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## Note

# Observations on the seasonal shrimp fishery off Periathalai in Gulf of Mannar

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**Abstract**

The seasonal shrimp fishery off Periathalai in the Gulf of Mannar was studied for a period of three years from 2000 to 2002 and the results obtained were compared with those of the earlier observations carried out by the authors during the years 1985 - 1987. The most striking difference in the fishery between the two periods was found to be in the species composition. From the exclusive occurrence of a single species of shrimp *viz., Penaeus indicus* during the previous investigation one more commercially important shrimp *P.semisulcatus* was observed to contribute to the fishery significantly during certain months. The annual estimated landings fluctuated widely from 9 t to 213 t in the present observation as against a more or less uniform trend, with only marginal fluctuation ranging between 96 t to 107 t, recorded earlier. Mature and spent-recovering females constituted significant proportions during both the observations.

In the Gulf of Mannar, between Tuticorin and Periathalai, the shrimp resources are exploited mainly by three different types of gears *viz.*, trawl net in the mechanized sector and gillnet and *thallumadi* in the artisanal sector. Trawlers operate all along the coast extending from Tuticorin to Ovari in the south in the depth range of 20 to 60 m keeping their base at Tuticorin Fishing Harbour and Veerapandianpattinam. Apart from the operation of trawlnets, shrimp gillnets are operated all along the coast by the traditional fishermen of the coastal fishing villages. Periathalai, which is about 70 km away from Tuticorin, is one of such fishing villages where extensive exploitation of the shrimps is going on for the past several years. The exploitation of shrimp resources off Periathalai during 1985 – 1987 has been reported by Rajamani and Manickaraja (1990). Their studies have clearly indicated that the resources exploited along Periathalai coast belonged mostly to the populations that migrate from southwest coast thus confirming the views of the earlier workers (Anon, 1982; Manissery and Manimaran, 1981). In order to study the changes that might have taken place in the fishery, further observations were carried out for a period of three years from 2000 to 2002 after a gap of more than a decade and the results obtained in both the investigations on various aspects of the fishery were compared, and presented here along with certain biological aspects of *Penaeus indicus.*

### Materials and methods

The shrimp landing centre at Periathalai was normally visited weekly once and data on various aspects of the fishery *viz.*, number of units operated, time of operation, catch landed by the units were collected. The craft used for the fishery during the years 2000 and 2001 was catamaran fitted with outboard motors. However, in 2002, a total of 35 fibre glass boats of 28 – 30 feet length fitted with outboard motors were introduced for fishing. The gear used for the fishing operation was gillnet, the description of which has been given by Joel and Ebenezer (1985). The fishing was carried out approximately 5 km off Periathalai at a depth of about 20 m. The shrimp catches landed during the month was estimated following the multistage stratified sampling method (Alagaraja, 1984).

The catch composition in the sampling units was observed and different species of shrimps that supported the fishery were recorded. Detailed biological observations *viz*., length, sex, maturity stages of the dominant species, *Penaeus indicus* were made in the landing centre itself on each observation day. For studying the maturity stages of the shrimps landed, they were classified as immature, early maturing, late mature, mature and spent-recovering based on the colour and size of the gonads following the methods suggested by Rao (1967).

### Results and discussion

***Trend in the Fishery***: During the three year period (2000 to 2002) of study the estimated catch of shrimps landed by the gillnets was 9t, 213t and 67t respectively indicating wide fluctuations. On the other hand, the total number of units operated steadily increased from 18,710 in 2000 to 40,719 in 2002. During 2000 the fishing operation was carried out only for five months from June to October. But during the subsequent two years the fishing operations extended from April to October and from April to December respectively.

The landing was poor throughout the season during the year 2000 with the monthly estimated catch fluctuating between 160 kg in September to 4 t in July. The average catch rate recorded for the year was very poor (0.2 kg). The fishery improved in 2001 with the monthly landing exceeding 30 t from June to August with the maximum landing of 133 t in July. The catch rate was good during the year exceeding 4 kg from April to August with an average catch rate of 10 kg. During 2002, the estimated catch exceeded 1 t during all the months with maximum landing of 27 t in September and the average annual catch rate was 0.6 kg.

