

**OBSERVATIONS ON THE RECRUITMENT AND SEASONAL ABUNDANCE  
OF POSTLARVAE OF *PENAEUS MONODON* FABRICIUS AND  
*PENAEUS INDICUS* H. MILNE EDWARDS IN THE BRACKISHWATER  
CREEKS OF MACHILIPATNAM, ANDHRA PRADESH, SOUTH INDIA**

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**ABSTRACT**

The recruitment and seasonal abundance of tiger prawn *Penaeus monodon* and white prawn *Penaeus indicus* seeds were studied by operating shooting net during spring high tides. The recruitment in terms of catch/hr/net was estimated for both the species. Seasonal availability of metapenaeids and predatory fish seeds were also studied, as they are treated as competitors and predators respectively.

*P. monodon* seed was observed from July to December and *P. indicus* from April to May and July to November. The season for recruitment of metapenaeid postlarvae was from July to November. The seeds of predatory fishes like *Lates calcarifer*, *Polynemus* sp., *Megalops* sp., *Elops* sp., *Therapon* sp. and eels were observed in the shooting net collection during July to November.

The study reveals that there is a tremendous potential for collecting commercially important penaeid prawn postlarvae in and around Machilipatnam creeks which could supply to the just developing new brackishwater prawn farms in Andhra Pradesh and neighbouring maritime states. Gears like hand net and scoop net have proved to be best suited for the collecting of prawn postlarvae and juveniles.

**INTRODUCTION**

IN VIEW of the increasing demand for shrimps in the international market, many farmers in recent years have come forward to take up shrimp farming in the brackishwater areas of the maritime states of India, particularly in Andhra Pradesh. The success of shrimp culture depends on the availability of shrimp seed at appropriate time. Pending establishment of full-fledged hatcheries, a prawn farmer still has to rely upon the naturally available seeds for his culture operation. A detailed study on the availability and abundance of fast

growing species like *Penaeus* in different estuaries and backwaters of India will go a long way to help the prawn farmers in meeting the seed requirement. Earlier studies on the availability of prawn seed, particularly in Andhra Pradesh relate to the finding of Subrahmanyam and Ganapathy (1971) in Godavari estuarine systems and Babu and Babu (1986) in Upputeru Estuary. The present study covers the seed availability of tiger prawn *Penaeus monodon* Fabricius and *P. indicus* H. Milne Edwards in the brackishwater creeks of Machilipatnam during 1982-84 and the results are presented in the following account.

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#### MATERIAL AND METHODS

Machilipatnam a coastal town located on the east coast of India, has an extensive brackish-water area in which many creeks are being influenced by the tidal influx of sea water from Bay of Bengal. Among other small creeks and canals, Pedapatnam Creek and Thallapalam Creek are the most prominent creeks in Machilipatnam area which form a part of the drainage system of Krishna River. The diurnal tidal fluctuations in these creeks more or less coincide with the local tidal fluctuations of Bay of Bengal. However, the influence of spring high tides is prominent. Hence, sampling was carried out once in a fortnight during spring high tides.

A Midnapore-type standard spawn collection net (nylon shooting net) (Jhingran *et al.*, 1973) was used for collection of postlarvae. The nets were fixed across the flow in these two creeks during the spring high tides of every month (both full-moon and new-moon phases) and postlarvae were collected by filtering maximum of flowing water.

In Pedapatnam creek, collections were made for 173.3 hrs distributed over 55 days and in Thallapalam creek for 195.15 hrs in a span of 69 days during the period from August, 1982 to December 1984.

The postlarvae of *P. monodon* and *P. indicus* were identified, segregated and counted. The average catch/hr/net was estimated for each operation and the monthly average of catch/hr/net was estimated to find out seasonal abundance. The quantitative representation of metapenaeid species and qualitative representation of predatory fish seed were also recorded simultaneously.

The hydrological data like surface water temperature, salinity, pH and dissolved oxygen were recorded at the time of collection. Shooting net could not be operated in Tallapalam creek during August and September, 1983 and September, 1984 due to heavy floods and cyclone.

