# NOTES

## GROWTH OF THE INDIAN WHITE PRAWN *PENAEUS INDICUS* IN RELATION TO STOCKING DENSITY


ABSTRACT

One month old seed of *Penaeus indicus* were stocked in 4 identical ponds at stocking densities of 5/m², 10/m², 25/m² and 50/m² and after 110 days they had attained a size of 128 mm 108 mm, 88 mm and 64 mm respectively. There was a clear inverse relationship between stocking density and growth Growth was comparatively very fast during the first month and a half and then slowed down considerably in all the ponds. The implications of the observed growth patterns are discussed.


BRACKISHWATER prawn culture on scientific lines is still in its infancy in India. In the traditional prawn culture practices in West Bengal and Kerala there is no control over the rate of stocking. But for a scientific management of prawn farms we should know the optimum stocking density that would give the best growth rate and yield. This is bound to vary according to the species of prawn to be cultivated, the natural fertility of the ponds and the quantity and quality of the supplementary feed given and has to be determined empirically for each area. At the Narakkal Prawn Hatchery Laboratory, experiments with the highly priced *Penaeus indicus* were undertaken to determine the optimum stocking density and the results are reported in this paper.


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### MATERIAL AND METHODS

The postlarvae of *P. indicus* collected from the surf region of Narakkal and grown in 6 feet diameter plastic pools for 15 days upto a size of about 13-20 mm on a diet of groundnut oil cake were used for the experiments. The experimental ponds were identical in size, being 60 $m^2$ in area and about 80 cm deep. The ponds which were situated side by side had separate sluice gates and received the water supply directly from the same source. They were subject to daily tidal flushing through the sluice gate which had velon screens to prevent the entry of fish and prawns from outside. Before stocking, the ponds were drained completely by pumping out the water and all the existing fish and prawns were removed. Four stocking densities were tried *viz.* 5/$m^2$, 10/$m^2$, 25/$m^2$ and 50/$m^2$.

In another experimental pond the fry of *Metapenaeus dobsoni* reared from eggs spawned in the laboratory at Narakkal were stocked at a density of 14 prawns per $m^2$. The eggs were spawned on 24-12-1975 and the fry (10 mm average length) were stocked in the pond on 1-2-1976 *i.e.* when they were 38 days old.

The prawns were counted and stocked and a sample of 50 prawns was measured to know the initial stocking size. No supplementary feed was given. Periodically the prawns were sampled with a cast net and the total length taken to study the growth rate. The temperature, salinity and dissolved oxygen content of the pond water were monitored weekly. The experiment was conducted during the period December 1975 to April 1976.

### RESULTS AND DISCUSSION

The growth curves for *P. indicus* at different stocking densities are shown in Fig. 1. There

was a clear inverse relationship between stocking density and growth. The growth was fastest at a density of 5 prawns/$m^2$ and declined sharply with increase in stocking density. In 110 days after stocking the prawn attained a size of 128 mm, 108 mm, 88 mm and 64 mm at stocking densities of 5/$m^2$, 10/$m^2$, 25/$m^2$ and 50/$m^2$ respectively. Growth was comparatively very fast during the first month and a half and then slowed down considerably in all the ponds. At a stocking density of 5/$m^2$ the 18 mm juveniles have grown to a length of 128 mm in 112 days *i.e.* an average growth rate of 1.0 mm per day. If the growth in the first 56 days is taken into account the growth is even faster, being 1.7 mm/day.

Unfortunately the final yield and survival rate of the prawns at the different stocking densities could not be estimated as there was high mortality towards the end of April 1976 when the water level in the ponds became very low during the low tides and the water temperature shot up to 36°C.

