THE LARVAL DEVELOPMENT OF *PALAEMONETES PALUDOSUS* (GIBBES, 1850) (DECAPODA, PALAEMONIDAE), REARED IN THE LABORATORY 1)

BY

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INTRODUCTION

The genus *Palaemonetes* contains species occupying a wide variety of habitats from marine conditions to fresh water. The larval development of many species of *Palaemonetes* has been studied at least in part. Du Cane (1839), Boas (1880, 1889), Sollaud (1923) and Gurney (1924) have contributed to our knowledge of the larval development of the European brackish water form *Palaemonetes varians* (Leach). The early life history of *P. vulgaris* (Say) was studied by Smith (1873), Faxon (1879) and Broad (1957), the last paper primarily being concerned with the detailed description of the larvae of *P. pugio* Holthuis. Both *P. vulgaris* and *P. pugio* are brackish water species of the Atlantic coast of the United States.

The larval development of *P. vulgaris*, *P. pugio*, and *P. varians* is quite similar, consisting of six or more stages (intermolts), with the larvae of the different species being morphologically alike. Studies of the larval stages of the fresh water species of *Palaemonetes* has in several cases shown a different mode of development, with a tendency toward condensation. Mayer (1881) was the first to report on abbreviated development in *Palaemonetes*, studying *P. antennarius* (H. Milne Edwards), a fresh water form of southern Europe. This species has also been investigated by Boas (1889) and Sollaud (1923). The latter author studied the larval stages of a large number of species of the family Palaemonidae, and showed that most of those inhabiting fresh water hatched in an advanced condition and completed larval development in a shorter time, passing through fewer stages than did the brackish water and marine forms.

Shen (1939) described abbreviated development in *Palaemonetes sinensis* (Sollaud). Broad & Hubschman (1960) described a longer development for *P. kadiakensis* Rathbun, a fresh-water form of the central portion of the United States. Boschi (1961) reported on the first larval stage of *P. argentinus* Nobili.

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Palaemonetes paludosus is common in the fresh waters of the United States east of the Alleghenies, from New Jersey to Florida (Holthuis, 1952). It is very similar to P. kadiakensis and for many years these two species were thought to be the same. Meehean (1936) briefly described the first two larval stages of "P. paludosus" in a paper dealing primarily with the description of the adult, and other facets of the biology and life history of this species.

The purpose of this paper is to provide detailed descriptions of the larval stages of P. paludosus, since the only other paper dealing in detail with a fresh water species of Palaemonetes (Mayer, 1881), is in some respects inaccurate.

METHODS

Adult Palaemonetes paludosus were collected from a fresh water canal 18 miles west of Miami, Florida, by means of a push net swept through the floating vegetation and shallow water grasses. In the laboratory, ovigerous females were held in 16-ounce jars filled with canal water. When the larvae hatched they were removed from the jars and placed in plastic compartmented trays, one individual per compartment, in 50 to 75 cc of filtered canal water. The larvae were reared at room temperatures which varied from 15° to 31° C during the course of the study.

Larvae of several broods were fed the newly-hatched nauplii of Artemia salina (L.) beginning with the third larval stage, or when they attained the first postlarval stage. Most broods were not fed at all. The compartments were examined daily for exuviae and the water was changed each day or every second day. Daily examination of each larva was made by means of a binocular microscope, and a molting record was kept for each of approximately 700 individuals. Exuviae and specimens of each developmental stage were preserved in 3 to 7% formalin buffered with hexamethylene-tetramine.

Drawings of the entire larva were made with the aid of an ocular micrometer mounted in the eyepiece of a binocular microscope (under 90 X) from living specimens anaesthetized by means of adding several drops of 70% ethyl alcohol to the water in a watch glass. Drawings of the appendages were made after staining exuviae with Mallory's acid fuchsin red and dissecting them in 85% lactic acid. The appendages were drawn while still in the lactic acid, with the aid of a Whipple Disc (under 90 X). Thereafter, the appendages were mounted in Hoyer's medium, and details of their setation checked under the high power (500 X) of a compound microscope.

The written descriptions were composed from both the completed drawings and notes made while the specimens and dissected appendages were being observed under the microscope. In most cases, the drawings were based on observation of several specimens or appendages. Setules have been omitted from the setae of the appendages in the dorsal and lateral views of the various stages in order to more clearly show gross appearance. These setules are also more numerous and somewhat longer than the drawings indicate.