#### RESULTS

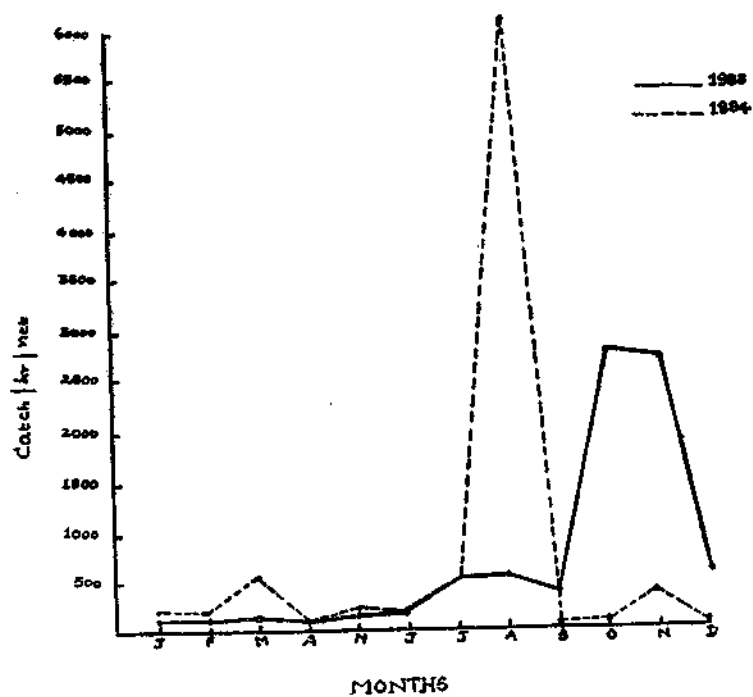
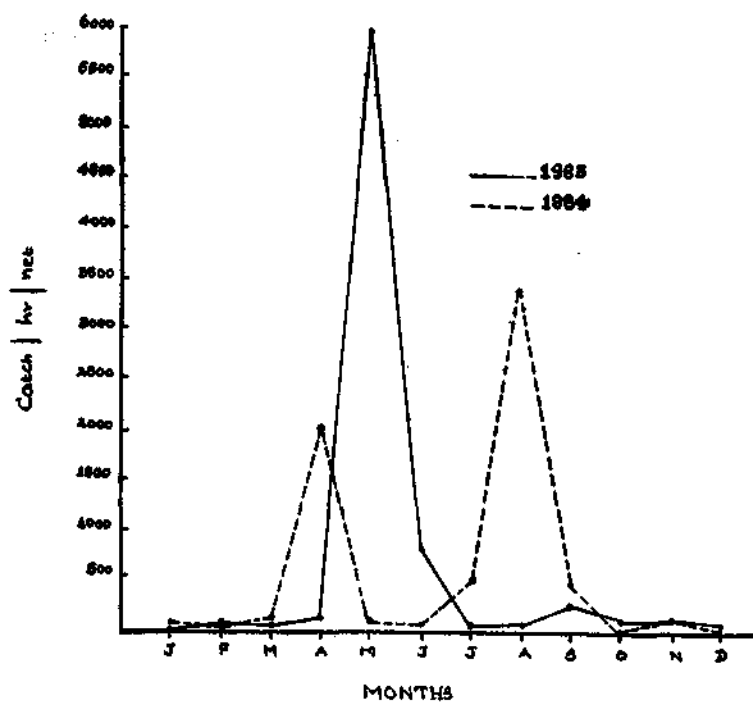
The hydrological data collected at two places is given in Table 1. The salinity of the water decreased to 1.0 ppt in Thallapalam creek and 4.0 ppt in Pedapatnam creek during rainy season due to heavy influx of fresh water. Higher salinity (34 ppt) was recorded during summer months.

