MULTIPLE SPAWNING IN PENAEID PRAWN, PARA-
PENAEOPSIS STYLIFERA IN CAPTIVITY

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ABSTRACT

Laboratory observations on the individual ripe and impregnated females of penaeid prawn *P. stylifera* kept separately in the absence of males were made for 58 days. It was revealed that *P. stylifera* spawn at an interval of 15 to 25 days during the active breeding period. This interval between two spawning is delayed if females lay fertilized eggs in each event of spawning. Moulting females lay unfertilized eggs. The probable significance of the results obtained are discussed in the present paper.

Key words: Penaeid prawn, Parapenaeopsis, multiple spawning.

Multiple spawning is reported for some of the penaeid prawns on the basis of percentage of incidence of different maturity stages in the random sample taken from total commercial catch (Rao, 1968). Experimental evidence has also been forwarded for multiple spawning in the same species of penaeid prawn species viz. *Penaeus indicus*, *M. affinis*, *M. dobsoni* and *P. stylifera* (Rao, 1978).

*P. stylifera* breeds throughout the year with a peak breeding period during February to March and August to September in Bombay water (Joshi, 1980). In the present investigation laboratory observations have been made to study multiple spawning in *P. stylifera*.

Ripe and impregnated females of *P. stylifera* were obtained from local fisherman of Versova, Bombay on 1st March 1979. Prawns were brought to laboratory and maintained in large aquarium supplied with continuously aerated sea water.

Five females ranging between 75 to 80 mm in length with fully developed ovaries were kept individually in separate aquaria. Prawns were marked as A, B, C, D, and E respectively to facilitate the data collection on events of spawning and moulting during observation period (1st March, 1979 to 27th April, 1979).

Experimental animals were maintained under constant laboratory conditions (salinity 34 ± 1‰, temperature 26 to 28 °C; photoperiod, 12 L : 12 D) throughout the period of observations.

Table 1 summarizes the records of spawning and moulting events of *P. stylifera* females. Prawns laid two or three batches of eggs with a interval of about 15 to 25 days. The prawns underwent moulting after laying two or three batches of eggs. Moulting females laid unfertilized eggs. The reason for this is the absence of spermatophores in the telyca of females undergoing moulting in the absence of males (Joshi, 1980).

Similar pattern of multiple spawning has also been reported for five species of Indian crabs (Gore, 1971). He has observed that ovigerous individuals
Table I. Multiple spawning in *P. stylifera*.

<table>
<thead>
<tr>
<th>Prawns</th>
<th>First event (Date)</th>
<th>Second event (Date)</th>
<th>Third event (Date)</th>
<th>Fourth event (Date)</th>
<th>Condition of ovary at the time of termination of experiment (Date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Spawning (1.3.79)</td>
<td>Moulting (6.3.79)</td>
<td>Death (13.3.79)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>B</td>
<td>Spawning (1.3.79)</td>
<td>Spawning (17.3.79)</td>
<td>Spawning (8.4.79)</td>
<td>Moulting (15.4.79)</td>
<td>Faint yellow ovary (27.4.79)</td>
</tr>
<tr>
<td>C</td>
<td>Spawning (1.3.79)</td>
<td>Spawning (23.3.79)</td>
<td>Moulting (29.3.79)</td>
<td>Spawning (Unfertilized eggs) (20.4.79)</td>
<td>No trace of ovary development (27.4.79)</td>
</tr>
<tr>
<td>D</td>
<td>Spawning (2.3.79)</td>
<td>Moulting (8.3.79)</td>
<td>Spawning (Unfertilized eggs) 20.4.70</td>
<td>—</td>
<td>Mature ovary (27.4.79)</td>
</tr>
<tr>
<td>E</td>
<td>Spawning (1.3.79)</td>
<td>Spawning (20.3.79)</td>
<td>Spawning (15.4.79)</td>
<td>Moulting (21.4.79)</td>
<td>Translucent ovary (27.4.79).</td>
</tr>
</tbody>
</table>
of these crabs (Philyra ecrallicola, Pinnothetes sp., Doclea gracilipes, Schizophyrs aspera and P.immunus vesperillo) lay two or three batches of fertilized eggs in the absence of males. However, he did not observe egg laying after molting in the crabs. His observations were limited only on intermoult crabs which were ovigerous at the beginning of the experiments. The results obtained on crabs (Gore, 1971) and present findings of P. styli/s/a on multiple spawnings suggest that these crustaceans develop ovaries rapidly and lay eggs in quick succession within a single intermoult cycle. They retain potent spermatophores, which they receive during copulation, for longer periods. The retention of spermatophores containing viable spermatozoa for a long period allow several batches of eggs to be fertilized following a single mating. On the contrary, in palaemonid prawns spermatophores are deposited on females (through copulation) when they moult and within 24 hrs after copulation females lay fertilized eggs and prawns become ovigerous. Long term retention of spermatophores has never been noticed in case of these prawns (Wickins, 1976).

The results of the present investigation suggest that penaeid spawners, which have been once used for larval rearing i.e. which have laid down first batch of eggs, be maintained for long period in captivity. By adopting this method it will be possible to harvest second and third lot of fertilized eggs for larval rearing. This will curtail the demand of wild penaeid prawn spawners for the commercial shrimp hatcheries.

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