LARVAL DEVELOPMENT OF THE FRESHWATER SHRIMP, 
**Palaemonetes antennarius** (H. Milne Edwards, 1837) 
(DECAPODA, PALAEMONIDAE) REARED IN THE LABORATORY

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**ABSTRACT**

The complete larval development of the freshwater shrimp, *Palaemonetes antennarius* under laboratory conditions is described and illustrated in detail. Three larval and two postlarval stages are distinguished. Morphological characteristics are discussed and behavioural observations are reported.

**RIASSUNTO**

Esemplari di *Palaemonetes antennarius* sono stati allevati in laboratorio e ne sono stati individuati e descritti in dettaglio gli stadi larvali. Lo sviluppo larvale di questa specie prevede tre stadi di zoa e due di postlarva. Sono state analizzate le caratteristiche morfologiche e vengono descritti alcuni aspetti comportamentali.

**INTRODUCTION**

*Palaemonetes antennarius* (H. Milne Edwards, 1837) inhabits fresh and brackish waters of the Mediterranean basin. Its distribution includes Dalmatia, Greece, and certain Ionic and Aegean islands as far as Turkey, as well as both sides of the Italian peninsula. It is quite common in calm waters of some major Italian inland lakes (Trasimeno, Bolsena, Garda, and Bracciano), in the lower reaches of rivers (Po, Tiber, and Mincio) and in coastal lagoons and lakes (Lisert and Lesina). It prefers environments rich in vegetation, especially submerged macrophytes, finding refuge among their leaves (Sollaud, 1923; Nocentini, 1971; Froglia, 1978; Dalla Via, 1983).

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Under the names of *P. varians lacustris* (Von Martens, 1857) and *P. varians macrogenitor* Boas, 1889, *Palaemonetes antennarius* (H. Milne Edwards, 1837) was regarded as a subspecies of *P. varians* (Leach, 1814), which is present not only in the Mediterranean area but also in the North Sea region. Morphological comparison revealed differences between the two species and led to the recognition of *Palaemonetes antennarius* as a separate species (Sollaud, 1938).


Mayer (1881) was the first to indicate that the larva of *P. varians lacustris* transforms into a “juvenile” at the sixth moult. Sollaud (1923) subsequently wrote that this species has three zoeal stages before becoming a “parva”. According to Froglia (1978), *P. antennarius* reaches the stage of “juvenile” after five larval stages; however, among these he includes forms commonly indicated as postlarvae.

Although they make interesting observations on the behaviour of the various phases, none of the authors gives a detailed morphological description of the larval stages identified; only Sollaud (1923) describes the first stage in a little more detail and pinpoints the morphological characters of the mouthparts as those best characterizing the transition from larval to postlarval or “parva” stage. This author is also the first to note a correlation between the size of females and the number of eggs laid.

The aim of the present study is, therefore, to clarify this aspect of the reproductive biology of *P. antennarius*, providing a morphological description of the larval stages of specimens reared in the laboratory and reporting certain interesting behavioural aspects observed during rearing.

**MATERIALS AND METHODS**

Twenty ovigerous females of *Palaemonetes antennarius* were captured with a 5 mm mesh sieve in the epiphytic zone of an eutrophic basin with shallow, slow-flowing waters (Montepulciano lake, central Italy) at the end of May 1998. The