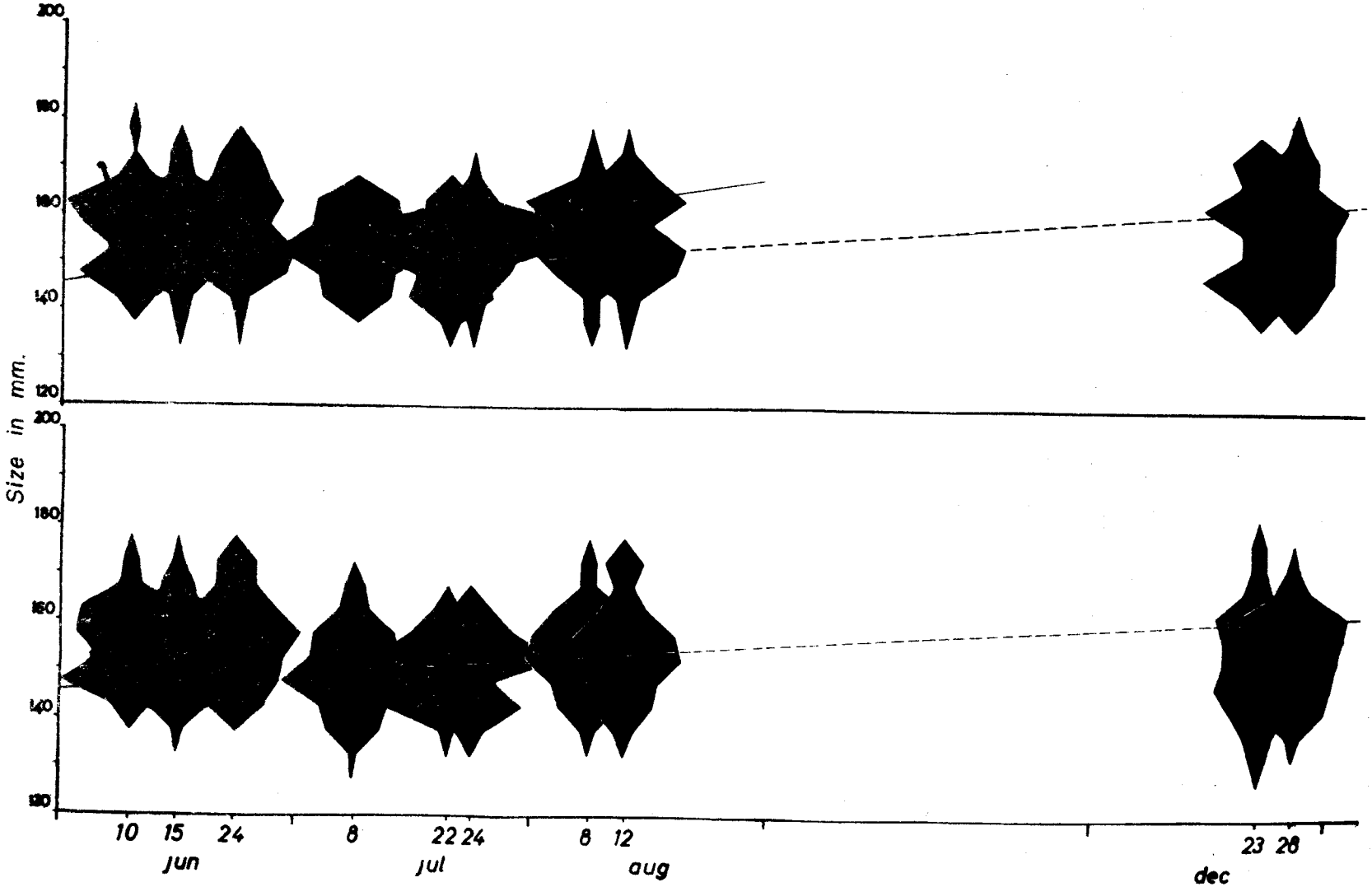

Fig. 2. Length frequency distribution of P. indicus - 1959.

