THE COMPLETE LARVAL DEVELOPMENT OF PILUMNOPEUS EUCRATOIDES STIMPSON, 1858 (DECAPODA, BRACHYURA, PILUMNIDAE) IN THE LABORATORY

BY

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INTRODUCTION

The pilumnid crab, Pilumnopeus eucratoide, Stimpson, 1858, is a fairly common animal along intertidal estuarine shores in Singapore and Malaysia. It has also been recorded from the Mergui Archipelago and Hong Kong (Balss, 1938). The status of the genus Pilumnopeus H. Milne Edwards, 1863, is still uncertain, and although several workers regard it as distinct (e.g., Balss, 1933), others have suggested that it only qualifies as a subgenus of Heteropanope Stimpson, 1858 (e.g., Monod, 1956). In this paper, the two genera are regarded as distinct. The zoeae of only three other species of these two genera are known: H. glabra Stimpson, 1858 (Lim et al., 1984), P. indica (De Man, 1888) (Takeda & Miyake, 1968) and P. serratifrons (Kinahan, 1856) (Wear, 1968; Greenwood & Fielder, 1984).

In this study, the complete larval development of P. eucratoide is described. It consists of only three zoeal and one megalopal stages lasting a total of approximately 10 days. The significance of having only three zoeal stages, and not the typical Xanthoid four is also briefly discussed.

MATERIALS AND METHODS

Three ovigerous females of Pilumnopeus eucratoide were collected from the intertidal region at Ponggol Point, Singapore, in March 1982.

The crabs were placed in bowls (diameter 15 cm) containing filtered sea water \((31 \pm 1\text{ ppt})\) at \(25 \pm 1^\circ\text{C}\) until the larvae hatched. The zoeae were then reared in mass cultures in glass bowls (diameter 15 cm) at densities of 200 to 300 per litre. The bowls were illuminated for 12 hours each day and the temperature was maintained at \(25 \pm 1^\circ\text{C}\). The zoeae were transferred to clean bowls containing freshly filtered sea water and fed with newly hatched Artemia nauplii and rotifers (Brachionus sp.) daily. When the megalopa stage was reached, they were transferred to compartmentalised plastic boxes to prevent excessive mortality due to fighting and cannibalism. The crabs from which
larvae were obtained are deposited in the Zoological Reference Collection, National University of Singapore.

From the mass cultures, larvae and exuviae were fixed/preserved at each developmental stage in Steedman’s preservative (Griffiths et al., 1976). Drawings of larvae and their appendages were made from these preserved specimens. Appendages were dissected in glycerine with the aid of entomological needles. Drawings of whole mounts and appendages were made with the aid of a camera lucida.

Measurements of the carapace and abdominal lengths were made of 10 zoeae of each of the 3 zoeal stages. The total length of each stage was then determined by adding the carapace length and the abdominal length (measured from the middle of the second segment to the posterior tip of the telson). The carapace length and width of 10 megalopae were also measured.

RESULTS

There are three zoeal stages and one megalopa stage in the complete development of P. eucratoides. The megalopa is the first to be known and described for the genus. Extra zoeal stages were not observed. The external morphology of these stages is described below. After stage 1, only those features that exhibited change are described.

The minimum duration of all zoeal stages was 2 days. The average duration of the megalopa stage was 4 days.

DESCRIPTION OF LARVAE

First Zoea (figs. 1A, 2)

Total length of first zoea (fig. 1A) is approximately 1.39 mm. The cephalothorax (fig. 1A) bears dorsal and rostral spines. Lateral spines not visible. Eyes sessile. Abdomen (fig. 2A, B) composed of 5 somites with the 6th fused to the telson. Second abdominal somite with a pair of lateral knobs. Somite 1 (fig. 2A, B) with 2 short mid-dorsal setae whereas somites 2 to 5 (fig. 2A, B) each possess a pair of short setae on their posterodorsal margins. Telson (fig. 2A) bifurcate, with each half of the furca bearing 1 large lateral spine, 1 small dorsal spine, 1 small lateral seta and covered with fine spinules. Inner margin of telson fork with 3 pairs of large spines and 1 pair of small spines.

The antennule (fig. 2C) is uniramous, unsegmented and conical with 2 stout and 2 thin terminal aesthetascs.

The exopodite of the antenna (fig. 2D) is approximately equal in length to the spinous process, each tapering to a point. Spinous process with 2 rows of spinules along distal half and exopodite with spinules along one edge of distal half only. Two spines present near the mid-point of the exopodite. Endopodite bud absent.

Mandible (fig. 2E) with both incisor and molar processes.