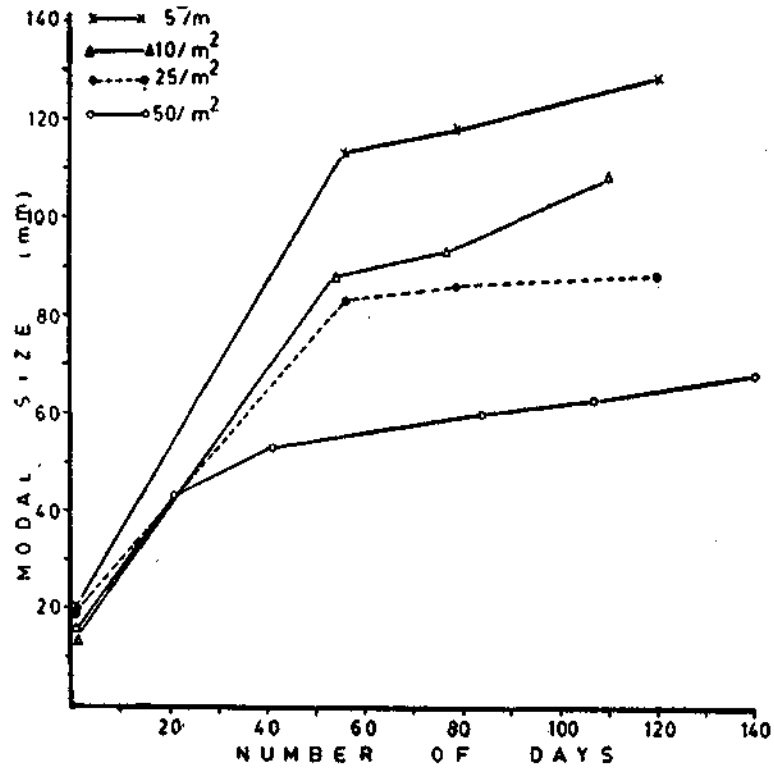


Fig. 1. Growth of *Penaeus indicus* in ponds at different stocking densities.

The fluctuations in temperature, salinity and dissolved oxygen content of the ponds during the period of the experiment are illustrated in Fig. 2. The salinity increased from 7‰ to 29.4‰ and the temperature from 22.1°C to 36.2°C. The dissolved oxygen content fluctuated between 1.4 ml/litre to 6.1 ml/litre.

The observations on growth of *Metapenaeus dobsoni* are tabulated below:

| Date of observation | No. of days after stocking | Size range mm | Modal size mm |
|---|---|---|---|
| 1-2-1976 | .. | 5 - 16 | 10 |
| 6-3-1976 | 34 | 26 - 65 | 43 |
| 29-3-1976 | 57 | 41 - 65 | 53 |
| 1-5-1976 | 90 | 51 - 75 | 63 |

From the experiments conducted at Narakkal it appears that *Penaeus indicus* could be cultured in the barckishwater areas of Kerala employing a stocking density of 5 prawns per $m^2$ to obtain the best growth rate. The stocking density could perhaps be increased if supplementary feeding is resorted to. The decline in growth rate observed 40-50 days after stocking may be due to the following reasons; It may be due to the usual physiological decline in growth rate associated with increase in the size of animals or it may be due to the fact that the natural food supply in the ponds was sufficient to meet the nutritional needs of the prawns when they were small but was inadequate to support the increasing biomass of growing prawns, in the later months. If the later reason is true the growth of the prawns could be increased by supplying supplementary feed to the prawns one month after stocking. Further experiments are underway to study this aspect.

