LARVAL DEVELOPMENT OF *APOCYCLOPS DENGIZICUS* LEPESHKIN (COPEPODA)

BY

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INTRODUCTION

Literature on cyclopoid copepods reveals that considerable work has been done on the development of the freshwater species, particularly those belonging to the family Cyclopidae. However, a controversy still exists regarding the exact number of naupliar stages in their development. Dietrich (1915), Manfredi (1925), Ame-lina (1927), Gelmini (1928), Gurney (1933), Rylov (1948), Ravera (1953), McLaren (1964), Au-ray & Dussart (1966, 1967) and Dussart (1969) working on the different species of the genus *Cyclops*, supported the opinion that there were five naupliar stages. On the other hand, Walter (1922), Ziegel-mayer (1925), Ewers (1929), Borutskii (1949), Dukina (1956), Elgmork (1965), Eppacher (1968) and Elgmork & Langeland (1970) working on the same genus, reported six naupliar stages.

It has been undisputedly established that the members of the family Oithonidae, the marine group of cyclopoids, have six naupliar stages in their development, cf. Oberg (1906), Murphy (1923), Gibbons & Ogilvie (1933) and Haq (1963).

The authors recording five naupliar stages in the foregoing works, have the common reservation that their findings were based on the development of the freshwater representatives of the Cyclopidae. *Apocylops dengizicus* Lepeshkin is a brackish water form. In the present work a study was made of the larval development of this copepod using specimens collected from the Bandra Creek in Bombay.

METHODS

The initial stock of *A. dengizicus* was picked from tow-nettings taken from Bandra Creek and could be maintained in the laboratory through several generations. The copepods were reared in finger bowls of 300 ml capacity and the green

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alga *Dunaliella primolecta* formed the main food item. Freshly hatched nauplii were transferred to cavity blocks of 5 ml capacity in which they were reared till copepodite I as this facilitated locating naupliar moults. They were then transferred to petri dishes of 25 ml capacity in which they were reared till the adult stage.

**DEVELOPMENT**

Complete development from eggs to copepodite VI took 7 to 8 days at room temperature which ranged from 25°C to 28°C. Examination of the moults recovered showed that there were six naupliar and six copepodite instars. Consideration of the growth factor also supports six naupliar stages in *A. dengizicus*. Gurney (1933) observed that the growth factor in copepods can be calculated by dividing the average length of one stage by the average length of the preceding stage. In *A. dengizicus* it was observed that nauplius I measures 0.107 mm and nauplius II 0.129 mm. From this it was calculated that the growth factor for the nauplii of *A. dengizicus* is 1.21. Using this growth factor it was possible to predict the length measurements of the remaining four stages. The validity of the calculated measurements, table I, was tested by actually measuring the remaining four stages, and a distinct similarity was observed between the calculated and actual measurements.

By application of the growth factor there is thus an indication that four stages can easily be accommodated between nauplius I, which measures 0.107 mm, and nauplius VI, which measures 0.274 mm.

**Table I**

Comparison between calculated and actual length measurements of nauplii of *A. dengizicus*

<table>
<thead>
<tr>
<th>Naupliar Stage</th>
<th>Calculated length in mm</th>
<th>Actual length in mm</th>
<th>Difference in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>—</td>
<td>0.107</td>
<td>—</td>
</tr>
<tr>
<td>II</td>
<td>—</td>
<td>0.129</td>
<td>—</td>
</tr>
<tr>
<td>III</td>
<td>0.156</td>
<td>0.158</td>
<td>+0.002</td>
</tr>
<tr>
<td>IV</td>
<td>0.189</td>
<td>0.193</td>
<td>+0.004</td>
</tr>
<tr>
<td>V</td>
<td>0.228</td>
<td>0.221</td>
<td>−0.007</td>
</tr>
<tr>
<td>VI</td>
<td>0.275</td>
<td>0.274</td>
<td>−0.001</td>
</tr>
</tbody>
</table>

Naupliar development (figs. 1-2)

Eggs hatch into nauplius I within 24 hours of the female becoming ovigerous. The first nauplius to appear has an average length of 0.107 mm and resembles a typical cyclopid nauplius in having an egg shaped body which is dorso-ventrally flattened. The posterior end of the body is provided with a pair of slender setae which are directed outwards. The labrum is large and almost round in shape and has fine hairs covering its surface. It retains this appearance till the last naupliar