TABLE 1. Hydrological variations

Parameter	Tallapalem Creek		Pedapatnam Creek	
	1983	1984	1983	1984
Surface water Temp. (°C)	.. 22.0—32.0	22.0—31.8	19.0—32.0	19.0—31.6
Salinity (ppt)	.. 1.0—33.8	7.6—33.6	4.0—32.8	5.6—33.6
pH	.. 8.0— 8.6	8.0— 8.4	8.0— 8.6	8.2— 8.4
Dissolved oxygen (ppm)	.. 5.6— 10.4	5.2—11.2	5.2—10.0	6.4— 8.4

TABLE 2. Year-wise percentage composition of *P. monodon* and *P. indicus* seed

Species	Tallapalem Creek		Pedapatnam Creek		Average
	1983	1984	1983	1984	
<i>P. monodon</i>	.. 36.7	60.7	55.8	44.7	54.6
<i>P. indicus</i>	.. 63.3	39.3	44.2	55.3	45.4

FIG. 1. Seasonal availability of *P. monodon* seed.FIG. 2. Seasonal availability of *P. indicus* seed.

Yearwise percentage composition of *P. monodon* and *P. indicus* seed is given in Table 2. The percentage composition of *P. indicus* seed was more than that of *P. monodon* indicating their relative dominance in recruitment during 1983. However, during 1984, the recruitment of *P. monodon* seed was relatively higher. But the average percentage composition of *P. monodon* was 54.6% indicating higher collection potential when compared to that of *P. indicus*.

Seasonal variation in the recruitment as indicated by catch/hr/net is represented in Fig. 1 and 2. The recruitment of *P. monodon* postlarvae was observed throughout the year. Abundant tiger prawn seed was observed to be from July to December with a peak in October during the year 1983. In 1984, the abundance was observed in March and July to August with a peak in August. Thus, the peak availability of tiger prawn seed was found to be preponed by two months in 1984 when compared to that of 1983, which may be attributed to variations in climatic conditions. Recruitment of white prawn seed was observed round the year except during January 1983 and October, 1984. The season of abundance in 1983 was observed to be from May to June and September with a peak in May. In 1984, season of abundance was observed to be in April and July to August with peaks in April and August. The peak season in 1984 was found to be advanced by one month for obvious reasons.

The recruitment of metapenaeids was found to be abundant from July to December with its peak in July and October during 1983 and in 1984, the ingressions were abundant during April-May and July to October with peaks in April, July and November.

Seeds of the following predatory fishes were observed in the collection. *Lates calcarifer*, *Megalops* sp., *Elops* sp., *Therapon* sp., *Polynemus* sp. and eels. These were represented in the collections abundantly during the period

from July to November. However numerical estimates were not made.

#### DISCUSSION

The peak season for the collection of *P. monodon* seeds has been reported to be between September and April in Andhra Pradesh and in particular from June to September in Kakinada area (Rao, 1983). The present study indicates that the peak abundance of *P. monodon* in Machilipatnam is from July to December (Table 3).

TABLE 3. Seasons of abundance of prawn seeds and fishes in Machilipatnam area

Species	Seasons of abundance
<i>P. monodon</i>	July to December
<i>P. indicus</i>	April-May, July-November
Metapenaeids	July to November
Predatory fishes	July to November

Similarly, Rao (1983) reported peak occurrence of *P. indicus* seed from October to December in Andhra Pradesh and May to June in Kakinada area. The season of abundance in Machilipatnam area was found to be April to May and July to November. The collection with shooting net has proved to be ineffective when the water flow is not sufficient to drive the postlarvae into the net. In areas where there is no flow of water, the traditional scoop net may serve as an effective gear. As the sample is a mixture of penaeid, non-penaeid prawn larvae and other fish larvae, segregation of commercially important prawns always requires careful scrutiny. It is well understood that a prawn farmer has to have adequate filtering mechanism while letting in the tidal water into his pond, failing which his pond will be stocked with predatory fishes and competitive non-penaeid prawns which will adversely reduce his shrimp production.

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