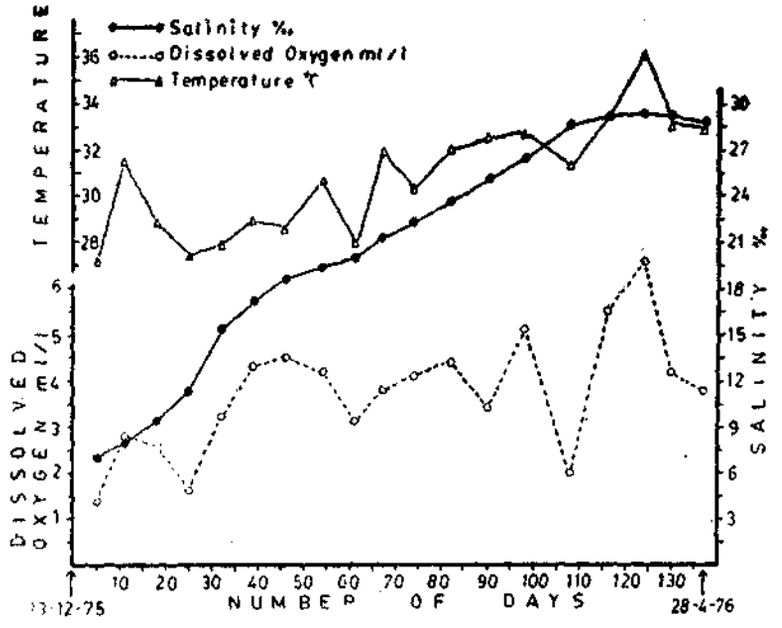


Fig. 2. Hydrographic conditions in one pond during the experimental period. The conditions in the other ponds were similiar.

The 10 mm prawns which were 38 days old at the time of stocking had attained a size of 63 mm in 3 months. In other words the 63 mm *M. dobsoni* were only about 4 months old.

The very high rate of growth of juvenile *P. indicus* observed during the present study is corroborated by the work of Suseelan (1975) who has also reported a very fast rate of growth for *P. indicus* juveniles stocked in the salt pan reservoirs at Manakkudy; he found that the juveniles between 68 mm and 123 mm in length grew at the rate of 1 mm/day.

The fast rate of growth observed in *P. indicus* cultured in brackishwater ponds without any supplementary feeding is likely to be true of the natural population of *P. indicus* in estuaries and backwaters as well. In fact, the growth rate may be faster under natural conditions because the population density will be much less than $5/m^2$ and they can roam over a larger area in search of food.

The present observations at Narakkal, therefore, have relevance to the estimation of the age of natural prawn populations. The development of *P. indicus* from egg to the first postlarval stage takes about 10 days (Muthu *et al.*, 1976) and from the first postlarval stage to the stocking size of 15-20 mm it takes about 20 days (present observation). Hence the prawns which were stocked were about one month old. They attained a length of 128 mm in 112 days or about 130 mm in about 4 months. So the 130 mm prawns were actually only 5 months old.

Similarly our experiment with *M. dobsoni* reveals that this species which is recruited into the marine fishery at a modal size of about 61-65 mm (George, 1961) is only 4 months old at the time of recruitment.

*Central Marine Fisheries*
*Research Institute,*
*Cochin* - 682 031.

M. S. MUTHU
N. N. PILLAI
K. V. GEORGE
S. LEKSHMI

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## NOTE ON THE ABUNDANCE OF ZOOPLANKTON AND TRAWLER CATCH DURING THE POSTMONSOON MONTHS ALONG THE NORTHWEST COAST OF INDIA

ABSTRACT

Zooplankton samples collected during the cruises of M.V. *Matsya Vigyani* from October to December 1977 from the northwest cost of India were utilised for the study of the faunal composition, variation in their abundance, distribution and their relationship with the fishery. Estimated zooplankton biomass in the area 20-71 followed by 20-70 and this was due to a higher density of *Salps* spp. where they out numbered the copepods. Copepods were dominant in the areas 18-72 (98%), 17-72 (87.5%), 19-71 (80.7%) and 17.72 (55.6%). *Evadne* sp. (39%) was next to copepods in the samples collected in the area 17-72 south of Bombay The percentage composition of various groups of zooplankton in different areas is given. The fish catch/hour was maximum in the area 19-71 (366.7 kg/h) followed by the area 18-72 (354.8 kg/h) in October which was the most productive month for the zooplankters.