

A COMPARATIVE STUDY OF PRAWN SEED RESOURCES OF ESTUARIES IN RAMNAD DISTRICT, TAMIL NADU*

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ABSTRACT

The availability of prawn seeds in Kottakkarai, Uppar, Vaigai and Kottakkudy Estuaries were studied during 1986-87. The prawn seed survey was conducted by operating velon drag nets in different biotopes. Suitable site for the collections have also been investigated. Seeds of *Penaeus indicus*, *Penaeus merguensis*, *Metapenaeus monoceros*, *Metapenaeus dobsoni*, *Penaeus semisulcatus* and *Penaeus monodon* were encountered in these estuaries in the order of abundance. Among these estuaries, Kottakkudy and Uppar have a rich potential for many culturable species of prawn seeds. Further information on the seasonal and spatial distribution pattern of the prawn seeds in relation to salinity and temperature are presented and discussed.

INTRODUCTION

RECENTLY farming of prawns in India is recognised as the most promising means of increasing prawn production and consequently there is a great demand for the seeds of cultivable species of prawns. Development of prawn farming in the coastal belt is not only to produce prawns, but also to generate rural wealth, employment and ancillary fishing industries. Ramnad District has about 1500 hectares of low lying area along the coastline which could be used for farming of prawns. Information on the availability of prawn juvenile resources in the estuaries is necessary as an aid for small farmers who can utilise their own labour to collect the seeds. Information is lacking on the naturally available seed resources of cultivable species of prawns in the estuaries in

Ramnad District. Therefore investigations were made on the seed resources of commercially important species of prawns in Ramnad District, Tamilnadu during 1986-87.

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THE STUDY AREA

Ramnad District has a coastline of 266 km with 7 estuaries and 2 backwaters. Among these, Kottakkarai (Karankadu), Uppar (Thiruppalakudy), Vaigai (Athangarai) and Kottakkudy (Sethukkarai) Estuaries were mainly taken into account for prawn seed investigation. They are located at 09°58' N and 78° 90'E; 09°05' N and 78°95'E and 9°15 N and 79°00' E in the Palk Bay and 09°58'N and 78°80' E in the Gulf of Mannar respectively. They are very shallow and their depth varied from 0.5

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to 2.5 m. Palk Bay near these estuaries is also very shallow and calm and provides abundant aquatic weeds whereas in the Gulf of Mannar surf is heavy. The bar mouth of these estuaries is open throughout the year allowing free influx of tidal water the influence of which is felt upto 1.5 to 5.0 km upstream. The tidal amplitude ranged from 0.3 to 0.6 m. Rainfall was very poor in this area. During the northeast monsoon (October to December) there was influx of rainwater from land drainage for a very short period.

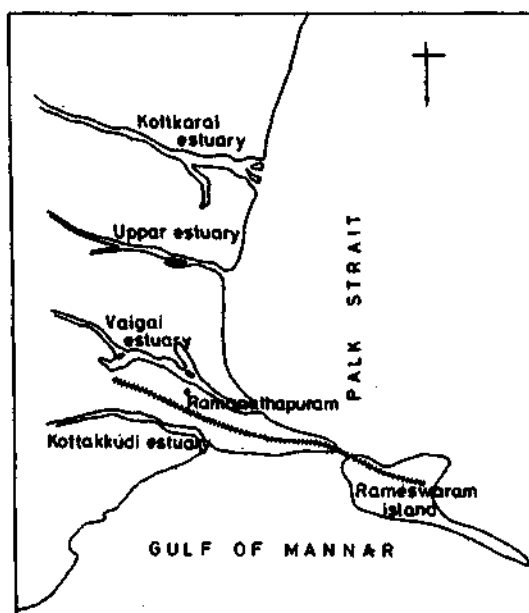


Fig. 1. Estuaries in Ramnad District showing collection places.