***Species composition***: The gillnet catch landed at Periathalai consisted of three species of shrimps *viz.*, *Penaeus indicus*, *P. semisulcatus* and *P. monodon*. *P. indicus* was the dominant species during all the three years with its composition ranging from 76 % to 99 % (Fig. 1). In the year 2000, *P. semisulcatus* constituted 24% and was recorded in the landings in sizeable proportions in June and October forming 28% and 35% respectively. During the year 2001 the composition of *P. semisulcatus* was moderate (Fig. 2). *P. monodon* was recorded in May and October during 2002 and constituted an insignificant proportion of the annual shrimp catch (Fig.2).

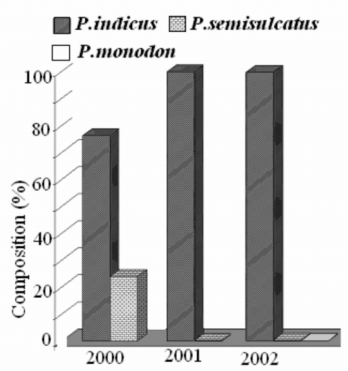


Fig. 1. Annual species composition of prawns landed by gillnets at Periathalai during the years 2000 – '02

***Size-frequency distribution****: P. indicus* showed a size rage of 113 mm to 188 mm (dominant size groups 151 mm to 175 mm) compared to 113 mm to 233 mm (dominant size groups 151 mm to 195 mm) in females (Figs. 3, 4). Shrimps of more than 200 mm in total length constituted 13%, 1% and 12% of the female population landed during 2000 to 2002 respectively.

An analysis of the month-wise size distributions of both sexes clearly indicated that as the fishing season progressed the smaller size groups gradually declined and largest shrimps contributed to the fishery. This trend was more pronounced in the case of females and those measuring less than 130 mm were virtually absent after August during all the three year period of observation.

***Sex ratio and maturity stages***: In *P. indicus*, females dominated during all the three years with their monthly percentage composition ranging from 51% to 71%, 42 % to 67% and from 43% to 85% in the year 2000, 2001 and 2002 respectively. Only in September during 2001 and July during 2002 males outnumbered females. Immature females were recorded in the catch only in June during 2000 constituting 21% and in April, May and July in 2001 forming 16%, 40% and 2% respectively. Mature and spent-recovering females were found to dominate the catch during most of the months in the three-year period of observation (Fig. 5).

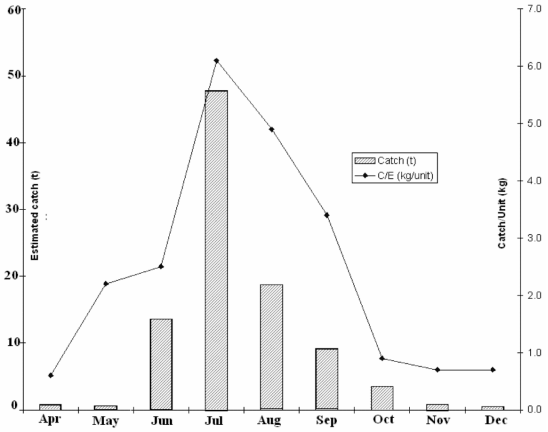


Fig. 2. Month-wise average landings of *P.indicus* by gillnets at Periathalai during the years 2000- '02

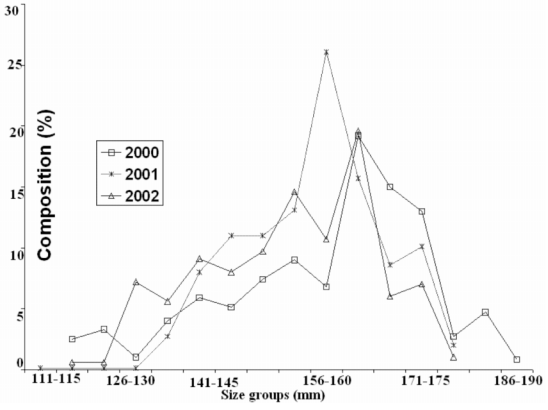


Fig. 3. Annual length-frequency distribution of males of *P.indicus* landed by gillnets at Periathalai during the years 2002-'02

