The larvae of the inter-tidal barnacle  
*Chthamalus malayensis* Pilsbry  

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**ABSTRACT**  

Barnacle nauplius before achieving a sedentary cyprid stage undergoes six transformations within a period of 7 to 15 days since its release from a parent body. The larval metamorphosis of *Chthamalus malayensis* P. was examined under controlled laboratory conditions to describe each of its six nauplii and cyprid larva. Highly setulose naupliar appendages, absence of paired posterior carapace spines, sculpturing of polygons on shell, presence of 4 pairs of abdominal spines, presence of pecten of teeth on labrum of early larvae and its subsequent disappearance are some of the important characteristics that separate these larvae from many other species so far described. The study again emphasises the fact that the larval development amongst cirripedes is very uniform.  

1. **INTRODUCTION**  

*Chthamalus malayensis* P. and *Chthamalus withersi* P. are two Indo-Malayan species which can be described as authentically present along the entire coastline of India and her sub-oceanic islands of Andaman and Nicobar. In Bombay waters *Ch. malayensis* breeds generally all the year round with a peak activity during the warmer months of March, April, May, June and October.¹ Both in the laboratory and in the field *Ch. malayensis* breeds more frequently than *Ch. withersi* though the number of first larvae released at each emission in the former is smaller than in the latter species. A maximum number of larvae held in brood by *Ch. malayensis* and *Ch. withersi* is 3,500 and 7,100 respectively.  

The literature on the cirriped larvae encountered in Indian waters is generally inadequate. Some of the species examined are *Balanus amphitrite amphitrite* Darwin²,³, *Balanus variegatus* Darwin⁴,⁵, *Balanus amaryllis euamaryllis*, *Tetraclitella karandei* Ross⁶ *Ibla cumingi* Darwin⁷ and *Ch. stellatus stellatus*.⁴
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The larval developments of *Ch. malayensis* and *Ch. withersi* were examined under controlled laboratory conditions with a view to describing appropriately each of their six nauplii and cyprid larvae. The present paper incorporates the observations on *Ch. malayensis*. The naupliar characters such as setation of appendages, carapace sculpture, abdominal and caudal processes and larval spinulation have been examined and are compared with those of balanid, megabalanid and iblidae barnacles encountered in Bombay waters.

2. Materials and Methods

Small pieces of stones bearing specimens of *Ch. malayensis* were maintained in small glass jars containing sea water. The adults were fed daily on a diet of *Dunaliella primolecta* and the diatoms *Pleurosigma* sp. and *Phaeodactylum* sp. The sea water was changed every day. The specimens were kept dry during night. The embryos or the first nauplii released by these adults were reared to obtain their subsequent growth stages. A general outline of the rearing technique has been earlier described by Karande and Thomas.6

3. Results

Description of the Larvae

Six naupliar stages and a cyprid larva were raised and examined. The outline drawings showing shapes and the more important processes with their spinulation are given in figure 1. Figures 2, 3 and 4 illustrate appendages of six naupliar larvae. Figure 5 is a microphotograph of the cyprid larva. The setal formulae of the naupliar appendages are given in table 1. Table 2 gives dimensions of the larvae of some cirriped species examined in this laboratory.

The first nauplius measuring 220 \( \mu \) has a 'wine-glass' shape. A width measured behind two fronto-lateral horns is 130 \( \mu \). The horns are 30 \( \mu \) long. The abdominal and caudal processes are clearly differentiated and each one of them is 30 \( \mu \) long. The frontal filaments are absent. The setation formula of the first antennule is 0.0.0.4.2.1.1.0.

The second nauplius is 300 \( \mu \) long. The frontal filaments are present in this and all the subsequent stages. A false carapace, 190 \( \mu \) long and wide bears a fine spinulation along its margin. About 7 to 8 spinules located along its posterio-lateral borders are longer than the rest of the spinules. 120 \( \mu \) long labrum bears seven clearly separated sub-equal teeth along its distal