On Maturation and Spawning in Some Penaeid Prawns of the Arabian Gulf

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Abstract

Some aspects of the maturation and spawning of the commercially important prawns of the Arabian Gulf, *Penaeus semisulcatus* de Haan, *Metapenaeus stebbingi* Nobili and *Trachypenaeus granulosus* (Haswell), have been studied. Five maturity stages: immature, early maturing, late maturing, mature, and spent-recovering, are distinguished, and the maturation process in the female of each species is described. The minimum size at first maturity was estimated to be 126 mm for *P. semisulcatus*, 88 mm for *M. stebbingi*, and 64 mm for *T. granulosus*. *T. granulosus* breeds throughout the year, with peaks in June, November-December, and in April; in *P. semisulcatus* and *M. stebbingi* the breeding period extends over the period October to March or April.

Introduction

Most of the studies on the breeding habits of the penaeid prawns of the Indian Ocean and the Arabian Gulf carried out by Menon (1952, 1953), Shaikmahmud and Tembe (1960, 1961), Rajyalakshmi (1961), and George (1962), were restricted to the determination of spawning time, and the conclusions arrived at were based entirely on data on incidence of mature prawns in the catches obtained in different months. No detailed study on the process of maturation and spawning periodicities has been so far attempted. The present investigation studies the different aspects of spawning of three commercially important species of prawn in the Gulf area: *Penaeus semisulcatus* de Haan, *Metapenaeus stebbingi* Nobili and *Trachypenaeus granulosus* (Haswell).

Materials and Methods

From September, 1973 to August, 1974, regular samples of prawns were collected from the catches of commercial fishing boats of Dammam, Saudi Arabia. These samples were sorted into species, and their lengths, from tip of rostrum to tip of telson, were recorded separately for both sexes. Observations on the nature, colour, size and texture of ovaries (indicating the degree of maturity) were also recorded. Using a compound microscope with an ocular micrometer, diameters of ova were determined from ovaries hardened in 5% formaldehyde for at least 2 days. In order to avoid errors due to selection and distortion in preservation, the diameters were taken parallel to the ocular micrometer. For the purpose of this study, samples were taken from the middle lobe of the ovary, and 300 ova were measured from each ovary.

Fecundity was calculated from the weight of the ovary and the number of eggs in a weighed subsample.

Results and Discussion

Maturation

There is little consistency among the various workers who have studied the maturation of ovaries in prawns as to the number of steps of maturity recognized. Thus, King (1948) recorded 5 stages in *Penaeus setiferus*, and Cummings (1961) described only 4 in *P. duorarum*. Shaikmahmud and Tembe (1961) differentiated between spent and regenerating *P. stylifera* and gave 6 stages of maturity, while Rajyalakshmi (1961) included neither spent nor regenerating stages among the 5 stages he recognized.
Table 1. *Penaeus semisulcatus*, *Metapenaeus stebbingi* and *Trachypenaeus granulosus*. Range in diameter (mm) of ova includes at least 90% of ova in each stage for each species.

<table>
<thead>
<tr>
<th>Stage</th>
<th><em>P. semisulcatus</em></th>
<th><em>M. stebbingi</em></th>
<th><em>T. granulosus</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Immature</td>
<td>&lt;0.080</td>
<td>&lt;0.096</td>
<td>&lt;0.080</td>
</tr>
<tr>
<td>Early maturing</td>
<td>0.08-0.25</td>
<td>0.10-0.24</td>
<td>0.08-0.20</td>
</tr>
<tr>
<td>Late maturing</td>
<td>0.20-0.30</td>
<td>0.15-0.31</td>
<td>0.15-0.25</td>
</tr>
<tr>
<td>Mature</td>
<td>0.24-0.36</td>
<td>0.20-0.34</td>
<td>0.15-0.30</td>
</tr>
<tr>
<td>Spent-recovering</td>
<td>&lt;0.096</td>
<td>&lt;0.096</td>
<td>&lt;0.096</td>
</tr>
</tbody>
</table>

Fig. 1. *Penaeus semisulcatus*. Size-frequency distribution of maturing ova: (A) immature; (B)-(D) early maturing; (E) late maturing; (F) mature. Numbers of specimens examined are given in brackets.

Fig. 2. *Metapenaeus stebbingi*. Size-frequency distribution of maturing ova: (A) immature; (B) (C) early maturing; (D) late maturing; (E) mature. Numbers of specimens examined are given in brackets.

Fig. 3. *Trachypenaeus granulosus*. Size-frequency distribution of maturing ova: (A) immature; (B)-(D) early maturing; (E)(F) late maturing; (G) mature. Numbers of specimens examined are given in brackets.