MATERIALS AND METHODS

Regular fortnightly collections were made in all these estuaries from July 1986 to June 1987 (Fig. 1). Velon screen dragnet (mesh 1/16) of 3 metres length and one meter width was used for collection. The net was operated near the algal beds, submerged weeds and plants and along the shallow margin and pools. When dragging the net by two person, the

algal flora and submerged plants were strongly agitated by another person. Bunches of plants were also tied to the poles and allowed to float near the margin for the collection of *Penaeus monodon*. Collections were made only during low tide. Seeds were collected for one hour

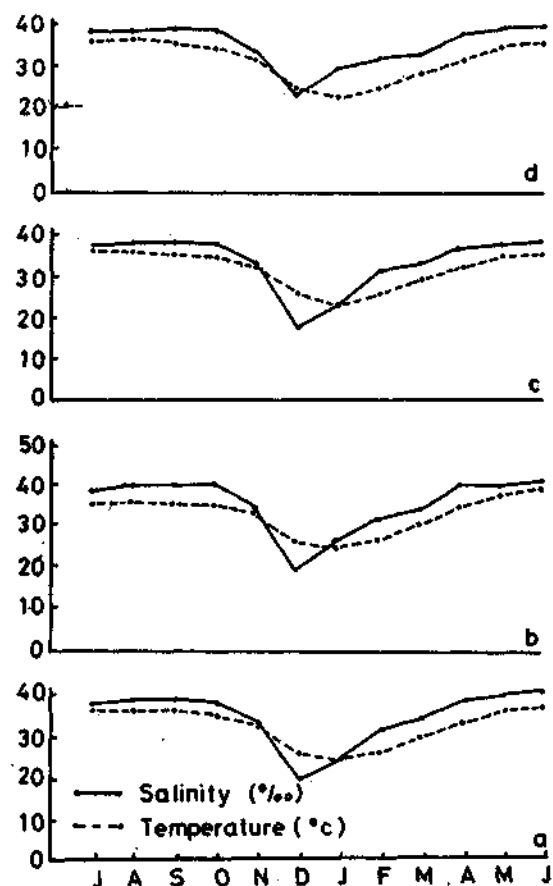


Fig. 2. Seasonal variations in salinity and temperature at four Estuaries - a Kottakarai, b. Uppar, c. Vaigai and d. Kottakkuddy.

duration. The seeds of the different species were segregated using the colour and other identifying characters. The commercially important prawns were numerically estimated and the quality prawn seeds were stocked in the Government model demonstration farms in Ramnad District.

RESULTS AND DISCUSSION

Hydrography

The hydrographical parameters such as salinity and temperature during the seed collections were estimated in all the above estuaries (Fig. 2). The surface water temperature

Species composition

The calculated percentage composition of the commercially important prawn seeds in these estuaries during 1986-87 is given in Table 1. Although juveniles of more than six species of penaeid prawns were recorded in these estuarine biotopes, emphasis is given in this

TABLE 1. Percentage composition of commercially important prawns during 1986-87

Species	Estuary			
	Kottakkarai	Upper	Vaigai	Kottakkudy
<i>Penaeus indicus</i>	44.3	46.2	49.8	50.3
<i>Penaeus semisulcatus</i>	17.8	11.4	16.2	13.8
<i>Penaeus merguensis</i>	14.2	18.3	11.4	14.6
<i>Penaeus monodon</i>	1.5	1.7	0.9	1.2
<i>Metapenaeus monoceros</i>	16.6	16.3	17.9	15.4
<i>Metapenaeus dobsoni</i>	5.6	6.1	3.8	4.7

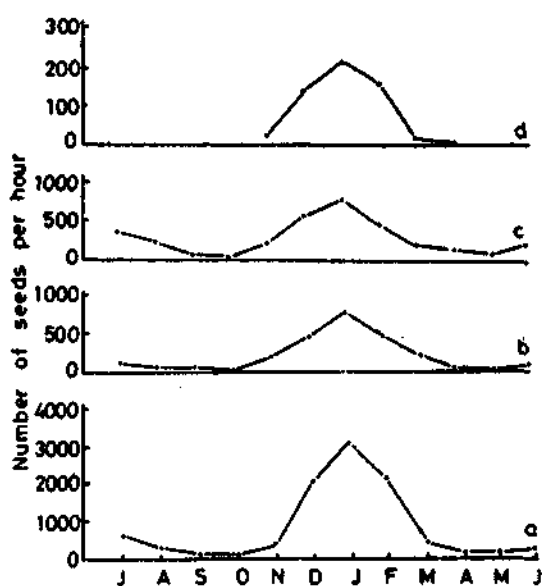


Fig. 3. Occurrence of prawn seeds in Kottakkarai Estuary:
a. *Penaeus indicus* b. *Penaeus merguensis*,
c. *Penaeus semisulcatus* and *Penaeus monodon*.

ranged from 24.0 to 36.9°C. The minima in temperature were recorded during December — January and the maxima were associated with summer. A minimum salinity value of 18.6‰ was recorded during December and a maximum value of 41‰ in June.

