THE LIFE-CYCLE OF PELTOGASTERELLA
(CIRRIPIEDIA, RHIZOCEPHALA) 1)

BY

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All the known Rhizocephala except a few species belonging to the family Sylonidae have been described as hermaphroditic animals. In 1958, Ichikawa and Yanagimachi reported that Peltogasterella gracilis (Boschma) (syn. Peltogasterella socialis Krüger; cf. Reischman, 1959) is not a hermaphrodite, but is structurally a female. The “testes” of this rhizocephalan are actually female organs which function as a reservoir to hold the cells of the larval cypris male. Ichikawa and Yanagimachi suggested that the “testes” should be called “spermathecae” (Ichikawa and Yanagimachi, 1958) or “cypris-cell receptacles” (Ichikawa and Yanagimachi, 1960).

Recently, the following facts have been elucidated in Peltogasterella gracilis:
1) An adult female produces exclusively either large eggs (160-170 μ in diameter) or small eggs (140-150 μ in diameter). Females on a single host-crab are uniformly either “large-egg-producing” or “small-egg-producing.”
2) The large eggs develop into large larvae, while the smaller eggs develop into small larvae. In the nauplius stage, the two types of the larvae are distinguishable only by their size. In the cypris stage, however, the larvae differ not only in size but also in structure. The most notable structural difference is found in the antennules which serve as organs of attachment.
3) The large cypris (300-340 μ in body length) affix to the mantle opening of the juvenile females of P. gracilis, while the smaller cypris (230-260 μ in body length) attach at the base of setae on the host’s body. The large cypris function as larval males, while the smaller cypris are destined to become adult females.

The details of the above-mentioned facts are reported elsewhere (Yanagimachi, 1961). The present paper describes a new concept of the life-cycle of Peltogasterella gracilis (Boschma) based on the nature of sex determination in this species (cf. fig. 1).

A female (A) infesting a host-crab produces large eggs. These eggs are fertilized inside the maternal mantle cavity by spermatozoa from the cypris-cell receptacles. The zygotes develop into large nauplii. The nauplii (B) leave the maternal mantle cavity and become a part of surface plankton. After successive

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moults they metamorphose into large cypris (C). The cypris searches for the juvenile females of the same species and attaches itself to the mantle opening of a female (D). The cellular mass of the cypris is now injected through one of the antennules into the mantle cavity of the juvenile female (D₁-D₃). The cypris-cell mass migrates posteriorly into the cavity and enters one of the paired cypris-cell receptacles (Ichikawa and Yanagimachi, 1958).

A female (A') on a different host may produce exclusively small eggs. When these eggs are fertilized by spermatozoa they give rise to small nauplii. The small nauplii (B' and B'') undergo successive moults and metamorphose into small cypris (C' and C''). The cypris seeks out a young host and attaches itself by one of its antennules to the base of a scallop on the carapace of the host (D' and D''). Soon after fixation the bivalve shell with the larval thoracic limbs is cast off.

Fig. 1. Diagram of the life-cycle of *Pelagasterella*. Explanation in the text. C, colleteric gland; CR, cypris-cell receptacle; CT, central tumor; MC, mantle cavity; NG, nervous ganglion; OV, ovary; R, root system.