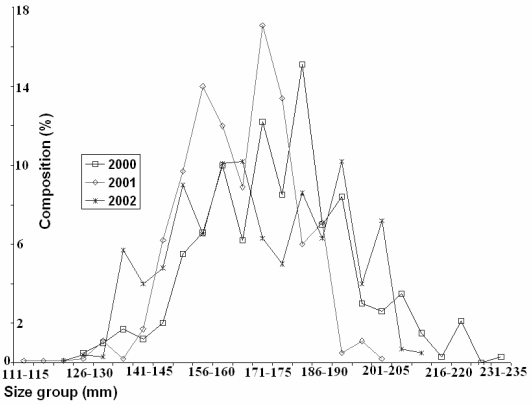


Fig. 4. Annual length-frequency distribution in the females *(P.indicus)* landed by gill nets at Periathalai during the years 2002- '02

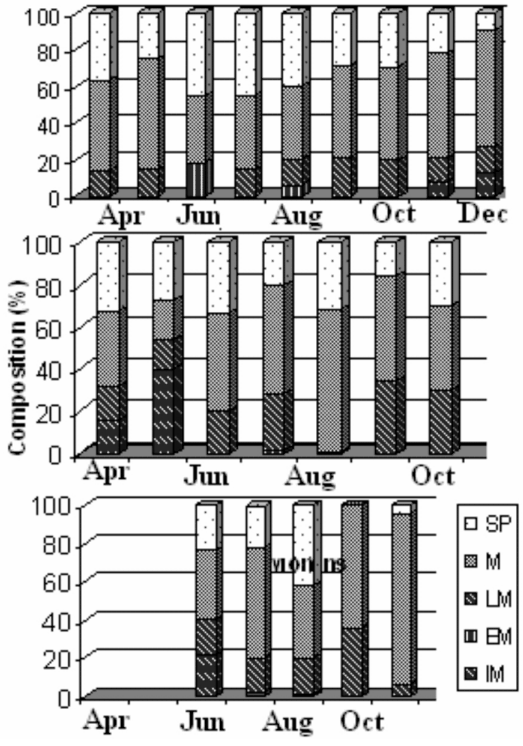


Fig. 5. Maturity stages in *P.indicus* landed by gillnets at Periathalai during the years 2000- '02. (IM – Immature; EM – Early maturing; LM – Late mature

***Price structure***: The price of the shrimps landed at Periathalai during the three-year period did not show much variation and were in the order of Rs 300-Rs 600, Rs 250-Rs 400 and Rs 250-Rs 400/kg. The decline in the price during the later two years may be due to a slump in the export market.

**Discussion**

As compared to the estimated catch and effort of shrimps reported by Rajamani and Manickaraja, (1990) at Periathalai during 1985 to 1987, marked changes are noticed in certain aspects of the fishery compared to present study. Motorization of the crafts has been completed, but in spite of this there was no remarkable increase in the landing except the catches recorded during the year 2001. During the year 2000 and 2002 the landing was less than what was recorded during the earlier study.

The second important difference noticed in the two observations was in the species composition of shrimps landed. From the exclusive occurrence of *P.indicus* during 1985-1987 the landings observed during the present investigation showed that *P. semisulcatus* constituted as much as 24% during 2000. The occurrence of this species in the ground in large numbers during October-November coinciding with the north-east monsoon in the region suggests a possible migration of the stock to relatively deeper waters. Lalitha Devi (1985) has reported that the gillnet catches off Kakinada consisted of eight species of penaeid shrimps dominated by *P.indicus* which may be due to the variation in the mesh size of the nets used in the two regions.

No remarkable difference could be observed in the size composition of *P. indicus* landed at Periathalai during the two different periods. The overall size ranges of males and females recorded during the years 1985-1987 were 120-198 mm and 123-223 mm respectively as against the size range of 113-188 mm and 113-233 mm recorded during the present investigation. Rajamani and Manickaraja (1996) have observed that the gill net catches landed at Tuticorin North Landing Centre consisted of *P. indicus* in the size range of 98-173 mm and 98-198 mm only in male and female respectively, thus indicating clearly that the gillnets operated off Periathalai capture larger shrimps.

Mature and spent-recovering females were found to dominate the catch of *P. indicus* landed at Periathalai during both the periods as against significant proportion of immature females in gillnets operated off Tuticorin (Rajamanai and Manickaraja, 2000). The high intensity of mature and spent-recovering females exploited off Periathalai further strengthens the earlier views that the stock migrates from the southwest coast to southeast coast during the southwest monsoon mainly for spawning as opined earlier by Manissery and Manimaran (1981) and Rajamani and Manickaraja (1990).

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