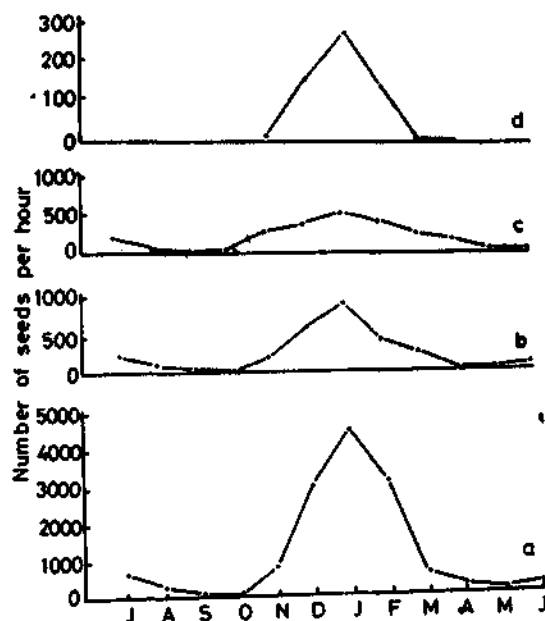


Fig. 4. Occurrence of prawn seeds at Upper Estuary :
a. *Penaeus indicus* b. *Penaeus merguensis*,
c. *Penaeus semisulcatus* and *Penaeus monodon*.

paper on the fast growing and commercially important species which were *Penaeus indicus*, *Penaeus semisulcatus*, *Penaeus merguensis* and *Penaeus monodon* in the order of abundance.

Seasonal abundance and spatial distribution

The seasonal abundance of the different species of prawn seeds collected in the different estuarine systems are given in Fig. 3-6.

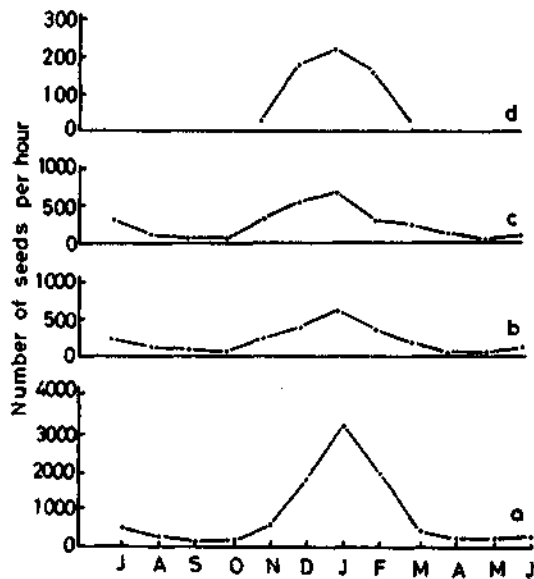


Fig. 5. Occurrence of prawn seeds in Vaigai Estuary :
a. *Penaeus indicus* b. *Penaeus merguensis*
c. *Penaeus semisulcatus* and *Penaeus monodon*.

Penaeus indicus was the most common species in all the estuaries, contributing 44.3 to 50.3% of the total catches. More number of *Penaeus indicus* seeds was recorded after 15 to 20 days of adequate rainfall in the shallow margins and pools with soft soil bottom. The abundance of seeds per hour of drag net operation varied from month to month. Maximum densities of 3045, 4465, 3175 and 4340 were collected during January in the respective estuaries and the density was less than 100 during May, September and October. The predominant size group was 15 to 30 mm during December and January.

The seeds of *Penaeus merguensis* were also recorded alongwith that of *Penaeus indicus* throughout the year and the nature of its

occurrence was more or less similar to *Penaeus indicus*. Considerable number of seeds of this species was obtained during December and January. Collection of *Penaeus merguensis* seed per hour of dragging ranged from 10 to 865 in all the estuaries. Observation reveals that *Penaeus indicus* and *Penaeus merguensis* have