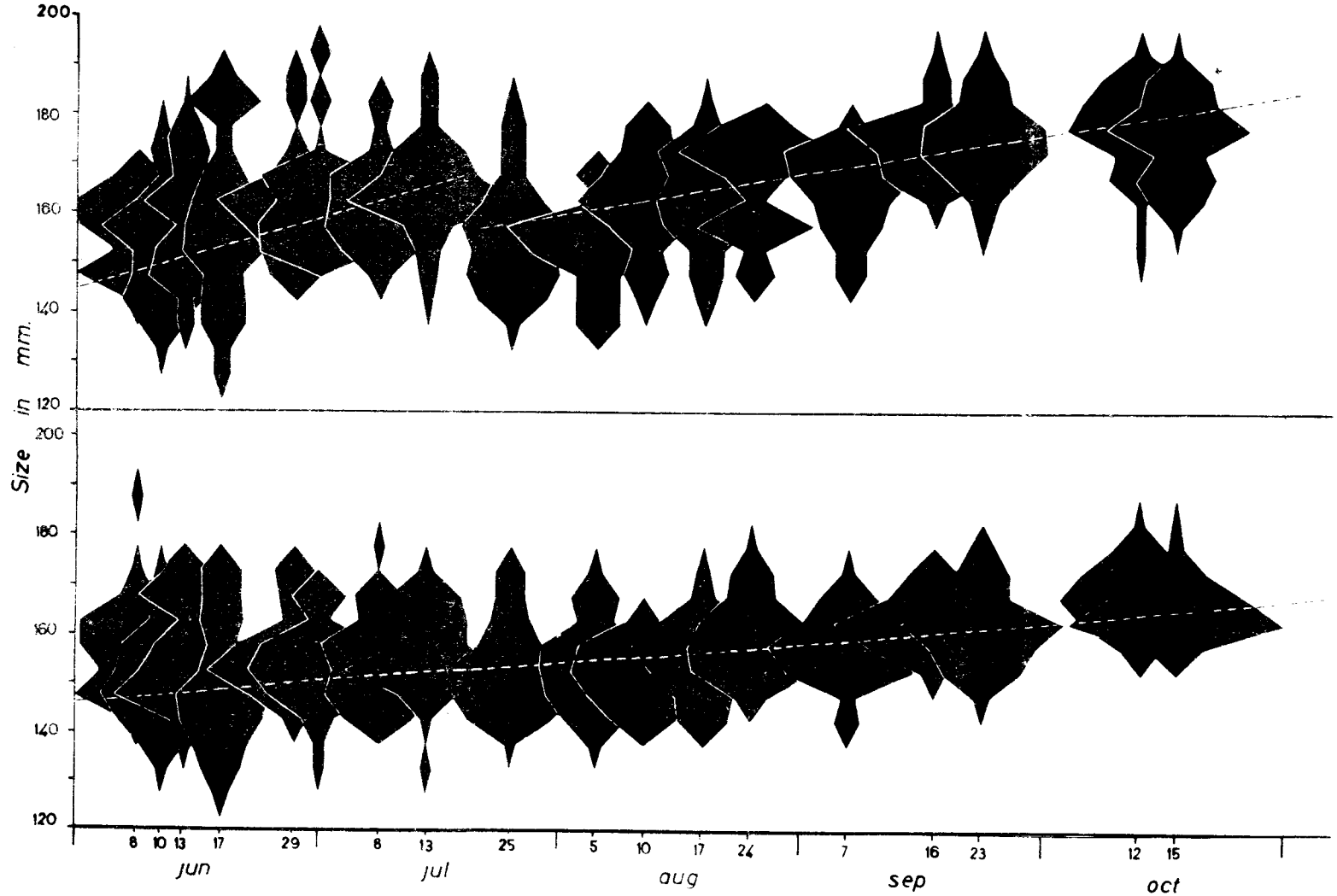

Fig. 3. Length frequency distribution of P. indicus - 1960.