

## BREEDING OF THE MARINE PRAWN *METAPENAEUS DOBSONI* IN BRACKISHWATER PONDS

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### ABSTRACT

Female *Metapenaeus dobsoni* have attained full ovarian maturation in the ponds of the Marine Prawn Hatchery Laboratory of the CMFRI at Narakkal during the summer months when the salinity was 28.0-29.0 ppt. These females were made to spawn in the pond water kept in 50 litre plastic basins and the resulting nauplii were successfully reared upto the late postlarval stage in the same medium. The possibility of *M. dobsoni* breeding and completing its life cycle in the brackishwater areas during the high salinity months is discussed.

### INTRODUCTION

THE MARINE PRAWN *Metapenaeus dobsoni* like all other penaeid prawns, spawns in the sea and the larvae develop in seawater. However, fully mature males and impregnated, but immature, females of *M. dobsoni* have been found in the Cochin Backwaters (Menon, 1951). Some mature females with ripe ovaries have been observed in these backwaters by Rao and Kathirvel (1973) and in the perennial prawn culture fields of Vypeen Island by George (1974) during the high salinity period (February-May). The possibility of their breeding in brackishwaters has been mooted by these authors. Rao and Kathirvel (1973) reported that the mature females from the backwaters spawned in the laboratory when kept in an aquarium tank filled with brackishwater of salinity 30.2 ppt, but the eggs did not develop beyond the 1st nauplius stage. When these nauplii were transferred to seawater they developed into abnormal protozoa and then died.

At the Marine Prawn Hatchery Laboratory (MPHL) of the Central Marine Fisheries Research Institute some fully ripe female *M. dobsoni* collected from the grow-out ponds during the summer months were made to spawn and the nauplii successfully reared upto the late

postlarval stage, in brackishwater collected from the same pond. These results are presented and discussed in this communication.

### MATERIAL AND METHODS

#### *Source of material*

Postlarval *M. dobsoni* stocked in the experimental ponds of the MPHL in June 1975 grew well and attained a size of 80-105 mm in March-April 1976 when the salinity in the ponds was 28.0-29.0 ppt. The males had fully developed spermatophores and were sexually active as evidenced by the high percentage of impregnated females present in the ponds. During the first week of April 1976 a number of females possessing dark green ripe ovaries were collected from these ponds and used in the following experiments.

#### *Experiment No. 1*

Three females (2 together and 1 individually) were kept for spawning in plastic basins containing 50 litres of filtered seawater of salinity 33.71-34.80 ppt. The water in each basin was aerated with an airstone connected to diaphragm aerators. After spawning the females were removed and the larvae were reared in the same containers upto the postlarval stage. To feed the larvae mixed phytoplankton which formed a surface film in the brackishwater ponds in the

afternoon was collected by skimming and resuspended in seawater. The phytoplankton suspension was filtered through a 60 micron mesh bolting cloth to remove the larger particles and then added to the larval rearing basins. Everyday the bottom sediments were siphoned out along with some water before adding the phytoplankton. The salinity and temperature of the water in the basins were monitored everyday. The salinity increased gradually upto 37.31 ppt due to evaporation. Counts were made of the number of nauplii at the beginning of the experiment and of the postlarvae at the conclusion of the experiment.

#### Experiment No. 2

To test whether normal development was possible in brackishwater, four mature females

were kept individually in plastic basins containing water from the pond from which the females were collected. The larval rearing procedure was the same as in Experiment No. 1, except for the fact that, instead of seawater, pond water was used both for spawning and for rearing the larvae. The initial salinity of the pond water varied from 28.72 to 30.1 ppt; it gradually increased by evaporation upto 34.32 ppt.

#### RESULTS AND DISCUSSION

The results of the two experiments are summarised in Tables 1 and 2. The 3 females which were kept in seawater produced a total of 86,700 nauplii out of which 10,600 postlarvae were obtained 21-27 days later, the average survival rate being 12.2%. All the 4 females kept in pond water spawned and produced a

TABLE 1. Experiment No. 1 Rearing of larvae of *M. dobsoni* in seawater

Length of female (T.L. mm)	Duration of experiment	Medium used	Salinity (‰)	Temperature (°C)	No. of nauplii produced	No. of postlarvae obtained	Survival rate (%)
91 74	7.4.76 to 4.5.76	Seawater	33.7 to 37.31	26.0 to 29.2	52,360	9800	18.5
104	9.4.76 to 30.4.76	Seawater	34.8 to 36.96	26.0 to 29.0	34,340	800	2.3

TABLE 2. Experiment No. 2 Rearing of larvae of *M. dobsoni* in pondwater

Length of female (T.L. mm)	Duration of experiment	Medium used	Salinity (‰)	Temperature (°C)	No. of nauplii produced	No. of post-larvae obtained	Survival rate (%)
77	9.4.76 to 5.5.76	Brackish water from the ponds	29.5 to 34.32	26.4 to 29.0	2720	1725	63.4
94	8.4.76 to 28.4.76	-do-	28.72 to 33.00	26.0 to 29.3	4060	360	8.9
74	9.4.76 to 29.4.76	-do-	30.1 to 33.88	26.3 to 29.3	7500	1580	21.1
97	9.4.76 to 11.5.76	-do-	30.1 to 34.85	26.4 to 29.0	17000	370	2.2

total of 31,280 healthy nauplii from which 4035 postlarvae were obtained after 20-32 days of rearing. The survival rate of nauplii to the postlarval stage ranged from 2.2 to 63.4% with an average of 12.9%. Although the average number of nauplii produced per female was more in seawater (28,900) than in pond water (7,820) the survival rate was more or less similar in both the media.

The nauplii developed into postlarvae without any abnormality even in pond water. The only "abnormality" noted was that in the pond water experiments some of the eggs had very narrow perivitelline space instead of the usual wide perivitelline space characteristic of the eggs of *M. dobsoni*. But even these eggs with narrow perivitelline space developed normally and produced active nauplii.

These experiments conclusively proved that *M. dobsoni* can spawn successfully and complete

its entire life history in brackishwater ponds with comparatively high salinity (28.0-29.0 ppt). Another species of *Metapenaeus*, *M. bennetae* has been reported to breed in a land locked coastal lake in New South Wales, Australia (Muriel and Bennett, 1951).

In nature the postlarvae of *M. dobsoni* enter the Vembanad Lake along with the incoming tide, settle down in the surrounding lowlying brackishwater areas and grow rapidly till they attain a size of 50-60 mm when they migrate back to the sea for further growth, maturation and spawning. But in the light of the results obtained during the present study, it is possible that the *M. dobsoni* which are prevented from migrating back to the sea by getting trapped in the perennial prawn culture fields may mature and spawn there during the summer months when the salinity is high (28-30 ppt) and the resulting larvae also may grow into juveniles and contribute to the backwater prawn fishery.

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