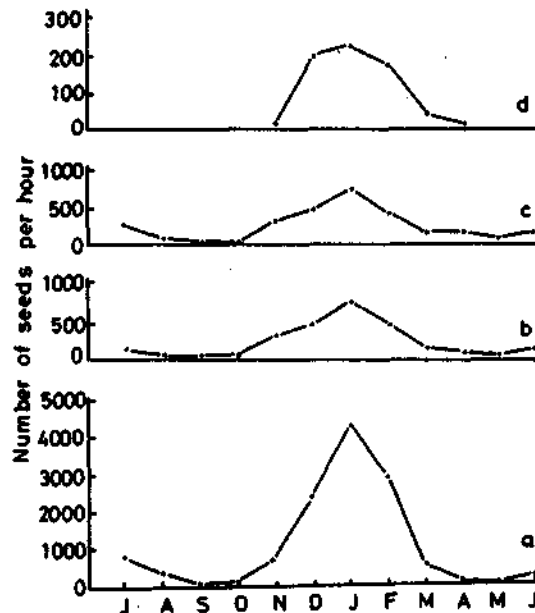


Fig. 6. Occurrence of prawn seeds in Kottakudy Estuary;
a. *Penaeus indicus* b. *Penaeus merguensis*
c. *Penaeus semisulcatus* and *Penaeus monodon*.

an overlapping distribution in these estuaries. Identification of *Penaeus merguensis* juveniles in the field was based on their more whitish body, high rostral crest and reddish colour of antennal flagella.

The seeds of *Penaeus semisulcatus* were plenty in the marine grass of Palk Bay near the estuaries and their juveniles were caught by the drag net. Good number of *Penaeus semisulcatus* seeds were collected where the algal flora and submerged mangrove vegetations were more along the margin of these estuaries. There was no drastic change in the salinity

throughout the collection of this species. The peak period was in December and January and the abundance per hour of dragging ranged from 52 to 765. The predominant size group was 20 to 40 mm. Due to its green colour and association with aquatic weeds it is locally called in Tamil as "thazhai erral". Due to the high price of this species, the fishermen along the Palk Bay fished intensively the juveniles of *Penaeus semisulcatus* throughout the year and earn a sizable income. This is however an alarming trend resulting in the depletion of natural stocks of *Penaeus semisulcatus* juveniles.

Penaeus monodon seeds were collected mainly from the marginal weeds and from the bunches of plants tied to the poles along the shallow bottom of the creeks. The seeds of *Penaeus monodon* were found clinging to the weeds. Maximum number of 295 per hour were recorded in December and January. It was completely absent in the rest of the period which may be due to the higher salinities of these estuaries. The data on the catch (per hour) of these commercially important prawn seeds are depicted in Fig. 3-6.

Ramnad District is bestowed with a number of fertile estuaries and backwaters which could be utilized for developing prawn farms. The rivers in the district are seasonal. The freshwater influx is also very low for a short period due to poor rainfall. Except in the monsoon period, high temperature and salinity prevail in these estuaries due to shallow and poor tidal amplitude. Prawn seed ingressión was found to be maximum during December and January and poor in other months. The distribution and abundance of *Penaeus indicus* observed during the present study agrees with the report of Bose *et al.* (1980), Bose and Venkatesan (1982) and Sambandam *et al.*

(1982). Appreciable numbers of *Penaeus monodon* seed were collected in Kottakkudy, Uppar and Kottakkarai where macro vegetation and debris were more. Similarly *Penaeus semisulcatus* seed were also recorded more in the mangrove vegetation and in the algal beds. The preference for weeds by *Penaeus semisulcatus* was reported in Pulicat Lake (Gobinathan, 1978), Vellar Estuary (Subramaniyam *et al.*, 1980; Sambandam *et al.*, 1982) and Marakanam Estuary (Bose and Venkatesan, 1982).

During the period of study the salinity and the rainfall were found to be the major environmental factors influencing the ingressión of penaeid prawn juveniles in the estuarine biotopes. Earlier studies have reported that *Penaeus indicus* and *Penaeus merguensis* are able to tolerate wide range of salinity. In this study ingressión of *Penaeus monodon* seed was more in areas of lower salinities and the species was absent when higher salinities prevailed in the estuaries. On the other hand *Penaeus semisulcatus* was associated with areas where the salinity showed narrow fluctuations.

At present prawn culture is being carried out in 15 hectares by the Co-operative prawn farming society and the Department of Fisheries. For intensive prawn culture practices in 15 hectares of area, the seed requirement will be about 15 lakhs at the rate of 50,000 Nos/hectare for two crops per year. With the naturally available seeds stocking can be done only for one crop during December to March. If hatchery produced seeds are made available, there is a possibility for taking 2 crops in a year. Further as favourable salinity prevails in these estuarine areas, culture of *Penaeus indicus* and *Penaeus semisulcatus* can be undertaken. Setting up of prawn hatchery in the vicinity of this area is considered indispensable in order to promote prawn farming in this area.

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